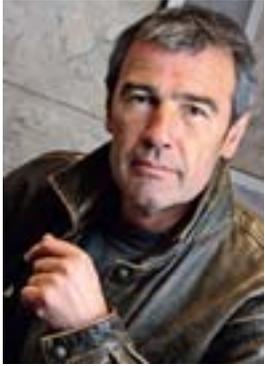




PERSPECTIVES 2010 / ANNUAL REPORT

# ENERGY IN MOTION



**MARC ROUSSEL**

A photographer, journalist and director for 20 years, Marc Roussel is a graduate of the École Centrale engineering school in Nantes and began his career in the nuclear power industry. He then created his own production company, specializing in corporate videos and TV documentaries. In 1991, he went into photojournalism, but has stayed in touch with the world of energy through his occasional collaborations with Total in particular. In 1995, he joined Agence Gamma, where he covers geopolitics in countries such as Afghanistan, Iraq and, more recently, Libya. In early 2011, he embarked on a "world tour of energy in motion" in five weeks, to illustrate this year's annual report.

**01 TOTAL IN BRIEF**

**02 A FULL TANK OF IDEAS**

**04 CONVERSATION WITH CHRISTOPHE DE MARGERIE**

/// Total's duty in terms of renewable energies is to move them forward, to second-, even third-generation solar power and to biomass that doesn't compete with food supplies. ///

**Christophe de Margerie,**  
Chairman and CEO

**10 KEY FIGURES, KEY PEOPLE**



- 12** Corporate Governance
- 14** 2010 Performance Measures
- 18** Shareholders' Notebook



**20 THE SHAPE OF OIL AND GAS TO COME**

- 22** Oil and Gas Are Not Going Anywhere
- 24** The Unconventional Revolution
- 28** Farsighted Projects
- 30** On the Hunt for New Fields
- 32** Safety Is Everybody's Business



**34 WIDENING OUR OPPORTUNITIES**

- 36** Adapting for the Long Haul
- 38** Big Projects for Emerging Markets
- 42** Responding to (R)evolutions

**44 THE ASCENSION OF ALTERNATIVE ENERGIES**

- 46** What Does the Future Hold?
- 48** A Place in the Sun
- 50** Finding Substitutes for Oil



**TRAVEL DIARY**

Check out the travel diary on the mini-site that accompanies this report: <http://annual-report.total.com>

## 54 THERE'S MORE

**56** An Integrated Business Model

**58** First-Quarter 2011 Highlights

**61** Glossary

**Words highlighted in black**

are defined in the glossary.



Use your smartphone to read this web link, found throughout the report, and go to the mini-site at:  
<http://annual-report.total.com>

## TOTAL IN BRIEF

Total is a leading international oil and gas company. Our mission is to meet the world's changing energy needs. To that end, we aim to offer a diversified energy mix – not just oil and gas, but also alternative energies such as solar and biomass. We are also a major chemical producer.

### WE ARE ACTIVE

#### IN THREE SEGMENTS:

**UPSTREAM** encompasses oil and gas exploration and production, liquefied natural gas, and alternative energies.

**DOWNSTREAM** spans the refining, marketing, trading and shipping of petroleum products such as automotive and other fuels, specialty products, LPG and lubricants.

**CHEMICALS** comprises Base Chemicals such as petrochemicals and fertilizers and Specialty Chemicals, which covers rubber processing, resins, adhesives and electroplating applications. Its products cater to both industry and consumers.

*To find out more, see the diagram of our activities on page 56.*

## OUR 2010 PERFORMANCE

**€159,269M**

SALES

**€16,273M**

GROSS CAPITAL EXPENDITURE

**€10,288M**

ADJUSTED NET INCOME

**92,855**

EMPLOYEES  
worldwide

WORLD'S

**5<sup>TH</sup>-RANKED**  
INTEGRATED, LISTED,  
INTERNATIONAL

oil and gas company

OPERATIONS  
IN MORE THAN

**130**  
COUNTRIES

# A FULL TANK OF IDEAS

You've seen Total service stations many times before. But did you know there are Total products in your children's diapers, your TV housing, computer or the tires of your bike? Let's take a brief stroll through an imaginary landscape for a quick glimpse of our products and services found in your daily life.

- 1** A Total Petrochemicals plastic is "FIFA RECOMMENDED" for use in artificial turf.
- 2** Since the Tour de France was created, 24 winners, including Alberto Contador and Lance Armstrong, have used Hutchinson tires.
- 3** Every Airbus 380 wing contains nearly 200 Hutchinson seal references.
- 4** Dole, the world's leading producer of fresh fruit, uses Total Special Fluids' Banole spray oil to protect its banana trees from black leaf streak, a destructive fungal disease.
- 5** Total has 17,490 service stations worldwide.
- 6** Cray Valley produces resins used in the solid fuel for the Ariane 5 launch system.
- 7** Bostik adhesives are used in 80 billion diapers a year, out of a global market of 110 billion.
- 8** Our oils protect fibers during industrial knitting, for instance to manufacture DIM® pantyhose and Petit Bateau® bodysuits.
- 9** 1,156 solar panels containing Photovoltech cells were installed in the new *El centre del món* train station and the surrounding commercial premises in Perpignan, southwestern France.
- 10** Atotech's electroplating expertise can be found in most electronic circuits and chips for cell phones, tablets and flat screen TVs.





Go to a more detailed version of this illustration on the mini-site that accompanies this report

Petrochemicals  
Fertilizers

Specialty chemicals  
Solar

Petroleum products and derivatives

Retail outlets  
Natural gas





// The world doesn't want prices to rise, even as the scarcity and growing difficulty of accessing energy sources pushes them inexorably higher. //

# ADAPTING TO THE EVOLUTIONS IN ENERGY

Will the world have enough fossil fuels to meet demand? How can we be smart about adding to the slate of existing energies? By posing such questions, Total is charting our strategy and opting for an identity as an energy company, not just an oil and gas company.

**T**he

global economic crisis is now behind us, but energy issues are more charged than ever. What does Total see as the major opportunities and risks ahead in the next five years?

A company like ours operates on a 25-year timeline. We're trying to determine how Total can evolve as an energy company and as a responsible company that points out the limitations of fossil fuel supply. The decisions we make today will take practical effect in five or ten years. And in order for things to change then, we have to make major decisions about investing in and researching the energies of



## INTERVIEW

**CONDUCTED BY STÉPHANE MARCHAND, engineer and economist by education, writer by calling and journalist by trade. He is currently the Editor-in-Chief of ParisTech Review and business commentator on the France 24 rolling news channel. After a lengthy stint at French daily Le Figaro as feature writer and Middle East and US correspondent, he was appointed First Assistant Editor. He has written a number of books, including Arabie Saoudite, la menace [Saudi Arabia, the Threat] and Quand la Chine veut vaincre [When China Wants to Conquer], published by Fayard.**

the future, today. And answer two questions right away: will there be enough fossil fuel to meet demand? And if not, how can we supplement it?

**You're looking ahead to the energy shifts that will take place in 2020-2030, while meticulously managing every detail of day-to-day business.**

An industrial company that doesn't pay attention to day-to-day operations, especially with respect to safety, has no future and all its long-term strategic planning is meaningless. Although the effects of our actions today won't be felt for another 20 years, we also have immediate demands, related to customer service, performance, cash flow and producing in a way that is acceptable to communities and society.

**This year's annual report is built around the theme of "energy in motion." What does that mean to you?**

For Total, "energy in motion" means, first, continuing to grow our reserves and production, developing →→→

our refining and chemical activities, and adapting them to the market. For our customers' sake. We're doing this in a new, sometimes contradictory environment. The world wants more and more and cleaner and cleaner energy. It also doesn't want prices and costs to rise too much, even as the scarcity and growing difficulty of accessing energy sources pushes them inexorably higher. Consumption is flat, even down, in mature economies, but it is on the rise in other parts of the world. "Energy in motion" means juggling all these trends at once.

**Demand for oil is sluggish in mature regions such as Europe, with its graying population, higher energy efficiency and stronger environmental concern, and robust in fast-growing emerging geographies such as India and China.**

I don't care for comparisons that are too simplistic: Europe and the United States – the mature West – versus high-growth emerging economies. They tend to overlook the fact that Europe is a vital component of our portfolio. Total has a significant presence in Europe, especially in refining and marketing, but also in chemicals. Logically, our presence is smaller in oil production, although the North Sea is and will long remain a major area of exploration and production development for us. We have to find **ways to maintain our activities in Europe**, and in mature economies in general, where energy use is declining, by choice incidentally, to tackle climate change. As for "emerging" economies, we really should update our vocabulary: China has "emerged." And let's not forget about Africa, home to a number of producing countries. Africa is an extraordinary growth region. Like-

wise, it's wrong to think about the Middle East solely in terms of production capacity. We must also count it as a major consumer market.

**Total's capital outlays are huge, about €16 billion in 2010. Do you plan to channel investment into one specific energy?**

Fossil energies will continue to meet the bulk of energy demand for a long time to come. They remain our core business, so it makes sense that most of our capital expenditure is directed to them. Development often takes substantial investment in terms of money and time. We announced capital spending of \$20 billion in 2011, of which 80% is earmarked for the Upstream. Most of this amount will be allocated to major development projects like Kashagan in Kazakhstan, Laggan and Tormore in the United Kingdom, Surmont in Canada, and Pazflor and CLOV in Angola. That said, we're also pursuing growth in alternative energies, even though our capital expenditure isn't on the same level.

**How much are you investing in renewable energies?**

Total is an energy company, but renewable energies can also be very expensive, especially for taxpayers via sizeable public subsidies. In order to finance them in the long term, you have to invest in R&D. That's where Total comes in. We aren't claiming we can become a solar or **biomass** leader overnight. We have set a different goal: to fairly quickly get those energies to the point where they can survive without subsidies. We aren't about to settle for developing business activities sure to be scooped up by

**AT END-2010, WESTERN EUROPE accounted for 85% of the refining capacity of Total, which operates nine refineries there. A network of more than 12,000 service stations, 56% of our Chemicals sales and 65% of our workforce are also in Europe. These figures clearly show that the region remains strategically important for us.**



“ Our job is to move things forward, to second-, even third-generation solar and to biomass use that doesn’t compete with food supplies.”

Asian competitors able to beat us in terms of cost effectiveness. That would be a big mistake.

#### Okay, but what will the “Total difference” consist of?

Our job is to move things forward, to second-, even third-generation solar and to biomass use that doesn’t compete with or raise the cost of food production. In short, to offer creativity and add value. That’s why we’re saying yes to alternative energies, yes to the capital outlays they require and yes to bringing in specialists in alternative energies. We want Total to be an architect, not a follower.

#### Total is an offshore and especially ultra-deep offshore expert. Has the 2010 explosion of the *Deepwater Horizon* drilling rig in the Gulf of Mexico put the brakes on projects or compromised the future of offshore drilling?

One year after that tragic accident, we’re as committed to the offshore as ever. I believe in the need to go after reserves wherever they are. It’s because we didn’t have enough access to the reserves of so-called “traditional” producing countries such as those in the Middle East that Total has always kicked it up a notch, exploring offshore fields in water depths of 80 meters, then 800 meters and →→→



// More and more women are working in positions of responsibility in exploration and production, including in complex places. //

now more than 2,000 meters – not to mention how deep they are below the seabed. For Total to stop pushing forward in the offshore would be like Airbus having decided to call it quits at the Caravelle instead of building the A380. Impossible to imagine!

**Refining in Europe and particularly in France is a tough industrial and social issue for Total. Is it inevitable that refining will shrink in Europe?**

“Inevitable” is probably the right word, though it seems a bit backward-looking to me. It suggests that the situation is outside our control, whereas “energy in motion” is a business principle that also applies to mature regions such as Europe or France, which incidentally is home to our largest base of refineries. The

need to adapt is definitely inevitable. Demand for energy is dropping, we need to produce less. That’s a fact we can’t ignore. If we continue to produce a surplus without being able to export, overcapacity could undermine the strength of the entire system. What’s more, in a world rightly demanding more energy efficiency, more respect for the environment and more climate responsibility, producing energy that won’t get used and the carbon emissions that go with it is really not what the public wants from us.

**For Total employees, this particular example of “motion” can sometimes be hard to take.**

Although it’s never pleasant to be caught up in a site closure, our employees won’t suffer too much because

we won't be laying anyone off. Let me repeat: refining is part of our business model and we believe in it. If we can't expand refining in Europe – which doesn't mean, once again, that we have to leave Europe – then let's look to other regions. I'm sorry if some people think that Total is expanding in Jubail, Saudi Arabia, because we don't want to in France. They're totally missing the point: there's oil in Jubail and we're close to the major consumer markets of Asia there.

**Total works in more than 130 countries worldwide. The company is quick to preach diversity. Yet its Executive Committee is not diverse. It is male, white and almost exclusively French.**

It's true, there are no women on the Executive Committee and its members consist of French nationals and one Belgian. We have some work to do. Change is a proactive, difficult exercise that we must keep plugging away at until we succeed. You can't just decide on a change and have it happen overnight.

**It starts with hiring.**

**Our diversity** will flow from internal vertical diversity, the kind that strives, at every reporting level, to give men and women of all nationalities an opportunity to advance. We must be able to tap the employee talent pools that we have, to place the best people in key company sectors. Things are changing. More and more women are working in positions of responsibility in **exploration** and production, including in complex places and major subsidiaries. We're starting to see real diversity emerge, based on personal abilities, capabilities and a difference. To be perfectly honest, we have made huge, but still insufficient strides.

**The European Union lacks a coherent energy policy, a security of supply policy, making it more vulnerable than other major economic**

**WITH A WORKFORCE COMPRISED OF 136 NATIONALITIES, diversity is a reality at Total. 2010 even set a record for permanent manager hires of non-French nationals: 74%! Women made up 27% of the hires for permanent manager positions. On the other hand, only 14% of senior executives are women and 23%, non-French nationals, leaving room for improvement.**

**blocs. Would Total want to see one or not? Would an energy policy be a help to you or a straitjacket?**

The EU doesn't really have a security of energy supply policy, but does that matter? I think that globalization has made this debate partly obsolete. Instead of thinking in terms of energy security for France or Europe, we need to think about it for the whole world. Imagining that you can guarantee any kind of security at the expense of other countries or regions, like some big zero-sum game, is a mistake and an illusion. It's a waste of time to talk about the G20 if we can't pool our resources globally.

Having said that, developing our European energy resources is a good idea, provided people can accept a few inconveniences. Take our project to produce shale gas in Montélimar, France. Before we could even get started on the studies, we were inundated with protests and hostile statements. You can't have it both ways. You can't decry overdependence on Middle Eastern oil and refuse to consider the alternatives. Europe's strides in how it perceives the environment are a healthy sign of civilization and responsibility, but they come at a price.

**Speaking of which, what is a fair price for energy?**

It's natural and necessary for energy prices to rise in step with the cost of operations in the oil industry. However, erratic price swings and volatility would be unacceptable. We have to guard against runaway speculation. Prices have climbed and will keep climbing, that's a fact. But we're not asking for a sharp hike in absolute value, which would be a shock and have an economic impact. We have to find the right balance.



Watch the video interview with Christophe de Margerie.



# KEY FIGURES, KEY PEOPLE



# THEIR TAKE ON 2010

**CHRISTOPHE DE MARGERIE,**  
CHAIRMAN OF THE EXECUTIVE COMMITTEE  
AND CHAIRMAN AND CHIEF EXECUTIVE OFFICER



**FRANÇOIS CORNÉLIS,**  
VICE CHAIRMAN OF THE EXECUTIVE COMMITTEE AND PRESIDENT, CHEMICALS



**MICHEL BÉNÉZIT,**  
PRESIDENT, REFINING & MARKETING



**YVES-LOUIS DARRICARRÈRE,**  
PRESIDENT, EXPLORATION & PRODUCTION



**JEAN-JACQUES GUILBAUD,**  
CHIEF ADMINISTRATIVE OFFICER



**PATRICK DE LA CHEVARDIÈRE,**  
CHIEF FINANCIAL OFFICER



## BOARD OF DIRECTORS

The mission of the Board of Directors is to determine the strategic direction of the Group and supervise the implementation of this vision. With the exception of the powers and authority expressly reserved for shareholders and within the limits of the Company's legal purpose, the Board may address any issue related to the operation of the Company and make any decision concerning the matters falling within its purview. On December 31, 2010, the Board of Directors was composed of 15 members, including a director representing Total's employee shareholders, elected by shareholders at the Annual Meeting.

Christophe de Margerie  
Chairman,  
Thierry Desmarest  
Honorary Chairman,

Patrick Artus,  
Patricia Barbizet,  
Daniel Bouton,  
Gunnar Brock,

Claude Clément  
employee  
shareholder  
representative

Bertrand Collomb,  
Paul Desmarais Jr,  
Bertrand Jacquillat,  
Anne Lauvergeon,

Lord Levene of Portsoken,  
Claude Mandil,  
Michel Pébereau,  
Thierry de Rudder.

**THE EXECUTIVE COMMITTEE** is Total's primary decision-making body. Led by the Chairman and Chief Executive Officer, it implements the strategy formulated by the Board of Directors and authorizes related investments.

>>> **"THE REASONS WE'RE INVESTING SO BROADLY IN THE SEARCH FOR ALTERNATE SOURCES OF ENERGY** are both environmental and because fossil fuels eventually won't be able to meet demand. However, oil and gas remain crucial for supplying the planet's energy needs. Growth will stall without oil."

>>> **"THE MARKET FOR POLYMERS, USED IN THE PLASTICS INDUSTRY,** is growing so fast that by 2030, petrochemicals are expected to account for twice the proportion of oil applications as today. Since oil production is expected to plateau, a major focus of innovation for us is to find substitutes for petroleum as a feedstock."

>>> **"WITH DEMAND FOR PETROLEUM PRODUCTS FALLING IN EUROPE** every year, we can no longer keep refining the volumes we used to. Mature markets need more sophisticated products, but in smaller quantities. To meet demand, we have to reorganize our production base and make it more competitive."

>>> **"ACCESSING FOSSIL FUEL RESOURCES** is increasingly complicated and expensive, for both technical and geopolitical reasons. Although exploration is still essential to replace our reserves, we're also pursuing a strategy of gaining access to resources through partnerships with the owners of undeveloped resources."

>>> **"THE 2010 DRILLING RIG ACCIDENT OF ONE OF OUR COMPETITORS** in the Gulf of Mexico has once again put industrial safety in the media spotlight. Although there's no such thing as zero risk, that doesn't mean accidents are inevitable. We have an obligation to be unflinching in our vigilance and to follow the rules to the letter."

>>> **"WE WERE EXTREMELY ACTIVE IN DEPLOYING OUR STRATEGY IN 2010,** shifting many of our assets — through acquisitions and divestments — to optimize our portfolio. To unearth new growth opportunities, we're stepping up our capital expenditure, which will climb to \$20 billion in 2011."

## THE MANAGEMENT COMMITTEE

The Management Committee coordinates our different units, tracks the performance of operational departments and reviews the activity reports of functional departments. On December 31, 2010, the Management Committee comprised the Executive Committee members plus 18 senior executives from the various functional and operational departments.

### CORPORATE

René Chappaz, Jean-François Minster,  
Yves-Marie Dalibard, Jean-Jacques Mosconi,  
Peter Herbel, François Viaud.  
Jean-Marc Jaubert,  
Manoelle Lepoutre,

### UPSTREAM

Marc Blaizot,  
Philippe Boisseau,  
Jacques Marraud  
des Grottes,  
Patrick Pouyanné.

### DOWNSTREAM

Pierre Barbé,  
Alain Champeaux,  
Bertrand Deroubaix,  
Éric de Menten,  
André Tricoire.

### CHEMICALS

Françoise Leroy.



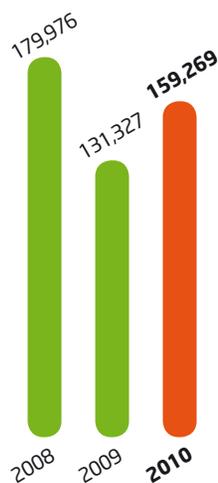
For a more detailed presentation of our corporate governance, see Chapter 5 of the 2010 Registration Document.

# A HIGH PROFILE AND ROBUST FINANCES

Our 2010 earnings reflect our improved performance in a more favorable environment. The year was also marked by a new momentum in our strategy to grow and optimize our asset portfolio. Our operations' safety, reliability and acceptability are vital prerequisites for our growth.

## SALES

(€ million)



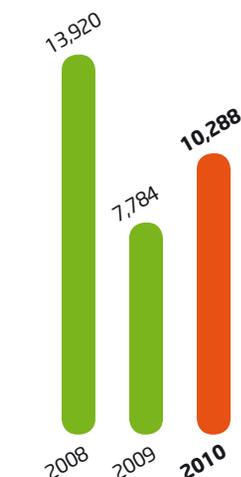
**+21%**

In a stronger business environment than 2009, sales were up 21% to €159,269 million. Demand soared in some of our segments, oil prices rose and the average selling price of gas was stable in 2010.

## ADJUSTED NET INCOME (Group share)

Underscoring our renewed vitality and ability to develop value-creating projects, adjusted net income increased 32% to €10,288 million.

(€ million)



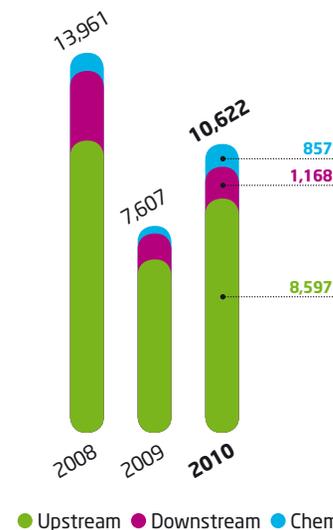
### EXPERT OPINION

**"OUR STRONG 2010 PERFORMANCE GIVES US THE RESOURCES TO FINANCE** our ambitious program of capital expenditure on large-scale projects that will drive growth. Over the course of the year, we shifted our portfolio's focus to targeted activities. We are cementing our status as an integrated company, active in exploration and production, refining, petrochemicals and specialty chemicals."

**Patrick de La Chevadière,**  
Chief Financial Officer, Total

## ADJUSTED NET OPERATING INCOME FROM BUSINESS SEGMENTS

(€ million)



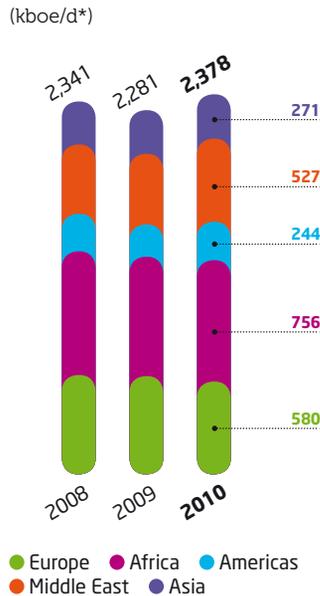
Adjusted net operating income from business segments was up 40% to €10,622 million. It was driven by growth of 35% in our Upstream activities and a strong rebound by Chemicals, which tripled its adjusted net operating income. Downstream income, up 23%, reflects improved European refining margins.



For a presentation of the consolidated financial statements, see Chapter 9 of the 2010 Registration Document.

# UPSTREAM

## OIL AND GAS PRODUCTION



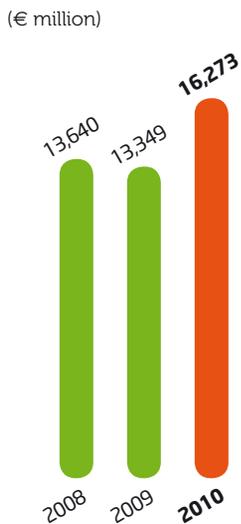
Oil and gas production grew 4.3% to 2,378 kboe/day\*, thanks largely to the ramp-up of new projects. It was led by growth in LNG, which accounted for about 20% of production in 2010.

## LIQUID AND GAS RESERVES

Our proved oil and gas reserves, established in accordance with U.S. Securities and Exchange Commission (SEC) guidance, totaled 10,695 Mboe\* at December 31, 2010. They have a life of more than 12 years at average 2010 levels, with a replacement rate of 124%. Our proved and probable reserves have a life of more than 20 years.



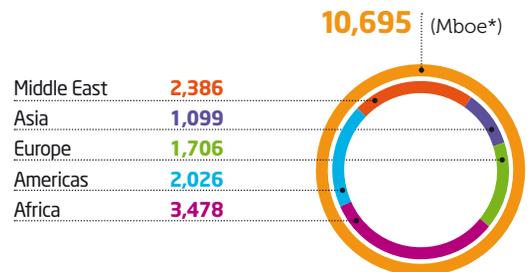
## GROSS CAPITAL EXPENDITURE



2010 saw the launch of six large-scale projects that will drive production growth. Two new major production hubs are taking shape: Canada and Australia. This momentum is confirmed by the 2011 budget of \$20 billion (excluding acquisitions and divestments), of which 80% is allocated to exploration and production.

## PROVED RESERVES BY REGION (at December 31, 2010)

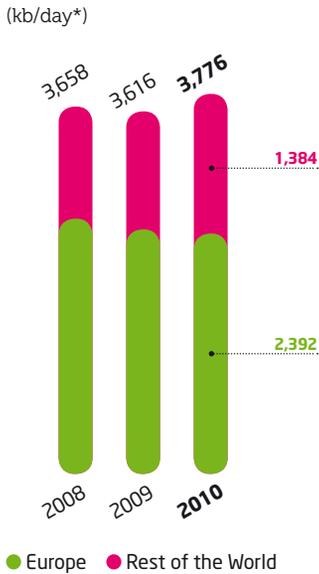
Our portfolio, which is balanced between liquids and gas, is spread across the world.



\* boe: barrel of oil equivalent. A barrel of oil is approximately equivalent in energy to 170 cubic meters of gas.

# DOWNSTREAM

## SALES OF REFINED PRODUCTS, including trading

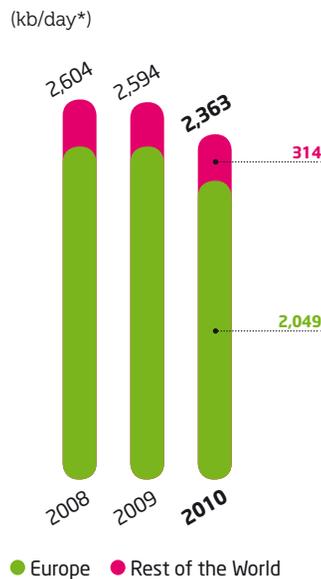


Our sales of refined products were up 4% to 3.8 million barrels per day, buoyed by a spike in trading. We are cementing our place among the leading global operators. Thanks to constantly evolving marketing efforts, we continue to grow and remain a leader. We are a top retailer in Western Europe and number one in Africa. We are also strengthening our presence in Asia and America.

\* kb: thousands of barrels.

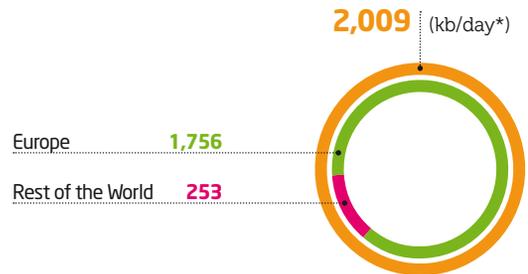
## REFINING CAPACITY AT YEAR-END

We continue to work toward our goals of cutting refining capacity in Europe by 20% between 2009 and 2011 and trimming break-even points. To that end, we closed the Dunkirk refinery in 2010, upgraded the Normandy refinery, scouted local synergies for the Provence refinery and initiated the still ongoing divestment of the Lindsey Oil Refinery in the United Kingdom.



## REFINERY THROUGHPUT, including Total's share in CEPSA and, since October 1, 2010, TotalErg

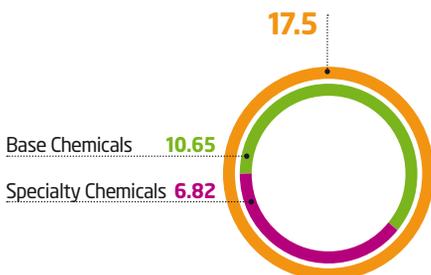
The closure of the Dunkirk refinery and a distillation unit in our Normandy refinery, combined with the impact of labor unrest in France, explains the 7% decrease in refinery throughput.



# CHEMICALS

## SALES (non-Group share) (€ billion)

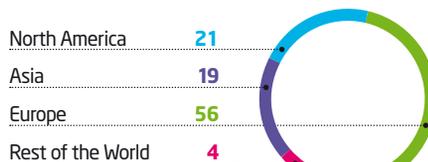
Chemicals benefited from a strong rebound in demand and petrochemical margins and robust demand for specialty chemicals (rubber, resins, adhesives and electroplating). Our sales increased 19%.



## SALES BY REGION\*\* (%)

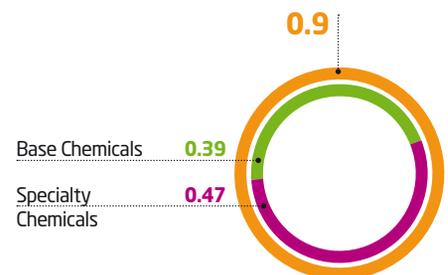
Chemicals' sales amounted to €19.5 billion in 2010, 77% in Europe and North America and most of the remainder in Asia (19%).

\*\* Including interests in Asia and the Middle East.



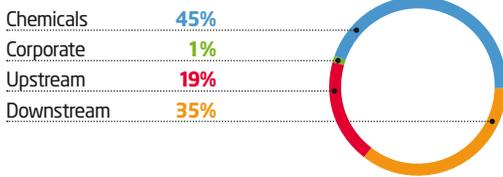
## ADJUSTED NET OPERATING INCOME (€ billion)

An improved environment in Base Chemical markets, the ramp-up of our production plants in Qatar and the good operational performance of Specialty Chemicals were all factors in tripling our net adjusted operating income.



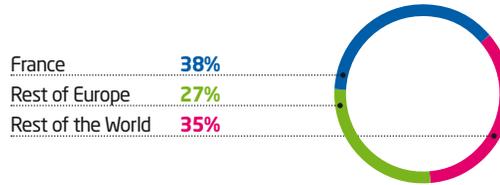
### WORKFORCE BY BUSINESS SEGMENT\*\*\*

Refining & Marketing and Chemicals account for nearly 80% of our workforce. Chemicals saw its percentage decline slightly from 2009.



### WORKFORCE BY REGION\*\*\*

The breakdown of the workforce by region is virtually unchanged from 2009.



\*\*\* Consolidated companies. Workforce at December 31, 2010: 92,855 employees.

## CORPORATE SOCIAL RESPONSIBILITY

#### COMMUNITY DEVELOPMENT SPENDING

€246<sup>M</sup>

#### NUMBER OF COMMUNITY DEVELOPMENT INITIATIVES

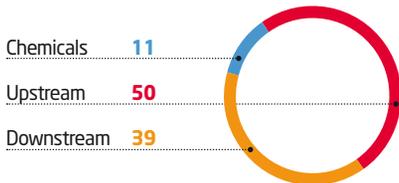
2,420

#### COMMUNITY DEVELOPMENT SPENDING IN NON-OECD COUNTRIES

94%

### WORLDWIDE GREENHOUSE GAS EMISSIONS AT OPERATED SITES

By business segment (%)



52 MILLION TONS OF CARBON EQUIVALENT

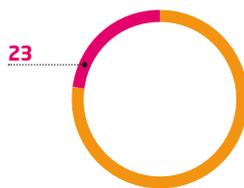
### DIVERSITY

Managers: 25,998 (out of 92,855 employees in 2010)

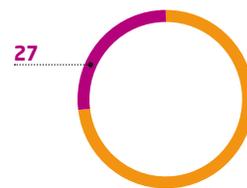
Permanent manager hires: 1,426 (out of 8,792 hires in 2010)

### PERCENTAGE WOMEN

Managers

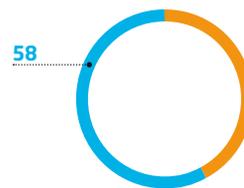


Permanent manager hires

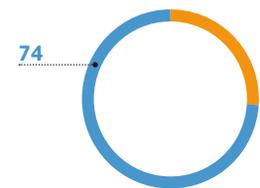


### PERCENTAGE NON-FRENCH NATIONALS

Managers



Permanent manager hires



### TOTAL RECORDABLE INJURY RATE\*\*\*\* (per million hours worked)



\*\*\*\* Total Recordable Injury Rate (TRIR). Accidents with or without lost time per million hours worked. Total and contractor employees.

For a more in-depth presentation of our CSR reporting, read the Society and Environment Report.



Find the figures on the Annual Report mini-site.

# TRANSPARENT COMMUNICATION

Investor relations were a focus of attention throughout 2010. Over the course of the year, we held around 600 meetings with investors and analysts. We also reached out to more than 11,000 individual shareholders in Europe, especially in France, through our discussion and meeting programs.



**Christophe de Margerie,**  
Chairman and CEO, on the Total  
stand at the Actionaria Investor  
Fair in November 2010.



address public concerns about our corporate social responsibility, Investor Relations talked about our progress and goals, especially our efforts to make our products and installations more energy efficient and to tackle climate change, at a number of informational meetings. Our information sharing and transparency process received several awards. One was for Best Investor Relations at a listed oil and gas company, presented by the Institutional Investor Research Group, *IR Magazine* and Thomson Extel Survey. We also received the Boursoscan Inves-

## CONTACTS

**IN FRANCE**  
**0800 039 039**  
(toll-free from landlines  
in France)

**OUTSIDE FRANCE**  
**+ 33 (0)1 47 44 24 02**  
Monday through Friday,  
9:00 a.m. to 12:30 p.m.  
and 1:30 to 5:30 p.m.

tor Relations award from *Boursorama*, an online financial services company, and the award for Best Shareholders' Club and second-place Shareholders' Department voted on by readers of the French money magazine *Le Revenu*. Lastly, *Institut d'Études Politiques de Paris (Sciences Po)* and Labrador presented us with their investor information transparency award.

In addition, our Individual Shareholder Relations Department earned renewed ISO 9001: 2008 certification for three years, cementing our commitment to these shareholders for the long haul.

## SHARE PERFORMANCE

2007-2010 change in Total's share price (in euros) in Paris\*



Source: Bloomberg – Share price on December 31, 2010: €39.65. \* Base 100 on January 1, 2007.

## 2010 DIVIDEND

Since 2004, Total has paid an interim dividend in November, with the remaining balance paid after the Annual Shareholders' Meeting in May. The interim dividend and remaining dividend for 2010 will be paid in line with this policy.

The Board of Directors met on July 29, 2010 and approved a 2010 interim dividend of €1.14 per share. The ex-dividend date for the interim dividend on Euronext Paris was November 12, 2010 and the dividend was paid on November 17, 2010.

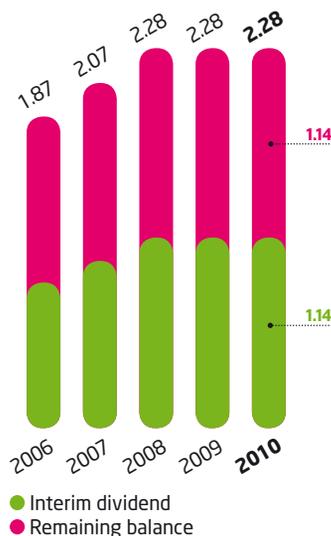
For 2010, Total plans to continue its dividend policy by recommending a dividend of €2.28 per share to shareholders at the Annual Shareholders' Meeting on May 13, 2011, including a balance of €1.14 per share, with an ex-dividend date of May 23, 2011 and payment on May 26, 2011. The total dividend of €2.28 per share is unchanged from 2009.

Over the last five years, the dividend has increased by an average of 5.1%<sup>1</sup> per year.

For 2010, Total's payout ratio was 50%<sup>2</sup>.

## DIVIDEND FOR THE LAST FIVE FISCAL YEARS<sup>3</sup>

(in €)



## CHANGE IN THE PAYOUT POLICY

At its meeting on October 28, 2010, the Board of Directors approved the quarterly payment of interim dividends.

The new policy will come into effect in fiscal 2011, after payment of the remaining balance of the 2010 dividend. The first quarterly interim dividend for 2011 is expected to be paid in September 2011.

Subject to decisions by the Board of Directors and shareholders at the Annual Meeting to approve the company's financial statements and the remaining dividend balance, the record dates for the interim dividends and remaining balance for 2011 will be:

- September 19, 2011
- December 19, 2011
- March 19, 2012
- June 18, 2012.

1. This increase does not take into account the Arkema share allotment right granted on May 18, 2006.

2. On the basis of adjusted, fully diluted earnings per share of €4.58.

3. Subject to approval by the shareholders on May 13, 2011.

# CALENDAR

Below, a list of investor relations events in 2011.

## 2011 Events

### February 11

Results for fourth-quarter and full-year 2010

### April 29

Results for first-quarter 2011

### April 30

VFB Conference and meeting with individual shareholders in Antwerp, Belgium

### May 13

2011 Annual Shareholders' Meeting in Paris, at the Palais des Congrès convention center

### May 25

Meeting with individual shareholders in Lyon, France

### June 8

Meeting with individual shareholders in Aix-en-Provence, France

### July 29

Results for second-quarter and first-half 2011

### September 26

Road show in London, England

### October 11

Meeting with individual shareholders in Strasbourg, France

### October 28

Results for third-quarter 2011

### November 18 and 19

Actionaria Investor Fair

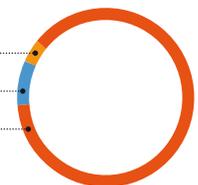
### November 29

Meeting with individual shareholders in Nantes, France

## SHAREHOLDER BASE BY TYPE OF INVESTOR\*

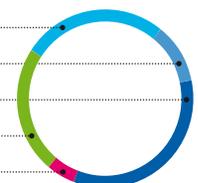
(%)

Employee shareholders	4
Individual shareholders	8
Institutional shareholders	88



## SHAREHOLDER BASE BY REGION\* (%)

North America	26.5
United Kingdom	11
France	34
Rest of Europe	23
Rest of the World	5.5



\* Estimates at December 31, 2010, excluding treasury shares.



# THE SHAPE OF OIL AND GAS TO

4 & 5  
HORSE

INDONESIAN

COME

# OIL AND GAS ARE NOT GOING ANYWHERE

Even though easy oil and gas are mostly history, there is nothing on the horizon that will knock hydrocarbons off their perch as the most efficient response to growing energy demand worldwide. We continued our efforts to meet demand in 2010.



## EXPERT INSIGHTS

**“OUR GOAL IS TO COST-EFFECTIVELY BOOST OUR PRODUCTION AND RESERVES**

**and move to the front of the field among oil majors.**

**To do that, we must maximize production from existing fields, start producing our growth projects as soon and as affordably as possible, and replace our reserves through exploration and access to already discovered fields.**

**It’s an ambitious goal that will take both technological and business drive and innovation.”**

**Olivier Cleret de Langavant,**  
Senior Vice President  
for Strategy, Business  
Development and R&D  
in Exploration & Production

**T**otal

has been demonstrating expertise as an oil and gas producer for almost 90 years. We operate across the value chain, from exploration to shipping and distribution to our various markets. Although some regions of the world have begun cutting back on their energy use, oil and gas demand is still largely spurred by development in emerging economies. The day when oil and gas account for only a minority share of the **energy mix** is a long way off. Storable and transportable, there is nothing on the horizon that will knock hydrocarbons off their perch as the most efficient response to global energy needs – not to mention the fact that for many uses, petroleum has no substitute. In 2030, fossil fuels are expected to still make up 76% of the energy mix, versus 81% in 2005. In our view, therefore, this is no time to drop our guard.

We must continue to grow our **reserves** and step up our production, despite an ever more difficult environment shaped by a growing number of mature fields, resources that are more complicated to extract, and more complex arrangements for access to reserves. Easy oil and gas are definitely a thing of the past. The technological, geopolitical and environmental challenges we face are enormous. 2010 proved that we are doing everything in our power to meet them – and meet them boldly.

**12 YEARS**

**TOTAL'S PROVED RESERVES;**

20 years if we add our probable reserves.

First, we invested in the unconventional oil and gas sector. Unconventional hydrocarbons differ from the oil and gas usually extracted by the type of fluid or **reservoir** involved or the processes required to produce them. Second, we made strides on gigantic projects located across the globe, in the North Sea, Angola and Yemen. Lastly, we gave new momentum to our exploration efforts, particularly in unexpected regions now accessible as a result of recent technological advances. Our strategy also spurred us to create new partnerships; teaming up with the industry's latest crop of emerging players, whether national oil companies or independents, is another way we can find and gain access to new resources and build our expertise in extracting them, now and in the future.



“ My assignment begins in Seoul, in deepest winter. I’ve been asked to translate motion into pictures. There are clearly a lot of energies that I as a Westerner will try to capture without fully understanding them. ”

**MARC ROUSSEL,**  
PHOTOGRAPHER



> **TOTAL HELPS FINANCE THE PROGRAM** to promote carbon capture processes sponsored by Bellona, an environmental NGO specializing in energy and climate change. The plan aims to conduct technical studies and educate the general public, industry and government. Here, the Lacq pilot project in France.



# THE UNCONVENTIONAL REVOLUTION

Unconventional resources are the future of oil and gas. We firmly believe that and have invested close to \$7 billion in “new wave” oil and gas, a major course shift that allows us to position ourselves in these growing sectors.



To drive our expansion in unconventional resources, we have forged strategic partnerships with companies with unmatched experience and expertise. Left, a Suncor open-pit mine in Canada; right, a Chesapeake well in the United States.

**33,000**

**BARRELS OF OIL EQUIVALENT PER DAY**

Total's 2010 production in the Barnett Shale in Texas.

The ascension of **unconventional oil and gas** seems unstoppable. Ignored not long ago because of the difficulty and expense of producing them, shale gas, coalbed methane and oil sands are now riding the surge in new extraction technologies. As conventional reserves grow scarcer, they will be crucial to meeting future global energy demand. The stakes are high and so are the potential rewards. On a planetary scale, unconventional oil and gas are thought to represent between one-third and one-half of all resources. Canada's oil sands, for example, are believed to hold the equivalent of 170 billion **barrels**, or the world's second-largest oil reserves after Saudi Arabia's.

What are the attributes of “new era” oil and gas? Actually, “unconventional” is a one-size-fits-all label applied to what are in reality many kinds of resources. One way or another, they are all set apart by the type of fluid (bitumen, coal, hydrates) or reservoir (tight, very deep, clay) involved or by the methods used to produce them, such as unconventional wells or mining. Some also require specific treatments during their production or processing. Oil sands, for instance, con-

sist of a mixture of sand, clay, water and oil that is so heavy and viscous that steam has to be injected to heat it and make it mobile. Shale gas is trapped in relatively impermeable, non-porous reservoirs whose rock must be “cracked” with water to release the gas, a technique called **hydraulic fracturing**.

The rise of shale gas is the most impressive. It actually got going in the United States, five years ago. Today it has progressed to the point that unconventional gases – shale gas plus coalbed methane and tight gas – have made the North American gas market virtually self-sufficient. The United States may even export gas within a decade.

## STRATEGIC ALLIANCES

In 2010, we stepped up our efforts to position ourself in the growth sectors of unconventional oil and gas. Our strategy is to partner with experts to build up our skills and expertise. We signed an agreement with U.S.-based Chesapeake Energy Corporation, a global leader in shale gas production, to acquire 25% of its Barnett Shale portfolio in Texas. The contract also calls for



We are striving to optimize technologies with a lower environmental impact for developing and producing unconventional resources. Here, Canada's Athabasca oil sands region.

## SHORT TAKES

### THE MAIN CATEGORIES OF...

#### ... UNCONVENTIONAL GAS:

- **Shale gas, which is trapped in the rock it formed in.**
- **Coalbed methane, or methane recovered from coal seams.**
- **Tight gas, trapped in ultra-compact, not very permeable sandstone reservoirs.**

#### ... AND UNCONVENTIONAL OIL:

- **Extra-heavy oil, which is crude oil made highly viscous by biodegradation.**
- **Oil sands, an immobile and virtually solid mixture of sand, clay, water and extra-heavy oil.**
- **Shale oil, or solid resources (kerogen) contained in impermeable rock.**

## SPOTLIGHT

### NEW TYPES OF PARTNERSHIPS

Conventional joint ventures between oil majors are increasingly morphing into new and much more varied types of partnerships that aim not only to share project risks and challenges, but also to create value by consolidating and broadening our portfolio of activities.

The main way we do this is through partnerships with the countries that are home to resources and, in particular, their national oil and gas companies. For instance, we recently strengthened our alliances with Russia's Gazprom, Novatek and Lukoil and China's CNPC, Sinopec and CNOOC to develop projects in these countries and outside them. As well, partnerships with independents are designed to pool skills and expertise in order to jointly conduct increasingly complex projects. The agreements we signed in 2010 with Santos in Australia, Suncor in Canada and Chesapeake in the United States are all examples.

creating a **joint venture** so that we can grow in that play together. We produced 33,000 barrels of oil equivalent a day there in 2010. For Christophe de Margerie, Total's Chairman and CEO, it is only the first step. "The alliance with Chesapeake doesn't just give us access to the gas acreage. It also aims to help us master the technology and then build on our expertise in unconventional oil and gas elsewhere." For a host of opportunities are expected to arise around the world, in China, Eastern Europe and North Africa. Total has also secured a number of exploration **leases**: four in the Neuquén Basin in Argentina, two in Denmark and one in France spanning a 4,327-square-kilometer expanse that stretches from south of Valence to the Montpellier region. Two years of studies are planned there to confirm the existence, based on available data, of shale gas before any drilling is undertaken. >>>

## WHAT DIFFERENCE DOES BEING A TOTAL PARTNER MAKE?



"We have long known that Total is one of the largest and most well respected industrial enterprises in the world. Total's global scale and technical expertise is well regarded in the industry. I was very impressed with the quality of all Total's personnel. From the start, they had a good understanding of resource type play. Total's team was not afraid of the challenges associated with the Barnett Shale. The facility at Pau is unbelievable. I am aware of nothing else like it on the planet. The technical capability of Total's staff is great."

*Steve Dixon, Executive Vice President, Operations and Geosciences and Chief Operating Officer, Chesapeake Energy*

**Synthetic image of the future GLNG plant in Gladstone, Australia. Production is scheduled to start in 2015 and eventually reach 7.2 million metric tons per year.**



## THE UNCONVENTIONAL REVOLUTION

Another large-scale project, GLNG, involves producing liquefied natural gas (LNG) from coal seam gas in Australia. This integrated project will extract gas in the Queensland region and build a 420-kilometer pipeline and a liquefaction plant with an eventual production capacity of 7.2 million metric tons a year, located in the industrial port of Gladstone. The LNG will be exported to Asia, where most of the growth in demand is concentrated. The project represents a total capital expenditure of \$16 billion. It is a first for Total, which holds a 27.5% interest in it alongside Santos – an independent that has been producing this type of gas for the local market since 2002 – Petronas, Malaysia’s national oil company, and Kogas, South Korea’s national oil company. We were selected on the basis of two criteria: our ability to manage large projects and our LNG expertise.

Lastly, we have teamed with an expert in the sector, Suncor, to bolster our position in Canada’s oil sands. The strategic alliance pools both parties’ interests in the Joslyn and Fort Hills mining projects, with Suncor acquiring 36.75% of our interest in Joslyn and Total picking up 19.2% of Suncor’s stake in Fort Hills. The transaction supplemented our acquisition of UTS’ 20% stake in Fort Hills via a takeover bid earlier in the year. So Total now has a 39.2% equity stake in Fort Hills, which alone represents 3.4 billion barrels of bitumen that will be extracted by open-pit mining. We have another, 49% stake in the Voyageur upgrader project, a unit needed to convert the bitumen to synthetic oil suitable for refining. These projects are on top of the Surmont project conducted with ConocoPhillips, whose Phase 2 was launched in January 2010. Its goal is to boost production from 27,000 to 110,000 barrels of bitumen per day.



In early 2011, Total acquired interests in four shale gas exploration leases in Argentina, in addition to those acquired in early 2010. Here, the Vaca Muerta formation.



GLNG Final Investment Decision announcement. Mike Sangster (Total), Heung Bog Lee (Kogas), David Knox (Santos), Datuk Anuar Ahmad (Petronas).

## SPOTLIGHT

### WHAT ABOUT THE ENVIRONMENT?

The production of unconventional oil and gas is not environmentally neutral.

• **Oil sands extraction** uses a lot of energy and water, generates more carbon emissions than conventional resource production and occupies a bigger land footprint. We take all these constraints into account and are developing a major R&D program to devise cleaner, more efficient production processes. A dedicated research center has been created for that purpose in Calgary, Canada. One topic under study is the possibility of applying, in Canada, lessons learned from our Lacq carbon capture and storage pilot under way in France. We are also trying to minimize the surface area required by our operations and to recycle an ever-higher percentage of the water used. We address the process for reclaiming sites at the project design stage.

• **Shale gas** entails two main problems: substantial water use to fracture the rock and a large land footprint. Since each well produces only a small amount, a large number has to be drilled. We are studying the possibility of reducing the visual impact on the landscape by clustering several wells on each surface pad.

• In Australia, **coalbed methane** – also known as coal seam gas – raises the issue of water management. GLNG project partners are working closely with the regional government and local farmers on this challenge.

## EXPERT INSIGHTS / SYLVIE DUFLLOT, Vice President, Administration and Public Relations, Total Gas Shale Europe



**2010** The Total Gas Shale Europe subsidiary was created in late 2010 to study the possibilities offered by shale gas.

**March 2010** Award of the Montélimar exploration lease in France for a five-year period.

**June 2010** Award of two exploration leases in Denmark.

### “THE TOTAL GAS SHALE EUROPE SUBSIDIARY WAS CREATED IN LATE 2010 TO STUDY THE POSSIBILITIES OFFERED

by the leases awarded in Denmark and France. We still have a very long way to go before producing from these leases, because the studies will be lengthy. We will start with a geosciences survey to assess subsurface shale gas potential. Next, if it's conclusive, we will move on to validating the project's technical feasibility, which will take one or two years. And we will need another year or two

after that to demonstrate its economic viability and potential for being produced in an environmentally responsible way.

“ We work far upstream to get a jump on potential environmental problems. ”

As an oil major, we have a role to play in providing technological solutions that are up to the challenges. We've already launched R&D projects to improve the techniques used and reduce their impacts, protect the groundwater table and preserve the landscape. The situation in France is uncertain. Protests fueled by the feeling that local communities were not sufficiently informed and consulted before the leases were awarded prompted a response from the government and members of parliament.

Task forces have been set up to examine the environmental and social aspects. They will produce recommendations that the public authorities will take into account when deciding whether or not to allow the projects to go forward. Whether in Denmark or France, we listen to what civil society has to say, since we want to establish a practical dialogue with it. Our goal is to work out acceptable solutions together. Discussion and explanation are the only ways to promote public acceptance of these kinds of projects.”

The Pazflor project reached major milestones in 2010, with the launching of the FPSO and installation of the subsea separation units.



Fabrication of umbilicals in Angola for the Pazflor project.

Berth for an LNG carrier at the Yemen LNG facility.



## FARSIGHTED PROJECTS

Total spared no effort and invested massively in 2010 to continue meeting demand for oil and gas. You have only to look at our gigantic projects in the North Sea, a mature play, and in Angola and Yemen.

### > PAZFLOR AT A GLANCE

Located in a water depth of **800 METERS**

A **600-SQUARE-KILOMETER** field, or an area six times the size of Paris

**\$1 BILLION**

invested in the Phase 2 development of the West Franklin gas and condensate field.

Words highlighted in black are defined in the glossary.

Not only are they huge, they are ultra-high-tech. To produce increasingly hard to extract oil and gas, Total is pulling out all the stops. In 2010, we got the ball rolling on several gargantuan projects that both epitomize our ability to carry out complex projects and provide us with invaluable experience.

Let's start with the North Sea. Work to set the stage for production of the Laggan and Tormore gas fields, located 140 kilometers west of the Shetland Islands in a water depth of 600 meters, began. Offshore gas infrastructure in one of the most complex environments of the UK continental shelf and a gas treatment plant in Sullom Voe, on the Shetland Islands, are under construction. The gas will then be exported through a 230-kilometer pipeline that converges with the UK line of the Frigg system, which will carry it to the St. Fergus gas terminal north of Aberdeen. Production of the total estimated reserves of 230 million barrels of oil equivalent will begin in 2014.

In the same region, Total and our partners will invest \$1 billion in the **Phase 2 development** of the West Franklin gas and condensate field. Three new wells will be drilled and a platform tied back to the Elgin/Franklin facilities installed before production begins in 2013.

In Yemen, the huge Yemen LNG project also switched into high gear when a second **liquefaction train** was commissioned on April 1, 2010. The combined production capacity of both trains is 6.7 million metric tons of LNG annually, equal to a hundred cargoes delivered each year for 25 years. The project, which came on stream in October 2009, required building a 320-kilometer gas pipeline between Block 18 in the Marib region in central Yemen and the Balhaf plant on the southern coast. A bold gamble!

### A DEEPWATER EXPERT

However, the most impressive projects are in Angola, where we are already well established. Each project we initiate in the region adds a little more to our proficiency in deep offshore technology. The challenge for the next one scheduled to come on stream and our biggest construction project, Pazflor, was finding a way to separate heavy, viscous oil from lighter gas at water depths of 800 meters, then bringing both up to the surface to a single **Floating Production Storage and Offloading (FPSO)** vessel. All on a 600-square-kilometer field, or an area six times the size of Paris. "It's a world first that elevates Total to the ranks of the world's deep offshore experts," says Louis Bon, the project's director.



The commissioning of Yemen LNG Train 2 in 2010 raised the facility's production capacity to 6.7 million metric tons per year.

Pazflor is entering the home stretch before the start of production, which is scheduled for end-2011. Its main components, built all over the world, have made their way to Angola for the trickiest step, begun in the summer of 2010: the offshore installation of the three subsea separation units – 25-meter-high behemoths weighing 300 metric tons – to be followed by the final deepwater testing phase. Meanwhile, the FPSO built in South Korea left its port of origin in January 2011, bound for Angolan waters.

In the same vein, development of the CLOV project kicked off in summer 2010. Total is its operator with a 40% equity stake. This field lies at a depth of 1,100 to 1,400 meters and also contains two different types of oil. Its production will require installing 34 subsea wells tied back to an FPSO by 210 kilometers of flowlines on the seabed. Installations have been very carefully designed to limit their environmental impact: there will be no flaring during normal operations and the heat from turbine exhaust gases will be recovered, as will tank vent gases. Like Pazflor, CLOV transfers knowledge to Sonangol, the Angolan national oil company, and strengthens the country's economic fabric, since much of the equipment is being built locally.

## SPOTLIGHT

### PAZFLOR WILL BE AN ENGINE OF ANGOLA'S ECONOMIC AND SOCIAL DEVELOPMENT

A program conducted in partnership with the World Bank and the Angolan Ministry of Health seeks to reduce the infant and maternal mortality rate, one of the highest in the world. It will train 650 nurses and midwives, renovate or build childbirth centers and supply school kits over a five-year period. The initiative will help 1.9 million people.

## FYI

### CLOV, A FOUR-LETTER ACRONYM STANDING FOR:

CRAVO (CARNATION), LIRIO (LILY), ORQUIDEA (ORCHID) AND VIOLETA (VIOLET), THE PROJECT'S FOUR FIELDS. START OF DRILLING: 2012. START OF PRODUCTION: 2014. CAPITAL EXPENDITURE: \$7 BILLION. PRODUCTION CAPACITY: 160,000 BARRELS PER DAY. ESTIMATED RESERVES: 500 MILLION BARRELS. MORE THAN 20% OF THE PROJECT'S PLANNED WORK HOURS HANDLED BY LOCAL CONTRACTORS, NOT COUNTING DRILLING AND WELL COMPLETION. ONE FPSO 305 METERS LONG – NEARLY THE HEIGHT OF THE EIFFEL TOWER – AND WEIGHING 110,000 METRIC TONS, OR AS MUCH AS 305 AIRBUS A380S.

## SHORT TAKES

### OTHER PROJECTS AROUND THE WORLD

Other projects were initiated in 2010 in countries around the world, including Gabon, Indonesia, Iraq, Nigeria, Norway and Thailand.

**IN NIGERIA, TOTAL CONTINUED** work on the Usan development project in 2010. Drilling of production wells began, as did construction of the FPSO and installation of subsea equipment. Located in OML 138, which we operate with a 20% interest, the project will have a production capacity of 180,000 barrels per day. It is scheduled to come on stream in 2012.

## SPOTLIGHT



## 1 BILLION

BARRELS FROM BLOCK 17

In late May 2010 in Angola, Block 17 and its currently operating fields – Girassol, Jasmim, Dalia and Rosa – reached the historic production milestone of one billion barrels of oil equivalent. The figure is emblematic of Total's deep offshore knowledge and expertise. When Pazflor and CLOV are brought on stream, Total's Block 17 output will average 800,000 barrels per day.



**3D seismic survey vessel. The streamers towed by the vessel record data that give a clear picture of the subsurface after the images are processed.**

## ON THE HUNT FOR NEW FIELDS

Exploration is a pivotal activity for an oil and gas producer, especially with demand soaring and resources harder and harder to find. Major oil and gas discoveries are still possible today. We must keep our eyes open and act boldly.



### EXPERT INSIGHTS

**“FOR OUR EXPLORATION TO BE SUCCESSFUL, we have to be proactive and take risks: position ourselves faster than the competition by leveraging new geological concepts and our technical advances; take a chance on risky countries; be creative both in exploration and business; partner with regional specialists; and develop concepts and technologies in complex fields – high pressure, ultra-deep offshore, transition zones, foothills – where others have given up or ‘project’ fewer barrels than we do.”**

**Marc Blaizot**, Senior Vice President, Exploration

Not only is the hunt for elephants and big cats on, it’s a Total priority. Our geologists, geophysicists and drilling experts are constantly on the lookout for new oil and gas deposits, both to replace our reserves and boost production. Thanks to recent advances in geological concepts and technologies, major finds are now possible even in unexpected places and areas that were inaccessible just a short while ago.

Total’s exploration strategy can be summed up in two words: “around” and “larger.” “Around” means exploring around and underneath existing fields, especially by drilling deeper to reach hard-to-produce reservoirs, at extreme pressures and temperatures (1,000 bar/180°C). “Larger” means being bold enough to hunt the “big

cats,” or reserves of more than 200 million barrels, and “elephants,” defined as having more than 500 million. It means scouting every possibility, by exploring the deep offshore, of course, but also onshore prospects. For that we are counting on **geophysics**, especially **seismic surveys**, in little explored places such as onshore-to-offshore transition zones and foothills. Moreover, fresh technical advances in seismic data processing allow us to better understand the evolution of sedimentary basins, delineate prospects and locate wells, while monitoring their drilling in real time and optimizing borehole trajectory. Invaluable assistance when you consider that drilling a deep offshore well can cost up to \$1 million a day.

### A GRAND TOUR

Africa and Western Europe currently represent almost 50% of Total’s proved reserves. But we can shift the focus of our exploration to anywhere in the world, and the slew of discoveries made in the Middle East, Russia,



**A core sample is a cylindrical section of the geological layers drilled through. The cores are analyzed to determine whether oil or gas is present.**

Asia-Pacific and the Americas show why it is worth doing so.

In 2010, we acquired exploration leases on four continents. In Europe, in the UK sector of the North Sea. In Africa, in Gabon's onshore acreage; in Sao Tomé and Príncipe in the Gulf of Guinea, in a play contiguous to Akpo, a major discovery already in production; and for the first time in the Ivory Coast's deep offshore. In Asia, in the deep offshore of Malaysia and Brunei, 100 kilometers off the coast of Brunei; offshore Kalimantan and in the Arafura Sea in Indonesia; and in the Masila Basin in Yemen. And lastly, in South America, in an offshore block in the Santos Basin in Brazil and in the Guyane Maritime Block in French Guiana, over an area spanning 32,000 square kilometers with water depths ranging up to 3,000 meters.

We have also taken our first few steps in unconventional gas exploration, in Europe with shale gas leases in France and Denmark, and in Argentina's Neuquén Basin.

## SPOTLIGHT

### 2010 DISCOVERIES

**In the Congo**, confirmation of a Moho-Bilondo extension.

**In Angola**, three deep offshore discoveries and a shallow offshore find in the pre-salt zone.

**In Nigeria**, several gas reservoirs with a total gross thickness of more than 150 meters were discovered in a previously undrilled compartment.

**In Vietnam**, the Lac Da Vang exploration well tested positive. It is the second offshore discovery in less than a year on this license acquired in 2007.

**In Brunei**, gas and condensate was found south of the Maharaja Lela field, in high-pressure/high-temperature formations.

**In the UK**, discovery of gas and condensate in Edradour, West of Shetlands.



# \$2.1

**BILLION**

Total's exploration program budget in 2011, up from 2010.

## SPOTLIGHT

### EXPLORATION, STEP BY STEP

- 1. Petroleum geology:** analysis and interpretation of surface and subsurface data to assess the petroleum potential of a basin. The idea is to choose the acreage with the best prospects and the greatest likelihood of containing deposits.
- 2. Seismic survey:** the depth, geometry and nature of subsurface geological formations are visualized using images obtained using ultrasonic frequencies.
- 3. Drilling:** boring a hole in the subsurface to reach the reservoirs. It is the only way to confirm the presence of oil or gas.
- 4. Core sampling:** the removal of a cylinder of rock during drilling, to describe the reservoir drilled through and measure its physical parameters.
- 5. Logging:** physical measurements taken during and at the end of exploration and/or appraisal drilling, to evaluate gas and liquid shows, the physical and chemical properties of the rocks and fluids, and pressure conditions.
- 6. Testing:** if operators believe they have made an oil or gas find, a test is conducted to produce the fluids trapped in the rock. The test confirms the fluid type and the productivity and connectivity of the oil reservoirs, enabling a development project to be designed.

A shared safety culture is critical to preventing accidents.



## SAFETY IS EVERYBODY'S BUSINESS

Safety – both personal and environmental – has always been our top priority. 2010 was a tough year for the oil majors. Total has learned from their experience.



### EXPERT INSIGHTS

**“THERE'S NO SUCH THING AS ZERO RISK.**

**The important thing is to assess it. When you know what kind of risk you're dealing with, you can manage it. Moreover, just because technological content is growing doesn't mean risk has to grow with it. So risks have to be constantly reassessed and every possible measure taken to manage them.”**

**Thierry Debertrand,**  
Vice President, Health, Safety & Environment in Exploration & Production

Safety is not something to be taken lightly. At Total, we never stop pushing to improve our safety performance. Our strict, common safety rules require that every task be carried out in accordance with specific internal guidance outlining rules, procedures and audits. Our Code of Conduct is the same everywhere and for everyone, Total and contractor employees alike, regardless of country. We especially stress employee accountability: all employees must check to make sure that any activity they are responsible for is carried out in line with the safety rules in effect at Total.

Yet despite our best precautions, accidents sometimes occur, providing a painful reminder that our business is not without risk. Each accident spurs industrial operators to rethink their approach and to ask themselves what they could do to prevent the same thing from happening again.

2010 was a case in point: following a string of serious incidents in France, Total set up a Safety Inspection Task Force that toured 13 industrial sites in mainland France representative of all our activities. Its goal was to understand why situations with a high risk potential still arise and why there are still sometimes significant discrepancies between practices and the required standard of safety. Ten internal experts representing all of our businesses spent a week at each site. They reviewed

everything, from risk analysis methods to operations management, maintenance and inspection practices, contractor safety, skills management, internal audit effectiveness, and organization. A veritable MRI of procedures and their level in terms of safety requirements. Like most internal accident investigations, the task force uncovered shortcomings related to complacency, behavior and organization. The main takeaway: even though all procedures must be followed to the letter, we must never lose sight of the basic rules, see to it that everyone understands them and, to that end, prepare the rules in concert with the people responsible for applying them in the field. We must also be more disciplined about implementing them. Management has an important role to play in safety, both in managing the discrepancies found and disseminating best practices.

### NEW TOOLS

To highlight safety priorities, Total drafted 12 Golden Rules applicable company-wide in the spring, followed by a revised Safety Health Environment Quality Charter in the fall. The charter also stresses the need for manager involvement and example, personal and individual accountability, vigilance and strict enforcement. Its clear goal is to improve the safety culture at Total until it is an ingrained habit. Safety is everybody's business! In light of this steadfast position, the explosion on April 20, 2010 of the BP-operated *Deepwater Horizon* rig on the Gulf of Mexico's Macondo field was a sad reminder that no one is ever safe from an accident. The incident prodded Total to undertake a painstaking analysis of our own offshore drilling standards and practices. Three task forces were set up for that purpose in the summer. Their goal was to study the causes of the explosion and the potential risks of our offshore facilities in light of the *Deepwater Horizon* event.



Compliance with simple rules, such as wearing personal protective equipment, reflects the constant attention paid to maintaining safety.



#### CONTAINMENT SYSTEMS

A type of pollution control barrier, containment systems aim to prevent oil and gas from spreading in the event of an incident. BP succeeded in capping the Macondo 252 well using a stack of three emergency blowout preventers (BOP), and eventually sealed it by injecting cement through the same BOP capping stack.

## FYI

### 12 GOLDEN RULES, SHARED DISCIPLINE

TOTAL'S GOLDEN RULES ON WORKPLACE SAFETY FOCUS ON 12 TOPICS:

1. HIGH-RISK SITUATIONS
2. TRAFFIC
3. BODY MECHANICS AND TOOLS
4. PROTECTIVE EQUIPMENT
5. WORK PERMITS
6. LIFTING OPERATIONS
7. POWERED SYSTEMS
8. CONFINED SPACES
9. EXCAVATION WORK
10. WORK AT HEIGHT
11. CHANGE MANAGEMENT
12. SIMULTANEOUS OPERATIONS AND CO-ACTIVITIES

OVERALL GROUP TRIR\* IN 2010:

# 2.6

\* Total Recordable Injury Rate, or number of accidents reported per million hours worked.

### THREE QUESTIONS FOR MICHEL HOURCARD, Senior Vice President, Development & Operations Techniques in Exploration & Production.



#### What conclusions can we draw from BP's Deepwater Horizon accident?

We now know that it could have been avoided. The blowout was detected too late, leading to a loss of control over the well. However, there's no such thing as zero risk. Total is just as exposed as anyone else. We can't let down our guard for a second.

#### What measures does Total have in place?

As soon as the accident was

reported, we tried to figure out why it had happened by analyzing it and immediately double-checked our own procedures.

“ We can't let down our guard for a second. ”

Formal action was taken in June when three task forces were created. The first, made

up of deep offshore drilling experts, reviewed all equipment, prepared written technical guidance and developed a program to strengthen the skills of personnel responsible for operations. The second, which is working on capture and containment, is responsible for verifying the integrity of subsea infrastructure and developing a system for responding more quickly in the event of a deep offshore well accident. The third is

examining our pollution control systems and organization.

#### What about the oil industry as a whole?

During the first few months, the United States suspended all new offshore drilling. Since then, measures to approve drilling programs have been tightened. The new requirements will obviously affect costs and turnaround times for project implementation.



**WIDENING OUR**  
OPPORTUNITIES



# ADAPTING FOR THE LONG HAUL

Cyclical and structural shifts in our business environment, such as changing demand and tighter regulations, continually require us to recalibrate our strategy and adjust our organization. We need to adapt who we are and our products to secure our long-term future.



On one side you have OECD\* countries, where demand is falling steadily. Europe already has a continent-wide surplus in **refining** capacity and the United States is scaling back its gasoline imports. On the other side are emerging markets, where demand is exploding.

The world is evolving, faster than most observers predicted. Ultimately, the economic crisis simply highlighted and accelerated a trend that is here to stay.

Faced with this fact, we are acting to secure our own long-term future and addressing both sides of this difficult equation.

In Europe, our first move was to cut our refining capacity, by around 500,000 barrels a day by end-2011. We have also started adapting our produc-



## EXPERT INSIGHTS

**“EUROPEAN REFINING HAS BEEN WEAKENED by ever stricter environmental regulations that have hastened the obsolescence of certain production facilities and by a geographical shakeup caused by the immense capacity developed elsewhere. Plus, in France, the automotive fuel consumption mix is skewed in favor of diesel. The result is mediocre profit margins, aggravated by economic trends that have caused consumption in Europe and the United States to fall.”**

**Elie Cohen**, economist  
Taken from *Politiques Énergétiques* [Energy Policies].

tion, and thus our refining infrastructure, to align it with the new shape of the market – higher demand for diesel and sagging demand for gasoline – and comply with new European Union requirements, namely ultra-low-sulfur products. More generally, we are taking steps to shrink the **environmental footprint** of our operations. We are also revamping our service station network, to compete with new low-cost suppliers and adjust to changes in the buying habits of consumers, whose main criterion is now price. Thanks to highly competent R&D teams, we have been anticipating such tricky transitions for several years now. In France alone, 550 engineers and technicians are working to create specific solutions and more efficient products.

To keep expanding, Total will also seek out growth where it can be found, in regions whose economies are soaring fastest: Asia, the Middle East and also Africa. The goal is to move closer to oil and gas fields as well as consumers, by adapting to specific local needs and requirements. Implementing this strategy in developing regions demands a solid partnership policy and great agility on the part of all our businesses – not just oil and gas, but chemicals and specialty chemicals too.

\* Organisation for Economic Co-operation and Development, whose members include most developed countries.



“ Yogyakarta is known as a city of culture and education. Smaller and more people-friendly than the capital, Indonesia’s second-biggest city is appealing because there are young people everywhere, going out and living their lives, defying the perpetual cycle of stereotypes. ”

**MARC ROUSSEL,**  
PHOTOGRAPHER



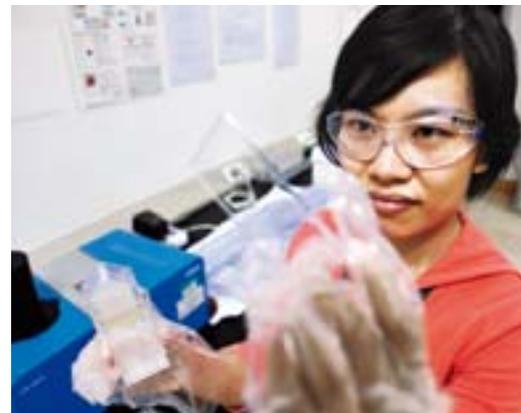
> **1,800 OF TOTAL’S SERVICE STATIONS IN FRANCE SUPPORTED THE PASTEURDON 2010 FUND-RAISING CAMPAIGN** through a program dubbed “*Le plein solidaire.*” For four days, €1 was donated to the Pasteur Institute for each tank of gasoline or diesel purchased. The drive collected €184,000, which will be used to fund research.

Adhesive specialist Bostik intends to commission new production units in Egypt, Vietnam and China in 2011 (here, the Guangzhou unit in China) and in India in 2012.



The Ras Laffan steam cracker in Qatar came on stream in March 2010.

In Asia, our petrochemical business is present in China, Singapore and South Korea.



## BIG PROJECTS FOR EMERGING MARKETS

Demand for oil, gas and chemicals is soaring in the world's growth regions. We are positioning ourselves in these fast-paced markets, while continuing to invest in our Western production base to adapt it to market requirements. Our goal is to satisfy local demand everywhere in the world.

Faced with a world changing at breakneck speed, our strategy is clear: to adapt to the different markets and cement our standing as an industry leader. Our top priority is to be there where demand is strongest. That is true of all our businesses and two especially fast-growing regions, Asia and the Middle East. Naturally, that is where we are developing our two biggest current projects. Conducted with local partners and fully integrated, they allow us to get closer both to oil and gas fields and consumers.

The first, in Qatar, is being carried out with our partner Qatar Petroleum and consists of producing plastic from **ethane**. Its final piece, the Ras Laffan ethane cracker, was inaugurated on May 4, 2010.

The second project is located in Jubail, Saudi Arabia, where we are building a world-class refinery in partnership with Saudi Aramco. Starting in 2013, it will process crude oil extracted nearby into refined products meeting the strictest standards, to supply local markets.

### > JUBAIL IS:

A capacity of **400,000** barrels per day.

Annual production of **700,000** metric tons of paraxylene, **140,000** metric tons of benzene and **200,000** metric tons of high-purity propylene.

A town-sized construction project, averaging **15,000** people on site and up to 40,000 during peak periods.

### BIG AMBITIONS

We are also stepping up our presence in these regions by expanding our retail network. The 600th Total service station in the Asia-Pacific region opened in China during 2010 – a symbolic milestone. In Africa, we have a network of over 3,500 service stations and are bolstering our positions in the Mediterranean basin by upgrading our infrastructure in North Africa.

At the same time, we are pushing our pawns forward in chemicals. We have a road map for this sector, where we hope to generate 25% of our sales in Asia by 2015 by offering turnkey solutions tailored to local demand and differentiated by their technological value added. To achieve that goal, we are continuing our capital investments via our joint venture with Samsung, the co-owner with Total in Daesan, South Korea of one of Asia's biggest petrochemical plants. A first step to upgrade the facility in 2008 has already boosted its original production capacity by a third. In June 2010, an aviation fuel unit opened →→→

# A PROJECT FOR EACH REGIONAL EMPLOYMENT AREA

Total does not initiate any closure or repurposing project without giving thought to the regional employment area's future. Below are three examples that back this up.

**A**fter

closing down a steam cracker and the styrene unit in Carling in north-eastern France, we will build a photovoltaic solar panel production and assembly plant at Composite Park in Porcellette, an industrial park that we also co-financed. About 80 jobs will be created.

Following the decision to repurpose the Flandres refinery, a task force dubbed Flandres 2010+ was cre-

ated. Its job is to do the preparatory work for implementing our commitments, especially our pledge to remain a major economic force in the region. Total participated in local discussions and consensus-building on how to revitalize the economy of the Dunkirk regional employment area, especially its port.

At the Feluy plant in Belgium, Total Petrochemicals took over the facilities of Polimeri, which intended to stop manufacturing polystyrene there. The decision saved dozens of jobs.



## SHORT TAKES

### FORTY YEARS OF RESEARCH AT CRES IN FRANCE

The Solaize Research Center, or CReS, near Lyon, is one of Total's 22 research centers worldwide. In 2010, it celebrated its 40th anniversary. Specializing in automotive fuels, lubricants and asphalt, it works on developing the always more environmentally friendly and energy-efficient technologies and products of the future.

## FYI

### 2010 DIVESTMENTS AND CLOSURES IN THE CHEMICALS BUSINESS

- MAPA SPONTEX, A GLOBAL MANUFACTURER AND DISTRIBUTOR OF BABY CARE (PACIFIERS, BOTTLES) AND HOME CARE (SPONGES, RUBBER GLOVES) PRODUCTS, WAS SOLD TO THE U.S. FIRM JARDEN.
- THE PROCESS OF DIVESTING OUR COATING RESINS (USED IN PAINT) AND PHOTOCURE RESINS (FOR OPTICS AND ELECTRONICS) BUSINESSES IS UNDER WAY.



The Modco plant in France's Lorraine region will be commissioned in 2012, with a production capacity of 220,000 photovoltaic panels per year.

## TWO QUESTIONS for GRAEME BURNETT, Senior Vice President, Middle East & Asia, Total Petrochemicals.



**The Middle East is on track to become the foremost producer of petrochemicals, with Asia**

### as its main market. How is Total Petrochemicals adapting to that change?

Our goal is to be a major, global petrochemical producer. To achieve that, we are banking on maximizing the efficiency and safety of our operations, on technological innovation and on geographical integration. In the Middle East, we're expanding our production by leveraging the proximity of feedstock. We have invested heavily there in the last few

years, especially in the Qatofin project in Qatar and the SATORP project in Jubail, Saudi Arabia. In Asia, we're stepping up our activities to meet the surge in demand. That's the reason for the expansions at the Daesan petrochemical complex in South Korea, which we operate as an equal partner with Samsung, and the creation in China of a partnership with China Power Investment Corporation (CPI).

### What are the partnership's plans?

It plans to build a huge industrial complex in Inner Mongolia, where we will produce ethylene, propylene and their derivatives from methanol obtained by gasifying coal, found in large quantities in the region. The project meshes perfectly with our strategy of using raw materials where they are found, producing close to consumer markets, and leveraging our technological

knowledge and expertise. We're bringing to the table our industrial proficiency in the methanol to olefins (MTO) process and the olefin cracking process (OCP) tested in Feluy, Belgium.



Our goal is to be a major, global petrochemical producer.





The new sulfur recovery units in Port Arthur, Texas, and Leuna, Germany, are two of the major projects in our program to upgrade our refining base.



€740 million is being spent to upgrade the Normandy refinery. The project will increase diesel production by 10% and reduce carbon emissions by 30%.

## BIG PROJECTS FOR EMERGING MARKETS

→→→ its doors, followed at the end of the year by the start of construction on a butane storage tank. Work will continue in the next few months to **debottleneck** the steam cracker and the polyolefin and aromatic units, further ramping up the site's production capacity. Lastly, to maintain our technological lead, we also opted in 2010 to shift our focus to materials science, through the activities of three major companies – Atotech in electroplating, Hutchinson in rubber processing and Bostik in adhesives – and to sell off other, less strategic assets (see FYI on page 39).

### REINVENTING REFINING

Despite our push in growth regions, we have not forgotten mature economies, where we plan to remain a major player. To that end, we are helping our Western refineries undertake an industrial makeover designed to achieve two goals: producing more diesel and ultra-low-sulfur fuels, while scaling back total refining capacity. In Europe, we will spend €1 billion annually on such projects, half in France. "Although the refineries have some flexibility to adjust to demand, it doesn't allow

them to respond to a market that has changed direction sharply over the years," says Raymond Bulle, a professor at France's IFP School. "Shifting production to intermediate products such as jet fuel and diesel requires new, major capital expenditure." The Leuna refinery in Germany and the Port Arthur refinery in Texas each rolled out a third **sulfur recovery unit** in 2010, which enable them to produce fuels that comply with local environmental standards. All of their products are marketed regionally. The Port Arthur project also includes, among other things, the construction of a **deep conversion unit**, or coker, to process crude oil into light products.

In France, initial construction work on the RN 2012 project to make the Normandy facility into one of the most competitive refining hubs in Europe got under way in 2010. Total is investing €740 million in it, to achieve a trio of goals: boosting diesel production capacity by 500,000 metric tons a year, slashing gasoline surpluses by 60% and upgrading facilities so that they are more fuel-efficient and emit 30% less carbon. Strike-ridden 2010 was also the year



Coke drums arrive on the Jubail site.



The full-conversion Jubail refinery in Saudi Arabia will process heavy crude. It is scheduled to come on stream in 2013.

when the future of the Flandres refinery, idled for several months because of weak market demand, was decided. The site will be repurposed into a technical support center, a refining training center for Total and a logistics depot.

Lastly, we are working to keep our retail operations in mature markets viable by teaming with other companies to achieve critical mass. That is what motivated the creation of the TotalErg joint venture with Italy's Erg, pooling virtually all of the refining and marketing activities of the two parties.

To stay competitive we sometimes have no choice but to pull out of a market. That is what is happening in the United Kingdom, where we embarked on a process to put the Lindsey Oil Refinery and most of our retail activities up for sale in 2010. In the Iberian Peninsula as well, we have opted to sell our interest in CEPSA, which manages three refineries and 1,750 service stations in Spain and Portugal, to IPIC, a UAE sovereign wealth fund. Our goal is to focus on growth in new markets, particularly R&M specialty product markets, in the region.

## SPOTLIGHT

### TWELVE CHARGING STATIONS FOR ELECTRIC VEHICLES

Our subsidiary Total Belgium rolled out its first rapid-charging stations for electric cars in 2010. The initiative supports the surge in "new wave" vehicles and is totally in step with new consumer expectations for cleaner solutions that protect the environment.

### RAS LAFFAN, AN INTEGRATED PROJECT

With a capacity of 1.3 million metric tons of ethylene a year, the Ras Laffan ethane cracker is the largest in the world. It is also part of an integrated project in which Total is involved end-to-end, using raw ethane from the North Field (Dolphin project). The gas is converted to ethylene in the Ras Laffan cracker and then piped to Mesaieed 140 kilometers away, to a unit that manufactures low-density, linear polyethylene, a plastic used primarily to make films.

### SUPPORT FOR SMALL BUSINESS

Through Total Développement Régional (TDR), we allocate €6 million a year to support around a hundred French small businesses. Assistance can take the form of financial support, coaching in the area of exports and international expansion, or technology and knowledge and skills sharing.

## SHORT TAKES

**CHINA WILL ACCOUNT FOR ONE-THIRD** of global demand for plastics in 2030.

**QAPCO, IN WHICH TOTAL HAS A 20% INTEREST**, began construction of a new low-density polyethylene line with a capacity of 300,000 metric tons per year in Qatar. It is scheduled to start up in 2012.

## FYI

### ATOTECH, A TOTAL SUBSIDIARY SPECIALIZED

**IN ELECTROPLATING**, OPENED TWO NEW TECHCENTERS, ONE IN THE CZECH REPUBLIC AND ONE IN ITALY, IN 2010 TO HELP LOCAL BUSINESSES DEVELOP INNOVATIVE, "GREEN" PRODUCTS AND PROCESSES. WE EXPECT TO BUILD ANOTHER TWO TECHCENTERS SOMEWHERE IN THE WORLD EACH YEAR.

**Total and Elf fuel economy lubricants improve fuel efficiency by at least 2.5%.**



**Total Ecosolutions-labeled Lumicene® polyethylene grades reduce the weight of packaging films by around 20%, a substantial savings in material compared to standard polyethylene grades.**

## RESPONDING TO (R)EVOLUTIONS

In a world in ferment, we feel it is important to respond to new environmental and societal demands. This commitment is reflected, for example, in our Total Ecosolutions line to promote energy efficiency and in our work to give the world's underprivileged access to energy.

Tell us what you need. In 2009, we created the Total Ecosolutions label to respond to new market and societal demands, especially calls to give greater weight to the environment. This distinctive seal of eco-efficiency identifies our products and services that are more energy-efficient and/or enviro-friendly than the market standard. By using the Total Ecosolutions lineup, our customers shrink their environmental footprint, either by utilizing fewer resources and raw materials or by reducing other environmental impacts.

A rigorous process has been created for awarding the label, in line with the international ISO 14020 and ISO 14021 standards on environmental labels and declarations. An external auditor reviewed the *Total Ecosolutions Guidelines* and found that they

were appropriate and complied with these standards. In addition, the labeling process for most of the products and services concerned has also been audited externally.

### BEHIND THE SCENES OF TOTAL ECOSOLUTIONS

In the last two years, around 20 Total products and services have received the label. They include 6 from Refining & Marketing and 12 from Chemicals (Petrochemicals and Specialty Chemicals). Another service awarded the label is Automated Meter Reading, or AMR. Developed by Total Gas & Power UK, it uses a smart meter to automatically track customer energy usage. Customers can access an Internet platform for detailed reporting.

**Words highlighted in black** are defined in the glossary.

# PLASTIC IS FANTASTIC, THE STORY OF LUMICENE®

**W**hat

do you do when you have a line of metallocene polyolefins – a main base component of most common plastics – that outperforms standard products? You showcase them by grouping them together under a single brand. That is what we did in 2009, when we created the Lumicene® line of products offering improvements in appearance, transparency, gas permeability, impact resistance, mechanical properties and food compatibility. Possible applications for Lumicene® plastics include caps and closures, films, bottles, fibers, rigid packaging and artificial turf – the last earning the “FIFA RECOMMENDED” endorsement in 2010.

Lumicene® Random, a new line of copolymers, joined the Lumicene® family in October 2010. Designed for the injection molding industry, it enables producers of rigid food packaging, caps and closures, medical supplies and household items to shave 8% off the thickness of their plastics. This trims their materials purchases, saves energy and shrinks products’ carbon footprint. All of which is good for the environment.



The range of products and services awarded the Total Ecosolutions label will continue to grow in the years ahead. In early 2011, another 13 products and services were in the final stage of labeling. However, even today, if the entire Total Ecosolutions lineup were used, it would avoid emissions of 578,000 metric tons of carbon equivalent a year, equal to the per capita annual emissions of 57,800 European Union citizens. “Far from being a constraint, the label is a lever for developing our activities, because there is strong market demand for this type of solution,” sums up Carl Van Camp, Senior Vice President, Polyolefins at Total Petrochemicals and a member of the Total Ecosolutions Labeling Committee for the Chemicals business.



## EXPERT INSIGHTS

### “SHOW MORE ORIGINALITY THAN OUR COMPETITORS

**There are three areas in which we absolutely must be innovative: sustainable development, efficiency and customer differentiation. The last point is essential, because we have to respond to our customers’ expectations in a way that is more original than our competitors. In order to anticipate their future needs, it is increasingly common to consult with customers when they draft their specifications. We do this with PSA, Renault and other automakers, especially for lubricants.”**

**Hélène Bérard,**  
Vice President,  
Innovation Development  
in Refining  
& Marketing’s  
Specialties business

## A WORLD FIRST

**“A REVOLUTIONARY HIGH-DENSITY POLYETHYLENE RESIN was rolled out in October 2010. It can be used to produce 60,000 milk bottles an hour that weigh 20% less than existing bottles, a production capacity six times higher than conventional systems.”**

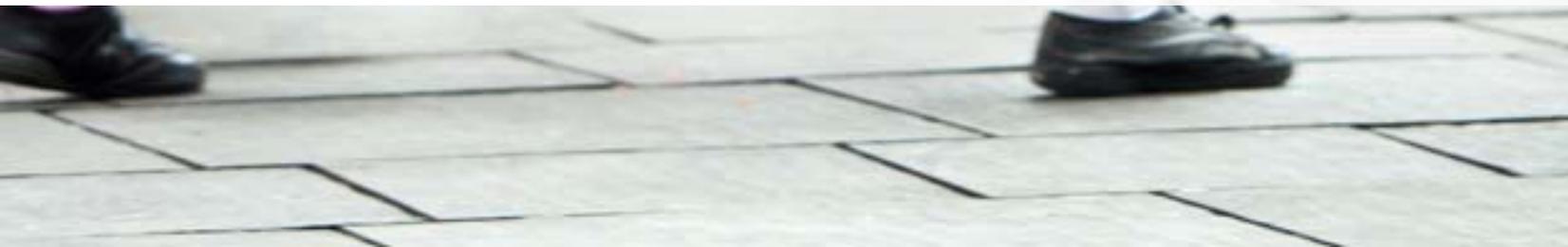
## SPOTLIGHT

### ENERGY FOR ALL

Some 4 billion people worldwide live on less than \$10 a day, including the potential target of a pilot program we have launched to provide low-income communities with modern, reliable forms of energy. The project has four separate focuses: energy insecurity in OECD countries (access to mobility and heating), biofuels produced for local markets, commoditizing the associated gas produced at Total sites, and photovoltaic solar power. The greatest strides were made by the fourth, which kicked off a test phase in Cameroon, Kenya and Indonesia in January 2011. It is expected to provide lighting and the ability to charge small electrical appliances to populations without access to power. The decision whether or not to deploy the project on a large scale will be made at the end of the year. The other focuses are not far behind. **Jatropha**, a vegetable oil that could replace automotive fuels for local uses, is now being tested in Mali and Senegal. In the area of associated gas, we are currently in the design phase of projects in Nigeria, Yemen, the Congo and Uganda. With one foot in business and the other in community development, access to energy is a laboratory for innovation and a way to help integrate Total into a number of our non-OECD host countries.



# **THE ASCENSION OF** ALTERNATIVE ENERGIES





# WHAT DOES THE FUTURE HOLD?

An experienced energy company, Total is securing the future by adapting our products and services to the new requirements of producing countries and customers. That means energy diversification, finding substitutes for oil to manufacture chemicals and fuels, and energy efficiency. R&D will be a key driver.



## EXPERT INSIGHTS

### "PUSH THE GREEN SOURCES

**Oil isn't as rare as people think, but the thirst for it is greater, it's harder to access and its price will climb. To put it another way, governments and major energy companies - which are responsible for ensuring secure supply and oil and gas continuity and for investing accordingly where there is a real need to - have an obligation to push the green sources that will some day help maintain basic balances."**

**Henry Lauret**, business and political journalist and editorialist for *Le Nouvel Économiste*. Taken from *Politiques Énergétiques* [Energy Policies].

# F

arsightedness

is our creed in meeting the new challenges of a changing world in which oil is becoming scarcer and increasingly costly to produce, demand for energy is soaring, and environmental protection is an imperative. Consequently, in 2010 we continued to boost our activities in two major segments: developing other energies to diversify our solutions and creating petroleum substitutes.

### SOLAR ENERGY IN THE LIMELIGHT

In the field of **renewable energies**, the sun shone especially brightly. During the year we broadened our expertise in this sector through two main projects. For the first one, United Arab Emirates authorities in Abu Dhabi chose us to help build the Shams **concentrated solar power plant** which will be one of the world's biggest. The second venture, in the United States, involved acquiring a stake in the American start-up AE Polysilicon.

The equity acquisition makes us a partner in constructing a plant to produce solar-grade polysilicon granules. The technology involved is both innovative and competitive.

In the **biotechnologies** field, our flagship project was an agreement signed with Amyris that has already resulted in the creation of a joint R&D team. This start-up specialized in biomass to molecules conversion to make biofuels and green chemicals is pioneering new and unusually promising production methods.

Partnering with firms developing innovative technologies has proved rewarding on a number of our projects. By teaming with start-ups breaking new ground with bold solutions, we assume some of the risks and capital expenditure. In exchange, we enrich our portfolio of expertise and share the industrial property rights and R&D work product. It is a win-win strategy for everyone, which holds the promise of exciting technological advances.



“ Every Sunday evening, young Porteños gather near the famous cemetery where Eva Perón is buried to party, in a contemporary, grateful ode to the week that is beginning, to life with its renewed promise and hopes. Buenos Aires is energy embodied. ”

**MARC ROUSSEL,**  
PHOTOGRAPHER



> **THE PARTNERSHIP WITH U.S. START-UP AMYRIS** is a landmark for Total in the field of biomass. Together, our R&D teams will step up the development of biotechnologies to produce molecules that we can use. Building our expertise in this way gives us a competitive advantage in renewable fuel and chemical production.



In the area of photovoltaic solar energy, we are leveraging existing competencies, investing heavily in R&D and forging partnerships.



## A PLACE IN THE SUN

Solar energy was one of our star performers in 2010. With two flagship projects, in Abu Dhabi and the United States, we have helped extend the reach of this innovative, environmentally-friendly technology.

"Al Shams" is Arabic for the Sun. It is also a shining symbol of Total's 2010 alternative energies strategy. For although nuclear power remains a long-term development focus, notably through our partnership with French electric utility EDF in the Penly EPR™ project, solar energy continues to grab the limelight. More important, it added two promising accomplishments to its résumé this year.

The first was in the Arabian Peninsula. In May 2010, two years of hard work by our teams was rewarded when Abu Dhabi authorities (United Arab Emirates) chose us to build and operate what will be one of the world's biggest concentrated solar power plants, an emerging technology with strong potential. Our partners are Masdar and Abengoa Solar.

Under construction since July 2010, the Shams power

### SHORT TAKES

**"IN APRIL 2010, TOTAL JOINED THE POSITIVE ENERGY CONSORTIUM, an association of businesses concerned by issues related to the buildings of the future, whose aim is to define and implement measures to cut energy use. Total will lead the working group on integrating photovoltaic solar energy into office buildings."**

plant will eventually have a capacity of 109 MW and is expected to supply power to over 30,000 households by 2012.

### A COLOSSAL UNDERTAKING

No fewer than 250,000 mirrors dotting 250 hectares of desert will heat a fluid that will be used to generate steam and produce electricity after flowing through a turbine. The plant will also be able to run on gas.

A true bellwether project, Shams will enable Total to gain new skills and expertise and to expand our solar energy portfolio. It will also allow us to satisfy the desire for energy diversification expressed by the Emirate, which aims to produce 7% of its electricity from renewables by 2020.



**AE Polysilicon employee. Improving the energy efficiency of polysilicon production and significantly reducing the associated greenhouse gas emissions, AEP's solar silicon production process is a highly competitive solution.**

Moving on to the United States, Total has acquired a 25.4% stake in AE Polysilicon (AEP), a start-up that specializes in purifying **silicon** and is developing polysilicon granules. Its highly innovative system is one of the most competitive out there, because it is much less energy-intensive than conventional processes. Work to commission a commercial plant that will produce more than 1,800 metric tons a year began in September 2010. It will be a key asset for Total, since purified silicon is essential for making solar panel cells and is produced by a limited number of companies in the world. The venture will also be an opportunity to lock up a spot upstream in the photovoltaic chain and to become an integrated operator.

## ABU DHABI, THE SECRETS OF A SUCCESS STORY

In February 2008, the Emirate of Abu Dhabi issued a tender for the construction of the Shams power plant.

**W**e

immediately decided to submit a bid. And to give it more weight, we teamed up with Abengoa Solar, a Spanish company with extensive experience in concentrated solar power. Together, we have a full hand to play. Abengoa Solar brings its know-how in building solar **tower plants** and plants equipped with parabolic trough collectors. Total is modeling the future plant and work-

ing out the technical specifications. "In addition to providing large-scale project management expertise, we were able to leverage our in-house skills," says Hervé Gasq, from Gas & Power's Engineering Department. "For example, the heating network issues raised by the project are similar to the ones you see in petrochemicals and refining." And we hit a bull's-eye with the pairing of our two companies: our consortium beat out three others to take the contract.



**The 109 MW Shams concentrated solar power plant will meet the electricity demand of more than 30,000 households.**

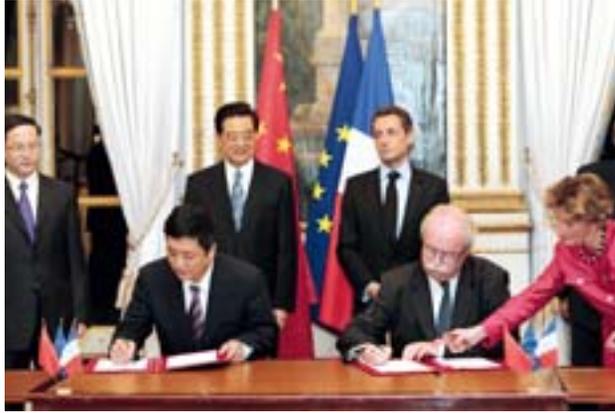
### NOVEMBER 2010

**SINCE JANUARY 2010, THE CENTRE SCIENTIFIQUE ET TECHNIQUE JEAN FÉGER (CSTJF) R&D CENTER IN PAU, FRANCE** has been producing solar electricity thanks to the installation of 2,400 square meters of solar panels. Production capacity is 230 MWh a year. The CSTJF is one of our five sites that will test and approve the use

of solar power. The next one on the list was the Lacq plant in the first quarter of 2011.

**WE ANNOUNCED PLANS TO BUILD A SOLAR PANEL MANUFACTURING AND ASSEMBLY PLANT** in Porcellette, in northeastern France. It will begin operating in late 2011 and will produce 50 MWp annually, or around 220,000 solar panels.

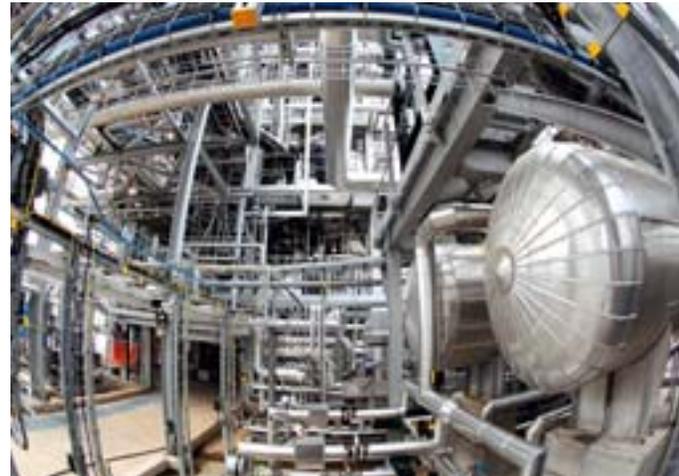
With the signature of the agreement with CPI, witnessed by the Chinese and French heads of state, the ground was broken for commercial application of Total Petrochemicals' MTO process.



The MTO (Methanol to Olefins) demonstration unit at the Feluy petrochemical complex in Belgium. This technology is helping to diversify Petrochemicals' sources of supply.

## FINDING SUBSTITUTES FOR OIL

Every day our teams are hard at work dreaming up and designing processes to obtain substitutes for oil. Biomass and other feedstock are commonly converted, in a bid to produce new generations of not just plastic, but also automotive fuels.



### SHORT TAKES

**LARGE-SCALE TESTING OF THE MTO/OCP TECHNOLOGY** was conducted at the Feluy petrochemical site in Belgium. Feluy has a pilot unit that came on stream in the fall of 2008 and is in the pre-commercial scale-up phase. Some €45 million was invested in the project.

What if some day people could make oil? Without dreaming that big, finding substitutes for it is more than just an item on our wish list at Total. It is serious business, as the projects we worked on in 2010 show.

The first, in China, involves MTO/OCP technology, a process that produces plastic from **methanol** using feedstock derived from coal, natural gas or biomass. In November 2010, we signaled our intention to study, alongside China Power Investment Corporation (CPI), the construction of a plant in Inner Mongolia. The facility is expected to produce 1 million metric tons a year of **polymers** – molecules used in plastics – starting in 2015. The €2-billion to €3-billion agreement with CPI is based on a practical partnership: the Chinese company will bring its access to substantial coal reserves to the table, while we will contribute

our expertise in methanol to olefins production technologies.

### FROM SUGAR BEETS TO PLASTIC

The Chinese project will be the first commercial application of MTO/OCP. We have already conducted large-scale testing of the technology at our Feluy site in Belgium, and in July 2010 confirmed our ability to make commercial-grade polypropylene using propylene derived from methanol. "The Feluy project's success gives Total Petrochemicals a usable **MTO/OCP** technology, as well as leadership in the process," noted François Cornélis, Vice Chairman of Total's Executive Committee and President of the Chemicals business. "We're going to launch MTO/OCP projects with partners in coal- or gas-rich countries interested in developing their petrochemical industry using their own resources." → → →

## AND WHAT ABOUT CONVERSION?

**B**iototechnologies are one way to produce fuels and plastics without oil. The method harnesses the action of living microorganisms to convert chains of molecules without breaking them.

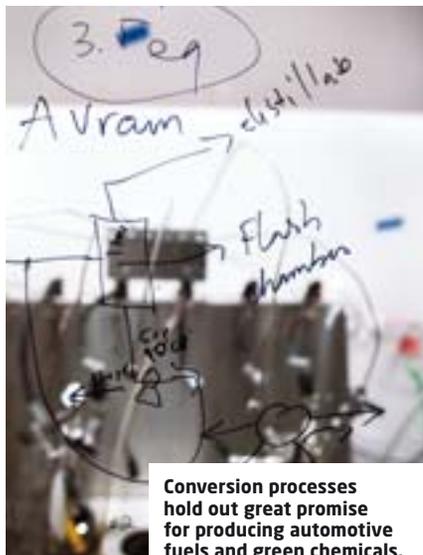
### A SECOND METHOD

Conversion separates and then reshuffles components. Specifically, a variety of feedstocks including biomass, coal and gas are converted to an equally diverse array of finished products. Such processes encompass Biomass to Liquids (BTL), Coal to Liquids (CTL) and Gas to Liquids (GTL).

### THE HOW

Conversion features a **gasification** step that produces synthetic gas, which subsequently undergoes chemical synthesis that yields methanol, diesel or dimethyl ether (DME). DME is a gas synthesized from natural gas, biomass or coal. Easy to transport

in liquid form, it boasts outstanding environmental qualities and can also be used as an industrial or home heating fuel, a **naphtha** substitute in **olefin** production and an automotive fuel to replace diesel. Total is involved in various pilot projects to produce dimethyl ether, especially bio-DME from black liquor, a pulp manufacturing waste product.



### EXPERT INSIGHTS

#### "SIZING UP NEW TECHNOLOGIES"

At Total Petrochemicals, we're working to develop petrochemical technologies by focusing on two main areas. The first is evaluating new technologies from outside Total, like MTO. This led us recently to take an interest in small emerging firms that have come up with innovative processes that they want to develop and market. These inventions usually relate to producing molecules from renewable carbon. The second is devising new technologies through in-house R&D programs, which has resulted in the development of OCP and alcohol dehydration for example."

**Walter Vermeiren,**  
New Technologies  
Development Manager,  
Total Petrochemicals

### SPOTLIGHT

**AMYRIS:**  
"TOTAL IS SERIOUS ABOUT RENEWABLES."



"We believe Total is serious about renewables, as they're a very strategic energy for you, unlike many companies in the sector. Everyone in your company gives a very consistent story of strategy and commitment. When you decided to go into biomass, you didn't just reassign people, you hired people who really understood the science. This is a unique, very effective move."

**John Melo,**  
CEO of Amyris, Inc.  
since 2007

## CHINA: ENVIRONMENT AND MTO

The excellent yields obtained at the Feluy demonstration unit persuaded our Chinese partners to sign on to an MTO/OCP project in Inner Mongolia. China Power Investment Corporation (CPI) had also told us it wanted to pay special attention to the project's environmental side: i.e., minimizing water use in a resource-strapped region and studying carbon capture and storage solutions.

We had an impressive achievement highlighting our know-how to put up against this requirement, namely our Lacq pilot in southwestern France. Thanks to feedback from Lacq, virtually the only pilot in the world to span the entire carbon capture and storage (CCS) chain, the Chinese plant could take advantage of tested, efficient solutions to be as "CO<sub>2</sub> ready" as possible.

The Lacq pilot is not our only CCS project. We are studying another process in our partnership with the French Petroleum and Alternative Energies Institute (IFP Energies Nouvelles), called Chemical Looping Combustion, or CLC (see sidebar on coal on page 53).



Amyris is a leader in synthetic biology. Our partner owns and develops equipment to reprogram the genome of microorganisms, which allows it to develop and optimize yeast strains to produce biodiesel and chemicals from cane sugar.

## FINDING SUBSTITUTES FOR OIL

→→→ Another technology that came a long way in 2010 is **polylactic acid**, or PLA. The Escanaffles demonstration unit inaugurated in Belgium in April will allow us to validate this process for making **bioplastics** from sugar beet pulp\*. PLA has several renewable plant source, a variety of end-of-life options and a lower environmental impact than other polymers. It is also highly rigid and impermeable to water, valuable properties. Futerro, the 50/50 joint venture created in 2007 by Total Petrochemicals and Galactic, is in charge of this innovative project. It is expected to produce its first marketable batches in 2011.

### AMYRIS: I RUN ON SUGAR, HOW ABOUT YOU?

Biofuel and chemical production has not been overlooked in the race to find petroleum substitutes. On June 23, 2010, we announced the acquisition of

**1 to 2%**  
THE ESTIMATED  
MARKET SHARE  
of bioplastics  
in 2020.

\* Other non-food biomass resources could be used in the future.

a 22.01% interest in Amyris, a Silicon Valley start-up. "One of the most promising [new companies] in the emerging sector of industrial biotechnology," according to Philippe Boisseau, President, Gas & Power at Total, it has a unique industrial platform to engineer and optimize microorganisms such as yeast, algae and bacteria to convert sugar into automotive fuel and chemicals.

Amyris has research laboratories and a pilot unit in California, as well as a demonstration site and pilot plant in Brazil. Production, currently in the commercial scale-up phase, is expected to begin in 2011.

The partnership between Total and Amyris is fairly unique. On the one hand, a large industrial company with its project management capabilities, product R&D and marketing expertise; on the other, an innovative start-up with its technological know-how. Our aim is to add biomass-derived products, such as bio-lubricants, bio-jet fuel, **biodiesel** and molecules for chemical applications, to our core production.



Amyris has two R&D centers, one in California and one in Sao Paulo, Brazil.



## EXPERT INSIGHTS

### SEVERAL NON-FOOD BIOMASS PROJECTS

**“Research on using non-food biomass – biomass not intended for human or animal consumption – has led us to participate in a number of projects. One is BioTfuel, which aims to develop a technology for converting biomass to biodiesel, and another is Futurol, a project to expand the production of bio-ethanol from lignocellulose.**

**At the same time, we’re scouting areas amenable to growing non-food biomass crops. Our priority is to avoid encroaching on land that could be used to feed the planet.”**

**Jean-Michel Brusson,**  
Research Project Manager,  
Biomass and Biotechnology,  
in the Scientific Development Department

## SPOTLIGHT

### COAL HAS A FUTURE

Coal is definitely not a has-been. An abundant resource (reserves of more than 1 trillion metric tons) that is easier to store and cheaper to produce than oil, it accounts for 40% of the power generated worldwide. In 2030, it will still be crucial, making up about 23% of the energy mix. But coal has major environmental impacts. Burning coal emits more carbon per unit of energy than other fossil fuel. Coal’s future is therefore tied to our ability to manage its negative impacts. An initial solution is to make power plants more energy efficient. Another, at the end of the line, is to capture and store the carbon emitted. Total’s research efforts are focused on the second. We have invested close to €60 million in a carbon capture and storage (CCS) pilot in Lacq, France. Inaugurated on January 11, 2010, the installation will test the entire CCS chain through end-2011. The pilot’s principle is simple. Captured using the **oxy-fuel combustion** process, carbon from the gases released by the Lacq gas treatment plant is piped to the Rousse geological storage

site 27 kilometers away. There it is injected into a depleted gas field for storage 4,500 meters below the surface.

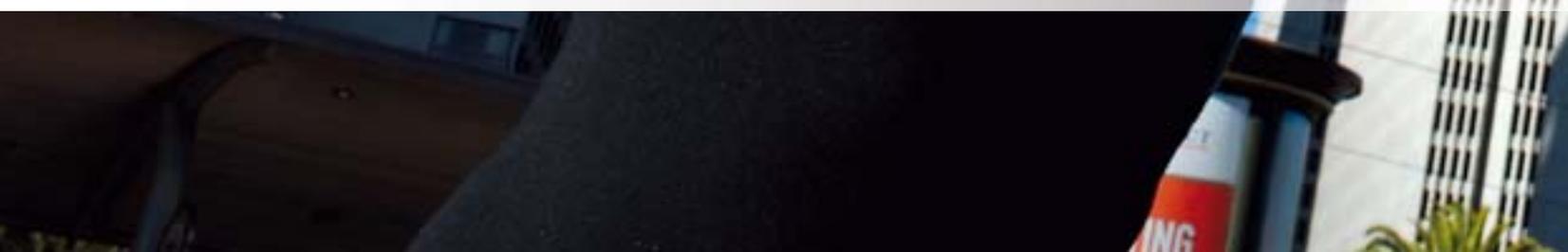
**Chemical Looping Combustion**, or CLC, is another carbon capture process. This technology is an alternative to oxy-fuel combustion, which uses pure oxygen instead of air to produce a concentrated stream of carbon. CLC is based on an innovative process in which metal oxides are used to supply the oxygen. Total is partnering with the French Petroleum and Alternative Energies Institute (IFPEN) to develop it using various energy sources, such as coal and heavy fuel oil. A pilot to demonstrate its use on a commercial scale is under study.

### ANOTHER PROCESS

Total is also conducting research on another process, Coal to Liquids (CTL), motivated by its strong growth potential. This conversion technique produces liquid hydrocarbons from a synthetic gas obtained by gasifying coal. Current forecasts project CTL production of 2 million to 2.5 million barrels per day in 2030.



**THERE'S**  
**MORE**





# 1, 2, 3 TOTAL

Total has opted for an integrated business model. We are active across the oil and gas value chain, from exploration and production to refining and marketing to petrochemicals. This is reflected in our organization into three business segments: Upstream, Downstream and Chemicals.

Our business model puts us on a sound financial footing and gives us the flexibility and adaptability we need to keep growing.

## UPSTREAM

Upstream encompasses oil and natural gas exploration, development and production, liquefied natural gas, and alternative energies. Upstream is organized into Exploration & Production and Gas & Power.

## DOWNSTREAM

Downstream spans the refining, marketing, trading and shipping of petroleum products such as automotive and other fuels and specialty products. It is organized into Refining & Marketing and Trading & Shipping.

## CHEMICALS

Chemicals comprises Base Chemicals such as petrochemicals and fertilizers and Specialty Chemicals, which covers rubber processing, resins, adhesives and electroplating applications. Its products cater to both industry and consumers.

### UPSTREAM

#### OIL AND GAS EXPLORATION AND PRODUCTION

- Production of nearly **2.4 million barrels of oil equivalent per day**, of which:
  - **56% liquids**
  - **44% natural gas**



#### Proved reserves

- **10,695 million barrels of oil equivalent\***
- A reserve life of **more than 12 years** at current production rates

#### Liquefaction plant

#### Liquefied natural gas

- Interests or reserved capacity in **9 liquefaction plants** and **5 regasification terminals**
- **12.3 million metric tons of LNG** marketed in 2010



#### Solar energy

Annual production capacity:

- **170 MWp** for Tenesol
- **155 MWp** for Photovolttech

#### Biomass & biotechnologies

- Acquisition of a roughly **22% interest** in U.S. start-up Amyris
- **First jet fuel and lubricant production** expected in 2016



\* Reserves calculated using U.S. Securities & Exchange Commission (SEC) rules (average Brent price of \$79.02 per barrel).

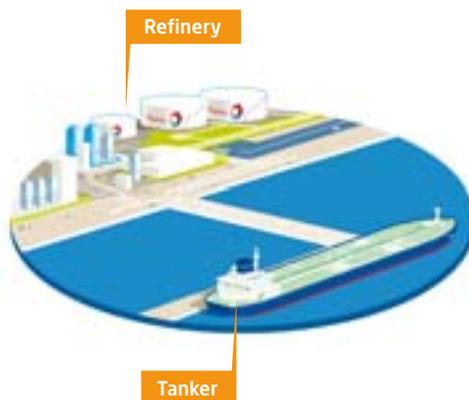
## DOWNSTREAM

### REFINING

- Interests in **24** refineries, of which **10** are operated directly by us
- **1.9** million barrels per day produced by Total refineries:
  - **18%** gasoline
  - **9%** aviation fuel
  - **41%** diesel and fuel
  - **12%** heavy fuel oil
  - **20%** other products

### Shipping

- **119** million metric tons of petroleum products
- **2,900** charters
- A time charter fleet consisting of **47** tankers with an average age of about four years.



### Trading

- **8** offices
- **Almost 5** million barrels per day of oil and refined products traded

### Road transportation

- **Over 590** million kilometers traveled



### Marketing

- **17,490** service stations
- **2.5** million barrels per day sold in 2010\*
- **Almost 2.6** million metric tons of biofuel blended into automotive fuel produced in Europe



## CHEMICALS

### SALES

- Base Chemicals: €**10.7** billion
- Specialty Chemicals: €**6.8** billion



### Petrochemicals

- Total Petrochemicals: **18** production sites in **9** countries

### Fertilizers

- GPN/Rosier: **5** production sites in France, Belgium and the Netherlands



### Elastomer processing

- Hutchinson: **76** production sites in **16** countries

### Resins

- Cray Valley/CCP/Sartomer: **39** sites in **16** countries

### Electroplating

- Atotech: **16** production sites in **14** countries

### Adhesives

- Bostik: **45** production sites in **19** countries

\*\* Excluding trading.

# HIGHLIGHTS

## IN EVERYTHING FROM EXPLORATION TO REFINING AND MARKETING,

2011 is off to a strong start for Total! We survey first-quarter 2011's milestone events around the world.

### CONSTRUCTION OF GLNG TO START SOON



plant that will produce 7.2 million metric tons of LNG a year. The first deliveries are planned for 2015.

### MORE THAN 250

#### BILLION CUBIC METERS OF GAS

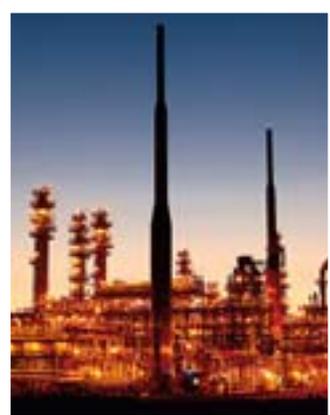
The estimated reserves contained by the Fairview, Arcadia, Roma and Scotia fields, from which the coal seam gas for the GNLG project will be extracted.

GNLNG is off and running! On January 13, we and our partners, Australia's Santos (operator with a 30% interest), Malaysia's Petronas and South Korea's Kogas, officially announced our decision to launch our liquefaction plant in Australia, which will be supplied with coal seam gas. Construction will begin immediately and will create 1,500 jobs in the first half of 2011 and 5,000 when work is in full swing. A thousand permanent jobs will be created later when production gets under way. The project involves a capital expenditure of \$16 billion and is located in Queensland, an Australian region hard hit by floods. It includes extracting coal seam gas and building a 420-kilometer gas pipeline and a liquefaction



### TWO AGREEMENTS WITH NOVATEK

Total and Russia's Novatek have stepped up their collaboration, signing two memorandums of cooperation. Total will acquire a 12.08% interest in Novatek and a 20% interest in the Yamal LNG project to develop the South Tambey gas and condensate field in the Arctic, which has estimated resources of 1.25 trillion cubic meters. The latter transaction should be finalized by July 2011. Our equity interest in Novatek gives us access to production of 120,000 barrels of oil equivalent per day and to proved and probable reserves of around 1 billion barrels of oil equivalent. The intention of the two parties is to boost our equity stake in the company to 15% within 12 months and 19.40% within 36 months.



### WORK COMPLETED AT PORT ARTHUR

At the Port Arthur refinery in Texas, construction work for the Deep Conversion Project (DCP) was completed in January. The project's goal was to upgrade the facility, in particular by increasing the amount of crude oil it can convert to light products. Safety was a core concern throughout the revamp period. Work proceeded very smoothly, with not a single lost time injury during the 6.4 million hours put in. The last units are scheduled to come on stream in May 2011.

## THE LONG VOYAGE OF THE PAZFLOR FPSO

On January 18, after two years of construction, the Pazflor FPSO left South Korea for Angola, which it reached after a three-month-long voyage. It was quite a globe-trot for the imposing "ship," which at a length of 325 meters and a surface area equivalent to four soccer fields is the biggest FPSO built to date. It will be able to process 220,000 barrels a day and store 1.9 million. Its start date is planned for late 2011. Pazflor's production comes on top of the output of the other large developments already in production in Block 17.

**SUNNY SKIES AT THE CSTJF R&D CENTER**  
The installation of solar panels atop the *Centre Scientifique et Technique Jean Féger (CSTJF)* R&D center in Pau, France was completed on **January 21. Some 2,400 square meters of panels will produce 230 MWh a year, or enough power to supply 75 households.**

### PRODUCTION KICKS OFF IN ITAÚ, BOLIVIA

On February 2 in Bolivia, Total gave the go-ahead to start production of the Itau gas and condensate field. Located on Block XX (Tarija Oeste), 400 kilometers from Santa Cruz, the field was discovered in 1999 and is expected to produce 1.5 million cubic meters of gas per day initially. Its production will be exported for the most part and may be bumped up to 5 million cubic meters per day by mid-2013.

## NEW GAS FIND IN THE UNITED KINGDOM

Gas and condensate has been discovered in the UK sector of the North Sea, 75 kilometers northwest of the Shetland Islands. The new find was made by an exploration well in the Edradour field, which we operate with a 75% stake. Appraisal is under way and will be followed by more in-depth studies. If they are conclusive, the field could be developed using the infrastructure installed for Laggan and Tormore, two nearby fields that Total began developing in March 2010.



## DESTINATION UGANDA

Total Exploration & Production is entering a new area in East Africa with the acquisition of a 33% interest in three licenses in the Lake Albert region of Uganda. We expect to operate one of the three blocks, our UK partner Tullow another and our Chinese partner CNOOC the third. This region spanning an area of nearly 10,000 square kilometers is very promising: the exploration and appraisal work already completed has found more than a billion barrels of oil. And we believe that the undiscovered potential may be on the same order of magnitude.

### PROMISING PROJECTS

An enormous development project is under study concurrently. It aims to install infrastructure around two production centers, a main hub in the north of the basin, and another in the south, plus an oil pipeline to export production to the Indian Ocean. The partners are also considering building a refinery in Uganda, which would enable the country to profit directly from refined petroleum products.

## TOTAL DIVESTS ITS INTEREST IN CEPSA IN SPAIN

Total and IPIC signed an agreement under which, if we obtain the necessary government approvals, we will sell our 48.83% interest in CEPSA, Spain's second-largest oil company, to the Abu Dhabi enterprise. The deal is attractive for both sides: IPIC wants to expand its holdings in European refining, while we are interested in cutting back on ours in light of declining demand and surplus capacity. The potential acquisition is also paired with a promising Upstream partnership, the Abu Dhabi concern playing a major role in the Middle East's oil industry.

Despite this divestment, we do not intend to pull out of the Iberian Peninsula: we will continue to expand there in new markets, especially specialty products, through our Spanish subsidiary.



### SUCCESSFUL WELLS IN THE REPUBLIC OF THE CONGO

Two new wells, Bilondo Marine 2 and 3, have tested positive in the Republic of the Congo. They are located in the middle of the Moho-Bilondo license, about 70 kilometers offshore in a water depth of 800 meters. The wells found reservoirs 77 and 44 meters thick respectively.

The last discoveries in the region, the Moho Nord Marine 1 and 2 wells, date back to 2007. These encouraging results mean that we can consider a new development hub, a direct extension of another field in production since 2008, which was the first ultra-deep offshore field developed in the country.

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## ARGENTINEAN LEASES

**In Argentina, Total is partnering with local company YPF to acquire an interest in four new exploration leases in the Neuquén basin in the country's interior. The six-year leases augment our portfolio in the region and allow us to assess the local potential in shale gas, a highly promising unconventional resource. Specifically, we are acquiring 42.5% of the Aguada de Castro and Pampa las Yeguas II leases, which we will operate, as well as 40% of the Cerro Las Minas lease and 45% of the Cerro Partido lease, two blocks operated by YPF. The first exploration wells are scheduled to be drilled this year. Total now holds shale gas interests across 1,548 square kilometers.**

## HEAT EXCHANGER SWITCH-OUT

On January 11, after a long journey across France, the Packinox heat exchanger reached its final destination, the Normandy refinery. This ultra-efficient device cools and heats fluids, vital steps in the refining process. It will replace and upgrade the 16 heat exchangers used before its arrival. With Packinox on the job, the refinery will use less fuel and emit less carbon. Its installation is the first major project of RN 2012, the facility's upgrading plan, and the first step in its transformation. When implementation of the plan is complete at end-2013, the Normandy refinery should emit 30% less carbon.

# A

## GLOSSARY

### ASSOCIATED GAS

Gas that is found naturally in an oil field.

# B

### BARREL

A standard unit of measurement for oil production. There are 159 liters in a barrel.

### BIODIESEL

A fuel made from vegetable oil (colza, soybean and others).

### BIOMASS

All plant, animal or fungal organic matter that can be burned to supply energy following methanization or after undergoing newly developed chemical conversion processes.

### BIOTECHNOLOGY

A marriage of life sciences and specific techniques. Yoghurt and alcoholic beverage production are examples of biotechnology applications. Industrial, or "white" biotechnology – biotechnology branches are often classified by color – uses enzymes or fermentation agents to convert molecules for industrial applications.

# C

### CATALYSIS

The chemical action of a substance – the catalyst, an acid or a base – whose presence modifies other substances without undergoing any alteration itself.

### CCS

Carbon capture and storage technology is designed to reduce emissions of greenhouse gases during fossil fuel combustion. Carbon dioxide is captured, compressed, transported and then injected into deep geological formations for permanent storage.

### CHEMICAL LOOPING COMBUSTION

A carbon capture process that provides an alternative to oxy-fuel combustion. It employs metal oxides to supply the oxygen used to produce a concentrated – and therefore easier to capture – carbon stream.

### CO<sub>2</sub>

Carbon dioxide, one of the primary greenhouse gases.

### COMPLETION

All operations required to bring a well on stream.

### CONCENTRATED SOLAR POWER PLANT

The most cutting-edge type of solar thermal plant, which uses mirrors to concentrate solar radiation and heat a liquid to produce power. Concentrated solar technology consists mainly of tower plants and plants with parabolic trough collectors.

### CRACKING

A refining process that converts large, complex, heavy oil molecules into simpler, lighter molecules using heat, pressure and sometimes a catalyst. Steam cracking, used in petrochemicals, differs from catalytic cracking in that it uses heat and no catalyst. This type of cracking produces ethylene and propylene.

### DEBOTTLENECKING

Modification of a facility to boost its production capacity.

### DEEP (FULL) CONVERSION UNIT

An installation that cracks residual oil to obtain light products, such as gas, gasoline, diesel and distillates, and petroleum coke.

### DEVELOPMENT

A key step in exploration and production, development is the period during which all the installations required to produce oil and gas are built, after completion of all the economic and technical validation steps.

**ECO-EFFICIENT**

Describes something that “does more” or is “efficient” at optimizing resource use and reducing environmental impacts.

**ENERGY MIX**

An expression referring to all energy sources used to meet demand. Experts say that 20 years from now, fossil fuels will still make up 75% of the energy mix.

**ENVIRONMENTAL FOOTPRINT**

A measurement of the impact human or industrial activity has on the environment – natural resources, climate, water, air, soil, biodiversity, etc. – in the short or medium term.

**ETHANE**

A colorless, odorless combustible gas that is found in natural gas and petroleum gases.

**ETHANOL (LIGNOCELLULOSIC)**

Also called ethyl alcohol. The purest form of alcohol, ethanol is colorless, water-miscible and usually obtained from grains and plants such as trees or straw. It is used in the chemical industry as a synthesis intermediate, a solvent and a disinfectant. It is also used as an automotive fuel, especially when blended with gasoline.

**ETHYLENE/PROPYLENE**

Two byproducts of olefin cracking that are essential for producing polyethylene and polypropylene, a pair of plastics frequently used in packaging, the automotive industry, household appliances, pipes and textiles.

**EXPLORATION**

All activities that help to establish the presence of oil and gas deposits. It includes geophysical and seismic surveys and exploratory drilling.

**FOSSIL FUELS**

The energy sources – oil, natural gas and coal – produced from rocks created by the fossilization of living creatures millions of years ago

**FPSO, OR FLOATING PRODUCTION, STORAGE AND OFFLOADING VESSEL**

A sort of giant ship that carries the equipment needed to produce, process and store oil and gas and offload them to a tanker at sea.

**FLARING**

The gas associated with oil production was long burned, or flared. Total has pledged to reduce the flaring associated with oil production, in order to curtail our greenhouse gas emissions. Some associated gas can be reinjected into wells to boost recovery rates or used to fuel power plants.

**GASIFICATION**

A process that converts carbonaceous matter such as coal, petroleum and biomass into carbon monoxide and hydrogen. The resulting mixture, called synthetic gas or syngas, can be used for combustion engine fuel or to produce hydrogen and methanol.

**GEOPHYSICS**

The study of the Earth's various physical properties and of the composition and movements of its various rock strata. It is applied to oil and gas exploration, to identify areas with distinctive physical properties and to ascertain the nature of deep geological formations.

## HEAVY OIL/BITUMEN

Unlike conventional crude oil, which flows naturally or can be pumped without being heated or diluted, heavy oil is oil that cannot be extracted in its natural state via a well and conventional production methods. This definition is also applicable to bitumen.

## HYDRAULIC FRACTURING

A method that "breaks" a reservoir's rock to allow the gas in it to flow out.

## HYDROCARBONS

Rock asphalt, crude oil, natural gas, etc. Hydrocarbon is the term used for mixtures of molecules composed principally of carbon and hydrogen atoms. They can also include compounds that contain sulfur, nitrogen or metal.

## JATROPHA

A plant native to semi-arid regions called "green gold" because it produces an oil with properties comparable to those of diesel.

## JOINT VENTURE

A partnership between two or more companies to conduct a specific project and share the resulting profits and losses.

## LEASE OR LICENSE

Acreage contractually granted to an oil and gas company or joint venture by the host country for a defined period. The lease or license grants the oil and gas company the exclusive right to conduct exploration (**exploration lease or license**) or produce a field (**production lease or license**).

## LIQUEFACTION TRAIN

The unit that converts natural gas into liquefied natural gas (LNG) by cooling it to  $-163^{\circ}\text{C}$ . LNG takes up just 1/640th of the space occupied by the gas in its gaseous state and is thus easier to transport when gas pipelines cannot be used.

## METHANOL

Also called wood alcohol, methanol is the simplest alcohol. It is toxic and can be used as an anti-freeze, solvent or fuel and to produce biodiesel.

## MTO/OCF

MTO, Methanol to Olefins, consists of converting methanol to olefins. OCF, which stands for olefin cracking process, is then used to convert the olefins into plastics.

## NAPHTHA

A heavy gasoline used as a petrochemical base.

## NEAR MISS

An unexpected, sudden event that does not result in damage or losses. Highly instructive, near misses spur analysis and show how useful safety measures really are.

## OLEFIN POLYOLEFIN

Olefins are derived from oil and gas. Polyolefins are synthetic polymers obtained by polymerizing an olefin.

## OXY-FUEL COMBUSTION

A carbon capture process that replaces air with oxygen to produce a concentrated carbon stream.

## POLYLACTIC ACID

A fully biodegradable polymer produced by the bacterial fermentation of sugars or starch. It is used in food packaging and surgical supplies.

## POLYMER/COPOLYMER

A polymer is a large molecule made up of monomers linked by covalent chemical bonds. Starch and protein are polymers. Polymers can be organic and natural (such as DNA) or artificial and synthetic (such as polystyrene). Polyolefins are the largest polymer family. Copolymers are polymers with at least two types of monomer (molecules used for polymer synthesis).

## RECOVERY RATE

The percentage of oil or gas that can be extracted from a given field or deposit. It depends among other things on rock porosity and gas pressure.

## REFINING

A set of processes, such as distillation, reforming, desulfurization and cracking, used to manufacture various petroleum products from crude oil.

## RENEWABLE ENERGY

Said of an energy whose reserves replenish themselves or are inexhaustible. Examples include solar, wind and hydropower, biomass, and geothermal energy.

## RESERVES

### Proved (1P) reserves

Those quantities of oil and gas which, by analysis of geoscience and engi-

neering data, can be estimated with reasonable certainty (90%) to be economically producible from known reservoirs under existing contract, economic and operating conditions:

- Proved developed reserves are reserves that can be expected to be recovered through existing wells with existing equipment and operating methods, without a major expenditure.
- Proved undeveloped reserves are reserves that are expected to be recovered following new capital expenditure (surface facilities, wells, etc.).

### Proved and probable (2P) reserves

Proved and probable reserves are the quantities of oil and gas expected to be recoverable from an average accumulation, under E&P contracts covering drilled acreage for which technical studies have demonstrated economically viable development in a long-term Brent price environment. They also include projects to be developed by mining.

## RESERVOIR

A sort of "pocket," or more accurately a porous, permeable subsurface rock formation, containing large quantities of oil or natural gas. It is contained by impermeable rock or a watercourse and is isolated from other deposits.

## SEISMIC SURVEY

A sort of ultrasonic imaging of the subsurface that shows deep geological structures. Seismic images are subsequently interpreted by geophysicists.

## SILICON/PURIFIED SILICON/POLYSILICON

Silicon is the most common element in the Earth's crust after oxygen. It does not occur as a free element, but in compounds such as silica, long employed as a basic ingredient in glass. Polysilicon, obtained by purifying silicon, consists of crystals with a metallic luster and is used in the manufacture of photovoltaic solar panels.

## SULFUR RECOVERY UNIT

A unit that removes sulfur or sulfur compounds from gaseous or liquid hydrocarbon mixtures.

## TOWER/PARABOLIC TROUGH COLLECTOR PLANT

A tower plant is a type of thermal solar plant comprised of a field of special solar mirrors, or heliostats, that concentrate solar radiation toward a generator at the top of a tower. In plants with parabolic trough collectors, the mirrors automatically track the sun as it moves across the sky.

## TRAP

Any geological structure that stops the migration of natural gas, crude oil and water through subsurface rocks, causing the hydrocarbons to accumulate in pools in the reservoir rock.

## UNCONVENTIONAL OIL AND GAS

Oil and gas that cannot be produced or extracted using conventional methods. Examples include shale gas and oil sands.



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20-F

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