DELIVERING AMERICA’S ENERGY SECURITY

REMARKS
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COLORADO SCHOOL OF MINES
COLORADO SPRINGS, CO
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SLIDE 1 INTRODUCTION
THANK YOU, KEVIN, FOR THAT KIND INTRODUCTION, AND THANKS TO ALL OF YOU FOR BEING HERE TODAY.

IT’S ALWAYS GREAT TO GET BACK ON THE CAMPUS OF THE COLORADO SCHOOL OF MINES, AND AS A PROUD ALUMNUS, BEING HERE TODAY ON THIS OCCASION HOLDS SPECIAL SIGNIFICANCE FOR ME.

SLIDE 2 ABOUT MARATHON
LET ME FIRST BEGIN WITH A BRIEF INTRODUCTION OF MARATHON. THIS YEAR MARATHON CELEBRATED 121 YEARS OF OPERATIONS.

TODAY WE ARE THE 4TH LARGEST U.S. INTEGRATED OIL AND GAS COMPANY.

WE HAVE EXPLORATION AND PRODUCTION OPERATIONS IN 10 COUNTRIES, INCLUDING CANADIAN HEAVY OIL SANDS.

WE ARE THE 5TH LARGEST U.S REFINER, WITH MARKETS PRIMARILY IN THE MIDWEST. WE MARKET UNDER THE MARATHON AND SPEEDWAY BRANDS.
AND WE HAVE AN INTEGRATED GAS SEGMENT; WHICH FOCUSES ON CONNECTING STRANDED GAS AND MARKETS USING LNG AND GAS TO FUELS TECHNOLOGY.

I LIKE TO SUM IT UP AS . . . WE HAVE THE CAPABILITIES OF A SUPER MAJOR, BUT WE ARE ABLE TO MOVE QUICKLY AND DECISIVELY LIKE AN INDEPENDENT.

SLIDE 3 DELIVERING AMERICA’S ENERGY SECURITY

NOW IN THE BRIEF TIME WE HAVE TOGETHER, I’D LIKE TO SHARE MY PERSPECTIVE ON WHAT I BELIEVE IS ONE OF THE MOST SERIOUS AND DEFINING ISSUES OF OUR TIME. AND THAT ISSUE IS DELIVERING AMERICA’S ENERGY SECURITY. AFTER MY COMMENTS, I LOOK FORWARD TO HEARING SOME OF YOUR THOUGHTS AND QUESTIONS ON THIS CRITICAL ISSUE.

LESS THAN TWO DAYS AGO, WE ELECTED A NEW PRESIDENT AND DURING THE RUN UP TO THE ELECTION, ENERGY WAS, AND CONTINUES TO BE, AMONG THE TOP PUBLIC POLICY ISSUES FACING OUR COUNTRY. PRESIDENT-ELECT OBAMA, THE CONGRESS, AND ALL OF US
MUST NOW JOIN TOGETHER TO FIND SOLUTIONS TO THIS GLOBAL CHALLENGE.

WE ALL HAVE A STAKE IN THE OUTCOME OF THIS ISSUE AND THIS DEMANDS THAT IT BE ADDRESSED IN A RATIONAL, FACT-BASED MANNER THAT TAPS THE LEADERSHIP AND FINEST MINDS ACROSS THE ENTIRE SPECTRUM REGARDLESS OF IDEALOGY OR POLITICAL PARTY AFFILIATION.

CLEARLY, THE TIME FOR JOINING TOGETHER TO TACKLE OUR ENERGY SECURITY ISSUES HAS NEVER BEEN MORE URGENT. SO I WANT TO SPEND OUR TIME TODAY OUTLINING SOME OF THE ACTIONS I BELIEVE WE NEED TO TAKE TO EFFECTIVELY ADDRESS OUR ENERGY CHALLENGES.

LET ME BEGIN WITH THE NOTION OF ENERGY INDEPENDENCE - A VERY POPULAR TOPIC THESE DAYS.

ENERGY INDEPENDENCE IS NEITHER POSSIBLE NOR IS IT DESIRABLE. IN FACT, CALLING FOR ENERGY INDEPENDENCE CREATES UNCERTAINTY AMONG OUR
INTERNATIONAL TRADING PARTNERS AND HINDERS INVESTMENT IN NEW INTERNATIONAL ENERGY SUPPLIES. ENERGY IS A GLOBAL ISSUE.

THE REAL KEY FOR US IS ENERGY SECURITY, WHICH I DEFINE AS HAVING AN ADEQUATE, RELIABLE AND SUSTAINABLE SUPPLY OF ENERGY TO MEET THE NEEDS AND ASPIRATIONS OF PRIVATE CITIZENS, COMMERCIAL ENTERPRISES AND PUBLIC SECTOR FUNCTIONS.

SLIDE 4 COMPETING FACTORS

TRUE ENERGY SECURITY ALSO MEANS THAT WE NEED TO:

ENSURE ENVIRONMENTAL PROTECTION AND SUSTAINABILITY, AND THAT THE COST OF OUR ENERGY IS COMPARABLE WITH THAT OF OTHER NATIONS SO WE CAN MAINTAIN OUR ECONOMIC COMPETITIVENESS.

ENERGY SECURITY, ENVIRONMENTAL CONCERNS, AND ECONOMIC STABILITY ARE OFTEN VIEWED AS COMPETING FACTORS.
TODAY WE ARE SEEKING A NEW BALANCE…ONE THAT REQUIRES MORE ENERGY WITH LOWER CARBON EMISSIONS WHILE STILL MAINTAINING ECONOMIC GROWTH AND STABILITY THAT PROVIDES FOR INCREASED PROSPERITY, PARTICULARLY IN THE DEVELOPING WORLD. NO SMALL CHALLENGE.

SLIDE 5 ECONOMY AND ENERGY
ECONOMIC GROWTH AND PROSPERITY ARE DIRECTLY LINKED TO THE SUPPLY OF A DEPENDABLE AND AFFORDABLE SOURCE OF ENERGY.

AS POPULATIONS GROW AND LIVING STANDARDS IMPROVE, ENERGY USE FOR HOMES, CARS, AND BUSINESSES – GOES UP.

THE WORLD’S POPULATION IS EXPECTED TO REACH 8 BILLION BY 2030 – THE MAJORITY OF THIS GROWTH WILL BE IN NON-OECD OR DEVELOPING COUNTRIES.
GLOBAL ECONOMIC GROWTH IS EXPECTED TO RANGE BETWEEN 2 AND 3 PERCENT PER YEAR WITH THE NON-OECD COUNTRIES ECONOMIC OUTPUT MORE THEN DOUBLING BY 2030.

REFLECTING POPULATION AND ECONOMIC GROWTH, ENERGY CONSUMPTION IS EXPECTED TO INCREASE 50 PERCENT BY 2030 AND THE NON-OECD COUNTRIES ACCOUNT FOR ABOUT 80 PERCENT OF THE GLOBAL INCREASE.

THIS PROJECTED GROWTH ISN'T UNCONSTRAINED. IT ACTUALLY ASSUMES SIGNIFICANT ENERGY EFFICIENCY IMPROVEMENTS AND A REDUCTION IN ENERGY INTENSITY. WITHOUT THESE ASSUMED EFFICIENCY GAINS, DEMAND WOULD ALMOST DOUBLE BY 2030.

SLIDE 6 ENERGY CONSUMPTION
MOST OF THE WORLD’S GROWING ENERGY NEEDS THROUGH 2030 WILL CONTINUE TO BE MET BY OIL, GAS, AND COAL.
TODAY FOSSIL FUELS ACCOUNT FOR MORE THAN 80 PERCENT OF GLOBAL ENERGY CONSUMPTION AND ARE EXPECTED TO STAY AT THAT SAME LEVEL THROUGH 2030.

CONSUMPTION OF OIL AND OTHER HYDROCARBON LIQUIDS, PRIMARILY FOR TRANSPORTATION FUEL, IS EXPECTED TO GROW AT A RATE OF 1.3 PERCENT WITH RISING DEMAND TEMPERED BY EFFICIENCY GAINS.

SLIDE 7 TRANSPORTATION DEMAND
TODAY THERE ARE ABOUT 900 MILLION VEHICLES ON THE WORLD’S ROADS; BY 2030 THAT NUMBER IS EXPECTED TO BE OVER 2.1 BILLION. MOST OF THE GROWTH IS IN ASIA. IT IS EXPECTED THAT THE NON-OECD VEHICLES FLEET WILL OVERTAKE THE OECD BY 2025, AND WILL BE 30 PERCENT HIGHER BY 2030. IN FACT, TODAY LESS THAN 2 PERCENT OF CHINA’S POPULATION OWN A CAR OR TRUCK. THIS COMPARES TO OUR 80 PERCENT. AS CHINA’S ECONOMY GROWS, IT’S NOT UNREASONABLE TO EXPECT THE CHINESE TO HAVE SIMILAR ASPIRATIONS AS WE HAVE.
GAS AND COAL ARE BOTH EXPECTED TO GROW AT AN AVERAGE ANNUAL RATE OF MORE THAN 2 PERCENT, PRIMARILY FOR POWER GENERATION, THE LARGEST AND FASTEST GROWING SECTOR.

COAL CONSUMPTION INCREASES MOST IN THE NON-OECD COUNTRIES. THE BIGGEST INCREASES WILL BE IN CHINA AND INDIA WHERE BOTH COUNTRIES HAVE AN ABUNDANT SUPPLY OF COAL. CHINA IS ADDING A NEW 500 MEGA WATT COAL-FIRED POWER PLANT APPROXIMATELY EVERY 10 DAYS.

COAL IS A PLENTIFUL RESOURCE AND PROVIDES THE MOST ECONOMIC FUEL CHOICE IN MANY CASES AROUND THE WORLD. HOWEVER, IT DOES RAISE ENVIRONMENTAL CONCERNS RELATING TO CO2 EMISSIONS.

NUCLEAR IS EXPECTED TO GROW AT LESS THEN 1 PERCENT. HOWEVER, ASSUMING CHANGE IN PUBLIC
POLICY, NUCLEAR POWER COULD DISPLACE THE MORE CARBON INTENSIVE COAL- AND TO A LESSER, EXTENT GAS-FIRED POWER GENERATION.

GEOTHERMAL, WIND, SOLAR, AND TIDAL ENERGY ARE THE FASTEST GROWING ENERGY SOURCES AT ALMOST 7 PERCENT PER YEAR.

BUT THEY STILL WILL ONLY MAKE A SMALL CONTRIBUTION IN MEETING THE GLOBAL ENERGY NEEDS BY 2030.

SLIDE 9 ENERGY CONSUMPTION

SO TO MEET THE INCREASING DEMAND FOR ENERGY IN A RELIABLE AND RESPONSIBLE MANNER WILL REQUIRE SUBSTANTIAL INCREASES IN THE SUPPLIES OF ALL FORMS OF ENERGY, INCLUDING FOSSIL FUELS.

DESPITE ALL THE RHETORIC TO THE CONTRARY, FOSSIL FUELS WILL STILL COMPRIZE MORE THAN 80 PERCENT OF THE WORLD’S ENERGY USAGE IN 2030.
BALANCING ENERGY DEMAND AND ECONOMIC GROWTH WITH ENVIRONMENTAL CONCERNS WILL PLAY AN INCREASING ROLE IN ENERGY CHOICES AND PUBLIC POLICY.

OBVIOUSLY WITH GROWTH IN ENERGY CONSUMPTION THERE WILL BE INCREASES IN CO2 EMISSIONS, ASSUMING CURRENT PUBLIC POLICY REMAINS UNCHANGED.

COAL GENERATES APPROXIMATELY 45 PERCENT OF THE ENERGY RELATED CO2 EMISSIONS, FOLLOWED BY OIL AT 35 PERCENT AND GAS AT 20 PERCENT.

MOST OF THE INCREASES WILL OCCUR IN THE NON-OECD COUNTRIES WHERE THERE IS A STRONG DEMAND GROWTH IN BOTH TRANSPORTATION AND POWER GENERATION WITH A HEAVY RELIANCE ON COAL.
SLIDE 11 CO2 EMISSION SENSITIVITIES

THIS SLIDE CONVEYS SOME IMPORTANT INFORMATION AND REQUIRES A BIT OF EXPLANATION.

ALONG THE Y-AXIS IS THE MARGINAL CO2 EMISSION ABATEMENT COST AND ON X-AXIS IS THE 2050 EMISSION REDUCTION RELATIVE TO A 2008 BASELINE. THE COST BANDS BETWEEN THE RED AND BLUE LINES REFLECT THE DIFFERENCE BETWEEN AN OPTIMISTIC OR PESSIMISTIC VIEW OF TECHNOLOGY DEVELOPMENT.

AS YOU CAN SEE, ENERGY EFFICIENCY PLAYS A SIGNIFICANT AND LOW COST ROLL IN REDUCING CO2 EMISSIONS. THIS IS FOLLOWED BY SIGNIFICANTLY MORE NUCLEAR AND COAL WITH CARBON CAPTURE AND STORAGE FOR POWER GENERATION.

IN FACT, FOR THE U.S. ALONE, THIS WOULD REQUIRE TWO TO THREE TIMES THE NUCLEAR POWER GENERATION CAPACITY THAN EXISTS TODAY, AND THAT CARBON
CAPTURE AND STORAGE IS WIDELY DEPLOYED. PERHAPS SOMEWHAT OPTIMISTIC IN THEIR TIME FRAME.

THESE WORLDWIDE ACTIONS POTENTIALLY REDUCE EMISSION SUCH THAT BY 2050 THEY ARE EQUIVALENT TO 2008. THE ABATEMENT COST IS BETWEEN $50 AND $100 PER TON.

INDUSTRY FUEL SWITCHING AND TRANSPORTATION ALTERNATIVES ARE NEEDED TO GET REDUCTION BELOW CURRENT LEVELS. THESE WILL BE MUCH MORE EXPENSIVE WITH RANGES OF $200 TO $500 PER TON FOR A 50% REDUCTION BY 2050.

TECHNOLOGIES THAT ALREADY EXIST OR ARE IN ADVANCED STAGES OF DEVELOPMENT, ALTHOUGH STILL CHALLENGING, CAN POTENTIALLY REDUCE EMISSION TO THE CURRENT LEVEL BY 2050. REDUCING CO2 EMISSIONS BY 50% FROM CURRENT LEVELS BY 2050 REPRESENTS A TOUGH CHALLENGE.

IF OUR NATION IS TO ACHIEVE ENERGY SECURITY AND MAINTAIN ECONOMIC COMPETITIVENESS AND NOT LET OUR STANDARD OF LIVING SLIP, WE CAN NO LONGER TOLERATE THE MISLEADING AND OFTEN INACCURATE RHETORIC AND QUICK FIXES.

WE NEED A WELL-REASONED, FACT-BASED COMPREHENSIVE ENERGY STRATEGY THAT IS FULLY INTEGRATED AND CONSISTENT WITH BOTH A CLIMATE CHANGE PLAN AND U.S. FOREIGN POLICY SINCE THIS IS A GLOBAL ISSUE.

WHAT I’D LIKE TO DO TODAY IS BRIEFLY OUTLINE WHAT I BELIEVE THE THREE MAJOR COMPONENTS OF THIS STRATEGY SHOULD BE ALONG WITH SOME EXAMPLES OF WHAT OUR INDUSTRY AND MARATHON ARE DOING.
FIRST, THE CHEAPEST AND FASTEST FORM OF NEW ENERGY IS ENERGY EFFICIENCY AND CONSERVATION. REASONABLE PROGRESS HAS BEEN MADE IN THE PAST. IN FACT, IF YOU LOOK BACK, THE U.S. ECONOMY HAS INCREASED 155 PERCENT SINCE 1977, WHILE OUR ENERGY USE HAS ONLY INCREASED ABOUT 30 PERCENT.

BUT MUCH MORE CAN BE DONE. TO GIVE A SENSE OF THE POTENTIAL IMPACT, A SIX PERCENT REDUCTION IN ENERGY USE - IF IT WERE ALL PETROLEUM-BASED - WOULD REDUCE U.S. CRUDE OIL IMPORTS BY 29 PERCENT.

I THINK EFFORTS TO INCREASE ENERGY EFFICIENCY SHOULD FOCUS ON A FEW KEY AREAS:

- THE FIRST IS TO IMPROVE VEHICLE FUEL ECONOMY. THE ENERGY SECURITY BILL SIGNED INTO LAW ALMOST A YEAR AGO MAKES IMPROVEMENTS AND SETS TIMETABLES IN THIS IMPORTANT AREA, BUT MORE CAN BE DONE THROUGH MORE RAPID DEPLOYMENT OF
ENGINE AND MATERIALS TECHNOLOGIES, AS WELL AS ELECTRIC AND PLUG-IN HYBRID.

- WE ALSO HAVE TO REDUCE ENERGY CONSUMPTION IN THE RESIDENTIAL AND COMMERCIAL SECTORS THROUGH MORE AGGRESSIVE BUILDING CODES AND APPLIANCE STANDARDS. THE NEW LEGISLATION CONTAINS SOME ENHANCED STANDARDS AND IMPROVEMENTS IN THIS AREA AS WELL.

- AND LASTLY, WE NEED TO INCREASE THE EFFICIENCY OF OUR INDUSTRIAL SECTOR.

TO THE LATTER POINT, THE OIL AND GAS INDUSTRY IS TAKING ACTION.

IN 2002, AMERICA’S OIL AND GAS COMPANIES MADE A PLEDGE TO THE GOVERNMENT THAT WE’D IMPROVE ENERGY EFFICIENCY IN OUR REFINERIES BY TEN PERCENT OVER TEN YEARS. AND I’M PLEASED TO REPORT THAT THE INDUSTRY IS MAKING SOLID PROGRESS TOWARD THAT GOAL OF IMPROVED EFFICIENCY. TO ILLUSTRATE, IN 2006
ALONE, U.S. REFINERS SAVED THE ENERGY EQUIVALENT OF TAKING 528,000 CARS OFF THE ROAD.

AT MARATHON WE ESTIMATE THAT OVER THE LAST FIVE YEARS OUR REFINERIES HAVE IMPROVED ENERGY EFFICIENCY BY ALMOST 4½%, AND WE ARE ON TRACK TO ACHIEVE THE TEN PERCENT GOAL BY 2012.

IN RECOGNITION OF WHAT WE’VE DONE, THE ENVIRONMENTAL PROTECTION AGENCY GAVE ITS ENERGY STAR AWARD FOR ENERGY EFFICIENCY TO MARATHON’S REFINERIES IN TEXAS, OHIO, MICHIGAN, MINNESOTA, AND LOUISIANA, AND THE U.S. ONSHORE UPSTREAM OPERATIONS RECEIVED NATURAL GAS STAR RECOGNITION AS “PARTNER OF THE YEAR” FOR ITS EFFORT TO REDUCE METHANE EMISSIONS DURING WELL COMPLETIONS.

SLIDE 14 ENERGY STRATEGY: DIVERSITY OF SUPPLY
THE SECOND KEY COMPONENT OF AN ENERGY STRATEGY IS DIVERSITY OF SUPPLY.

DIVERSITY COMES IN TWO FORMS: GEOGRAPHIC DIVERSITY IN TERMS OF WHERE THE ENERGY COMES
FROM, AND THE SECOND PART IS DIVERSITY IN TERMS OF THE FORMS OF ENERGY THAT WE USE.

SLIDE 15 TECHNICAL RECOVERABLE RESOURCES
A COUPLE OF POINTS AS IT RELATES TO OIL AND NATURAL GAS:

FIRST, AS I INDICATED BEFORE, OIL AND GAS WILL REMAIN DOMINANT SOURCES OF ENERGY FOR A VERY LONG TIME DUE IN LARGE PART TO SIGNIFICANT COST AND INFRASTRUCTURE ADVANTAGES.

SECOND, DESPITE WHAT PEAK OIL THEORISTS MAY SAY, THERE IS MORE THAN AMPLE OIL AND GAS RESOURCE IN THE WORLD TO MEET DEMAND.

IN FACT, THERE IS AN ESTIMATED 11 TRILLION BARRELS OF OIL AND GAS EQUIVALENT TECHNICAL RECOVERABLE RESOURCES KNOWN TO EXIST IN THE WORLD TODAY. A RELATIVELY LOW QUANTITY HAS BEEN PRODUCED. A MODEST AMOUNT IS HELD BY NATIONAL OIL COMPANIES AND THE REMAINDER IS MORE TECHNICALLY CHALLENGING.
ACCESS TO THESE CRITICAL RESOURCES SPECIFICALLY FOR U.S. COMPANIES IS BECOMING INCREASINGLY DIFFICULT AND COSTLY DUE TO AN INTENSE WAVE OF NATIONALISM BY THOSE COUNTRIES WHO HOLD THE BULK OF THE WORLD’S RESOURCE, AND FRANKLY BY RESTRICTIVE POLICIES ON FEDERAL LAND ACCESS - BOTH ONSHORE AND OFFSHORE - BY OUR OWN GOVERNMENT.

CONGRESS RECENTLY TOOK ACTION TO LIFT THE DRILLING MORATORIUM ON THE OUTER CONTINENTAL SHELF. WE EXPECT THE MORATORIUM TO BE MODIFIED IN THE NEW CONGRESS DUE TO THE POLITICS SURROUNDING IT.

REGARDLESS OF FURTHER ANTICIPATED ACTION NEXT YEAR, IT REMAINS TO BE SEEN HOW THIS SHIFT IN POLICY WILL ULTIMATELY IMPACT THE DEVELOPMENT OF THESE IMPORTANT RESOURCES GIVEN THE MULTIPLE LAYERS OF LEGISLATIVE AND REGULATORY APPROVALS NECESSARY BEFORE WE CAN EVEN CONDUCT SEISMIC STUDIES, MUCH LESS BEGIN DRILLING EXPLORATORY WELLS.
REGARDLESS, WE NEED MORE GLOBAL ACCESS AND WE NEED TO CONTINUE TO INNOVATE AND ADVANCE TECHNOLOGY IN THESE MORE ACCESSIBLE/COMPLEX RESOURCES.

SLIDE 16 RESERVE OWNERSHIP

ON A GLOBAL SCALE, IT MAY SURPRISE YOU BUT THE LARGEST U.S. OIL AND GAS COMPANIES, OFTEN REFERRED TO IN A NEGATIVE FASHION AS BIG OIL, ARE REALLY QUITE SMALL WHEN COMPARED TO OUR GLOBAL COMPETITORS, ESPECIALLY THE NATIONAL OIL COMPANIES (NOCs).

IN FACT, U.S. OIL COMPANIES IN TOTAL ONLY HOLD ABOUT SIX TO EIGHT PERCENT OF THE WORLD’S PROVEN OIL AND GAS RESERVES. THAT’S NOT WHAT I WOULD CALL BIG OIL.

ON THE OTHER HAND, THE NATIONAL OIL COMPANIES AND THEIR HOST GOVERNMENTS CONTROL ABOUT 80 PERCENT OF THE WORLD’S PROVEN OIL AND GAS RESERVES. AND THESE ARE INCREASINGLY GLOBAL COMPANIES WHO ARE FINANCIALLY STRONG, WHO HAVE ACCESS TO WORLD CLASS TECHNOLOGY, AND THEY HAVE THE FULL BACKING AND SUPPORT OF THEIR RESPECTIVE GOVERNMENTS.
AS THESE NATIONAL OIL COMPANIES HAVE GROWN MORE INDEPENDENT, AND MORE NATIONALISTIC -- ONE NEED ONLY LOOK AT VENEZUELA TO GET AN EXAMPLE -- IT IS INCREASINGLY DIFFICULT FOR U.S. COMPANIES TO ACCESS THE OIL AND GAS RESOURCE OPPORTUNITIES THAT WE NEED TO DEVELOP, PRODUCE AND BRING TO AMERICAN CONSUMERS.

SO IT’S CRITICAL FOR WASHINGTON, AND I BELIEVE THE AMERICAN PEOPLE IN GENERAL, TO RECOGNIZE THAT OUR NATION IS IN A TOUGH GLOBAL COMPETITION FOR NEW SUPPLIES OF OIL AND GAS AND THAT THE U.S. OIL AND GAS COMPANIES ARE INDEED OUR BEST ALLY IN THIS COMPETITION.

IT SIMPLY MAKES NO SENSE TO FURTHER HINDER OUR ABILITY TO COMPETE BY UNFAIR TAXATION, REGULATION, OR UNREASONABLY RESTRICTING ACCESS TO CERTAIN U.S. OIL AND GAS BASINS THAT HOLD THE POTENTIAL TO SUPPLY OUR NATION WITH CRITICAL ENERGY FOR DECADES TO COME.
Ours is an industry that has made great strides in technology over the past 20 years and these advances, coupled with the excellent track record of experience we’ve got, clearly demonstrate our ability to produce oil and gas and protect the environment at the same time. I would argue more so than the global competition.

**Slide 17 Supply Challenge**

Given the accessibility and increasing technical difficulty, supply will be challenging and costly.

This slide shows oil and gas historical consumption and forecasted demand expressed in million barrels of oil equivalent per day.

Today the world consumes about 120 million barrels of oil equivalent per day in the form of oil and gas.

If we assume an underlying decline of 5 percent, then by 2025 new production capacity, nearly equal
TO THE CURRENT TOTAL PRODUCTION CAPACITY, WOULD HAVE TO BE DEVELOPED. THAT’S NO SMALL TASK.

THIS NEW CAPACITY WOULD REQUIRE THE DEVELOPMENT OF KNOWN DISCOVERIES, ENHANCED OIL RECOVERY, UNCONVENTIONAL OIL AND GAS, AND EXPLORATION SUCCESS LEADING TO NEW DEVELOPMENTS.

IT IS ESTIMATED THAT THE REQUIRED INVESTMENT IN OIL AND GAS DEVELOPMENT WILL BE ALMOST 10 TRILLION DOLLARS OVER THIS PERIOD. SUPPLY WILL BE CHALLENGED BY ACCESS AND GEOPOLITICAL ISSUES. AND ADVANCEMENT IN TECHNOLOGY IS CONTINUAL, ESPECIALLY FOR IOR/EOR AND UNCONVENTIONAL OIL AND GAS. EACH WILL PLAY AN INCREASING ROLL IN MEETING WORLD ENERGY DEMAND.

A SIGNIFICANT EXAMPLE OF AN UNCONVENTIONAL RESOURCE IS THE HEAVY OIL SANDS OF CANADA.

IN THE ATHABASCA REGION OF NORTHERN ALBERTA, THERE IS AN ESTIMATED 175 BILLION BARRELS OF RECOVERABLE CRUDE BITUMEN - OR HEAVY OIL - WHICH
AMOUNTS TO THREE-QUARTERS OF NORTH AMERICAN PETROLEUM RESOURCES.

IT IS IN THIS REGION THAT MARATHON HAS INVESTED ALMOST $7 BILLION TO ACQUIRE AN INTEREST IN THE ATHABASCA OIL SANDS PROJECT AND ULTIMATELY LINK THIS WORLD-CLASS OIL RESOURCE WITH OUR U.S. REFINERIES. IN FACT, WE ARE MOVING FORWARD WITH A PROJECTED $1.9 BILLION HEAVY OIL UPGRADING PROJECT AT OUR DETROIT REFINERY, WHICH WILL BECOME A DESTINATION FOR REFINING SOME OF THE CANADIAN BITUMEN.

PUTTING TOGETHER LONG-TERM AND ENVIRONMENTALLY RESPONSIBLE SOLUTIONS TO ECONOMICALLY PRODUCE THE MULTI-BILLION BARREL, LONG-LIFE RESERVES OF THE CANADIAN OIL SANDS IS ANOTHER KEY EXAMPLE OF HOW WE WILL HELP MEET ENERGY DEMAND.
THE OTHER ASPECT OF DIVERSITY I TALKED ABOUT IS REALLY ENCOURAGING DEVELOPMENT OF ALTERNATIVE AND RENEWABLE SOURCES OF ENERGY.


IMPORTANTLY, THESE INVESTMENTS ARE MORE THAN DOUBLE THE AMOUNT INVESTED BY THE FEDERAL GOVERNMENT AND ALL OTHER U.S. COMPANIES - COMBINED.

OUR INDUSTRY HAS ALSO INVESTED HEAVILY TO MEET AND EXCEED FEDERAL MANDATES FOR ETHANOL-BLENDDED GASOLINE. IN 2007, AS AN INDUSTRY, WE USED 6.85 BILLION GALLONS OF ETHANOL - 46 PERCENT MORE THAN WHAT WAS LEGALLY REQUIRED.
WE ARE CONCERNED, HOWEVER, ABOUT THE AGGRESSIVE AND PRESCRIPTIVE NEW RENEWABLE FUEL MANDATES CONTAINED IN THE ENERGY LEGISLATION JUST SIGNED INTO LAW LAST DECEMBER.

THIS LAW REQUIRES RENEWABLES TO INCREASE FROM THE PREVIOUS FEDERAL MANDATE OF 7.5 BILLION GALLONS PER YEAR BY 2012, TO 36 BILLION GALLONS PER YEAR IN 2022. BREAKING THIS MANDATE DOWN, FIFTEEN BILLION GALLONS PER YEAR OF THIS TOTAL MUST BE SUPPLIED FROM CORN-BASED ETHANOL BY 2015, WITH THE REMAINING 21 BILLION GALLONS PER YEAR FROM ADVANCED BIOFUELS BY THE 2022 DEADLINE. AS A POINT OF REFERENCE, THE INDUSTRY EXPECTS TO SUPPLY APPROXIMATELY NINE BILLION GALLONS OF RENEWABLES THIS YEAR.

THE CHALLENGE HERE IS THAT THE TECHNOLOGY TO MANUFACTURE THOSE 21 BILLION GALLONS PER YEAR OF ADVANCED BIOFUELS IS NOT YET ESTABLISHED, NOT TO MENTION THE ASSOCIATED COMMERCIAL VIABILITY OR WHAT WILL BE REQUIRED TO MANUFACTURE AND
DISTRIBUTE THESE FUELS ON THE LARGE SCALE REQUIRED BY LAW.

ALL OF THIS CREATES UNCERTAINTY FOR THOSE OF US THAT ARE EXPECTED TO MEET THESE MANDATED LEVELS AND WHILE 2022 MAY SEEM A LONG WAY OFF, 14 YEARS IS PRETTY SHORT GIVEN ALL THAT NEEDS TO BE DONE.

THE POTENTIAL IS ALSO HIGH FOR UNINTENDED NEGATIVE CONSEQUENCES SUCH AS IMPACTS TO FOOD, WATER SUPPLIES AND LAND USE.

THIS IS A GOOD EXAMPLE OF WELL INTENDED, BUT MISGUIDED EFFORTS TO FOCUS ON WHAT APPEARS TO BE A "SILVER BULLET" SOLUTION - RENEWABLES - TO THE EXCLUSION OF OTHER FORMS OF ENERGY. AND WITHOUT DOUBT, ALL FORMS OF ENERGY WILL BE REQUIRED.

SPEAKING OF OTHER FORMS OF ENERGY, LET ME TURN TO OTHER ALTERNATIVES. I BELIEVE SOLAR AND WIND ENERGY HAVE IMPORTANT ROLES TO PLAY AND WILL GROW IN USE IN THOSE SPECIFIC LOCALES WHERE THEY ARE ABUNDANTLY AVAILABLE. IN FACT, GE, A MAJOR WIND
TURBINE MANUFACTURER, EXPECTS EIGHT TO TEN PERCENT ANNUAL GROWTH IN THAT WORLDWIDE MARKET.

NUCLEAR ENERGY IS NOT EXACTLY A NEW ENERGY SOURCE EITHER, BUT WE MUST USE TECHNOLOGY TO HELP OVERCOME THE CHALLENGES OF COST AND WASTE DISPOSAL, ALONG WITH PERCEIVED SAFETY ISSUES, SO THAT NUCLEAR ENERGY CAN PLAY A MUCH LARGER ROLE THAN IT CURRENTLY DOES OR IS EVEN ENVISIONED. I THINK THERE’S TREMENDOUS OPPORTUNITY TO DO MUCH MORE HERE, PARTICULARLY AS WE FOCUS ON HOW WE CAN PROVIDE ENERGY WITHOUT EMITTING CO2.

NONE OF THESE OPTIONS ALONE WILL MEET OUR NEEDS, BUT EACH WILL HAVE ITS OWN NICHE AND IN TOTAL, THEY ARE CAPABLE OF INCREASING THE SUPPLY AND DIVERSITY OF ENERGY SOURCES.

SLIDE 19 ENERGY STARTEGY: TECHNOLOGY

THE THIRD KEY COMPONENT OF A U.S. ENERGY SECURITY STRATEGY IS TECHNOLOGY.
TECHNOLOGY IS VITALLY IMPORTANT IN INCREASING THE SUPPLY OF ENERGY, IN MODERATING DEMAND, AND IN PROTECTING THE ENVIRONMENT.

HOWEVER, IN MY VIEW, NO AREA OF INNOVATION OR TECHNOLOGY DEVELOPMENT IS OF A HIGHER PRIORITY THAN CARBON CAPTURE AND STORAGE, OR CCS.

AS I INDICATED EARLIER, FOSSIL FUELS - OIL, NATURAL GAS AND COAL - ARE GOING TO CONTINUE TO BE THE DOMINANT SOURCES OF ENERGY FOR THE U.S. AND THE WORLD FOR A LONG TIME.

SO IN ORDER TO PROTECT THE ENVIRONMENT, WE MUST CAPTURE AND PERMANENTLY SEQUESTER A LARGE FRACTION OF THE CO₂ PRODUCED BY CONSUMING THESE FOSSIL FUELS.

WHILE MOST OF THE TECHNOLOGIES FOR CCS ARE ESSENTIALLY AVAILABLE, MUCH REMAINS TO BE DONE IN IMPROVING THE CAPTURE STAGE, DEMONSTRATING FEASIBILITY ON A VERY LARGE SCALE, AND LOWERING THE
COST. WE ALSO WILL NEED TO RESOLVE DIFFICULT LEGAL AND LIABILITY ISSUES.

A KEY STRATEGY RECOMMENDATION OF THE NATIONAL PETROLEUM COUNCIL IS FOR OUR NATION TO “DEVELOP THE LEGAL AND REGULATORY FRAMEWORK TO ENABLE CARBON CAPTURE AND STORAGE.”

THERE ARE SEVERAL MAJOR CCS PROJECTS UNDERWAY AROUND THE WORLD TODAY THAT HOPEFULLY WILL POINT THE WAY FORWARD ON THIS CRITICAL TECHNOLOGY, AND MARATHON IS INVOLVED IN A NUMBER OF THESE.

SO IN CLOSING . . . I’VE BEEN IN THE OIL AND NATURAL GAS INDUSTRY FOR 28 YEARS. I’VE SEEN A LOT OF CHANGE IN THE BUSINESS. BUT AT NO TIME IN MY CAREER HAVE I EXPERIENCED A TIME OF MORE DRAMATIC AND RAPID CHANGE THAN WHAT’S HAPPENING TODAY.

THINK OF IT - IN THE SPAN OF FIVE MONTHS, THE PRICE OF CRUDE OIL FELL FROM A RECORD HIGH OF $145 PER BARRELL TO ITS CURRENT PRICE OF $65 PER BARREL.
THIS IS NOT THE ONLY FACTOR I COULD POINT TO. OTHERS LOOMING ON THE HORIZON ARE THREATS BY OUR FEDERAL GOVERNMENT TO IMPOSE A WINDFALL PROFITS TAX AND OTHER PUNITIVE LEGISLATION ON OUR INDUSTRY. THESE TYPES OF MEASURES WILL HAVE A CHILLING EFFECT ON MUCH NEEDED ENERGY INVESTMENTS AND HAVE BEEN PROVEN IN THE PAST TO LESSEN - NOT INCREASE - OUR ENERGY SECURITY.

BUT DRAMATIC CHANGE IN OUR INDUSTRY SHOULDN’T JUST BE OF INTEREST TO ME AND THOSE OF US IN THE INDUSTRY. THIS CHANGE IS TOUCHING ALL OF US BECAUSE OUR COUNTRY’S ECONOMIC PROSPERITY AND COMPETITIVENESS ARE IN LARGE PART DEPENDENT ON ACCESS TO AMPLE SUPPLIES OF AFFORDABLE, RELIABLE ENERGY.

THAT BEING THE CASE, WE NEED BALANCED, INTEGRATED SOLUTIONS THAT INCLUDE SLOWING THE RATE OF GROWTH IN ENERGY DEMAND, PROVIDING INCREASED SUPPLIES OF ENERGY FROM DIVERSE SOURCES AND LEVERAGING TECHNOLOGY, ALL THE WHILE MINIMIZING THE IMPACT ON OUR ENVIRONMENT.
TO ME AND MY 30,000 FELLOW MARATHON EMPLOYEES, AND FRANKLY ALL OF OUR COLLEAGUES THROUGHOUT THE INDUSTRY, ENERGY SECURITY ISN’T A GLIB PHRASE THAT CAN BE USED IN SPEECHES SUCH AS THIS.

BUT RATHER, ENERGY SECURITY IS WHAT OUR WORK IS ALL ABOUT, AS WE PROUDLY DELIVER AFFORDABLE, RELIABLE ENERGY THAT’S VITAL TO OUR STANDARD OF LIVING AND THE ECONOMIC WELL-BEING OF OUR COUNTRY AND THE WORLD.

AND I WOULD BE REMISS IF I DID NOT ADD THAT THE WORK YOU UNDERTAKE HERE AT THE COLORADO SCHOOL OF MINES WILL CONTRIBUTE TO THE FUTURE SUCCESS OF THIS INDUSTRY, AS WELL AS EMERGING TECHNOLOGY VITAL TO MEET OUR ENERGY NEEDS.

AND FOR THAT I CONGRATULATE AND THANK YOU FOR YOUR INNOVATION, DEDICATION AND PROFESSIONALISM.
THANK YOU FOR HAVING ME HERE TODAY AND I LOOK FORWARD TO YOUR COMMENTS AND QUESTIONS.