



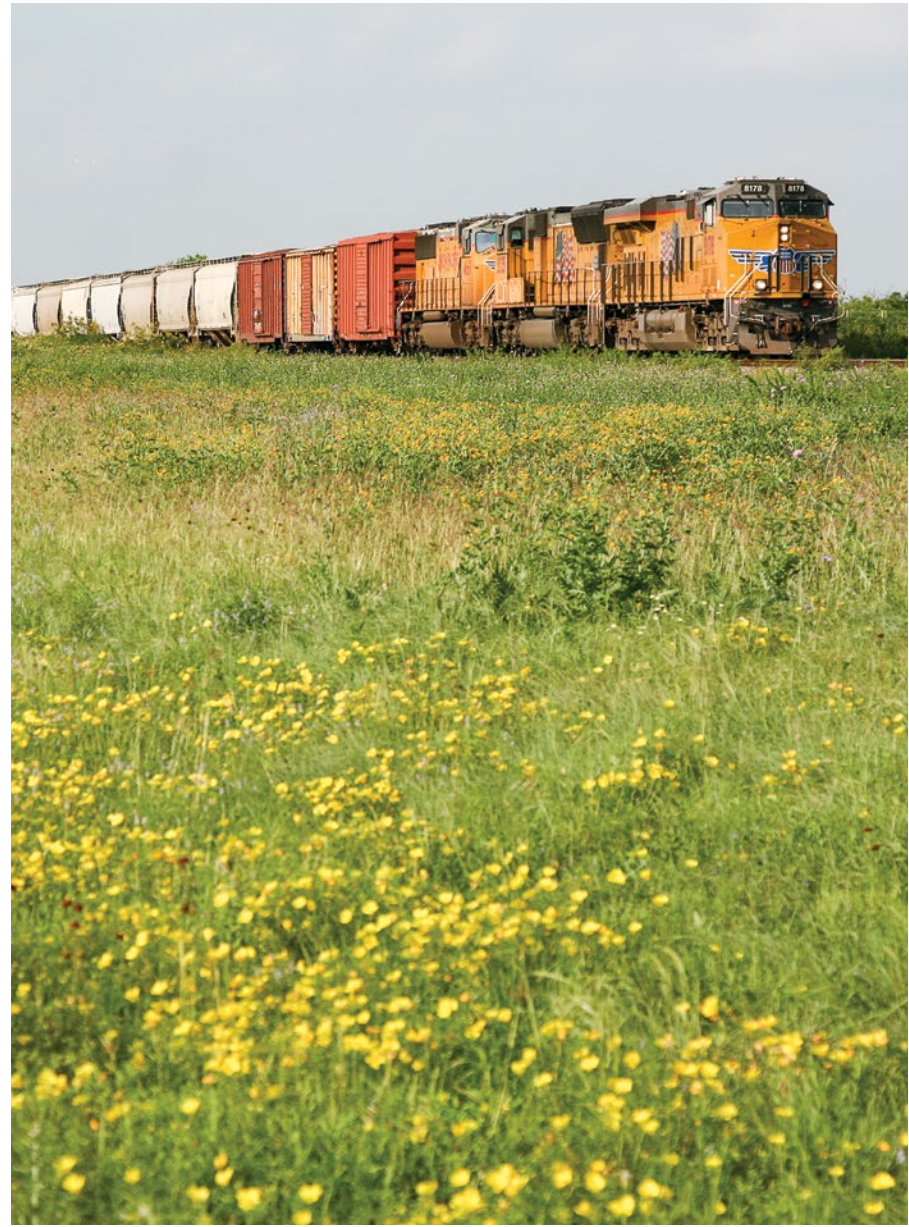
UNION PACIFIC RAILROAD

# 2022 Climate Action Plan



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*On the cover: Stacey Tansey, Yardman*

# Our Commitment to Reducing Climate Impact Remains Strong

A year after publishing our first Climate Action Plan, we believe more than ever in the importance of taking thoughtful, deliberate steps to reduce our environmental impact and to help our partners do the same.

Evidence of that importance can be seen in the impacts of human-caused climate change around the world. In addition to disrupting the lives of thousands in our communities, catastrophic weather events have historically impacted our operations and created service disruptions that rippled throughout the entire supply chain.

Our commitment to mitigating the impacts of climate change is underscored by our science-based target to reduce absolute Scope 1 and 2 greenhouse gas (GHG) emissions and GHG emissions on a well-to-wheel basis from locomotive operations 26% by 2030 from a 2018 base year. Since our last Climate Action Plan publication, we've taken significant steps toward reaching these goals:

- We streamlined our operations – from right-sizing trains to applying new technologies designed to result in fuel-saving and improved tractive force for increased fuel efficiency – resulting in reducing fuel consumption by more than 11 million gallons in 2021 compared to 2020.
- We modernized 120 existing locomotives during 2021 and committed to spending more than \$1 billion on modernizing an additional 600 locomotives from 2023 through 2025. The modernizations should provide approximately 350 tons of carbon reduction per locomotive per year, and the total order for 600 locomotives will realize approximately 210,000 tons in annual emission reductions.
- We worked hand-in-hand with our locomotive and fuel suppliers to increase our use of renewable diesel and biofuels. Our 2021 low-carbon fuel consumption rose to 3.0% of total diesel consumed, up from 2.2% in 2020. As we approach the end of 2022, this number is climbing above 4.0%.
- We announced plans to purchase North America's largest carrier-owned fleet of battery-electric locomotives for testing in freight yard operations. We are piloting this technology in its early adoption phase to better understand how we could deploy it at scale in our operations, and give feedback to manufacturers to advance battery-electric locomotive development.
- We created partnerships within our value chain and community to help us reduce

our climate impact. We announced a strategic alliance with Shell and a partnership with a green technology company and leader in locomotive control systems to build hybrid-electric switch locomotives that will likely play a role in our transition to net zero.

- We recently announced a partnership with The Nature Conservancy to explore and harness the benefits of nature-based solutions.
- We became the first U.S. railroad to formally support the Task Force on Climate-related Financial Disclosures (TCFD), reinforcing our company's commitment to transparent disclosure. We are committed to continuing to implement the TCFD framework in our climate reporting.

Although our absolute GHG emissions increased 3.6% in 2021 over 2020, driven by increased demand for transportation services and service interruptions, our emissions intensity decreased by 2.2%. We expect to continue to take bolder and broader actions to see reductions in our absolute emissions.

We have formally committed with the Science Based Target Initiative (SBTi) to revise our near-term emissions reduction target to support a 1.5°C climate ambition, as well as set and validate a net-zero emissions target.

Earlier this year, we conducted an extensive climate scenario analysis to better understand the risks to and opportunities for our operations, infrastructure and supply chains from specific climate scenarios. The analysis is being used to evaluate and develop strategies to allow us to respond to both high- and low-carbon scenarios.

Our efforts toward our climate goals and the progress and steps we've taken are outlined in this Climate Action Plan, which is part of our overall ESG initiative we call Building a Sustainable Future 2030. It aligns with our strategic framework of Serve, Grow, Win – Together. Central to our success is our ongoing efforts to report our progress through climate-related disclosures to all Union Pacific stakeholders – employees, customers, shareholders and the communities we serve.

We only have one world. We want to do our part to help protect it for our generation and for the generations to come.

**Beth Whited**, Executive Vice President – Sustainability & Strategy & CHRO

# Introduction

## Climate change is continuing and impacting everyone, but railroads offer a cleaner transportation alternative.

### Climate Change Impacts Our Stakeholders

Increases in the frequency and intensity of climate and weather extremes result in serious and widespread impacts to ecosystems, people and infrastructure, according to the latest Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6). These weather events include heat extremes on land and in the ocean, heavy precipitation events, drought and fire. Climate change induced by human action may cause extensive negative impacts and related losses to ecosystems and people, beyond natural climate variability.

In its latest annual report, the National Oceanic and Atmospheric Administration (NOAA) concluded that 2021 was the 6th warmest year on record, with average temperatures 0.84°C (1.51°F) above the 20th century average. This increase in temperature has resulted in regional and seasonal weather extremes, reduced snow cover and sea ice, intensified heavy rainfall, and changes in habitat for plants and animals.

The timing of extreme weather events is challenging to predict, but it is anticipated they will increase in frequency and intensity over time. These extreme weather events have impacted our network and are likely to continue. Examples include the [burning of Dry Canyon Bridge in California](#), hurricanes that resulted in flood-related derailments, and other extreme weather events. These instances can result in service delays, undermine our customers' trust in our operations, and disrupt upstream supply chains, impacting our network.

### Railroads Provide Distinct Environmental Advantages

According to the U.S. Environmental Protection Agency (EPA), the transportation sector accounted for the largest proportion of anthropogenic U.S. greenhouse gas (GHG) emissions in 2020, totaling 27% of all such GHG emissions. However, GHG emissions from rail transportation represented only 2% of U.S. transportation-related GHG emissions.<sup>1</sup> Freight rail leads other forms of surface transportation when it comes to minimizing greenhouse gas emissions and we expect it will continue to play a critical role in mitigating and abating the impacts of climate change.

<sup>1</sup> See the EPA's [Fast Facts on Transportation Greenhouse Gas Emissions](#)

### Fast Facts

- One train can carry the freight of hundreds of trucks, which reduces highway congestion.
- Freight railroads are 3 to 4 times more fuel efficient than trucks, on average.
- Moving freight by train instead of truck reduced GHG emissions by up to 75%.
- Railroads account for around 40% of long-distance freight volume but only 2% of US transport-related GHG emissions.

[AAR Freight Railroads and Climate Change, pg 2](#)

In addition to producing fewer emissions, railroads also help reduce the huge economic costs of highway congestion. A single freight train can replace several hundred trucks, freeing up space on the highway for other motorists and decreasing traffic. Converting from truck to rail typically results in an immediate reduction in our customers' Scope 3 GHG emissions, which enables us to become a bigger part of our customers' value chains.

### Union Pacific Is Investing in Cleaner Technologies

With the inherent fuel efficiency and lower emissions benefits provided by freight railroads versus trucking, rail transportation is an important part of the solution to addressing and mitigating the impacts of climate change. However, no sector in the freight transportation industry is standing still when it comes to decarbonization and decreasing the GHG emissions intensity of transportation products. Like the railroad industry, other transportation modes are investing in fuel efficiency and developing clean propulsion technologies.<sup>2</sup>

<sup>2</sup> See American Trucking Associations' ["Energy & Environment" statement](#), the National Renewable Energy Laboratory's [research and development work with the trucking industry](#), and the International Maritime Organization's ["Initial IMO GHG Strategy."](#)

Union Pacific is committed to investing in the development of technology that will reduce its carbon footprint and enable us to achieve our net-zero emissions ambition. Succeeding in these initiatives is a critical part of the solution to addressing and mitigating the impacts of climate change.

In addition, it's just good business: We believe decarbonizing our operations will enable Union Pacific to grow our competitive strengths to become the supply chain partner of choice for many shippers that currently ship via truck.

## TRAIN FACTS YOU MIGHT NOT KNOW

# RAIL CARS CAN HAUL MORE THAN TRUCK TRAILERS



CAN HOLD **3** TO **4** TRUCKLOADS WORTH OF FREIGHT.



CAN HAVE A GROSS WEIGHT\*

**UP TO 286,000 LBS**

HEAVY AXLE RAIL CARS CAN HAVE A GROSS WEIGHT OF UP TO **315,000 LBS**.

THE FEDERAL GROSS VEHICLE WEIGHT LIMIT FOR TRUCKS TRAVELING ON THE INTERSTATE IS



\* the total weight of the load, including the weight of the rail car itself.

## A SINGLE TRAIN CAN CARRY THE SAME AMOUNT OF FREIGHT AS 300 TRUCKS!

Source: Association of American Railroads

# Our Goals Represent a Pragmatic Approach to Climate Activities

## Strategy includes both our activities and the activities of others.

Locomotive operations represent our greatest source of GHG emissions. In 2018 (our baseline year), emissions from locomotives comprised 95.4% of our target scope GHG emissions and 83.4% of our total calculated emissions. Accordingly, our major focus in reducing our carbon footprint is on our locomotive operations.

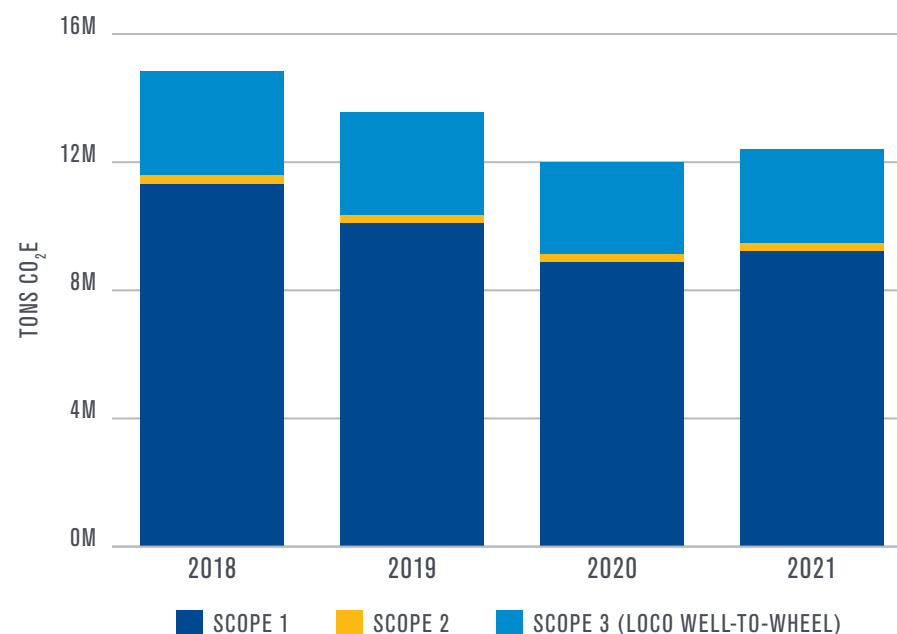
Union Pacific's climate strategy represents a pragmatic approach to our climate activities. While developing this strategy, we considered actions already taken to address climate change as well as what we could do additionally to reduce our environmental footprint. We have considered actions we can accomplish by ourselves and actions we expect to take with others.

In 2021 we committed to reduce absolute Scope 1 and 2 GHG emissions and GHG emissions on a well-to-wheel basis from locomotive operations 26% by 2030 from a 2018 baseline. The target boundary includes biogenic emissions and removals from bioenergy feedstocks and has been validated by the Science Based Target initiative (SBTi).

We also committed to a specific company target to increase the percentage of low-carbon fuels consumed to 10% of our total diesel consumption by 2025, and further increase that consumption to 20% by 2030. Achieving this target should enable considerable progress toward achieving our SBTi 2030 goal.

*Restatement/Verification: Union Pacific works with independent organizations to develop an accurate estimate of its annual GHG emissions and continually evaluates its greenhouse gas and energy data to produce a calculation of its environmental footprint. In this report, some emissions data have been restated from previous sustainability reports to reflect changes in reporting.*

**UNION PACIFIC ABSOLUTE GHG EMISSIONS**  
EXCLUDES NON-LOCOMOTIVE SCOPE 3 GHG EMISSIONS





# Despite Emissions Intensity Improvements, Absolute Emissions Increased

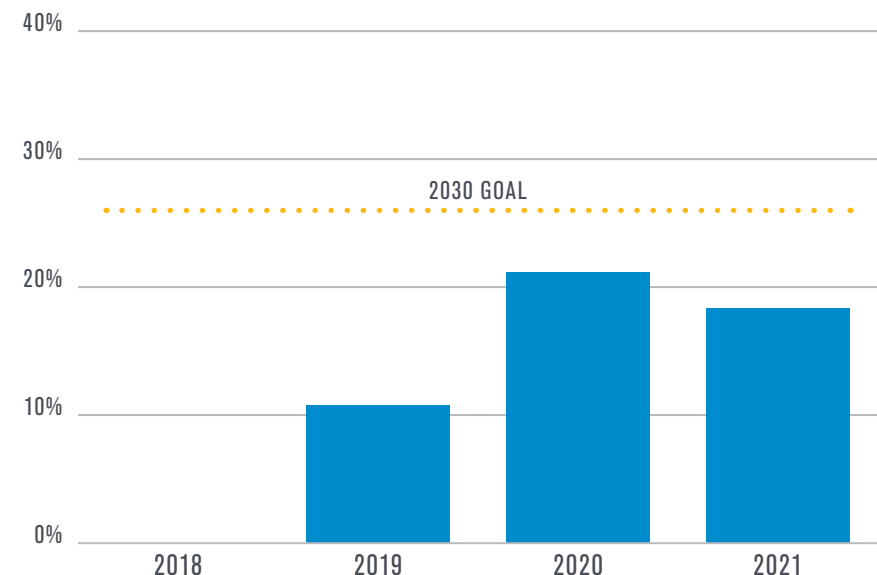
**A rise in demand for transportation services and service interruptions negatively impacted absolute emissions in 2021.**

During 2021 our business experienced increased carload and gross ton-mile volumes year over year as the economy recovered from the pandemic. This business growth, combined with our decarbonization and fuel efficiency initiatives, resulted in both a Scope 1 and overall target scope reduction in GHG emissions intensity of approximately 2% and 2.2%, respectively.

This business growth, combined with our decarbonization and fuel efficiency initiatives, resulted in both a Scope 1 and overall target scope reduction in GHG emissions intensity of approximately 2% and 2.2%, respectively.

However, the upswing in shipping volumes and other service interruptions caused us to add over 800 locomotives to our active fleet to efficiently serve our customers. This impacted our ability to achieve absolute GHG emissions reductions in 2021. For 2021, our Scope 1 absolute emissions increased 3.8%, and our overall target scope absolute emissions increased 3.6%. These results underscore the importance of investing in and developing technology that helps decouple emissions from our operations. We remain committed to our absolute GHG emissions reduction goal.

**UNION PACIFIC EMISSIONS REDUCTIONS VS. 2018 BASELINE**  
EXCLUDES NON-LOCOMOTIVE SCOPE 3 GHG EMISSIONS



# Climate Scenario Analysis Identifies Risks and Opportunities

**Our climate scenario analysis considers how different climate-related decisions in the future could impact our company.**

In our 2021 Climate Action Plan we committed to conduct an extensive climate scenario analysis to better understand the risks and potential opportunities of climate change for our company from specific climate scenarios. In 2022, we completed our first climate scenario analysis.

Climate scenario analysis is a core recommendation of the Taskforce on Climate-related Financial Disclosure (TCFD) and provides a rigorous assessment of the climate-related risks and opportunities the company may face in the future under a range of potential climate scenarios. Our analysis integrated several factors to represent plausible future pathways based on credible science, developed by experts at the International Energy Agency (IEA) and other reputable organizations. The results of this scenario analysis are intended to inform our understanding of our business' climate-related risk and opportunities and support planning and investment decisions.

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## Methodology

We analyzed perspectives from internal leaders, suppliers, customers, peer literature review and expert assessment to gather insights regarding the climate-related risks and opportunities they identified in the rail industry. We have targeted nine priority climate-related driving forces that have impacted and/or were deemed to have potential further impacts on Union Pacific.





## We identified 9 climate-related driving forces that currently impact our business:

### Physical

**Acute climate change:** Increasing frequencies of short-duration extreme weather events, such as hurricanes, wildfires, storms and floods. These events may affect our infrastructure and operations, potentially impacting our service levels, increasing costs and requiring investments to improve our infrastructure's resiliency.

**Chronic climate change:** Long-term changes in weather patterns, such as secular shifts in annual temperature and precipitation levels. These events represent both a risk to our infrastructure and our work patterns, and potential opportunities as consumers and our customers shift to new climate realities.

### Market

**Decarbonization of power generation:** While the pace and scope of decarbonization of electrical power generation may vary across our markets, it is highly likely that the power generation sector will continue to replace fossil fuel power generation with renewable fuel sources over the long term, impacting company revenues. Additionally, renewable energy products, feedstocks and infrastructure can be a positive revenue opportunity.

**Low-carbon transition:** The economy-wide carbon emission reductions and transition to low-carbon businesses represent both a risk and opportunity to our business.

**Stakeholder ESG interest:** ESG-related expectations by our stakeholders (shareholders, customers, communities and employees) have grown significantly, with concomitant demands for climate-related performance commitments, transparent disclosure, and climate-benefiting investment.

### Policy

**Environmental policy and regulation** are generally expected to become more stringent over time. State-by-state adoption of GHG emissions-reduction standards or prescriptive regulations regarding low-carbon technology or fuel may subject our company to a patchwork of applicable regulations. Public low-carbon infrastructure spending can directly or indirectly benefit Union Pacific.

### Technology

**Electrification of transportation:** Transition from combustion engines to electric motors powered by renewable fuels in the North American transportation sector is continuing at differing speeds across modal types, with uncertainties arising as to cost, availability, procurement and performance.

**Low-carbon fuels:** Reduction of carbon emissions through biofuels enables many power generation technologies to transition to a renewable power source. Uncertainty arises from the availability of biofuel feedstocks, policy and regulation, and social and economic challenges. Transport of renewable diesel and associated feedstocks is a potential revenue growth opportunity.

**Energy and infrastructure:** Fuel and electricity prices are challenging to predict and can fluctuate greatly in the near and long term. There is uncertainty around the amount of low-carbon fuel and electricity required for a net-zero future and the ability of the electrical infrastructure to meet this growing demand.

## Scenarios Contrast High-Carbon and Low-Carbon Worlds

Scenario narratives describe hypothetical futures with attendant new risks and opportunities. We worked with outside experts to describe two climate scenarios relevant to Union Pacific based on physical climate and transition trends and data identified in reputable public sources such as the IEA and IPCC. We caution that each of these scenarios is hypothetical and as we continue to refine our approach, technology develops and the world changes, these scenarios may change accordingly.

### Scenario #1: High-Carbon World

This scenario is characterized by an economy that largely fails to decarbonize – emissions reductions from efficiency gains and low-carbon energy are offset by an increasing population and gross domestic product (GDP). Emissions in the U.S. flatline from 2023 onwards, but global emissions double by 2050, exacerbating physical climate risks such as hurricanes and heat waves. While carbon pricing is muted, lower investment in climate-related innovation and technology means mitigation costs are higher than in low-carbon scenarios. *Reference Scenarios: RCP 8.5, IEA STEPS and EIA Reference Case.*

### Scenario #2: Low-Carbon World

This scenario is characterized by an economy that reaches net zero by 2050. Decarbonization is led by the power generation and transportation sectors – each of which decarbonize rapidly, creating widespread opportunities for companies providing low-carbon services. Still, global emissions drive up U.S. mean air temperatures 1.4°C above pre-industrial levels by 2050, increasing physical climate risks such as hurricanes, heat waves and agriculture impacts, though less than in the High-Carbon World. Climate policy is also a significant driver and carbon pricing reaches notable highs. *Reference Scenarios: IEA NZE, EIA Low Renewables Cost, EIA High Oil Price, IPCC RCP 2.6, EnerFuture EnerGreen.*

## Drivers of Risks and Opportunities Identified through Analysis

We identified and assessed the potential impacts of four priority risk/opportunity drivers on Union Pacific's business under both the High-Carbon and Low-Carbon scenarios, using a combination of climate and business data.

**Carbon Pricing Exposure:** Union Pacific may face substantially increased operational costs in the short- to mid-term due to increasing carbon prices. This can be mitigated by reducing company emissions. Carbon pricing may also represent an opportunity for our company as potential customers seeking lower transportation costs shift transportation modes to rail.

**Electricity Generation Mix:** A sharp decline in the demand for coal transportation is anticipated. This decline may be partially mitigated by demand for transportation of wind and other low-emissions electricity generation infrastructure. Component shipments will likely increase, creating new revenue opportunities.

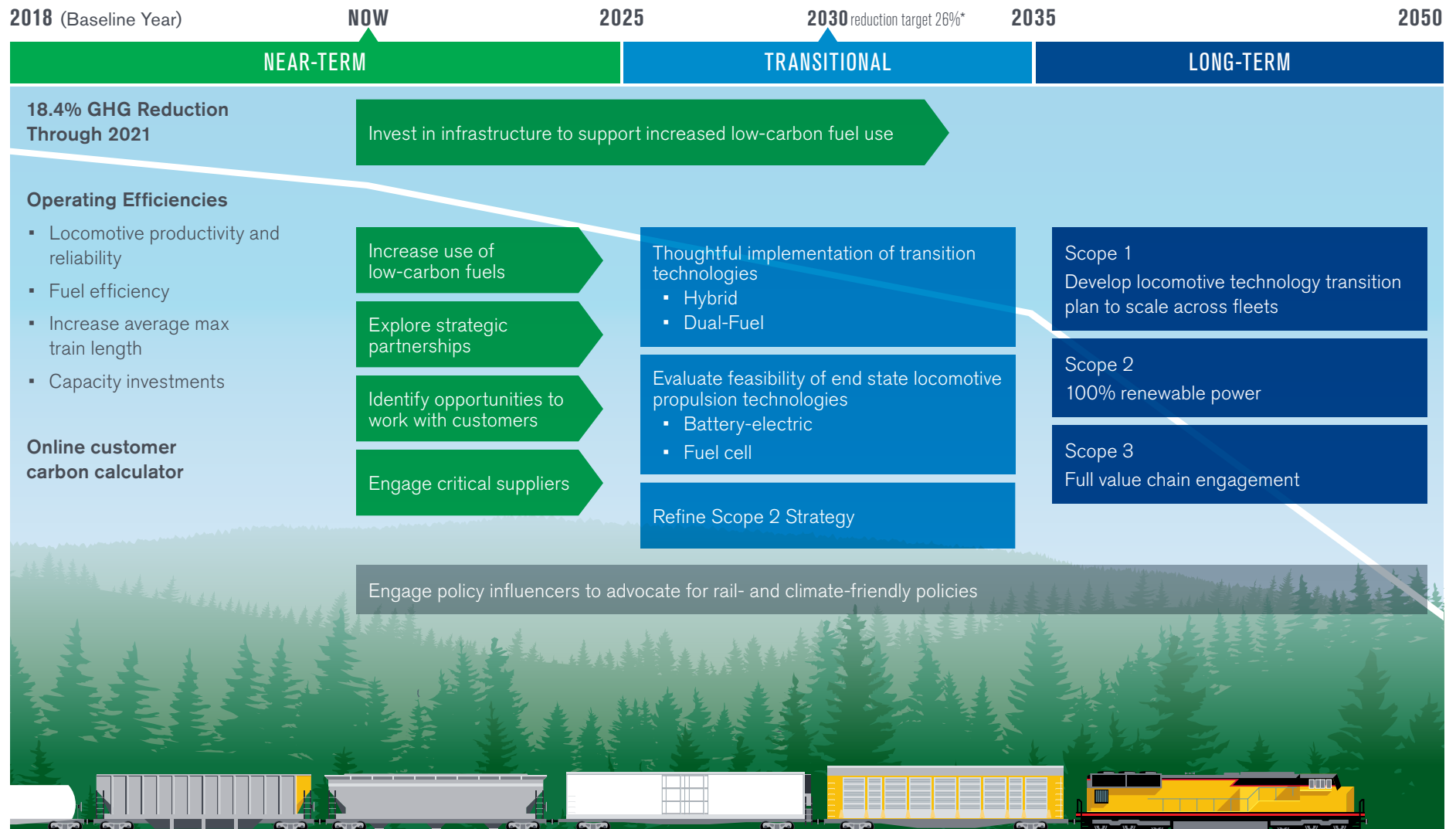
**Agriculture Impacts:** Decreasing corn yields in the Midwest can pose a challenge as there have been greater exports from this region lately due to higher-demand markets and dry conditions in the Southwest. Overall increasing wheat yields in the U.S. can present a potential significant opportunity for global export markets.

**Acute Climate Risk:** In a high-carbon world, greater incidence of operational and maintenance challenges from acute weather – extreme precipitation, flooding, heat waves, and wildfire – could require changes in the level or type of investments for infrastructure and operational resiliency.

Union Pacific is identifying potential strategic responses to mitigate the risks and capitalize on opportunities identified in the climate scenario analysis. Further development of these strategic responses for both the high- and low-carbon scenarios should help us prioritize climate-related impacts against other business risks and opportunities, and designate business and climate trend indicators as signposts that can indicate the emergence of strategic decision points for action by the company. We are taking an iterative approach to climate scenario analysis to be integrated into our business planning processes.

# Climate Action Strategy

## Reduce emissions via near-term, transitional and long-term strategies



\*SBTi has approved our short-term target to reduce absolute Scope 1 and 2 GHG emissions and GHG emissions on a well-to-wheel basis from locomotive operations 26% by 2030.

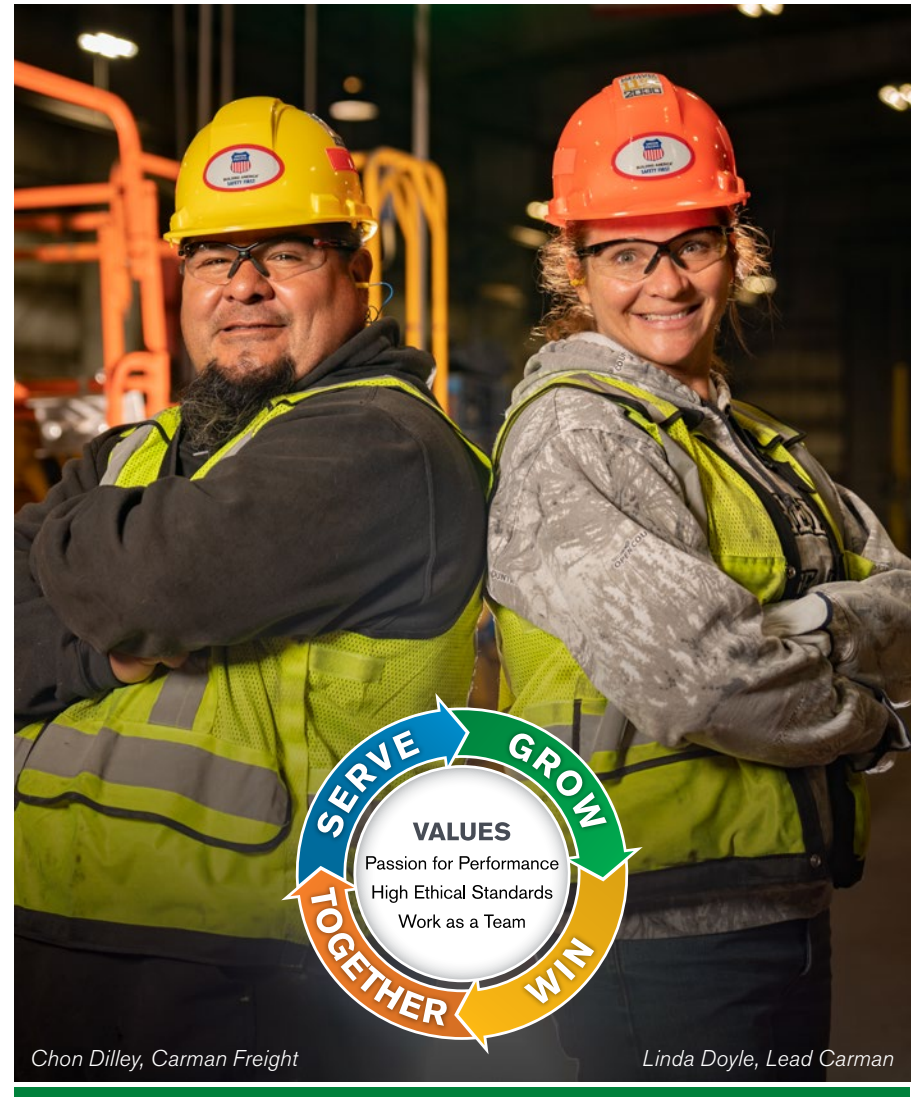
# Climate Action Strategy Is Aligned with Our Corporate Strategy: Serve, Grow, Win – Together

At the heart of Union Pacific's climate action strategy are four core strategies that drive our climate-focused activities:

- Reduce locomotive emissions via near-term, transitional, and long-term strategies
- Offer a sustainable supply chain solution as part of our value proposition to our customers
- Collaborate with our value chain on climate action initiatives
- Decarbonize our footprint to realize our net-zero ambition

These climate activities are aligned with our broader corporate strategy of Serve, Grow, Win - Together:

- **Serve** with customer-centered operational excellence
- **Grow** carloads, products and services that meet customers' needs
- **Win** as the customer's supply chain partner of choice
- **Together** we create value for all stakeholders





# Reduce locomotive emissions via near-term, transitional and long-term strategies

## Near-Term Strategies Reduce Locomotive Emissions Now

Locomotive operations are the primary source of our Scope 1 emissions. We have been executing near-term strategies to reduce our emissions annually via improvements in our operating efficiencies, locomotive fuel efficiency and locomotive modernizations. These strategies have yielded the bulk of our cumulative 18.5% reduction in locomotive GHG emissions compared to our 2018 baseline.

There is tremendous uncertainty surrounding the pathway to a net zero future, and we are taking collaborative action to understand plausible pathways. Over the short term, continued progress on fuel efficiency initiatives and operational productivity, coupled with increased utilization of low-carbon fuels, are key to achieving our short-term science-based target. We have also announced investments in battery-electric and hybrid propulsion technology and are developing partnerships that will help us develop solutions to achieve our long-term target.

During 2023 we expect to further refine our potential net-zero pathways as part of our science-based net-zero target submission to SBTi.

Looking beyond 2030, we expect to develop a better understanding of the capability of hybrid propulsion and will consider what role dual-fuel internal combustion engine technology may play in the transition to zero-emissions technology. Experience gained with these transition technologies will help us think about infrastructure, energy density, and fuel supply, which will guide our future investments in zero emissions technology like battery-electric high horsepower propulsion and alternative fuel-cell technology. During 2023 we expect to further refine our potential net-zero pathways as part of our science-based net-zero target submission to SBTi.

## Operating Efficiencies

Since 2018, Union Pacific has implemented changes to its transportation plan to eliminate unnecessary work, increase average train length, and improve locomotive productivity. These efforts have resulted in freight cars moving across our network faster and more efficiently. Longer train lengths improve locomotive productivity

measured in gross ton miles per horsepower day, which typically results in fewer locomotives required to handle our freight. These reduced locomotive requirements allow us to retire or store our least-efficient units, improving our average fuel efficiency. Better fuel efficiency reduces fuel consumption, which also reduces GHG emissions.

|   | 2018       | 2019      | 2020      | 2021      | 2021 vs 2018 |
|---|------------|-----------|-----------|-----------|--------------|
| Average Max Train Length  | 7,036      | 7,747     | 8,798     | 9,334     | +32.7%       |
| Locomotive Productivity (Gross Ton-Miles / Horsepower-Day)      | 106        | 120       | 137       | 133       | +25.5%       |
| Freight Car Velocity (daily miles per car)                      | 198        | 209       | 221       | 203       | +2.5%        |
| Gross Ton-Miles (billions)                                      | 928.6      | 846.6     | 771.8     | 817.9     | (11.9%)      |
| Scope 1 GHG Emissions – Locomotive (mTons CO2e)                 | 10,884,670 | 9,683,373 | 8,545,365 | 8,875,559 | (18.5%)      |
| Scope 1 GHG Emissions – Locomotive (mTons CO2e per million GTM) | 11.7       | 11.4      | 11.1      | 10.9      | (7.4%)       |

As Union Pacific has grown, operating efficiencies via increased average train length, locomotive productivity, and freight car velocity have decreased locomotive GHG emissions on both an absolute (18.5%) and intensity (7.4%) basis versus our 2018 baseline.

## Near-Term Strategies *(continued)*

### Fuel Efficiency

Our Energy Management System (EMS) on locomotives function similarly to a cruise control system in a vehicle, automatically controlling a locomotive's throttle and dynamic braking systems to optimize fuel usage and minimize GHG emissions. By the end of 2022, EMS will have been implemented in approximately three-quarters of our active road fleet, and we are still on track to fully implement it by 2025.

In 2021, our full-year fuel consumption rate improved 1%, a new record low. This represents the third consecutive year we improved our fuel consumption rate on a year-over-year basis and was a factor in helping our customers eliminate 22.9 million metric tons of GHG emissions by using rail versus truck during 2021.

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Other technology in addition to EMS is also helping us maximize our fuel economy. For example, we have used automatic shutdown technology on many of our locomotives for more than a decade to prevent unnecessary engine idling. Additional operating practices have allowed us to further reduce overall locomotive energy consumption by about 5% from 2018 to 2021.



## Near-Term Strategies *(continued)*

### Locomotive Overhauls and Modernizations

We continue to retrofit our existing locomotive fleet with new technology for improved fuel efficiency, greater reliability and reduced emissions. During 2021 we continued modernizing our locomotive fleet by upgrading 120 older units. These modernizations not only improve the reliability of the asset, but should make each unit up to 5% more fuel efficient and emit approximately 53% less emissions.

In 2022 we announced the largest-ever investment in modernized locomotives in rail industry history: an agreement with Wabtec Corporation for 600 locomotive modernizations, worth more than \$1 billion. Compared to existing technology, the modernizations will include next-generation controls; a fuel-efficiency improvement of up to 18%; a more than 80% increase in reliability; and increased haulage capacity. Increased reliability and capacity result in fewer locomotives required to haul our freight. The modernizations also support the circular economy, with components comprising more than half the locomotive's weight being reused. Expected to be fully completed for all 600 units by the end of 2025, the total order will enable Union Pacific to realize approximately 210,000 tons in annual emission reductions, equivalent to removing emissions from nearly 45,000 passenger cars per year.

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### Capacity Additions Increase Average Train Length

We also continue to invest in capacity projects that drive locomotive productivity, increase train length, and improve our network efficiency. We invested \$197 million in 2021 on sidings, which included the completion of 15 projects. In 2022, we are on pace to spend approximately \$214 million, which includes the completion of 20+ siding projects. For example, on our Golden State route between El Paso and Harrington, Texas, we have extended 21 sidings since 2019 to increase potential maximum train length from 6,800+ feet to over 9,500+ feet.



*Left, a main cab for a Union Pacific modernized locomotive on the floor of Wabtec's Fort Worth, Texas, plant. Right, a modernized locomotive receives finishing touches.*



### Serve + Together

Four siding extensions in the west Texas, San Antonio and Houston areas were completed with diverse suppliers, including Latino-owned Macro Z Technologies and Native American-owned Choctaw Construction Services. "Leveraging diverse suppliers helps us meet our supply needs while allowing us to work with companies who are reflective of the communities Union Pacific serves," said Mark Allen, director-Track Construction, Engineering, Spring, Texas.



## Transition Strategies Prepare the Way for Alternative Technologies

Current advances in low- or zero-emission passenger vehicles are encouraging, but we believe additional research and development is required before our industry can adopt zero emissions locomotives at scale. Efforts to develop next-generation battery electric and other fuel cell technologies will take time, and locomotives typically have a useful operational life of 30 or more years. As a transitional strategy, we are focused on utilizing low-carbon fuels in our locomotives to further reduce our emissions across our entire fleet while proactively supporting research and testing for a new generation of low- and zero-emissions locomotives.

Last year, we announced a company-specific target to increase the percentage of low-carbon fuels consumed to 10% of our total diesel consumption by 2025 and 20% by 2030. Our 2021 low-carbon fuels consumption was 3.0% of total diesel used, up from 2.2% in 2020, and is over 4.0% since mid-2022. Further, we have line-of-sight into how we intend to achieve our 20% low-carbon fuels target by 2030.

To facilitate our increased use of low-carbon fuels, we added more locomotive fueling locations using low-carbon fuels, including Los Angeles, Houston, Roseville, Des Moines and Baton Rouge. Additionally, we have analyzed our network fueling locations and begun infrastructure design work for new and retrofitted storage and blending infrastructure to further increase our usage of low-carbon fuels each year.

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We have line-of-sight into how we intend to achieve our 20% low-carbon fuels target by 2030.

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To reach our goals related to the consumption of low-carbon fuels, more of our locomotive model types must be certified as compatible with higher blends of low-carbon fuels. We continue to collaborate with other Class I railroads and with domestic locomotive manufacturers on testing and approving use of blends of biofuel and renewable diesel for use in nearly every major locomotive model we operate and expect to implement results from the testing into our fueling plans during 2024.

We are working with our fuel supply-chain partners to secure supplies of low-carbon fuels to meet both our current and projected future needs. Additionally, we believe governmental and regulatory action is necessary to encourage the supply of biodiesel and renewable diesel in the 23 states where we operate. Federal and state



### Win + Together

Four Union Pacific locomotives providing service to a San Bernardino, California, sand and gravel mine are running on 100% biomass-based fuel – the first time in UP's history that a locomotive is being powered solely by a renewable fuel source made from vegetable and/or animal fats. The field test will determine the feasibility of using a blend of 80% renewable diesel and 20% biodiesel in Union Pacific's fleet.

government policies should harness market principles to encourage the development and deployment of low-carbon fuels. We are working to develop policy strategies through the Decarbonization Working Group of the Association of American Railroads (AAR) to support this effort.

We have also begun collaborating with other Class I railroads and others to advance the development of new locomotive propulsion technologies. We are committed to working with third parties inside and outside of the industry to enable even broader industry actions and support policies that permit and encourage appropriate further collaboration.



## Transition Strategies *(continued)*

### Investigating Alternative Propulsion and Fuel Technologies

Over time, new propulsion technologies like battery-electric, renewable fuels and fuel cell technology may become increasingly viable for use in heavy-haul, long-distance freight locomotives. Our pathway to net zero will depend on the introduction of zero-emissions locomotives into our operations, the locomotives' operational reliability, the availability of support infrastructure, the economics of production and procurement, and public policy and marketplace support. Our efforts have already begun.

### Battery-Electric Locomotive Technology

In January 2022, we announced plans to purchase battery-electric locomotives for testing in yard operations. The combined purchases and required upgrades to yard infrastructure to support battery-electric locomotive operations are expected to exceed \$100 million, which would represent the largest investment in battery-electric technology by a U.S. Class I railroad. Once the units are in service, it will be North America's largest carrier-owned battery-electric locomotive fleet in freight service.

By working with locomotive manufacturers in this test phase, Union Pacific hopes to advance battery-electric technology development and evaluate its potential deployment in long-haul service.

Due to supply chain challenges and the complexity associated with design specifications, we now expect delivery of our first units to begin in 2024. The locomotives will be tested for performance in cold and warm weather, helping identify the locomotives' capabilities and challenges for broader deployment.

### Hybrid Locomotive Technology

In October, we announced a partnership with ZTR, a green technology company and leader in locomotive control systems, to build hybrid-electric locomotives. The locomotives will be built at Union Pacific's North Little Rock, Arkansas, facility with the first prototype expected to be delivered in 2023 and five additional units arriving in 2024.

The locomotives, which will run as "mother-slug" units, are expected to work much like a plug-in hybrid car, capable of operating in multiple modes. The unit will have multiple ways to charge the locomotive batteries, including wayside charging and onboard charging capabilities.

As the new locomotives will be used chiefly for yard operations, the engineless slug increases traction motors available to the locomotive, boosting the pulling and braking power that is key for this kind of work. We plan to use the lessons learned from this project to inform our thinking about our long-term transition of our existing fleet to low- and zero-emissions technology.



### Long-Term Strategy Looks Beyond Internal Combustion Engine Technology

[The Long-Term Strategy of the United States, Pathways to Net-Zero Greenhouse Gas Emissions by 2050](#) acknowledges that an integrated strategy will be required to address the challenges of decarbonizing sectors that are difficult to electrify.

If we are to achieve net-zero emissions, we must also continue to evaluate technology relying on alternative clean fuels, such as hydrogen and sustainable biofuels. We are learning from the work others in the industry have done in this space and are thinking about how best to explore these technologies. For example, we are an active member of the state of Nebraska's Hydrogen Hub Industry Work Group, which is developing a proposal for a regional clean hydrogen hub.

# Offer a sustainable supply chain solution to improve our value proposition to our customers

## WE ARE ENGAGING OUR CUSTOMERS TO UNDERSTAND THEIR CLIMATE EMISSION'S REDUCTION GOALS

Railroads are currently the most fuel-efficient way to move freight over land. As more of our customers set science-based targets and begin focusing on reducing their own environmental footprints, we are positioned to provide lower carbon transportation solutions that can help them reach their targets. Converting traffic to rail from truck offers our customers an immediate reduction in Scope 3 GHG emissions, which we believe will enable us to become a bigger part of our customers' value chains. We are engaging with our customers to understand their sustainability goals and identify opportunities to work together to help them reach their targets.

Union Pacific Railroad's Carbon Emission Estimator allows customers seeking to reduce carbon emissions to calculate their potential carbon emissions savings from shipping on our railroad compared to moving goods by truck. We also provide customers with annual emissions savings estimates, and the number of customers requesting these estimates increased 22% in 2021, to over 1,700 as compared to 2020. In 2021, we estimate that our customers eliminated approximately 22.9 million metric tons of GHG emissions by choosing rail over truck transportation. That is the equivalent of removing about 4.5 million cars from our highways or planting 350 million trees.

Union Pacific is also working directly with companies to provide rail transportation in support of the circular economy. For example, our company transports spent sulfuric acid in tank cars, which travel from refineries, where it is used in high-octane fuel production, to regeneration companies that give it a second life. We are also engaged with customers in exploring rail as a shipping option for other recycled commodities, such as plastic resin.



### Grow

Plastic producers have meaningful sustainability goals, and their transportation decisions are making a difference. "Rail is a safe, reliable and sustainable mode that we take advantage of as much as possible," said Jacqueline Faseler, global director supply chain sustainability and compliance at Dow. "Each shipping mode has its function/purpose in the order fulfillment process. Rail has an advantage over other modes where we see larger order volumes and longer distances. It has proven to be a highly reliable mode of transportation to destinations having the capability of receiving rail."



### Grow

Union Pacific joined the Cyclyx consortium in 2022 to partner with the member companies and lend our expertise to develop supply chain solutions for increasing recycling rates and advancing circular economies. Cyclyx is a plastic feedstock management company that works with industries to increase plastic recyclability. Their goal is to increase plastic recycling rates from 10% to 90% by working with industry partners to source, collect and pre-process large volumes of waste and redirect it to be recycled.

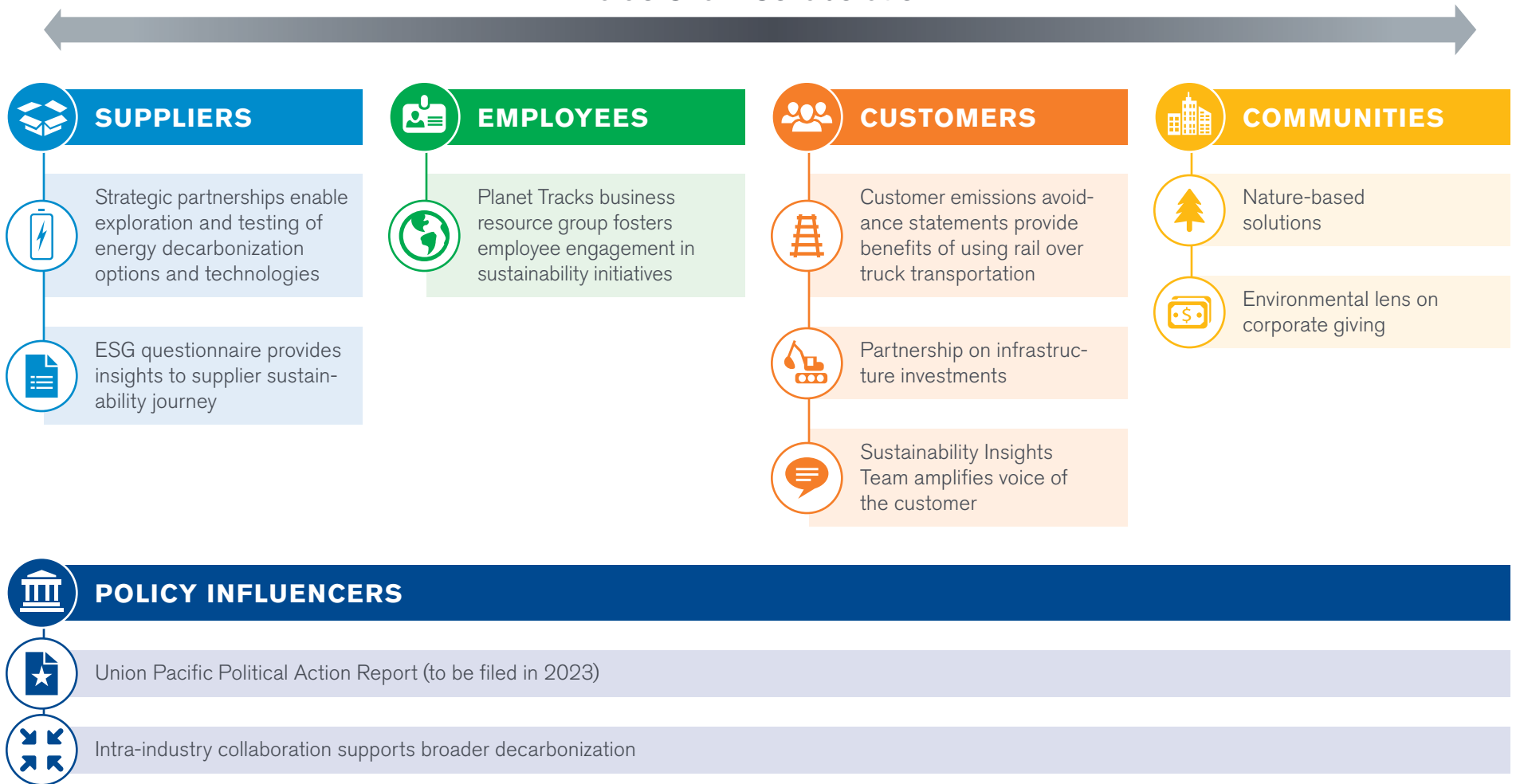


# Collaborate with our value chain on climate action initiatives

## OUR STAKEHOLDERS ARE INCLUDED IN OUR CLIMATE COMMITMENT

Individual action against climate change is not sufficient. Addressing the impacts of climate change depends on bold, collective action. Accordingly, we know that we must engage across our value chain to help reach our targets.

### Value Chain Collaboration

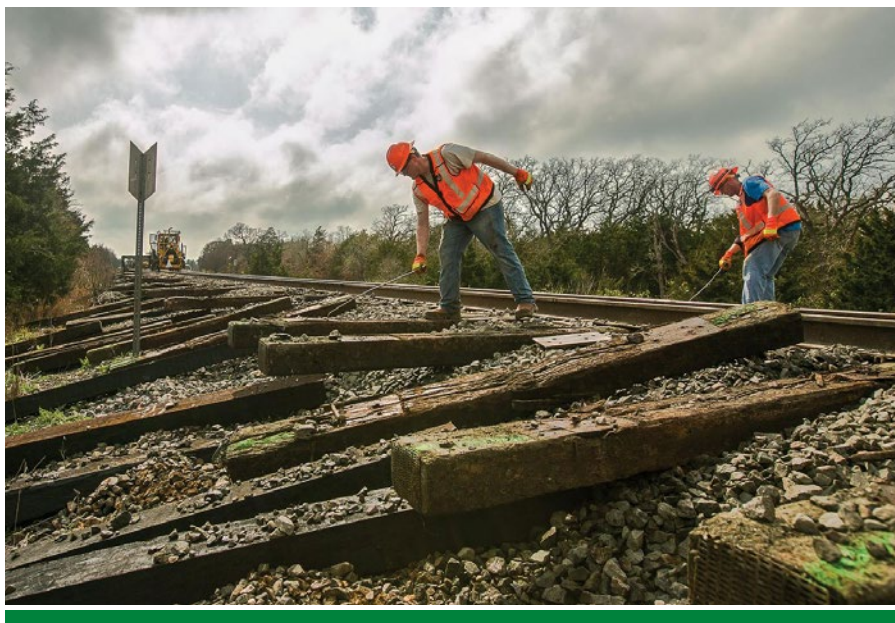


## Suppliers

Our suppliers are an integral part of our business, and we cannot succeed in our climate journey without their partnership.

**Strategic Partnerships:** Earlier this year, we announced a strategic alliance with Shell that allows exploration and testing of several collaboration and technological innovation opportunities in connection with energy decarbonization and powering sustainable supply chains.

**ESG Questionnaire:** In 2022, Union Pacific sent out an ESG questionnaire to Tier 1 suppliers comprising 44% of our non-fuel annual procurement expenditures. The questionnaire sought basic information about the full spectrum of each supplier's sustainability initiatives to give us a baseline look at each supplier's sustainability journey so that we can effectively engage them going forward.



## Employees

**Employee Sustainability Business Resource Group:** We engage our workforce on sustainability initiatives through our first-ever business resource group (BRG), Planet Tracks. Union Pacific is the first railroad to organize an employee led BRG focused on environmental sustainability. Its objectives include identifying and educating Union Pacific's workforce on environmental issues; championing environmental stewardship across the company; and fostering employee engagement through training, networking and targeted activities.

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Planet Tracks provides an opportunity for UP to encourage employee focus on sustainability as we work as a corporation and as individuals to protect the environment.

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Planet Tracks launched at the end of 2021 and over 1,500 employees are members. While engaging in awareness and nature-based service activities, Planet Tracks members also spearheaded Union Pacific's nature-based solutions partnership with The Nature Conservancy.



### Grow

Kerin Bristow, senior analyst-Real Estate, seated, and Dana Bittner, director-Strategic Planning, were among the employees who got behind the wheel of a Ford electric vehicle during a Planet Tracks event held in Omaha.



## Customers

Rail, having an environmental advantage over truck, allows our customers the ability to move their goods in a more environmentally friendly manner.

**Customer Emissions Avoidance Statements:** In 2021 we provided over 1,700 customers with specific annual emissions savings statements estimating what their actual shipments with Union Pacific had saved in reduced GHG emissions versus utilizing trucks.

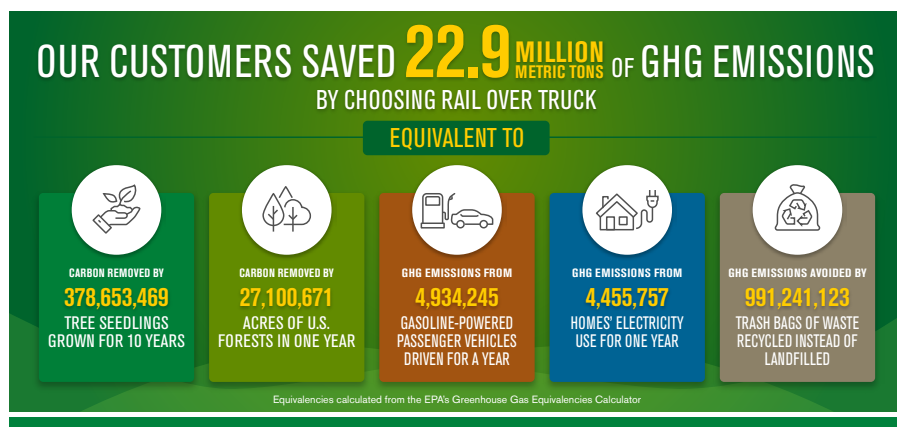
**Infrastructure Investment:** Earlier this year we partnered with Solvay on a purpose-built railcar fleet to reduce the carbon footprint of every railcar of soda ash.

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“We love it when our customers focus on becoming more environmentally friendly, because we can support each other in our efforts,”  
 – UP Vice President-Industrial, Marketing and Sales **Jacque Bendon**

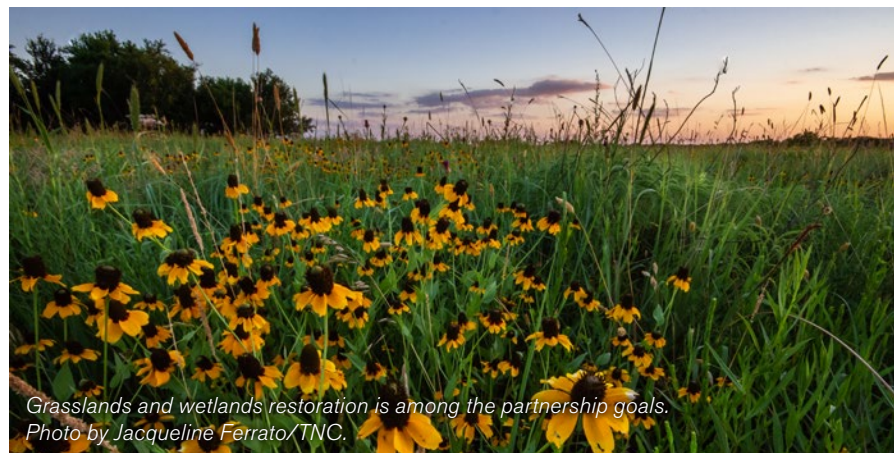
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**Sustainability Voice of the Customer:** In 2022, Union Pacific assembled an internal, ongoing Marketing & Sales Sustainability Insights Team to better understand what sustainability-related issues and initiatives are most important to our customers. The team provides customer perspectives on our sustainability tools, climate strategies and low-carbon offerings, identifies sustainability-related opportunities with customers, and assists with customer requests for ESG data about our company.



## Communities

**Nature-Based Solutions Partnership:** In 2022, Union Pacific announced a new partnership with The Nature Conservancy to support three separate nature-based solutions projects based in Nebraska, California and Texas. Project goals include grassland and wetland restoration, groundwater recharge, threatened species habitat conservation, and community education.



**Environmental Lens on Corporate Giving:** We are taking additional steps to reduce our environmental impact by helping our community partners improve their own impact. Beginning with our 2023 giving cycle, we are adding an environmental criteria pillar to our philanthropic giving program, which seeks to support programs and projects that achieve the following objectives:

- Preserve and restore nature, including natural habitats, ecosystems and biodiversity
- Protect and enhance water or air quality
- Reduce waste through initiatives focused on circularity and recycling
- Develop environmental stewards through youth programs focused on fostering environmental appreciation, responsibility and leadership
- Advance a green economy by helping communities, nonprofits and small business accelerate their transition to green jobs and renewable energy

For more information, see our [Key Partnerships](#) webpage.

## Policy Influencers

Union Pacific is a member of many national industry and business organizations, including the U.S. Chamber of Commerce, the National Association of Manufacturers, the Business Roundtable, and the GreenBiz Executive Network. We actively participate in the policy-making process with these organizations and advocate for rail- and climate friendly policies. For example, in 2021 we actively lobbied for the Infrastructure Investment and Jobs Act (IIJA), which included funding for electric-grid and renewable energy programs, locomotive overhauls and remanufacturing that results in emissions reductions, and the largest federal investment in public transit in history.

With regard to legislation and regulations, we support reasonable market-based solutions that support the development of appropriate low- and zero-carbon technologies. Until we have better visibility into workable options, such regulation needs to be technology- and fuel- agnostic. Additionally, we support legislation that does not favor one mode over another, and we prefer action that is federal in scope, thus avoiding a patchwork of local or state laws. We will support reasonable legislation and regulation that is compatible with these principles.

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With regard to legislation and regulations, we support market-based solutions that support the development of appropriate low- and zero-carbon technologies.

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**Upcoming Political Action Report:** In 2021, Union Pacific shareholders requested we publish a report describing if, and how, our lobbying activities align with the Paris Agreement - limiting global warming to well below 2°C above pre-industrial levels and pursuing efforts to limit it to 1.5°C. In response to this request, we are conducting a deep dive analysis into our key trade association memberships. Through this analysis, we intend to identify which trade associations we align with, where misalignment exists, and what actions we may take so that our actions and associations are congruent with reasonable climate change policies, legislation and regulations. This report will be published in 2023.

**Intra-Industry Collaboration:** We also collaborate within the rail industry to impact climate change. Union Pacific participates in The Association of American Railroads (AAR) Decarbonization Working Group and Locomotive Committee to identify emerging technologies and advance policy to support the decarbonization of the rail industry. We are also exploring ways to partner with the other rail carriers and our equipment and energy suppliers to develop technology and fuel availability that can move the industry forward in this effort.



*Union Pacific took part in Railroad Day on the Hill. From left are James Carey, Brandon McRae, Craig Coyle, Adrian Guerrero, Abby Zach, Andrew Brady, Terrill Maxwell, Pat Linden, J.P. Garcia, U.S. Senator Deb Fischer (R-NE); Arash Shahabi; Corrie Shumaker; Mike Azzarello; Tiffanie Russell; Terri Carlson; Greg Brigham; Connie Roseberry; Phillip Tassin; Agi Van Wetering; Sara Janke and Marquis Davis.*



## Decarbonize our footprint to realize our net-zero ambition

WE ARE REEVALUATING OUR NEAR-TERM SCIENCE-BASED TARGET TO SUPPORT A 1.5°C SCENARIO

### SBTi Net-Zero Target Revalidation Work Comes Sooner than Anticipated

Since we set our 2030 short-term emissions reduction target, SBTi has updated its minimum ambition guidance to a below 1.5°C global warming scenario, and the IPCC has reaffirmed the need to quickly reduce emissions globally to align with the 1.5°C target goal.

Union Pacific is committed to reaching net-zero GHG emissions. In 2022 we joined the **Business Ambition for 1.5°C**, an alliance of more than 3,000 companies pledged to taking bold action to limit global warming to 1.5°C. As part of that pledge, we committed to the Science Based Targets Initiative (SBTi) to revalidate our short-term target in line with the 1.5°C global warming scenario and develop a long-term, science-based target to reach net-zero value chain GHG emissions by 2050. We will publish both targets after they are validated by SBTi.

We are continuing to develop our decarbonization and residual emissions strategies in conjunction with this commitment, including other aspects of our operations beyond locomotive emissions.

In 2019, we evaluated available light- and medium-duty electric vehicles (EV) and introduced 8 EV sedans to the fleet in 2020. Despite the auto industry's current supply constraints, we've continued to aggressively order EVs from appropriate OEMs, while strategically building out our charging infrastructure systemwide. We are expecting 17 additional EVs this year, with the potential to acquire about 80 more units in 2023.

We are always looking for innovative ways to apply battery technology to our work environment. Recent battery-powered additions include a battery spike puller, spike driver, rail saw, rail drill, lag screw removal/installation tool and more. Our track maintenance teams continue adopting battery technology to their tool set, allowing them to retire tools that use hydraulic hoses. It is far easier for our employees to operate a power tool that does not have to be tethered to a truck's hydraulic lines, which further reduces vehicle fuel consumption and emissions.



*A Union Pacific Ford Mustang Mach-E and Ford Lightning pickup truck, two of several vehicles added to Union Pacific's recently expanded electric fleet.*

## Reducing and Greening Our Electricity Use

Union Pacific classifies Scope 2 emissions as indirect emissions from the generation of purchased energy, primarily purchased electricity. We utilize purchased electricity in our office locations to operate and light our classification yards for 24/7 operations, and to operate our trackside signal and safety systems.

Since 2018, Union Pacific has decreased its GHG emissions from Scope 2 sources by over 17%, driven in part by an ongoing portfolio of projects that increase the efficiency of our electricity consumption. These projects include replacing yard lighting with LED systems at facilities in California and Louisiana, upgrading HVAC systems to improve efficiency, and continuing electrical efficiency projects at our headquarters location.

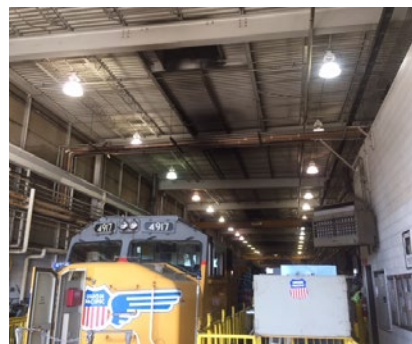
In 2021, Scope 2 emissions were 229,081 metric tons of CO<sub>2</sub>e, comprising approximately 2.4% of our total calculated emissions. While the current percentage of Scope 2 emissions is small compared to our total emissions footprint, we expect the usage of electricity in our operations to grow as we migrate our locomotive and passenger vehicle fleets from fossil fuel-based energy to electric power. As our operation's demand for electricity grows, we need to ensure our Scope 2 energy in the future is sustainable, energy efficient, cost-effective, and reliable.

During 2022 we began analyzing our current and future electricity demands and developing strategic options to reduce Scope 2 emissions. There is uncertainty in this exercise as we consider higher demand for electricity as we electrify operations. We are also investigating electricity decarbonization options, such as onsite solar power generation and virtual purchased clean power agreements, for potential future implementation as we progress toward our net-zero emissions ambition.

## Scope 3 Strategy Depends on Understanding Our Upstream Suppliers

Over the past two years, Union Pacific's focus has been on the carbon emissions under its control. For Scope 3 we focused on indirect emissions related to fuels, rail-tie combustion, business travel and employee commuting, and some purchased products. The Scope 3 emissions included in our target scope are comprised of GHG emissions on a well-to-tank basis from locomotive operations, which are generated upstream in our value chain during fuel production and transport to our locomotives. These Scope 3 well-to-tank emissions comprised approximately 82% of our total calculated Scope 3 emissions.

As part of our SBTi revalidation initiative currently underway, we are reassessing our existing Scope 3 value chain emissions data sources and inventory methodologies to reflect our total GHG emissions, including those of our extended supply chain. We are also engaging with our upstream suppliers to better understand their emissions reduction activities so that we can better measure reductions in our Scope 3 emissions.



### Serve

A lighting improvement project in Roseville, California, replaced older light bulbs with new high-efficiency LED lights. In addition to aiding in energy efficiency, the improved brightness aided safety.



### Win

When a thief stole a 7,000-watt generator powering air-conditioning, heat, laptops, printers and other necessities from a Union Pacific trailer, track manager Shane Karstens developed a solar-powered trailer, called the DREAM trailer. Three DREAM trailers are now helping the railroad expand its use of renewable energy.



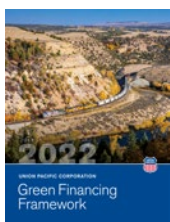
# Climate Actions Are Integrated into Our Governance Policies

## ESG developments are adopted in practices, policies and procedures

Union Pacific's climate actions are already integrated into the company's governance structure. The Union Pacific Board of Directors provides oversight of our ESG strategy. The Corporate Governance, Nominating and Sustainability Committee is responsible for reviewing current developments in ESG and recommends adoption of new – or modifications to existing – practices, policies and procedures.<sup>3</sup>

In addition to providing the Board with an annual report on environmental risk management, we provide routine updates on our ESG activities, which include actions related to climate change. In 2021, we formalized the Sustainability Team and added resources, including an individual dedicated to overseeing the day-to-day implementation of Union Pacific's ESG strategy and moving the company forward along its ESG disclosure journey.

To advance our ESG governance efforts, we are continuing to evolve ESG-related key performance indicators in our executive compensation scorecard. Continuous improvement in achieving the company's fuel efficiency goals and trip plan compliance, which directly impact emissions, are tied to executive compensation based on Union Pacific's performance review process. As our journey progresses, the metrics tied to executive compensation may change.



In 2022, Union Pacific designed a Green Financing Framework, which will be used to guide future green bond issuances. The Framework addresses the four following components: (1) Use of Proceeds, (2) Process for Project Evaluation and Selection, (3) Management of Proceeds and (4) Reporting. After the issuance of any green financing, Union Pacific intends to report via its website on the allocation of an amount equal to the net proceeds to Eligible Green Projects, and the positive environmental impacts related to those Projects. Updates will continue at least annually until full allocation and as necessary thereafter in the event of material developments. Proceeds from the bond will be exclusively applied to climate-related or environmentally friendly projects. Union Pacific successfully issued a \$600 million inaugural green bond tranche during its September 9, 2022, debt issuance under its Green Financing Framework. For more information, find the full framework here: [Green Bond Financing Framework](#).

Additionally, we became the first U.S. railroad to formally support the Task Force on Climate-Related Financial Disclosures (TCFD), reinforcing the company's commitment to transparent disclosures. We also formally committed with the SBTi to revise our near-term emissions reduction target to support a 1.5°C climate ambition, and to set a long term net-zero emissions target. Our actions demonstrate our commitment to accountability for our goals.

<sup>3</sup> Effective September 29, 2022, the Union Pacific Board of Directors renamed the Corporate Governance and Nominating Committee to the Corporate Governance, Nominating and Sustainability Committee to reflect the committee's responsibilities for governance related to ESG.

# Enterprise Risk Management Considers Potential Barriers to Achieving Goals

## **Our ERM process is designed to consider the ever-changing strategic, economic, political, legal and technology threat environment where we operate**

Our enterprise risk management (ERM) process is designed to identify and consider a variety of risks to achieving the Company's strategic objectives, including climate-related risks.

Union Pacific defines the short-term horizon as 0-3 years, the medium-term horizon as 3-10 years, and the long-term horizon as 10-30 years. With respect to climate-related risks, we currently expect that we are most likely to be affected in the short term by acute physical risks. As a railroad with a vast network, we are exposed to severe weather conditions and other natural phenomena, including earthquakes, hurricanes, forest fires, floods, mudslides or landslides, extreme temperatures, avalanches, and significant precipitation. Additionally, we are subject to transition risks involving policy and legal risks and market risks. Restrictions, caps, taxes, or other controls on emissions of GHGs, including diesel exhaust, could significantly increase our operating costs.

Union Pacific's ERM process is dynamic and regularly monitored with the goal of timely identifying and addressing significant potential risks that arise in the ever-changing strategic, economic, political, legal and technology threat environment in which it operates, as well as addressing business continuity and long-term operational resiliency.

The Board of Directors is responsible for overseeing the assessment and management of the critical enterprise risks affecting the company. The Board delegates to the Audit Committee primary responsibility for oversight of managing risks related to operations of the company.

Management identifies and prioritizes enterprise risks, including climate-related risks, and regularly presents them to the Board for its review and consideration. The senior executives responsible for implementation of appropriate mitigation strategies for the company's top enterprise risks, along with the chief accounting, risk and compliance officer, provide reports directly to the Audit Committee and/or the Board during the year.

The Audit Committee also receives reports throughout the year from the chief accounting, risk and compliance officer and the senior executives responsible for risk management. In addition, the Audit Committee is responsible for overseeing the company's internal audit of enterprise risks selected for review and evaluation based upon the company's annual risk assessment model with the purpose of evaluating the effectiveness of mitigating controls and activities of company personnel. The company's internal auditors present to the Audit Committee findings regarding the mitigating controls and processes for the enterprise risks selected for review. The Audit Committee, in turn, reports those findings to the entire Board. The Audit Committee duties and responsibilities are further outlined in its Charter, which is reviewed annually by the Committee and the Board of Directors.

# Conclusion

The climate challenges faced by our country and the world over the past year are a testament to the importance of finding and implementing climate solutions. We're proud of the steps we've taken at Union Pacific along our path toward a net zero emissions future.

Our near-term commitment is reflected in our science-based target to reduce absolute scope 1 and 2 GHG emissions and GHG emissions on a well-to-wheel basis from locomotive operations 26% by 2030 from a 2018 base year. Our progress toward that goal is driving us to reevaluate our near-term science-based target to support a 1.5°C scenario, to be evaluated in 2023. In addition, we are working to set and validate a longer-term net-zero science-based target.

The keys to our climate efforts are centered on improving the reliability and productivity of our locomotive fleet, implementing technology to reduce fuel consumption, and working with our supply chain partners to achieve our low-carbon fuel objectives.

Our announced plan to acquire the country's largest battery-electric locomotive fleet and our investments in modernizing our existing fleet are among the actions that underscore our commitment to these targets.

But we know this is not something we can do alone. We continue to collaborate both inside and outside our industry to develop innovative solutions for the railroad industry and align with our internal and external stakeholders, implementing our strong governance mechanisms to maintain visibility into our climate efforts.



Art Schultz, MIC Electrician

# Appendix

## 2018-2021 GHG Emissions Data

| EMISSIONS   | UNIT                   | 2018       | 2019       | 2020       | 2021       |
|---|------------------------|------------|------------|------------|------------|
| Direct (Scope 1) GHG Emissions  | Metric Tons CO2Eq      | 11,313,933 | 10,083,282 | 8,896,946  | 9,236,750  |
| Energy Indirect (Scope 2) GHG Emissions                               | Metric Tons CO2Eq      | 277,200    | 261,372    | 241,805    | 229,081    |
| Other Indirect (Scope 3) GHG Emissions (Locomotive Fuel Well-to-Tank) | Metric Tons CO2Eq      | 3,624,596  | 3,226,663  | 2,847,397  | 2,956,497  |
| Other Indirect (Scope 3) GHG Emissions*                               | Metric Tons CO2Eq      | 2,184,882  | 829,069    | 711,083    | 624,330    |
| Total Calculated Scope 1 & 2 Emissions                                | Metric Tons CO2Eq      | 11,591,133 | 10,344,654 | 9,138,751  | 9,465,831  |
| Total Calculated Scope 1, 2 & 3 Emissions                             | Metric Tons CO2Eq      | 17,400,611 | 14,400,386 | 12,697,231 | 13,046,658 |
| Absolute GHG Emissions for SBT  | Metric Tons CO2Eq      | 15,215,729 | 13,571,317 | 11,986,148 | 12,422,328 |
| GHG Emissions Intensity (Scope 1 & Scope 2)                           | Metric Tons CO2Eq/MGTM | 12.5       | 12.2       | 11.8       | 11.6       |
| GHG Emissions Intensity (Target Scope)                                | Metric Tons CO2Eq/MGTM | 16.4       | 16.0       | 15.5       | 15.2       |
| Emissions of Ozone-Depleting Substances (ODS)                         | Metric Tons CO2Eq      | 55,758     | 39,947     | 32,699     | 34,573     |

| FUEL & ENERGY CONSUMPTION        | UNIT           | 2018         | 2019         | 2020         | 2021         |
|----------------------------------|----------------|--------------|--------------|--------------|--------------|
| Total Energy Usage               | Megawatt Hours | 45.3 Million | 40.4 Million | 36.4 Million | 37.4 Million |
| Non-Renewable Energy Consumption | Megawatt Hours | 45,033,372   | 40,112,387   | 35,871,243   | 36,760,103   |
| Renewable Energy Consumption     | Megawatt Hours | 316,422      | 327,309      | 479,185      | 677,481      |

| WATER CONSUMPTION                          | UNIT                 | 2018  | 2019  | 2020  | 2021  |
|--|----------------------|-------|-------|-------|-------|
| Withdrawal: Total Municipal Water Supplies | Million cubic meters | 2.115 | 2.516 | 2.140 | 2.951 |
| Withdrawal: Fresh Surface Water            | Million cubic meters | 0.60  | 0.51  | 0.37  | 0.054 |
| Withdrawal: Fresh Groundwater              | Million cubic meters | 1.438 | 0.453 | 0.50  | 0.50  |
| Water Discharge                            | Million cubic meters | 1.878 | 2.964 | 1.535 | 1.376 |

| WASTE                              | UNIT | 2018      | 2019      | 2020      | 2021      |
|------------------------------------|------|-----------|-----------|-----------|-----------|
| Total Waste Generated              | Tons | 2,090,000 | 1,430,000 | 2,110,000 | 1,077,503 |
| Total Waste Diverted from Landfill | %    | 71%       | 68%       | 47%       | 56%       |

\* Non-Locomotive Fuels, Rail Ties, Combustion, Business Travel and Employee Commuting, and Various Purchased Products  
For complete sustainability metrics and frameworks, go to [UP.com](https://www.up.com).



## Cautionary Language

Our 2022 Climate Action Plan report provides additional explanatory information regarding Union Pacific that may not be available, included or directly derived from information in the company's Annual Report. Information included in this document, and any issues identified as important for purposes of this document, may not be considered material for SEC reporting purposes. Materiality and/or the term "material" and "significant" in the context of this document is distinct from and should not be confused with such terms as defined for SEC reporting purposes.

This report includes statements and information regarding future expectations, outcomes or results of the company that are not historical facts. These statements and information are forward looking as defined by federal securities laws. Forward-looking statements and information can be identified by use of forward-looking terminology (and derivations thereof), such as "believes," "expects," "may," "should," "will," "would," "intends," "plans," "estimates," "anticipates," "strives," "seeks," "aspires," "endeavors," "target," "projects" and other words or phrases of similar intent. Forward-looking statements and information generally include the following: the company's expectations, goals, forecasts, targets, and aspirations with respect to sustainability, climate change, environmental, and corporate responsibility matters, including related risks and opportunities; demand for the company's rail service; enhancing profitability; volume and revenue growth; efficiency improvements and increasing returns; the effectiveness or growth of new and newer services; management of network volumes; increasing shareholder value; total amount of capital investments; completion and effectiveness of capacity expansion and other capital investments, and other investments in infrastructure improvements, including as related to the Climate Action Plan and related efforts; returns on capital investments; improvements regarding the sustainability, emissions, and safety of our operations and equipment; improving efficiencies in fuel consumption; preserving the environment and communities where the company operates; availability of necessary resources in the supply chain; and effectiveness of plans, programs and initiatives to reduce costs, reduce or improve environmental impacts and other efficiency improvements. Forward-looking statements and information should not be read as a guarantee of future performance or results and will not necessarily be accurate indications of the times that, or by which, such performance, targets, goals, or results will be achieved. Forward-looking statements and information are subject to risks and uncertainties that could cause actual performance or results to differ materially from those expressed in the statements. Forward-looking statements and information reflect the good faith consideration by management of currently available information and may be based on underlying assumptions believed to be reasonable under the circumstances.

However, such information and assumptions (and, therefore, such forward-looking statements and information) are or may be subject to variables or unknown or unforeseeable events or circumstances over which management has little or no influence or control and may be derived from internal controls and processes that continue to evolve and standards are measuring progress that are still developing.

Factors that could cause results or outcomes to differ, including the risk factors in Item 1A of the company's Annual Form 10-K, filed Feb. 4, 2022, also could affect our future results and could cause those results or other outcomes to differ materially from those expressed or implied in the forward-looking statements and information. This report should be read in consideration of these risk factors. To the extent circumstances require or the company deems it otherwise necessary, the company will update or amend these risk factors in subsequent Annual Reports, periodic reports on Form 10-Q or current reports on Form 8-K.

This document was issued and its statements (including forward-looking statements) speak only as of November 15, 2022, unless otherwise noted. We assume no obligation to update forward-looking information to reflect actual results, changes in assumptions or changes in other factors affecting forward-looking information, regardless of any past practice of doing so. If we do update one or more forward-looking statements, no inference should be drawn that we will make additional updates with respect thereto or with respect to other forward-looking statements.

Website references and/or hyperlinks have been provided for convenience only, and the contents therein are not incorporated into, nor do they constitute a part of, this document.