# Offshore Drilling Fuels the Climate Crisis and Threatens the Economy

**Sources and Methods for State Factsheets**
**September 2021**

**Greenhouse gas emission calculations**
https://usa.oceana.org/sites/default/files/4046/final_ghg_emissions_and_scc_from_ocs_development_tbd_economics_final012221.pdf
**Coastal economy calculations**
https://usa.oceana.org/sites/default/files/4046/final_cleancoastmethodology_1.22.21.pdf
**Coastal mileage**
https://coast.noaa.gov/data/docs/states/shorelines.pdf
**Fishery species**
https://www.fisheries.noaa.gov/national/sustainable-fisheries/commercial-fisheries-landings
**Offshore Drilling Fuels the Climate Crisis and Threatens the Economy National Factsheet references**
https://usa.oceana.org/sites/default/files/4046/final_references_climatereport_jan2021.pdf

# Oil and Gas Resource Estimates

## Methodology for Economically Recoverable Oil and Gas Estimates

In December 2017, the Bureau of Ocean Energy Management (BOEM) released a minor update to their 2016 National Assessment of Undiscovered Oil and Gas Resources of the U.S. Outer Continental Shelf (OCS).[1] The document designates known oil and gas plays on the OCS and the potential reserves located in the geologic formations of each region. A "play" is defined as a "group of pools that share a common history of hydrocarbon generation, migration, reservoir development, and entrapment", in BOEM's 2016a National Assessment. The 2016a Assessment gives estimates of the Undiscovered Technically Recoverable Resources (UTRR) for each OCS Planning Area in the Arctic Ocean, Atlantic Ocean, Pacific Ocean and Gulf of Mexico. BOEM uses "play-based"

modeling, which extrapolates information from similar geologic formations with known oil and gas resources to estimate resource potential of unknown oil and gas fields.[1]

Specifically, UTRR are the reserves which can be extracted with current technology regardless of the size, accessibility and economics of the accumulations.[2] However, UTRR estimates give no consideration to the economic viability of extraction, and based on BOEM's analysis of economic factors, a significant portion of these resources will not be extracted and used because they would be prohibitively expensive to develop. We used the mean, or average, UTRR values for oil and gas in each of the planning areas incorporated in our analysis.

BOEM's 2016a National Assessment also provides the expected Undiscovered Economically Recoverable Resources (UERR) for the OCS. UERR is the portion of UTRR which is economically feasible to recover under certain economic and technological conditions, like the price of oil and gas.[2] BOEM estimates UERR scenarios at a range of price points from $30/barrel (Bbl) of oil up to $160/Bbl of oil and from $1.60/thousand cubic feet (Mcf) of gas up to $8.54/Mcf of gas.

Based on trends in the spot prices of oil and gas reported by the U.S. Energy Information Administration (EIA), we used the $100/Bbl (and $5.34/Mcf) price cases for our primary estimates of UERR. This price case reflects the rising trend in oil prices, which has increased by almost 91% since its lowest point, from $30.32/Bbl in February 2016 to $57.88/Bbl in December 2017.[3] As of February 1, 2018, the price has continued its upward trajectory and sits at $65.71/Bbl for January 29, 2018.[3] While the current spot prices are closer to the $60/Bbl scenario, our estimate conservatively utilizes the $100/Bbl scenario. This estimate provides a significant margin between current spot prices and future prices, and as a result, overestimates current UERR.

For each OCS Planning Area, we took the expected values of UTRR and UERR and calculated the amount of time each would last the nation at current consumption rates. According to the U.S. EIA, the U.S. consumed approximately 7.19 billion barrels of oil[4] and 27,490,301 million cubic feet of gas[5] in 2016.

We computed how long the estimated oil and gas reserves in each planning area would meet U.S. demand with the following equation:

Amount of time reserves meet domestic demand = reserves / consumption rate

## Oil and Gas Resource Estimates at the State Level

The 2016a National Assessment breaks down oil and gas resource estimates by all four OCS Regions and the 22 OCS Planning Areas within those four, but does not delineate how much of those reserves are located offshore each state. To determine the portion of resources assumed to be offshore each state, we incorporated information from reports put out by Quest Offshore Resources, Inc. In three separate reports, Quest estimated energy and job potential for offshore oil and gas development in the Atlantic Ocean[6], Pacific Ocean[7] and Gulf of Mexico.[8] It is important to note that the Quest Resources reports use substantial assumptions favoring the oil industry and their employment values appear to be exaggerated.[9] These reports give projections for government revenues (rentals, royalties and bonus bids) accrued by each state over a projected time period from 2017 to 2035. These projections represent an analysis done by Quest, and it should be noted that state-level policies do not contribute to differences in revenue streams between states.

Projected government revenues serve as a proxy for determining the oil and gas resources in each state since they are proportional to the amount of oil and gas extracted. We summed these projected revenues over the entire project lifetime, and used the proportion of government revenue in each planning area that is accrued by each individual state to determine the assumed oil and gas resources coming from each state's offshore waters. Finally, we multiplied this proportion by the respective Planning Area's UERR estimate.

We used the equation below to calculate the estimated oil and gas off each state's coast:

> Projected oil or gas reserves (Billion barrels of oil (Bbbl) or trillion cubic feet of gas (Tcf) respectively) per state = (state total of government revenues / Planning Area total of government revenues) * 2014 UERR (Bbbl or Tcf) for Planning Area

## Sources for Oil and Gas Resource Estimates


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# Clean Coast Economy

## Technical Methodology

Oceana's 2021 Clean Coast Economy analysis estimates the number of jobs and the portion of gross domestic product (GDP) that relies on healthy ocean resources, including fishing, tourism and recreation in the United States. This document details the data sources and calculations used in this analysis as presented in Oceana's "Offshore Drilling Fuels the Climate Crisis and Threatens the Economy" report.

Oceana defines Clean Coast Economy to include ocean-dependent commercial and recreational fishing, tourism, and recreation sectors. The analysis is based on National Oceanic and Atmospheric Administration (NOAA) Ocean Economy job and GDP data, focusing on a subset of the ocean economy that relies on a clean and healthy ocean. Total Clean Coast Jobs and GDP are calculated for each coastal state, coastal region and at the national level.

- Total Clean Coast Jobs:
    - Clean Coast Jobs include employed and self-employed workers in the Living Resources and Tourism and Recreation sectors, as defined by NOAA. [1]
    - We estimated the Total Clean Coast Jobs by incorporating the indirect and induced jobs by using economic multipliers derived from National Ocean Economics Program (NOEP) data. Induced jobs are those created in other industries by the increased spending of the employees in the Clean Coast industries.
- Total Clean Coast GDP:
    - The Clean Coast GDP is defined as the GDP from the Living Resources and Tourism and Recreation sectors, according to NOAA.
    - Total Clean Coast GDP includes the indirect and induced GDP from increased spending in the area created by the Clean Coast industries. by using economic multipliers from NOEP.

### 1. TOTAL CLEAN COAST JOBS

The NOAA Office of Coastal Management Digital Coast data portal includes a dataset titled "Economics: National Ocean Watch (ENOW)".[2] ENOW uses Quarterly Census of Employment and Wages data compiled by the Bureau of Labor Statistics to quantify the U.S. jobs dependent on the ocean and Great Lakes. ENOW computes an annual average

using monthly job data, including both the full-time and part-time jobs. In ENOW, jobs are averaged across the year, for example three workers employed for a four-month summer season count as one job. All ENOW data were downloaded through the Quick Report Tool for Socioeconomic Data.

Our calculations use data from the Living Resources and Tourism and Recreation sectors. The Living Resources sector includes commercial fishing, fish hatcheries, aquaculture, seafood processing, and seafood markets.[1] Tourism and Recreation includes eating and drinking establishments, hotels and lodging, marinas, boat dealers, campsites and RV parks, scenic water tours, manufacture of sporting goods, amusement and recreational services, recreational fishing, charter boats, zoos, and aquariums.[1]. Our analysis uses the direct employment data from the two sectors in 2017, which are the most recent data available. Given the current year (2021) and potential impact of the COVID-19 pandemic on the national economy, the 2017data may not fully represent the current fishing, tourism, and recreation markets.

### 1.1 Direct Employment and Self-Employed Workers

The ENOW data portal provides information on employed workers and self-employed workers.[2] Over one-third of the 2017 Living Resources sector workforce is self-employed because many workers in seafood harvesting are classified as self-employed.[2] Self-employment totals from the ENOW portal were added to the employed workers to arrive at direct employment in each sector by state and region.

Direct employment = employed workers + self-employed workers

### 1.2 Indirect and Induced Effects

We estimate the total impacts of tourism, fishing and recreation on the economy by incorporating multiplier effects, or the effects of indirect and induced employment and GDP.[3] For example, when a new beachfront hotel is developed, the resulting additional hotel jobs and income earned by hotel employees are considered direct effects on the ocean economy. Growth in industries related to the commercial enterprise (e.g. supply chain or services), such as additional jobs and income in the industrial laundry or beverage supply industries, are measured as indirect effects of the new hotel. Finally, the induced effects of the hotel are the increases in economic activity because of higher income or employment rates in hotel, support services such as laundry and beverage employees, as well as the higher regional spending on groceries, transportation, housing, etc.

To estimate indirect and induced effects we used economic multipliers – the ratio of the total economic impact (or jobs) of these sectors to the directly measured impact (e.g.

direct employment). After establishing the direct Clean Coast Jobs in the Living Resources and the Tourism and Recreation sectors (Section 1.1) from ENOW, we used job multipliers to calculate total Clean Coast Jobs for each of the coastal state and region.

Multipliers were based on National Ocean Economics Program (NOEP) data.[4] From 2005-2010, NOEP data included direct jobs as well and total jobs (direct, indirect and induced). We used these data to calculate the multipliers used. NOEP used the same multipliers from 2005-2010. Absent more recent multipliers we applied the NOEP multipliers to 2017 jobs data.

We used the following equations to determine total Clean Coast Jobs:

> Clean Coast Jobs multiplier = total employment / direct employment
>
> Total Clean Coast Jobs (direct + indirect + induced employment) = employment multiplier * direct employment (Section 1.1)

Each sector (Living Resources and Tourism and Recreation) has a unique multiplier. Additionally, these multipliers vary by state and region. For example, the Living Resources sector has a Mid-Atlantic regional multiplier of 1.35 and a North Carolina state-level multiplier of 1.28. Total employment was calculated for each coastal state and region with the relevant employment multipliers for each sector, see Tables 2 and 3. For a full list of the multipliers used, see Table 1.

To estimate national Clean Coast Jobs, we total regional employment from the Northeast, Mid-Atlantic, Southeast, Gulf of Mexico, West, North Pacific and Pacific regions.

### 1.3 Split States

Three states in the analysis are what NOAA calls "split states," since they border multiple coasts. The ENOW data portal provides information on coastal jobs bordering the ocean and the Great Lakes. Both New York and Pennsylvania have an Atlantic and Great Lakes coast contributing to their economy. To exclude jobs dependent on the Great Lakes and focus on only ocean-related jobs, we used only the Atlantic jobs in our analysis. Florida borders the Atlantic and the Gulf of Mexico, we added both coasts' employment numbers together to calculate the direct Clean Coast Jobs in Florida. The Florida-state level employment multiplier was used to calculate total employment.

## 2. TOTAL CLEAN COAST GDP

Determining the Clean Coast GDP follows similar methods as the employment calculation described above. We combined NOAA GDP data for Living Resources and Tourism and Recreation sectors to calculate direct Clean Coast GDP. Consistent with NOAA protocol, self-employment gross receipts were not included in GDP calculations, as these are not directly comparable to GDP in the employer-reported datasets.[1] In New York and Pennsylvania we used only the Atlantic Coast GDP.

We generated the Clean Coast GDP multipliers the same way as job multipliers (Section 1.2), using 2010 NOEP data:

Clean Coast GDP multiplier = Total GDP / Direct GDP

Total Clean Coast GDP per sector per state = GDP multiplier * Direct GDP

GDP multipliers were calculated for each sector (Living Resources, and Tourism and Recreation) within each state and region. For a full list of the multipliers used, see Table 1. Total Clean Coast GDP was calculated for each state and region with the relevant GDP multipliers, see Tables 2 and 3.

The national Clean Coast GDP was estimated by adding the regional GDP totals together from the Northeast, Mid-Atlantic, Southeast, Gulf of Mexico, West, North Pacific and Pacific.

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**For additional information, please visit oceana.org/climatecrisis or contact Oceana's Marine Scientist Sarah Giltz at sgiltz@oceana.org**

**Clean Coast Economy Sources**:


1. NOAA (2020) National Oceanic and Atmospheric Administration, Office for Coastal Management. "NOAA Report on the U.S. Marine Economy." Charleston, SC: NOAA Office for Coastal Management. Available: https://coast.noaa.gov/data/digitalcoast/pdf/econ-report.pdf. Accessed Dec 8, 2020.
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## Appendix

**Table 1: Multipliers used to calculate indirect and induced Clean Coast Jobs and GDP, based on 2010 NOEP data.**

| GEOGRAPHIC SCALE | EMPLOYMENT MULTIPLIER | | GDP MULTIPLIER | |
|---|---|---|---|---|
| | Living Resources | Tourism & Recreation | Living Resources | Tourism & Recreation |
| **Regional** | | | | |
| **Gulf of Mexico** | 1.286 | 1.297 | 1.633 | 1.75 |
| **Mid-Atlantic** | 1.351 | 1.403 | 1.784 | 2.025 |
| **North Pacific** | 1.881 | 1.324 | 2.747 | 1.71 |
| **Northeast** | 1.394 | 1.425 | 1.792 | 2.025 |
| **Pacific** | 1.339 | 1.535 | 1.635 | 1.8 |
| **Southeast** | 1.395 | 1.493 | 1.754 | 1.974 |
| **West** | 1.482 | 1.414 | 1.779 | 2.045 |
| **State** | | | | |
| **Alabama** | 1.699 | 1.565 | 1.276 | 1.712 |
| **Alaska** | 1.837 | 1.315 | 2.706 | 1.699 |
| **California** | 1.478 | 1.454 | 1.786 | 2.133 |
| **Connecticut** | 1.311 | 1.335 | 1.626 | 1.903 |
| **Delaware** | 1.257 | 1.486 | 1.290 | 1.686 |
| **Florida** | 1.426 | 1.543 | 1.800 | 2.051 |
| **Georgia** | 1.304 | 1.361 | 1.633 | 1.919 |
| **Hawaii** | 1.339 | 1.535 | 1.635 | 1.800 |
| **Louisiana** | 1.248 | 1.259 | 1.518 | 1.603 |
| **Maine** | 1.357 | 1.421 | 1.621 | 1.840 |
| **Maryland** | 1.363 | 1.378 | 1.674 | 1.926 |
| **Massachusetts** | 1.381 | 1.411 | 1.754 | 1.979 |
| **Mississippi** | 1.326 | 1.270 | 1.640 | 1.521 |
| **New Hampshire** | 1.297 | 1.338 | 1.579 | 1.755 |
| **New Jersey** | 1.337 | 1.382 | 1.692 | 1.934 |
| **New York** | 1.287 | 1.372 | 1.701 | 1.962 |
| **North Carolina** | 1.284 | 1.324 | 1.572 | 2.418 |
| **Oregon** | 1.397 | 1.404 | 1.659 | 1.924 |
| **Pennsylvania** | 1.286 | 1.347 | 1.586 | 1.909 |
| **Rhode Island** | 1.341 | 1.372 | 1.593 | 1.837 |
| **South Carolina** | 1.270 | 1.318 | 1.456 | 1.721 |

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|---|---|---|---|---|
| **Texas** | 1.291 | 1.328 | 1.623 | 1.917 |
| **Virginia** | 1.290 | 1.327 | 1.693 | 1.878 |
| **Washington** | 1.642 | 1.405 | 1.820 | 1.996 |

**Table 2: Regional Total Clean Coast Jobs and GDP**

| Region | Employment | GDP ($USD) |
|---|---|---|
| **Gulf of Mexico** | 490,202 | 29,537,488,000 |
| **Mid-Atlantic** | 911,233 | 77,778,378,000 |
| **North Pacific** | 64,613 | 4,516,969,000 |
| **Northeast** | 311,391 | 24,053,139,000 |
| **Pacific** | 172,204 | 14,050,273,000 |
| **Southeast** | 524,259 | 34,924,864,000 |
| **West** | 817,711 | 68,141,688,000 |
| **National Total** | 3,291,613 | 253,002,797,000 |

**Table 3: State Total Clean Coast Jobs and GDP**

| State | Employment | GDP ($USD) |
|---|---|---|
| **Alabama** | 28,201 | 1,496,714,000 |
| **Alaska** | 63,625 | 4,465,064,000 |
| **California** | 653,671 | 54,303,375,000 |
| **Connecticut** | 53,933 | 4,205,613,000 |
| **Delaware** | 28,609 | 1,365,041,000 |
| **Florida** | 659,131 | 43,164,311,000 |
| **Georgia** | 26,775 | 1,566,446,000 |
| **Hawaii** | 172,204 | 14,050,273,000 |
| **Louisiana** | 78,352 | 4,898,081,000 |
| **Maine** | 59,813 | 3,806,988,000 |
| **Maryland** | 103,632 | 6,992,365,000 |
| **Massachusetts** | 123,956 | 10,341,600,000 |
| **Mississippi** | 25,549 | 1,234,484,000 |
| **New Hampshire** | 12,429 | 844,614,000 |
| **New York (Atlantic only)** | 46,7213 | 47,944,240,000 |
| **New Jersey** | 138,465 | 8,352,417,000 |
| **North Carolina** | 61,804 | 3,130,865,000 |
| **Oregon** | 43,991 | 2,730,637,000 |
| **Pennsylvania (Atlantic only)** | 56,929 | 4,362,154,000 |

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|---|---|---|
| **Rhode Island** | 52,992 | 3,468,407,000 |
| **South Carolina** | 96,781 | 6,696,269,000 |
| **Texas** | 76,234 | 4,492,054,000 |
| **Virginia** | 91,898 | 5,508,652,000 |
| **Washington** | 138,565 | 12,586,147,000 |