OFFSHORE WIND

GENERATING ECONOMIC BENEFITS ON THE EAST COAST

Good for the Economy.
Good for the Environment.

OVERVIEW

The U.S. offshore wind industry is poised for substantial growth, thanks to falling costs and increasing recognition by state and federal policy makers that there are tremendous economic benefits in harnessing clean, renewable energy offshore. BW Research, on behalf of E2, found that if each of the five states below added an average-sized offshore wind energy farm (352 MW) nearly 25,000 construction and operational jobs would be created up and down the eastern seaboard. The Department of Interior is developing lease sales for a strong pipeline of projects in this region—28 in total—which could equal 23,735 MW of new generating capacity, which if all developed would result in tens of thousands of more jobs and added economic benefits for those states. Through its expected growth over the next several years, offshore wind energy has the potential to significantly add to the Gross Regional Product (GRP) and state and federal tax revenues of South and North Carolina, Virginia, New Jersey, and New York.

The country's emerging offshore industry will add jobs and new economic opportunities to already robust coastal economies. In 2015, the ocean-related tourism and recreation industry in North and South Carolina, Virginia, New York, and New Jersey supported over 34,500 business establishments and 572,667 jobs, with $15.6 billion paid in wages and over $32.6 billion in contributions to the country's gross domestic product (GDP)[1] (2018 USD).[2] Additionally, in 2016 commercial fisheries landings[3] in the five Atlantic states had a total landed value of $582 million.[4,5] These two industries, critical to the region's economy, are dependent on clean and healthy oceans.

While responsibly developed offshore wind is compatible with coastal recreation, tourism, and commercial economies, offshore oil and gas development pose a threat to those industries. The Bureau of Ocean Energy Management (BOEM)'s draft proposed five-year offshore oil and gas leasing program would open nearly the entire U.S. continental coastline, including the Atlantic coast, to oil and gas drilling.[6] Allowing drilling along the U.S. coast threatens not only critical natural resources, but also vital sectors of the U.S. economy and the livelihoods of many of the millions of Americans living along the coastline.

The second part of this analysis quantifies several key economic impacts of an oil spill, including identifying important industries that would be at risk, as well as the costs involved in cleanup efforts.[7] The analysis assumes that the Atlantic coast would be open to offshore drilling and, more specifically, that an oil spill would occur offshore in the following states: North Carolina, South Carolina, Virginia, New Jersey, and New York. Using NOAA's Digital Coast ENOW data and National Ocean Economics Commercial Landings Data, the analysis assesses the economic impact of one month of fishing and beach closure due to an oil spill,[8] which results show would have significant impacts to states' economies.[9] Considerable evidence also indicates that the impacts of oil spills persist for many years, indicating that the immediate impacts of closures are only part of the economic and environmental picture.

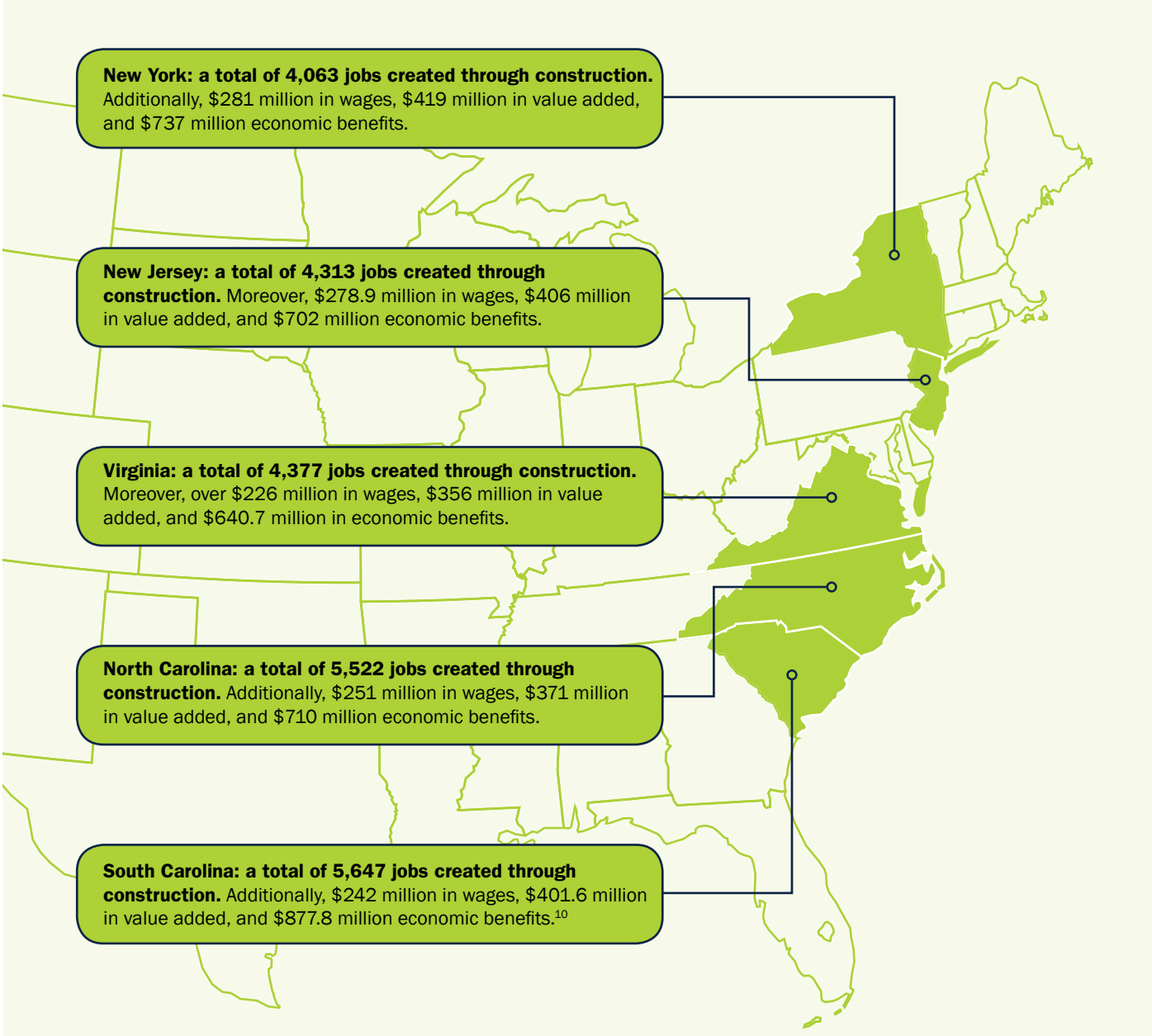
The conclusions of this analysis are clear: responsible offshore wind development is a source for new employment and economic growth while the potential oil spill threats that could arise from an offshore drilling accident jeopardize jobs and businesses that rely on a clean ocean environment.

OFFSHORE WIND DATA BY STATE

The data below show direct and indirect impacts for the construction phase of projects off the coast of South Carolina, North Carolina, Virginia, New Jersey, and New York. Total impacts vary by state depending on factors such as the state's economy (which industries and businesses are present), workforce availability and cost, total project expenditures, and total leakages to outside-the-region businesses (or contrarily, the percentage of local purchases).

For example, expenditures for the construction phase varied from $843 million in New Jersey to $993 million in South Carolina and local imports (money spent outside-the-region) ranged from $386 million in South Carolina to $619 million in North Carolina.

Results show that building offshore wind energy farms along the five east coast states could have significant economic benefits throughout the region (Table 1). These include:



Note that these projections assume large-scale offshore wind development would occur in 2022 and are based on 2018 dollars.

In addition to jobs created, the economic impacts of the offshore wind energy farms include income paid to its employees (i.e. labor wages[11]), contributions to the Regional Gross Product (i.e. GRP or value added[12]), and total sales (i.e. economic benefits[13]). The map above illustrates these impacts by state.

TABLE 1: TOTAL ECONOMIC IMPACT OF BUILDING THE OFFSHORE WIND ENERGY FARMS BY STATE

State	Employment[14]	Wages	Value Added	Economic Benefits
South Carolina	5,647	$242,242,541	$401,608,120	$877,757,516
North Carolina	5,522	$251,494,272	$371,226,884	$710,059,434
Virginia	4,377	$226,117,734	$356,443,742	$640,659,435
New Jersey	4,313	$278,846,133	$406,138,766	$702,121,911
New York	4,063	$281,164,965	$419,048,650	$737,382,141

Once the construction is complete, wind farms require ongoing maintenance and operations such as turbine and blade inspection, routine operations maintenance, and management of energy generation.

// Operating and maintaining an offshore wind farm is responsible for 148 to 204 jobs in each of the five states.

// Labor income (wages) totals $10.5 million in North Carolina to $13 million in New Jersey

// Total value-added to states ranges from $14.7 million in North Carolina to $18.5 million in New Jersey.

// Total economic benefits ranged from $26.9 million in North Carolina to $31 million in New Jersey.

These impacts are significant, especially considering they are expected to continue annually throughout the lifetime of the project.

TABLE 2: TOTAL ECONOMIC IMPACTS OF OPERATING THE OFFSHORE WIND ENERGY FARMS BY STATE

State	Employment	Wages	Value Added	Economic Benefits
South Carolina	204	$10,875,701	$15,363,856	$29,293,053
North Carolina	191	$10,538,130	$14,655,953	$26,877,806
Virginia	160	$11,077,487	$15,849,567	$27,139,572
New Jersey	169	$13,058,963	$18,456,543	$31,333,152
New York	148	$12,111,077	$17,292,561	$29,952,955

In addition to jobs, income, and value added, offshore wind energy development also provides significant state, local, and federal tax revenue. Total state, local, and federal taxes paid by offshore wind farm construction are provided in the table below. State and local taxes range from $18.8 million to $43.8 million and federal taxes from $25.5 million to $66 million.[15]

TABLE 3: FISCAL IMPACTS PER STATE DURING THE CONSTRUCTION PHASE

State	State and Local Taxes	Federal Taxes
South Carolina	$34,968,719	$55,275,939
North Carolina	$28,434,874	$54,312,547
Virginia	$18,861,030	$25,508,499
New Jersey	$38,518,467	$66,160,250
New York	$43,784,554	$63,800,194

The ongoing operations and maintenance of the wind farms are also responsible for significant state and federal tax revenue. During this phase tax contributions would be on-going and expected to last throughout the lifetime of the wind farm.

Total annual state and local tax revenue range from $1 million to $1.6 million annually and federal taxes from $2.2 million to $3 million annually.

TABLE 4: FISCAL IMPACTS PER STATE DURING THE OPERATIONS PHASE

State	State and Local Taxes	Federal Taxes
South Carolina	$1,044,972	$2,289,818
North Carolina	$1,053,186	$2,226,756
Virginia	$1,005,009	$2,417,622
New Jersey	$1,548,593	$3,061,108
New York	$1,582,896	$2,719,529

SOUTH CAROLINA

FOR EVERY **$1.00** SPENT BUILDING AN OFFSHORE WIND FARM, A TOTAL OF **$1.60** IS GENERATED IN THE STATE'S ECONOMY.

South Carolina Construction Phase

Expenditures during the construction phase will include equipment and materials, labor installation, insurance, and development services such as engineering and legal fees. Total expenditures will be approximately $970 million, of which approximately 41% goes to out-of-state businesses.

The total impact of construction of an offshore wind farm in South Carolina will be a little over **$877.8 million** in economic benefits and a total of **5,647 jobs** (Table 5).

TABLE 5: TOTAL ECONOMIC IMPACT OF BUILDING AN OFFSHORE WIND ENERGY FARM IN SOUTH CAROLINA

Construction Phase	Employment	Wages	Value Added	Economic Benefits
Direct Effect	3,350	$140,179,012	$223,799,859	$549,054,050
Indirect Effect	1,118	$56,440,894	$92,409,578	$177,356,303
Induced Effect	1,179	$45,622,634	$85,398,684	$151,347,163
Total Effect	**5,647**	**$242,242,541**	**$401,608,120**	**$877,757,516**

In addition, the construction activities spent in the state in 2022 are responsible for a fiscal impact of nearly $35 million in state and local taxes and over $55 million in federal taxes for that same year. These tax contributions would be a one-time contribution corresponding to year 2022, the year when construction of the wind farm occurs.

South Carolina Operations and Maintenance Phase

The total impact of operations and maintenance is considered to continue annually, assuming the facility continues to be active and the same number of people remain employed. Total annual operating expenditures are a little over $30 million and include personnel wages and materials and services expenses.

With approximately 50% of the operating expenditures (excluding personnel employment which is assumed to be 100% local) going to out-of-state businesses, the total direct impact to the state is $16.9 million and the overall total impact is **$29.3 million** and **204 jobs** created (Table 6).

TABLE 6: TOTAL ECONOMIC IMPACT OF OPERATING AN OFFSHORE WIND ENERGY FARM IN SOUTH CAROLINA

Operations Phase	Employment	Wages	Value Added	Economic Benefits
Direct Effect	110	$6,844,508	$8,490,991	$16,940,656
Indirect Effect	41	$1,982,816	$3,039,044	$5,557,330
Induced Effect	53	$2,048,376	$3,833,821	$6,795,067
Total Effect	**204**	**$10,875,701**	**$15,363,856**	**$29,293,053**

The ongoing maintenance expenditures are also responsible for a significant amount of annual taxes, specifically over $1 million in state and local taxes and $2.3 million in federal taxes in 2022. These tax contributions would be on-going and expected to last throughout the lifetime of the wind farm.

In 2015, the ocean-related tourism and recreation in South Carolina supported 2,891 establishments, 68,106 jobs,[16] wages totaling $1.4 billion, and $3.77 billion in contributions to the GDP (2018 USD). In 2016, commercial fish landings in the state had a total landed value of $21.6 million (2018 USD).[17]

Oil Spill Impact

Assuming a month of beach and fishing closures and consequently a month of lost revenue from tourism and recreation (T&R) and commercial fishing, the total impact of a potential oil spill in the state of South Carolina is $117 million in T&R wages, **$314 million** in T&R GDP contributions, and a total landed value of $1.8 million from commercial fisheries.

NORTH CAROLINA

FOR EVERY **$1.00** SPENT BUILDING AN OFFSHORE WIND FARM, A TOTAL OF **$1.80** IS GENERATED IN THE STATE'S ECONOMY.

North Carolina Construction Phase

Expenditures during the construction phase will include equipment and materials, labor installation, insurance, and development services such as engineering and legal fees. Total expenditures will be approximately $993 million, of which approximately 61% impact out-of-state businesses.

The total impact of the construction of the offshore wind energy farm in the state of North Carolina will be a little over **$710 million** in total economic investment and a total of **5,522 jobs** (Table 7). For every direct $1.00 generated in the state's economy from building an offshore wind farm (direct output), a total of $1.80 is generated in the state's economy

TABLE 7: TOTAL ECONOMIC IMPACT OF BUILDING AN OFFSHORE WIND ENERGY FARM IN NORTH CAROLINA

Construction Phase	Employment	Wages	Value Added	Economic Benefits
Direct Effect	3,329	$149,134,597	$192,015,410	$391,731,787
Indirect Effect	913	$48,426,158	$78,938,870	$144,289,936
Induced Effect	1,280	$53,933,517	$100,272,604	$174,037,711
Total Effect	**5,522**	**$251,494,272**	**$371,226,884**	**$710,059,434**

In addition, the construction activities spent in the state are responsible for an annual fiscal impact of nearly $28.4 million in state and local taxes and $54.3 million in federal taxes in 2022.

North Carolina Operations and Maintenance Phase

The total impact of operations and maintenance is considered to continue annually, assuming the facility continues to be active and the same number of people remain employed. Total annual operating expenditures (excluding financing) are a little over $30 million and include personnel wages and materials and services expenses.

With approximately 58% of the operating expenditures going to out-of-state businesses, the total direct impact to the state is $14.4 million and the overall total economic benefits are **$26.8 million** with **191 jobs** created (Table 8).

TABLE 8: TOTAL ECONOMIC IMPACT OF OPERATING AN OFFSHORE WIND ENERGY FARM IN NORTH CAROLINA

Operations Phase	Employment	Wages	Value Added	Economic Benefits
Direct Effect	101	$6,369,767	$7,491,872	$14,363,033
Indirect Effect	37	$1,909,958	$2,965,403	$5,226,887
Induced Effect	54	$2,258,405	$4,198,678	$7,287,886
Total Effect	**191**	**$10,538,130**	**$14,655,953**	**$26,877,806**

Total fiscal impacts were $1 million in state and local taxes and $2.2 million in federal taxes in 2022.

In 2015, the ocean-related tourism and recreation economy in North Carolina supported 2,585 establishments, 40,995 jobs,[18] wages totaling $685 million, and $1.4 billion in contributions to the GDP. In 2016, commercial fishing in the state had a total landed value of $97.2 million (2018 USD).

Oil Spill Impact

Assuming a month of beach and fishing closures and consequently a month of lost revenue from the tourism and recreation and commercial fishing industries, the total impact of a potential oil spill in the state of North Carolina is $57.1 million in T&R wages, **$120 million** in T&R GDP contributions, and total lost value of $8.1 million from commercial fisheries.

VIRGINIA

FOR EVERY $1.00 SPENT BUILDING AN OFFSHORE WIND FARM, A TOTAL OF $1.73 IS GENERATED IN THE STATE'S ECONOMY.

Virginia Construction Phase

The expenditures during the construction phase will include equipment and materials, labor installation, insurance, and development services such as engineering, public relations, and legal fees. Total expenditures will be approximately $866 million, of which approximately 56% went to out-of-state businesses. The total impact of the construction of the offshore wind energy farm in the state of Virginia will be a little over $640 million in economic investment and a total of **4,337 jobs** (Table 9). The total output multiplier is 1.73, meaning that for every $1.00 spent in building the offshore wind farm, a total of $1.73 is generated in the state's economy.

TABLE 9: TOTAL ECONOMIC IMPACT OF BUILDING AN OFFSHORE WIND ENERGY FARM IN VIRGINIA

Construction Phase	Employment	Wages	Value Added	Economic Benefits
Direct Effect	2,673	$134,826,247	$196,373,559	$370,383,300
Indirect Effect	729	$46,314,432	$75,637,212	$130,114,252
Induced Effect	975	$44,977,055	$84,432,971	$140,161,883
Total Effect	**4,377**	**$226,117,734**	**$356,443,742**	**$640,659,435**

Lastly, the fiscal impact of the construction phase is a total of $29 million in state and local taxes and $52 million in federal taxes in 2022.

Virginia Operations and Maintenance Phase

Total annual operating expenditures (excluding financing) for an offshore wind energy farm in Virginia are a little over $30 million and include personnel wages and materials and services expenses. With approximately 68% of the operating expenditures going to out-of-state businesses, the total direct impact to the state is $15.3 million and the overall economic benefit is **$27.2 million** and **160** jobs created (Table 10). The total output multiplier for operations is 1.78, meaning that for every dollar spent in operating the offshore wind farm, a total of $1.78 is generated in the state's economy.

TABLE 10: TOTAL ECONOMIC IMPACT OF OPERATING AN OFFSHORE WIND ENERGY FARM IN VIRGINIA

Operations Phase	Employment	Wages	Value Added	Economic Benefits
Direct Effect	81	$6,943,952	$8,725,191	$15,270,554
Indirect Effect	31	$1,932,261	$2,992,017	$5,009,195
Induced Effect	48	$2,201,274	$4,132,359	$6,859,823
Total Effect	**160**	**$11,077,487**	**$15,849,567**	**$27,139,572**

Total fiscal impacts were $1 million in state and local taxes and $2.4 million in federal taxes in 2022.

In 2015, the ocean-related tourism and recreation economy in Virginia supported 3,223 establishments, 62,040 jobs,[19] wages over $1 billion, and $2.1 billion in contributions to the GDP (2018 USD). In 2016, commercial fishing in the state had a total landed value of over $212 million (2018 USD).

Oil Spill Impact

Assuming a month of beach and fishing closures and consequently a month of lost revenue from the tourism and recreation and commercial fishing industries, the total impact of a potential oil spill in Virginia is approximately $90 million in T&R wages, **$175 million** in T&R GDP contributions, and a total landed value of $17.7 million from commercial fisheries.

NEW JERSEY

FOR EVERY **$1.00** SPENT BUILDING AN OFFSHORE WIND FARM, A TOTAL OF **$1.83** IS GENERATED IN THE STATE'S ECONOMY.

New Jersey Construction Phase

The expenditures during the construction phase included equipment and materials, labor installation, insurance, and development services such as engineering, public relations, and legal fees. Total expenditures were approximately $843 million, of which approximately 56% went to out-of-state businesses.

The total impact of the construction of the offshore wind energy farm in the state of New Jersey was a little over **$702 million** in economic benefit and a total of **4,313 jobs** (Table 11). For every $1.00 spent in the state in building an offshore wind farm, a total of $1.83 is generated in the state's economy.

TABLE 11: TOTAL ECONOMIC IMPACT OF BUILDING AN OFFSHORE WIND FARM IN NEW JERSEY

Construction Phase	Employment	Wages	Value Added	Economic Benefits
Direct Effect	2,399	$158,059,791	$210,430,397	$382,653,225
Indirect Effect	776	$57,905,967	$88,320,191	$145,946,492
Induced Effect	1,137	$62,880,374	$107,388,178	$173,522,195
Total Effect	**4,313**	**$278,846,133**	**$406,138,766**	**$702,121,911**

The total fiscal impact of building the New Jersey wind energy farm is $38.5 million in state and local taxes and $66.2 million in federal taxes in 2022.

New Jersey Operations & Maintenance Phase

Total annual operating expenditures (excluding financing) for the offshore wind energy farm in New Jersey are a little over $30 million and include personnel wages and materials and services expenses. With approximately 50% of the operating expenditures going to out-of-state businesses, the total direct impact to the state is $16.9 million and the overall total impact is **$31.3 million** and **169 jobs** created (Table 12). The total output multiplier for operations is 1.86, meaning that for every dollar spent in the state in operating the offshore wind farm, a total of $1.86 is generated in the state's economy.

TABLE 12: TOTAL ECONOMIC IMPACT OF OPERATING THE OFFSHORE WIND ENERGY FARM IN NEW JERSEY

Operations Phase	Employment	Wages	Value Added	Economic Benefits
Direct Effect	80	$7,504,907	$9,575,678	$16,867,006
Indirect Effect	36	$2,609,818	$3,852,898	$6,341,399
Induced Effect	53	$2,944,238	$5,027,967	$8,124,747
Total Effect	**169**	**$13,058,963**	**$18,456,543**	**$31,333,152**

The total annual fiscal impact of operating the New Jersey wind energy farm is $1.5 million in state and local taxes and $3 million in federal taxes in 2022.

In 2015, the ocean-related tourism and recreation economy in New Jersey supported 7,555 establishments, 90,774 jobs,[20] almost $2 billion in wages, and over $3.6 billion in contributions to the GDP (2018 USD). In 2016, commercial fishing in the state had a total landed value of over $200 million.

Oil Spill Impact

Assuming a month of beach and fishing closures and consequently a month of lost revenue from the tourism and recreation and commercial fishing industries, the total impact of a potential oil spill in New Jersey is over $163.3 million in T&R wages, approximately **$307.6 million** in T&R GDP contributions, and a total landed value of $16.7 million from commercial fisheries.

NEW YORK

FOR EVERY **$1.00** SPENT BUILDING AN OFFSHORE WIND FARM, A TOTAL OF **$1.72** IS GENERATED IN THE STATE'S ECONOMY.

New York Construction Phase

The expenditures during the construction phase will include equipment and materials, labor installation, insurance, and development services such as engineering, public relations, and legal fees. Total expenditures will be approximately $897 million, of which approximately 54% went to out-of-state businesses.

The total economic benefits of the construction of the offshore wind energy farm in the state of New York was a little over $737 million in economic investment and a total of 4,063 jobs (Table 13). For every dollar spent in the state in building an offshore wind farm, a total of $1.72 is generated in the state's economy.

TABLE 13: TOTAL ECONOMIC IMPACT OF BUILDING THE OFFSHORE WIND FARM IN NEW YORK

Construction Phase	Employment	Wages	Value Added	Economic Benefits
Direct Effect	2,345	$163,339,541	$223,446,892	$428,633,486
Indirect Effect	742	$60,719,200	$93,500,043	$151,777,016
Induced Effect	976	$57,106,224	$102,101,714	$156,971,639
Total Effect	**4,063**	**$281,164,965**	**$419,048,650**	**$737,382,141**

Total fiscal impact of building the offshore wind energy facility in New York is $43.8 million in local and state taxes and $63.8 million in federal taxes in 2022.

New York Operations and Maintenance Phase

Total annual operating expenditures (excluding financing) for the offshore wind energy farm in New York are a little over $30 million and include personnel wages and materials and services expenses. With approximately 48% of the operating expenditures going to out-of-state businesses (excluding personnel wages), the total direct impact to the state is $17.3 million and the overall total economic benefits are **$30 million** and **148 jobs** created (Table 14). The total output multiplier for operations is 1.73, meaning that for every dollar spent in the state in operating the offshore wind farm, a total of $1.73 is generated in the state's economy.

TABLE 14: TOTAL IMPACT OF OPERATING THE OFFSHORE WIND ENERGY FARM IN NEW YORK

Operations Phase	Employment	Wages	Value Added	Economic Benefits
Direct Effect	75	$7,115,118	$9,152,310	$17,325,065
Indirect Effect	31	$2,543,209	$3,755,002	$5,885,529
Induced Effect	42	$2,452,749	$4,385,248	$6,742,362
Total Effect	**148**	**$12,111,077**	**$17,292,561**	**$29,952,955**

Lastly, the annual fiscal impact of operating the offshore wind energy farm in New York include $1.6 million in local and state taxes and $2.7 million in federal taxes in 2022.

In 2015, the ocean-related tourism and recreation economy in New York supported 18,281 establishments, 311,728 jobs,[21] over $10 billion in wages, and over $21 billion in contributions to the GDP (2018 USD) (Table 36). In 2016, commercial fishing in the state had a total landed value of almost $50 million (2018 USD).

Oil Spill Impact

Assuming a month of beach and fishing closures and consequently a month of lost revenue from the tourism and recreation and commercial fishing industries, the total impact of a potential oil spill in New York is over $870 million in T&R wages, approximately **$1.8 billion** in T&R GDP contributions, and a total landed value of $4.1 million from commercial fisheries.

CONCLUSION

Offshore Wind

Five economic impact analyses were conducted to determine the impacts of *building* and *operating* offshore wind energy farms in the states of South Carolina, North Carolina, Virginia, New Jersey, and New York.

Results show that building offshore wind energy farms along the Atlantic coast can have significant economic benefits to the region. Total jobs created range from 2,556 in Virginia to 5,647 in South Carolina and these jobs provide wages and income ranging from over $108 million in Virginia to $281 million in New York. Total contributions to the GRP, or value added, range from $173 million in Virginia to $419 million in New York.

Oil Drilling

In a region such as the Atlantic coast where beaches and barrier islands dominate the landscape, the economic loss from an oil spill could be significant. An oil spill would threaten the ocean-related tourism and recreation and commercial fishing industries along the five states of South and North Carolina, Virginia, New Jersey, and New York.

Results from the oil spill impact analysis show that total tourism and recreation **GDP loss** would be greatest in New York at $1.8 billion, with New Yorkers losing $870 million in wages as well. Looking at the impact to commercial fishing, the landed value lost would be significant as well, with the largest cost expected in Virginia ($17.7 million) (Figure 1) and (Figure 2).

FIGURE 1: TOURISM & RECREATION WAGES AND GDP IMPACTED BY AN OIL SPILL BY STATE[22]

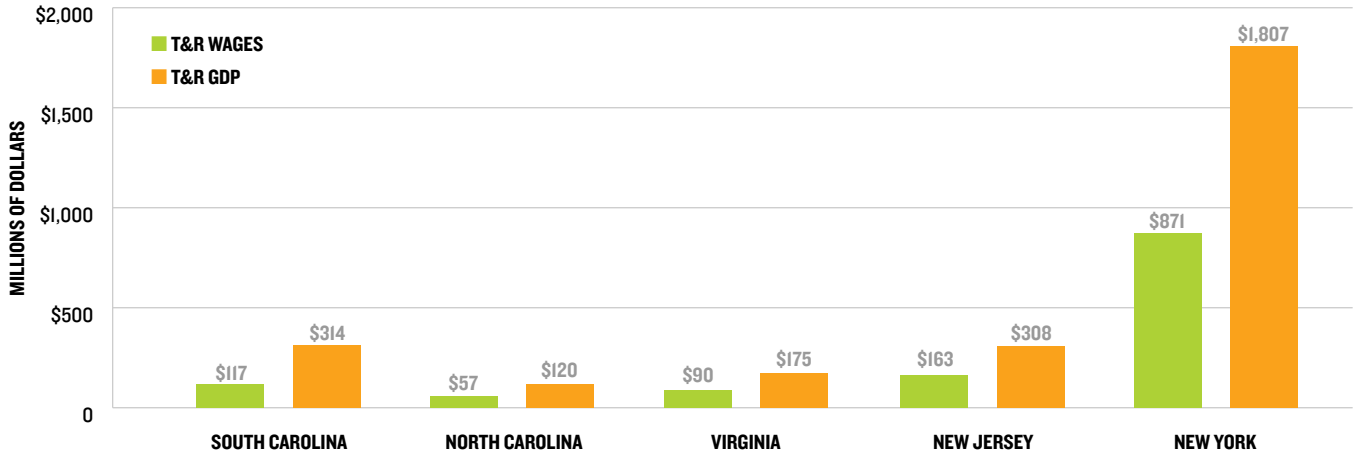
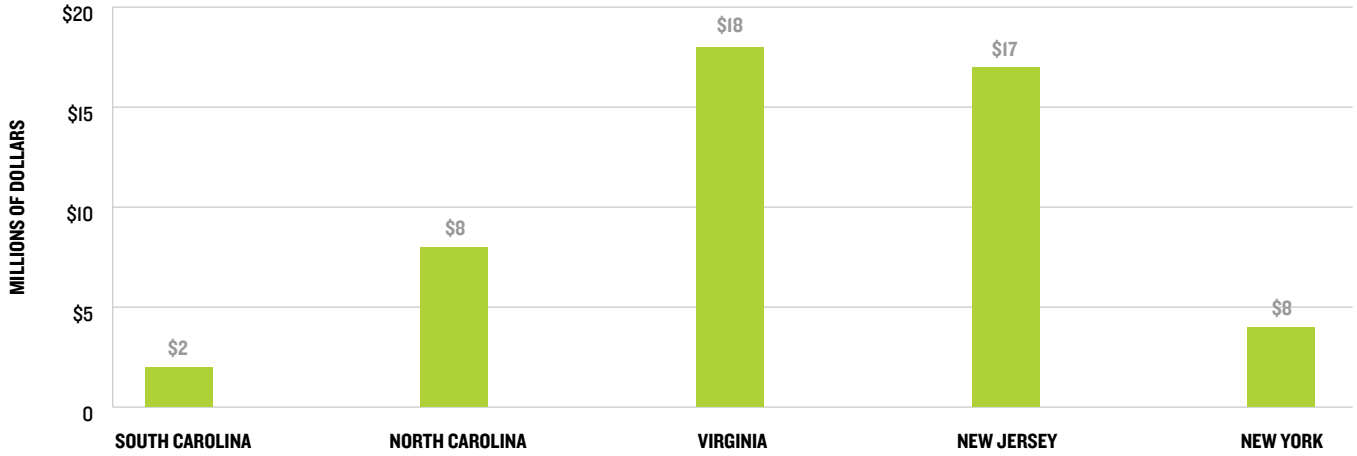


FIGURE 2: COMMERCIAL FISHING LANDINGS IMPACTED BY AN OIL SPILL[23]



Offshore Wind Methodology

BW Research relied on secondary data provided by sources such as the Bureau of Ocean Energy Management (BOEM), the National Renewable Energy Laboratory (NREL), 4C Offshore, and others, to determine offshore wind project parameters in the five different states. Data on current proposed projects and BOEM lease blocks were taken into consideration to identify potential wind farm characteristics such as energy generation capacity, turbines size, average water depth, distance from the coast, and distance to port. These parameters were then input into NREL's offshore wind jobs & economic development impact (JEDI) model to determine the construction and operating costs of offshore wind farms in each of the five U.S. states (Figure 3). Note that the construction costs of a wind farm will change with technology advancements, deployment efficiency, economies of scale and other factors. The JEDI model provides a "point-in-time" estimate customized to potential state settings.

FIGURE 3: ECONOMIC IMPACT ANALYSIS MODEL

Lastly, to conduct the economic impact analysis, JEDI's construction and operating costs were applied to the Impact analysis for PLANning (IMPLAN), an input-out model that traces how changes in spending and infrastructural developments move through the economy (Figure 3). The final economic impact models include the total direct, indirect, and induced impacts and tax contributions generated by the construction and annual operation of each offshore wind farm. All monetary values are provided in 2018 USD.

For more on the methodology for this report, please see the full memo prepared by BW Research, here.

Offshore Drilling Spill Methodology

Oil Spill Impact Analysis

To determine the economic impact of a hypothetical oil spill offshore of each of the five U.S. states, the research team started with two assumptions. One was that the Atlantic coast was open to offshore drilling[24] and that there was currently oil and gas exploration, development, or production off the coasts of South Carolina, North Carolina, Virginia, New Jersey, and New York. The second assumption was that there would be an oil spill that would result in a one-month beach and fishing closure to the affected state. The Deepwater Horizon oil spill, which occurred on April 20th, 2010, was responsible for 197 days (nearly 7 months) of fishing closures[25] and over ten million recreational user days lost or severely affected due to the oil spill.[26] Beach closures can be measured in units of "oil spill advisory days," where one day of beach closure equals one oil spill advisory day.[27] Through June 15, 2011 the number of oil spill advisory days were as follows:[28]

// Alabama: 1,661 oil spill advisory days at 30 beaches from June 1 to July 30, 2010.

// Florida: 2,245 oil spill advisory days at 30 beaches from June 8, 2010 to June 15, 2011.

// Louisiana: 3,420 oil spill closure days at 11 beaches from May 7, 2010 to June 15, 2011.

// Mississippi: 2,148 oil spill advisory days at 17 beaches from June 28 to November 30, 2010.

Following the Deepwater Horizon fishing and beach closure days, our assumption of a one month closure is conservative and yet illustrative of the impacts an oil spill can have in the surrounding area.

We chose National Oceanic and Atmospheric Administration's (NOAA) Economics: National Ocean Watch (ENOW) available at NOAA's Digital Coast[29] and NOAA's National Ocean Economics Commercial Landings Data as our datasets, due to their comprehensive and uniform nature.[30] Tourism and recreational data by state were provided for year 2015[31] and commercial landings data for year 2016.[32] The tourism and recreation sector of the ocean economy includes revenue from dining establishments, hotels, marinas, boat dealers, charters, campsites and RV parks, scenic water tours, manufacture of sporting goods, amusement and recreation, recreational fishing, zoos, and aquariums.[33]

For the tourism and recreation analysis in New York, the Great Lakes Counties were excluded, leaving only those coastal counties that would be affected by an oil spill.[34,35]

For more on the methodology for this report, please see here.

ENDNOTES

1 Source: NOAA ENOW Explorer available at: https://coast.noaa.gov/enowexplorer/#/.

2 Values were converted from 2015 US dollars to 2018 US dollars using the annual GDP deflator provided by https://www.eia.gov/opendata/qb.php?category=1039997&sdid=STEO.GDPDIUS.A.

3 Source: https://www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html.

4 Note that this value does not include multipliers and the landed value or dock value is lower than the final price paid in restaurants and other businesses selling to the final consumer.

5 Values were converted from 2016 US dollars to 2018 US dollars using the annual GDP deflator provided by https://www.eia.gov/opendata/qb.php?category=1039997&sdid=STEO.GDPDIUS.A.

6 More information can be found at https://www.boem.gov/National-Program-Learn/#regionalmaps/.

7 It is important to note that these two impacts should be looked at separately. While oil spill economic impacts have a negative effect on the economy, the cleanup costs could have a temporary positive impact to the local economy, with increased hotel occupancies and restaurant expenditures from the influx of hundreds of oil spill workers. For oil spill cleanup cost data, see full report.

8 Source: http://sero.nmfs.noaa.gov/deepwater_horizon/closure_info/index.html A one-month closure can be a conservative estimate, since the impacts to wildlife and natural resources can be felt over a much longer period of time and the Deepwater Horizon oil spill, which occurred on April 20th, 2010, was responsible for 197 days (nearly 7 months) of fishing closures. Nonetheless, it was determined that this timeline would be a good starting point for this type of analysis.

9 The values calculated in this analysis are based on average values and do not account for seasonal variation in the industry activity. Seasonality is very important in both the tourism and recreation and commercial fishing industries and wages, GDP, and landings can vary significantly throughout the year. For example, summer peak employment in the tourism and recreation industry is 103% the annual average employment in New York Counties and 110% in New Jersey Counties (http://midatlanticocean.org/wp-content/uploads/2018/05/Climate-Change-Vulnerabilities-in-the-Coastal-Mid-Atlantic-Region.pdf). By simply calculating average, monthly values we are not accounting for seasonality, but this methodology was chosen for simplicity and to avoid adding extra assumptions such as the time of the year the oil spill would occur.

10 Output includes total revenues or sales (for retail and wholesale trade, output equals gross margin and not gross sales.

11 Labor income includes all forms of employment income, including employee compensation (wages + benefits) and self-employed income.

12 Value added is total sales minus the cost of intermediate inputs (purchased from other businesses) required to make the final product or service.

13 Total output includes total revenues or sales; for retail and wholesale trade, output equals gross margin and not total sales.

14 Employment refers to the annual average of monthly jobs (same definition used by QCEW, BLS, and BEA, nationally) and it includes both full- and part-time jobs.

15 These taxes derived from the construction of the wind farm are annual (year 2022) and a one-time contribution.

16 Includes self-employment.

17 Includes self-employment.

18 Includes self-employment.

19 Includes self-employment.

20 Includes self-employment.

21 Includes self-employment.

22 Assuming a one-month of beach and fishing closures.

23 Ibid.

24 Oil and gas exploitation is not currently underway in the Atlantic.

25 Source: http://sero.nmfs.noaa.gov/deepwater_horizon/closure_info/index.html

26 Source: https://www.doi.gov/sites/doi.gov/files/migrated/deepwaterhorizon/upload/ERP-PEIS-Part-2-Chapter-4-through-Chapter-9.pdf

27 Source: http://www.gulfspillrestoration.noaa.gov/sites/default/files/wp-content/uploads/Chapter-2_Incident-Overview_508.pdf

28 Ibid.

29 Source: NOAA ENOW Explorer available at: https://coast.noaa.gov/enowexplorer/#/.

30 Source: http://www.oceaneconomics.org/LMR/fishSearch.asp.

31 Source: https://coast.noaa.gov/enowexplorer/#/employment/total/2015/34000

32 Source: http://www.oceaneconomics.org/LMR/fishSearch.asp.

33 Source: https://coast.noaa.gov/digitalcoast/tools/enow.html.

34 New York Counties included in the recreation & tourism data analysis: Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, Westchester. The Counties of Dutchess, Rockland, and Ulster were initially considered for analysis, but had no ocean-related tourism and recreation economic activity.

35 For the commercial fishing analysis in New York, data by county were not available. Thus, in addition to the previously considered, Columbia and Green counties were also included in the analysis.

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