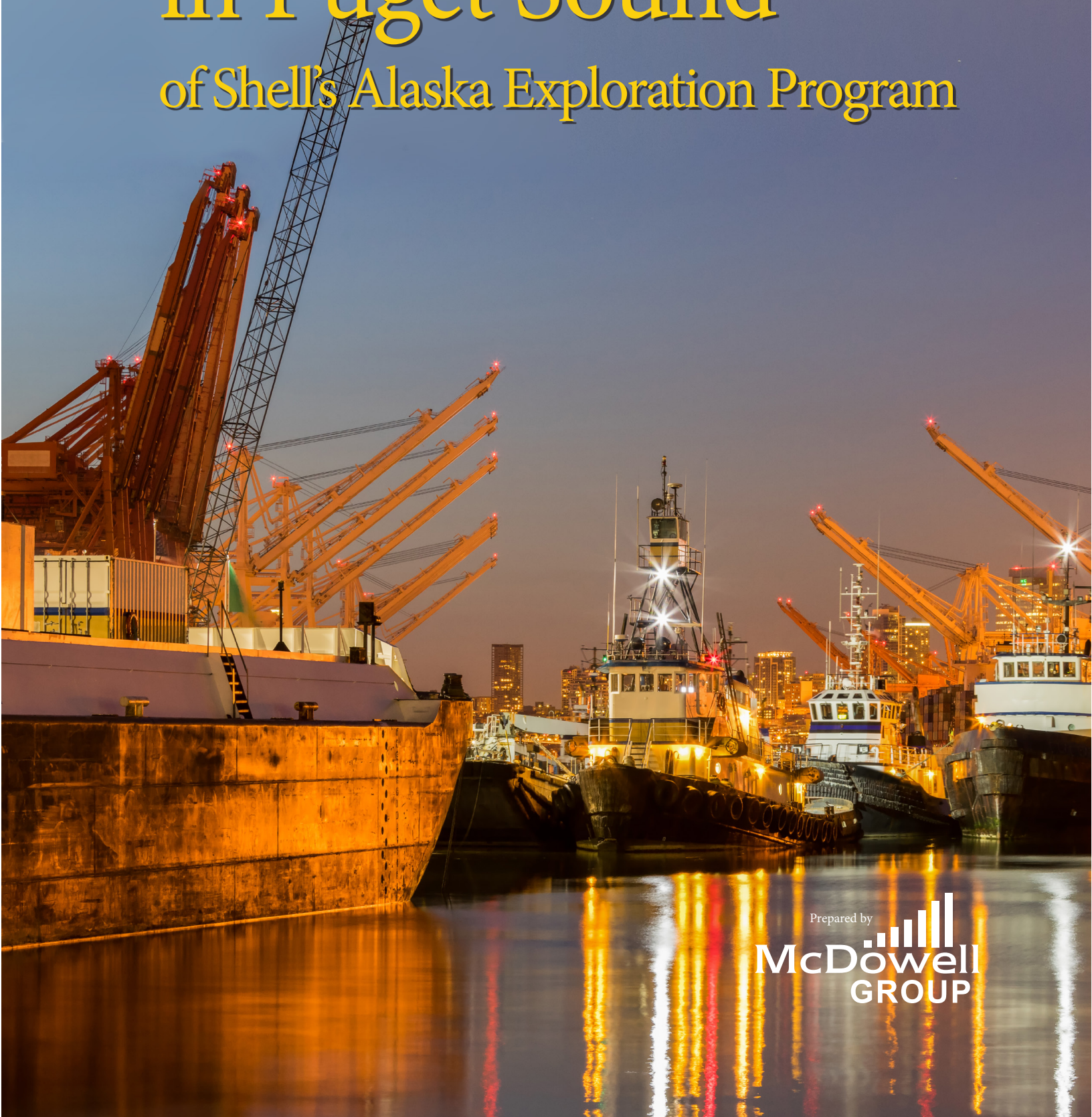


September 2015

# Economic Impacts in Puget Sound of Shell's Alaska Exploration Program



Prepared by

  
**McDowell**  
GROUP

# *Economic Impacts in Puget Sound of Shell's Alaska Exploration Program*

*Prepared for:*

**Shell Exploration & Production Company**

*And*

**Alaska Chamber**

*September 2015*

*Prepared by:*



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# Key Findings

This report examines the economic impact in the Puget Sound region associated with Shell Exploration & Production Company's (Shell) recent exploration efforts in Alaska. The scope of this report includes a brief overview of historical and contemporary Arctic oil and gas exploration and development, analysis of the economic impact on Puget Sound of Shell's exploration activity in Alaska, and profiles of Puget Sound ports that have served to support Shell's Alaska exploration.

## Total Puget Sound Regional Impact

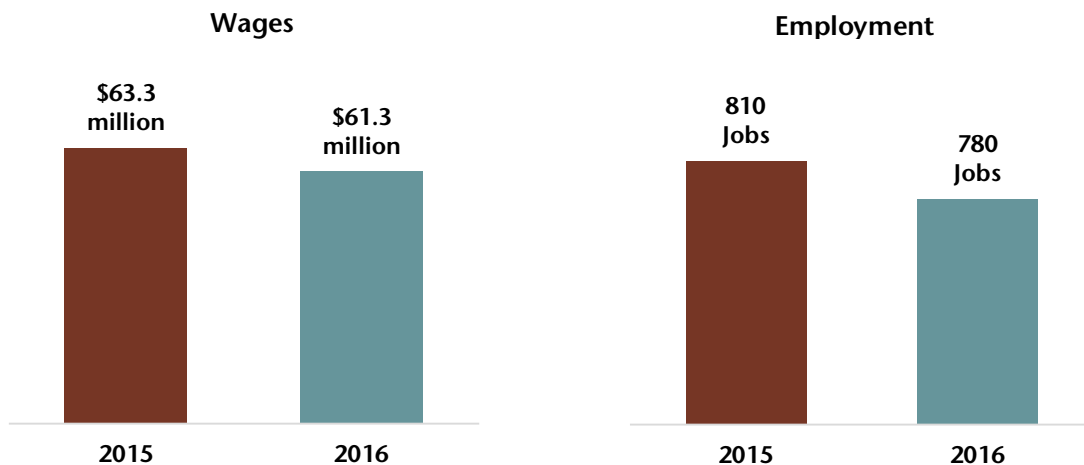
- By the end of 2016, Shell and its contractors will have spent \$630 million with hundreds of public and private organizations in Puget Sound in support of its Alaska exploration efforts, including \$313 million between 2006 and 2014, and \$317 million budgeted for 2015 and 2016.
- Approximately 40 Puget Sound businesses have provided goods and services directly to Shell in support of its Alaska activities, representing 21 different commercial and industrial sectors.
- Port facilities in Port Angeles, Everett, Seattle, and Bellingham have been used in support of Shell's Alaska exploration activity since 2011.



## Economic Impacts in 2015 and 2016

- Spending in 2015 and 2016 will total an estimated \$317 million (because of one-time expenditures made in 2015, spending in 2016 is expected to be slightly less than 2015). Approximately half of this spending will flow through the Puget Sound economy.

Figure 1. Shell's Alaska-Related Total Economic Impact on Puget, 2015 and 2016



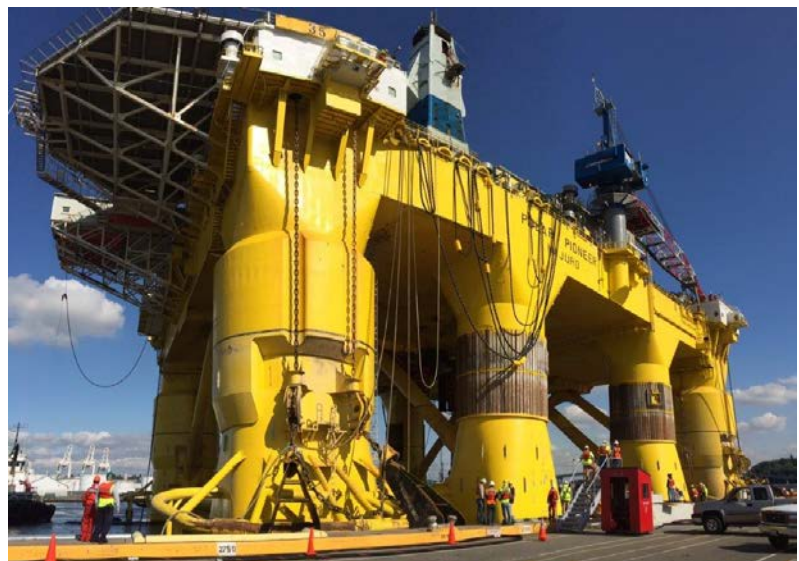
- In 2015, the total economic impact of Shell’s Alaska-related spending in Puget Sound includes approximately 810 jobs, \$63 million in wages, and \$158 million in total economic output. This includes all direct, indirect, and induced impacts.
- Spending in 2016 will result in an estimated 780 jobs, \$61 million in wages, and \$153 million in total economic output, including all multiplier effects.

**Table 1. Shell-Related Anticipated Total Economic Impact in Puget Sound, 2015 and 2016**

	Cumulative Impacts 2015-2016
<b>Direct impacts</b>	
Direct spending with vendors with a Puget Sound presence	\$317.1 million
Direct spending remaining in Puget Sound	\$172.7 million
<b>Total impacts (direct, indirect, and induced)</b>	
Total Puget Sound region wages	\$124.6 million
Total Puget Sound region jobs per year	810 (2015)/780 (2016)
Total Puget Sound region economic output	\$312.1 million

## 2006 to 2014 Total Economic Impacts

- From 2006 to 2014, Shell spent \$313 million with businesses and organizations based in the Puget Sound region, as well as businesses based elsewhere but doing business in support of Shell’s activity in the region. Some spending with Puget Sound-based companies occurred in Alaska or elsewhere and did not have any direct economic impact in Puget Sound. Based on detailed analysis of vendor data provided by Shell and its key contractors, it is estimated that approximately half of that direct spending — \$158 million — impacted the Puget Sound region’s economy, creating jobs and income.



*The Polar Pioneer at Terminal 5 in the Port of Seattle.*

- Shell’s spending generated an estimated \$115 million in total wages in the Puget Sound economy and \$282 million in total economic output, including all direct, indirect, and induced (multiplier) effects.

**Table 2. Shell-Related Total Economic Impact in Puget Sound, 2006 to 2014**

	Cumulative Impact
Direct impacts	
Direct spending with vendors with a Puget Sound presence	\$313.1 million
Direct spending remaining in Puget Sound	\$158.4 million
Total impacts (direct, indirect, and induced)	
Total Puget Sound-region wages	\$115.1 million
Total Puget Sound-region economic output	\$282.4 million

## Arctic Oil and Gas Development

- The Arctic has attracted oil and gas development since the early 20<sup>th</sup> Century, with exploration beginning in the 1910s and production in the Canadian Arctic starting in the 1920s.
- To date, approximately 25 billion barrels of liquids (including crude oil and natural gas liquids) and 550 TCF of natural gas have been produced from the Arctic. Norway, Greenland, Russia, Canada, and the United States are developing their Arctic oil and gas resources.
- The Arctic is estimated to contain more than 25 percent of global undiscovered oil and gas. Proven reserves in the Arctic total 38 billion barrels of liquids and 920 TCF of natural gas. In addition, the region is estimated to contain 525 billion barrels of oil or oil equivalents. Approximately 75 percent of Arctic oil and gas resources are offshore.

## Shell in Alaska and the Arctic

- The company's first interaction with the Arctic and subarctic began in 1918. Shell operated offshore in Cook Inlet for approximately 50 years.
- The company has pursued oil and gas exploration in the Arctic regions of the United States, Greenland, Norway, and Russia.
- Alaska OCS exploration efforts in 2012 involved 22 maritime assets (including two drill rigs), a fleet of chartered helicopters and fixed-wing aircraft, and nearly 2,000 people. Exploration drilling in 2015 and 2016 will involve two drill units, 28 vessels, seven aircraft, and expanded shoreside operations.

# Introduction and Methodology

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Puget Sound has long been a hub of maritime and industrial activity connecting the Pacific Northwest and Alaska. For more than 100 years, the region has supported resource and other development in Alaska. Providing the closest full-service ports on the U.S. West Coast, industrial activity in Alaska — including the mining, commercial fishing, construction, and oil and gas industries — relies on Puget Sound for staging, shipping, skilled labor, and manufacturing.

As the Arctic offshore opens for resource development, Puget Sound continues to play an important role in oil and gas development off Alaska’s northern coasts. Recent Outer Continental Shelf (OCS) exploration efforts by Shell Exploration & Production Company (referred to as Shell) in the Chukchi Sea can be viewed as a case study for how further Alaska OCS development might occur.

This report examines the history and current status of Arctic oil and gas development, quantifies the economic impact on Puget Sound, and provides a brief overview of Shell-related activity by each Puget Sound port, including the ports of Port Angeles, Bellingham, Everett, and Seattle.

For purposes of this analysis, the Puget Sound region and economy is assumed to include the following seven Washington counties: Clallam, King, Kitsap, Pierce, Snohomish, Skagit, and Whatcom. All photographs in the report were used with permission by Shell.

## Methodology

McDowell Group used a combination of executive interviews, public research, and proprietary vendor data to quantify the economic impact of Shell’s Alaska OCS activities on Puget Sound.

### EXECUTIVE INTERVIEWS

Interviews were conducted with a variety companies, ports, communities, trade groups, and other stakeholders including:

- Port of Port Angeles
- City of Port Angeles
- Port of Bellingham
- City of Bellingham
- Port of Everett
- Alaska Oil and Gas Association
- Superior Energy Services
- Shell Exploration & Production Company
- Washington Maritime Federation
- Manufacturing Industrial Council

### REVIEW OF PUBLIC DOCUMENTS

Information and data contained in public documents relating to Arctic oil and gas exploration was reviewed and cited for this report. Reports from the following organizations were used:

- Northern Economics
- University of Alaska Anchorage
- Ernst & Young (EY)
- Wilson Center
- Department of the Interior
- Community Attributes Inc.

## **VENDOR DATA**

Shell and Superior Energy Services provided confidential vendor data that enabled the research team to understand how money flowed through Puget Sound and impacted the broader region. Interviews helped refine the interpretation of the data, especially related to residency of workers and timing of spending. With this vendor data it was possible to estimate the indirect and induced effects (often termed “multiplier effects”) of Shell’s activity in Puget Sound.

Economic models are useful in understanding the magnitude of total direct, indirect and induced economic effects. IMPLAN™ (one of the most widely used U.S. input-output models for analyzing the economic impact of industrial and commercial development projects) uses county-level and statewide employment, payroll, and other data to define linkages between industries in the local economy and multipliers that predict the total impact of an economic stimulus.<sup>1</sup> The model provides local and regional multipliers for a broad spectrum of industry sectors.

In general, multipliers provide a measure of the relationship between basic industry activity and activity in an economy’s service and supply sector. Multipliers can show either the number of direct, indirect, and induced jobs created per million dollars of output (spending), or the number of jobs or payroll dollars created in the support sector for each direct job or direct payroll dollar. IMPLAN™ measures jobs in terms of “annual average full and part-time employment.” The total (peak) number of jobs is typically larger than the annual average.

IMPLAN™ multipliers capture only “backward linkages;” that is, they capture only jobs associated with purchases of goods and services by a firm and its employees. IMPLAN™ multipliers do not capture “forward linkages,” or those downstream jobs associated with adding value to a product.

## **PHOTO CREDIT**

All photos used in the report come from the Port of Seattle or Shell Exploration & Production Company.

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<sup>1</sup> IMPLAN™ (IMpact Analysis for PLANning) was originally developed for the U.S. Forest Service by the University of Minnesota to assist with land and resource management planning.



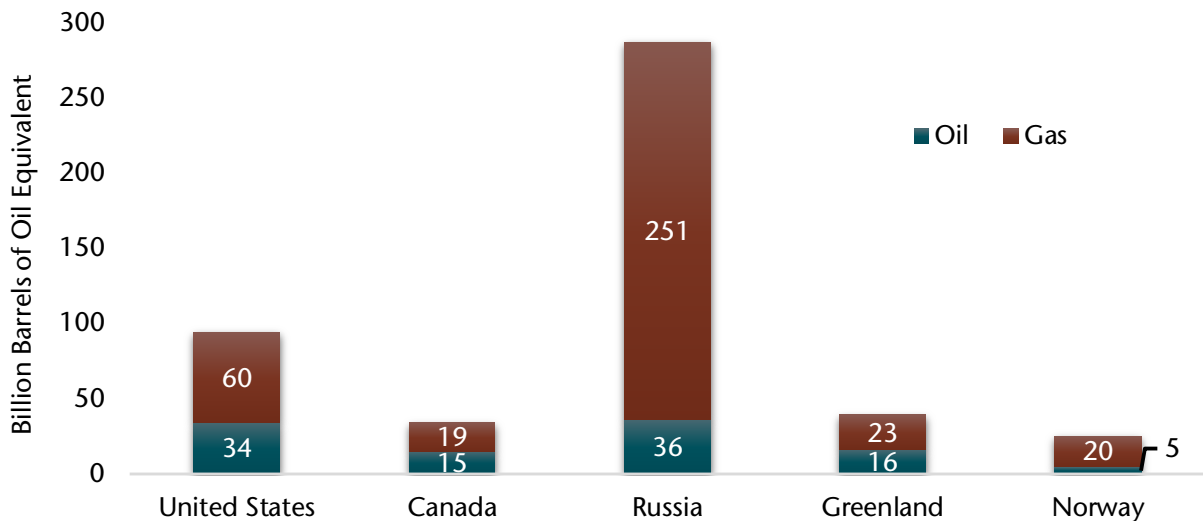
# Arctic Oil and Gas Potential

With the Arctic estimated to hold 30 percent of the world’s undiscovered natural gas and 13 percent of its undiscovered, technically recoverable oil, countries throughout the region have been examining options to develop these resources.<sup>2</sup> This chapter provides an overview of historical and contemporary Arctic exploration and development and the potential economic impacts of future Arctic development. This chapter also provides an overview of the connections between Washington State and Alaska oil and gas exploration and development.

## Arctic Oil and Gas Exploration

Defined generally as the region north of the Arctic Circle, the Arctic has attracted oil and gas development since the early 20<sup>th</sup> Century. Beginning with Canadian production in the 1920s and the United States’ Alaska production 30 years later, approximately 25 billion barrels of liquids, and 550 TCF of natural gas have been produced from the Arctic. With the region estimated to contain more than a quarter of global undiscovered oil and gas, Norway, Greenland, and Russia are also seeking to develop their oil and gas resources.<sup>3</sup>

Figure 2. Global Arctic Conventional Oil and Gas Resource Potential, by Country



Source: National Petroleum Council, 2015.

The Arctic’s proven reserves total 38 billion barrels of liquids and 920 TCF of natural gas. In addition, the region is estimated to contain 525 billion barrels of oil or oil equivalents (BBOE), of which natural gas makes up approximately 71 percent of the BBOE estimates in the Arctic (see Figure 2). Approximately 75 percent of Arctic oil and gas resources are offshore.

<sup>2</sup> [http://www.eia.gov/oiaf/analysispaper/arctic/pdf/arctic\\_oil.pdf](http://www.eia.gov/oiaf/analysispaper/arctic/pdf/arctic_oil.pdf)

<sup>3</sup> [http://npcarcticpotentialreport.org/pdf/ExSummary\\_vol-41715.pdf](http://npcarcticpotentialreport.org/pdf/ExSummary_vol-41715.pdf). Note: Liquids include both crude oil and natural gas liquid. Refers only to conventional sources.

## United States

Oil and gas activity in Alaska has been underway for more than 60 years. Beginning with discoveries in Cook Inlet and later on the Alaska North Slope, total statewide production of oil and gas has reached nearly 18 billion barrels and 13 billion cubic feet of natural gas.<sup>4</sup> The first offshore discoveries in Cook Inlet were made in 1962 with production beginning in 1969. While Cook Inlet is typically not considered part of the Arctic, ice is present most of the winter and spring.<sup>5</sup>

Oil was discovered on Alaska's Arctic North Slope in 1968. After completion of the 800-mile Trans-Alaska Pipeline System (TAPS) oil began flowing south to Valdez in 1977. Oil production on the North Slope grew from 1.5 million barrels per day to a peak of 2.1 million barrels per day in 1988. Following this peak, oil production has gradually declined to the current average of approximately 500,000 barrels per day.

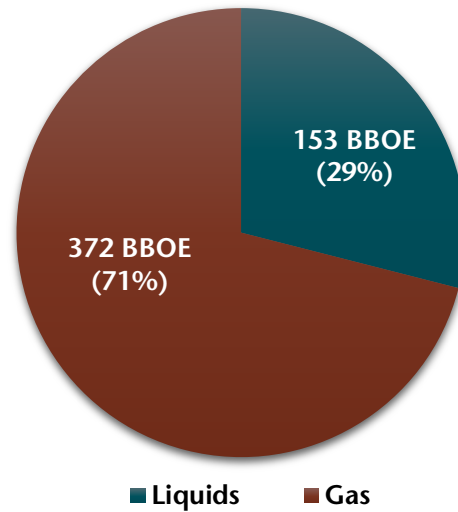
Offshore exploration and drilling in the Alaska OCS began in the 1970s with the construction of artificial islands built from gravel or ice, and the first floating drill rigs were used to drill nine offshore wells in the late 1980s. Use of artificial islands constructed from gravel continues today. Endicott Island is a 45-acre island approximately 2.5 miles off the coast in the Beaufort Sea. Additionally, the five-acre Northstar Island is located six miles off the Arctic coast in approximately 40 feet of water. A pipeline connects these islands to existing infrastructure to transport production to TAPS.

## Canada

Northern Canada has been home to active oil and gas exploration and production for more than 100 years. The first Arctic exploratory well was drilled in Northern Canada in 1920 with production beginning in 1932.<sup>6</sup> From the 1960s to the early 1980s, discoveries in the Mackenzie Delta, Beaufort Sea, Nunavut, and eastern Canada prompted additional exploration efforts. In total, approximately 90 wells have been drilled in the Canadian Beaufort, 34 wells have been drilled in Nunavut, and three wells were drilled in the eastern Arctic.

Further interest in oil and gas development was slowed with the expiration of public exploration incentives, reduced oil prices, and limited Arctic infrastructure through the 1990s and 2000s. Chevron and Statoil currently

**Figure 3. Global Arctic Conventional Resource Potential, by Hydrocarbon Type**



Note: BBOE refers to "barrel of oil equivalent."  
Source: National Petroleum Council, 2015.

<sup>4</sup> <http://www.aoga.org/facts-and-figures>

<sup>5</sup> <http://www.akrdc.org/membership/events/conference/2013/presentations/navarre.pdf>

<sup>6</sup> *Arctic Potential, Realizing the promise of the U.S. Arctic oil and Gas Resources*, National Petroleum Council, March 2015.

hold leases in the Canadian Arctic and have indicated they intend to begin initial exploration efforts. However, recent uncertainty in oil prices have resulted in an “indefinite pause” to these activities.<sup>7</sup>

## **Greenland**

Oil and gas exploration in Greenland has resulted in minimal success since activity began in the 1970s. Six exploratory wells were drilled between 1976 and 1990 with limited potential. Recent discoveries by Cairn Energy in 2010 indicated greater hydrocarbon potential and resulted in Greenland offering its first offshore oil and gas exploration leases.<sup>8</sup> Efforts surrounding oil and gas development are largely in the exploration stages.

## **Norway**

Norway’s northern location and existing offshore oil and gas development experience makes increased Arctic development likely. In 1977, the country’s first oil was produced from the offshore Ekofisk field in the North Sea. Further discoveries and accompanying development allowed production to rise to a peak of 3.4 million barrels of liquids per day in 2001.<sup>9</sup> With maturing fields and an increasingly ice-free Arctic, development in the Barents Sea may be relied on to maintain Norway’s hydrocarbon production. Bordering both Norway and Russia, the Sea already produces hydrocarbons.

## **Russia**

Russian Arctic oil and gas potential is the largest of any country, estimated at 287 BBOE. The country is producing both oil and natural gas in its western and eastern regions. In April 2014, Russia’s Prirazlomnoye platform — operating 37 miles from shore in the Barents Sea — delivered the first oil from an offshore rig in the Arctic. Instead of a gravel or ice island, the platform mimics an artificial island by being large enough to rest on the seafloor. In the Russian Far East, the Sakhalin Island LNG development in the Sea of Okhotsk has been active since the early 1990s. Built to withstand a winter season that lasts up to 240 days, the fixed concrete platforms are located in waters over 140 feet.<sup>10</sup> A network of underwater and buried pipelines bring the natural gas to shore.

Moving forward, Russia has signaled its intent to continue development in the Arctic. Recent sanctions from Western countries, as well as low market prices and high expenses, may temporarily slow activity.

## **Potential Economic Impact**

The potential economic impact of U.S. Arctic offshore exploration and development extends beyond Alaska. Potentially containing more than 23 billion barrels of oil and 104 trillion cubic feet of natural gas, full development of these resources would have significant impact on Alaska, Washington State, and the nation.<sup>11</sup> A 2009 analysis conducted by Northern Economics and the University of Alaska Institute of Social and Economic

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<sup>7</sup> <http://www.reuters.com/article/2014/12/17/chevron-canada-artic-idUSL1N0U137H20141217>

<sup>8</sup> [http://www.wilsoncenter.org/sites/default/files/Artic%20Report\\_F2.pdf](http://www.wilsoncenter.org/sites/default/files/Artic%20Report_F2.pdf)

<sup>9</sup> <https://www.regjeringen.no/en/topics/energy/oil-and-gas/norways-oil-history-in-5-minutes/id440538/>

<sup>10</sup> <http://www.shell.com/global/aboutshell/major-projects-2/sakhalin/largest-integrated-oil-gas-project.html>

<sup>11</sup> Estimates are for technically recoverable oil and gas. [http://www.boem.gov/Oil-and-Gas-Energy-Program/Resource-Evaluation/Resource-Assessment/2011\\_National\\_Assessment\\_Factsheet-pdf.aspx](http://www.boem.gov/Oil-and-Gas-Energy-Program/Resource-Evaluation/Resource-Assessment/2011_National_Assessment_Factsheet-pdf.aspx)

Research (ISER) estimates OCS development would result in more than 54,000 jobs with cumulative payroll totaling \$145 billion over 50 years.<sup>12</sup>

## **Economic Impact of Puget Sound Refineries**

Alaska OCS development has the potential to result in significant amounts of crude oil that will need to find a way to market. If TAPS is used, the established relationship between Washington's refineries and Alaska's Arctic production could result in additional crude oil flowing to Puget Sound.

Historically, Puget Sound has been the destination for the majority of Alaska's oil production. In 2003, Alaska supplied 90 percent of oil used by Puget Sound's five oil refineries. By 2013 this proportion had eroded to 46 percent as Alaska oil production decreased, and supply from Canadian oil sands and shipments from the Bakken Formation (Montana, North Dakota, Saskatchewan, and Manitoba) increased.<sup>13</sup>

A report produced by the Washington Research Council estimates Washington's refineries supported approximately 26,000 jobs and nearly \$1.8 billion in payroll in 2013. Additionally, refiners paid a total of \$268.6 million in taxes to state and local governments.<sup>14</sup>

## **Shell Exploration & Production Company**

Shell is one of the largest oil and gas companies in the world, with operations in 70 countries. The company produces more than 3 million barrels of oil and gas per day, operates 43,000 service stations, and employs approximately 90,000 people.<sup>15</sup>

The company's first interaction with the Arctic and subarctic was in 1918 when Shell geologists entered Alaska. Following the discovery of oil in Cook Inlet, Shell designed offshore platforms capable of dealing with ice and some of the largest tides in the world. These platforms were operated from the mid-1960s to the end of the 20<sup>th</sup> Century.

Shell is currently active in oil and gas exploration, development, and production throughout the Arctic. The offshore Sakhalin-2 project in eastern Russia, a joint venture between Shell and Gazprom, is currently producing 4 percent of global LNG. Shell is also in the early exploration stages in Greenland and Norway's Barents Sea.<sup>16</sup>

Starting in 2005, Shell purchased leases in the Chukchi and Beaufort seas, and began surveying, scientific baseline research, and community engagement in preparation for drilling. Drilling was conducted during the 2012 exploration season supported by a fleet of 22 marine assets, a fleet of chartered helicopters and fixed-wing aircraft, nearly 2,000 employees and contractors, and operations in communities across Alaska and Washington. Exploration drilling in 2015 involves two drill units, 28 vessels, seven aircraft, and seven shore bases.

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<sup>12</sup> *Potential National-Level Benefits of Oil and Gas Development in the Beaufort Sea and Chukchi Sea*, Northern Economics, February 2011.

<sup>13</sup> *The Ties that Bind*, McDowell Group, 2015.

<sup>14</sup> *The Economic Contribution of Washington State's Petroleum Refining Industry in 2013*, Washington Research Council, December 2014.

<sup>15</sup> <http://s06.static-shell.com/content/dam/shell-new/local/corporate/corporate/downloads/pdf/shell-corporate-brochure-discover-26082014.pdf>

<sup>16</sup> <http://www.shell.com/global/future-energy/arctic/shell-in-the-arctic.html>

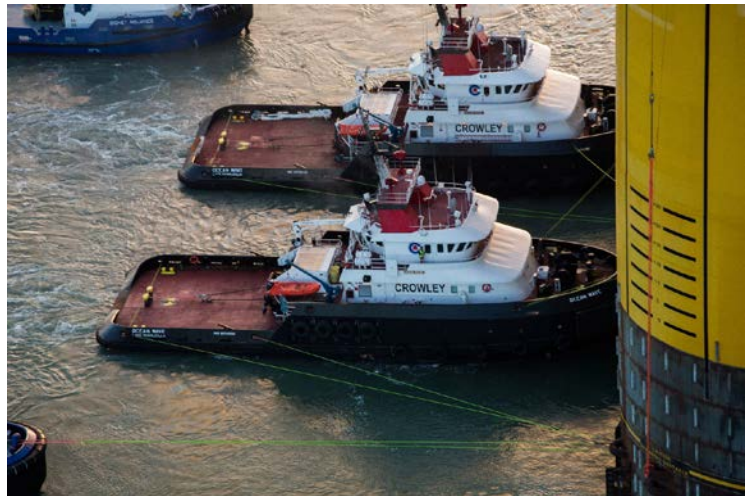
# Shell's Puget Sound Economic Impact

Shell and its contractors have used Puget Sound companies and port facilities since the mid-2000s for support of its Alaska exploration campaign. A wide variety of industries, ranging from professional services to manufacturing to the hospitality industry, have participated in Shell-related activity. Port facilities throughout the region have been used for staging, repair, and provisioning. This chapter examines the economic impact of Shell's Alaska project over the past decade.

## Puget Sound Maritime Industry

Puget Sound ports and communities have an established maritime tradition. Offering several full-service ports capable of handling large ocean-going vessels and numerous smaller ports and harbors, the region is ideally situated to support resource development in Alaska, and has played this role for more than a century.

Nearly 58,000 direct jobs in Washington (with most located in Puget Sound) were supported by the state's maritime industry in 2012. The most significant industry was maritime logistics and shipping with 16,700 positions, and boat and ship building, repair, and maintenance was the second largest at 16,500. Fishing and seafood processing, maritime support services, and passenger water transportation account for the remainder. Wages for these positions totaled more than \$4 billion, and gross income generated from 2,100 businesses in the maritime industry is estimated at \$15.2 billion.<sup>17</sup>



*Two Crowley tugs maneuver the Polar Pioneer at the Port of Seattle.*

**Table 3. Maritime Industry in Washington, 2012**

Category	Number of Businesses	Wages (\$millions)	Jobs	Gross Business Income (\$millions)
Passenger Water Transportation	130	\$262.8	4,500	\$544.5
Boat and Ship Building, Repair, and Maintenance	150	\$1,163.8	16,500	\$1,489.7
Maritime Support Services	300	\$387.7	4,600	\$864.2
Fishing and Seafood Processing	720	\$1,113.4	15,400	\$8,592.6
Maritime Logistics and Shipping	800	\$1,156.0	16,700	\$3,722.4
<b>Total</b>	<b>2,100</b>	<b>\$4,083.7</b>	<b>57,700</b>	<b>\$15,213.3</b>

Source: Community Attributes, 2013

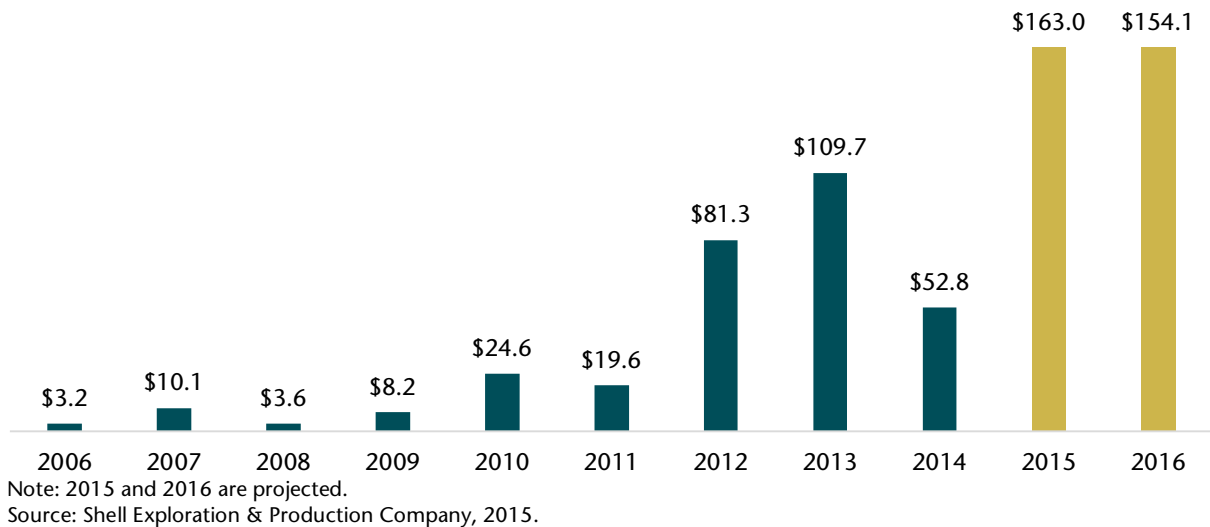
<sup>17</sup> <http://www.psrc.org/assets/10304/Maritime-Impact.pdf>



## Shell's Alaska-Related Spending in Puget Sound

In the last decade, Shell has spent hundreds of millions of dollars with Puget Sound's businesses, non-profit organizations, and public entities such as ports, cities, and the State of Washington in support of their Alaska operations. From 2006 to 2014, spending totaled slightly more than \$313 million. Spending is projected to increase significantly in 2015 and 2016, totaling an estimated \$317 million for those two years combined. In sum, total spending by Shell related to Puget Sound activity by the end of 2016 will be approximately \$630 million for the 2006-2016 period.

**Figure 4. Puget Sound Spending by Shell in Support of Alaska Operations 2006-2016 (\$millions)**



### Shell's Alaska-related Activity in Puget Sound

Since 2006, Shell's Alaska project has received support from Puget Sound businesses. In the early stages of the project, activity was centered in the professional services and surveying industry. Construction of specialized infrastructure took place in local facilities, and finally provisioning took place for the drill season. While surveying, engineering, and building of equipment will continue to be a part of Shell's economic impact in Puget Sound, this project has matured to the point where the most significant activity going forward will surround provisioning of Shell's fleet in 2015 and 2016.

Following the 2008 acquisition of 275 leases in the Chukchi Sea, local companies provided a variety of services: surveying of the sites, engineering needed to build specialized equipment for exploration, and consulting on current "best practices" in oil and gas development in the Arctic.

By 2011, the Arctic Containment System (ACS), was under construction in Bellingham (detailed on pg. 16/17), and Shell's two drill rigs (*Noble Discoverer* and *Kulluk*) were being upgraded, along with custom fabrication to prepare the fleet for the drill season.

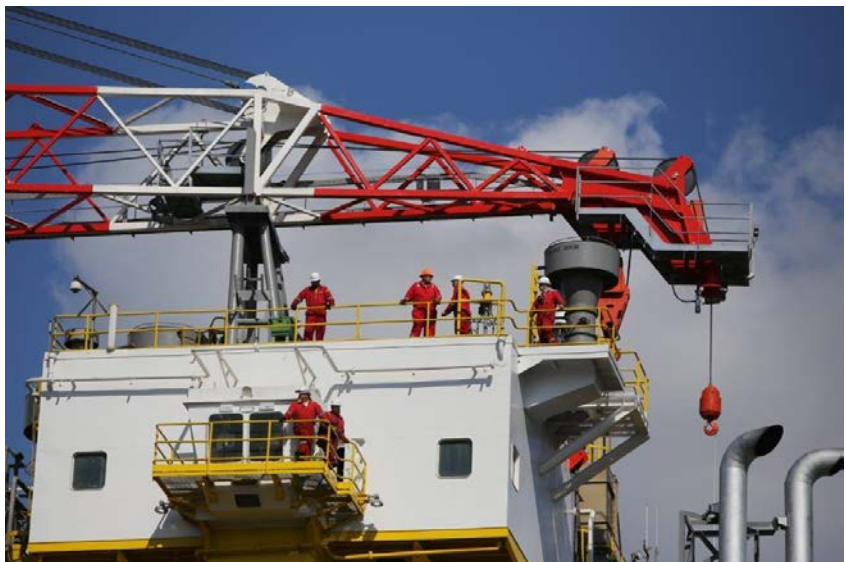
In the spring of 2012, support vessels began arriving in Puget Sound ports. Maintenance was completed, training was conducted, and "load-out" operations began, including provisioning the vessels with what they would need for the months-long exploration efforts. Different supplies were needed depending on the role of

the support vessel. Vessels tasked with handling anchors needed spare wire, winch and crane parts, and shackles. Vessels with medical facilities needed supplies unique to the provision of healthcare in a remote area. While data are not available on specific purchases made for these vessels, according to discussions with mariners frequenting Puget Sound, it is likely that most of “load-out” supplies were purchased locally.

Following the 2012 season, Shell’s exploration efforts were paused. Additional modifications were made to the ACS in Puget Sound, training of response personnel continued, and Shell’s exploration plan was internally reviewed. In the spring of 2015, Shell again began staging in Puget Sound for the summer drilling season. These activities are detailed further in the next chapter.

## Total Economic Impact 2006 to 2014

As described above, Shell spent \$313 million on its Puget Sound activities (related to Alaska operations) occurring between 2006 and 2014. This measure includes spending with businesses and organizations based in Puget Sound, as well as businesses located elsewhere but doing business in Puget Sound; however, not all of this spending impacts the regional economy. To measure the economic impact in Puget Sound stemming from this spending, it is first necessary to assess how much



*Crewmembers aboard the Polar Pioneer at the Port of Seattle.*

of that spending actually flowed through the region’s economy. Some spending with Puget Sound-based companies may have actually occurred in Alaska, without a direct economic impact in Puget Sound. Similarly only a portion of spending with businesses located elsewhere but working in Puget Sound may have actually impacted the regional economy (as revenue flows back to out-of-state headquarters or vendors). Finally, to the extent that workers from outside Puget Sound participated in various Shell-related activities in Puget Sound, some labor economy would have leaked from the regional economy. These considerations were taken into account in the analysis of Shell and contractor vendor data.

Overall, it is estimated about half (53 percent, or \$158 million) of the \$313 million in Alaska-related Puget Sound spending between 2006 and 2014 actually created jobs, income, and economic output in the Puget Sound economy. The following table summarizes the economic impact of the portion of Shell’s 2006-2014 spending that impacted the Puget Sound economy. Approximately \$158 million in spending generated a cumulative nine-year total of \$115 million in wages, including direct, indirect, and induced effects. Over that same period, output (a measure of total spending) totaled \$282 million, including multiplier effects. Most of this economic activity occurred in 2011 and 2012, during construction of the ACS.

**Table 4. Total Shell-related Economic Impact in Puget Sound, 2006 - 2014**

	Cumulative Puget Sound Impact
Total direct spending	\$158.4 million
Total wages (direct, indirect, and induced)	\$115.1 million
Total economic output (direct, indirect, and induced spending)	\$282.4 million

## Total Anticipated Economic Impact in 2015 and 2016

The economic impact of Shell’s activities in 2015 stem from approximately \$163 million in Alaska-related spending in Puget Sound, with about half of that amount actually flowing to or through the region’s economy. Approximately \$154 million in direct spending is expected in 2016, with about the same portion impacting the Puget Sound economy.

In 2015, Shell’s total economic impact in Puget Sound related to Alaska operations included 810 jobs and \$63 million in wages, including direct, indirect, and induced impacts. Slightly lower spending in 2016 will result in proportionately less total economic impact, at 780 jobs and \$61 million in wages. Total annual output of \$158 million and \$154 million are expected for 2015 and 2016, respectively.

**Table 5. Total Anticipated Shell-related Economic Impact in Puget Sound, 2015 and 2016**

	2015 Impact	2016 Impact	Cumulative Impact
Total direct spending	\$87.6 million	\$85.1 million	\$172.7 million
Total wages (direct, indirect, and induced)	\$63.3 million	\$61.3 million	\$124.6 million
Total jobs per year (direct, indirect, and induced)	810 jobs	780 jobs	780 to 810 jobs
Total economic output (direct, indirect, and induced spending)	\$158.3 million	\$153.8 million	\$312.1 million

Jobs and income in the Puget Sound region generated by Shell’s operations are scattered across the economy. Approximately 40 businesses providing goods and services directly to Shell in support of its Alaska-related activities in Puget Sound, in 21 different commercial and industrial sectors. The breadth of the economic impact broadens as those 40 businesses make purchases in support of their Puget Sound operations (“indirect impacts”). Finally, Shell’s economic impact filters to a much larger segment of the Puget Sound economy as wages are spent in support of families and households of workers employed by the businesses serving Shell (“induced impacts”).

# Shell-Related Activity by Port

The economic impact of Shell and its contractors occurs throughout the Puget Sound region, which includes ports in Seattle, Everett, Port Angeles, and Bellingham. This chapter provides a brief overview of Shell-related activity by port.

## Seattle

The Port of Seattle offers the most extensive maritime industrial support services and facilities in Puget Sound. Since 2006, companies and infrastructure in Seattle have supported Shell's exploration efforts. More than 15 local companies have directly provided services including fueling, engineering, environmental monitoring, offshore surveying, waste management, transportation, and safety training.<sup>18</sup> The number of companies impacted increases when considering Shell's main contractors. In addition, local shipyards and port facilities have supported Shell's efforts through vessel supply and maintenance.

From 2006 to 2010, local companies provided services necessary for engineering of specialized equipment and technologies needed to perform in Alaska; surveying and geological consultants were used to gain an understanding of the sea-floor where Shell intended to drill; and local transportation and logistics companies helped support initial exploration tasks.

Shell first used Seattle's maritime industrial support industry in 2011 when Vigor Industrial conducted extensive modifications in their Seattle shipyard to the *Kulluk*, a 266' by 230' ice-hardened drill rig, and the *Noble Discoverer*, a 512' drill ship designed for Arctic conditions. More than 500 workers completed replacement or upgrades to onboard cranes, engines, and waste management systems. One of the most significant projects completed was testing the six diesel engines on the *Noble Discoverer* to support compliance with air permits. Foss Maritime provided two tugs to support Shell's 2012 exploration efforts. The *Corbin Foss* and *Lauren Foss*, 149-foot sister offshore tug boats, were modified in Seattle (and Oregon) in preparation for work in Alaska. Foss upgraded electronic and communication equipment, increased on-deck storage, and completed ice-hardening modifications.<sup>19</sup>



*The 149-foot Lauren Foss operating in Puget Sound.*

<sup>18</sup> Note: "Local companies" are defined as firm maintaining a physical presence in the area where most of their employees are residents.

<sup>19</sup> <http://www.foss.com/wp-content/uploads/Tow-Bitts-May-2012.pdf>

Following Shell's 2012 campaign, port activities slowed while preparations were made for the 2015 season. In late 2014 and early 2015, Shell began to stage for summer exploration again. A \$13.7 million lease was signed between the Port of Seattle and Foss Maritime which allows Shell and its support fleet interim use of Terminal 5 (T5) for storage, moorage of drilling and support vessels, provisioning of vessels, and minor vessel modification and repairs.<sup>20</sup>

In preparation for Shell's arrival, modifications to T5 were made. Once Shell arrived, with the *Polar Pioneer* (a 400' by 292' drill rig) and a variety of other support vessels, the fleet required stevedores, electricians, welders, engineers, hydraulic technicians, equipment operators, and other skilled labor. Vigor Industrial completed three barges for use by Foss Maritime in support of Shell's operations at T5.<sup>21,22</sup>

## Everett

Located 25 miles north of Seattle, all activities at the deep-water Port of Everett supports more than 13,800 direct jobs and an additional 17,700 indirect and induced jobs with total wages of approximately \$3.9 billion. In 2014, port-related activity generated an estimated \$4.3 billion in revenue for Puget Sound businesses and more than \$372 million in state and local taxes.<sup>23</sup>

Since 2012, the Port of Everett and local area companies have provided repair, maintenance, provisioning, and storage for Shell's fleet. The Port has been used mainly for staging of vessels with some activity occurring at local shipyards (including Vigor Industrial's facility at the Port), which offers two piers with a total of 1,200 feet of dock space, seven cranes with capacity to 45 tons, and fabrication shops.

Local officials estimate activity at the port in a year that Shell intends to drill (e.g., 2012 and 2015) supports slightly more than 270 direct local jobs and approximately 310 induced or indirect jobs (total of 580 jobs). Personal income resulting from this total economic activity is estimated at nearly \$40.1 million and revenue generated by local businesses totals \$78.2 million (including the multiplier effects). Estimated tax revenue generated by the city and county is slightly more than \$1.3 million.<sup>24</sup>

## Port Angeles

Port Angeles offers the first deep-water port to vessels entering the Juan de Fuca Straits. The port can handle vessels up to 1,200 feet in length and 35 feet of draft. Local services include topside repair and maintenance, fuel and lubrication sales, provisioning, and heavy lift cranes. While the port is known best for its log-handling capabilities, activity related to Shell's Alaska-related efforts were welcomed as Port Angeles has been actively trying to diversify the local economy.

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<sup>20</sup> <http://cloud3.wsbcndn.com/blog/wp-content/uploads/2015/02/portletter.pdf>

<sup>21</sup> Construction of the 60' by 24' barges supported 60 positions in Vigor's Tacoma shipyard.

<sup>22</sup> <http://vigorindustrial.com/news-press/vigor-expands-new-build-capacity-in-washington>

<sup>23</sup> <http://www.portofeverett.com/home/showdocument?id=6648>. Note: These figures include some non-maritime economic impacts

<sup>24</sup> Personal Communication, Lisa Lefeber, Port of Everett, 6/17/2015; *Potential Impact of Off-Shore Operation at Port of Everett*, Martin Associates, January, 2015.



In mid-March the *Blue Marlin*, a 738 foot heavy-lift ship, arrived in Port Angeles with the *Polar Pioneer* and a number of support vessels. After the *Polar Pioneer* was unloaded close to the Port, topside work was conducted in preparation for transport to Seattle and eventually Alaska.

The *Polar Pioneer* was in Port Angeles for 26 days before moving to Seattle. In that time, more than 130 workers connected with Shell's activities purchased hotel rooms, bought meals, rented cars, and spent money with local businesses.<sup>25</sup>

City officials estimate approximately \$1 million was injected into the Port Angeles economy from spending with more than 20 businesses. Businesses affected included local clothing stores, restaurants and bars, hardware stores, and water transportation services. One local business owner with a restaurant reported he had to increase the number of hours worked by employees, "We are delivering 150 to 300 lunches per day." Sunset Hardware, a local hardware store, reported "thousands of dollars in sales" for various supplies needed to work on the drill rig.<sup>26</sup> A local hotel was able to book 130 rooms for 26 days for a total of 3,380 rented rooms. Allpoints Travel, a local charter and tour operator, provided transportation for workers.

One local official noted the spending was unanticipated: "Having this additional economic activity in our shoulder season before tourism traditionally picks up was a great surprise for our small businesses. Having just a few thousand dollars extra in sales for many local businesses is the difference between an average month and a record month."

In addition to revenue generated by local businesses, taxes paid by workers and other visitors flowed to local, county, and state coffers through bed taxes, sales taxes, and port fees. The Port of Port Angeles generated \$52,000 from dockage and security fees, equipment rentals, and storage leases.<sup>27</sup>

## Bellingham

Approximately 90 miles north of Seattle and 20 miles south of the Canadian-American border, the Port of Bellingham is the northern-most large industrial port on the West Coast of the contiguous 48 states. In 2013, an estimated 8,780 jobs were supported by the Port of Bellingham, or more than one in ten jobs in Whatcom County.<sup>28</sup> Over the same period port-related activity generated more than \$400 million in wages, \$1.35 billion in business revenue, and \$37.7 million in state and local taxes.

Shell and its contractors have used the Port of Bellingham since 2011 for the construction and maintenance of the ACS, which is a unique oil response system on the *Arctic Challenger* barge. The construction of the ACS in 2011 brought a surge of activity to the port. The 315' by 107' *Arctic Challenger* barge was brought from Portland to Bellingham for topside construction. Superior Energy Services, operator of the *Arctic Challenger*, subcontracted the construction and fabrication of the ACS to Greenberry Industrial. Over the course of the nearly year-long project, Greenberry welded over 200,000 feet of steel, installed more than 2.5 million pounds of equipment, and fabricated miles of HVAC, fire systems, and other plumbing.<sup>29</sup> Over a half million labor-

<sup>25</sup> Personal Communication, Nathan West, City of Port Angeles, 5/29/2015.

<sup>26</sup> <http://www.king5.com/media/cinematic/video/70986084/>

<sup>27</sup> Personal Communication, Nathan West, City of Port Angeles, 5/29/2015.

<sup>28</sup> <https://www.portofbellingham.com/161/Port-Economic-Impact> Note: These figures include substantial non-maritime economic activities.

<sup>29</sup> <http://www.greenberry.com/projects/arctic-containment-system/>

hours, a figure equal to 50 people working ten years, were completed with a labor force that peaked at more than 1,200.

Benefits continue to flow to the Bellingham area as *Arctic Challenger* is home-ported here while not in use. Vendor data provided to McDowell Group indicates tens of millions of dollars has been spent with more than 100 local and Puget Sound companies since construction of the ACS began. Port officials report local hotels were booked for months, restaurants were very busy, many local suppliers were involved, and stores in downtown Bellingham experienced a substantial increase in activity related to the ACS spending.<sup>30</sup> Discussions with companies that conducted this work said they made a conscious effort to support local suppliers and skilled labor. “We tried to do what we could to support the local supplier and labor to support these businesses. If we buy materials and services they can stay in business,” reported one company representative.

Asked why Superior Energy Services chose Bellingham instead of another port on the West Coast, a company representative noted the port’s geographical location and established maritime support industries: “Recognizing the *Arctic Challenger* was going to make regular trips to Alaska, Bellingham is a great spot for quick access to the Strait of Juan de Fuca for transport north. And with the area’s capable maritime industrial services capacity, Bellingham was a natural fit.”

## Summary

As illustrated by this report, Shell’s activity in Puget Sound as a staging area for its Alaska exploration has resulted in substantial local economic impacts, supporting employment and wages and generating revenue for local business and communities. These impacts are expected to continue into the medium-term as Shell intends to undertake a similar campaign in 2016. It is expected exploration and possible development activity related to offshore oil and gas resources in Alaska will continue to benefit the region for years and possibly decades to come.

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<sup>30</sup> Personal communication, Mike Hogan, Port of Bellingham, 6/9/2015.