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### Angola Block 15: In a class by itself



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**ExxonMobil**

Taking on the world's toughest energy challenges.™



# ExxonMobil

Taking on the world's toughest energy challenges.™



Cover photo by Robert Seale

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### ► Upfront

Block 15 offshore Angola is a shining example of innovative resource development, deep-water technology and strong, ongoing cooperation between ExxonMobil, its co-venturers, national oil company Sonangol, the Angolan government and local suppliers.

These collaborations are providing needed energy to the world – 450,000 barrels of oil a day – from a resource estimated to be more than 5 billion barrels of oil equivalent. Beginning on page 15, a series of compelling photographs captures a day in the life of this world-class project that has just expanded with the startup of new undersea satellites.

Periodically, *The Lamp* features profiles of members of the Exxon Mobil Corporation Board

of Directors. These biographical sketches highlight the director's business career, achievements, education and other personal events. Beginning on page 5 are profiles of Board Members Jay Fishman, Henrietta Fore and Peter Brabeck-Letmathe.

The National Math and Science Initiative – with a \$125 million commitment from Exxon Mobil Corporation – is dramatically improving high school student math and science test scores, helping them do better in college. Read more starting on page 27.

Thanks to the power of an astounding supercomputer, ExxonMobil scientists and engineers are now capturing some of the clearest pictures of the subsurface for use in oil and gas exploration, development and

production. Read how this new technology is giving the company a competitive edge on page 21.

Porsche is an iconic name in the automobile industry, and since 1996 1 million Porsches have left the factory filled with *Mobil 1* synthetic motor oil. ExxonMobil and Porsche are continuing their strategic relationship, and the story detailing this alliance begins on page 13.

Plus, how Imperial Oil is cultivating future scientists (page 33) and new exploration blocks in Colombia (page 38).

We hope you enjoy this issue of *The Lamp*.



Bob Davis  
Editor

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# Keys to energy development in Canada: technology, openness and sound policies

The Banff Forum is an annual retreat held every autumn in a different location in Canada. ExxonMobil Senior Vice President Andy Swiger addressed the conference this year in Banff, Alberta.

► Despite the economic challenges facing the world today, said Swiger, the need for energy will continue to rise, driven by population growth and the universal desire for a better life. The world's economy will more than double in size between now and 2040.

"With this extraordinary expansion will come strong growth in the demand for energy," he said. "We project that global energy demand will be more than 30 percent higher than it is today, and we can expect natural gas and oil to meet close to 60 percent of energy needs in the future."

Technology will play a central role in safe, efficient and responsible energy development,

Swiger said. As the economy grows, the world must look to technology for "visionary breakthroughs as well as incremental gains over the long term."

## Role of technology

Swiger cited the importance of innovation at ExxonMobil's Kearl Oil Sands Project in Canada. Canadian oil sands contain about 170 billion recoverable barrels of oil, one of the world's largest known reserves of energy.

"By using an innovative and proprietary process, we can generate pipeline-quality bitumen that will be blended with diluent for shipment," Swiger said. "This requires less solvent at lower cost and eliminates the construc-

tion of associated facilities, making the tremendous resources at Kearl more economical to develop. In addition, we will deploy cogeneration technology at Kearl that will further reduce energy needs. These technologies, taken together, would allow us to produce the oil sands with about the same levels of lifecycle greenhouse gas emissions as many other crude oils processed in North America."

Innovation and ingenuity are also evident at the Cold Lake heavy oil project operated by Imperial Oil, ExxonMobil's Canadian affiliate. Long-term investment and research have led to state-of-the-art water recycling techniques. These

steps, begun nearly 30 years ago, have lowered fresh water use by nearly 90 percent. Further initiatives could achieve another 30 percent reduction.

Technology has enabled industry to develop North America's vast shale gas and tight oil resources, Swiger said. Hydraulic fracturing, horizontal drilling and other completion technologies have made it possible to "recover natural gas and oil from sources once believed to be not just unconventional, but uneconomic, and, at times, unreachable."

## Public concerns

"Canadians and Americans are interested in the environmental impact of resource recovery,"





The Kearl Oil Sands Project in Canada will use innovative technology to reduce greenhouse gas emissions and operating costs.



Andy Swiger  
Senior Vice President  
Exxon Mobil Corporation

Swiger said. "With every new technological advance comes a renewed obligation for industry to address the public's questions."

ExxonMobil does so by reaching out to the public and policy-makers alike to explain that its innovations, project execution and risk-management systems are designed to protect communities and the environment.

"For example," said Swiger, "we recognize that many people are asking questions about oil-sands development and the environmental impact of resource recovery. That's why we are working to increase the knowledge and understanding of government officials and the general public."

"For oil-sands development,"

said Swiger, "this outreach means that we discuss how we are conserving water throughout development, how we monitor and preserve biodiversity, how we seek to reduce emissions at every stage of the energy supply chain and how we will reclaim the land for nature as operations draw to a close."

#### World lessons

Swiger stressed the importance of sound and consistent energy regulations and policies.

"Governments around the world play a crucial role in promoting free trade and establishing a level playing field for lawful competition among market participants," he said. "Because investment, innovation and cooperation are so critical in our industry, we need governments to establish and maintain sound policies."

One of the most important areas for government action is building a clear regulatory pathway. In this area, Swiger said, Canada is a global leader.

"Environmental rules in Canada are rigorous and demanding," he said, "but government officials work with industry to provide guidance and clarity at each step. Businesses can proceed with the assurance that a project will advance to completion without arbitrary delays."

Canada has proven that with resource access and the right policies in place, the energy industry can bring new supplies of energy to market. That, in turn, will create new jobs, provide government revenue, increase trade and spur economic growth.

"The nation, the government and the people of Canada are uniquely positioned to make an extraordinary contribution – not only in the enormous energy resources they can help deliver, but also in the model for energy regulation, policymaking and partnership they can provide," Swiger said. **theLamp**

# The winding road from the Bronx to Wall Street

Jay Fishman brings the lessons of a diverse career to the Exxon Mobil Corporation Board of Directors.

*Editor's note: The Lamp periodically publishes profiles of members of the Exxon Mobil Corporation Board of Directors.*

*The objective of these biographical sketches is to introduce our readers to members of the board, highlighting the individual's business career, achievements, education and other notable events. This special supplement features profiles of Board Members Jay Fishman, Henrietta Fore and Peter Brabeck-Letmathe.*

*Profiles by Bill Corporon  
Photography by Janice Rubin*

► While one of the Travelers company's many offerings is auto insurance, its chairman and CEO, Jay Fishman, isn't kidding when he says he came to the insurance industry "by accident."

Armed with a bachelor's degree in economics and a master's in accounting from The Wharton School, Fishman went to work as an audit supervisor for the accounting firm Coopers & Lybrand in 1974.

At the time, he wasn't thinking about running a large corporation. "My goal," he says, "was to get out of college and make a living."

After five years at Coopers & Lybrand, Fishman moved on to increasingly senior positions with prominent financial firms. In 1991, he became senior vice president and treasurer of Primerica Corporation, a financial services company whose diversity of products included insurance.

Two years later, when Primerica acquired Travelers, Fishman became Travelers' chief financial officer. In 2001, he left New York for Minnesota to head up the financially troubled insurer The St. Paul Companies. When Travelers and The St. Paul merged in 2004, he was named chief executive officer of the newly formed organization.

By 2005, he was chairman and CEO of Travelers and now

oversees one of the nation's leading property and casualty insurance companies, with more than \$100 billion in assets.

## Value-based achievements

Industry observers have written about Fishman's reputation for "intensity."

"It was probably more the case when I was a younger man," he says. "It's true that I'm intense about work, but I'm not that way with people. I do take my responsibilities seriously, however."

The importance of hard work and personal responsibility was a lesson learned from one of the most important people in Fishman's life – his father.

Fishman's rise to the top of Travelers began in a small family-owned business in the Bronx, New York.

"I have the greatest respect for my father's generation," he says. "My dad was a radar instructor in the Army Air Force during World War II. When he left the service, he opened a tiny print shop. He worked hard to pay the rent and provide for his family."

Thanks to his father's determination, Fishman was able to attend a private school in New York and was the first person in his family to graduate from college.

## Shared approach to the business

Fishman says he's still learning about the energy industry, but points out similar aspects of the way Travelers and ExxonMobil operate – the need for rigorous risk analysis, taking a long-term perspective and a disciplined approach to business.

"In the insurance industry," he says, "we spend a fair amount of time thinking about long-term risk. It's critical for us and, clearly, for an energy company as well. ExxonMobil's emphasis on long-term planning is very clear. It's a part of the company's DNA."

Fishman sees the long-term view in several aspects of ExxonMobil's business – its emphasis on safety, health and the environment, its career development and succession planning process and its commitment to diversity.

Travelers and ExxonMobil also share a dedication to increasing shareholder value: "We have to think of our respective companies' money as if it were our own."

All in all, says Fishman, running a successful business comes down to one word: "Discipline."

## A dedication to public service

Fishman has strong ties to his alma mater. He's a University of

Pennsylvania trustee, a member of the board of overseers of the School of Veterinary Medicine and a member of the Industry Advisory Board of the Financial Institutions Center at The Wharton School. He also chairs the Travelers/Wharton Partnership for Risk Management and Leadership.

He sits on the board of the Carlyle Group and is an active member of the Business Council. He's a trustee of New York-Presbyterian Hospital and a vice chairman of the Corporate Fund Board of the John F. Kennedy Center for the Performing Arts.

Fishman's father was a jazz enthusiast and kept an extensive record collection. Fishman inherited his father's love of music, especially jazz and classical. He has served on the advisory board of the Jazz Foundation of America and the board of directors of the New York Philharmonic.

Recently, when he became chairman of the board of the New York City Ballet, Fishman made it clear that assuming the leadership of one of the world's most prestigious performing arts organizations had not changed him.

"No silver spoon here," he told *The New York Times*. "I don't aspire to be anything more than an ordinary guy." **theLamp**



Jay Fishman



# Maximizing the benefits of a connected world

Exxon Mobil Corporation Director Henrietta Fore seeks to make business, government and nonprofit partnerships more effective.

► Henrietta Fore sees a world full of connections – a perception that began to form when she was a child.

“Both my mother and my father were in business,” she says, “so I came to view things from an interesting perspective. I came to understand that a company’s success is closely tied to the success and advancement of the society in which it operates. The world presents a resource to business and provides a wide range of opportunities to help improve people’s lives and move the world forward. The role of energy in achieving economic progress in the developing world is an excellent example.”

Her understanding of the connections between business, government and society developed during her years as a student at Wellesley College.

“I studied a great number of subjects,” she says. “I majored in history with a minor in economics and art. In studying history, I developed an interest in government and how its interconnection with business can work to the benefit of each and to society as a whole.”

Fore credits her parents for helping her see the world that way.

“My father grew up during the First World War and the Depression,” she says. “He was what we would call today a ‘hard-nosed businessman.’ My

grandfather was an architect and an early inventor of the Holsman automobile in 1902. A strong interest in technology and invention runs through our family line.”

Fore describes her father as “a man of the mind.”

“He taught me how to look at things and understand how mechanical sciences and physics worked. My mother was a European, a woman of the heart. She taught me about people and how they interact with one another.”

The lessons learned early in her life created the foundation for a distinguished career in business and government as well as nonprofit organizations that draw on the strengths of the public and private sectors.

## A lifetime of service

Henrietta Fore is chairman of the board and chief executive officer of Holsman International, a manufacturing, consulting and investment company operating in the United States and international markets.

The Holsman companies include Stockton Products, a manufacturer and distributor of steel and wire products, Vicenza, which makes unique home hardware, and Green Express Direct, a distributor of energy-saving building products.

In addition to her bachelor’s degree from Wellesley, Fore holds a master’s in public

administration from the University of Northern Colorado. She studied international politics at Oxford University and attended the Stanford University Graduate School of Business.

In 2001, she became the 37th director of the United States Mint, managing the world’s largest manufacturer of coins, medals and coin products. She served as chair of the International Mint Directors Conference.

In 2005, Fore earned the U.S. Department of the Treasury’s highest honor, the Alexander Hamilton Award, for achieving historic progress in Mint operations, improving safety, providing unparalleled customer satisfaction and accomplishing significant cost reduction. As a result of her leadership, the U.S. Mint transferred more than \$4 billion back to the Treasury General Fund. In addition, Fore enriched coin design through creation of an innovative artistic program.

From 2005 to 2007, she served as Under Secretary of State for Management, the department’s chief operating officer and the Secretary of State’s principal advisor on management issues.

In 2007, Fore became the first woman to head the U.S. Agency for International Development (USAID) and Director of United States Foreign Assistance, holding the equivalent rank of Deputy Secretary of State. In 2009, she

received the Distinguished Service Award, the highest honor the Secretary of State can bestow.

“I became interested in areas where business, government and nonprofit organizations can work together to improve the lives of people in need,” Fore says. “USAID is a great platform for exploring and understanding the developing countries.”

She pursued that interest by becoming actively involved in nonprofit organizations. She co-chairs the Asia Society, a prominent board of U.S. and Asian business and social leaders, and Women Corporate Directors. She also sits on the boards of organizations such as the Clinton Bush Haiti Fund, the Center for Strategic and International Studies, the Women’s Foreign Policy Group and the Council on Foreign Relations.

## Power of partnerships

Fore’s a firm believer in the effectiveness of public-private partnerships.

“One of the best examples I can cite,” she says, “is the President’s Malaria Initiative (PMI), which brings together government, business and NGOs (non-governmental organizations) to battle malaria in places like Angola. It’s heart-breaking to see the suffering, especially among children, that this disease has caused.”

ExxonMobil has contributed





Henrietta Fore

\$2 million to the PMI. The money has been used to develop information materials and assist with the distribution of anti-malarial drugs with support from NGOs.

"The Middle East and North Africa are tenuous regions politically and economically," she says, "but there is a lot of good work under way. Opportunities are abundant in these areas for future partnerships that are mutually beneficial to U.S. corporations, government, NGOs and the developing countries in need."

#### **Helping women succeed**

Fore has a passion for promoting the success of women.

"My mother and sister taught me to appreciate, support, promote and admire women," she says. "I attended girls' schools and women's colleges with many role models as professors and peers. I carried away the knowledge that women can do anything. When women do well, they set an example for other women, and for men."

She acknowledges that women trying to balance a successful career while meeting family obligations face a difficult challenge.

"Developing multitasking skills is an absolute necessity," she says.

Her advice to women: "Learn, learn, learn about the world around you, about other societies, other economies and other cultures. Then lead." **theLamp**

► Peter Brabeck-Letmathe heads Nestlé, the world's largest company in the fast-moving consumer goods industry, but one of his fondest memories is of selling ice cream in Austria.

"It was my first job," he says. "I worked from early in the morning till late in the evening. I had a truck and an assigned route, and I was responsible for delivering merchandise and developing new customers. I was essentially the head of a small company, and I enjoyed it enormously."

Today, Brabeck-Letmathe is board chairman of a company that employs some 330,000 people in 150 countries.

Nestlé traces its origins back to 1866, when the Anglo-Swiss Condensed Milk Company opened the first European condensed milk factory in Cham, Switzerland. One year later, pharmacist Henri Nestlé developed one of the world's first prepared infant cereals in Vevey, Switzerland. The two companies merged in 1905 to become the Nestlé the world knows today, with headquarters in Vevey.

#### **A lifelong career**

Brabeck-Letmathe was born near the end of World War II in Villach, Austria. Because of its



Peter Brabeck-Letmathe

# Scaling the heights

Exxon Mobil Corporation Director Peter Brabeck-Letmathe applies life's lessons to running a giant in the food industry.

strategic importance as a major railway hub, the town was heavily damaged by Allied bombing.

"I was extremely young at the time," says Brabeck-Letmathe, "but I remember walking through the town with not much left behind. When the war ended, the community set out to rebuild and move forward. That determination to reshape the future made an impression on me, and it's a part of my own thinking about running a successful business."

Brabeck-Letmathe graduated from the University of World Trade in Vienna with a degree in economics. After joining the Nestlé Group in 1968, he spent a significant part of his career in Latin America, moving from sales manager and marketing director in Chile to CEO of Nestlé Ecuador and later to chairman and CEO of Nestlé Venezuela.

During his rise through the ranks of the Nestlé organization, Brabeck-Letmathe immensely enjoyed his field assignments.

"In the field is where the business is really happening," he says. "You have operational responsibilities that give you valuable experience."

He was transferred in 1987 to Nestlé's international headquarters as senior vice president

in charge of the culinary division. Appointed executive vice president in 1992, he assumed worldwide leadership of strategic business groups and oversaw marketing, communications and public affairs.

Brabeck-Letmathe led the Nestlé Group from 1997 to 2008, first as CEO, and later as chairman and CEO. In 2008, he handed over the office of CEO and remained chairman of the board.

## The importance of risk

Brabeck-Letmathe's life and career have been shaped by many experiences, but none as lasting as what happened on a mountain-climbing expedition in 1967. During summer vacation, he and a group of friends drove to Pakistan to climb Trich Mir, the highest peak in the Hindu Kush mountain range.

During the climb, two members of the group had to turn back for health reasons, leaving Brabeck-Letmathe and two others. Their provisions were running low, so they drew lots to decide who would continue.

Brabeck-Letmathe lost, and the other two, including his best friend from childhood, continued on. They disappeared on the mountain and haven't been seen since.

At age 56, Brabeck-Letmathe attempted to climb the Matterhorn, but when a storm rolled in, he decided to turn back.

"My decision to discontinue the climb was based on weighing the importance of reaching the summit against the possibility that I might be injured or worse and unable to do my job," he says. "It was an example of how to manage risk."

He tried again two years later and succeeded.

## Creating shared value

The concept of "giving back" pervades the business world. Brabeck-Letmathe thinks it's off the mark.

"What should we give back to society?" he asks. "We have neither stolen nor taken anything. A business's fundamental duty is to create jobs and to produce useful products in a sensible way. There is no conflict between creating value for both shareholders and society."

Nestlé has developed the idea of "Creating Shared Value," which holds that in order to create long-term value for shareholders, Nestlé must also create value for people in the countries where it operates.

Brabeck-Letmathe cites a

Nestlé program in the Philippines as an example. When Nestlé built a manufacturing plant, many of the local women wanted to work there. Nestlé did not have jobs for all who sought them, so the company provided formal training for women with basic sewing skills. The company gave them small sewing jobs that helped them take out a business loan from a local bank. The "Cut and Sew" project took on bigger jobs for the factory and has now grown to a sizable business on its own.

## Pursuits

Brabeck-Letmathe has been mountaineering in the Alps since he was a child, so it's not surprising that his favorite forms of relaxing include climbing and walking in the mountains. He also likes to fly to glaciers in his own small airplane.

His regular reading material consists of financial publications and scientific magazines because he wants to know "what may be coming in the future."

The guiding principle throughout his life has been straightforward: "Success is a journey, not a destination," he says. "Every single day has to be better than the day before. It never ends."

theLamp





## Saving an endangered turtle in Papua New Guinea

Conservation campaign aims to recruit the people of southern Papua New Guinea to protect a threatened creature that has long been an important part of their culture.



Papua New Guinea's pristine Kikori and Omati River basin is home to the unusual pig-nosed turtle, known as Piku in the local dialect.

▶ A little cartoon character named Piggy has taken on a big job in Papua New Guinea: to build community awareness about survival of her own rare species.

No, pigs and hogs haven't been placed on the endangered list. Piggy, however, does have something in common with them – a snout-like nose.

Piggy is a pig-nosed turtle, known in the Kikori delta dialect as Piku. She's the central character of a children's book, *The Adventures of Piggy on the Kikori River*, funded by Esso Highlands Limited, an ExxonMobil subsidiary and operator of the Papua New Guinea

liquefied natural gas project.

Distributed to some 2,000 students in eight schools in Papua New Guinea, the book combines facts about the conservation and life history of Piku with games and puzzles.

### Platypus of turtles

Piku is of particular interest to scientists because it represents the last of a once-widespread family of turtles (*Carettochelys insculpta*). The turtles are found only in the southern part of the island of New Guinea and in the Northern Territory of Australia.

"It is so different, with no





Above: Villagers in the Kikori region of Papua New Guinea release Piku hatchlings into Wau Creek. Local residents have been encouraged to support turtle conservation.

Below: Piku, with its snout-like nose, is the last of a once-widespread family of turtles.



close relatives,” says Dr. Carla Eisemberg, University of Canberra. “It is like the platypus of the turtle world.”

Eisemberg heads an Esso Highlands-funded team studying conservation of the turtle and its unique native habitat in Papua New Guinea’s Kikori and Omati River basin.

People of the Kikori delta have long prized the turtle for its meat and eggs; however, harvesting has increased over recent decades, and studies are showing a decline in both numbers and sizes of the reptile. Regionally, the decline had taken on greater concern due to unsustainable levels of harvesting in neighboring Indonesian Papua (Irian Jaya) to supply the international trade in turtles and turtle products.

### Striking a balance

Eisemberg says the global scientific community and local communities understand that Papua New Guinea can play a major role in saving Piku for future generations. “It’s a matter of striking

a balance – allowing harvest of turtles to continue but at levels that do not threaten the turtle population in the long term.”

In support of this message, Eisemberg and her team are working to build community awareness, including helping teachers get students interested in the conservation of their environment. Playing a big role is Piggy and her book of stories about her Piku family, with games and puzzles to stimulate learning about turtle conservation.

Nelly Owamu, Kikori Primary School teacher, says Piggy is getting the job done, plus she’s providing some spin-off benefits as well. “The students have really shown an interest toward the activities in the book,” says Owamu. “The book is also serving as a resource for teachers to use in other subjects such as environmental studies, community living, arts, mathematics and language.”

A second phase of the community awareness effort has involved development of a radio series that pulls in other animals that share Piku’s habitat. In one of six scripts, Bart the barramundi (also known as Australian sea bass) complains that he is sick because he has eaten a plastic bag. The narrator and Bart then discuss the dangers of throwing trash into the river.

The radio programs were translated into the local Tok Pisin and Hiri-motu languages and recorded on compact discs for distribution to area radio stations.

### Conservation and income

Meanwhile, Eisemberg says action on the ground is needed, too.

She and Yolarnie Amepou, a student at the PNG Institute of Biological Research, are working with landowners to establish protected beaches to help boost turtle numbers. There are also benefits in protecting the important riverbank vegetation and the surrounding forest.

“The challenge is to show that through such conservation measures, landowners can generate a cash income and, as rangers, create meaningful employment for their family and friends,” says Eisemberg.

Professor Arthur Georges, University of Canberra, says local villagers can change their behavior toward saving the turtles.

“But we need to provide other sources of income and employment for them if we expect them to change long-held beliefs and practices,” says Georges. “Why should they forgo food and other resources now to provide for future generations when, often, these things are needed right now to provide for their families?”

To this end, a conservation site has been developed at Wau Creek in the Kikori and Omati River basin. The goal is to recruit a local landowner and his family to be rangers as well as conservationists.

“If we can get this to work, other landowners will follow,” says Eisemberg. “It is critically important that local people are driving these initiatives if conservation is to endure.” **theLamp**

# Porsche and ExxonMobil: A partnership for excellence

Experts at ExxonMobil and legendary automaker Porsche team up to make the best motor oil for one of the best cars in the world.

▶ You ease your brand-new Porsche 911 Carrera out of the dealer's lot, itching to find an open stretch of highway where you can head toward the horizon. All you can think about is – your first oil change?

Probably not.

However, a team of experts at Porsche and ExxonMobil has been thinking about the right lubricants for that iconic brand since the mid-1990s. Its objective is to collaborate on the exciting advances in high-performance engines and the world-class lubricants used to protect them, and keep them running in top condition.

"A critical fundamental in engine performance is lubrication," says Wolfgang Hatz, member of the Executive Board – Research and Development for Porsche. "Teaming with the *Mobil 1* technology experts has helped Porsche to achieve its outstanding racing performance and meet the expectations consumers hold for our brand."

## Ongoing relationship

Since 1996, 1 million Porsches have rolled out of the factory filled with *Mobil 1* synthetic motor oil. Porsche recommends

that its owners use the same brand when their car is serviced.

Over the past 16 years, ExxonMobil and Porsche have worked together on technical programs resulting in victories for Porsche racing teams, and contributing to new offerings, including the Cayenne in the sport utility and the Panamera in the gran turismo (touring car) categories.

It's been a team effort benefiting both companies.

"Working alongside the passionate and innovative engineers at Porsche has allowed us to develop advanced lubrication technologies to protect and optimize high-performance Porsche engines," says Nigel Searle, vice president of finished lubricants for ExxonMobil Lubricants & Specialties. "That effort has helped us develop one of the highest-quality motor oils on the market."

Under a new agreement, the strategic relationship between Porsche and *Mobil 1* will continue through 2017.

When Porsche returns in 2014 to the pinnacle of endurance motorsports racing in what's called the LMP1 class – the most powerful and fastest category in the World Endurance Championship – *Mobil 1* racing



## 1.25 million miles

How passionate is Porsche about achieving high standards of excellence? Its 2011 annual report provides a clue. Porsche recently introduced a new version of its iconic model, the 911, but not until the company had it just right. According to the annual report, "The prototypes of the new 911 drove a total of 1.25 million test miles until we were sure we had created the best 911 of all time."





Over the past 16 years, ExxonMobil and Porsche have worked together on technical programs resulting in numerous victories for Porsche racing teams.

engineers will provide technical support as the auto manufacturer's exclusive motorsports lubrication partner. Experts from both companies will team up for the 2014 LMP1 racing season, which includes the 24 Hours of Le Mans.

#### A natural fit

"We believe people who buy Porsches are most likely to buy *Mobil 1*," says Tim Hinchman, sales director of strategic global alliances for ExxonMobil Lubricants & Specialties.

"Porsche recommends *Mobil 1*. Porsche owners have high standards, and they insist on quality and top performance in everything they own."

The two companies have much in common as well. "Our corporate values are very similar," says Searle. "Porsche and ExxonMobil share the same focus on integrity, high-quality people and a relentless push for technological advancement. Innovation helps both companies achieve competitive advantage."

#### Why Mobil 1?

The innovative molecules that comprise synthetic motor oils – such as *Mobil 1* – are more resistant to breaking down than those found in conventional mineral-based oils, providing drivers with better engine protection and performance.

*Mobil 1* motor oils meet or exceed the toughest standards of Japanese, European and U.S. car builders. In fact, *Mobil 1* is recommended by more car builders than any other brand of synthetic motor oil. It provides exceptional

protection against engine wear in both normal use and in some of the most demanding driving conditions in the world. It all adds up to less engine wear and longer engine life. And that's important, whether conquering the grueling 24 Hours of Le Mans or driving the kids to soccer practice. **theLamp**

► To learn more  
Mobil1.com and  
Porsche.com



# Angola Block 15: In a class by itself

With resources exceeding 5 billion oil-equivalent barrels, production of nearly 430,000 barrels of oil a day and use of leading-edge deepwater technology, the ExxonMobil-operated Block 15 has set standards for the industry.




Story by Mike Long   Photography by Robert Seale

Angolans represent about 78 percent of Esso Angola's employee count of 289 in Block 15. Including contractors, some 500 Angolans are employed in Block 15.

Kizomba B FPSO crew members attend the 6 a.m. safety and operations meeting before starting their work day. Block 15 developments have consistently achieved safety milestones. For example, nearly 5 million work hours were completed on the recent Satellites Phase 1 project without a lost-time incident.







► **The Kizomba B** development's floating production, storage and offloading vessel (FPSO), about as long as an aircraft carrier, and tension-leg drilling and production platform are silhouetted amid tranquil seas some 90 miles offshore Angola. Kizomba B and its twin, Kizomba A, account for about 70 percent of Block 15's daily production. The new Satellites Phase 1 project added 250 million barrels of resources that are being produced through the Kizomba A and B FPSOs.

Knut Dhalen (foreground) and Paulo Tavira, control room operators, monitor Kizomba B FPSO operations. Control room computers handle an estimated 60 million bits of information every second. They are connected to some 4,000 devices that manage a variety of activity – from water, oil and gas quality to oil storage and subsea well performance.

Michael Klitzing (center), FPSO maintenance supervisor, confers with newly trained maintenance personnel who will assume responsibility for training others. Recruiting and development of technically trained Angolans for long-term careers is a strategic business objective for Esso Angola and its Block 15 co-venturers.







Belmiro Gabriel, production technician, inspects a crude oil sample in the Kizomba B FPSO quality-control lab. Kizomba fields primarily yield light, low-sulfur oils that are of high quality for refining into gasoline and other premium products.



Francisco Ribeiro (left), FPSO operations supervisor, advises Ayrton Antonio, operations trainee, during inspection of new facilities associated with the Kizomba Satellites Phase 1 project.



**Samuel Love, FPSO instrument technician,** performs maintenance in the marine gas turbine compartment. The Kizomba B FPSO contains five turbines (as does Kizomba A), two for gas compression and three for power generation. The generators are each rated at 23 megawatts.





Photo by Michael Kottlen

Equipment is transported to the Kizomba B FPSO as part of the Satellites Phase 1 project. Nearly 100 percent of the project's topsides and subsea equipment was fabricated in Angola, including some 10,000 hours of skill-based training for contractor personnel.



In addition to Block 15 and other developments offshore Angola, ExxonMobil and Esso have invested some \$30 million in community programs in the country. In the photo above, students gather at a church school near the Angolan capital of Luanda for a malaria-prevention program sponsored by ExxonMobil and the United States Agency for International Development.





**The Kizomba B FPSO and tension-leg platform** with their thousands of lights twinkling at dusk take on the look of a city at sea. The FPSO and its Kizomba A twin each contain 621 miles of electrical cable and living quarters for 100.

The new Kizomba Satellites Phase 1 allows production from 18 new wells tied back to both FPSOs without the need for a third vessel. The project was completed ahead of schedule thanks to collaborative problem solving and open communication across multiple ExxonMobil entities in cooperation with Sonangol, the Angolan government and local suppliers. [theLamp](#)

Electrical Supervisor João Cruz is a member of a workforce on Block 15 that includes nearly 300 Esso employees and several hundred contractors.

Paulo Facatino, production technician, uses a remote control to check pressure gauges aboard the Kizomba B FPSO. An average of 150,000 barrels of oil flow daily through each of the Kizomba FPSOs for separation, treating and storage before being pumped to tankers for shipment to global markets.







Mechanical technicians meet to establish priorities for maintenance and repairs along with any safety issues that need to be reviewed. Esso has established eight work groups responsible for 24 specific job categories for operating the Kizomba FPSOs.

Sara Cruz, production operator, is among Esso Angola employees who have received in-depth training that can extend up to six years in preparation for technical and production positions. Training often includes assignments at ExxonMobil locations in Canada and the United States.







# Riding the full wave

ExxonMobil develops industry-leading technology that launches a new era in seismic processing for use in oil and gas exploration, development and production.

► Seeing through the earth with an advanced high-tech camera to know exactly where to drill for oil and natural gas may always be an elusive dream. However, ExxonMobil has developed new seismic technology that brings that dream a big step closer.

This technology, known as full wavefield inversion (FWI), a key component of the company's *EMprise* seismic capability, will

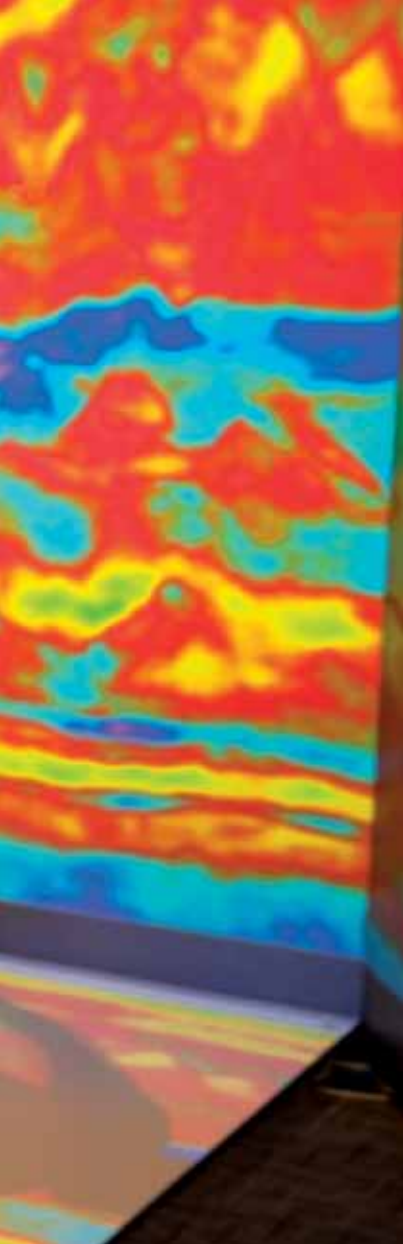
give geoscientists unparalleled insights into the physical characteristics of rocks and geologic structures in the subsurface. In doing so, it will make oil and gas resources easier to identify and target in exploration, development and production programs.

For ExxonMobil, this could mean access to billions of barrels of hydrocarbons in areas of the world where current seismic

technology has had limited success. It also has the potential to produce high-definition subsurface images of existing fields that could make development and production more efficient and less costly.

"FWI is the start of a new era in seismic technology," says Gavin Wall, vice president of Geoscience, ExxonMobil Upstream Research Company.

At right: Project leaders Steve Derenthal (left) and Michael Deal visit the Houston-based center that houses ExxonMobil's Cray high-performance computing system. It has a petascale computational capability that provides extraordinary images of subsurface structures.



Gavin Wall (above), vice president of Geoscience, ExxonMobil Upstream Research Company, is shown with a sample of the high-definition seismic imaging that can be produced with the company's new game-changing full wavefield inversion technology.

"3-D seismic technology, invented by Exxon in 1963, was a game-changing approach to seismic exploration. And now our patented FWI technology does the same by producing high-definition models of geologic structures and rock properties in the subsurface that are unmatched in the industry. It will give ExxonMobil geoscientists an unprecedented level of detail, enabling them to see opportunities faster and more distinctly."

#### Improving current 3-D

Seismic surveys, used in oil and gas exploration since the 1920s, involve generating sound waves that travel down into the earth and then are reflected back to listening devices on the surface.

"The hard part comes in developing meaningful seismic images of the subsurface," says Wall.

"This requires making sense of the complex sound waves that have bounced around underground before being detected by the listening devices."

ExxonMobil and industry in recent decades have made significant improvements in creating more-detailed seismic images with 3-D technology. For ExxonMobil alone, that technology has underpinned the discovery, development and production of billions of oil-equivalent barrels of oil and gas resources.

However, as valuable as current 3-D seismic-processing technology has been, industry practices have generally involved using only a portion of the sound wave data, or "wavefield." The rest has been disposed of as unusable "noise" mainly because processing techniques could not handle the complexity

and quantity of the data.

"Given this constraint, industry has focused on where sound waves have reflected off different subsurface interfaces or boundaries between the rocks and formations to detect potential structures that might contain hydrocarbons," says Michael Deal, Geophysics function manager, ExxonMobil Upstream Research.

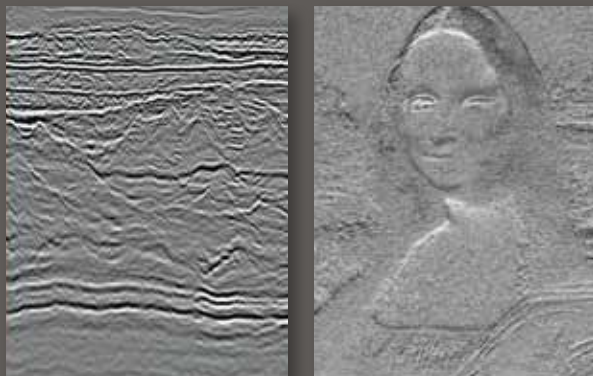
"To date, this has worked reasonably well in finding and developing resources," says Deal. "But an increasing number of exploration prospects contain geological characteristics that are more subtle and harder to distinguish. In these environments, we want to go beyond the boundaries to directly characterize the physical properties of the rocks and the fluids within the layers.

"Although we've developed techniques to analyze these

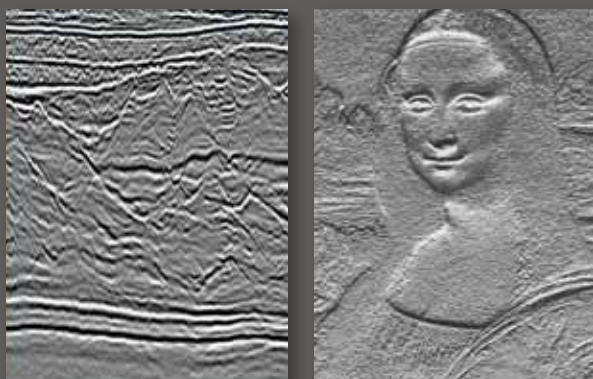




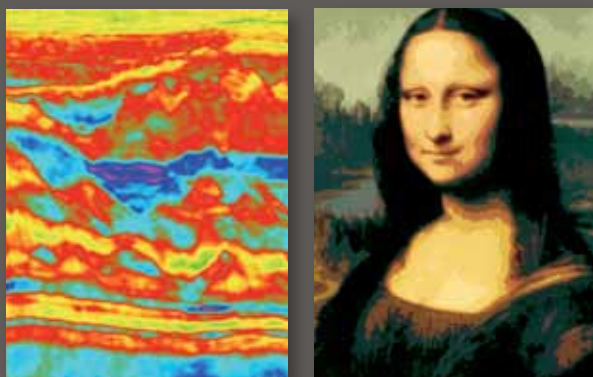
Circa 1990



Circa 2000



Circa 2012



## Improving image quality

For years, ExxonMobil geoscientists have used seismic images to see the outlines of rock structures deep under the ground. Now, with new FWI technology, it is possible to see and dissect the very subtle physical properties of the rocks themselves and more accurately locate oil and gas reservoirs. The difference would be similar to evaluating the physical characteristics of the Mona Lisa. Previously, one would only be able to see contours and basic outlines. But, thanks to these technological advances, the physical characteristics of her face and clothing come into much more vivid color and detail, and depict more closely what is actually present.

## “Full wavefield inversion is the start of a new era in seismic technology.”

Gavin Wall  
Vice President of Geoscience  
ExxonMobil Upstream Research Company

detailed rock properties in the past, they required making a tremendous number of assumptions. To perform this with more confidence and significantly fewer assumptions, we need to use all of the seismic data; in other words, the ‘full wavefield.’”

### An industry first

And that’s exactly what ExxonMobil’s *EMprise* FWI technology has achieved.

“We have developed an approach that can take all parts of the seismic data – not just the primary reflection waves – and use the full spectrum to develop a geologically meaningful, high-definition model or picture of what’s in the subsurface,” says Deal. “As far as we know, no one has achieved this level of detail before.

“We can go between the structural boundaries to determine with more certainty if what has been surveyed is shale, sand or salt; whether the rock is high-porosity with the potential to contain hydrocarbons or whether it’s compact with very few pore spaces; and much more. Equally important, we can process these data in a time frame that is practical for business application.”

### From impractical to practical

What makes FWI possible in a practical time frame are breakthroughs in computational science and high-performance computing capability.

Some of the fundamental science behind the technology has been understood for decades. But actually applying it to seismic processing on a project-size scale involving data covering hundreds or even thousands of square miles was impractical. This was due to the enormous amount of seismic data and thus the vast amount of time required by computers to process these data to produce images.

“When we began our research on this new technology, we estimated that it would take tens of thousands of years for the computers to process this amount of seismic data on the fastest computer available,” says Steve Derenthal, High Performance Computing manager, ExxonMobil Upstream Information Technology. “Even as computers became faster, it would still be impractical unless an algorithmic breakthrough could be discovered to dramatically reduce the number of required computations.”



FWI team members who helped develop the breakthroughs to make the new technology practical are (foreground, from left) Teresa Lassak, geophysicist; David McAdow, supervisor; Spyros Lazaratos, technical team lead; (background, from left) Jerry Krebs, senior associate research geophysicist; and technical team leads Partha Routh and Alex Bobrek.

The solutions came from the ExxonMobil geophysicists and computational scientists on the FWI team. Together, they applied more than 500 years of collective experience to develop patented processes that use algorithms and mathematical formulas optimized to work with today's high-performance computers. These computing systems work at speeds of more than 10 quadrillion operations a second, a task that would take the earth's entire population of 7 billion people, each performing a calculation every second, approximately 40 hours to complete.

"We found ways to accelerate the massive computational tasks required to directly generate high-definition models of the subsurface from the full-

wavefield response recorded at the surface," says Wall.

"For example, our algorithms combine the thousands of sound sources in a seismic survey to form one giant data set that can be processed simultaneously, rather than sequentially, making computation practical. This iterative inversion of data from simultaneous sources is the basis for our *EMprise* technology, and it positions ExxonMobil as the industry leader in FWI."

Derenthal notes that ExxonMobil's world-class state-of-the-art Cray high-performance computing system features a next-generation petascale capability that allows ExxonMobil to take on technical and computational challenges via a proprietary high-speed network. "This

integrated capability allows us to tackle huge tasks, such as FWI," he says.

Derenthal adds, however, that it's more than just a matter of having larger, more powerful computers.

"It's also being smarter in their application to solve science and engineering problems at a scale and within a time frame that delivers the competitive advantage. Instead of thousands of years, we can now process a full FWI survey in a matter of weeks or days, depending on the amount of data and complexity of the rocks in the subsurface."

#### **A core commitment**

Wall says that ExxonMobil's FWI breakthrough reflects a core commitment to technology pres-

ent since the company's founding more than 130 years ago.

"That commitment has been evident throughout our entire organization as we secured support for the major investments needed to advance this new capability. No matter how technical the conversation, we've remained steadfast in our engagement and commitment, and that's extremely gratifying."

Wall concludes this is just the beginning.

"Having one of the world's fastest computers and some of the best minds in the world of geoscience and information technology, ExxonMobil is poised to deliver more breakthroughs in the global quest to ensure future supplies of affordable oil and gas." **theLamp**





# Shale gas:

## A success story for U.S. chemical manufacturers

Technology and abundant natural gas supplies are creating jobs and giving companies a competitive edge.

► During a speech at Lafayette College in Easton, Pennsylvania, Steve Pryor, president of ExxonMobil Chemical Company, said that increased natural gas production is revitalizing the U.S. petrochemical industry.

The reason is that relatively low natural gas prices are providing chemical companies in the United States an advantage over competitors in other parts of the world that rely on more expensive oil-based feedstocks.

Speaking at his alma mater, where he also serves as vice chair of the board of trustees,

Pryor noted that ExxonMobil is the largest natural gas producer in the country, and is a leading chemical manufacturer that uses natural gas for energy and feedstock. He also addressed the domestic supply picture.

"Today, the United States has a projected 100-year supply of gas from dense shale rock to heat and provide electricity to homes, industries and businesses," he said. "Shale gas produced throughout the country can support all the major chemical producing regions, including the U.S. Gulf Coast, a major manufactur-

Steve Pryor (right), president of ExxonMobil Chemical Company, and Dan Weiss, president of Lafayette College, discuss Pryor's presentation at the school, which is his alma mater and where he also serves as vice chair of the board of trustees.

Photo by Roy Groething



ExxonMobil Chemical has filed permits to build an ethane steam cracker and other facilities at its Baytown complex (above) and Mont Belvieu Plastics plant in Texas.

Photo by Rich LaSalle

## Planned expansion of Baytown complex

ExxonMobil has filed permit applications for a world-class petrochemical expansion at its Baytown complex in Texas. Plans for the multibillion-dollar project include a new ethane cracker and premium product facilities.

The permits, expected to take a year for government review and approval, were filed with the U.S. Environmental Protection Agency and the Texas Commission on Environmental Quality, in anticipation of a 2016 startup.

ing hub. Ethylene, for example, is produced from natural gas and is a key chemical building block used to manufacture products for the construction, food packaging, textile, apparel, automotive and other industries."

### Continued confidence

Pryor said an example of ExxonMobil's continued confidence in the natural gas-driven revitalization of the U.S. chemical industry is the company's recent permit application to expand production along the Gulf Coast. "Plans for a multibillion-dollar

project at our Baytown, Texas, complex include constructing a new ethane cracker – a project specifically designed to capitalize on abundant supplies of domestic natural gas."

Pryor said the steam cracker would have a capacity of up to 1.5 million tons a year and provide ethylene feedstock for two new 650,000-tons-a-year high-performance polyethylene lines at the company's nearby Mont Belvieu Plastics plant. "It's estimated the project would create about 10,000 construction jobs, and some 350 permanent

jobs in addition to ExxonMobil's full-time and contractor workforce of 6,500 in the Baytown area," he said.

### Economic boost

The proposed expansion would increase regional economic activity by an estimated \$870 million a year and generate more than \$90 million a year of new tax revenues locally. An additional 3,700 jobs in the local community could be created if the project moves forward.

"The new facilities would enhance ExxonMobil's interna-

tional petrochemical manufacturing network, and help meet growing global demand for high-quality petrochemical products," Pryor said.

Pryor concluded by saying the natural gas revolution in the United States, coupled with industry innovation, is enabling ExxonMobil and other U.S. chemical manufacturers to invest in North America, creating thousands of jobs and increasing sales of important products to domestic and global markets.

theLamp



# Program promotes success in U.S. math and science

What happens when you expand math and science education across the nation? More students do better in college, including disadvantaged youths and minorities.

► Over the past five years, the National Math and Science Initiative's *Advanced Placement* program has dramatically improved high school student scores in math and science courses, helping students perform at a higher level in college.

Thanks to a \$125 million commitment from Exxon Mobil Corporation, today the Initiative is in 19 states and achieving record-setting results. For example, schools that have gone through the program average an increase of almost 80 percent in the number of qualifying *Advanced Placement* math, science and English exams after just one year, 11 times the national average. These gains are sustained year after year, transforming the school culture and young lives.

Gains for minority groups are equally impressive. In the Initiative's 70 new schools for the 2011-2012 school year, African-American students more than tripled the number of qualifying scores achieved on math, science and English exams. Hispanics doubled their number of qualifying scores – a significant step toward reducing the minority achievement gap in



technical proficiency.

In addition, the program has helped female students double their number of qualifying scores on recent exams.

Why are these numbers so significant? Studies show that students who master this coursework in high school are three times more likely to graduate from college. Graduation rates for students passing even one *Advanced Placement* course increase from 30 percent to more than 70 percent.

## Raising the bar

The program's origins began in the 1990s, after the federal government selected Waxahachie, Texas, as the location for its supercollider project. Dallas philanthropist Peter O'Donnell approached Gregg Fleisher, a calculus teacher, with a unique proposal: Let's raise the bar on math and science education in public schools to make the area more attractive for scientists and researchers who might move there with their families.

Above: Alabama high school teacher Karen Naquin says the Initiative has helped student qualifying scores increase by nearly 600 percent in her state.



National Math and Science Initiative Chairman Tom Luce and Sue Payne, chief operating officer, work with teachers nationwide to increase student proficiency in science, technology, engineering and math.



## Making eyes light up

Another effort by the National Math and Science Initiative includes the UTeach program, which recruits and trains students in technical studies to become teachers in America's public schools. Today, more than 5,500 college students are enrolled in the teacher preparation program at 34 universities across the United States.

In response to national concerns about the need to develop highly qualified science and math teachers, UTeach offers an integrated-degree plan, financial assistance and early teaching experience to encourage math and science majors to enter that profession. More than 90 percent of university students who complete the UTeach program go on to teach. More than 80 percent are in the classroom five years later.

National Math and Science Initiative Chairman Tom Luce understands that the stakes are high. "Our country faces tough challenges that can only be solved with new ideas that are rooted in science, technology, engineering and math education. We must answer the need for more educated workers," he says.

"The key is hiring more teachers who have majored in math and science. They need to know the subject thoroughly. And they need to be trained to involve students in hands-on learning. If you don't know math and science, you can't teach math and science," Luce notes. "You may stay a day ahead of the students, but you can't make a student's eyes light up."

Although the supercollider was later cancelled, the impact of Fleisher's academic program created dramatic results in area schools, increasing the number of qualifying scores from 54 to 521 in just five years. In 1996, the program came to the Dallas Independent School District where, before any formal programs began, only 29 African-American and Hispanic students from 10 urban schools earned qualifying *Advanced Placement* scores in math, science and English. By last year, with training in place since 1997, that number had grown to more than 1,100.

### Nationwide rollout

With its goal to get more American students college-ready and prepared for future jobs, the Initiative recruited Fleisher to roll out the program nationwide, with ExxonMobil funding making that possible.

Its success hinges on four key elements that help students perform at a higher level. First, the entire school district, from classroom teachers to school administrators, works toward specific accountability goals and welcomes all students to enroll in advanced classes.

Second, teachers receive extra training and ongoing support from experienced educators. Third, after-school and Saturday study sessions are used to reinforce student learning. And finally, teachers receive a stipend for meeting performance measures, and students earn \$100 per course if they score 3 or higher on the *Advanced Placement* qualifying exam.

Karen Naquin, a calculus teacher at Stanhope Elmore High School in Alabama, has seen a 50 percent increase in the number of students in her class receiving qualifying

scores since her district started the program three years ago. In the first year alone, her school increased the number of students with qualifying scores from nine to 62, an increase of nearly 600 percent.

"The training and resources are invaluable, and have made a difference in the way I teach," Naquin says. "The rigor of the course really prepares my students for what they will see when they get to college. Completing these courses gives them confidence."

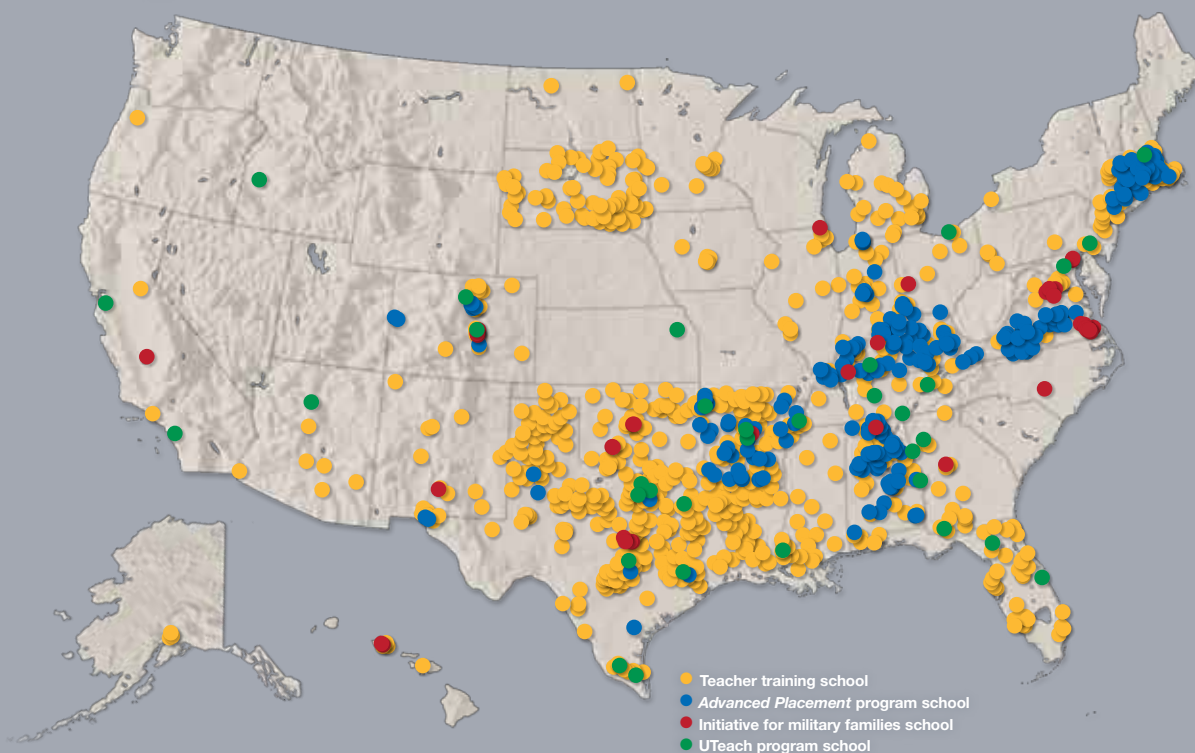
What began as a ripple is now a wave of academic achievement for Alabama, a state that historically ranked near the bottom in U.S. education achievement. During the past four years, Alabama has ranked number one among all 50 states in the percent increase in qualifying scores on *Advanced Placement* exams in math, science and English.

### Moving the needle

"Last year, the 64 schools involved in the program accounted for 67 percent of the entire state's increase in passing math, science and English scores," says Mary Boehm, president of the Alabama affiliate of the National Math and Science Initiative. "We're moving the needle in Alabama."

Similar results are seen across the nation. After the Department of Defense asked the Initiative to establish *Advanced Placement* studies in schools serving military bases around the country, participating schools achieved a 45 percent increase in passing exams, nearly six times the national average. The increase in *Advanced Placement* math and science exams was even greater – 57 percent.

## National Math and Science Initiative Program Locations – 2012



### Key facts

- ▶ ExxonMobil has committed \$125 million over 10 years to the National Math and Science Initiative
- ▶ After just one year of the *Advanced Placement* program, schools average a nearly 80 percent increase in qualifying math, science and English exams – 11 times the national average

### After just three years:

- ▶ 137 percent increase versus 24 percent nationally
- ▶ 167 percent increase among female students versus 26 percent nationally
- ▶ 203 percent increase among African-American and Hispanic students versus 50 percent nationally

### Remembering Sally Ride

The world lost an American hero with the passing of Sally Ride last summer. Best known for her accomplishments as the first American woman in space, she also inspired a new generation, particularly girls, to pursue interests in science, engineering and math.

ExxonMobil is proud to have worked with her in her role as a director of the National Math and Science Initiative, and to have helped her develop the Sally Ride Science Academy in 2009. The Academy builds teachers' skills to prepare young people for careers in science, technology, engineering and math. Ride once explained that her goal was simply to "make science and engineering cool again." Mission accomplished, Sally.

### More scientists and engineers

The Initiative's goal is to expand that success to all 50 states. "This program has achieved tremendous results in both urban and rural schools serving a broad range of students," says Sue Payne, chief operating officer for the National Math and Science Initiative. "We've demonstrated its success in just about any setting."

Payne understands firsthand the importance of building technical skills in today's youth. As a former geoscience resource manager for ExxonMobil, she managed training and career development for more than

1,500 geoscientists before joining the Initiative about a year ago.

"Having spent 35 years with ExxonMobil, I've seen what's needed to prepare young American students to work in the energy industry and other technical fields. First, it's about creating the interest and problem-solving ability to become a new engineer or scientist. By the same token, we're providing the skill sets for students to be successful in whatever they do, regardless of profession." **theLamp**

▶ To learn more  
[exxonmobil.com/mathandscience](http://exxonmobil.com/mathandscience)







# Putting education on the table

New desks for classrooms in Papua New Guinea's Southern Highlands are boosting education and encouraging economic growth.

► Jackie Mandika used to dread rainy school days for her students at Halimbu Elementary in Papua New Guinea's Southern Highlands.

Like other schools in the region, Halimbu's classrooms are basic, with earthen floors, walls made of woven grass and a chalkboard. However, prior to January 2012, "basic" also meant there were no school desks with benches and chairs.

"The students sat on the floor," says Mandika, a teacher at the school. "When it rained, we would put down banana leaves to stay dry and avoid the run-off. It was hard to teach the students in those conditions."

And even in dry times, not having a sturdy surface on which

to take notes, write essays and work math problems proved a major hindrance to learning.

## No more banana leaves

Today, Mandika and teachers in 30 other schools in the Southern Highlands can put away their banana leaves on rainy days, thanks to school desks provided by the Papua New Guinea liquefied natural gas project (PNG LNG).

Operated by Esso Highlands Limited, an Exxon Mobil Corporation subsidiary, on behalf of itself and six joint-venture partners, PNG LNG is pursuing a natural gas development project that in 2014 is expected to begin shipping some 6.6 million tons of liquefied natural gas to Asian

markets each year.

The school desk program is part of the project's broad initiative to support local government, churches and non-governmental organizations involved in education. To date, more than 1,300 desks have been built or refurbished and distributed to schools in the project area.

Winch William, headmaster of Waralo Primary, says the desks make the students feel comfortable, which helps them to learn. "Education is very important," says William. "The future of the country lies in increasing the knowledge of children. We are very grateful for this support to help build the quality of education at our school."

## Made locally

The school desk program is generating other benefits for regional communities as well.

The desks are made locally, encouraging local economic activity. For example, Jamero Hajabe, an entrepreneur and carpenter at the Evangelical Church in Hides, has built some 115 desks. "When we heard about this project, we thought we could offer a valuable service," says Hajabe. "It's important to support the schools."

The program is also providing



Carpenter Jamero Hajabe has built more than 100 desks for schools in the PNG LNG project area.



Having to sit on the floor in their classroom is a thing of the past for these Papua New Guinea school children.

skills-development opportunities for students at the project's training facility in the capital city of Port Moresby. Those studying carpentry have made dozens of new wooden desks, and the metalworking students have advanced their knowledge while refurbishing existing metal desks.

Beyond skills development, the desk program has special meaning for the student trainees. The desks they have built and repaired are being distributed to schools in their home villages. **theLamp**



# Cultivating the next generation of Canadian scientists and engineers

In Canada, ExxonMobil affiliate Imperial Oil is cultivating the next generation of scientists, engineers and technologists through an education program for Aboriginal students.

► Imperial Oil is investing billions of dollars to find and develop needed energy supplies in Canada. Projects include world-class oil sands developments, exploration off Newfoundland's east coast, and extraction of unconventional resources such as shale gas and tight oil in Western Canada. Finding skilled workers with technical backgrounds is a key to the success of these activities.

That's why Imperial Oil is investing \$1 million (Canadian) over five years to create a university program in Calgary, Alberta, that encourages Aboriginal students to pursue science and technology education.

The Aboriginal Science and Technology Education Program (ASTEP), through Mount Royal University's Iniskim Centre, will support 25 students a year for the next five years for science-focused studies.

"In Canada, industries in all sectors are feeling the employ-

ment crunch as an older workforce retires," says Hart Searle, Imperial's Community and Aboriginal Relations manager and a Mount Royal alumnus. "The Aboriginal population is growing three times faster than the national average, and companies like Imperial recognize the potential First Nation, Métis and Inuit people can bring to the workforce."

Through ASTEP, Aboriginal students seeking bachelor's degrees in science, computer information systems or applied environmental studies receive individually tailored academic and personal support to ensure they reach their academic goals. This includes guidance from the program's full-time coordinator, homework assistance, student workshops, cultural activities and support completing funding applications. The program also provides access to mentors and advocates who help students adjust to life at Mount Royal,

and become more comfortable expressing their opinions and views within the university.

## Ensuring success

"Our goal is to recruit, retain and ensure Aboriginal students succeed in their programs," says ASTEP Program Coordinator Scott Many Fingers. A member of the Kainai First Nation in Southern Alberta, he understands the challenges many Aboriginal students face.

"We encourage our young people to go to school, but there are a lot of barriers to their success," he says. "Science is not always a priority in school. Many of our students are far from their home communities and feel disconnected from their culture. They are not accustomed to life in a large city and need support transitioning to an urban campus lifestyle far from family and friends."

Katelin Breaker grew up on the Siksika reservation in Southern



Scott Many Fingers is a member of the Kainai First Nation in Southern Alberta and coordinator for the Aboriginal Science and Technology Education Program.



Alberta, about an hour's drive from the Calgary-based university. One of 27 students enrolled in ASTEP this fall, she credits tutors and other support services for helping her achieve good grades in her health science studies.

"Mount Royal's smaller class sizes and commitment to supporting students of all backgrounds and, particularly, Aboriginal students, are the key reasons why I chose to pursue a science degree here," says the third-year student, who plans to attend medical school.

### Supporting communities

ASTEP is the latest in a long history of outreach by Imperial to develop and maintain lasting relationships with Aboriginal communities where many of Imperial's operations and development opportunities are situated.

Imperial's Native Internship Program, which celebrated its 15th anniversary in 2012, provides paid training and work

experience for Aboriginal workers at its Cold Lake thermal heavy-oil operation, one of the largest of its kind in the world. At its Kearl Oil Sands Project, the company works with an advisory council of elders and other community members, incorporating their advice and traditional ecological knowledge in its operations.

Besides workforce development, Imperial supports school programs and technology scholarships. In 2010, the Imperial Oil and ExxonMobil Foundations provided \$4 million to the Coady International Institute to launch the Indigenous Women in Community Leadership Program, which offers practical leadership skills and experience to the next generation of Aboriginal women leaders.

In 2011, the Northern Alberta Institute of Technology presented Imperial Oil with the Senator Thelma Chalifoux Award for its ongoing commitment to Aboriginal student success.

Imperial previously funded the school's pre-technology program, which helped bridge the gap for Aboriginal students who did not have the prerequisites to enter technology programs.

Imperial's relationship with Mount Royal University began in 2007 when it became a founding partner of the Iniskim Centre, an on-campus facility established to increase enrollment and retention of First Nations, Inuit and Métis students. The center serves as a welcoming community for Aboriginal students, providing tutoring services, as well as a resource room and computer lab. Imperial also supports the Centre's Medicine Trail Program, which connects students with elders for cultural activities and events, and spiritual guidance.

While the Iniskim Centre attracts more Aboriginal students to the college, few were pursuing careers in science and technology. "We believe that ASTEP, with its focus on preparing and tran-



Left: Aboriginal student Katelin Breaker, who plans to attend medical school, credits tutors and other ASTEP services for helping her achieve good grades. Above: Imperial Oil's Hart Searle with Alenna Jamieson, a fourth-year science student majoring in health science who is on the president's honor roll at Canada's Mount Royal University.

Roth and Ramberg Photography Inc.



sitioning Aboriginal students into a science-focused program, will help change this,” Searle says.

#### **Technical workforce**

The ultimate goal of Imperial’s educational outreach is to graduate more students who can meet Canada’s growing demand for technical jobs. Forecasts from the 2011 census suggest that as many as 1 million jobs could go unfilled during the next decade in Canada, due to a retiring baby boomer generation.

“The development of oil and

gas in Western Canada, with its focus on technology, will create much of this demand. Imperial would like to see more Aboriginal people from the communities where we operate, particularly in the North and Western Canada, directly benefit from these jobs,” notes Bruce March, Imperial’s chairman and CEO.

“Having a science or technology degree will give Aboriginal students the skills they need to get better jobs, create new business ventures, and have the opportunity to become role

models and mentors to other Aboriginal youth,” March says.

Many Fingers agrees. “Our warriors used to carry bows and arrows. Now, the modern warrior is carrying a briefcase, and it comes with a degree and knowledge. We are going to continue in this new way of life, but we will always have our unique identity as Aboriginal people. Pursuing education is a way of giving back and continuing our heritage.”

**theLamp**



# The world of energy – at your fingertips

Interested in getting the latest information about ExxonMobil and the energy industry – from news and stock prices to publications? Now there's an app for that.

► The new ExxonMobil app for the Apple iPad features the company's latest news, blog posts, stock price, videos and publications.

The free app includes an enhanced version of the corporation's *Outlook for Energy: A View to 2040*, which contains ExxonMobil's analysis of trends that are expected to shape global energy supply and demand over the coming decades. New animations, photos and videos incorporated into the publication help bring com-

plex facts and information to life. Readers can:

- See how technology has allowed wells to be drilled in water depths of more than 10,000 feet
- Learn how primary energy is used to produce electricity
- Watch how hydraulic fracturing helps to safely extract oil and gas out of the ground

The app, which became available in June, helps effectively communicate the complex world of energy, and highlights ExxonMobil's safe and environ-

mentally responsible operations.

"Tablet devices create unique opportunities for people to engage with our company and learn more about how ExxonMobil provides the energy that helps support global economic and social progress," says Ken Cohen, Exxon Mobil Corporation vice president of Public and Government Affairs. "The app will create new opportunities for sharing information on the key energy issues facing our nation and the world over coming decades."

Besides stock information and current news releases, the app puts a variety of ExxonMobil publications at users' fingertips, including the *Corporate Citizenship Report*, *Summary Annual Report*, *Financial and Operating Review* and *The Lamp*.

Users can also access engaging videos, from ExxonMobil's "Let's Solve This" ad campaign promoting math and science education to clips sharing the company's efforts to meet the global demand for energy. They also gain instant access to the ExxonMobil Perspectives blog, which offers the company's views on the issues, policies, technologies and trends shaping the energy industry.

For more information and to download the free app, visit [www.exxonmobil.com/appforipad](http://www.exxonmobil.com/appforipad) or go to Apple's App Store. **theLamp**



# Panorama

► Around the world with ExxonMobil

## Successful Colombia bid round

ExxonMobil and Ecopetrol, the national oil company of Colombia, successfully bid on three onshore leases in Colombia's first tender round in two years. In October 2012 ExxonMobil partnered with Ecopetrol for the bids in the Middle Magdalena and Eastern Cordillera regions, which are in the central part of the country.

More than 960,000 gross acres (480,000 net acres to



ExxonMobil) are included in the three awarded blocks, VMM 29, COR 46 and COR 62.

The attainment of three new blocks continues ExxonMobil's more than 90-year presence in Colombia. The company operated the first producing well in the country in 1918. ExxonMobil also participated in the drilling of the first deepwater exploration well in 2007.

In addition to the new blocks, ExxonMobil has equity interests in three other blocks in Colombia, CPE 3, VMM 2 and VMM 37, establishing a material position in these high potential unconventional liquids plays. Exploratory drilling has begun on two of these properties.

## Treasures from Saudi Arabia

"Roads of Arabia: Archeology and History of the Kingdom of Saudi Arabia," co-organized by the Arthur M. Sackler Gallery and the Saudi Commission for Tourism and Antiquities, features objects recently excavated from more than 10 sites throughout the Arabian Peninsula. The Sackler Gallery in Washington, D.C., will be the first U.S. venue for this unprecedented exhibition through February 24, 2013.

The exhibition will then travel to the Houston Museum of Fine Arts, the Asian Art Museum in San Francisco and to Boston through early 2015. ExxonMobil and Saudi Aramco are the principal co-sponsors of the United States tour.

An earlier version of the exhibition, developed by the commission in collaboration with the Musée du Louvre, was exhibited in Paris, the CaixaForum in Barcelona, the Hermitage Museum in St. Petersburg and the Pergamon Museum in Berlin.

## Help after the hurricane

In the aftermath of Hurricane Sandy, ExxonMobil worked to support distribution of gasoline and fuel throughout affected communities via its network of independently owned distributors, and donated \$1 million to the American Red Cross for disaster relief assistance in New York, New Jersey and the Caribbean.

The company's three terminals in Massachusetts and Rhode Island were temporarily closed during the height of the storm, but quickly returned to normal operations. ExxonMobil worked with distributors, suppliers and local, state and federal agencies to help re-establish the fuel supply infrastructure. This included shipping additional fuel supplies from the U.S. Gulf Coast into the Northeast.

Other actions involved working with its distributors to secure additional fuel delivery trucks from other locations to help get fuel to service stations, and helping distributors secure additional fuel sources for independently owned Exxon- and Mobil-branded stations, and other stations in the region.



**Funerary mask**  
Thaj, Tell al-Zayer  
Saudi Arabia  
1st century CE, Gold  
H x W: 17.5 x 13 cm  
National Museum, Riyadh

## the Lamp

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## Let's not stop at nine.

American students rank 25th in the world in math and 17th in science. But there is reason for hope. High schools in nine states are taking part in the National Math and Science Initiative's Advanced Placement<sup>®</sup> program. In the past four years, participating schools increased the number of qualifying test scores in math and science by 160%. Imagine the impact if all 50 states join the program. Let's support math and science education. Let's solve this.<sup>SM</sup>

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