

Orion Engineered Carbons: Light in the Black

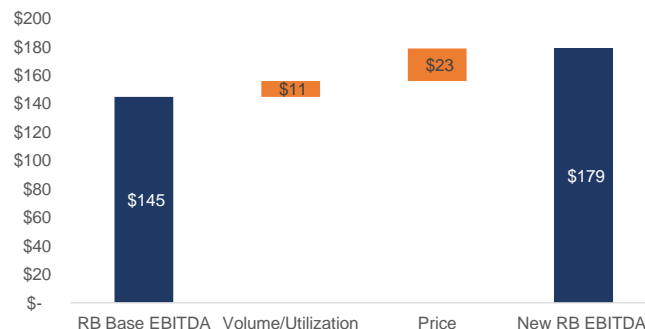
Porter Street Research

By Alex Jones alex.jones@porterstreetresearch.com

Investment Thesis

Orion Engineered Carbons (Ticker: OEC) is a leading producer of carbon black, a manufactured product made by breaking down heavy hydrocarbons and processing them further into useful applications. Carbon black is essential to reinforcing and strengthening tires as well as making high end and high margin specialty applications like coatings, fibers, pigments, and inks. The business is cyclical but many of its products are vital for use in the automotive aftermarket, coatings, and plastics industries. Orion is currently under earning relative to its history and two years of mandatory environmental capex will consume nearly all of Orion's free cash flow depressing investor sentiment during the initial stages of a recovery. Orion can improve its earnings potential this cycle as a result of a pricing cycle in rubber black, led by its US division, a recovery in utilization and volumes of extremely high margin coating applications and growth from two new specialty carbon black facilities. The combination of margin improvement driven by pricing, mean reversion in volumes plus growth in new products from two new specialty facilities will raise Orion's earnings potential from \$250-\$275mn of EBITDA to closer to \$325-\$350mn.

Rubber Black Estimated Mid Cycle Adj. EBITDA Potential



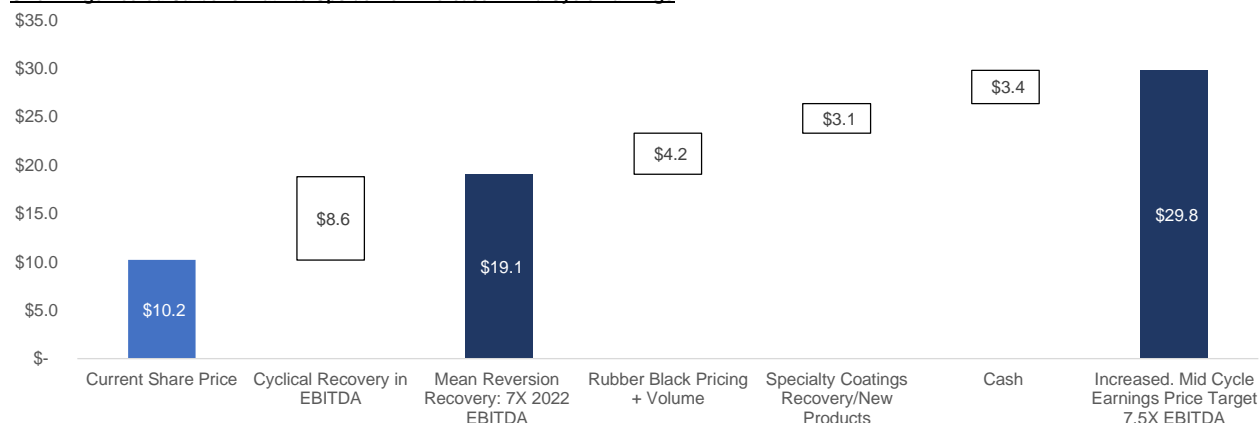
Specialty Black Estimated Mid Cycle Adj. EBITDA Potential



Sources: Capital IQ and Orion Engineered Carbons.

At 7.5X EBITDA, Orion would be worth nearly \$30/share or 3X today's price of ~\$10/share and above the \$19/share we think Orion would be worth in a normal mean reverting cyclical recovery.

Orion Engineered Carbons: Path to Upside from Increase in Mid Cycle Earnings



Sources: Capital IQ and Orion Engineered Carbons.

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What is Creating an Opportunity

Orion shares today are priced for a modest cyclical recovery with Orion's automotive exposure, mandatory environmental capex over the next two years and leverage creating an overhang.

Automotive and End Market Exposure

- 60% of Orion's rubber black and 45% of Orion's total volumes are for replacement tires, which have a stable demand profile and are less cyclical than demand for new tires. 15% of Orion's specialty black volumes are exposed to automotive manufacturing but this includes the ultra-high margin coatings segment. Within Orion's rubber black division, 25% of their product's skew premium and 66% of Orion's total volumes have margins above peers. As the largest global specialty carbon black producer in the world, Orion's global asset base and their ability to source feedstocks allows for a differentiated product portfolio. 77% of Orion's total EBITDA and 50% of volume is driven by specialty carbon black and technical grade rubber black products. Over indexing to high value, high margin specialty carbon black products has allowed Orion to earn 20% plus returns on capital over time.

Mandatory Environmental Cap-Ex in the United States

- As result of US Environmental Protection Agency (EPA) regulations, Orion and carbon black peers in the US are spending capital updating facilities and installing emissions reduction technology until 2023. Orion will spend \$50-\$60mn/year in 2021 and 2022 to comply. The annual mandatory cap-ex is equivalent to a 10-15% free cash flow yield and will mask Orion's free cash flow potential and limit any capital return until at least 2023. Orion's previous shareholder base was dividend focused and in March of 2020 a wave of forced selling pressured shares as Orion suspended the dividend.

Leverage

- Orion has \$657 of net debt outstanding in the form of two term loans with no maturities until 2024 and total liquidity of \$287mn. Adj. EBITDA would have to fall to \$125mn from \$267mn on a TTM basis and Orion would need to draw > 35% of their credit lines to break covenants. A counter cyclical cash inflow from working capital due to lower oil prices should help Orion break even on cash flow in 2020.
- Orion is indemnified against its form owner, Evonik for a portion of the estimated \$250mn in total EPA cap-ex Orion is spending between 2018-2023. We believe a settlement over the next three years is likely with Orion recovering between \$50-\$100mn with any settlement helping Orion to reduce debt.

Key Statistics and Capital IQ Consensus Estimates

Ticker	OEC	Cap- IQ Consensus				
Price	\$ 10.2		2019 (A)	2020 (est.)	2021 (est.)	2022 (est.)
Shares Outstanding	60.6	Revenue	\$ 1,579	\$ 1,037	\$ 1,183	\$ 1,303
Market Capitalization	\$ 618	Adj EBITDA	\$ 267	\$ 161	\$ 206	\$ 239
Debt	\$ 765	EPS	\$ 1.83	\$ 0.48	\$ 1.08	\$ 1.40
Cash	\$ 108	Growth	2019	2020	2021	2022
Enterprise Value	\$ 1,276	Revenue		-34%	14%	10%
Key Stats		EBITDA		-40%	28%	16%
52 Week High	\$ 21.4	EPS		-74%	125%	30%
52 Week Low	\$ 5.9	Margin	2019	2020	2021	2022
Debt/EBITDA TTM	2.9	EBITDA	16.9%	15.5%	17.4%	18.3%
EBITDA/Interest	14.8	Valuation	2019	2020	2021	2022
Replacement Cost	\$17.0	EV/EBITDA	4.8	7.9	6.2	5.3
Discount	60%	P/E	5.6	21.3	9.4	7.3
Sources: CapitalIQ and OEC		Net Debt/EBITDA	2.5	4.1	3.2	2.8

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Introduction and Recent History

Carbon black is an engineered solid carbon manufactured to produce aggregates of carbon particles that vary in size, surface chemistry and porosity. Carbon black is typically 95% pure carbon and mixed with other elements: hydrogen, nitrogen, and oxygen to create various end products. The main use of carbon black is to enhance a variety of material's physical, electrical, and optical properties. By volume, the largest use of carbon black is as a reinforcement agent when combined with rubber to strengthen tires.

Applications of Carbon Black

Area	Application
Rubber	Reinforcing filler in tires and mechanical rubber components, conductivity
Printing Inks	Pigmentation, rheology, tinting
Coatings	Black and grey pigmentation, tinting
Plastics	Black and grey pigmentation, tinting, UV protection, conductivity, conductor coating
Fibers	Pigmentation
Paper	Black and grey pigmentation, conductivity, decorative and photo-protective papers
Construction	Cement and concrete pigmentation, conductivity
Power	Carbon brushes, electrodes, battery cells
Metal Reduction Compounds	Metal smelting, friction compound
Metal Carbide	Reduction compound, carbon source
Fireproofing	Reduction of mineral porosity
Insulation	Graphite furnaces, polystyrene and PU foam

Different Types of Manufactured Carbon Black



Sources: Orion Engineered Carbons, Google.

The carbon black industry is global and valued at nearly \$20bn. By volume, over 70% of the carbon black produced is used in making tires. The specialty carbon black subindustry is 7% of total carbon black volumes but 25% of the value and used to make high end, additive like specialty applications including coatings, pigments, plastics, and polymers. There are six ways to produce carbon black and 90% of global volumes are produced using the furnace black method. Orion is the only company in the world that uses all six processes and the only company that uses lamp black technology, which is proprietary to Orion. **(See Appendix for more detail)**

Orion operates in two divisions:

Rubber Carbon Black: #4 producer in the world with a 7% global market share. Within any geographic region market share is closer to 15-20%. 80% of demand for rubber black is for replacement tires and Orion over indexes to more complex, premium technical tire grades as well as higher margin mechanical rubber goods products. 75% of contracts are pass through and the division benefits from higher oil and energy prices. **(TTM Contribution of 75% of Volume, 54% Adj. EBITDA)**

Specialty Carbon Black: #1 player in \$2bn sub industry with > 24% market share by volume and 40% share by revenue. Orion has unique, patented process applications (6 vs 2 for average competitor) that allow for more refined, high value carbon black required in specialty applications including coatings and pigments. Long term customer relationships for low volume, high value products leads to high margins and pricing power. 30-40% of supply is on pass through contracts and the division generally benefits from lower oil and energy prices. **(TTM Contribution of 25% volume, 46% Adj. EBITDA)**

Orion was purchased out of Evonik, a Germany chemical company in 2011 by two private equity firms. Orion was taken public in 2014 and the private equity owners exited their positions by 2017. The predecessors to Orion at Evonik include August Wegelin, AG, which has been producing carbon black since the 1920s. Degussa, AG purchased August Wegelin and Orion grew through a series of acquisitions and joint ventures throughout the 1980s and 2000s before Degussa was acquired by Evonik in 2002. Orion shares debuted at \$18/share and peaked at over \$36 in August 2018. Of note, Orion had

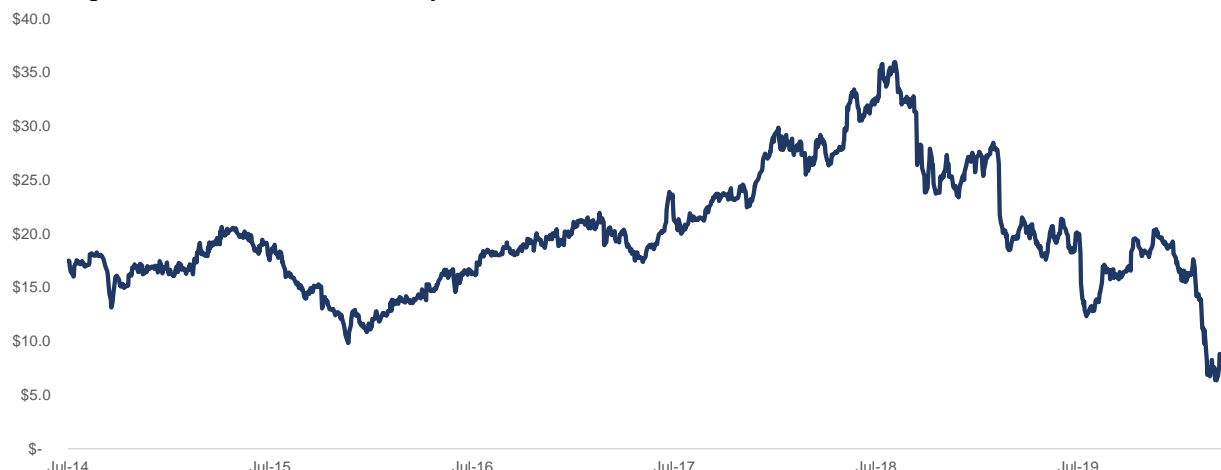
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historically reported in Euros and under IFRS until 2019, when it completed a re-listing. Orion now reports in US Dollars under GAAP. Below we show Orion's share price over time as well as some key highlights and milestones.

Orion Engineered Carbons Share Price and Key Events Over Time



2014: Orion goes public at \$18/share (originally listed in Euros in Europe)

2014-2016: Series of profit misses and hiccups as a public company.

- : Rapid decline in oil price from \$100 to under \$40 creates issues in rubber black with contracts not reflecting reality of differentials
- : Decline in oil price helps specialty black profitability which increases as a % of total profits as Orion converts capacity from rubber to specialty

2014 - 2017: Orion does series of equity secondaries. Former private equity owners completely out of Orion shares by 2017.

2018: Orion shares peak at \$36/share in August 2018 as Corning Painter takes over as CEO replacing Jack Clem.

2017-2019: Orion able to take price increases in rubber black in Europe and the US.

- : US rubber black in sold out situation leads to customers coming to Orion in the spring (normally winter) to discuss pricing.
- : Orion able to pass through mid year price increase in rubber black in the US

2019: CEO Corning Painter comments publicly that while China is 6% of Orion's direct revenue, it's total end market exposure is closer to 25%.

- : Weakness in China 2018-2019 creates caution among sell-side and buy-side investors who were unaware the extent of China exposure.
- : Orion calls out weakness in auto end markets in China and Europe. Mix in specialty affecting profitability highlighted by weakness in coatings
- : Hired Lorin Crenshaw as CFO

2020: Orion announces it is cutting dividend, drawing down credit facility and suspending guidance. Stock bottoms at \$5.9/share

Sources: Orion Engineered Carbons, Google, JPMorgan

Barriers to Entry Driven by the Cost of Environmental Compliance Will Support US Rubber Black Pricing Cycle

Increased capital and operating costs because of mandatory environmental spending raises the level of pricing required for US carbon black producers to deliver adequate supply to meet future demand. As industry demand recovers from the recent Covid-19 downturn, the underlying industry dynamics are favorable for a carbon black pricing cycle in the US over the next 2-5 years. Due to onshoring of tire capacity in the US, demand for rubber carbon black has outstripped increases in capacity and Orion was in a sold-out position for much of the last three years in rubber black in the US. Once demand returns and new tire capacity ramps up, post Covid-19, pricing favors suppliers who are spec'd in with customers on existing and new tire capacity and formulations. Importantly, we believe the anticipated increase in carbon black prices, while helping to increase Orion's overall rubber black division's EBITDA potential, will likely

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not be high enough to attract substitution from compounds like silica or imports of carbon black from outside the US.

Producing carbon black is a nasty, dirty process that emits tremendous amount of emissions and particles into the air. The US Environmental Protection Agency (EPA) began contacting carbon black producers in 2008-2009 requesting information regarding potential violations under section 114 of the Clean Air Act. To summarize the outcome, Orion, and each of the other carbon black producers in the US were issued notices alleging various permit and facility violations. Cabot was the first carbon black producer to settle with the EPA. Orion was the last and settled in late December 2017. As a result of the settlement, Orion paid civil penalties of \$800,000 and agreed to install and operate up to date pollution control technologies to reduce emissions of harmful air pollutants. Orion has stated its intention to install scrubbers to reduce sulfur dioxide emissions at two facilities and technology to reduce nitrous oxide at all four of its facilities. They have until the end of 2023 to comply.

The increasing cost of the EPA compliance has been and remains an overhang for Orion's stock. At the time of the settlement it was estimated that the capital projects to be implemented would cost around \$100mn over five years. The market took the original announcement in stride as \$20mn/year over five years was manageable. However, since then, due to poor original cost projections, cost overruns and delays in implementing construction Orion has increased the cost of EPA compliance three times. From conversations with former employees our sense was that internally, the original \$100mn estimate was always seen as too low. Communication between finance and engineering improved, and internal employees as well as consultants with project management experience have helped refine the estimates. Still, on the Q1 2020 conference call Orion again increased the estimate to a mid-point of \$250mn in total up from \$190mn, partially because of labor cost inflation along the Gulf Coast and delays due to Covid-19. Our sense is that this should be it in terms of additional cost. However, it remains to be seen and any additional cap-ex, however low a probability, cannot be ruled out. It should be noted that current CEO Corning Painter was not involved in the initial estimates as he joined in Summer 2018.

OEC EPA Cap-ex	2017	2018	2019	Current	OEC Cap-Ex Total	2020	2021	2022	2023
Low		\$ 110	\$ 140	\$ 210	EPA Cap-Ex	\$ 50	\$ 60	\$ 60	\$ 15
High	\$ 100	\$ 140	\$ 190	\$ 250	Maintenance	\$ 40	\$ 40	\$ 40	\$ 40
Increase		\$ 40	\$ 50	\$ 60	Growth	\$ 30	\$ 25	\$ 25	\$ 45
Total Est. EPA Cap-Ex	\$ 250				Total Cap-Ex	\$ 120	\$ 125	\$ 125	\$ 100
Spent (2018-2020)	\$ 115				Total US Cap-Ex	\$ 78	\$ 86	\$ 86	\$ 49
Remaining (2021-2023)	\$ 135								
Avg/Year	\$ 45								

Source: Orion Engineered Carbons

With each cost overrun, it is apparent the market is losing patience with Orion. At least part of the bull case going into 2019 and 2020 was that capex would normalize and free cash flow would inflect. Instead, Orion will be spending an average of \$120mn/year from 2020-2023 in total cap-ex compared to a more normalized \$40mn/year of maintenance and \$40mn/year or so of growth and discretionary cap-ex. The incremental regulatory capex with an uncertain return delays Orion's ability to generate excess free cash flow to return to shareholders leading some investors to put Orion in the penalty box.

The flipside of the required EPA cap-ex and increased regulation are threefold:

1. The Cost of Adding New Capacity and Increased Operating Costs to Produce Carbon Black Have Raised Barriers to Entry in the US

- There has not been a new carbon black facility built in the US in over a decade. Even if a factory could get through permitting (2 years) which is unlikely, it would take 3 years to build which limits

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the potential for any meaningful new supply additions over the next 3-5 years. The increased cost of environmental compliance and low returns on capital further limit any potential new supply from anything other than yield enhancements and small brownfield extensions.

2. The Price of Carbon Black Required to Recover the Increased Capital and Operating Costs Has Increased

- The increased capital and operating costs have raised the cost operating as well as the cost of new capacity, which is currently estimated at over \$1,500/ton compared to carbon black prices in the US at less than \$1,000/ton. Current carbon black prices in the US do not allow Orion to earn a return on capital after factoring in the new mandatory environmental cap-ex to their asset base. There will be zero supply response to meet future demand without significantly higher carbon black prices in the US (40-60% increase).

3. New Equipment Allows Orion to Source Additional Low-Cost Feedstock That Can Potentially Increase Yields and Outputs

- As a result of the newly installed scrubber and emission reducing technology, Orion will be able to use dirtier and potentially discounted feedstocks. Orion already has a competitive advantage in sourcing and utilizing a variety of feedstocks. Increased regulations and the implementation of IMO 2020 could limit demand and pressure pricing for heavy, negative API type crude's which have favorable characteristics and better yields that make them attractive to carbon black customers and producers. Also, in the United States, emissions are measured on the output of a factory compared to in Europe where regulations are based on the inputs. This is a potential underrated advantage as Orion will be able to process cheaper, dirtier feedstocks and produce end products that are as environmentally sound as global peers.

US Carbon Black Industry Overview

The US carbon black industry is concentrated with five large producers. Sid Richardson, which was bought by Tokai Carbon in 2018 is the largest producer by nameplate capacity with the remainder evenly split. There has not been a new rubber carbon black facility built in the US in over a decade. Given the cost of compliance and weak near-term demand we think it unlikely new capacity will be added in a meaningful way over the next decade. Even if a new greenfield plant were to be commissioned, it would take 1-2 years of permitting and 2-3 years to construct. While producers can add on to existing facilities and undertake projects to improve yields to meet increased demand, we do not see capacity extensions as a priority in today's depressed price environment.

U.S Carbon Black Capacity: Top Producers			
Producer	Capacity (kmt)	% Total	# Plants
Sid Richardson (Tokai)	440	24%	3
Cabot	380	21%	3
OEC	370	20%	4
Continental Carbon	305	17%	3
Birla	320	18%	2
Total	1815	100%	15

Source: Tokai Carbon/Sid Richardson

Pre-Corona, tire capacity in the US from on shoring and demand for rubber black was outstripping increases in carbon black capacity and supply. The chart below from Tokai Carbon/Sid Richardson shows that in 2018, suppliers were estimating shortages. However, it should be noted that headline capacity figures and utilization understate how tight the industry was in 2018 and 2019. Not all capacity is the

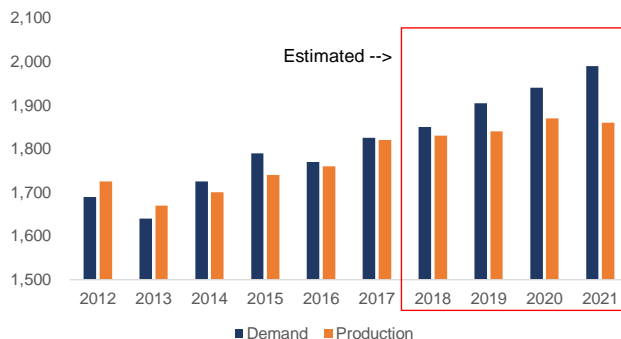
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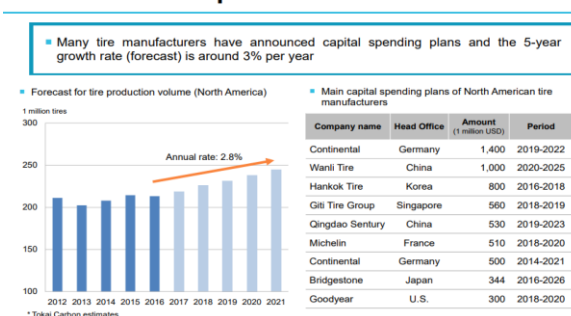
same and with the trends towards larger tires and more complex carbon black formulations, effective capacity in the US is closer to 90%, not 100%.

NA Carbon Black Supply and Demand Balance (est. as of 2018)



Source: Tokai Carbon

Forecast for tire production in North America



Replacement tire demand accounts for 70% of all tire demand and is less cyclical than tire demand from new cars. Over the last few years there has been a shift towards so called "HVA" or high value-added tires. These tires are more premium, have better performance characteristics and are taking a larger share of the total replacement tire market. According to Pirelli, premium and high value, technical tires are growing at 4X the rate of commodity, low value tires. In addition to more premium tires, those made in the US have gotten larger. Greater than 18-inch diameter tires to meet demand for light SUVs and pickup trucks, the fastest growing car categories in the US, is an important trend as well. Finally, while small as a percentage of total vehicles, electric vehicles are heavier and add more wear to tires. According to one tire manufacturer we spoke with, hybrid and electric vehicles are a tailwind as they require more carbon black. He also told us that some electric vehicle tires are wearing out as early as 20,000 miles because of the increased weight associated with EV's compared to a more normal 60,000 miles. All these trends: EV's, larger, more premium tires are favorable for carbon black producers.

Most carbon black suppliers produce the same, high-volume commodity rubber black grades. However, there are also many custom and technical grades that are made specifically for customers. Orion produces over 60 grades of rubber carbon black compared to peers in the US like Sid Richardson, who produces 20. Orion over indexes to more premium grades. These so-called technical tires require additional treatment following a typical furnace black production process or are made from a higher quality carbon black feedstock with fewer impurities and residual particles. Orion's competitive advantage comes from sourcing different feedstocks that have desirable properties, and how Orion operates its assets to run those feedstocks and remove impurities. The ability to remove imperfections and improve quality of the carbon black yields better, higher quality carbon blacks to meet customer specifications allows Orion to earn a premium for quality and reliability. As each grade of rubber black requires a different operating configuration, Orion also operates their plants differently than some peers with more frequent, shorter product runs and more change overs. The higher margin and greater turn over allows for greater gross profit compared to large, furnace black operators who produce the same line of commodity rubber black over and over maximizing uptime to leverage fixed costs. In addition to technical tire grades, Orion produces mechanical rubber goods (MRG) including things like conveyor belts, valves, and other technical grade rubber black products. We estimate that MRG EBITDA per ton is 30% higher than the average product in Orion's rubber black division. Despite less capacity than Sid Richardson, Orion has higher margins in its rubber black division because of better mix.

Orion and Cabot Corporation (Ticker: CBT), Orion's most direct competitor, have indicated that despite the strong rubber black price gains in the US over the last few years, because the increased cost of EPA compliance, rubber black prices in the US are not supportive of re-investment economics. Said differently,

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their US divisions are not earning their cost of capital. To meet current (pre-covid) demand and expected increases in demand for carbon black over the next 3, 5 and 20 years, carbon black prices need to raise to justify any potential additional capacity and to cover the cost of investments made to meet EPA standards. Clearly, in the current operating environment with depressed volumes and demand, rubber black producers negotiating power is limited. Prior to Covid-19, Orion was forecasting volume declines in rubber and specialty offset by 3-4% pricing gains for 2020. We do not know where demand will end 2020 but early indications are that volumes could decline 20-30% for the year based on commentary from tire producers and Orion. A period of weak demand makes pricing negotiations for rubber black producers more difficult over the next 12 months. Demand will need to recover before suppliers have much negotiation power. However, based on pricing gains in 2018 and 2019 and conversations we had with customers; tire manufacturers understand how tight the market can be once demand returns.

Orion's CEO Corning Painter summed up his view on the outlook for US carbon black at a conference in 2019 below:

"I think the key thing we are trying to emphasize and educate our customers on is the limited supply availability in the industry – particularly in North America – over the next few years and how far current pricing is below our cost of capital. With additional tire capacity starting up in North America, no new significant carbon black capacity in the works, transportation costs for imports, and increased capital cost of carbon black stemming from EPA upgrades, we think there is a certain value for quality, reliable, supply that we are hoping to impress upon our customers"

Source: CapitalIQ

It is not just Orion that is indicating pricing will need to be higher in the US because of the required EPA cap-ex. Below is a quote from Cabot CEO Sean Keohane on Cabot's Q1, 2020 earnings call:

"...we think it is an important industry issue, where in order to provide long-term supply reliability and surety to our customers and to do it in a way that is ever more sustainable, and all of our customers care about sustainability.....and so...these investments are clearly lined up to support sustainable and consistent supply of carbon black over time, and that does mean that pricing has to – has to move higher in order to get a cost of capital on that and the return on that. And, ultimately, that will have to get pushed down the chain to us as tire consumers who will pay some small increment for a more sustainable tire. And so, that's the narrative, and that's what we have been pushing and stressing with our customers, and its been an important underpinning of pricing in this industry. Now does that change with COVID? No, I don't think it does. We'll have to see how demand responds and begins to recover, and that's always a factor in the sort of rhythm of the business. But that necessity has not changed and our conviction around that has not changed and we'll continue to advance the narrative and make progress with customers on this front because it's the only way we can provide sustainable supply to them over a long period of time and I think they know that"

Source: CapitalIQ

Carbon Black Price Recovery Towards Cost of Capital Pricing and Volume Recovery Will Lead to Rubber Black EBITDA Growth

We believe that higher rubber black prices in the US will allow Orion to increase the EBITDA potential of their rubber black business by 20-30% without attracting meaningful imports or substitute products. In theory, higher prices for carbon black in the US could attract low price carbon black imports. However, carbon black is largely a regional market, and US imports account for less than 10% of total US carbon black supply. The reduction in coal tar pricing in China makes any arbitrage unattractive and imports

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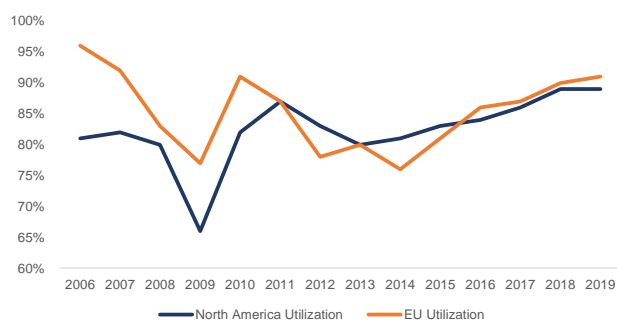
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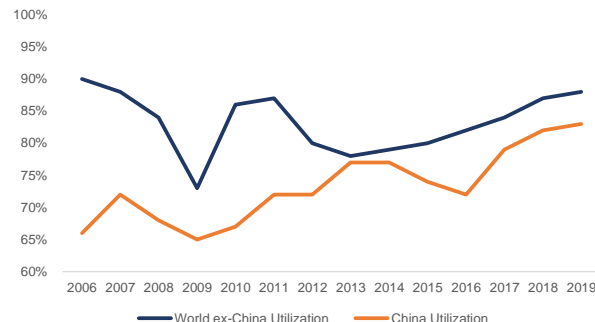
unlikely limiting the risks of new supply disrupting the potential pricing cycle in the US. The bigger risk to a pricing cycle is from low quality, cheap tires imported from Asia that indirectly import cheap carbon black. However, demand trends and capacity additions in the US have been to higher value, larger tires and away from low end commodity tires. While silica is currently used as a rubber black substitute in tires, we believe due to technical limitations, silica isn't competitive versus carbon black at scale and oil prices would need to be \$80-\$100 before any meaningful incremental substitution. **(See Appendix for a deeper discussion on imports and substitution)**

There is precedent for a potential carbon black pricing cycle. As demand for carbon black increased in 2015 and global capacity began to be rationalized, utilization at carbon black producers increased leading to an increase in carbon black prices globally. Orion was able to take favorable price increases from 2016-2019, first in Europe and then in the US, both of which helped lift profitability. As a reflection of how tight the carbon black market in the US was in 2018-2019, tire customers began coming to carbon black producers as early as May of 2018 to negotiate and lock in carbon black prices for 2019. Orion was also able to get a mid-year price adjustment in 2019 and according to the company, Orion was in a sold-out position for most of the last three years in the US.

Utilization: North America and Europe



Utilization: China and World Ex China



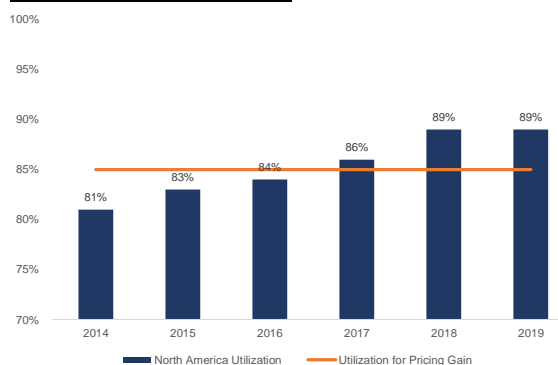
Sources: Notch Consulting and JPMorgan

Carbon black prices in the US began to increase as North American and global utilization picked up above 85% in 2016. Below we show where carbon black prices are today relative to the last six years, and where we think they need to go for Orion to earn its cost of capital after spending the required EPA cap-ex.

Est. US Carbon Black Price Overtime and Cost of Capital Price Pre and Post EPA Cap-Ex



North American Carbon Black Utilization



Sources: JPMorgan, Bloomberg, Datastream

On the following page we attempt to break down how we arrive at > \$1,500/ton as the price that is required for Orion's consolidated rubber black division to earn its cost of capital after accounting for the

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EPA cap-ex. First, we look at what current replacement cost in the United States is. Sid Richardson was purchased by Tokai Carbon in 2018 for \$310mn. It was understood at the time they would have to spend an additional \$100mn on EPA related cap-ex. Based on 400 thousand metric tons of capacity, we estimate the deal was done at \$932 per metric ton of capacity. Orion and Cabot, in public documents (conference call transcripts) and in conversations with employees indicate the cost of greenfield capacity in the US, inclusive of new scrubber technology is over \$1,500/metric ton (Orion) and closer to \$1,600/ton (Cabot). Below we attempt to square that analysis. If we apply the \$700/ton for the stand alone factory and technology of the Sid Richardson deal (not adjusting for quality/volume differences) and apply an average compliance cost/ton of \$667/ton based on Orion's forecast, we quickly see how \$1,500/ton that Orion and Cabot claim is reasonable.

Taking \$1,500/ton as a minimum price required to earn a 10% return on capital, we can back into what the required average selling price of rubber carbon black and EBITDA margin is for Orion's rubber black division. We estimate that rubber black average selling prices would have to average \$1,500/ton up from \$1,250/ton in 2019, and less than \$900/ton currently. This analysis is for the entire rubber black division at Orion, not simply the US. According to the Orion, the European and Asian rubber black divisions are both currently earning their cost of capital and we believe the competitive dynamics there will allow them to again as demand returns. This implies that US prices would have to rise greater than 20% from 2019 levels. Holding ex US prices/profitability contribution flat in a recovery, we think that number is more on the order of 40-60% from the US segment.

Sid Richardson/Tokai	
Deal Price (\$mn)	\$ 310
Capacity (kmt)	440
EV/Ton	\$ 705
Compliance Cost (mn)	\$ 100
Total Cost/Ton	\$ 932

OEC EPA Cap-ex	High	Low
Total Cost (mn)	\$ 270	\$ 230
US Total Capacity	375	375
Compliance Cost/Ton	\$ 720	\$ 613
Avg. Compliance Cost/Ton	\$	667

Est. EV/Ton Cost	
Tokai + OEC Compliance	\$ 1,371 : Calculated
Est. Cost Greenfield (inc. compliance)	\$ 1,500 : OEC Company estimate. Inc. scrubbers
Est. Cost Greenfield (inc. compliance)	\$ 1,600 : CBT Company estimate
Average	\$ 1,490

Required Return (Post Tax EBIT/Ton)	10%	\$ 150	Post Tax EBIT @ \$1,500/ton
Tax Rate (Global)	30%	\$ 45	Tax
Maint-Cap-ex/Ton	5%	\$ 30	Maint Cap/D&A
After Tax FCF/Ton	5%	\$ 75	FCF/Ton
EBITDA/Ton	15%	\$ 225	EBITDA

2019 EBITDA/Ton Total Rubber Black	\$ 188
Required vs. Actual EBITDA/Ton	\$ 37

ASP Required for 10% After Tax ROIC	\$1,500	: Implies RB ASP need to rise 20% from 2019 level
ASP of OEC Rubber Black Division 2019	\$1,254	: and > 50% increase from current, depressed price in US
Current RB Prices in US (March 31, 2020)	\$925	: US required price inc. > Ex.US as US has lower EBITDA/Ton

Difference/Implied Price Gains

From 2019 ASP	20%
3/31/2020	62%

Sources: Porter Street Estimates, Orion Engineered Carbons, Cabot, Sid Richardson/Tokai

The addition of the EPA capex to the rubber black division's asset base raises the absolute level of after-tax operating income Orion's rubber black division must generate to earn its cost of capital. On the following page we try and break this out another way. Of note, this is **not our forecast**, but rather an attempt to back into what is required and whether that is reasonable and realistic about what potentially could unfold. Zooming in on 2023, the year Orion will be done with the EPA cap-ex, we can estimate the

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Porter Street Research

By Alex Jones alex.jones@porterstreetresearch.com

rubber black division's total asset base and what is required to earn a 10% after tax return on capital and the required level of EBITDA. We can also estimate what the contribution from the US division is. After accounting for all of the EPA related cap-ex, Orion's rubber black EBITDA would have to increase about 36% from 2019 to earn a cost of capital of 10%. The US division would have to increase its EBITDA by 64%.

Rubber Black Required Earnings							
	2019	2020	2021	2022	2023	2024	
Total RB Assets Start	\$ 697	\$ 697	\$ 775	\$ 861	\$ 947	\$ 988	
US Rubber Black Cap-Ex		\$ 67	\$ 76	\$ 76	\$ 31	\$ -	
of Which EPA Cap-ex US		\$ 50	\$ 60	\$ 60	\$ 15	\$ -	
Total Cap-Ex	\$ 120	\$ 125	\$ 125	\$ 95	\$ 80	\$ -	
Total RB Cap-ex (Global)	\$ 78	\$ 86	\$ 86	\$ 41	\$ -	\$ -	
End Total RB Assets	\$ 697	\$ 775	\$ 861	\$ 947	\$ 988	\$ 988	
ROIC Required RB (Total)	8.6%	10%	10%	10%	10%	10%	
Post Tax EBIT	\$ 60	\$ 74	\$ 82	\$ 90	\$ 97	\$ 99	
Pre-Tax EBIT (30% Tax)	\$ 86	\$ 105	\$ 117	\$ 129	\$ 138	\$ 141	
D&A	\$ 60	\$ 60	\$ 60	\$ 60	\$ 60	\$ 60	
Total Adj. EBITDA Required	\$ 146	\$ 165	\$ 177	\$ 189	\$ 198	\$ 201	
Increase from 2019		13%	21%	30%	36%	38%	
US Assets	\$ 279	\$ 345	\$ 421	\$ 497	\$ 527	\$ 527	
US % of Total Assets	40%	45%	49%	52%	53%	53%	
ROIC Required RB		10%	10%	10%	10%	10%	
Post Tax EBIT US Only	\$ 31	\$ 38	\$ 46	\$ 51	\$ 53	\$ 53	
Pre-Tax EBIT US Only	\$ 39	\$ 48	\$ 57	\$ 64	\$ 66	\$ 66	
US D&A	\$ 27	\$ 29	\$ 31	\$ 32	\$ 32	\$ 32	
US Adj. EBITDA	\$ 58	\$ 66	\$ 77	\$ 89	\$ 96	\$ 98	
Increase from 2019		13%	32%	52%	64%	68%	

Sources: Capital IQ, Porter Street Estimates

Below is a sensitivity table to arrive at various levels of rubber black EBITDA based on average selling prices and utilization.

Rubber Black Key Stats		Rubber Black Earnings Potential					
Avg. Volume (2015-2019) KMT	827	Average Selling Price Inc. from 2019	2019 Actual			Cost of Capital est.	
Capacity	922		\$ 1,254	\$ 1,379	\$ 1,442	\$ 1,500	\$ 1,630
Avg. Utilization (2015-2019)	90%			10%	15%	20%	30%
2015 - 2019 Avg. Adj EBITDA	\$ 122						
Avg Selling Price	\$ 1,086						
2019 Price RB Division	\$ 1,254						
Cost of Capital US Price	\$ 1,500						
			ASP				
		Utilization	\$ 1,254	\$ 1,379	\$ 1,442	\$ 1,500	\$ 1,630
		Inc from 2019		10%	15%	20%	30%
		85%	\$ 147	\$ 162	\$ 169	\$ 176	\$ 192
		90%	\$ 156	\$ 172	\$ 179	\$ 187	\$ 203
		93%	\$ 160	\$ 176	\$ 184	\$ 192	\$ 209
		95%	\$ 165	\$ 181	\$ 189	\$ 197	\$ 214

Source: Porter Street Estimates

To arrive at how we are thinking about the earnings increase in rubber black this cycle, we start with what Orion earned in 2019. Assuming no increase in average selling prices beyond 2019, at 90% utilization, average for a cycle, we think EBITDA can increase by \$11 driven by volume and increased utilization. Assuming only a 15% increase in average selling price, which would be less than cost of capital pricing

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after accounting for the new EPA cap-ex, we think pricing can add another \$23mn in EBITDA. Combined, we think rubber black EBITDA has the potential to increase to \$179mn next cycle.

Rubber Black Estimated Mid Cycle Adj. EBITDA Potential



Source: Porter Street Estimates

This increase is reasonable and achievable based on the potential demand for rubber carbon black and the limited ability of US suppliers to meet it in the coming years. A 20-30% plus increase in the earnings potential of Orion's rubber carbon black businesses as a result of a favorable carbon black pricing cycle in the US would materially improve Orion's margins and free cash flow growth over the coming years and we believe it remains underappreciated by the market.

Recovery in High Margin Proprietary Products and New Product Introductions from Two New Facilities Will Lead to Growth in Specialty Carbon Black

The specialty carbon black business should be able to grow EBITDA this cycle because of a recovery in utilization in the ultra-high margin gas and lamp black products (coatings/pigments) and the addition of two new European specialty facilities in Italy and France. The Italian facility in Ravenna is finishing a conversion of capacity from rubber to specialty adding an incremental 15kmt of specialty capacity which should contribute an incremental \$8-10mn of EBITDA this cycle beginning in 2021. There are also several de-bottlenecking and operational initiatives in specialty black facilities that are underappreciated. Long term upside is driven by Orion's tiny, but high potential position providing carbon black for lithium ion batteries from its acetylene black facility in France which was acquired in late 2018.

By volume, the specialty carbon black market is just 7% but it accounts for 25% by value of the overall carbon black industry and valued at around \$2bn dollars. Orion is the largest producer of specialty carbon black in the world with a 24% market share by volume, and an estimated 40% market share by revenue. Unlike rubber black, the specialty carbon black market has high barriers to entry and is concentrated. The top three players: Orion, Cabot, and Birla control over 65% of the market by volume. Orion serves over 1,000 customers in specialty with top five customers accounting for about 50% of specialty revenues. Many customer relationships date over 30 years. Orion's specialty segment EBITDA margins are > 1,000 basis points higher than the rubber black division on average helping Orion's overall return on invested capital average > 20% over time.

Orion's strategy leading up to and following its IPO in 2014 was to shut down unprofitable rubber black capacity and shift the overall production mix from commodity rubber black to MRG and specialty. Under previous management and private equity ownership, the specialty division's strategy was to expand and enter China and Asia which meant growing market share for volumes of lower margin specialty products

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compared to the high margin, mostly European specialty assets. So far, the strategy has been a success. The specialty black division has grown volumes 35% since 2012 because of capacity additions and converting rubber black lines to specialty. Since 2013, Orion has converted lines within existing capacity to specialty carbon black from rubber in Sweden and at two US factories: in Borger, Texas (30 kmt) and Belpre, Ohio (20 kmt) as well as a facility in Korea. Overall, specialty volumes account for 25% of total volumes up from 20% in 2012. The flexibility to add specialty lines or convert existing assets is somewhat unique to Orion. Most large competitors run one or two furnace black lines and prefer to run the plants full out making the same grades of mostly commodity rubber blacks repeatedly. Orion's smaller, more technical asset base gave them flexibility to upgrade and convert to specialty over time.

Specialty Carbon Black Market: Top Producers

Producer	Production (kmt)	% Total	# Plants
OEC	251	24%	8
Cabot	241	23%	
Birla	199	19%	
Others		34%	
Total	1047	100%	
Top 3	691	66%	

Source: Phillips Carbon Black

According to Phillips Carbon black, an Indian competitor, there are two major categories of specialty carbon black:

1. Highly proprietary customized grades where clients work directly with a producer to develop custom formulations for the life of a product.

Example: Orion develops custom grades of product used in automotive coatings which can last 5-7 years of production runs after taking 2-3 years to develop with the customers. Paints and coatings that are pigmented with carbon black offer exceptional jetness, enhance UV stability and prolong the life of the coating.

2. Cleaner versions of more conventional rubber grades of carbon black for different (non-tire) product configurations. By cleaner, we mean cleaner and more pure grades or traditional rubber grades that contain lower levels of residual sulfur or products.

Example: Orion produces carbon blacks that are FDA grade meaning they can go in products that can be eaten off. The carbon black needs to be processed such that there is no residual chemicals or sulfur that would be harmful when consumed in trace amounts.

Major product categories and applications for specialty carbon black include plastics and polymers, inks, fibers, toners, paints, and coatings. Orion's specialty black division's strength is a result of their legacy gas and lamp black assets which are proprietary to Orion. At least part of the barrier to entry around gas and lamp black is that so few competitors over the years maintained their equipment. Orion's gas black facilities date back to the 1920s in Germany. For years competitors had similar assets but given the low volume, poor yields, cost to maintain and difficulty operating assets, most simply closed. Orion and its legacy owners (Degussa/Evonik) maintained and continued to develop the assets into what they are today. There is a high degree of human capital and operating knowhow that comes with operating the assets. It is our understanding that there are a handful of other gas black operations in the world: in Canada and China, but none can match the quality and purity of Orion's. The particle size produced by the gas black technology at Orion is unmatched and the uniform molecule size produced with gas black makes it easier to blend and disperse with other polymers. The outputs of these production processes produce extremely fine carbons whose properties are highly valued and essential in making products like paints, coatings, pigments, and polymers shine and add strength. Despite representing less than 5% of

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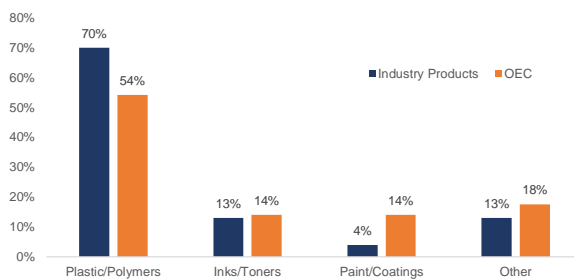
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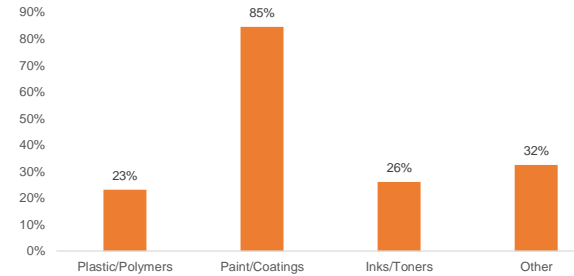
the total cost of the product some of the additive-like products are essential and give Orion a degree of pricing power and allow them to absorb fluctuations in inputs prices over time.

As the largest specialty carbon black producer, Orion makes over 280 grades of specialty carbon black and about 20% of their products are sole sourced and patented. Industry wide, 70% of specialty carbon black is used in plastics and polymers. A large portion of these products are simply cleaner versions of rubber black pellets that are sent to so called “master batchers” and then used to make various plastics components further down the line after additional treatment. Orion over indexes to high margin, high value, but lower volume specialty carbon black products. In paints and coatings, we estimate that Orion has over an 80% market share and competition is based on reliability and product quality, not price. The difference between average selling price and gross profit/ton is extreme in specialty carbon black. Lower value specialty products like plastic pipes can earn \$500-\$700/ton. Certain hard to manufacture products like coatings and pigments can earn up to \$10-\$20,000/ton, albeit at much lower volumes based on conversations we have had with customers and suppliers.

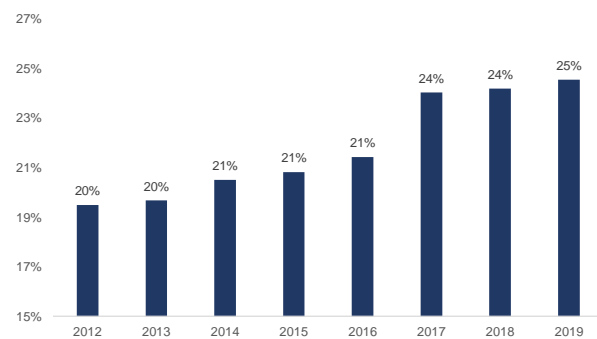
Specialty Carbon Black Use by Applications: Industry vs. OEC



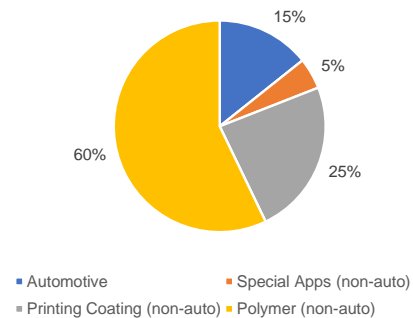
OEC Estimated Market Share by Application



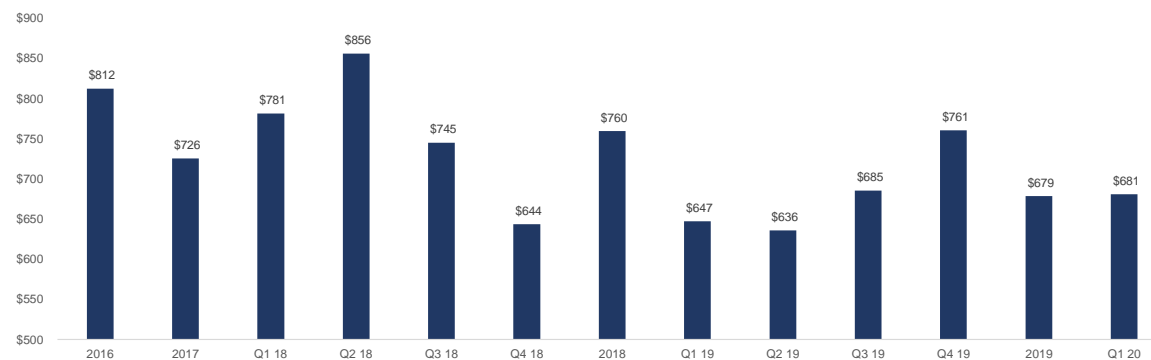
Specialty Volumes as a Percentage of Total



Specialty Carbon Black End Market by Volume (2019)



Orion Specialty Carbon Black Gross Profit/Ton 2016 - Q1 2020



Source: Orion Engineered Carbons

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There are two key drivers to our outlook for the specialty division's earnings potential this cycle: First, we see upside from a recovery in utilization in Orion's early cycle, proprietary high margin coatings applications for use in the automotive industry. These are the highest margin products Orion produces and as we will show, have a disproportionate effect on overall profitability. As auto production recovers, we believe even small incremental changes in demand will have a large impact on this ultra-high margin segment.

Second, we see upside from two new facilities: one that was acquired in 2018 in France, and the other, that will be operating at capacity by 2021. Orion's acquired SN2A, from LyondellBasell in late 2018. With the acquisition, Orion acquired an acetylene black facility in France. Acetylene is an ultra-premium carbon black that distinguishes itself based on high electrical and thermal conductivity. The acetylene facility is unique and adds to Orion's roster of sole source or near sole source production techniques and products. Orion has stated that the goal was to use the facility to continue to expand into the lithium ion battery market where customers value acetylene's properties. Carbon black is considered an essential additive for lithium ion batteries and without the conductive properties it provides, the electrical current wouldn't be able to flow through the battery. Currently, the facility is in a sold-out position and once the company refines the acetylene production process, it is likely Orion will expand acetylene capabilities to other facilities to help supply growing demand for electric vehicle components. When acquired, the facility was doing \$10mn in revenue per year. For now, the facility is small, and Orion is still in the process of getting qualified with customers (2-3 year process). The lithium ion battery and electric vehicle market is small but growing rapidly and only Tokai and Orion can deliver acetylene for lithium batteries at scale. We think the facility is capable of adding only \$2-\$4mn of EBITDA in the near term with the potential for significant growth down the road.

Finally, Orion is in the process of converting their Ravenna, Italy factory by adding a line for specialty products which will be complete in 2021. Orion management has stated that over the next few years the facility can produce 20k metric tons/year from 5k today at around \$700/ton in gross profit – in line with historical averages for the specialty segment. Assuming a similar flow through to EBITDA, we see the facility capable of adding \$8-10mn of average EBITDA to the specialty division in the coming years.

Estimating what the specialty division will earn is a challenge. In 2019, volumes in the specialty division fell 4%, offset by price increases, yet gross profit/ton fell 11% implying a greater share of less profitable volumes. In addition to customers reducing production in 2018/2019 in high margin coatings and pigments, pipe and polymer applications for use in the oil and gas sector have hurt the division's profitability. A clear risk in the specialty segment is that it is dependent on a few high value, low volume products that have a disproportionate effect on Orion's overall profitability. Also, Orion has a high market share in inks and toners which is a business in secular decline. The unpredictable volume growth and lack of disclosure about what the drivers of profitability are adds to investor confusion. We think this limits investors willingness to assign a higher multiple to the division compared to what a business with similar characteristics would likely get. Many specialty chemical peers trade between 10-14x EBITDA vs. Orion at less than 7X on average over a cycle. As shown above, Orion's Gross Profit/Ton peaked in 2018 and trended down since. We believe the drop in production and utilization in the coatings, (gas and lamp black division) led to the 16% decline in Adj EBITDA from 2018 to 2019. Below we attempt to estimate and break out what has caused some of the downside in gross profitability of the specialty division over the last few years. We do this to demonstrate just how disproportionate Orion's coatings segment is to their overall earnings and are using our best guess in trying to estimate GP/Ton and utilization. We then use this framework to estimate the division's earnings potential 3-4 years out under more normal conditions.

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2018	OEC Specialty Division Estimated Gross Profit By Product					
Production Estimates	Capacity	Utilization	Volume	GP/Ton	\$ Gross Profit	
Coatings	25	87.5%	22	\$ 3,000	\$ 66	
Plastics	27	91.2%	25	\$ 750	\$ 18	
Others	50	95.0%	48	\$ 750	\$ 36	
Gas & Lamp Black	102	92.2%	94	\$ 1,274	\$ 120	
Coatings	12					
Plastics	114					
Others	32					
Furnace Black	158	100.0%	158	\$ 500	\$ 79	
Total Specialty (kmt)	260	96.9%	252	\$ 789	\$ 199	
Adj EBITDA					\$ 145	

A decline in utilization at Orion's ultra-high margin gas and lamp black coating facilities led to a decline in gross profit and a 16% reduction in EBITDA from 2018 to 2019.

2019	OEC Specialty Division Estimated Gross Profit By Product					
Production Estimates	Capacity	Utilization	Volume	GP/Ton	\$ Gross Profit	
Coatings	25	70.0%	18	\$ 2,500	\$ 44	
Plastics	27	95.0%	26	\$ 700	\$ 18	
Others	50	97.5%	49	\$ 600	\$ 29	
Gas & Lamp Black	102	90.1%	92	\$ 990	\$ 91	
Coatings	12					
Plastics	114					
Others	32					
Furnace Black	158	100.0%	158	\$ 500	\$ 79	
Total	260	96.1%	250	\$ 680	\$ 170	
2018 vs 2019			-5%	-14%	-14%	
Adj EBITDA					\$ 122	
2019 - 2018 Decline					-16%	

Using this framework, below we estimate what we think Orion could earn this cycle based on a recovery in coatings utilization and the two new facilities.

2023	OEC Specialty Division Estimated Gross Profit By Product					
Production Estimates	Capacity	Utilization	Volume	GP/Ton	\$ Gross Profit	
Coatings	25	87.5%	22	2,750	60	
Plastics	27	92.5%	25	700	17	
Others	50	92.5%	46	700	32	
Gas & Lamp Black	102	91.3%	93	\$ 1,182	\$ 110	
Ravenna Italy Conversion	20	95.0%	19	\$ 700	\$ 13	
Acetylene	5	90.0%	5	\$ 800	\$ 4	
Coatings	12					
Plastics	114					
Others	32					
Furnace Black	158	95.0%	150	\$ 500	\$ 75	
Total	285	92.0%	262	\$ 770	\$ 202	
Adj EBITDA					\$ 147	

Sources: Orion Engineered Carbons, Porter Street Estimates

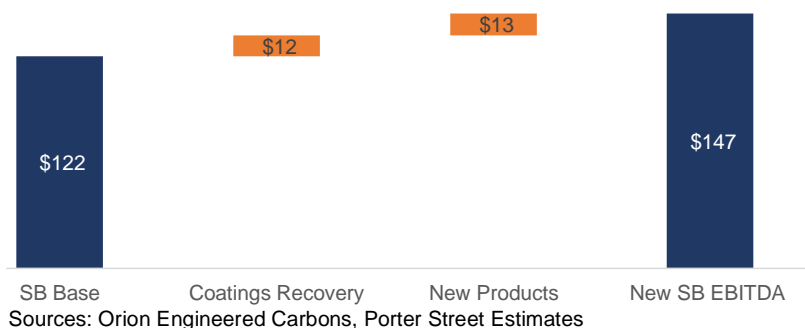
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Adding it all up, we estimate that a recovery and gas and lamp black from coatings can add \$12mn in EBITDA with new products from the new facilities contributing an additional \$13mn during this next cycle.

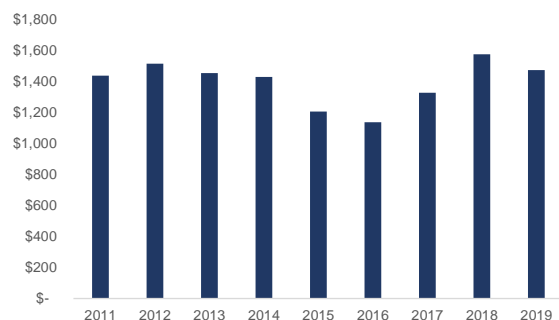
Specialty Black Estimated Mid Cycle Adj. EBITDA Potential



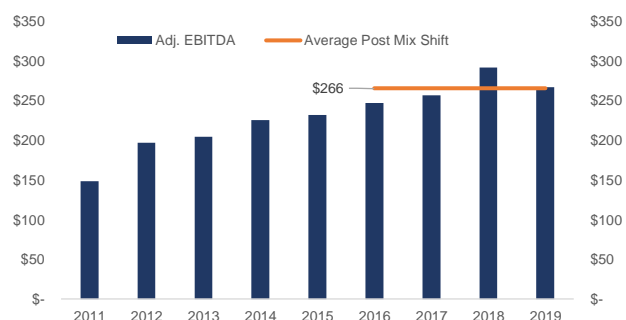
Valuation and Upside Potential in Shares

Following the IPO in 2014, Orion's previous management and remaining private equity ownership had a strategy of shifting Orion's capacity and revenue mix towards specialty and other higher margin applications, like mechanical rubber goods and technical tire grades. As we demonstrated above, volumes at specialty have gone from 20% to 25% of total and the specialty division's contribution to EBITDA peaked at close to 60% in 2016 before falling back to about 50% on the back of improved pricing, utilization and higher oil prices in rubber black. Looking backwards, despite choppy revenue, Orion has grown Adjusted EBITDA over time. Isolating the last four years, where the mix shift has taken place, we take the simply four-year average of \$266mn an apply that as "normalized" Adjusted EBITDA.

Orion Revenue in USD: 2011 - 2019



Orion Adj. EBITDA in USD: 2011-2019



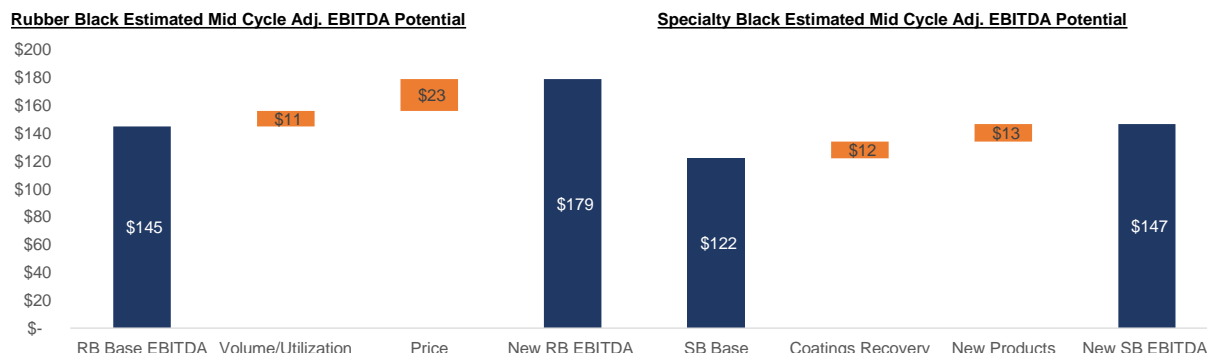
Sources: CapitalIQ and Orion Engineered Carbons.

On the following page is our summary bridge that shows how we think Orion can earn closer to \$325mn this cycle.

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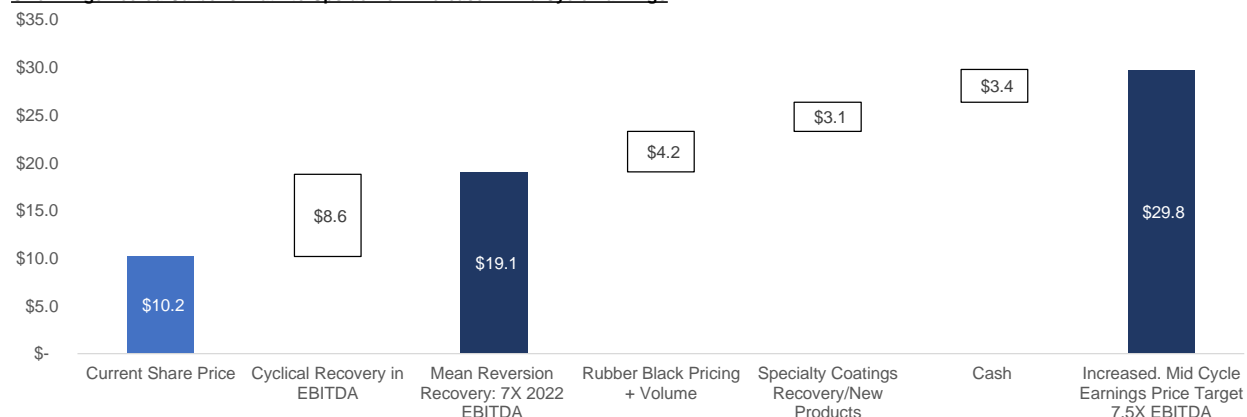
By Alex Jones alex.jones@porterstreetresearch.com



Sources: CapitalIQ and Orion Engineered Carbons.

In a modest cyclical recovery with utilization and demand mean reverting, we think Orion can earn around \$260m in EBITDA and at 7X EBITDA, would be worth \$19/share in an average outcome. However, based on the combination of factors described above and accounting for additional cash generated over the next few years, we think Orion will be worth close to \$30/share during the next up cycle. With utilization at major tire customers down 20-30% in 2020, we think the first step towards a turnaround will be for Orion to re-set 2021 pricing in US rubber black, which may not happen until 2022. While Orion's volumes are set to be down 40-50% in Q2 and Q3, by Q4 2020 and into Q1 2021, we anticipate signs of improvement. Our view is that from depressed 2020 volumes and prices, we think it could take until at least the end of 2022 for Orion to be approaching levels of operating that rivaled 2019, which was a down year for volumes at least partially driven by the closure of 10kmt of production in Korea. We would not expect Orion to be firing on all cylinders until at least 2023-2024 but at that time we believe the signs of a recovery in demand a potential pricing cycle should be clear and reflected in Orion's earnings estimates and share price.

Orion Engineered Carbons: Path to Upside from Increase in Mid Cycle Earnings



Sources: CapitalIQ and Orion Engineered Carbons.

Sources of Additional Upside We Ascribe No Value to Today

While we do not ascribe any value to them, we believe there are four sources of additional upside in Orion's shares over the next few years. No one is key to the thesis, but all are important to understand and worth discussing:

1. Long Term Contracts in Rubber Black

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2. An Increase in Passive Equity Ownership and Re-Rating to Peer Multiples
3. Increased Revenue from Co-Generation at Higher Oil Prices
4. New Management That is Changing Orion's Culture to be Growth and Return on Capital Focused

Long Term Contracts in Rubber Black

Orion CEO Corning Painter, who joined in August 2018, is a Carbon black outsider. He spent his entire career at Air Products, an industrial gas company. Since coming to Orion, Painter has been in active discussions with suppliers to change how rubber black is priced and supplied. Painter wants to move from typical 1-year contracts that are pass through and adjust for price increases and differential surcharges. Painter has said he would like to secure contracts that are 5-10-years. The way the long-term contracts would work is that producers would pay Orion a base reservation fee for a set amount of capacity and volume. Then when that capacity is called, the contract would be structured through a typical pass through arrangement with Orion giving up more of the potential upside from higher oil prices, but also benefiting on the downside from a fixed fee and pass through. Our view is that margins over time would be more stable and less cyclical which could provide more stability and give Orion more comfort in expanding and adding new product lines to meet future demand. The idea for the long-term contracts are like those Painter structured at Air Products (APD) in their industrial gas business. During his time at APD, margins rose > 1,000 basis points following the contract implementation and pricing change. According to Painter, this type of supply agreement will remove some of the upside to the rubber black division but also limits the downside. Together with base price increases these actions should allow the rubber black division to recover the cost of environmental compliance and move towards earnings its cost of capital. We believe it will also provide less margin fluctuation and for more stable earnings and cash flow which may lead to investors place a higher multiple on Orion's shares.

Pre-COVID we did not ascribe any value to Orion signing any long-term contracts. Our view from talking to customers and other US rubber black producers (Cabot and Sid Richardson) is any change in supply agreements is a way off particularly in a weak demand environment like 2020. One competitor gave an example of how when the carbon black market was tight in the US in the early 1990s, they were able to sign a few customers up for 7 year take or pay contracts. The first two years were positive for both sides but when demand declined, customers were stuck paying extremely high prices for the duration of the contracts. That competitor told us that customers still bring up that experience during annual pricing negotiations. From the producer's standpoint, Cabot made the argument that carbon black producers would also not have wanted to lock in carbon black prices in the US from 2-3 years ago. We believe that Painter, as an outsider to the otherwise sleepy but entrenched carbon black industry may have a hard time changing the way carbon black is priced and supplied. The industrial logic of why Painter wants to move to long term contracts make sense, but in practice there are challenges and it is going to take time to get contracts. The best chance to get contracts may be from Orion's MRG customers, where Orion is likely a larger supplier for the specific product and has more weight over their more commoditized tire products. Success could also come on the more technical tire and specialty like grades of tread that Orion produces for customers. To the extent Orion is one of only 1 or 2 suppliers for a carbon black, and they can deliver quality, differentiated product, we see the potential for both sides of the table to agree to longer term contracts. However, for now, the power resides with customers.

Potential for Re-Rating to Peer Multiples and Increased Passive Ownership

As Orion makes the necessary EPA capital investments and earnings recover, we think shares can re-rate to peer Cabot (Ticker: CBT) type multiples. Despite higher gross margins, better inventory turns and higher returns on capital, Orion has historically traded at about a 1X discount on an EV/EBITDA basis. We believe this is in part because of Orion's delay in settling with the EPA and implementing the

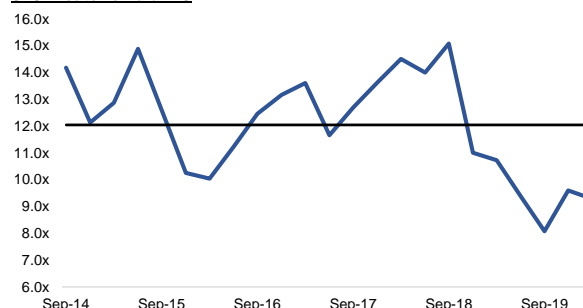
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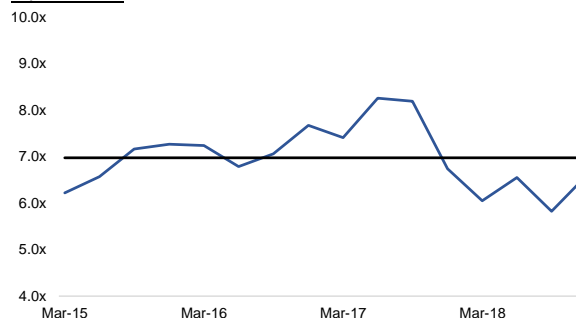
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necessary emissions reduction technology. Orion has traded at average multiples of 12X earnings and 7X EV/EBITDA compared to Cabot, which has traded at multiples of 13.5X and 8.0X, respectively over time. Cabot has additional product lines outside of carbon black, typically runs with less leverage but also has lower returns on invested capital due to lower margins and lower capital turns than Orion. We believe that once the EPA cap-ex is behind them and specialty begins to recover, investors will recognize and reward Orion for its higher returns on capital and free cash flow potential leading to at least multiple similar to Cabot.

OEC Price to Forward EPS



EV/NTM EBITDA



Source: Capital IQ

Orion became eligible as of July 1, 2019 for US index inclusion and was added to the Russell 2000. So far, that is it. Having previously been listed in Europe, we believe Orion will attract additional flows over the next few years from passive and index following funds and ETFs helping support a bid for shares. As shown below we think Cabot's ownership base is over 20% passive, compared to less than 10% for Orion. In today's market, this kind of discrepancy is worth highlighting as the flows to passive can influence liquidity and valuation over time.

Cabot Corporation (Ticker: CBT)

Notable Index Fund/ETFs

Vanguard Total Market	2.8%
iShares Core S&P Mid Cap	2.7%
Vanguard Small Cap Index	2.4%
Vanguard Small Cap Value Index	1.5%
Vanguard Extended Market	1.4%
S&P 400 Mid Cap ETF	0.9%
State Street Mid Cap ETF	0.6%
Total	12.2%

Known Passive/ETF Holders

Vanguard	9.5%
Blackrock	9.1%
State Street	2.2%
Total	20.7%

Orion Engineered Carbons (Ticker: OEC)

Notable Index Fund/ETFs

Russell 2000 ETF	2%
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Total 2.2%

Known Passive/ETF Holders

BlackRock	5%
StateStreet	2%
Vanguard	0%
Total	6.6%

Sources: Capital IQ and Morningstar

Recover in Co-Generation Revenue at Higher Oil Prices

Orion and other carbon black producers use the BTU (energy) content of tail gas generated during the production process to power and operate parts of their large furnace black facilities. In many cases, Orion will then sell the excess power to local factories or facilities and generate additional revenue. Power prices are linked to energy prices and at a lower oil prices and lower factory utilization, Orion loses out on

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this additional source of revenue and operating profit. Orion will not disclose how much revenue it earns from co-generation but based on conversations with competitors (Tokai and Phillips Carbon of India) we estimate it can be between 5-10% of revenue at 60-70% operating margins. In the two plants in the US where Tokai/Sid Richardson operates co-generation, the facilities generate about \$3-\$4mn in revenue each. At least some of the impact from higher oil prices on Orion can be seen below. When oil prices were high and increasing: 2016-2018, Orion's rubber black division performed very well at least partially because of incremental co-gen revenue.

Oil Price Sensitivity and Change in Orion Segment EBITDA

	TTM 2014	TTM 2016	Abs. Change	% Change
Average Oil Price	\$ 99	\$ 45	\$ (54)	(54%)
RB Adj EBITDA	\$ 108	\$ 86	\$ (22)	(20%)
Specialty Adj. EBITDA	\$ 100	\$ 137	\$ 37	37%

	TTM 2016	TTM 2018	Abs. Change	% Change
Average Oil Price	\$ 45	\$ 71	\$ 26	58%
RB Adj EBITDA	\$ 86	\$ 145	\$ 59	68%
Specialty Adj. EBITDA	\$ 137	\$ 149	\$ 12	9%

Source: Orion Engineered Carbons, US EIA

While seemingly small, co-generation is an important source of incremental operating profit and cash flow for Orion. Further, not all of Orion's facilities have co-generation and many can still benefit from new co-generation equipment and yield enhancements that remain under appreciated. Corning Painter has spoken about a \$100mn back log of 15-20% IRR type projects to improve quality, increase utilization and upgrade equipment and facilities. Increasing up time and maintaining equipment to reduce maintenance and downtime are all self-help fixes that Orion should benefit from over the next 3-5 years. An additional silver lining of the EPA cap-ex is that Orion is able to undertake some of these projects simultaneously while installing scrubbers and other equipment. In one plant, Orion is using a newly patented wet sulfuric acid method when utilizing their scrubbers. The co product generated will help Orion lower operating costs at the facility. Co-generation is dependent on the price of oil, but assuming a recovery back to \$60-\$70 per barrel oil, we think the combination of higher co-generation EBITDA and lower operating costs can add an incremental \$10-\$20mn of EBITDA and potentially much more at higher > \$80 per barrel oil.

New Management is Changing the Culture at Orion to be Growth and Return on Capital Oriented

New management led by CEO Corning Painter and CFO Lorin Crenshaw are changing Orion's culture and mindset to be return on capital and growth oriented. They are both incentivized to improve return on capital employed (ROCE) and see shares perform well. Combined, insiders have purchased over \$3mn of stock over the last 12 months.

Corning Painter joined Orion from Air Products (APD) in 2018. He spent his entire career at APD after graduating from Carnegie Mellon in 1984 ultimately heading the global industrial gases business. At APD, Painter thrived under CEO Seifi Ghasemi who is known to be extremely demanding and difficult to work for. The carbon black industry is like the oil and gas industry in so far as there are many people who have only worked in carbon black and are set in their ways. Painter brings and outsiders perspective and already has shown a willingness to think differently and question some of the assumption long held by the industry (see supply/contract discussion). What we gather so far is that the biggest change Painter is making is around communication with employees about the large goals of the business and making the business more return on capital focused. One anecdote is that employees across the company are encouraged to listen to firm wide events where management is forthcoming about the results and opportunities in the business. Painter is changing the way Orion thinks about product development and is

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working to hammer home to his sales and business development people that products need to be priced for Orion to earn a return on capital. Not all sales are good sales. Under previous management and private equity ownership, employees had been compensated based on EBITDA. As a result, any new sales and EBITDA would be rewarded – regardless if they allowed Orion to earn a return on capital. Painter has taken steps to reverse this thinking and shifted incentives down the line at factories to be focused on local, plant level EBITDA and return on capital metrics.

Long term incentive compensation at Orion is based on return on capital over a three-year period as well as relative total shareholder return. Executives are incentivized to see the stock price increase over the next few years as they recover from the recent downturn and execute on growth initiatives. In addition to Painter, new CFO, Lorin Crenshaw joined in late 2019. Both appear to be capable leaders that are bringing a growth mindset to Orion. Over the last two years, top executives have purchased a significant amount of stock. Importantly, the buys were across the management team and included many lower level executives including the SVP of Global Operations, Chief Accounting Officer and SVP of Human Resources. Corning Painter was well compensated at Air Products taking in an estimated \$20mn during the last five years on the job. His buys, while significant, are likely less as a percentage of his net worth and current earnings than other, lower level executives.

Recent Insider Open Market Purchases					
Corning Painter	Date	Shares	Price		Value
	3/3/2020	35,000	\$ 14	\$	485,450
	5/22/2020	50,000	\$ 9	\$	455,500
	8/15/2019	80,000	\$ 12	\$	998,400
	5/1/2019	55,000	\$ 18	\$	962,500
	11/1/2018	36,950	\$ 24	\$	868,325
Total Insider Buys		256,950		\$	3,770,175
Total Shares Owned		322,977			
% of Total Shares Out.		0.5%			

Other Executives	Date	Shares	Price		Value
Lorin Crewnshaw, CFO	5/15/2020	14,750	\$ 7	\$	108,708
Chief Accounting Officer	5/18/2020	5,000	\$ 7	\$	36,600
SVP Global Operations	3/13/2020	2,000	\$ 11	\$	21,160
	2/28/2002	3,600	\$ 13	\$	47,520
SVP Human Resources	3/4/2020	4,250	\$ 14	\$	59,500

Source: CapitalIQ

Risks

1. Weak Demand Recovery Delays Rubber Black Pricing Potential

The current economic recovery remains very weak and highly uncertain. Orion's business recovering will be dependent on an increase in industrial production, automotive manufacturing, and tire production. Utilization at tire manufacturers is expected to be down 20-30% in 2020 with many producers in the US idling production at least temporarily in Q2 2020. Carbon black producers in the US have enjoyed strong pricing gains over the last few years which may limit their near-term negotiating power with rubber black pricing negotiation set to begin in the fall. 2021 pricing could favor customers over suppliers, but we believe base price increases will have to come as a recovery in utilization and increased cost of compliance favors suppliers as the cycle turns.

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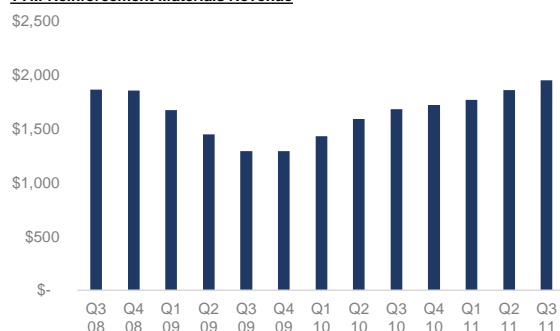
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Mitigants and Charts to Watch:

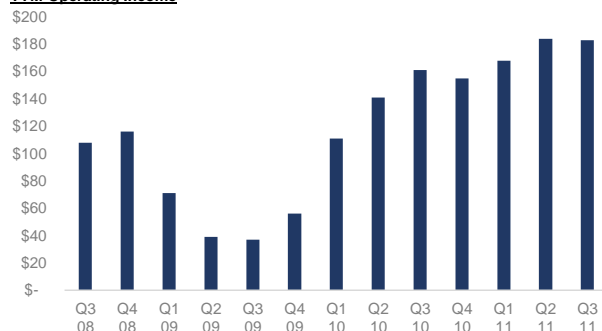
Orion was not public during the 2008-2009 downturn, however management estimated that volumes declined somewhere in the 5-15% range for the full year driven mostly by rubber black. Covid-19 is a different animal and most customer plants didn't shut entirely for extended period of time in 2008-2009 like they have during Covid. Cabot, Orion's most direct competitor was public during that time and we can track what the performance of their reinforcement materials business looked like. We broke the data down in two ways.

First, we looked at revenue and operating income on a trailing twelve-month basis. From the peak in Q3 2008 to the bottom in Q3 2009, revenue fell 30% and did not recover to Q3 2008 levels until Q2 2011. Operating income, while more effected on the downside, falling, 68%, recovered much quicker as the increase in utilization and some pricing benefit helped leverage fixed costs to improve operating margins.

TTM Reinforcement Materials Revenue



TTM Operating Income



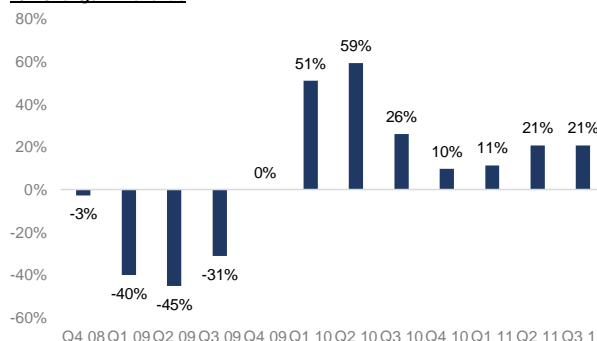
Source: CapitalIQ

The 30% revenue decline in 2009 masks significant volatility intra year as revenue collapsed 40 and 45% in Q1 and Q2 of 2009 with little volume and utilization flowing through the factory. Our conversation with someone at Orion at the time confirmed this experience occurred there: a few quarters of almost no orders and growth and then a rapid recovery.

Quarterly Revenue



Y/Y Change in Revenue



Source: CapitalIQ

Covid is different for a lot of reasons, but we believe that once a recovery begins, Orion could follow a similar pattern. Negotiations for 2021 pricing start in Q4 when utilization will be recovering vs. Q2 and Q3 of 2020 which could be near all-time lows because of Corona related shutdowns.

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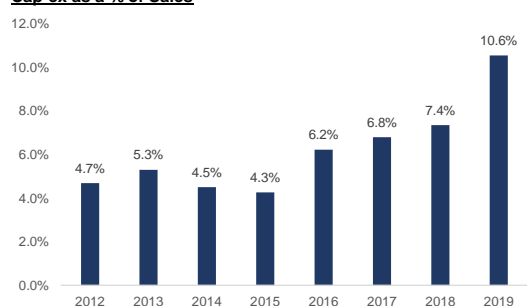
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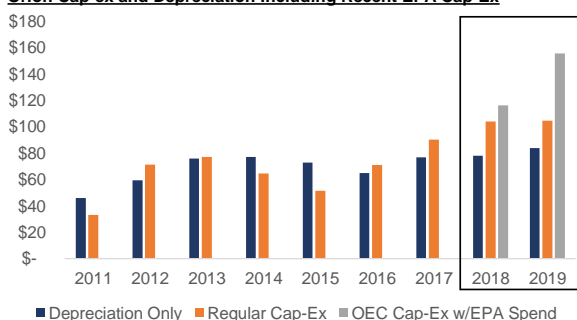
2. Capital Intensity of Orion Increases Limiting Capital Returns and Efficiency

Orion is spending \$50-\$60mn per year in EPA regulatory cap-ex from 2020-2022. Depending on the strength and direction of any recovery, excess free cash flow to help reduce leverage or re-invest in growth projects may be limited. Further, even once EPA-cap-ex is complete, Orion may have to continue to spend cap-ex on capacity to grow to meet customer demand. Any potential inflection in free cash flow, which we think is likely in 2023, could continue to be pushed to the right with more cap-ex and less cash flow to return to shareholders than anticipated. Over the last two years, Orion's cap-ex as a percentage of sales has increased substantially. Once there is visibility to it normalizing that should prove to be a positive catalyst for shares as investors contemplate what an incremental \$80-\$120mn/year of free cash flow is worth.

Cap-ex as a % of Sales



Orion Cap-ex and Depreciation Including Recent EPA Cap-Ex



Source: Orion Engineered Carbons

3. Change in Oil Prices Creates Issues With Pass Through Contracts and Differentials

Rubber black contracts are structured as cost pass through which can help insulate Orion from increases in feedstock prices, which are volatile. Raw materials make up 75% of the rubber black division's cost of goods sold and over 80% are hydrocarbon related. 65-75% of Orion's rubber black contracts are pass through with the majority that are not related are for higher margin MRG products. The pass-through contracts are structured with two parts: a fixed base pricing component and a floating component tied to an oil reference benchmark that is passed on to customers. The floating portion is based on a percentage change formula. When the underlying heavy hydrocarbon feedstock Orion is consuming changes in price by more or less than the reference benchmark in the pass-through contract, Orion's margins will be affected. This has been a challenge in recent quarters as discounts/premiums on regional heavy crudes have shifted and the reference benchmarks, which are typically based on heavy crudes in the US Gulf Coast, Singapore or Antwerp, have been priced above or below what Orion was purchasing creating a negative differential.

Mitigant: Orion and competitors have taken steps to proactively manage the differentials to recover costs by re-setting contracts quarterly and monthly in some cases, down from annually. Orion has also added surcharges for differentials on certain volumes. We view the ability to pass along input cost increases more than what is in the formula-based contracts as a positive

4. Debt and Lack of Free Cash Flow Generation Pressures the Balance Sheet

On a trailing 12-month basis Orion's net debt/EBTIDA is 2.5x with Adj. EBITDA covering interest and fixed charges by 15x and 11x. However, at \$267mn of TTM Adj EBITDA, that number should fall significantly in 2020. Using consensus estimates of \$160mn of EBITDA for 2020, Orion's leverage is close to 4.5x, with interest and fixed charges covered 9x and 6x respectively. As of 3/31/2020, Orion had \$108mn in cash against \$770mn of total debt. Most of the debt is in the form of two term loans, one, a USD based term

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loan for \$283mn matures in July 2024 and the other, a \$324mn euro denominated term loan matures in April of 2024.

We are not worried about liquidity in the near term. Orion has \$247mn of liquidity available at **any** level of LTM Adjusted EBITDA. Further, Orion should generate on the order of \$30-\$50mn of cash from working capital release in Q2 alone and likely generate positive free cash flow for the year as a result. Adj. EBITDA would have to fall to around \$125mn on a TTM basis from \$267mn in Q1 for Orion to breach their covenants. Even in such a scenario we think banks would be willing to work with Orion on a covenant waiver even if it means a small fee or higher interest rate in the near term.

Most relevant for us as it relates to leverage is how quickly Orion can start paying back their debt, specifically their revolving credit facility which they drew down in Q1 2020 as a precaution. The required cap-ex on the EPA projects will not only mask the free cash flow potential of Orion's business, but also mean that Orion will be more levered over the next 6-24 months than they otherwise would like to be. We believe net debt to EBITDA will be under 3.0x and back in Orion's target zone of 2- 2.5x net debt/EBITDA by late 2021/2022. That will hopefully be a more favorable time for them to re-finance their maturing term loans in 2024.

Mitigant: At some point a settlement with Evonik could return \$50-\$100mn to OEC in next 2-3 years and working capital release in 2020 from lower oil prices adds to counter cyclical support to cash flow.

5. Underlying Product Exposure and Risks in Specialty from Market Share Loss and Mix Deterioration

Orion is highly exposed to the automotive sector in both specialty and rubber black. While tire demand is mostly driven by aftermarket and replacement tires, which are more stable than new auto production demand is still cyclical and dependent on people driving, which could be slow to recover post Covid. The margins in Orion's specialty black division's profitability will continue to attract competition which could lower margins going forward. We covered what we believe the drivers of the recent decrease in profitability in specialty are and reiterate our view that they are cyclical and not a result of market share losses. In the super high margin products, we are not worried about competition. Where we are more concerned is in lower margin polymers and plastics, where Orion has greater volumes at risk.

Mitigant: 20% of Orion's products including its most profitable specialty applications have almost zero competition. Orion is opening a technical lab in the US to be closer to customer for product development as they actively grow in their higher margin business. The recent growth in acetylene is also an example of Orion adding new product categories and production process that are sole source or with limited competition.

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Projections

Free Cash Flow Reconciliation + Forecasts						
	2019	2020	2021	2022	2023	2024
Adj EBITDA	\$ 267	\$ 148	\$ 218	\$ 265	\$ 308	\$ 343
Growth Cap-Ex	\$ 40	\$ 25	\$ 30	\$ 30	\$ 45	\$ 45
Maintenance	\$ 35	\$ 35	\$ 35	\$ 35	\$ 40	\$ 40
OEC Biz. Cap-Ex	\$ 75	\$ 60	\$ 65	\$ 65	\$ 85	\$ 85
EPA Related	\$ 60	\$ 60	\$ 60	\$ 60	\$ 15	
Total Cap-Ex Spend	\$ 135	\$ 120	\$ 125	\$ 125	\$ 100	\$ 85
EBITDA-Cap-ex Core OEC	\$ 192	\$ 88	\$ 153	\$ 200	\$ 223	\$ 258
EBITDA- Cap-ex w/EPA	\$ 132	\$ 28	\$ 93	\$ 140	\$ 208	\$ 258
Depreciation	\$ 78	\$ 80	\$ 80	\$ 80	\$ 81	\$ 82
Amortization	\$ 18	\$ 16	\$ 14	\$ 12	\$ 10	\$ 8
Total D&A	\$ 96	\$ 96	\$ 94	\$ 92	\$ 91	\$ 90
R&D	\$ 20	\$ 20	\$ 20	\$ 20	\$ 21	\$ 22
EBIT	\$ 151	\$ 32	\$ 104	\$ 153	\$ 196	\$ 231
FCF Pre-Cap-Ex/WC/Div	\$ 197	\$ 106	\$ 154	\$ 186	\$ 215	\$ 238
Total Cap-Ex	\$ 135	\$ 120	\$ 125	\$ 125	\$ 100	\$ 85
Dividend	\$ 48	\$ 10				
Debt Service	\$ 8.0	\$ 8.0	\$ 8.0	\$ 8.0	\$ 8.0	\$ 8.0
Change in WC	\$ -	\$ 20	\$ (15)	\$ (15)	\$ (10)	\$ (10)
FCF Post Dividend	\$ 6	\$ (12)	\$ 6	\$ 38	\$ 97	\$ 135
FCF ex EPA	\$ 66	\$ 48	\$ 66	\$ 98	\$ 112	\$ 135
Equity FCF Yield	2019	2020	2021	2022	2023	2024
FCF pre Dividend	0.9%	-2.0%	1.0%	6.1%	15.5%	21.5%
FCF ex EPA	10.4%	7.6%	10.5%	15.7%	17.9%	21.5%

Source: Porter Street Estimates, CapitalIQ

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PSR Base Base Income Statement				Projections				
Cost Breakout				2020	2021	2022	2023	2024
Total Volume	1,087	1,084	1,023	747	878	993	1,043	1,069
Price/kT	1,222	1,455	1,443	1,345	1,423	1,488	1,593	1,682
Total Revenue	1,328	1,578	1,476	1,005	1,249	1,478	1,662	1,798
Y/Y Revenue				(32%)	24%	18%	12%	8%
Variable Costs	804	1,006	936	606	762	923	1,047	1,133
% Revenue				60.3%	61.0%	62.5%	63.0%	63.0%
Contribution Margin	524	572	541	399	487	554	615	665
% Revenue				39.5%	39.0%	37.5%	37.0%	37.0%
Freight	76	88	79	57	71	84	95	103
Freight % Revenue				5.7%	5.7%	5.7%	5.7%	5.7%
Fixed Costs Within COGS	227	235	229	234	230	240	246	252
Of which D&A								
D&A				98	94	99	100	101
Non D&A Fixed Costs				136	136	141	146	151
Total Fixed Costs in COGS			231	234	230	240	246	252
Gross Profit	378	430	390	223	329	399	464	516
Selling Expense	130	148	132	87	112	133	150	162
G&A Expense	78	84	73	63	64	69	74	79
Total SG&A	207	232	205	151	176	202	224	241
Selling % of Revenue	9.8%	9.4%	9.0%	8.7%	9.0%	9.0%	9.0%	9.0%
R&D	18	20	20	20	20	21	22	23
Other	8	1	9	13	8	10	10	10
EBIT	144	176	156	40	124	166	208	242
Int Expense	(44)	(23)	(17)	21	20	20	20	20
EBITDA Clean	243	274	252	138	218	265	308	343
Adj EBITDA Reconciliation								
EBITDA	236	294	244	138	218	265	308	343
Restructuring	6.5	-24.6	3.6					
Consulting Fees	2.8	4.8	3					
LTIP/Stock Comp	8.8	13.9	9.4	5	7	8	8	8
Other	2.1	5	6.8	5	2	2	2	2
Total Adjustments Post EBITDA	20	-1	23	10	8	10	10	10
Adj. EBITDA	256	294	267	148	226	275	318	353
Summary Forecasts								
Revenue	1,328	1,578	1,476	1,005	1,249	1,478	1,662	1,798
Gross Profit	378	430	390	223	329	399	464	516
EBIT	144	176	154	40	124	166	208	242
Interest Expense	(44)	(23)	(17)	21	20	20	20	20
Tax			51	6	31	44	56	67
Net Income	65	121	87	13	73	102	132	155
Clean EPS	1.09	2.04	1.45	0.22	1.20	1.68	2.17	2.56
Adjustments								
D&A > Maint				16	14	12	10	8
Excess Amortization Per Share				0.26	0.23	0.20	0.17	0.13
Cash EPS				0.5	1.4	1.9	2.3	2.7
Simple Valuation								
PE	9.4	5.0	7.0	47.2	8.5	6.1	4.7	4.0
Cash PE				21.2	7.1	5.4	4.4	3.8
EV/EBITDA	5.0	4.3	4.8	8.6	5.7	4.6	4.0	3.6
Assumptions								
Volume				-27%	18%	13%	5%	2%
Price				-7%	6%	5%	7%	6%
EBITDA Margin (%)				18.3%	17.4%	17.9%	18.5%	19.1%

Source: Porter Street Estimates, CapitalIQ