

OUR FUTURE IS IN

MOTION

CLIMATE CHANGE SCENARIO REPORT



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ABOUT THIS REPORT

This stand-alone climate change scenario report complements our annual sustainability report and provide stakeholders with Ford's perspective on the risks and opportunities associated with climate change. It addresses Ford's vision of new mobility solutions that will contribute to a low-carbon future.

Ford engaged an outside consultant with experience in the oil, gas and automotive industries, and an expert in Scenario Planning and the Ceres Oil and Gas 2 Degree Scenario Analysis Framework, to create scenarios that were diverse, distinct and expansive.

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SUSTAINABLE DEVELOPMENT GOALS

Through our climate change scenario planning we are contributing to SDG 13 Climate Action.

LETTER FROM WILLIAM CLAY FORD, JR. AND JIM HACKETT

“ THE RISKS AND OPPORTUNITIES ASSOCIATED WITH THE CHANGING CLIMATE ARE SHAPING THE WAY WE DO BUSINESS.



WILLIAM CLAY FORD, JR.

It has been 20 years since we produced our first sustainability report but, for us, moving toward a more sustainable world has been a priority from the very start. We are building a smarter Ford Motor Company, by Creating Tomorrow, Together.

Our 20-year reporting anniversary provides an opportunity to reflect on how far we've already come. At the turn of the millennium, being one of the first companies to publish a sustainability report was a big deal, not just for us but for business as a whole. As well as celebrating our successes, it gave an honest account of where we needed to improve. As our subsequent reports testify, we have continued to do better, time and time again. You will find yet more examples of our progress from the past year in these very pages.

But we have reached a milestone moment: a time to look forward to where we want to go. How can we address a transportation system that grew up around the automobile but has become increasingly unsustainable? What can we do to address climate change, as its scale and urgency come into stark focus? If we are to become the world's most trusted company, designing and building smart vehicles for a smart world, we need to be part of the solution to such challenges, not part of the problem. So while we still need to make great cars and trucks today, we also need to keep one eye on tomorrow.

That's why we are transforming our culture and innovating right across the business, from the production line to the design studio. We are working to reduce the CO₂ emissions from our facilities and our vehicles, in line with the climate targets outlined in the Paris Climate Accord. The risks and opportunities associated with the changing climate are shaping the way we do business, from offering electrified versions of our popular models, to a global carbon reduction strategy focused on powering our facilities with renewable energy.



JIM HACKETT

We are making great strides toward a more connected, cloud-based and congestion-free world: a better world. We are reimagining what mobility will look like beyond the privately owned, traditionally powered automobile. We foresee clean, smart vehicles communicating with each other, as well as the road infrastructure and public transit systems, orchestrated by open cloud-based platforms like our Transportation Mobility Cloud. Those all-important first and last miles of a journey will be accomplished on a bike or scooter. And despite growing urbanization, rethinking our cities in these ways could result in cleaner air and less-congested streets, so that everyone can get to work or school, deliver goods, or visit friends and family efficiently, affordably and sustainably.

Of course, we don't have all the answers, but we do have the drive and determination to find them. Working closely with our partners, we will continue to do things the right way – the Ford way – and keep people at the heart of every decision we make.

We are building a smarter Ford Motor Company, by Creating Tomorrow, Together.

William Clay Ford, Jr.
Executive Chairman

Jim Hackett
President and Chief Executive Officer

OUR SUSTAINABLE FUTURE

Today, Ford faces challenges that affect lives around the world, from increasing traffic congestion, deteriorating air quality and the effects of climate change. Their implications are profound and the societal cost of not addressing them is high. As Ford looks to the future, we have a vision that will move us from simply reducing our impacts on the environment to actions that will create environmental benefits.

In an effort to increase transparency about the resiliency of our strategies to climate change, we are publishing this stand-alone Climate Change Scenario Report. This report outlines our present strategies related to climate change, the climate scenarios we developed with our internal leaders and experts, the resiliency assessment of our strategies to those scenarios and steps we will take to monitor and review the impacts of climate change on our strategies on an ongoing basis.

With the publication of this report, Ford has completed the voluntary climate-related disclosures recommended by the Task Force on Climate-related Financial Disclosures. The goal of these disclosures is to provide information to investors, lenders, insurers, and other stakeholders on Ford's actions to respond to climate change risks.

FORD'S CLIMATE CHANGE STRATEGY

Over the past decade, we have developed a comprehensive approach to address climate change with a focus on three key areas: reducing CO₂ emissions from our vehicle fleets, implementing efficient state-of-the-art manufacturing, and supporting our suppliers to drive positive change. We recently expanded our scope to include mobility, services and experiences as primary initiatives. In 2018, we conducted the United Nations human rights saliency assessment and identified climate change as one of the nine most important human rights issues due to the impacts of extreme weather events, natural disasters, rising sea levels, droughts, water shortages and the spread of disease.

Our climate change strategy is not only driven by these factors, but is also shaped by government policies, market trends, and investor concern. We rely on our Creating Value Roadmap Process to deliver our strategy, including the product and manufacturing facility plans that will meet our commitment to the Paris Climate Accord by doing our share to keep global temperature rise this century below 2°C.

Our Board of Directors and its Sustainability and Innovation Committee govern our climate change strategy. The committee is responsible for reviewing strategic sustainability issues, including evaluating and advising on innovations that improve our environmental and social sustainability, and the strategies to bring them to market.

CREATING VALUE ROADMAP PROCESS

Our Creating Value Roadmap Process is the model for how we run the company. It enables us to continually monitor the changing global business environment for risks and opportunities, including those related to sustainability, and uses the resulting analysis to inform our strategies as needed. It also creates accountability for setting, tracking and reporting progress against our goals and objectives, revenue targets, other financial indicators and stakeholder satisfaction measures. This process allows us to respond to new internal and external developments such as climate change and the Paris Climate Accord in a timely manner, and adjust our management approaches where necessary.

FORD'S CLIMATE CHANGE STRATEGY CONTINUED

FORD'S 2°C PRODUCT GLIDE PATHS

Since 2000, we have been actively engaged in the carbon dioxide (CO₂) emissions reduction dialogue. In 2007, we developed a science-based corporate CO₂ strategy based on full well-to-wheels (WTW) emissions analysis targeting a path toward stabilizing atmospheric CO₂ at 450 parts per million, as recommended at the time.

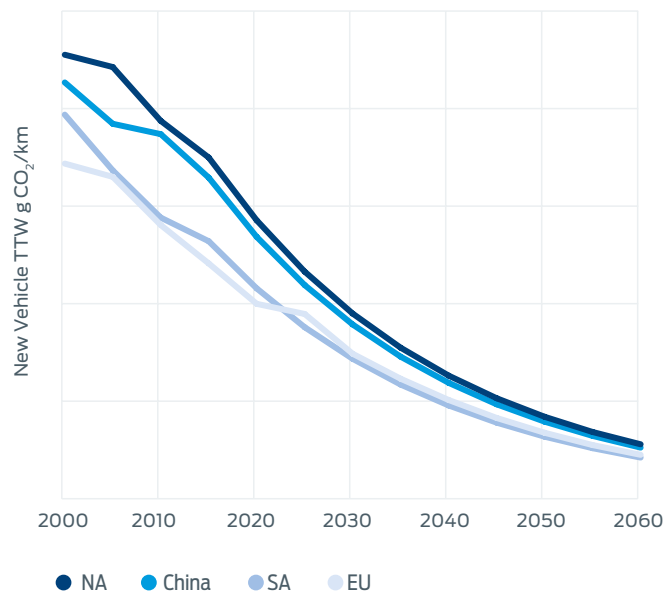
In 2009, using a WTW CO₂ model that calculates light-duty vehicle tank-to-wheels CO₂ emissions targets for 11 regions of the world, we began to implement long-term vehicle planning guidance – referred to as our “glide path” – to align our product plans with a path towards stabilizing temperature increase and atmospheric CO₂ at a level consistent with United Nations climate targets. Last year we completed a major revision, moving to a 2°C temperature stabilization pathway and decoupling from any specific regulations.

Our light-duty vehicle glide path analysis and guidance methodology includes a semi-annual quantitative fleet assessment of alignment with 2°C stabilization. Our 2°C regional glide paths describe the level of reduction in new vehicle tailpipe CO₂ (tank-to-wheels) emissions required to keep the full fleet WTW CO₂ emissions at a level that supports the Paris Climate Accord. The glide paths provide guidance for long-term vehicle planning. Ongoing changes in fuel prices and other factors are monitored and evaluated on a regular basis. We conduct sensitivity scenarios about changing scrappage rates and travel rates to understand the effects of mode shifts to emerging mobility solutions such as ride sharing and autonomous vehicles.

We developed our 2°C light-duty vehicle glide path based on the International Energy Agency's Energy Technology Perspectives 2°C scenario (2DS) that calculates a global CO₂ cap for emissions from multiple sectors. We also conduct a 1.5°C sensitivity analysis using the Intergovernmental Panel on Climate Change RCP2.6 CO₂ pathway. When calculating Ford glide paths, our scientists model WTW CO₂ reduction at the same proportional rate as the 2DS light road sub-sector CO₂ pathway.

We calculate our Ford-specific 2°C glide path targets for the regions where most of our products are sold. Our regional input data includes availability and use of biofuels, vehicle scrappage rates, travel per vehicle, and actual fuel consumption numbers for the current fleet.

2°C INDUSTRY AVERAGE CO₂ GLIDE PATHS



The 2°C glide path analysis, shown above, highlights that Ford and other automakers must produce new vehicle fleets with progressively lower CO₂ emissions. The glide paths also show that the highly divergent emissions rates of the regional fleets today must converge to very low levels over time.

PRODUCTS, SERVICES AND EXPERIENCES

Ford's 2019 trends report explores the dynamic relationship between consumers and the shifting landscape of technology. Report surveys showed people believe that technology is a force for good and that environmental progress will require changes in human behavior. At the same time, real vehicle costs are rising, household income is not, and life is becoming ever more complex. Although there is a belief in technology, cost and complexity too often work against its adoption. For this reason, Ford is pursuing a variety of human-centered design solutions and expanding our mobility and services portfolio.

INTERNAL COMBUSTION ENGINE VEHICLES

Opinions differ on when sales of internal combustion engine (ICE) vehicles will reach a peak. The view that ICE powertrains will slowly be displaced by electric or other advanced-technology powertrains offering lower CO₂ emissions is becoming more and more prevalent. Recent geopolitical events and a slowdown in vehicle sales in key markets such as China has led to speculation that a peak may be reached more quickly in certain locations. Several key European and Asian cities, including London, Paris, Madrid, Hamburg and Shanghai, are placing restrictions on ICE vehicles and proposing policies that shift urban transportation modes away from personal vehicles.

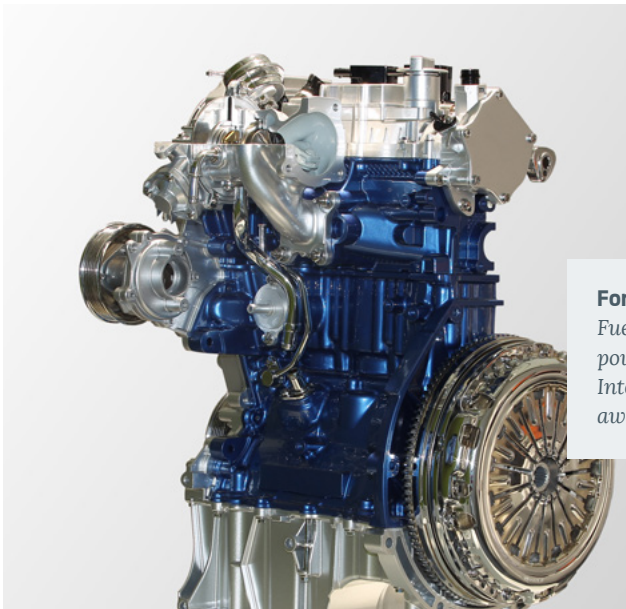
As part of our strategy of diversification and to provide product and services for a wide-ranging customer base, we continue to design and develop advanced ICE technologies to deliver products that meet those needs while minimizing their impact on the environment. As an example, the industry-leading EcoBoost® engine, first introduced in 2009, can reduce vehicle CO₂ emissions up to 15 percent and improve fuel economy up to 20 percent. The EcoBoost® engines are available on more than 80 percent of our global nameplates, with sales of over 8 million vehicles to date.

ELECTRIFIED VEHICLES

Ford believes in a holistic approach to electrification by providing hybrids, plug-in hybrids and all-electric versions of our most popular vehicles based on customer needs and preferences. We believe that providing the right electrified technologies and seamless services to customers drives demand and profitability.



Upcoming Mustang-inspired battery electric crossover



Ford 1.0-Liter EcoBoost Engine

Fuel-efficient, compact and powerful engine has won 10 International Engine of the Year awards since its launch in 2012.

\$11 billion

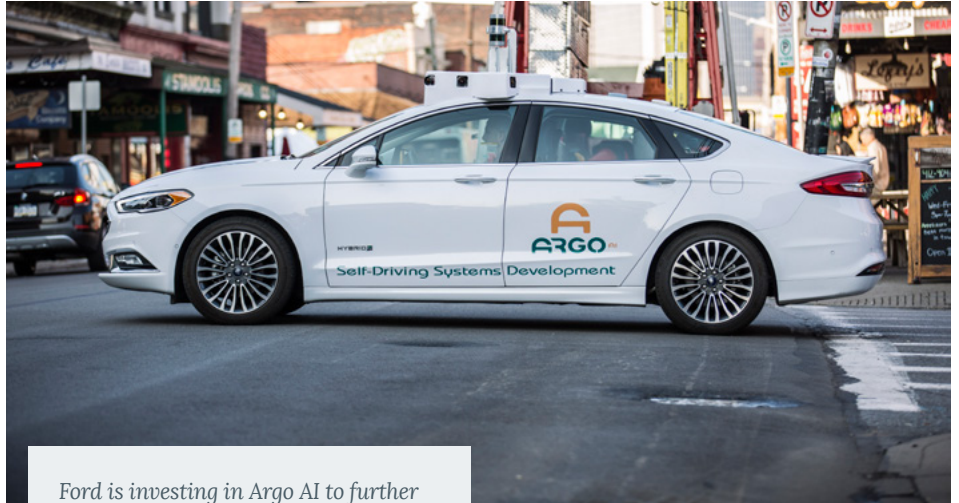
GLOBAL INVESTMENT IN ELECTRIFIED VEHICLES BY 2022

PRODUCTS, SERVICES AND EXPERIENCES CONTINUED

Ford is investing \$11 billion in electrified vehicles from 2017–2022 to substantially increase our offerings around the world, including extensive hybrid deployment across many of our mainstream models in the United States. We understand what drives electric vehicle profitability and our increased investment is enabling us to achieve scale in China, Europe and North America. We are focused on building a profitable electric vehicle portfolio by leveraging our strongest brands and nameplates. We are also applying design and performance attributes from our segment leading cars, trucks and SUVs to our expanded portfolio of all-electric vehicles.

We understand placing electrified products on the showroom floor is not enough to encourage consumer adoption. In September 2017, we announced the creation of a dedicated global electric vehicle organization, Team Edison, with a focus on rapidly designing and implementing a new holistic customer-focused approach including all-electric vehicles, services and ownership experiences. We are also looking to improve revenue through nameplate selection, a thorough understanding of customer trends and segmentation, cost reductions through scale, and new business models and partnerships.

Charging is a key customer experience for all-electric vehicle customers and offers opportunities for an enhanced ownership experience versus fueling. We are dedicated to making charging effortless at home and on the road. In Europe, we are a part of the IONITY joint venture for higher-powered public charging. In the United States, we will have an extensive set of charging solutions to support our customers. Additionally, all-electric vehicles will unlock opportunities to exceed customer expectations, such as using space differently because there is no conventional engine. Human-centric design exploits the usefulness of these differences and will set our all-electric vehicles apart and improve customer acceptance.



Ford is investing in Argo AI to further advance autonomous vehicles.

CONNECTED VEHICLES

We are accelerating our introduction of connected vehicles and services and announced that all new Ford vehicles built in the United States by the end of 2019, and 90 percent globally by 2020, will be connected. We believe that pairing vehicle connectivity with a Transportation Mobility Cloud across mobility modes is the key to creating sustainable human-centered mobility solutions, by providing consumers with services, information and choices that help mitigate congestion and climate change. Connectivity will revolutionize personal, public and commercial mobility and delivery. As we design and deploy connected solutions, Ford will strive to maintain privacy and confidentiality with customer information.

AUTONOMOUS VEHICLES

We believe that the central challenge in the development of self-driving vehicles is not the technology. It is trust. Trust in the safety, reliability and experience that the technology will enable. One of the reasons customers trust Ford is because we prioritize people as we design our vehicles. That might seem like common sense, but when new technology comes to market, it is easy to design with technology as the priority. We work closely with customers, industry and government partners to apply this technology to solve today's mobility challenges safely and responsibly.

In 2017, we made a \$1 billion investment commitment to self-driving start up Argo AI. Argo now has a footprint in multiple cities – Pittsburgh, Detroit, Palo Alto, Miami and Washington, DC – where it tests and develops self-driving technology. We launched several pilots with key partners in Miami to test how customers interact with autonomous vehicles. These pilots directly inform our product development process and keep the customer at the center of our self-driving vehicle and service designs. We are on track to deliver on our commitment to launch a purpose-built autonomous vehicle in 2021 on a hybrid-electric platform to maximize uptime and utilization. In the future, Level 4 self-driving technology (having no expectation of driver intervention) could be expanded to all-electric vehicle applications.

90%

OF GLOBAL VEHICLES WILL BE CONNECTED BY 2020

PRODUCTS, SERVICES AND EXPERIENCES CONTINUED

SUSTAINABLE MATERIALS

Guided by our global materials strategy, we aspire to use only renewable, recycled and lightweight plastic materials that have a reduced life cycle impact. These materials have lower social and environmental impacts, and can have equivalent or superior performance to existing materials.

In addition to our use of recycled content, we now have over 300 parts from renewable materials such as soy, wheat, rice, castor, hibiscus, tree cellulose, jute and coconut. These materials are from non-food sources and often from post-production waste. Utilization of these wastes, which are sometimes burned in the field, has also provided farmers with a new source of revenue. In our use of soybean based foam alone, we achieved a 228 million pound reduction in CO₂ by using less energy, producing less waste and moving away from fossil fuels.



MOBILITY SOLUTIONS

Our vision for the future of urban transportation is to return streets to the people from cars by addressing the huge challenges facing cities today: Climate change, air pollution and congestion that will only be worsened by urbanization. To do this, we are providing new transportation solutions such as zero-emission electric scooters, building a transportation mobility cloud to help better orchestrate those who move around cities, and working with cities globally to reimagine their transport systems. We believe everything from parking, traffic flow and goods delivery can be radically improved – reducing congestion and allowing cities to transform roads into more public spaces.

This work starts with conversations with city officials, residents and others to uncover targeted solutions to each community's unique mobility challenges. Solutions developed last year are now being piloted. These pilots range from helping teachers and parents manage school drop-offs and pickups to be safer and more efficient, to helping late-shift workers safely travel to and from work.

The future also could include a significant utilization of autonomous electric vehicles that, if executed correctly, could result in the reduction of a city's environmental footprint by minimizing congestion and coordinating traffic flow. This, along with the potential impact of drones, high-speed mass transit and many other innovations, could change the way an entire city's infrastructure operates.



OPERATIONS: FACILITY AND SUPPLIER RISK



Because Ford operates over 60 plants around the world (including vehicle assembly, engine and transmission plants) and our suppliers are located in more than 60 countries, we work to keep these facilities operational after severe weather events, for the sake of business continuity as well as to maintain the livelihoods of our employees. We also work to minimize water usage to help communities experiencing water shortages.

100%

RENEWABLE ENERGY
FOR ALL MANUFACTURING PLANTS GLOBALLY BY 2035

FACILITIES

Every year, we assess business continuity and resumption plans for our facilities and suppliers as a part of our risk management process. Business continuity plans include climate-related risks to our facilities, such as shifting patterns of extreme weather. We have taken actions to reduce these risks, including risks to the energy supplies we need to operate our manufacturing facilities. We utilize firm delivery contracts for natural gas and other energy needed to run our operations. We also have installed tank farms at key manufacturing facilities as a source of backup fuel.

Global climate change has the potential to lead to increased precipitation events that produce flooding, which may disrupt our production activities either directly or through interruptions to our supply chain. In 2011, for example, flooding in Thailand led to 34,000 units of lost production. Our purchasing operations implemented a Risk Exposure Index developed by the Ford-MIT alliance. The Risk Exposure Index enables the identification of the key elements in our supply chain that require climate risk monitoring. Ford's Global Disaster Alert and Coordination System and use of a Humanitarian Early Warning Service provide important data and analysis for exposure assessment and recovery planning.

We also evaluate our water strategy to align with core elements of the CEO Water Mandate, a public-private initiative launched by the United Nations Secretary General in 2007. We developed our strategy to prioritize addressing our water use and community water issues in water-stressed regions. About a quarter of our global operations are located in regions that are now or will be considered at risk for water scarcity by 2025. We have also been adding substantial new water management systems by updating and replacing equipment in areas where water is scarcer. In Pretoria, South Africa, for example, a \$2.5 million capital investment in an on-site wastewater treatment facility at the Silverton Assembly Plant is increasing the amount of water that may be reused by up to 15 percent. Our newest plants are set to use advanced technologies such as membrane biological reactors and reverse-osmosis processes to recycle water from our on-site wastewater treatment plants in arid regions such as Chihuahua and Hermosillo, Mexico; Chennai, India and Chongqing, China.

We have been a leader in facilities-related greenhouse gas (GHG) and energy use reductions, voluntary reporting of our GHG emissions, and participation in GHG reduction and trading programs. In 2010, Ford adopted a goal to reduce our facility CO₂ emissions by 30 percent per vehicle produced by 2025. The glide path strategy was based on Ford's contribution to prevent the atmospheric concentration of CO₂ from rising above 450 ppm. This goal was achieved eight years ahead of schedule with a 32 percent reduction per vehicle from 2010 to 2017. This was achieved through energy conservation and efficiency changes at our manufacturing facilities, including the installation of over 100,000 LED efficient light fixtures and updating our paint operations. Ford is now setting a new Carbon Reduction Strategy goal, with a significant focus on renewable energy initiatives including an aspirational goal to achieve 100 percent renewable energy for all manufacturing plants globally by 2035.

Ford has established comprehensive internal controls including centralized tracking of emissions data globally, internal procedures for establishing emissions trading strategies and status reports, and central coordination of all CO₂-related audits and reporting. Ford's Global Emissions Manager database serves as a central repository for our facilities to consistently input and assess energy and CO₂ data. Ford plant managers have targets for many metrics, including environmental metrics such as water use, reducing waste sent to landfill, increased recycling, waste minimization through source reduction, energy use and CO₂ emissions. These targets are included in our calculation of performance incentives. The Compensation Committee of our Board of Directors approved specific performance goals and business criteria for cash awards that include those relating to climate change and CO₂ emissions.

OPERATIONS: FACILITY AND SUPPLIER RISK CONTINUED

SUPPLIERS

As well as directly managing the impacts of Ford-owned and operated facilities around the globe, we also have a responsibility to help our suppliers manage their business continuity risks and reduce their environmental footprint while ensuring social standards.

As part of business continuity planning, we require our global supply chain to implement a supply risk management process within their company, including third-party audits of their processes. Business continuity planning includes any unforeseen event, such as the F-150 supplier manufacturing site fire in 2018, as well as severe weather events that suppliers may need to respond to quickly and decisively. We actively work with suppliers to minimize risk to our ongoing operations. As an example, during recent hurricane threats on the U.S. East Coast, we reached out to suppliers with facilities in the threatened region to ship Ford inventory ahead of the pending storm. After the event, we reached out again to ensure the

safety of our supplier personnel, determine the condition of the manufacturing site and develop plans to re-establish shipment. We encourage our Tier 1 suppliers to work with their sub-tiers to implement similar actions.

Our Partnership for A Cleaner Environment (PACE) program enables us to share best-practice actions Ford has implemented at our manufacturing facilities with 50 suppliers representing over 1,500 manufacturing sites,

so that the best practices can be replicated, minimizing our overall environmental impact. Ford also encourages our Tier 1 suppliers to cascade the information to their own suppliers to extend the reach of the program. In addition to the full PACE program, we are launching a new, streamlined version, called FastPACE, to share leading practices for air emissions, energy use and water use reductions with selected suppliers in the Asia-Pacific region.



PUBLIC POLICY

Climate change can be a very challenging issue because of the wide diversity of contributors and solutions, each with their own implications, costs and benefits. Policy makers have many tools to influence consumer behavior in the transportation sector and the impact on vehicle manufacturers could vary dramatically depending on what suite of policies gain traction in the coming decades. Among the many options under study in various key markets around the world are ICE vehicle restrictions or bans, carbon pricing, incentives and other differentiated vehicle taxation, road pricing or congestion fees, and taxation that discourages single-occupancy trips. With such a diversity of solutions, it can be challenging to gain alignment on the best course of action, adding complexity and uncertainty to our business. We support cross-sector, economy-wide policies and programs that encourage investment in actions that benefit the environment while giving companies options for how to best manage their business.

We support our business interests by participating openly and transparently in the political process. Our aim, across a range of issues, is to be part of the solution. We support local, regional, national and international policies that are economically, environmentally and socially sustainable for our company, our customers and their communities. In our major markets, on issues of the highest priority, we maintain regular dialogue with legislators and regulatory officials. We share our expertise and add our perspective to the policy-making process, which is overseen by our Government Affairs offices around the world. For example, we have joined the CEO Climate Dialogue and the Climate Leadership Council who are urging Congress to enact an economy-wide approach that will result in significant carbon reduction beyond the Paris Climate Accord.

To leverage our resources more effectively on important issues, we work with numerous external partners. We belong to a broad range of partnerships, coalitions, industry groups and trade associations that advocate for legislation and regulation on behalf of their

members. This work helps us develop and promote policies that could have far-reaching benefits for our company, our industry and society as a whole. Of course, there are times when our views may not align with those of the associations to which we belong. In such cases, we always reserve the right to speak with our own voice and make our own stance clear.

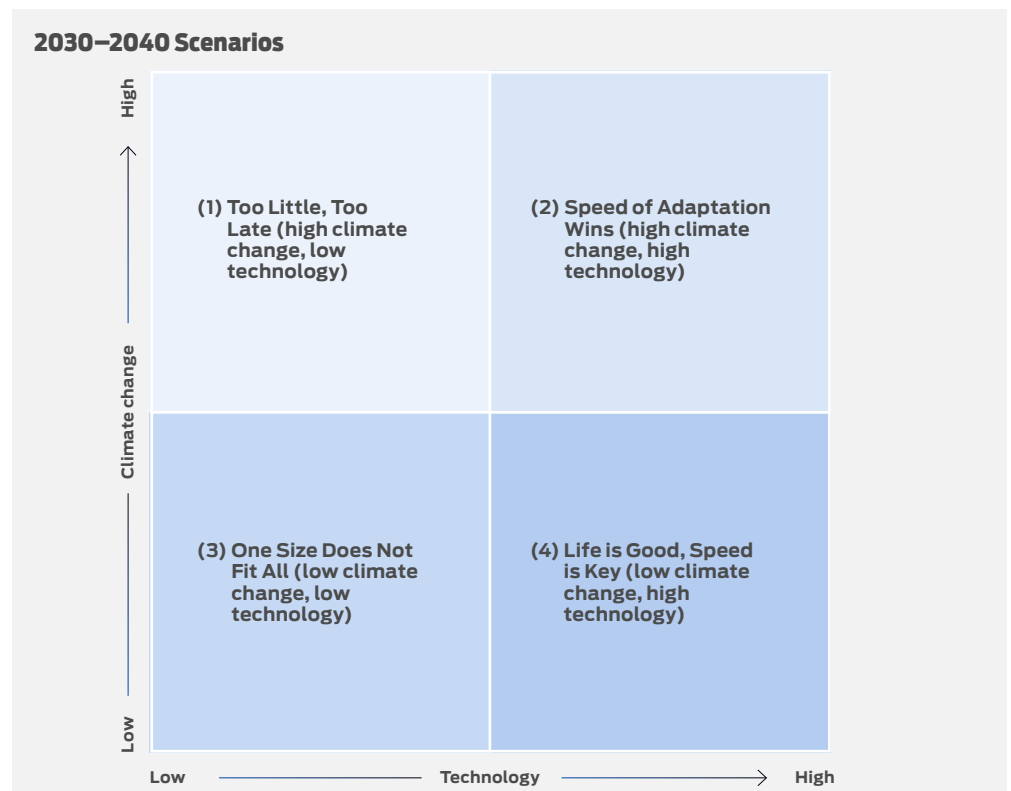
CLIMATE CHANGE SCENARIO PLANNING

Our businesses are committed to supporting global efforts to lower CO₂ emissions to avoid an increase in temperatures greater than 2°C above pre-industrial levels. We recognize that individual country efforts to mitigate climate change introduce uncertainty into the range of outcomes for regulations and consumer behaviors. To better understand the impact of the wide range of potential outcomes, we are supplementing our 2°C glide path analysis with alternative future scenarios to identify critical influences and drivers of change for the global mobility industry in the 2030–2040 time frame. To consider these alternative futures, a broad team of Ford leaders and experts embarked on a scenario-planning exercise to consider the many uncertainties that face the automobile sector. Our climate change scenario-planning activities facilitated consideration of a wide range of climate-focused futures, implications and outcomes, in today’s highly uncertain context.

Scenario planning is a disciplined method of imagining possible future environments that companies might face over a set time period. By engaging in scenario analysis, we are able to explore and examine a wider range of economic, regulatory and societal conditions and consider how Ford’s businesses and strategies might fare under varying operating environments. Scenario analysis is a good way to consider the business risks associated with climate change because it allows for a multi-pronged approach to the wide range of factors that may influence the mobility sector under a global climate accord. Scenario analysis allows us to capture a wider possible range of future influences on our business, including new regulations and policies, unexpected technological innovation, and changing societal values and priorities that could lead to new patterns of behavior.

We cannot list every influence that we believe might affect the automobile industry in the coming decades. To help our stakeholders understand how we consider the changes that are coming, we focus on four alternative long-term transportation scenarios, all of

which are plausible and all of which could influence Ford’s operating environment in markedly different ways. The scenarios are broadly constrained by their position in the climate and technology scopes. Two scenarios experience low climate impacts, while the other two face significant global changes due to climate. On the technology side, the high-technology scenarios undergo revolutionary advances, while the low-technology cases have evolutionary change. We believe that sharing these scenarios will give our shareholders and other stakeholders confidence that Ford is preparing for reductions in CO₂ consistent with the Paris Climate Accord and will be able to build resilient strategies that reflect our changing transportation landscape. We categorize these scenarios as: (1) Too Little, Too Late (high climate change, low technology), (2) Speed of Adaptation Wins (high climate change, high technology), (3) One Size Does Not Fit All (low climate change, low technology) and (4) Life is Good, Speed is Key (low climate change, high technology).



CLIMATE CHANGE SCENARIO PLANNING CONTINUED



**(1) TOO LITTLE, TOO LATE
(HIGH CLIMATE CHANGE,
LOW TECHNOLOGY)**

In a scenario that bounds more negative outcomes stemming from climate change, *Too Little, Too Late* (high climate change, low technology), climate change makes itself felt across a broad range of geographies, prompting large migrations away from coastal areas facing repeated flooding and storms. As flooding, droughts and heatwaves become more commonplace, mobile global lifestyles begin to fade in popularity and people start to stay closer to home, where possible. Mass migrations mean many cities, especially in the developing world, become crowded, and congestion, air pollution and severe weather hamper mobility. Mobility in cities deteriorates further as public funding must be spent largely on repairs of aging infrastructure damaged in climate-related events, draining resources away from expansion and modernization. Private business mobility solutions emerge where they can, and use of ride-hailing services grows in major urban centers. Wealthier cities in Europe, China, the United States and Canada begin to dictate that ride-hailing companies must charge dramatically higher rates for single occupancy users. Electric vehicle components remain costly, leaving strong market penetration only in high-income urban areas. Autonomous vehicles only make slow progress in narrow geographic deployment. Global cooperation on climate change is limited, as industrial nations have failed to provide the financial assistance once promised under prior global climate accords. Automotive companies remain under pressure to provide solutions to vehicle CO₂ emissions but worsening urban conditions have prompted a deterioration of traditional product sales growth. Instead, companies are forced to consider new businesses and partnerships to maintain revenues.



**(2) SPEED OF ADAPTATION WINS
(HIGH CLIMATE CHANGE, HIGH
TECHNOLOGY)**

In a second scenario, *Speed of Adaptation Wins* (high climate change, high technology), the physical manifestations of climate change mount at a pace faster than had been previously expected, creating a more urgent stimulus to collective global action. Sea-level rise is inundating low-lying coastal regions, especially in southeast Asia, while drought and severe weather events increase globally. Significant migration begins to take shape in specific geographies where governments have increased difficulty providing for the safety and basic needs of citizens, such as Central America, North Africa and southeast Asia. As the global public becomes more engaged in international efforts to organize solutions to climate change, widespread support for public spending on climate adaptation and new technologies grows in the industrialized West, China and India. The global agenda for public-private partnerships in energy management and carbon mitigation technologies gets back on track, and new government-industry-university collaborations are formed, including several major multilateral efforts. The vehicle industry benefits from massive public investment in technologies enabling driverless vehicles and technology advancements that lead to low-cost, all-electric vehicle solutions with high urban market penetration. The sense of urgency leads to strong investment in many advanced green technologies, with new breakthroughs driving economic growth in the developed world, as accelerating catastrophic climate events stifle growth, reducing the number of people reaching the middle class and limiting demand for new vehicles.



**(3) ONE SIZE DOES NOT FIT ALL
(LOW CLIMATE CHANGE, LOW
TECHNOLOGY)**

In the scenario *One Size Does Not Fit All* (low climate change, low technology), the continued expansion of the global economy hastens the trend toward urbanization and the number of mega-cities continues to grow. While the personal automobile remains a status symbol among many economically rising populations in emerging markets, the hastening of urbanization drives a pressing need for solutions to congestion and local air pollution. In contrast, low climate impact signals cause CO₂ mitigation policies and efforts to take lower priority regionally and a global pact to address climate change is absent. Transportation solutions vary by location, geography and culture, with only the wealthiest of societies experimenting with automation, smart machines and robotics. For the most part, self-driving vehicles are limited to small, geo-fenced areas or dedicated lanes in and around major cities or suburbs in the United States, Europe and China. More broadly, governments, especially in Asia, are still providing support for infrastructure expansion including new highways, bridges and rail to reflect the growing movement of people and goods between rural and urban localities. In the western democracies, there is local support for stricter solutions to urban air quality and water sustainability. Some European cities create low emission zones where only advanced vehicles, such as battery electric vehicles or plug-in hybrid vehicles, are allowed. London becomes the first city to ban ICE vehicles in the central district. As public acceptance of battery electric vehicles expands, the automobile industry offers more choice of electric vehicles. But the uptake in consumer demand is slow, requiring companies to enhance marketing and sales efforts.

CLIMATE CHANGE SCENARIO PLANNING CONTINUED



(4) LIFE IS GOOD, SPEED IS KEY (LOW CLIMATE CHANGE, HIGH TECHNOLOGY)

By contrast, in the *Life is Good, Speed is Key* (low climate change, high technology) scenario, profound technological changes reshape everyday life, with staggering changes in artificial intelligence, robotics and connected, intelligent devices. Global economic growth remains strong as new businesses, products and services drive growth and productivity and create millions of jobs that didn't exist a decade before. Battery advancements enable low-cost, all-electric vehicle solutions in both urban and suburban settings, and advances in lidar and computing allow for accelerated deployment of electrified, self-driving technologies that spur new mobility and delivery businesses in both urban and suburban settings.

Technological innovation is so pervasive that individuals and businesses feel empowered to

create their own solutions to environmental challenges. Local activism is commonplace, and grassroots movements spread quickly across multiple geographies to drive new business and lifestyle paradigms. The idea that national governments will solve problems such as climate change through global policies takes a back seat to deep-rooted, widely accepted social movements. Individuals and communities take direct responsibility for climate change mitigation and resilience, and local stakeholders and customers press corporations operating in their jurisdictions to adapt to new demands for green, cost-effective solutions. Innovation is highly rewarded, bringing climate solutions that are localized and driven by the business case. Privacy concerns are addressed. In wealthier communities, momentum grows for new technologies that allow for a seamless coordination of private, semi-private and public transportation connected to smart personal devices. Mass transit is green, clean and privatized, designed with flexibility to adapt to local requirements, decreasing the need for personal automobiles. Energy management technologies for home and office become routine, creating a commercial culture where energy savings is a quality sought in all consumer products.

Across all of these scenarios, urbanization will be an important feature of the new automotive landscape, and therefore we expect future urban environmental trends will be a major determinant of consumer vehicle choice. How urbanization presents itself, whether through megacities or transitions away from rural to suburban to urban, may differ between the scenarios. Ford has chosen to remain flexible in our products and services, and this will allow us to pivot depending on emerging regulatory requirements, regional differences and changing customer needs. We are positioning Ford Smart Mobility to respond to demand for different kinds of urban transportation solutions, as it becomes increasingly clear that to be successful, automotive companies must be able to create products and services that minimize air pollution and reduce congestion in urban centers. Scenario analysis highlights that, while consumer preferences and technology choices are changing, there is a wide range of uncertainty associated with the pace of uptake of new technologies such as all-electric and autonomous vehicles. That is why Ford is making sure we remain in a competitive position to exploit market opportunities for a wide range of emerging technologies and ensure our investments in these products and services align with a clearly monetizable business case. One critical take-away from this future scenario deep dive is that Ford must position our company to meet the need for a diverse set of environmentally friendly technology solutions globally. Across all scenarios, customers will be expecting Ford to be part of the solution.

CLIMATE CHANGE SCENARIO PLANNING CONTINUED

(1) TOO LITTLE, TOO LATE

High Climate/Low Tech



Scenario

Environment: Climate requires significant intervention but the technology is unavailable to respond. Investment in mitigation is limited as funds are continuously allocated to rebuilding from natural disasters.

Social: Global mobile lifestyles begin to fade and people stay closer to home where possible. Significant migration after repeated flooding or drought and fires. Cities become more overcrowded and refugee camps become increasingly permanent.

Economy: Economic growth and trade slows as countries have to focus on their own needs including disaster recovery, population relocation, food and water.

Energy prices: Highest in this scenario and across all forms of energy (fuel, electricity, etc.), which does not generate organic demand for alternative propulsion.

Policy: Global cooperation is limited. Climate accords have failed and not been replaced. Automotive industry identified to mitigate issues created by vehicle and manufacturing contributions to climate change. Requires local and individual creative solutions to reduce CO₂ emissions.

Technology: New technology solutions are not developed quickly enough nor are cost effective. Energy management technology and solutions emerge slowly or in select markets.

Industry Implications

Mobility hampered by congestion, air pollution and severe weather. Significant increase in the availability of private solutions. Access restrictions based on occupancy.

City center requirements lead to mass electric vehicle adoption only in major urban centers. Limitations of technology and high cost keep all-electric vehicles from reaching mass-market adoption in suburban and rural areas.

Slow technical progress leads to high costs for critical autonomous vehicle components resulting in high levels of human intervention and narrow geographic deployment.

Significant pressure on automotive manufacturers to be a part of the solution although being able to do so while staying financially relevant will be a challenge. May result in unusual collaborations and partnerships.

Ford Implications

Vehicle solutions must be environmentally friendly (air quality and CO₂) and simultaneously rugged enough to handle severe weather.

All-electric vehicles are required but are expensive. Low demand and lack of policy hinder their profitability. E-bikes and e-scooters satisfy the market for environmentally friendly solutions.

Smart mobility does not reach full potential foreseen in 2020; autonomous vehicles are a niche market.

ASSESSMENT: Most difficult scenario to develop plans and strategies against as both economy and environment are challenging. Portfolio diversification, including vehicles, services and mobility solutions is important to maintain resilience. Mobility and autonomous vehicle investments may not be recouped.

CLIMATE CHANGE SCENARIO PLANNING CONTINUED

(2) SPEED OF ADAPTATION WINS

High Climate/High Tech



Scenario

Environment: Significant sea-level rise faster than previously predicted, drought, severe weather events increase globally. High tech used to develop mitigation and adaptation solutions. Droughts make water an expensive commodity. New and emerging solutions address resource constraints.

Social: Middle class constrained due to migration and pressure on urban areas. Disparity grows between countries as some invest in growth while others invest in climate recovery. Significant migration occurs as some countries cannot provide for basic needs.

Economy: Economy stable, driven by green technologies and solutions but productivity slows due to costs of addressing mitigation actions. Growth limited in developing countries.

Energy prices: High due to increased risks of disruptions across all production and distribution networks, and rising costs of productivity.

Policy: Aligned global focus to address global warming, climate change. Government, industry and university collaborations form.

Technology: Urgency of need enables viability of alternate technology solutions. Energy management technology and solutions emerge as cost effective and common place.

Industry Implications

Significant investment in technology to stay ahead of curve. Revolutionary new technologies and players emerge. Innovative, diverse solutions required to meet global demand.

May see a shift in markets and megacities resulting in a change from private ownership to shared or public solutions.

Strong technical progress leads to low-cost all-electric vehicle solutions and ubiquitous all-electric vehicle adoption including electric autonomous vehicles in urban centers.

Climate impacts increase risk to supply chain, manufacturing, transportation and logistics.

Ford Implications

Transportation and mobility solutions emerge beyond connected vehicles to connected cities.

Technology implementation accelerated. Fast followers may benefit from infrastructure deployment. Mix of solutions available globally.

Ability to move quickly to implement new technologies critical for success.

Mix of public and private, first-mile and last-mile solutions.

ASSESSMENT: Technology opportunities and environmental needs align to deliver diverse solution sets addressing climate change. Challenge in finding winners globally to achieve scale. Competition in the mobility space from public and private providers.

CLIMATE CHANGE SCENARIO PLANNING CONTINUED

(3) ONE SIZE DOES NOT FIT ALL

Low Climate/Low Tech



Scenario
<p>Environment: Urbanization puts pressure on air quality and water resources at a local level but there are limited actions due to lack of urgency.</p> <p>Social: Rise of megacities, still significant populations in suburban and rural areas. Middle class grows.</p> <p>Economy: Global economic growth relatively stable with typical cyclical swings in western markets, emerging markets continue to expand.</p> <p>Energy prices: Oil and gas prices remain low by historical standards providing limited incentive for innovation and customer adoption beyond policy-driven initiatives.</p> <p>Policy: Global climate accords fall apart; local policies restrict vehicles from city centers for air quality. CO₂ mitigation policies lose momentum.</p> <p>Technology: Evolutionary improvements in automation, digitization and robotics enhance productivity. Energy management technology and solutions emerge slowly or in select markets.</p>

Industry Implications
<p>Congestion, air quality and quality of life are major urban issues.</p> <p>All-electric vehicles considered key lever for automotive companies to contribute to climate change initiative. Growing consumer acceptance of all-electric vehicles.</p> <p>Limited technology deployment and developing regulatory frameworks result in mixed fleets (drivered, non-drivered, all-electric and hybrid vehicles, etc.).</p> <p>Targeted solutions required in response to emergence of ICE-free or low-emission zones and commercial vehicle lanes.</p>

Ford Implications
<p>One size does not fit all. Need flexibility in products and services to meet a variety of regional requirements and customer needs.</p> <p>Aligns with Ford Smart Mobility, autonomous vehicle and all-electric vehicle investment. Opportunity for Transportation Mobility Cloud as a solution.</p> <p>Slow but growing market for electric vehicles including hybrids and plug-in hybrids. E-bikes and e-scooters satisfy the market for environmentally friendly solutions.</p> <p>Challenges meeting regulatory and climate change requirements without mass-market all-electric vehicle adoption.</p>

ASSESSMENT: Ford strategy of maintaining our core vehicle business while growing smart mobility service is aligned with the diverse needs of “One Size Does Not Fit All.” However, the diversity of solutions required to meet inconsistent global policies, requirements, infrastructure and consumer demand makes profitability challenging. Slow but growing electric vehicle adoption supports improvement of environmental footprint.

CLIMATE CHANGE SCENARIO PLANNING CONTINUED

(4) LIFE IS GOOD, SPEED IS KEY

Low Climate/High Tech



Scenario

Environment: Local mitigation and resilience actions by individuals and communities. Circular economy booming.

Social: More local and personal environmental activism. People empowered to create solutions and opportunities.

Economy: Economy is strong, driven by new industries providing green solutions and technologies. Global opportunities expand in all markets as technologies are democratized.

Energy prices: Oil and gas prices remain low, but this is driven by declining demand as technology provides attractive alternative sources of energy and propulsion.

Policy: Social and political grass roots movements flourish. Local efforts are joined together to create global solutions.

Technology: Staggering changes with AI, robotics, battery technology and connected devices. Innovation rewarded. Advances in materials, lidar and AI. Carbon capture, energy management technology and solutions minimize carbon-based energy consumption.

Industry Implications

Seamless coordination of private, semi-private and public transportation.

Battery advancements and cost reductions enable low-cost, all-electric transportation solutions in urban and suburban areas.

Accelerated autonomous vehicle deployment; technology advances enable low-cost autonomous vehicle transportation solutions in urban and suburban areas.

Innovation is ahead of climate change, allowing technology implementation to be driven by automotive manufacturers and consumer demand rather than climate and political initiatives.

Ford Implications

Requires multiple solutions for urban, suburban and rural applications. Need for customization. Actions driven by business case rather than addressing global crisis.

Connected vehicles and services take forefront; required to remain relevant.

Changing transportation models transform business models. Must provide mobility services to compete with popular public and private transportation options. All-electric vehicle demand by consumers and private mobility providers increasing.

ASSESSMENT: Technology enables solutions. Investments in electrification, autonomy and smart mobility pay off. Opportunities with customization, connected and new business models. Conventional vehicle business declines and mobility solutions face competition from numerous players in the sector.

BUSINESS STRATEGY FOR A CHANGING WORLD

Our leaders and experts evaluated each scenario against our corporate strategies to assess our resilience to climate change and to confirm we are robust for potential futures. We considered the strategies and investments previously announced and the Creating Value Roadmap Process as a tool to evaluate risks and opportunities, and to see if our strategies continue to be responsive to the current and future business environment and the importance of urbanization. We identified seven key themes that emerged as critical to our success: Vehicles, Services and Customer Experience, Mobility, Facilities and Supply Chains, Research, Culture, and Policy Engagement.



Goods That Deliver Themselves

As we work toward launching self-driving vehicles, we have teamed up with Postmates to test prototype vehicles with locker systems to keep packages secure and to make multiple deliveries along a route. A touch screen allows customers to retrieve their orders.

Our **vehicle** plans include continued investment in ICE technology to improve fuel economy and reduce fleetwide CO₂ emissions while devoting additional resources to the development of our global electrified portfolio. We announced over \$11 billion investment through 2022 to develop electrified vehicles, as well as investments in autonomous vehicles and partnerships such as with Argo AI. Maintaining our diverse powertrain options provides flexibility to respond to all four scenarios. We review our product and technology plans at least twice a year and assess our alignment with our 2°C vehicle glide path. The glide path allows us to evaluate our long-term commitment to the Paris Climate Accord while providing flexibility to meet customers' needs with a variety of powertrain solutions.

Our focus on **services and customer experience** to encourage adoption of Ford solutions is important in all scenarios but is particularly important for electrified products. Ford strategies are designed to

help consumers integrate all-electric vehicles into their life through novel solutions and services. Comprehensive vehicle charging solutions, route and trip planning, and energy management capabilities are examples of the wide range of solutions included in our portfolio of service offerings. These extra efforts increase the likelihood of consideration for Ford electrified vehicles.

We are also evaluating alternative business models to integrate our all-electric vehicles into the emerging electric energy ecosystem. The goal is to utilize not only the battery but also vehicle connectivity to optimize consumer energy costs while maximizing the reduction of CO₂ emissions.

Mobility is a quickly changing space that is likely to continue to evolve in the future with opportunities for investment and third-party engagement. The time to market is significantly faster than the traditional automotive industry because the work product is often software rather than hardware and



Putting a New Spin on Urban Mobility

Reflecting the pace and dynamic nature of modern mobility, we have acquired San Francisco-based electric scooter company Spin. Extending its existing operations in three U.S. cities and university campuses, we plan to deploy fleets of zero-emission two-wheelers in 100 locations by 2020, making those first and last miles of a journey more efficient and sustainable.

BUSINESS STRATEGY FOR A CHANGING WORLD CONTINUED

modifying solutions can be accomplished quickly. The winners will be those companies that are able to move quickly and find solutions that have the widest application and strongest consumer demand.

We are engaging in a wide variety of opportunities to learn about mobility, how cities and commuters think and make decisions, and to build on our reputation as a trusted partner. We are investing time and resources to develop a library of solutions that can be applied and modified to be a part of a broader urban mobility ecosystem. Our investment in companies such as TransLoc and Spin and the development of the open standard Transportation Mobility Cloud are part of our strategy to provide a variety of options to address mobility concerns in cities.

Facility and supply chain considerations about climate change are unique in that heavy investments have already been made to establish initial sites and rebuilding is often not a solution. We established a manufacturing 2°C glide path to follow, and we continually improve our facility footprint. We announced an aspirational goal of using 100 percent renewable energy for all manufacturing plants by 2035. We have worked extensively to ensure our facilities and those of our suppliers are resilient to severe weather conditions and water resource constraints. We invest in new technologies that reduce our water utilization,



allow for water reuse and minimize the use of potable water—prioritizing sites that are in drought-prone areas. We establish business continuity plans for our own facilities and require our suppliers to have plans in place to respond to unexpected occurrences such as severe weather, floods or earthquakes. We evaluate the resilience of our facilities to climate change and are working to ensure our suppliers are equally prepared.

We continue to invest in **research** for materials, powertrains and battery technology and work with our suppliers and university partners to develop earth-friendly solutions. These efforts are required for all scenarios and provide us with options and opportunities to continue meeting our goals and aspirations.



BUSINESS STRATEGY FOR A CHANGING WORLD CONTINUED

We are creating a **culture** that encourages curiosity and innovation. We believe encouraging curiosity helps forge new frontiers, helping people move in new ways. We look at what we can learn from new challenges and ask how they can be improved. We are cultivating innovation through the use of human-centered design solutions, utilizing critical thinking practices, and ongoing conversations with thought leaders in our Curious Minds events. Bureaucracy is being reduced through an organizational redesign with increased spans of control allowing for quicker action. Collaboration is being enhanced through a move to team-oriented, open workspaces. We are also investing \$740 million to restore Michigan Central Station and several surrounding properties to create a hub of innovation in Corktown, Detroit's oldest neighborhood. This will bring together thousands of Ford employees, entrepreneurs and partners to shape the future of mobility. Although culture change takes time, these ongoing, focused actions will result in an organization better able to adapt to a rapidly changing world.

Finally, Ford is **engaging policy makers** to ensure they understand our commitment to reduce CO₂ emissions in our vehicles and facilities, and to expand our focus on electrified vehicles. In the United States, our message to regulators at both federal and state levels is to urge collaboration toward one common standard that ensures regulatory certainty for our product planning. One standard aids our ability to provide affordable technology and vehicles that reduce emissions to our customers in the future. Consistent with our climate strategy to reduce emissions from our vehicles worldwide, we support fuel economy standards that increase in stringency over time.



Transforming Michigan Central Station

The Michigan Central Station area will serve as a catalyst for new ideas and a proving ground for self-driving vehicles, connectivity and new mobility solutions. We plan to transform the long-abandoned train station to its original grandeur and preserve the cultural heritage of existing neighborhoods, while creating modern, sustainable mixed-use spaces that foster innovation and community engagement.

CONCLUSION

As part of the scenario development process, Ford leaders and subject matter experts discussed the differences and commonalities between the scenarios; which best aligned with our current strategies (Life is Good, Speed is Key); and which would be most challenging (Too Little, Too Late). We assessed the impacts to climate, society, mobility and our company provided by differing levels of technology and policy alignment. Each scenario provided its own unique opportunities and challenges. Even with the most positive scenarios, there are challenges with customer adoption of environmentally beneficial solutions such as shared solutions and the willingness of cities and mass-market consumers to pay.

The Scenario Analysis process impressed on us the importance of maintaining flexibility in offering diverse solutions so that we can be responsive to the changing needs of consumers and cities. Overall, based on the analysis of the scenarios against our strategies, we believe we are investing in the appropriate technologies, products, services and experiences to be resilient for three of the four climate change scenarios. The Too Little, Too Late scenario will prove exceptionally challenging for many businesses, including Ford. But in general, maintaining product flexibility and expanding opportunities through our mobility services efforts will work well for a range of outcomes.

Additionally, we will continue to establish climate-related aspirational goals in response to our commitment to the Paris Climate Accord to keep global temperature rise this century below 2°C. We will work with our suppliers to improve their business continuity robustness and reduce their environmental

footprint. As part of the Creating Value Roadmap process, we will continue to review these plans on a regular basis and make adjustments through investments, partnerships or vehicle offerings as needed to maintain a viable future.

This is Ford's first Climate Change Scenario Report, and we have learned much through this effort. We plan to address additional issues in our upcoming reports (such as human capital and expanding our supplier analysis), as well as develop approaches to the challenges of the Too Little, Too Late scenario. We understand that this scenario report is only valuable if its findings are integrated into our actions, which we will do through our Creating Value Roadmap Process. Through implementing this process we will develop better metrics and further integrate sustainability trend reviews.

Importantly, we cannot succeed on our own and are dependent on external factors such as aligned global policies, increased infrastructure deployment and environmentally conscious decisions by consumers to support global climate change initiatives. As outlined in this report, although we are dependent on these external factors, we are actively working to influence them through policy engagement and improving customer services and experiences.

Although we cannot solve the climate change challenge through our actions alone, we are committed to do our part. We will support the needed actions of other companies, governments and stakeholders so that, collectively, we can meet the challenge of climate change.

OTHER RESOURCES

- ▶ [Ford 2018/19 Sustainability Report](#)
- ▶ [The City of Tomorrow](#)
- ▶ [Looking Further with Ford: The 2019 Trend Report](#)
- ▶ [Our Truths](#)



Innovating Future Motion

Our belief, that freedom of movement drives human progress, fuels our passion for designing smart vehicles for a smart world.



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