



Taskforce on Climate-related Financial Disclosures – Scenario Analysis & Risk Management



Task Force on Climate-Related Financial Disclosures

Kirby has committed to its stakeholders to enhancing its ESG disclosures by integrating elements of TCFD into its sustainability reporting. Established in 2015 by the Financial Stability Board (FSB), the Task Force on Climate-related Disclosures (TCFD) was asked to develop recommendations for more effective, voluntary climate-related disclosures that could promote more informed investment, credit, and insurance underwriting decisions.

The task force developed four widely adoptable recommendations on climate-related financial disclosures that are applicable to organizations across different sectors and jurisdictions. The recommendations represent core elements of how organizations operate: governance, strategy, risk management, and metrics and targets. Each of the TCFD thematic elements is reflected in the structure of our disclosures on the following pages. In this initial TCFD report, Kirby has primarily focused on scenarios in the marine transportation business which represents 98% of the company's greenhouse gas emissions. We anticipate further enhancements, refinements, and disclosures in the future as the experience and practice of TCFD reporting becomes more common amongst global companies.



Governance

The organization's governance around climate-related risks and opportunities.

Strategy

The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.

Risk Management

The processes used by the organization to identify, assess, and manage climate-related risks.

Metrics and Targets

The metrics and targets used to assess and manage relevant climate-related risks and opportunities.

Governance

Disclose the organization's governance around climate-related risks and opportunities.

a) Describe the board's oversight of climate-related risks and opportunities.

- Kirby Corporation's Board of Directors oversees the Company's environmental, social and governance (ESG) initiatives and disclosures. The Board is committed to elevating Kirby's leadership profile and reputation among our investors, government policymakers, stakeholders, and others on ESG issues and practices and believes the Company has a unique opportunity to be an industry leader on these important issues.
- The Board's oversight of ESG is codified in the Governance Committee Charter. The Governance Committee meets quarterly to discuss ESG issues. In the past year, these meetings have included reviews of Kirby's ESG disclosures, including the 2020 Sustainability Report, external ESG ratings of the Company, Sustainability Accounting Standards Board (SASB) disclosures, and TCFD disclosures.
- The Board also engaged in strategic discussions regarding incident/emergency response and recovery, (i.e. hurricanes), capital allocation, workplace and vessel safety, energy transition, and various alternative future business scenarios.
- The Audit Committee oversees Kirby's management of enterprise risk, including climate-related risks and regulations that could impact the Company.

b) Describe management's role in assessing and managing climate-related risks and opportunities.


- At the management level, climate-related risks and assessing opportunities ultimately resides with the Chief Executive Officer, who chairs the ESG Executive Committee. The Committee includes the segment presidents, Executive Vice President and Chief Financial Officer, Chief Human Resources Officer, Vice President and General Counsel, and Vice President of Investor Relations. Reporting to this Committee is a cross-functional team designed to advise executive leadership and the Board on managing climate and sustainability-related risks and assessing future business opportunities through Kirby's Enterprise Risk Management process ("ERM")
- Kirby's businesses leaders and other functions monitor quantitative and qualitative information related to the medium-and long-term impacts of climate change using publicly available and proprietary scenarios, including the International Energy Agency's 1.5°C Degree Sustainable Development Scenario.

Strategy: Overview


Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.

- TCFD characterizes climate-related risks in two categories:
 - **Transition risks** – Risks related to the transition to a lower-carbon economy including policy and legal risk; technological risk; market risk (for example, consumer preferences); and reputational risk. Transition risks include policy constraints on emissions, imposition of carbon tax, water restrictions, land use restrictions or incentives, and market demand and supply shifts.
 - **Physical risks** – Risks associated with physical impacts from climate change, including the two-degree Celsius change, may impact company assets, personnel and operating companies. These impacts may include acute physical damage from variations in weather patterns (such as severe storms, floods, and drought) and chronic impacts, such as sea-level rise and desertification. Physical risks include the disruption of operations or destruction of property.
- In the following slides, Kirby has identified climate-related resiliency themes, risks, and opportunities with potential impact to our business over short (1–3 years), medium (3–5 years) and long-term (5+ years) time horizons and the Company's approach to each.
- Kirby's resiliency themes of risk assessment, strategy, engagement and operational efficiency helped guide our team to better understand our roles and responses to said risks.

Strategy: Transition Risks – Policy & Legal

Transition Risks			
 Policy & Legal	Risk or Opportunity	Potential Financial Impact	Strategy & Risk Management
	RISK: Increased climate-change-related regulations and disclosures [Long Term]	<ul style="list-style-type: none"> Capital investments into new technologies to improve data capture and facilitate increased disclosure Capital investments to retrofit existing equipment Increased costs for enhanced emissions reporting and oversight Additional administrative, compliance, and legal costs 	<ul style="list-style-type: none"> Proactive implementation of monitoring, data aggregation, and calculations Reporting in accordance with SASB, TCFD, and other reporting frameworks Increase monitoring of carbon emissions associated with fuel consumption associated with marine operations to identify and assess operational or technological improvements
	RISK: Changes to oil and gas exploration regulations [Short Term]	<ul style="list-style-type: none"> Distribution & Services oil and gas businesses could be impacted financially with loss of business and revenue Impact to market segments as the need to move certain petroleum products could decline Low-cost feedstock advantages for U.S. petrochemical companies could diminish, reducing production and likely limit new petrochemical plant construction 	<ul style="list-style-type: none"> Monitor legislation and potential regulatory/administrative proposals Research and monitor new trends in the industry

Strategy: Transition Risks – Technology

Transition Risks			
 Technology	Risk or Opportunity	Potential Financial Impact	Strategy & Risk Management
	RISK AND OPPORTUNITY: Transition to low-emissions technology in the marine fleet [Long Term]	<ul style="list-style-type: none"> Investment in the development of new technologies, assets, and vessels Retrofit equipment, modify mariner training, and adopt new practices and procedures including operating standards for new equipment Potential increase or decrease in operating, engineering, and asset costs Potential impact to valuation of certain existing vessels Opportunity to be an industry leader in the development and adoption of low-emissions marine equipment 	<ul style="list-style-type: none"> Long-term strategy of investing in efficient boat fleet, including integrating high tier standard marine engines and vessel hull design Early partnership with original equipment manufacturers (OEMs) regarding designs for low emission marine engines to achieve future emission standards Proactive engagement with customers to understand their future carbon emissions targets and develop complimentary initiatives
	RISK AND OPPORTUNITY: Distribution & Services customer equipment requirements transition from diesel power to alternatives fuel sources such as hydrogen or electric [Long Term]	<ul style="list-style-type: none"> Development of new distribution and dealer relationships with OEMs Capital investment in new technologies and R&D Opportunity to be an industry leader in the distribution of low-emissions alternative power sources for vehicles, trucks, oilfield equipment, and power generation Adopt new practices and modify technician training including operating standards for new equipment 	<ul style="list-style-type: none"> Executive management plus Board oversight and assessment to monitor emerging innovative technologies in the marketplace Investment in new technologies Engage with OEMs to lead the transition and develop new advanced technologies Proactive engagement with customers to understand their future carbon emissions strategies Hydrogen infrastructure is extensive along the Gulf Coast; utilize this to develop knowledge about supply chain opportunities

Strategy: Transition Risks - Market

Transition Risks			
Market	Risk or Opportunity	Potential Financial Impact	Strategy & Risk Management
	RISK AND OPPORTUNITY: Increased concerns of stakeholders (e.g., investors, customers, regulators) regarding lower carbon emissions [Medium Term]	<ul style="list-style-type: none"> Unexpected changes in commodity prices (i.e. fuel costs) Potential impact on valuation of certain existing vessels Opportunity to develop an industry leading position in the development and adoption of low-emissions marine equipment 	<ul style="list-style-type: none"> Executive management plus Board oversight and assessment to follow market trends and stakeholder concerns Monitoring and disclosure of the Company's carbon emissions with long-term targets to reduce impact on the environment Adopt long-term strategy to develop new efficient low carbon emission vessels Early partnership with OEMs to develop low emission marine engines Proactive engagement with customers to understand their future carbon emissions targets
	OPPORTUNITY: Increased demand for eco-friendly fracking equipment [Medium Term]	<ul style="list-style-type: none"> Demand for low noise, electric, or dual fuel fracking equipment could offset some of the demand for conventional fracking equipment that may be reduced due to negative perception of fracking industry New revenue streams for manufacturing of eco-friendly pressure pumping equipment 	<ul style="list-style-type: none"> Proactive engagement with customers to understand their future carbon emissions strategies Investment in new technologies Develop and construct new eco-friendly technologies and equipment to support customers transitioning away from conventional fracking equipment

Strategy: Transition Risks - Reputation

Transition Risks			
Reputation	Risk or Opportunity	Potential Financial Impact	Strategy & Risk Management
	RISK: Cargo spills or incidents which occur as a result of a climate-related event (i.e. hurricane, high water) results in negative stakeholder perception [Short & Long Term]	<ul style="list-style-type: none"> Potential reduced revenue from negative customer impacts of the incident Increased litigation exposure, mitigation, and clean-up costs Higher insurance rates 	<ul style="list-style-type: none"> Effective U.S. Coast Guard training programs for all mariners Safety culture committed to Zero Harm to the Environment, Equipment and People Train well-prepared incident response teams and perform emergency drills with customers, stakeholders, and government authorities Spill contingency plans Approved procedures Vetted equipment Maintenance program and oversight
	OPPORTUNITY: Be an industry leader in the transition of marine vessels to low-emissions technology [Medium Term]	<ul style="list-style-type: none"> Increased revenue opportunities from customers seeking vendors with leading ESG platforms Increased development costs and investments in new technologies Cost to retrofit existing marine equipment, train mariners, and adopt new practices and procedures 	<ul style="list-style-type: none"> Executive management plus Board oversight and assessment to follow trends in the marketplace Early partnership with original equipment manufacturers (OEMs) regarding designs for low emission marine engines to achieve future emission standards Proactive engagement with customers to understand their future carbon emissions targets

Strategy: Physical Risks

Physical Risks			
	Risk	Potential Financial Impact	Strategy & Risk Management
Acute	<p>More frequent and severe weather events (i.e. hurricanes) leading to increased delays, business interruption, and damages (including marine vessels and facilities)</p> <p>[Long Term]</p>	<ul style="list-style-type: none"> Loss of revenues resulting from extensive delays due to severe weather events and lower barge utilization Increased operating costs Self-insured losses for damage to equipment and facilities Increased litigation exposure and mitigation/recovery expenses in the event of casualties or spills 	<ul style="list-style-type: none"> Executive oversight of hurricane preparedness Robust hurricane preparedness and emergency management plan Proactive coordination and effective communication with the industry and government stakeholders such as the U.S. Coast Guard, Gulf Intracoastal Canal Association, etc. Contingency plan identifies safe berths for weather events to protect marine assets
	<p>Long-term changes in climate patterns could result in new storm patterns and more frequent high water/flooding conditions on the inland waterways</p> <p>[Long Term]</p>	<ul style="list-style-type: none"> Reduced revenue as a result of increased delay days Reduced revenue as a result of tow size restrictions Increased operating costs resulting from additional boat/horsepower requirements, reduced efficiencies, and higher maintenance Increased fuel consumption per ton mile Increased costs to mitigate and potential legal expense associated with navigation incidents Increased administrative costs to advocate for waterway infrastructure repairs and maintenance 	<ul style="list-style-type: none"> Effective leadership, participation, and involvement in forecasting, preparing for, and managing high water Coordination with industry peers to establish additional horsepower support Proactive engagement associations that can advocate waterway infrastructure repairs and maintenance Effective communication strategy Additional safety preparedness policies and procedures to manage through high water situations Effective training programs for mariners to safely navigate high water conditions
Chronic			

Risk Management

Disclose how the organization identifies, assesses and manages climate-related risks.

- Kirby is already experiencing some of the consequences of growing climate-related risks. While many companies are forecasting what could happen in the future, Kirby is exposed to certain climate-related risks in the Company's marine transportation business given its exposure to hurricanes and high water. In accessing TCFD disclosure and climate-related risks, the impact of weather volatility is a risk that has been identified as evidenced by a [National Oceanic and Atmospheric Administration report on Global Warming and Hurricanes](#)¹.
- The Board has the overall responsibility for risk oversight, with a focus on the most significant risks facing the company, including climate change. The Board implements its risk oversight function both as a whole and through delegation to the Committees. Each of the Board Committees is responsible for oversight of risk management practices for categories of risks relevant to its functions, with the Governance Committee being responsible for risks and opportunities related to ESG and the Audit Committee being responsible for the oversight of the Company's comprehensive risk management plan.
- As part of our enterprise risk management process, Kirby is performing a scenario analysis of risks and opportunities associated with changing weather patterns that could have significant impact on our marine transportation operations. Scenario planning is not intended to predict the future, but to highlight potential climate change risks and better prepare the Company for possible future business interruptions and decisions.
- The following slides are examples of Kirby's scenario planning for hurricanes and seasonal high river level conditions, which are growing climate-related risks to the Company's marine transportation business. In these scenarios, the Company has highlighted why these events are important, the potential financial and operational impacts, and the strategy, processes, and procedures management uses to mitigate the risks.

Hurricane Scenario



High Water Scenario



Risk Management – Hurricane Scenario

Hurricanes and tropical storms are an acute physical risk. Climate change could result in hurricanes becoming more frequent and severe which could impact the waterways, equipment, and potentially create a loss of business opportunities. In order for Kirby to thrive in this type of business, the Company must stay true to its core values of No Harm to People, Equipment, and to the Environment. Under these core values and with governance, risk, strategy and management, the Company positions itself to be resilient to these acute physical risks going forward as the nation's largest tank barge operator.

Why are hurricanes a risk for the marine transportation industry?

- Extreme precipitation, wind, and storm surge results in significant disruption and delays to barge movements, customer facilities, waterway infrastructure, and other stakeholders in the path of the storm
- Hurricanes are highly unpredictable with wide weather variability making it impossible to predict the severity of damages
- Potential Impacts:
 - By authority of the U.S. Coast Guard, all waterways in the path of a hurricane are closed or travel is restricted for days leading up to and after a storm, thus hindering the Company's ability to move customer products and resulting in loss of revenue
 - Damage to the waterways can reduce barge traffic for extended periods of time and limit business opportunities
 - Refineries, petrochemical plants, and port terminals may temporarily shutdown before and delay opening after a storm which limits business opportunities for barges to move products and has further ramifications for stakeholders:
 - Creates a ripple effect for customers
 - End user of products may be impacted by supply shock and higher commodity prices
 - Equipment to be secured in advance of the storm, increasing operating costs
 - Navigational incidents caused by storms can be very costly and result in extensive mitigation and litigation exposure
 - Damages to equipment and onshore facilities can be costly which can lead to higher operating expenses
 - Power outages can cause a delay of business

Risk Management – Hurricane Scenario

Impact Example – 2017 Hurricane Harvey

- Significant costs and delay impacts resulted in lost revenue and lost business; oil prices spiked
- Dislocated normal supply and distribution routes for the inland barge business for extended time periods
- Created challenging operating conditions
- More than 10 oil refineries temporarily shutdown during Hurricane Harvey
- Financial metrics:
 - The cost and delay impact of Hurricane Harvey was approximately \$0.07 per share.
 - Lost revenue and business: 2017 Q3 – \$318M vs. 2016 Q3 – \$359M
 - Delay days: 2017 Q3 – 1965 vs. 2016 Q3 – 929
 - Operating margins: Inland Business: 2017 Q3 – 11.3% vs. 2016 Q3 – 15.4%
 - Storm disruptions: 50% of U.S. petroleum capacity and 25% of refinery capacity
- Direct cost impact from Hurricane Harvey:
 - Property damages
 - Office building damages
 - Clean-up expenses
 - Equipment losses
 - Boat maintenance and repairs
 - Barge maintenance and repairs
 - Increased fuel costs
 - Surveyor fees
 - Legal fees
 - Ecological restoration
- Employee impacts:
 - Many Kirby employees live along the Gulf Coast and are personally impacted by hurricanes, reducing availability of mariners and staff during the recovery phase
 - Kirby Disaster Relief Fund is activated to supply employees with financial assistance and enable a faster recovery
 - Nonprofit charitable organization that provides support to Kirby employees, families, and communities affected by natural disasters or qualified family hardship

Risk Management – Hurricane Scenario

Strategy & Risk Management

Crisis Readiness – Governance

- Kirby coordinates advance hurricane planning with the industry, customers, regulatory bodies, and government agencies
- Kirby management maintains and executes an internal 'Hurricane Safety Plan' and works in conjunction externally with the Gulf Intracoastal Canal Association on a 'Joint Hurricane Team'

Hurricane Safety Plan

- The purpose of the plan is to familiarize Kirby Marine personnel (both vessel and Shoreside) with the policies and procedures that apply in the event of a tropical cyclone or storm surge. The procedures will provide a consistent and uniform work practice that will be activated as conditions warrant to help safeguard personnel, equipment, property, the environment, and foster continual improvement.
- Executive Management, Safety Management, Operations, Legal and the Quality Steering Committee have oversight over hurricane preparedness
 - Each year the Hurricane Safety Plan is accessed and modified as appropriate based on lessons learned in the previous year
- Management Roles
 - Incident Commander, Operations Section Chief, Planning Section Chief, and Liaison Chief
 - Essential personnel group

Joint Hurricane Team

- Joint Hurricane Response Protocol
 - The Protocol is intended to focus on the working relationships, roles, and responsibilities of the USCG, USACE, NOAA, states and the inland barge industry, partnering together to effectively and expeditiously secure the waterways prior to storm landfall and restore them afterward. The protocol does not abridge or supplant specifics of existing USCG and USACE hurricane response plans.

Strategy: Physical Risk – Hurricane Scenario

Strategy & Risk Management

Crisis Readiness – Preparation Strategy

Monitoring & Assessment

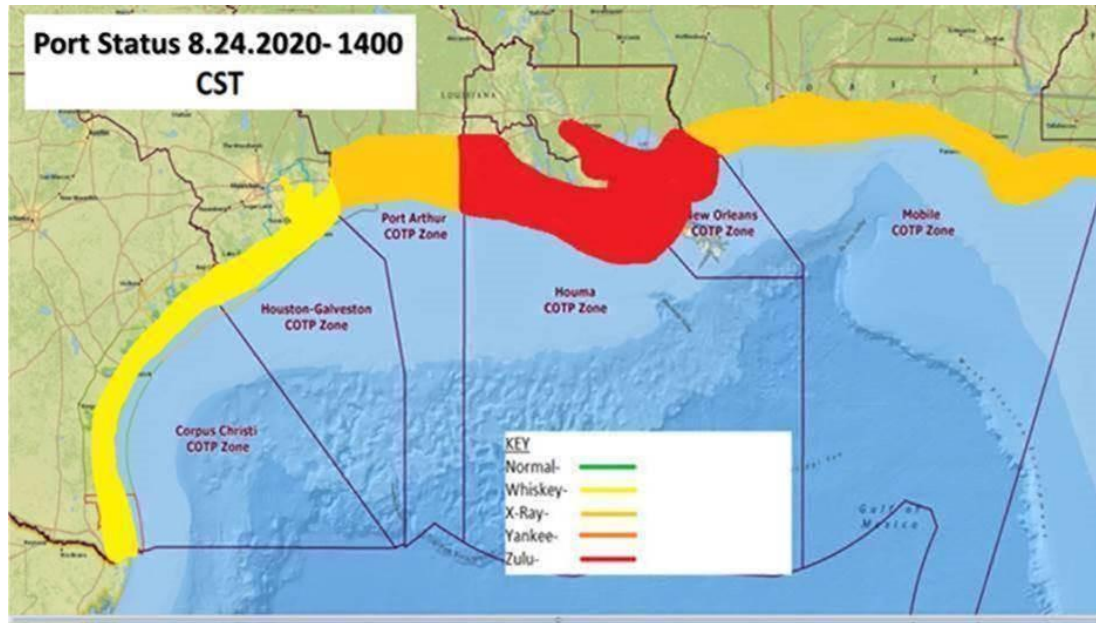
- USCG and Kirby management monitor hurricane development and trajectories via the National Oceanic & Atmospheric Administration (NOAA), assess the risk, and prepare and notify employees of potential development scenarios during hurricane season
- Management assesses potential adverse weather conditions and propensity for development routinely during hurricane season

Stakeholder Communications

- Although hurricanes are not exactly predictable, unlike other storms, they may develop in a manner that provides forewarning. The development period of time is critical preparation to implement safety action plans, to lessen potential impact and damage to equipment, and to mitigate potential threats to the environment.
- Where tropical weather conditions have the potential to impact Kirby equipment and/or one or more Kirby facilities, the Incident Commander will establish email communications with all shoreside and vessel staff, updating individuals with the storm's current status as well as the storm's projected path. As the storm's cone of uncertainty begins to narrow, the Incident Commander and essential personnel implement the safety action plan including assessment of the particular conditions and appropriate preparations in response to the threat assessment.
- Notify and keep customers informed of actions taking place regarding hurricane safety and preparedness
- Ensure all vessels have hurricane plans which are reviewed and approved
- Ensure crew and staff are aware of risks; Provide adequate supplies should employees remain at office locations

Risk Management – Hurricane Scenario

Strategy & Risk Management



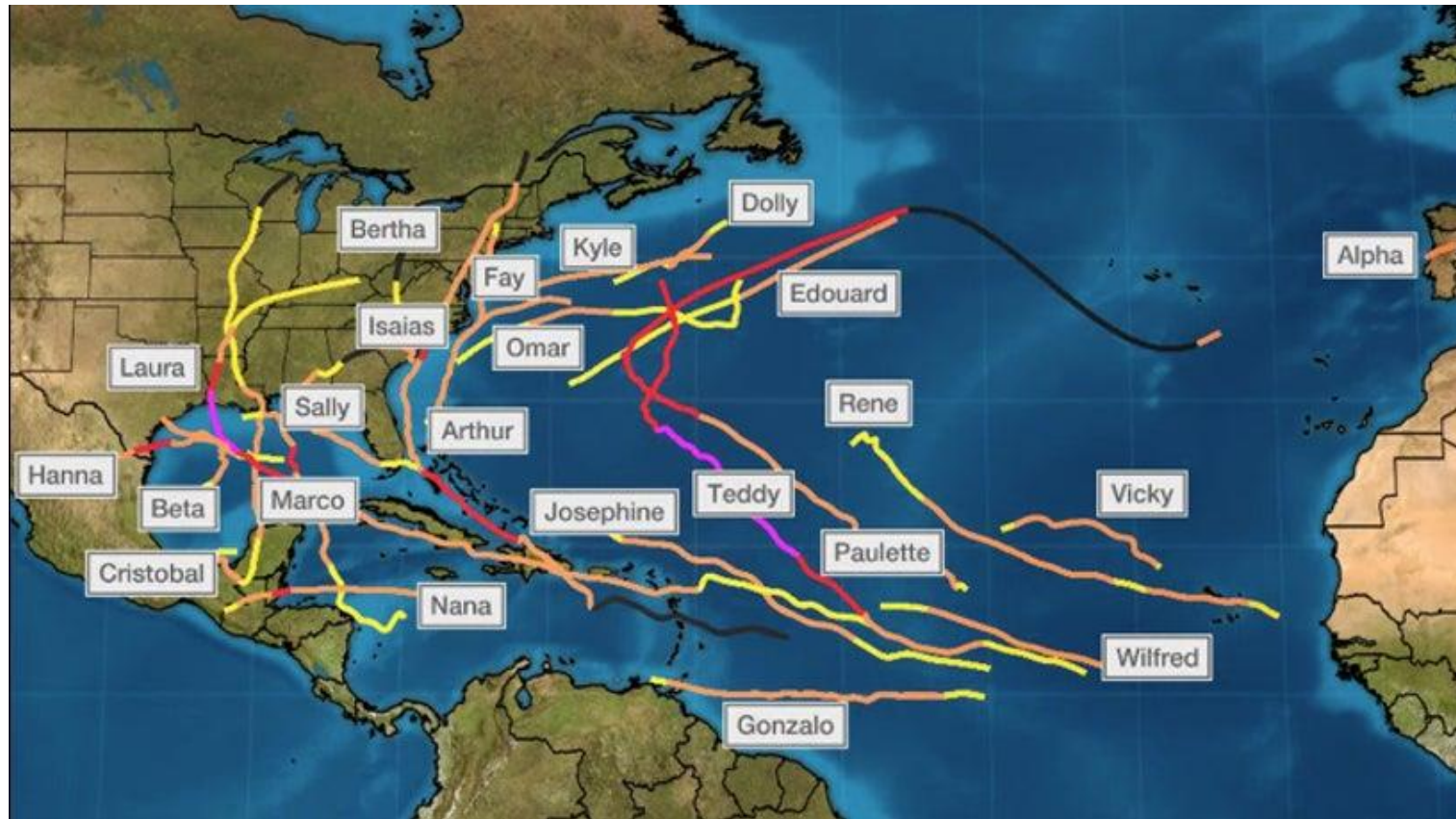
Port Conditions for Hurricanes and Severe Weather

TIME TO LANDFALL	HURRICANE CONDITIONS	PORT CONDITIONS	NATIONAL WEATHER SERVICE
SEASONAL ALERT	SEASONAL ALERT "Five"	N/A	N/A
72 HOURS	FOUR	WHISKEY	N/A
48 HOURS	THREE	X-RAY	WATCH
36 HOURS	N/A	N/A	WATCH
24 HOURS	TWO	YANKEE	WARNING
12 HOURS	ONE	ZULU	WARNING

Risk Mitigation & Safety Preparedness

- Spill contingency plans
- Approved procedures
- Vetted equipment
- Maintenance program and oversight
- Increasing levels of preparedness align with USCG pre-storm conditions (Whiskey, X-Ray, Yankee, Zulu)

2020 Named Storms Impacting Kirby Operations



- Cristobal – June 7
- Hanna – July 25
- Marco – August 24
- Laura – August 27
- Sally – September 16
- Beta – September 22
- Delta – October 9
- Epsilon – October 21
- Zeta – October 28
- Eta – October 31 – November 12
- Iota – November 17

Risk Management – High Water Scenario

High water is a chronic risk. If climate-related changes result in storms becoming more severe or frequent, increased precipitation upriver (i.e. St. Louis, Cincinnati) results in a higher likelihood of high water conditions downriver (i.e. New Orleans).

Why is high water a problem for the marine transportation industry?

- **Acute Impact:**

- Hazardous situations arise:
 - Water current velocity increases which can increase the rate that barges and tugs move
 - Eddies can form under river bends and water flows in different directions could create potential navigation risks
 - High water conditions could increase risk of navigational incidents
- Potential financial impact:
 - Mandated waterway closures and daylight-only travel restrictions implemented by the Coast Guard increase delays and may reduce revenue
 - Reduced tow size requirements may lead to reduced revenue
 - Increased operating costs for additional boats at bridges and docks
 - Increased costs to mitigate and litigate potential navigational incidents

- **Chronic Impact:**

- High water allows for accelerated wear and tear on locks, docking facilities, and reduced waterway draft
- Results in "choking" barge traffic to less than optimal rates
- Results in more trips for less cargo, reducing operating efficiencies and increasing maintenance costs per ton-mile of cargo transported
- Allocate internal resources to advocate for needed waterway infrastructure repairs and maintenance
- Reduced barge load volumes based shallower waterway draft that is more fuel burned per ton of cargo transported (ton-mile)
- Risk to equipment of running aground; navigational issues arise from the deterioration from the waterway

Risk Management – High Water Scenario

Strategy & Risk Management

Crisis Readiness – Governance

- Industry is governed by the Coast Guard's Waterways Action Plan (WAP) during periods of high water
- In addition to WAP compliance during periods of high water, Kirby has developed additional safeguards to mitigate the risk to people, environment, and equipment
- Active leadership, participation and involvement in forecasting, preparing, and managing high water
 - State – Government Land Office
 - Industry – Coordinate with peers to establish additional horsepower support at all bridges
 - Government agencies – U.S. Army Corps of Engineers, U.S. Coast Guard
 - Trade associations
 - [Waterways Council, Inc.](#) - the only national organization that advocates for a modern, efficient and well-maintained of inland waterways, including lock and dam infrastructure, and channel maintenance
 - [Gulf Intracoastal Canal Association](#) - mission is to facilitate commerce through ensuring safe, reliable, and efficient Gulf Coast waterways
 - Foundations – National Waterways Foundation
 - [The National Waterways Foundation](#) is a center for research and learning where industry leaders and thinkers can address public policy issues related to America's inland waterways system
 - Through studies, education and training programs, grants, forums and similar activities, the Foundation helps the public to understand how to maintain our waterways system, enhance its capabilities and promote its value in the years ahead

Risk Management – High Water Scenario

Strategy & Risk Management

Crisis Readiness – Preparation Strategy

Monitoring & Assessment

- USCG and Kirby management monitor high water levels via the National Oceanic & Atmospheric Administration (NOAA), assess the risk, and prepared and notify employees of potential situations during high water season
- Assessment takes place weekly during high water season

Communication

- Daily High Water Report – includes all vessels on the river or destined for the Mississippi River System. This report provides information to assist in addressing crewing during high water events given the potential risks associated with navigating an area affected by high-water.
- High Water Conference Calls – The VP of Traffic hosts regular conference calls with members of the commercial and operations teams designed to heighten communication and awareness of high water conditions operating restrictions
 - Weather updates, river forecasts, number of vessels on as well as destined for the river, fleet capacity updates and comments from the executive staff make up the meeting

Risk Mitigation & Safety Preparedness

- Employ manning and vessel strategies to support safety objectives and reduce navigation incidents
- High water mooring plans initiated
- Prohibit square-ends of barges facing upstream at fleets and docks
- Mandatory usage of assist vessels entering and exiting certain locks
- Tonnage reductions on vessels transiting in high water (reduced tow-size)

Risk Management – Energy Technology Transition Scenario

The transition to low-emissions technology in the oil field service space is growing. Kirby, through its subsidiary, Stewart and Stevenson (“S&S”), was the first to bring to the market an electric oil and gas pressure pumping solution. The demand for this equipment and other low carbon emission solutions is developing. In response to customer interest and as a means to drive the industry forward, Kirby Distribution and Services (“KDS”) has created partnerships with customers and original equipment manufacturers as leaders in providing solutions for this space. Although there is some risk of demand destruction for some of our products and services due to the rapidly evolving energy transition, we believe the transition has a large opportunity set for Kirby due to our unique products and position in the market.

In addition to the trend in low-emission technology, there is a potential for reduced demand for conventional oil and gas pressure pumping services as new alternative energy technologies become viable. However, Kirby is uniquely positioned in that its partnership with OEMs enables it to market its equipment to new markets. This is an emerging opportunity for Kirby, and it is one that Kirby is pursuing as a long-term strategy.

Why is the energy technology transition an opportunity for the distribution and services businesses?

- As described in Kirby’s Form 10-K, greenhouse gas emissions, including carbon emissions or energy use, have increasingly become the subject of a large amount of international, national, regional, state and local attention.
- Investors and customers are encouraging oil and gas companies to invest in emissions reducing alternatives and to consider low emission alternative energy technologies. Thus, there is increased demand for low emission oil and gas pressure pumping equipment through low-emissions technology and electrification.
- KDS is positioned as a leader due to its technology solutions. KDS designs and manufactures equipment that can significantly reduce the emissions from hydraulic fracturing.
 - Through its subsidiary, S&S, it was the first to bring electric fracturing equipment to the market that reduces emissions compared to traditional diesel combustion units
 - KDS has designed and is further developing natural gas power generation and energy storage systems solutions, which offer expansion opportunities into new commercial and industrial markets while reducing emissions
- Demand for low noise, electric, or dual fuel equipment is anticipated to offset reduced demand for conventional pressure pumping equipment
- Focus on industry leadership in the distribution of low-emissions alternative power sources for vehicles, trucks, oilfield equipment, and power generation
- Diversification through applying its expertise to new markets

Risk Management – Energy Technology Transition Scenario

Kirby manufactures leading technology equipment that significantly reduces the environmental impact of oil and gas pressure pumping solutions

Electric Units

- E-frac units operate using natural gas generators or existing utility power together with electric motors, reducing their environmental footprint
- Units operate on field gas that may otherwise be flared
- Compared to conventional fracturing units, e-frac units:
 - Reduce NOx emissions by up to 99%
 - Reduce CO2e emissions by 32% and NO2 by 28%
 - Reduce average sound pressure (decibels) by up to 69%



Stewart & Stevenson built electric frac unit

Dual Fuel and Quiet Units

- Dual-fuel (DGB) fracturing units have up to an 85% diesel displacement rate when using natural gas
- Units can operate on CNG, LNG, pipeline gas, and field gas that would otherwise be flared
- Reduces trucking and road traffic associated with diesel fuel transportation to the wellsite
- Noise reduction units reduce decibel levels by more than 3x (10+ dB noise reduction) compared to conventional frac units



UE Manufacturing built DGB and quiet frac unit

Risk Management – Energy Technology Transition Scenario

Kirby manufactures power generation equipment that is creating opportunities in new commercial and industrial markets

Natural Gas Reciprocating Generators

- High Power Output: 2.5 MW
- High Mobility: 53' x 8.5' x 13.5'
- Wide Operating Range: Up to 122°F operation
- Sound attenuated environmental enclosure
- Scalable operation with multiple generators
- Integrates with existing S&S power distribution products
- 27.5% more fuel efficient than turbines assuming zero grid power supply at net zero consumption
- Reduces CO₂e by 32% resulting in the cleanest power platform available for e-frac



Mobile Energy Storage Systems

- High Power Density: Up to 3 MWh storage capacity
- High Power Output: Up to 3 MW
- High Mobility: 53' x 8.5' x 13.5'
- Self Contained: Drive-up and plug-in (no additional rig-up)
- Output Voltage Flexibility: 13,800 volt shown
- Wide Operating Range: Up to 122°F operation
- Intelligent Operation: Advanced Battery Management System (BMS) and Power Management System (PMS)
- Highly Scalable: Platform Based Design (allows for smaller systems or use of multiple systems to meet different power demands)
- Integrated Turnkey Packages: ESS compliments existing S&S power generation and power distribution products



Risk Management – Energy Technology Transition Scenario

Strategy & Opportunity Management

Opportunity Readiness – Governance

- Executive management plus Board oversight and assessment to monitor emerging innovative technologies in the marketplace
- Monitoring state and federal policy regarding legislation impacting oil and gas production and policies to increase environmentally friendly technologies or mandates
- Monitor emerging macro level insights to better understand market trends and forecasting

Strategy

- Investment in new technologies and partnerships with OEMs to meet customer demands
- Develop and construct new eco-friendly technologies and equipment to support customers transitioning away from conventional fracking equipment
- Enable customers to achieve their carbon emissions reduction goals and commitments
- Capital investment in new technologies and R&D
- Adopt new practices and modify technician training including operating standards for new equipment
- Development of new distribution and dealer relationships with OEMs
- Industry leadership in the distribution of low-emissions alternative power sources for vehicles, trucks, oilfield equipment, and power generation
- Continue innovation and commercialization of eco-friendly pressure pumping equipment with electric, dual fuel, and low noise products that support our customers needs to reduce emissions and environmental impact.
- New revenue streams from applying natural gas power generation equipment to new markets including back-up power in commercial and industrial applications
- Develop and expand energy storage system solutions that have combined high powered storage and the capability to work in challenging operation conditions with the potential for vast application use

Alternative Fuels & Electrification Outlook Scenario

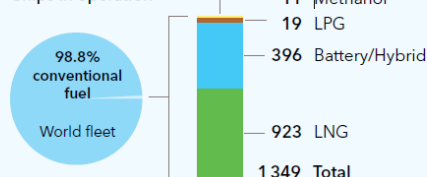
The transition to alternative fuels and electric vehicles in the transportation space is accelerating. For the marine transportation industry, the pathway for aligning with the IEA's 1.5-degree Celsius target is not certain. There are many scenarios to consider as the outlook is filled with viable solutions. Kirby is exploring many solutions that align with the IEA target, address market demands and customer preferences. While some of these potential opportunities are still in their infancy, it is important for our businesses to prepare for coming market changes, and this is exactly what our core businesses are doing. The two following visuals from [DNV's Maritime Forecast to 2050](#) & [McKinsey's](#) article on electric vehicles provide insight on leading indicators to the alternative fuels transition.

Alternative fueled ships on order are set to increase.

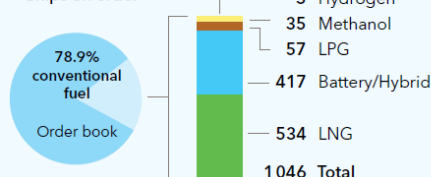
Alternative fuel uptake in the world fleet by number of ships and gross tonnage

NUMBER OF SHIPS

Ships in operation

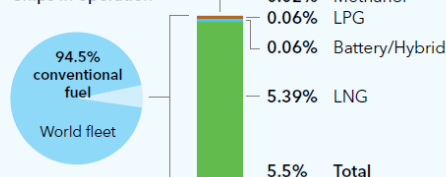


Ships on order

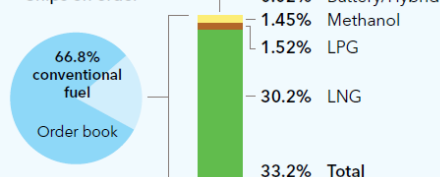


IN % OF GROSS TONNAGE

Ships in operation

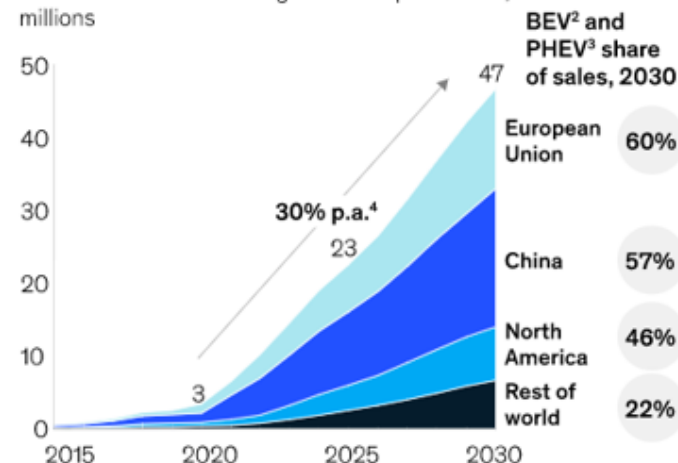


Ships on order



Global EV¹ market growth is strong and accelerating.

Global BEV² and PHEV³ light-vehicle production, millions



Electric vehicle growth is forecast to double by 2030.

Alternative Fuels & Electrification Outlook Scenario

Governance & Strategy

Opportunity Readiness – Governance

- Executive management with Board oversight to assess and monitor alternative fuels & electrification in the marketplace
- The Executive Committee, which is the most senior management committee within the organization, evaluates risks that could materially impact Kirby, including risks related to climate change as part of Kirby's Enterprise Risk Assessment process.
- Monitoring state and federal policy regarding legislation impacting traditional and alternative fuels and electrification
- Technical teams working with customers and original equipment manufacturers ("OEM") to identify and monitor emerging macro level market trends, projections and feasibility of alternative energy scenarios

Strategy

- Support customers greenhouse gas ("GHG") emission reduction goals and commitments
- Capital investment in new technologies and R&D
- Investment in hybrid electric technologies and partnerships with OEMs to meet customer demands and advance GHG emission reduction strategies
- Pursue use of alternative fuels on existing equipment to reduce GHG emissions
- Position Kirby as industry leader in design and construction of the first inland marine hybrid electric towboat used to transport liquid tank barges
- Focus on industry leadership in the electrification & alternative fuels space

Risk Management – Alternative Fuels Transition Scenario

Risk & Opportunity Management

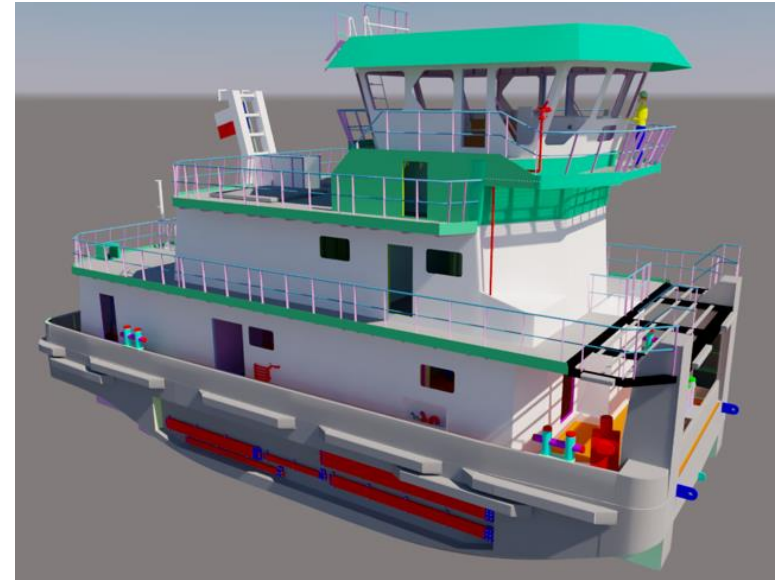
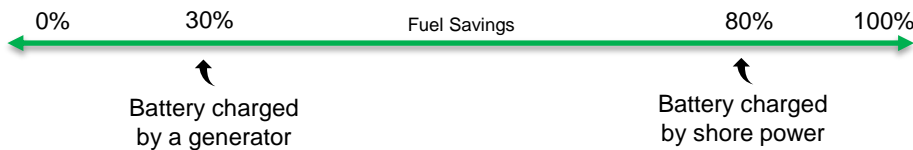
Why is the alternative fuels transition an opportunity for the company?

- Kirby is the largest inland tank barge operator in the U.S., transporting liquid cargoes throughout the Mississippi River System and on the Gulf Intracoastal Waterway. The company monitors the outlook for cargo transport demand under each of the energy transition scenarios. Depending on the scenario, while demand for traditional fossil fuel waterborne transportation may decline, we anticipate that demand for waterborne transportation of alternative fuels (including ammonia, methanol, biofuel, etc.) will increase, and the cargo volumes for alternative fuels are expected to replace traditional petroleum cargoes.
- Investors and customers are encouraging transportation companies to invest in emissions reducing alternatives and to consider low emission alternative energy technologies. Thus, there is increased demand for low emission transportation equipment through low alternative fuels emissions and electrification.
- Kirby Inland Marine LP (“KIM”) is expected to be the first inland marine transportation company to own and operate a diesel-electric hybrid towboat in the United States. The hybrid vessel will incorporate an energy storage system to reduce diesel fuel consumption and reduce emissions. The towboat, which is developed from proprietary Kirby design, is expected to be ready for service in 2023. The customer demand for this technology is growing and allows Kirby to maintain its industry leadership position as the premier inland liquid marine transportation company while reducing emissions per ton mile traveled.
- In addition, Kirby is also testing alternative fuels on certain inland towboats in its fleet. The alternative fuels under testing include several blends of biodiesel. Kirby is also monitoring the viability of methanol as an alternative fuel. The Company is investigating using alternative fuels in combination with its hybrid propulsion system to offset the use of diesel.

Inland Marine – Hybrid Electric Towboat

Kirby is expected to be the first inland marine transportation company to own and operate a diesel-electric hybrid towboat in the United States

- Proprietary in-house design, development, and construction underway for a diesel-electric inland push boat incorporating an energy storage system (ESS) to significantly reduce emissions
- Ready for service in 2023
- Flexible battery design allows for adding or removing battery packs based on power needs
- Reduced maintenance schedule and costs against conventional vessels
- Efficiency gains in multiple operating modes
- Estimated fuel savings of 30-80%:



KIRBY PARTNERSHIP



SPECS:

- Hybrid Drive with 2 Generators (1130 kW)
- Battery Pack : 1243 kWh
- Charge time at dock (480 VAC, 200A) : 6 hrs

Marine Transportation – GHG Emissions

- ~99% of Kirby's emissions are from the marine transportation fleet

Scope 1: Marine Transportation Fleet CO2e (MT)

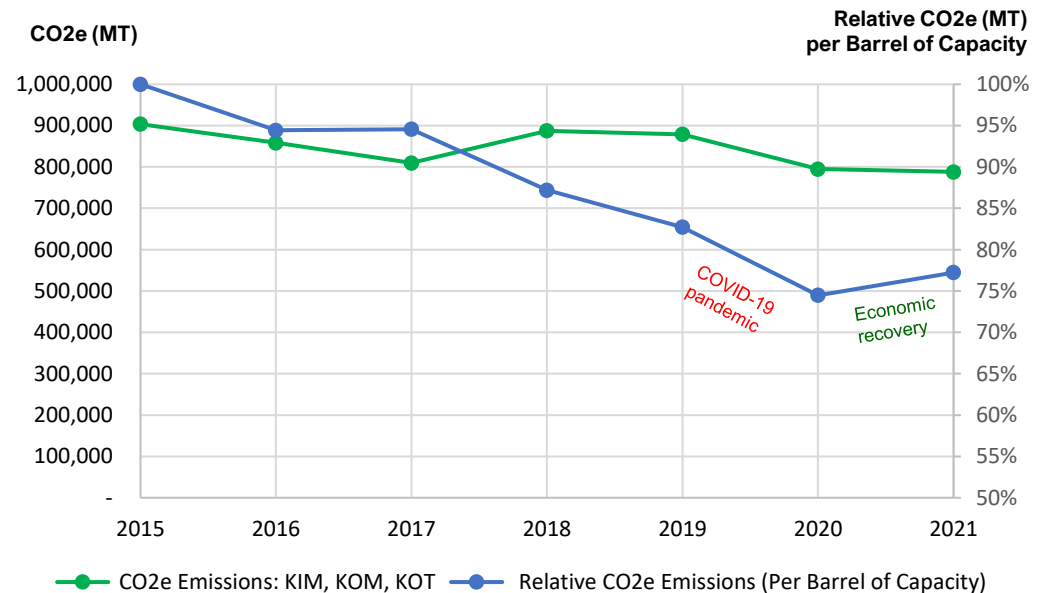


Emissions Performance (2015 to 2021)

- Since 2015, total CO2e emissions have declined 13% despite significant growth in the fleet
 - Total barrel capacity up ~15%
 - Result of inland acquisitions offset by offshore fleet retirements
 - Diesel consumption declined 10% '19Y/'20Y primarily due to reduced activity associated with the COVID-19 pandemic
- Since 2015, average age of inland boats is down 16 years and offshore boats is down 18 years

Emissions Reduction Targets:

- In 2020, Kirby met its 25% emissions reduction target early as a result of the COVID-19 pandemic and the associated reduction in economic activity
- Short term target: Overall, Kirby emissions are expected to decline 25% per barrel of capacity by 2024
- Long term target: 40% reduction of emissions per barrel of capacity by 2040



Target Reduction by 2024
(vs. 2015 base year)

↓ 25%



Target Reduction by 2040
(vs. 2015 base year)

↓ 40%

Kirby Corporation – GHG Emissions Summary

Marine Transportation Fleet Scope 1 – CO2e Direct Emissions

Year	CO2e MT (thousands)	Diesel Gallons Consumed (millions)	Barrel Capacity* (millions)	Relative CO2e Emissions (Per Barrel of Capacity)
2015	903.9	87.4	23.9	100%
2016	858.5	83.0	24.0	94%
2017	809.7	78.3	22.6	95%
2018	887.6	85.8	26.9	87%
2019	878.9	85.0	28.1	83%
2020	795.1	76.9	28.2	74%
2021	787.9	76.2	27.5	76%

Scope 1 Emissions Performance

- ~99% of Kirby Corporation Scope 1 GHG emissions come from the operation of the marine transportation boat/barge fleet
- Ultra low sulfur diesel fuel consumption and CO2e emissions have declined 13% since 2015 despite significant growth in the number of vessels in the fleet
 - 2018: Higman, Targa, CGBM acquisitions added ~5.4 million barrels of capacity and 75 towboats
 - 2019: Cenac acquisition added ~1.8 million barrels of capacity, 34 towboats, and 2 offshore tugboats
 - 2020: Savage acquisition added ~ 2.5 million barrels of capacity, 45 towboats
- Emissions data reporting project launched in 2020 to better understand Kirby's emissions footprint on a micro level

Scope 2 Emissions Performance

- 100% of Scope 2 energy is consumed from the grid
- Signed a 36-month agreement for 100% green e-certified energy in April 2020 for all Kirby marine transportation facilities in Texas
 - ECO Solutions Champion issued ~6,000 renewable energy certificates in 2021; 100% renewable representation
 - ~25% of Scope 2 energy is renewable
 - *2021 Scope 2 excludes 6,000 MWh of electricity consumed from renewable sources

Kirby Corporation Scope 1 – CO2e Direct Emissions

Year	CO2e MT (thousands)	Fuel Gallons Consumed (millions)*
2020	804.9	77.9
2021	796.5	77.1

*Fuel gallons consumed include gasoline, diesel, and ethanol

Kirby Corporation Scope 2 – Indirect Emissions

Year	MWh (thousands)	CO2e MT (thousands)	NOx (MT)	SO ₂ (MT)
2019	30.9	13.6	8.4	12.0
2020	23.1	10.2	6.3	8.9
2021	19.9	7.4	4.4	4.3



**Barrel capacities reflect Kirby Inland Marine and Kirby Offshore Marine tank barge businesses

Quarterly Public Company Update

Forward looking statement disclosure

- Forward-looking statements The information contained in this report, including but not limited to any facts or forwarding-looking statements, should not be interpreted as a decision by Kirby that such information is “material” information as that term is used or understood in filings with the Securities and Exchange Commission or as that term is defined by the Supreme Court in *TSC Industries v. Northway, Inc.*, 426 U.S. 438, 449 (1976). Many statements in this Report are forward-looking statements related to projections and future plans that are based, and inherently subject to, on a number of uncertainties, risks, and unknowns. Such forward-looking statements may be identified by words such as “may,” “expect,” “could,” “goal”, “will,” “plan,” “intend,” “anticipate,” “target,” “potential,” and other similar phrases or words that convey a future or prospective nature. These statements should be used with caution and are subject to various risks and uncertainties, many of which are outside Kirby’s control. These factors could cause actual results to differ materially from the forward-looking statements in this Report and include, but are not limited to: the availability of credit to customers and suppliers; the introduction of competing technologies or new technological innovations; unexpected technical or marketing difficulties; the impact of acquisitions and divestitures; changes to laws, accords, and governmental regulations; future economic, market, or other global or domestic conditions; or availability of materials necessary for our products, all of which are highly uncertain and cannot be predicted. The forward-looking statements are made as of the date of this Report, and Kirby undertakes no express or implied obligation to update or revise any such statement.