promontory
investment research

CSX Transportation
Freshworks
Freeport-McMoRan

# Winter 2024 Equity Report

# Foreword

Promontory Investment Research is proud to present its seventeenth equity research report! This winter, our Research Analysts produced high-quality work in six industry coverage pods, and we've selected three of the most outstanding reports to share with you: CSX Transportation, a supplier of rail-based freight transportation, Freshworks, a business software firm, and Freeport-McMoRan, a major mining company.

As with each of Promontory's equity research publications, we are very proud of everything our research analysts have accomplished over the past nine weeks. This report is a culmination of their hard work, and we sincerely hope that you will enjoy reading it.

Alongside our commitment to research, we have also continued to stand by our goal of providing new recruits with a solid introduction to equity research. This quarter, we have revamped our Basic Financial Training (BFT) Program to develop more opportunities for inquiry-based learning.

Moreover, alongside our research and the BFT Program, we've continued to foster a tight-knit community by introducing mentorship families to create stronger support networks, creating more avenues for engagements between new recruits, research analysts, research associates, and board members, and continuing to host a wide range of engagement events.

Lastly, thank you for your support, and for taking the time to read our reports. As always, we are excited to see what the future will bring, and eagerly invite you to continue moving forward with us on our journey.

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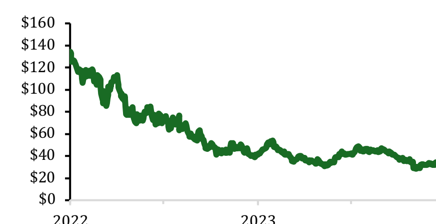
# CSX Transportation (NASDAQ: CSX)

| Rating | Outperform |
|---|---|
| Price (MM DD YY) | **$36.52** |
| Price Target | **$59.22** |
| 52W Range | **$27.60 - $37.37** |
| Market Cap | **$72.15B** |
| EPS (FY 2023) | **$1.89** |
| Consensus | **$40.00** |
| Ticker | **CSX (NASDAQ)** |

CSX Corporation presents a nuanced investment opportunity, reflecting their integration of cutting-edge technology, strategic acquisitions of Pan Axm Railways, and expansion into multimodal and chemical transport. The company's technological footing includes GPS freight tracking, Train Inspection Portal Projects, and investment in hydrogen locomotives. These innovations are implemented into their extensive network, recently expanded through the acquisition of Pan Am Railways. Finally, the company's expansion into chemicals and multimodal transport represents a ripe opportunity for growth and consolidation, achieved through CSX's outstanding fleet. These advancements, coupled with strategic moves like the acquisition of Pan Am Railways and expansion into multimodal and chemical transport, position CSX for potential growth in the evolving rail industry landscape.

Consequently, the model projects average year-over-year revenue growth of 4% to 2030. However, significant exposure to the declining coal industry and vulnerabilities in multimodal transport underscore the importance of diversification and technological integration as mitigating strategies.

**Price Performance Chart**




| | | | |
|---|---|---|---|
| **Revenue (M)** | $14,657 | $15,020 | $15,678 |
| ***% Growth*** | -1.32% | 2.48% | 4.38% |
| **EBIT (M)** | $5,788 | $6,066 | $6,474 |
| ***% Margin*** | 39.5% | 40.4% | 41.3% |
| **FCF** | $4741 | $4916 | $5270 |

## Company Overview

Founded in 1986 from the merger of railways Chessie Systems and Seaboard Coast Line Industries, CSX Transportation is one of the largest rail-based transportation companies in North America. Operating as a Class I railroad with 21,000 miles of track in 23 states, CSX maintains access to 70 port connections concentrated on the Eastern and Southeastern seaboard. In FY 2022, CSX transported 6.2 million carloads worth of freight. With rapid integration of novel technologies in the railway industry, including real-time GPS tracking, precision scheduled railroading, and drive plan generators to optimize transport times and costs. The company operates a number of freight services including intermodal transportation, bulk transportation, and automotive transport.

Appointed in 2022, the current CEO of CSX is Joseph Hinrichs. Prior to this role, Hinrichs was the President of the global automotive business of Ford Motor Company. Hinrichs tenure as CEO has been marked by an emphasis on collaboration with other Class I railroad companies, such as CPKC, in an effort to improve technology and safety.

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**Revenue & Costs**

The company's main revenue streams consist of merchandise, intermodal, coal, and trucking. Their merchandise segment was responsible for $8.2B in revenue and includes the company's shipment of chemicals, agricultural and food products, minerals, automotive, forest products, metals and equipment, and fertilizer products. CSX's intermodal business, in which a combination of trucks and trains are used to transport consumer goods, is the second largest revenue driver for the company, yielding $2.3B. Following this, the company's involvement in the coal business, which includes their shipment of domestic coal and iron ore to various plans, increased revenue by $2.4B. Finally, CSX also has a specialty chemicals trucking business, which is $966M of revenue. In 2022, CSX's total revenue was valued at $14.9B.

CSX's operating expenses include labor and fringe costs, purchased services, fuel, and equipment; these expenses are valued at $2.8B, $2.7B, and $396M, respectively. Outside of these expenses, one of the company's main uses of cash is capital expenditures and long-term debt costs, which are valued at $2.1B and $2B, respectively. However, the company seems to be repaying the debt at a much slower rate than it's currently borrowing. In 2022, the repayment of long-term debt was valued at $186M, a decline from $426M in 2021. The company also incurs expenses through their acquisitions, stock repurchases, and the issuance of dividends.

## Breakdown of CSX Merchandise by Volume (Thousands of Units)

## Breakdown of CSX Revenue

**Recent M&A & News**

In June 2022, CSX formally acquired Pan Am Railways. The acquisition is an integral step in allowing CSX to expand its operations into the Northeast, specifically giving the company access to Vermont, New Hampshire, Maine, Saint John, and New Brunswick. With integrated trackage through New England, CSX is the only Class I railroad with extensive coverage in the Northeast. The company additionally increased worker benefits in 2023 by becoming one of the only major freight railroads to offer paid sick days to conductors. This is especially notable in light of the recent United Auto Workers Strike. The company's emphasis on labor rights and healthy corporate culture further distinguishes them from competitors in the Class I railroad industry.

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# Industry Overview

**Value Drivers**

Some of the primary value drivers in this industry are focused on the stability and safety of large-scale operations as freight train transportation (excluding passengers) is often done between hundreds of thousands of miles. First are Efficient Operations as transportation companies that can operate efficiently, optimize their networks, and minimize costs while maintaining high service levels are better positioned as expanding networks beyond current areas have diminishing returns. Second is effective Network and Infrastructure as a well-developed and strategically positioned network of railroads, terminals, and intermodal facilities will enhance a company's ability to serve customers and move goods effectively. Thirdly, Technology and Innovation incorporate embracing technological advancements, such as advanced analytics, automation, and digital platforms, which can drive operational improvements, enhance customer service, and create value for the company. Finally, Regulatory Compliance and Safety are vital as safety regulations are a big part of the industry, making maintaining good adherence to regulatory bodies. Examples include the American Association of Railroads (AAR) Surface Transportation Board ("STB"), the Federal Railroad Administration ("FRA"), and its sister agency within the U.S. Department of Transportation ("DOT"), and the Pipeline and Hazardous Materials Safety Administration ("PHMSA")

**Nature of the Industry**

The typical structure of a company in the Freight Transportation industry has 3 major characteristics. There ar**e l**arge quantities of assets such as a vast network of railroads, terminals, locomotives, freight cars, and other equipment necessary for transporting goods. Major costs for a freight transportation company would include fuel, labor, maintenance of infrastructure and equipment, regulatory compliance, and administrative expenses. Additionally, investments in technology and innovation to improve efficiency and safety are becoming increasingly important for freight transportation companies. The freight transportation industry can be described as somewhat cyclical, meaning that it is influenced by economic cycles and fluctuations in demand for goods and commodities. During economic expansions, there is typically an increase in the movement of goods, leading to higher demand for freight transportation services. Conversely, during economic downturns, demand for transportation services may decrease as businesses and consumers reduce their spending. While the industry is influenced by economic cycles, it also exhibits defensive characteristics. Even during economic downturns, certain segments of the freight transportation industry, such as the transportation of essential goods like food, fuel, and raw materials, tend to remain relatively stable. This can provide a degree of resilience to the industry during challenging economic times.

**Competitive Landscape**

The U.S. rail industry has an oligopoly structure, with roughly 90% of revenues generated by the four largest railroads; CSX and Norfolk Southern have competitive networks in the eastern states, and Union Pacific and Burlington Northern Santa Fe in the west. Extremely high barriers to entry. A new entrant in its markets would need to establish right-of-ways to lay thousands of miles of track, which is just impossible at this point given how densely populated its most valuable customer areas are. Railroads compete for customers while simultaneously cooperating to share assets, interface systems, and complete customer shipments. For example, an intermodal unit originating from Place A that is destined for Place B might start on a Pacific Ocean liner, move to a Union Pacific train in Los Angeles, and then be loaded to a CSX train at its New Orleans gateway, which then takes it the rest of the way to Place B.

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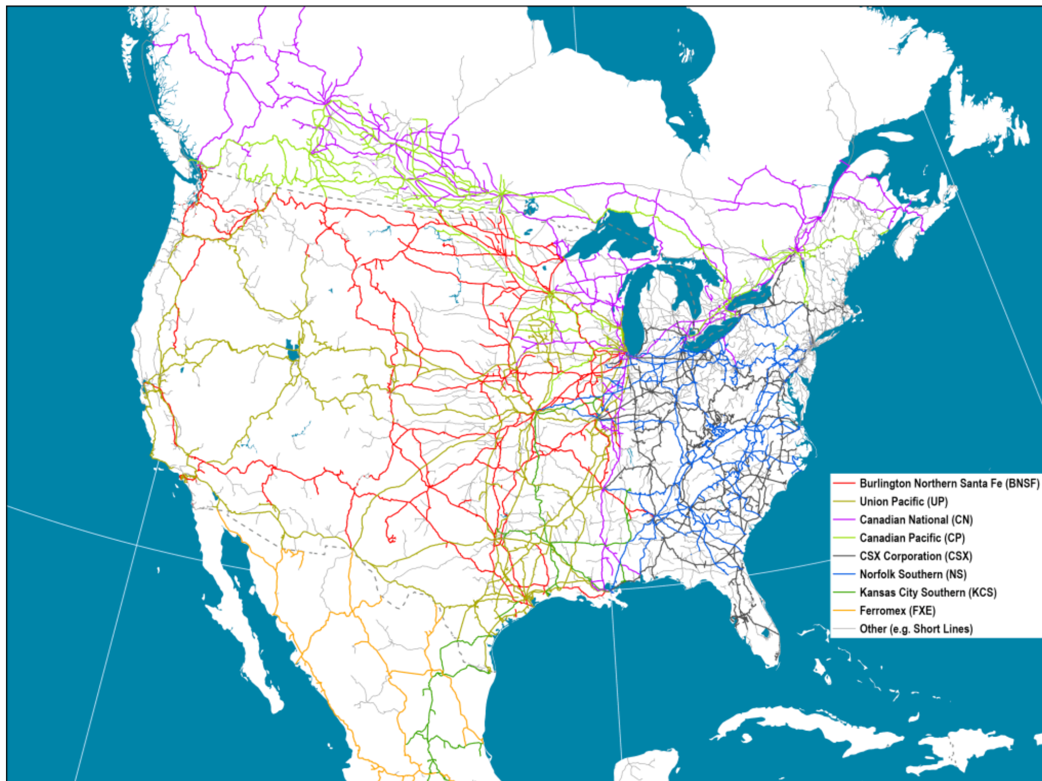


In Eastern North America, CSX Transportation has three direct competitors in the railroad industry in terms of geography. Notable competitors include:

- Norfolk Southern Railway: Norfolk Southern operates an extensive rail network in the eastern United States, providing transportation services for a variety of goods, including coal, intermodal, and automotive products. The company competes directly with CSX in serving many of the same regions and industries.
- Canadian National Railway: While primarily operating in Canada, Canadian National Railway also has a significant presence in the eastern United States, particularly in the Great Lakes region and the Northeast. It competes with CSX in providing rail transportation services for various commodities.
- Canadian Pacific Railway: Although Canadian Pacific's main network is in Canada, it also has operations in the northeastern United States. The company competes with CSX in serving customers in the region and transporting goods across the border between the U.S. and Canada.

These companies are among the key players in the railroad industry in Eastern North America and are direct competitors with CSX Transportation in providing freight transportation services.

# Investment Thesis

## Thesis One: CSX has recently since 2020 upheld a commitment to not only improve but renew their entire operations to incorporate technology as a cost-cutting and safety-improving tool.

**GPS freight tracking systems**

Previously most freight trains in the industry utilized what is called (Automatic Equipment identification) or AEI which essentially tracks shipment movements when trains reach certain sensor checkpoints along the track. New GPS tags are being installed on CSX rail cars and containers to provide up-to-the-minute location information anywhere on their 20,000-mile network. Continued investment in such technology is making CSX a more reliable, sustainable transportation partner between their customers and other transportation systems. As a result of this new GPS technology, CSX will be able to provide more efficient data to its customers as well as manage and plan shipping schedules down to the hour, saving time and money for delays at drop-off centers as well improving safety measures for the foreseeable future. Competitors like Norfolk Southern and

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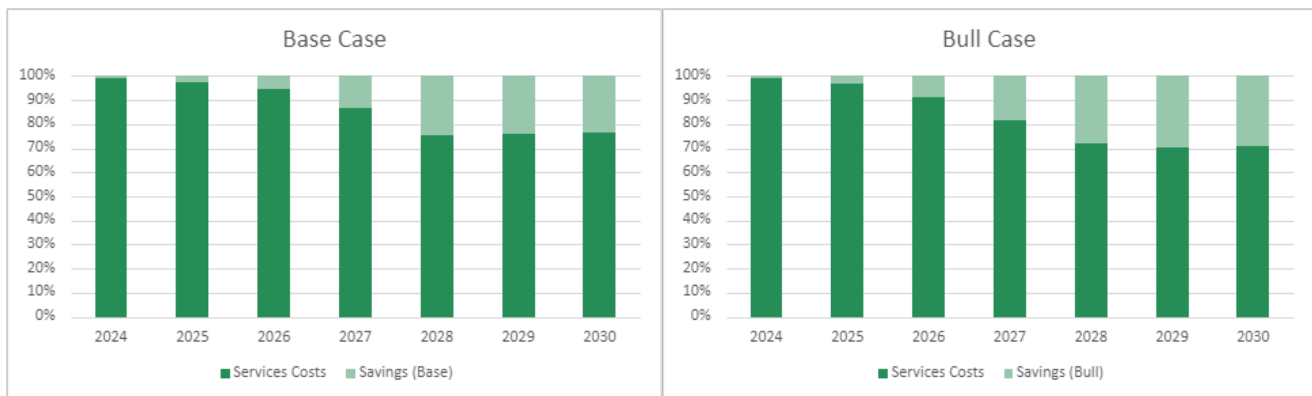
Canada Pacific have already seen positive results from GPS tracking and as CSX begins implementing this system starting from 2023 the company hopes to see the same benefits in the future.

**Train Inspection Portal (TIP) Projects**

Currently, many Freight trains are typically manually inspected by trained personnel who visually examine the train cars for any signs of damage, wear, or irregularities. This process involves walking alongside the stationary train, and visually inspecting the wheels, brakes, couplings, and other critical components to ensure they are in proper working condition. As Freight train lengths on average have increased about 25% in recent decades this has resulted in longer static inspection times and safety concerns due to human error. What CSX has been doing in recent years is the introduction of a dynamic inspection system called Train Inspection Portals (TIPS) that allows for camera technology to inspect trains as they are moving through these checkpoints. Such technologies would save on operation costs in two avenues: Firstly, there will be less need to pay specialized personnel to come out and manually inspect freight trains; Secondly, as the new TIPS technology allows trains to continue moving this will drastically reduce fuel costs and improve dwell times, saving about **$1200 an hour per cart in maintenance.** As an after-effect the new systems could reduce human error as the new TIPS systems analyze 10,000 frames a second allowing for small yet vital parts such as cotter keys (which are essential to braking systems) to be checked accurately. In base and bull cases we can predict future savings on service expenses for the company to reduce by almost 25% and 30% respectively by 2030 totaling $3.36B - $4.46B in savings across the decade.




Currently February 28, 2023 – CSX has opened a third train inspection portal (TIP) that is already using its advanced imaging and analysis technology to inspect up to 20 trains a day on the busy mainline at Walthourville, Georgia, northeast of the Waycross terminal. The first TIP opened in 2019 just outside of Waycross, and a second was added on the Fitzgerald Subdivision northwest of the vital CSX hub. CSX has currently implemented 3 TIPS in their busiest lines but plans on having it as a standard across all their operating geographies in the coming years. CSX has been optimizing their technology since 2019 while competitors like Norfolk Southern have only begun implementation of Train Inspection Portals very recently in late 2023 setting themselves behind in the race. CSX's competitors also share a critical flaw in their safety as the standard for when to stop the actual train has not been adjusted even after the Palestine OH derailment posing concerns that even with more accurate screening there will still be a lack of action with the current guidelines. On the contrary, CSX states that should a critical flaw be found by one of the portals, the conductor is to be instructed to immediately halt the train at the nearest stop for manual inspection and repair.

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Picture reference here (Left: the system with cameras lined 360 degrees; Right: the train passing through)

**Upgrading their PTC programs**
Currently CSX operates 850 - 1100 trains daily with PTC on CSX tracks. Main usages of the overlay system dubbed Positive Train Control (PTC) allows an early warning system for train operators on the rail lines. PTC Technology is already required for where passenger and commuter tracks occur, and Class 1 Lines where dangerous hazardous materials are being shipped as to prevent collisions or derailments. December 18, 2023 - CSX's Positive Train Control (PTC) continues to evolve as an unprecedented system of advanced technologies to enhance safety on lines that carry passenger trains and certain hazardous materials. As CSX focuses on advancing its strategy of transformation through technology, the company is upgrading its PTC system with next-generation hardware and software. Plans have been made to expand data collection as well as implement this safety system with their new GPS modules along with releasing a new onboard software for operators to use. By embracing advanced technologies, CSX is positioning itself ahead in the future by bolstering its safety measures and operational capabilities. The integration of new onboard software further underscores the company's commitment to leveraging innovation for effective growth and value creation. This proactive approach not only strengthens CSX's competitive edge but also reinforces its reputation as a leader in the rail transportation industry. As a result, these advancements are likely to improve the company's overall value by fostering a safer, more reliable, and technologically advanced rail network, thereby attracting more customers and investors alike.

## Thesis Two: Multimodal and chemical expansions provide stable revenue growth over an expanded network.

**Outstanding Port Access**
CSX Transportation is uniquely suited to adapt to changes in the multimodal transportation industry, reflecting its strong port access on the Eastern seaboard, exclusive presence in the Northeast, and penetration into the specialty chemicals transport market. Expansion in both the multimodal market and chemicals transport business presents unique opportunities for revenue growth and fleet development.

CSX maintains strong fundamentals in the multimodal transport sector, thus presenting ripe opportunities in this growing market. Multimodal transportation represents travel that is processed through two distinct modes of transportation, including rail, sea, or road. CSX operates a strong network of railways concentrated in the Eastern United States. Intermodal freight is projected to have a strong CAGR of 8.27% from 2024–2029. Consequently, CSX is well-positioned to extract value from this industry with 70 port connections and 50 intermodal terminals spread across North America ensuring variable shipping of diverse cargo. This allows for greater flexibility in freight shipping and provides exposure to distinct markets and customers.

**Pan Am Railways Acquisition**
With CSX's previous trackage rights and networks limited to Connecticut, New York, and Massachusetts, the Pan Am network adds 1,200 miles across New England proper. This acquisition allows for port expansion and coverage in Maine, Vermont, and New Hampshire, alongside increased trackage in Massachusetts. Added trackage secures CSX's dominance in the region, presenting advantages over Class II railroads due to its national networks and Norfolk Southern due to greater penetration. Consequently, competitive gains are realized in the multimodal operations division, linking rail cargo to road and truck transport thus ensuring cost-effective cargo and priority delivery. As multimodal transportation has been established primarily in the latter half of the 20th century, market players are still relatively new, ensuring that CSX can solidify its position as a market leader.

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Furthermore, multimodal transport can operate off existing rail infrastructure, avoiding headwinds against new construction. The construction of new freight railroad lines is limited by legal concerns, funding issues, and engineering difficulties. As a result, capital expenditures, which are concentrated in railway construction and maintenance, are significant in the Class I railroad industry, with the mean at 18.4% of revenue among Class I railroads from 2012–2021.

The integration of Pan Am into the CSX family thus cements CSX as the sole carrier with mature operations in the Northeast, decreases potential capital expenditure costs, and produces a significant moat against competitor Class I and Class II railroads in the region. Consequently, long term intermodal is projected to produce rapid growth in CSX's portfolio, with the model projecting average year over year growth of 3.4% till 2030 as part of the base projection

Picture reference on the left (CSX Network)

**Quality Carriers Division Provides Multimodal Chemicals Transport Exposure**

Through its division Quality Carriers, CSX maintains exposure to the specialty chemicals transport market. Acquired in 2021, Quality Carriers operates as a road-based chemical transport company and integrates into the CSX multimodal network. The chemical multimodal transport market is poised to undergo rapid expansion with a CAGR of 9.69% from 2023–2028, representing an increase of $1.67 billion. The Quality Carriers are well equipped to capitalize on this expansion through its existing infrastructure of 2,500 trucks and 6,400 trailers, extending CSX's penetration beyond traditional fully rail-based chemical transport.

With additional scrutiny placed on rail-based chemical transport due to the 2023 Norfolk Southern derailment, the maintenance of a trucking-based chemicals transport company allows for greater flexibility in the transport of hazardous chemicals. This unique offering differentiates CSX from both Class I and Class II competitors in the Eastern North America market. Therefore, the additional efficiency and safety of CSX's chemical transport through Quality Carriers presents an enticing offering compared to competitors. Growth in the chemicals division of CSX is expected to plateau as changes in the market impact overall chemical demand. However, CSX will be well suited to adapt to these changes given the competitiveness of their offering.

## Thesis Three: CSX's differentiated Corporate Culture and Safety Practices will continue to provide value and reduce risks of crashes relative to their competitors.

Corporate culture is often an opaque and nebulous term. We think that in the situation of CSX, there is a real case to be made that CSX as a company will see outside returns because of its firm culture, especially with regard to its competitors. Norfolk Southern's East Palestine Ohio incident was a tragic event that occurred under large and ongoing suspicions about class one railroads lacking in their safety investment. The crash in question occurred because of the lack of a robust monitoring system to detect the overheating of a ball bearing. Important to note, Norfolk Southern is arguably CSX's main rival as they are geographically competitive, unlike other freight rail firms which do not overlap with CSX. Furthermore, though trucking is a major competitor with CSX in the intermodal segment, that only makes up roughly 16% of its rail revenues. This crash has not only had a serious impact on CSX's main rival but is also indicative of a competitive advantage CSX holds in terms of its culture over Norfolk Southern.

This crash alone cost NFS over $1 billion for clean-up, legal suits from federal and state governments, as well as class action lawsuits, with long-term health costs notwithstanding. To this day, the residents of East Palestine Ohio drink imported water due to environmental concerns. This crash cut Norfolk Southern's earnings in half for the quarter to $356 million. What's more

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Norfolk Southern has a long reputation both as a firm that lacks investment in the safety monitoring systems and has a large corporate culture problem. The Federal Railroad Administration conducted a study of Norfolk Southern's practices, and found: "shows numerous examples where NS seems more concerned with compliance with minimum safety requirements of federal regulations and industry standards rather than understanding and seeking to address safety concerns that fall outside the boundaries of existing rules and regulations." These safety and corporate concerns are further evidenced by the numerous articles written about the companies, corporate cultural problems. This has been expressed by investors through a recent board and CEO take over bid from Ancora, a $9B activist fund.

Valuing the importance of corporate culture is very difficult. It does not directly credit enterprise value, nor does it directly affect financial performance, but when placed within the broader analysis of our research on CSX, it is clear that CSX is not valued as a company with better safety, leadership and overall corporate culture to its competitors. For example, CSX's price-earnings ratio sits just below 20, while Norfolk Southern's price-earnings ratio currently rests around 31. This is all despite the management and safety problems faced by Norfolk Southern.

### Thesis Four: The adoption of hydrogen locomotives will allow railroad companies to reduce costs and increase their energy efficiency; CSX's partnership with CPKC makes the company primed to take advantage of this trend.

The use of hydrogen locomotives as opposed to diesel locomotives will prove to be a profitable venture for railroad companies. CSX's partnership with CPKC has allowed them to have an early start to this trend, as the company has announced its intentions to convert some of its engines to hydrogen-powered locomotives.

While there are currently pricing pressures on hydrogen, these will cool dramatically by 2030 due to a rapid increase in hydrogen production. Hydrogen production is poised to grow at a CAGR of 9.3% from 2024-2030. Such production is fueled by numerous tailwinds, particularly the demand for cleaner energy alternatives. Most notably, the US Department of Energy has implemented "Hydrogen Shot," an initiative to bring the costs of hydrogen down to $1 per kg by 2031. To this end, in 2023, Biden enacted the Regional Clean Hubs Program, which allocated $7B to forming up to ten clean energy hubs in America. Additionally, these hubs will also receive approximately $40B from private investments, further fueling production.

Given that a large amount of hydrogen production will be domestic as opposed to imported, hydrogen should also prove to be a less cyclical source of fuel than diesel. This will allow for more stability in their financial statements, as opposed to drastic losses due to market conditions. For example, in 2022 CSX suffered losses of $1.63B due to fuel expenses; this was a 78% YoY increase. This, along with other factors, drove up the company's operating ratio from 55.3% to 59.5% in 2022.

Finally, hydrogen will prove to be a vastly more energy-efficient than diesel. Hydrogen fuel cells have an energy conversion efficiency of 50-60%, which is roughly 2.5x higher than gasoline engines. 100% fuel-powered engines have an effective power rate of only 30% and experience a reduction in efficiency from the following sources: friction and parasitic losses, coolant heat, and exhausted heat.

Ultimately, coupled with a reduction in hydrogen prices, CSX's partnership with CPKC will prove to dramatically boost operating costs. Considering the rate of hydrogen production and current fuel prices, costs should decrease by approximately $1,564,778 in 2030.

## Investment Risks

**Risk #1: Overexposure to coal industry**

CSX's significant exposure to the coal industry poses a notable risk amidst the current trend of declining coal prices. Recent market data indicates a downward trajectory in coal prices, driven by various factors such as shifting energy preferences, regulatory pressures, and advancements in alternative energy sources. According to the U.S. Energy Information Administration (EIA), coal production in the United States has been on a gradual decline, reflecting a broader global trend away from coal-based energy generation. Moreover, increasing environmental concerns and efforts to mitigate climate change are further dampening

the long-term outlook for coal demand. CSX's reliance on coal transportation, which accounted for 11% of volume and 16% of revenue in 2022, exposes the company to potential revenue volatility and margin pressures as demand for coal weakens.

**Mitigating Factor #1**

To mitigate the risk stemming from CSX's reliance on coal transportation, the company can leverage its diversified portfolio of freight services to cushion potential revenue fluctuations. While coal transportation has historically constituted a notable portion of CSX's business, the company also transports a wide range of other products, including agricultural goods, chemicals, consumer products, and industrial materials. Diversification across multiple sectors and product categories can help buffer the impact of declining coal demand on CSX's overall revenue streams. Notably, CSX's annual report highlights the resilience of its diverse freight portfolio, with growth in non-coal segments outpacing declines in coal transportation. By emphasizing the promotion of these alternative freight services, CSX can mitigate the financial vulnerability associated with fluctuations in coal markets.

**Risk #2: Multimodal Transport Disrupts Just-In-Time Shipping**

With industrial reliance on just-in-time shipping, disruptions present in the multimodal transport sector increases the risk of potential losses. A 2015 study indicates that rail transportation may lack viable transportation alternatives in the case of a rail shutdown, thus resulting in delayed cargo and millions in losses. An overreliance on multimodal transportation increases the risk of potential supply chain disruptions. Though rail is cheaper than pure-road transport, with a cost of $0.05 per ton-mile vs $3.88 respectively, it presents increased exposure to disruption from external events. Future reliance on multimodal transportation thereby increases the risk of potential supply chain disruptions which can negatively impact just-in-time shipping and manufacturing.

**Mitigating Factor #2:**

Rail-based shipping disruptions can be mitigated by regular maintenance, promoting staff-retention, increasing rail tracking, and further integrating its own trucking fleet. With a culture emphasizing safety and capital expenditures to match, CSX maintains a portfolio of high-quality infrastructure equipped for a plethora of situations. Indeed, as of 2023, CSX spent $1.7 billion on track, bridge, and signal construction and updating projects, representing 74% of total capital expenditures. CSX's promotion of paid sick-leave for conductors, an industry first, helps retain employees during the railroad staffing crisis. CSX can also increase promotion of its real-time rail shipment tracking, ensuring customers are aware of potential disruptions. Finally, CSX can continue to integrate its trucking fleet to deliver last-minute chemical shipments. These solutions provide a diverse set of offerings against various disruptions, consequently limiting supply chain disruptions

**Risk #3**

CSX Corporation, a prominent player in the freight transportation industry, faces inherent investment risks tied to the volatility of commodity prices. As a key component of their revenue model, CSX's revenue per unit is intricately linked with the pricing dynamics of commodities transported. This dependence on fluctuating commodity prices significantly limits CSX's pricing power over the types of items they ship. Moreover, the presence of similar competitors in the region exacerbates this risk, as CSX must contend with competitive pricing pressures in an environment where pricing strategies are often dictated by broader market forces rather than the company's own discretion. Additionally, the uncertainty surrounding future commodity prices introduces another layer of complexity, as CSX has minimal control over these external market variables.

**Mitigating Factor #3**

CSX Corporation currently maintains a diversified portfolio within the transportation industry, which serves as a strategic buffer against the impacts of commodity price fluctuations. With its operations spanning various sectors including intermodal transportation, specialized freight services, and commodities transportation, CSX enjoys a degree of resilience to the volatility of any single market segment. This diversified revenue stream helps mitigate the risks associated with fluctuations in commodity prices, as CSX can leverage the stability of other sectors to offset potential losses. Furthermore, within the competitive landscape of the transportation industry, no singular competitor holds a distinct advantage against these challenges. Similar to CSX, other industry players face comparable hurdles regarding commodity price volatility and limited pricing power, ensuring a relatively level playing field. As a result, CSX's diversified portfolio positions the company well to navigate market uncertainties and maintain a competitive edge within the industry.

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# Valuation

**Assumptions**

For most product lines of CSX (excluding Intermodal), we can assume that their revenue per unit follows in tandem with the Price Index of their corresponding commodity. We can draw this connection by comparing 10-year historical data of CSX's product lines (Light Green) to the 10-year historical data given by FRED (Dark Green). As a result, we can use commodity prices as a baseline to predict the future revenue per unit cart.

## Volume Assumptions:

*Chemicals* – Reflecting the integration of the Quality Carriers assets, chemicals are projected to record modest growth in light of the current downturn.

*Agriculture and Food* - No notable events have given reason for major changes in the industry

*Automotive* - No notable events have given reason for major changes in the industry

*Minerals* - Given CSX's transportation of materials in the aggregates, clay, cement, and related fields, the potential short-term growth can be directly correlated with the burgeoning demand for construction, as these materials serve as fundamental components for building projects,

*Forest Products* - No notable events have given reason for major changes in the industry

*Metals and Equipment* – The Inflation Reduction Act (IRA) offers a strategic avenue to revitalize domestic steel production, synergizing with CSX's shipping portfolio of steel sheets, scrap, and other unfinished parts.

*Fertilizers* – No notable events have given reason for major changes in the industry

*Intermodal* – CSX's long-term focus on intermodal, alongside its superior network given its port access and Pan Am acquisition, ensures it is well prepared to receive large increases in intermodal volume buoyed by consumer demand.

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*Coal* – With a future push to electrification as well as the uptick in competition with natural gas, we see a reduction in total volume of coal transportation

| UNITS CARRIED (CARLOADS, '000) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| Chemicals | 670 | 664 | 659 | 641 | 642 | 623 | 651 | 696 | 745 | 790 | 829 | 854 |
| Agricultural and Food Products | 469 | 463 | 467 | 481 | 468 | 484 | 504 | 524 | 545 | 567 | 589 | 613 |
| Automotive | 456 | 344 | 318 | 338 | 388 | 392 | 396 | 400 | 404 | 408 | 412 | 416 |
| Minerals | 337 | 321 | 325 | 337 | 358 | 381 | 404 | 424 | 441 | 455 | 464 | 473 |
| Forest Products | 283 | 270 | 296 | 291 | 282 | 293 | 311 | 330 | 349 | 367 | 381 | 393 |
| Metals and Equipment | 249 | 239 | 277 | 267 | 284 | 301 | 316 | 326 | 332 | 332 | 332 | 332 |
| Fertilizers | 243 | 234 | 229 | 203 | 199 | 199 | 208 | 219 | 231 | 243 | 254 | 263 |
| **Total Merchandise** | 2707 | 2535 | 2571 | 2558 | 2621 | 2674 | 2789 | 2919 | 3048 | 3161 | 3262 | 3344 |
| Intermodal | 2670 | 2720 | 2976 | 2963 | 2766 | 2877 | 3078 | 3355 | 3623 | 3841 | 4033 | 4114 |
| Coal | 843 | 637 | 706 | 697 | 755 | 710 | 674 | 641 | 608 | 590 | 573 | 555 |
| **Total Units Carried** | 6220 | 5892 | 6253 | 6218 | 6142 | 6260 | 6542 | 6914 | 7280 | 7592 | 7867 | 8013 |

| Current: YOY Change/Drivers (Base Case) | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chemicals | | -0.9% | -0.8% | -2.7% | 0.2% | -3.0% | 4.5% | 7.0% | 7.0% | 6.0% | 5.0% | 3.0% |
| Agricultural and Food Products | | -1.3% | 0.9% | 3.0% | -2.7% | 3.5% | 4.0% | 4.0% | 4.0% | 4.0% | 4.0% | 4.0% |
| Automotive | | -24.6% | -7.6% | 6.3% | 14.8% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% |
| Minerals | | -4.7% | 1.2% | 3.7% | 6.2% | 6.5% | 6.0% | 5.0% | 4.0% | 3.0% | 2.0% | 2.0% |
| Forest Products | | -4.6% | 9.6% | -1.7% | -3.1% | 4.0% | 6.0% | 6.0% | 6.0% | 5.0% | 4.0% | 3.0% |
| Metals and Equipment | | -4.0% | 15.9% | -3.6% | 6.4% | 6.0% | 5.0% | 3.0% | 2.0% | 0.0% | 0.0% | 0.0% |
| Fertilizers | | -3.7% | -2.1% | -11.4% | -2.0% | 0.3% | 4.3% | 5.5% | 5.5% | 5.0% | 4.5% | 3.5% |
| | | -6.4% | 1.4% | -0.5% | 2.5% | | | | | | | |
| Intermodal | | 1.9% | 9.4% | -0.4% | -6.6% | 4.0% | 7.0% | 9.0% | 8.0% | 6.0% | 5.0% | 2.0% |
| Coal | | -24.4% | 10.8% | -1.3% | 8.3% | -6.0% | -5.0% | -5.0% | -5.0% | -3.0% | -3.0% | -3.0% |
| **Total Units Carried** | | -5.3% | 6.1% | -0.6% | -1.2% | 1.9% | 4.5% | 5.7% | 5.3% | 4.3% | 3.6% | 1.9% |

| YOY Change/Drivers (Bear Case) | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|
| Chemicals | -3.0% | -3.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Agricultural and Food Products | 3.0% | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% |
| Automotive | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Minerals | 3.0% | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% |
| Forest Products | 2.0% | 3.0% | 3.0% | 3.0% | 3.0% | 2.0% | 1.0% |
| Metals and Equipment | 6.0% | 5.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Fertilizers | -2.0% | -0.5% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% |
| **Total Merchandise** | | | | | | | |
| Intermodal | 0.0% | 3.0% | 2.0% | 2.0% | 2.0% | 1.0% | 0.0% |
| Coal | -10.0% | -8.0% | -6.0% | -5.0% | -5.0% | -5.0% | -5.0% |

| YOY Change/Drivers (Base Case) | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|
| Chemicals | -3.0% | 4.5% | 7.0% | 7.0% | 6.0% | 5.0% | 3.0% |
| Agricultural and Food Products | 3.5% | 4.0% | 4.0% | 4.0% | 4.0% | 4.0% | 4.0% |
| Automotive | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% |
| Minerals | 6.5% | 6.0% | 5.0% | 4.0% | 3.0% | 2.0% | 2.0% |
| Forest Products | 4.0% | 6.0% | 6.0% | 6.0% | 5.0% | 4.0% | 3.0% |
| Metals and Equipment | 6.0% | 5.0% | 3.0% | 2.0% | 0.0% | 0.0% | 0.0% |
| Fertilizers | 0.3% | 4.3% | 5.5% | 5.5% | 5.0% | 4.5% | 3.5% |
| **Total Merchandise** | | | | | | | |
| Intermodal | 4.0% | 7.0% | 9.0% | 8.0% | 6.0% | 5.0% | 2.0% |
| Coal | -6.0% | -5.0% | -5.0% | -5.0% | -3.0% | -3.0% | -3.0% |

| YOY Change/Drivers (Bull Case) | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|
| Chemicals | 0.0% | 6.0% | 10.0% | 10.0% | 8.0% | 7.0% | 5.0% |
| Agricultural and Food Products | 4.0% | 5.0% | 5.0% | 5.0% | 4.0% | 3.0% | 3.0% |
| Automotive | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% |
| Minerals | 8.0% | 5.0% | 4.0% | 3.0% | 2.0% | 2.0% | 2.0% |
| Forest Products | 5.0% | 4.0% | 3.0% | 3.0% | 2.0% | 1.0% | 1.0% |
| Metals and Equipment | 6.0% | 5.0% | 3.0% | 3.0% | 2.0% | 1.0% | 0.0% |
| Fertilizers | 0.0% | 2.0% | 4.0% | 5.0% | 6.0% | 6.0% | 4.0% |
| **Total Merchandise** | | | | | | | |
| Intermodal | 4.0% | 9.0% | 11.0% | 10.0% | 8.0% | 7.0% | 4.0% |
| Coal | 0.0% | 0.0% | -2.0% | -3.0% | -3.0% | -3.0% | -3.0% |

## Price Assumptions

*Chemicals* – In the short term there is a downturn in the chemicals market, but it is projected to grow as the commodities cycle restarts and the Quality Carriers network matures.

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*Agriculture and Food* **-** No notable events have given reason for major changes in the industry

*Automotive* - No notable events have given reason for major changes in the industry

*Minerals* – We used Price Index Forecasts/Futures for specifically Non-Metallic Minerals, returning to a historical 10 yr bottom-line in the long-term

*Forest Products* - No notable events have given reason for major changes in the industry

*Metals and Equipment* – In the short-term there are high steel prices due to regulations favoring domestic steel. We will decide to return to a historical 10 yr baseline in long term

*Fertilizers* - No notable events have given reason for major changes in the industry

*Intermodal* – With increased consumer demand for multimodal transport, demand for intermodal is expected to increase. This can result in greater intermodal growth for CSX compared to the mean.

*Coal* **-** With reduced transportation of coal, demand for coal is likely to decrease. This decrease in demand can exert downward pressure on coal prices, as suppliers may need to lower prices to stimulate demand and compete with alternative energy sources such as natural gas and renewables.

## Comps Comparable

| Ticker | Company | Enterprise Value | EBIT | EV/EBIT | EV/EBITDA | Beta |
|---|---|---|---|---|---|---|
| NFS | Norfolk Southern | 73,360,000,000 | 4,109,000,000 | 17.85 | 16.95 | 1.3 |
| CNI | Canadian National | 96,160,000,000 | 5,243,282,000 | 18.34 | 10.65 | 0.66 |
| CP | Canadian Pacific | 95,860,000,000 | 1,689,757,000 | 56.73 | (129.52) | 0.76 |
| UNP | Union Pacific | 185,220,000,000 | 9,588,000,000 | 19.32 | 15.58 | 1.08 |
| **CSX** | **CSX** | **78,181,223,000** | **4,948,167,898** | 15.80 | **10.57** | |

| | Median | 25th Percentile | 75th Percentile |
|---|---|---|---|
| EV/EBITDA | 13.12 | -24.39 | 15.92 |
| EV/EBIT | 18.83 | 18.22 | 28.67 |
| CSX | | | |

## Beta Calculation

| Company | Total Debt | Total Equity | Beta | Unlevered Beta |
|---|---|---|---|---|
| Norfolk Southern Railway | 17,571,000 | 12,781,000 | 1.3 | 0.62 |
| Canadian National Railway | 14,237,901 | 15,164,330 | 0.66 | 0.38 |
| Canadian Pacific Railway | 16,956,128 | 31,969,697 | 0.76 | 0.54 |
| Union Pacific | 34,179,000 | 14,788,000 | 1.08 | 0.38 |

| Median | 25th Percentile | 75th Percentile |
|---|---|---|
| 0.459 | 0.381 | 0.557 |

# DCF

| Discounted Cash Flow | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Revenue** | $10,583 | $12,522 | $14,853 | $14,657 | $15,020 | $15,678 | $16,485 | $17,329 | $18,143 | $18,881 | $19,415 |
| **EBIT** | $3,627 | $4,951 | $5,414 | $5,788 | $6,066 | $6,474 | $7,053 | $7,825 | $8,658 | $9,029 | $9,273 |
| *Effective Tax Rate* | 24% | 24% | 23% | 21% | 21% | 21% | 21% | 21% | 21% | 21% | 21% |
| **NOPAT** | $2,765 | $3,781 | $4,166 | $4,572 | $4,792 | $5,115 | $5,572 | $6,182 | $6,839 | $7,133 | $7,326 |
| (+) D&A | 1,383 | 1,420 | 1,500 | 1,612 | 1,667 | 1,725 | 1,787 | 1,853 | 1,922 | 1,997 | 2,076 |
| (-) CapEx | | | | | 1,728 | 1,866 | 2,024 | 2,207 | 2,421 | 2,672 | 2,969 |
| NWC | | | | $2,154 | $2,144 | $2,203 | $2,268 | $2,364 | $2,473 | $2,506 | $2,531 |
| (-) Δ NWC | | | | | -$10 | $59 | $65 | $96 | $109 | $33 | $24 |
| **FCF** | | | | | $4,741 | $4,916 | $5,270 | $5,731 | $6,232 | $6,424 | $6,409 |
| **Discounted FCF** | | | | | $4,599 | $4,488 | $4,528 | $4,635 | $4,743 | $4,602 | $4,320 |

| WACC Calculation | | | | |
|---|---|---|---|---|
| Cost of Debt | 4.93% | from CDS spread | Total Shares | 1,994,000,000 |
| RFR | 4.15% | | Beta | 0.458883557 |
| ERP (Damoda | 4.45% | | Total Debt | 18,533 |
| Beta (Levered | 0.55 | | Total Equity | 72900 |
| Cost of Equity | 6.60% | | | |
| **WACC** | 6.25% | | | |

| Gordon Growth Valuation | |
|---|---|
| Present value of NTM CF | $31,916 |
| Terminal Growth Rate | 2.00% |
| PV of TV | $103,591 |
| Total Estimated EV | $135,506 |
| Estimated Equity Value | $118,326 |
| Implied Share Price | $59.34 |
| Current Share Price | $36.89 |
| **Implied Upside** | **60.86%** |

| Terminal Multiple Valuation | |
|---|---|
| Median EV/EBIT | 13.12 |
| Terminal Value | 121,619,162,548.25 |
| Present Value of TV | 79,539,591,437.93 |
| Sum of Near Term Cash Flows | 39,722.33 |
| Implied Enterprise Value | 79,539,631,160.26 |
| Implied Equity Value | 79,539,612,627.26 |
| Implied Share Price | 39.88947474 |
| **Upside** | **7.52%** |

# Cost Model

| General Cost Schedule (In millions) | 2019 | 2020 | 2021 | 2022 | **2023** | **2024** | **2025** | **2026** | **2027** | **2028** | **2029** | **2030** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Labor and Fringe | 2,616 | 2,275 | 2,550 | 2,861 | 2,970 | 2,946 | 2,982 | 3,049 | 3,025 | 2,947 | 3,097 | 3,205 |
| Purchased Services and Other | 1,749 | 1,684 | 2,135 | 2,685 | 2,334 | 2,376 | 2,464 | 2,577 | 2,679 | 2,768 | 2,885 | 2,970 |
| Fuel | 906 | 541 | 913 | 1,626 | 1,060 | 1,038 | 1,037 | 1,047 | 1,011 | 948 | 1,002 | 1,040 |
| Equipment and Other Rents | 352 | 338 | 364 | 396 | 429 | 440 | 459 | 483 | 508 | 531 | 553 | 569 |
| Gains on Property Dispositions | | | (454) | (238) | (192) | (196) | (205) | (215) | (227) | (237) | (247) | (254) |
| Depreciation & Amortization | | | | | 1,612 | 1,667 | 1,725 | 1,787 | 1,853 | 1,922 | 1,997 | 2,076 |

| **Growth Rates Assumptions (Percentage of Revenue)** | | | | | | Bear Case | Base Case | Bull Case |
|---|---|---|---|---|---|---|---|---|
| Labor and Fringe | 21.92% | 21.50% | 20.37% | 19.26% | 20.3% | 22% | 20.3% | 20% |
| Purchased Services and Other | 14.65% | 15.91% | 17.05% | 18.08% | 15.9% | 18% | 15.9% | 14% |
| Fuel | 7.59% | 5.11% | 7.29% | 10.95% | 7.2% | 9% | 7.2% | 6% |
| Equipment and Other Rents | 2.95% | 3.19% | 2.91% | 2.67% | 2.9% | 3.00% | 2.9% | 2% |
| Gains on Property Dispositions | 0.00% | 0.00% | -3.63% | -1.60% | -1.3% | -1.31% | -1.3% | -1.31% |

# PPE Schedule

Growth rates for the purchase of PPE within each line were based on historical averages with any negative historical growth then being set at 0% as there is no news of divesting activities within CSX.

| **Depreciation rates (2022)** | **Annual Depreciation Rate** |
|---|---|
| Rail and Other Track Materials | 2.5% |
| Ties | 3.5% |
| Grading | 1.3% |
| Ballast | 2.6% |
| Bridges, Trestles, and Culverts | 1.7% |
| Signals and Interlockers | 4.1% |
| Buildings | 2.5% |
| Other | 4.1% |
| Locomotive | 3.8% |
| Freight Cars | 3.1% |
| Works Equipment and Other | 8.9% |
| Land | N/A |
| Construction in Progress | N/A |

| | **2023** | **2024** | **2025** | **2026** | **2027** | **2028** | **2029** | **2030** |
|---|---|---|---|---|---|---|---|---|
| TOTAL DEPREC. for all | 1,612 | 1,667 | 1,725 | 1,787 | 1,853 | 1,922 | 1,997 | 2,076 |

| **Growth Rates Assumptions** | | | | | Bear Case | Base Case | Bull Case |
|---|---|---|---|---|---|---|---|
| Rail and Other Track Materials | 3.11% | 3.69% | -1.15% | 1.88% | 2.88% | 1.88% | 0.88% |
| Ties | 4.02% | 3.79% | 3.70% | 3.84% | 4.84% | 3.84% | 2.84% |
| Grading | 0.18% | -0.61% | -0.36% | 0.00% | 0.73% | -0.27% | -1.27% |
| Ballast | 2.60% | 1.58% | 2.86% | 2.34% | 3.34% | 2.34% | 1.34% |
| Bridges, Trestles, and Culverts | 6.29% | 3.94% | 6.98% | 5.74% | 6.74% | 5.74% | 4.74% |
| Signals and Interlockers | 3.02% | 3.03% | 1.01% | 2.35% | 3.35% | 2.35% | 1.35% |
| Buildings | 2.32% | 1.61% | 2.02% | 1.98% | 2.98% | 1.98% | 0.98% |
| Other | 2.31% | 3.09% | 4.45% | 3.28% | 4.28% | 3.28% | 2.28% |
| Locomotive | -4.42% | -3.40% | -1.30% | 0.00% | -2.04% | -3.04% | -4.04% |
| Freight Cars | -13.73% | -9.19% | -0.26% | 0.00% | -6.73% | -7.73% | -8.73% |
| Works Equipment and Other | 6.64% | 11.84% | 8.34% | 8.94% | 9.94% | 8.94% | 7.94% |
| Land | -0.71% | 3.40% | 20.53% | 7.74% | 8.74% | 7.74% | 6.74% |
| Construction in Progress | -13.92% | 12.94% | 77.80% | 25.61% | 26.61% | 25.61% | 24.61% |

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The example below details how we split the depreciation of the current existing assets with the new Capex that was to happen to each product line CSX provided an example of the new Capex for Work, Equipment, and Other. We created similar sections for each individual section corresponding to each product line's annual depreciation rates for accuracy.

| Capex(Work, Equip, Other) | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|
| **279.95543** | 24.91603327 | 24.91603327 | 24.91603327 | 24.91603327 | 24.91603327 | 24.91603327 | 24.91603327 | 24.91603327 |
| **304.97939** | | 27.14316571 | 27.14316571 | 27.14316571 | 27.14316571 | 27.14316571 | 27.14316571 | 27.14316571 |
| **332.2401295** | | | 29.56937153 | 29.56937153 | 29.56937153 | 29.56937153 | 29.56937153 | 29.56937153 |
| **361.9375843** | | | | 32.212445 | 32.212445 | 32.212445 | 32.212445 | 32.212445 |
| **394.2895613** | | | | | 35.09177096 | 35.09177096 | 35.09177096 | 35.09177096 |
| **429.5333364** | | | | | | 38.22846694 | 38.22846694 | 38.22846694 |
| **467.9273945** | | | | | | | 41.64553811 | 41.64553811 |
| **509.7533252** | | | | | | | | 45.36804594 |
| Sum of Depr. | 24.91603327 | 52.05919898 | 81.6285705 | 113.8410155 | 148.9327865 | 187.1612534 | 228.8067915 | 274.1748375 |

| | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|
| **Total Depreciation for new Assets** | **52** | **107** | **165** | **227** | **292** | **362** | **436** | **516** |

| | **Existing Assets Depreciation** | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Rail and Other Track Materials | 8,660 | 216.5 | 216.5 | 216.5 | 216.5 | 216.5 | 216.5 | 216.5 | 216.5 |
| Ties | 6,763 | 236.705 | 236.705 | 236.705 | 236.705 | 236.705 | 236.705 | 236.705 | 236.705 |
| Grading | 2,741 | 35.633 | 35.633 | 35.633 | 35.633 | 35.633 | 35.633 | 35.633 | 35.633 |
| Ballast | 3,383 | 87.958 | 87.958 | 87.958 | 87.958 | 87.958 | 87.958 | 87.958 | 87.958 |
| Bridges, Trestles, and Culverts | 2,989 | 50.813 | 50.813 | 50.813 | 50.813 | 50.813 | 50.813 | 50.813 | 50.813 |
| Signals and Interlockers | 3,299 | 135.259 | 135.259 | 135.259 | 135.259 | 135.259 | 135.259 | 135.259 | 135.259 |
| Buildings | 1,416 | 35.4 | 35.4 | 35.4 | 35.4 | 35.4 | 35.4 | 35.4 | 35.4 |
| Other | 5,541 | 227.181 | 227.181 | 227.181 | 227.181 | 227.181 | 227.181 | 227.181 | 227.181 |
| Locomotive | 4,848 | 184.224 | 184.224 | 184.224 | 184.224 | 184.224 | 184.224 | 184.224 | 184.224 |
| Freight Cars | 2,316 | 71.796 | 71.796 | 71.796 | 71.796 | 71.796 | 71.796 | 71.796 | 71.796 |
| Works Equipment and Other | 3,132 | 278.748 | 278.748 | 278.748 | 278.748 | 278.748 | 278.748 | 278.748 | 278.748 |
| Land | 2,272 - | - | - | - | - | - | - | - | |
| Construction in Progress | 745 - | - | - | - | - | - | - | - | |
| **Total Depreciation for Current Assets** | | 1560.217 | 1560.217 | 1560.217 | 1560.217 | 1560.217 | 1560.217 | 1560.217 | 1560.217 |

| | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|
| TOTAL DEPREC. for all | 1,612 | 1,667 | 1,725 | 1,787 | 1,853 | 1,922 | 1,997 | 2,076 |

## TIPS Project Cost Savings

One of the largest costs in Freight Transportation that could be addressed would be dwell time, hours spent at yards waiting for manual inspection which requires additional wage, fuel, and time costs. We modeled out the potential savings within each case to witness cost savings that could be realized.

| Cost Savings From TIP Projects | 2019 | 2020 | 2021 | 2022 | **2023** | **2024** | **2025** | **2026** | **2027** | **2028** | **2029** | **2030** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Annual Inspections | | | | 674,520 | 674,551 | 674,582 | 674,613 | 674,644 | 674,675 | 674,706 | 674,737 | 674,768 |
| Cost Savings Realized (%) | | | | | | 10% | 20% | 30% | 50% | 75% | 75% | 75% |
| Annual Cost Savings (Millions) | | | | | | **162** | **324** | **486** | **810** | **1,214** | **1,215** | **1,215** |
| Cost Savings Realized (Bear Case) | | | | | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Cost Savings Realized (Base Case) | | | | | | 10% | 20% | 30% | 50% | 75% | 75% | 75% |
| Cost Savings Realized (Bull Case) | | | | | | 10% | 25% | 50% | 75% | 90% | 100% | 100% |

| Assumptions (Each locomotive must be inspected each Calendar Day) | % of Rev Growth | | |
|---|---|---|---|
| **Daily Trains Operating => Daily Inspections** | | 0.0046% | 1,848 |
| **Cost Savings per Train** | 1200 | | |
| **Time Saved (Hours)** | 2 | | |

[

## Hydrogen Cost Savings

We based each case on which year the price per kg of hydrogen would become cheaper than the price of diesel. Before the tipping point, we would allow a minimal increase in hydrogen utilization rate as CSX already had begun implementation on a select few trains in their fleet. Afterwards, we would assume that CSX would take this new alternative fuel in mass ramping up the utilization rate of hydrogen by about 3% each year. Cost savings were calculated by the margin difference of diesel and hydrogen along with the utilization rate of that year.

| Cost Savings from Hydrogen Locomotives | 2019 | 2020 | 2021 | 2022 | 2023 | **2024** | **2025** | **2026** | **2027** | **2028** | **2029** | **2030** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bear Case | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Base Case | | | | | | | | | | 0.00 | 0.76 | 1.45 |
| Bull Case | | | | | | | 0.00 | 1.20 | 3.65 | 7.46 | 12.70 | 17.96 |
| Assumptions | | | | | | | | | | | | |
| Price per Gallon | 3.06 | 2.55 | 3.29 | 4.99 | 4.84 | 4.74 | 4.64 | 4.54 | 4.44 | 4.34 | 4.24 | 4.10 |
| **Price per kg(Diesel)** | **0.81** | **0.67** | **0.87** | **1.32** | **1.28** | **1.25** | **1.22** | **1.20** | **1.17** | **1.14** | **1.12** | **1.08** |
| https://atb.nrel.gov/transportation/2020/hydrogen | | | | | | | | | | | | |
| Price per kg(Hydrogen) - Bear | | | | 1.32 | 1.29 | 1.26 | 1.23 | 1.22 | 1.19 | 1.16 | 1.13 | 1.08 |
| Price per kg(Hydrogen) - Base | | | | 1.32 | 1.31 | 1.30 | 1.28 | 1.25 | 1.20 | 1.14 | 1.10 | 1.06 |
| Price per kg(Hydrogen) - Bull | | | | 1.32 | 1.30 | 1.27 | 1.22 | 1.17 | 1.12 | 1.07 | 1.02 | 0.97 |
| Utilization rate - Bear | | | | | 0.03% | 0.09% | 0.15% | 0.21% | 0.27% | 0.33% | 0.39% | 0.45% |
| Utilization rate - Base | | | | | 0.03% | 0.09% | 0.15% | 0.21% | 0.27% | 3.27% | 6.27% | 9.27% |
| Utilization rate - Bull | | | | | 0.03% | 0.09% | 3.09% | 6.09% | 9.09% | 12.09% | 15.09% | 18.09% |
| Fuel Costs (Dollars) | 906,000,000 | ######### | 913,000,000 | 1,626,000,000 | 996,500,000 | 996,500,000 | 996,500,000 | 996,500,000 | 996,500,000 | 996,500,000 | 996,500,000 | 996,500,000 |
| Volume of Fuel | 1,123,606,021 | ######### | 1,052,713,721 | 1,235,225,496 | 780,478,405 | 796,947,668 | 814,126,967 | 832,063,230 | 850,807,614 | 870,415,994 | 890,949,516 | 921,154,878 |

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## Valuation

### Prices Comparison to Commodities

| | |
|---|---|
| PI - Chemicals and Allied Products: Industrial Chemicals | https://fred.stlouisfed.org/series/WPS061 |
| PI - Processed Foods and Feeds: Corn Sweeteners, Made by Wet Milling | https://fred.stlouisfed.org/series/WPU02540107 |
| PI - Automotive Parts, Accessories and Tire Retailers | https://fred.stlouisfed.org/series/PCU44134413 |
| PI - Non Metallic Minerals | https://fred.stlouisfed.org/series/WPS1321 |
| PI - Lumber and Wood Products: Lumber | https://fred.stlouisfed.org/series/WPS081 |
| PI - Metals and Metals Products | https://fred.stlouisfed.org/series/WPU10 |
| PI - Fertilizer Manufacturing | https://fred.stlouisfed.org/series/PCU3253132531 |
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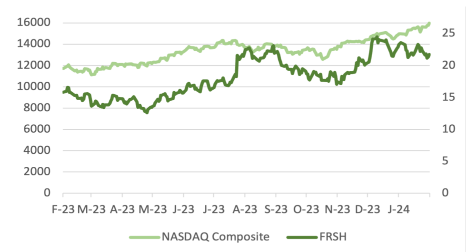
# Freshworks (NASDAQ: FRSH)

Freshworks has a positive forward looking growth trajectory due to three primary reasons: its ability to onboard enterprise customers for amplified revenue growth, its replacement of sunsetting competitors in the ITSM space, and its strategic focus on improving operating margins. We believe Freshworks is undervalued for its currently negative profit margins, presenting a unique investment opportunity. With a price target of $24.96, we recommend a buy of FRSH.

| | |
|---|---|
| Rating | **Outperform** |
| Price (02/13/24) | **$20.74** |
| Price Target | **$29.81** |
| 52W Range | **$12.22 - $24.98** |
| Market Cap | **$6.4B** |
| EPS (FY 2023) | **($0.37)** |
| Consensus | **$24.00** |
| Ticker | **FRSH (NASDAQ)** |

| | 2022A | 2023E | 2024E |
|---|---|---|---|
| **Revenue (M)** | $505 | $745 | $1,050 |
| *% Growth* | 36% | 48% | 41% |
| **EBIT (M)** | ($230) | ($186) | ($105) |
| *% Change* | 14.5% | 35% | 31% |
| **EBITDA (M)** | ($223) | ($175) | ($142) |

**Price Performance Chart**

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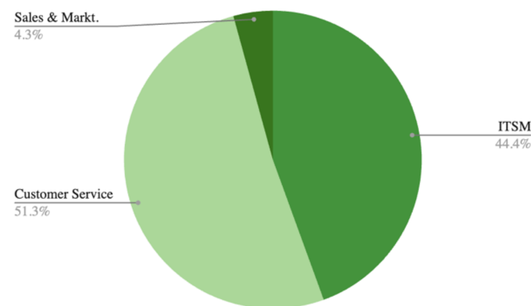
## Company Overview

Freshworks is a cloud-based software company serving primarily at offering low friction, low cost, and easily scalable solutions for SMB's. They have a variety of offerings across customer experience (such as Freshdesk, a chatbot service, their first product offering), IT Service Management (Freshservice), as well as Sales and Marketing automations (Freshsales, Freshmarketer). Freshworks operates a subscription-based revenue model, with the vast majority of its revenue derived from subscriptions to its cloud-based software products. This model has allowed Freshworks to maintain a strong and growing customer base while providing a scalable solution for small to medium-sized businesses, as well as larger enterprises seeking integrated business software solutions.

## Business Segmentation

Freshworks competes in three large growing and overlapping markets; IT & employee service, customer service, and sales and marketing. In IT & employee service, Freshworks' fastest growing product vertical boasting a growth rate in the low 40's, there is 'Freshservice' – an ITSM product aimed at IT service teams which saw an ARR of $260 million in 2023. Their second – and original – vertical, customer service, boasts $300 million ARR in 2023, yet a lower growth rate when compared to Freshworks' ITSM offerings. In this sits customer service products like 'Freshdesk', 'Freshchat' and 'Freshcaller' – all with the general aim of improving digital ticketing and support for businesses. It's important to note here that Freshworks maintains a strong foothold in this space given the fragmented vertical where other software giants such as ZenDesk, Zoho, and Salesforce dominate. Their final vertical, Sales & Marketing is their newest, only yielding around $25 million in ARR in 2023. In this space, Freshworks offers seamless AI powered CRM tools such as 'Freshsales' and 'Freshmarketer' which enhance salesforce and marketing automation. All in all, these three markets, whose TAM sits at $78 billion per Gartner, are rapidly expanding – posing an opportunity for rich integration with Freshworks' multifaceted product suite.




*Freshworks revenue split by product*

## Industry Overview & Company Positioning

<u>Competitive Landscape & Industry Targets</u>

The customer engagement solutions market is characterized by a fragmented and highly competitive landscape. Currently, most competitors of Freshworks operate features comparable to a component of Freshworks' platform, which are split across the industry targets of customer experience management, IT management, and sales and marketing. Salesforce and Zendesk are major competitors for customer experience management, whereas ServiceNow and BMC are major competitors for IT Management. Notably, the Sales and Marketing division's competitors are predominantly full-featured companies with comprehensive system integration, like Salesforce and Microsoft Dynamics. Salesforce in particular is the most dominant competitor in the CRM software market with a ~24% market share. Currently, a major competitive advantage is Freshworks' unified, omnichannel offerings that distinctively appeal to



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customers for an all-in-one system management solution, which none of its competitors are as comprehensive in currently.

Competitive Advantage: Cost Competitiveness

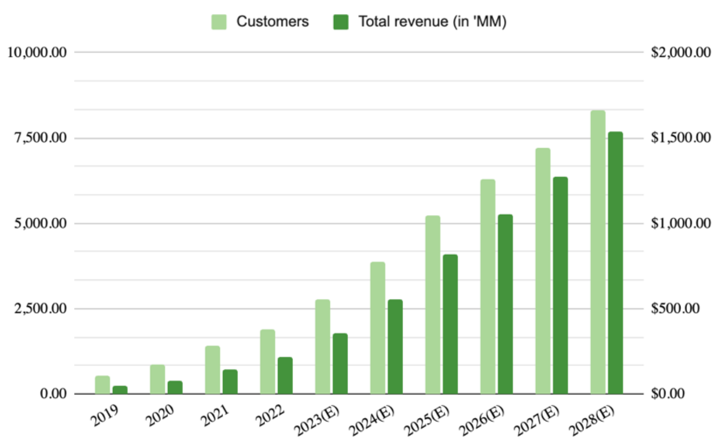
A major challenge in the market growth is the lack of availability of affordable customer engagement solutions. Freshworks' offerings are increasingly popular among small and medium-sized businesses with limited IT budgets, due to the high cost of competitors' SaaS customer engagement solutions. Moreover, given Freshworks' comprehensive pricing ranges that target a variety of business sizes, they have a more diversified customer base compared to many competitors that target customers with a particular market size. However, according to Forbes, more than 51,000 of the total Freshworks customer base of 65,600 are composed of SMBs (companies with 250 or fewer employees). This indicates their reliance on this market and reaffirms their cost advantage. Over the past three years, the number of customers contributing more than $5,000 in ARR as a proportion of total ARR has risen steadily from 82% to 85% to 87%, thus indicating increasing customer stickiness and increasing Freshworks integration over time, both factors that benefit consistent revenue performance. However, despite increasing customer ARR, customer concentration is very low for Freshworks, with no single customer accounting for more than 1% of ARR nor significant concentration within one singular industry vertical. This suggests Freshworks' significant diversification, which minimizes risks associated with customer concentration.

Industry Trend: Rising Adoption and Expectation of Personalization

The surge in the adoption of customer engagement solutions marks businesses' efforts to create positive brand perceptions and enhance customer retention. These solutions encompass a variety of touchpoints including social media, surveys, advertisement campaigns, and direct interactions. A key example is the 2021 HubSpot State of Inbound report, which highlighted that over 50% of companies saw a boost in lead generation through such engagement strategies. Hence, the growing demand for customer engagement solutions is a major driver of industry growth. However, meeting customer expectations is becoming increasingly challenging. According to McKinsey Industry Research, millennials, for instance, expect real-time customer service, while a majority of customers demand a consistent cross-channel service experience. With rising cost pressures and heightened service expectations, simply increasing the workforce for customer service is no longer a feasible solution. This dilemma has led companies to turn to AI for delivering proactive, personalized service that meets customer demands efficiently. This trend is expected to increase the TAM of Freshworks' market.

## Thesis 1: Strategic Expansion in Enterprise Segment with AI Differentiation

The market's current view of Freshworks (FRSH) predominantly as an SMB-centric platform we believe significantly underestimates its strategic evolution and growing appeal in the mid-market and enterprise domains. Its evolution beyond an SMB-centric view is marked by a significant shift towards the mid-market and enterprise sectors, evidenced by a 33% year-over-year increase in customers contributing over $50,000 in ARR, now representing 46% of Freshworks' total ARR. This shift is further accentuated internally by strategic marketing adjustments and a focus on larger deals – both through onboarding specialized deal partners who can support enterprise companies (notably, this partner sourced business has grown 40% YoY), as well as adjusting their marketing budget to overweight the acquisition of larger, higher potential clients — resulting in improved sales efficiency (non-GAAP sales and marketing expenses dropping from 51% to 48% of revenue). Specifically, the introduction of outbound marketing tactics (all marketing strategies excluding inbound marketing like Display, PPC, YouTube, Google ads, etc) in 2020 marked a significant shift, resulting in an increase in brand visibility. Looking to diversify their customer base and alleviate risks associated with solely serving SMBs, Freshworks implemented a twin-engine model to accommodate different growth drivers and focuses for SMBs versus middle-market



enterprises. By balancing between a 40-60 or 50-50 split for outbound and inbound marketing for mid-market enterprises, Freshworks has managed to greatly increase their presence in the mid-market enterprise segment, which is now around 30% of its customer base. This change has not only diversified their customer acquisition channels and repositioned the company as a viable competitor to industry giants like Salesforce and Zendesk, especially in the large enterprise segment. The outbound marketing effort, now leaning towards a 70-30 or 80-20 split for mid-market enterprises, is a strategy that is expected to contribute top-line growth through increasing both the number and ARR of mid-market enterprise customers. This emphasizes Freshworks commitment to expanding beyond their core target market of SMBs, and instead, through their maturation, extending this netting to higher value clients.

Freshworks is not only scaling its offerings but also enhancing them with advanced AI capabilities, notably through Freddy AI. Whilst we acknowledge that AI integrations are a platitude as they are sprouting up across the board in most B2B SaaS companies, we believe – as evidenced by talks with Freshworks partners – that Freddy AI is, and will continue to be, a significant factor in appealing to and winning these larger enterprise deals. The integration of these AI capabilities across Freshworks' comprehensive suite of tools, from customer support to project management, presents a compelling value proposition for larger organizations that favor efficiency and seamless software stack. This is a stark contrast to the segment-specific solutions offered by competitors such as ZenDesk and Atlassian, highlighting Freshworks' unique position in the market. Alongside with AI, Freshworks' current strategy on providing an integrated all-in-one ecosystem differentiates it from competitors who offer solutions that often cater to specific segments of system management. This unique positioning has been propelling the increasing ARR per individual customer, particularly for SMBs, and highlights a potential for further growth within the existing user base in the future. This strategy will play a critical role for increasing ARR of mid-market enterprise customers, especially because a key driver of conversions on mid-market enterprise side for Freshworks is its infrastructure customization capacity. Customization and integration with an entire ecosystem for larger enterprises which have a lot of service needs could have a lot of potential for ARR per individual enterprise customer. Just this month, the successful platform integration of Freshworks' middle-market enterprise Monos demonstrates businesses' draw towards Freshworks' system integration: Monos saw a dramatic improvement in agent efficiency with decreased resolution time by 150% and a consequent increase in sales by 500%. The spokespeople from Monos expressed how it was a "game changer" for Freshworks to consolidate their processes and induce increased operational efficiency. This strategic direction towards integration propels the potential for Freshworks to significantly expand its mid-market enterprise segment through targeted marketing efforts and through offering integrated solutions that appeal to the complex service needs of larger enterprises, therefore increasing their number of customers and their LTV respectively.

Overall these three trends/strategic direction promises consistent revenue stream and revenue growth for the future. Due to the existing positive trend of revenue growth, the market has somewhat priced in the expectations of revenue growth as can be seen through the stock performance after their Q2 2023 financial results were published. However, given the strong potential for top-line growth and trends of increasing revenue performance through their integration strategy and enterprise-level customer prioritization, which Freshworks has increasingly prioritized in recent months, the market has largely not accounted for this potential for top line growth and undervalues Freshworks' potential in these larger segments. The company's successful customer stories, like Clopay Corporation and Trainline, and its shift towards annual contracts rather than shorter monthly contracts, which contribute to stable revenue streams, underscore its growth trajectory and suggest growing revenue from its enterprise customer segment.

## Thesis 2: Growing Market Share in ITSM with Competitive Displacement Opportunities

In addition to the expansion opportunities from larger enterprises, as explained in the previous thesis point, the significant growth potential for Freshworks in the IT Service Management (ITSM) market from digital and strategic transformation shifts from legacy ITSM players, such as BMC, Ivanti, and ServiceNow, provides massive competitive displacement opportunities regarding small-to-medium sized enterprises (SMEs). Beginning with BMC, the firm's strategic refocus towards iBMC Helix, its enterprise-level ITSM platform, has led to the sunsetting of Remedyforce and a de-emphasis on its on-premise solutions, FootPrints and Track-It!. This shift away from legacy products, which have been crucial for SMEs, due to increased pricing or discontinuation, has alienated a significant portion of its customer base. Specifically, FootPrints and Track-It! collectively serve approximately 2,500 firms, many of which

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now find themselves compelled to seek ITSM solutions that align better with their needs for affordability and agility, especially with regards to cloud-based software.

In parallel, Ivanti's acquisition strategy, particularly its integration of Cherwell into its offerings, has similarly unsettled the space. Cherwell's appeal lay in its customizable ITSM solutions that attracted a diverse range of businesses, including a significant number of SMEs. Post-acquisition attempts to consolidate Cherwell customers into Ivanti's unified platform have not been uniformly successful, with notable resistance stemming from fears of losing Cherwell's unique advantages. This unrest among Cherwell's user base, which is part of an immediate potential market for Freshworks estimated at nearly 2,000 firms, underscores a substantial opportunity for displacement. Additionally, ServiceNow's position in the market, primarily targeting medium to large enterprises with its sophisticated, but also higher-priced solutions, further amplifies this opportunity. ServiceNow's churn, which has exposed $165 million worth of business to potential displacement, positions Freshworks favorably as a viable alternative for those scrutinizing IT spend more closely.

Coined as a formidable "contender" by Gartner's 2022 MQ, Freshworks is strategically positioned to capitalize on the market dynamics shaped by the strategic shifts of BMC and Ivanti, along with the churn from ServiceNow, with its competitive pricing and comprehensive suite. The company's flagship ITSM offering, Freshservice, is at the forefront of this growth catalyst, appealing to an increasingly broad spectrum of business — from small and medium-sized businesses (SMBs) to mid-market and enterprise customers — through a comprehensive and enterprise-grade suite that encompasses IT operations management (ITOM), IT asset management (ITAM), and enterprise service management (ESM). This past year, Freshservice has significantly improved customizability by adding support for Microsoft Teams and WhatsApp, allowing customers to receive on-call notifications on those channels. Additionally, the cloud-based solution has officially integrated Freddy AI, which has already begun improving client operations such as that of Pitchbook, experiencing decreased agent response and requested wait times by over 20% and automated IT processes for employee onboarding and uploading. All of these improvements, alongside being a relatively less-expensive product than BMC Helix, Ivanti, and ServiceNow, position the ITSM segment as the most poised for future growth.

In fact, this competitive displacement shift has already begun over the past year with success stories of Freshworks displacing each of the three aforementioned companies' clients, effectively displaying its competitive edge. To begin, Freshworks replaced ServiceNow with a major food industry player, generating $30,000 in monthly revenue, equating to around $350,000 annually. This success is part of a broader pattern, with Freshworks achieving six ServiceNow displacements over the past year, reinforcing its growth trajectory and service enhancements. Similarly, Freshworks has made inroads against Cherwell, most notably with a specialty retail giant, boosting its monthly revenue by $20,000. Another displacement from Cherwell contributed an additional $240,000 in annual recurring revenue, underlining Freshworks' expanding presence in the ITSM market. Furthermore, the transition of Motorama from BMC's Track-It! to Freshservice due to challenges with performance and scalability illustrates Freshworks' ability to attract businesses seeking more efficient, scalable, and user-friendly ITSM solutions. These instances collectively showcase Freshworks' capacity to effectively respond to the evolving needs of the ITSM sector, leveraging industry shifts to secure new business as well as displacing traditional providers with its modern, cloud-based service offerings.

Lastly, when examining the competitive landscape, Atlassian Corp emerges as a significant competitor to Freshworks in the quest to capture market share through strategic competitive displacements. Our analysis suggests that the ITSM space has enough capacity to accommodate multiple key players, which is a perspective that aligns with the views of Freshworks' partners. Furthermore, a competitive advantage in Freshworks' favor, particularly when competing with Atlassian for mid-market deals, is its cohesive and unified user experience offered by Freshservice. This advantage stems from the Freshservice solution being developed from the ground up, in contrast to Atlassian's approach of piecing together its ITSM offerings through the acquisition of product lines from four different companies. As a result, considering Freshworks' distinct competitive edges—notably, its unified product experience—it's evident that Freshworks is well-positioned for significant growth in the ITSM domain for years to come.

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## Thesis 3: Enhancing Margins and Market Edge: Freshworks' Strategic Efficiency in G&A

Looking towards the future, Freshworks is looking to curb expenditures in General & Administrative to propel margin expansion. Market sentiment currently underestimates Freshworks' cost cutting measures within this line item. We argue that these underappreciated strategies will be pivotal in driving the company's profitability and providing a competitive edge in the market. Within the G&A domain, Freshworks' workforce being primarily based out of India delivers a significant cost advantage – especially looking forward when scaling for their increasing SMB and Enterprise customer base. This Indian hotspot of innovation, representing over 85% of Freshworks' 5,000 plus employees, stands apart from similar SaaS companies such as Salesforce and HubSpot, who either lack a more margin efficient offshore team and instead build product primarily in North America or Europe, or *outsource* their innovations to be built in cheaper labor markets – resulting in disconnect from innovation and design teams. We believe Freshworks is different by being grounded in its Indian heritage, both innovating *and* building in India – operating in three offices: Chennai, Bangalore, Hyderabad, with Chennai being the largest R&D center. This model provides a ground for agile and efficient innovation, a necessary tenet moving forward given Freshworks' ambitious growth plans. This will lead to stable revenue generation even given their scaling plans.

In parallel with Freshworks' strategy to utilize its India-based workforce for cost efficiency and innovation, the company is also making a significant move within the General & Administrative (G&A) domain to reduce stock-based compensation (SBC) as a percentage of revenue. This transition, from a high of 47% in 2021 to a projected 18% by 2026, signifies a substantial shift in their compensation strategy. The decrease in SBC is a strategic decision that will have a pronounced positive impact on the company's GAAP operating income. By allocating a lower percentage of revenue towards stock-based compensation, Freshworks can retain a larger portion as operating income, leading to an increase in their operating margins.

Through strategic G&A efficiency measures, Freshworks is on track to significantly boost its operating margins. The dual approach of leveraging its cost-effective and staunchly innovative India-based workforce and reducing stock-based compensation aligns with fiscal prudence and sustainable growth. These efforts are set to enhance Freshworks' financial health and competitive stance in the SaaS market, marking a crucial step in its journey towards increased market success.

## Investment Risks & Mitigants

Risk 1: C-Suite Management Changes Creates Uncertainty

Freshworks' CRO, Pradeep Rathinam, plans to leave the company by the end of February 2025, and Mika Yamamoto will be onboarded as the Chief of Customer and Marketing, and Abe Smith will be onboarded as Chief of Global Field Operations. Although executive changes bring on execution risks, this change is mitigated by the new management's alignment with Freshworks' go-to-market strategy: Yamamoto will be focusing on inbound marketing to improve SMB operations, whereas Smith will focus on outbound marketing for enterprise customers. Their expertise in this field positions them well to execute Freshworks' recent marketing strategy shifts, therefore mitigating the risks of harmful management changes.

Risk 2: Competition in Saturated Markets May Lead to Unsuccessful Market Penetration

Freshworks operates in highly competitive and fragmented markets with dominant players like Salesforce and Zendesk. This competition can limit market share growth, as they may not be able to successfully gain traction in a highly competitive market. As a result, revenue growth might be more conservative than estimated. To mitigate this risk, Freshworks offers a unique value proposition: a comprehensive product suite and AI capabilities (e.g., Freddy AI), which differentiates them from competitors. Their increasing emphasis on tapping strengths of their integrated system provides a unique edge against their competitors.

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## Valuation

Revenue build: When constructing our revenue build, we segment Freshworks' revenue by customer segment (less than $5k ARR, between $5K ARR and $50K ARR, and greater than $50K ARR). We assume, in line with our first thesis point, that Freshworks will increase the number of enterprise customers it onboards whilst maintaining its foothold in the SMB space.

EBIT Margins: Our EBIT Margins are based upon improving operational efficiency assumptions, leading to greater operating margins for projected years. We assume, in line with our third thesis, that strategic focus on continued margin improvement will allow the company to break-even between FY2026 and FY2027, slightly after management's guidance. Following this, Freshworks will lead to a positive operating margin of 2.5% by FY2027, then increase at 10% the year after by scaling further.

Effective Tax Rate: We assume that the effective tax rate will stay relatively stable during the projection period, at just above 6%. Their ETR appears to be relatively low due to numerous factors, but primarily the presence of international operations and tax jurisdictions.

Lastly, for calculating our WACC, we assumed the cost of debt to be negligible due to the company having a net positive interest (income) instead of expenses, as well as the overwhelming amount of equity in the company's capital structure compared to its debt counterpart. With a WACC of 8.91% and Terminal Growth Rate of 5.00%, we project a potential upside of 43.72% for the Gordon Growth Method and 257.82% for the Exit Multiples Method.

Revenue Build

| | Historical | | | | Projected | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | *2019* | *2020* | *2021* | *2022* | *2023* | *2024* | *2025* | *2026* | *2027* | *2028* |
| **Customer < $5k ARR** | | | | | | | | | | |
| ARR per customer - Customers < $5K ARR | 1.35 | 3.11 | 1.46 | 1.51 | 1.56 | 1.62 | 1.67 | 1.73 | 1.79 | 1.86 |
| *Percentage Growth* | | *130.37%* | *-53.05%* | *3.42%* | *3.50%* | *3.50%* | *3.50%* | *3.50%* | *3.50%* | *3.50%* |
| Customers < $5K ARR | 31,412.00 | 36,930.00 | 41,186.00 | 45,678.00 | 51,616.14 | 57,293.92 | 63,309.78 | 69,957.30 | 76,953.03 | 84,648.34 |
| *Percentage Growth* | | *17.57%* | *11.52%* | *10.91%* | *13.00%* | *11.00%* | *10.50%* | *10.50%* | *10.00%* | *10.00%* |
| Total revenue - Customers < $5K ARR | 40,270.00 | 97,900.00 | 59,080.00 | 69,080.00 | 80,668.28 | 92,675.76 | 105,990.95 | 121,219.20 | 138,008.06 | 157,122.17 |
| | | | | | | | | | | |
| **$5K ARR < Customer < $50K ARR** | | | | | | | | | | |
| ARR per customer - $5K ARR < Customers < $50K ARR | 11.51 | 12.24 | 13.28 | 14.08 | 14.92 | 15.82 | 16.77 | 17.78 | 18.84 | 19.97 |
| *Percentage Growth* | | *6.34%* | *8.50%* | *6.02%* | *6.00%* | *6.00%* | *6.00%* | *6.00%* | *6.00%* | *6.00%* |
| $5K ARR < Customers < $50K ARR | 8,054.00 | 10,689.00 | 13,398.00 | 15,814.00 | 20,558.20 | 25,697.75 | 31,479.74 | 37,775.69 | 45,330.83 | 53,263.73 |
| *Percentage Growth* | | *32.72%* | *25.34%* | *18.03%* | *30.00%* | *25.00%* | *22.50%* | *20.00%* | *20.00%* | *17.50%* |
| Total revenue - $5K ARR < Customers < $50K ARR | 86,050.00 | 121,600.00 | 170,090.00 | 218,210.00 | 306,827.02 | 406,545.81 | 527,899.73 | 671,488.46 | 854,133.32 | 1,063,823.04 |
| | | | | | | | | | | |
| **Customer > $50k ARR** | | | | | | | | | | |
| ARR per customer - Customers > $50K ARR | 86.25 | 89.08 | 100.16 | 113.98 | 129.37 | 142.30 | 156.53 | 168.27 | 176.69 | 185.52 |
| *Percentage Growth* | | *3.28%* | *12.43%* | *13.80%* | *13.50%* | *10.00%* | *10.00%* | *7.50%* | *5.00%* | *5.00%* |
| Customers > $50K ARR | 534.00 | 881.00 | 1,416.00 | 1,908.00 | 2,766.60 | 3,873.24 | 5,228.87 | 6,274.65 | 7,215.85 | 8,298.22 |
| *Percentage Growth* | | *64.98%* | *60.73%* | *34.75%* | *45.00%* | *40.00%* | *35.00%* | *20.00%* | *15.00%* | *15.00%* |
| Total revenue - Customers > $50K ARR | 46,060.00 | 78,480.00 | 141,820.00 | 217,470.00 | 357,901.25 | 551,167.93 | 818,484.37 | 1,055,844.84 | 1,274,932.65 | 1,539,481.17 |
| | | | | | | | | | | |
| **Total Revenue** | 172.38 | 297.98 | 370.99 | 504.76 | 745.40 | 1,050.39 | 1,452.38 | 1,848.55 | 2,267.07 | 2,760.43 |

DCF Valuation

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| | Historical | | | | Projected | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 |
| Revenue | 172.38 | 297.98 | 370.99 | 504.76 | 745.40 | 1,050.39 | 1,452.38 | 1,848.55 | 2,267.07 | 2,760.43 |
| *revenue growth* | | *72.86%* | *24.50%* | *36.06%* | *47.67%* | *40.92%* | *38.27%* | *27.28%* | *22.64%* | *21.76%* |
| EBIT | (29.70) | (56.10) | (200.90) | (230.10) | (186.35) | (157.56) | (108.93) | (46.21) | 56.68 | 276.04 |
| *%rev* | *-17.23%* | *-18.83%* | *-54.15%* | *-45.59%* | *-25.00%* | *-15.00%* | *-7.50%* | *-2.50%* | *2.50%* | *10.00%* |
| Effective Tax Rate | | 7.60% | 5.80% | 5.10% | *6.17%* | *6.17%* | *6.17%* | *6.17%* | *6.17%* | *6.17%* |
| (+) D&A | 4.90 | 5.40 | 6.50 | 6.70 | 11.18 | 15.76 | 21.79 | 32.35 | 34.01 | 41.41 |
| *%rev* | *2.84%* | *1.81%* | *1.75%* | *1.33%* | *1.50%* | *1.50%* | *1.50%* | *1.75%* | *1.50%* | *1.50%* |
| (-) CapEx | (11.50) | (4.40) | (5.60) | (7.10) | (11.18) | (10.50) | (14.52) | (18.49) | (17.00) | (20.70) |
| *%rev* | *6.67%* | *1.48%* | *1.51%* | *1.41%* | *1.50%* | *1.00%* | *1.00%* | *1.00%* | *0.75%* | *0.75%* |
| NWC | (44.80) | (77.90) | (125.40) | (142.20) | (212.63) | (299.64) | (414.31) | (527.32) | (646.71) | (787.45) |
| *%rev* | *-25.99%* | *-26.14%* | *-33.80%* | *-28.17%* | *-28.53%* | *-28.53%* | *-28.53%* | *-28.53%* | *-28.53%* | *-28.53%* |
| Change in NWC | | (33.10) | (47.50) | (16.80) | (70.43) | (87.00) | (114.67) | (113.01) | (119.39) | (140.73) |
| FCF | | (17.74) | (140.85) | (201.96) | (104.42) | (55.59) | 19.72 | 83.51 | 189.57 | 420.46 |
| Discounted FCF | | | | | (95.88) | (46.86) | 15.27 | 59.35 | 123.71 | 251.92 |

| WACC Calculation | |
|---|---|
| Risk Free | 3.95% |
| Unlevered Beta | 1.19 |
| Levered Beta | 1.20 |
| Equity Risk Premium | 4.19% |
| | |
| Effective Tax Rate | 6.17% |
| Cost of Equity | 8.96% |
| Cost of Debt | 0.00% |
| Current Stock Price | 20.74 |
| Shares Outstanding | 295.25 |
| Market Cap | 6,123 |
| | |
| Total Debt | 34.95 |
| Net Debt | -1,129.75 |
| Market Cap | 6,123.49 |
| Percent Equity | 99.43% |
| Percent Debt | 0.57% |
| **WACC** | 8.91% |

| Terminal Value: Gordon Growth Method | |
|---|---|
| Terminal Growth Rate | 5.00% |
| Terminal Value | 11,284.30 |
| Present Value of TV | 7,363.58 |
| Sum of Near Term Cash Flows | 307.50 |
| Implied Enterprise Value | 7,671.09 |
| Implied Equity Value | 8,800.84 |
| Implied Share Price | 29.81 |
| Upside | 43.72% |

| Terminal Value: Exit Multiples Method | |
|---|---|
| Median EV/Revenue | 11.37 |
| Terminal Value | 31,375.21 |
| Present Value of TV | 20,473.92 |
| Sum of Near Term Cash Flows | 307.50 |
| Implied Enterprise Value | 20,781.42 |
| Implied Equity Value | 21,911.18 |
| Implied Share Price | 74.21 |
| Upside | 257.82% |

Comparable Companies Valuation

| Company | Stock Price | Shares Out. | Market Cap | Net Debt | EV | Revenue | EV/Revenue |
|---|---|---|---|---|---|---|---|
| Braze | 59.16 | 99.80 | 5,904.17 | (376.93) | 5,527.24 | 439.52 | 12.6 |
| Klaviyo | 30.78 | 258.70 | 7,962.79 | (668.95) | 7,293.84 | 641.72 | 11.4 |
| Asana | 19.61 | 222.50 | 4,363.23 | (247.41) | 4,115.82 | 631.60 | 6.5 |
| Five9 | 77.99 | 72.70 | 5,669.87 | 95.33 | 5,765.20 | 879.77 | 6.6 |
| Atlassian | 216.17 | 259.40 | 56,074.50 | (366.53) | 55,707.97 | 3,892.44 | 14.3 |
| HubSpot | 617.07 | 50.33 | 31,057.13 | (809.96) | 30,247.17 | 2,057.97 | 14.7 |
| ServiceNow | 787.35 | 204.46 | 160,981.58 | (5,796.00) | 155,185.58 | 8,971.00 | 17.3 |
| Salesforce | 287.32 | 968.00 | 278,125.76 | 1,896.00 | 280,021.76 | 33,954.00 | 8.2 |
| | | | | | | | |
| **Freshworks** | **21.58** | **295.30** | **6,372.57** | **(1,160.83)** | **5,211.74** | **596.43** | **8.7** |
| **Median** | | | | | | | **11.4** |

| Implied Share Price | |
|---|---|
| Median EV/Revenue | 11.37 |
| Implied EV | 6,779.07 |
| Implied Eq Value | 7,908.82 |
| Implied Share Price | 26.79 |
| Upside | 29.16% |

## Comparable Company Analysis

For an equitable comparison, we valued Freshworks alongside companies that operate across all of Freshworks' product verticals, to get an all-encompassing view of the firm. The metric we chose for the analysis was EV/Revenue, since nearly all of the Freshworks direct competitors that target SMBs and lower middle-market enterprises have negative operating margins. Freshworks' exemplified an EV/Revenue ratio of 8.7x, standing below our calculated industry median of 11.4x, which implies the company's current undervaluation and a potential upside of 29.16%.

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# Freeport-McMoRan Inc. (NYSE: FCX)

| Rating | Outperform |
|---|---|
| Price (02 16 24) | $38.83 |
| Price Target | $50.00 |
| 52W Range | $32.82 - $44.70 |
| Market Cap | $55.68B |
| EPS (FY 2023) | $1.28 |
| Consensus | $45.00 |
| Ticker | NYSE: FCX |

Freeport McMoRan (NYSE: FCX) is one of the world's largest miners of Copper, the world's largest miner of Molybdenum, and owns the single largest deposit of Gold in the world, the Grasberg mine, which also happens to be the world's second largest deposit of copper, in addition to being the world's largest underground operation. Given its quality asset base, strong operational & financial performance, and the tailwinds of the copper market, attributable to global decarbonization & electrification efforts, we see Freeport as a unique opportunity for capital allocators looking for exposure in the mining and metals industry.

**Price Performance Chart**

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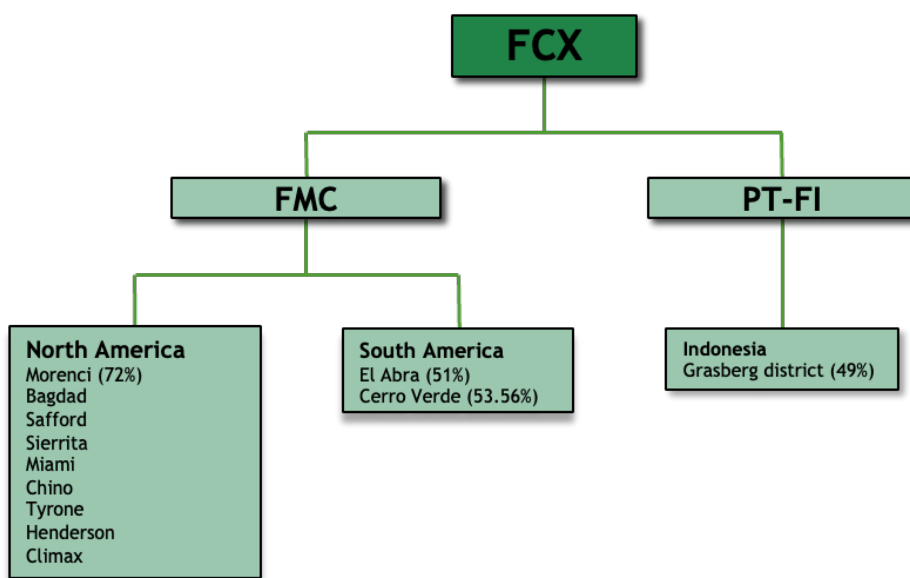
## Company Overview

Freeport-McMoRan (NYSE: FCX) is an international mining company headquartered in Phoenix, Arizona. Founded in 1981, Freeport-McMoRan is now an international leading operator of copper, gold, and molybdenum reserves. Freeport-McMoRan's portfolio of assets includes the Grasberg minerals district in Indonesia, one of the world's largest copper and gold deposits; and mining operations in North and South America like the Morenci minerals district in Arizona and the Cerro Verde operation in Peru. Freeport-McMoRan's ownership in interests in consolidated subsidiaries, FMC and PT-FI, look like the following tree:




## Business Segmentation

Freeport-McMoran has segmented its mining operations into four primary divisions:

**North American copper mines:**
FCX operates seven copper mines in North America which make up 44% of the firm's probable reserves. The most notable of which are the Morenci mine (72% ownership), Safford mine, and Sierrita mines which produce the most copper for the firm in North America.

The majority of FCX's North American copper that is mined and refined in their El Paso refinery is consumed to produce copper rod, which is then sold to wire and cable manufacturers. The remainder of our North America copper production is sold in the form of copper cathode or copper concentrate under U.S. dollar-denominated annual contracts. Generally, the copper cathode is sold to rod, brass or tube fabricators.

**South America mining:**
FCX operates two copper/molybdenum mines in South America: Cerro Verde in Peru and El Abra in Chile. These mines make up 28% of copper reserves and 20% of molybdenum reserves for the firm. FCX has a 53.56% ownership interest of Cerro Verde, the open-pit copper and molybdenum mining complex that has been in operation. FCX's long term mining operation plans expect to continue mining the reserves until 2052.
FCX also holds a majority interest in El Abra of 51% and plans to continue mining reserves until 2040. Higher mining and stacking activities at El Abra resulted in a 26% increase in copper production for the year 2022, compared with the year 2021(impacted by COVID protocols).

**Indonesia mining:**
FCX's Indonesian mining operations in Grasberg make up 28% of the firm's copper reserves and 98% of gold reserves making the mine practically the firm's only gold operation. Grasberg will be a major focus for FCX's future operations with plans to operate up to 2041 at the earliest. FCX also has plans to expand in the Kucing Liar to diversify their interests in Indonesia. In 2018, FCX expanded operations into Indonesia with a transaction with the Indonesian government for 48.76% share ownership in PF-TI, a limited liability company organized under the laws of the Republic of Indonesia. The remaining ownership belongs to Inalum (aka PT Indonesia Asahan Aluminum), an Indonesian state-owned enterprise. With a 2018 concurrent negotiation, FCX owned up to 81% interest until 2022. In this same negotiation, FCX received an IUPK, a special mining license, to replace its former Contract of Work (COW), enabling PT-FI to conduct operations in the Grasberg minerals district through 2041. Under the terms of the IUPK, PT-FI has been granted an extension of mining rights through 2031, with rights to extend mining rights through 2041, subject to PT-FI completing the construction of additional domestic smelting capacity in Indonesia and fulfilling its defined fiscal obligations to the Indonesia government.

**Molybdenum:**
North American and South American mines make up the entirety of FCX's molybdenum reserves with 73% coming from four mines in North America and the remaining coming from the Cerro Verde copper mine in Peru. FCX is a leader in the mining industry for molybdenum, becoming the first molybdenum miner to receive a Molybdenum mark.

## Recent Events

***Dispositions***
In September 2021, FCX's 56% owned subsidiary, Koboltti Chemicals Holdings Limited (KCHL), completed the sale of its remaining cobalt business based in Kokkola, Finland (Freeport Cobalt) to Jervois Global Limited (Jervois) for $208 million (before post-closing adjustments), consisting of cash consideration of $173 million and 7% of Jervois common stock (valued at $35 million at the time of closing). In 2022, KCHL sold these shares for $60 million. Following this disposition, FCX no longer has any cobalt operations.
***PT-FI:***
In December 2018, FCX announced its long-awaited agreement with the Indonesian state-owned enterprise (Inalum) and PT-Freeport Indonesia (PT-FI) joint venture (JV) partner Rio Tinto. Inalum acquired for cash consideration of $3.85 billion all of Rio Tinto's interests associated with the JV with PT-FI and 9.36% of FCX's interest in PT-FI. Rio Tinto received $3.5 billion, and FCX received $350 million in cash proceeds from Inalum. FCX will continue to manage the operations of PT-FI. Under the terms of the agreement, PT-FI has been granted an extension of mining rights through 2031, with rights to extend mining rights through 2041. Following the transaction, FCX has 48.79% ownership in PT-FI and the remaining 51.24% is owned by Inalum; however, the deal was structured so that FCX retains 81% economic ownership through 2022. Beginning January 1, 2023, FCX's economic interest in PT-FI is 48.76%.

In 2018, PT-FI was granted an extension of mining rights through 2031, with rights to extend mining rights through 2041. Maintaining a good relationship with the Indonesian government and Inalum will be especially important due to the political controversy that the Grasberg mine has in Indonesian media. PF-TI's current long-term mine plan assume that the IUPK they received will be approved past 2041 meaning that current operation plans will only mine through 46% of aggregate proven and probable recoverable mineral reserves which represent approximately half of FCX's total net equity share of recoverable copper and gold reserves. Failing to extend the IUPK to 2041 will greatly impact FCX's financial position as the firm will not be able to mine a large share of their ore reserves and lose geographical diversity advantage.

The fifth Indonesian General elections were held on February 14th of this year. As of the 16th of February, the internationally controversial Prabowo Subianto, Indonesia's current Defense Minister and past military general, is the presumptive winner. It is currently unclear how this may impact PTFI's operations.

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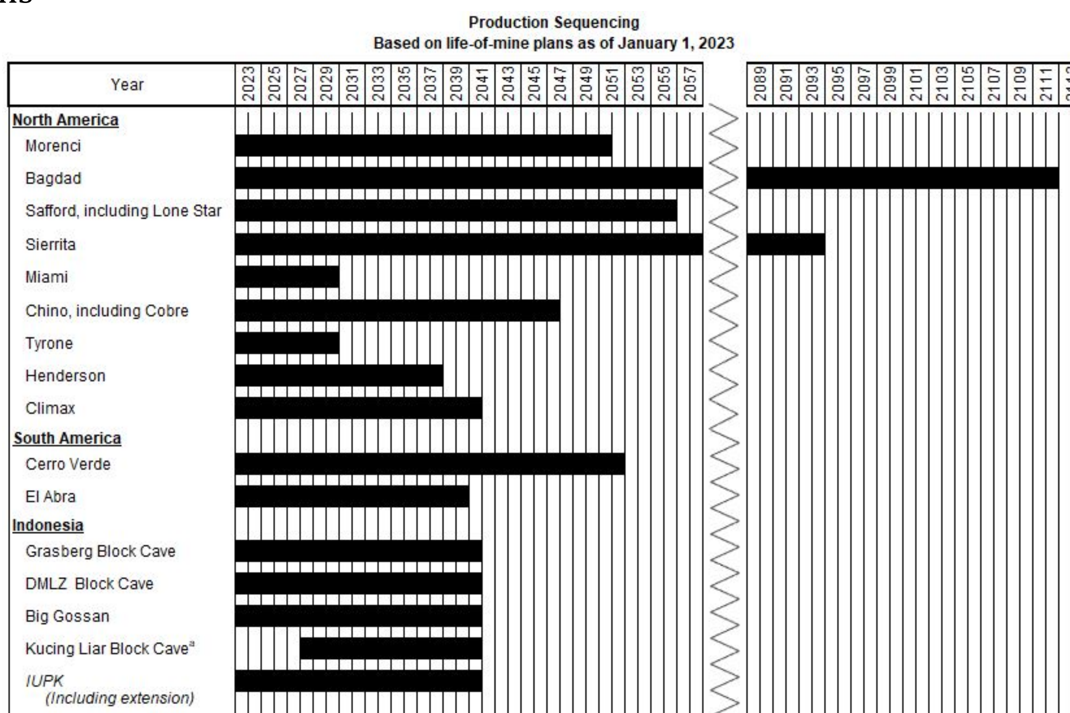
## Mining Plans




# Industry Overview

The mining industry is a highly competitive sector with several major players. The industry is characterized by high barriers to entry due to substantial upfront capital requirements, complex regulatory environments, and technical expertise. This reduces the threat of new entrants. However, the rise of new technologies and the increasing demand for critical minerals could potentially lower these barriers, allowing new players to enter the market.

The bargaining power of buyers in the mining industry is moderate. While there are few substitutes for minerals, the global nature of the mining industry means that buyers can switch suppliers if necessary. However, the quality and type of mineral can significantly impact a buyer's ability to switch, as not all minerals are created equal. The bargaining power of suppliers is relatively low in the mining industry. This is because the suppliers of raw materials, such as machinery and equipment manufacturers, are numerous and fragmented. However, the bargaining power of labor can be significant, particularly in regions where skilled labor is scarce.

The threat of substitutes in the mining industry is relatively low. Minerals and metals have unique properties that are difficult to replicate with other materials. However, the push towards a circular economy and the development of recycling technologies could increase the availability of secondary raw materials, posing a potential threat. The rivalry among existing competitors in the mining industry is high. The industry is characterized by a large number of global and regional players competing on the basis of price, quality, and service. Additionally, the high fixed costs associated with mining lead to significant competition during periods of low demand.

Freeport-McMoRan (FCX), Southern Copper (SCCO), Vale (VALE), Rio Tinto Group (RIO), BHP Group (BHP), Glencore PLC (GLNCY), and Jiangxi Copper Co. Ltd. (600362) are all part of the "basic materials" sector and are considered major players in the mining industry. Each company has its strengths and weaknesses, and they all compete with respect to price, quality, service, and their ability to meet the increasing demand for minerals. The competitive landscape is further shaped by factors such as government regulations, technological advancements, and global economic conditions.

**Industry Trends:**

*General:*

The mining industry is pivotal to the world's economy. The financial prospects of the mining industry in 2024 are shaped by several key factors. The adoption of digital technologies is accelerating, which is expected to enhance operational efficiency, productivity, and cash flow generation. Despite forecasted lower prices, higher investment into mines and permits for critical minerals is expected, with governments working to increase domestic production and critical mineral security. However, deteriorating global macroeconomic conditions are expected to persist into early 2024, representing a downside risk to the sector

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as many commodity prices slide and equity market support weakens. Producers will be impacted by narrowing margins, while the exploration sector will restrain activity amid tighter financing conditions. Indeed, as established deposits are exhausted, the net profit margin of the mining industry has decreased, from 25% in 2010 to 14% in 2022. Still, though, the global mining market grew from $2022.6 billion in 2022 to $2145.15 billion in 2023 at a compound annual growth rate of 6.1%. Mining revenue held steady at $711 billion in 2022, in another year of strong financial performance, but rising costs and economic uncertainty squeezed EBITDA margins from 32% to 29%.

*Clean Energy:*
The mining industry is also seeing a shift towards clean energy, with critical-mineral deals making up 66% of total top 40 M&A in 2022. This is driven by the role many of these minerals play in the clean energy transition technologies, such as batteries, electric vehicles, and solar and wind generation. In particular, increasing demand for copper, coupled with supply challenges, is likely to drive up prices and spur the development of new mines, while also presenting significant challenges for the industry. The global demand for copper, driven by the green energy transition, has surged in recent years, with over 60 countries backing a plan to triple global renewable energy capacity by 2030. This increased demand presents both opportunities and challenges for the mining industry. On one hand, the rising prices, which are set to soar more than 75% over the next two years, provide an incentive for miners to bring new copper mines to market. On the other hand, the industry faces significant supply challenges. The global average copper ore grade for mining is approximately 0.62% copper content, a figure that is expected to decline as mines with higher ore grades are depleted. Market analysts estimate the annual copper supply shortfall could be as high as 10 million tonnes by 2030 if no new mines are built, and the complexity of any new mines could be unprecedented as more sophisticated ore-retrieval systems are required.

Furthermore, a net zero world requires more mined critical minerals, not less, as reflected by the flow of industry dealmaking, but the increasing rise of geopolitics as an influencing factor in global mining may complicate operations in an increasingly complex world with new actors. Given ongoing geopolitical uncertainty, the rapid shift to clean-energy technologies and the importance of both these issues to national security and economic stability, governments around the world have taken swift action over the last 12 months to secure critical mineral supply and, in doing so, changed the playing field significantly. This includes swift action to form alliances, craft policies and laws, and fund initiatives that will help stabilize the supplies of critical minerals.

*Declining Ore Grades:*
As demand for copper is set to continue rising and is anticipated to exceed primary supply, markets will rely on large volumes of high-grade copper. Across the industry, market leaders like SCCO, RIO, and BHP are all struggling with declining ore grades. Drivers for declining copper ore grades are varied and not strictly limited to depletion of higher-grade resources. A large factor for this is that the development of larger mines results in economies of scale that allows the profitable extraction of lower grade resources. This helps explain the observed decrease in head grade along with the physical exhaustion of higher-grade deposits. A lowered cutoff grade for economic extraction due to current economics and improved technology are contributing to a decrease in average grades. Resource depletion will come with debates over sustainability constraints and may potentially limit future production. This will motivate the market to prioritize higher-grade reserves to hedge against the erratic changes in copper price and demand.

# Investment Thesis

## Thesis 1 – The risks placed on Grasberg by the market are overstated and its cash flows are discounted too heavily

FCX is strategically positioned to exploit escalating copper demand driven by widespread electrification. The company's competitive advantage stems from the volume and quality of its copper reserves. In 2022, FCX reported an average head grade of 0.83% copper, significantly higher than the industry average of 0.5% (SCCO: 0.39%, RIO: 0.55%, BHP: 0.71%).

In particular, Grasberg, FCX's premier asset in Indonesia, boasts a head grade of 1.5%. The extraction of a pound of copper at this site necessitates 40% less energy and machinery relative to the industry average, resulting in a $0.15 cost advantage per pound. This benefit permeates the entire cost structure and is magnified by escalating energy prices. Assuming a 10% increase in copper prices, a scenario that is plausible given analysts' predictions of a 75% surge in copper prices over the next two years, FCX's gains would be amplified. The $0.15 cost advantage would increase to $0.165 per pound, leading to a profit margin expansion that is 10% higher than the industry average. Consequently, FCX's net income could increase by 20%, compared to a 10% increase for its competitors. Indeed, each percentage point increase in copper price disproportionately benefits FCX. Analysts anticipate a copper deficit by the mid-2020s, which could further increase copper prices and amplify FCX's gains.

FCX's success is not solely dependent on current high-grade reserves; the company is aggressively expanding its operations. Grasberg, for instance, is expected to yield additional high-grade reserves. By 2027, Grasberg is projected to contribute 500,000

tons of copper annually, potentially making FCX the world's largest producer. Furthermore, the Grasberg mine is among the lowest-cost mining operations due to its ore-grades and gold by-products. In 2Q23, unit copper costs of Freeport's Indonesian operations were -$0.09/lb. In other words, Freeport was paid $0.09/lb to extract copper, attributable to the fact that mined gold covers the costs of copper mining at Grasberg. Furthermore, Freeport Indonesia's transition to underground mining presents growth opportunities, as they mine more parts of the main ore body and expand into new bodies previously unreachable through the open pit. Freeport Indonesia currently has three active underground mining operations (GBC, DMLZ, and Big Gossan) in addition to the current development of the Kucing Liar deposit, which could produce over 6 billion lbs (+/- 550M lbs/year) of copper and 6M ounces (+/- 560K oz/year) of gold between 2028 and 2041 while leveraging existing infrastructure rather than starting from scratch. Pre-production development activities started in 2022 and are expected to continue over a 10-year time frame. As such, we see strong potential for development of additional areas far beyond 2041, the current stated end-term for their contract of work.

However, much of this is overlooked by the market as geopolitical unrest often overshadows the benefits of operating in Papua, Indonesia, and the fate of FCX's lease on Grasberg is unknown. The geopolitical unrest in Indonesian Papua (formerly known as Irian Jaya) began in 1945 as the newly formed Indonesia assumed possession of all land that was previously controlled by the Dutch as part of the Dutch East Indies. The people of Papua immediately took problem with this as they feared they would be neglected by Jakarta due to their significant physical and cultural differences. In 1969, the controversial "Act of Free Choice" took place where 1,025 tribal leaders selected by the Indonesian Military unanimously voted in favor of being part of the Republic of Indonesia. However, this vote as been the source of many conflicts between Jakarta and Papua, as many believe that tribal leaders were either bribed or forced to vote for Indonesian control. Since then, the Free Papua Movement (OPM) has formed and has been active in advocating for Papuan separatism from Indonesia, both through diplomatic and militarized means. In 2002, Papua assumed its current name and gain a special autonomous status under the Indonesian legislation. Also in 2022, two expatriate teachers teaching in Grasberg's supporting town, Tembagapura, were murdered by gunfire when returning from a lunch. However, there is overwhelming evidence that this act was carried out by the Indonesian Military's special forces, Kopassus (which current President-elect Prabowo was commander of), rather than the OPM. Since then, there has been numerous armed conflicts between the OPM and the Indonesian military, including at Grasberg. Between 2003 and 2015, at least 45 men were shot and killed along the 79-mile route between Timika and the Grasberg gold mine, including an Australian miner in 2009. Recently, Papuan separatists took a New Zealander pilot hostage and set fire to his plane. He has not been released.

Many calls for reform have been made by the international community condemning the Indonesian military and Freeport's involvement with the former. For example, on February 8th of this year, two pressure groups have begun suing the London Metals Exchange (LME) for allowing the sale of metal produced by Freeport in Indonesia, due to the tailings that, the plaintiffs claim, are polluting the local rivers and for human rights abuses against the indigenous people.

However, we believe that these concerns over the geopolitical concerns in Papua are overblown by the market. In fact, many investors have divested (often huge amounts) from Freeport due to their operations in Indonesia, including the Government Pension Fund of Norway, the world's largest sovereign wealth fund. Consequently, these concerns have caused an over discounting of PTFI's cash flows. Indeed, Wall Street analysts predict a 55.8% year-over-year decline in its upcoming quarterly earnings, consistent with a bearish trend on FCX stock recently. However, according to an employee at Grasberg, the conflict does "not impact our mines at all." And therefore, the discounting of the Grasberg mine is illogical at best, or just plain wrong at worst. Also, some investors believe that there is a chance that the Indonesian government could fully nationalize the Grasberg operations, as the Indonesian government has increasingly placed pressure on Freeport to give a larger share of Grasberg to Inalum. However, this need not be a worry as, according to Promontory's projections, we are modelling Freeport's operations as if they would not extend past 2041 and we are still seeing significant upside. Therefore, there exists a mispricing opportunity in Freeport's Indonesian operations.

## Thesis 2 – Grasberg's low net cash costs insulate it against expected copper price volatility

FCX's journey towards sustainable growth is marked by a decrease in net cash costs, a factor influenced by the cessation of export duties in Indonesia in the short term. This positive trend is bolstered by capacity expansion and vertical integration in key mines including Grasberg, Morenci, and Bagdad. Notably, the company's leaching process is set to add a new stream of cash flows, with FCX already achieving a ~200 mm lbs annual run rate in 2023 from leaching alone.

In the backdrop of this development, the copper market is expected to witness high but volatile prices. In such a scenario, the ability to maintain low net cash costs becomes crucial to fully leverage the high prices and avoid mothballing mines during periods of volatility. FCX, with its Grasberg mine and leaching process, is uniquely positioned to maintain low unit net cash costs, thereby reducing the likelihood of mothballing mines going forward. The low cash costs at Grasberg not only contribute to the company's overall financial health but also provide a strategic advantage. It allows FCX the flexibility to mothball other mines if necessary while continuing low-cost production, thereby insulating the company against short-term market fluctuations. This is a significant edge over competitors like Glencore or Southern Copper, which lack a large, consistently productive mine like

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Grasberg. Specifically, while the average unit net cash cost for FCX stands at $1.75, Grasberg outperforms with a net cash cost of -$0.09. In contrast, competitors grapple with costs around $1 across the board, without a Grasberg-like mine to offset and stabilize.

FCX's strategy extends beyond cost management to volume growth, with the company making strides in boosting copper volumes by 30-40%. The company's consolidated net cash costs per pound of copper stand at $1.58, indicating a sequential decrease of 8.7%. FCX's ability to adjust mining plans in response to market conditions, including the potential for mothballing mines, further underscores its operational resilience as the market rapidly evolves in the light of financial and geopolitical changes.

## Thesis 3 – Freeport's strong operational and financial performance positions it well to capitalize on the growing tailwinds in the copper industry

Although FCX's current price action may not necessarily suggest it, Freeport has declared outstanding fourth quarter/full year results, with notable achievements in operational performance, especially in the Grasberg minerals district. This comes from the successful ramp-up of Grasberg's underground operations that was initiated in 2019 and contributed significantly to the company's performance throughout 2023. Operationally, the company's successful transition to underground mining in Indonesia marked a significant operational milestone. The shift transformed PTFI's mining operations into the world's largest underground mining complex. Indeed, many investors were worried over PTFI's transition from a low-cost open-pit operation to a fully underground mine. However, four years on, the numbers are telling us that such pessimistic views are just plain wrong. Underground ore mined averaged over 214,000 tons per day, 8% higher than the year ago period, combined with strong recoveries (thanks in part to the construction of the new SAG mill). PTFI's copper and gold production in the fourth quarter was over 20% higher than last year's fourth quarter.

On a full-year basis, Freeport generated $8.8 billion in adjusted EBITDA and operating cash flows exceeding $5 billion, indicating its ability to generate substantial earnings and cash flow from its operations, even in unfavorable economic conditions and the fact that the new PTFI ownership structure took effect on January 1st, 2023.

Despite facing challenges such as slightly higher unit net cash costs compared to the previous year, Freeport effectively managed its costs, with unit net cash costs averaging $1.52 per pound in the fourth quarter, with the Indonesian operations yielding a byproduct unit net cash cost of $0.00 also in the same time frame.

With that said, the company also reaffirmed its commitment to maintaining a strong balance sheet, returning cash to shareholders, and investing in value-enhancing growth projects. The company's financial policies prioritize disciplined capital allocation and prudent investment decisions to protect sustainable long-term value creation for shareholders. After all, mining operations carry significant financial risks as it is easy to waste huge sums of cash on risky expansions. However, this need not be a worry for investors in FCX as Freeport has a long-lived asset base, with their two largest operations mining until at least 2041, and with their Bagdad mine until at least 2112. In addition to a long-lived asset base that will be used to continuously generate cash flow for shareholders, Freeport management has proven themselves impressively scrupulous when it comes to debt, an all-too often problem that plagues the industry as miners look to fund their large operations. The company has only $700 million in debt maturities until 2027, which buys management a lot of time in the current environment of elevated rates. Furthermore, Freeport has close to $5 billion in cash and cash equivalents. It also has another $3.0 billion available under its credit facility, $1.8 billion available under its PT-FI credit facility, and $350 million available under the Cerro Verde credit facility. As for ratios, the company has a net leverage ratio of just 0.4x EBITDA based on $3.6 billion in net debt (with $2.8 billion of their net-debt coming from the Manyar smelter project). Needless to say, Freeport is in a more-than comfortable position when it comes to leverage, with the possibility of the company actually becoming net debt positive in the near future.

In terms of market outlook, FCX remains optimistic about the copper market's fundamentals, driven by supply disruptions and growing demand in key sectors such as energy infrastructure and electric vehicles. Despite market volatility influenced by macroeconomic factors, FCX believes in the long-term strength of the copper market and anticipates higher copper prices in the future. We also share in Freeport' views, seeing that it is practically impossible not to predict that copper supply will squeeze in the coming years.

As Promontory Investment Research is in no business of predicting long-term macroeconomic conditions, we will merely present findings from other reputable firms and organizations that have conducted their own bottoms-up research into the future of the copper industry. Specifically, we will base our views on that of the International Energy Agency's (IEA) and Standard & Poor's Global Research's (S&P Global) findings. The results will be presented below in Table 1.

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**Table 1**. Scenarios for Copper Supply-Demand Imbalances

| Scenario | Copper Demand (MMt/year) | Demand Growth Rate YoY (%) | Copper Supply (MMt/year) | Implied Deficit (MMt/year) |
|---|---|---|---|---|
| "Stated Policies" Scenario (IEA) | 2030: 37.7 | 3.70% | 2030: 31.7 | 6.00 |
| "Net Zero Emissions 2050" (IEA) | 2030: 44.2 | 5.50% | 2030: 33.2 | 11.0 |
| "High Ambitions" Scenario (S&P Global) | 2035: 49.0 | 7.30% | 2035: 44.0 | 5.00 |
| "Rocky Road" Scenario (S&P Global) | 2035: 49.0 | 7.30% | 2035: 35.0 | 14.0 |

Again, Promontory Investment research does not, and does not aim to, project global macroeconomic conditions far into the future, however, with the above data, it is safe to say that prices of copper will increase, perhaps into unprecedented territory such as $6.00 per pound, which will undoubtedly greatly benefit copper miners such as Freeport McMoRan. We must not underestimate the effects that the prevailing price of copper will have on Freeport's top-line. However, as Promontory Investment Research will not take a definite stance on the future performance of copper, we have not built the above commentary into our base case (and consequently, was not built into our base FCX price recommendation) but we did include a conservative account of the above into our bull case.

A particular macroeconomic indicator has also piqued our curiosity: the US ISM Manufacturing index, which measures manufacturing/industrial activity in the United States.

The graph is promising as it seems that the manufacturing index is now rebounding, having bottomed out at the end of 2023. Indeed, the ISM index unexpectedly rose in January by 5.5 points, the largest monthly advance in more than three years, helped by robust demand in the latter half of 2023. Although the economy remains prone to elevated uncertainty due to sticky inflation and elevated rates, a further increase in the ISM Index could be highly beneficial for copper prices and add a cyclical tailwind to a long-term secular growth trend.

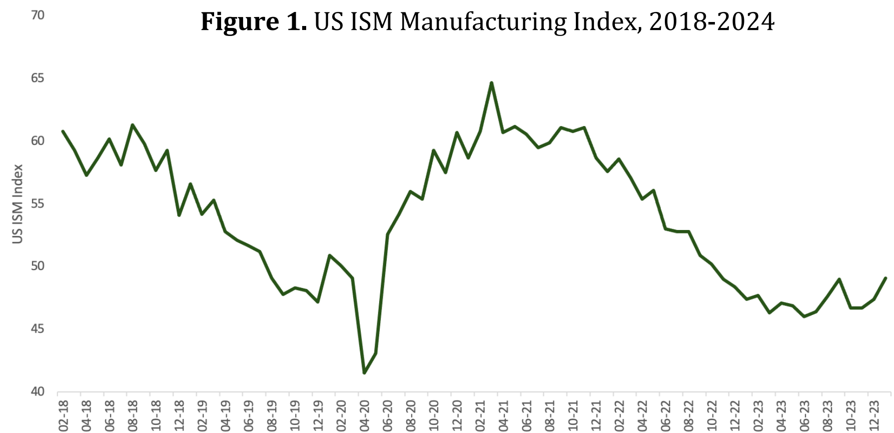

**Figure 1.** US ISM Manufacturing Index, 2018-2024

In summary, with a solid financial foundation and a focus on operational improvements, FCX remains well positioned to capitalize on the tailwinds of the copper industry. As such, Freeport McMoRan should have a bright future ahead of it, especially given the worldwide transition towards green energy and decarbonization.

# Risks and Mitigants

## Risk 1 – Grasberg non-renewal and violence

Freeport McMoran (FCX) operates the Grasberg mine, which is one of the world's largest gold and copper mines. Located in the Indonesian province of West Papua, the mine is leased from the Indonesian government, not owned, by FCX, with the lease set to expire in 2041. The Grasberg mine is a significant contributor to FCX's financial performance. In 2022, production from the Grasberg minerals district totaled 1.6 billion pounds of copper and 1.8 million ounces of gold. This was an increase from 1.3 billion pounds of copper and 1.4 million ounces of gold in 2021, and 0.8 billion pounds of copper and 0.8 million ounces of gold in 2020.

The financial implications of the Grasberg mine on FCX's bottom line are substantial. For instance, FCX's net PP&E and mine-development costs totaled $16.9 billion in 2022. Moreover, long-term mine development activities are ongoing for FCX's Kucing Liar deposit in the Grasberg minerals district, which is expected to produce over 6 billion pounds of copper and 6 million ounces of gold between 2028 and the end of 2041. Capital investments are estimated to average approximately $400 million per year over this period (including $470 million for the year 2023). At full operating rates of approximately 90,000 metric tons of ore

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per day, annual production from Kucing Liar is expected to approximate 550 million pounds of copper and 560 thousand ounces of gold. This provides FCX with sustained long-term, large-scale, and low-cost production.

However, the lease for the Grasberg mine is set to expire in 2041. If the lease is not renewed by the Indonesian government—for instance as a result of nationalist or protectionist policy shifts—FCX could face a significant reduction in its income. Indeed, in 2022, the mine yielded 40% of FCX's annual copper production and nearly 30% of its gold. The ongoing development of the Kucing Liar deposit strengthens this dependence, promising substantial copper and gold output through 2041. But the lease expiration date casts a long shadow, potentially triggering a 40% decline in FCX's earnings and significant shareholder-value erosion if renewal fails. The nearly $17 billion invested in Grasberg and Kucing Liar could become stranded assets, jeopardizing future growth.

Moreover, the Grasberg mine is located in a region that has seen pro-independence movements and a persistent low-level insurgency. This instability poses a risk to FCX's operations. Any disruption in the mine's operations due to violence or instability could lead to a decrease in production, which would cut off a key revenue stream. For instance, a 2017 protest cost FCX 5% of its quarterly revenue. A sustained conflict poses an even greater threat, potentially halting production and jeopardizing the entire operation.

## Mitigant 1 – Renewal is likely, and upside exists independently of Grasberg

Seizing the Grasberg mine is unlikely for the Indonesian government due to the potential economic and operational repercussions. Seizing the mine would result in significant loss of revenue, international condemnation, and possibly costly legal battles. The government might lack the expertise to manage the complex operation—as has been demonstrated by Russian seizures of Western industrial assets since 2022—and seizing it could exacerbate security concerns in the region. Negotiating a lease extension with increased control and benefits for local communities, or gradually acquiring more ownership, appear as more viable options for the Indonesian government to address its concerns while ensuring continued economic benefits and stability. Furthermore, with the election of Prabowo Subianto to the Indonesian presidency, FCX's position looks safer. Prabowo was a high-ranking official under and son-in-law of the Western-aligned Indonesian dictator Suharto, and if his past political stances are any indicator, he will not be zealous with respect to anti-Western nationalization. Even if FCX loses Grasberg in 2041, upside exists still: the below valuation in all scenarios assumes non-renewal in 2041 but still demonstrates a promising investment opportunity regardless.

## Risk 2 – Fluctuations in the market prices of the commodities that Freeport produces, along with fluctuations in the spot price of the overseas currency of the countries that Freeport operates in, could adversely affect their financial position.

FCX's financial results can vary significantly based on the prevailing market price of copper, gold, and to a lesser extent, molybdenum and silver. Extended price depression for such commodities could have a material adverse effect on Freeport's financial results, along with the stock price, and may put Freeport in a position where servicing debt and other financial obligations becomes increasingly strenuous. Beginning in 2020 with the onset of the COVID-19 pandemic and continuing in 2022 because of a series of macro-economic factors, there has been significant volatility in the financial and commodities markets, including the copper market.

Fluctuations in commodities prices are caused by varied and complex factors beyond Freeport's control, including global supply and demand and inventory levels, global economic and political conditions (such as a potential global recession and Russia's invasion of Ukraine), international regulatory, trade policies, such as national tariffs, commodities investment activity and speculation, global interest rates, inflation rates, the strength of the U.S. dollar compared to foreign currencies, the price and availability of substitute products, and changes in technology. Volatility in global economic growth, particularly in developing economies, has the potential to adversely affect future demand and prices for commodities. Geopolitical uncertainty and protectionism have the potential to inhibit international trade and negatively impact business confidence, which has the potential to create additional price volatility.

As for fluctuations in the spot price for foreign currencies for the overseas countries that Freeport operates in, namely, Indonesia, Chile, and Peru, certain fluctuations against the US dollar could adversely affect Freeport's financial results. Specifically, foreign exchange fluctuations that cause foreign currencies to depreciate against the US Dollar will cause overseas revenues and profits to be worth less when repatriated back to the United States. Large foreign depreciation against the US Dollar has the possibility to, and has, adversely affected Freeport's financial results as such.

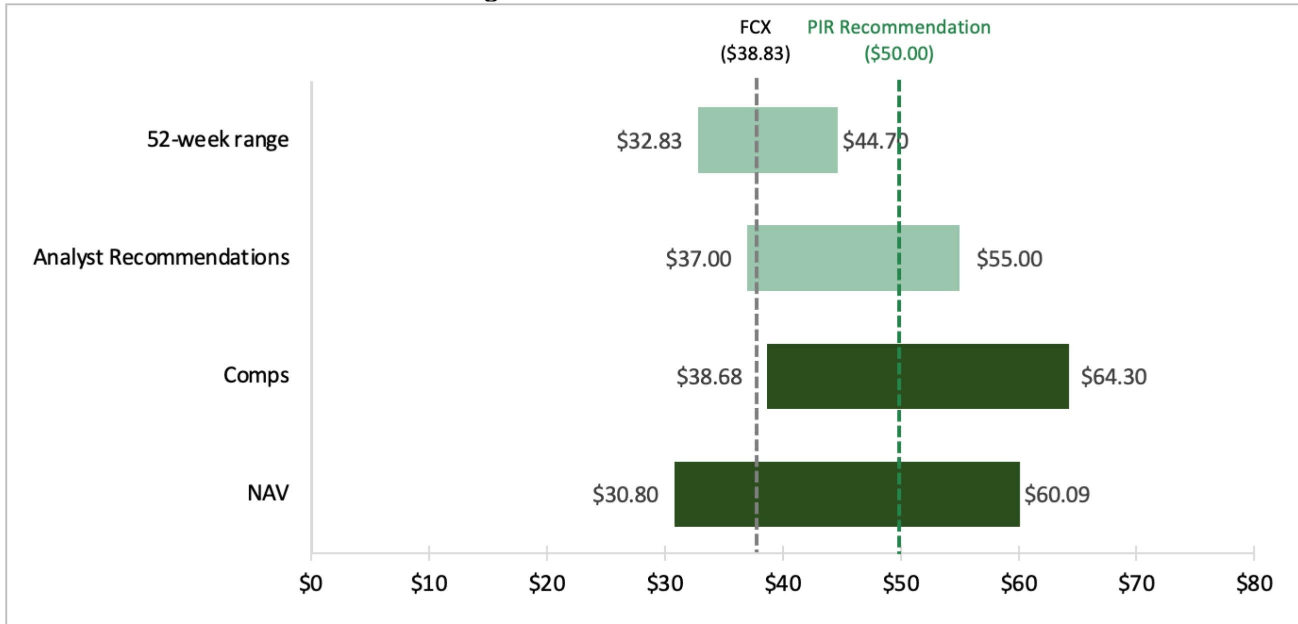
## Mitigant 2 – It is highly unlikely that the commodities that Freeport produces will undergo sustained periods of depressed prices, and Freeport can hedge against foreign exchange risk.

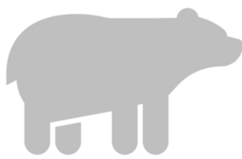
As stated in the investment thesis section of this report, we have strong conviction that copper will not undergo a sustained period of suppressed prices, attributable to the doubling in the demand for copper by 2050 and the consequent shortage of the metal. We also see gold holding its ground as we enter an era of macroeconomic and global uncertainty given increased protectionist sentiment. Gold tends to do well in uncertain environments, as it acts as a safe-haven investment. Additionally, gold typically performs well during times of interest rate cuts as the real return on rates declines, thereby making gold a more attractive, risk-adjusted investment. As for foreign currency risk, Freeport can hedge against currency movements via numerous financial instruments, including but not limited to insurance, forwards, foreign exchange swaps, currency swaps, options, and other exotic instruments. If properly utilized by Freeport, foreign exchange risk need not be a concerning risk unless a catastrophic macroeconomic event occurs which these contracts do not have the ability to protect against.

# Valuation

***Valuation Summary***

**Figure 2.** Valuation Football Field



Bear

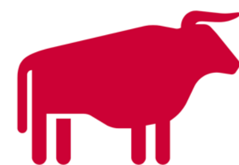
- The squeeze in copper prices fails to play out
- Global governments are not committed to reaching Net Zero goals
- Freeport fails to make material decreases to their unit net cash costs across all mines

***Recommendation***: **$32.80 (-15.5%)**

Base

- We see a rise in copper prices, but do not chart unprecedented territory
- Increase in global demand for copper due to electrification
- Freeport's unit net cash costs see minimal improvements

***Recommendation***: **$50.00 (28.8%)**



Bull

- There are precipitous increases in copper prices, reaching to $6 per pound
- Global governments reach their Net Zero goals
- Freeport materially decreases their unit net cash costs

***Recommendation***: **$64.30 (65.6%)**

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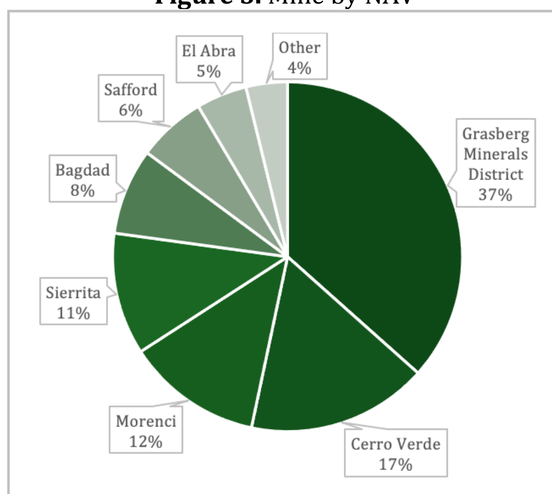
***Valuation Methodology***
Our valuation methodology consisted of a life of mine (LOM) net asset valuation (NAV) and a comparable companies analysis. The NAV assumed total or near total completion of stated recoverable (proven and probable) reserves, which are post recovery and milling losses. Below is the proportion of each mine's NAV that makes up FCX's total NAV.

**Figure 3.** Mine by NAV




***Discount Rates***
The discount used for each mine was unique, taking into account the country of operation and metal type to adjust for related risks accordingly, as shown below.

**Figure 4.** Discount Rate Calculations

| | 10-yr Government Bond | Sovreign CDS Spread | Risk-Free Rate | FCX CDS Spread | Cost of Debt | ERP | Beta | Cost of Equity | Discount Rate |
|---|---|---|---|---|---|---|---|---|---|
| United States | 4.17% | 0% | 4.17% | 1.21% | 5.38% | 4.45% | 1.08 | 8.98% | 8.30% |
| Chile | 5.51% | 1.15% | 4.36% | 1.21% | 5.57% | 5.84% | 1.08 | 10.67% | 9.77% |
| Peru | 6.77% | 1.37% | 5.40% | 1.21% | 6.61% | 6.94% | 1.08 | 12.91% | 11.80% |
| Indonesia - Gold | 6.60% | 1.32% | 5.28% | 1.21% | 6.49% | 7.38% | 0.49 | 8.90% | 8.35% |
| Indonesia - Copper | 6.60% | 1.32% | 5.28% | 1.21% | 6.49% | 7.38% | 1.08 | 13.26% | 12.08% |

***Metal price forecasts and NAV***
For every mine (12 in total), we started by projecting out production volume per metal per year. We could then, according to our assumptions, find the revenue and costs per unit of metal mined to calculate the profit per unit metal mined. Applying an appropriate discount rate, as per above, yields a net mine value, which is the present value of all future cash flows of a particular mine.

This, inevitably, involved projecting out the future prices of copper, gold, and molybdenum, and also projecting out Freeport's future net cash costs per geographic area and metal type. As Promontory Investment Research does not aim to take positions on the future price of global commodities well into the future, we resulted to taking into account the projections of multiple financial and governmental institutions for our bull case — in which we see the price of copper being squeezed due to a shortage caused by electrification and decarbonization efforts — a conservative base case which we projected only taking into account today's prices (this was does merely for the sake of projecting prices and does not represent our views of the future performance of the commodity) and the bear case in where we see no significant increases in the price of the green metal. This is summarized in our Valuation Summary.

We also projected out Freeport's net cash costs per geographic area and by type of metal. Our bull case projections also aim to take into account Freeport's current initiatives and investments in lowering their net cash costs, especially in their higher cost mines in North America. We projected net cash costs using the coproduct method to as to be able to project unit net cash costs per metal in order to construct more accurate projections. Our NAV yielded, in our base case, an implied fair share price of $43.73, a premium of 12.63% to the current share price.

| Net Asset Valuation | |
|---|---|
| Asset Value of Mines | 67,380 |
| Cash | 4,758 |
| Less: Debt | 9,422 |
| **Net Asset Value (NAV)** | **62,716** |
| FDSO (millions) | 1,434 |
| **Implied NAV per Share** | **$43.73** |
| NAV per share premium (discount) | 12.63% |

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The comparable companies selected for comps were similarly sized miners that have large operations in copper, such as Southern Copper (NYSE: SCCO), BHP Group (NYSE: BHP), and RioTinto (LON: RIO). The below two graphs display how FCX is trading in comparison to its peers.

***Comparable Companies***

**Figure 5.** EV/EBITDA Comparable Companies

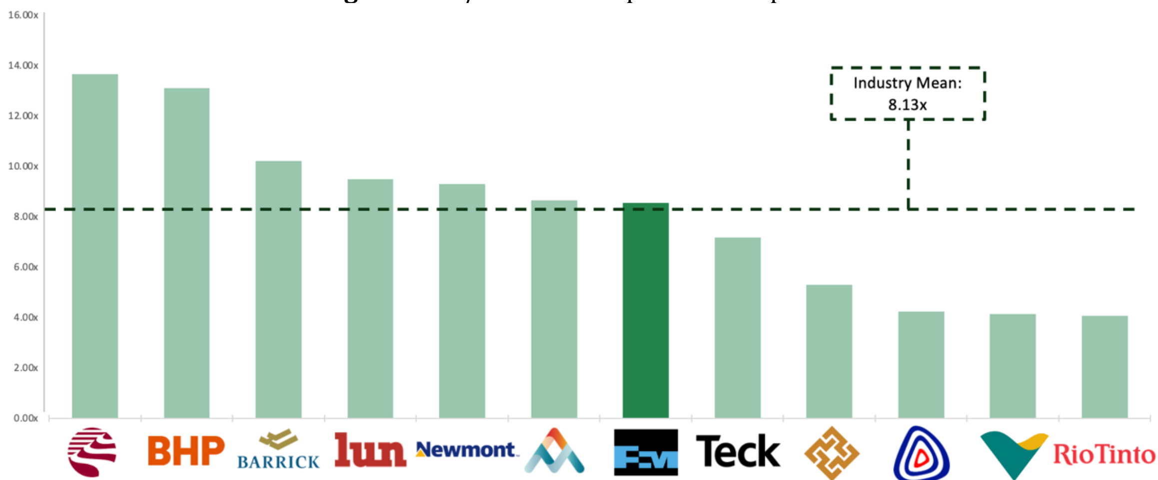
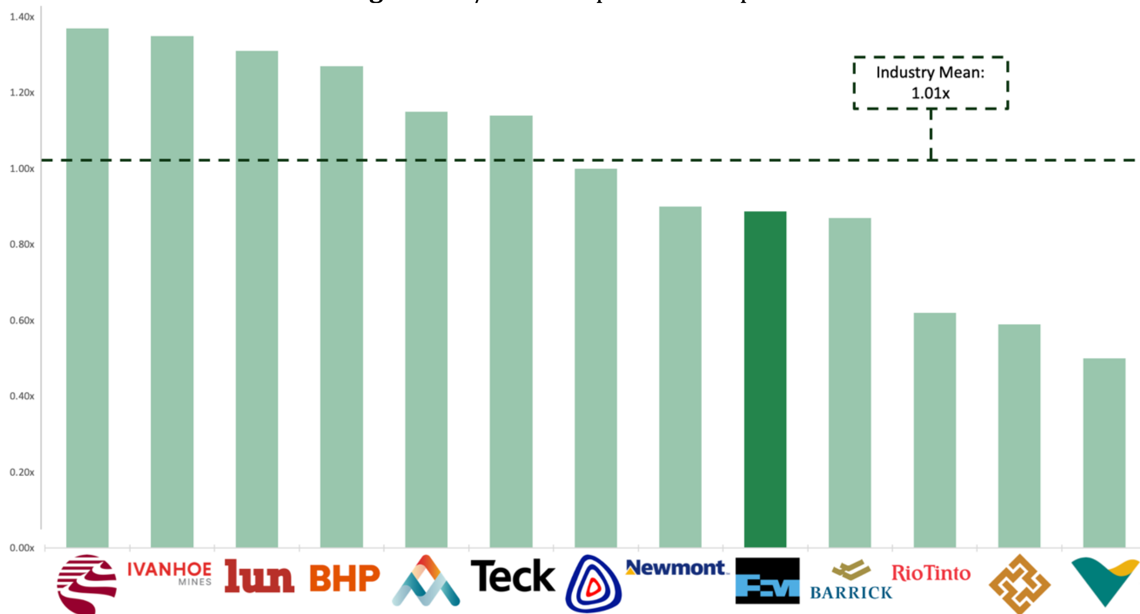



**Figure 6.** P/NAV Comparable Companies




As can be seen from Figure 5, Freeport is trading only marginally above the industry average of 8.13x for the EV/EBITDA multiple. As for the P/NAV multiple, Freeport is trading comfortably below the Industry mean of 1.01x with only non-material differences between its closest comparable directly above and below it. However, Freeport does not quite reach the ultra-low P/NAV multiples of RioTinto, First Quantum Minerals, and Vale.

The following page contains our comparable companies analysis using EV/EBITDA, P/NAV, and P/E ratios. We would like to stress the first two multiples as they are especially appropriate for mining valuations. This is as miners tend to have extremely volatile earnings due in part of volatile commodity prices and, in the case of certain miners, significant financial leverage. It is for this reason that, for example, we can see P/E ratios greater than 400x even though the industry mean is ~17x.

**Figure 7.** Comparable Companies Analysis

| Company Name | EV/ EBITDA | Include (Yes/No) | Price/ NAV | Include (Yes/No) | Price/ Earnings | Include (Yes/No) |
|---|---|---|---|---|---|---|
| *(all figures in USD millions, except per share figures)* | | | | | | |
| *[0- No; 1- Yes]* | | | | | | |
| BHP Group (NYSE: BHP) | 13.11x | Yes | 1.27x | Yes | 11.65x | Yes |
| Southern Copper (NYSE: SCCO) | 13.67x | Yes | 1.37x | Yes | 25.80x | Yes |
| Barrick Gold (NYSE: GOLD) | 10.23x | Yes | 0.87x | Yes | 0.00x | No |
| Lundin Mining (TSX: LUN) | 9.51x | Yes | 1.31x | Yes | 18.15x | Yes |
| Newmont Corporation (NYSE: NEM) | 9.32x | Yes | 0.90x | Yes | 0.00x | No |
| Antofagasta (LON: ANTO) | 8.65x | Yes | 1.15x | Yes | 12.79x | Yes |
| Teck Resources (TSX: TECK) | 7.18x | Yes | 1.14x | Yes | 12.05x | Yes |
| First Quantum Minerals (TSE: FM) | 5.30x | Yes | 0.59x | Yes | 10.23x | Yes |
| Anglo American (LON: AAL) | 4.25x | Yes | 1.00x | Yes | 12.71x | Yes |
| Vale (NYSE: VALE) | 4.14x | Yes | 0.50x | Yes | 0.00x | No |
| Rio Tinto (LON: RIO) | 4.07x | Yes | 0.62x | Yes | 12.93x | Yes |
| Ivanhoe Mines (TSE: IVN) | 0.00x | No | 1.35x | Yes | 39.32x | Yes |

| | EV/EBITDA | Price/NAV | Price/Earnings |
|---|---|---|---|
| Average Industry Multiples | 8.13x | 1.01x | 17.29x |
| Median Industry Multiples | 8.65x | 1.07x | 12.79x |
| Freeport McMoRan (NYSE: FCX) | 8.55x | 0.89x | 30.13x |
| FCX Total Enterprise Value | 72,292 | - | - |
| - Debt | 9,422 | 9,422 | 9,422 |
| - Noncontrolling Interest | 10,617 | 10,617 | 10,617 |
| - Pension Plan Net Assets | 1,537 | 1,537 | 1,537 |
| + Cash & Equivalents | 4,758 | 4,758 | 4,758 |
| Equity Value | 55,474 | 67,106 | 31,955 |
| FDSO (millions) | 1,434 | 1,434 | 1,434 |
| **Implied Fair Share Price** | **38.68** | **46.80** | **22.28** |
| Implied Premium (Discount) | (0.37%) | 20.52% | (42.61%) |

As a final note, we would like to address some potential problems concerning fair value realization by the market.

Due to Freeport McMoRan's nature of business, many investors and portfolio managers may potentially look to allocate capital elsewhere — perhaps in a supposedly ESG friendlier firm — prior to allocating capital to Freeport McMoRan, if such an investor or portfolio manager were to take into consideration ESG ratings. Consequently, one could come to believe that this may impact FCX's ability to have its fair intrinsic value realized by the market as capital allocators artificially shy away from its stock.

However, we do not see this as a material problem concerning FCX's ability to have its fair value realized by the market. There are still plenty of investors and portfolio managers that would be more than willing to allocate capital into FCX, especially considering the abysmal returns of ESG focused funds, such as Cathie Wood's ARK funds, that topped the charts for the greatest wealth destruction in the past decade. In a family of ETFs that managed ~$16 billion, $14.3 billion in shareholder value was destroyed.

Additionally, if one were to analyze the top holdings in multiple ETFs that are committed to investing in the green energy transition, but do not solely focus on ESG ratings like the ARK funds do, one would quickly discover that Freeport McMoRan is often one of the top holdings. Indeed, for both the VanEck Global Resources Fund and its Green Metals ETF, Freeport McMoRan is its top holding. This exemplifies the fact that institutional investors that aim to fund the green transition fully embrace FCX and the significant part that FCX will play in this new global paradigm.

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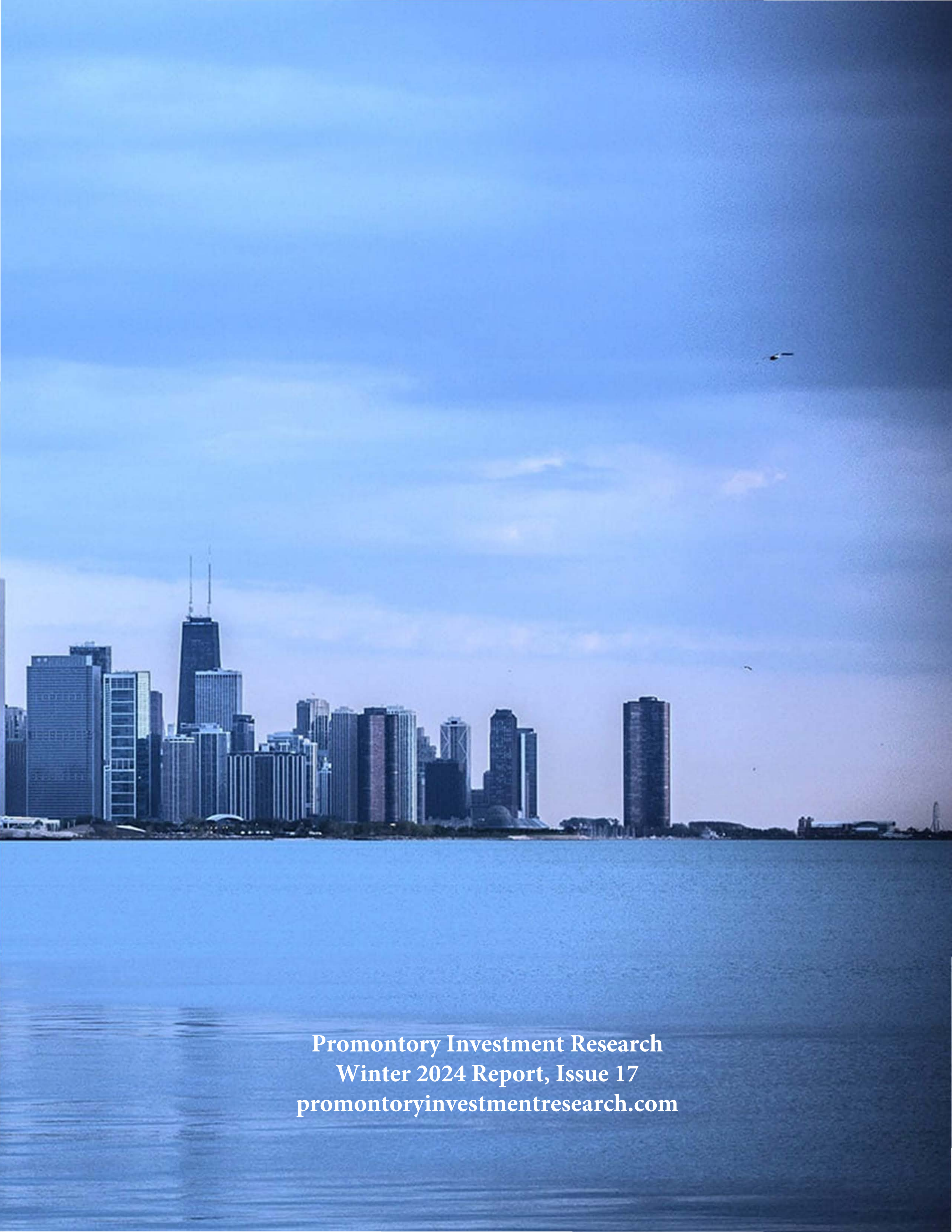
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