

The Economic Impacts of Allowing Access to the Mid and South Atlantic OCS for Oil and Natural Gas Exploration and Development

Prepared For:

The American Petroleum Institute (API)

Prepared By:



Executive Summary

Executive Summary

The U.S. offshore oil and natural gas industry is a significant contributor to domestic energy production, the national economy, employment, and government revenues. New offshore oil and gas exploration and development in the U.S. is currently limited primarily to the Central and Western Gulf of Mexico, with limited legacy production off California and Alaska. In total, approximately 94 percent¹ of the total 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. Atlantic areas were subsequently removed from the 2017-2022 OCS Oil and Gas Leasing Program (five-year plan).

This report constructs a scenario of oil and natural gas development in the Atlantic, based on the resource potential of the area, geologic analogs, and the full value chain of oil and natural gas development and production. This report also attempts to construct a scenario based on which areas of the Atlantic coast are most likely to be opened to oil and natural gas activities, with the North Atlantic OCS excluded from the study, and southern Atlantic OCS leasing beginning five years after leasing begins in the mid-Atlantic. 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 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. (Table 1)

Table 1: Summary Table Potential Impacts from Atlantic Oil and Natural Gas Development²

Economic Impact	First Leasing + 3 Years	First Leasing + 8 Years	First Leasing + 18 Years	Cumulative 18 Years
Capital Investment and Spending (\$Millions)	\$474	\$2,306	\$15,125	\$68,634
Employment	7,165	31,504	192,056	n/a
Contributions to Economy - GDP (\$Millions)	\$620	\$2,466	\$15,009	\$117,583
Federal / State Government Revenue (\$millions)	\$195	\$501	\$2,711	\$16,962
Natural Gas and Oil Production (BOED)	-	3,158	974,980	4.47 MMBOE

Source: Calash

¹ "2012-2017 OCS Oil and Gas Leasing Program", Bureau of Ocean Energy Management, August 22, 2012, September 1, 2017.

² BOED or barrel of oil equivalent per day is unit of combined oil and natural gas based on the energy equivalency of oil and natural gas. A MMBOE is a million barrels of oil equivalent.

Leasing

This study assumes that leasing will begin in the mid-Atlantic in a currently undetermined future Year X, potentially coinciding with a new Bureau of Ocean Energy Management (BOEM) five-year plan. Leasing activity in the initial year of leasing is projected at around 100 leases sold. Leasing activity in the southern Atlantic is projected to begin after five years, potentially coinciding with the next Bureau of Ocean Energy Management (BOEM) five-year plan.

Drilling

Drilling is the key activity both to discover oil and natural gas resources through exploration drilling as well as to prepare them for production by drilling development wells. With leasing starting in Year 1, Atlantic drilling would be expected to begin shortly after in the following year, and continue at very low levels (1-2 wells a year) for around five years. Total exploratory and development wells drilled is projected to average about 20 wells across the forecast period of which around 90 percent of wells would be in deepwater. Drilling in the area is projected to trend upwards as infrastructure is developed and a higher percentage of development wells are drilled each year. In the last five years of the forecast an average of around 45 are projected to be drilled annually.

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 engineers, contractors, and equipment suppliers working over a number of years prior to oil and natural gas 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 51 projects could begin oil and natural gas production in the Atlantic OCS over the 18-year forecast period, of which 45 would be deepwater projects and 6 would be shallow water projects.

Oil and Natural Gas Production

Allowing access to the Mid and South Atlantic for offshore oil and natural gas production is projected to lead to an increase in domestic energy production, the first oil and natural gas production from the Atlantic is projected to start within seven years. Within three years of initial production, Atlantic production is projected to increase to nearly 150 thousand barrels of oil equivalent per day (BOED). Production is projected to reach nearly 975 thousand BOED 18 years after leasing begins, with production expected to be around 27 percent oil and 73 percent natural gas.

Spending

Total cumulative spending across the forecast period is projected to be around \$68 billion. Spending is projected to grow from an average of \$373 million during the first five years of initial leasing, seismic, and exploratory drilling to over \$15 billion per year 18 years after first leasing begins.

The largest amounts of expenditures are for drilling, operational expenditures, engineering, manufacturing and fabrication of platforms and equipment. Cumulative operational expenditures (OPEX), which occur after a well's initial production, are projected at nearly \$12.6 billion.

Domestic spending is expected to account for 86 percent of cumulative spending from Atlantic offshore development, with the remaining taking place internationally. For domestic spending, nearly 65 percent of spending from Atlantic oil and natural gas developments is expected to take place in the mid and southern Atlantic states, with North Carolina (21 percent), South Carolina (12 percent) and Virginia (12 percent) accounting for the largest share. States outside of the mid and south Atlantic are expected to account for 32 percent of total spending.

Employment

Atlantic oil and natural gas development is expected to lead to significant employment gains, both in the Atlantic Coast region and nationally. Employment impacts are expected to grow throughout the forecast period, with total incremental U.S. employment supported reaching nearly 192 thousand jobs 18 years after initial lease sales. Total mid and south Atlantic employment is projected to reach nearly 140 thousand jobs. States outside the region are projected to see employment gains of over 53 thousand jobs by the end of the forecast period. The largest employment impact of Atlantic oil and natural gas activity is projected in North Carolina where 55 thousand jobs will be created by the end of the forecast period and South Carolina and Virginia which are projected to employment gains of over 31 thousand and nearly 27 thousand jobs respectively by the end of the forecast period. The share of incremental employment within the mid and south Atlantic states is projected to steadily grow as the area is developed – allowing for additional goods and services to be sourced locally.

Contributions to the Economy and Government Revenues

Spending by the oil and gas industry is expected to lead to a significant increase of the nation's GDP. Total contributions to the economy are projected to be nearly \$20 billion per year by the end of the forecast period, with over \$10.5 billion of the total expected impact to occur in the mid and south Atlantic states.

Atlantic oil and natural gas development has the potential to increase government revenue from royalties, bonus bids, and rents on leases by nearly \$17 billion cumulatively throughout the forecast period. Total government revenues are projected to reach over \$2.7 billion per year 18 years after initial lease sales. The majority of cumulative revenues are from royalties on produced oil and natural gas at around \$17 billion. Leasing bonus bids are projected to account for around \$6 billion while rental income from offshore blocks is expected to account for approximately \$1.5 billion.

This report assumes that associated government revenue is split 37.5 percent to the affected coastal states and 62.5 percent to the Federal government. This is similar to the arrangement in place with currently producing Gulf of Mexico States without an associated cap on state government revenue. Actual revenue proportion going to state governments, if any, would be determined by future legislation. Cumulative state revenues through the forecast period for the mid and south Atlantic states could reach over \$6 billion. Any spending by state governments due to additional revenue has the potential to increase GDP.³

Allowing access for Atlantic oil and natural gas development is projected to increase employment, economic activity, and government revenues with comparatively little additional spending required by federal and state governments. The nation as a whole, but especially the mid and south Atlantic states would likely see large employment gains, increased economic activity, and additional government revenue. In addition, the nation is projected to see increased domestic oil and natural gas production, thus increasing the nation's energy security.

³ Analysis assumes states spend 50 percent of additional revenue.

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Section 1 – Introduction

Oil and natural gas development contributes significantly to the U.S. economy. The impacts of oil and natural gas exploration and production are felt both throughout the nation and throughout all sectors of the economy. 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, most notably 94 percent⁴ of the U.S. outer continental shelf's (OCS). These offshore areas are limited due to a lack of lease sales by the Federal government or outright moratoriums.

Drilling restrictions in the Atlantic OCS of the United States were lifted in 2008. However, since no Federal lease sales have occurred, the Atlantic OCS is still under a de facto drilling moratorium. A lease sale off of the coast of Virginia was scheduled for November 2011, but was subsequently canceled. The current 2017 to 2022 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 2023.

The de facto ban on drilling 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.

1.1 Purpose of the Report

Calash was commissioned by the American Petroleum Institute (API) to provide an independent evaluation of the potential impacts of the development of America's offshore oil and gas resources within the mid and southern Atlantic OCS if oil and natural gas development restrictions were lifted. In addition, Calash projected potential impacts on U.S. oil and natural gas production, supported employment, GDP, and government revenue. The conclusions set forth in this study are based solely upon government and other publicly-available data and Calash's own expertise and analysis.

The report assumes a favorable regulatory environment for development such as regular lease sales and reasonable rate of permit approvals for projects and drilling within areas that are currently under moratorium. The report assumes that lease sales in the southern Atlantic OCS would begin five years after lease sales in the mid-Atlantic OCS. The provided analysis uses existing USGS and Bureau of Ocean Energy Management (BOEM) resource estimates.

⁴ "2012-2017 OCS Oil and Gas Leasing Program", Bureau of Ocean Energy Management, August 22, 2012, September 1, 2017.

This scenario in no way covers all previous or possible future proposals for Atlantic oil and natural gas activity; beginning lease sales in the southern Atlantic earlier or the inclusion of the North Atlantic OCS would likely lead to increased activity. The analysis tracks the full lifecycle of oil and natural gas development that is projected to take place following the opening of the mid and south Atlantic. The report therefore projects spending from leasing and seismic imaging to exploration drilling, onto project development and through production. The associated ongoing spending needed to maintain and operate projects is also estimated.

The report assumes that the initial seismic activity will begin in an undetermined future date X. The study projects activity, spending, employment, economic impacts, and government revenues associated with these activities for 18 years.

Economic and employment impacts calculated on expected industry spending are based on the report's forecasted timing of oil and natural gas exploration and production activity as well as projections for where the development activity and associated economic activity will take place. The report also projects estimated state and federal government revenues from sources such as bids, rents, and royalties, and projects the economic and employment effects of these where applicable. Assumptions on pricing, the location mix of spending, oil and natural gas prices, and economic multipliers are based on current conditions and are subject to change based on the timing of increased access to Atlantic oil and natural gas reserves.

1.2 Report Structure

The report is structured as follows: preceding this introductory section is the Executive Summary outlining all principal results and findings of this report. Immediately following the section is the Data Development section, outlining Calash'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. The final Conclusions section provides further assessment and analysis. Additional essential information can be found within the appendix sections following the report.

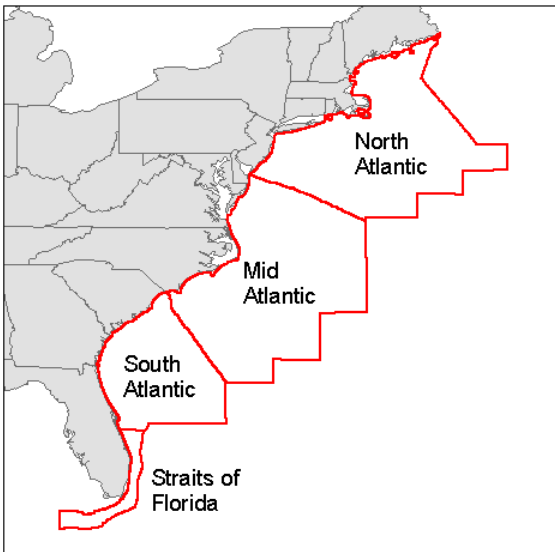
For the purpose of this report the directly affected states along the mid and south Atlantic coast are defined as: North Carolina, Virginia, South Carolina, Georgia, Florida, Maryland and Delaware.

1.3 About Calash

Since Calash's creation it has evolved from an oil and natural gas commercial and operational due diligence provider into an award-winning energy advisory firm providing strategy, business advisory, economic analysis, and mergers and acquisitions support services. As a function of Calash's core business, the company is engaged daily in the collection and analysis of data as it relates to the oil and natural gas industry. Calash serves the global community of operating oil and natural gas companies, their suppliers, financial firms, and many others by providing detailed analysis on projects, investments, capital investment and operational spending undertaken by the onshore and offshore industries. Calash analyzes market data from a variety of sources at the project level for projects throughout the world.

1.4 The Atlantic OCS

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 1)

Figure 1: Atlantic OCS Planning Areas Map

Source: Bureau of Ocean Energy Management

For the purposes of this study, only the Mid and South Atlantic OCS areas were considered.

1.5 Lease History

Atlantic OCS lease activity has been inactive since the early 1980's. In the originally proposed 2007-2012 five-year plan⁵ one lease sale in the Mid Atlantic during 2011 was proposed before government intervention caused the sale to be withdrawn. No Atlantic OCS leases were scheduled in the current 2017 to 2022 five-year plan even though there technically is no legal moratorium on Atlantic OCS 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.

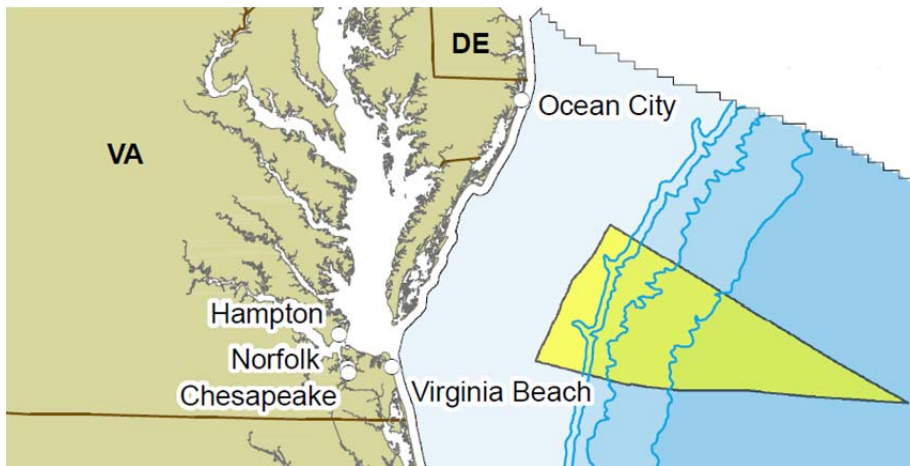
As originally proposed, the previous 2012 to 2017 five-year plan was scheduled to include the Beaufort Sea, Chukchi Sea, and Cook Inlet off the coast of Alaska; Western, Central, and Eastern GOM; and the Mid and South Atlantic.⁶ The Northern Atlantic OCS was

⁵ "2012-2017 OCS Oil and Gas Leasing Program", Bureau of Ocean Energy Management, August 22, 2012, September 1, 2017.

⁶ "Secretary Salazar Announces Comprehensive Strategy for Offshore Oil and Gas Development and Exploration." U.S. Department of the Interior, 31 Mar. 2010, accessed online on 11 Nov. 2013.

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 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 2011.⁷ (Figure 2)

Figure 2: Area of Proposed Virginia Lease Sale 220



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. The Atlantic OCS region was not included in the 2017-2022 five-year plan developed by the Obama administration. Proposed mid and south Atlantic lease sales were removed from the draft proposed program during the proposed program stage of the development of the five-year plan.⁸

Subsequently, The Department of the Bureau of Ocean Energy Management under the Trump administration has announced its intention to potentially develop a new five-year plan, with Secretary of the Interior Ryan Zinke releasing a secretarial order to start formulating a new five-year plan.⁹

1.6 Seismic

According to the BOEM estimates, some 240 thousand line miles of two-dimensional seismic imaging has been carried out 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

⁷ "Virginia Lease Sale 220 Information." *BOEM Homepage*. Bureau of Ocean Energy Management, 27 May 2010, accessed online on 11 Nov. 2013.

⁸ "Secretary Jewell Announces Offshore Oil and Gas Leasing Plan for 2017-2022", Department of Interior Homepage, Department of Interior, November 18, 2016, accessed online on September 1, 2017.

⁹ "Secretarial Order No. 3350, America-First Offshore Energy Strategy", Department of Interior Homepage, Department of Interior, 1 May 2017, accessed online on September 1, 2017.

seismic was also carried out 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.

No seismic has been carried out 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. Subsequently, the Obama administration blocked the issuance of new seismic permits in the region. As part of Secretary of the Interior Zinke's secretarial order to start formulating a new five-year plan, the Secretary also announced the restart of the permitting process which would allow new geophysical surveys of the Atlantic OCS.¹⁰

1.7 Drilling & Production

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 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 within HC598/599/642, although a later appraisal found the reserve to be non-commercial and the operator released the blocks in 1984.

1.8 Atlantic Resources

The Bureau of Ocean Energy Management produces analysis of the potential Atlantic OCS oil and natural gas resources in their "Assessment of Undiscovered Technically Recoverable Oil and Gas Resources off the Atlantic Outer Continental Shelf" series which is the basis for the reserve information in this report. This report identified ten unique plays, or oil and gas systems, on the Atlantic OCS. (Table 2)

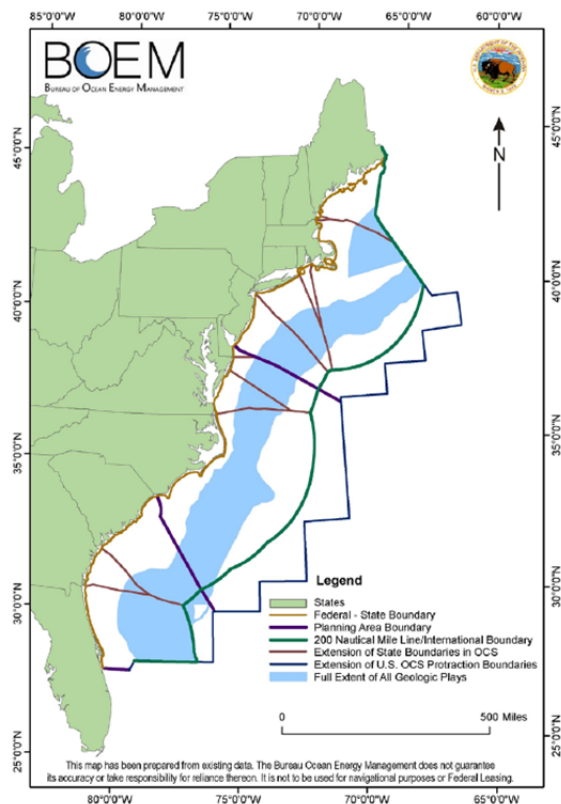
¹⁰ "Secretarial Order No. 3350, America-First Offshore Energy Strategy", Department of Interior Homepage, Department of Interior, 1 May 2017, September 1, 2017.

Table 2: Atlantic OCS Plays as Identified by BOEM Report

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

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 3)

Figure 3: 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.

1.9 Excluded from This Study

This paper has been limited in scope to the assessment of the development of oil and natural gas resources from known Atlantic formations in Federal waters identified in BOEM reports. Any potential benefits from the development of onshore midstream and downstream infrastructure are not included. In addition, the calculated government revenue potential does not include personal income taxes, corporate income taxes or local property taxes. The development of additional oil and natural gas resources not identified in the BOEM report are not included even though new formations will likely be found as the area is developed.

Section 2 – Data Development

2.1 Data Development

Calash's data development scenario focused on constructing a tiered "bottom-up" model that separates 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 potential reserve information under the expectation of estimating the possible number of projects based on the resources within the Atlantic, 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 3)

Table 3: Oil and Gas Project Development Model

	Activity Forecast	Spending Model	Economic Model
Reserves	<ul style="list-style-type: none"> • Total Eastern Gulf Reserves • Reserves by Play • Reserves by Field • Fields into Projects 	N/A	N/A
Seismic	<ul style="list-style-type: none"> • Pre-Lease Seismic • Leased Block Seismic • Shoot Type 	<ul style="list-style-type: none"> • Cost per Acre 	<ul style="list-style-type: none"> • Economic Activity due to Seismic Spending within States
Leasing	<ul style="list-style-type: none"> • Yearly Lease Sales 	<ul style="list-style-type: none"> • Bonus Bid Prices • Rental Rates 	<ul style="list-style-type: none"> • Federal and State Revenues Created through Lease Sales • Economic Activity due to Increased State/Personal Spending
Exploration Drilling	<ul style="list-style-type: none"> • Number of Wells Drilled • Water Depth of Wells Drilled • Number of Drilling Rigs Required 	<ul style="list-style-type: none"> • Cost per Well 	<ul style="list-style-type: none"> • Economic Activity due to Exploration Drilling within States
Project Development & Operation	<ul style="list-style-type: none"> • Project Size • Project Development Timeline 	<ul style="list-style-type: none"> • Spending per Project • Per Project Spending Timeline 	<ul style="list-style-type: none"> • Division of State Spending • Economic Activity due to Project Development within States Vicinity
Production	<ul style="list-style-type: none"> • Production Type and Amount 	<ul style="list-style-type: none"> • Oil and Gas Price Forecast 	<ul style="list-style-type: none"> • Federal and State Revenues Created through Royalty Sharing • Economic Activity due to Increased State/Personal Spending

Source: Calash

2.2 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 estimated resources in place. Given the predictive nature of these reports, Calash 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 developed areas of 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.

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 potential reserves within each discovery were then further discounted based on a recovery factor of similar geological plays. Calash'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, Calash concluded a forecast of the number of projects expected within each play. It is important to note the uncertainty around the location of fields and projects within each play, and thereby placing them within the associated vicinity of states becomes a challenge. In order to account for this, Calash drew a 200-mile buffer around each individual state's 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 offshore sector data, as each project was given an individual timeline representing the required time for a generic project of that size and scope. Assumptions were made for development scenarios given the lack of existing infrastructure currently in place within the Atlantic OCS. Timelines and infrastructure requirements were adjusted as infrastructure grew within certain areas, 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 equation.¹¹

2.3 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 4)

¹¹ Arps represents the hyperbolic shaped decline curve of an oil and gas field after peak production. Arps, J.J. "[Analysis of Decline Curves](#)" Trans. AIME (1944) 160, 228-47.

Table 4: Oil and Gas Project Spending Model

	Activity Model	Spending Model	Economic Model
Seismic (G&G)	<ul style="list-style-type: none"> • Number of Leases • 2D vs. 3D 	<ul style="list-style-type: none"> • Cost per Acre 	<ul style="list-style-type: none"> • Operation Requirements
SURF	<ul style="list-style-type: none"> • Trees, Manifolds, and Other Subsea Equipment • Umbilicals • Pipelines, Flowlines, and Risers 	<ul style="list-style-type: none"> • Cost per Item • Cost per Mile 	<ul style="list-style-type: none"> • Fabrication Locations
Platforms	<ul style="list-style-type: none"> • Fixed Platforms • Floating Production Systems 	<ul style="list-style-type: none"> • Unit Size 	<ul style="list-style-type: none"> • Fabrication Locations
Installation	<ul style="list-style-type: none"> • Surf Installation • Platform Installation 	<ul style="list-style-type: none"> • Number of Vessels • Type of Vessels • Vessel Dayrate 	<ul style="list-style-type: none"> • Operation Requirements • Shorebase Locations
Drilling	<ul style="list-style-type: none"> • Exploration Drilling • Development Drilling 	<ul style="list-style-type: none"> • Rig Type • Rig Dayrate 	<ul style="list-style-type: none"> • Operating Requirements • Shorebase Locations
Engineering	<ul style="list-style-type: none"> • FEED 	<ul style="list-style-type: none"> • CAPEX • OPEX 	<ul style="list-style-type: none"> • Technological Centers
Operating Expenditures (OPEX)	<ul style="list-style-type: none"> • Supply and Personnel Requirements • Project Maintenance • Project Reconfiguration 	<ul style="list-style-type: none"> • Type of Project 	<ul style="list-style-type: none"> • Shoreabse Locations

Source: Calash

Upon compiling the scenario of overall spending estimates, Calash 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 within the Atlantic states. 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.

2.4 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.

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

2.5 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 using the current operating structure of the Gulf of Mexico where applicable due to a lack of existing structures in the Atlantic states. 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, Calash has modeled yearly area wide sales within each region - thus contrasting the current sales which have included a sale approximately every two to three years.

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 / state revenue sharing agreement applicable to the Atlantic states under GOMESA. Calculations in this report were made to distinguish the potential State government revenue impacts among Atlantic coast states. These revenue estimates will need to be adjusted based on future legislated sharing arrangements if and when they occur.

Production pricing was calculated using the EIA estimates for both Brent crude spot and Henry Hub natural gas prices from the 2017 Annual Energy Outlook with 2018 prices used for the first year of leasing. Due to the steadily increasing trend in the near to medium term of the EIA price forecast, delaying the beginning of leasing likely could lead to higher realized prices for oil and natural gas. 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.

Section 3 – National Results

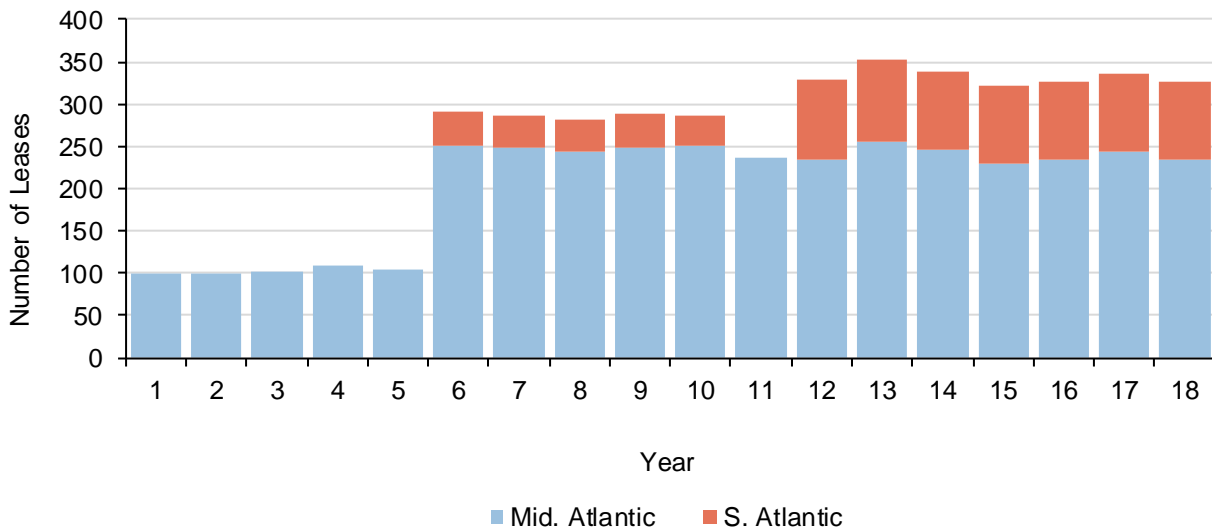
Allowing access to the Atlantic OCS for oil and natural gas production would likely provide large contributions to employment, gross domestic product, and state and federal government revenues. These benefits would be felt throughout the Atlantic coast region as well as the US as a whole.

Offshore oil and natural gas exploration and production would require diverse activities such as: seismic imaging of reservoirs, drilling of wells, manufacturing equipment, and installing specialized equipment. The development of Atlantic oil and natural gas reserves would require capital and operational expenditures associated with these activities, as well as increase government revenues, which would combine to lead to increased employment and economic activity.

3.1 Seismic and Leasing Activity

Seismic activity is normally the first step required for offshore exploration, both to enable oil and natural gas companies to make bids on lease blocks and to identify drilling targets after leasing. Due to the lack of recently acquired seismic data in the Atlantic OCS, some pre-leasing seismic activity is expected. Upon the beginning of wide spread sustained leasing in the Atlantic OCS, seismic and leasing activity would be expected to increase significantly. This study assumes that widespread leasing begins at an undetermined date X. New seismic activity is expected to begin within the first year after initial lease sales at the latest, but significant seismic activity would likely begin as soon as seismic permits are issued for the Atlantic OCS.

This study assumed that initial leasing will begin in the mid-Atlantic, with leasing in the southern Atlantic beginning five years later. The study assumed that leasing in the North Atlantic OCS planning area would not take place during the study period. 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. Across the forecast period the number of leases sold is expected to range from 100 to 350 per year. (Figure 4)

Figure 4: Projected Leases Sold Atlantic OCS¹²

Source: Calash

3.2 Projects

Offshore project development is the key determinant of oil and natural gas production, industry spending, and economic impacts. Developing offshore projects is a complex process, requiring time, detailed engineering and large amounts of capital. An offshore oil and natural gas project is typically based on one or more discoveries of oil and natural gas fields. Although seismic and other surveys can identify possible oil and natural gas deposits, only drilling can confirm the existence of oil and natural gas in a given location. After confirmation of a viable oil and natural gas field that meets the operators' 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).

Deepwater projects are typically more complex and thus more capital intensive. Most deepwater projects utilize floating production units and subsea oil production infrastructure. Due

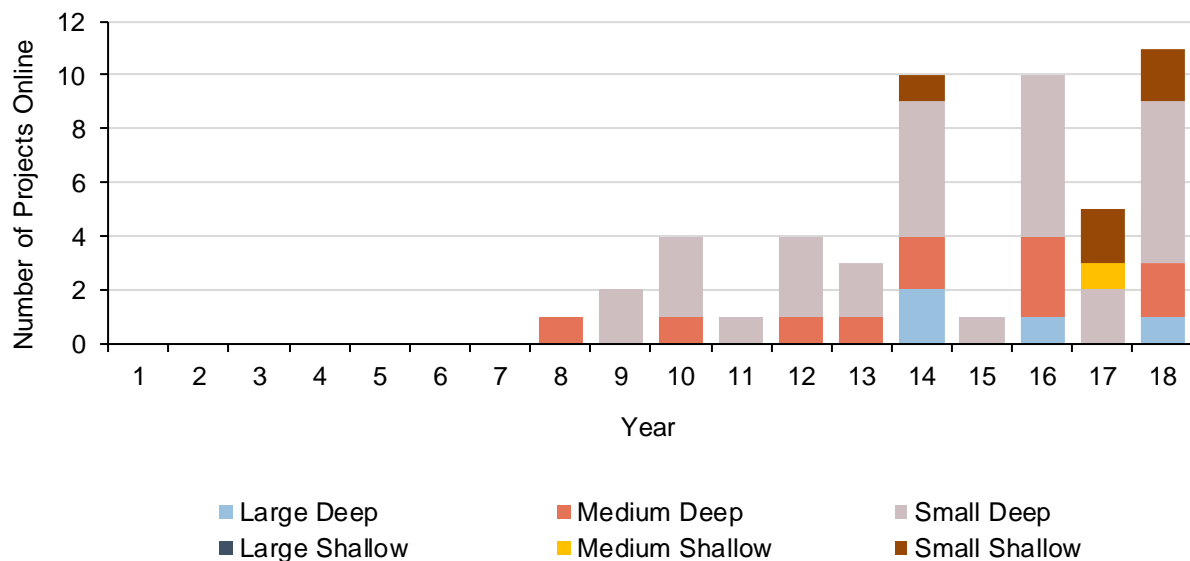
¹² Lease sales begin in year 1.

to their increased complexity, deep water projects typically have longer development timeframes, as well as larger capital requirements.

Apart from water depth, project size is typically defined by reservoir characteristics, hydrocarbon volumes, and most importantly expected production, all which define the timeline and capital investment required to develop the project. Larger projects typically require more wells, longer development periods, and larger upfront capital requirements. Smaller projects, on the other hand, often rely on larger projects for infrastructure such as pipelines or processing facilities. Thus, smaller projects are normally delayed, especially in undeveloped areas with little to no infrastructure currently in place such as the Atlantic OCS until larger projects are in place or processing is available.

During the 18-year forecast period the study projects that over 50 projects could begin oil and natural gas production in the Atlantic planning area. Given the location of the resource potential, most of these projects would be expected to be deepwater projects, with around 45 deepwater projects and 5 shallow water projects projected. (Figure 5)

Figure 5: Projected Number of Projects by Start-Up Year, Size and Water Depth



Source: Calash

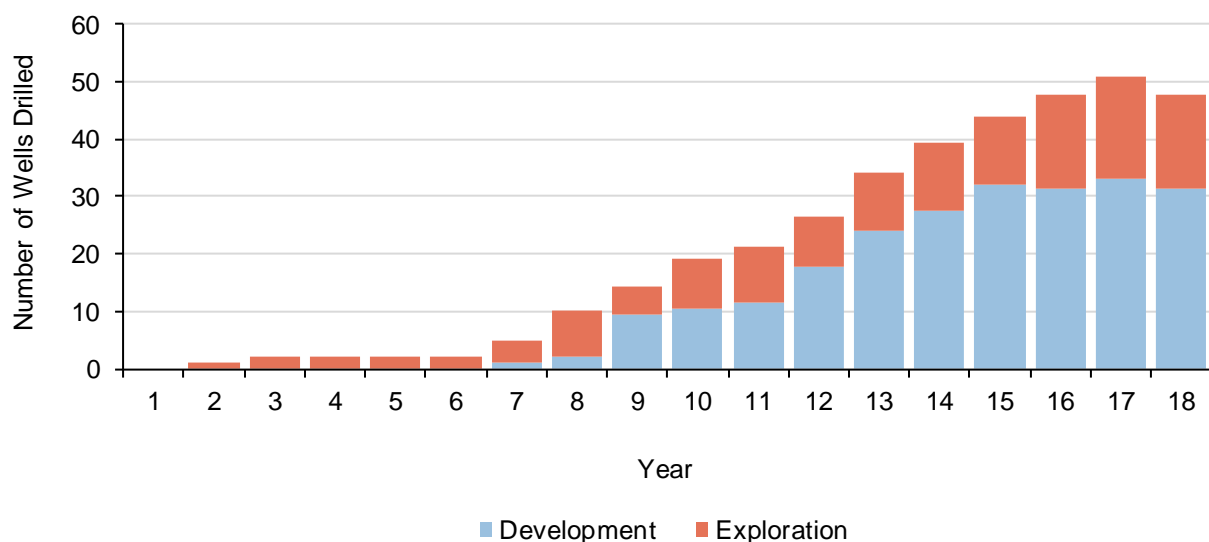
Projects could begin producing oil and natural gas as soon as seven years after leasing begins in the Atlantic OCS. The number of projects anticipated to start up each year is expected to vary between one and 11 annually, dependent on variables such as discovery timing, water depth, available infrastructure already in place, and project development lead times.

3.3 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 oil and natural gas 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 drilling 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.

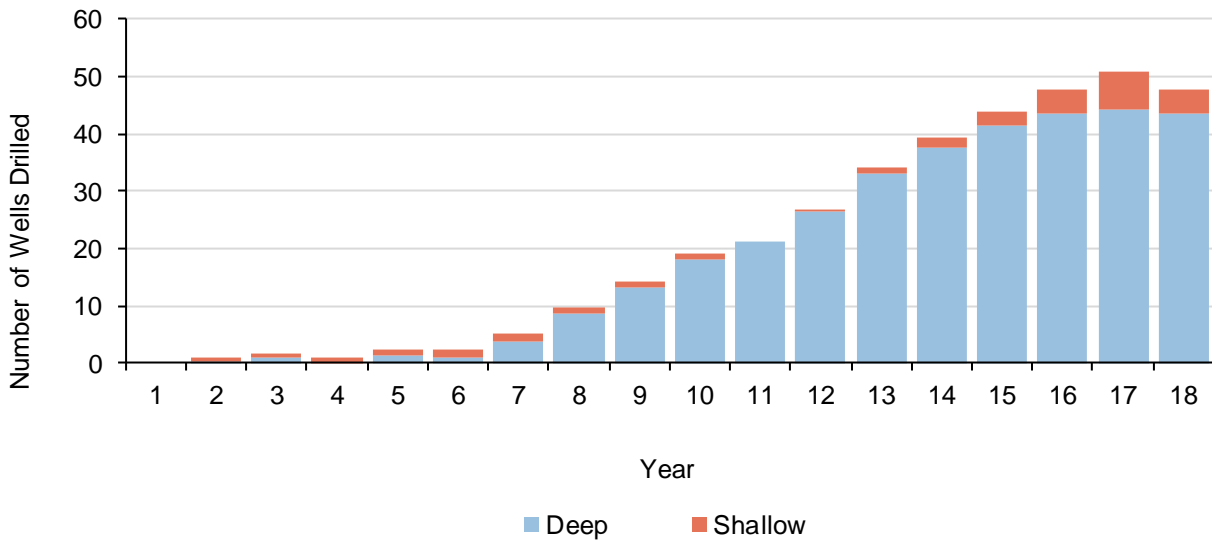
Drilling activity in the Atlantic is expected to be highly robust upon the commencement of offshore oil and natural gas activity. Exploratory drilling is projected to begin within two years after the first lease sales. Only exploratory drilling is expected to take place for the first five years of potential Atlantic OCS development. Total drilling activity is projected to level off at around 50 wells per year 16 years after initial lease sales. (Figure 6)

Figure 6: Projected Number of Wells Drilled by Well Type



Source: Calash

Due to the interconnected nature of exploration, drilling, and development, Atlantic OCS drilling is projected to follow a trend similar to project development regarding water depths of wells. As the basin matures, drilling is projected to trend to an approximately 90 to 10 ratio of deepwater to shallow water wells. A total of around 370 wells are projected to be drilled across the forecast period. (Figure 7)

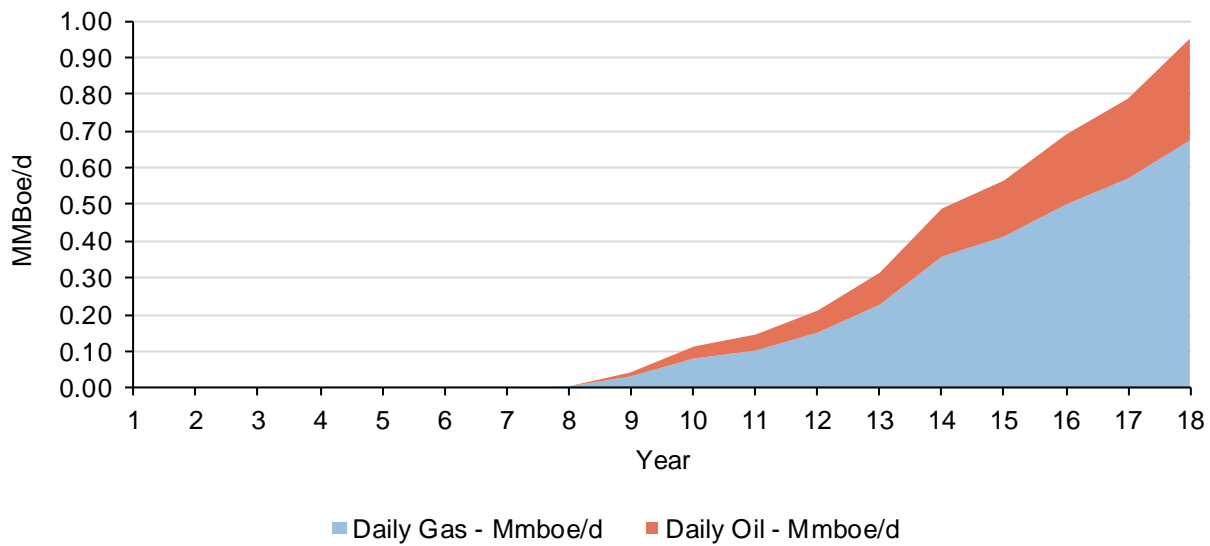
Figure 7: Projected Number of Wells Drilled by Water Depth and Year

Source: Calash

3.4 Production Activity

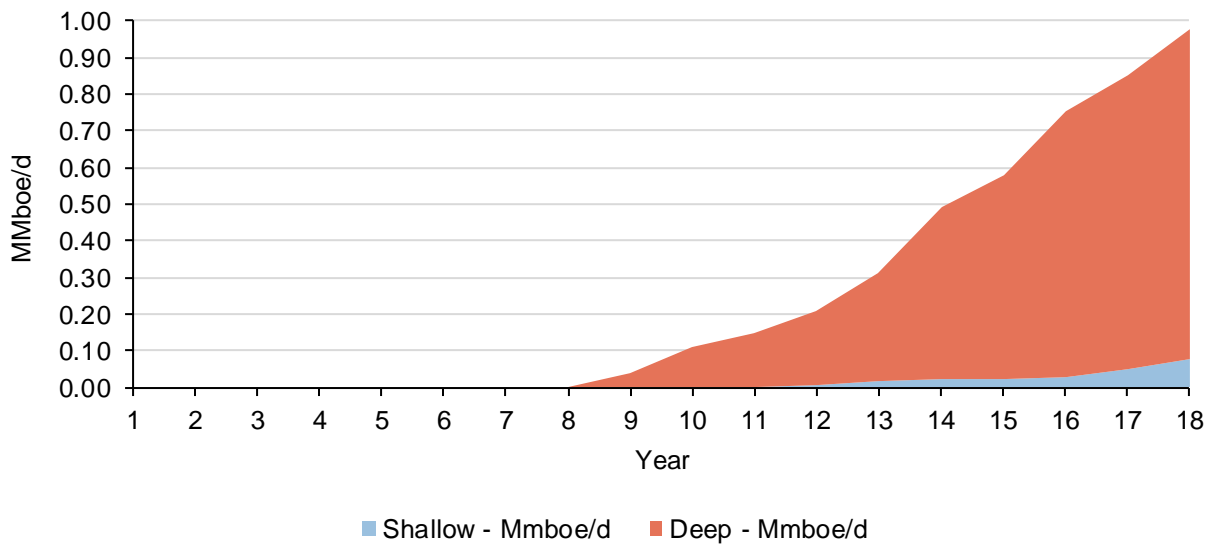
The number of projects developed, coupled with reservoir size and reservoir productivity, is the main determinant of oil and natural gas production levels. Most oil and natural gas reservoirs contain a combination of oil, natural gas, water, and many other substances. Some reservoirs may contain nearly 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 and gas ratios for individual fields across plays 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 seven years after the beginning of leasing in the area. Annual production is projected to reach 100 thousand BOED by the third year of production. Production is projected to reach around 975 thousand BOED by the end of the forecast period, with approximately 29 percent of production oil (280 thousand BOED), and 71 percent of the production natural gas (670 thousand BOED or 3.9 billion cubic feet per day). (Figure 8)

Figure 8: Projected Production by Type and Year

Source: Calash

Since project development and drilling is expected to be concentrated in deepwater, production is expected to outweigh shallow water production by a large margin. Deepwater production is expected to account for 92 percent of production by the end of the forecast period, compared to 8 percent of production from shallow water fields. (Figure 9)

Figure 9: Projected Production by Water Depth

Source: Calash

3.5 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 entire economy driving employment and economic growth. Total cumulative spending for the 18 year forecast period on Atlantic OCS offshore oil and natural gas development is projected to be over \$68 billion. Total spending in the first five years is projected to be around \$320 million per year; spending per year is expected to increase as projects are built and development drilling begins. Total drilling spending is projected to steadily increase throughout the forecast period, reaching over \$3.1 billion by the end of the forecast period. Total spending is projected to remain relatively constant at about \$14 to 15 billion per year for the last four years of the forecast period.

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, geological and geophysical (G&G) 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, G&G) spending including seismic is a relatively low percentage of overall spending at an average of nearly \$350 million per year or just over five percent of overall spending across the forecast period. Seismic spending is one of first categories of spending expected in the region, accounting for nearly 85 percent of spending in the first five years of the forecast period, as offshore prospects require a significant amount of time to identify.

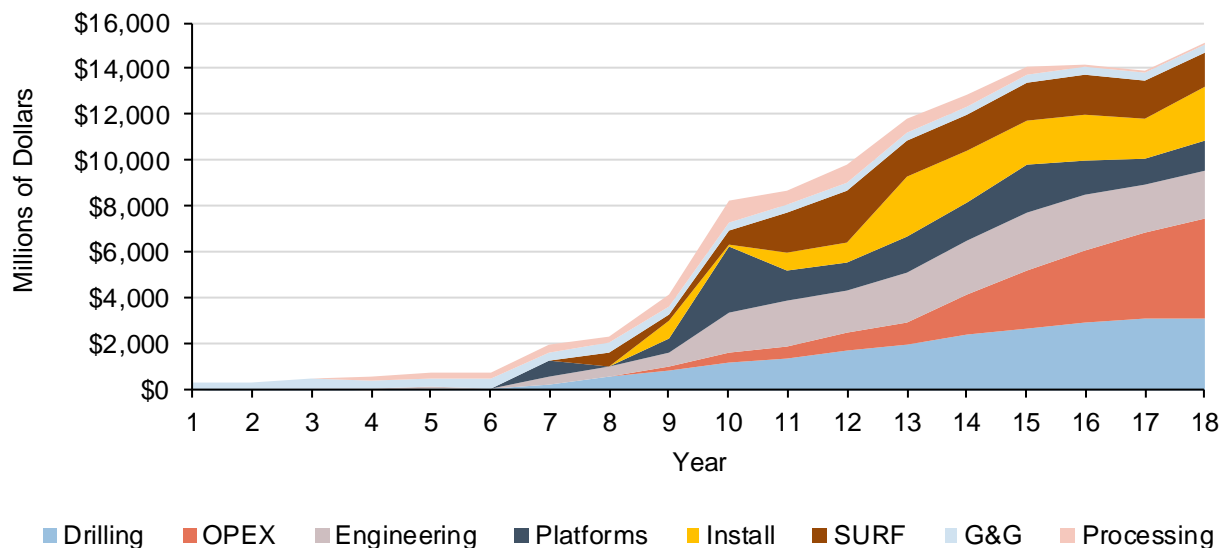
Given the expense and logistics requirements of offshore drilling, where rigs command large day rates in conjunction with high operational supply costs, drilling expenditures represent one of the largest sources of spending for any offshore project. Drilling expenditures across the forecast period, including both exploration and development drilling are projected to average nearly \$1.2 billion per year. Drilling expenditures are projected to increase throughout the forecast to over \$3 billion per year by the end of the forecast period.

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 billion per year across the forecast period, increasing steadily as the Atlantic OCS is developed.

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 include 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 pipeline that transport production back to shore. Some of the equipment required is less complex, such as nonstructural steel and unpressurized tanks. Due to the different timelines for procurement of equipment, spending for platforms and SURF equipment is more variable year to year than most other project development spending. Platform spending is expected to average around \$840 million per year across the forecast period. SURF spending is projected to average around \$800 million per year. (Figure 10)

Figure 10: Projected Overall Spending by Category



Source: Calash

Installation of platforms and SURF equipment is normally carried out by a number of different construction vessels, each with specialized functions such as pipe-lay or heavy-lift. Some vessels might lay large diameter pipelines (14 inch+), while other vessels reel-lay smaller diameter (2-10 inches) pipelines connecting wells to platforms, or lift heavy equipment or install smaller hardware. Additional specialized supply vessels supply drill-pipe, fuel and other fluids, and food to offshore vessels and platforms. Nearly everything installed offshore must first be prepared onshore at specialized shore bases located near projects prior to execution. Sometimes, equipment is transported to the field on the installation vessels themselves, and other times it is transferred to the field in specialized barges or heavy-lift transport vessels. Installing offshore equipment often requires complex connection or integration operations that require specialized vessels that can command day rates of over \$1 million. The combination of these operation is projected to lead to annual installation spending of \$815 million per year across the forecast period.

Once the initial production wells have been drilled and completed and the necessary equipment installed, a field can enter the operational phase. The operational phase requires

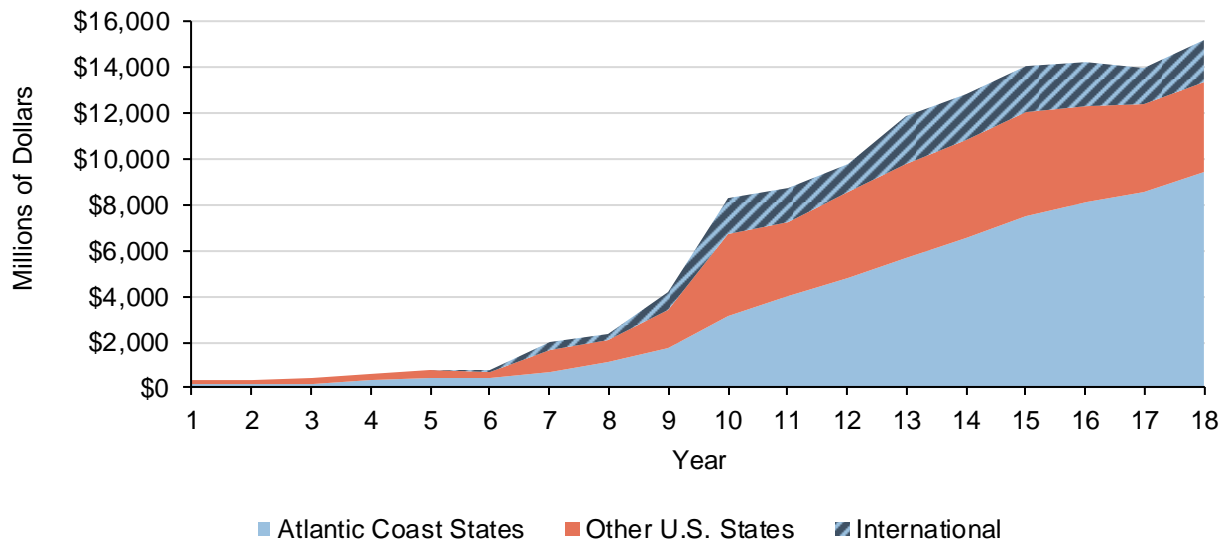
manning and operating facilities and equipment, continuously supplying essential fluids and supplies, and constant general maintenance. These operational expenditures (OPEX) are a significant source of ongoing spending by oil and gas companies within the region and grow with the volume of oil and natural gas production. Five years after initial Atlantic OCS production, operational expenditures are expected to be nearly \$960 million per year, and with OPEX spending projected to continue to climb to nearly \$4.4 billion per year by the end of the forecast period.

3.6 Spending Trends

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 first five years of leasing in the Atlantic OCS, where activity is projected to consist mostly of seismic and exploration drilling, an average of 49 percent of total domestic Atlantic OCS oil and natural gas spending is projected to take place along the mid and south Atlantic states. However, as projects begin to be developed and spending on platforms and SURF equipment begins, they cause the mid and south Atlantic coast states' share of spending to dip to a low of 38 percent ten years after the beginning of leasing, with high value SURF equipment and platforms expected to be supplied by other states. (Figure 11)

Figure 11: Projected Overall Spending Mid and South Coast States vs. Other U.S. States vs. International



Source: Calash

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 is expected to originate from Atlantic coast states. Production in the region is projected to lead to significantly lower transportation costs, as well as allowing suppliers to diversify their workforce nationally. By the end of the forecast period, 71 percent of domestic spending on Atlantic OCS oil and natural gas developments is projected to accrue to the mid and south Atlantic coast states reaching nearly \$9.5 billion per year. Other U.S. state spending in at the end of the forecast period is projected to be nearly \$3.9 billion.

Over the full forecast period, the largest share of spending due to Atlantic OCS offshore oil and natural gas development occurs in the mid and south Atlantic coast states themselves, with nearly \$37.5 billion spent cumulatively.

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 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. (Table 5).

**Table 5: Projected Spending Mid and South Atlantic Coast States and Other U.S. States
(Millions of Dollars per Year)**

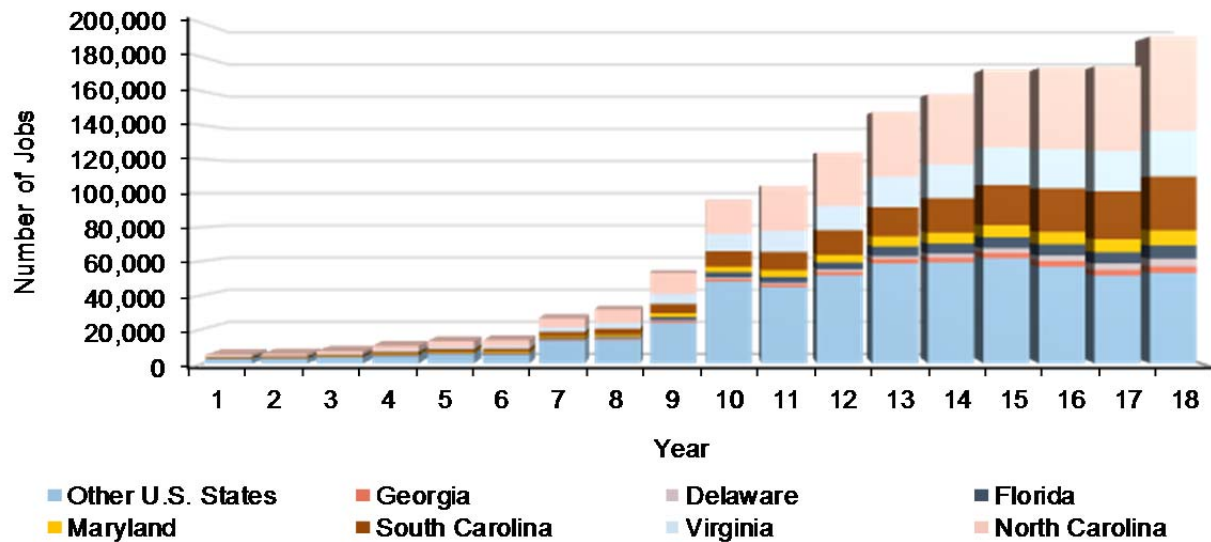
State	1	2	3	4	5	6	7	8	9	10
North Carolina	\$49	\$54	\$71	\$112	\$148	\$145	\$266	\$456	\$648	\$1,201
Virginia	\$26	\$28	\$38	\$62	\$84	\$82	\$168	\$234	\$398	\$747
South Carolina	\$41	\$44	\$58	\$70	\$88	\$86	\$147	\$229	\$338	\$613
Maryland	\$9	\$10	\$14	\$25	\$34	\$33	\$61	\$76	\$147	\$246
Florida	\$6	\$7	\$9	\$19	\$26	\$25	\$45	\$55	\$110	\$179
Delaware	\$9	\$10	\$13	\$13	\$16	\$15	\$23	\$34	\$51	\$87
Georgia	\$4	\$5	\$6	\$9	\$12	\$12	\$20	\$30	\$49	\$85
Atlantic Coast	\$145	\$158	\$209	\$311	\$407	\$399	\$730	\$1,114	\$1,741	\$3,158
% Atlantic Coast	44%	44%	44%	53%	53%	54%	37%	48%	42%	38%
Other U.S. States	\$182	\$195	\$255	\$272	\$342	\$320	\$937	\$1,014	\$1,655	\$3,527
International	\$0	\$4	\$10	\$7	\$22	\$20	\$328	\$178	\$764	\$1,555
Totals	\$327	\$357	\$474	\$590	\$772	\$739	\$1,995	\$2,306	\$4,160	\$8,239

State	11	12	13	14	15	16	17	18	Total
North Carolina	\$1,638	\$1,911	\$2,190	\$2,491	\$2,834	\$3,042	\$3,160	\$3,454	\$23,886
Virginia	\$933	\$1,055	\$1,296	\$1,465	\$1,660	\$1,761	\$1,801	\$1,997	\$13,843
South Carolina	\$729	\$963	\$1,093	\$1,345	\$1,602	\$1,775	\$1,951	\$2,158	\$13,343
Maryland	\$301	\$339	\$446	\$498	\$555	\$590	\$607	\$687	\$4,680
Florida	\$215	\$249	\$328	\$360	\$396	\$417	\$429	\$488	\$3,366
Delaware	\$102	\$132	\$159	\$215	\$265	\$308	\$349	\$390	\$2,194
Georgia	\$107	\$126	\$154	\$179	\$206	\$224	\$236	\$263	\$1,729
Atlantic Coast	\$4,025	\$4,775	\$5,666	\$6,552	\$7,518	\$8,118	\$8,533	\$9,437	\$63,042
% Atlantic Coast	46%	49%	31%	33%	34%	35%	37%	37%	37%
Other U.S. States	\$3,217	\$3,749	\$4,119	\$4,251	\$4,530	\$4,196	\$3,829	\$3,867	\$40,522
International	\$1,451	\$1,249	\$2,037	\$2,030	\$2,016	\$1,880	\$1,577	\$1,821	\$16,949
Totals	\$8,692	\$9,773	\$17,987	\$19,921	\$22,178	\$22,912	\$23,075	\$25,223	\$169,835

Source: Calash

3.7 Employment

Spending on goods and services to develop oil and natural gas in the Atlantic OCS is projected to provide large employment gains both nationally and regionally. Employment generally follows spending patterns. Employment effects are expected to steadily grow throughout the forecast period, reaching over 190 thousand jobs supported in the US 18 years after initial leasing begins. Total mid and south Atlantic coast state employment is projected to reach nearly 140 thousand jobs by the end of the forecast period. U.S. states outside the mid and south Atlantic regions are projected to see additional employment of over 50 thousand jobs by the end of the forecast period. (Figure 12)

Figure 12: Projected Employment by State

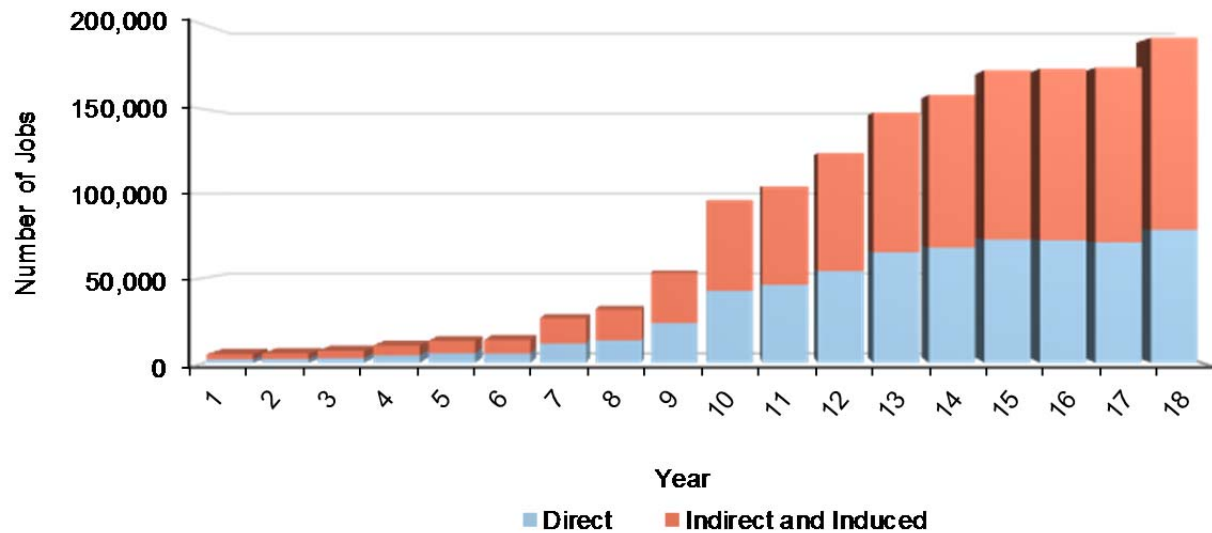
Source: Calash

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, with the three states projected to see employment gains of around 55 thousand, 27 thousand and 32 thousand jobs respectively by the end of the forecast period. Over eight and a half thousand jobs in mid and south Atlantic coast states will be created within five years of the beginning of leasing.

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 mid and south Atlantic 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 first five years of the forecast period, prior to the beginning of significant project development, an average of 56 percent of employment benefits are expected to accrue to the mid and south Atlantic coast states. 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 50, albeit with overall employment in the region still growing rapidly. By the end of the forecast period, the mid and south Atlantic coast states are projected to account for 72 percent of the employment effects of Atlantic OCS development. 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 79 thousand jobs by the end of the forecast period. Jobs generated

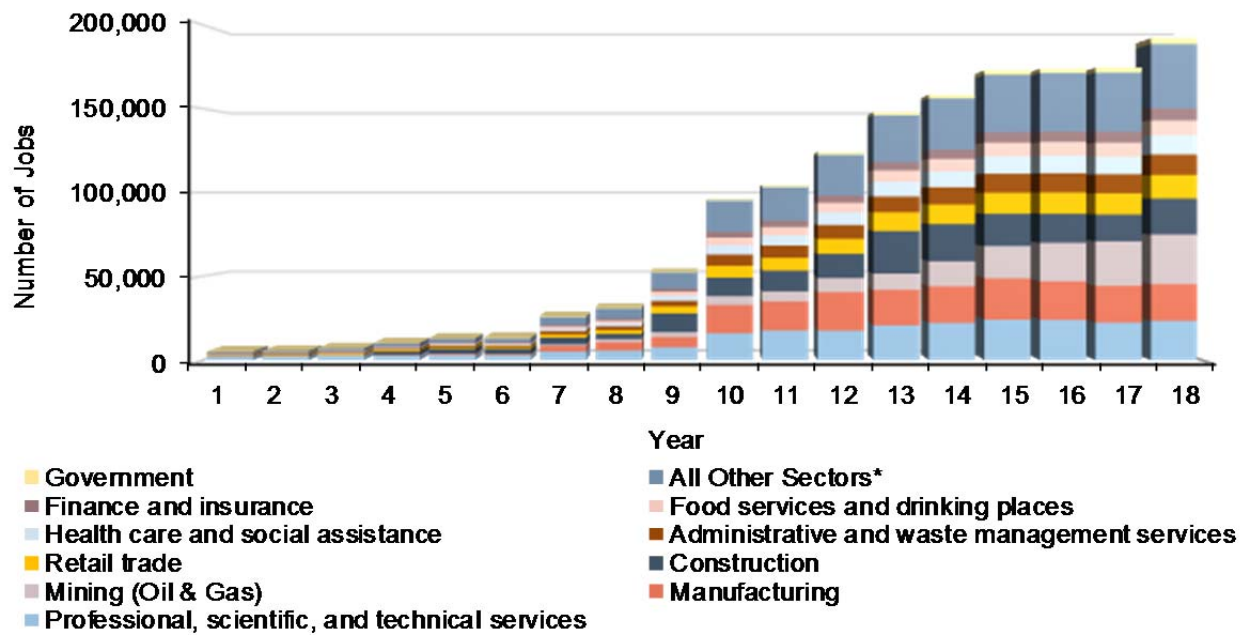
through the purchase of goods and services coupled with the income effects of increased employment are expected to contribute a further 114 thousand jobs. (Figure 13)

Figure 13: Projected Employment Direct vs. Indirect and Induced



Source: Calash

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 96 thousand jobs by the end of the forecast period. Additionally, employment impacts are expected to be significant for a variety of other industries outside oil and gas, with nearly 96 thousand jobs projected outside of these four categories at the end of the forecast period. (Figure 14)

Figure 14: Projected Employment by Industry Sector

Source: Calash

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 summary table of projected total employment supported at the state level is provided below. (Table 6)

Table 6: Projected Employment Mid and South Atlantic Coast States and Other U.S. States

State	1	2	3	4	5	6	7	8	9
North Carolina	1,011	1,074	1,369	2,430	3,152	3,382	5,286	7,772	12,141
Virginia	437	474	611	1,097	1,443	1,563	2,655	3,247	5,962
South Carolina	710	771	977	1,338	1,643	1,780	2,596	3,532	5,405
Maryland	179	201	253	444	579	642	985	1,109	2,150
Florida	107	115	152	356	486	621	944	1,015	2,015
Delaware	140	149	191	215	249	306	372	437	630
Georgia	69	74	97	170	223	313	455	551	891
Atlantic Coast	2,653	2,858	3,650	6,050	7,776	8,607	13,293	17,662	29,193
Other U.S. States	2,610	2,746	3,515	4,235	5,278	4,988	13,174	13,842	23,820
Totals	5,264	5,605	7,165	10,285	13,054	13,595	26,467	31,504	53,013

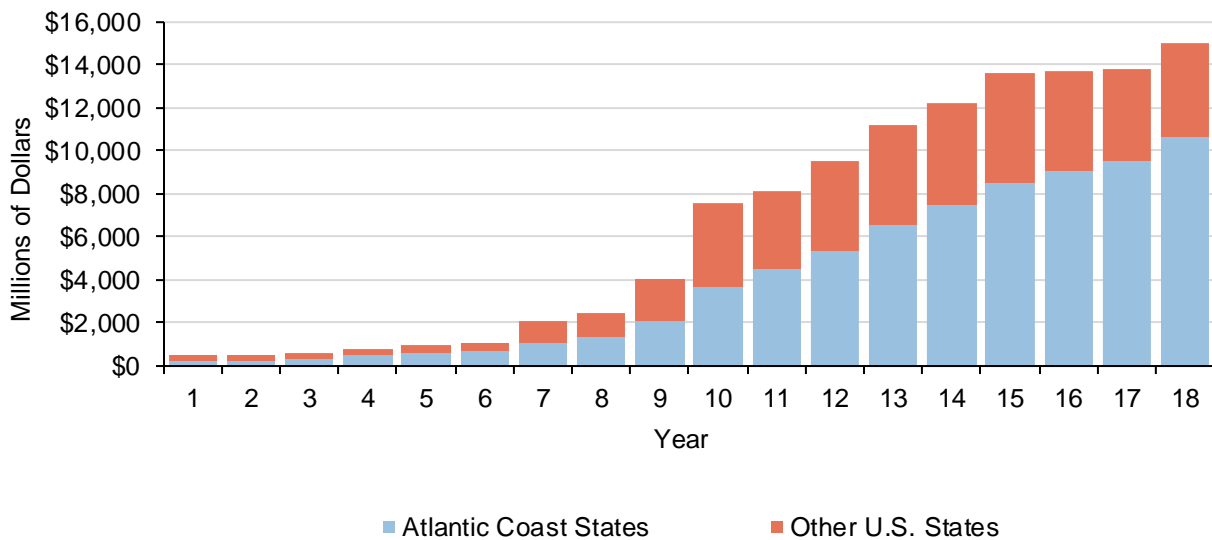
State	10	11	12	13	14	15	16	17	18
North Carolina	19,972	26,515	31,537	37,914	41,378	45,888	47,923	49,687	55,423
Virginia	10,046	12,267	14,050	18,061	19,834	22,079	22,940	23,636	26,879
South Carolina	9,084	10,710	14,552	17,139	20,213	23,689	25,571	28,092	31,615
Maryland	3,266	3,906	4,366	5,884	6,414	7,027	7,314	7,644	8,907
Florida	3,061	3,429	4,180	5,722	6,011	6,392	6,596	6,665	7,746
Delaware	941	1,073	1,346	1,632	2,247	2,813	3,218	3,847	4,512
Georgia	1,426	1,641	2,064	2,623	2,849	3,109	3,273	3,361	3,808
Atlantic Coast	47,795	59,540	72,095	88,975	98,946	110,997	116,836	122,932	138,889
Other U.S. States	48,168	44,717	51,738	58,777	59,317	61,811	56,873	51,486	53,167
Totals	95,964	104,257	123,832	147,751	158,263	172,808	173,709	174,418	192,056

Source: Calash

3.8 State Income Impacts

Along with employment benefits, significant contributions to state and national gross domestic product are also expected due to Atlantic coast oil and natural gas development. Total contributions to state economies are projected at over \$15 billion per year by the end of the forecast period, with around 71 percent expected to occur in mid and south Atlantic coast states and 29 percent in the rest of the U.S. (Figure 15)

Figure 15: Projected Contributions to State Economies Mid and South Atlantic Coast vs. Other U.S. States – Total



Source: Calash

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. Under this projection, the states of North Carolina, Virginia, and South Carolina receive the majority of contributions to their states' economies. (Table 7)

Table 7: Projected Contributions to State Economies Atlantic Coast States and Other U.S. States

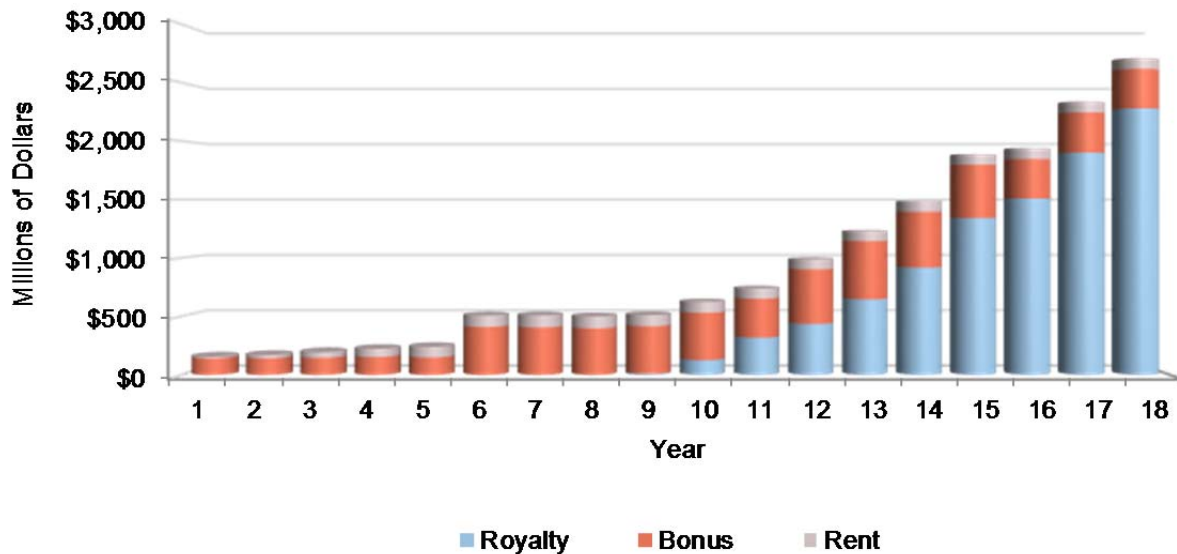
State GDP	1	2	3	4	5	6	7	8	9	10
North Carolina	\$79	\$84	\$108	\$163	\$206	\$225	\$361	\$529	\$788	\$1,382
Virginia	\$41	\$45	\$58	\$89	\$114	\$124	\$222	\$278	\$481	\$871
South Carolina	\$58	\$63	\$81	\$98	\$119	\$131	\$195	\$270	\$392	\$685
Maryland	\$17	\$19	\$24	\$38	\$48	\$53	\$85	\$97	\$179	\$288
Florida	\$8	\$9	\$12	\$23	\$31	\$42	\$65	\$73	\$133	\$215
Delaware	\$15	\$16	\$20	\$22	\$25	\$29	\$37	\$46	\$65	\$99
Georgia	\$6	\$6	\$8	\$12	\$16	\$23	\$34	\$42	\$63	\$108
Atlantic Coast	\$224	\$242	\$311	\$445	\$560	\$627	\$1,000	\$1,334	\$2,101	\$3,649
Other U.S. States	\$227	\$240	\$310	\$336	\$416	\$389	\$1,072	\$1,132	\$1,880	\$3,931
Totals	\$451	\$482	\$620	\$781	\$975	\$1,017	\$2,072	\$2,466	\$3,982	\$7,580

State GDP	11	12	13	14	15	16	17	18	Total
North Carolina	\$1,799	\$2,128	\$2,514	\$2,834	\$3,223	\$3,396	\$3,550	\$3,927	\$27,296
Virginia	\$1,059	\$1,190	\$1,497	\$1,681	\$1,906	\$1,992	\$2,048	\$2,298	\$15,995
South Carolina	\$806	\$1,063	\$1,241	\$1,500	\$1,783	\$1,935	\$2,120	\$2,355	\$14,897
Maryland	\$346	\$380	\$502	\$555	\$616	\$644	\$669	\$771	\$5,330
Florida	\$240	\$293	\$389	\$419	\$454	\$473	\$481	\$551	\$3,913
Delaware	\$114	\$142	\$170	\$231	\$287	\$328	\$386	\$445	\$2,477
Georgia	\$122	\$157	\$194	\$220	\$248	\$266	\$279	\$314	\$2,119
Atlantic Coast	\$4,485	\$5,354	\$6,506	\$7,440	\$8,517	\$9,035	\$9,533	\$10,662	\$72,027
Other U.S. States	\$3,610	\$4,133	\$4,632	\$4,767	\$5,048	\$4,681	\$4,262	\$4,347	\$45,414
Totals	\$8,096	\$9,487	\$11,138	\$12,207	\$13,565	\$13,716	\$13,796	\$15,009	\$117,441

Source: Calash

3.9 Government Revenue Impacts

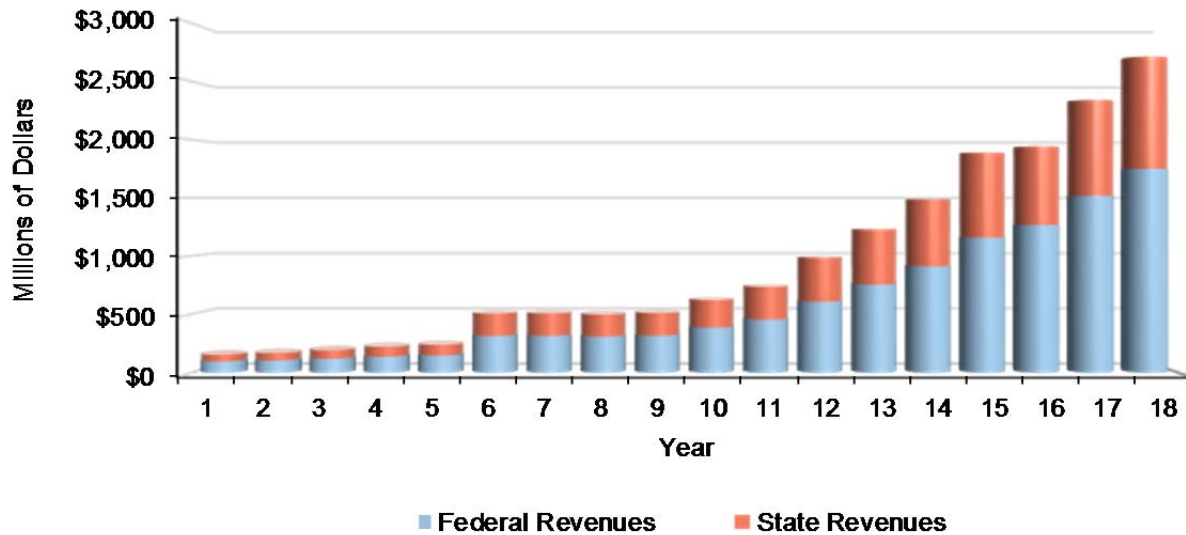
In addition to economic and employment growth, oil and gas production in the Atlantic OCS would increase government revenue. Extrapolating from the current Gulf of Mexico regulatory environment due to a lack of similar structures in the Atlantic OCS, total government revenues are projected to reach over \$2.2 billion dollars per year by the end of the forecast period, with the majority of revenues from royalties on produced oil and natural gas at over \$1.7 billion. At the end of the forecast period, leasing bonus bids are projected to account for nearly \$338 million per year in government revenue, while rental income from offshore blocks is expected to account for nearly \$93 million. Across the forecast period, royalties on oil and natural gas production are expected to total nearly \$17 billion. (Figure 16)

Figure 16: Projected Government Revenues – Rentals, Royalties, and Bonus Bids

Source: Calash

There is a possibility that revenue generated from Atlantic OCS 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 that covers the Atlantic OCS. 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 Atlantic coast states. This is in-line with the percentage split currently in place with states in the Gulf of Mexico covered by GOMESA, but with no annual revenue cap. Such projected state government revenue streams will need to be adjusted proportionally when or if agreements are legislated. Given the assumed 37.5 percent revenue share to the mid and south Atlantic coast states, federal government revenues from Atlantic OCS offshore oil and natural gas production are projected to reach over \$1.7 billion per year at the end of the forecast period. Combined state revenues for the mid and south Atlantic coast states are projected at about \$960 million per year by the end of the forecast period. (Figure 17)

Figure 17: Projected Government Revenues from Rentals, Royalties, and Bonus Bids, State and Federal¹³



Source: Calash

Due to the projected location of the potential oil and natural gas production based on the play data, North Carolina, Virginia, and South Carolina are most likely to receive significant returns from any revenue sharing agreement. At a 37.5 percent share for state governments, these states are projected to receive a cumulative \$2.2 billion, \$1.1 and \$1.8 billion respectively across the forecast period. Each of the mid and south Atlantic coast states would receive at least \$165 million cumulatively of new government revenue over the forecast period. (Table 8)

¹³ Assumes 37.5 percent revenue sharing with state governments.

Table 8: Projected Government Revenues from Rentals, Royalties, and Bonus Bids by State and Federal

State	1	2	3	4	5	6	7	8	9	10
North Carolina	\$21	\$22	\$24	\$30	\$31	\$60	\$60	\$59	\$65	\$81
Virginia	\$12	\$13	\$16	\$17	\$19	\$33	\$33	\$33	\$38	\$42
South Carolina	\$11	\$14	\$15	\$17	\$19	\$37	\$37	\$36	\$35	\$55
Maryland	\$7	\$8	\$10	\$11	\$12	\$19	\$19	\$19	\$22	\$19
Florida	\$0	\$0	\$0	\$0	\$0	\$15	\$15	\$15	\$8	\$14
Delaware	\$7	\$7	\$9	\$10	\$11	\$17	\$18	\$17	\$20	\$17
Georgia	\$0	\$0	\$0	\$0	\$0	\$10	\$10	\$10	\$5	\$9
Atlantic Coast	\$58	\$64	\$74	\$85	\$91	\$192	\$193	\$189	\$194	\$238
Federal	\$97	\$106	\$121	\$138	\$149	\$316	\$317	\$312	\$319	\$388
Total Revenues	\$155	\$170	\$195	\$223	\$240	\$509	\$510	\$501	\$512	\$625

State	11	12	13	14	15	16	17	18	Total
North Carolina	\$111	\$132	\$171	\$213	\$278	\$254	\$304	\$344	\$2,263
Virginia	\$58	\$62	\$79	\$98	\$127	\$114	\$147	\$177	\$1,120
South Carolina	\$73	\$106	\$140	\$179	\$236	\$231	\$264	\$294	\$1,799
Maryland	\$22	\$19	\$20	\$21	\$24	\$16	\$33	\$51	\$352
Florida	\$0	\$25	\$26	\$25	\$25	\$26	\$25	\$28	\$249
Delaware	\$20	\$17	\$18	\$19	\$22	\$15	\$31	\$49	\$324
Georgia	\$0	\$17	\$17	\$17	\$17	\$17	\$17	\$19	\$165
Atlantic Coast	\$283	\$379	\$472	\$572	\$729	\$674	\$821	\$962	\$6,271
Federal	\$456	\$610	\$758	\$914	\$1,159	\$1,267	\$1,518	\$1,749	\$10,691
Total Revenues	\$739	\$989	\$1,230	\$1,486	\$1,888	\$1,941	\$2,339	\$2,711	\$16,962

Source: Calash

Section 4 – Conclusions

The offshore oil and natural gas industry is a key component of the nation's energy mix, and a significant source of employment, economic activity, and government revenue nationally. However, large portions of the nations' federal waters are currently inaccessible to oil and gas operators, including the Atlantic OCS due to a lack of lease sales. Allowing oil and gas operators increased access to the mid and south Atlantic OCS and its resources would be expected to benefit oil and natural gas production, employment, the national economy, and government revenue.

- If leasing in the mid and south Atlantic was allowed (with leasing in the south Atlantic taking place five years after initial leasing), annual capital investment and other spending due to offshore oil and natural gas development would be projected to grow to over \$15 billion per year within 18 years after initial lease sales. Cumulative capital investments and other spending over the 18-year forecast period are projected at over \$68 billion.
- Atlantic OCS oil and gas activities could create over 100 thousand jobs within ten years of the beginning of leasing activity, the vast majority of which is likely to be in the mid and south Atlantic coast states.
- By the end of the forecast period, total national employment due to Atlantic OCS oil and gas exploration and production could reach over 190 thousand jobs, with nearly 140 thousand of these jobs in the mid and south Atlantic coast states.
- Development of the Atlantic OCS' offshore oil and natural gas resources could lead to production of approximately 975 thousand barrels of oil equivalent per day within 18 years after initial lease sales.
- Atlantic OCS oil and natural gas activity could contribute over \$8 billion per year to the national economy within ten years of leasing activity, with mid and south Atlantic coast states receiving contributions of nearly \$4.5 billion per year.
- At the end of the forecast period total national contributions to the economy could reach over \$15 billion per year, with mid and south Atlantic Coast states receiving combined contributions of over \$10.5 billion per year.
- Combined state and federal revenues from bonuses, rents and royalties are projected to reach nearly \$740 million per year within ten years of leasing activity, with these revenues projected to grow to over \$2.7 billion per year by the end of the 18-year forecast period.
- If a legislated state / federal revenue sharing agreement is enacted, the mid and south Atlantic coast states could see significant gains to their state budgets. With a 37.5 percent sharing agreement, state revenues are projected to be nearly

\$285 million per year within ten years of leasing activity, with revenues expected to grow to over \$1.7 billion per year by the end of the forecast period, leading to further increases in economic activity and employment. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

Under the development scenario put forth in this report, allowing oil and natural gas development in the mid and south Atlantic OCS shows significant potential to grow the American economy across numerous industries and areas. Allowing access to these areas 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 key resource areas. This spending would likely lead to large increases in employment and economic activity both in mid and south Atlantic Coast 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.

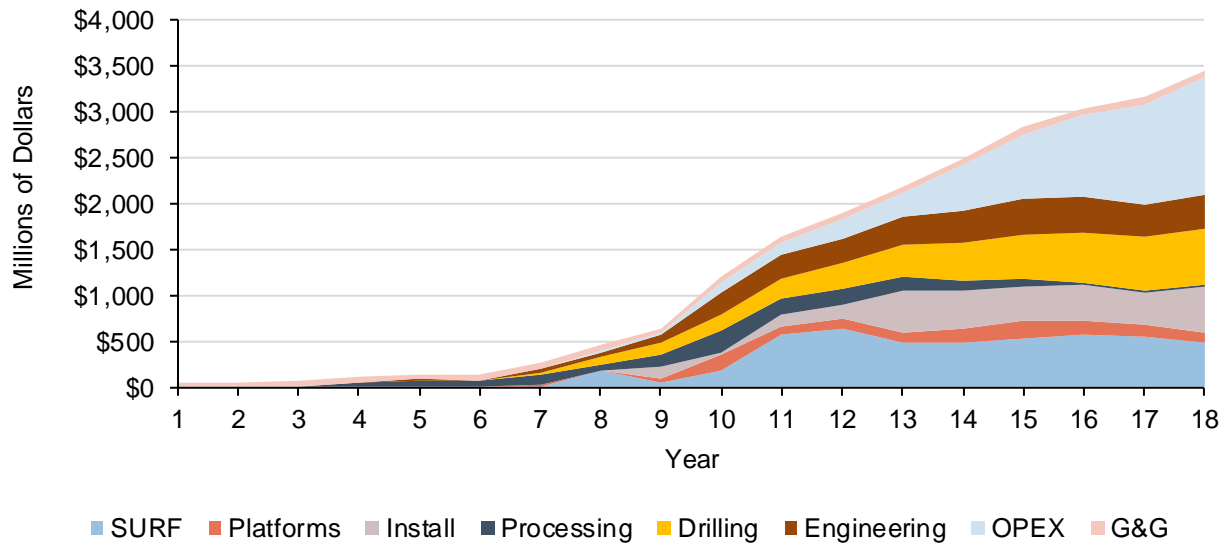
Section 5 – State Results Appendix

6.1 States 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 are projected to 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.

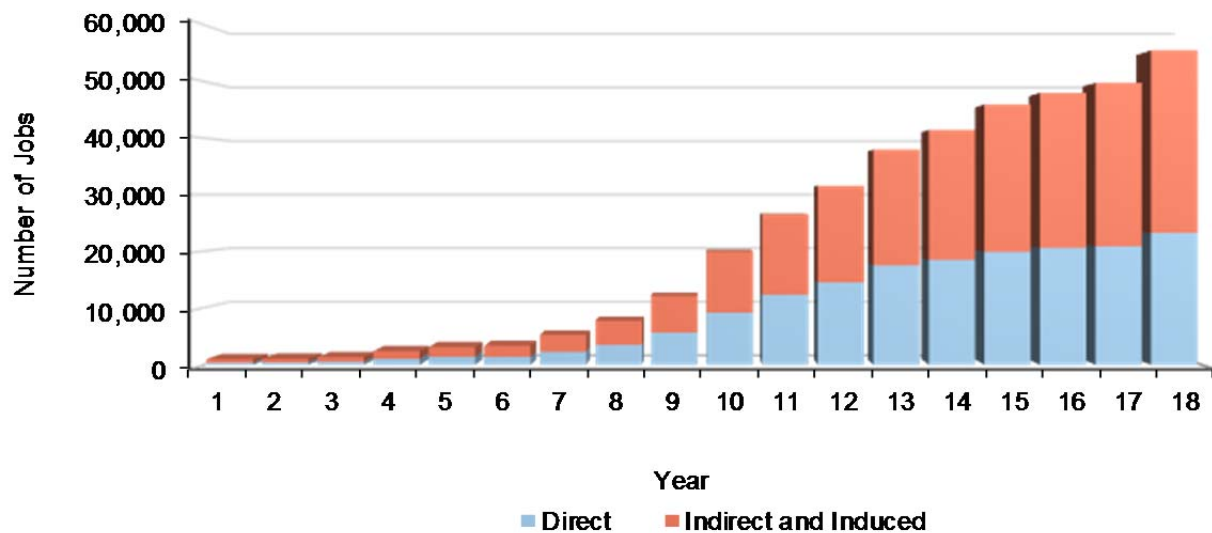
6.2 North Carolina

North Carolina is projected to see the highest levels of spending, employment and contributions to its economy if mid and south Atlantic OCS oil and natural gas resources are developed. Annual spending on Atlantic OCS oil and gas in North Carolina could reach nearly \$3.5 billion by the end of the forecast period. Under this projection, North Carolina benefits from the large amount of project activity expected off the state due to the large reserves in nearby waters and a relatively long coastline. Spending driven primarily through North Carolina's location is projected to include high operational expenditures (projected to be nearly \$1.3 billion at the end of the forecast period), drilling spending (over \$600 million at the end of the forecast period), and installation spending (nearly \$500 million). 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 18)

Figure 18: North Carolina Spending by Sector

Source: Calash

Employment due to offshore oil and gas development in North Carolina is expected to reach over 55 thousand jobs at the end of the forecast period, with direct employment of over 23 thousand jobs and indirect and induced employment of over 32 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 19)

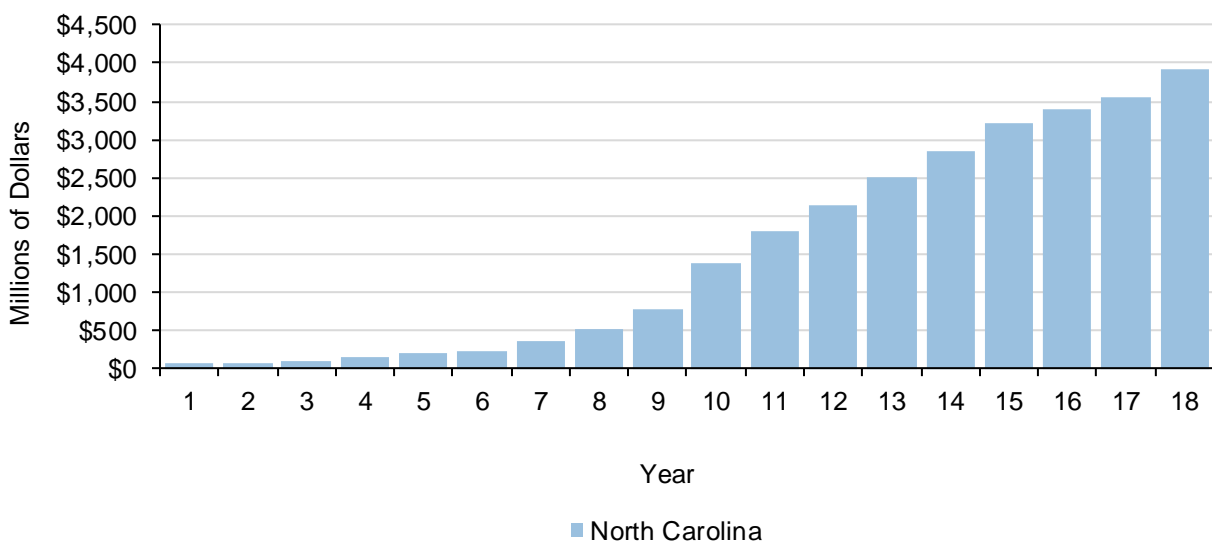
Figure 19: North Carolina Employment Direct vs. Indirect and Induced

Source: Calash

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 at the end of the forecast period) include retail with 3,850 jobs, administrative and waste management services with around 3,300 jobs, healthcare and social assistance with nearly 3,300 jobs, and food services with nearly 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 nearly \$4 billion by the end of the forecast period. (Figure 20)

Figure 20: North Carolina Contributions to the State Economy



Source: Calash

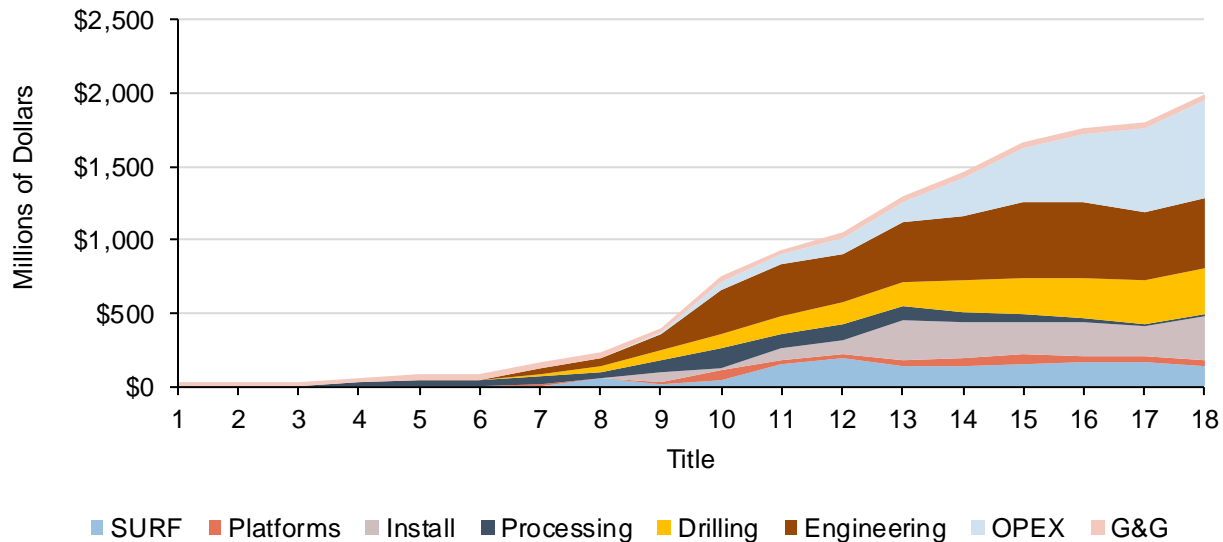
Additionally, if state / federal revenue sharing legislation is enacted North Carolina could see significant incremental government revenues. Under 37.5 percent state revenue sharing, North Carolina state government revenues from bonuses, rents and royalties are projected to reach nearly \$350 million per year by the end of the forecast period and the cumulative effects on the state budget during the forecast period are projected to be nearly \$2.3 billion. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.3 Virginia

Virginia is projected to receive the second highest levels of spending, employment and gross domestic product due to mid and south Atlantic offshore oil and natural gas development. Annual spending from Atlantic OCS oil and natural gas activity in Virginia is projected to reach nearly \$2 billion at the end of the study period. Virginia is expected to see high spending levels

due to significant oil and gas development activity in the resource rich waters around the state. Spending driven by projects, and mainly due to the state's large estimated resource base, include operational expenditures (projected at nearly \$670 million at the end of the forecast period), and installation spending (nearly \$300 million). (Figure 21)

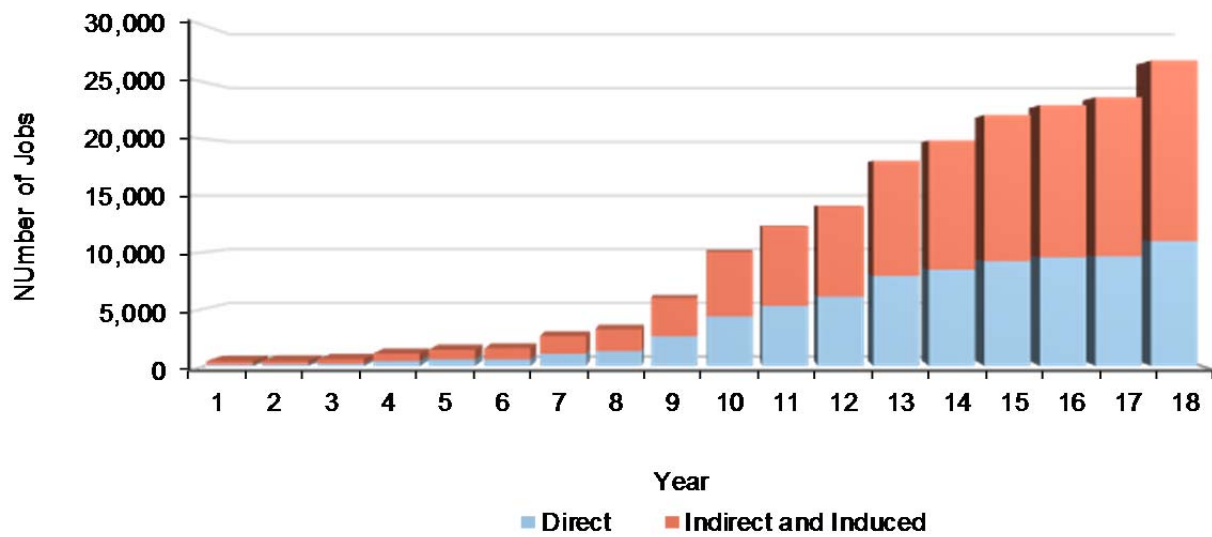
Figure 21: Virginia Spending by Sector



Source: Calash

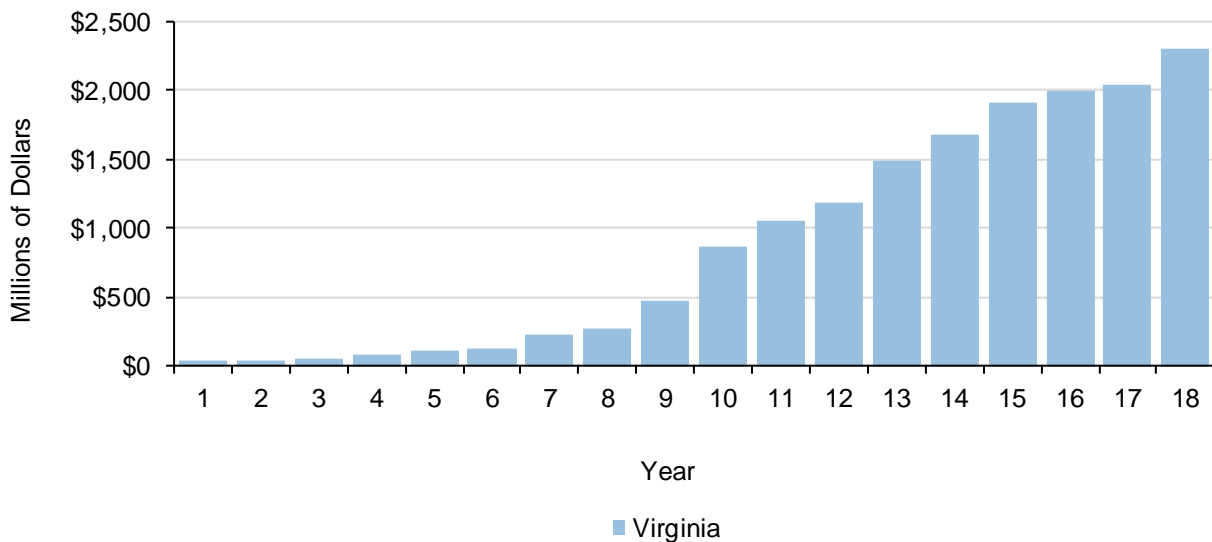
The makeup of Virginia's economy, as well as the large amount of development activity projected off its coast is expected to lead to high levels of engineering activity in the state, with spending projected to reach nearly \$480 million dollars a year at the end of the forecast period. Virginia possesses a strong marine background, hosting a major offshore industry supplier in Chesapeake and one of the largest dry docks in the US at Newport News. Other existing industry suppliers include suppliers of compression equipment for use on offshore platforms, cargo handling equipment for offshore vessels and platforms, and high-tech building materials used in the construction of floating production units.

Virginia employment due to mid and south Atlantic OCS oil and gas exploration and development activities is projected to reach nearly 27 thousand jobs at the end of the forecast period, with a direct employment level due to development activity of nearly eleven thousand jobs and an indirect and induced employment level of nearly 16 thousand jobs. (Figure 22)

Figure 22: Virginia Employment Direct vs. Indirect and Induced

Source: Calash

Atlantic OCS oil and natural gas production is also expected to contribute significant sums to the Virginia state economy. At the end of the forecast period, the contributions of this activity are projected to reach nearly \$2.3 billion. (Figure 23)

Figure 23: Virginia Contributions to the State Economy

Source: Calash

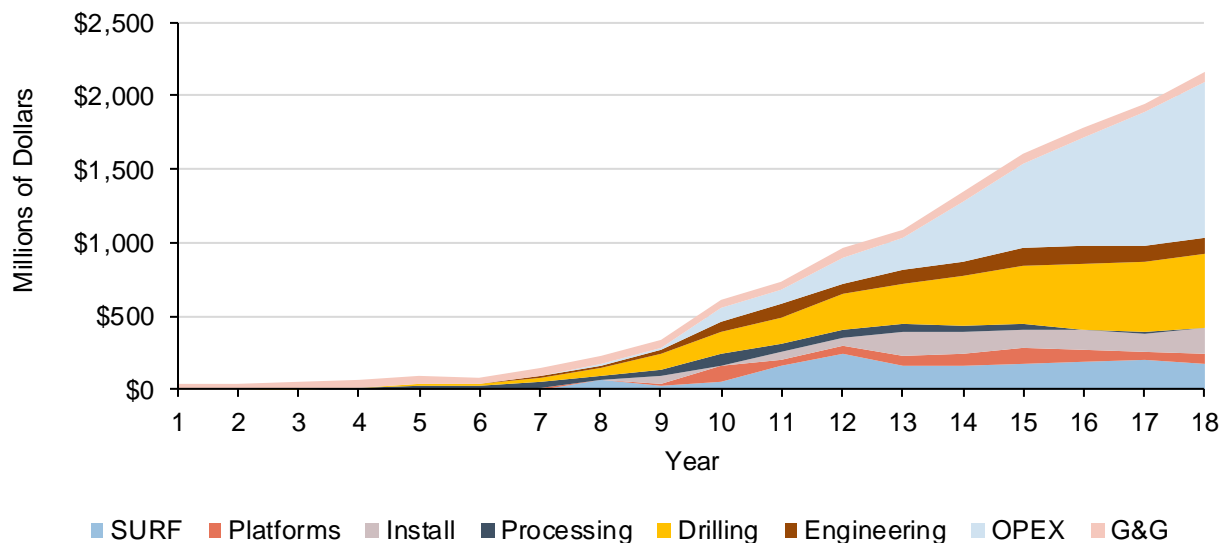
Potential state government revenue from offshore development would be dependent on any future legislated revenue sharing agreements. Under a similar state percentage of revenue sharing as in the Gulf of Mexico at 37.5 percent, Virginia state revenues are projected to reach over \$175 million per year by the end of the study period, with the cumulative effects on the

state budget across the forecast period projected to reach over \$1.1 billion. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.4 South Carolina

South Carolina is projected to see the third highest levels of spending, employment and gross domestic product if mid and south 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 reach nearly \$2.2 billion at the end of the study period. South Carolina is expected to benefit from the high levels of oil and gas development activity expected off the state due to the large reserves in the waters surrounding the state. Spending is driven primarily through these reserves and the expected projects off South Carolina's coast include high levels of operational expenditures (projected to be just over \$1 billion at the end of the forecast period), drilling spending (nearly \$500 million at the end of the forecast period), and installation spending (\$175 million). (Figure 24)

Figure 24: South Carolina Spending by Sector



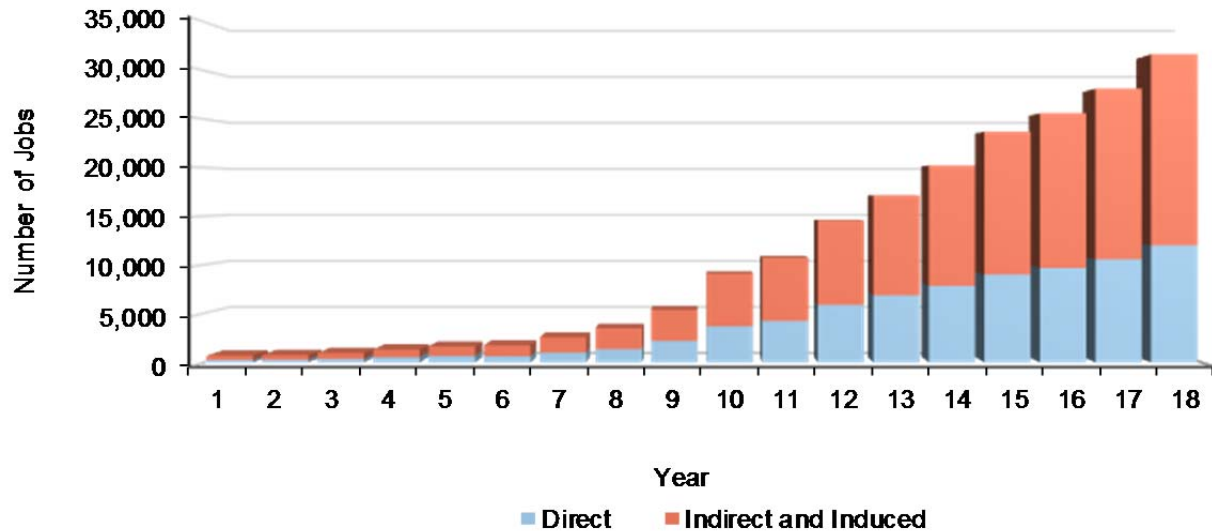
Source: Calash

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 reach over \$700 million dollars a year at the end of the forecast period. South Carolina possesses a strong high-tech manufacturing sector, extensive automobile manufacturing related activity, and manufacturing for suppliers to the energy industry.

Employment due to offshore oil and gas development activities on the Atlantic Coast in South Carolina is expected to reach over 31 thousand jobs at the end of the forecast period,

with direct employment due to development activity at over 12 thousand jobs and an indirect and induced employment increase of nearly 20 thousand jobs. (Figure 25)

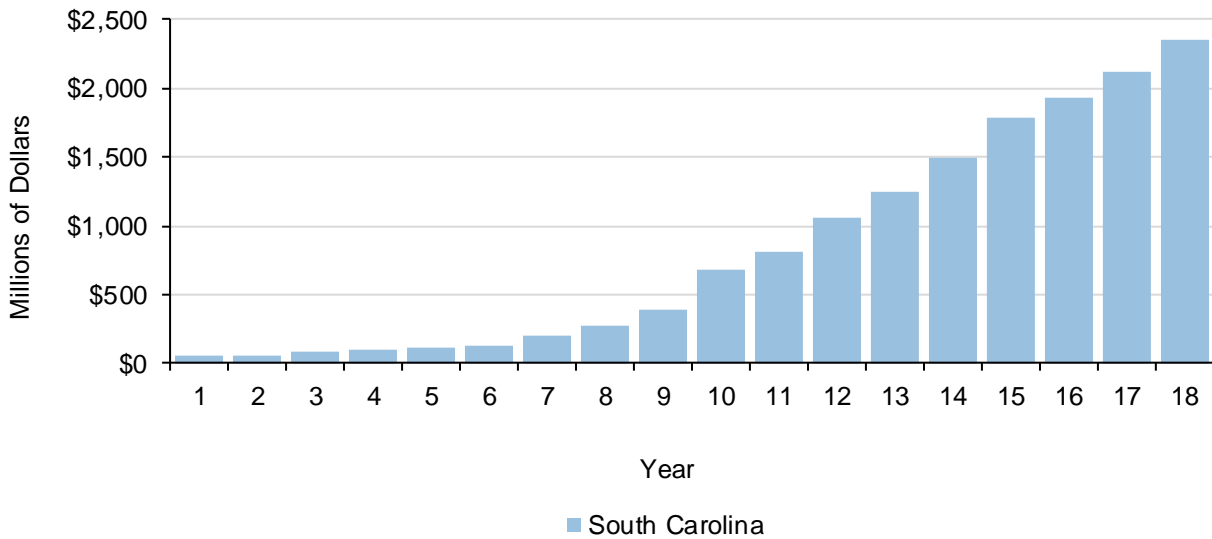
Figure 25: South Carolina Employment Direct vs. Indirect and Induced



Source: Calash

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 at the end of the forecast period) include retail with around 2,100 jobs, administrative and waste management services (over 1,800 jobs), and healthcare and social assistance with over 1,800 jobs, and real estate and food services with around 1,400 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 nearly \$2.4 billion by the end of the forecast period. (Figure 26)

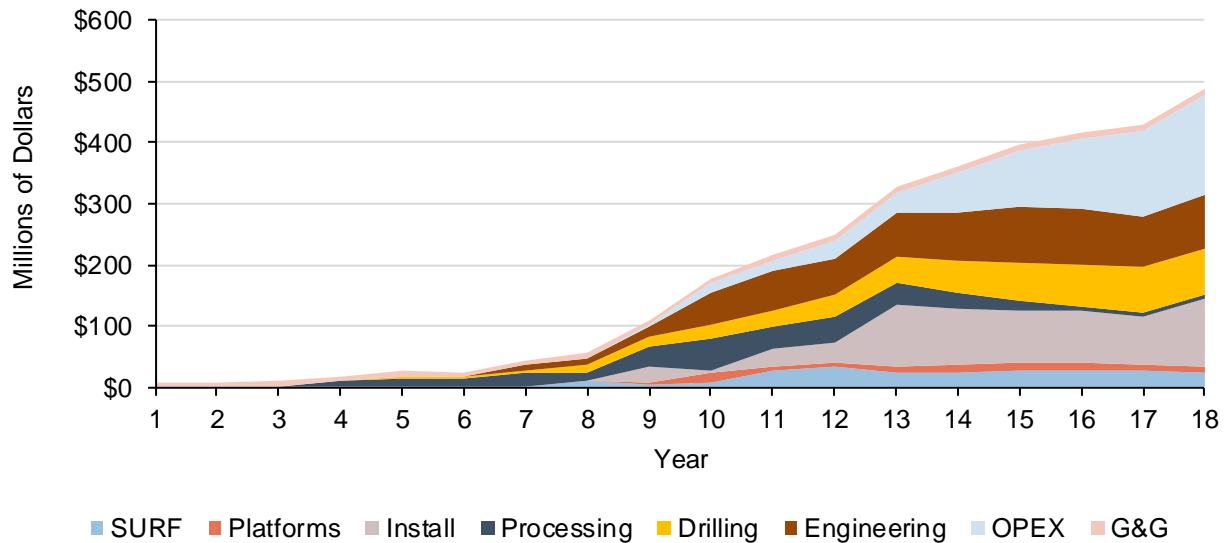
Figure 26: South Carolina Contributions to the State Economy

Source: Calash

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 nearly \$300 million by the end of the forecast period, with the cumulative effects on the state budget across the forecast period projected to be over \$1.8 billion. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.5 Florida

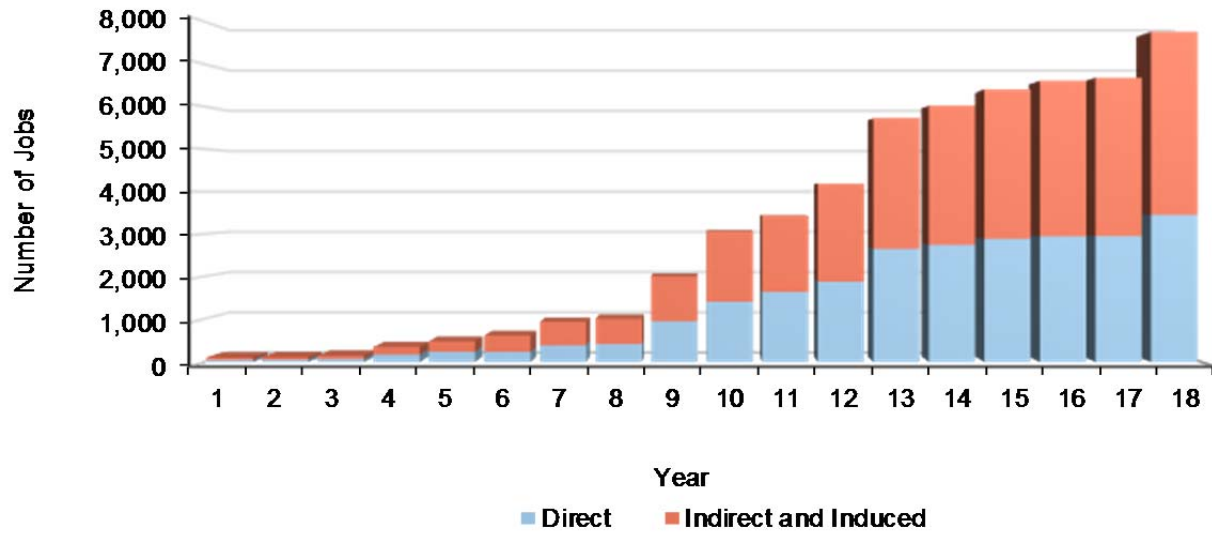
Florida is projected to see annual spending of nearly \$490 million due to the mid and south Atlantic offshore oil and natural gas industry by the end of the forecast period, with spending primarily focused on operational expenditures and engineering. (Figure 27)

Figure 27: Florida Spending by Sector

Source: Calash

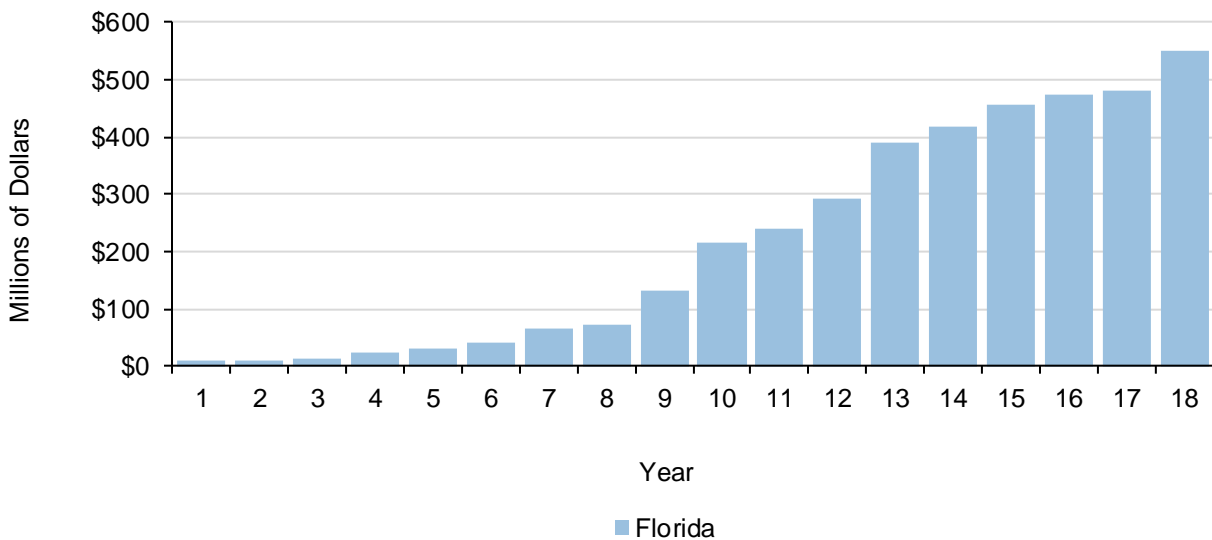
Spending on operation expenditures is projected to reach \$165 million by the end of the forecast period, with engineering spending at over \$85 million. Florida is already host to major oil and natural gas industry suppliers, including one of the largest operators of large offshore tugs used for the transportation of drilling rigs and production units and one of the largest umbilical plants in the world.

Employment in Florida due to spending supporting Atlantic offshore oil and natural gas development is projected to reach nearly eight thousand jobs by the end of the forecast period. Direct employment due to offshore oil and natural gas exploration and production is expected to reach nearly 3,500 jobs in at the end of the forecast period, with indirect and induced employment of nearly 4,300 jobs expected in the same year. (Figure 28)

Figure 28: Florida Employment Direct vs. Indirect and Induced

Source: Calash

Contributions to Florida's state economy due to spending by the Atlantic OCS oil and natural gas industry are projected to be over \$550 million at the end of the forecast period. (Figure 29)

Figure 29: Florida Contributions to the State Economy

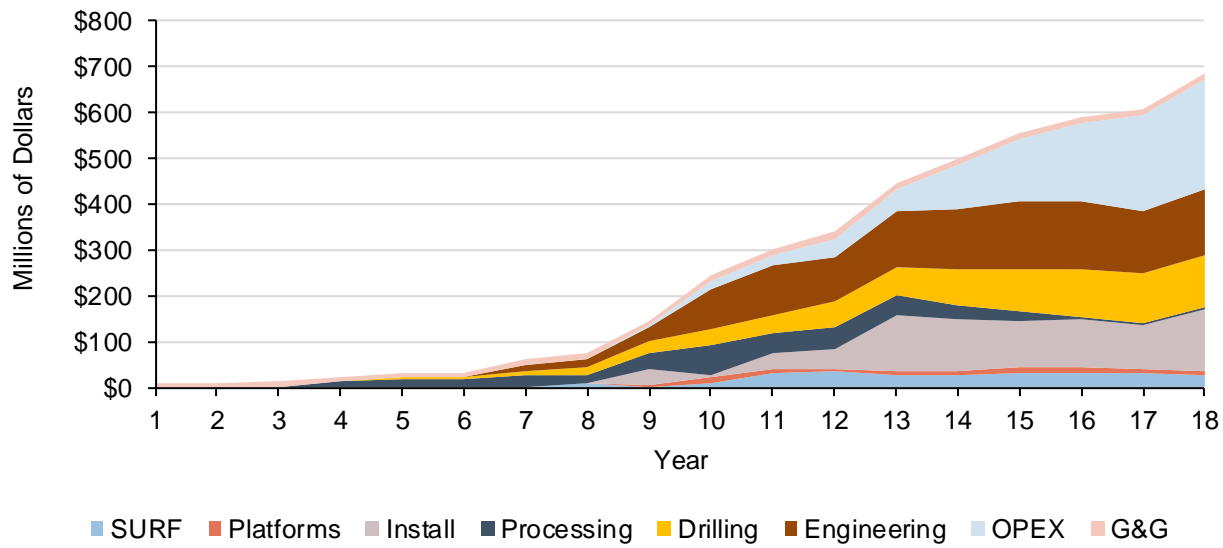
Source: Calash

With an assumed 37.5 percent revenue sharing agreement in place, Atlantic OCS oil and natural gas activities are projected to contribute nearly \$30 million to Florida's budget at the end of the forecast period, with cumulative contributions across the forecast period projected to be nearly \$250 million. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.6 Maryland

Spending due to mid and south Atlantic OCS oil and natural gas exploration and production in Maryland is projected to reach nearly \$690 million at the end of the forecast period, with spending concentrated toward operational expenditures and engineering. (Figure 30)

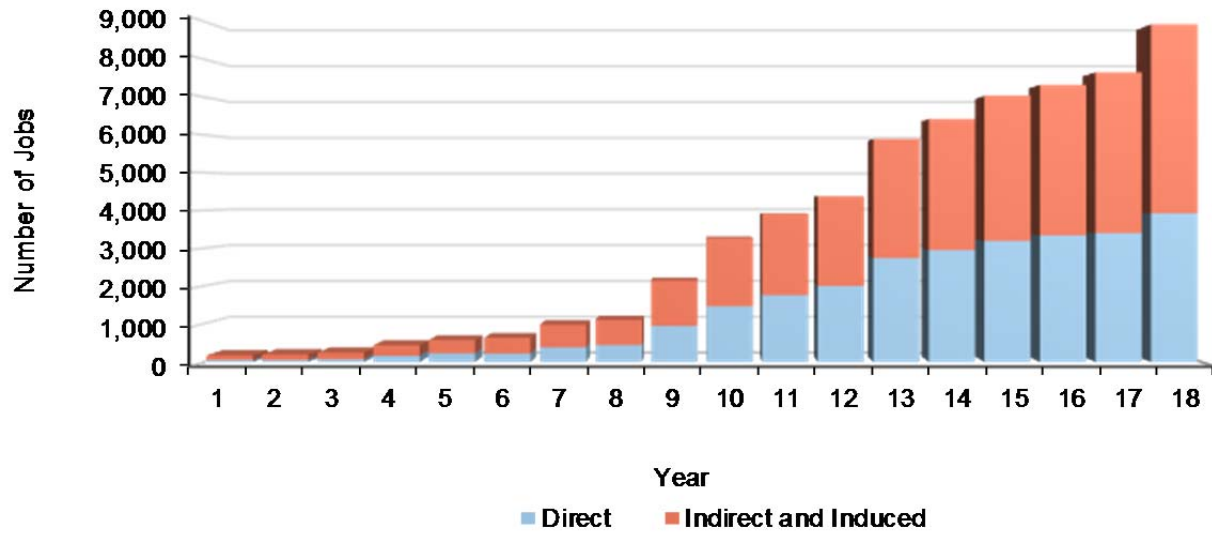
Figure 30: Maryland Spending by Sector



Source: Calash

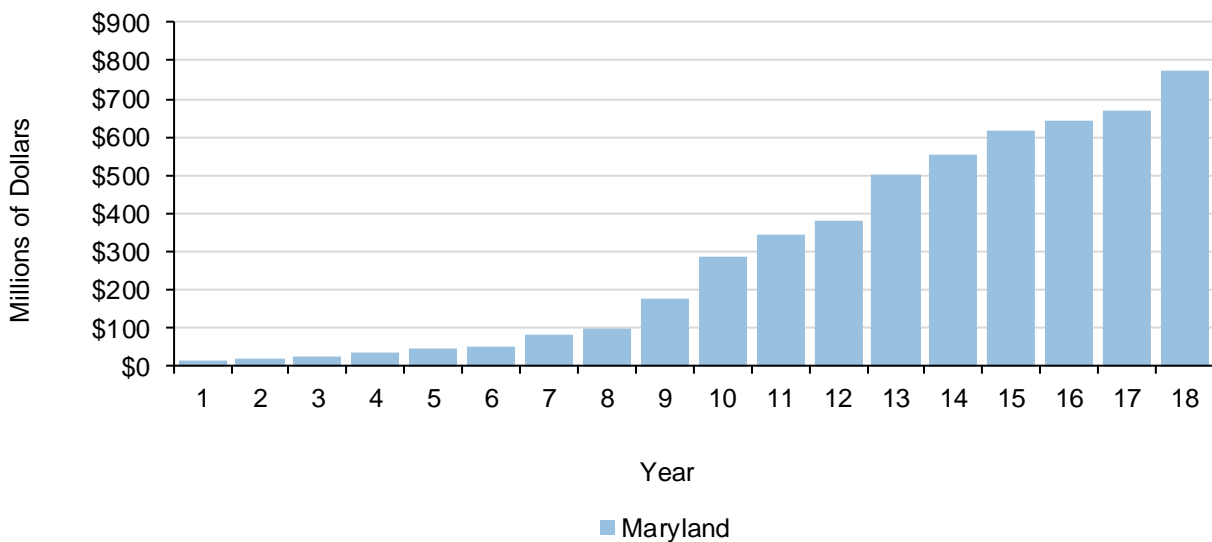
Operational spending is expected to be over \$240 million at the end of the forecast period, with drilling spending just over \$135 million. Maryland is home to a provider of compression equipment for vessels, drilling rigs, and platforms and also is home to one of the largest ports on the east coast in Baltimore.

Employment in Maryland due to spending by the offshore oil and natural gas industry is expected to reach nearly nine thousand at the end of the forecast period. Direct employment due to offshore oil and natural gas exploration and production is expected to reach nearly four thousand jobs at the end of the forecast period, with an indirect and induced employment level of nearly five thousand jobs expected in the same year. (Figure 31)

Figure 31: Maryland Employment Direct vs. Indirect and Induced

Source: Calash

Contributions to Maryland's state economy due to spending by the Atlantic OCS oil and natural gas industry are projected to reach over \$770 million at the end of the forecast period. (Figure 32)

Figure 32: Maryland Contributions to the State Economy

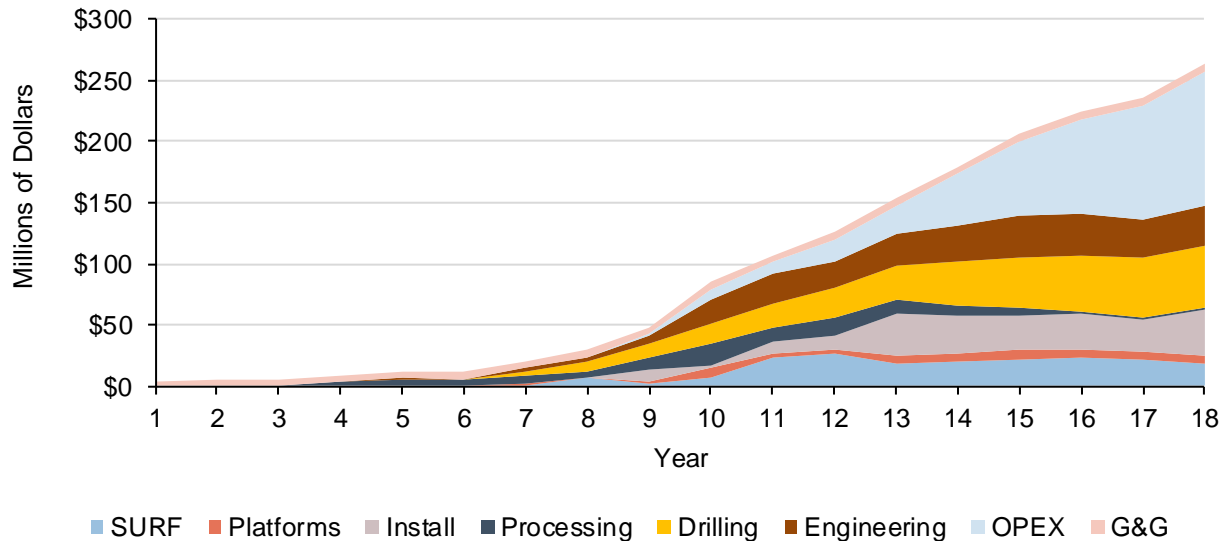
Source: Calash

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 around \$50 million to the Maryland budget at the end of the forecast period, cumulative contributions from across the forecast period are projected to be over \$350 million. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.7 Georgia

Spending in Georgia due to offshore oil and gas activity on the Atlantic coast is projected to reach over \$260 million at the end of the forecast period, and is expected to be primarily focused on operational expenditures and drilling. (Figure 33)

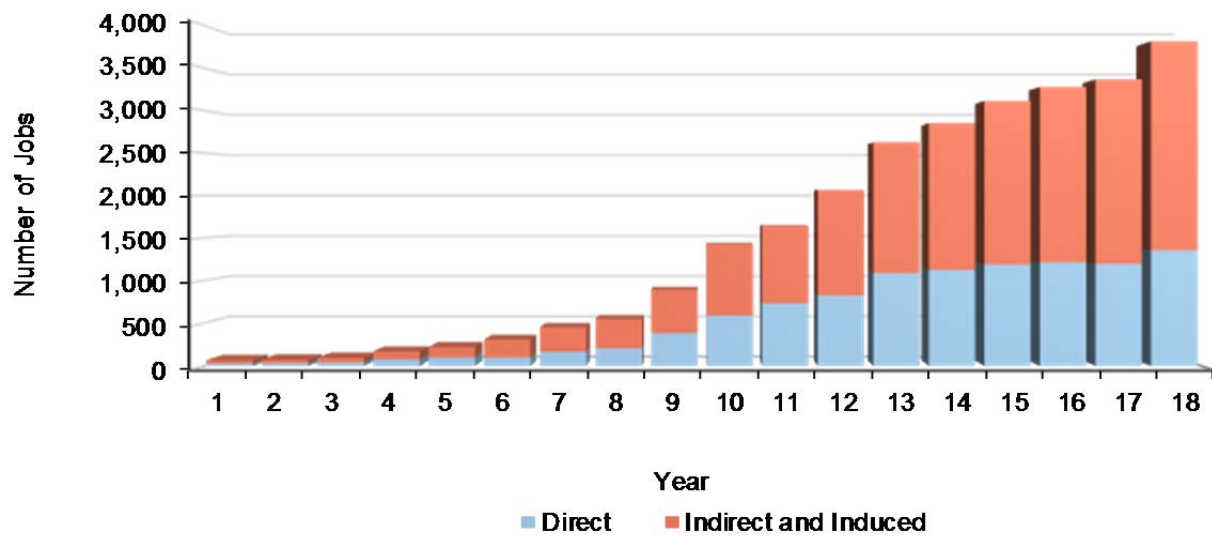
Figure 33: Georgia Spending by Sector



Source: Calash

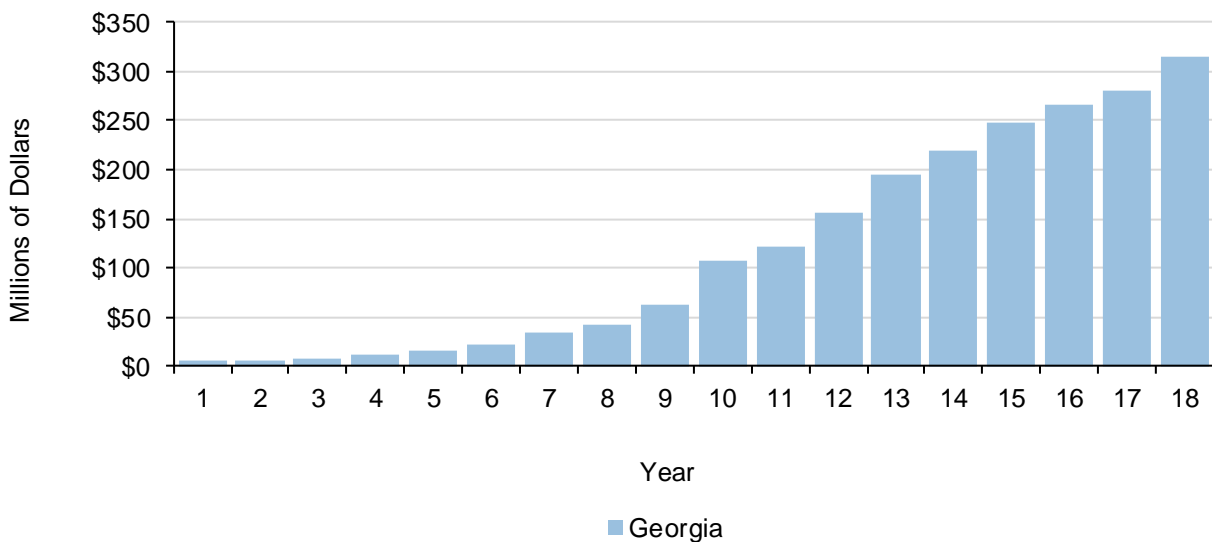
Operational spending is expected to reach over \$100 million at the end of the forecast period, with drilling spending projected to be above \$50 million in the same year. Companies from Georgia currently supply equipment used in offshore oil and gas exploration and production, including pressure control equipment, industrial monitors, and industrial lighting.

Employment in Georgia due to spending by the offshore oil and natural gas industry is projected to reach nearly four thousand jobs at the end of the forecast period. Direct employment due to offshore oil and natural gas exploration and production is projected to be nearly one thousand four hundred jobs at the end of the forecast period, with an indirect and induced employment level of over two thousand four hundred jobs in the same year. (Figure 34)

Figure 34: Georgia Employment Direct vs. Indirect and Induced

Source: Calash

Contributions to Georgia's economy due to spending by the Atlantic OCS oil and natural gas industry are projected to reach nearly \$315 million at the end of the forecast period. (Figure 35)

Figure 35: Georgia Contributions to the State Economy

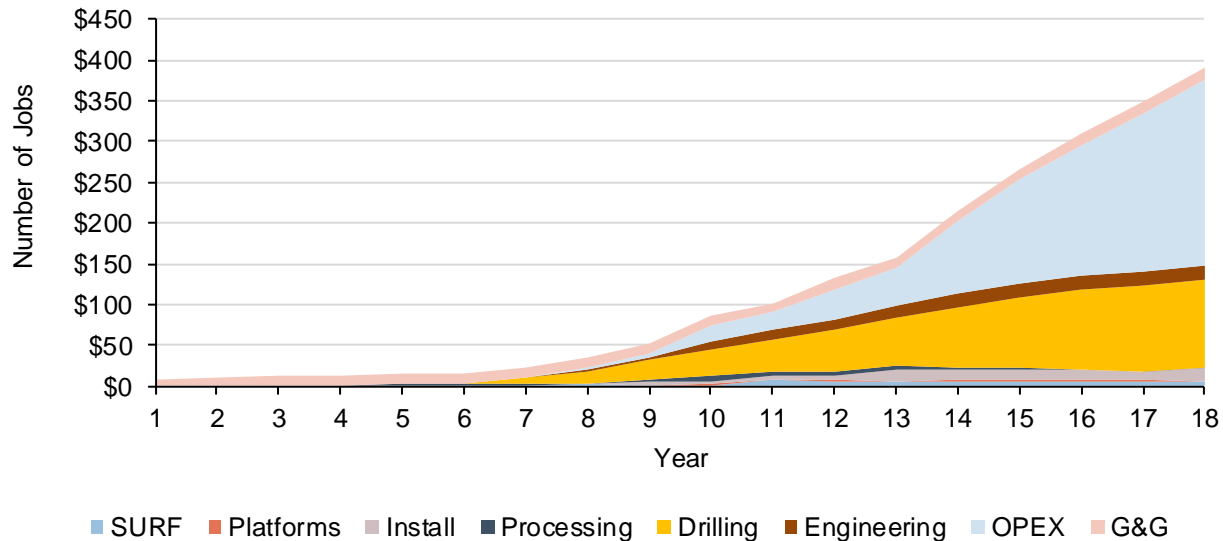
Source: Calash

Georgia's state revenue could see an increase of nearly \$20 million at the end of the forecast period if a 37.5 percent revenue sharing agreement within the Atlantic OCS were enacted. Cumulative contributions across the forecast period are projected to be over \$165 million. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.

6.8 Delaware

Delaware is projected to see spending reach \$390 million at the end of the forecast period due to offshore oil and natural gas activity in the mid and south Atlantic OCS. Operational expenditures and drilling are expected to provide the majority of this spending. (Figure 36)

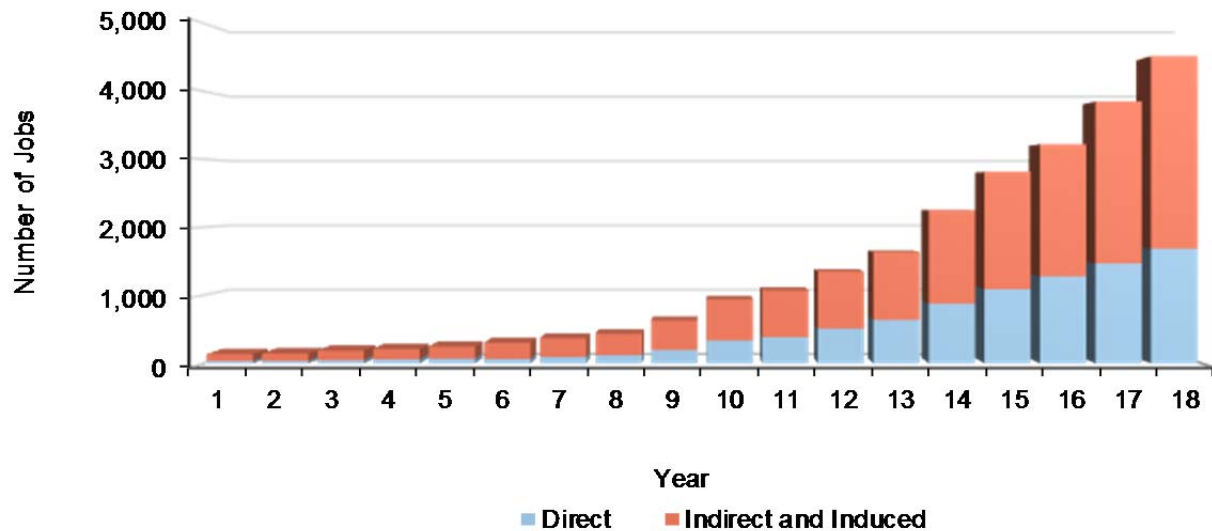
Figure 36: Delaware Spending by Sector



Source: Calash

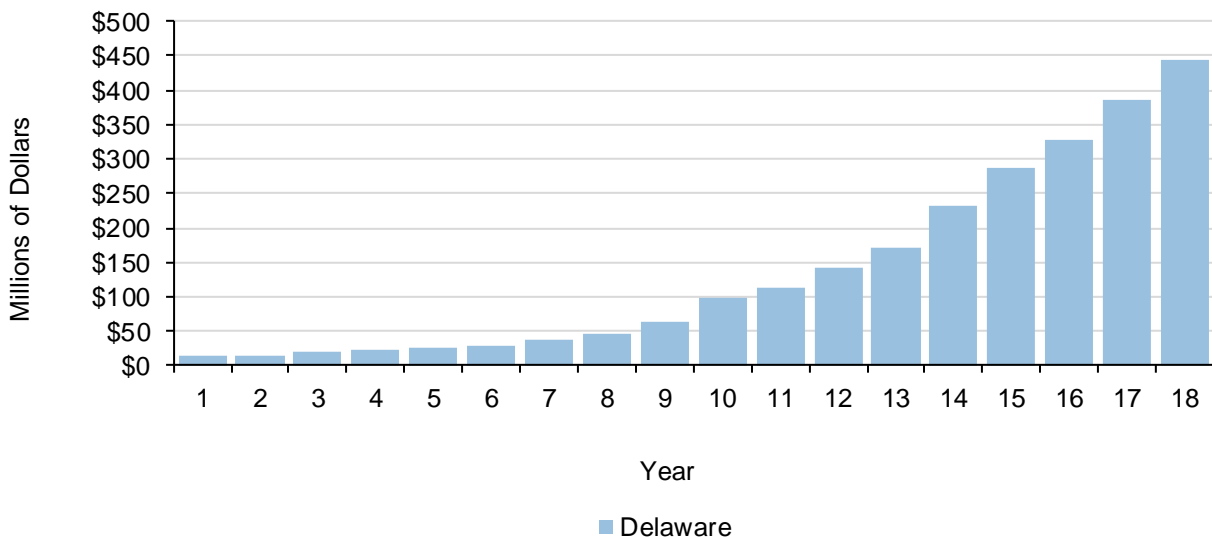
Operational spending is expected to be nearly \$230 million at the end of the forecast period, with drilling spending projected to be nearly \$110 million in the same year. Companies in Delaware currently provide equipment and services to the offshore oil and natural gas industry, including fabrics that provide insulation for wiring used in offshore surveying and exploration and chemical precursors used in pipeline insulation.

Employment in Delaware due to spending by the offshore oil and natural gas industry is projected to reach over four thousand five hundred jobs at the end of the forecast period. Direct employment due to offshore oil and natural gas exploration and production is projected to be nearly one thousand seven hundred jobs at the end of the forecast period, with an indirect and induced employment level of over two thousand eight hundred jobs in the same year. (Figure 37)

Figure 37: Delaware Employment Direct vs. Indirect and Induced

Source: Calash

Contributions to Delaware's economy due to spending by the Atlantic OCS oil and natural gas industry are projected to reach nearly \$450 million at the end of the forecast period. (Figure 38)

Figure 38: Delaware Contributions to the State Economy

Source: Calash

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 nearly \$50 million to the Delaware's state budget at the end of the forecast period; cumulative contributions from across the forecast period are projected to be nearly \$325 million. If a different revenue percentage were enacted, projected state revenues should be adjusted proportionally.



CONTACT

SEAN SHAFER

281-491-2392

s.shafer@calash.com

CAMERON LYNCH

212-392-4809

c.lynch@calash.com

www.calashamericas.com

CALASH

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