



## Alaska



State Profile and Energy Estimates

### Profile Analysis [Print State Energy Profile](#) (overview, data, & analysis)

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#### Overview

Alaska, the largest U.S. state by area, is one-fifth the size of the Lower 48 states and, with the Aleutian Island chain, as wide as the Lower 48 states from east to west.<sup>1</sup> It is the only state with territory north of the Arctic Circle, and it has the highest mountains and longest coastline of any state.<sup>2</sup> Alaska's winters are frequently severe, but its climate varies significantly from north to south and from winter to summer, particularly in the interior where temperatures ranging from 100 degrees Fahrenheit to 80 degrees below zero have been recorded.<sup>3</sup> Large areas of Alaska remain uninhabited. It has the fourth-smallest population and is the least densely populated of any state.<sup>4</sup> More than two-fifths of Alaskans live in the Anchorage area, while the rest of the state averages less than one resident per square mile.<sup>5</sup>

*Alaska's energy demand per person is third highest in the nation.*

The oil and natural gas industry dominates Alaska's economy.<sup>6</sup> The North Slope contains half a dozen of the 100 largest oil fields in the United States and one of the 100 largest natural gas fields.<sup>7</sup> Alaska's Prudhoe Bay field remains one of the largest oil fields in the nation, although production has fallen to less than 300,000 barrels per day from its peak of 1.6 million barrels per day in 1988.<sup>8,9</sup>

In recent years, Alaska has experienced warmer temperatures for longer periods of time during the year. This temperature change reduces the amount of time energy companies can explore for onshore oil, because ice roads and drilling pads can be used only during the coldest months of the year, when the frozen land is less damaged by equipment. On the other hand, the warmer temperatures reduce floating ice packs, potentially making offshore oil exploration easier.<sup>10</sup>

Alaska also has other energy resources. Its many rivers offer some of the highest hydroelectric power potential in the nation.<sup>11</sup> Large swaths of the Alaskan coastline offer significant wind<sup>12</sup> energy potential, and the state's many volcanic fields offer geothermal potential.<sup>13</sup> Because of its small population, Alaska's total energy demand is below the national median;<sup>14</sup> however, harsh winters and energy-intensive industry make the state's per capita energy consumption the third highest in the nation after Wyoming and Louisiana.<sup>15</sup>

#### Petroleum

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Although Alaska's oil production has declined steadily as the state's oil fields have matured,<sup>16</sup> it is still one of the top crude oil producers in the nation. Most of Alaska's oil production takes place on the North Slope.<sup>17</sup> Large areas of the state remain unexplored. Oil exploration and drilling are prohibited in the Arctic National Wildlife Refuge and in other environmentally sensitive areas in the state.<sup>18</sup>

The Trans-Alaska Pipeline System transports crude oil from the frozen North Slope to the warm-water port at Valdez, on Alaska's southern coast.<sup>19</sup> The pipeline can carry more than 2 million barrels per day, but actual deliveries have been less than 1 million barrels per day since 2003.<sup>20,21</sup> Alaskan crude oil is transported by tanker primarily to refineries in Alaska, California, and Washington.<sup>22,23</sup> On March 24, 1989, the Exxon Valdez tanker struck Bligh Reef and spilled 257,000 barrels of oil into the Prince William Sound.<sup>24</sup> As a result, changes were made in tanker construction and navigation technology, as well as in crew training.<sup>25</sup>

Total demand for finished petroleum products in Alaska is low compared to demand in most states.<sup>26</sup> The state has five operating refineries.<sup>27</sup> Two of them, in the Prudhoe Bay region, supply fuel to crude oil drilling operations. Motor gasoline demand is primarily met by a refinery in Kenai, and aviation and heating fuels are produced there and in two other refineries, located at Valdez and near Fairbanks.<sup>28,29,30</sup> The state's largest refinery, near Fairbanks, was shut down in 2014, with the owner citing unfavorable economics.<sup>31</sup> Alaska is the largest jet fuel-consuming state on a per capita basis.<sup>32,33</sup> It is a major fueling stop for military aircraft and for commercial passenger and cargo flights between the United States and Asian countries.<sup>34</sup> Alaska also consumes a large amount of petroleum for electricity generation.<sup>35</sup> Alaska both imports and exports petroleum products.<sup>36</sup>

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## Natural gas

Alaska ranks third in the nation in natural gas gross withdrawals,<sup>37</sup> but most of the state's production is not brought to market. Natural gas volumes far exceed local demand, and there is insufficient pipeline capacity to transport the natural gas to distant markets.<sup>38</sup> Large volumes of natural gas, extracted during oil production, are reinjected into oil fields to help maintain oil production rates.<sup>39</sup> About three-fourths of Alaska's natural gas withdrawals are consumed at the production site.<sup>40</sup>

The state government has long urged construction of a natural gas pipeline linking Alaska's North Slope with markets in the Lower 48 states, but, to date, a pipeline has not been considered commercially feasible.<sup>41</sup> Several major pipeline project applications have been filed with the state of Alaska, but none have gone forward.<sup>42</sup> Until 2012, the Kenai liquefied natural gas (LNG) liquefaction and terminal complex on the Cook Inlet, which began operating in 1969, was the only facility in the United States authorized to export LNG produced from domestic natural gas. The terminal has a current capacity to liquefy 200 million cubic feet of natural gas per day<sup>43</sup> and exports LNG to Japan.<sup>44</sup> Four major oil companies are interested in jointly building a new LNG export terminal in the Valdez area that could eventually ship up to 2.4 billion cubic feet of LNG per day.<sup>45</sup>

*Most of Alaska's natural gas production is reinjected into oil fields for pressure to maintain oil production rates.*

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## Coal

Coal mines have operated in Alaska since 1855.<sup>46</sup> Substantial deposits of bituminous, subbituminous, and lignite coal<sup>47,48</sup> are found in the north, south, and central portions of the state,<sup>49</sup> but most of Alaska's coal resources have remained unmined.<sup>50</sup> Alaska has only one operating surface coal mine, the Usibelli mine, which produces about 2 million tons of coal per year.<sup>51</sup> Most of the state's coal exports go to countries in Asia and South America.<sup>52</sup>

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## Electricity

The electricity infrastructure in Alaska differs from that in the Lower 48 states in that Alaskans are not linked to large, interconnected grids through transmission and distribution lines.<sup>53</sup> Although an interconnected grid called the Railbelt exists in the more populated areas from Fairbanks to south of Anchorage, even that grid is isolated from the electric grids in Canada and the Lower 48 states.<sup>54,55</sup> Most of the state's rural communities have no grid access and rely on consumer-owned electric cooperatives for their power, and many of those rural power providers use diesel electricity generators.<sup>56</sup> This diesel use contributed to Alaska's ranking second only to Hawaii in the per capita generation of electric power from petroleum liquids.<sup>57,58</sup>

Natural gas accounts for about half of Alaska's electricity generation,<sup>59</sup> and hydroelectric power supplies more than one-fifth.<sup>60</sup> More than 50 hydroelectric power plants supply Alaskan communities with electricity.<sup>61</sup> Petroleum liquids and coal<sup>62</sup> combined account for about one-fifth of Alaska's electricity generation.

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## Renewable energy

Alaskans use a variety of renewable energy resources.<sup>63</sup> In addition to hydropower,<sup>64</sup> Alaska has more than 60 megawatts of wind capacity installed around the state.<sup>65</sup> In 2014, wind projects along the southern and western coasts<sup>66,67,68</sup> and on the Railbelt grid<sup>69</sup> provided three-fourths of Alaska's non-hydroelectric renewable electricity from utility-scale facilities.<sup>70</sup> Increasing numbers of small wind energy facilities, including some wind-diesel hybrid systems, are providing power to rural communities throughout the state.<sup>71</sup> Alaska's biomass fuels are wood, sawmill wastes, fish byproducts, and municipal waste. The first large-scale biodiesel plant in the state opened in 2010 and can produce 250,000 gallons of biodiesel annually using waste vegetable oil gathered from local restaurants. Wood is another important renewable energy source for Alaskans, with more than 100,000 cords burned every year for residential space heating. The state has a growing number of wood pellet manufacturers. About 8 million gallons of fish oil are produced annually as a byproduct at Alaskan fish meal plants; some of the fish oil is used for boiler fuel.<sup>72</sup>

*Alaska is one of eight states with power plants generating electricity from geothermal sources.*

Alaska was 1 of 10 states in 2014 with power plants generating electricity from geothermal sources.<sup>73</sup> A 400-kilowatt geothermal power plant installed in 2006 at Chena Hot Springs was the first geothermal project to be completed in Alaska. Its generating capacity has since been increased to 730 kilowatts.<sup>74,75,76</sup> Several more geothermal projects are in development.<sup>77</sup>

Despite Alaska's high latitude, solar energy is playing a role in off-grid applications, especially in remote locations. Solar thermal technologies, primarily for hot water and building heat, and solar photovoltaic panels are all being used to tap solar energy.<sup>78</sup>

### Energy on tribal lands

Alaska has the largest number of acres held as tribal lands of any state—more than 44 million acres.<sup>79</sup> Almost all Alaskan tribal land is owned outright by 12 regional native corporations encompassing more than 220 tribal groups.<sup>80</sup> The Alaska Native Claims Settlement Act, passed by the U.S. Congress in 1971, divided Alaska into 12 geographic regions of common heritage and interests. Under the Act, tribal lands do not have the sovereign status of reservations, as Native American reservations do in the Lower 48 states. Instead, the land is owned corporately by Native Alaskans, allowing them all to benefit from resources on their lands.<sup>81</sup> The 12 native corporations hold most subsurface mineral rights for native lands, and they all rank among the largest private businesses in the state.<sup>82</sup>

Alaska's tribal lands include oil and natural gas resources on the North Slope and along the southern coast, and Alaska's largest bituminous coal deposit.<sup>83,84,85</sup> Almost one-fourth of Alaska's 129 million acres of forested land is controlled by native corporations, providing the tribes with vast biomass resource potential.<sup>86</sup> Seventy percent of the revenue earned from timber and mineral resources by each regional corporation is shared among all 12 corporations in proportion to their native populations. A significant portion of each corporation's revenue is then redistributed to village corporations within each region.<sup>87</sup> The corporations have formed many business subsidiaries that involve Native Alaskans in the development of their energy resources, including drilling field services for crude oil and natural gas resources, oil refining, and real estate and financial services. One corporation manages a commercial-scale wind farm and is a shareholder in Alaska's first underground natural gas storage facility.<sup>88</sup>

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## Endnotes

- <sup>1</sup> Alaska Public Lands Information Centers, Statewide FAQs, Interesting facts about Alaska, accessed September 18, 2015.
- <sup>2</sup> Fly Alaska, Interesting Geographical Alaska Facts, accessed September 18, 2015.
- <sup>3</sup> Alaska Public Lands Information Centers, Statewide FAQs, What is Alaska's weather like, accessed September 18, 2015.
- <sup>4</sup> U.S. Census Bureau, Table 14, State Population-Rank, Percent Change, and Population Density, 1980-2010.
- <sup>5</sup> Alaska Department of Labor and Workforce Development, Alaska Population Overview, 2013 Estimates (February 2013), p. 7.
- <sup>6</sup> State of Alaska, Alaska Kids' Corner, Economy, accessed August 21, 2015.

- <sup>7</sup> U.S. Energy Information Administration, Top 100 U.S. Oil & Gas Fields (March 2015), p. 5, 8.
- <sup>8</sup> Alaska Sourcebook, History of Alaska Oil Production 1959-2012, accessed August 21, 2015.
- <sup>9</sup> U.S. Energy Information Administration, Crude Oil Production, Annual thousand barrels per day, 2009-2014.
- <sup>10</sup> U.S. Environmental Protection Agency, Alaska, Climate Impacts in Alaska, accessed August 21, 2015.
- <sup>11</sup> Idaho National Laboratory, Undeveloped Hydropower Potential by State, accessed August 21, 2015.
- <sup>12</sup> National Renewable Energy Laboratory, 50m Wind Power Resource -Alaska, accessed August 21, 2015.
- <sup>13</sup> Open EI, Alaska Geothermal Resources, accessed August 21, 2015.
- <sup>14</sup> U.S. Energy Information Administration, State Energy Data System, Table C3, Primary Energy Consumption Estimates, 2013.
- <sup>15</sup> U.S. Energy Information Administration, State Energy Data System, Table C13, Energy Consumption per Capita by End-Use Sector, Ranked by State, 2013.
- <sup>16</sup> U.S. Energy Information Administration, Alaska Field Production of Crude Oil, 1973-2014.
- <sup>17</sup> U.S. Energy Information Administration, Crude Oil Production, Annual thousand barrels, 2009-2014.
- <sup>18</sup> U.S. Energy Information Administration, Analysis of Crude Oil Production in the Arctic National Wildlife Refuge, SR/OIAF/2008-03 (Washington, DC, May 2008), p. 1.
- <sup>19</sup> Alyeska Pipeline Service Co., "About Us," accessed August 22, 2015.
- <sup>20</sup> Alyeska Pipeline Service Co., TAPS Low Flow Study Status (Jan 31, 2011), slide 5.
- <sup>21</sup> Alyeska Pipeline Service Co., Pipeline Operations, Declining Throughput, accessed August 22, 2015.
- <sup>22</sup> Western States Petroleum Association, WSPA States List, accessed August 22, 2015.
- <sup>23</sup> Muskal, Michael, "Alaska Oil, Exported for First Time in a Decade, Heads to South Korea," Los Angeles Times (September 30, 2014).
- <sup>24</sup> Exxon Valdez Oil Spill Trustee Council, Questions and Answers, accessed August 22, 2015.
- <sup>25</sup> Hadhazy, Adam, "20 Years After the Exxon Valdez: Preventing-and Preparing For-the Next Oil Spill Disaster," Scientific American (March 23, 2009).
- <sup>26</sup> U.S. Energy Information Administration, State Energy Data System, Table F15, Total Petroleum Consumption Estimates, 2013.
- <sup>27</sup> U.S. Energy Information Administration, Refinery Capacity Report, Table 3, Capacity of Operable Petroleum Refineries by State as of January 1, 2015, p. 5-7.
- <sup>28</sup> Alaska Department of Natural Resources, Division of Oil and Gas 2009 Annual Report, p. 54-56.
- <sup>29</sup> Tesoro, Kenai Refinery, accessed August 22, 2015.
- <sup>30</sup> PetroStar Inc., Mission, accessed August 22, 2015.
- <sup>31</sup> Doan, Lynn, and Eliot Caroom, "Flint Hills Alaska Refinery to Shut Amid 'Enormous' Costs," Bloomberg Business (February 5, 2014).
- <sup>32</sup> U.S. Energy Information Administration, State Energy Data System, Table C8, Transportation Sector Energy Consumption Estimates, 2013.
- <sup>33</sup> U.S. Census Bureau, Population Estimates, State Totals: Vintage 2013, Tables, Annual Population Estimates.
- <sup>34</sup> Bradner, Tim, "International Cargo Off, but Alaska's Airports Still Hold Edge," Alaska Journal of Commerce (May 4, 2012).
- <sup>35</sup> U.S. Energy Information Administration, Electric Power Monthly (February 2015), Table 1.8.B.
- <sup>36</sup> U.S. Census Bureau, State Imports for Alaska (2014).
- <sup>37</sup> U.S. Energy Information Administration, Natural Gas Gross Withdrawals and Production, 2009-2014.
- <sup>38</sup> Alaska Natural Gas Transportation Projects, Office of the Federal Coordinator, Guide to Alaska Natural Gas Projects, accessed August 22, 2015.
- <sup>39</sup> U.S. Energy Information Administration, Natural Gas Summary, Alaska, 2009-2014.
- <sup>40</sup> U.S. Energy Information Administration, Natural Gas Consumption by End Use, Alaska, 2009-2014.

- <sup>41</sup> Alaska Natural Gas Transportation Projects, Office of the Federal Coordinator, Alaska Natural Gas Pipeline History, accessed August 22, 2015.
- <sup>42</sup> Alaska Natural Gas Transportation Projects, Office of the Federal Coordinator, Guide to Alaska Natural Gas Projects, accessed August 22, 2015.
- <sup>43</sup> Argus Media, "Alaska Kenai LNG to Resume Exports in May: Update" (April 30, 2015).
- <sup>44</sup> Ratner, Michael, et al., U.S. Natural Gas Exports: New Opportunities, Uncertain Outcomes, Congressional Research Service (Washington, DC, January 28, 2015), p. 1, 5.
- <sup>45</sup> Alaska Natural Gas Transportation Projects, Office of the Federal Coordinator, Alaska LNG Project, accessed August 22, 2015.
- <sup>46</sup> Alaska Department of Natural Resources, Mining, Land & Water, Coal Regulatory Program, Operating Mines.
- <sup>47</sup> Flores, Romeo M., Gary D. Stricker, and Scott A. Kinney, Alaska Coal Geology, Resources, and Coalbed Methane Potential, USGS, DDS-77 (2005), Abstract.
- <sup>48</sup> U.S. Energy Information Administration, Annual Coal Report 2013, Table 15, Recoverable Coal Reserves at Producing Mines, Estimated Recoverable Reserves, and Demonstrated Reserve Base by Mining Method, 2013.
- <sup>49</sup> U.S. Energy Information Administration, U.S. Coalbed Methane, accessed August 22, 2015.
- <sup>50</sup> Flores, Romeo M., Gary D. Stricker, and Scott A. Kinney, Alaska Coal Geology, Resources, and Coalbed Methane Potential, USGS, DDS-77 (2005), p. 2.
- <sup>51</sup> U.S. Energy Information Administration, Annual Coal Report, Table 1, Coal Production and Number of Mines by State and Mine Type, 2013 and 2012.
- <sup>52</sup> Usibelli Coal Mine, accessed August 22, 2015.
- <sup>53</sup> Alaska Power Association, Alaska Energy Systems, accessed August 24, 2015.
- <sup>54</sup> U.S. Department of Homeland Security, Science and Technology Directorate, National Power Grid Simulator Workshop, National Power Grid Simulation Capability: Needs and Issues (Argonne, IL, December 9-10, 2008), p. 6.
- <sup>55</sup> Alaska Center for Energy and Power, Alaska Energy Wiki, Railbelt, accessed August 24, 2015.
- <sup>56</sup> Fay, Ginny, Alejandra Villalobos Melendez and Corinna West, Alaska Energy Statistics, 1960-2011, Final Report (December 2013), p. 6.
- <sup>57</sup> U.S. Energy Information Administration, Electric Power Monthly (February 2015), Table 1.8.B.
- <sup>58</sup> U.S. Census Bureau, Population Estimates, State Totals: Vintage 2014, Tables, Annual Population Estimates.
- <sup>59</sup> U.S. Energy Information Administration, Electric Power Monthly (February 2015), Tables 1.10.B, 1.6.B.
- <sup>60</sup> U.S. Energy Information Administration, Electric Power Monthly (February 2015), Tables 1.13.B, 1.6.B.
- <sup>61</sup> Alaska Power Association, Alaska Energy Systems, paragraph 5, accessed August 24, 2015.
- <sup>62</sup> U.S. Energy Information Administration, Electric Power Monthly (February 2015), Tables 1.7.B, 1.8.B.
- <sup>63</sup> Alaska Energy Authority, Renewable Energy Atlas of Alaska (April 2013), p. 4.
- <sup>64</sup> U.S. Energy Information Administration, Electric Power Monthly (February 2015), Tables 1.6.B, 1.13.B.
- <sup>65</sup> Alaska Energy Authority, Renewable Energy Atlas of Alaska (April 2013), p. 16.
- <sup>66</sup> Kodiak Electric Association, Pillar Mountain Wind Farm, updated July 27, 2015.
- <sup>67</sup> Caldwell, Suzanna, "With No Buyers for Power, Fire Island Delays Adding Turbines," Alaska Dispatch News, January 29, 2015.
- <sup>68</sup> Renewable Energy Alaska Project, Wind, accessed August 25, 2015.
- <sup>69</sup> Golden Valley Electric Association, Eva Creek Wind Project, accessed August 25, 2015.
- <sup>70</sup> U.S. Energy Information Administration, Electric Power Monthly (February 2015), Tables 1.13.B, 1.17.B.
- <sup>71</sup> Alaska Energy Authority, Renewable Energy Atlas of Alaska (April 2013), p. 16.
- <sup>72</sup> Alaska Energy Authority, Renewable Energy Atlas of Alaska (April 2013), p. 8.
- <sup>73</sup> Geothermal Energy Association, 2015 U.S. and Global Geothermal Power Production Report (February 2015), p. 14.
- <sup>74</sup> Alaska Energy Authority, Chena Hot Springs, accessed August 25, 2015.

- <sup>75</sup> Holdman, Gwen, "The Chena Hot Springs 400 kW Geothermal Power Plant," p. 22 & 32, accessed August 25, 2015.
- <sup>76</sup> Boyd, Tonya L., Alex Sifford, and John W. Lund, "The United States of America Country Update 2015," World Geothermal Congress, accessed September 18, 2015.
- <sup>77</sup> Alaska Energy Authority, Geothermal Projects, accessed August 25, 2015.
- <sup>78</sup> Alaska Energy Authority, Renewable Energy Atlas of Alaska (April 2013), p. 14.
- <sup>79</sup> U.S. Forest Service, American Indian Digest, Appendix D Indian Nations, p. D-3.
- <sup>80</sup> U.S. Department of the Interior, Indian Affairs, Alaska Region Overview, accessed August 25, 2015.
- <sup>81</sup> Native American Science Curriculum, Alaska Native Land Claims & Tribal Sovereignty Issues, accessed August 26, 2015.
- <sup>82</sup> Alaska Business Monthly, "Top 49ers Announced by Alaska Business Monthly," Press Release (October 2, 2014).
- <sup>83</sup> University of Alaska Fairbanks Interior Aleutians Campus, Federal Indian Law for Alaska Tribes, accessed August 26, 2015, see list of regional corporations with links to their businesses.
- <sup>84</sup> Flores, Romeo M., Gary D. Stricker, and Scott A. Kinney, Alaska Coal Geology, Resources, and Coalbed Methane Potential, USGS, DDS-77 (2005) -Northern Alaska Slope Coal Province.
- <sup>85</sup> Meyer, Mark, Selected Coal Deposits in Alaska, OFR 33-90, U.S. Department of the Interior, Bureau of Mines (1990), p. 2.
- <sup>86</sup> Resource Development Council, Alaska's Forest Industry, Facts & Economic Impact, accessed August 26, 2015.
- <sup>87</sup> Native American Science Curriculum, Alaska Native Land Claims & Tribal Sovereignty Issues, accessed August 26, 2015.
- <sup>88</sup> Cook Inlet Region, Inc., Energy and Infrastructure, accessed August 26, 2015.

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