The Economic Benefits of Increasing U.S. Access to Offshore Oil and Natural Gas Resources in the Atlantic

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Section 1 – Key Findings and Executive Summary

1.1 - Key Findings

This report quantifies the significant potential benefits to the U.S. economy that would stem from opening the Atlantic outer continental shelf to oil and natural gas exploration. Federal offshore lease sales under existing U.S. law would be expected to lead to high levels of offshore oil and natural gas activity. This activity would require large amounts of investment and operational spending by oil and gas operators, an estimated \$195 billion cumulative between 2017 and 2035, which would be primarily spent inside the U.S. and the Atlantic coast states. If seismic activity were to begin in 2017 and lease sales in 2018, first production could be expected as early as 2026.

By 2035, offshore oil and natural gas development could produce an incremental 1.3 million barrels of oil equivalent per day (MMboe/d), generate nearly 280,000 jobs, contribute up to \$23.5 billion per year to the U.S. economy, and generate \$51 billion in cumulative government revenue (Table 1), Most of the benefits would be accrued to states along the east coast (Table 2) but the economic impacts would be felt throughout the U.S. The amount of revenue accrued to state governments would be dependent on legislated federal/state sharing agreements.¹

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	2020	2025	2035	Cumulative
	2020	2025	2000	2017 to 2035
Capital Investment and Spending (\$Millions)	\$685	\$6,924	\$19,994	\$194,531
Employment	11,391	78,098	279,562	n/a
Contributions to Economy - GDP (\$Millions)	\$1,008	\$6,408	\$23,428	\$199,201
Federal / State Government Revenue (\$millions)	\$603	\$644	\$12,191	\$51,464
Natural Gas and Oil Production (MMboe/d)	-	-	1.3	2,000

 Table 1: Projected Economic Impacts² due to Atlantic OCS Offshore Oil and Natural Gas Exploration and Production

Source: Quest Offshore Resources, Inc.

Table 2: Projected Economic Impacts - Atlantic Coast Region Only due to Atlantic OCS Offshore Oil and Natural Gas Exploration

	2020	2025	2025	Cumulative
	2020	2025	2035	2017 to 2035
Capital Investment and Spending (\$Millions)	\$302	\$2,618	\$13,974	\$109,413
Employment	6,057	37,751	215,612	n/a
Contributions to Economy – GDP (\$Millions)	\$530	\$3,066	\$17,929	\$130,331
State Government Revenue Only (\$Millions)	\$226	\$242	\$4,571	\$19,299

Source: Quest Offshore Resources, Inc.

¹ Assumes a 37.5/62.5 percent state / federal revenue sharing

² All spending, contributions to economy, and government revenues are constant 2012 dollars

1.2 - Executive Summary

The offshore oil and natural gas industry within the United States is a significant contributor to employment, the national economy, government revenues, and domestic energy production. Current offshore oil and gas production in the U.S. is essentially limited to the Central, Western and a small amount of the eastern Gulf of Mexico with limited additional legacy production off Alaska and California. Total offshore oil and natural gas production in federal waters was a combined 1.87 million barrels of oil equivalent per day as of June of 2013 or 9 percent of U.S. production.

Approximately 85 percent of acreage in federal offshore waters is inaccessible to offshore oil and natural gas development, either through lack of federal lease sales or outright moratoriums. Oil and gas development off the Atlantic coast has been restricted since the 1980's. Only 51 exploratory wells were drilled in the 1970s and 1980s, mainly in shallow water. A lease sale off the coast of Virginia was planned for 2011, but was subsequently canceled. No lease sales in the Atlantic Outer Continental Shelf (OCS) are currently scheduled. The next five-year plan of OCS lease sales, yet to be released, would start in 2017.

While there have been no recent seismic surveys or exploratory wells in the Atlantic OCS, an updated reserve analysis based on historic information was released by the Bureau of Ocean Energy Management (BOEM) in 2011. The BOEM report identified and estimated resources in ten unique geologic plays. The BOEM resource estimates served as the foundation for the reserve and production models of this report.

This report constructs a scenario of oil and natural gas development in the Atlantic OCS, based on the resource potential of the area, geologic analogs, and the full value chain of oil and natural gas development and production. It quantifies the capital and other investments projected to be undertaken by the oil and natural gas industry, identifies linkages to the oil and gas supply chain and supporting industries at both the state and national levels, estimates both job creation and contributions to economies associated with oil and natural gas development, as well as government revenues due to lease bids, rents and production royalties. The report relies on Quest Offshore Resources, Inc. (Quest) proprietary database³ on the offshore oil and natural gas supply chain.

Leasing

This study assumes that leasing will begin in the Mid and South-Atlantic OCS in 2018 coinciding with the beginning of the next BOEM five year leasing program. Leasing in the North Atlantic OCS is assumed to start two years later. According to the study's analysis, demand from operators for Atlantic OCS leases would parallel the strength of historic lease sales within other OCS regions. Leasing in 2018, taking place only in the Mid and South Atlantic planning areas is projected at around 350 leases sold, with leasing activity expected to peak at around 480 leases sold per year.

³ See Appendix 7.1 "Overview of Quest Offshore Data"

Projects

Offshore project development is the key factor in oil and natural gas production. It is also the main factor in the capital and operational expenditures that lead to increases in employment and economic activity. Offshore projects are complex, requiring a multitude of diverse engineers, contractors, and equipment suppliers working over a number of years prior to the start of production. For the purposes of this study, offshore project development was generalized into six project types based on project size and water depth. This study estimates that if there were regular lease sales and no regulatory restraints to development, 69 projects would begin oil and natural gas production in the Atlantic OCS between 2017 and 2035, of which 52 would be deepwater projects and 17 would be shallow water projects.

Drilling

Drilling is the key activity both to discover oil and natural gas resources as well as to prepare them for production. Drilling activity in the Atlantic OCS would be expected to be robust upon the opening of the Atlantic OCS to offshore oil and gas exploration and production. Atlantic OCS drilling would be expected to begin in 2019, with an average of 30 wells drilled annually from 2017 to 2035 mostly in deepwater. In the last five years of the forecast (2031-2035) an average of 66 wells would be expected to be drilled annually as the number of active projects grows and the need for development wells increase.

Oil and Natural Gas Production

Atlantic OCS development would lead to an increase in domestic energy production. The first oil and natural gas production in the Atlantic OCS is projected to start in 2026, given the scenarios' leasing assumptions. Initial annual production would be just over 6 thousand barrels of oil equivalent per day (BOED); by the second year production is projected to increase to over 65 thousand BOED. Production is projected to reach 1.34 million BOED by 2035, approximately 40 percent of which is expected to be oil at 550 thousand BOED, and 60 percent natural gas at 790 thousand barrels of oil equivalent (or 4.6 billion cubic feet) per day. Production from deepwater projects is expected to account for 75 percent of production in 2035, compared to 25 percent of production for shallow water fields. (Figure 1)



Figure 1: Projected Atlantic OCS Oil and Natural Gas Production by Type and Year

Source: Quest Offshore Resources, Inc.

Spending

Spending is divided into eight main categories in the report, with each category representing one general activity type required to find, develop, and produce an offshore oil and natural gas project. Although each activity category is required to develop an offshore oil and natural gas project, certain categories have a more substantial impact on overall spending such as drilling, operational expenditures, engineering, manufacturing and fabrication of platforms and equipment. For example, drilling spending from 2017 to 2035 is projected to average over \$2.3 billion per year, while geological and geophysical spending averages only around \$430 million per year.

Total cumulative spending from 2017 to 2035 is projected at nearly \$200 billion. Spending is expected to grow throughout the forecast period from an average of \$480 million during the first five years of initial leasing, seismic, and exploratory drilling to just under \$20 billion per year in 2035. Spending on offshore oil and natural gas projects is normally divided into capital and operational spending. Capital spending primarily consists of investments in drilling, equipment used to develop offshore projects and engineering. Total capital spending on offshore oil and natural gas developments in the Atlantic OCS is expected to be over \$160 billion from 2017 to 2035. (Figure 2)



Figure 2: Projected Atlantic OCS Oil and Natural Gas Exploration and Production Spending

■ CAPEX □ OPEX

Source: Quest Offshore Resources, Inc.

Cumulative operational expenditures (OPEX), which occur after a well's initial production, are projected at over \$33.5 billion over the same time period.

The supply chain required to develop an offshore oil and natural gas project is incredibly complex, with suppliers located throughout the country and often the world. Certain activities, such as specialized manufacturing of equipment components often take place far from the area of exploration and production, while other work must take place within the region. Especially in an area that is new to oil and gas development, a significant amount of spending on fabrication and manufacturing normally takes place outside the region due to the undeveloped nature of the local supply chain and knowledge base.

Overtime, suppliers of offshore oil and natural gas equipment begin to produce a more significant share of equipment locally. In an area with the high-tech manufacturing capabilities, knowledge base, and extensive maritime infrastructure of the Atlantic coast states, this trend would be expected to continue. This study projects that the percentage of spending that will take place in the Atlantic coast states will progress from 48 percent in the first five years of activity to 64 percent in the last five years. Spending in the Atlantic coast states is projected to vary based on the location of the individual states relative to offshore oil and natural gas reserves, projects, and production; as well as the makeup of the individual state's economies.

Employment

Atlantic OCS oil and natural gas development is expected to lead to significant employment gains, both along the east coast and nationally. Employment impacts are expected to grow throughout the forecast period, with total incremental U.S. employment reaching nearly 280 thousand jobs by

2035.⁴ Total Atlantic coast employment in 2035 is projected to reach over 215 thousand jobs with employment spread across the region. States outside the region are projected to see employment gains of nearly 65 thousand jobs in 2035. The largest employment impact of Atlantic OCS oil and natural gas activity is projected in the Mid-Atlantic states of North and South Carolina and Virginia. North Atlantic states such as Massachusetts, Maine, and New York are all also projected to see employment increases of at least 10 thousand jobs by 2035. The share of incremental employment within the Atlantic coast region is anticipated to steadily grow as the proportion of goods and services that are supplied locally increases. (Figure 3)



Figure 3: Projected Employment Increase Due to Atlantic OCS Oil and Natural Gas Development

The resulting impact of Atlantic OCS development upon the economy will be widespread among industries. Industries which are directly involved in oil and natural gas activities such as the mining sector (which includes oil and gas development), manufacturing, professional, scientific, and technical services (engineering), and construction (installation) are expected to see the largest employment effects with a combined 125 thousand jobs in 2035. Of that total, employment in the oil and gas sector is projected to be 45 thousand jobs. By 2035, the manufacturing sector which includes businesses that manufacture and fabricate oil and gas equipment, platforms and otherwise produce the goods required to develop oil and natural gas fields is projected at around 30 thousand jobs, of which over 20 thousand of these jobs are expected in the Atlantic coast states. The professional, scientific, and technical service sector, which includes engineering employment, is expected to see employment in excess of 32 thousand additional jobs. Employment in the construction sector which includes offshore installation employment is projected to be around 19 thousand jobs in 2035.

Source: Quest Offshore Resources, Inc.

⁴ Includes total supported jobs; direct, indirect, and induced. See section 3.4.

Sectors not directly related to oil and gas development or the supply chain will also see impacts, mainly due to a general increase of income in the economy. Retail sector employment is projected to increase by over 20 thousand jobs in 2035 due to Atlantic OCS development. Health care and social assistance could increase by nearly 19 thousand jobs, administrative and waste management services by over 18 thousand jobs, food services and drinking places by over 13 thousand jobs, and finance and insurance, and real estate, rental, and leasing are both projected to see the creation of over 11 thousand jobs in each sector by 2035.

Contributions to the Economy and Government Revenues

Spending by the oil and gas industry, as well as the impact of increased revenues to state governments is expected to lead to a significant increase of the nation's GDP. Total contributions to the economy are projected to be nearly \$23.5 billion per year in 2035, with roughly 75 percent of the total expected impact to occur in Atlantic coast states and 25 percent in the rest of the U.S. The largest contributions to states' economies are expected to be seen in the Mid-Atlantic states of North Carolina, South Carolina, and Virginia as well as North Atlantic states such as Massachusetts, New York and Maine. (Figure 4)



Figure 4: Projected Contributions to States' Economies Due to Atlantic OCS Oil and Gas Development

Source: Quest Offshore Resources, Inc.

Atlantic OCS oil and natural gas development has the potential to significantly increase government revenue from royalties, bonus bids, and rents on leases, a cumulative \$51 billion from 2017 to 2035. Total government revenues are projected to reach over \$12 billion dollars per year in 2035 and are projected to grow beyond the forecast. The majority of cumulative revenues are from royalties on produced oil and natural gas at \$40 billion, leasing bonus bids are projected to account for around \$9 billion, while rental income from offshore blocks is expected to account for a cumulative amount of \$2 billion. This report assumes that associated government revenue is split 37.5 percent to the coastal

states and 62.5 percent to the Federal government. This is similar to the arrangement in the Gulf of Mexico without an associated cap on state government revenue. Actual revenue proportion going to state governments, if any, would be determined by future legislation. Combined state revenues for the Atlantic coast states would reach approximately \$4.5 billion per year by 2035, given that assumption. (Figure 5)



Figure 5: Projected Government Revenues due to Atlantic OCS Oil and Gas Development



Source: Quest Offshore Resources, Inc.

State Results

Although the impacts of Atlantic OCS oil and natural gas development would be felt nationwide, the majority of the employment, economic, and revenue effects of increased access benefits would be expected to go to the states along the east coast. Although some states such as the Carolinas, Virginia, Massachusetts, New York and Maine are expected to see larger benefits, the effects of offshore oil and natural gas activity are expected to be felt all along the Atlantic coast. Each state is expected to see annual spending by the industry of over \$100 million dollars per year by 2028, with spending continuing to increase on average through 2035. Each state is also expected to see between three thousand five hundred and 55 thousand jobs created by 2035, and contributions to their economies ranging from \$315 million to over \$4 billion per year. Additionally, state governments have the potential to receive large increases in revenues if state/Federal revenue sharing legislation is enacted. A 37.5 percent sharing agreement would produce cumulative state government revenues of \$330 million to \$4 billion. (Table 3)

State	2017-2035 Cumulative Spending (\$Millions)	2035 Employment	2035 Contributions to Economy (\$Millions/year)	2017-2035 Cumulative State Government Revenue (\$Millions)
North Carolina	\$26,439	55,422	\$4,081	\$3,989
South Carolina	\$15,572	35,569	\$2,730	\$3,728
Virginia	\$14,214	24,979	\$2,177	\$1,874
Massachusetts	\$8,164	14,814	\$1,365	\$1,411
New York	\$9,637	12,345	\$1,250	\$869
Maine	\$3,892	10,305	\$840	\$879
Florida	\$3,998	9,222	\$694	\$1,057
Rhode Island	\$3,485	8,499	\$771	\$1,198
Connecticut	\$4,371	8,169	\$776	\$929
New Jersey	\$4,984	8,340	\$785	\$515
Maryland	\$4,159	7,236	\$632	\$499
Pennsylvania	\$4,050	7,227	\$619	\$330
Georgia	\$2,076	5,088	\$426	\$702
Delaware	\$2,430	4,790	\$466	\$475
New Hampshire	\$1,942	3,608	\$317	\$843
Other U.S. States	\$58,320	63,950	\$5,498	\$0
Totals	\$194,531	279,562	\$23,428	\$19,299

Table 3: Projected Spending, Employment, Contributions to Economy and Government Revenue by State

Source: Quest Offshore Resources, Inc.

Allowing access to the Atlantic OCS for oil and natural gas exploration and production activities would increase employment, economic activity, and government revenues over the long-term with comparatively little additional spending required by federal and state governments. The nation as a whole, but especially the Atlantic coast states would likely see large employment increases, increased economic activity and increased government revenue as well as increased domestic oil and natural gas production, increasing the nation's energy security.

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Section 2 – Introduction

2.1 – Introduction

Oil and natural gas account for over 60 percent of U.S. primary energy consumption. Oil and natural gas exploration and production is also a key driver of economic and employment growth in the United States. Despite the benefits of oil and natural gas development, a significant portion of the oil and natural gas resources of the United States are inaccessible to operators, most notably 85 percent of the U.S. outer continental shelf (OCS). These offshore areas are inaccessible to operators due to a lack of lease sales by the Federal government or outright moratoriums.⁵ Drilling restrictions in the Atlantic OCS of the United States were lifted in 2008. However, since no Federal lease sales have occurred, there has been no oil and natural gas development in the Atlantic OCS. A lease sale off of the coast of Virginia was scheduled for November 2011, but was subsequently canceled. The current 2012 to 2017 schedule of Federal offshore leasing does not include any proposed leases off of the U.S. Atlantic coast. Therefore the earliest leasing could begin in the Atlantic OCS, without changing the current leasing schedule, would be late 2017.

The lack of lease sales in the Atlantic OCS prevents oil and gas operators from exploring and producing oil and gas from one of the key untapped energy resources in the country. Allowing safe, well regulated exploration and production from this area would further enhance the nation's energy security, enhance America's trade balance, and provide significant employment and economic benefits both to the affected region as well as the country as a whole.

2.2 - Purpose of the Report

Quest Offshore Resources, Inc. (Quest) was commissioned by the American Petroleum Institute (API) and the National Ocean Industries Association (NOIA) to provide a comprehensive evaluation regarding the development of America's offshore oil and gas resources within the Atlantic Outer Continental Shelf (OCS). Quest is a full-service market research and consulting firm focused on the global offshore oil and natural gas industry. Much of the information in the report, especially as it pertains to projected spending and investment patterns from offshore oil and natural gas production, is directly derived from information received from oil and gas operators and contractors both in the Gulf of Mexico and worldwide. The report expands on previous governmental studies that have assessed technical resources recoverable within the area and focuses on extending resource estimates through to economic and employment impacts due to oil and natural gas development. The provided analysis will build on existing USGS and Bureau of Ocean Energy Management (BOEM) resource estimates, to produce an overall oil and natural gas production, economic, and employment impact forecast upon the development of the Atlantic OCS. This analysis will identify key areas of economic activity as follows: resources and production, project development and spending, and economic and governmental impacts.

⁵ The Eastern Gulf of Mexico is under Moratorium until 2022.

This report seeks to quantify the benefits of Atlantic OCS oil and gas exploration and production assuming a favorable regulatory environment for development such as regular lease sales and reasonable rate of permit approvals for projects and drilling. The report projects the timing and magnitude of potential oil and gas development activities on the Atlantic OCS, analyzes the spending patterns that would be associated with these activities, and assesses the economic and employment effects of this spending on the economies of the directly affected states as well as the nation as a whole.

The analysis tracks the full lifecycle of oil and natural gas development that is projected to take place following the opening of the Atlantic OCS. The report projects spending from leasing and seismic imaging to exploration drilling, to project development and on through production. The associated ongoing spending needed to maintain and operate projects is also estimated.

The report assumes that the first least sale of Atlantic OCS blocks takes place in 2018, with initial seismic activity beginning in 2017. The study projects activity, spending, employment, economic impacts, and government revenues associated with these activities from 2017 to 2035.

Economic and employment impacts are calculated on expected industry spending throughout the forecast period and are based on the report's forecast of oil and natural gas exploration and production activity for the Atlantic OCS, as well as projections for when and where both the development activity and associated economic activity will take place. The report also projects the effects that Atlantic OCS oil and natural gas exploration and production would have on both state and federal government revenues from sources such as bids, rents, and royalties, and projects the economic and employment effects of these where applicable.

2.3 - Report Structure

The report is structured as follows; preceding this introductory section is the Key Findings and Executive Summary outlining all principal results and findings of this report. Immediately following the section is Data Development outlining Quest's methods for data aggregation and analysis, including a comprehensive overview of the project and model flow. Data Development may further be broken down into subsets based on; resource and production modeling, project spending inputs encompassing capital expenditures (CAPEX) and operational expenditures (OPEX), allocated spending into individual states, economic development representing job growth, and governmental revenues. Applications of the model and its results are presented in further detail within the Results section of the paper. Included within Results are the distributions of production, spending, economic, and governmental effects upon the national, regional, and states applied to the study. The final Conclusions section provides further assessment and analysis drawn from Quest. Additional essential information can be found within the appendix sections following the report.

For the purpose of this report the directly affected states along the Atlantic Coast are defined as:

Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia and Florida.

2.4 - Current status of Offshore Oil & Natural Gas Production

Technological advancements within the past decade have brought offshore oil and natural gas production to the forefront of worldwide energy production growth. Driven by more efficient technologies, deeper waters, and new regions, offshore production continues to be one of the major driving factors in global oil and natural gas production growth, now accounting for nearly one third of the world's production and 55 percent of non-OPEC reserves according to the International Energy Administration (IEA).⁶ Ongoing growth requires a calculated evolution of technology to safely expand into additional hydrocarbon rich regions as well as deeper water depths that provide untapped growth potential. These untapped regions exist within the U.S.; including the Atlantic OCS, Pacific OCS, the Eastern Gulf of Mexico, and basins offshore Northern Alaska to name a few. Expansion of offshore oil and natural gas production and support job growth all while adding revenues to a multitude of industries in addition to federal and state governments.

2.5 - Current U.S. Oil and Natural Gas Production

Total U.S. oil and natural gas production has increased in recent years. However, this was due mostly to rising production from shale gas and tight oil formations. The dramatic increase in onshore unconventional oil and natural development has been a major contributor in increasing U.S. energy security as well as a significant contributor to the economic recovery in a number of U.S. states. U.S. offshore oil and natural gas production, predominately from the Gulf of Mexico, has recently declined. Currently, there is no oil or natural gas production from the Atlantic OCS. (Figure 6)

⁶ International Energy Agency. *World Energy Outlook 2012*. International Energy Agency, 12 Nov. 2012.



Figure 6: U.S. Oil and Natural Gas Production 2000-2012



As of June 2013, U.S. domestic crude production has grown to 7.2 MMboe/d (million barrels of oil equivalent per day), distributed through:

- 1.07 MMboe/d from the Gulf of Mexico Federal Outer Continental Shelf
- .051 MMboe/d from offshore California
- .489 MMboe/d from offshore Federal Alaska
- 5.59 MMboe/d from offshore State waters and onshore (including shale)

Dry natural gas production nationwide has paralleled this growth eclipsing 76 BCF/d (billion cubic feet of gas per day). It is estimated that the oil and gas industry currently supports 9.8 million jobs nationwide⁷.

2.6 - The Atlantic Outer Continental Shelf

The Atlantic OCS stretches the coastlines of 14 U.S states, comprising federal waters from Nova Scotia, Canada in the North to the Bahamas in the South. Defined by four regions, the North Atlantic, Mid Atlantic, South Atlantic, and Straits of Florida, the Atlantic OCS is the second largest OCS, comprising 269 million acres or 49,252 individual blocks. (Figure 7)

⁷ PWC, "Economic Impacts of the Oil and Natural Gas Industry on the U.S. Economy in 2011", American Petroleum Institute, July 2013



Figure 7: Atlantic OCS Planning Areas Map

Source: Bureau of Ocean Energy Management

2.7- Atlantic Coast Lease History

Atlantic OCS lease activity has been inactive since the early 1980's. Strides were made within the 2007-2012 "five-year plan"⁸, committing to one lease sale in the Mid Atlantic during 2011 before government intervention caused the sale to be withdrawn. No Atlantic OCS leases were scheduled in the 2012 to 2017 five year plan, even though there technically was no legal moratorium.

Beginning in 2008, increased commitment to develop new offshore areas was set in motion through the initial draft of five-year leasing Environmental Impact Statement (EIS) for 2012-2017. In March of 2010 President Obama and then Interior Secretary Salazar announced a "Comprehensive strategy for offshore oil and gas exploration and development to strengthen the nation's energy security and reduce dependence on foreign oil, while protecting fisheries, tourism, and areas off U.S. coasts that are not appropriate for development."⁹

Secretary Salazar announced that the upcoming five-year EIS would include, "eight of the twelve areas included in the 2009 draft proposed program (DPP), including the Beaufort Sea, Chukchi Sea, and Cook Inlet off the coast of Alaska; Western, Central, and Eastern GOM; and the Mid and South Atlantic".¹⁰ The Northern Atlantic OCS was one of four areas excluded from this scoping. On the Atlantic Coast, the initial lease sale was planned for offshore Virginia to be named Virginia Lease Sale

⁸ "2007-2012 5-Year Program." *BOEM Homepage*. Bureau of Ocean Energy Management, n.d. Web. 8 Nov. 2013.

⁹ Working Schedule Atlantic G&G Programmatic Environmental Impact Statement Project." BOEM. Bureau of Ocean Energy Management, n.d. Web. 8 Nov. 2013.

¹⁰ "Secretary Salazar Announces Comprehensive Strategy for Offshore Oil and Gas Development and Exploration." U.S. Department of the Interior, 31 Mar. 2010. Web. 11 Nov. 2013.

220, a portioned lease sale focused on 2.9 million acres over 50 miles offshore Virginia with the lease sale expected to take place in 2011¹¹. (Figure 8)



Source: Bureau of Ocean Energy Management

Under increased industry scrutiny during 2010 in the wake of the Macondo incident, all leasing plans pertaining to the Atlantic OCS were removed from consideration. Most recent initiatives within the Atlantic OCS have culminated around plans to update seismic studies within the Mid and South Atlantic planning areas as the public comment phase has completed and a decision on further action is expected in early 2014¹².

2.8 - Historic Lease Sales

Historic lease sales within the Atlantic OCS took place between the years of 1976-1983, mainly focusing on the Mid Atlantic and South Atlantic regions. In the Mid Atlantic planning area, lease sales were executed in 1976, 1979, 1981 and 1983. In the South Atlantic planning area, lease sales were executed in 1978, 1981, and 1983. Only one lease sale has occurred in the North Atlantic planning area, this lease sale took place in 1979.

2.9 - Seismic

According to the BOEM estimates, some 240 thousand line miles of two dimensional seismic imaging has been shot in the Atlantic OCS, with data acquisition taking place from the late 1960's to the mid 1980's. Additionally a very limited amount of three dimensional seismic was also shot over a four block area in 1982. The lack of recent seismic imaging of the Atlantic OCS increases uncertainty as to the oil and natural gas resources of the area.

¹¹ "Virginia Lease Sale 220 Information." *BOEM Homepage*. Bureau of Ocean Energy Management, 27 May 2010. Web. 11 Nov. 2013.

¹² "Working Schedule Atlantic G&G Programmatic Environmental Impact Statement Project." BOEM Homepage. Bureau of Ocean Energy Management, n.d. Web. 11 Nov. 2013.

No seismic has been shot since the 1980s. However in 2011, BOEM began the process to open the Atlantic for seismic with the focus on the Mid and South-Atlantic regions only. A final environmental impact statement (EIS) was expected to be completed by the end of 2013 or in early 2014. Approval of this EIS is required before approval for seismic shoots can be given.

2.10 - Drilling

Drilling within the Atlantic OCS has been a limited and focused effort; only 51 wells were drilled between 1975 and 1984. Located predominately within the shallow waters of the South Atlantic and North Atlantic, all but four of the wells drilled were in less than 500 feet of water. Information regarding the Mid-Atlantic and deepwater, where a vast portion of the reserves are believed to exist, remains sparse. Shell Oil Company conducted an ambitious drilling program focused on the Mesozoic shelf-edge during 1983 which represents the only deepwater exploration in the region. This established world records at the time, with water depths ranging between 5,838 to 6,952 feet, as well as the only well within the Mid-Atlantic region. Drilling success within the region was limited to one discovery by Tenneco and Texaco of the coast of New Jersey, although a later appraisal found the reserve to be non-commercial and the operator released the blocks in 1984.

2.11 – Atlantic OCS Resource Background

The most recent in-depth analysis of the Atlantic OCS was released in 2011 by the Bureau of Ocean Energy Management; this analysis was entitled "Assessment of Undiscovered Technically Recoverable Oil and Gas Resources off the Atlantic Outer Continental Shelf 2011 as of January 1, 2009". This report identified ten unique plays, or oil and gas systems, on the Atlantic OCS. (Table 4)

Play	Planning Area(s)
Late Jurassic-Early Cretaceous Carbonate Margin	North, Mid, South
Cretaceous & Jurassic Marginal Fault Belt	Mid
Cenozoic - Cretaceous & Jurassic Carolina Trough Salt Basin	Mid
Jurassic Shelf Stratigraphic	North, Mid
Cretaceous & Jurassic Interior Shelf Structure	North, Mid
Cretaceous & Jurassic Blake Plateau Basin	Mid, South
Triassic - Jurassic Rift Basin	North
Cretaceous & Jurassic Hydrothermal Dolomite	North
Cenozoic - Cretaceous & Jurassic Paleo-Slope Siliciclastic Core	North, Mid
Cenozoic - Cretaceous & Jurassic Paleo-Slope Siliciclastic Extension	North, Mid, South

Table 4: Atlantic OCS Plays as Identified by BOEM Report

Source: Bureau of Ocean Energy Management

The report recognized possible oil and gas bearing geologies through the Atlantic coast, with some plays being relatively localized in one region and others stretching throughout the Atlantic coast. In many places the various plays overlap throughout different depths (Figure 9). More detailed maps of the individual plays can be found in Appendix Section 7.2.



Figure 9: Full Extent of All Geologic Plays for the Atlantic OCS

Source: Bureau of Ocean Energy Management

The play by play reserve assessments produced by the BOEM are the basis for both the resource and production models used to formulate this study as discussed in the data development section and resource appendix. (Table 5)

Table	5:	BOEM	2011 F	Resource	Estimates	by	Play	and	Resource	Ty	pe
											£

UTRR by Play	Oil (Bbbl)	Gas (Tcf)	Oil %	Gas %	BOE (Bbbl)
Late Jurassic-Early Cretaceous Carbonate Margin	0.32	6.14	23%	77%	1.41
Cretaceous & Jurassic Marginal Fault Belt	0.22	4.34	22%	78%	0.99
Cenozoic - Cretaceous & Jurassic Carolina Trough Salt Basin	0.61	7.76	31%	69%	1.99
Jurassic Shelf Stratigraphic	0.03	0.68	19%	81%	0.16
Cretaceous & Jurassic Interior Shelf Structure	0.07	1.36	23%	77%	0.31
Cretaceous & Jurassic Blake Plateau Basin	0.46	0.68	79%	21%	0.58
Triassic - Jurassic Rift Basin	0.49	1.37	66%	34%	0.74
Cretaceous & Jurassic Hydrothermal Dolomite	0.31	0.88	67%	33%	0.46
Cenozoic - Cretaceous & Jurassic Paleo-Slope Siliciclastic Core	0.45	5.71	31%	69%	1.47
Cenozoic - Cretaceous & Jurassic Paleo-Slope Siliciclastic Extension	0.34	2.37	45%	55%	0.76
Total Atlantic OCS	3.3	31.28	37%	63%	8.87

Source: Bureau of Ocean Energy Management

2.12 - Excluded From This Study

Given the expansive nature of offshore oil and gas production and its economic impact, this paper has been limited in scope to the overall assessment of development of oil and natural gas resources from known formations identified in the BOEM report. Additional topics that have been discussed outside or may be beneficial for future reports include; midstream, downstream, other governmental revenues (corporate or personal income taxes, local property taxes), gas hydrates, and additional Atlantic OCS reserves that extend past the U.S. 200 mile Exclusive Economic Zone.

Section 3 – Data Development

3.1 - Data Development

Quest's data development scenario focused on constructing a tiered "bottom-up" model that separated the complete life cycle of offshore operations and subsequent effects into three main categories and five sub categories. The three main categories are as follows; an "Activity" model assessing reserve information under the expectation of estimating the possible number of projects based on the resources within the Atlantic OCS, a "Spending" model based on the requirements to develop projects within the "Activity Forecast", and an "Economic" model focused on the economic impact on employment and government revenue from the "Spending" model. Individual subsections of each of the three major models were further examined under six additional criteria that create an individual "Project" model. These categories include; reserves, seismic, leasing activity, drilling, infrastructure & project development, and production & operation. (Table 6)

	Activity Forecast	Spending Model	Economic Model
Reserves	 Total Atlantic Coast Reserves Reserves by Play Reserves by Field Fields into Projects 	N/A	N/A
Seismic	Pre-Lease SeismicLeased Block SeismicShoot Type	Cost per acre	 Economic activity due to seismic spending within states
Leasing	Yearly Lease sales for individual regions	Bonus bid pricesRental rate	 Federal and state revenues created through lease sales Economic activity due to increased state/personal spending
Exploration Drilling	 Number wells drilled Water depth of wells drilled Number of drilling rigs required 	Cost per well	 Economic activity due to exploration drilling within states vicinity
Project Development & Operation	 Project size Project development timeline	 Spending per project Per project spending timeline 	 Division of state spending Economic activity due to project development within states vicinity
Production	Production type and amount	Oil and gas price forecast	 Federal and state revenues created royalty sharing Economic activity due to increased state/personal spending

Table 6 - Oil and Gas Project Development Model

Source: Quest Offshore Resources, Inc.

3.2 - Resources

Methodology used in the calculation of resources was derived from previous reports of the Bureau of Ocean Energy Management (BOEM) and its predecessor agencies on forecasted resources in place. Given the predictive nature of these reports and the lack of any new geophysical information within the Atlantic OCS, Quest deemed it reasonable to extrapolate from BOEM estimates to closer reflect undiscovered technically recoverable reserves (UTRR) growth patterns within developed regions. This important step was principally modeled through analysis on historical reserve

assessment growth within the Gulf of Mexico, Alaska, and the North Sea. A resulting multiplier of 2.06 and UTRR alternative case of 18.42 MMboe were calculated using this methodology. (Table 7)

UTRR by Play - Adjusted	Oil (Bbbl)	Gas (Tcf)	Oil %	Gas %	BOE (Bbbl)
Late Jurassic-Early Cretaceous Carbonate Margin	0.665	12.756	23%	77%	2.929
Cretaceous & Jurassic Marginal Fault Belt	0.457	9.016	22%	78%	2.057
Cenozoic - Cretaceous & Jurassic Carolina Trough Salt Basin	1.267	16.121	31%	69%	4.134
Jurassic Shelf Stratigraphic	0.062	1.413	19%	81%	0.332
Cretaceous & Jurassic Interior Shelf Structure	0.145	2.825	23%	77%	0.644
Cretaceous & Jurassic Blake Plateau Basin	0.956	1.413	79%	21%	1.205
Triassic - Jurassic Rift Basin	1.018	2.846	66%	34%	1.537
Cretaceous & Jurassic Hydrothermal Dolomite	0.644	1.828	67%	33%	0.956
Cenozoic - Cretaceous & Jurassic Paleo-Slope Siliciclastic Core	0.935	11.863	31%	69%	3.054
Cenozoic - Cretaceous & Jurassic Paleo-Slope Siliciclastic Extension	0.706	4.924	45%	55%	1.579
Total Atlantic OCS	6.856	64.984	37%	63%	18.427

Table 7: Adjusted Reserves by Atlantic OCS Play

Source: The Bureau of Ocean Management and Quest Offshore Resources, Inc.

After recalculating UTRR play resources, further subdivision was assigned based on USGS field size distributions within similar geological plays. The combination of field sizing and number of fields allows for the distribution estimation of possible discoveries within each play, while the reserves within each discovery were then further discounted based on a recovery factor of similar geological plays. Quest's assessments of potential field developments led to the creation of multiple project development scenarios dependent on the field sizing, with the assumption that large fields are more likely to be discovered first. Through the allocation of field discoveries into project categories based on individual play reserve expectations, Quest concluded a forecast of the number of projects within each play, and thereby placing them within the associated vicinity of states becomes a challenge. In order to account for this, Quest drew a 200 mile buffer around each individual states border, reweighting reserves and spending for each project based on the reserves in proximity to a state's border.

Projects were developed under two major criteria that allowed for six development scenarios. These criteria were separated between deepwater and shallow water projects and furthermore between small, medium, and large projects. This allowed for further delineation between projections, as each individual scenario has defined characteristics behind timing, spending, and production that drive later modeling. These delineations allowed for smaller projects to be developed under a shorter time-frame, require less hardware and engineering, as well as produce lower volumes for fewer years, while the opposites holds true for larger projects.

Project timing was developed based on Quest's proprietary offshore sector data¹³, as each project was given an individual timeline representing the required time for a generic project of that size and scope.

¹³ See Appendix 7.1 "Overview of Quest Offshore Data"

Assumptions were made for different development scenarios given the lack of infrastructure in place currently in the Atlantic OCS. Timelines and infrastructure requirements were adjusted as infrastructure grew within the area, allowing for increased subsea tie-backs for deepwater projects and increased project numbers given decreasing infrastructure requirements and increasing project economics. Once in place, projects are expected to produce based on a set production curve based on historical ramp-up and peak production data for existing fields, while declines were expected to follow an Arps equation¹⁴.

3.3 - Project Spending

This spending analysis accounts for all capital investment and operational spending through the entire "life cycle" of operations. Every offshore oil or natural gas project must go through a series of steps in order to be developed. Initial expenditures necessary to identify targets and estimate the potential recoverable resources in place include seismic surveys (G&G) and the drilling and evaluation of exploration & appraisal (E&A) wells. For projects that are commercially viable, the full range of above surface and below water (subsea) equipment must be designed and purchased. Offshore equipment includes production platforms and potentially on-site processing facilities as well as below water equipment generally referred to as SURF (Subsea, Umbilicals, Risers and Flowlines). Finally, the equipment must be installed and additional development wells must be drilled. Once under production, further operational expenditures (OPEX) are required to perform ongoing maintenance, production operations and other life extension activities as necessary for continued field production and optimization.

Spending for individual projects was subdivided into sixteen categories covering the complete life cycle of a single offshore project, excluding decommissioning, as well as two additional groups for natural gas processing and operation. Timing and cost for individual categories were assigned based on the previously mentioned project types where prices scale given the complexity and size of the project. (Table 8)

¹⁴ Arps represents the hyperbolic shaped decline curve of an oil and gas field after peak production. Arps, J.J "<u>Analysis of Decline Curves</u>" Trans. AIME (1944) 160, 228-47.

	Activity Model	Spending Model	Economic Model
Seismic (G&G)	Number of leases2D vs. 3D	Cost per acre	Operation requirements
SURF	 Trees, manifolds, and other subsea equipment Umbilicals Pipelines, flowlines, and risers 	Cost per itemCost per mile	Fabrication locations
Platforms	Fixed PlatformsFloating Production System	Unit size	Fabrication locations
Installation	Surf InstallationPlatform Installation	Number of vesselsType of vesselsVessel dayrate	 Operation requirements Shorebase locations
Drilling	Exploration drillingDevelopment drilling	Rig typeRig dayrate	 Operating requirements Shorebase locations
Engineering	• FEED	CAPEXOPEX	Technological centers
Operating Expenditures (OPEX)	 Supply and personnel requirements Project maintenance Project reconfiguration 	Type of project	Shorebase locations

Table 8: Oil and Gas Project Spending Model

Source: Quest Offshore Resources, Inc.

Upon compiling the scenario of overall spending estimates, Quest deconstructed the "local content" of oil and gas operations within the studied region. Individual tasks were analyzed on a component by component basis to provide an estimate of the percentage of regional, national, and international construction required by offshore operations. Once compiled, further modeling was prepared to forecast changing distributions as oil and gas development activity increases along the eastern coast. Additionally, delineations were made at the regional level in order to project spending for individual states. Considerations were based on the proximity to reserves and production, strategic locations such as shore bases and ports, as well as Bureau of Economic Analysis (BEA) data pertaining to each state's present economic distribution.

3.4 - Economic Data Development

Development of GDP and job data were calculated using the BEA's RIMs II Model providing an input-output multiplier on spending at the industry and state levels for each defined category. Model outputs considered from spending effects include number of jobs and GDP multiplier effects. Further delineation is presented in the form of direct and indirect and induced job numbers, which encompass the number of jobs relating to the spending in that category versus indirect and induced jobs that are created from pass-through spending. For states considered within the study that contained no RIMs II multipliers for specific sectors, state multiplier from economies that most closely paralleled those in question were replicated.

Rims Categories used:

- Architectural, Engineering, and Related Services
- Construction
- Drilling Oil and Gas Wells
- Fabricated Metal Product Manufacturing

- Mining and Oil and Gas Field Machinery Manufacturing
- Natural Gas Distribution
- Oil and Gas Extraction
- Steel Product Manufacturing from Purchased Steel
- Support Activities for Oil and Gas Operations

3.5 - Governmental Revenue Development

Governmental revenue data is presented in three categories; bonus bids from lease sales, rents from purchased but not yet developed leases, and royalty payments from producing leases. The projected revenue was calculated assuming the current operating structure of the Gulf of Mexico where applicable. Lease sales and rental rates were calculated through the simulation of lease sales within each individual area, while the number of leases acquired has been modeled on historical rates and based on the estimated amount of reserves in the region. Given the uncertainty around the form of lease sales that may be presented within the Atlantic OCS, Quest has modeled yearly area wide sales within each region - thus contrasting with a more focused submission under Virginia lease sale 220.

The federal / state government revenue split of leases, rents and royalties were modeled assuming a similar percentage split as in GOMESA (Gulf of Mexico Energy Security Act). Under GOMESA 37.5 percent of OCS bonus bid, rent, and royalty income is distributed to the appropriate states. GOMESA has an annual revenue cap per state. No such cap was assumed in this analysis.

Currently there is no legislated federal *l* state revenue sharing agreement applicable to the Atlantic OCS. Calculations in this report were made to distinguish the potential State government revenue impacts among east coast states. These revenue estimates will need to be adjusted based on future legislated sharing arrangements if and when they occur.

Production pricing were calculated using the EIA estimates for both West Texas Intermediate (WTI) spot and Henry Hub natural gas prices¹⁵. Additional governmental revenues such as income and corporate taxes were considered outside of the scope of this study, and are likely to provide additional government revenues throughout the studied period.

¹⁵ United States. Energy Information Administration. *Annual Energy Outlook 2013*. Energy Information Administration, 2 May 2013.

Section 4 – National Results

The opening of the Atlantic outer continental shelf (OCS) to oil and natural gas exploration and production activity is expected to provide large contributions to employment, gross domestic product, and state and federal government revenues. These benefits are expected to be felt not just by the Atlantic coast states, but by the whole nation. To fully understand the effects of opening the Atlantic OCS to offshore oil and natural gas exploration and production, this study examines the total activities and effects expected to result from Atlantic OCS oil and gas exploration and production. Offshore oil and natural gas exploration requires many different activities ranging from seismic imaging of reservoirs, to drilling, to manufacturing, fabricating and installing specialized equipment. Offshore oil and natural gas fields also require on-going operational expenditures after production has begun.

4.1 – Seismic and Leasing Activity

Seismic activity is normally the first step required for offshore exploration, both to enable oil companies to make bids on lease blocks and to identify drilling targets after leasing. While some minor pre-leasing seismic activity is expected prior to the beginning of lease sales, the beginning of wide spread, sustained leasing on the Atlantic OCS would signify that offshore oil and natural gas exploration and development activity had been fully initiated in the region. This study assumes that leasing begins in 2018, coinciding with the first full year of the next five-year leasing schedule. Seismic activity is assumed to start one year earlier in 2017.

Given current BOEM plans, initial leasing will most likely begin in the Mid and South Atlantic regions first. The study assumes that leasing in the North Atlantic OCS planning area lags leasing in the Mid and South Atlantic planning areas by two years. Lease sales in the offshore Atlantic OCS are expected to draw significant interest from oil and gas operators due to the significant resource potential of the area. The number of leases sold each year in the study's scenario is the estimated amount necessary to develop the projected number of projects, given historical leasing trends in other areas. In 2018, with leasing taking place only in the Mid and South Atlantic planning areas, around 350 leases per year are projected to be sold. Leasing activity is expected to peak in 2021 with an average of around 480 leases sold per year. (Figure 10)



Figure 10: Projected Leases Sold by Atlantic OCS Planning Area



Source: Quest Offshore Resources, Inc.

Due to the geology of the region and the location of resource potential, the Mid Atlantic planning area is expected to see the most robust leasing activity with around 55 percent of total leases sold. The North and South Atlantic planning areas are expected to see similar activity levels with around 22 percent of total leases sold each. The slowly declining trend in leases purchased is primarily a function of less leases being offered in later lease sales as the number of leases owned by operators grows.

4.2 - Projects

Offshore project development is the key determinant of oil and natural gas production. Developing offshore projects is complex, requiring time, planning and high levels of capital investment. An offshore oil and natural gas project is based on one or more discoveries of oil and natural gas fields, often after further delineation or appraisal drilling. Although seismic and other surveys can identify possible oil and natural gas deposits; it is only through drilling that confirmation of oil and natural gas field that meets stringent technical and economic constraints - project development may begin.

Although no two offshore oil and natural gas projects are exactly alike, for the purposes of this study, offshore project developments were generalized into six generic project types based on project size and water depth. Water depth range is one of the key determinants of project development, as field development scenarios vary greatly from shallow to deepwater fields. In shallow water fields so called "fixed" infrastructure is most often used with drilling, processing, and production taking place from one or more platform or platforms that are fixed directly to the seafloor (fixed platforms). (Figure 11)

Figure 11: Fixed Platform



Source: McDermott International, Inc.

Deepwater projects are typically more complex and thus more capital intensive. Most deepwater projects utilize floating production and subsea infrastructure. Due to their increased complexity, deep water projects typically have longer development timeframes. (Figure 12)



Figure 12: Deepwater Project using Floating Production and Subsea Hardware

Source: Royal Dutch Shell

Apart from water depth, project size is typically defined by reservoir characteristics, hydrocarbon volumes, and expected production, which define the timeline and capital investment required to develop the project. Larger projects typically require more wells, a longer development period in addition to requiring increased material resources and larger equipment such as platforms, trees and pipelines. Smaller projects, on the other hand, often rely on larger projects for certain types of

infrastructure such as pipelines or processing facilities. Thus smaller projects are normally delayed, especially in undeveloped areas such as the Atlantic OCS until larger projects are in place or processing is available.

During the 2017 to 2035 period the study projects that 69 projects will begin oil and natural gas production in the Atlantic OCS. Given the location of the resource potential, most of these projects are expected to be deepwater projects; with 52 deepwater projects and 17 shallow water projects projected. (Figure 13)



Figure 13: Projected Number of Projects by Start-Up Year, Size and Water Depth

Source: Quest Offshore Resources, Inc.

If Atlantic OCS leasing begins in 2018, projects could begin producing oil and natural gas by 2026. The number of projects anticipated to start up each year is expected to vary between two and fourteen annually. Project startup is dependent on variables such as discovery timing, water depth, available infrastructure already in place, and project development lead times.

4.3 - Drilling Activity

Exploration and production drilling is used to identify, confirm, delineate, and produce oil and natural gas, making it one of the most important offshore activities. Drilling is a very capital intensive process employing drilling rigs that require large crews as well as significant quantities of consumables ranging from food and fuel to drill pipe and fluids. Drilling rigs (mobile offshore drilling units – MODU's) must constantly be resupplied and crewed, and thus lead to high levels of activity in the areas and ports that support offshore drilling rigs.

Drilling activity in the Atlantic OCS is expected to be highly robust upon the commencement of Atlantic OCS offshore oil and natural gas activity. Exploratory drilling is expected to begin in 2019 or one year

after lease sales begin. Only exploratory drilling is expected to take place for the first five years. After 2023, development drilling is expected to begin and continue to accelerate. Total drilling activity, is projected to level off at about 60 to 70 wells per year after 2030. During this time, the proportion between development and exploratory wells is expected to shift to around 55 and 45 percent respectively, which is in line with other mature provinces. (Figure 14)



Figure 14: Projected Number of Wells Drilled by Well Type - Exploration and Development

Source: Quest Offshore Resources, Inc.

Due to the interconnected nature of exploration, drilling, and development, Atlantic OCS drilling follows a trend similar to project development regarding water depths of wells. As the basin matures, drilling is projected to trend to a 70 / 30 ratio of deepwater to shallow water wells. The increase in later years of shallow water wells projected for the Atlantic OCS is driven by activity in the North Atlantic planning area. The North Atlantic planning area has a higher relative percentage of resource in shallow water. North Atlantic development lags the Mid and South Atlantic planning areas due to delays in leasing. As with projects, deepwater drilling is more capital intensive than shallow water drilling; with most deepwater wells drilled from floating drilling rigs (semis and drillships) in contrast to jack-up or fixed platform rigs that rest on the seafloor. These floating rigs command significantly higher day rates than non-floating rig types. (Figure 15)

Development Exploration


Figure 15: Projected Number of Wells Drilled by Water Depth and Year

A total of around 570 wells are projected to be drilled from 2017 to 2035, with 78 percent of the wells expected in deepwater and 22 percent expected in shallow water.

4.4 – Production Activity

The number of projects developed, coupled with reservoir size and reservoir productivity, is the main determinant of oil and natural gas production levels. Most oil and natural gas reservoirs contain a combination of oil, natural gas, water, and many other substances. Some reservoirs may contain nearly all oil or all natural gas. Most reservoirs possess both oil and natural gas in varying ratios with oil sometimes expressed as condensate. All of the resource plays defined by BOEM studies are constructed under the expectation that both oil and natural gas are present, with the relative ratios defined on a play by play basis. Oil / gas ratios for individual fields are likely to vary, though for the purpose of this study, they were modeled as consistent within each play. Production for each project was modeled based on standard production curves taking into account the start-up, ramp-up, peak, and decline timing, as well as the expected hydrocarbon mix.

This study projects that first oil and natural gas production in the Atlantic OCS would take place in 2026, nine years after the beginning of leasing in the area. Initial annual production would be just over 6 thousand barrels of oil equivalent per day (BOED) as the first projects come online at low initial levels of production; by the second year production is projected to increase to over 65 thousand BOED. Production is then projected to grow relatively consistently throughout the period, at a compound annual growth rate of over 40 percent per year from 2026 to 2035. Production is projected to reach 1.34 million BOED by 2035, with approximately 40 percent of production oil (550 thousand BOED), and 60 percent of the production natural gas (790 thousand BOED or 4.5 billion cubic feet per day). (Figure 16)



Figure 16: Projected Production by Type

Since project development and drilling is expected to be concentrated in deepwater, deepwater production is expected to outweigh shallow water production by a large margin. Deepwater production is expected to account for 75 percent of production in 2035, compared to 25 percent of production for shallow water fields. For the overall period from 2017 to 2035, deepwater accounts for an even larger share at 81 percent of production to shallow waters' 19 percent. (Figure 17)







Source: Quest Offshore Resources, Inc.

4.5 – Spending Activity

Offshore oil and natural gas development is capital intensive. Offshore projects require exploratory seismic surveys and drilling, production equipment, services such as engineering, operational expenditures including the ongoing supply of consumables, and maintenance. The combined effects of one individual project flow through the economy driving employment and economic growth. From 2017 to 2035, total cumulative spending on Atlantic OCS offshore oil and natural gas development is projected to be nearly \$195 billion. Total spending in the first five years is projected to be modest at less than \$1 billion per year. Spending per year is expected to increase as projects are built and development drilling begins. Total drilling activity is projected to continuously increase from 2023 to 2030. By 2030 total spending is projected to remain relatively constant at about \$20 billion per year.

For the purposes of this report, spending is divided into eight main categories, with each category encompassing a major type of exploration and production activity. For example, seismic (G&G)¹⁶ spending is normally associated with imaging of possible reservoirs prior to exploration drilling and thus takes place primarily at the early stages of a project's lifecycle. Although critically important, seismic spending is a relatively low percent of overall spending at an average of \$426 million or 4 percent of overall spending from 2017 to 2035. Seismic spending is one of first categories of spending expected in the region, accounting for nearly 80 percent of spending from 2017 to 2021, as offshore prospects require a significant amount of time to identify. Given the expense and logistics requirements of offshore drilling, where rigs command large day rates in conjunction with high operational supply costs, drilling expenditures represent one of the largest sources of spending for any offshore project. Total drilling expenditure from 2017 to 2035, both exploration and development drilling in shallow and deep waters, is projected to average over \$2.3 billion per year. Drilling spending from 2031 to 2035 expected to average nearly \$4.8 billion per year.

Engineering spending takes place at all stages of an offshore projects lifecycle; from exploration to project development as well as during a projects operational phase. Engineering activities vary from overall project-focused engineering to the engineering of very specific equipment and components. Engineering spending is projected to average over \$1.7 billion per year from 2017 to 2035; increasing as the Atlantic OCS is developed. Engineering spending from 2031 to 2035 is projected to average just over \$3 billion per year.

Most of the equipment utilized in developing offshore oil and natural gas fields falls into either the platform (both fixed and floating) or SURF (subsea equipment, umbilicals, risers and flowlines) categories. This equipment is traditionally purchased and constructed prior to production of oil and natural gas. The types of equipment includes complicated structures like floating platforms that weigh tens of thousands of tons, complex subsea trees that control wells at the ocean floor, and miles of

¹⁶ G&G is defined as geological and geophysical and is primary the study of the structure and composition of subsurface formation especially using seismic imaging to identify possible oil and natural gas deposits.

pipeline that transport production back to shore. Some of the equipment required is less complex, for instance, offshore accommodation modules as wells as equipment such as mats which are metal frames placed on the seafloor to hold other equipment. Due to the varying timelines for procurement of equipment, spending for platforms and SURF equipment is more variable year to year than most other offshore exploration and development spending. Platform spending is expected to average over \$1.3 billion per year from 2017 to 2035 and nearly \$1.9 billion per year from 2031 to 2035, the last five years of the forecast. SURF spending is projected to average over \$1.1 billion per year from 2017 to 2035, and \$1.9 billion per year from 2031 to 2035. (Figure 18)



Figure 18: Projected Overall Spending by Category¹⁷



Source: Quest Offshore Resources, Inc.

Installation of platforms and SURF equipment is normally carried out by multiple vessels, each with specialized functions such as pipe-lay or heavy-lift. Some vessels might lay large diameter pipelines (14 inch+), while other vessels lay smaller diameter infield lines (2-10 inches) or lift equipment, and install hardware. Other specialized vessels supply drill-pipe, fuel and other fluids, and food. Nearly everything installed offshore must first be prepared on shore at specialized bases in the region prior to installation. Equipment is sometimes transported to the field on the installation vessels. Installing offshore equipment often requires complex connection or integration operations and uses vessels that can command day rates of over \$1 million. Between 2017 and 2035, average annual installation spending is projected to be above \$1.1 billion per year, with 2031 to 2035 installation spending projected to average of \$2.3 billion per year.

¹⁷ OPEX is defined as operational expenditures, SURF is defined as subsea, umbilical, riser and flowline equipment, processing is defined as onshore natural gas processing. Please see previous footnote for definition of G&G

Once the initial wells have been drilled and the necessary equipment installed, a field can enter the operational phase. The operation phase requires manning and operating facilities and equipment, continuously supplying essential fluids, and constant general maintenance. These operational expenditures (OPEX) are a significant source of ongoing spending by oil and gas companies within the region. As projects begin to come online in 2026, operational expenditures are expected to be around \$300 million in the first year, climbing to over \$6.7 billion per year by 2035.

Due to significant amounts of natural gas production expected from the Atlantic OCS, investment in gas processing infrastructure will be needed to receive produced gas from offshore fields. Although some limited natural gas processing occurs offshore, onshore natural gas processing plants are necessary to separate other gases and liquids to meet quality specifications of the onshore pipeline and gas distribution system. As the Atlantic coast lacks these facilities, expenditures to build and operate these plants would be necessary to enable offshore natural gas production. On average from 2017 to 2035 construction of natural gas processing plants is expected to account for spending of around \$300 million per year or \$6 billion total over the 2017 to 2035 period, representing the ability to handle approximately 7.8 billion cubic feet per day of natural gas production by 2035.

The location of spending for Atlantic OCS oil and natural gas development will be dependent on a variety of factors, including the type of equipment and services, the location of the projects being developed, and the time period in which the spending takes place. Developing an offshore oil and gas project requires a complex supply chain with suppliers located all over the country and often the world. Depending on the activity type, some spending can take place far from the activity area while other spending must be undertaken geographically close to projects. For instance, activity such as G&G seismic or drilling must take place in the waters of the affected region, with support required from nearby shorebases and ports to supply items such as fuel, food and other consumables. Specialized equipment may be manufactured in far off states or even foreign countries with more developed oil and natural gas supply chains, especially in the early years of development in a new offshore oil and gas production region.

During the initial seismic and exploratory drilling phase, 2017 to 2022, an average of 48 percent of total domestic Atlantic OCS oil and natural gas spending is projected to take place along Atlantic coast. However, as projects begin to be developed and spending on platforms and SURF equipment begin, the Atlantic coast's share of spending is projected to dip to a low of 39 percent in 2023, with high value SURF equipment and platforms expected to be supplied by other states. (Figure 19)



Figure 19: Projected Overall Spending Atlantic Coast vs. Other U.S States vs. International

As the Atlantic OCS is developed, it is projected that suppliers of offshore oil and natural gas equipment will take advantage of the high-tech manufacturing capabilities of the Atlantic coast states, as well the extensive port infrastructure already in place. An increased amount of equipment and services will originate from Atlantic coast states. Production in the region will lead to significantly lower transportation costs, as well as allowing suppliers to diversify their workforce nationally. In 2035, 78 percent of domestic spending on Atlantic OCS oil and natural gas developments is projected to accrue to the Atlantic coast states reaching nearly \$14 billion per year in 2035. Other U.S. state spending in 2035 is projected to be just over \$4 billion per year, below the peak of over \$6.2 billion per year in 2030 due to increased operational expenditures and higher levels of Atlantic state content for capital goods.

Over the 2017 to 2035 period, the largest share of spending due to Atlantic OCS offshore oil and natural gas development occurs in the east coast itself, \$109 billion cumulative over that time period. Spending reaches nearly \$14 billion a year by 2035. Approximately \$58 billion is projected to be spent in states outside the region. (Table 9)

State	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
North Carolina	\$14	\$40	\$47	\$66	\$93	\$132	\$279	\$544	\$631	\$1,190	\$1,561
South Carolina	\$11	\$33	\$39	\$54	\$60	\$83	\$164	\$249	\$355	\$583	\$798
Virginia	\$7	\$21	\$25	\$36	\$49	\$71	\$172	\$252	\$354	\$630	\$810
Massachusetts	\$4	\$12	\$14	\$20	\$26	\$37	\$103	\$138	\$213	\$361	\$477
New York	\$3	\$9	\$11	\$16	\$34	\$51	\$127	\$179	\$267	\$483	\$607
Maine	\$2	\$5	\$6	\$9	\$8	\$11	\$33	\$32	\$59	\$104	\$151
Florida	\$2	\$5	\$6	\$9	\$17	\$25	\$50	\$70	\$104	\$189	\$236
Rhode Island	\$4	\$10	\$12	\$17	\$15	\$21	\$33	\$46	\$65	\$98	\$140
Connecticut	\$3	\$9	\$10	\$15	\$16	\$22	\$50	\$67	\$104	\$168	\$230
New Jersey	\$3	\$8	\$9	\$13	\$18	\$26	\$60	\$88	\$123	\$219	\$282
Maryland	\$3	\$8	\$9	\$13	\$17	\$25	\$48	\$68	\$97	\$171	\$219
Pennsylvania	\$2	\$5	\$6	\$8	\$13	\$19	\$52	\$73	\$112	\$193	\$254
Georgia	\$1	\$3	\$4	\$6	\$8	\$11	\$23	\$38	\$50	\$90	\$116
Delaware	\$2	\$7	\$8	\$12	\$11	\$14	\$23	\$32	\$45	\$69	\$97
New Hampshire	\$2	\$5	\$6	\$9	\$8	\$11	\$19	\$26	\$39	\$59	\$84
Atlantic Coast	\$62	\$182	\$213	\$302	\$394	\$559	\$1,237	\$1,899	\$2,618	\$4,607	\$6,064
Other U.S. States	\$76	\$212	\$253	\$356	\$311	\$443	\$1,923	\$1,462	\$2,989	\$4,002	\$4,872
International	\$0	\$0	\$11	\$28	\$12	\$46	\$847	\$401	\$1,316	\$1,927	\$1,688
Totals	\$138	\$394	\$477	\$685	\$717	\$1,048	\$4,007	\$3,762	\$6,924	\$10,536	\$12,624

Table 9: Projected Overall	pending Atlanti	c Coast States and Other U	J.S. States (Millions of Dollars	oer year)
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State	2028	2029	2030	2031	2032	2033	2034	2035	Total
North Carolina	\$1,936	\$2,328	\$2,604	\$2,913	\$2,890	\$2,885	\$3,014	\$3,269	\$26,439
South Carolina	\$1,005	\$1,240	\$1,497	\$1,688	\$1,772	\$1,865	\$1,953	\$2,122	\$15,572
Virginia	\$1,026	\$1,255	\$1,393	\$1,555	\$1,548	\$1,623	\$1,635	\$1,751	\$14,214
Massachusetts	\$598	\$703	\$818	\$882	\$875	\$926	\$947	\$1,010	\$8,164
New York	\$776	\$918	\$963	\$1,057	\$1,026	\$1,055	\$989	\$1,065	\$9,637
Maine	\$198	\$274	\$349	\$416	\$464	\$545	\$596	\$629	\$3,892
Florida	\$303	\$375	\$386	\$439	\$440	\$460	\$423	\$459	\$3,998
Rhode Island	\$178	\$248	\$316	\$377	\$418	\$459	\$494	\$536	\$3,485
Connecticut	\$288	\$349	\$426	\$470	\$487	\$523	\$547	\$588	\$4,371
New Jersey	\$357	\$440	\$485	\$545	\$545	\$574	\$574	\$616	\$4,984
Maryland	\$281	\$359	\$394	\$455	\$469	\$500	\$493	\$533	\$4,159
Pennsylvania	\$318	\$364	\$411	\$438	\$430	\$443	\$439	\$472	\$4,050
Georgia	\$147	\$181	\$201	\$227	\$230	\$239	\$240	\$260	\$2,076
Delaware	\$124	\$173	\$220	\$263	\$291	\$320	\$346	\$374	\$2,430
New Hampshire	\$106	\$140	\$181	\$209	\$228	\$249	\$269	\$291	\$1,942
Atlantic Coast	\$7,640	\$9,348	\$10,646	\$11,932	\$12,111	\$12,667	\$12,959	\$13,974	\$109,413
Other U.S. States	\$5,564	\$5,678	\$6,215	\$5,672	\$4,898	\$5,001	\$4,343	\$4,051	\$58,320
International	\$2,687	\$2,877	\$2,825	\$2,689	\$2,326	\$2,842	\$2,307	\$1,969	\$26,798
Totals	\$15,891	\$17,903	\$19,686	\$20,292	\$19,334	\$20,510	\$19,609	\$19,994	\$194,531

Spending among the Atlantic coast states is projected to vary based on the location of offshore oil and natural gas reserves, projects, and production as well as the makeup of the individual state's economies. The location of spending for activities that require operations to be located in or near an oil and gas development are primarily driven by geographic factors, while spending on manufacturing equipment that can be more easily transported is driven by both the make-up of the Atlantic coast's states economies as well as geography. States with strong manufacturing, fabrication, engineering and other relevant industries are thus projected to be more likely to undertake these activities for Atlantic OCS offshore oil and gas exploration and production.

4.6 – Employment

Spending on goods and services to develop oil and natural gas in the Atlantic OCS is expected to provide large employment gains both nationally and regionally. Employment generally follows spending patterns. Employment effects are expected to steadily grow, reaching nearly 280 thousand jobs in 2035. Total Atlantic coast employment in 2035 is projected to reach over 215 thousand jobs in 2035, with employment spread across the region. U.S. states outside the east coast region are projected to see employment of approximately 65 thousand jobs in 2035, down from a peak of around 85 thousand jobs in 2030 as more employment shifts into the Atlantic coast region. (Figure 20)





Source: Quest Offshore Resources, Inc.

The largest impact on employment by number of jobs is expected to be seen in the Mid-Atlantic states of North and South Carolina and Virginia, while North Atlantic states such as Massachusetts, Maine, and New York are all also projected to see employment of over 10 thousand jobs by 2035. Over 10 thousand jobs in Atlantic coast states will be created by 2022.

As the Atlantic OCS is developed, the oil and gas industry is expected to take advantage of the skilled workforce and extensive infrastructure in place within the region. The mix between east coast and

other U.S. state employment effects are projected to be highly dependent on the type of activity taking place in a given year, as well as the projected in region supply chain shift over time. In the early years of the forecast period from 2017 to 2021, prior to the beginning of significant project development, an average of 53 percent of employment benefits are expected to accrue to the Atlantic coast region. As spending on items such as SURF equipment and platforms that will initially be produced outside the region increases, the percentage of overall employment effects in Atlantic coast states is expected to fall as low as 42 percent in 2023, albeit with overall employment in the region still growing rapidly. By 2035, the Atlantic coast states are projected account for 77 percent of the employment effects of Atlantic OCS development. (Figure 21)



Figure 21: Projected Employment Atlantic Coast vs. Other U.S States

Source: Quest Offshore Resources, Inc.

The opening of the Atlantic OCS to offshore oil and natural gas production is expected to increase employment not only through direct employment in the industry, but also indirectly. Indirect employment occurs through the purchases of needed goods and services and the induced employment impact of greater income in the economy. Direct employment by oil and natural gas companies and their suppliers is projected to reach nearly 95 thousand jobs in 2035. Jobs generated through the purchase of goods and services coupled with the income effects of increased employment are expected to contribute a further 185 thousand jobs. (Figure 22)



Figure 22: Projected Employment Direct vs. Indirect and Induced

Direct Indirect and Induced

Source: Quest Offshore Resources, Inc.

Offshore oil and natural gas development in the Atlantic OCS is expected to benefit a diverse spectrum of industries both nationally and in Atlantic coast states. Industry sectors which are directly involved in oil and natural gas activities such as mining, which includes the oil and gas industry, manufacturing, professional, scientific, and technical Services (engineering), and Construction (installation) are expected to see the largest employment impacts with a combined 125 thousand jobs in 2035. Additionally, employment impacts expected to be significant for a variety of other industries outside oil and gas, with 155 thousand jobs projected outside of these four categories in 2035. (Figure 23)



Figure 23: Projected Employment by Industry Sector

The manufacturing sector includes those businesses that manufacture and fabricate oil and gas equipment, platforms and otherwise produce the goods required to develop oil and natural gas fields. Manufacturing is projected to see some of the largest gains due to Atlantic OCS offshore oil and natural gas production, with around 30 thousand jobs created by 2035, with over 20 thousand jobs in Atlantic coast states and over nine thousand in the rest of the U.S. (Figure 24)

Source: Quest Offshore Resources, Inc.



Figure 24: Projected Manufacturing Employment



Other U.S States - Manufacturing

Source: Quest Offshore Resources, Inc.

Employment in the mining sector, which includes oil and gas, is also expected to see significant growth. In 2035 total employment is projected to reach around 45 thousand jobs representing 39 thousand jobs expected in the Atlantic coast states and over six thousand jobs in the rest of the U.S. (Figure 25)



Figure 25: Projected Mining (Oil & Gas) Employment



Source: Quest Offshore Resources, Inc.

Another employment sector expected to see large gains as a result of Atlantic OCS offshore oil and natural gas activity is the professional, scientific, and technical service sector which includes high value engineering employment. This sector is projected to see in excess of 32 thousand additional

jobs in 2035, with nearly 24 thousand jobs in the Atlantic coast states and over eight thousand jobs in other U.S. states. (Figure 26)



Figure 26: Projected Professional, Scientific, and Technical Service Employment

Source: Quest Offshore Resources, Inc.

The construction sector, which includes industrial construction activities such as offshore installation and construction of natural gas processing infrastructure, is also expected to see large employment gains. Due to the cyclical nature of installation, construction employment is expected to be more variable than most other sectors. After 2027, employment in the construction sector is expected to fluctuate between 15 thousand and 30 thousand jobs though in 2035. (Figure 27)



Figure 27: Projected Construction Employment



Many employment sectors of the economy outside oil and gas development or the direct supply chain will also be impacted, mainly due to greater income in the economy. The most affected sectors are projected to be retail with over 20 thousand jobs created in 2035, health care and social assistance with nearly 19 thousand jobs created, administrative and waste management services with over 17 thousand jobs, food services and drinking places with over 13 thousand jobs, and finance and insurance, and real estate, rental and leasing with both industries individually projected to see the creation of over 11 thousand jobs by 2035.

As production increases along the coastline of the Atlantic OCS, employment relating to oil and gas production is expected to migrate towards the Mid-Atlantic states of North Carolina, South Carolina, and Virginia with employment reaching around 55 thousand, 35 thousand, and 25 thousand jobs respectively in 2035. Large employment gains are also expected in the North Atlantic states of Massachusetts, New York, and Maine where employment in 2035 is projected to reach 15 thousand, 12 thousand and 10 thousand jobs respectively. (Table 10)

State	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
North Carolina	225	717	815	1,287	2,031	2,751	4,821	8,626	10,542	19,521
South Carolina	169	667	735	1,014	1,282	1,622	2,607	3,688	5,274	8,658
Virginia	90	290	336	566	873	1,195	2,367	3,230	4,708	8,317
New York	34	198	219	285	560	761	1,534	1,989	3,053	5,434
Massachusetts	51	295	324	405	525	664	1,394	1,782	2,628	4,410
Florida	30	336	367	405	598	754	1,128	1,380	2,000	3,410
New Jersey	33	148	167	257	364	476	869	1,159	1,634	2,858
Pennsylvania	25	103	116	167	280	378	839	1,177	1,743	3,045
Maine	28	142	154	191	203	236	534	478	840	1,441
Connecticut	36	202	224	283	319	396	712	876	1,318	2,026
Maryland	32	125	143	246	332	436	706	923	1,310	2,235
Rhode Island	43	245	265	326	340	393	492	602	771	1,116
Georgia	19	222	241	265	334	404	576	768	984	1,632
Delaware	22	97	109	189	192	228	290	361	456	685
New Hampshire	24	127	139	173	181	211	293	358	489	651
Atlantic Coast	861	3,913	4,355	6,057	8,414	10,905	19,160	27,396	37,751	65,439
Other U.S. States	1,085	3,426	3,895	5,334	5,344	7,072	26,143	20,165	40,347	55,059
Totals	1,945	7,339	8,250	11,391	13,758	17,977	45,303	47,560	78,098	120,498
Stata	2027	2028	202	0 7	020	2021	2022	2022	2024	2025
State	2027	2020	202	9 Z	030	2031	2032	2033	40.007	2033
North Carolina	25,355	32,245	38,9	25 41	.,937	47,860	48,803	49,777	49,827	55,422
South Carolina	10.674	12,387	17.0	29 22	2,115	25,514	21,781	30,602	31,840	35,569
Virginia	10,074	13,819	10.2	59 18 76 10	0,390	21,050	21,012	23,209	22,798	24,979
New YOR	0,091 E 714	8,017 7 194	10,2		770	10,902	11,492	12,117	12 262	14 914
Florido	5,714	7,104	6,00		,779	7 152	7.071	12,540	7.042	14,014
Fiorida	4,105	5,250	0,43 E 75		170	7,152	7,371	8,508	7,943	9,222
New Jersey	3,020	4,019	5,75	2 6	,170	6 742	6 6 4 9	6.964	6.640	0,340
Maino	2 024	2 624	2,66	.5 0,	,220	0,742 5.611	6 5 4 2	0,004	0,040	10 205
Connecticut	2,024	2,034	3,00 4 1 4	3 1	,002 047	5,605	6.030	6 770	7 202	8 160
Manyland	2,003	3,309	4,14	-5 4, 12 5	,947	5,005	6 1 8 3	6,669	6 536	7 236
Phode Island	1 563	1 960	2,80	и з	580	1 480	5 320	6,005	7 477	8 /00
Georgia	1 997	2 / 90	2,00		113	3 50/	3,636	4 307	1,411	5.088
Delaware	00/	1 270	1 83		255	2 927	3 3/0	3 8/3	4,340	4 790
New Hampshire	800	970	1 21	6 1	,555	1 710	2 035	2 506	3,000	3,608
Atlantic Coast	000	513	1,21	.0 I,	,-30	1,710	175.000	2,300	102 544	215 612
/ dunie Coast	84 880	108 //21	122 1	37 1/1	6 333	16/625	1/5/54	19111711	193 5/1/1	213 012
Other U.S. States	84,889 66,462	108,421	133,1	.37 14 39 84	6,333 L 294	167,625 78 951	70 159	73 825	193,544 65 284	63 950

Table 10: Projected Employment Atlantic Coast States and Other U.S. States

The remaining east coast states are projected to reach a combined employment of over 62 thousand jobs in 2035, with other U.S. states employment at nearly 64 thousand jobs in 2035.

4.7 – Economic Impacts

Along with employment benefits, significant contributions to state and national gross domestic product are also expected due to Atlantic OCS oil and natural gas development. Total contributions to state economies are projected at \$23.5 billion per year in 2035, with around 76 percent of the total expected to occur in Atlantic coast states and 24 percent in the rest of the U.S. From 2017 to 2035, Atlantic coast states' share of increased GDP is expected to be slightly lower than in later years at around 65 percent compared to 35 percent for the rest of the U.S. (Figure 28)



Figure 28: Projected Contributions to State Economies Atlantic Coast vs. Other U.S. States

Source: Quest Offshore Resources, Inc.

Presented below are the projected economic effects of Atlantic OCS exploration and production. The largest contributions are expected to mimic spending at the state level. The Mid-Atlantic states of North Carolina, South Carolina, and Virginia receive the majority of contributions to their states' economies. (Table 11)

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State GDP	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
North Carolina	\$18	\$56	\$64	\$101	\$137	\$183	\$346	\$581	\$724	\$1,303	\$1,721
South Carolina	\$14	\$54	\$61	\$85	\$95	\$121	\$206	\$286	\$402	\$641	\$885
Virginia	\$9	\$28	\$33	\$54	\$71	\$97	\$212	\$280	\$409	\$707	\$913
New York	\$4	\$19	\$22	\$29	\$48	\$66	\$151	\$191	\$295	\$516	\$642
Massachusetts	\$5	\$27	\$30	\$39	\$46	\$59	\$133	\$161	\$250	\$407	\$531
New Jersey	\$3	\$14	\$16	\$25	\$32	\$42	\$83	\$108	\$155	\$265	\$338
Florida	\$2	\$27	\$30	\$33	\$44	\$54	\$83	\$100	\$142	\$236	\$286
Pennsylvania	\$2	\$9	\$10	\$15	\$22	\$30	\$70	\$92	\$144	\$242	\$317
Connecticut	\$4	\$19	\$20	\$26	\$28	\$35	\$65	\$78	\$118	\$181	\$245
Maryland	\$3	\$12	\$14	\$23	\$29	\$37	\$63	\$82	\$115	\$194	\$247
Maine	\$2	\$11	\$12	\$15	\$16	\$19	\$43	\$39	\$69	\$115	\$162
Rhode Island	\$4	\$21	\$23	\$29	\$29	\$35	\$45	\$56	\$73	\$104	\$146
Georgia	\$2	\$18	\$20	\$22	\$26	\$31	\$45	\$57	\$75	\$120	\$149
Delaware	\$3	\$11	\$12	\$20	\$19	\$23	\$31	\$40	\$40 \$51		\$106
New Hampshire	\$2	\$11	\$12	\$16	\$16	\$19	\$27	\$33	\$45	\$59	\$73
Atlantic Coast	\$77	\$339	\$380	\$530	\$659	\$848	\$1,602	\$2,184	\$3,066	\$5,166	\$6,763
Other U.S. States	\$94	\$299	\$345	\$478	\$439	\$586	\$2,201	\$1,700	\$3,342	\$4,493	\$5,435
Totals	\$171	\$638	\$724	\$1,008	\$1,098	\$1,434	\$3,803	\$3,884	\$6,408	\$9,659	\$12,198
State GDP	2028	202	.9	2030	2031	2032	203	3 20	034	2035	Total
North Carolina	\$2,175	\$2,6	43	\$2,952	\$3,349	\$3,427	\$3,5	81 \$3	,702	\$4,081	\$31,144
South Carolina	\$1,132	\$1,4	10	\$1,685	\$1,934	\$2,093	\$2,32	25 \$2	,457	\$2,730	\$18,617
Virginia	\$1,172	\$1,4	45	\$1,602	\$1,810	\$1,840	\$1,9	90 \$2	,008	\$2,177	\$16,859
New York	\$823	\$98	1	\$1,029	\$1,139	\$1,122	\$1,1	94 \$1	,147	\$1,250	\$10,666
Massachusetts	\$667	\$79	4	\$922	\$1,015	\$1,043	\$1,1	63 \$1	,241	\$1,365	\$9,901
New Jersey	\$429	\$53	3	\$586	\$663	\$670	\$71	9 \$	722	\$785	\$6,189
Florida	\$362	\$44	.3	\$447	\$503	\$519	\$61	6 \$	599	\$694	\$5,219
Pennsylvania	\$399	\$46	,0	\$517	\$557	\$553	\$57	9 \$	572	\$619	\$5,210
Connecticut	\$307	\$37	9	\$463	\$524	\$565	\$64	0 \$	700	\$776	\$5,174
Maryland	\$315	\$40	4	\$442	\$513	\$532	\$57	6 \$	576	\$632	\$4,810
Maine	\$211	\$29	6	\$376	\$458	\$534	\$66	4 \$	766	\$840	\$4,647
Rhode Island	\$184	\$26	,2	\$339	\$420	\$494	\$58	8 \$	682	\$771	\$4,304
Georgia	\$185	\$22	.6	\$245	\$274	\$288	\$34	9 \$3	367	\$426	\$2,924
Delaware	\$135	\$19	/1	\$245	\$299	\$337	\$38	0 \$422		\$466	\$2,865
Manual Language alabase				-							
New Hampshire	\$90	\$11	.2	\$136	\$159	\$186	\$22	5 \$2	267	\$317	\$1,804
Atlantic Coast	\$90 \$8,587	\$11 \$10,5	.2 579 \$	\$136 \$11,986	\$159 \$13,617	\$186 \$14,204	\$22 \$15,5	5 \$: ;91 \$16	267 3,227	\$317 \$17,929	\$1,804 \$130,331
Atlantic Coast Other U.S. States	\$90 \$8,587 \$6,234	\$11 \$10,5 \$6,4	.2 579 \$ 71	\$136 \$11,986 \$7,027	\$159 \$13,617 \$6,564	\$186 \$14,204 \$5,844	\$22 \$15,5 \$6,2	5 \$;91 \$16 01 \$5	267 5,227 ,619	\$317 \$17,929 \$5,498	\$1,804 \$130,331 \$68,870

Table 11: Projected Contributions to State Economies Atlantic Coast States and Other U.S. States

In addition to economic and employment growth, expanding current oil and gas production in the Atlantic OCS would increase government revenue. Extrapolating upon the current Gulf of Mexico regulatory environment, total government revenues are project to reach \$12.2 billion dollars per year in 2035, with the majority of revenues from royalties on produced oil and natural gas at \$9.2 billion. In

2035, leasing bonus bids are projected to account for around \$500 million per year in government revenue, while rental income from offshore blocks is expected to account for \$130 million. From 2017 to 2035, as oil and natural gas production lags behind bonus bids and rents, these revenues account for 17 and four percent respectively of the total government revenues of around \$51 billion dollars cumulative through 2035. (Figure 29)







Source: Quest Offshore Resources, Inc.

There is a possibility that revenue generated from Atlantic oil and natural gas development will be shared between the Federal government and the various state governments, although there currently is no revenue sharing agreement in place. However, an assumption that government revenues would be split on the basis of 62.5 percent for the Federal government and 37.5 percent for state governments was assumed for this analysis to compare potential revenue streams among the east coast states. This is in-line with the percentage split currently in place with states in the Gulf of Mexico, but with no annual revenue cap. Such projected state government revenue streams will need to be adjusted proportionally when or if a legislated agreement occurs. Given the 37.5 percent revenue share to the east coast states, federal government revenues from Atlantic OCS offshore oil and natural gas production are projected to reach \$7.6 billion per year in 2035, while combined state revenues for the Atlantic coast states are projected at about \$4.6 billion per year. (Figure 30)



Figure 30: Projected Government Revenues from Rentals, Royalties, and Bonus Bids, State and Federal

Given the location of the potential oil and natural gas production, three states, North Carolina, South Carolina, and Virginia would most likely receive the largest amount of any revenue sharing agreement. At a 37.5 percent take for state governments, North Carolina, South Carolina, and Virginia would receive a cumulative \$4 billion, \$3.7 Billion, and \$1.9 billion respectively. Most east coast states, with the exception of Pennsylvania, would receive at least \$90 million per year by 2035. (Table 12)

,					· · ·	,		5			
State	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
North Carolina	\$0	\$6	\$7	\$27	\$28	\$30	\$29	\$30	\$28	\$33	\$78
South Carolina	\$0	\$19	\$20	\$29	\$30	\$32	\$31	\$31	\$30	\$34	\$72
Virginia	\$0	\$3	\$3	\$15	\$15	\$16	\$16	\$16	\$16	\$18	\$38
Massachusetts	\$0	\$15	\$16	\$18	\$20	\$20	\$20	\$20	\$19	\$20	\$22
Rhode Island	\$0	\$13	\$13	\$14	\$16	\$16	\$16	\$16	\$16	\$16	\$18
Florida	\$0	\$27	\$29	\$28	\$29	\$31	\$31	\$30	\$30	\$30	\$29
Connecticut	\$0	\$10	\$11	\$12	\$13	\$13	\$13	\$13	\$13	\$13	\$15
Maine	\$0	\$6	\$7	\$8	\$8	\$9	\$8	\$8	\$8	\$8	\$8
New York	\$0	\$10	\$11	\$13	\$14	\$14	\$14	\$14	\$14	\$14	\$16
New Hampshire	\$0	\$6	\$7	\$7	\$8	\$8	\$8	\$8	\$8	\$8	\$8
Georgia	\$0	\$18	\$19	\$19	\$20	\$21	\$20	\$20	\$20	\$20	\$19
New Jersey	\$0	\$5	\$6	\$11	\$12	\$12	\$12	\$12	\$12	\$12	\$14
Maryland	\$0	\$4	\$4	\$10	\$11	\$12	\$11	\$12	\$11	\$12	\$13
Delaware	\$0	\$4	\$4	\$10	\$10	\$11	\$11	\$11	\$11	\$11	\$13
Pennsylvania	\$0	\$3	\$4	\$6	\$6	\$6	\$6	\$6	\$6	\$6	\$8
East Coast	\$0	\$149	\$160	\$226	\$239	\$251	\$248	\$248	\$242	\$256	\$370
Federal	\$0	\$249	\$267	\$377	\$399	\$419	\$414	\$414	\$403	\$424	\$617
I otal Revenues	\$0	\$399	\$427	\$603	\$639	\$670	\$662	\$662	\$644	\$679	\$987
State	2028	2029	20	30	2031	2032	2033	2034	2	035	Total
North Carolina	\$128	\$195	\$2	60	\$362	\$478	\$639	\$746	.\$	885	\$3.989
South Carolina	¢115	¢130	φ2 ¢2	25	¢200	¢410	¢604	¢710	Ф Ф	040	¢0,000
South Carolina	¢C1	\$170	- Φ4	.25	φ300 Φ170	Φ 2 05	\$004	\$712	ф Ф	040	Φ3,720
virginia	\$01	\$93	\$1	.23	\$1/3	\$225	\$293	\$343	\$·	406	\$1,874
Massachusetts	\$25	\$41	\$5	90	\$88	\$137	\$208	\$295	\$	372	\$1,411
Rhode Island	\$21	\$35	\$4	48	\$76	\$118	\$179	\$251	\$	315	\$1,198
Florida	\$29	\$29	\$3	30	\$29	\$49	\$143	\$190	\$	264	\$1,057
Connecticut	\$18	\$30	\$4	40	\$63	\$93	\$136	\$187	\$	234	\$929
Maine	\$9	\$18	\$2	26	\$46	\$83	\$142	\$211	\$3	265	\$879
New York	\$20	\$32	\$4	41	\$63	\$88	\$122	\$163	\$2	205	\$869
New Hampshire	\$9	\$18	\$2	26	\$45	\$80	\$136	\$201	\$3	252	\$843
Georgia	\$19	\$19	\$2	20	\$19	\$33	\$95	\$126	\$	175	\$702
New Jersey	\$18	\$25	\$3	31	\$43	\$52	\$62	\$77	\$	99	\$515
Maryland	\$17	\$25	\$3	30	\$42	\$51	\$62	\$76	\$	97	\$499
Delaware	\$16	\$24	\$2	28	\$40	\$49	\$59	\$73	\$	92	\$475
Pennsylvania	\$10	\$16	\$2	20	\$30	\$37	\$44	\$53	\$	62	\$330
East Coast	\$517	\$771	\$1,	002	\$1,428	\$1,991	\$2,924	\$3,70	5 \$4	,571	\$19,299
Federal	\$864	\$1,285	5 \$1,	670	\$2,380	\$3,318	\$4,873	\$6,17	4 \$7	,619	\$32,164
Total Revenues	\$1,381	\$2,055	\$2,	672	\$3,808	\$5,309	\$7,796	\$9,87	9 \$12	2,191	\$51,464

Table 12: Projected Government Revenues from Rentals, Royalties, and Bonus Bids by State and Federal¹⁸

¹⁸ For comparison purposes only for potential revenue among states. Assumes 37.5 percent of bonuses, rents and royalties go to state governments. There is no current revenue sharing agreement in place.

Section 5 – Conclusions

5.1 – Conclusions

The offshore U.S. oil and natural gas industry is a vital component to the nation's energy supply, as well a significant source of employment, economic activity, and government revenue throughout the nation. However, large portions of the nations' federal waters are currently inaccessible to oil and gas operators, including the Atlantic OCS area which shows strong potential for offshore oil and natural gas activity. Allowing oil and gas operators access to Atlantic OCS offshore reserves is expected to benefit oil and natural gas production, employment, the national economy, and government revenue.

- If leasing in the Atlantic OCS began in 2018 and seismic in 2017, annual capital investment and other spending due to offshore oil and natural gas development would be projected to grow from nearly \$7 billion per year in 2025 to nearly \$20 billion per year in 2035. Cumulative capital investments and other spending from 2017 to 2035 are projected at about \$195 billion.
- Atlantic coast OCS oil and gas activities could create nearly 80 thousand jobs by 2025, of which nearly 40 thousand would be in the Atlantic coast states.
- By 2035, total national employment due to Atlantic OCS oil and gas exploration and production would reach nearly 280 thousand jobs, with 215 thousand of these jobs in Atlantic coast states.
- Development of the Atlantic coasts' offshore oil and natural gas reserves would lead to production of over 1.34 million barrels of oil equivalent per day by 2035.
- Atlantic OCS offshore activity would contribute nearly \$6.5 billion per year to the national economy in 2025, with Atlantic coast states receiving contributions of over \$3 billion per year.
- In 2035 total national contributions to the economy could reach \$23.5 billion per year, with Atlantic coast states receiving combined contributions of \$18 billion per year.
- Combined state and federal revenues from bonuses, rents and royalties are projected to reach about \$645 million per year in 2025, with these revenues projected to grow to nearly \$12.2 billion per year in 2035.
- If a legislated state / federal revenue sharing agreement is enacted, the Atlantic coast states could see significant gains to their state budgets. With a 37.5 percent sharing agreement, state revenues are projected to be around \$250 million per year by 2025, with these revenues expected to grow to over \$4.5 billion per year by 2035, leading to further increases in

economic activity and employment.¹⁹ If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

Under the development scenario put forth by Quest Offshore Resources, it is clear that the Atlantic OCS displays significant potential to grow the American economy within a multitude of industries and locations. Allowing access to the Atlantic OCS for oil and gas exploration and production activities is likely to lead to large capital investments and operational spending by oil and gas operators to develop the areas reserves. This spending would likely lead to large increases in employment and economic activity both in the directly affected states and nationally. Additionally, this activity is projected to lead to a large increase in domestic energy production and the royalties plus other revenues received are expected to lead to healthy increases in revenues to state and federal governments.

¹⁹ Under assumed effective 67.5 / 32.5 percent revenue sharing

Section 6 – State Results Appendix

6.1 - State Results

While the opening of the Atlantic OCS for oil and natural gas production activities is expected to benefit both the states that border the Atlantic as well other U.S. states, the benefits of projected exploration and development activity especially in later years are expected to accrue most significantly within the Atlantic coast region. If exploration and production of oil and natural gas in U.S. Atlantic waters were to be allowed, each of the states on the coast would see significant increases in employment, gross domestic product, and government revenue due to capital and operational spending from the oil and gas industry. Within the region, the distribution of the benefits is also expected to be diverse with certain states expected to accrue greater benefits due to factors such as the state's coastline's proximity to modeled reserves, the relative density of oil and natural gas reserves in the waters off a state's coast, and the size and makeup of the states' economy.

6.2 - North Carolina

North Carolina is projected to see the highest levels of spending, employment and contributions to its economy if Atlantic OCS oil and natural gas resources are developed. Annual spending on Atlantic OCS oil and gas in North Carolina could reach nearly \$3.3 billion in 2035. North Carolina benefits from the large amount of project activity expected off the state due to the large amount of potential reserves in nearby waters and a relatively long coastline. Spending driven primarily through North Carolina's location includes high operational expenditures (projected to be nearly \$1.3 billion per year in 2035), drilling spending (\$635 million per year in 2035), and installation spending (over \$250 million per year). North Carolina's extensive port infrastructure at Morehead City and Wilmington is expected to be heavily involved in offshore oil and natural gas activities. (Figure 31)



Figure 31: Projected North Carolina Spending by Sector



Source: Quest Offshore Resources, Inc.

Additionally, North Carolina's economic makeup coupled with its proximity to developments is expected to attract significant manufacturing of oilfield equipment, rising to nearly \$600 million dollars per year of spending by 2035. North Carolina is already home to many high tech manufacturing suppliers to the oil and gas industry such as General Electric (which manufactures turbines in Durham) and ABB power systems (North American headquarters in Cary, U.S. Corporate Research Center in Raleigh and manufacturing in Huntersville) which supplies power transmission equipment to the oil and gas as well as other industries. The state also hosts Siemens, a major supplier of power equipment to the oil and gas industry whose Power Distribution and Power Transmission headquarters is in Wendell. Siemens recently announced an expansion of its gas turbine operations in Mecklenburg County, with investment of at least \$135 million over a five year period. DSM Dyneema with American headquarters in Stanley provides mooring and lifting ropes to the offshore industry.

Employment due to offshore oil and gas development in North Carolina is expected to reach over 55 thousand jobs in 2035, with direct employment of over 20 thousand jobs and indirect and induced employment of over 35 thousand jobs. North Carolina's workforce is well placed to take advantage of the high tech nature of oil and gas manufacturing and other activities, drawing on the same workforce that has led companies such as Caterpillar, John Deere and Volvo to place significant manufacturing operations in the state, especially in and around the Raleigh, Durham, and Chapel Hill triangle. (Figure 32)





Employment gains are not expected to be limited to those industries directly tied to oil and natural gas production, with a broad spectrum of businesses expected to benefit. Some of the industries expected to benefit most (in number of projected jobs in 2035) include retail with over 3,500 jobs, administrative and waste management services with around 3,300 jobs, healthcare and social assistance with nearly 3,400 jobs, and food services with 2,600 jobs.

Atlantic OCS oil and natural gas exploration and production is also expected to cause a significant increase in North Carolina's gross state product with contributions to the state economy expected to reach over \$4 billion per year in 2035. (Figure 33)

Source: Quest Offshore Resources, Inc.



Figure 33: Projected North Carolina Contributions to the State Economy

North Carolina

Source: Quest Offshore Resources, Inc.

Additionally, if state / federal revenue sharing legislation is enacted North Carolina could see significant incremental government revenues. Under 37.5 percent state revenue sharing, North Carolina state government revenues from bonuses, rents and royalties are projected to reach \$885 million per year by 2035 and the cumulative effects on the state budget from 2017 to 2035 are projected to be nearly \$4 billion. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.3 - South Carolina

South Carolina is projected to see the second highest levels of spending, employment and gross domestic product if Atlantic offshore oil and natural gas resources are developed. Annual spending due to Atlantic coast offshore oil and natural gas activity in South Carolina is expected to peak in the study period in 2035 at just over \$2.1 billion. South Carolina is expected to benefit from the high levels of oil and gas development activity expected off the state due to the large potential reserves in the waters surrounding the state. Spending driven primarily through potential reserves and expected projects off South Carolina's coast include high levels of operational expenditures (projected to be just over \$1 billion per year in 2035), drilling spending (\$524 million per year in 2035), and installation spending (nearly \$100 million per year). (Figure 34)



Figure 34: Projected South Carolina Spending by Sector

■ Drilling ■ OPEX ■ Engineering ■ Platforms ■ Install ■ SURF ■ G&G ■ Processing

Source: Quest Offshore Resources, Inc.

South Carolina's economy, coupled with the high level of development activity off its coast, is projected to lead to high levels of oilfield equipment manufacturing activity, with spending projected to nearly reach \$200 million dollars a year in 2035. South Carolina possesses a strong high tech manufacturing sector including companies such as Boeing who manufactures 777 sections as well as final assembly in the Charleston area. The state also hosts extensive automobile manufacturing related activity including plants producing BMW, Honda and Daimler cars, as well as manufacturing for suppliers to the energy industry such as Bosch.

Employment due to offshore oil and gas development activities on the Atlantic Coast in South Carolina is expected to reach over 35 thousand jobs in 2035, with direct employment due to development activity at 11 thousand jobs and an indirect and induced employment increase of over 24 thousand jobs. (Figure 35)



Figure 35: Projected South Carolina Employment Direct vs. Indirect and Induced

Direct Indirect and Induced

Source: Quest Offshore Resources, Inc.

A diverse spectrum of industries in South Carolina is expected to benefit from Atlantic OCS oil and natural gas production. Industries projected to see the greatest gains (in number of projected jobs in 2035) include retail with around 2,300 jobs, administrative and waste management services (nearly 1,900 jobs), and healthcare and social assistance with over 2 thousand jobs, and real estate and food services with around 1,600 jobs each.

Offshore oil and natural gas production in the Atlantic OCS is also projected to contribute significantly to South Carolina's gross domestic product; contributions to the state economy are expected to reach over \$2.7 billion per year by 2035. (Figure 36)



South Carolina

Figure 36: Projected South Carolina Contributions to the State Economy

Source: Quest Offshore Resources, Inc.

Potential state government revenue from offshore development would be dependent on any future legislated revenue sharing agreements. At a 37.5 percent share of bonuses, rents, and royalties, South Carolina's state government revenues are projected to reach \$850 million per year by 2035, with the cumulative effects on the state budget from 2017 to 2035 projected to be over \$3.7 billion. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.4 - Virginia

Virginia would be projected to receive the third highest levels of spending, employment and gross domestic product due to Atlantic offshore oil and natural gas development. Annual spending from Atlantic OCS oil and natural gas activity in Virginia is projected to peak at the end of the study period in 2035 at nearly \$1.8 billion per year. Virginia is expected to see high spending levels due to the significant oil and gas development activity in the resource rich waters around the state. Spending driven by projects, and mainly due to state's large estimated resource base, include operational expenditures (projected to be just over \$665 million per year in 2035), drilling spending (\$330 million per year in 2035), and installation spending (over \$135 million per year). (Figure 37)



Figure 37: Projected Virginia Spending by Sector



Source: Quest Offshore Resources, Inc.

The makeup of Virginia's economy, as well as the large amount of development activity projected off its coast is expected to lead to high levels of engineering activity in the state, with spending projected to reach nearly \$400 million dollars a year in 2035. Virginia possesses a strong marine background, hosting major offshore industry supplier Oceaneering's marine service division in Chesapeake, as well as one of the largest dry docks in the U.S. at Newport News Shipbuilding. Other existing industry suppliers in Virginia include Bauer Compressors in Norfolk who supplies compression equipment for use on offshore platforms, PaR Marine Services which provides cargo handling equipment for offshore vessels and platforms, and Strongwell of Bristol which provides high-tech building materials used in the construction of floating production units.

Virginia employment due to Atlantic OCS oil and gas exploration and development activities is projected to reach nearly 25 thousand jobs in 2035, with a direct employment level due to development activity of nearly nine thousand jobs and an indirect and induced employment level of nearly 16 thousand jobs. (Figure 38)



Figure 38: Projected Virginia Employment Direct vs. Indirect and Induced

Direct Indirect and Induced

Source: Quest Offshore Resources, Inc.

Atlantic OCS oil and natural gas production is also expected to contribute significant sums to the Virginia state economy. In 2035, the contributions of this activity are projected to reach nearly \$2.2 billion per year. (Figure 39)





Virginia

Source: Quest Offshore Resources, Inc.

Potential state government revenue from offshore development would be dependent on any future legislated revenue sharing agreements. Under a similar state percentage of revenue sharing as in the Gulf of Mexico at 37.5 percent, Virginia state revenues are projected to reach \$400 million per year by 2035 at the end of the study period, with the cumulative effects on the state budget from 2017 to 2035 projected to reach nearly \$1.9 billion. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.5 - Massachusetts

Massachusetts is expected to receive the fourth highest levels of spending, employment, and gross state product due to offshore oil and natural gas activity in the Atlantic OCS. Atlantic OCS oil and natural gas activity is expected to lead to spending of over \$1 billion per year in 2035 in Massachusetts. Spending driven by projects due to the state's large estimated resource base include operational expenditures (projected to be just nearly \$385 million per year in 2035), drilling spending (\$190 million per year in 2035), and installation spending (\$60 million per year). (Figure 40)





■ Drilling ■ OPEX ■ Engineering ■ Platforms ■ Install ■ SURF ■ G&G ■ Processing

Source: Quest Offshore Resources, Inc.

Massachusetts' economic position coupled with the oil and natural gas development activity in areas near to the state are projected to lead to large engineering spending in the state reaching \$194 million per year in 2035. In 2035, spending on manufacturing of SURF and platform equipment is expected to reach over \$160 million per year combined. Massachusetts is home to many suppliers to the offshore oil and natural gas industry such as Aspen Aero Gels based in Northborough who provides high-tech insulation for subsea pipelines and equipment. The state is also home to such providers of equipment to the industry as Bluefin Robotics which provides autonomous underwater vehicles, Lewa pumps which provides chemical injection equipment to offshore platforms, and Azonix which produces hazardous-area computing equipment for platforms.

Massachusetts is expected to see significant employment due to Atlantic OCS oil and gas exploration and development activities, with total employment reaching nearly 15 thousand jobs in 2035. Direct employment due to offshore oil and natural gas exploration and production is projected to be over five thousand jobs in 2035, with an indirect and induced employment level of nearly 10 thousand jobs expected in the same year. (Figure 41)



Figure 41: Projected Massachusetts Employment Direct vs. Indirect and Induced

Offshore oil and natural gas exploration and production in the Atlantic OCS is also expected to provide large contributions to the Massachusetts state economy. In 2035, contributions to the state economy from Atlantic offshore oil and natural gas exploration and production are projected to reach nearly \$1.4 billion per year. (Figure 42)





Massachusetts

Source: Quest Offshore Resources, Inc.

Under a 37.5 percent revenue sharing agreement, state government revenues for Massachusetts from bonuses, rents, and royalties are projected to reach \$372 million per year in revenue in 2035, with the cumulative effects on the state budget from 2017 to 2035 projected to be nearly \$1.4 billion. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.6 - New York

New York is expected to receive the fifth highest levels of spending, employment and gross domestic product due to offshore oil and natural gas activity in the Atlantic OCS. Spending in the state is projected to reach just over \$1 billion per year in 2035, with spending especially focused on services to the offshore oil and gas industry. (Figure 43)





■ Drilling ■ OPEX ■ Engineering ■ Platforms ■ Install ■ SURF ■ G&G ■ Processing

Source: Quest Offshore Resources, Inc.

Spending in New York is expected to be driven by engineering and operational expenditures, with these two categories accounting for around \$315 million and \$290 million per year respectively, in 2035. Manufacturing and fabrication spending on SURF equipment and platforms is projected to reach over \$150 million in the same year. New York is home to Hess Corporation, a major offshore oil and gas operator, as well as many supply chain companies. The companies include Dover Corporation which provides fluid handling equipment for offshore drilling rigs, ITT Corporation which provides pumps, valves and other equipment to platforms, FPSOs and drilling rigs and General Maritime who builds tankers and other ships.

Employment in New York due to Atlantic coast offshore oil and gas production is projected to reach over 12 thousand jobs in 2035. Direct employment due to offshore oil and natural gas exploration and production is expected to reach nearly five thousand jobs in 2035, with an indirect and induced employment level of over seven thousand jobs expected in the same year. (Figure 44)


Figure 44: Projected New York Employment Direct vs. Indirect and Induced

In 2035, contributions to the state economy from Atlantic offshore oil and natural gas exploration and production in New York are projected to reach over \$1.2 billion per year. (Figure 45)



Figure 45: Projected New York Contributions to the State Economy

New York

Source: Quest Offshore Resources, Inc.

Governmental revenues collected under a 37.5 percent state/federal revenue sharing agreement would be expected to create \$205 million per year in new revenues for the state of New York in 2035, with cumulative revenues from 2017 to 2035 projected to be nearly \$870 million. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.7 - Maine

Spending in Maine due to the offshore oil and natural gas industry is expected to reach around \$630 million per year in 2035, with spending primarily focused on operational expenditures. Maine is expected to be the main provider of ongoing services to producing oil and gas products in the North Atlantic planning area. (Figure 46)







Source: Quest Offshore Resources, Inc.

Spending on operation expenditures is projected to reach nearly \$500 million per year in 2035. Maine has a large marine industry, including five seaports. The state is also host to many ship building and repair facilities including General Dynamic's Bath ship yard, which builds and repairs large ships.

Employment in Maine due to Atlantic coast offshore oil and gas production is projected to reach over 10 thousand jobs in 2035. Direct employment due to offshore oil and natural gas exploration and production is expected to reach three thousand jobs in 2035, with an indirect and induced employment level of over seven thousand jobs expected in the same year. (Figure 47)



Figure 47: Projected Maine Employment Direct vs. Indirect and Induced

Total contributions to the state economy due to spending on the Atlantic OCS oil and natural gas industry in Maine are projected to reach nearly \$850 million per year by 2035. (Figure 48)



Figure 48: Projected Maine Contributions to the State Economy

Maine

Source: Quest Offshore Resources, Inc.

Given Maine's location in proximity to all North Atlantic activity, Maine can be expected to benefit in the later years as the North Atlantic takes additional time to develop. Under the current development plan and an assumed revenue sharing plan of 37.5 percent, oil and natural gas activities are projected to contribute

over \$265 million per year to the state budget in 2035, with cumulative 2017 to 2035 contributions at over \$880 million. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.8 - Florida

Florida is expected to see annual spending near \$460 million per year due to the offshore Atlantic oil and natural gas industry in 2035, with spending primarily focused on operational expenditures and engineering. (Figure 49)





Drilling OPEX Engineering Platforms Install SURF G&G Processing

Source: Quest Offshore Resources, Inc.

Spending on operation expenditures is projected to reach over \$160 million per year in 2035, with engineering spending at nearly \$100 million per year. Florida is already host to major oil and natural gas industry suppliers such as Crowley, one of the largest operators of large offshore tugs used for the transportation of drilling rigs and production units and Oceaneering's Panama City umbilical plant which is one of the largest facilities of its type in the world.

Employment in Florida due to spending by the Atlantic offshore oil and natural gas industry is projected to reach over nine thousand jobs in 2035. Direct employment due to offshore oil and natural gas exploration and production is expected to reach over three thousand jobs in 2035, with indirect and induced employment of over six thousand jobs expected in the same year. (Figure 50)



Figure 50: Projected Florida Employment Direct vs. Indirect and Induced

Source: Quest Offshore Resources, Inc.

Contributions to Florida's state economy due to spending by the Atlantic OCS oil and natural gas industry are projected to be nearly \$700 million per year by 2035. (Figure 51)



Figure 51: Projected Florida Contributions to the State Economy

Source: Quest Offshore Resources, Inc.

With an assumed 37.5 percent revenue sharing agreement in place, Atlantic OCS oil and natural gas activities are projected to contribute \$265 million per year to the Florida's budget in 2035, cumulative contributions from 2017 to 2035 are projected to be over \$1 billion. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.9 - Rhode Island

Spending due to Atlantic OCS oil and natural gas production in Rhode Island is expected to reach over \$530 million per year in 2035, with spending levels expected to be highest in operational expenditures, and drilling. (Figure 52)



Figure 52: Projected Rhode Island Spending by Sector



Source: Quest Offshore Resources, Inc.

Operational spending is projected to be over \$150 million per year in 2035, with spending on drilling at nearly \$80 million per year. Textron Corporation, the parent company of Bell helicopters, is based in Rhode Island and supplies helicopters used to ferry people and equipment to offshore rigs and facilities. Providence port is one of New England's premier deepwater ports and the center of the states' extensive maritime industry.

Employment in Rhode Island due to spending by the offshore oil and natural gas industry is projected to reach eight thousand five hundred jobs in 2035. Direct employment due to offshore oil and natural gas exploration and production is expected to reach nearly two thousand five hundred jobs in 2035, with an indirect and induced employment level of over six thousand jobs expected in the same year. (Figure 53)



Figure 53: Projected Rhode Island Employment Direct vs. Indirect and Induced

Contributions to Rhode Island's state economy due to spending by the Atlantic OCS oil and natural gas industry are projected to reach over \$750 million per year in 2035. (Figure 54)



Figure 54: Projected Rhode Island Contributions to the State Economy

Source: Quest Offshore Resources, Inc.

Rhode Island is expected to be one of the main benefactors of Atlantic OCS oil and natural gas activities on a per capita basis. If a 37.5 percent revenue sharing agreement were enacted, Rhode Island government revenues could contribute \$315 million per year to the Rhode Island's budget in 2035, contributing over \$1.2 billion from 2017 to 2035. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.10 - Connecticut

Spending in Connecticut due to the Atlantic coast offshore oil and natural gas industry is projected to reach just nearly \$600 million per year in 2035, with spending focused on operational expenditures and drilling. (Figure 55)





Drilling OPEX Engineering Platforms Install SURF G&G Processing

Source: Quest Offshore Resources, Inc.

Operational spending is expected to be over \$280 million per year in 2035, with drilling spending at \$140 million per year. The state is home to many suppliers to the offshore oil and natural gas industry including Crane Corporation who manufactures fluid handling systems, High Precision, Inc. which manufactures specialized equipment and Sikorsky who provides helicopters used to shuttle people and supplies to offshore installations and drilling rigs.

Employment in Connecticut due to spending by the offshore oil and natural gas industry is expected to reach over eight thousand jobs in 2035. Direct employment due to offshore oil and natural gas exploration and production is expected to reach two thousand six hundred jobs in 2035, with an indirect and induced employment level of over five thousand five hundred jobs expected in the same year. (Figure 56)



Figure 56: Projected Connecticut Employment Direct vs. Indirect and Induced

Contributions to Connecticut's state economy due to spending by the Atlantic OCS oil and natural gas industry are projected to reach \$775 million per year in 2035. (Figure 57)



Figure 57: Projected Connecticut Contributions to the State Economy

Source: Quest Offshore Resources, Inc.

If a 37.5 percent revenue sharing agreement were in place between federal and state governments for Atlantic OCS oil and natural gas development, it could contribute nearly \$235 million per year to Connecticut's budget in 2035, with cumulative contributions from 2017 to 2035 are projected to be around \$930 million. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.11 - New Jersey

New Jersey is projected to see spending due to Atlantic OCS oil and natural gas exploration and production of over \$600 million per year in 2035, with spending concentrated in operational expenditures, engineering and drilling. (Figure 58)







Source: Quest Offshore Resources, Inc.

Operational spending is expected to be over \$240 million per year in 2035, with drilling spending just over \$120 million per year, and engineering spending of over \$125 million per year. The state is home to major marine construction company Weeks Marine and Honeywell Corporation, a major industrial company who provides a wide array of equipment for the offshore oil and natural gas industry.

Employment in New Jersey due to spending by the offshore oil and natural gas industry is expected to be over eight thousand three hundred jobs in 2035. Direct employment due to offshore oil and natural gas exploration and production is expected to reach over three thousand jobs in 2035, with an indirect and induced level employment of over five thousand jobs expected in the same year. (Figure 59)





Contributions to New Jersey's state economy due to spending by the Atlantic OCS oil and natural gas industry are projected to reach over \$750 million per year in 2035. (Figure 60)



Figure 60: Projected New Jersey Contributions to the State Economy

Source: Quest Offshore Resources, Inc.

Under the assumption of 37.5 percent revenue sharing in place between federal and state governments, Atlantic OCS oil and natural gas activities are projected to contribute nearly \$100 million per year to the New Jersey's budget in 2035; cumulative contributions from 2017 to 2035 are projected to be \$515 million. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.12 - Maryland

Spending due to Atlantic OCS oil and natural gas exploration and production in Maryland is projected to reach over \$530 million per year in 2035, with spending concentrated toward operational expenditures and drilling. (Figure 61)





■ Drilling ■ OPEX ■ Engineering ■ Platforms ■ Install ■ SURF ■ G&G ■ Processing

Source: Quest Offshore Resources, Inc.

Operational spending is expected to be over \$240 million per year in 2035, with drilling spending just over \$120 million per year. Maryland is home to Sauer Compressors which provides compression equipment for vessels, drilling rigs, and platforms and also is home to one of the largest ports on the east coast in Baltimore.

Employment in Maryland due to spending by the offshore oil and natural gas industry is expected to reach over seven thousand two hundred jobs in 2035. Direct employment due to offshore oil and natural gas exploration and production is expected to reach nearly three thousand jobs in 2035, with an indirect and induced employment level of over four thousand three hundred jobs expected in the same year. (Figure 62)





Contributions to Maryland's state economy due to spending by the Atlantic OCS oil and natural gas industry are projected to reach over \$630 million per year in 2035. (Figure 63)



Figure 63: Projected Maryland Contributions to the State Economy

Source: Quest Offshore Resources, Inc.

Revenue impacts under the assumptions of 37.5 percent sharing in place between federal and state governments, Atlantic OCS oil and natural gas activities are projected to contribute around \$100 million per year to the Maryland budget in 2035, cumulative contributions from 2017 to 2035 are projected to be over \$500 million. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.13 - Pennsylvania

Pennsylvania is expected to see spending due to the Atlantic coast offshore oil and natural gas activity in excess of \$470 million per year in 2035, with spending focused on ongoing operational expenditures and the manufacturing and fabrication of offshore equipment. (Figure 64)





Drilling OPEX Engineering Platforms Install SURF G&G Processing

Source: Quest Offshore Resources, Inc.

Operational spending is expected to be over \$150 million per year in 2035, with combined spending on SURF equipment and platforms projected to be over \$110 million per year. The state is home to suppliers to the industry such as the Aker Philadelphia Shipyard, which is one of the premier U.S. shipbuilders for the domestic oil and gas industry, Allegheny Technologies which provides specialized steel products to the industry and Kennametal which provides down-hole and flow control equipment used on offshore drilling rigs.

Employment in Pennsylvania due to spending by the offshore oil and natural gas industry in 2035 is expected to reach nearly seven thousand two hundred jobs. Direct employment due to offshore oil and natural gas exploration and production is expected to reach nearly two thousand five hundred jobs in 2035, with an indirect and induced employment level of over four thousand six jobs expected in the same year. (Figure 65)



Figure 65: Projected Pennsylvania Employment Direct vs. Indirect and Induced

Contributions to Pennsylvania's state economy due to spending by the Atlantic OCS oil and natural gas industry are projected to reach nearly \$620 million per year in 2035. (Figure 66)



Figure 66: Projected Pennsylvania Contributions to the State Economy

Source: Quest Offshore Resources, Inc.

Even with a revenue sharing agreement of 37.5 percent is enacted, Pennsylvania's share of revenues are diminished due to the state's short coast line and distance from reserves on the Atlantic OCS. However, revenues but are still projected to reach over \$60 million per year in 2035, with cumulative contributions from 2017 to 2035 are projected to be over \$325 million. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.14 - Georgia

Spending in Georgia due to offshore oil and gas activity on the Atlantic coast is projected to reach over \$250 million per year in 2035, and is expected to be primarily focused on operational expenditures and drilling. (Figure 67)





Source: Quest Offshore Resources, Inc.

Operational spending is expected to reach nearly \$110 million per year in 2035, with drilling spending projected to be above \$55 million in the same year. Companies from Georgia who currently supply equipment used in offshore oil and gas exploration and production include WIKA who produces pressure control equipment and industrial monitors, and Acuity who provides industrial lighting.

Employment in Georgia due to spending by the offshore oil and natural gas industry is projected to reach over five thousand jobs in 2035. Direct employment due to offshore oil and natural gas exploration and production is over one thousand two hundred jobs in 2035, with an indirect and induced employment level of over three thousand eight hundred jobs in the same year. (Figure 68)

Drilling OPEX Engineering Platforms Install SURF G&G Processing



Figure 68: Projected Georgia Employment Direct vs. Indirect and Induced

Source: Quest Offshore Resources, Inc.

Contributions to Georgia's economy due to spending by the Atlantic OCS oil and natural gas industry are projected to reach nearly \$430 million per year in 2035. (Figure 69)



Figure 69: Projected Georgia Contributions to the State Economy

Source: Quest Offshore Resources, Inc.

Georgia's state revenue could see an increase of \$175 million per year in 2035 if a 37.5 percent revenue sharing agreement within the Atlantic OCS were enacted. Cumulative contributions from 2017 to 2035 are projected to be over \$700 million. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.15 - Delaware

Delaware is projected to see spending reach nearly \$375 million per year in 2035 due to offshore oil and natural gas activity on the Atlantic OCS. Operational expenditures and drilling are expected to provide the majority of this spending. (Figure 70)







Source: Quest Offshore Resources, Inc.

Operational spending is expected to be nearly \$230 million per year in 2035, with drilling spending projected to be nearly \$115 million in the same year. Companies in Delaware who currently provide equipment and services to the offshore oil and natural gas industry include W. L. Gore and Associates, makers of Gore-Tex fabrics which provides insulation for wiring used in offshore surveying and exploration and DuPont which provides chemical precursors used in pipeline insulation.

Employment in Delaware due to spending by the offshore oil and natural gas industry is projected to reach nearly five thousand jobs in 2035. Direct employment due to offshore oil and natural gas exploration and production is projected to be thousand six hundred jobs in 2035, with an indirect and induced employment level of nearly three thousand two hundred jobs in the same year. (Figure 71)



Figure 71: Projected Delaware Employment Direct vs. Indirect and Induced

Contributions to Delaware's economy due to spending by the Atlantic OCS oil and natural gas industry are projected to reach over \$460 million per year in 2035. (Figure 72)



Figure 72: Projected Delaware Contributions to the State Economy

Source: Quest Offshore Resources, Inc.

Under a 62.5/37.5 revenue sharing agreement in place between federal and state governments, Atlantic OCS oil and natural gas activities are projected to contribute over \$90 million per year to the Delaware's state budget in 2035; cumulative contributions from 2017 to 2035 are projected to be \$475 million. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.16 - New Hampshire

Spending by the oil and natural gas industry in New Hampshire as a result of Atlantic OCS oil and natural gas activities is projected to reach nearly \$300 million per year in 2035. Operational expenditures and drilling spending are expected to account for the majority of spending. (Figure 73)







Source: Quest Offshore Resources, Inc.

Operational spending is projected to be nearly \$170 million per year in 2035, with drilling spending expected to reach nearly \$85 million in the same year. New Hampshire hosts a major Climax Corporation welding equipment manufacturing company as well as being the headquarters of Sponge Jet which provides blasting equipment to the industry. Teledyne D.G.O'Brien is also expanding their facilities in New Hampshire where the company builds harsh environment connectors.

Employment in New Hampshire as a result of spending by the offshore oil and natural gas industry is projected to reach three thousand six hundred jobs in 2035. Direct employment due to offshore oil and natural gas exploration and production is nearly six hundred jobs in 2035, with an indirect and induced employment level of over three thousand jobs in the same year. (Figure 74)



Figure 74: Projected New Hampshire Employment Direct vs. Indirect and Induced

Direct Indirect and Induced

Source: Quest Offshore Resources, Inc.

Contributions to New Hampshire's economy due to spending by the Atlantic OCS oil and natural gas industry are projected to reach over \$315 million per year in 2035. (Figure 75)



Figure 75: Projected New Hampshire Contributions to the State Economy



Source: Quest Offshore Resources, Inc.

Additional revenue could be collected by the New Hampshire state government if revenue sharing legislation is enacted. A 37.5 percent share of bonuses, rents, and royalties is projected to contribute over \$250 million per year to the New Hampshire budget in 2035, with cumulative contributions from 2017 to 2035 are projected to be nearly \$850 million. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

Section 7 – Other Appendices

7.1 Overview of Quest Offshore Data

Quest Offshore Resources, Inc. is a full-service market research and consulting firm focused on the global deepwater oil and natural gas industry. As a function of Quest's core business, the company is engaged daily in the collection and analysis of data as it relates to the offshore oil and natural gas industry. Quest serves the global community of operating oil and natural gas companies, their suppliers, financial firms, and many others by providing detailed data and analysis on capital investment and operational spending undertaken by the offshore industry. Quest collects and develops market data from a variety of sources at the project level for projects throughout the world. (Figure 76)





Source: Quest Offshore Resources, Inc.

A unique feature of this analysis, which lends it credibility, is its reliance on primary data through direct contact with the industry's supply chain. This connection with oil and natural gas companies and equipment and service providers throughout the world imparts a high quality and degree of accuracy to the data. Data is tracked in Quest's proprietary Quest Enhanced Deepwater Development Database as well as additional proprietary databases related other facets of the global supply chain worldwide. Quest aggregates capital and operating expenditures on a project by project basis for projects worldwide, with detailed information recorded on the supply of the equipment and services necessary to develop individual offshore oil and natural gas projects. Quest Offshore tracks not only existing or historical projects, but also projects that are in all stages of development from the prospect (or undrilled target) stage through to producing and decommissioned projects. For projects without firm development information, Quest utilizes benchmarking based on Quest's proprietary databases to forecast development timing and scenarios appropriate to the type of development, the developments' characteristics and region. This information, coupled with operators expected exploration and appraisal programs, is used to take into account yet to be discovered and delineated fields that may be developed in the forecast time frame. Secondary data development was also undertaken in this analysis and refers to any source of information and data that is not collected via direct contact with the industry, such as

press releases, financial reports, other SEC filings, industry white papers, industry presentations, and other publicly available sources.

This proprietary approach allows Quest to ensure a comprehensive "canvassing" of the industry worldwide, which in turn facilitates a high level of validation and quality control needed to produce accurate analysis and forecasts. Once collected and verified, the data is housed and maintained in Quest Offshore's Deepwater Development Database. The primary components of this proprietary database are the numerous pieces of offshore oilfield equipment and services that are used in the development of an offshore project.

7.2 – Reservoir Graphs & Tables



Figure 77: Late Jurassic-Early Cretaceous Carbonate Margin Play



Figure 78: Cenozoic-Cretaceous and Jurassic Paleo-Slope Siliciclastic Core Play



Figure 79: Cenozoic-Cretaceous and Jurassic Paleo-Slope Siliciclastic Extension Play

Source: Bureau of Ocean Energy Management



Figure 80: Cretaceous and Jurassic Marginal Fault Belt Play



Figure 81: Cenozoic-Cretaceous and Jurassic Carolina Trough Salt Basin Play



Figure 82: Jurassic Shelf Stratigraphic Play



Figure 83: Cretaceous and Jurassic Interior Shelf Structure Play



Figure 84: Cretaceous and Jurassic Blake Plateau Basin Play



Figure 85: Triassic-Jurassic Rift Basin Play



Figure 86: Cretaceous and Jurassic Hydrothermal Dolomite Play

UTRR by Play	Oil (Bbbl)	Gas (Tcf)	Oil %	Gas %	BOE (Bbbl)
Late Jurassic-Early Cretaceous Carbonate Margin	0.32	6.14	23%	77%	1.41
Cretaceous & Jurassic Marginal Fault Belt	0.22	4.34	22%	78%	0.99
Cenozoic - Cretaceous & Jurassic Carolina Trough Salt Basin	0.61	7.76	31%	69%	1.99
Jurassic Shelf Stratigraphic	0.03	0.68	19%	81%	0.16
Cretaceous & Jurassic Interior Shelf Structure	0.07	1.36	23%	77%	0.31
Cretaceous & Jurassic Blake Plateau Basin	0.46	0.68	79%	21%	0.58
Triassic - Jurassic Rift Basin	0.49	1.37	66%	34%	0.74
Cretaceous & Jurassic Hydrothermal Dolomite	0.31	0.88	67%	33%	0.46
Cenozoic - Cretaceous & Jurassic Paleo-Slope Siliciclastic Core	0.45	5.71	31%	69%	1.47
Cenozoic - Cretaceous & Jurassic Paleo-Slope Siliciclastic Extension	0.34	2.37	45%	55%	0.76
Total Atlantic OCS	3.3	31.28	37%	63%	8.87

Table 13: BOEM 2011 Reserve Estimates by Play and Resource Type

Source: Bureau of Ocean Energy Management

Table 14: Historic Assessments of Atlantic OCS Resource Potential

	Effective Date	Atlantic Coast	Risk Estimates of Undiscovered Resources			
Organization			Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)	
			Mean	Mean	Mean	
USGS (Miller et al. 1975)	1/1/1975 UERR	Atlantic OCS	3.25	10.00	5.03	
USGS (Dolton et al. 1981)	mid 1980 UERR	Atlantic OCS	5.51	23.66	9.72	
MMS (Cooke, 1985)	7/1/1984 UERR	Atlantic OCS	0.68	12.31	2.87	
MMS (Cooke et al, 1990)	1/1/1987 UTRR	Atlantic OCS	0.96	17.03	3.99	
MMS (Cooke et al, 1990)	1/1/1987 UERR Primary Case	Atlantic OCS	0.25	4.51	1.05	
MMS (Cooke, 1991)	1/1/1990 UERR	Atlantic OCS	0.25	4.51	1.05	
MMS (MMS, 1996)	1/1/1995 UTRR	Atlantic OCS	2.30	27.50	7.20	
MMS (MMS, 1996)	1/1/1995 UERR	Atlantic OCS	0.40	5.20	1.33	
MMS (MMS, 2001)	1/1/1999 UTRR	Atlantic OCS	2.30	28.00	7.30	
MMS (MMS, 2006)	1/1/2003 UTRR	Atlantic OCS	3.82	36.99	10.40	

Source: Bureau of Ocean Energy Management
Class	Maximum MMboe	Average Barrels in Field in Class
USGS -5	1	750,000.00
USGS -6	2	1,500,000.00
USGS -7	4	3,000,000.00
USGS -8	8	6,000,000.00
USGS -9	16	12,000,000.00
USGS -10	32	24,000,000.00
USGS -11	64	48,000,000.00
USGS -12	128	96,000,000.00
USGS -13	256	192,000,000.00
USGS -14	512	384,000,000.00
USGS -15	1024	768,000,000.00
USGS -16	2048	1,536,000,000.00
USGS -17	4096	3,072,000,000.00

Table 15: USGS Field Sizes by Maximum and Average BOE in Field Class

Source: U.S. Geological Survey

Table 16: Pro	ojected	Leasing	; Activi	ty by PI	lanning														
Atlantic Coast	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
N. Atlantic	0	0	0	114	111	116	111	110	105	108	104	108	115	104	101	108	106	66	104
Mid. Atlantic	0	250	250	257	270	261	250	248	243	249	250	236	235	256	245	231	233	244	235
S. Atlantic	0	86	102	86	86	100	100	66	95	95	93	93	95	96	93	92	93	91	92

API & NOIA | Quest Offshore Resources

7.3 – Data Tables

Daily Gas - MMboe/D	Daily Oil - MMboe/D	MMboe	
0	0	2017	
0	0	2018	
0	0	2019	
0	0	2020	
0	0	2021	
0	0	2022	
0	0	2023	
0	0	2024	
0	0	2025	
4,506	1,811	2026	
48,043	19,413	2027	
101,395	39,578	2028	
176,871	74,136	2029	
237,971	103,597	2030	
353,204	157,550	2031	
467,459	231,219	2032	
606,690	358,411	2033	
697,945	453,225	2034	
789,611	550,827	2035	

•

Play 20	17 20	018 2	.019 2	020 2()21 20	22 202	3 2024	2025	2026
Late Jurassic-Early Cretaceous Carbonate Margin		1							1,579
Cretaceous & Jurassic Marginal Fault Belt		'		'		1			
Cenozoic - Cretaceous & Jurassic Carolina Trough Salt Basin		ı			'				4,737
Jurassic Shelf Stratigraphic		1				ı			
Cretaceous & Jurassic Interior Shelf Structure		1	1				,		
Cretaceous & Jurassic Blake Plateau Basin		'	ı	'	'	1	ı		
Triassic - Jurassic Rift Basin		1	1				ı.		
Cretaceous & Jurassic Hydrothermal Dolomite		1				1	ı		
Cenozoic - Cretaceous & Jurassic Paleo-Slope Siliciclastic Core		1	1	'		1	ı		
Cenozoic - Cretaceous & Jurassic Paleo-Slope Siliciclastic Extension			I			1	ı		
Play 2	027	2028	2029	2030	2031	2032	2033	2034	2035
Late Jurassic-Early Cretaceous Carbonate Margin	,212 3	37,672	82,058	108,487	177,909	215,601	207,045	200,758	207,967
Cretaceous & Jurassic Marginal Fault Belt 1,	579 1	14,212	15,770	15,296	34,461	75,494	127,810	156,313	162,111
Cenozoic - Cretaceous & Jurassic Carolina Trough Salt Basin 51	,664 8	37,509	138,967	192,988	247,625	294,459	360,874	387,222	429,034
Jurassic Shelf Stratigraphic	T	ı	ı.	ı	ı	ı	ı	ı	3,158
Cretaceous & Jurassic Interior Shelf Structure	1	ı	ı.	ı.	ı.	1,579	14,212	15,770	13,717
Cretaceous & Jurassic Blake Plateau Basin	1	ı	ı	ı	ı	12,186	63,887	86,719	120,703
Triassic - Jurassic Rift Basin		1,579	14,212	24,797	50,758	97,779	155,847	169,636	182,629
Cretaceous & Jurassic Hydrothermal Dolomite	1	·	ı	·		·	12,186	72,914	111,575
Cenozoic - Cretaceous & Jurassic Paleo-Slope Siliciclastic Core		ı	ı.	,	ı.	1,579	23,240	51,232	59,869
Cenozoic - Cretaceous & Jurassic Paleo-Slope Siliciclastic Extension	1	ı	ı	ı	ı	·	ı	10,607	49,674

Table 18: Projected Production by Play

Source:
Quest
Offshore
Resources
, Inc.

SURF	↔ '	↔ '	↔ '	↔ '	⇔ '	↔ '	↔ '	\$1,029	\$ 596	\$ 1,382
Platforms	⇔ '	↔ '	↔ '	() '	⇔ '	() '	\$1,750	φ '	\$1,900	\$ 2,100
Install	() '	↔ '	() '	() '	\$	⇔ '	() '	↔ '	\$ 716	\$ 1,432
Processing	() '	\$ '	↔ '	() '	\$200	\$ 300	\$ 300	\$ 400	\$ 300	\$ 600
Drilling	() '	⇔ '	\$ 70	\$175	\$ 35	\$ 234	\$ 631	\$1,029	\$1,566	\$ 2,051
Engineering	() '	\$ '	\$ 12	\$ 31	\$ 6	\$ 41	\$ 873	\$ 844	\$1,363	\$ 2,281
OPEX	() '	↔ '	() '	() '	\$	⇔ '	() '	Φ ω	\$ 33	\$ 295
G&G	\$138	\$394	\$395	\$479	\$476	\$ 474	\$ 452	\$ 457	\$ 449	\$ 393
Total	\$138	\$394	\$477	\$685	\$717	\$1,048	\$4,007	\$3,762	\$6,924	\$10,536
Activity Type	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total
SURF	\$ 1,823	\$ 2,217	\$ 1,982	\$ 2,454	\$ 2,518	\$ 2,184	\$ 922	\$ 1,799	\$ 2,144	\$ 21,050
Platforms	\$ 2,500	\$ 2,900	\$ 2,400	\$ 3,050	\$ 1,800	\$ 950	\$ 2,700	\$ 2,400	\$ 1,450	\$ 25,900
Install	\$ 951	\$ 2,295	\$ 3,009	\$ 2,005	\$ 2,718	\$ 3,144	\$ 3,246	\$ 993	\$ 1,612	\$ 22,122
Processing	\$ 1,000	\$ 700	\$ 800	\$ 500	\$ 500	\$ 200	() '	\$ 200	() '	\$ 6,000
Drilling	\$ 2,454	\$ 3,135	\$ 3,980	\$ 4,796	\$ 5,196	\$ 5,215	\$ 4,777	\$ 4,310	\$ 4,777	\$ 44,429
Engineering	\$ 2,623	\$ 3,181	\$ 3,408	\$ 3,627	\$ 3,457	\$ 2,770	\$ 2,975	\$ 3,001	\$ 2,814	\$ 33,308
OPEX	\$ 814	\$ 1,082	\$ 1,869	\$ 2,791	\$ 3,653	\$ 4,428	\$ 5,444	\$ 6,459	\$ 6,753	\$ 33,625
G&G	\$ 459	\$ 381	\$ 455	\$ 463	\$ 450	\$ 444	\$ 445	\$ 447	\$ 444	\$ 8,096
Total	\$12,624	\$15,891	\$17,903	\$19,686	\$20,292	\$19,334	\$20,510	\$19,609	\$19,994	\$194,531

Activity Type

Table 19: Projected Spending By Activity Type (Millions of Dollars)

Totals	Interna	Other I	Atlantic	New H	Delawa	Georgi	Pennsy	Maryla	New Je	Conne	Rhode	Florida	Maine	New Y	Massa	Virginia	South	North (
	tional	U.S. Sta	c Coast	ampshi	are	a	ylvania	Ind	ersey	cticut	Island	-		ork	chusett	Ð	Carolina	Carolina	State
		ltes		ſe											0,		ų	F	
\$138	↔ '	\$ 76	\$ 62	\$ 2	\$ 2	\$ 1	\$ 2	φ ω	Φ ω	φ ω	\$ 4	\$ 2	\$ 2	φ ω	\$ 4	\$7	\$ 11	\$ 14	2017
\$394	ن	\$212	\$182	ம	\$7	φ ω	ம	↔ ∞	↔ ∞	9 9	\$ 10	ம	ம	\$ 9	\$ 12	\$ 21	\$ 33	\$ 40	2018
ŵ	\$	(y	6	\$	\$	\$	\$	\$	\$	↔	\$	↔	\$	\$	\$	⇔	\$	↔	2(
477	11	253	213	6	ω	4	6	9	9	10	12	0	6	11	14	25	39	47	019
\$68	\$ 2	\$35	\$30	\$	\$ 1	\$	θ	\$ 1	\$ 1	\$ 1	\$ 1	↔	\$	\$ 1	\$ 2	မှ ယ	கு ப	ф	202
J	œ	0	2	9	2	6	œ	ω	ω	U	7	9	9	6	0	0	4	6	0
\$717	\$ 12	\$311	\$394	↔ ∞	\$ 11	\$ 8	\$ 13	\$ 17	\$ 18	\$ 16	\$ 15	\$ 17	\$ 00	\$ 34	\$ 26	\$ 49	\$ 60	\$ 93	2021
€0	€9	€9	€9	€₽	÷	€₽	€9	€₽	€0	€9	()	€9	€0	€₽	€9	↔	()	€9	
1,048	46	443	559	11	14	11	19	25	26	22	21	25	11	51	37	71	8	132	2022
\$4	⇔	\$1	\$1	θ	φ	θ	⇔	θ	θ	⇔	θ	⇔	θ	θ	⇔	⇔	θ	⇔	2(
,007	847	,923	,237	19	23	23	52	48	60	50	မ္သ	50	33	127	103	172	164	279)23
\$3,7	\$ 4	\$1,4	\$1,8	⇔	⇔	⇔	⇔	⇔	θ	⇔	θ	⇔	θ	\$ 1	\$ 1	\$ 2	\$ 2	ம	202
62	01	62	66	26	32	38	73	68	88	67	46	70	32	79	38	52	49	44	:4
\$6,924	\$1,316	\$2,989	\$2,618	\$ 30	\$ 4!	\$ 50	\$ 112	9 9	\$ 123	\$ 10	\$ 65	\$ 10	\$ 50	\$ 26	\$ 210	\$ 35	\$ 35	\$ 633	2025
4	0) ()	\$	\$	\$	сл СЛ	\$	2	7	ω φ	4	ர க	4	\$	7	ω Φ	4	сл Ф	1	
10,536	1,927	4,002	4,607	59	69	00	193	171	219	168	86	189	104	483	361	630	583	1,190	2026

Table 20: Projected Spending By State (Millions of Dollars)

Table 20: Projecte	ed Spendin	g By State ((Millions o	f Dollars)						
State	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total
North Carolina	\$ 1,561	\$ 1,936	\$ 2,328	\$ 2,604	\$ 2,913	\$ 2,890	\$ 2,885	\$ 3,014	\$ 3,269	\$ 26,439
South Carolina	\$ 798	\$ 1,005	\$ 1,240	\$ 1,497	\$ 1,688	\$ 1,772	\$ 1,865	\$ 1,953	\$ 2,122	\$ 15,572
Virginia	\$ 810	\$ 1,026	\$ 1,255	\$ 1,393	\$ 1,555	\$ 1,548	\$ 1,623	\$ 1,635	\$ 1,751	\$ 14,214
Massachusetts	\$ 477	\$ 598	\$ 703	\$ 818	\$ 882	\$ 875	\$ 926	\$ 947	\$ 1,010	\$ 8,164
New York	\$ 607	\$ 776	\$ 918	\$ 963	\$ 1,057	\$ 1,026	\$ 1,055	686 \$	\$ 1,065	\$ 9,637
Maine	\$ 151	\$ 198	\$ 274	\$ 349	\$ 416	\$ 464	\$ 545	\$ 596	\$ 629	\$ 3,892
Florida	\$ 236	\$ 303	\$ 375	\$ 386	\$ 439	\$ 440	\$ 460	\$ 423	\$ 459	\$ 3,998
Rhode Island	\$ 140	\$ 178	\$ 248	\$ 316	\$ 377	\$ 418	\$ 459	\$ 494	\$ 536	\$ 3,485
Connecticut	\$ 230	\$ 288	\$ 349	\$ 426	\$ 470	\$ 487	\$ 523	\$ 547	\$ 588	\$ 4,371
New Jersey	\$ 282	\$ 357	\$ 440	\$ 485	\$ 545	\$ 545	\$ 574	\$ 574	\$ 616	\$ 4,984
Maryland	\$ 219	\$ 281	\$ 359	\$ 394	\$ 455	\$ 469	\$ 500	\$ 493	\$ 533	\$ 4,159
Pennsylvania	\$ 254	\$ 318	\$ 364	\$ 411	\$ 438	\$ 430	\$ 443	\$ 439	\$ 472	\$ 4,050
Georgia	\$ 116	\$ 147	\$ 181	\$ 201	\$ 227	\$ 230	\$ 239	\$ 240	\$ 260	\$ 2,076
Delaware	\$ 97	\$ 124	\$ 173	\$ 220	\$ 263	\$ 291	\$ 320	\$ 346	\$ 374	\$ 2,430
New Hampshire	\$ 84	\$ 106	\$ 140	\$ 181	\$ 209	\$ 228	\$ 249	\$ 269	\$ 291	\$ 1,942
Atlantic Coast	\$ 6,064	\$ 7,640	\$ 9,348	\$10,646	\$11,932	\$12,111	\$12,667	\$12,959	\$13,974	\$109,413
Other U.S. States	\$ 4,872	\$ 5,564	\$ 5,678	\$ 6,215	\$ 5,672	\$ 4,898	\$ 5,001	\$ 4,343	\$ 4,051	\$ 58,320
International	\$ 1,688	\$ 2,687	\$ 2,877	\$ 2,825	\$ 2,689	\$ 2,326	\$ 2,842	\$ 2,307	\$ 1,969	\$ 26,798
Totals	\$12,624	\$15,891	\$17,903	\$19,686	\$20,292	\$19,334	\$20,510	\$19,609	\$19,994	\$194,531

State	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
North Carolina	225	717	815	1,287	2,031	2,751	4,821	8,626	10,542	19,521
South Carolina	169	667	735	1,014	1,282	1,622	2,607	3,688	5,274	8,658
Virginia	00	290	336	566	873	1,195	2,367	3,230	4,708	8,317
New York	34	198	219	285	560	761	1,534	1,989	3,053	5,434
Massachusetts	51	295	324	405	525	664	1,394	1,782	2,628	4,410
Florida	30	336	367	405	598	754	1,128	1,380	2,000	3,410
New Jersey	33	148	167	257	364	476	698	1,159	1,634	2,858
Pennsylvania	25	103	116	167	280	378	839	1,177	1,743	3,045
Maine	28	142	154	191	203	236	534	478	840	1,441
Connecticut	36	202	224	283	319	396	712	876	1,318	2,026
Maryland	32	125	143	246	332	436	706	923	1,310	2,235
Rhode Island	43	245	265	326	340	393	492	602	771	1,116
Georgia	19	222	241	265	334	404	576	768	984	1,632
Delaware	22	97	109	189	192	228	290	361	456	685
New Hampshire	24	127	139	173	181	211	293	358	489	651
Atlantic Coast	861	3,913	4,355	6,057	8,414	10,905	19,160	27,396	37,751	65,439
Other U.S. States	1,085	3,426	3,895	5,334	5,344	7,072	26,143	20,165	40,347	55,059
Totals	1,945	7,339	8,250	11,391	13,758	17,977	45,303	47,560	78,098	120,498

Table 21: Projected Employment by State

Table 21: Projected	ł Employme	nt by State	Continued						
State	2027	2028	2029	2030	2031	2032	2033	2034	2035
North Carolina	25,355	32,245	38,955	41,937	47,860	48,803	49,777	49,827	55,422
South Carolina	11,907	15,387	18,929	22,115	25,514	27,781	30,602	31,840	35,569
Virginia	10,674	13,819	17,089	18,396	21,056	21,612	23,209	22,798	24,979
New York	6,691	8,617	10,276	10,350	11,592	11,492	12,117	11,141	12,345
Massachusetts	5,714	7,184	8,606	9,779	10,893	11,263	12,540	13,362	14,814
Florida	4,105	5,250	6,439	6,281	7,152	7,371	8,568	7,943	9,222
New Jersey	3,620	4,619	5,753	6,170	7,068	7,198	7,707	7,603	8,340
Pennsylvania	3,937	4,955	5,713	6,220	6,742	6,648	6,864	6,640	7,227
Maine	2,024	2,634	3,665	4,602	5,611	6,542	8,184	9,417	10,305
Connecticut	2,683	3,369	4,143	4,947	5,605	6,030	6,770	7,293	8,169
Maryland	2,826	3,643	4,692	5,032	5,913	6,183	6,669	6,536	7,236
Rhode Island	1,563	1,960	2,804	3,580	4,480	5,320	6,406	7,477	8,499
Georgia	1,997	2,490	3,025	3,113	3,504	3,636	4,307	4,340	5,088
Delaware	994	1,270	1,833	2,355	2,927	3,349	3,843	4,317	4,790
New Hampshire	800	979	1,216	1,456	1,710	2,035	2,506	3,009	3,608
Atlantic Coast	84,889	108,421	133,137	146,333	167,625	175,263	190,070	193,544	215,612
Other U.S. States	66,462	76,727	79,289	84,294	78,951	70,159	73,825	65,284	63,950
Source: Quest Offsho	relkesðafces,	Int.85,148	212,426	230,628	246,576	245,422	263,895	258,829	279,562

Total Jobs by Industry	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Agriculture, forestry, fishing, and hunting	6	43	51	76	85	114	228	248	396	584
Mining (Oil & Gas)	2	16	216	524	130	710	1,912	3,069	4,719	7,285
Utilities*	6	22	27	38	41	57	194	197	373	586
Construction	11	194	211	297	2,264	3,272	3,455	4,450	7,856	15,488
Manufacturing	50	221	276	415	531	780	7,590	6,690	13,491	19,584
Wholesale trade	27	117	143	212	244	350	1,020	1,218	1,917	2,971
Retail trade	131	518	587	817	1,051	1,395	3,240	3,417	5,685	8,817
Transportation and warehousing*	39	150	179	259	289	405	1,121	1,265	2,030	3,109
Information	30	110	123	168	185	235	634	642	1,059	1,598
Finance and insurance	85	324	360	493	526	659	1,791	1,752	2,864	4,338
Real estate and rental and leasing	106	362	400	542	577	725	2,032	1,994	3,266	4,946
Professional, scientific, and technical services	877	2,591	2,717	3,462	3,372	3,764	9,353	9,351	13,481	19,995
Management of companies and enterprises	16	57	76	117	105	168	558	658	1,098	1,635
Administrative and waste management services	195	639	695	925	986	1,209	3,283	3,391	5,321	8,096
Educational services	21	94	106	147	165	211	504	521	852	1,272
Health care and social assistance	119	496	561	783	888	1,150	2,823	2,921	4,820	7,241
Arts, entertainment, and recreation	24	86	109	150	166	207	513	530	856	1,286
Accommodation	23	75	82	109	118	148	414	415	869	1,041
Food services and drinking places	115	420	465	633	694	874	2,214	2,299	3,739	5,599
Other services*	47	200	231	327	389	521	1,227	1,334	2,198	3,347
Households	13	56	62	86	96	122	307	308	510	763
Government	·	536	574	811	859	902	068	891	866	917
Total	1,945	7,339	8,250	11,391	13,758	17,977	45,303	47,560	78,098	120,498

Table 22: Projected Employment by Industry

Source:
Quest
Offshore Resources, Inc

Table 22: Projected Employment by Industry	Continued								
Total Jobs by Industry	2027	2028	2029	2030	2031	2032	2033	2034	2035
Agriculture, forestry, fishing, and hunting	731	915	1,099	1,204	1,349	1,431	1,603	1,619	1,823
Mining (Oil & Gas)	10,751	13,936	19,920	26,471	31,468	35,063	38,494	41,788	44,799
Utilities*	791	965	1,150	1,358	1,506	1,551	1,689	1,770	1,835
Construction	16,949	23,072	29,459	20,701	26,400	27,435	27,766	14,526	18,364
Manufacturing	26,332	30,379	28,458	34,579	31,098	27,232	26,852	28,390	29,398
Wholesale trade	3,813	4,641	5,206	5,871	6,202	6,131	6,332	6,405	6,944
Retail trade	10,951	13,535	15,699	16,588	17,965	18,043	19,372	18,424	20,069
Transportation and warehousing*	3,944	4,803	5,469	6,100	6,467	6,392	6,697	6,673	7,179
Information	2,021	2,448	2,780	3,103	3,269	3,229	3,507	3,535	3,777
Finance and insurance	5,546	6,664	7,710	8,719	9,283	9,274	10,382	10,757	11,473
Real estate and rental and leasing	6,248	7,479	8,549	9,549	9,992	9,724	10,673	10,806	11,390
Professional, scientific, and technical services	23,699	27,845	31,068	33,497	33,525	30,033	32,284	32,481	32,529
Management of companies and enterprises	2,184	2,691	3,083	3,763	4,019	4,109	4,283	4,487	4,808
Administrative and waste management services	10,121	12,131	13,647	15,121	15,708	15,112	16,220	16,409	17,261
Educational services	1,606	1,970	2,265	2,518	2,711	2,761	3,039	3,083	3,377
Health care and social assistance	9,146	11,216	12,886	14,287	15,332	15,512	16,937	17,008	18,533
Arts, entertainment, and recreation	1,632	1,991	2,278	2,556	2,732	2,757	3,038	3,118	3,388
Accommodation	1,319	1,601	1,781	2,014	2,093	2,053	2,184	2,194	2,318
Food services and drinking places	7,051	8,600	9,748	10,879	11,513	11,468	12,363	12,453	13,392
Other services*	4,226	5,238	6,065	6,665	7,230	7,367	7,926	7,829	8,564
Households	962	1,174	1,344	1,492	1,593	1,605	1,769	1,789	1,948
Government	1,327	1,854	2,764	3,593	5,121	7,139	10,483	13,284	16,392
Total	151,352	185,148	212,426	230,628	246,576	245,422	263,895	258,829	279,562

Table 23: Projected (Contribution	is to State Ec	onomies by	State (Milli	ons of Dolla	rs)				
State GDP	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
North Carolina	\$18	\$56	\$64	\$101	\$137	\$183	\$346	\$581	\$724	\$1,303
South Carolina	\$14	\$54	\$61	\$85	\$95	\$121	\$206	\$286	\$402	\$641
Virginia	6\$	\$28	\$33	\$54	\$71	\$97	\$212	\$280	\$409	\$707
New York	\$4	\$19	\$22	\$29	\$48	\$66	\$151	\$191	\$295	\$516
Massachusetts	\$5	\$27	\$30	\$39	\$46	\$59	\$133	\$161	\$250	\$407
New Jersey	\$3	\$14	\$16	\$25	\$32	\$42	\$83	\$108	\$155	\$265
Florida	\$2	\$27	\$30	\$33	\$44	\$54	\$83	\$100	\$142	\$236
Pennsylvania	\$2	\$9	\$10	\$15	\$22	\$30	\$70	\$92	\$144	\$242
Connecticut	\$4	\$19	\$20	\$26	\$28	\$35	\$65	\$78	\$118	\$181
Maryland	\$3	\$12	\$14	\$23	\$29	\$37	\$63	\$82	\$115	\$194
Maine	\$2	\$11	\$12	\$15	\$16	\$19	\$43	\$39	69\$	\$115
Rhode Island	\$4	\$21	\$23	\$29	\$29	\$35	\$45	\$56	\$73	\$104
Georgia	\$2	\$18	\$20	\$22	\$26	\$31	\$45	\$57	\$75	\$120
Delaware	\$3	\$11	\$12	\$20	\$19	\$23	\$31	\$40	\$51	\$75
New Hampshire	\$2	\$11	\$12	\$16	\$16	\$19	\$27	\$33	\$45	\$59
Atlantic Coast	\$77	\$339	\$380	\$530	\$659	\$848	\$1,602	\$2,184	\$3,066	\$5,166
Other U.S. States	\$94	\$299	\$345	\$478	\$439	\$586	\$2,201	\$1,700	\$3,342	\$4,493
Totals	\$171	\$638	\$724	\$1,008	\$1,098	\$1,434	\$3,803	\$3,884	\$6,408	\$9,659

Table 23: Projected	l Contributi	ons to State	Economies by	y State (Million	ns of Dollars)				
State GDP	2027	2028	2029	2030	2031	2032	2033	2034	2035
North Carolina	\$1,721	\$2,175	\$2,643	\$2,952	\$3,349	\$3,427	\$3,581	\$3,702	\$4,081
South Carolina	\$885	\$1,132	\$1,410	\$1,685	\$1,934	\$2,093	\$2,325	\$2,457	\$2,730
Virginia	\$913	\$1,172	\$1,445	\$1,602	\$1,810	\$1,840	\$1,990	\$2,008	\$2,177
New York	\$642	\$823	\$981	\$1,029	\$1,139	\$1,122	\$1,194	\$1,147	\$1,250
Massachusetts	\$531	\$667	\$794	\$922	\$1,015	\$1,043	\$1,163	\$1,241	\$1,365
New Jersey	\$338	\$429	\$533	\$586	\$663	\$670	\$719	\$722	\$785
Florida	\$286	\$362	\$443	\$447	\$503	\$519	\$616	\$599	\$694
Pennsylvania	\$317	\$399	\$460	\$517	\$557	\$553	\$579	\$572	\$619
Connecticut	\$245	\$307	\$379	\$463	\$524	\$565	\$640	\$700	\$776
Maryland	\$247	\$315	\$404	\$442	\$513	\$532	\$576	\$576	\$632
Maine	\$162	\$211	\$296	\$376	\$458	\$534	\$664	\$766	\$840
Rhode Island	\$146	\$184	\$262	\$339	\$420	\$494	\$588	\$682	\$771
Georgia	\$149	\$185	\$226	\$245	\$274	\$288	\$349	\$367	\$426
Delaware	\$106	\$135	\$191	\$245	\$299	\$337	\$380	\$422	\$466
New Hampshire	\$73	06\$	\$112	\$136	\$159	\$186	\$225	\$267	\$317
Atlantic Coast	\$6,763	\$8,587	\$10,579	\$11,986	\$13,617	\$14,204	\$15,591	\$16,227	\$17,929
Other U.S. States	\$5,435	\$6,234	\$6,471	\$7,027	\$6,564	\$5,844	\$6,201	\$5,619	\$5,498
Totals	\$12,198	\$14,821	\$17,049	\$19,013	\$20,182	\$20,047	\$21,792	\$21,845	\$23,428

Total GDP by Industry	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Agriculture, forestry, fishing, and hunting	\$0	\$2	\$2	\$3	\$4	\$5	\$10	\$11	\$17	\$26
Mining	\$0	\$3	\$32	\$76	\$19	\$101	\$270	\$430	\$658	\$961
Utilities*	\$2	\$8	\$9	\$13	\$14	\$18	\$55	\$58	\$104	\$164
Construction	\$1	\$13	\$14	\$19	\$117	\$168	\$178	\$227	\$397	\$778
Manufacturing	\$4	\$23	\$28	\$43	\$51	\$74	\$673	\$471	\$1,118	\$1,558
Wholesale trade	\$4	\$16	\$20	\$29	\$33	\$46	\$135	\$159	\$248	\$386
Retail trade	\$7	\$25	\$28	\$39	\$50	\$65	\$155	\$161	\$267	\$414
Transportation and warehousing*	\$3	\$10	\$12	\$17	\$19	\$26	\$74	\$82	\$131	\$200
Information	\$4	\$18	\$20	\$27	\$30	\$37	\$95	\$97	\$157	\$237
Finance and insurance	\$9	\$38	\$42	\$58	\$63	\$80	\$195	\$203	\$322	\$493
Real estate and rental and leasing	\$15	\$62	\$70	96\$	\$106	\$136	\$345	\$349	\$575	\$865
Professional, scientific, and technical services	\$97	\$286	\$299	\$381	\$369	\$408	\$1,019	\$1,017	\$1,455	\$2,159
Management of companies and enterprises	\$2	\$7	\$10	\$15	\$14	\$21	\$68	\$83	\$135	\$205
Administrative and waste management services	\$7	\$23	\$25	\$33	\$35	\$42	\$114	\$114	\$180	\$272
Educational services	\$1	\$4	\$4	\$6	\$7	88	\$19	\$19	\$31	\$47
Health care and social assistance	\$7	\$29	\$33	\$46	\$51	\$65	\$158	\$162	\$264	\$397
Arts, entertainment, and recreation	\$1	\$3	\$4	\$5	\$6	\$7	\$18	\$18	\$29	\$43
Accommodation	\$1	\$4	\$5	\$6	\$7	\$8	\$24	\$23	\$39	\$59
Food services and drinking places	\$3	\$12	\$14	\$18	\$20	\$24	\$62	\$62	\$101	\$150
Other services*	\$3	\$12	\$13	\$18	\$21	\$27	\$68	\$70	\$115	\$175
Households	\$0	\$1	\$1	\$1	\$1	\$1	\$3	\$3	\$	\$7
Government	\$0	\$39	\$42	\$59	\$62	\$65	\$65	\$65	\$63	\$66
Total	\$171	\$638	\$724	\$1,008	\$1,098	\$1,434	\$3,803	\$3,884	\$6,408	\$9,659

Table 24: Projected Contributions to State Economies by Industry (Millions of

									Source: Quest Offshore Resources, Inc.
\$23,428	\$21,845	\$21,792	\$20,047	\$20,182	\$19,013	\$17,049	\$14,821	\$12,198	Total
\$1,189	\$963	\$760	\$518	\$371	\$261	\$200	\$134	96\$	Government
\$19	\$18	\$17	\$15	\$15	\$14	\$12	\$11	6\$	Households
\$418	\$387	\$387	\$355	\$357	\$335	\$306	\$267	\$219	Other services*
\$365	\$340	\$333	\$303	\$305	\$289	\$259	\$229	\$189	Food services and drinking places
\$131	\$124	\$123	\$114	\$117	\$113	\$100	06\$	\$74	Accommodation
\$118	\$108	\$104	\$93	\$92	\$86	\$76	\$67	\$55	Arts, entertainment, and recreation
\$1,038	\$952	\$937	\$848	\$839	\$782	\$704	\$612	\$501	Health care and social assistance
\$132	\$120	\$116	\$103	\$101	\$93	\$83	\$72	\$59	Educational services
\$600	\$569	\$555	\$507	\$527	\$509	\$457	\$406	\$341	Administrative and waste management services
\$633	\$588	\$557	\$531	\$517	\$480	\$393	\$339	\$274	Management of companies and enterprises
\$3,413	\$3,428	\$3,396	\$3,155	\$3,561	\$3,578	\$3,325	\$2,988	\$2,549	Professional, scientific, and technical services
\$2,291	\$2,118	\$2,078	\$1,879	\$1,862	\$1,736	\$1,549	\$1,340	\$1,099	Real estate and rental and leasing
\$1,434	\$1,326	\$1,275	\$1,138	\$1,117	\$1,027	\$907	\$771	\$632	Finance and insurance
\$614	\$568	\$555	\$501	\$501	\$470	\$420	\$366	\$301	Information
\$466	\$434	\$431	\$407	\$413	\$391	\$350	\$307	\$254	Transportation and warehousing*
\$936	\$862	\$901	\$835	\$836	\$775	\$732	\$633	\$514	Retail trade
\$917	\$846	\$829	\$794	\$804	\$761	\$675	\$600	\$495	Wholesale trade
\$2,443	\$2,385	\$2,331	\$2,171	\$2,463	\$2,766	\$2,278	\$2,405	\$2,099	Manufacturing
\$1,007	\$799	\$1,444	\$1,408	\$1,346	\$1,054	\$1,484	\$1,161	\$854	Construction
\$539	\$513	\$485	\$440	\$424	\$380	\$322	\$270	\$220	Utilities*
\$4,646	\$4,326	\$4,109	\$3,870	\$3,555	\$3,060	\$2,366	\$1,713	\$1,331	Mining
\$79	\$70	\$70	\$62	\$59	\$53	\$49	\$41	\$33	Agriculture, forestry, fishing, and hunting
2035	2034	2033	2032	2031	2030	2029	2028	2027	Total GDP by Industry

Table 25: Projected	Revenue Sh	aring Unde	r 37.5/62.5 Pe	rcent Reven	ue Sharing b	y State (Mil	lions of Dol	lars)		
State	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
North Carolina	\$0	\$6	\$7	\$27	\$28	\$30	\$29	\$30	\$28	\$33
South Carolina	\$0	\$19	\$20	\$29	\$30	\$32	\$31	\$31	\$30	\$34
Virginia	\$0	\$3	\$3	\$15	\$15	\$16	\$16	\$16	\$16	\$18
Massachusetts	\$0	\$15	\$16	\$18	\$20	\$20	\$20	\$20	\$19	\$20
Rhode Island	\$0	\$13	\$13	\$14	\$16	\$16	\$16	\$16	\$16	\$16
Florida	\$0	\$27	\$29	\$28	\$29	\$31	\$31	\$30	\$30	\$30
Connecticut	\$0	\$10	\$11	\$12	\$13	\$13	\$13	\$13	\$13	\$13
Maine	\$0	\$6	\$7	\$8	\$8	6\$	\$8	\$8	\$8	8\$
New York	\$0	\$10	\$11	\$13	\$14	\$14	\$14	\$14	\$14	\$14
New Hampshire	\$0	\$6	\$7	\$7	\$8	\$8	\$8	88	\$8	8\$
Georgia	\$0	\$18	\$19	\$19	\$20	\$21	\$20	\$20	\$20	\$20
New Jersey	\$0	\$5	\$6	\$11	\$12	\$12	\$12	\$12	\$12	\$12
Maryland	\$0	\$4	\$4	\$10	\$11	\$12	\$11	\$12	\$11	\$12
Delaware	\$0	\$4	\$4	\$10	\$10	\$11	\$11	\$11	\$11	\$11
Pennsylvania	\$0	\$3	\$4	\$6	\$6	\$6	\$6	\$6	\$6	\$6
Total	\$0	\$149	\$160	\$226	\$239	\$251	\$248	\$248	\$242	\$256

Table 25: Projected F	Revenue Shar	ing Under 37.	5/62.5 Percen	t Revenue Sh	aring by State	e (Millions of	Dollars)		
State	2027	2028	2029	2030	2031	2032	2033	2034	2035
North Carolina	\$78	\$128	\$195	\$260	\$362	\$478	\$639	\$746	\$885
South Carolina	\$72	\$115	\$170	\$225	\$308	\$418	\$604	\$712	\$848
Virginia	\$38	\$61	\$93	\$123	\$173	\$225	\$293	\$343	\$406
Massachusetts	\$22	\$25	\$41	\$56	\$88	\$137	\$208	\$295	\$372
Rhode Island	\$18	\$21	\$35	\$48	\$76	\$118	\$179	\$251	\$315
Florida	\$29	\$29	\$29	\$30	\$29	\$49	\$143	\$190	\$264
Connecticut	\$15	\$18	\$30	\$40	\$63	\$93	\$136	\$187	\$234
Maine	\$8	6\$	\$18	\$26	\$46	\$83	\$142	\$211	\$265
New York	\$16	\$20	\$32	\$41	\$63	88\$	\$122	\$163	\$205
New Hampshire	\$8	6\$	\$18	\$26	\$45	\$80	\$136	\$201	\$252
Georgia	\$19	\$19	\$19	\$20	\$19	\$33	\$95	\$126	\$175
New Jersey	\$14	\$18	\$25	\$31	\$43	\$52	\$62	\$77	66\$
Maryland	\$13	\$17	\$25	\$30	\$42	\$51	\$62	\$76	\$97
Delaware	\$13	\$16	\$24	\$28	\$40	\$49	\$59	\$73	\$92
Pennsylvania	\$8	\$10	\$16	\$20	\$30	\$37	\$44	\$53	\$62
Total	\$370	\$517	\$771	\$1,002	\$1,428	\$1,991	\$2,924	\$3,705	\$4,571