
MAY 2016

Integrating
Climate
into our Strategy



TOTAL
COMMITTED TO BETTER ENERGY

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Total at a Glance



96,000
employees
in 130+ countries



4 million
customers served
each day, including
2 million in Africa

A global energy leader



No. 4
oil and gas company
worldwide

2.3 Mboe/d produced in 2015,
of which approximately 50% gas



Refining & Chemicals:
a global top 10
integrated
manufacturer



A top 3
solar player
6GW installed



European leader
in biofuel marketing
2.2 Mt of biofuels blended
into gasoline and diesel in 2015

Responsible growth



19%
decrease in greenhouse
gas emissions since 2010
in our operated scope



USD 7.4 billion
forecasted spending
on R&D between 2015
and 2019
including 25% on cleantechs
and environmental issues



“Our ambition for Total in 2035 is consistent with the IEA’s 2°C scenario”

A CONVERSATION WITH

PATRICK POUYANNÉ

Chairman and Chief Executive Officer of Total

Did COP21 live up to your expectations?

COP21 was definitely a watershed. There will be a “before” and “after” COP21. Despite the current instability worldwide, 195 countries managed to unite around an ambitious climate agreement. That sends a strong message. What’s more, businesses were also galvanized; the drive and energy extended far beyond the negotiations between governments.

Another positive sign: around 40 countries and regions have already introduced a carbon pricing mechanism or are considering doing so, and that the agreement includes mechanisms to link the different pricing systems. That’s something Total strongly advocates. Steering investment in the private sector is vital if we want to keep global warming under 2°C. Putting a price on CO₂ is the most efficient financial mechanism to change the rules of the game quickly.

“Our stakeholders understandably have higher expectations”

It's a must in the energy sector. The main priority is to reduce the use of coal, which generates more emissions than any other type of energy, and to switch to gas and renewables for power generation. A carbon price of USD 30 to USD 40 per ton would make this possible.

Will the Paris climate agreement change Total's strategy?

The agreement confirms that we were right to make climate a cornerstone of our strategic vision. We have been taking practical steps since 2000 to reduce the impact of our activities. We were among the first in our industry to publish quantified improvement objectives. Since 2008, we have applied an internal carbon price to our projects and in 2011 began investing significantly in renewable energies. This strategic approach has taken shape gradually. And this year we're taking a decisive step by creating a combined Strategy & Climate Division, because climate, a global concern, must be fully integrated into our overarching strategy.

In the energy sector, the “COP21 effect” also means that businesses are becoming far more proactive. Here at Total, we have lobbied strongly for international initiatives, such as the Oil & Gas Climate Initiative, that will reshape our industry.

Our stakeholders are voicing higher expectations, understandably so. We called for this climate agreement and have made commitments to support it. Now it's time for us to step up and explain how our strategies tangibly reflect this engagement.

Is this report a means for Total to respond to these expectations?

Yes, and its appropriateness was discussed and approved by the Board of Directors. The report has three main goals. First, to share our ambition for Total in 2035: we have chosen a timeline that is

consistent with the International Energy Agency's (IEA) 2°C scenario. Second, to specify how this scenario impacts our decision-making process. And third, this report is an opportunity to review the actions we have already implemented, the initiatives we are currently undertaking, the investments we are planning to secure for the future and the indicators we use to track our performance.

What are Total's objectives for 2035? Is climate change the company's biggest challenge?

Keeping the global temperature rise below 2°C is a challenge everyone must meet. The next 20 years will be decisive in building a low-carbon future that does not curb economic and social development. In 2040, the global population is projected to be 9 billion. That includes 2 billion people in Africa alone, where over 600 million people today do not have access to electricity. That figure worldwide is 1.2 billion.

I believe our main responsibility is to help provide safe, affordable energy solutions to as many people as possible, while managing energy consumption and the related emissions. Doing this will entail improving energy efficiency across the board, optimizing the fossil fuel mix and accelerating the development of renewable energies. Our ambition is to position Total as a global leader in these three priority areas and drive progress. Our integrated business model, which spans producing, refining or processing and marketing oil and gas, will be our biggest advantage in achieving this goal.

It enables us to take action across the entire energy value chain and keeps us in touch with our customers' expectations. The challenge is not just to produce an energy mix that generates fewer emissions.

We also have to continue reinventing our relationships with customers worldwide, by keeping pace with changes in energy use, adopting digital technology and adapting to macro-trends such as urbanization.



“We intend to deploy an assertive strategy in gas, which will grow over the next 20 years”

I am also convinced that being “the most African international oil company” is another one of our strengths. Africa, where these challenges are crucial, will lead the way in energy innovation. We intend to be the responsible energy major that meets these challenges. We are, after all, “Committed to Better Energy.”

Will oil and gas still be Total’s core business in 2035?

Under the 2°C scenario, oil and gas will still make up almost 50% of the primary energy mix at that time. So yes, of course, we will still be an oil and gas major, meeting this demand. But our ambition is to put our talent to work to become the leader in responsible oil and gas, while also ramping up renewables. We will increase the proportion of gas in our mix, because it is the fossil fuel with the lowest emissions. It already accounts for more than half of our reserves and roughly half of our production. We intend to deploy an assertive strategy in gas, which will grow over the next 20 years.

We will emphasize downstream investment to accelerate the growth in gas demand. In our operations, we are aiming to become a benchmark for safety and environmental responsibility well before 2035. Our safety record has steadily improved over the last decade, but we can still do better. From an environmental standpoint, advancements include reducing routine flaring at our facilities by 67% between 2010 and 2015. We aim to eliminate it completely by 2030. That’s setting the bar high, but we will meet this commitment. And as we promote gas, we are closely tracking methane emissions to reduce them as much as possible. When you’re dealing with a 2°C trajectory, strict investment discipline is vital. Our focus is on projects that can withstand low oil prices and higher carbon costs. It’s the best way to protect against the risk of stranded assets. Lastly, preparing for the future means speeding up the development of carbon capture, use and storage technologies. We therefore plan to allocate up to 10% of our R&D budget to this area over the coming years.



“Our ambition is to have low-carbon businesses make up around 20% of Total’s portfolio in 20 years”

How important will renewable energies be in Total’s portfolio in 2035?

Extremely important! Our ambition is summed up by the motto “20% in 20 years.” We want to make low-carbon businesses a genuine and profitable growth driver accounting for around 20% of our portfolio in 20 years’ time.

Over the coming decades, the growth in electricity demand will outpace global energy demand.

Achieving the 2°C scenario hinges on using renewables to generate power. This is one opportunity for us.

We believe, however, that electricity will not be able to meet all requirements, particularly those related to transportation. Electric cars will continue to gain ground, but we must not overlook trucks, aircraft and ships. That is why, in addition to increasing the use of electricity and gas in transportation, we also believe biofuels offer another renewables opportunity we can leverage.

Our experience gives us a clear advantage. We have been producing biofuels for over 20 years and are the top marketer in Europe. We aim to build on our front-ranking position in biodiesel and biojet fuel: by next year, our La Mède refinery in France will have been transformed into a world-class biorefinery.



Through our affiliate SunPower, we are a top three solar player. The challenge will be to maintain that position and to successfully expand our operations — especially in Africa, which is likely to leapfrog to distributed generation based on renewable energies. Already deployed in over 30 countries, our Total access to energy solar program provides us with valuable experience in understanding the challenges ahead. Moreover, the simultaneous growth of gas and renewables is encouraging us to take a broader approach to the end-to-end electricity value chain. We want to develop a renewable power trading business. We are also positioning ourself in energy storage with our recently announced acquisition of Saft. Lastly, we will be reexamining the potential of other renewable energies, in particular onshore wind power. However, we will not include any nuclear activity in our portfolio.

Energy efficiency is a major 2°C scenario driver. What are your objectives in this area?

We want to do much more to help our customers. Their attitudes and behaviors in terms of reducing energy costs and their environmental impact are changing fast. And this trend is going to pick up

speed with digital technologies. We want to innovate to bring our customers new products and services that will help them make informed choices about energy and manage their consumption. Promoting hybrid solutions combining oil or gas and renewables is one avenue; another is providing energy efficiency services for industrial sites. Our goal is to cover the manufacturing and transportation sectors. We are a leading energy company recognized for both our closeness to customers and as a committed partner. We intend to build on this valuable asset.

You have set some very ambitious goals. Where do the changes need to start?

It is vital for our stakeholders and for us that we clarify our position and share our ambition for the next 20 years. It's not a shift, it's a genuine ramp-up. But I know we can succeed, because this transformative project reflects the aspirations of everyone at Total and their desire to find meaning in what they do. Rising to the challenges of the 2°C scenario is so important that we have no other choice than to be ambitious.

THREE QUESTIONS FOR

PATRICIA BARBIZET

Lead Independent Director of Total



“The Board of Directors supports the publication of this report”

You were appointed lead independent director of Total on December 19, 2015. What does your role involve?

The lead independent director helps to ensure efficient governance of the company in accordance with current practice. This role is considered to be useful by many investors and proxy advisory firms when the positions of Chairman and Chief Executive Officer are combined, as is the case at Total since the management transition led by Patrick Pouyanné. My responsibility is to ensure that the Board of Directors runs smoothly and follows its rules of procedure. As Chairwoman of the Governance & Ethics Committee, I'm also in charge of leading the review of the Board's work and preventing conflicts of interest. And, along with the Chairman and Chief Executive Officer, I'm a primary contact for shareholders.

You have been a Total director since 2008. How has the Board of Directors' approach to climate issues changed over time?

The Board has always taken climate issues seriously. But what has changed significantly over

the years is their importance in Total's strategy. In 2008, climate issues were treated as a completely separate environmental risk requiring measures to reduce the footprint of its activities. More recently, these issues have been fully integrated into the company's business and strategic vision. Today, Total's long-term strategy is built on addressing climate-related challenges.

What work has the Board undertaken in this area since 2015?

In 2015, as every year, the Board of Directors examined climate issues during its review of the strategies for Total's business segments, presented by their respective senior executives. Mr. Pouyanné also brought us up to date on the work carried out as part of the Oil & Gas Climate Initiative, in particular the meeting held in Paris in October 2015 that brought together the chief executives of the leading oil and gas companies that have committed to fighting climate change. The Audit Committee also carries out more detailed work on environmental risks during its review of the performance indicators published by Total in its management report.

These indicators are audited by an independent external organization. In addition, starting this year the Compensation Committee has changed the criteria for the Chairman and Chief Executive Officer's variable compensation to put more emphasis on achieving HSE and CSR objectives. The Board is fully committed to climate issues and this commitment will continue to support Total's development in 2016. That is why we endorsed the company's suggestion of publishing this Climate Report to coincide with the Annual Shareholders' Meeting.

A STRONGER LINK TO THE CHAIRMAN AND CEO'S COMPENSATION

In 2015, the portion relating to the HSE/CSR performance criteria taken into account when calculating Mr. Pouyanné's variable compensation was set at a maximum of 16% of his base salary. For 2016, the Board of Directors increased this portion to 30%, with 20% tied to safety performance and 10% to CSR performance. The latter is measured based on the achievement of targets for carbon emissions, energy efficiency and Total's position in the rankings published by non-financial rating agencies.

Shaping Tomorrow's Energy

Energy is at the heart of the challenges we face to keep the global average temperature rise below 2°C. What mechanisms can be put in place and what conditions favor success?

We are helping to effect this transformation and are actively involved, both within our industry and in the broader international community, in shaping tomorrow's energy.

A CLOSER LOOK

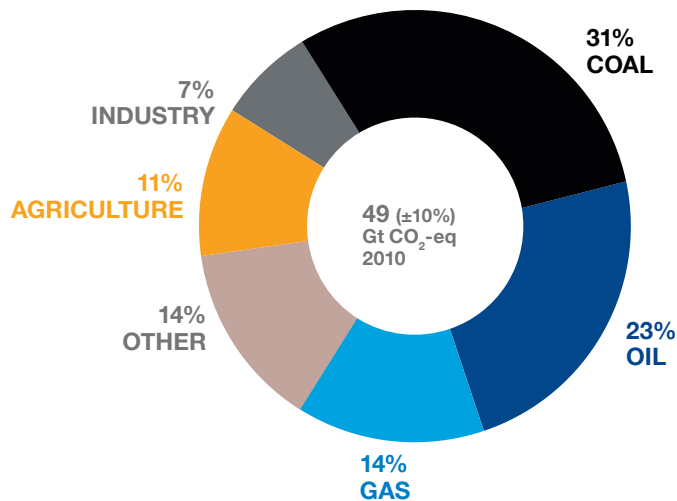
The Challenges of the 2°C Target

The world economy must be profoundly reshaped to keep the average global temperature increase below 2°C. Energy, which represents nearly 70% of global greenhouse gas emissions, is a key factor in the balancing act required.

The Facts

- Global greenhouse gas emissions amounted to 49 Gt CO₂-eq in 2010.
- If current trends were to continue, cumulative global emissions would reach around 75 Gt CO₂-eq in 2035.
- The IEA's 2°C scenario¹ aims to limit emissions to approximately 35 Gt CO₂-eq in 2035.

 This reduction in emissions entails sharply decreasing the carbon content (or "carbon intensity") of GDP. In its 2°C scenario, the IEA estimates that a decline of 3 to 4% a year would be required between now and 2035.



OIL AND GAS ACCOUNT FOR 37% OF GREENHOUSE GAS EMISSIONS RELATED TO HUMAN ACTIVITY

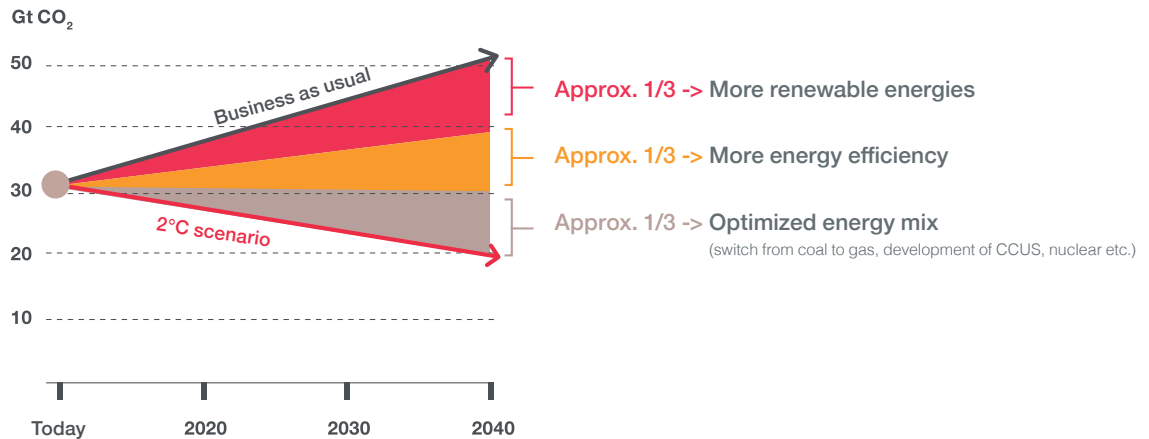
- Roughly 85% of emissions related to oil and gas are generated during product end-use; the remaining 14%, during production and refining.

Source: IEA, *CO₂ Emissions from Fuel Combustion*, 2014 Edition.

¹ For the purposes of this report, "2°C scenario" refers to the pathways outlined in the 450 and 2°C scenarios published by the IEA in *World Energy Outlook and Energy Technology Perspectives*, respectively. These scenarios aim to limit the average global temperature rise above pre-industrial levels to 2°C by 2100.

Three Areas of Focus

In the 2°C scenario, the IEA outlines three areas of focus to alter the energy-related CO₂ emissions trajectory.

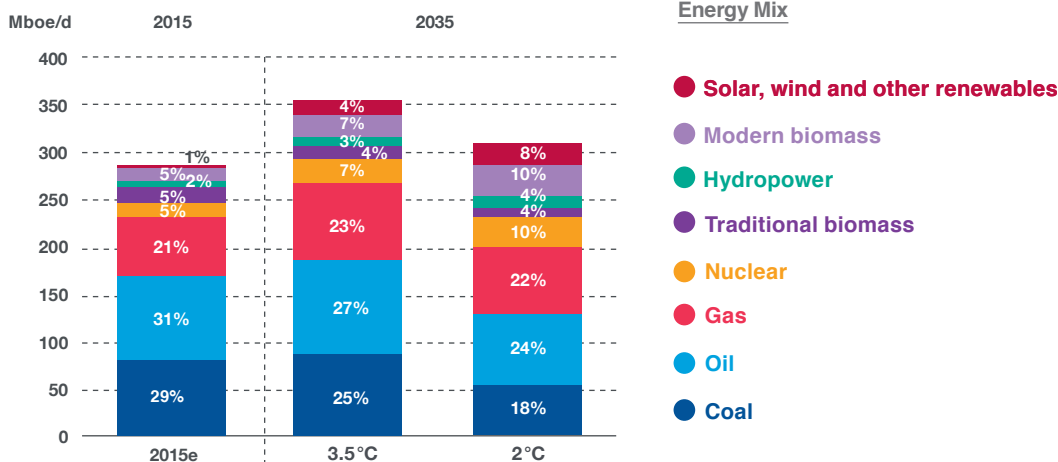


Creating an Energy Mix That Meets the 2°C Challenge

The first challenge is to reduce the share of coal. Under the 2°C scenario, it will shrink from 28% to 18% between 2015 and 2035. Oil and gas will account for 46% of the “target” 2°C mix for 2035, versus 52% today. All fossil fuels are not equal. For an equivalent energy content, gas emits around half as much CO₂ as coal

on average when used for power generation. Consequently, the share of gas is expected to continue to grow — by around 15% over the period — to 22% of the 2035 energy mix, overtaking coal. The share of oil will begin to decline gradually, to 24% in 2035 from 31% today, because it will be reserved primarily for transportation and petrochemicals. The share of renewables will soar over the same period, to 22% from 8%,

excluding traditional biomass. This growth will be led by a surge in solar and wind power, which could both help to replace coal despite the disadvantage of their variability, along with “modern” biomass.

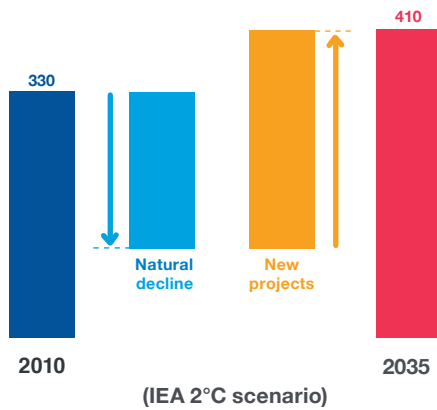


Continuing to Develop Oil and Gas Production Capacity

Substantial investment is needed to meet higher projected demand for gas in 2035. Given that the natural decline in production is averaging around 4% a year, the volume of production from new gas projects in 2035 is forecast to be 90% of 2010 production, even under the 2°C scenario.

Growth in Gas Production Based on the 2°C scenario

billion cubic feet per day



INVESTMENT REQUIRED

According to the IEA, some USD 7.5 trillion and USD 11.1 trillion need to be invested in the gas and oil sectors respectively over the next 20 years. This represents increases of 41% and 23% compared to average annual investment in these sectors between 2000 and 2013.

Similarly, additional spending will also be required to meet oil demand in 2035. Given the natural decline of output, the volume of production from new oil projects in 2035 is forecast to be 75% of 2010 production, even under the 2°C scenario.

Meeting the 2°C target will be based in large part on continuously improving energy efficiency and targeting energies more effectively in line with uses. Gas and renewables are therefore expected to be primarily dedicated to power generation, replacing coal and, to a lesser extent, heavy fuel oil. The use of oil will have to be concentrated on transportation and petrochemicals, sectors in which it remains indispensable. But other energies — electricity, gas and renewables in particular for transportation — will play an increasingly important role.

 The use of renewables will expand rapidly. But their deployment at a global scale will, in fact, take place in stages. The transportation sector, which currently accounts for over 55% of oil demand, is an example of this. According to the 2°C scenario, biofuels and electricity will grow at a faster pace between now and 2035, but will only meet a small portion of transportation demand.

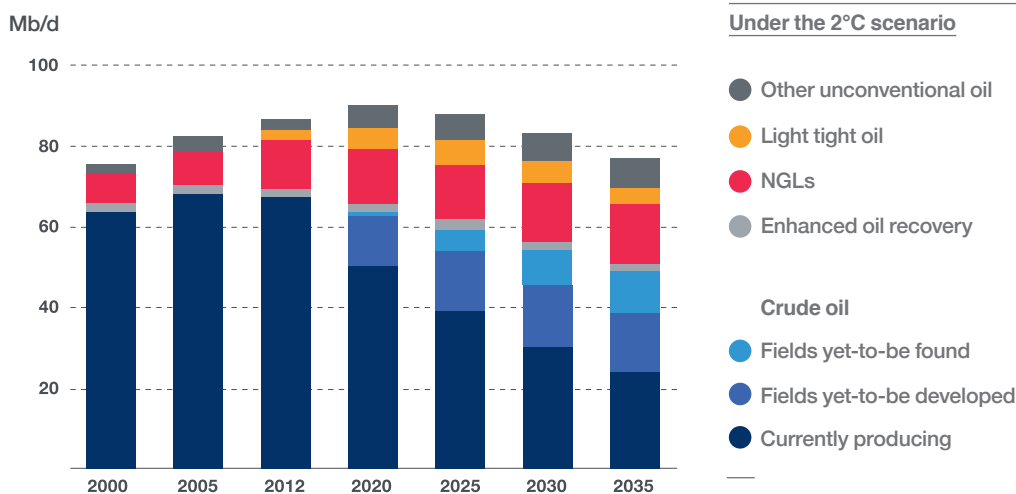
Taking Positions in Competitive Resources

The reserves that have already been discovered, and especially those yet to be found, will not necessarily be fully developed. Whether or not they can be will depend on a number of factors: demand, production conditions (profitability, political context and environmental issues),

as well as carbon pricing. The IEA puts oil demand over the period 2014-2035 at 690 billion barrels. Although discovered reserves currently stand at approximately 1.7 trillion barrels, the agency believes that about one-third of demand over the next two decades will be met by fields yet-to-be developed or yet-to-be found.



The 2°C scenario means that oil companies need to allocate their investments to assets that will be competitive — in other words, with reasonable costs.



Source: IEA – World Energy Investment Outlook 2014.

In the next two decades, around one-third of demand will be met by yet-to-be developed or yet-to-be found fields.

Carbon Capture, Use and Storage

The 2°C scenario also includes a significant ramp-up in the coming decades of carbon capture, use and storage (CCUS) technologies, which will be needed to achieve carbon neutrality in the second half of the century. Total has long been committed to developing CCUS technology, in particular through the Lacq pilot project carried out between 2010 and 2013 involving oxy-fuel combustion capture followed by storage in a depleted reservoir. We systematically examine the possibility of reinjecting CO₂ from the fields we produce and are looking at ways to use it to enhance oil recovery. Based on our experience, we feel that further R&D is required in a variety of areas, including the maturity of capture technologies, carbon use, technical feasibility at the scale of current needs, and reducing the cost of

these technologies. To that end, we will allocate up to 10% of our R&D spending for CCUS. We have also begun working alongside our peers within the Oil & Gas Climate Initiative on commerciality issues, capture technologies and global storage capacity.

Advocating for Carbon Pricing

Clear economic signals over the medium to long term are vital to reduce greenhouse gas emissions.

We encourage the development of linked carbon pricing mechanisms in the main economic regions.

A price of between USD 30 and USD 40 per ton would be enough to:

- Promote the switch from coal to gas; gas emits only half as much CO₂ as coal in power generation.
- Steer investment toward the technologies required to reduce emissions, such as carbon capture, use and storage.

Around 40 regions and countries and 20 cities have already implemented a carbon pricing mechanism or are planning to do so¹.

Generally speaking, clear rules are needed to support the transition to a lower-carbon economy. They must provide information on public policy, facilitate long-term investment and prevent unfair competition. International carbon credit mechanisms must also be maintained and/or implemented to foster the development of projects offering the highest emissions cuts at the lowest cost.

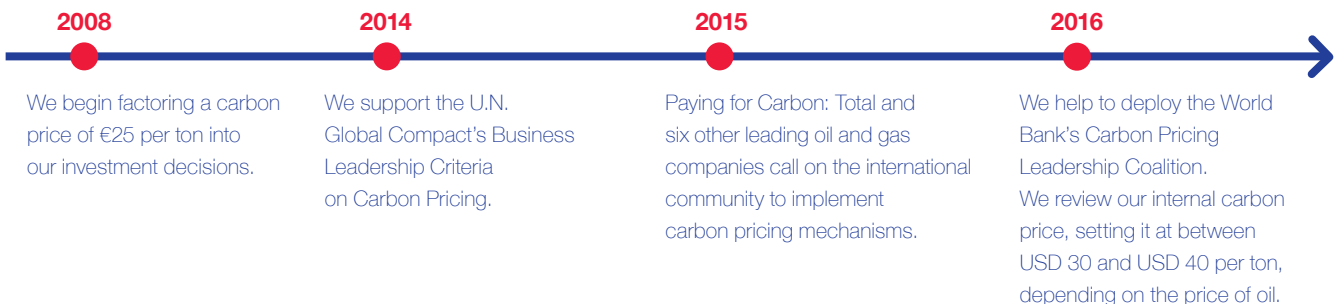
We participate constructively in discussions with the public authorities, associations and our peers to share our ideas and recommend solutions.

LOBBYING ETHICS CHARTER

We have adopted a lobbying ethics charter that is published on our website. It governs our practices and ensures that our publicly stated positions are consistent with those conveyed through our lobbying, either directly or indirectly, through professional organizations or associations. The consensus required by these organizations does not always reflect our position. In such cases, we believe that it is preferable to promote our ideas from within by working to convince our peers of our position, rather than leave the discussions. Our participation in these organizations, beneficial in many ways including sharing of best practices, does not prevent us from publicly defending our positions, even when they differ from those of the organizations to which we belong. In the event of a difference, Total's position prevails. Mindful of the need to be fully transparent on climate-related issues, we are committed to publishing a list of all of the professional organizations and associations of which we are a member.

Long-Standing Involvement

We have campaigned for the introduction of carbon pricing since 2008.



¹ More generally, several countries that have filed their Intended Nationally Determined Contributions (INDC) have declared that they are in favor of market mechanisms.



Encouraging a Collective Approach

The response to the 2°C scenario challenges must also be collective. Two in particular require public and private sector participation: eliminating routine flaring and managing methane emissions. To speed up progress, we are actively involved in these areas, through international organizations and initiatives.

10 Companies Committed to the Climate

The industry-driven Oil & Gas Climate Initiative (OGCI) was announced during the United Nations Climate Summit in New York on September 23, 2014. The Initiative currently has 10 members, all major international companies, that together represent around 20% of global oil and gas production.

The CEO-led OGCI aims to catalyze collective action by those most committed to addressing climate change and to advance technological solutions through collaborative programs. As a founding member, we engaged fully in the initiative's launch and development. We are working with our peers to further topics such as the role of natural gas; carbon capture, use and storage; carbon reduction instruments and mechanisms; and long-term energy solutions.

In October 2015, following their initial work, the chief executives of the member companies met with a panel of prominent experts to discuss major political, scientific and economic issues related to

climate change and agree on the added efforts that would need to be made by our industry. After calling for an ambitious COP21 agreement in its first report, the OGCI and its members welcomed the successful outcome of the negotiations and defined a working program for this year based on three main priorities:

- Creating a shared roadmap to reduce emissions in line with the 2°C target.
- Conducting carbon capture, use and storage R&D.
- Developing a global database and effective measurement tools for methane emissions.

TOTAL ALSO SUPPORTS THE FOLLOWING ORGANIZATIONS AND INITIATIVES

- The World Bank's Zero Routine Flaring by 2030 initiative
- The Climate and Clean Air Coalition's Oil & Gas Methane Partnership
- The U.N. Global Compact's Caring for Climate initiative
- The Paris Pledge for Action to limit the average global temperature rise to less than 2°C
- The French Business Climate Pledge, a commitment by 39 French companies to combat climate change
- A Coalition to Contribute to Universal Access to Energy, bringing together 25 international businesses and organizations
- The Terrawatt Initiative, which brings together key players in the private sector to promote affordable solar energy around the world

3 QUESTIONS FOR

CHRISTIANA FIGUERES

Executive Secretary of the United Nations
Framework Convention on Climate Change



**“The energy sector
needs to move
very quickly.”**

**What was the biggest win
at COP21?**

There were many significant wins at COP21, but perhaps the most powerful expression of determination was the Paris Agreement that set a final destination or end point of efforts to reduce emissions. Governments agreed to reestablish the ecological balance of the planet by agreeing to drive down emissions so low that by the second half of the century all greenhouse gas emissions can be safely absorbed by natural systems such as forests or soils. It's what we have to keep in mind in our business planning. For the energy sector it means moving very quickly from high-carbon to low-carbon and eventually to zero-carbon business models.

**What is key to a successful
transformation?**

The required pace of transformation means that everybody needs to be doing much more, faster. The oil and gas sector has identified some of the things that they can and should be doing. One is investing in carbon capture, use and storage. As a whole we're not investing enough into this;

it's still very expensive and the progress is disappointingly slow, both in terms of reducing costs as well as increasing the safety of storage.

The second urgency is investing in renewables. Total has adopted the vision to move into renewables and to integrate gas and renewables in a holistic way. There is much to be done in that field and it is critical that this happens fast. The third area is the elimination of methane emissions.

**How can industry work with
governments to advance action?**

Nothing will be done unless there is a good collaboration between government and the private sector including governments providing the necessary incentives, and private sector boldly moving forward. Some 60 jurisdictions have put carbon pricing in place, but we don't have a carbon price everywhere, which would be enormously helpful. We have actually undervalued every ton of CO₂, and that has huge costs. We have to begin to act very differently and understand that for every ton of CO₂ that we do emit, we have to get much more

productivity out of it. In fact, by some estimates we should be increasing the productivity of each ton by a factor of 15. One of the problems is that the private sector has not provided a consistent signal to governments: on the one side, some companies put pressure on governments not to establish carbon policies and on the other side, there is an invitation to move to a level playing field. The oil and gas industry in particular has a huge opportunity to give one consistent voice to governments. It is in the oil and gas sector's interest to increase the pace while also deploying its amazing technological engineering skills to push forward innovations and solutions to the challenges of this, rather than the last, century.

Taking Action Today

Conscious of the part we play, we take action across our value chain to reduce our impact on the climate and promote the responsible use of energy.

What actions have we already implemented?
Where do we stand in relation to our objectives?
How are we taking into account the implications of the 2°C scenario for the oil and gas market?

Integrating Climate into our strategy

Improving the Carbon Intensity of Our Production Mix

Become the responsible energy major “More than 60% gas in our hydrocarbon production mix in 20 years’ time.”



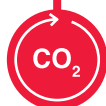
Deploying an assertive strategy in gas, while limiting methane emissions

[P. 24-25](#)



Selecting and developing safe, environmentally responsible, competitive oil and gas projects

[P. 26](#)



Expanding carbon capture, use and storage technologies

[P. 34-36](#)



Publicly supporting the implementation of carbon pricing mechanisms

[P. 16](#)



Exiting the coal business

We ceased coal production following the sale of our affiliate Total Coal South Africa in August 2015. We will also be withdrawing from coal marketing by the end of 2016.



Encourage sector initiatives and collectively engage to address climate issues

[P. 17](#)

A NEW STRATEGY & CLIMATE DIVISION

In 2016, strategy and climate are being combined in a single division as part of an organizational renewal.

Developing Renewable Energies

“20% low-carbon businesses in 20 years’ time”



Growing as a top three solar player by expanding our activities across the photovoltaic chain, including distribution

P. 28-29



Adding energy storage to our businesses

P. 29



Developing bioenergies

P. 30



Promoting access to energy

P. 29

A STRATEGY COMMUNICATED TO SHAREHOLDERS

In February 2016, during the full-year 2015 results presentation, Patrick Pouyanné outlined the key points of Total's strategy, built on a 2°C roadmap.

Improving Energy Efficiency

Promote responsible energy use in our operations and by our customers



Continuing our efforts to reduce greenhouse gas emissions at our facilities

P. 23 and 31



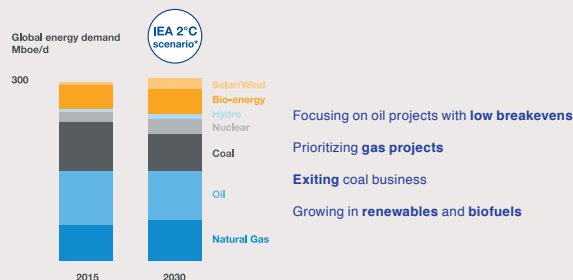
Providing solutions (products and services) to encourage responsible energy use by our customers

P. 32

EXCERPT FROM THE 2015 RESULTS PRESENTATION

Group strategy integrating 2°C roadmap

Sustainable business model



Our Production Mix for 2035

A Target Consistent with the 2°C scenario

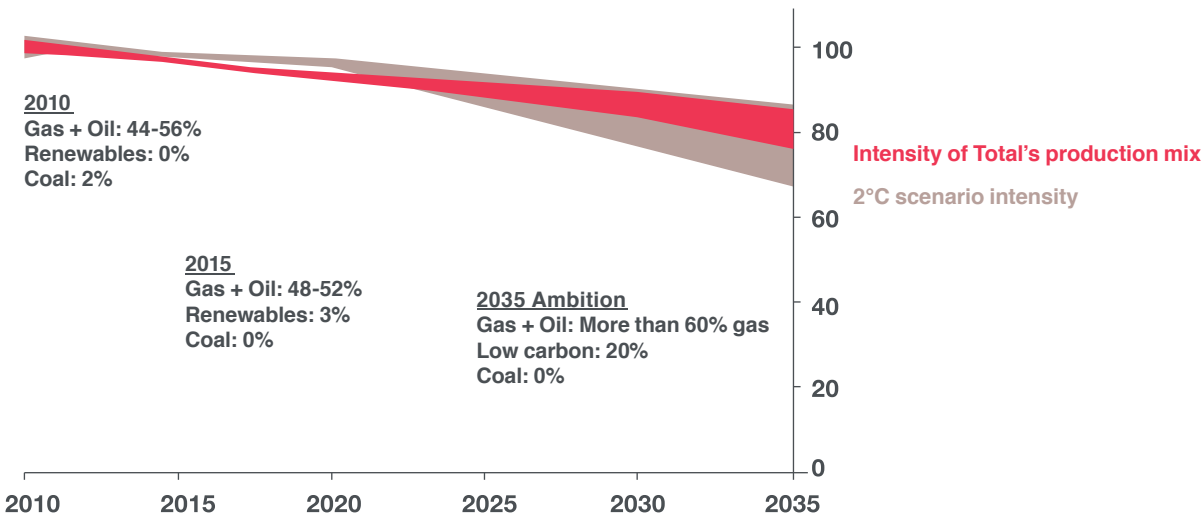
Integrating climate issues into our strategy goes beyond reducing emissions at our facilities. It also involves gradually decreasing the carbon intensity¹ of our production mix. We take the 2°C scenario into account in our strategy.

To do this, we compare the change in the carbon intensity of our projected growth profile for primary energy production to the change in carbon intensity under the 2°C scenario, on a like-for-like energy basis (coal, oil, gas, solar, wind power and biofuels).

¹The carbon intensity of our primary energy production mix is the ratio between:
- CO₂ emissions across the entire life cycle of products, limited to the year in question if necessary
- primary energy production related to these products during the year in question.
We express carbon intensity in kgCO₂/toe of primary energy.

**Carbon Intensity of Total's Primary Energy Mix
Versus the Energy Mix Outlined in the 2°C scenario***

base 100 IEA 2010; ranges determined by the emissions factors selected and Total's energy mix scenarios
* With the methodological support of French carbon strategy consultant Carbone 4, which also conducted an audit.
This methodology is still under development.



Our Operated Scope

Greenhouse Gas Emissions Down 19% since 2010

For almost 10 years, we have published our improvement objectives and reported on our achievements annually, listing the difficulties encountered and outlining our future actions.

In 2015, our direct greenhouse gas emissions amounted to 42 MtCO₂-eq in our operated scope, down 19% from 2010.

Our emissions can be broken down as follows: 46% from our Exploration & Production segment and 53% from our Refining & Chemicals segment. The Marketing & Services segment accounted for around 1%.

The three main sources of these emissions are fuel combustion (59%), industrial processes (19%) and flaring (18%).

We continue to cut greenhouse gas emissions in our operated scope by focusing on two main areas:

- Reducing routine flaring in our production activities.
- Improving energy efficiency at our facilities.

Zero Routine Flaring by 2030

We have long been committed to reducing routine flaring.

In 2000, we pledged that this practice would be eliminated in new developments.

In addition, we worked with the World Bank to create and launch the Zero Routine Flaring by 2030 initiative bringing together oil and gas companies, producing countries and international institutions to support flaring reduction. We were the first company to adhere to the initiative, in 2014.

Between 2005 and 2015, we reduced flaring, excluding initial start-up, at our operated facilities by more than 50%.

A New Energy Efficiency Target for Our Facilities by 2020

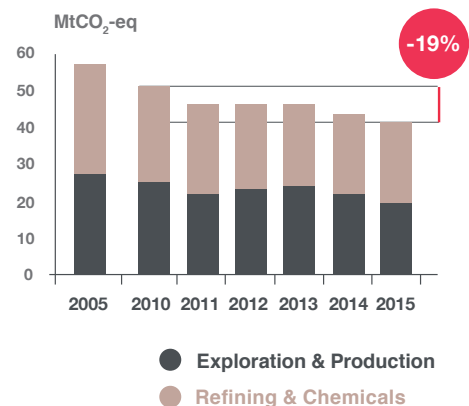
We have reduced our net primary energy consumption by over 10% in 10 years, and by 3% since 2010. Energy efficiency is a key factor in improving our financial, environmental and industrial performance. Since 2010, it has improved by more than 6%.

🔦 In early 2016, we set a new target of an average 1% per year improvement in the energy efficiency of our facilities from 2010 to 2020, despite the increasingly complex operating environment.

🔦 To achieve this goal, we set an objective to reduce routine flaring by 80% from the 2010 baseline over the period 2010-2020.

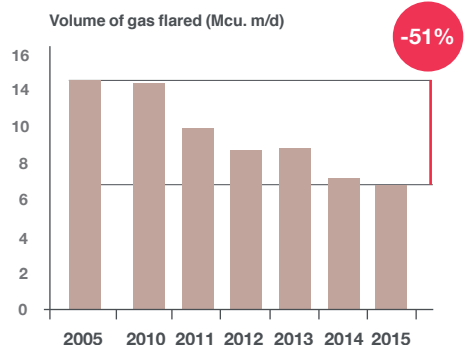
1- Change in GHG Emissions

per segment within the operated scope



2 - Change in Flaring

(operated scope, excluding start-up flaring)



OPERATED VS. NON-OPERATED SCOPE

Operated scope reporting reflects the efforts we undertake regarding the assets we operate. For non-operated assets — those in which we have a working interest only — we responsibly challenge environmental performance.

Limiting Methane Emissions

Natural gas will play a pivotal role in the fight against climate change. Substituting natural gas for all coal used in power generation would reduce global CO₂ emissions by approximately 5 billion tons per year¹, or around 10%. However, increasing the share of gas in the energy mix must go hand-in-hand with limiting methane emissions.

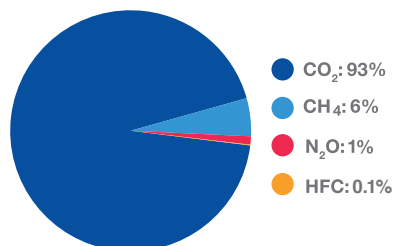
Methane's global warming potential is higher than that of carbon dioxide.

To maintain the advantage gas offers over coal in terms of reduced greenhouse gas emissions when used in power generation, methane emissions associated with its production and transportation must be limited.

- ❗ Methane emissions in our operated scope stood at 2.3 Mt CO₂-eq in 2015. Nearly half, or 1.1 Mt CO₂-eq, were specifically related to gas production. In all, they account for less than 0.5% of Total's marketed operated production. Improving methane measurement and mitigating these emissions are environmental priorities for Total.

GHG Emissions

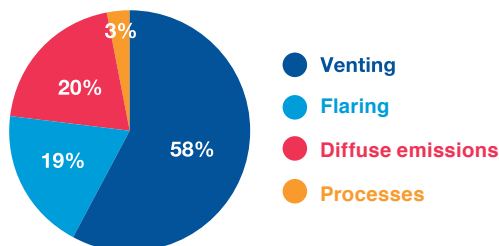
(operated scope): 42 Mt CO₂-eq in 2015



Direct Emissions of Methane (CH₄)

associated with Total's production of gas

(operated scope): 1.1 Mt CO₂-eq in 2015



¹ Source: IEA – CO₂ Emissions from Fuel Combustion 2014.

Removing Uncertainty Surrounding Global Data

Reliable data is crucial to industry-wide progress on this issue.

Global methane emissions are primarily extrapolated from U.S. data. Additional estimates that are more representative of global production are required to reduce uncertainty where emission calculations are concerned.

In 2014, we decided to step up our involvement in this field by becoming one of the first members of the Climate & Clean Air Coalition² Methane Partnership between governments and industry to improve methane emission measurement and control methods.

In addition, in 2016, the OGCI plans to launch a program to improve knowledge of methane emissions in the oil and gas industry beyond the United States and to help develop reliable, low-cost continuous emissions detection technologies for facilities.

² CCAC, promoted by the United Nations Environment Programme (UNEP) and the Environmental Defense Fund (EDF), a U.S.-based nonprofit environmental advocacy group.

Advantages of Gas Over Coal

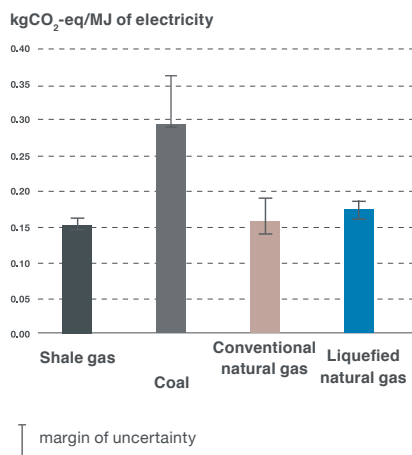
In 2015, we carried out studies with CIRAIG⁴ comparing the use of coal and gas for power generation. They found that, over the full life cycle, gas emits around half as much greenhouse gas as European domestic coal. This proportion is unvarying even in the case of coal-fired plants equipped with supercritical steam generators. Despite genuinely improved efficiency, the gap in emissions between gas and coal is not significantly narrowed.

If coal-fired and gas-fired plants with the same capacity were combined with a carbon capture and storage solution, the amount of carbon to be captured, transported and stored would still only be half as much for the gas-fired unit. The electricity generated by the gas-fired plant would be more cost-competitive, despite the higher cost of capture due to the more diffuse concentration of emissions.

This would remain the case even when carbon storage facilities were located at some distance from the emissions sites or if storage capacity were limited.

In addition, on average, gas-fired power plants have a much faster restart time and can build up to full capacity twice as fast as coal-fired plants. Pending the development of electricity storage capacity to meet demand, these advantages make gas-fired plants the ideal solution to partner renewables to offset their variability.

2015 CIRAIG Study



Power Plant Comparison

	Gas	Coal	Nuclear
Minimum restart time (hours)	1-3 hrs.	approx. 5 hrs.	approx. 10 hrs.
Ramp up (%/minute)	8-10%/min.	2-4%/min.	3-5%/min.

⁴ International Reference Centre for the Life Cycle of Products Processes and Services, Polytechnique Montréal engineering school in Canada.

A Resilient Portfolio

The 2°C scenario highlights the fact that a part of the world's fossil fuel resources cannot be developed. Total's growth strategy takes this into account.

In today's challenging production environment, we are prioritizing our projects and focusing on moderately priced production and processing assets that meet the highest environmental and safety standards.

On that basis, in 2015 we decided to reduce our exposure in Canada's oil sands, which are particularly expensive to develop and operate. We also confirmed that we do not conduct oil exploration or production operations in the Arctic ice pack.

In addition, to ensure the viability of our projects and our long-term strategy with regard to climate change issues, we apply an internal CO₂ price of USD 30 to USD 40, depending on the oil price scenario or the actual price if it is higher in a given country, when evaluating our investments. This is consistent with our support for mechanisms to replace coal with gas in power generation and our investment in R&D on low-carbon technologies.

 **Studies have shown that a long-term CO₂ price of USD 40 per ton¹ applied worldwide would have an impact of around 5% on Total's discounted present value (upstream and downstream assets²). Our portfolio can therefore be considered resilient under such a scenario.**

¹ Effective from 2021, or the current price if higher in a given country.

² Sensitivity calculated for a crude oil price of USD 60 to USD 80 compared to a reference scenario that includes a CO₂ price in regions already covered by carbon pricing mechanisms.

Facilities That Can Withstand Natural Disasters

The models produced by the Intergovernmental Panel on Climate Change (IPCC)¹ anticipate increasingly significant natural impacts over the coming decades as the global temperature gradually increases. We assess the vulnerability of our facilities to these events, which include rising sea levels, hurricanes, flooding and droughts.

In accordance with generally accepted practices, we take the risk of natural disasters into account when designing industrial facilities. These risks can be climate-related; they can also include seismic, tsunami, soil strength and other risks. Meteorological and, where applicable, oceanographic measurements taken on site are supplemented by satellite data and climate models. These data are used to develop statistics describing normal operating conditions and extrapolate extreme, centennial and over 10,000-year conditions. Facilities are designed to withstand both normal and extreme conditions, by building in appropriate safety margins.

In addition, our internal procedures specifically call for the systematic assessment of the possible repercussions of climate change on our future projects. In-depth studies are carried out when the potential risk is significant relative to the existing safety margin. Our analyses include a review by type of risk — sea level, storms, temperature change and melting permafrost, among others. They also take into account the life span of our projects and their capacity to gradually adapt.

To date, these studies have not identified any facilities that cannot withstand the consequences of climate change.

With our partners, we also conduct studies focusing on a given region or topic. For example, through the CASE² consortium, we took part in a study led by RPSEA³ on how climate change affects hurricanes in the Gulf of Mexico. We are also involved in the European Union CLIM4ENERGY project, to better understand the potential effects of climate change on our North Sea platforms.

Additionally, we lead an IPIECA⁴ task force focused on best practices and adapting oil and gas facilities to climate risk.

¹ The IPCC brings together several hundred international researchers and is the acknowledged authority on climate science.

² Climatology and Simulation of Eddies.

³ Research Partnership to Secure Energy for America.

⁴ The global oil and gas industry association for environmental and social issues.

A Solar Leader

As a top-tier energy player, we view our contribution to developing new energies as both a strategic choice and an industrial responsibility. Through our affiliate SunPower, we rank among the top three globally in the solar industry and are expanding across the entire value chain.

Total designs and manufactures photovoltaic cells, build utility-scale solar power plants and market integrated solar solutions for distributed power generation. Our affiliate SunPower is currently the global leader in solar technology. Its Maxeon® solar cells are the best in the market, with a conversion efficiency of 25%. Solar panels equipped with this technology produce 1.7 times more energy than conventional panels of the same size. Lowering manufacturing costs and improving photovoltaic cell conversion efficiency will enhance the competitiveness of solar energy

without subsidies. This is already the case in around 20 countries, and this trend is expected to continue driving market growth of over 10% a year. Consequently, SunPower plans to triple its manufacturing capacity in the coming years to meet this demand. Supporting this growing market is part of our strategy to increase the share of low-carbon businesses in our portfolio to around 20% in 20 years.

6 GW+
deployed worldwide

DEVELOPING WORLD-CLASS SOLAR FARMS

Connected to the grid in mid-2015, the Solar Star Projects in California can power 255,000 homes with its 1.7 million panels. In doing so, it avoids CO₂ emissions equivalent to the amount generated by a city the size of Buenos Aires. Continuing its strategic development, in March 2016 SunPower announced a partnership with ISE Group to build photovoltaic solar power plant in Japan with more than 80,000 panels to supply electricity to over 8,900 homes via the regional power grid.



Preparing the Solar Energy of the Future

To gradually build an innovative offering to help customers optimize their consumption, SunPower has made several acquisitions in the energy management and storage sectors. As part of this “Smart Energy” strategy, it recently introduced a new service that includes onsite solar energy production for facility needs and is also planning to expand into smart energy management, storage and distribution to the grid.

ENERGY STORAGE:

TOTAL PLANS TO ACQUIRE SAFT

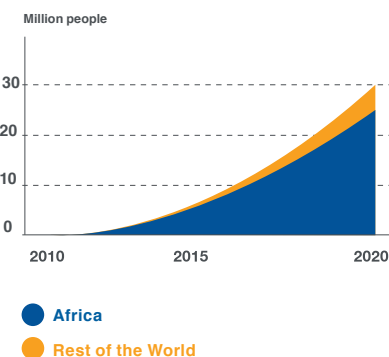
“As part of Total, Saft will spearhead our growth in the electricity storage sector,” commented Patrick Pouyanné, Chairman and CEO of Total. “The acquisition of Saft is fully aligned with our ambition of growing in renewable energies and electricity, a process initiated in 2011 with the acquisition of SunPower. Saft is an industrial flagship recognized globally for its technological know-how. It develops innovative, competitive solutions for its customers. Saft will allow us to add electricity storage solutions to our portfolio, necessary to the future growth of renewable energies.”

Solar Solutions for Access to Energy

Our ambition is to provide access to energy to

25 million
people in Africa by 2020

People Reached by Our Access To Energy Program



After more than a decade of examining ways to provide access to energy in our host countries, in 2011 we launched a program to market distributed solar solutions in growth countries. Against a backdrop of fast-paced energy demand in emerging economies, these solutions meet the needs of communities with little or no access to the grid. The use of a renewable, modern and reliable source of energy also avoids emissions associated with the use of the traditional energy sources that they are replacing.

At the end of 2015, the Awango by Total range of solar solutions for lighting and cell phone charging was available in over 30 countries in Africa and in Asia, providing

access to electricity to more than 6 million people.

Based on a social business model, i.e. one that both addresses a social problem and is financially self-sustainable, we continue to expand our range of products by testing broader energy services with the help of multiple partnerships with large multinational institutions and small local businesses alike. For example, we are looking at products that make it possible to use several sources of light, fans and televisions, clean cooking options, new distribution models and financing solutions such as “pay as you go” schemes.



BIOTFUEL, A PILOT UNIT FOR ADVANCED BIOMASS

We are developing advanced biomass conversion processes on a commercial scale. To achieve this, we form R&D partnerships and acquire interests in start-ups working in the field.

After five years of R&D, construction of the BioTFUEL pilot plant has begun at our Dunkirk site in France. Production is set to begin in the first quarter of 2017. The project, which was launched with five European partners, aims to develop an innovative process to gasify biomass, such as agricultural by-products and forest waste, to produce high-quality biodiesel and biojet fuel.

TOTAL AND AMYRIS BIOJET USED FOR COMMERCIAL FLIGHTS

The drop-in renewable jet fuel developed by Total and Amyris, which contains up to 10% blends of biocomponents, obtained ASTM International certification in 2014, authorizing its use in civil aviation worldwide.

Since October 2014, Air France has used it for its demonstrations of eco-responsible technology. The fuel was used until January 2016 for weekly flights between Toulouse and Paris and will power 23 flights between Nice and Paris in May 2016.

Biofuels:

New Production Capacity

As a leading refiner, we are continuing to responsibly adapt our production base in Europe, against a backdrop of structural decline in demand for petroleum products. The fast-expanding biofuels market offers new opportunities. As a producer with over 20 years of experience and the leading marketer in Europe, we are well positioned to expand in this energy segment.

A Closer Look

Transportation accounts for almost one-quarter of energy-related greenhouse gas emissions and two-thirds of final oil consumption. Under the 2°C scenario, demand for liquid fuel for transportation is expected to remain relatively stable to 2035. The projected 20% drop in oil demand will mainly be offset by increased use of biofuels. At present, biofuels only account for 3% of global energy supply, but production is forecast to double over the next 10 years, particularly since the European Union is targeting 10% renewables in the transportation sector in 2020.

Sources: IEA - Energy Technology 2015 – World Energy Outlook 2015 – CO₂ Emissions from fuel combustion 2015.

LA MÈDE

A World-Class Biorefinery in France

To make our La Mède site in southern France sustainably competitive, we plan to convert some of its units to manufacture 500,000 tons of biofuels a year — mainly biodiesel, but also biojet fuel and feedstock for bioplastics — starting in 2017.

A high-quality biodiesel, hydrotreated vegetable oil (HVO), will be manufactured primarily from used oils, as well as renewable feedstock, thanks to new French technology developed by IFP Énergies Nouvelles and marketed by its affiliate Axens. The HVO's specifications comply with the sustainability criteria set out in the E.U.'s Renewable Energy Directive, known as RED¹.

To eventually diversify the sources and types of biomass used, the biorefinery is being designed to treat all types of oil.

¹ Directive 2009/28/EC on the promotion of the use of energy from renewable sources. Starting January 1, 2017, the greenhouse gas emission savings resulting from the use of biofuels must be 50% compared with the use of a reference fossil fuel, versus 35% today.

Promoting Responsible Energy Use

In addition to making a key contribution to achieving the 2°C scenario, energy efficiency drives operational performance. We continuously improve the energy efficiency of our facilities and develop products and services to help manufacturers and consumers optimize their energy use.

Improving Our Own Energy Efficiency

OFFSHORE

For certain offshore projects, such as Martin Linge in the Norwegian North Sea, the facilities are all-electric. The power is generated onshore, then transported to the platform via a subsea cable. Unlike the gas turbines usually used, this innovation means that consumption matches the facility's actual requirements.

By making smart choices about equipment and innovative technologies right from the project design phase, we have cut our energy use 10% since 2005.

By end-2016, we will have deployed energy management systems at all our main sites. These include:

- Energy audits to assess the amount of primary energy consumed by each site and identify where energy efficiency gains can be made.
- Energy improvement programs to reduce fuel and steam consumption by optimizing refinery operations. These programs also assess the potential installation of new equipment that maximizes heat transfer.
- Upgrading facilities by replacing older equipment with more efficient, less energy-intensive equipment.
- Preparing long-term investment plans for the sites.

REFINERIES

Since 2012, 30 energy efficiency projects have been rolled out at our various refineries. The €60 million invested has helped us to save roughly 60,000 tons of oil equivalent a year. The redesign of the distillation unit in Normandy in 2012, for example, improved its energy efficiency 22%.

We are also pursuing ISO 50001 energy management certification.

In 2015, our Leuna refinery obtained certification, as did several Marketing & Services sites: the Brunsbüttel bitumen plant in Germany and the Solaize research center, the Saint-Martin-d'Hères site and seven depots and 193 service stations in France. In the Exploration & Production segment, Total ABK in Abu Dhabi was certified in early 2016.

At our exploration and production sites, we are stepping up our efforts by reducing the routine flaring of gas from our production activities.

Reducing Our Manufacturing Customers' Energy Bills

To meet the needs and expectations of our customers from the manufacturing sector, we constantly expand our services offering by developing the most effective solutions to manage energy use. To help us do this, we rely on the expertise of TENAG, our German joint venture, and of recently acquired BHC Energy in France. We offer customers solutions to perform energy audits, deploy energy management systems and develop their employees' skills in these areas. Since 2011, our solutions have reduced our French customers' energy use by 10 TWh a year and have cut €150 million off our German customers' energy bills¹.

¹ In Germany, reductions in our industrial customers' consumption range from 2% a year for a water supplier to 3% a year for a chocolate maker, a pharmaceuticals producer and a flat glass manufacturer to 5% a year for a textile company and up to 13% a year in the agri-food sector.

MORE THAN 80 PRODUCTS AND SERVICES HAVE EARNED THE TOTAL ECOSOLUTIONS LABEL

Under this program, we develop innovative solutions that outperform the market standard in terms of environmental and health impact. In 2015, sales of Total Ecosolutions products and services avoided 1.7 million tons of carbon emissions across the entire life cycle, or the equivalent of the annual emissions of nearly 190,000 Europeans².

² Source: Eurostat: 2013 Greenhouse Gas Emissions Per Capita, EU-28.



Offering Eco-Efficient Products and Services

Around 85% of greenhouse gas emissions associated with oil and gas occur when finished products are used. That's why helping our customers reduce their energy use is a key focus of our efforts to curb emissions.

One way we aim to achieve this is through an array of sustainable transportation solutions.

New Product Ranges to Improve Fuel Efficiency

Two years of R&D went into developing TOTAL EXCELLIUM Next Generation fuels. Using these fuels keeps engines cleaner, reducing air pollutant and carbon emissions. The entire lineup has been awarded the Total Ecosolutions label.

The Fuel Economy lubricant range improves fuel efficiency by decreasing friction between engine parts. We are also developing lubricants that incorporate biocomponents to deliver enhanced performance.

Materials to Make Vehicles Lighter

We develop polymers using proprietary processes and formulations to provide manufacturers with cutting-edge

materials. Polypropylene body parts trim 100 kilograms off the weight of a standard vehicle, reducing fuel consumption by 0.4 liters per 100 kilometers and carbon emissions by 10 grams per kilometer.

Partnerships to Promote New Forms of Transportation

Attitudes, behaviors and use are changing fast, driven by the spread of new technologies and the sharing economy. We believe in the importance of this transformation and are teaming up with top-ranked players in the transportation sector. One example is our partnership with the French start-up BlaBlaCar, a global leader in ride sharing.

Preparing for the Future

What are the main R&D challenges associated with the transition to a low-carbon future?
How do we make sure we have the resources we need to innovate?
How are we investing to prepare for the future?

A CONVERSATION WITH

PHILIPPE BAPTISTE

Senior Vice President,
Scientific Development at Total

FRANÇOIS BADOUAL

Chief Executive Officer,
Total Energy Ventures

“Developing new types of collaboration to spur innovation”



Total has aligned its vision of the future with the 2°C scenario. What are the main challenges involved in terms of innovation and R&D?

Philippe Baptiste Access to affordable energy unlocks development for all. Our energy systems must continue to meet this basic need while transforming themselves to reduce their climate impact. As a developer of renewable energies, our R&D requirements are substantial, ranging from their production and storage to managing their variability. Another of our challenges is mitigating the climate impact of oil and gas. In the short term, improving energy efficiency is unquestionably one of the key ways for us to do this. But we also need to find solutions that will allow us to continue to use oil and gas, by reducing or even offsetting their carbon footprint. This is a major global issue, because these sources of energy offer unequaled advantages, particularly in terms of energy content, easy storage and cost competitiveness. That's why we must increase our R&D investments in carbon capture, use and storage (CCUS) technologies. What's clear today is that there isn't just one energy pathway for the future, but many. Over the past 10 years, not only have we stepped up our R&D efforts, we have also added more fundamental research to support our applied research. We are also more able

to tap into the innovation capabilities of start-ups through Total Energy Ventures (TEV).

François Badoual Innovation is not just the prerogative of big companies, academics and major R&D programs. Being an innovative company today means being open to new types of collaboration with start-ups and being inspired by their agility, freedom and boldness.

Does TEV allow you to get the jump on disruption?

FB Our focus is increasingly turning to start-ups whose disruptive innovations can potentially become new growth drivers. Our value-added lies in helping them speed up the industrial and commercial rollout of their creations. Since 2009, we have invested USD 150 million in 25 start-ups. Twenty-one are still active in our portfolio and represent a host of opportunities for the future. Our development capital activities make it possible to discern trends. For example, as early as 2005, growing global climate concerns spurred the emergence of a certain number of cleantech solutions, first in the biotech sector, and now, over the past four years, in the energy storage sector. Our activities can give us a head start and allow us to invest in promising technologies very early on.



François Badoual

Is storage the primary focus for your expansion in solar?

PB It's an important area, but not the only one. There's also a lot we need to look at in photovoltaics itself as new technologies emerge that are more efficient for longer. But yes, storage is a major focus. It's the key to developing photovoltaic solar power on a large scale — something that is true for most renewables. We know that disruptive technologies will make an appearance, but we don't know when or what they will be. That's why diversifying our options is so critical. Bringing renewables to the grid is also becoming a strategic way of our achieving our goal. Tomorrow's grids will have to be able to manage a number of factors: diverse energy sources, such as gas and solar, renewables' variability, and more distributed generation because anyone can become a producer simply by installing solar panels on their rooftops. We need to deepen our understanding of smart electricity systems to optimize grid performance. Naturally, digital technology will play a significant role.

What are you concentrating on in the area of energy efficiency?

PB Energy efficiency is a source of continuous improvement, because it's also a way to make our facilities more profitable. In the Refining & Chemicals segment, energy costs make up a significant share of our operating expenses. We plan to continue improving our processes and

the design of our facilities, while looking at other, broader ways of making our operations more efficient. For example, there have been some interesting reports from eco-industrial parks where different companies pool material and energy flows. We are currently working on this subject with Paris-Saclay Energy Efficiency (PS2E), a research and training institute of which we are a founding partner. We can also help customers reduce their energy use by making our products more energy efficient. This is achieved through different formulations and by developing new molecules for our fuels and lubricants.

FV Thanks to TEV and our investment in the Ecomobility Ventures fund, we can support the development of start-ups that promote new practices and business models in the transportation sector. One example is France's OuiCar, a peer-to-peer car sharing service.

R&D spending of

USD 7.4 billion

between 2015 and 2019, including 25% on cleantech and environmental issues.

USD 150 million

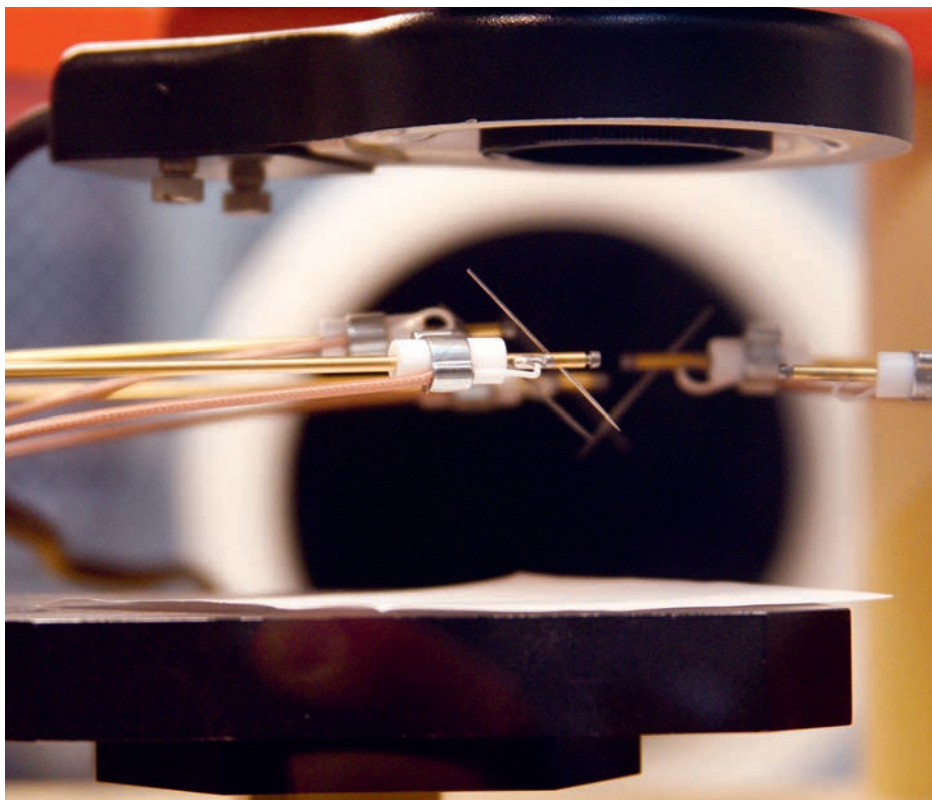
invested in minority interests in 25 innovative start-ups addressing the energy issues of the future.

1,000 R&D partnerships

with other industrial companies, universities and dedicated research organizations.

Close to

4,500 R&D employees



Earlier you mentioned stepping up research into carbon capture, use and storage (CCUS) technologies. What is the outlook in this field?

PB From a technology standpoint, we already know how to capture and store carbon. The main purpose of research now is to lower costs, which are currently too high. Also, there is still some uncertainty surrounding how regional and global storage capacity is measured. And there are major social issues to be addressed. The successful dialogue during our pilot project in Lacq, France provided us with valuable input regarding the types of questions raised by local communities. However, we're still in the very early stages of research into carbon use. To accelerate the emergence of technologies, we will be committing up to 10% of our R&D budget to this field.

FB There is a whole ecosystem of start-ups dedicated to CCUS technologies. We have invested in Solidia, which is developing a new cement and concrete chemistry. Their technology can reduce the carbon footprint of the concrete industry by up to 70% and is a brand-new way of using CO₂. More generally, our support of the 2°C trajectory could help to forge new partnerships that would provide extremely innovative solutions to address all climate issues.

Our Figures

As part of our continuous improvement process, we report our results publicly. We rely on best reporting practices that make it easier for stakeholders to assess our performance.

Reporting Frameworks

Cross-Reference Table¹

	Page(s)	IPIECA Climate Change Reporting Framework	CDP Climate Change Reporting Guidance 2016		
A CONVERSATION WITH PATRICK POUYANNÉ	5 -9	Topic: 1	CC2.2 CC2.2a	CC2.2c CC2.2d	
THREE QUESTIONS FOR PATRICIA BARBIZET	10	Topic: 2	CC1.1 CC1.1a	CC1.2 CC1.2a	
ADVOCATING FOR CARBON PRICING	16	Topic: 3 and 7	CC2.2c CC2.2d CC2.3	CC2.3a CC4.1 CC13.1	C13.1a-b CC13.2 C13.2a
ENCOURAGING A COLLECTIVE APPROACH	17	Topic: 1 and 3	CC2.1c CC2.2 CC2.2a CC2.2c	CC2.2d CC2.3 CC2.3a-f CC4.1	
INTEGRATING CLIMATE INTO OUR STRATEGY	20-21	Topic: 6	CC2.2a CC3.1 CC3.1a-e CC3.2 CC3.2a	CC3.3 CC3.3a-c CC14.1 CC14.4	
FORECASTING OUR PRODUCTION MIX	22-23	Topic: 9	CC7.1-7.4 CC8.1-8.5 CC9.1 CC9.1a CC9.2	CC9.2a-c CC10.1 CC10.1a CC10.2 CC10.2a	CC11.1-11.4 CC14.1
GREENHOUSE GAS EMISSIONS IN OUR OPERATED SCOPE					

¹ The cross-reference table above is based on IPIECA's Climate Change Reporting Framework, the pilot version of which was published in December 2015, and on the CDP's Climate Change questionnaire (Total's full response to the questionnaire for 2015 will be published on our website, www.total.com, on June 30, 2016).

	Page(s)	IPIECA Climate Change Reporting Framework	CDP Climate Change Reporting Guidance 2016		
LIMITING METHANE EMISSIONS	24-25	Topic: 4	CC2.1 CC2.1b-c		
A RESILIENT PORTFOLIO	26-27	Topic: 4 and 5	CC2.1 CC2.1b-c CC3.3c	CC5.1 CC5.1a-c CC6.1	CC6.1a-e
A SOLAR LEADER	28-29	Topic: 4	CC2.1 CC2.1b-c		
BIOFUELS: NEW PRODUCTION CAPACITY	30	Topic: 4	CC2.1 CC2.1b-c		
PROMOTING RESPONSIBLE ENERGY USE	31-32	Topic: 4	CC2.1 CC2.1b-c	CC2.2a	
A CONVERSATION WITH PHILIPPE BAPTISTE AND FRANÇOIS BADOUAL	34-35	Topic: 8	CC3.3c		
INDICATORS	40	Topic: 9	CC7.1-7.4 CC8.1-8.5 CC9.1 CC9.1a	CC9.2 CC9.2a-c CC10.1 CC10.1a	CC10.2 CC10.2a CC11.1-11.4 CC14.1
ASSURANCE	Registration Document 2015, p.159	Topic: 10	CC8.6 CC8.6a CC8.7 CC8.7a	CC8.8 CC14.2 CC14.2a	

Indicators

	2010	2011	2012	2013	2014	2015
SCOPE 1 Total direct greenhouse gas emissions (operated scope) (Mt CO ₂ -eq)	51.6	46.3	47.0	46.0	44.3	41.8
BREAKDOWN BY SEGMENT (Mt CO₂-eq)						
Upstream (E1–C3) ¹	26.0	22.1	23.4	23.5	22.1	19.3
Refining & Chemicals (E1–C3)	25.4	24.0	23.4	22.3	22.0	22.3
Marketing & Services (E1–C3)	0.2	0.2	0.2	0.2	0.2	0.2
BREAKDOWN BY REGION (Mt CO₂-eq)						
Europe (E1–C3)	25.6	23.8	22.8	22.1	21.2	22.3
Africa (E1–C3)	16.0	11.9	14.2	14.7	14.2	11.6
Americas (E1–C3)	3.7	3.9	3.7	3.7	3.8	3.8
CIS and Asia (E1–C3)	3.7	3.4	3.5	3.6	3.8	3.3
Middle East (E1–C3)	2.4	3.3	2.8	1.9	1.3	0.8
BREAKDOWN BY TYPE OF GREENHOUSE GAS (Mt CO₂-eq)						
CO ₂ (E1–C1)	47.6	43.1	43.5	43.5	41.3	38.9
Methane – CH ₄ (E1–C1)	2.8	2.6	2.8	2.0	2.5	2.3
N ₂ O (E1–C1)	1.2	0.6	0.7	0.5	0.5	0.5
SCOPE 1 Group's equity share of direct greenhouse gas emissions (Mt CO ₂ -eq)	59	53	53	51	54	50
SCOPE 2 Indirect emissions (E1–S1) (Mt CO ₂ -eq)	5.4	5.5	4.4	4.3	4.1	4.0
SCOPE 3 ² Other indirect emissions – Use of products sold (E1–S2) (Mt CO ₂ -eq)	630	600	560	550	550	530
Net primary energy consumption (operated scope) (TWh) (E2–C1)	157	158	159	157	153	153
Daily flaring (including routine, start-up, operational and safety flaring – operated scope) (E4–C1) (Mcu m/d)	14.5	10.0	10.8	10.8	9.8	7.2
GHG intensity of oil and gas produced (operated scope) (kg/CO ₂ -eq/boe)	22.6	21.6	23.7	24.2	25.4	21.8

¹ The references provided in parentheses refer to the 2015 edition of the Oil and Gas Industry Guidance on Voluntary Sustainability Reporting published by IPIECA, API and IOGP. E(x) refers to an environmental indicator. C(x) refers to a common reporting element. S(x) refers to a supplemental reporting element.

² For information purposes, we calculate and publish emissions related our products that undergo combustion. We use a simplified approach that applies emissions factors to our sales, because they exceed emissions related to our production and refining operations. This method is compliant with the oil and gas industry recommendations soon to be published in the form of a methodology guide.

Glossary

Unit of measurement

b	barrel
B or G	billion
boe	barrel of oil equivalent
CO₂-eq	CO ₂ equivalent
e	equivalent
Gt	billion tons
GW	gigawatt
k	thousand
M	million
Mboe/d	million barrels of oil equivalent per day
Mcu. m	million cubic meters
t	metric ton
TWh	terawatt-hour

Acronyms

CSR	Corporate Social Responsibility
HSE	Health, Safety & Environment
IEA	International Energy Agency
IOGP	International Association of Oil & Gas Producers
IPCC	Intergovernmental Panel on Climate Change
IPIECA	The global oil and gas industry association for environmental and social issues
OECD	Organisation for Economic Co-operation and Development
OGCI	Oil & Gas Climate Initiative
R&D	Research and Development
USD	Official abbreviation of the United States dollar

Definitions

Greenhouse Gas (GHG)

The six gases named in the Kyoto Protocol: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF₆), with their respective Global Warming Potential (GWP), as described in the 2007 IPCC report.

Operated Scope

The activities, sites and assets operated by Total S.A. or a company it controls, i.e. those that Total or a Total-controlled company operates or is contractually responsible for managing operations: 803 sites at December 31, 2015.

Operational/Non-Continuous Production Flaring

All flaring other than continuous or safety flaring. It is usually sporadic and carried out at high intensity for a short duration. It may occur on a planned or unplanned basis. It includes flaring carried out during temporary (or partial) failures of equipment used to process gas during normal operations and lasts until the equipment has been repaired or replaced.

Start-up Flaring

Commissioning new oil or gas production facilities generally takes several weeks. Flaring during this phase can take the form of each of the types of flaring mentioned above, until normal production starts.

More

Total is rolling out a new sustainability reporting and information process this year outlining our Corporate Social Responsibility. In addition to the Registration Document, all reporting information on this topic will be gradually be made available on our new Sustainable Performance website. All of our publications and the latest news and reports can still be found on our corporate website, www.total.com.



Registration Document

The Registration Document presents our activities and the financial statements for the year just ended. In application of France's Grenelle II Act, social, environmental and societal information is reported in Section 7. This information is audited by an independent external organization.

www.total.com/en/media/publications



Sustainable Performance

Total's new website dedicated to sustainability reporting went live in May 2016 and will be gradually updated between now and the end of the year. The website will focus on all of the CSR and sustainability issues we deal with, including safety, climate change, environmental protection, ethics, human rights and community engagement. The site will also feature our related policies, information on our initiatives and our performance indicators. It also makes our response to environmental, social and governance (ESG) reporting standards available to the public.

www.sustainable-performance.total.com

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This document was printed with vegetable ink on 100% recycled uncoated, natural white CyclusOffset, produced from recycled FSC-certified pulp, reducing pressure on the world's forests. The E.U. Ecolabel-certified paper was produced in an ISO 14001- and FSC-certified paper mill. The printer is certified as complying with Imprim'Vert[®], the French printing industry's environmental initiative.

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J. Barande / Ecole Polytechnique, B. Blaise, B. Cohen, Courtesy of BHE Renewables, M. Dufour, F. Lacour, M. Roussel, P. Sittler / Rea, P. Sordoillet, UNFCCC, L. Zylberman / Graphix Images.

DESIGN AND PRODUCTION

Mullen Lowe Paris / So Bam
Editorial Consulting: Terre de Sienne
Printing: Advence May 2016

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Additional information concerning factors, risks and uncertainties that may affect Total's financial results or activities is provided in the most recent Registration Document, the French-language version of which is filed with the French securities regulator Autorité des Marchés Financiers (AMF), and in Form 20-F filed with the United States Securities and Exchange Commission (SEC).

total.com



Supplying affordable energy to a growing population, addressing climate change and meeting new customer expectations are the three main challenges Total must meet as an energy major.

That is what guides what we do. With operations in more than 130 countries, we are a top-tier international oil and gas company. We are also a world-class natural gas operator and a global solar leader through our affiliate SunPower. Our activities span oil and gas production, refining, petrochemicals and marketing. Demonstrating their commitment to better energy, our 96,000 employees help supply our customers worldwide with safer, cleaner, more efficient and more innovative products and services that are accessible to as many people as possible.

Our ambition is to become the responsible energy major.



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