*Perceptions & Realities in the Downstream:*
*Shedding Some Light on Crude Oil Demand*
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Thank you, Dan (Yergin). It's a great pleasure to be here today. And I'm especially honored to appear before such a distinguished group of our industry's leaders. CERA Week has become one of the most important annual gatherings for our industry – and we welcome all who have come from near and far to be with us today. We appreciate your time.

Many of the companies represented here have contributed to the tremendous advances in the development of petroleum resources during the last century that have improved the quality of life across the globe. And still today, we understand that providing affordable and reliable energy supplies remains essential to the progress, prosperity, and well being of the world's citizens. At ExxonMobil, we still think that's a mission worth pursuing – even if it means taking on the world's toughest energy challenges.

We are meeting at a time of dramatic – some might say, unprecedented – historical change in our industry. Growing markets, new technologies, and geopolitical events are transforming our business and reshaping the energy landscape. Today, I'll explore the downstream side of that landscape, invite you to consider how some widely held perceptions measure up against reality, and ponder how things may change in the years ahead.

I recognize that we have a very mixed audience. There are refiners in this room who will think I am oversimplifying a very complex problem. There are upstreamers here who may think I am overcomplicating a very simple problem. There are even some in this room who, jet-lagged and with a full stomach, may be more interested in taking a nap. For that happy lot, I'll do my best to keep you awake. And in doing so, I'll focus on some of the perceptions and realities that apply to the downstream.

First, I would like to address the perception many hold that there are limited opportunities in the downstream. But is this really the case?

Each year, ExxonMobil looks closely at the world economic and energy picture, and we try to identify and assess emerging trends and challenges. For the oil component of the energy picture, our most recent outlook calls for an average annual growth rate of about 1.5 percent through 2030. Transportation remains the primary driver of growth in oil demand. And over time, we expect that a greater portion of the oil barrel will be used to make products for this use.

Now some people might assume that – as an oil and gas company – in developing our outlook, we have simply extrapolated "business as usual" and ignored the potential for energy alternatives. But that's not the case. In fact, our outlook includes very aggressive assumptions for increased efficiency and growth of renewables.

Still, the world's growing economies and underlying transportation needs – especially in Asia – will result in a continued call for plentiful, reliable, affordable, and easily transportable energy. Petroleum products fill that need quite nicely. Indeed, oil demand in the mature markets of North America, Western Europe, and Japan is forecast to grow at less than one-half of one percent per year on average to 2030. And we think oil demand in these areas will peak in the 2020 time frame, as more-efficient vehicles penetrate the market.

On the other hand, China has a much higher long-term growth rate – closer to 4 percent per year on average – and a large part of that growth will come in the transportation sector. At that rate, China will represent about 14 percent of world oil demand by 2030 – twice their share today. So the reality is that downstream demand growth for oil will continue at a steady pace globally – primarily driven by transportation and concentrated in Asia Pacific.

As an aside, there is a perception of some here in the United States that this country can achieve energy independence. In our view, that goal is unrealistic. But more importantly, holding that view can be counterproductive. It can distract us from focusing on the reality – the need to deal

with U.S. interdependence in the global energy market – an interdependence that we believe will persist in the future.

There is also a perception I hear as I travel the globe that the world supply of crude oil is getting heavier. In fact, if you look at the data, the world average crude gravity has actually been fairly constant for a long time. When we look at the gravity of crude coming out of the ground – both for several decades in the past and for the near term going forward – we find that the average crude mix is not getting heavier at all.

Now, to be sure, there are geographic variations – such as the heavy oil in Western Canada. And clearly, this past year, the marginal crude production available to the market – in the short-term – was heavier than the average. But when we look at the mix of crude coming on production and that which is depleting, we believe average crude gravity will become a bit lighter between now and the end of the decade.

That said, there are a lot of challenged crudes on the market – such as Doba from Chad and Grane from the North Sea. A refiner's ability to process these crudes represents opportunities for growth in earnings, if not volumes. Last year, in fact, my own company's refineries around the world ran 86 new crudes, 16 of which had never been processed by ExxonMobil anywhere before. So while we expect to experience short-term ups and downs in gravity at the margin – along with opportunities for refiners to run challenged crudes – we do not see the crude mix getting heavier. Instead, what has actually happened over time is that product demand has gotten a lot lighter.

I'll say that again. Supply isn't getting heavier. Demand is getting lighter. This becomes vividly clear when we look at the high spread between marketplace values for lighter and heavier products. The marketplace wants more of the lighter, cleaner, higher-valued products – not the heavier fuel oil-type products – which is very consistent with the point I made earlier that it's the transportation sector driving the growth. And we are all well aware of the ongoing trend to higher-quality transportation fuels. In fact, this past year, we saw an unusual jump up in light product demand that we estimate at about 3.5 percent.

And with relatively fixed refining capacity in the very short term, one way for a refiner to make more of those products is to run lighter crude. It is the price of these lighter crudes – such as Brent and WTI – that is quoted on the exchanges and on the nightly news and has been bid up in the marketplace. These lighter crudes have topped $50 a barrel in recent months. But heavier crudes have not risen nearly as much, resulting in an increase in light-heavy crude spreads.

These higher spreads create opportunities for refiners – which leads me to another perception I want to address – that there is shortage of refining capacity. When people talk about refining capacity, they are generally speaking of distillation or pipestill capacity – the volume of crude input that a facility can run. Here in the United States, for example, they talk about how there are fewer refineries and how no new ones have been built for decades. While this perception is rooted in elements of truth, let me expand on the point with a few realities.

Despite the number of refineries in the U.S. dropping more than 50 percent – from 325 in 1981 to about 150 today – total capacity has decreased by only 10 percent. Over the same period, refinery output is up about 25 percent.

So, how is that possible? The number of refineries is down. Capacity is down. But output is up. Clearly, the industry is better utilizing existing capacity. And, in fact, utilization rates have increased from less than 70 percent to more than 90 percent of distillation capacity. More important, however, is that conversion capacity – the equipment downstream of the pipestills that converts heavy molecules to meet light-product demand – has been creeping up here in the U.S. – for example – by about 2 percent a year. That's greater than the long-term growth in demand. But as I mentioned earlier, last year, we saw a more dramatic spike in global demand for light products. As a result, conversion capacity utilization increased, and the market became tighter for light products. And in tighter markets, one can expect higher margins.

But the market worked. There were no run-outs. The reality is that light product supply has been more than adequate to meet light product demand. And I have every confidence that with the incentives that the market is providing today, refiners will get very clever in finding ways to meet further growth in demand. Now to be sure, in our global refining industry, interregional

imbalances do exist – but they are regularly brought back into balance through product trade flows. This has been the case for decades.

Broadly speaking, North America, Western Europe, and Asia are net importers – while Latin America, Eastern Europe, Africa, and the Middle East are net exporters. Sometimes these interregional flows increase or decrease due to factors such as seasonality, refinery maintenance schedules, operating problems, and product margin differences. On average, there are 3 million barrels of net trade in light refined products among regions each day – not an insignificant volume.

So the perception that the world's refining and supply system is fixed and unchanging – fixed in its size, fixed in its flexibility, fixed in its capability, and unable to meet changing product demands – is simply not accurate. In fact, refineries often have a lot of flexibility in what products they make, and where they go – and how refiners choose to use that flexibility is driven by the economic incentives set by the marketplace. How much flexibility is a function of time.

In this context, there are two principal decisions that are made.

First is how to operate in the here and now – and the decision is based on current prices, margins, and spreads – or those expected within the next several months.

The second decision is whether to invest in new capacity, based on the longer-term outlook for margins. As an example, if one were to decide today to build a new refinery in the United States – and assuming we could find a site and acquire the necessary permits – it would not likely be online until into the next decade.

And if U.S. oil demand were to peak 15 or 20 years from now – as many predict it will – what might be the incentive at that time? At that point, it appears the challenge will be finding value in a business environment that threatens to have too much capacity relative to the demand.

In a long-term, capital-intensive business, it is the investor's assessment of the margins – when the investment comes on line and in the decades that follow – that drives the investment economics and the ultimate decision taken today. While we have seen stronger margins in refining this past year, an underlying, long-term, downward trend makes it unlikely that investors will be willing to invest billions of dollars for a new refinery in the mature, lower-growth markets of the world.

Now some clearly have a different view. Some say we have entered a "Golden Age of Refining." Of those, I ask – how long is an age? And remember, those of us with upstream businesses tend to think in geologic terms.

With all due respect to the incurably upbeat among us, I don't know how long today's stronger margins may persist. And with higher capacity utilization and normal variations in demand, I expect we will continue to see significant margin volatility.

But I also know that an underlying, long-term, downward trend in refining margins makes sense for two reasons. First, productivity gains – including advances in technology – continue to take costs out and improve yields in running the business. And second, long-term, incremental refining capacity growth has generally been sufficient to meet demand growth in the mature markets. We believe the industry will continue to find ways to incrementally grow distillation – and more importantly, conversion capacity – through low-cost methods, primarily through the deployment of new technology.

Advances in technology such as the introduction of new, improved catalysts and refinery process improvements will enable the industry to meet these challenges. My own company's approach and business strategies are underpinned by a strong commitment to technology and our belief that technology is absolutely vital in rising to the challenge of providing reliable and affordable energy supplies to the world.

For example, many of the tools and technologies we use to optimize the product streams that move through our refineries have been enhanced or developed under our molecule-management

system. Under this system, we have developed technology in both molecular fingerprinting and process modeling, which we combine with our real-time, process-unit optimization tools. This understanding enables us to more precisely select and blend crudes with the properties that will maximize the yield of products that provide the highest margin opportunity.

Another example of how technology is helping us push past old boundaries is in the manufacturing process itself. One of the most common processes used to upgrade resid – the most difficult part of the crude barrel – is delayed coking. This process produces a dense by-product we know as petroleum coke. Delayed coking is a batch-at-a-time process, and the length of time required for removing that coke from the vessel significantly impacts the coker's capacity.

Building on our molecular-management system, we are now better able to select raw materials that perform the best under coking conditions. This – combined with a careful control over the unit's operating parameters – results in the formation of coke with properties that make it much easier and faster to remove. This is a technology we are deploying now, with early results showing the potential to increase a delayed coker's capacity by up to 20 percent.

Another exciting example of recent technological innovation is an approach called high-throughput experimentation – a process that entails both new research tools and new ways to manage research and technology data.

The process is truly fascinating. We use miniature computer-driven equipment to rapidly synthesize and test literally hundreds of catalysts. We then evaluate the products using high-speed analytical equipment and collect all the results in a computerized database. Because of the small scale, we can conduct nearly 100 parallel experiments in a single lab, yielding results in a day that might have taken months in the past.

The power of the approach is the vast amount of experimental territory that can be covered in a short period of time. This opens up the discovery process and generates new leads that can be progressed into the development stage. Ultimately, this capability will usher in technological

innovations that will enable us to continue to grow conversion capacity. Each of the examples I have cited points to the powerful role that technology continues to play in shaping our industry's future.

As we gather this week in Houston to reflect on our industry and its future, please consider these final thoughts and questions I leave with you today.

For those of you who think there's no opportunity left in our industry – think of technology. Think how far we have come – how far and how fast, in just a few years.

For those who believe in an extended Golden Age of refining – the key question is – how long will it be before market incentives and technology prevail?

For those who think that U.S. energy independence is possible – are we diverting our attention in pursuit of an unlikely outcome?

For those who think today's crude supply is getting heavier and our global refining system is limited and inflexible – should we not broaden our time and our geographic horizons?

And for those who may think we need government incentives to drive consumer choice or even to build new refineries – should we not let the markets work?

If we have learned anything from the 20th Century, it is that markets work – and free markets work best. Free markets enable competition. Competition advances technology and productivity improvements. The value generated by technology advancements and productivity improvements accrues to consumers and society-at-large. In a free market, investments and capital will flow to where there is opportunity. People will make investments when they perceive that they can get an attractive return on their investment.

Short-term perceptions are not sound guides when dealing with the realities of a global, highly technical, long-term, capital-intensive industry. In our long-term business, we must not cling to the perception that our course must be altered with every gust of wind that rises along the way.

We cannot afford to be enchanted by the fleeting perceptions of the moment. Instead, we must be guided by long-term realities. In this, we have little choice. We operate and compete in a fiercely competitive global marketplace. And within that marketplace, we have risen to the great challenges we have faced – and we have learned we can not run from economic reality.

For each of us gathered here today, there is great significance and responsibility in knowing that the energy industry is arguably the most important business in the world. We take pride in fulfilling the mission to provide affordable energy for all the people who inhabit the earth.

As we look to the future, we can only ponder what challenges await us in the 21st Century. But there is no question the energy industry will remain vital to the future growth and progress of the world. As we have done throughout our long history, the energy industry – and the downstream within it – will continue to serve humanity faithfully and responsibly by rising to meet the world's toughest energy challenges.

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