



Impact of COVID – 19 on the Global Composites Industry – Navigating Through Crisis

PRESENTED BY

Lucintel

DATE

04 JUNE, 2020

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Covid has Significantly Affected Global and US Economy

COVID-19 Impact on Economy

>\$2.5 Trillion loss in Global Economy

>\$1.0 Trillion loss in US Economy

305 Million Global Job loss

30 Million Job lost in US (till April)

10%-30% Drop in Market Cap of Companies

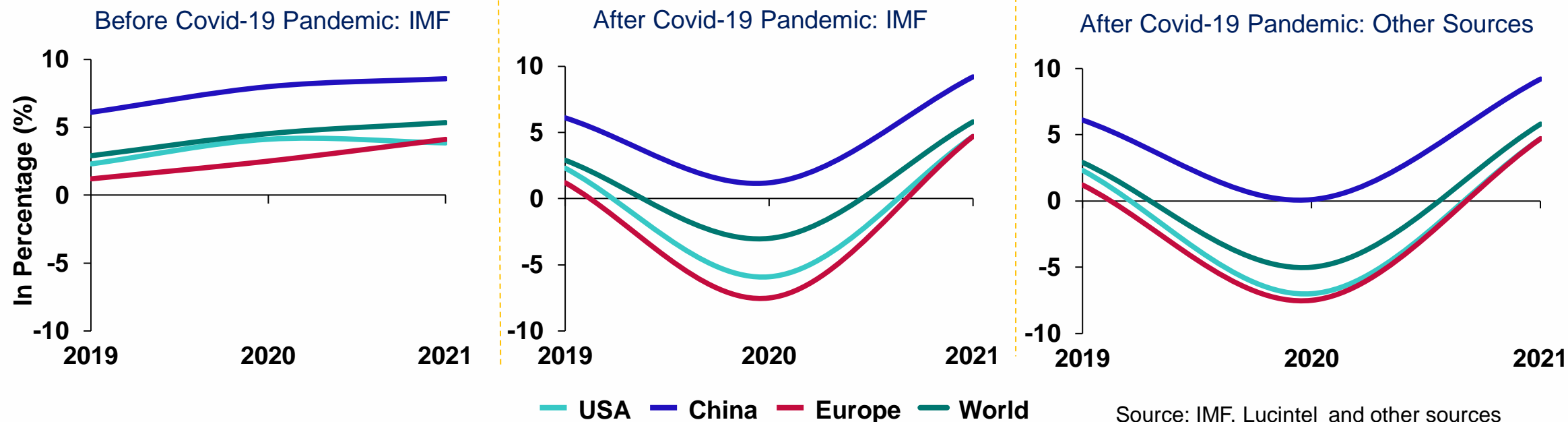
Impact is worse than 2009 Recession

Uncertainty, lack of cash and demand, supply chain issues, and workers safety are key issues all the industries are facing



US GDP to Decline by 6% & Global GDP to Decline about 3% to 6% in 2020

Growth Rate of Gross Domestic Products (GDP) at Current Price : 2019-2021

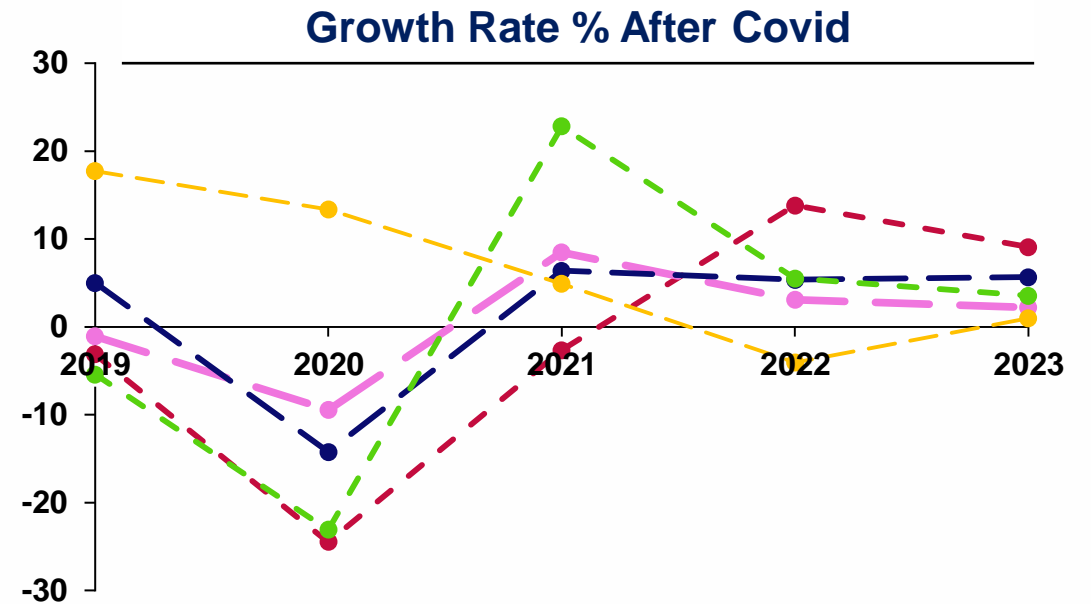
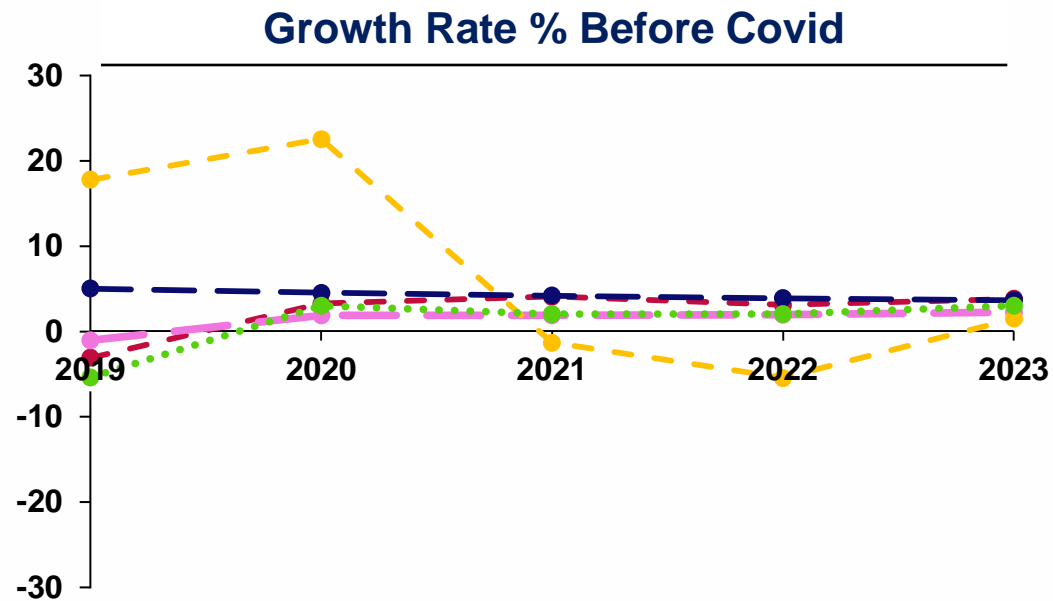


Country / Region	Before Covid-19 Pandemic: IMF			After Covid-19 Pandemic: IMF			After Covid-19 Pandemic: Other Sources		
	2019	2020	2021	2019	2020	2021	2019	2020	2021
US	2.3%	4.1%	3.8%	2.3%	-5.9%	4.7%	2.3%	-5% to -7%	4% to 5%
Europe	1.2%	2.5%	4.1%	1.2%	-7.5%	4.7%	1.2%	-7% to -9%	4% to 5%
China	6.1%	7.9%	8.5%	6.1%	1.2%	9.2%	6.1%	1% to 2%	8% to 9%
Global	2.9%	4.5%	5.3%	2.9%	-3.0%	5.8%	2.9%	-3% to -6%	4% to 6%

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Average Forecast (%) of Various Industries Before and After Covid: All the Major End Use Industries are Affected Badly in 2020 Except Wind Energy



- - ● - - Aerospace (Deliveries)
- - ● - - E&E (Smartphones, PC, & Laptop Shipment)
- - ● - - Construction
- - ● - - Wind Energy (MW Installation)
- - ● - - Automotive (Unit Production)

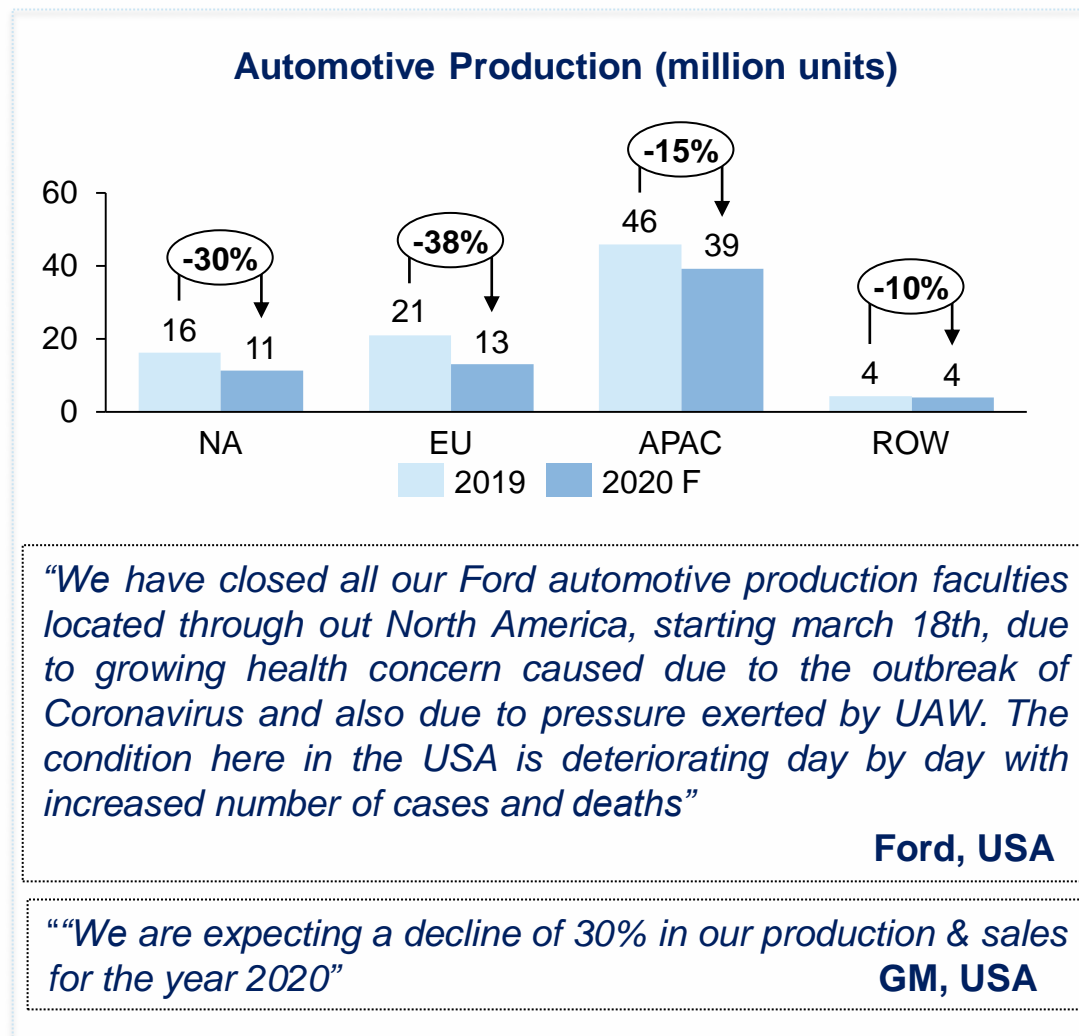
Source: Lucintel Analysis, Primary Research. The market rebound for 2021-2023 is based on historical analysis of the 2009 recession, and primary research

Impact of Covid on Various Industries: Wind Energy is Expected to Grow at a Positive Rate in 2020

Industry	Market Size in 2019	Forecast for 2020	Forecast for 2021
Global Automotive (Car and LCV)	~\$2,000 Billion	-20% to -30%	20% to 25%
Global Aerospace (Aircraft)	~\$250 Billion	-20% to -30%	-2% to -4%
Global Wind (Turbine)	~\$55 Billion	10% to 15%	4% to 6%
Global Construction	~\$8,945 Billion	-10% to -20%	5% to 7%
Global Consumer Electronics	\$1,129 Billion	-6% to -10%	6% to 10%

Source: Lucintel Analysis

Automotive: Major Auto OEMs Halted their Production due to Pandemic as a Result of Slow Demand and Stay Home Order

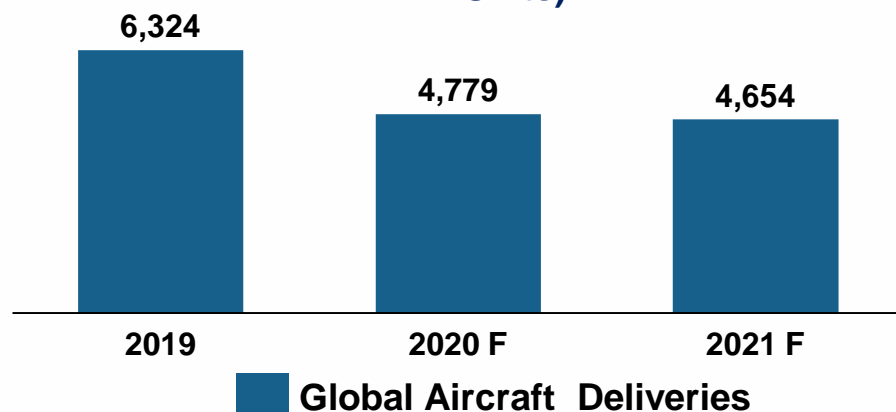


Hit to Automotive Industry by COVID

- Automotive production has been hit hard and global market is forecast to drop by 20% to 30% in 2020
- Composites are used to make bumper, door, chassis, roof top, deck lid, instrument panel and other hundreds of parts for the automotive industry
- Major OEMs across the globe have halted the production of vehicles in the fight against Covid-19
- Automotive industry rely heavily on cross border shipment of parts for car manufacturing, and government restrictions on international trade has affected automotive industry supply chain
- In order to make up the loss auto companies are taking some measures:
 - Salary cut and laying off of employees
 - Companies like GM, Ford have suspended their dividends for first quarter

Aerospace: Major OEMs have Cut off Production of Major Platforms that are Composite-Intensive, thus Affecting the Demand

Total Global Aircraft Deliveries Trend and Forecast (In Units)



“The corona virus is having an impact to our business. Operations in the US and France have temporarily shut down and this will have a huge impact on our first quarter earnings and earnings over the year”

Sales Director, Toray

“There will be recovery, but it may take a couple of years to get back to where we were a couple of weeks ago. The current situation is steeper and longer, but I think air travel will recover”

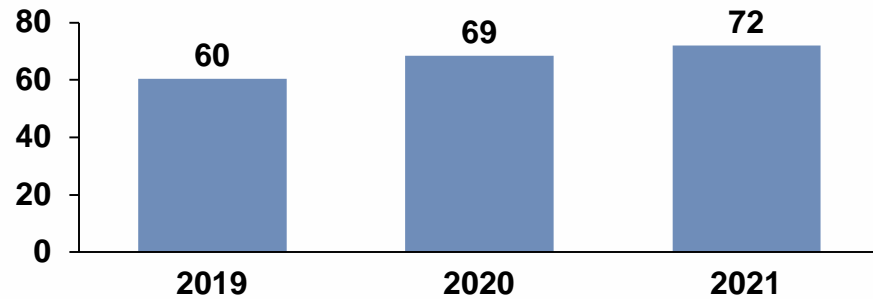
CEO, Airbus, Wales

Hit to Aerospace Industry by COVID

- Aerospace industry is forecast to see a drop of 20% to 30% in 2020
- Composites are used in wings, flaps, fuselage, floors, bulkheads, seating and other hundreds of applications in the aerospace industry. The industry is facing many issues, such as liquidity challenges, demand uncertainty, supply chain issues, etc.
- Covid has hit the aerospace industry hard, as airline business has decreased dramatically
 - Airbus to cut of A320, A330, A350 current production from 60,4 and 10 per month to 40, 2, and 6 respectively
 - Boeing to reduce 787 and 777 production from 14 and 4 to 10 and 3 respectively
 - OEMs and airlines has started furloughing people or reducing the salary of employees

Wind Energy: Impact of Covid-19 is Moderate in the Wind Energy Market

Global Annual Wind Turbine Installation (In GW)



“We expect the slowdown will last minimum up to one month and maximum for three months. COVID - 19 has moderately impacted our business because China plays a very important role in our business. China is one of the largest market for us in terms of revenue generation, it contributes nearly about 9% of the company annual industrial segment”

GE Renewable Energy, Spain

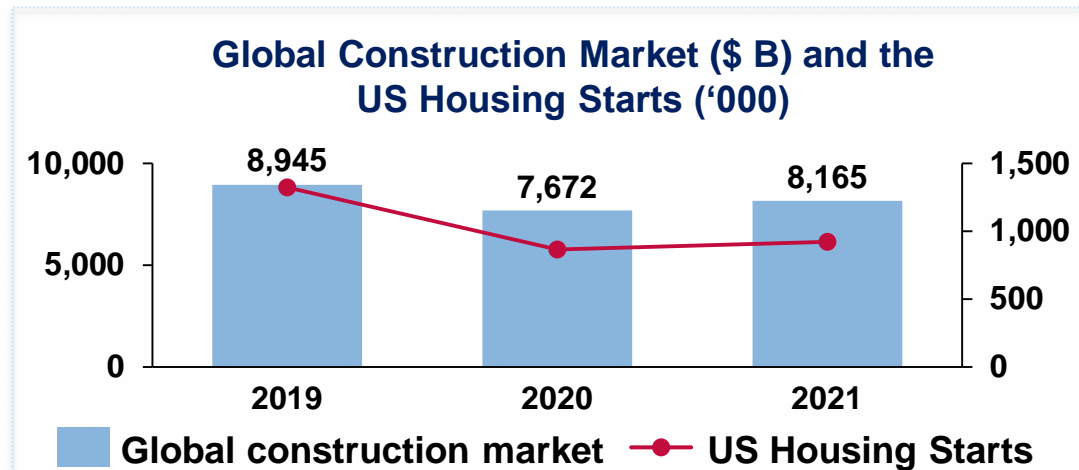
“COVID -19 impacted will be moderate in the production lines of turbine blades. One plant in China was also shut down for one and a half month but we have revamped our facility with full production capacity by mid of March”

Vestas, Denmark

Hit to Wind Energy Industry by COVID

- Wind industry will see a positive growth in 2020 even though there is temporary slowdown in March and April
- Composite materials are used to make wind blade, wind spar, nacelle housing, etc.
- Major issues in wind energy are workers safety and supply chain bottleneck, as materials and components are made around the world. Cross-border shipment issues and government restrictions are causing bottleneck in supply chain
- Major companies have halted the production and construction of new wind farms

Construction: Composite Demand will be Hit Hard by Covid Pandemic as Many Infrastructure Projects are now on Hold



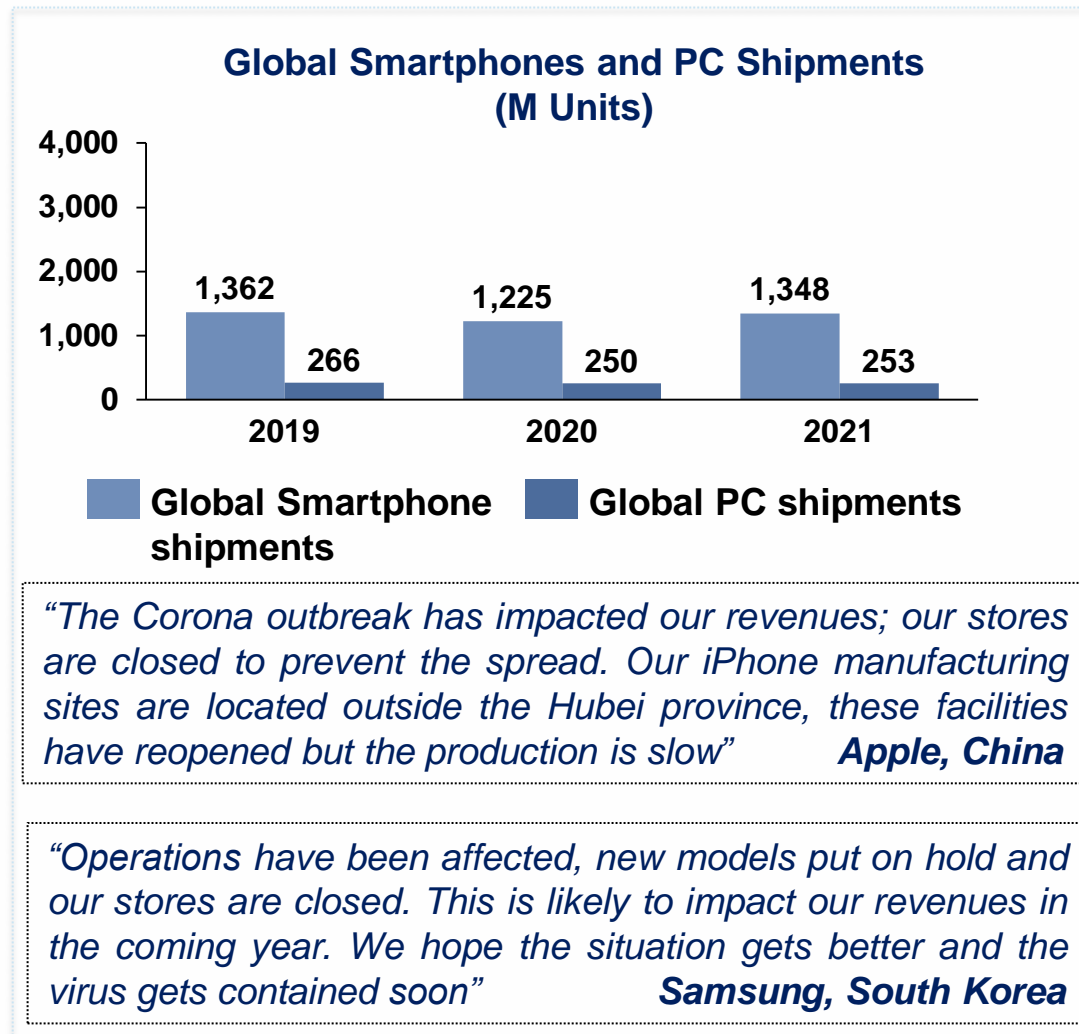
“We were able to avoid several supply chain issues in this covid crisis, as we’re a big company & were able to lock in orders with suppliers. We’re struggling in shipping & getting products out to our customers, so there has been an increase in cost of shipping to our customers. Cost has gone up a little on the front end and the back end for shipping”
Marketing Manager, Strongwell

“We anticipate ~10% decrease to construction in 2020. Ongoing projects will continue, but we expect a drop in Q4 & Q1, 2021 as government funding shifts, & fewer shovel-ready projects are prepared to start ”
CEO, Composite Advantage

Hit to Construction Industry by COVID

- The global shutdown and lockdown have created threat and halted many construction works globally
- Composites are used to make bath tub, window profile, utility pole, bridge deck, grating, and many other parts for the construction industry
- With increase in unemployment and low purchasing power, investment will decline in new housing projects
- The industry is also anticipating a possible supply chain bottleneck for key resources of materials and equipments
- Composite part fabricators such as Strongwell, Composite Advantage, Creative Pultrusion, and Bedford Reinforced Plastics are undertaking safety measures to follow all the guidelines of the CDC and WHO, and are limiting site access to essential personnel only

E&E industry has also Witnessed Decline, Mainly Due to China and its Role in the Global Electrical and Electronics Market



Hit to E&E Industry by COVID

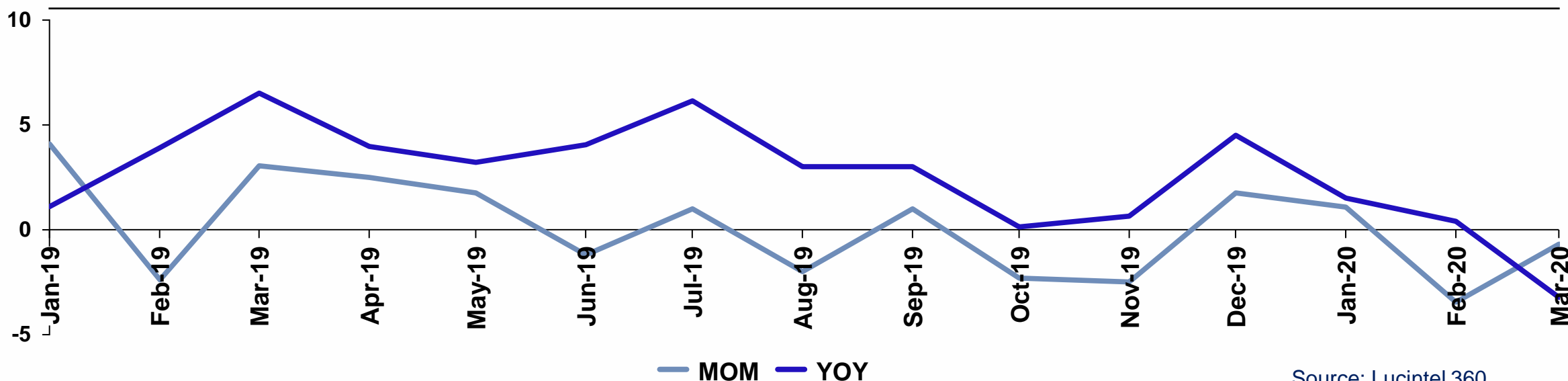
- Global smartphones and personal computer (PCs) shipments are expected to decline by ~10% and ~6%, respectively, in the year 2020, compared to 2019
- Composites are used to make PCB (printed circuit board), insulation, housing and more for electrical and electronics market
- E&E industry employs about 16 million people globally and significant numbers are located in Asia
- Though China’s plants are coming back into operation, Apple’s and other OEMs’ stores are closed in the US, Europe, and other regions, affecting demand for electrical & electronic products
- Companies are facing absenteeism challenges and operating at lower production volumes due to low demand

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US Composites Industry not Much Affected as of March 2020. Composites Market to Decline by 15% to 20% in 2020

% Change in US Composites Shipment in (Billion lbs)

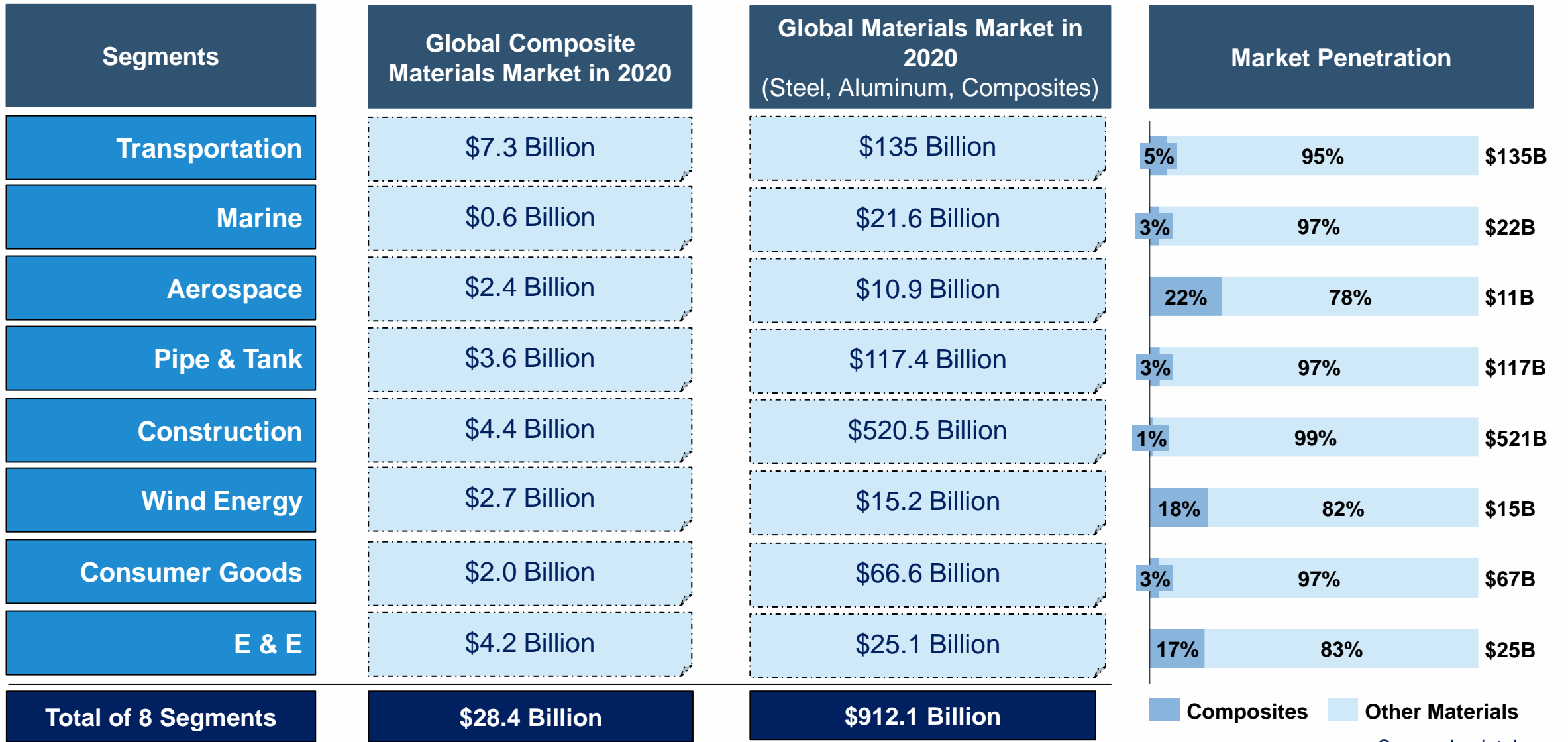


Source: Lucintel 360

Key Insights

- Demand for composite materials saw a decline of about 1% in the first quarter compared to 2019 Q1
- Plant shut downs in various end use industries will affect the composites industry going forward and Lucintel expects that the composites industry will be down by 15% to 20% in 2020

Composite Materials Have a Low Market Penetration in 8 Major the Segments Reflecting Significant Opportunity for Growth



Source: Lucintel

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Four Top Issues such as Cash/Liquidity, Uncertainty in Demand, Workers Safety & Supply Chain Bottleneck are Faced by Major Players



Source: Lucintel

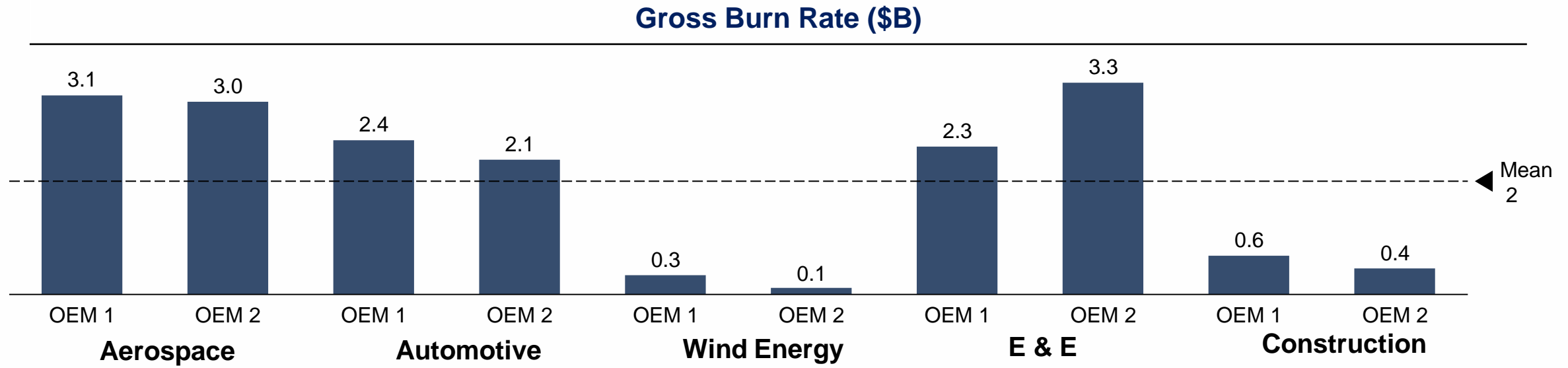
Health Monitoring: Performance of Aerospace and Automotive is Severely Affected by COVID. Electronics and Wind Industry are Healthier

Navigating Through Crisis - Health Monitoring of Industries in 2020 in Post Covid Period



Source: Lucintel

Cash Burn Rate in Various Industries Ranges from \$100 Mil to \$3.3 Bil based on Industry for Major Players



Source: Lucintel

Key Insights

- OEMs are tightly managing cash flow in the automotive, E & E, and aerospace industries, as the burn rate is in between 2.1 to 3.3 billion per month
- OEMs in the wind energy and construction industries has burn rate of is in between 0.1 to 0.6 billion per month
- OEMs are looking for higher credit lines to overcome crises. Government aids might necessary to prevent bankruptcy and job losses

Maintaining Cash / Liquidity is Top Priority for Companies so as to Fund Critical Operation and to Meet Day to Day Fixed Costs....(1/2)



Automotive



Aerospace

Liquidity Management (Monthly Cash Burn Rate) \$B	Liquidity Management (Cash Burn Rate: Months)	How to Manage in this Crises
<p>\$2.0-\$2.5 GM and GM</p>	<p>3.0-4.0</p>	<ul style="list-style-type: none"> • The high monthly cash burn rate for major OEMs is likely to create liquidity issues as operating cash flow diminishes rapidly during the crisis • Automotive OEMs are likely to burn through cash reserves in 3 to 4 months time if cash is not managed properly • OEMs can cut nonessential operations, opt for temporary salary cuts, deferred dividend payouts, etc. to protect cash flow • GM and Ford have a monthly cash burn rate of \$2.0 to \$2.5 B
<p>\$2.5 -\$3.5 Airbus and Boeing</p>	<p>3.0-3.5</p>	<ul style="list-style-type: none"> • Boeing & Airbus have a monthly burn rate of \$2.5 to \$3.5 billion • Aerospace OEMs likely to burn out cash reserve in 3 to 3.5 months time if cash is not managed properly • OEMs can cut nonessential operation, opt for temporary salary cuts, lay-offs, production cuts to manage cash flow • In addition, government intervention is necessary to provide a boost to the industry to prevent bankruptcies and job losses

Source: Lucintel

Maintaining Cash / Liquidity is Top Priority for Companies so as to Fund Critical Operation and to Meet Day to Day Fixed Costs....(2/2)



Wind Energy



Construction



E&E

Source: Lucintel

Liquidity Management (Monthly Cash Burn Rate) \$B	Liquidity Management (Cash Burn Rate: Months)	How to Manage in this Crises
<\$0.5 Vestas and Nordex	7.0-12	<ul style="list-style-type: none"> • Cash burn rate for major OEMs in the wind energy industry is \$100 to \$500 million • Wind energy OEMs are well-aligned to survive the turbulence and have good cash reserves to run operations for months without fallout • Major OEMs are ramping up their operations in countries like China to mitigate shuttered operations in other parts of the globe
\$0.4 - \$0.6 D.R. Horton & ACS Group	4.0-15	<ul style="list-style-type: none"> • Construction companies employ small to mid size companies • Cash availability in the construction industry is more than 6 months
\$2.5-\$3.5 Apple and Samsung	7.0-20	<ul style="list-style-type: none"> • E&E industry has some of the most cash-rich companies such as Apple and Samsung that could more efficiently navigate through the COVID Crisis • Cash availability in E&E industry is currently more than 6 months

Managing Demands: To Stay in the Business, Companies Need to Restart Their Operations....(1/2)

Industry	Demand Outlook in 2020	Recovery Period	Current Situation	Challenges
Aerospace	-20% to -30%	Slow	Production Shutdown, Lockdowns. Falling revenue & profitability throughout the value chain	<ul style="list-style-type: none"> • Falling airline health, cancellation of existing orders, smaller new orders • Challenge to ensure required safety to employees • Absenteeism, start production at a lower rate, & fewer employees on the floor due to social distancing
Automotive	-20% to -30%	Moderate	Production Shutdown, Lockdown. Falling revenue & profitability throughout the value chain	<ul style="list-style-type: none"> • Absenteeism, start production at a lower rate, & fewer employees on the floor due to social distancing • Challenge to ensure required safety to employees
Wind Energy	10% to 15%	Moderate to Fast	Delay in the construction of farms, & difficulty to procure critical components	<ul style="list-style-type: none"> • Limited availability of skilled workforce to install new turbines and to provide MRO services to wind farms • Supply chain bottleneck due to lockdown

Source: Lucintel

Managing Demands: To Stay in the Business, Companies Need to Restart Their Operations....(2/2)

Industry	Demand Outlook in 2020	Recovery Period	Current Situation	Challenges
Construction	-10% to -20%	Moderate to Fast	Slowdown in construction activity due to lockdown. Decline in financial health of the industry	<ul style="list-style-type: none"> • Higher rate of unemployment affecting purchasing power for new homes; lower investment in new facilities due to low demand • Low consumer confidence
E&E	-6% to -10%	Fast	Sales decline due to lockdown	<ul style="list-style-type: none"> • Low consumer confidence • Higher rate of unemployment affecting purchasing power & discretionary spending

Protocol for Workers Safety for Post COVID Manufacturing and Operations



Source: Lucintel

Supply Chain Disruption: Companies will Need to Build Resilient Supply Chains to Cope up Future Challenges..(1/2)



Automotive



Aerospace

Supply Chain Disruption	Dependency on Imports	Insights
		<ul style="list-style-type: none"> • China is the world largest exporter of automotive components to all the major OEMs across region • In 2019, China exported more than \$35 B worth of automotive components globally to OE market • High dependency on Chinese imports and also plant shutdown and lockdown in different parts of the world has cause serious concern on supply of critical components
		<ul style="list-style-type: none"> • Commercial aerospace OEMs tend to carry sufficient inventory for months • The critical supply chain challenge that the industry usually faces are long lead time, relatively high dependence on sole supplier for materials and parts • Limited dependency on Chinese exports • Lockdown and shutdown has made OEMs to cut production as part suppliers are also facing similar challenges

Supply Chain Disruption / Dependency on Import

Low

Medium

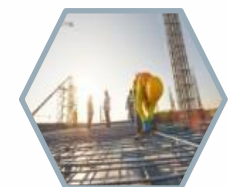
High

Source: Lucintel

Supply Chain Disruption: Companies will Need to Build Resilient Supply Chains to Cope up Future Challenges..(2/2)



Wind Energy



Construction



E&E

Supply Chain Disruption	Dependency on Imports	Insights
		<ul style="list-style-type: none"> • Aggressive lockdown measures in major European countries, such as Spain, France, & Italy restricted movement of workers, parts, pressurizing supply chain • US, Mexico closed borders also impacted the supply of wind blades • China's supply of wind blade to the US is also affected • Shortage of critical components increase due to COVID crisis in EU market
		<ul style="list-style-type: none"> • US & the EU region have dependency on China for materials & other supplies. • Restriction on imports from COVID affected nation could put considerable strain on the supply chain and could cause delay in the projects • Port closures, borders sealed restrict the movement of labors, materials, & others • Absenteeism, high lead time could cost millions of dollar to projects
		<ul style="list-style-type: none"> • High dependency on China for import of parts & assemblies in E&E market • Closed borders & countries under some form of lockdown affected the movement of critical components, have halted production • Delay in shipment of parts and final products by more than 4 weeks • Revival of Chinese operation brings up a positive sign

Supply Chain Disruption / Dependency on Import

Low

Medium

High

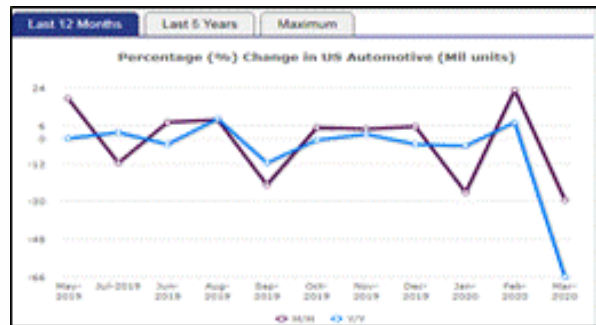
Source: Lucintel

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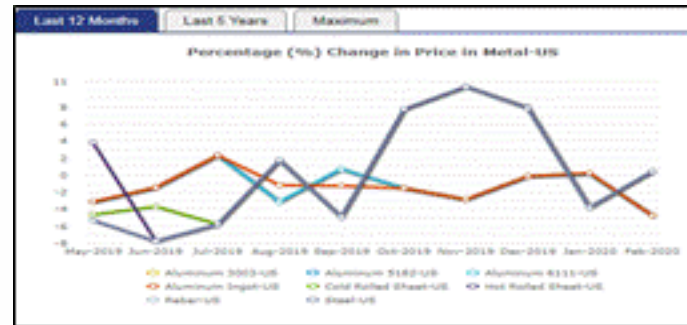
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Lucintel 360 – Starting at \$89 / Month, Have access to Monthly Price of Materials and Demand Shipment for Various Industries

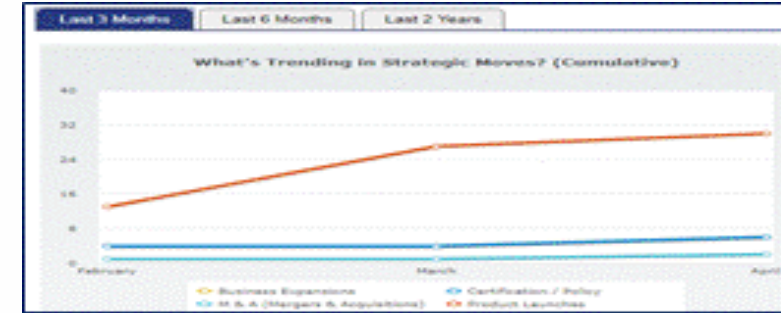
Monthly Shipment Data



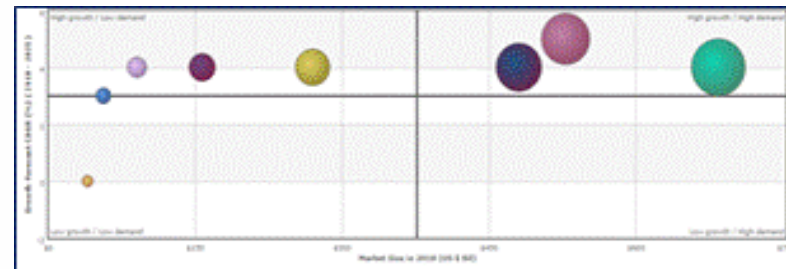
Monthly Pricing Trends



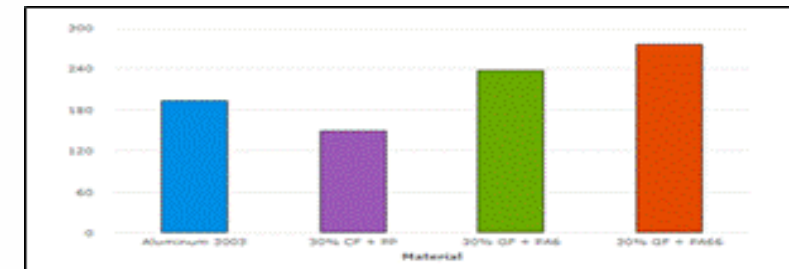
Real Time Monitoring



Industry Dashboard



Property Comparison



Lucintel 360 – Subscription Service

- In its 360 subscription service, Lucintel offers access to monthly shipment data for various industries like automotive, aerospace, composites, steel, aluminum etc., monthly price trends of different materials like fibers, resins, aluminum, metals, etc., industry and application dashboard, real time monitoring such as customer and competitor monitoring, and other data like property comparison, country dashboard, etc.

Lucintel has Helped Number of Companies to Manage the Impact of Last Recession and to Navigate through the COVID Crisis

Look into Performance of a Product / Portfolio in Various Markets in Post Covid Scenario

- Understand impact of COVID/ Macroeconomic factors into your product portfolio
 - Demand forecast
 - Price analysis
 - Cost analysis
- Find out the best and worst performers amongst all the products

M&A or Diversification

- Growth opportunity to expand into markets that are less impacted
- Peer and business analysis to identify unnecessary operation and deploy all cost cutting measures
- Find relevant companies to bid for SBUs that are intended to divest
- Identify best companies for target, best of synergy, revenue, location, etc.
- Set up meeting with prospects

Supply Chain Risk Assessment

- Help companies to mitigate supply chain risk
- Assessment of value chain to identify risk factors
- Supply chain mapping
- Risk assessment while considering country risk, supplier risk, quality failures, logistics failures, government regulations etc.

Lucintel - At a Glance

- Premier management consulting and market research firm. Founded in 1998.
- Deep global insights into major industries. Team of over 120 analysts / consultants across globe
- Management comprised of PhDs, MBAs, and subject matter experts. Head quarter in Dallas, USA.

Conducted 500+ consulting projects across industries for 3M, Audi, Dupont, Carlyle, GE, etc.

Consulting Services



Why Lucintel

Trusted insights: Reliable insights. Widely cited in Wall Street Journal, Financial Times, Forbes, etc.

Clients we serve: Over 1000 clients from 70 countries – Fortune 500 companies

Strategic advice: Over 20 years of proven global strategic management consulting experience

Industries Served



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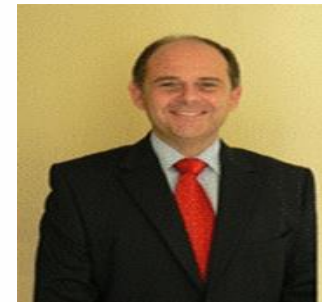


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Thank You