# AN INITIAL ASSESSMENT OF THE IMPACT OF THE COVID-19 PANDEMIC ON GLOBAL ALUMINIUM DEMAND

18 MAY 2020

A REPORT PREPARED BY **CM GROUP**

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*This report has been prepared by the CM Group for the International Aluminium Institute (IAI) as an addendum to its previous January 2020 report. It takes into consideration the impact of the COVID-19 pandemic on its long-term global aluminium demand outlook to 2050 by mid-May 2020, concentrating on the two key market sectors of transport and construction.*

## 1 EXECUTIVE SUMMARY

The impact of the COVID-19 (C19) pandemic on global economic activity will be profound; a deep and potentially extended recession appears inevitable. Global aluminium demand has been hit already, with the automotive and aerospace sectors in particular feeling the full force of the downturn.

High-level responses from CM's C19 base case survey, updated to end-Q1 2020, suggest global aluminium demand will contract by 5.4% in 2020, followed by a prolonged period of slow and staggered recovery, resulting in a lag of five to seven years on the pre-C19 demand forecast over the period to 2050. The rapid and overwhelming nature of the demand shock caused by COVID-19 is most likely to be followed by a slow and staged 'staircase' shaped recovery, where global aluminium demand recovers on a staggered, sector-by-sector, region-by-region basis.

Indeed, macro-economic forecasts, combined with survey responses, suggest market sectors such as global automotive may undergo significant change, resulting in a period of accelerated transformation and the potential for a fundamental shift in raw materials demand. Furthermore, macro-commentators and survey respondents have drawn attention to the deterioration in global trade relationships and the re-emergence of trade-conflict, which could add to a lengthy and extended economic recovery, as well as a stronger push toward resource nationalism.

The updated survey base case also indicates the impact on China's aluminium demand outlook is likely to be severe over the short-term, although a strong recovery in demand growth through 2021 is forecast, followed by and a return to pre-COVID-19 growth rates beyond 2022. Survey respondents expect the Chinese government to introduce a range of additional stimulus measures later this year to keep its economy growing at a prescribed rate. The severe impact of the downturn on China's international markets will, inevitably, impede China's growth over a prolonged period, which our analysis suggests will contribute to a delay of five to eight years in China reaching the pre-C19 2050 demand forecast.

Rest-Of-World (ROW) markets will experience a contraction in demand growth across all regions, with previously strong demand forecasts for South-East Asian countries replaced by significantly lower short-term figures, albeit some still positive, and with a similar compounding impact as with China over the longer-term. The collective impact of the C19 downturn on ROW aluminium demand is forecast to delay our pre-C19 2050 forecast by four to six years, although this figure varies markedly within and between regions.

FIGURE 1.1

**Comparative Global CAGRs, Original Base Case vs COVID-19 Case, 2020 to 2022, 3 yr and 30 yr Outlooks (%)**

Source: CM Group

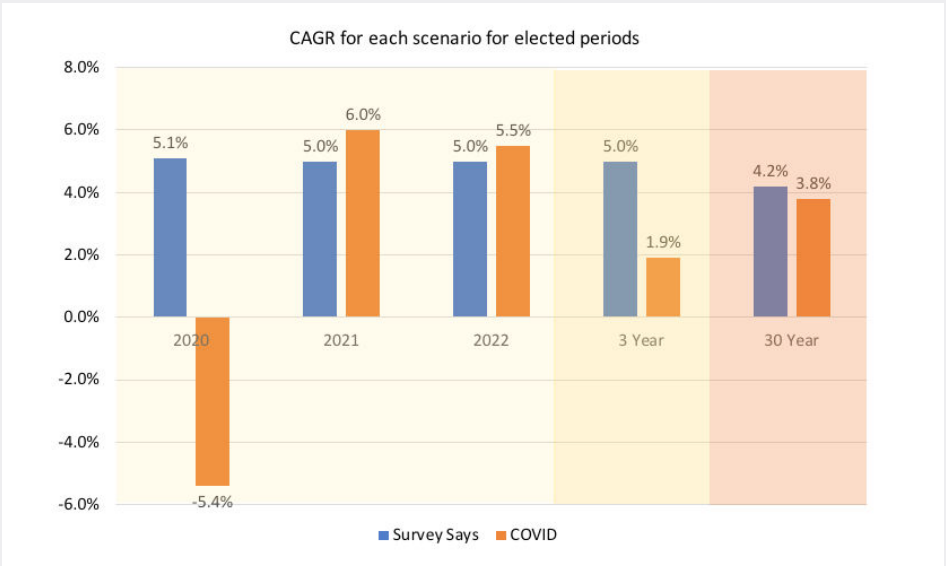


**TABLE 1.1-1**
Forecast Average CAGR in the Three-year period 2020-2022 under the COVID scenario (%) and change from original forecast (%)

Source: CM Group

| | Building and Construction | Transportation - Auto & Lt Truck | Transportation - Aerospace | Transportation – Non Auto or Aero |
|---|---|---|---|---|
| Africa | 4.1% (2.8%) | 3.5% (2.4%) | 0.9% (1%) | 2.2% (1.7%) |
| China | 5.6% (0.4%) | 1.7% (4.3%) | 2.2% (2.8%) | -3.8% (14.3%) |
| Europe | -19.2% (18.8%) | -5.3% (10.4%) | -7.7% (9.3%) | 1.1% (5.5%) |
| Japan | -2.1% (1.9%) | -3.9% (5.5%) | -0.6% (8.7%) | -0.6% (6.2%) |
| Latin/South America | 0.2% (0.7%) | 0.2% (0.3%) | 0.2% (1.4%) | 0.2% (1.9%) |
| North America | -5.4% (8.5%) | -5.4% (9.5%) | 0.6% (6%) | 0.6% (2%) |
| Middle East | 0.9% (1.4%) | 0.9% (1.4%) | 0.9% (1.4%) | 0.9% (1.4%) |
| India | 6.7% (4.9%) | 2.4% (5.9%) | 10.4% (1.9%) | 5.4% (1.9%) |
| Indonesia | 1.5% (3.3%) | 2.3% (1.5%) | 3.3% (5.5%) | 3.3% (1.5%) |
| Other Asia | 4.6% (0.1%) | 1.3% (2.5%) | 4.3% (0.5%) | 4.3% (0.5%) |
| Other | 2.9% (1.4%) | 0.0% (2.0%) | 0.0% (-) | 0.0% (-) |

**TABLE 1.1-2**
Forecast Average CAGR in the Three-year period 2020-2022 under the COVID scenario (%) and change from original forecast (%)

Source: CM Group

| | Packaging - Cans | Packaging - Other | Machinery & Equipment | Electrical - Cable |
|---|---|---|---|---|
| Africa | 3.1% (2.3%) | 2.2% (1.7%) | 2.5% (1.9%) | 4.1% (2.8%) |
| China | 10.1% (1.7%) | 7.1% (0.1%) | 3.2% (1.8%) | 5.3% (1.1%) |
| Europe | 2.9% (3.3%) | 0.1% (1.5%) | 1.4% (5.2%) | 1.1% (2.2%) |
| Japan | -0.2% (1%) | -0.6% (1.2%) | -0.3% (0.9%) | -0.6% (2.7%) |
| Latin/South America | 0.2% (5.1%) | 0.2% (3.1%) | 0.2% (1.9%) | 0.2% (2.8%) |
| North America | 1.6% (1.3%) | 0.6% (1%) | 0.6% (1%) | 0.6% (2%) |
| Middle East | 0.9% (3.4%) | 0.9% (3.4%) | 0.9% (1.4%) | 0.9% (3.4%) |
| India | 8.3% (2%) | 5.4% (1.9%) | 5.4% (1.9%) | 8.6% (0.2%) |
| Indonesia | 0.3% (1.5%) | 0.3% (1.5%) | 3.3% (1.5%) | 2.9% (1.5%) |
| Other Asia | 2.3% (0.5%) | 2.3% (0.5%) | 3.3% (0.5%) | 5.0% (1.3%) |
| Other | 0.0% (-) | 0.0% (-) | 0.0% (-) | 0.0% (10.0%) |

**TABLE 1.1-3**
Forecast Average CAGR in the Three-year period 2020-2022 under the COVID scenario (%) and change from original forecast (%)

Source: CM Group

| | Electrical - Other | Consumer Durables | Other (ex Destructive Uses) | Destructive Uses |
|---|---|---|---|---|
| Africa | 2.2% (1.7%) | 2.8% (2.1%) | 2.2% (1.7%) | 0% (-) |
| China | 5.3% (0.3%) | 1.6% (5.4%) | 3.9% (1.1%) | 5% (-) |
| Europe | 0.1% (1.5%) | 0.4% (0.4%) | 0.1% (1.5%) | 0.1% (1.5%) |
| Japan | -0.6% (1.2%) | -0.3% (0.4%) | -0.6% (1.2%) | -0.6% (1.2%) |
| Latin/South America | 0.2% (2.1%) | 0.2% (2.7%) | 0.2% (7.1%) | 0.2% (7.1%) |
| North America | 0.6% (1%) | 0.6% (1%) | 0.6% (1%) | 0.6% (1%) |
| Middle East | 0.9% (1.4%) | 0.9% (3.7%) | 0.9% (0.9%) | 0.9% (1.4%) |
| India | 5.4% (1.9%) | 11% (4.6%) | 5.4% (1.9%) | 5.4% (1.9%) |
| Indonesia | 3.3% (1.5%) | 16.3% (1.5%) | 3.3% (1.5%) | 3.3% (1.5%) |
| Other Asia | 4.3% (0.5%) | 8.1% (9.7%) | 4.3% (0.5%) | 4.3% (0.5%) |
| Other | 0.0% (-) | 0.0% (-) | 0.0% (-) | 0.0% (-) |

The analysis indicates a significant difference in the impact of COVID-19 across major global aluminium market sectors.

- The global automotive sector has experienced almost a total production shutdown, likely to run beyond eight weeks, representing a reduction in supply of at least 20%. A global recovery on the demand side is likely to take many years.
- Canstock producers in the in US and EU continue to report strong production and, in some cases, positive growth, almost in spite of the pandemic. Foil producers, on the other hand, report deteriorating conditions and strong growth headwinds.
- Extruders servicing the wider construction market and smaller markets such as heat exchangers report increasingly challenging markets conditions and expect a contraction in demand at least over the short-term.
- The aerospace sector reports a significant reduction in build rates and a prolonged downturn in global demand likely to last years.

Not all respondents see the C19 demand shock as purely negative to the industry; some experts see the challenging market conditions as an opportunity for the industry to reposition. For example

- Elimination of inefficient and outdated capacity,
- Elimination of capacity unlikely to meet increasingly tight environmental standards
- Acceleration of development projects aimed at better positioning the industry for a carbon-constrained future, and
- Identifying and capturing growth opportunities in less-traditional markets where competitor materials have been exposed by C19 and where aluminium has the potential to compete.

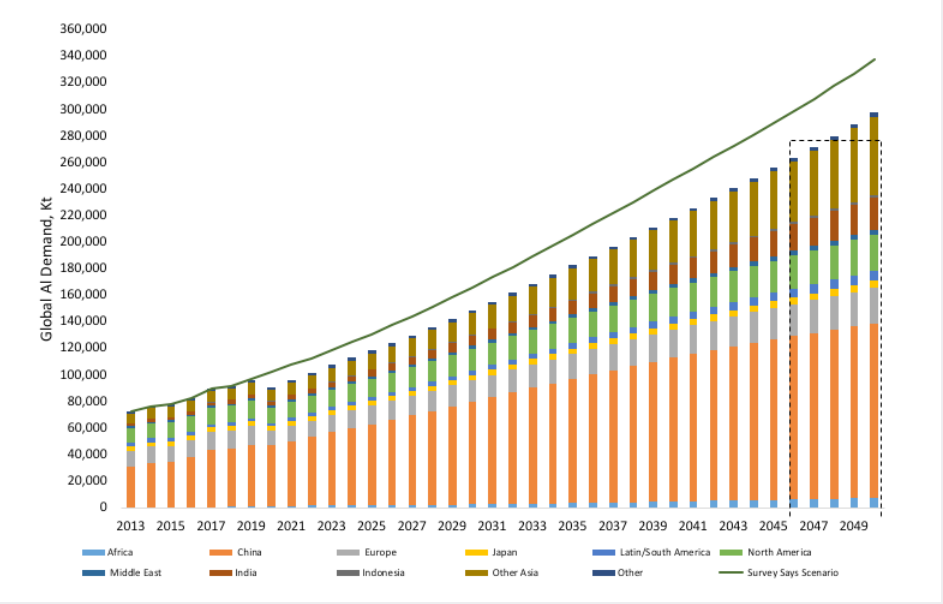
Outlook

Our updated C19 outlook sees global aluminium demand in 2050 reaching 298 million tonnes per year (mtpy), down from 337 mtpy previously, representing a CAGR of 3.8% compared with 4.2% pre-C19.

FIGURE 1.2

**Forecast Global Aluminium Demand to 2050 (COVID-19 Update) by Major Region (ktpa) Adjusted for 2018 actuals (Updated from the previous report)**

Source: CM Group

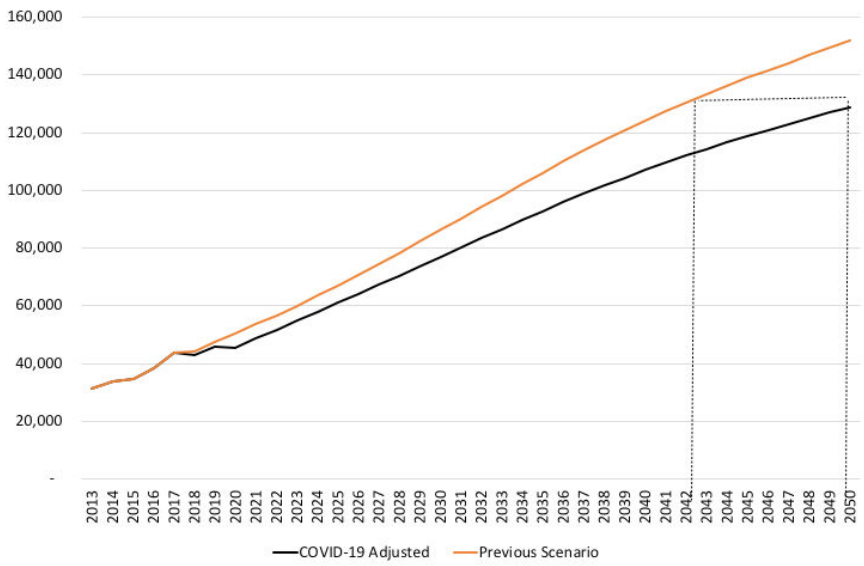


The updated C19 outlook for China sees aluminium demand in 2050 reaching 131 mtpy, down from 152 mtpy previously, representing a CAGR of 3.6% compared with 4.0% pre-C19.

FIGURE 1.3

China Total Aluminium Consumption and Demand Outlook Comparison – COVID-19 Impacted Scenario - vs 'Survey Says' Scenario, 2013 to 2050 (ktpa)

Source: CM Group

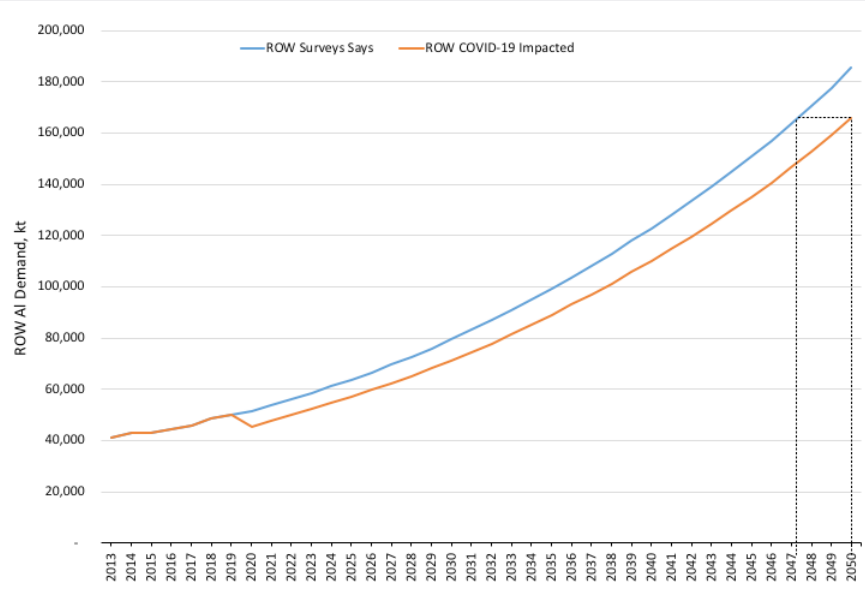



The updated C19 ROW outlook sees aluminium demand in 2050 reaching 166 mtpy, down from 185 mtpy previously, representing a CAGR of 4.1% compared with 4.5% pre-C19.

FIGURE 1.4

ROW Total Aluminium Consumption and Demand Outlook Comparison – COVID-19 Impacted Scenario - vs 'Survey Says' Scenario, 2013 to 2050* (ktpa)

Source: CM Group



## 2 INTRODUCTION

In preparing this addendum report, CM has called upon macro-economic data and analysis compiled from a wide range of sources including, but not limited to the following

- OECD
- IMF
- WTO
- World Bank
- Morgan Stanley
- McKinsey
- UBS
- Macquarie Group
- Goldman Sachs
- FT

In collecting specific aluminium industry-related data and expert opinion, CM has called on its own global aluminium industry network to canvass a wide range of sector and regional views, using a similar approach to that used on the original report. This includes a wide-ranging survey across all major aluminium market sectors and geographic regions.

## 3 CHINA

The impact of the C19 pandemic on China's aluminium demand will be substantial in CY2020. This is despite a surprisingly strong rebound in economic activity in China's domestic market observed during the months following the relaxation of social and economic controls. It is likely that China's export markets have yet to feel the full impact of C19, which could see its economy come under renewed pressure later in CY2020.

Based on a review of the most recent macro-economic data from China, as well as our own survey across China's aluminium industries, we have reviewed China's CY2020 headline demand down from the previous 7.0% to -1.0%, a turnaround of -8%.

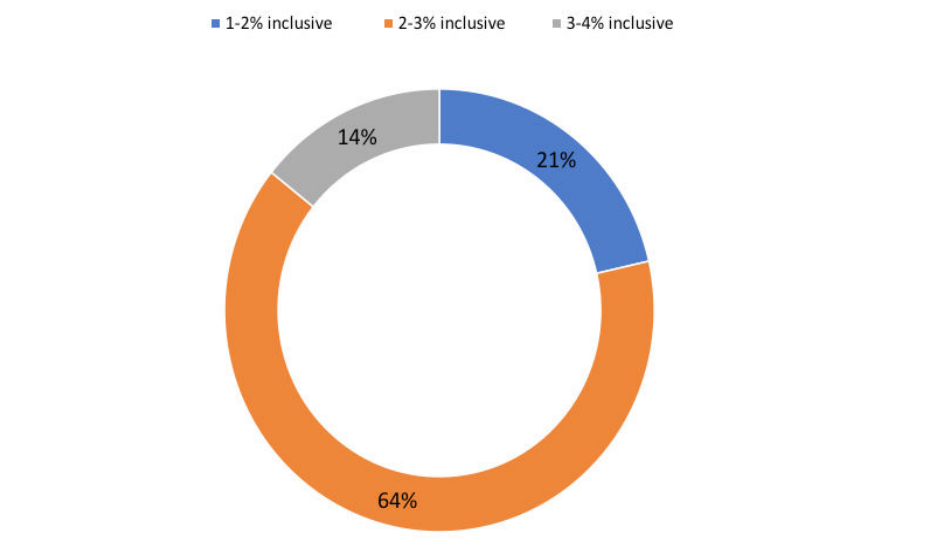
The International Monetary Fund (IMF)'s latest forecast has China's GDP growth revised down to 1.2% in 2020 from 6.1% in 2019, followed by a conspicuously strong growth of 9.2% in 2021.

CM's calling survey indicated that the majority of interviewees estimate China's 2020 GDP growth at between 2% to 3%, with some as positive as 4%. For 2021, our desktop research revealed most industry forecasts for China are markedly stronger, in the range 7% to 9%.

FIGURE 3.1

2020 GDP Growth Rate Forecast by Interviewees

Source: CM Group




During the assessment of the COVID-19 impact on China's AI demand, we have made the following observations from our discussion with the industry participants.

- China's auto industry has been hit hard, with both supply chain disruptions and demand shocks, first due to the strict lockdown within China and then in China's international markets
  - The immediate impact is significant, with most interviewees suffering from sharply reduced orders. The general expectation of interviewees is for demand to gradually recovered in the next half of 2020.
  - Most interviewees expect only moderate policy stimulus for the auto industry. In particular, favourable policies for new-energy vehicles are expected to roll out with restraint. Policy is viewed only as a short-term remedy instead of longer-term growth drive.
  - A notable exception is that some manufacturers of cheaper cars, e.g. Geely, seem to receive more orders and are at full swing to meet relatively stronger sales demand.

- The great dependency of manufacturing parts on global network has added further complexity to the situation. With the uncertainty involving the COVID-19 situation outside China, many are faced with shortages of auto parts sourced from countries most affected, such as Italy and Germany.

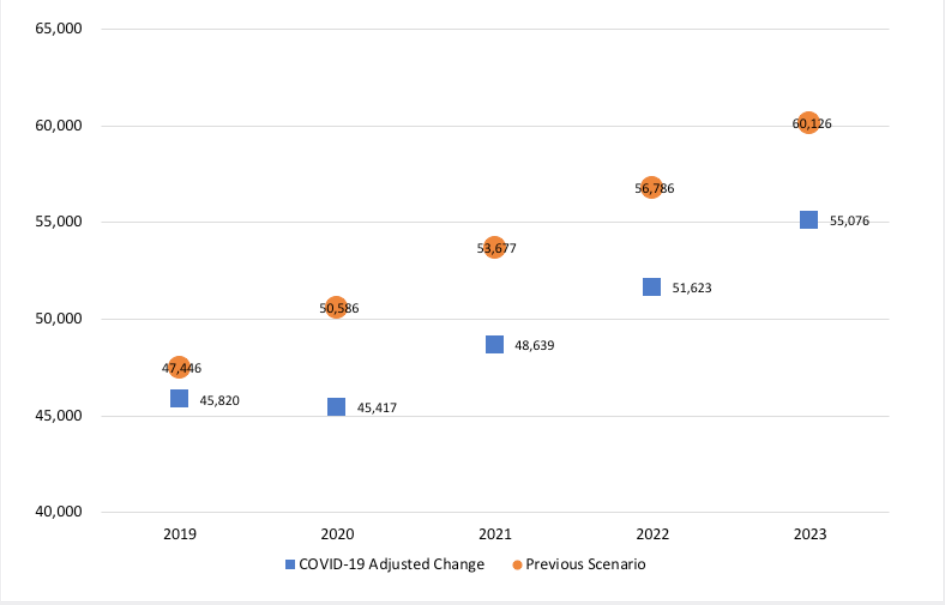
- For China's building and construction sector, the impact is mainly on the demand side, with gradual resumption of construction activities as China has the COVID-19 largely under control. We estimate it to track closely the country's GDP growth in the following few years.
  - While recognizing that 2020 will be a year of hardship and expecting severe impact from COVID-19, the majority of survey participants hold an outlook of either moderately positive or vigorously positive.
  - The interviewees take more confidence from the prospect of government stimulus packages in favour of the industry's growth. Policies are not expected to be aggressive either, but enhanced efforts to accelerate construction activities and favourable policies to boost demand (especially demand of residential purposes instead of investment purpose) would potentially aim to keep the sector maintain on the growing track and consequently drive GDP growth.

Overall, we forecast China's AI demand to experience a y-o-y decrease of around 1% in 2020 before bouncing back to a growth rate of over 7% in 2021. Notably, the AI consumption in auto and light truck industry is likely to fall by 9% y-o-y as a result of industry cyclical weakness compounded by COVID-19. AI demand from its building and construction sector is forecast to closely track GDP growth, at a positive rate of 2.5% in 2020.

FIGURE 3.2

China Total Aluminium Consumption Comparison – COVID-19 Impacted Scenario vs Survey Say Scenario, 2019~2023, Kt

Source: CM Group

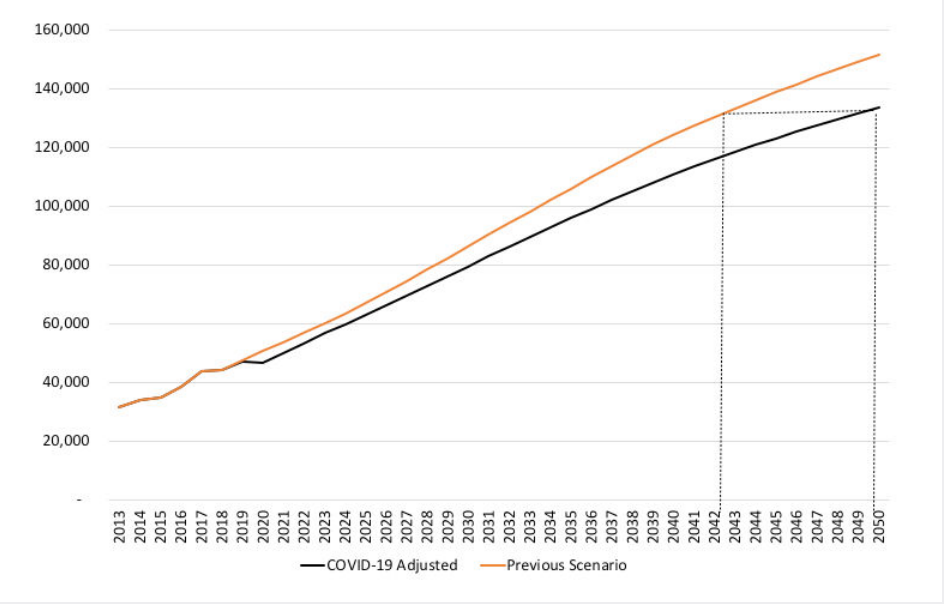



With the impact built into our previous "Survey Say" scenario analysis, China's total aluminium consumption is forecast to reach 131Mt by 2050, a level to be reached around 2042 in the Survey Says scenario, delaying aluminium demand growth 8 years.

FIGURE 3.3

China Total Aluminium Consumption Comparison – COVID-19 Impacted Scenario vs Survey Says Scenario, 2013~2050, Kt

Source: CM Group



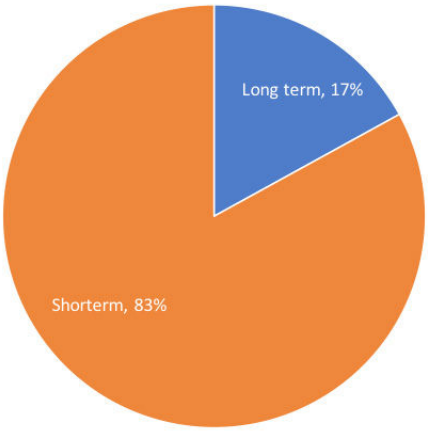

## *3.1 Auto Industry*

### 3.1.1 Market Sentiment Overview

Industry views gathered from calling survey, desktop research and government release of official data are the main approach to this project, with 30 calls made to interviewers including smelters, automobile insiders, real estate insiders, government officers, aluminium products producers etc.

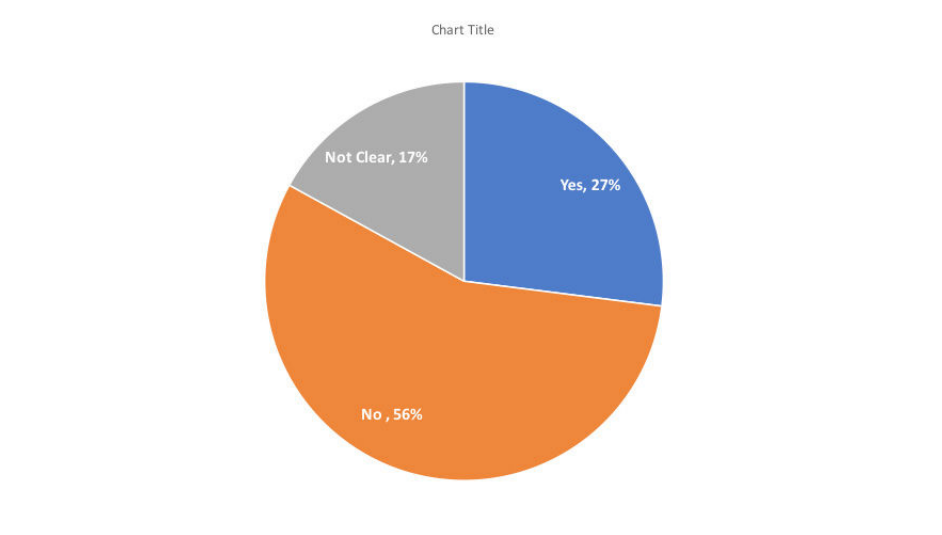
6 key questions as below have been asked:

*1. Will the impact of COVID-19 be short-term or long-term for AI demand growth?*



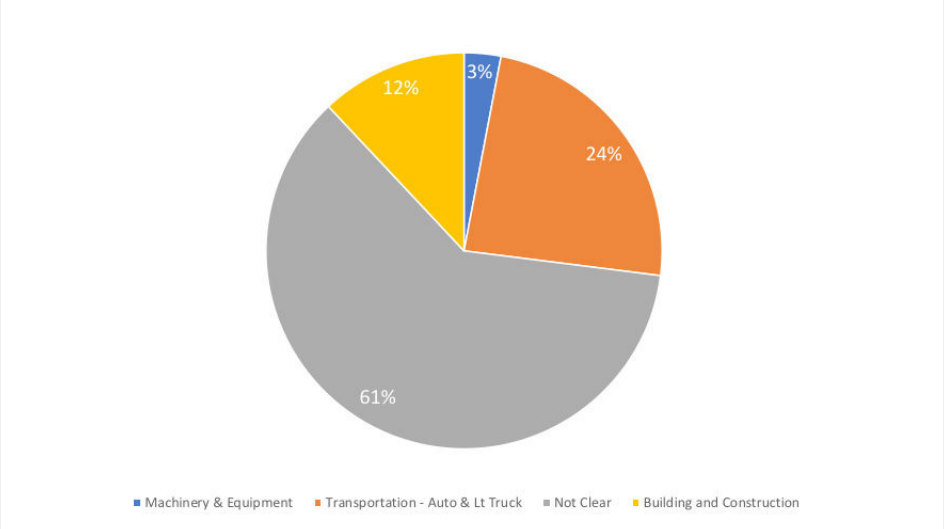

83% of the interviewees think the pandemic is more likely to have a short-term impact on aluminium consumption. Most believe China's economy growth will slow down in 2020 but likely to rebound in 2021 strongly. However, those relying more heavily on international markets are likely to have prolonged recovery periods.

*2. Do you think COVID-19 will have the potential to cause fundamental changes to the current patterns of production and consumption of aluminium?*



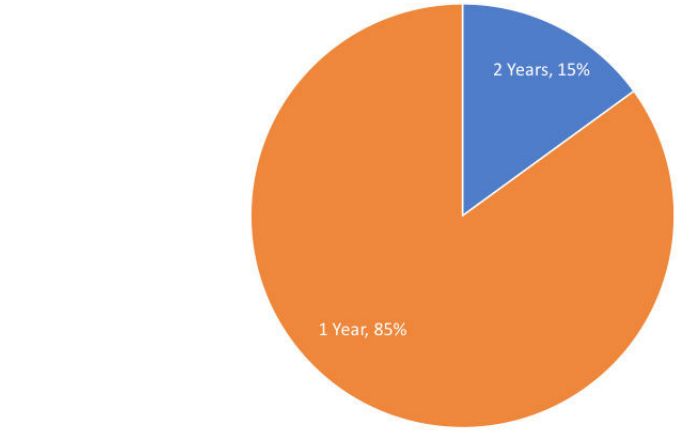

More than half (56%) of the interviewees do not think the pandemic to cause fundamental changes to  Al supply and consumption. Notably, the general view is the crisis presents opportunities for low-cost and well-performing players to stand out and acquire more market shares as those with high costs, outdated technology and lacking financial strength are forced to exit the market.

*3. Which major aluminium market sectors do you believe are most exposed and why?*



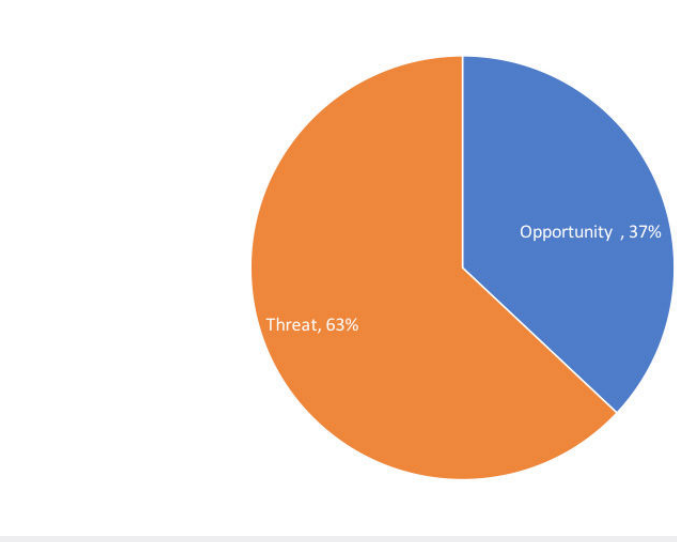

More interviewees believe the impact to be bigger on China's auto industry than its building and construction sector.

*4. What is your view about the likely timeframe of a recovery and how might this impact demand growth?*




85% of the interviewees deem the impact to be short-term and expect consumption to rebound in one year. Nearly all of them expect demand for aluminium to drop or, at best, remain flat in 2020.

*5. Swift, major disruptive changes can bring threats and opportunities to industries. Do you see the current situation as potentially positive or negative to long-term demand growth, and why?*




37% of the interviewees think this will also bring some long-term development opportunities to grow AI consumption, including the increase of aluminium furniture and potential use of aluminium cable in UHV (Ultra-high voltage) construction.

### 3.1.2 AI Demand in China's Auto Sector

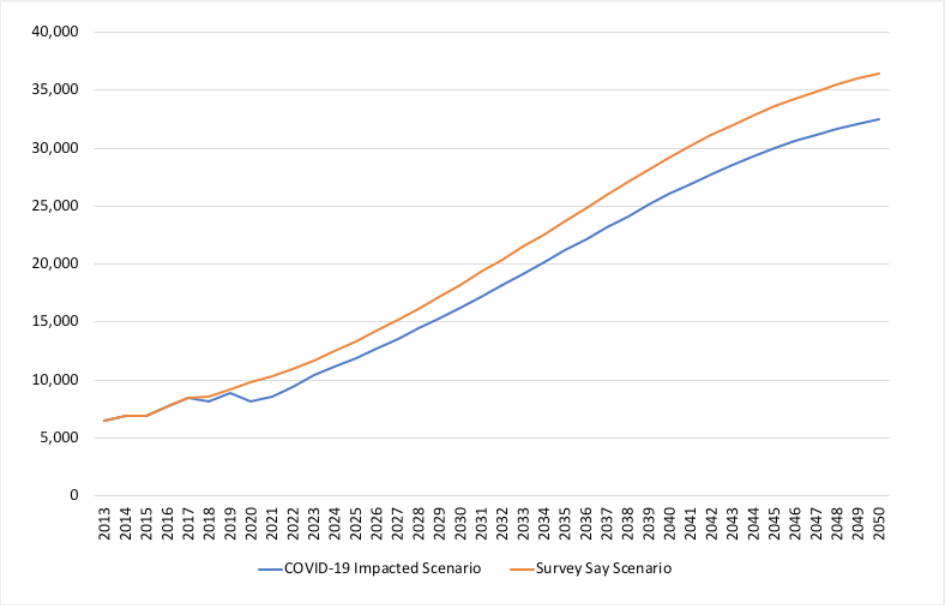
China's auto industry has been hit hard, first by China's previous isolation and lockdown, and now by the disruption of supply chain from outside China. Although China has gradually return to normal daily life and manufacturing, the auto industry continues to bear a relatively bigger impact, relative to other industries in China, of the ROW coronavirus-related disruptions due to its higher degree of global interdependency across the manufacturing supply chain.

We forecast China's auto production to suffer a decrease of around 15% y-o-y in 2020, resulting in around 9% decrease in its aluminium consumption.

FIGURE 3.4

COVID-19 Impacted Scenario and Survey Say Scenario Comparison for China's Auto Sector, kt

Source: CM Group



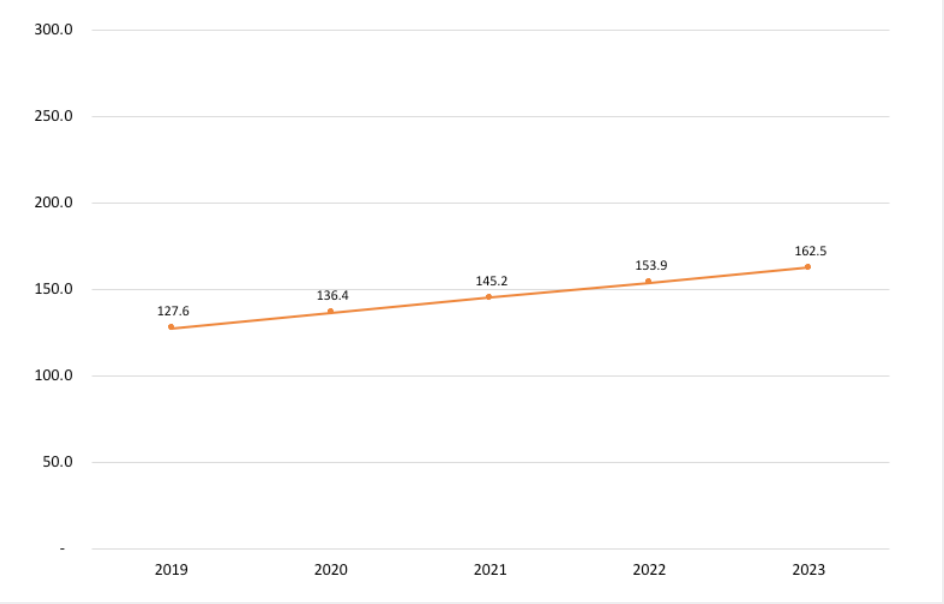

Passenger Vehicle

In our previous analysis on China's aluminium consumption in automobile industry, China's average aluminium usage per passenger vehicle is approximately 128kgpv in 2019. With the continuous trend of light weighting, we forecast this number to continuously grow in the next 10 years with an average CAGR approximately 5.7%. After talking to industry participants, we think China's automobile industry is undergoing a period of reshuffle aimed at qualitative growth rather than quantity growth. Thus, more home-brand high-quality automobiles are likely to be produced in China in the future. Therefore, we maintain that the automobile manufacturers will enhance the use of aluminium for light weighting.

FIGURE 3.5

Unit Al Consumption of Passenger Vehicle in China, kgpv, 2019~2023

Source: CM Group

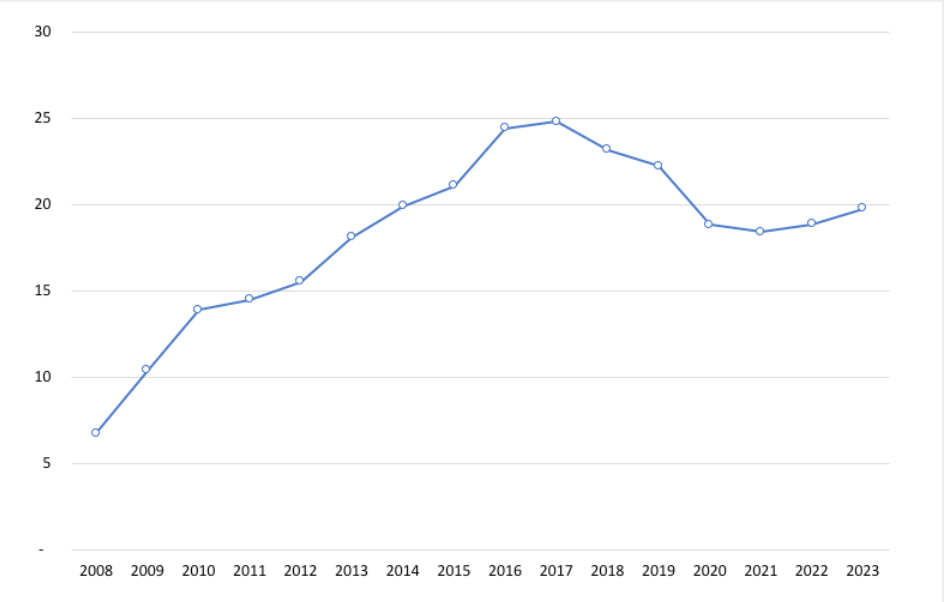



After the GFC in 2008, China's automobile industry witnessed rapid growth over the proceeding decade, with total passenger vehicle production CAGR of 16%. However, the industry has fallen since 2018 as a result of slowing economic growth in China. This, coupled with the C19 impact, leads to forecasts of further negative growth of production over the next two to three years.

FIGURE 3.6

China Passenger Vehicle Production 2008~2023 (f), million units

Source: CM Group



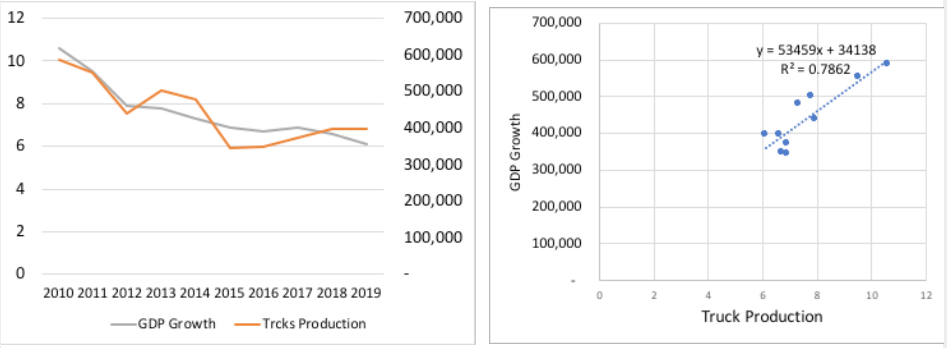

## Commercial Vehicles

With the fast development of public transportation including subway and high-speed railway, China's production of trucks experienced a consecutive-three-year decline from 2017. Based on historical data, China's truck production is highly in line with GDP production (R2>0.75), and is estimated to track GDP growth in the following years.

FIGURE 3.7

China GDP Growth and Trucks Production 2010~2019

Source: CM Group

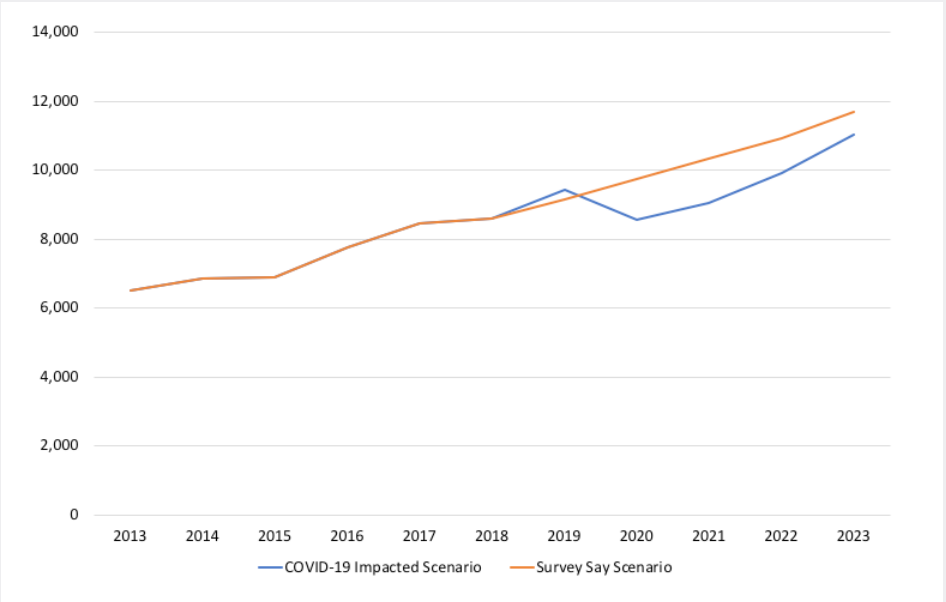



We estimate China's aluminium demand in the auto and truck sector to fall 9% in 2020 before starting to pick up again in 2021.

FIGURE 3.8

China Aluminium Consumption in Auto and Truck Sector, Kt, 2013~2023

Source: CM Group




## *3.2 Non-Auto and Aerospace*

China's high-speed train fleet witnessed robust increase in the past 9 years and have risen from 6.6 thousand km in 2011 to 32 thousand km in 2019, at CAGR 22%. According to China's "five-year plan", the growth will continue in the next five years, but the growth rate will slow down, with an average CAGR 5% during 2020 to 2025.

Intercity rails have also increased rapidly since 2011 at CAGR 19% to 6,730km in 2019. In the next five years, we estimate the CAGR to be 7%.

According to our research, each high-speed train uses around 160 tonnes aluminium and each subway uses around 60 tonnes.

FIGURE 3.9

China High-speed and Intercity Railway Development, km, 2011~2025

Source: CM Group

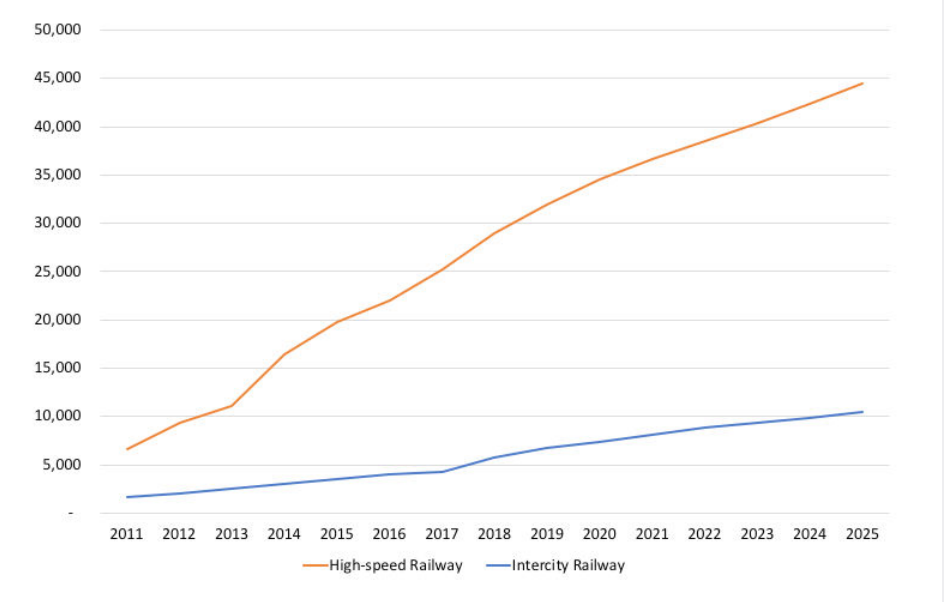
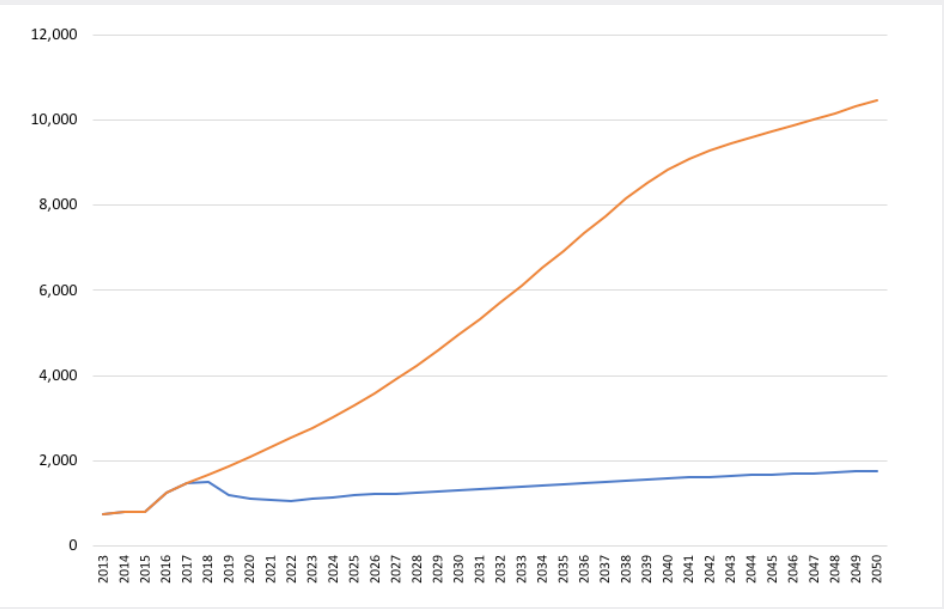



FIGURE 3.10

China Aluminium Consumption in Non Auto & Aerospace Sector, kt, 2013~2050

Source: CM Group




## *3.3 Building and Construction*

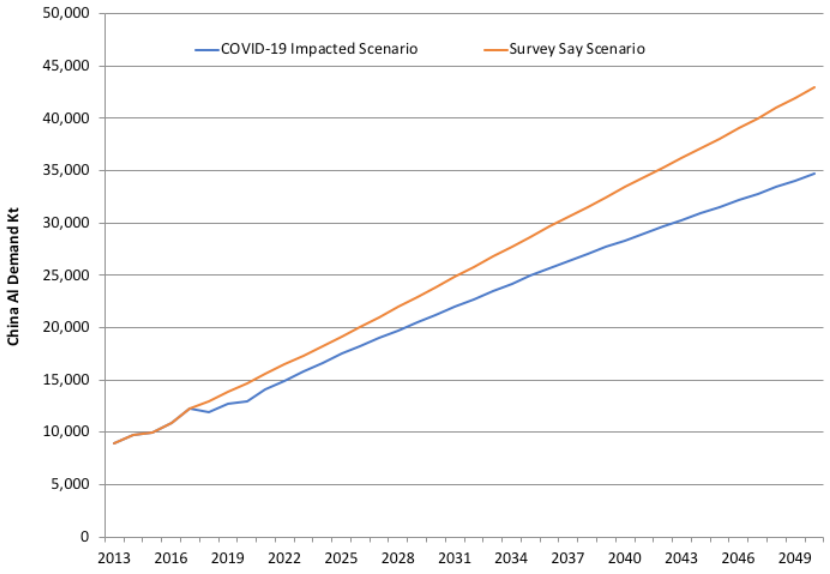
China's building and construction sector, especially residential buildings, is also likely to see a significant slowdown in the short term, although to a lesser extent and with a more rapid recovery than the auto industry. Given the existing and potential policy stimulus, the building and construction sector is estimated to be on a more promising recovery path, with the majority of survey participants holding an outlook of either moderately positive or vigorously positive.

We therefore forecast total aluminium demand in China's building and construction sector to experience a smaller but still positive growth rate compared with previous years, at around 2.5%, and bounce back to stronger growth rates.

FIGURE 3.11

COVID-19 Impacted Scenario and Survey Say Scenario Comparison for the Building and Construction Sector, kt

Source: CM Group




### 3.3.1 Market Sentiment Overview

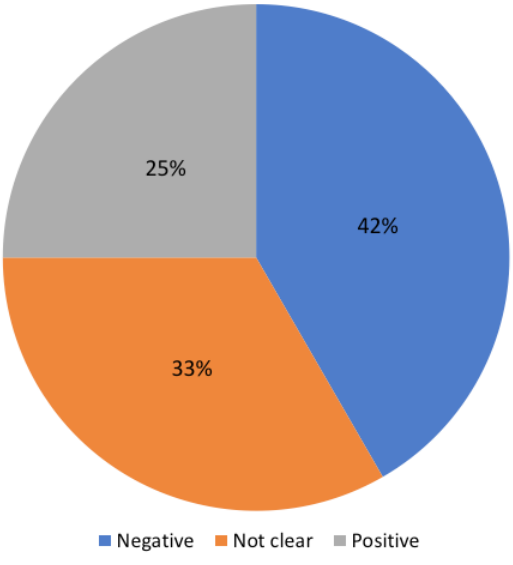
CM's recent C19 survey included real estate companies, property investment groups, aluminium smelters, aluminium downstream producers, stock traders and futures traders.

Only 25% of interviewees were optimistic about aluminium demand in China's building and construction sector during 2020, with 42% holding a bearish view.

FIGURE 3.12

China's Building and Construction Sector - 2020 Al Demand Outlook by Interviewees

Source: CM Group



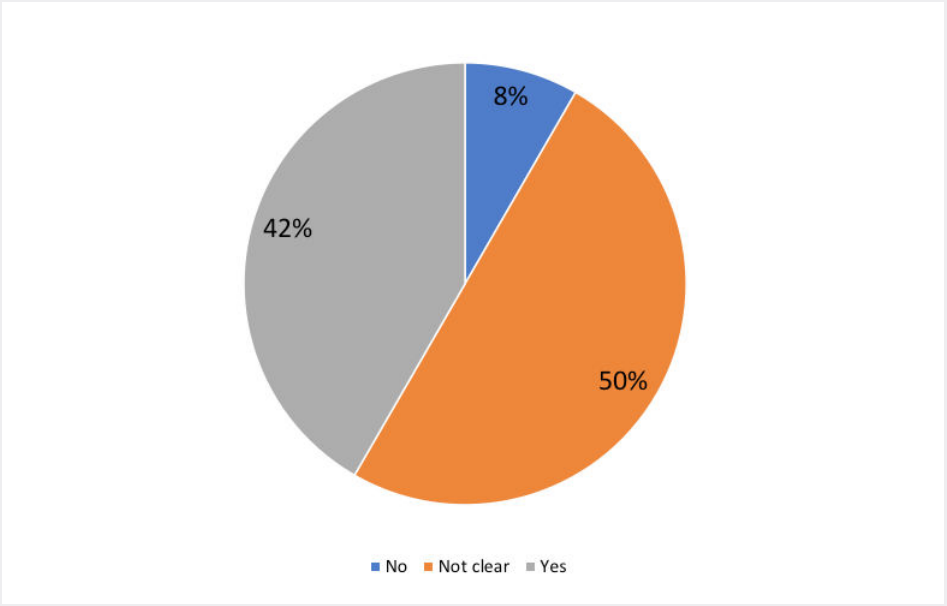

A surprising proportion of 42% of interviewees believe there will be new opportunities for aluminium demand growth in building and construction despite COVID-19.

Amid this crisis, it was also considered an opportunity for industry restructuring – small players will be forced to exit; large and outperforming players will be in a good position to take more market shares, resulting in a trend of industry resource concentration.

FIGURE 3.13

New Opportunities for AI Demand Amid Crisis

Source: CM Group

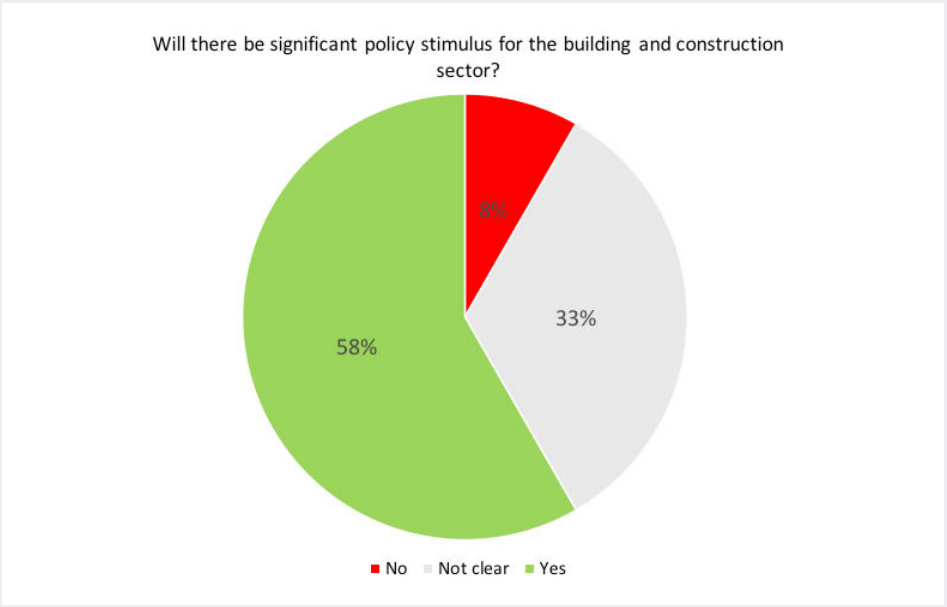



The industry's overall expectation is that the government will step up existing efforts and improve existing measures promoting the building and construction sector, as well as roll out new stimulus measures to support its growth.

FIGURE 3.14

Interviewees' Take on the Positive Impact of Government Policy on the Building and Construction Sector

Source: CM Group




Major policies include

1. Urbanization: The National Development and Reform Commission (NDRC) issued the "Key Tasks for New Urbanization Construction and Urban-Rural Integration Development in 2020" on April 9, 2020. The document urges cities with a permanent population of less than 3 million to completely remove restrictions on permeant residency for all migrants and cities with more than 3 million urban residents to basically remove restrictions on major migration groups.

2. New Infrastructure: A total of 25 provinces, autonomous regions and municipalities have announced their future investment plan, with total investment of 22,000 projects reached 49.6 trillion yuan, including 7.6 trillion yuan spending in 2020. "New infrastructure" mainly includes seven major areas: 5G infrastructure, UHV, intercity high-speed railway and urban rail transit, new energy vehicle charging piles, big data centers, artificial intelligence, and industrial Internet.

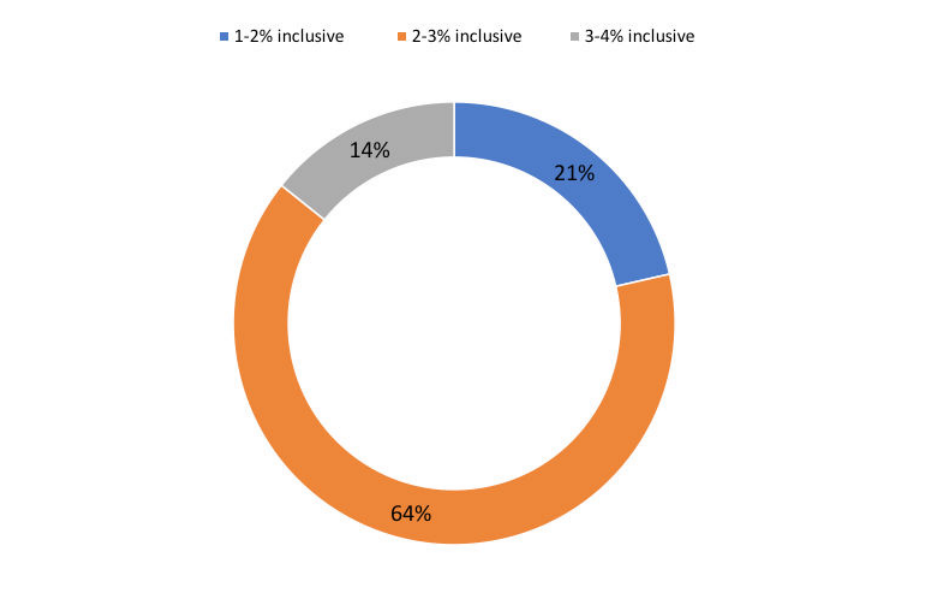
3. Yangtze River Delta Group and Greater Bay Area: 1) State Council's plan to build a world-class city cluster of global importance by 2030. 2) State Council's "Outline for the Development of the Guangdong-Hong Kong-Macao Greater Bay Area" (2019), the world's fourth largest bay area - one of the areas with the highest degree and strongest economic vitality.

### 3.3.2 GDP Growth and the Building and Construction Sector

The majority of GDP growth forecasts for 2020 after the COVID-19 impact are in the range of 2-3%. Based on these feedbacks as well as survey results on markets sentiments for key sectors such as building and construction, auto industry and packaging industry, we forecast China's GDP growth for 2020 at 2.5%.

FIGURE 3.15
GDP Growth Rates Forecast by Interviewees

Source: CM Group

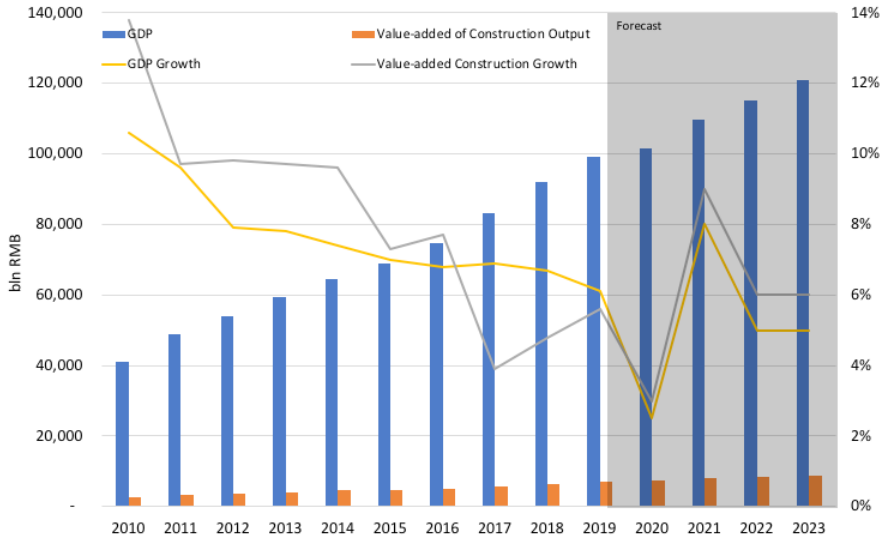



The close correlation of GDP growth and the growth of China's building and construction sector is evident based on historical data as well as survey responses throughout our survey process.

FIGURE 3.16

Close Correlation of GDP Growth and the Growth of the Building and Construction Sector

Source: CM Group



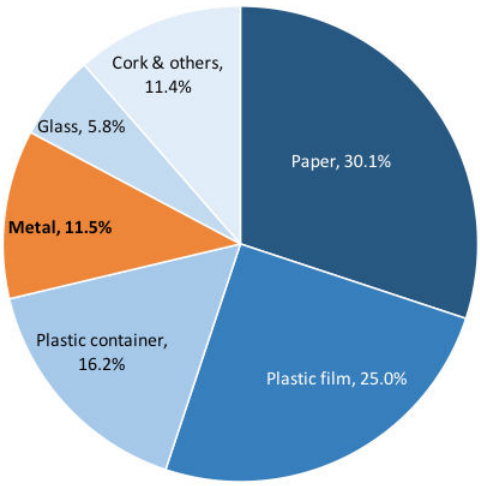

## *3.4 Packaging*

China's packaging industry has been enjoying fast development in recent years, with traditional packaging material such as paper and plastic accounting for more than 70% of the total market share, while metal packaging for only 11.5%. The survey reveals that Nanshan Group, a major supplier for aluminium packaging material in China, believes that there is great potential for aluminium demand to grow significantly from this low base.

FIGURE 3.17

Industry Output Value of China's Packaging Market

Source: CM Group



## 4 ROW MARKETS

This section provides a summary of the major impacts of COVID-19 across ROW markets (excluding China), concentrating on the key sectors of construction and automotive. For succinctness, we have kept the summary to the major regional changes impacting each market sector, rather than discussing each region and each market individually.

Moving through Q2 2020 global economic forecasts continue to vary significantly, although most commentators are in agreement about a deep global recession, significantly worse than any previous downturn witnessed since the Great Depression. The EU/UK and North America are likely to be hit hardest.

The IMF forecasts

- World GDP to fall 3% in 2020
- A rebound of 5.8% in 2021
- Advanced economies' GDP to drop 6.1%, emerging market and developing economies to drop 1% in 2020
- A rebound to 2019 GDP growth forecasts by Q4 2021

These forecasts are based on the global economy avoiding a 'second wave' of infections. Significantly worse outcomes / scenarios are possible if a second wave cannot be avoided.

The speed of economic decline has been record-breaking; US markets fell 37% in 22 days and US unemployment has risen to over 35 million. Previous recessions have seen unemployment in the US at significantly lower levels on a per capital basis.

Japan has fared better in terms of controlling the virus and, as a result, the economic impact has been less than in the EU/UK and NA.

Heading through Q2 2020, the US had yet to peak in terms of maximum daily C19 cases, suggesting Q2 2020 economic data will reveal a further deterioration in its economy.

FIGURE 4.1

**Economists' Forecasts for GDP 2020 (% change)**

Source: The Economist

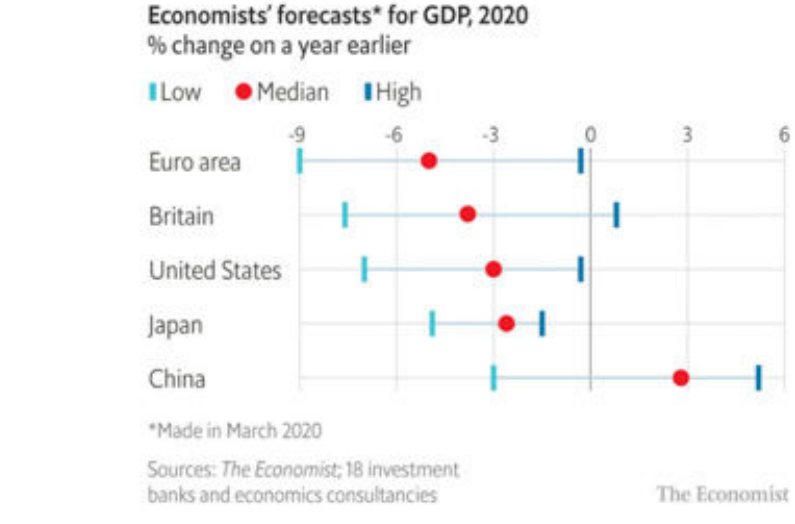
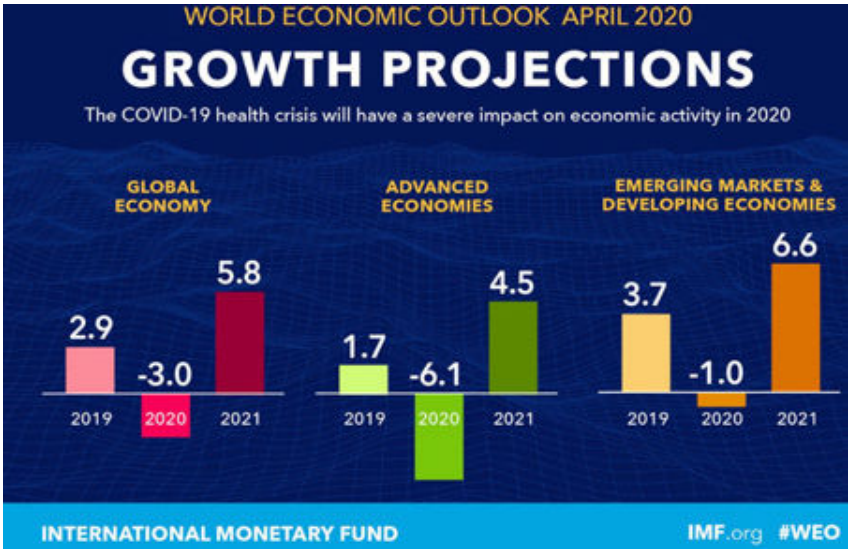


FIGURE 4.2

GDP Growth Projections to 2021 by Major Markets (% change)

Source: IMF




In preparing its analysis, CM has considered changes to GDP forecasts made by the IMF and adopted these as a baseline position. We have then adjusted these forecasts by region and by sector over the period 2020 to 2023 where we have sufficient evidence from our industry discussions to make an adjustment.

Using this methodology, our analysis concludes that ROW markets are set for a period of approximately three to four years before pre-C19 consumption levels are once again achieved. This is illustrated in Figure 4.3, which shows an approximate 12% fall in 2020 forecast demand between pre-C19 and the current C19 forecast.

FIGURE 4.3

ROW Total Aluminium Consumption Comparison – COVID-19 Impacted Scenario vs Survey Say Scenario, 2019~2023, Kt

Source: IMF

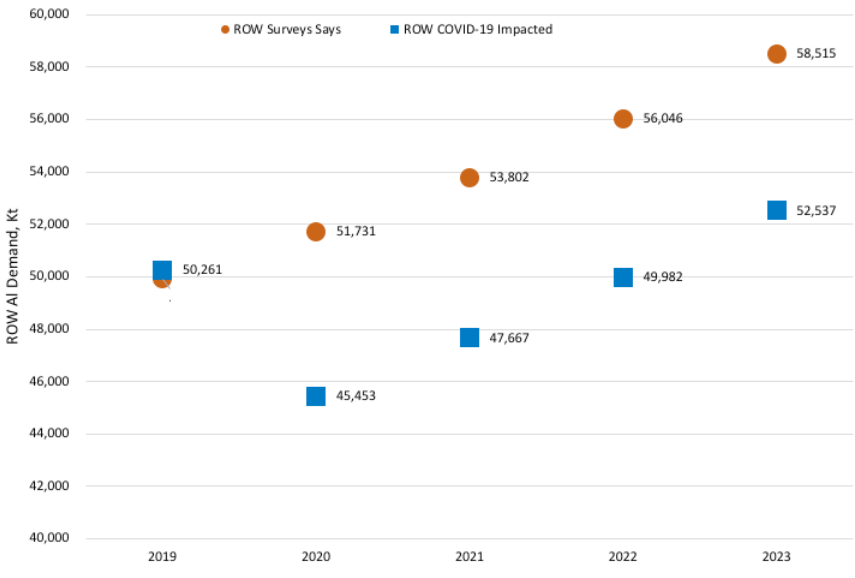


FIGURE 4.4

ROW Total Aluminium Consumption and Demand Outlook Comparison – COVID-19 Impacted Scenario - vs 'Survey Says' Scenario, 2013 to 2050 (ktpa)

Source: IMF

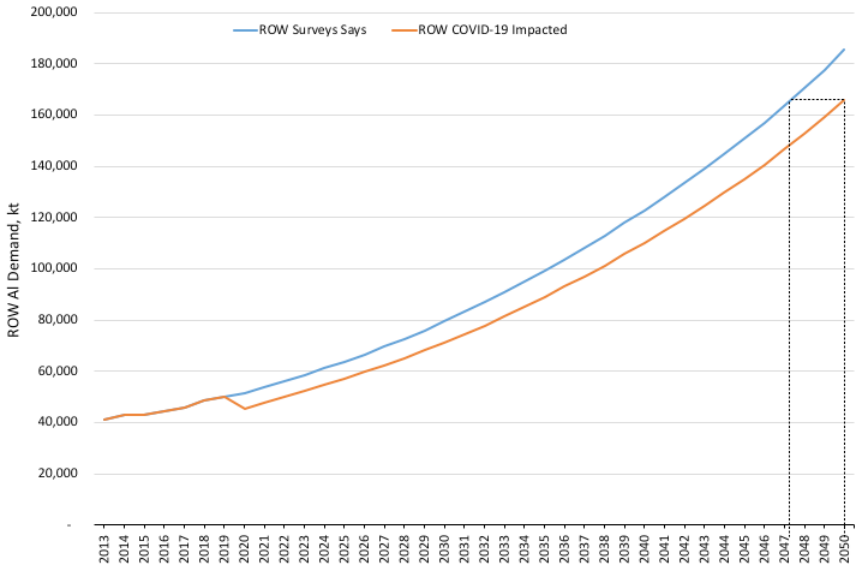



TABLE 4.1-1

Forecast Average CAGR in the Three-year period 2020-2022 under the COVID scenario (%) and change from original forecast (%)

Source: CM Group

| | Building and Construction | Transportation - Auto & Lt Truck | Transportation - Aerospace | Transportation – Non Auto or Aero |
|---|---|---|---|---|
| Africa | 4.1% (2.8%) | 3.5% (2.4%) | 0.9% (1%) | 2.2% (1.7%) |
| China | 5.6% (0.4%) | 1.7% (4.3%) | 2.2% (2.8%) | -3.8% (14.3%) |
| Europe | -19.2% (18.8%) | -5.3% (10.4%) | -7.7% (9.3%) | 1.1% (5.5%) |
| Japan | -2.1% (1.9%) | -3.9% (5.5%) | -0.6% (8.7%) | -0.6% (6.2%) |
| Latin/South America | 0.2% (0.7%) | 0.2% (0.3%) | 0.2% (1.4%) | 0.2% (1.9%) |
| North America | -5.4% (8.5%) | -5.4% (9.5%) | 0.6% (6%) | 0.6% (2%) |
| Middle East | 0.9% (1.4%) | 0.9% (1.4%) | 0.9% (1.4%) | 0.9% (1.4%) |
| India | 6.7% (4.9%) | 2.4% (5.9%) | 10.4% (1.9%) | 5.4% (1.9%) |
| Indonesia | 1.5% (3.3%) | 2.3% (1.5%) | 3.3% (5.5%) | 3.3% (1.5%) |
| Other Asia | 4.6% (0.1%) | 1.3% (2.5%) | 4.3% (0.5%) | 4.3% (0.5%) |
| Other | 2.9% (1.4%) | 0.0% (2.0%) | 0.0% (-) | 0.0% (-) |

TABLE 4.1-2

Forecast Average CAGR in the Three-year period 2020-2022 under the COVID scenario (%) and change from original forecast (%)

Source: CM Group

| | Packaging - Cans | Packaging - Other | Machinery & Equipment | Electrical - Cable |
|---|---|---|---|---|
| Africa | 3.1% (2.3%) | 2.2% (1.7%) | 2.5% (1.9%) | 4.1% (2.8%) |
| China | 10.1% (1.7%) | 7.1% (0.1%) | 3.2% (1.8%) | 5.3% (1.1%) |
| Europe | 2.9% (3.3%) | 0.1% (1.5%) | 1.4% (5.2%) | 1.1% (2.2%) |
| Japan | -0.2% (1%) | -0.6% (1.2%) | -0.3% (0.9%) | -0.6% (2.7%) |
| Latin/South America | 0.2% (5.1%) | 0.2% (3.1%) | 0.2% (1.9%) | 0.2% (2.8%) |
| North America | 1.6% (1.3%) | 0.6% (1%) | 0.6% (1%) | 0.6% (2%) |
| Middle East | 0.9% (3.4%) | 0.9% (3.4%) | 0.9% (1.4%) | 0.9% (3.4%) |
| India | 8.3% (2%) | 5.4% (1.9%) | 5.4% (1.9%) | 8.6% (0.2%) |
| Indonesia | 0.3% (1.5%) | 0.3% (1.5%) | 3.3% (1.5%) | 2.9% (1.5%) |
| Other Asia | 2.3% (0.5%) | 2.3% (0.5%) | 3.3% (0.5%) | 5.0% (1.3%) |
| Other | 0.0% (-) | 0.0% (-) | 0.0% (-) | 0.0% (10.0%) |

TABLE 4.1-3
Forecast Average CAGR in the Three-year period 2020-2022 under the COVID scenario (%) and change from original forecast (%)

Source: CM Group

| | Electrical - Other | Consumer Durables | Other (ex Destructive Uses) | Destructive Uses |
|---|---|---|---|---|
| Africa | 2.2% (1.7%) | 2.8% (2.1%) | 2.2% (1.7%) | 0% (-) |
| China | 5.3% (0.3%) | 1.6% (5.4%) | 3.9% (1.1%) | 5% (-) |
| Europe | 0.1% (1.5%) | 0.4% (0.4%) | 0.1% (1.5%) | 0.1% (1.5%) |
| Japan | -0.6% (1.2%) | -0.3% (0.4%) | -0.6% (1.2%) | -0.6% (1.2%) |
| Latin/South America | 0.2% (2.1%) | 0.2% (2.7%) | 0.2% (7.1%) | 0.2% (7.1%) |
| North America | 0.6% (1%) | 0.6% (1%) | 0.6% (1%) | 0.6% (1%) |
| Middle East | 0.9% (1.4%) | 0.9% (3.7%) | 0.9% (0.9%) | 0.9% (1.4%) |
| India | 5.4% (1.9%) | 11% (4.6%) | 5.4% (1.9%) | 5.4% (1.9%) |
| Indonesia | 3.3% (1.5%) | 16.3% (1.5%) | 3.3% (1.5%) | 3.3% (1.5%) |
| Other Asia | 4.3% (0.5%) | 8.1% (9.7%) | 4.3% (0.5%) | 4.3% (0.5%) |
| Other | 0.0% (-) | 0.0% (-) | 0.0% (-) | 0.0% (-) |

## *4.1 Auto Industry*

Not only have auto makers shut their production facilities but also their showrooms, repair firms and parts suppliers have all been hit.

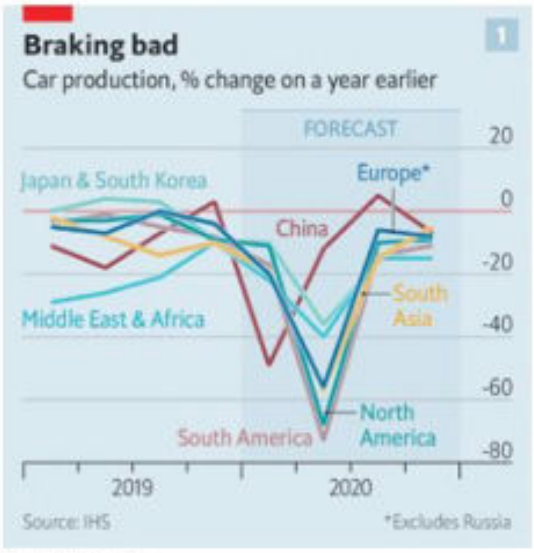
### Market Sentiment

Extensive shutdowns of all major OEMs likely to be up to eight weeks have been in place but reopening deadlines have passed with only a handful of OEMs back in operation ie the situation is worsening.

Based on announced shutdowns, global automotive production will be lower by at least 20% for 2020. Some car makers are unlikely to have the cash to survive a prolonged forced closure, thus mergers and/or acquisitions may take place.

FIGURE 4.5
Car production, % change on a year earlier

Source: The Economist



As a result of lessons learned in the GFC, the hits on ROW OEM supply chains will be less, due to ensuring local supply. Automakers are typically also holding more cash this time around.

### Auto Sector AI Demand Outlook

As the EIU stated

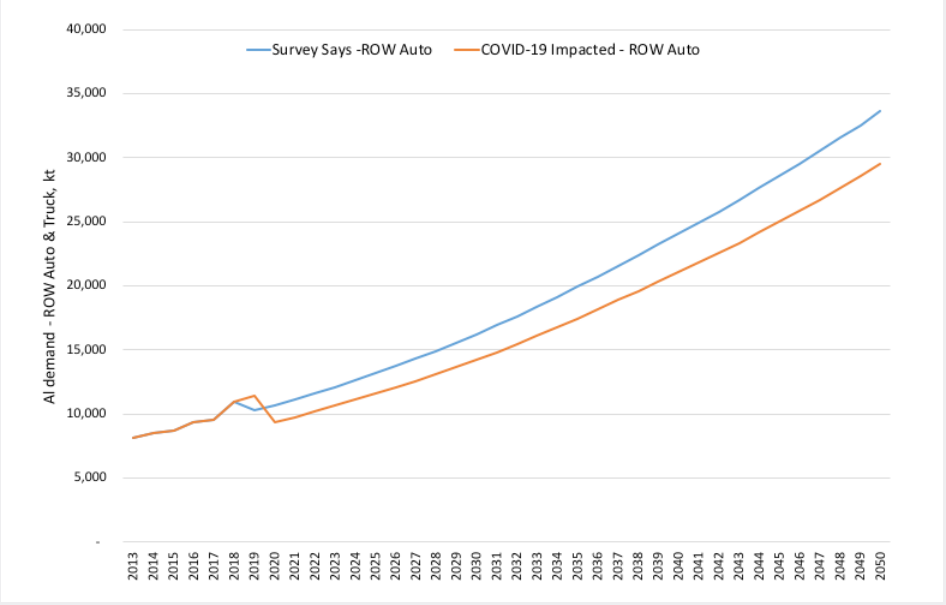
"The biggest concern may be that the virus changes attitudes to cars. On the one hand, fear of infection may put commuters off trains, buses or ride-hailing, and into automobiles. On the other, more home-working may reduce commuting of any kind, including with your own set of wheels. A prolonged recession could damage sales for good. Carmakers of the future may yet look back nostalgically to 2017 as their industry's peak. "

Our industry surveys support this view, with many respondents commenting on the possibility of a more significant shift in the relationship between people and automobiles away from ownership.

FIGURE 4.6

COVID-19 Impacted Scenario and Survey Says Scenario Comparison for the Auto Sector, kt

Source: CM Group



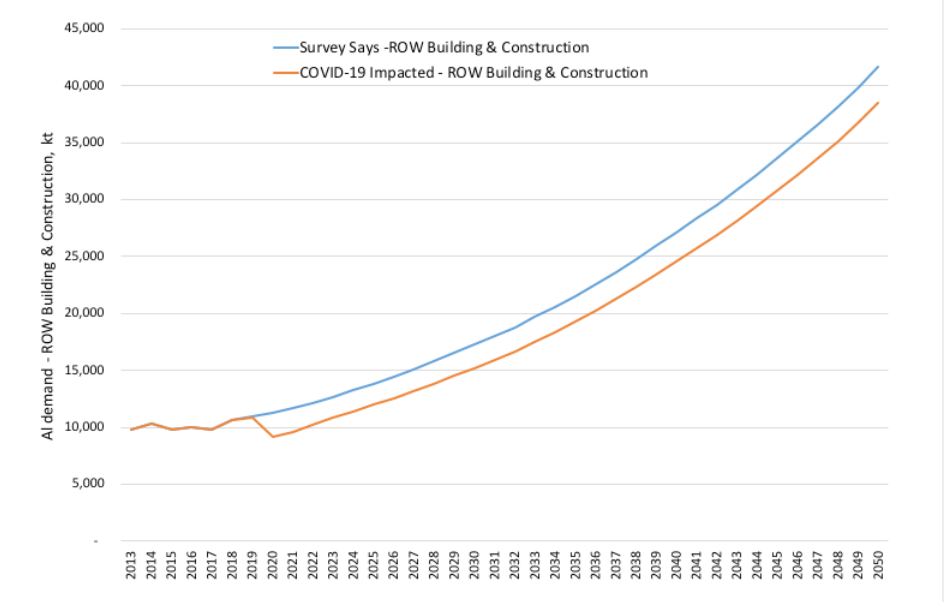

## *4.2 Building and Construction*

- US building and construction new ground breaking fell 22% in March according to the US Census.
- Building projects related to tourism such as hotels have stalled.
- Southern European construction is down 60-70%.
- The cement industry was expecting global growth would be slightly positive in 2020 but this was based on the assumption the virus was going to run its course in Q2 2020.

FIGURE 4.7

COVID-19 Impacted Scenario and Survey Say Scenario Comparison for the Building and Construction Sector, kt

Source: CM Group




## *4.3 Other Key Market Sectors*

### Beverage Can Sector

Beverage can producers are reporting no apparent decline in sales as a result of the C19 pandemic. In fact, some US and European produces have reported growth during the crisis, which is explained by more people drinking beverages at home rather than in a restaurant, where beverages are more likely to be packed in glass.

### Aerospace

The aerospace sector on average was showing signs of a slowdown leading into the C19 pandemic, as a result of the prolonged grounding of Boeing's 7376-MAX aircraft.

Since the outbreak, airplane build rates have plummeted, with small aircraft maker Embraer now completely shut down. With many airlines around the world teetering on the brink of collapse and restrictions on global travel likely to be in place for many months to come, the outlook is bleak. Failed airlines also means a growing secondary aircraft market, placing prolonged pressure on demand likely to be measured in years rather than months.

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