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FOREWORD

Complementary Energies to Reconcile Climate and Development

The COP21 Climate Conference held in Paris in 2015 generated heightened awareness of climate issues and was followed by two years of stable greenhouse gas emissions, prompting hopes that a trend reversal and future decline were on the horizon. Unfortunately, the opposite proved to be the case, as emissions climbed upward in 2017 and 2018, continuing the trend seen from 2000 to 2015.

Changes in the global energy mix since the start of the century have, in fact, hindered emissions reduction. While production of natural gas — the fossil fuel that generates the least greenhouse gases in power generation — has risen by more than 2% a year, the benefits have been largely offset by increased production of coal, which emits more greenhouse gases than any other fossil fuel and has seen growth of nearly 3% annually since 2000.

Steady growth in renewable energies, meanwhile, has not been enough to absorb the increase in energy demand worldwide (about 2% a year). As a result, fossil fuels continue to make up 81% of the global energy mix, unchanged from three decades ago.

Thus, we are still faced with the challenge of reducing greenhouse gas emissions. There is no silver bullet — we can only respond by looking at energy supply as a whole, rather than by pitting one form of energy against another. The growth of renewable energies will be central to the new energy mix, and natural gas is a necessary partner to both offset the variability of renewables and handle seasonal fluctuations in demand. That's why at Total, we are pragmatically and sustainably diversifying our energy mix, with the conviction that pairing complementary forms of energy can yield synergies, create value and unleash technological advances. ▶

- ▶ The move toward this new mix — a combination of gas, low-carbon electricity and oil — needs to happen at a pace that is compatible with consumer demand and with development in the countries where we market our products. We need to strike the right balance between urgency and acceptability. Our customers are asking us to help reduce global greenhouse gas emissions while continuing to meet rising energy demand driven by economic and demographic growth. This entails reconciling two of the U.N.'s Sustainable Development Goals: ensuring universal access to energy and fighting climate change. Our ambition is to provide as many people as possible with energy that is cleaner, more reliable and more affordable.

The energy demand scenarios developed in our Total Energy Outlook 2018 demonstrate that the current trend in global greenhouse gas emissions diverges markedly from any scenario compatible with the Paris Agreement, including the International Energy Agency's Sustainable Development Scenario and our own Rupture scenario. Achieving a compatible situation would require major changes from nations, businesses and consumers.

Clearly, we need to take stronger action. We have grouped our initiatives around four strategic focuses. As you will see in the articles that follow, we have made substantial progress in each of these areas since the previous report.

NATURAL GAS – EXPANDING OUR PRESENCE ACROSS THE ENTIRE CHAIN

Gas emits half the greenhouse gases of coal in power generation¹ and is a natural partner to renewable energies. Abundant and inexpensive, it posted the biggest growth of any primary energy source in 2018, at 4.6%, and offers the most immediate and practical solution for combating the rise in greenhouse gas emissions.

For these reasons, Total has continued to expand across the entire gas value chain, finalizing the acquisition of Engie's LNG assets and starting up multiple LNG projects, including Ichthys LNG in Australia, Cameron LNG in Louisiana and trains 2 and 3 of the Yamal LNG project in Russia. Building on Yamal LNG's success, a major new development — Arctic LNG 2 — was also launched in northern Russia, alongside Novatek. Lastly, Total has taken steps to prepare the future and strengthen our reserves by acquiring Anadarko's gas assets in Mozambique, with resources estimated at more than 60 trillion cubic feet (TCF) in the main block.

On the marketing side, we are pursuing an assertive policy to develop alternative fuels for transportation.

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Total has acquired a 25% stake in Clean Energy, a U.S. distributor of natural gas vehicle (NGV) fuel and biogas for road transportation, signed LNG bunkering contracts with CMA CGM and Pavilion Energy, and entered into a cooperation agreement with Adani in India covering regasification and gas distribution.

To fully play its role in the energy transition, the integrated natural gas value chain will need to reduce its emissions of methane, which has far greater warming potential than carbon dioxide. Total is leading the way in this area. In 2018, we set an objective of reducing methane emissions at our operated facilities² to less than 0.2% of the commercial gas produced by 2025. These emissions have already been cut by more than a quarter since 2010, thanks to our work on flaring and venting. We are pursuing our R&D initiatives, including a pilot project at our Lacq facility to test innovative technology for detecting and quantifying gas leaks.

LOW-CARBON ELECTRICITY – DEVELOPING AN INTEGRATED BUSINESS ON THE UNREGULATED PORTION OF THE VALUE CHAIN

Success in curbing the world's carbon emissions is contingent on electrifying the economy. That process is under way: power consumption rose by an annual 4% in 2018, nearly twice the rate of growth in energy use. We are playing an instrumental role in that trend, investing USD 1.5 billion to USD 2 billion annually in low-carbon electricity, or more than 10% of our total capital expenditure — a figure unmatched by any other major. The cumulative impact of that investment, which is inherently more lasting than that of an oil or gas project, will exceed the actual share of investment over

1. Sources: "Life Cycle Assessment of Greenhouse Gas Emissions Associated with Natural Gas and Coal in Different Geographical Contexts," International Reference Centre for the Life Cycle of Products, Processes and Services, October 2016, and "Review of Life Cycle Analysis of Gas and Coal Supply and Power Generation from GHG and Air Quality Perspective," Imperial College London, 2017.

2. Exploration and production.

FOUR CLIMATE-ORIENTED STRATEGIC FOCUSES



NATURAL GAS

Expand our presence across the entire natural gas chain, reduce our methane emissions and make LNG more energy efficient.



LOW-CARBON ELECTRICITY

Expand our operations in the non-regulated portion of the value chain (i.e., excluding power transmission), from power generation using renewables and natural gas to sales to end customers and energy storage (batteries and hydrogen).



PETROLEUM PRODUCTS

Avoid expensive oil, reduce emissions at our facilities, and promote both sparing oil use and sustainable biofuels.



CARBON NEUTRALITY

Develop businesses that will help achieve carbon neutrality through providing energy efficiency services to our customers and by investing in natural carbon sinks such as forests and wetlands, and in carbon capture, utilization and storage (CCUS).

time, with the result that low-carbon electricity projects could account for 15 to 20% of our energy mix by 2040.

Total saw sustained growth in our low-carbon electricity businesses in 2018-2019. In power generation, we have bolstered capacity with the acquisition of four combined-cycle gas power plants that, coupled with other ongoing projects, will lift our gas-fired power generation capacity to 2.8 GW by 2020.

Our portfolio has expanded in renewables as well. We have completed our acquisition of Direct Energie and its affiliate Quadran, respectively renamed Total Direct Energie and Total Quadran, raised our stake in Total Eren through the purchase of NovEnergie and, more recently, acquired wind power firm Vents d'Oc.

In marketing, in 2018 we created an organization devoted to electric mobility, Total EV Charge, after acquiring G2mobility, the French leader in smart charging solutions, and introduced a range of products designed especially for electric vehicles.

Lastly, in the area of batteries, Saft formed a joint venture in April 2019 with China's Tianneng to expand its international business in mobility and stationary energy storage.

PETROLEUM PRODUCTS – AVOID EXPENSIVE OIL, REDUCE OUR EMISSIONS, AND PROMOTE BOTH SPARING OIL USE AND SUSTAINABLE BIOFUELS

Over the years, oil has demonstrated a number of qualities, including high energy density, exceptional stability (which makes it easier to ship) and affordable cost. However, the related CO₂ emissions are significant. At Total, we believe the right move is to save this energy for specific uses, such as aviation and certain types of transportation, and to avoid uses where oil can be easily replaced, for example in power generation.

With this in mind, we are anticipating flat or declining oil demand and concentrating on low breakeven assets. We do not develop oil projects in the Arctic sea ice, for example, and are no longer developing oil sands projects in Canada.

To sustainably reduce our emissions, we are taking action against CO₂. A dedicated task force bringing together Total's different skill sets was formed in 2019 and emissions will be systematically displayed at the entrance to industrial facilities to further raise our teams' awareness and buy-in.



- ▶ We are also pursuing our efforts to sustainably improve energy efficiency at our production facilities. In 2018, we made significant advances in that area. In downstream operations, we launched a five-year, USD 300-million capital investment program to enhance energy efficiency at our plants, while in the upstream we have made further reductions in routine flaring (down 80% since 2010). Lastly, we have set a goal to cut greenhouse gas emissions at our operated oil and gas facilities¹ from 46 million tons of carbon dioxide equivalent (CO₂e) in 2015 to less than 40 million tons in 2025; that includes new projects that will be started up in the interim. The Chairman and CEO's compensation and that of our top executives will be directly affected by this indicator.

Our efforts to promote sustainable biofuels are also helping to reduce the carbon impact of our petroleum products. In late 2018, we acquired new interests in Brazil, one of the world's leading biofuel markets, through our acquisition of Zema's retail network (280 service stations, with biofuels making up 30% of sales). We have also begun production at our La Mède site, France's first world-class biorefinery, with a production capacity of 500,000 tons of hydrotreated vegetable oil (HVO) a year. This oil can be incorporated directly into biojet fuel, where it plays a critical role in reducing aviation emissions. The International Air Transport Association has set a goal of stabilizing its emissions by 2020 and halving them between 2005 and 2020. That milestone will remain beyond reach without the extensive use of biofuels.

CONTRIBUTING TO CARBON NEUTRALITY THROUGH ENERGY EFFICIENCY AND CARBON SINKS

Achieving carbon neutrality in the second half of this century will require first and foremost that we curb growth in energy consumption. In 2050, consumption levels will need to match those of a hundred years earlier, despite a population that is three to four times larger and a GDP that is at least ten times higher. With our acquisition of GreenFlex, an energy efficiency consultant, we can advise our customers on ways they can reduce their energy consumption and emissions.

Moreover, in 2019, we established a dedicated division for investing in natural carbon sinks (forests, mangroves, etc.) with an annual budget of USD 100 million as from 2020 and an annual sustainable storage capacity target of 5 million tons of carbon by 2030.

We have expanded our efforts in the area of carbon capture, utilization and storage (CCUS) by taking part in several major projects, one in Norway (Northern Lights) and the others in the U.K. (Clean Gas Project and Acorn). We are also intensifying our R&D investment through partnerships with the National Carbon Capture Center in the United States and French public research, innovation and training center IFP Énergies Nouvelles (IFPEN).

1. Scope 1 emissions (direct emissions) and Scope 2 emissions (indirect emissions from purchased energy).

Cameron LNG liquefaction terminal, Louisiana, U.S.A.



Development studies on a major upcoming project in Dunkirk and a project to produce methanol from CO₂ and hydrogen in Germany (E-CO₂MET) have also been launched.

Lastly, Total's venture capital fund, renamed Total Carbon Neutrality Ventures, has been fully refocused on low-carbon projects and its investment volume has been increased, with a projected portfolio of around USD 400 million by 2023.

SOLID RESULTS

These initiatives are paying off and have allowed us to significantly improve our climate-related indicators.

- Emissions from our operated oil and gas facilities declined from 46 million tons of CO₂e in 2015 to 42 million tons in 2018, in line with our goal of bringing those emissions below 40 million tons by 2025 while continuing to grow our business.
- Our methane emissions are now among the lowest in the industry (methane intensity below 0.25% in relation to the commercial gas produced in 2018).

Lastly, the carbon intensity of the products used by our customers decreased by about 5% from 2015 to 2018. Here too, we are on track to meet our ambition of a 15% reduction between 2015 and 2030. We are supporting our customers in their efforts to decrease their carbon footprint by offering an energy mix with diminishing carbon intensity.

WORKING TOGETHER

Of course, we at Total can only do so much on our own. Changes in demand spurred by public policies and consumer practices will play a decisive role in determining the speed of the energy transition. With this in mind, we are multiplying our efforts to forge partnerships with the public sector and consumers alike.

In our discussions with governments, we actively advocate for carbon pricing, an essential step, particularly if the world is to switch from coal to natural gas for power generation. By 2040, such a move could slash carbon emissions by 5 billion tons annually and bring global emissions nearly one third of the way to compliance with the International Energy Agency's 2°C scenario. But carbon must be priced fairly, with appropriate mechanisms, since consumers may lack the means to change their behavior and view a carbon price as unfair. For this reason, we support a proposal by the Climate Leadership Council (of which Total is a founding member) to establish a carbon dividend, which creates an incentive for consumers while redistributing resources to those with the lowest incomes.

SunPower Total solar power plant (Chile).



Lastly, Total is a member of numerous industry associations. In 2019, we decided to review the main associations' positions on climate change to confirm they coincide with our own. The vast majority of these organizations hold positions that are aligned with Total's, but in four cases we found points of concern or even diverging views. As a result, Total has chosen to withdraw from one of those organizations and to closely monitor developments at the other three while continuing to promote our own views as a member.

These actions, initiatives and commitments place us among the top oil and gas companies in terms of business readiness for a low-carbon transition, according to a November 2018 study by CDP.

Our clearly stated ambition is to become the responsible energy major. To do that, we are integrating the climate challenge into our strategy and our operations. This is not just an environmental challenge — it impacts business and strategy as well. There are risks ahead, obviously, because climate change calls for a more diversified business model, but it is also a fantastic source of opportunity. As an energy provider, we are in the best position to offer sustainable solutions that will ensure our own prosperity and that of the global community in the decades to come. Our transition must be dynamic and positive for our employees, our customers and our partners. ■