2025
IDAHO ENERGY & MINERAL LANDSCAPE

304 N. 8th Street, Suite 242
P.O. Box 83720
Boise, Idaho 83720

Governor's Office of Energy and Mineral Resources
IDAHO

Created by the Idaho Governor's
Office of Energy and Mineral Resources

304 N. 8th Street, Suite 242
P.O. Box 83720
Boise, Idaho 83720-0199

Special thanks to Intermountain Gas Company, a subsidiary of MDU Resources Group, for printing and binding this edition of the Idaho Energy and Mineral Landscape.

Note: Energy statistics compiled for the 2025 Idaho Energy and Mineral Landscape reflect the most recent data available from a wide variety of sources. Different sources will update energy data at irregular intervals, some more frequently than others. For that reason, the facts and statistics referenced in this document, including graphs and tables, represent the most up-to-date information available, but may be several years old. Each year, the Idaho Governor's Office of Energy and Mineral Resources staff conducts thorough research to ensure that the data presented in this document is accurate and complete.

The U.S. Energy Information Administration (EIA) has updated its methodology for calculating the primary energy consumption of electricity from noncombustible renewable energy sources, effective October 2023. This update impacts both archived data as far back as 1960 and future statistics. The new approach uses a captured energy method, aligning more closely with international standards, in contrast to the previous fossil fuel equivalency method. As a result, the 2025 Idaho Energy and Mineral Landscape, which considers data back to 1990, will incorporate this updated data, and may differ from the related data in earlier Energy Landscapes.

About the Idaho Governor's Office of Energy and Mineral Resources

The Idaho Governor's Office of Energy and Mineral Resources (OEMR) coordinates energy and mineral planning, permitting processes, and policy development in the state of Idaho. OEMR works to ensure that Idaho's energy and mineral resources are developed and utilized in an efficient, effective, and responsible manner that sustains the quality of life for its residents and enhances the economy. OEMR serves as the clearinghouse and first point of contact for the state on energy and mineral matters. It oversees the Idaho Strategic Energy Alliance (ISEA), serves as a resource for policymakers, and coordinates efforts with federal and state agencies and local governments.[1]

OEMR prepares publications such as the Idaho Energy and Mineral Landscape and the Idaho State Energy Security Plan.[2] A detailed list of recent publications can be found in Appendix C.

As of December 2024, OEMR administers the following energy-related programs. A detailed list of OEMR's programs can be found in Appendix B.

- Idaho Energy Resiliency Grant Program
- State Energy Loan Program
- Government Leading by Example
- Idaho Awards for Leadership in Energy Efficiency
- Energy Efficiency Conservation Block Grant Program
- National Electric Vehicle Infrastructure Program (in cooperation with the Idaho Transportation Department and the Idaho Department of Environmental Quality)

[1] Governor Brad Little. "Executive Order 2024-09." https://oemr.idaho.gov/wp-content/uploads/EO-2024-09.pdf
[2] Idaho Governor's Office of Energy and Mineral Resources. "Reports and Publications". https://oemr.idaho.gov/financial-information/reports-and-publications/

Table of Contents

1. IDAHO'S ENERGY LANDSCAPE 5
1.1 Energy Leadership and the Economy 5
1.2 Energy Production and Consumption 6
1.3 Fuels 9
1.4 Electricity 14
1.5 Investor-owned Utilities 18
1.6 Municipal and Cooperative Utilities and the Bonneville Power Administration 24
2. ENERGY STAKEHOLDERS 27
2.1 State Entities 27
2.2 Regional Entities 33
2.3 Federal Entities 38
2.4 Energy Research and Education in Idaho 41
3. ENERGY SOURCES 45
3.1 Hydroelectricity 45
3.2 Wind 46
3.3 Solar 47
3.4 Bioenergy 48
3.5 Geothermal 49
3.6 Combined Heat and Power 49
3.7 Nuclear 50
3.8 Natural Gas 51
3.9 Propane 52
3.10 Petroleum 53
3.11 Hydrogen 53
3.12 Coal 53
4. ENERGY EFFICIENCY AND ENERGY TECHNOLOGIES 53
4.1 Energy Efficiency 53
4.2 Energy Technologies 55
5. MINERALS 61

APPENDIX A: LIST OF IDAHO UTILITIES 64
APPENDIX B: OEMR PROGRAMS 65
Idaho Energy Efficiency and Conservation Block Grant Program 65
Idaho Energy Resiliency Grant Program 66
State Energy Loan Program 66
Government Leading by Example Program 66
Idaho Awards for Leadership in Energy Efficiency 67
National Electric Vehicle Formula Program 67
APPENDIX C: PUBLICATIONS 68

GLOSSARY 70

1. Idaho's Energy Landscape

1.1 Energy Leadership and the Economy

Idaho's abundant natural resources enable reliable and low-cost energy which sustains Idaho's quality of life for its citizens and the economy. There are several key attributes that enable a dynamic energy industry in Idaho including the low cost of doing business, availability of an energy-ready workforce, access to leaders in energy innovation, and friendly regulatory environment and tax structures.[3]

The State of Idaho works to provide its citizens with affordable and reliable power. Efforts include developing new policies, improving coordination, and providing funding over the next several years for projects that will enhance the resiliency and security of the grid and conserve energy to save citizens money. See Appendix B for a list of OEMR Programs.

Figure 1: Endowment Lands: Generating More Than Energy

In Spring 2024, the Idaho State Board of Land Commissioners (Land Board) approved an Energy Leasing Policy to address the substantial increase in interest in developing energy projects on Endowment Land. On October 19, the Land Board approved its first ever solar lease on state land. According to the Idaho Department of Lands (IDL), this 300 MW project will serve eastern Idahoans and is expected to generate between $1.5 and $2 million in rent annually, benefitting Idaho's public school system.[4]

Energy-related job growth is increasing in Idaho. Energy job categories range from electric power generation, fuel, energy efficiency, motor vehicles, and transmission, distribution, and storage. In 2023, Idaho had 34,308 energy workers, increasing 3.7% from 2022.[5] 19,863 of these jobs are in clean energy.[6] In 2023, Idaho experienced a 12% increase in employment within the electric power generation sector, marking it the second largest state for job growth in this industry.[7] Over the next year, Idaho's energy sector job growth is expected to exceed the national average across all major technologies.[8]

[3] Idaho Commerce. "Idaho Incentives for Advanced Energy." https://commerce.idaho.gov/content/uploads/2023/10/Energy-Incentives-at-a-Glance.pdf/
[4] Idaho Press. "Idaho approves first solar permit on state endowment land." https://www.idahopress.com/news/local/idaho-approves-first-solar-permit-on-state-endowment-land/article_31596aa2-8d8f-11ef-ad66-e30a6a0d8ec6.html
[5] United States Energy and Employment Report. "Energy Employment by State 2024." https://www.energy.gov/sites/default/files/2024-08/USEER%202024%20States%20Final.pdf
[6] Ibid.
[7] Ibid.
[8] Ibid.

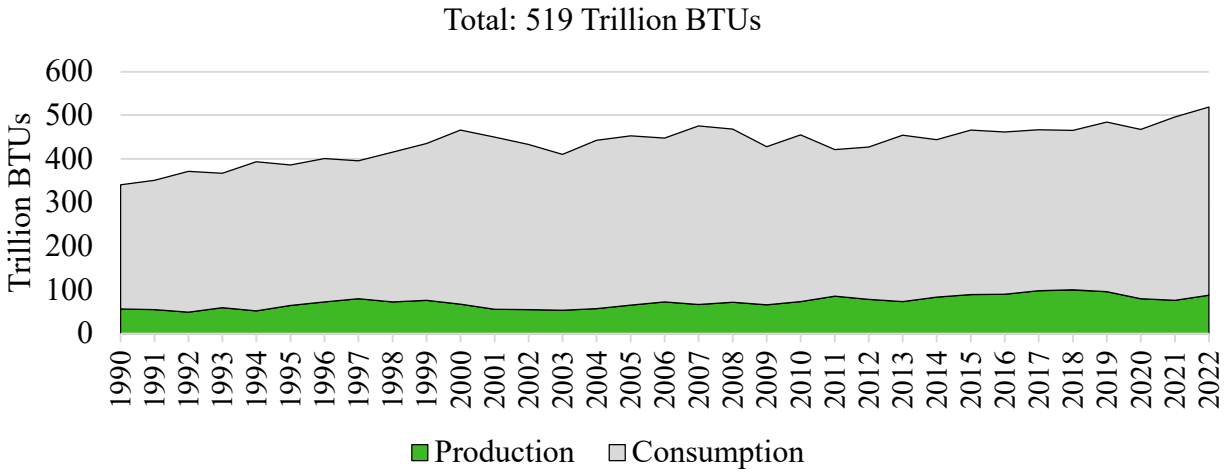
Figure 2: Expected Energy Job Growth[9]

Technology	Idaho Expected Growth Next 12 Months (percent)	U.S. Expected Growth Next 12 Months (percent)	Idaho Increase from National Average
Electric Power Generation	8.6	6.6	+ 2
Electric Power Transmission, Distribution, and Storage	8.7	6.7	+ 2
Energy Efficiency	9.3	8.0	+ 1.3
Fuels	7.8	5.1	+ 2.7
Motor Vehicles	7.5	4.5	+ 3

1.2 Energy Production and Consumption

Resource adequacy refers to the ability to ensure a reliable and resilient supply of energy resources, such as electricity or natural gas, to meet energy demand which supports daily life and the economy. A diverse portfolio of energy resources helps create resiliency and reliability for the grid.

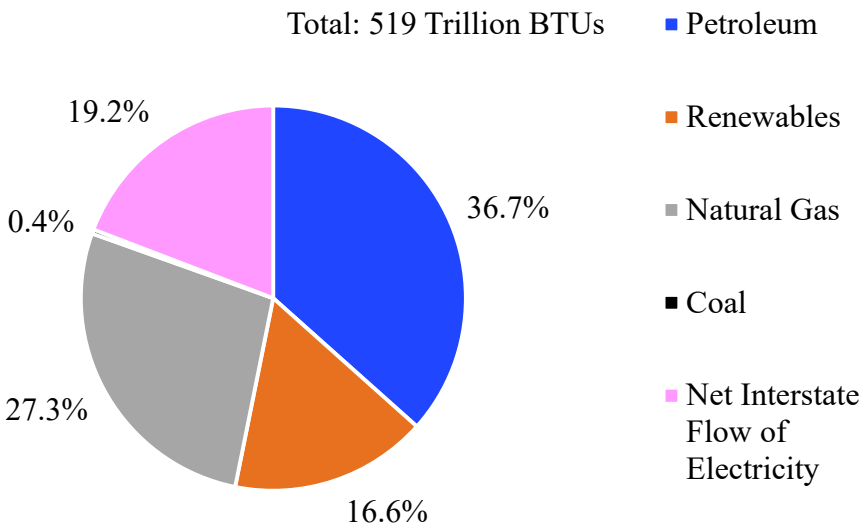
Figure 3: Idaho Energy Production and Consumption, 2022[10,11]



In 2022, Idaho consumed approximately 519 trillion British thermal units (BTUs) of energy. Of that energy, 16.9% was produced in Idaho. Utilities meet energy demands by importing resources located outside the state, such as through regional energy markets. The state's imported energy requires a robust and well-maintained infrastructure of highways, railroads, pipelines, and transmission lines to facilitate economic development and meet Idahoans' needs.

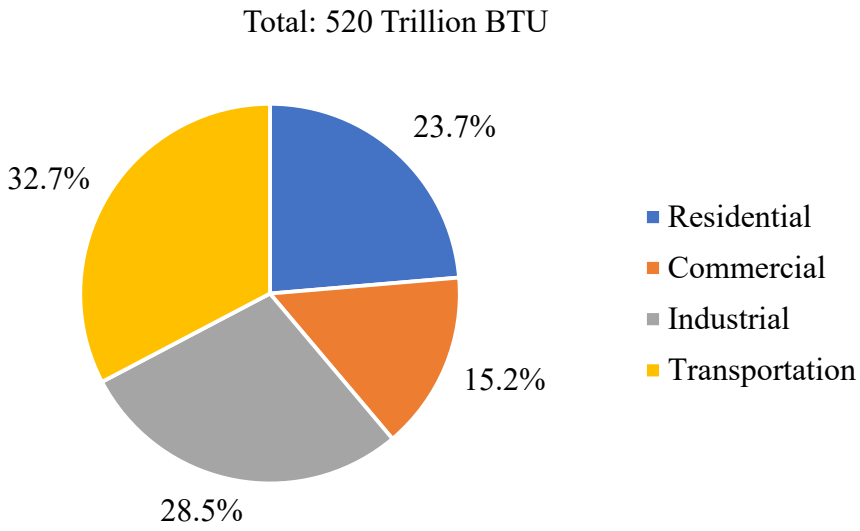
[9] Ibid.
[10] U.S. Energy Information Administration. "Primary Energy Consumption Estimates." https://www.eia.gov/state/seds/sep_use/total/pdf_cb/use_tot_IDcb.pdf
[11] U.S. Energy Information Administration. "Primary Energy Production Estimates." https://www.eia.gov/state/seds/sep_prod/pdf/PT2_ID.pdf

Figure 4: Sources of Total Energy Consumed in Idaho, 2022[12]



Petroleum accounts for over 36% of Idaho's energy consumed, mostly consisting of motor gasoline and diesel. Clean sources of energy represent over 16% of Idaho's total energy consumed. This growing share includes hydroelectricity, biomass, geothermal, solar, and wind.

Figure 5. Idaho Energy Consumption by Sector, 2022[13]

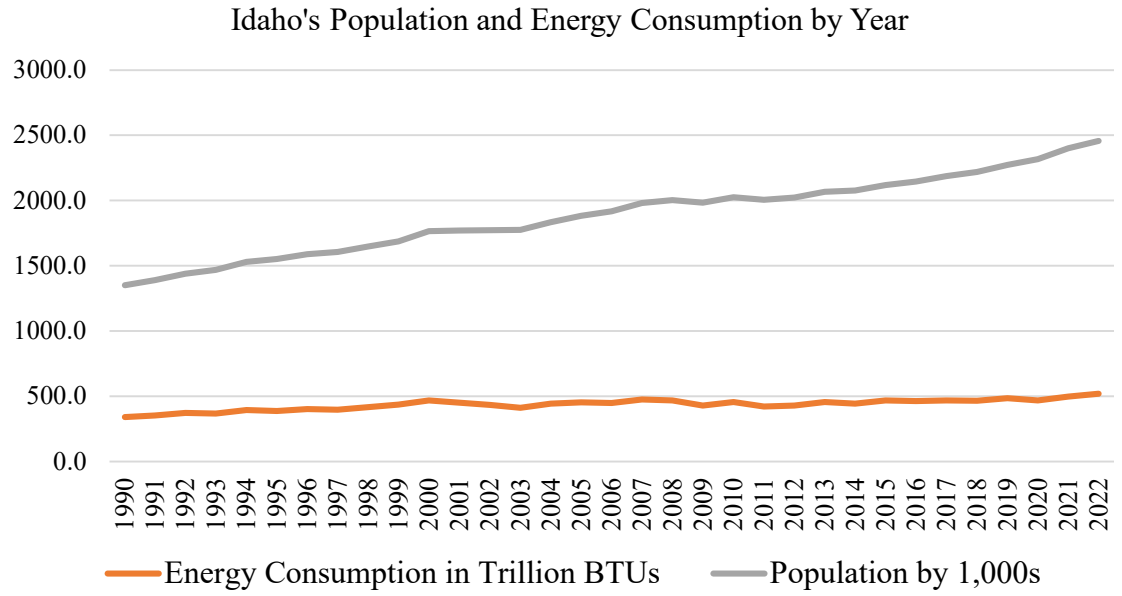


Energy consumption can be tracked by its end-use sector: residential, commercial, industrial, or transportation. Residential consumption includes single-family, multi-family, and manufactured homes. Commercial consumption is the smallest sector and includes businesses, retail stores, and government facilities. Industrial consumption includes facilities used to produce, process, and manufacture products. This encompasses mining, agriculture, manufacturing, and other industries

[12] U.S. Energy Information Administration. "Idaho Energy Consumption Estimates, 2022" https://www.eia.gov/state/?sid=ID#tabs-1
[13] U.S. Energy Information Administration. "Idaho State Energy Profile." https://www.eia.gov/state/print.php?sid=ID

throughout the state. Transportation is the largest sector and includes fleet vehicles, personal vehicles, shipments, and air travel.

Figure 6. Idaho's Population and Energy Consumption by Year[14,15]



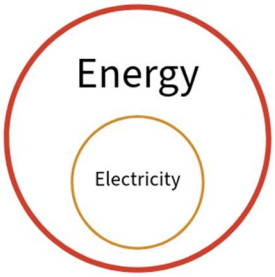
As shown in Figure 6, the state's energy consumption remained relatively consistent from 1990 to 2022 despite Idaho's population increasing during this 32-year period. Energy efficiency and improved energy technologies made it possible to consume about the same amount of energy despite the state's growing population.[16]

Although overall energy consumption has stayed relatively stable year-to-year, demand is projected to significantly increase throughout the West. Electricity demand is projected to increase 20% over the next decade, mostly due to the development of new data centers, manufacturing, cryptocurrency, and electrification.[17] New generation and transmission resources are needed to meet the pace of this demand, which will require extensive and careful coordination between states.

[14] U.S. Energy Information Administration. "Primary energy consumption estimates, selected years, 1960-2022, Idaho." https://www.eia.gov/state/seds/sep_use/total/pdf_cb/use_tot_IDcb.pdf
[15] Macrotrends. "Idaho Population 1900-2023." https://www.macrotrends.net/global-metrics/states/idaho/population#:~:text=The%20population%20of%20Idaho%20in,a%203.37%25%20increase%20from%202019.
[16] U.S. Energy Information Administration. "Use of energy explained. Energy efficiency and conservation." https://www.eia.gov/energyexplained/use-of-energy/efficiency-and-conservation.php
[17] Western Electricity Coordinating Council. "2024 Western Assessment of Resource Adequacy." https://feature.wecc.org/wara/

Figure 7: Energy vs. Electricity
Energy is the ability to do work. There are many sources of energy such as biomass, hydropower, geothermal, petroleum, and natural gas. Energy sources in their natural states are considered primary energy sources and can be converted to secondary sources such as electricity or gasoline. Energy is typically measured in Joules (J), and BTUs.

Electricity is a secondary source of energy. It is produced by converting primary sources of energy into electrical power. Electricity is delivered by electrons, typically moved through a wire. Electricity generation is measured in watts for small devices, and kilowatts (kW) for larger devices. The capacity for this generation is measured in multiples; one megawatt (MW) is equal to 1,000 kW, and one gigawatt (GW) is equal to 1,000 MW. One kilowatt hour (kWh) is one kW generated or consumed for one hour.[18,19]



1.3 Fuels

Idaho's energy economy heavily relies on fossil fuel resources. Accounting for 64% of the state's total energy consumption, natural gas, petroleum (diesel, motor gasoline, and jet fuel), and propane are essential for the continued provision of low-cost energy and heating for Idahoans.[20]

Natural Gas

Natural gas is utilized in Idaho to heat homes, power businesses, move vehicles, and serves as a key component in many industrial processes. More than half of Idaho households use natural gas as their primary energy source to heat their home.[21]

Between 2016 and 2022, natural gas consumption per capita in Idaho ranked among the lowest one-third of states, despite about half of Idaho households using natural gas as their primary heating energy source.[22] Avista and Intermountain Gas Company (IGC) provide most of the natural gas service in Idaho. A third utility, Dominion Energy, provides service to Idaho customers in a portion of Franklin County in the southeastern part of the state.[23]

---

[18] U.S. Energy Information Administration. "What is Energy?" https://www.eia.gov/energyexplained/what-is-energy
[19] U.S. Energy Information Administration. "Measuring Electricity." https://www.eia.gov/energyexplained/electricity/measuring-electricity.php
[20] U.S. Energy Information Administration. "Idaho Energy Consumption Estimates, 2022" https://www.eia.gov/state/?sid=ID#tabs-1
[21] U.S. Energy Information Administration. "Idaho State Profile and Energy Estimates – Profile Analysis." https://www.eia.gov/state/?sid=ID
[22] U.S. Energy Information Administration. "Natural Gas Consumption by End Use." https://www.eia.gov/dnav/ng/ng_cons_sum_a_EPG0_VC0_mmcf_a.htm
[23] Dominion Energy. "About Us – Western Gas Operations." https://www.dominionenergy.com/about-us/moving-energy/western-gas-operations

Figure 8: Sources of Natural Gas Consumption, 2022[24]

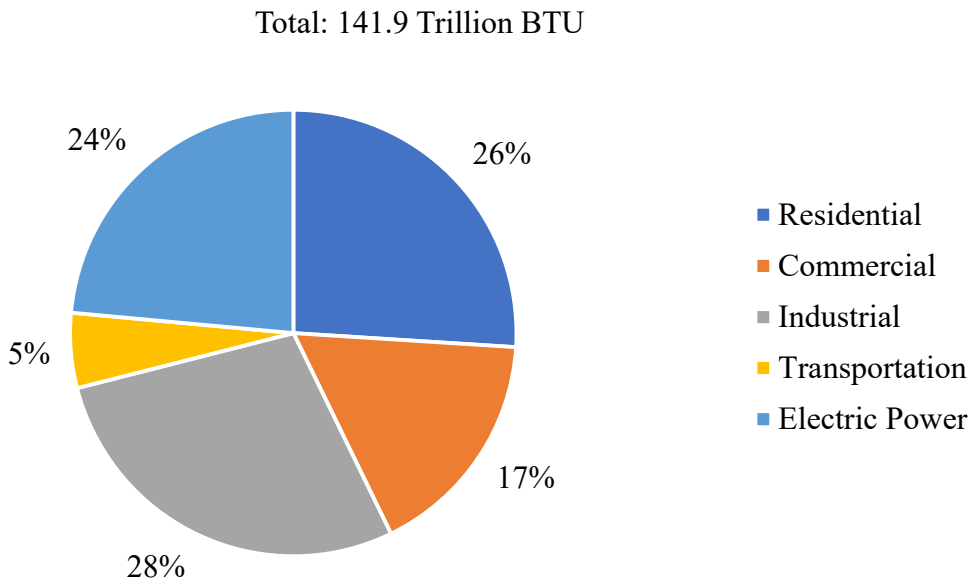
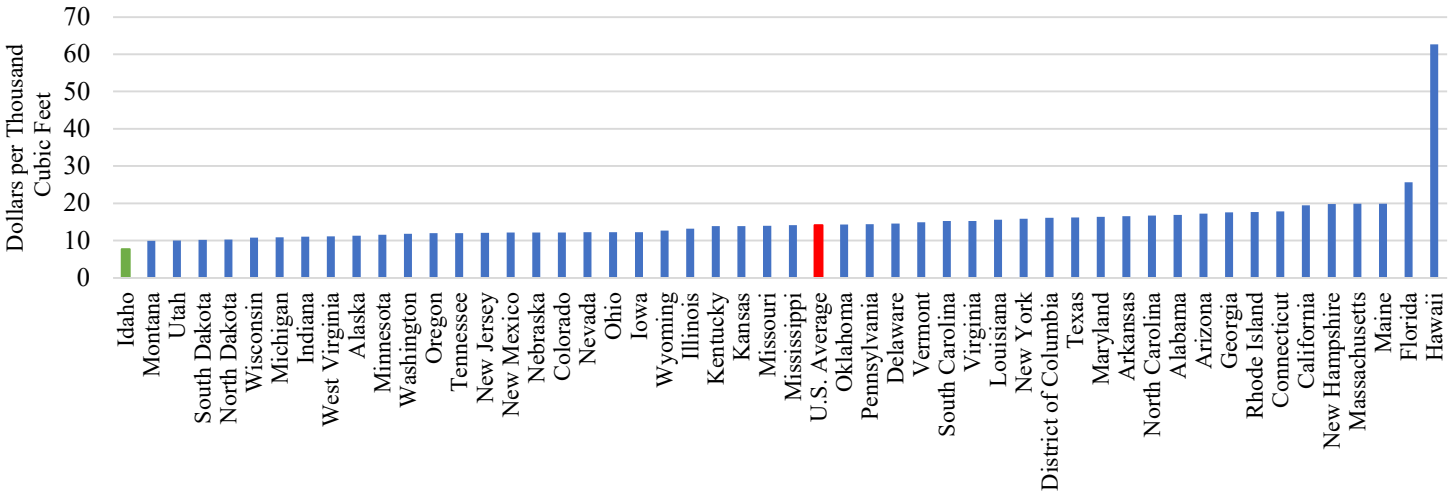


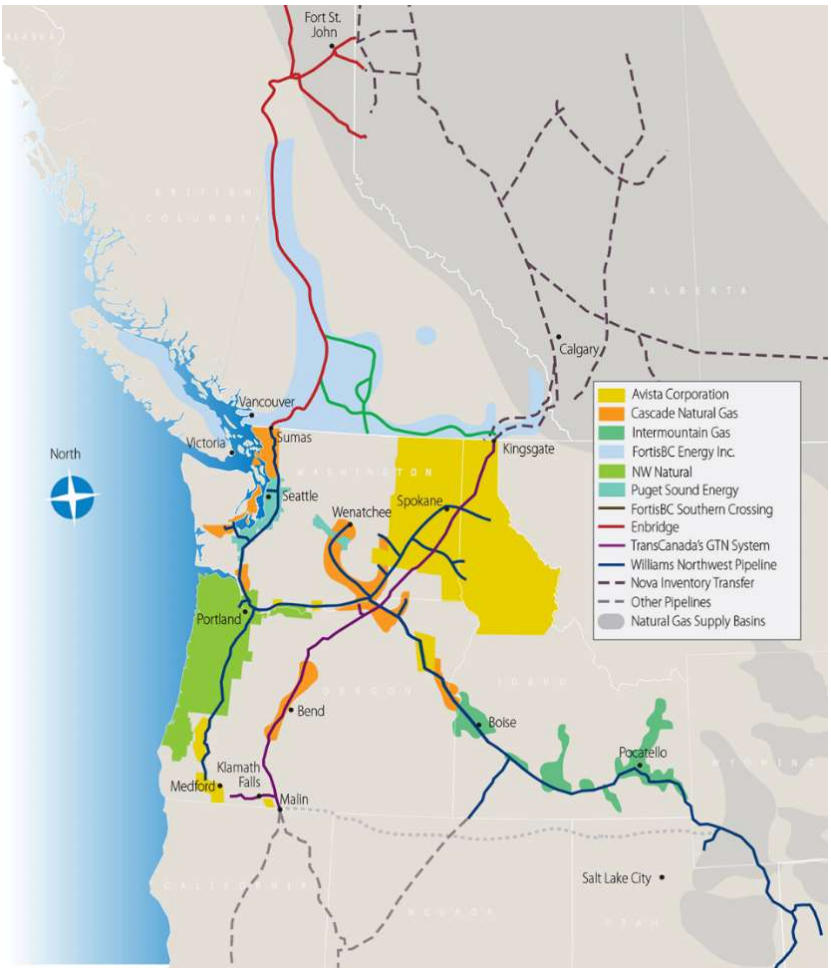
Figure 9: Residential Natural Gas Prices Compared to Other States, 2022[25]



In 2022, Idaho had the lowest average natural gas rate in the U.S. Idaho's natural gas is indicated in green, the U.S. average is indicated in red.

[24] U.S. Energy Information Administration. "Table F21: Natural Gas Consumption Estimates, 2022." https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep_fuel/html/fuel_use_ng.html&sid=US
[25] U.S. Energy Information Administration. "Table F22: Natural Gas Price and Expenditure Estimates, 2022." https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep_fuel/html/fuel_pr_ng.html&sid=US

Figure 10: Western Interstate Natural Gas Pipeline System and Service Territories[26]



Avista Corporation

Avista Corporation (Avista) serves over 93,000 natural gas customers in Idaho's northern and central regions. Avista's North Division supplies gas to eastern Washington and northern Idaho along its 75-mile interstate pipeline.[27]

Avista's natural gas distribution system consists of approximately 3,300 miles of distribution pipelines in Idaho. Avista holds firm access rights to both Canadian and Rocky Mountain natural gas supplies through the Williams Northwest and TransCanada Gas Transmission Northwest pipelines. Avista also holds rights to the Jackson Prairie storage facility in Washington.

According to Avista's 2023 Natural Gas Integrated Resource Plan (IRP), forecasting natural gas customer demand is becoming more difficult due to policy updates in Oregon and Washington.[28] Nevertheless, Avista estimates natural gas customers will increase by 1.1% annually.[29]

[26] Northwest Gas Association. "Natural Gas Facts." https://www.nwga.org/_files/ugd/054dfe_5391c325d32346fbaedfb48af81d37a7.pdf
[27] Idaho Public Utility Commission. "IPUC 2023 Annual Report." https://puc.idaho.gov/Fileroom/PublicFiles/annualreports/ar2023/Section%20V%20Natural%20Gas.pdf
[28] Avista. "2023 Natural Gas Integrated Resource Plan." https://www.myavista.com/about-us/integrated-resource-planning
[29] Avista. "2023 Natural Gas Integrated Resource Plan." https://www.myavista.com/about-us/integrated-resource-planning

Intermountain Gas Company

Intermountain Gas Company (IGC) was founded in Idaho in 1950 and is a subsidiary of MDU Resources Group. IGC distributes natural gas to over 412,500 residential, commercial, and industrial customers in 74 Idaho communities.[30] IGC's 145 industrial and transport customers comprise 46% of its annual energy demand, while residential and commercial customers comprise 36% and 17%, respectively.

IGC uses approximately 13,300 miles of pipelines across 50,000 square miles in southern Idaho.[31] IGC holds firm capacity rights on William's Northwest Pipeline as well as three upstream pipelines to deliver gas to the distribution system. The upstream systems are Gas Transmission Northwest, Foothills Pipeline, and Nova Gas Transmission. IGC owns and operates the Nampa liquified natural gas (LNG) storage facility and leases storage at the Jackson Prairie underground facility, the Plymouth LNG facility, and from Dominion Energy's Mountain West/Williams Pipeline's Clay Basin underground storage field.

Since 2017, the IGC Energy Efficiency Program has operated with the goal of acquiring cost effective demand-side management resources in the form of natural gas therm savings. Residential customers can earn rebates for the purchase and installation of high-efficiency natural gas equipment and construction of energy-efficient homes. The program offers tools such as a calculator to estimate energy savings from the installation of high-efficiency appliances and a video library demonstrating home weatherization measures to enhance energy efficiency.

Commercial customers are also eligible for rebates when they install high-efficiency natural gas space heating and kitchen equipment. The program's website provides energy savings tips for businesses and includes a commercial kitchen savings estimator for the installation of high-efficiency commercial kitchen upgrades.

In 2022, 7,945 rebates were issued to IGC customers, a 43% increase from the previous year. The program engages customers through interactive online educational materials and activities designed to promote energy efficiency for both homes and businesses.

Dominion Energy

Dominion Energy, formerly called Questar Gas, based in Salt Lake City, provides natural gas service to residential, commercial, and industrial customers in Utah, southwestern Wyoming and about 2,500 customers in Franklin County, Idaho.[32] The Public Utilities Commission (PUC) has elected to allow the Utah Public Service Commission to regulate Dominion Energy's activities in its small Idaho service area.[33]

Propane

Propane is used to heat homes and businesses throughout the state, particularly in rural areas. Residential propane prices in Idaho fluctuated between $2.21/gallon to $2.567/gallon as of

[30] Idaho Public Utility Commission. "IPUC 2023 Annual Report." https://puc.idaho.gov/Fileroom/PublicFiles/annualreports/ar2023/Section%20V%20Natural%20Gas.pdf
[31] Intermountain Gas. "About Us." https://www.intgas.com/in-the-community/about-us/
[32] Idaho Public Utility Commission. "IPUC 2023 Annual Report." https://puc.idaho.gov/Fileroom/PublicFiles/annualreports/ar2023/Section%20V%20Natural%20Gas.pdf
[33] Idaho Public Utilities Commission. "Merger Agreement." https://puc.idaho.gov/Case/Details/3245

November 2024. Propane is not regulated by the PUC in Idaho. It is delivered by truck by private corporations. Propane consumption is seasonal, with peak consumption in fall and winter.

Propane is also used as a transportation fuel, for which there are nine publicly available stations for refueling in Idaho.[34] As a transportation fuel, propane is most used in specialized medium-duty and heavy-duty vehicles with engines capable of running on liquified petroleum gas. The Idaho Department of Environmental Quality's (DEQ) Vehicle Replacement Program has provided funding for several propane school buses.[35]

Petroleum

Petroleum products include gasoline, diesel, and aviation fuel and are used for transportation, electricity production, and heating. Petroleum accounts for over one-third of Idaho's energy consumed, mostly consisting of motor gasoline and diesel. Idaho's small population contributes to it being among the ten states with the lowest total petroleum consumption, but Idaho's per capita petroleum use is near the national average. Idaho's prices for these products are typically higher than the national average, primarily because Idaho relies on petroleum imports from nearby states.

Idaho has no petroleum refineries and limited storage capacity. Petroleum in Idaho is moved through four major modes of transportation: pipelines, railcars, barges, and truck delivery. Petroleum pipeline infrastructure within Idaho includes the Northwest Products Pipeline, which connects Salt Lake City refineries with Idaho Falls, Pocatello, Burley, and Boise, and continues to Pasco and Spokane in Washington state. This pipeline delivers refined petroleum products predominantly to southern Idaho. Much of the refined petroleum products for northern Idaho are sourced from refineries near Billings, Montana, with the product moved through the Yellowstone Pipeline and terminating in Moses Lake, Washington. Idaho's petroleum products are mostly transported using pipelines, while some are shipped on the Snake River into Lewiston, via barge, and others are transported via truck. End use refined petroleum products are typically delivered from terminal via truck to fueling stations.

[34] U.S. Department of Energy. "Alternative Fuels Data Center." https://afdc.energy.gov/fuels/propane_locations.html#/find/nearest?fuel=LPG

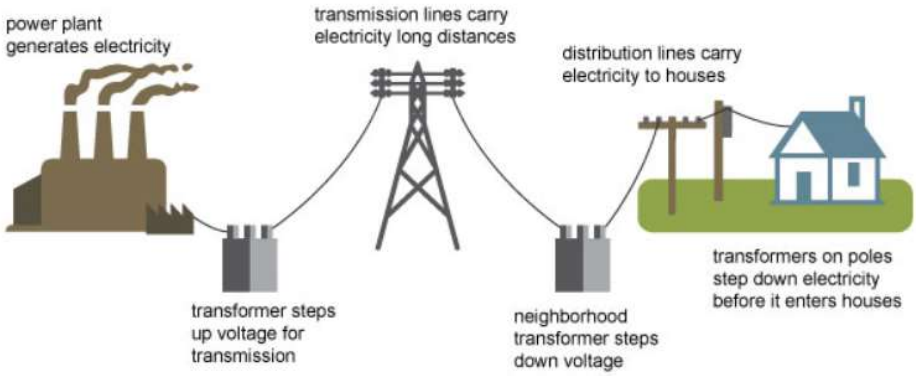
[35] United States Environmental Protection Agency. "School Bus Rebates: Diesel Emissions Reduction Act (DERA)." https://www.epa.gov/dera/rebates

Figure 11: Idaho Petroleum System[36]

1.4 Electricity

The grid is a system of electricity substations, transformers, and power lines that transport electricity to customers. There are three main components to the grid: generation, transmission, and distribution. Electricity is produced at a power plant from a generation resource. Electricity from power plants moves through a substation then through transformers that increase the voltage. Transmission lines then carry electricity over long distances to a substation that decreases the voltage. Once the voltage decreases, distribution lines safely deliver power to customers.[37] This infrastructure enables the efficient distribution of electricity across regions and ensures a reliable power supply for consumers.

Figure 12. Generation, Transmission, and Distribution[38]



[36] Office of Energy and Mineral Resources. "2022 Idaho Energy Security Plan." https://oemr.idaho.gov/wp-content/uploads/2022-Idaho-Energy-Security-Plan-Redacted.pdf
[37] U.S. Department of Energy. "How It Works: Electric Transmission & Distribution and Protective Measures." https://www.energy.gov/sites/default/files/2023-11/FINAL_CESER%20Electricity%20Grid%20Backgrounder_508.pdf
[38] U.S. Energy Information Administration. "Electricity Explained." https://www.eia.gov/energyexplained/electricity/delivery-to-consumers.php

Transmission plays a vital role in various contexts including energy integration, economic growth, energy security, and ensuring reliability and resiliency. A robust transmission network allows for the efficient integration of energy sources into the grid. Diverse and interconnected transmission networks enhance energy security by providing support during system failure or disruptions, which is especially important in areas prone to extreme weather conditions.

Reliable and resilient infrastructure ensures uninterrupted power supply to essential services like hospitals and other emergency services. A resilient grid also defends against potential disruptions caused by natural disasters, cyberattacks, or other unforeseen events.

Figure 13: Idaho's Investments in Grid Resiliency
Through OEMR's Energy Resiliency Grant Program, in 2023 Salmon River Electric Cooperative based in Challis purchased vegetation management equipment and wrapped 562 power poles with fire-retardant mesh. In 2024, the mesh protected power poles during a wildfire, preventing outages in Stanley.

The transmission network in the U.S. and Canada is made up of four separate interconnections. The Western Interconnection links Idaho with the rest of the western U.S. and two Canadian provinces. It serves 90 million people, is comprised of approximately 156,000 miles of transmission lines, and spans more than 1.8 million square miles.[39] A large proportion of generation capacity comes from hydroelectricity, wind, and solar. Coordination throughout the Western Interconnection on a local, sub-regional, and regional basis ensures a reliable and adequate integrated system of electricity for consumers. The Western Electricity Coordinating Council (WECC) is the regional entity that monitors and enforces compliance with electricity reliability standards throughout the Western Interconnection.[40]

[39] The Western Electricity Coordinating Council. "2024 State of the Interconnection." https://feature.wecc.org/soti/index.html
[40] Western Electricity Coordinating Council. "About WECC." https://www.wecc.org/Pages/AboutWECC.aspx

Figure 14: North American Electric Reliability Corporation (NERC) Regional Electric Interconnections[41]

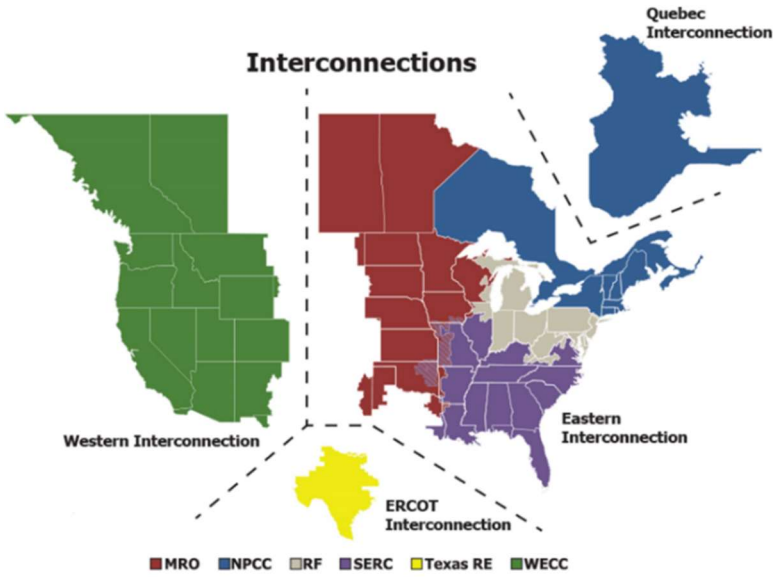
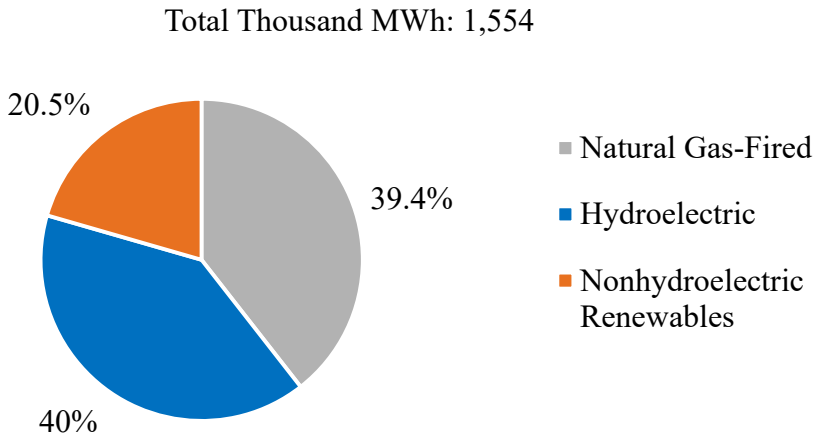


Figure 15: Idaho Electricity Generation by Resource, July 2024[42]

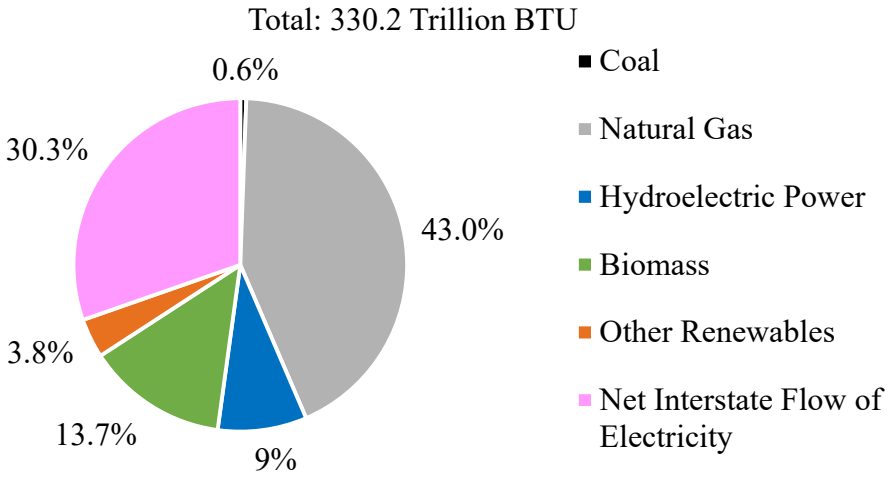


In 2023, Idaho had the fifth highest share of renewable energy after Vermont, South Dakota, Washington, and Maine. Hydroelectric power plants account for the majority of Idaho's in-state generation. In recent years, due to the integration of other renewable resources and drought, the hydroelectric share of the state's total annual generation has dropped from two-thirds to approximately 43%.[43] Natural gas produces over one-third of Idaho's electricity. Avista owns and

[41] North American Electric Reliability Corporation. "Maps: NERC Interconnections." https://www.nerc.com/AboutNERC/keyplayers/PublishingImages/NERC%20Interconnections.pdf
[42] U.S. Energy Information Administration. "Idaho Net Electricity Generation by Source, Jul. 2024." https://www.eia.gov/state/?sid=ID#tabs-4
[43] U.S. Energy Information Administration. "Idaho Profile Analysis." https://www.eia.gov/state/analysis.php?sid=ID#:~:text=Although%20geothermal%20energy%20provides%20less,state's%20only%20geothermal%20power%20plant.&text=Idaho%20does%20not%20have%20a,residential%20heating%20or%20electricity%20generation.&text=While%20the.

operates five natural gas-fired power plants, while Idaho Power Company (Idaho Power) owns and operates three and has a share in the Jim Bridger Plant in Wyoming.[44,45]

Figure 16: Idaho's Electricity Consumption by Resource, 2022[46]



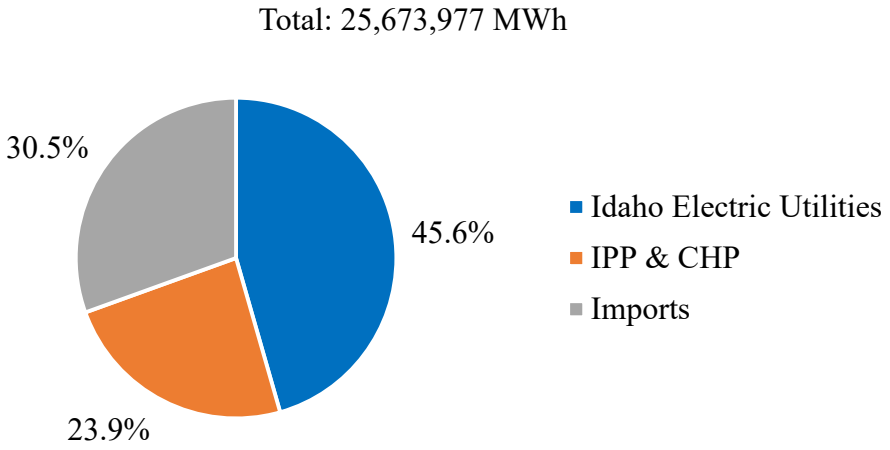
Idaho consumes more electricity than it generates. A portion of electricity consumed in Idaho comes from renewable in-state resources like hydroelectric, wind, solar, biomass, and geothermal. The remaining portion comes from neighboring states like Wyoming, Montana, and Utah, and is generated from hydroelectric, wind, natural gas, coal, and other sources.

Idaho depends on imported electricity to meet demand. Idaho's utilities generate approximately 45% of the electricity utilized in-state. 23% is provided by combined heat and power (CHP) or independent power producers (IPP). The remaining 30% is comprised of market purchases and energy imports from out-of-state generating resources owned by Idaho utilities. Idaho's retail sales of electricity totaled 25,673,977 MWh.

Imports grew over 40% from 2019 to 2023. This is likely attributed to Idaho utilities' involvement in the Western Energy Imbalance Market (WEIM), described further under Section 2.2, which allows participants to buy and sell power close to the time electricity is consumed, managing transmission congestion and providing supply at lower costs.[47]

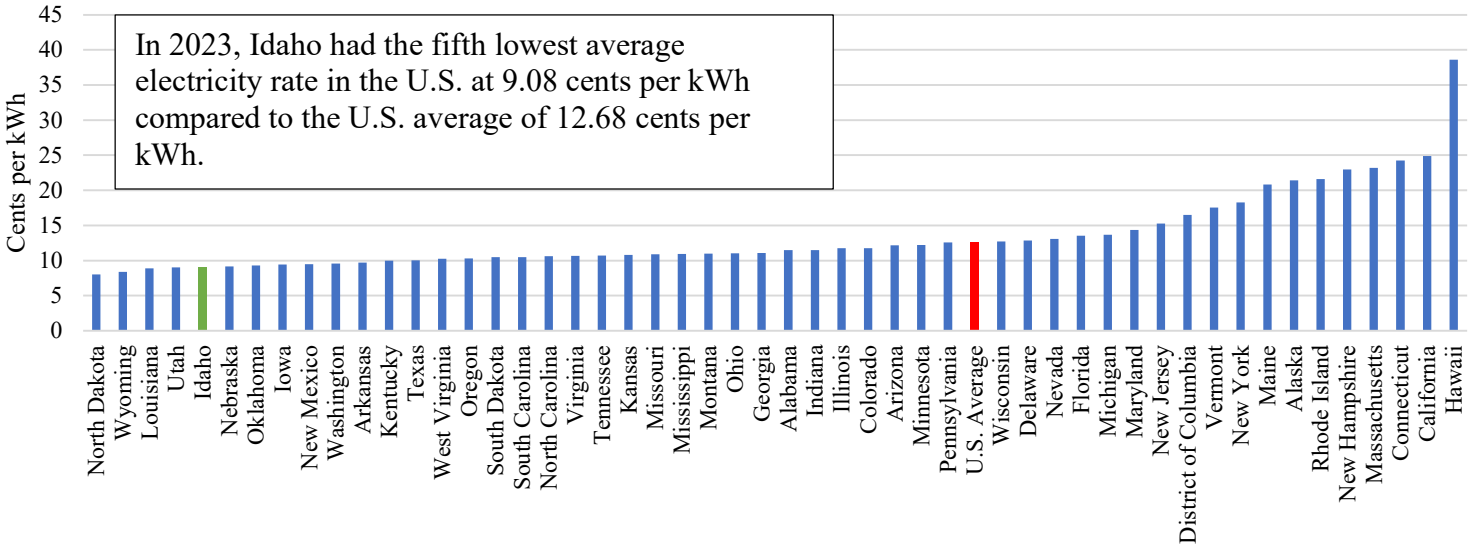
[44] *2023 Integrated Resource Plan.* Idaho Power. https://docs.idahopower.com/pdfs/AboutUs/PlanningForFuture/irp/2023/2023-irp-final.pdf
[45] *2023 Electric Integrated Resource Plan*. Avista Utilities. https://www.myavista.com/about-us/integrated-resource-planning
[46] U.S. Energy Information Administration. "Primary Energy Consumption Estimates." https://www.eia.gov/state/seds/sep_use/total/pdf_cb/use_tot_IDcb.pdf
[47] Western Energy Imbalance Market. "How it Works." https://www.westerneim.com/Pages/About/HowItWorks.aspx

Figure 17: Idaho's Electricity Sources, 2023[48]



Idaho's baseload resources, including hydroelectricity and biomass, provide a constant source of reliable low-cost electricity to Idaho utilities. As a result, Idaho's average electricity rates were the fifth lowest among the fifty states in 2023.

Figure 18: Idaho's Average Electricity Rates Compared to Other States, 2023[49]



1.5 Investor-owned Utilities

Idaho's grid is operated by three investor-owned utilities (IOUs), as well as 29 municipal and rural electric cooperative utilities, which are listed in Appendix A. Idaho's three IOUs serve approximately 84% of the state's electricity needs, while the municipal and rural electric cooperative utilities serve the remaining 16%.[50]

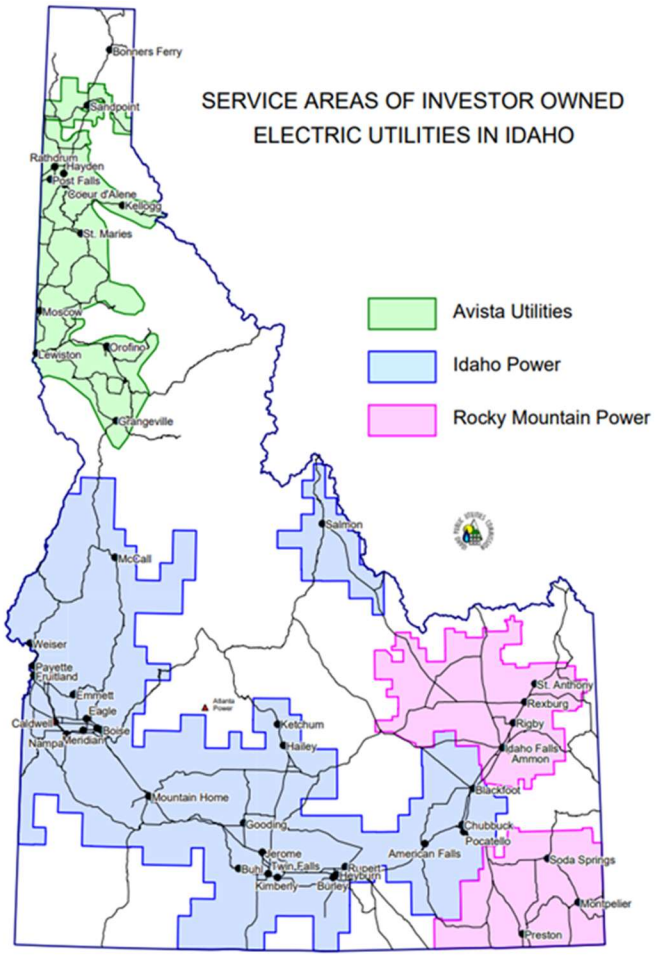
[48] U.S. Energy Information Administration. "Idaho Electricity Profile 2023." https://www.eia.gov/electricity/state/idaho/index.php

[49] U.S. Energy Information Administration. "US Electricity Profile 2022." https://www.eia.gov/electricity/state/#:~:text=Archived%20State%20Electricity%20Profiles%20%20%20%20Name,%20%2045%2C851%2C003%20%2039%20more%20rows%20

[50] U.S. Energy Information Administration. "Annual Electric Power Industry Report, Form EIS-861 detailed data files." https://www.eia.gov/electricity/data/eia861/

Idaho's IOUs work with stakeholders to develop Integrated Resource Plans (IRPs) that must be filed with the Idaho Public Utilities Commission (PUC) every two years. IRPs forecast energy demands over 20 years and evaluate a variety of different resources to meet demand, including the addition of generation resources and demand-side measures such as conservation and energy efficiency programs. IRPs typically select a "preferred resource strategy" based on evaluation criteria including cost, risk, reliability, and environmental factors.

Figure 19: Idaho's Investor-owned Electric Utilities Service Territories[51]



Avista

Avista is an investor-owned electric and natural gas utility headquartered in Spokane, Washington. Avista serves more than 144,000 electric and 95,000 natural gas customers in north and central Idaho.

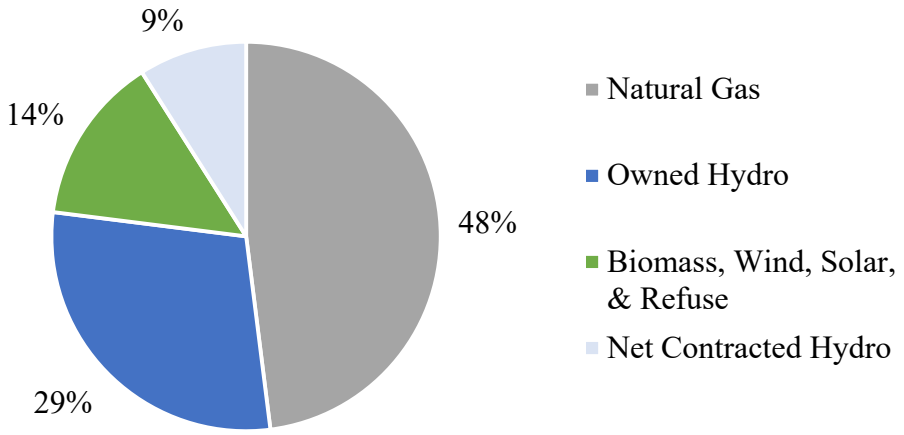
Avista generates electricity by utilizing a mix of hydroelectric, natural gas, coal, biomass, and wind generation, see Figure 14. This electricity is delivered through 2,800 miles of electrical transmission lines, 19,700 miles of electrical distribution lines, and 8,200 miles of natural gas lines.[52] Hydroelectric generation accounts for nearly half of Avista's electricity mix, which

[51] Idaho Public Utilities Commission. "Service Areas of Investor-Owned Electric Utilities in Idaho." https://puc.idaho.gov/Fileroom/PublicFiles/maps/elec.pdf

[52] Avista. "2024 Quick Facts." https://investor.avistacorp.com/static-files/365756ed-8fd4-48f4-9abe-e79ef78c730b

provides low-cost energy to customers. Avista's company-owned and contract hydroelectric resources are in western Montana, eastern Washington, and northern Idaho (Post Falls, Clark Fork River Hydroelectric Development and Cabinet Gorge); and its natural gas-fired baseload and capacity resources are in Idaho, Oregon, and Washington. It also has an ownership share in the Colstrip coal-fired power plant in Montana which is scheduled to stop serving Avista's customers by the end of 2025. The draft 2025 electric IRP plans to incorporate small modular nuclear reactors to Avista's resource mix in 2045.[53]

Figure 20: Avista's 2026 Annual Energy Resource Portfolio[54]



Avista has saved 275 average megawatts (aMW) since it began offering energy efficiency programs in 1978. Current Avista energy efficiency programs reduce demand by nearly 12.2%, or by 156 aMW.[55] Avista predicts that energy efficiency will serve 32% of future demand, reducing demand by 105 aMW through 2045. Avista's demand response and energy efficiency programs reduce the need to purchase high-cost wholesale electricity from out-of-state networks, allowing Avista to meet both winter and summer peak loads.[56]

Over the next 20 years, Avista expects an average annual growth rate of 0.91%, with winter peaks load estimated to grow at 1.12% and summer peak loads at 1.14%.[57] In April 2019, Avista announced its goal to have a carbon neutral portfolio by the end of 2027 and to serve its customers with 100% clean electricity by 2045. Over the next ten years (2026-2035), Avista's resource strategy focuses in new regional transmission projects, energy efficiency, distributed solar generation, natural gas combustion turbines, and demand response. The following ten years (2036-2045) includes more natural gas combustion turbines, wind, distributed solar, energy storage technologies, renewable fuels including green hydrogen and ammonia, nuclear energy, and additional demand response programs.

[53] Avista. "Draft 2025 Electric Integrated Resource Plan." https://www.myavista.com/about-us/integrated-resource-planning
[54] Avista. "Draft 2025 Electric Integrated Resource Plan." https://www.myavista.com/about-us/integrated-resource-planning
[55] Avista. "2023 Electric IRP." https://www.myavista.com/about-us/integrated-resource-planning
[56] Avista. "Draft 2025 Electric Integrated Resource Plan." https://www.myavista.com/about-us/integrated-resource-planning
[57] Avista. "Draft 2025 Electric Integrated Resource Plan." https://www.myavista.com/about-us/integrated-resource-planning

Idaho Power Company

Founded in 1916, Idaho Power is the largest electricity provider in the state. Headquartered in Boise, Idaho Power services more than 640,000 customers throughout its 24,000 square mile service territory in southern Idaho and eastern Oregon.[58]

Idaho Power primarily relies on company-owned hydropower, coal- and gas-fired generation facilities, and long-term power purchase agreements to supply the energy needed to serve customers. Idaho Power's company-owned hydroelectric generation facilities include the 1,267 MW Hells Canyon Complex which provides approximately 70% of Idaho Power's hydroelectric generating capacity and 30% of the company's total generating capacity. With 17 low-cost hydroelectric projects at the core of its diverse energy mix, Idaho Power's residential, business, and agricultural customers pay electricity prices 20% to 30% below the national average.[59] This electricity is supplied through approximately 4,800 miles of transmission lines and approximately 30,000 miles of distribution lines. Idaho Power plans to begin construction on the 300-mile Boardman-to-Hemingway high-voltage transmission line project no sooner than late 2024 and aims to bring it into service no earlier than 2027.

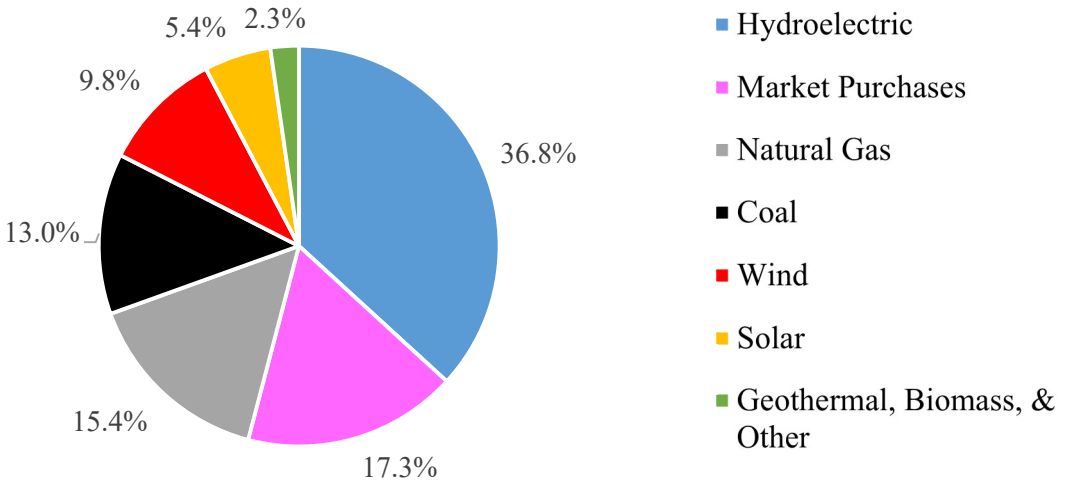
Idaho Power also generates electricity at the Langley Gulch natural gas-fired, combination-cycle combustion turbine power plant near New Plymouth, and two natural gas-fired, simple-cycle combustion turbine power plants near Mountain Home. Idaho Power has joint ownership in baseload coal facilities located in Wyoming and Nevada — the Jim Bridger and North Valmy power plants. Idaho Power exited the Boardman coal facility located in Oregon in 2020 and half of its share of the Valmy coal facility in 2019. In 2024, two of the four units at Jim Bridger will be converted from coal to natural gas, with the other two units planned to be converted in 2030. In 2026, North Valmy's two units are also planned to be converted from coal to natural gas, and Idaho Power will reenter operation of its full share of the facility. By 2030, Idaho Power aims to exit coal-fired generation and add a net total of 261 MW of natural gas-fired generation by 2043. Idaho Power's resource portfolio mix for 2023 is shown in Figure 15. Idaho Power-owned generating capacity was the source for about 64% of the energy delivered to customers. Purchased power comprises 36% of the total energy delivered to customers.[60]

[58] Idaho Power. "About Us." https://www.idahopower.com/about-us/

[59] Idaho Power Company. "Hydroelectric." https://www.idahopower.com/energy-environment/energy/energy-sources/hydroelectric/

[60] Idaho Power Company. "2023 Integrated Resource Plan." https://docs.idahopower.com/pdfs/AboutUs/PlanningForFuture/irp/2023/2023-irp-final.pdf

Figure 21: Idaho Power 2023 Resource Portfolio[61]



Between 2004 and 2022, Idaho Power achieved a cumulative average annual load reduction of 324 MW through energy efficiency investments. In 2023, Idaho Power's energy efficiency programs achieved 139,683 MWh of incremental energy savings, which represents enough energy to power approximately 12,253 average homes in Idaho Power's service area for one year.[62] Additionally, Idaho Power operated three demand response programs in 2023. The total demand response capacity was approximately 316 MW with an actual load reduction of 240 MW.[63]

In 2019, Idaho Power announced its goal to provide 100% clean energy to its customers by 2045. The average annual number of Idaho Power customers is expected to increase from nearly 639,000 in 2024 to 855,000 in 2043, adding approximately 11,400 customers each year throughout the 20-year planning period.

Rocky Mountain Power (PacifiCorp)

PacifiCorp is the largest grid operator in the western United States, providing electric service to about 2.1 million customers across its 141,390 square mile service territory in California, Idaho, Oregon, Utah, Washington, and Wyoming. For customers in Idaho, Utah, and Wyoming, PacifiCorp operates under the name Rocky Mountain Power. Rocky Mountain Power serves 82,000 customers in 14 Idaho counties[64]

PacifiCorp owns 14,132 MW of generation capacity from a diverse mix of hydroelectric, wind, natural gas, coal, solar and geothermal sources.[65] PacifiCorp's customers receive electricity through approximately 17,100 miles of transmission lines, 64,000 miles of distribution lines, and

[61] Idaho Power Company. "How We Compare Nationally." https://www.idahopower.com/energy-environment/energy/energy-sources/how-we-compare-nationally/
[62] Idaho Power Company. "Demand-Side Management 2023 Annual Report." https://docs.idahopower.com/pdfs/EnergyEfficiency/Reports/2023_DSM.pdf
[63] Idaho Power. "Demand-Side Management 2023 Annual Report." https://docs.idahopower.com/pdfs/EnergyEfficiency/Reports/2023_DSM.pdf
[64] PacifiCorp. "About." https://www.pacificorp.com/about.html
[65] PacifiCorp. "Just the Facts." April 2024. https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/about/PacifiCorp_Fact_Sheet.pdf

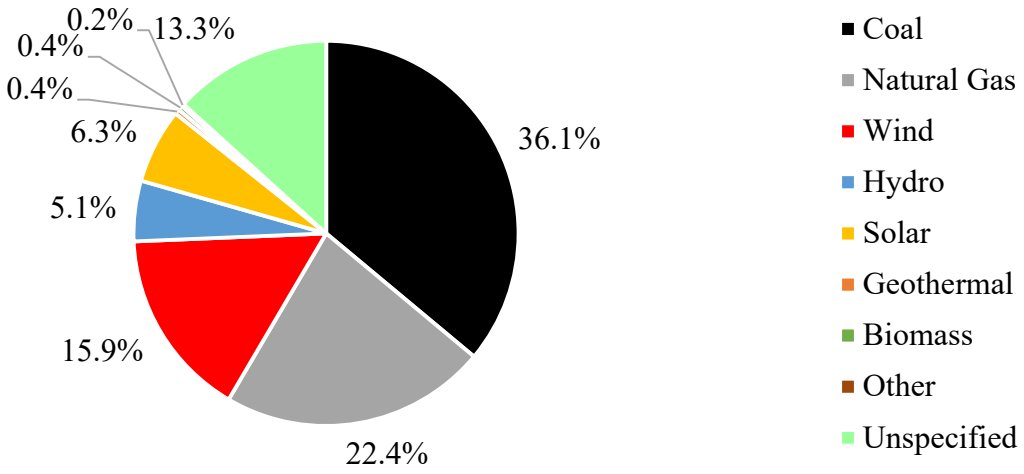
900 substations.[66] The Populus Substation known as Energy Gateway West Sub-Segment D.3 is scheduled to come online in 2028 in Southwest Idaho. This transmission line will run 200 miles at 500 KV of high voltage, which will help meet the expected increase in demand in Idaho.

The forecasted system load in the region has increased about 0.8%, with the average annual growth rate set at approximately 2.13% for load and 1.80% peak. The changes to load forecast are due to higher project demand from new large customers including data centers driving up the commercial forecast and increased residential forecast. From 2024 to 2033, residential customers in Idaho are expected to decrease 0.94% per year and commercial customers in Idaho are expected to decrease 0.30% per year.[67]

PacifiCorp's 2023 IRP identifies the company's investments in clean energy, expanding modernized transmission, advanced nuclear, and energy storage to meet forecasted demand.[68] Rocky Mountain Power is the largest regulated utility owner of wind power in the West and the company plans to expand their wind, solar and storage resources on their path to a net-zero emissions future.[69]

PacifiCorp's 2023 IRP indicates the PacifiCorp aims to add 3,749 MW of solar, over 9,800 MW of wind, and over 4,000 MW of storage capacity by 2037. Additionally, the company aims to bring online 500 MW of advanced nuclear capacity by 2030.[70]

Figure 22: Rocky Mountain Power 2023 Resource Portfolio[71]



[66] PacifiCorp. "Transmission." https://www.pacificorp.com/transmission.html
[67] PacifiCorp. "2023 Integrated Resource Plan Update." https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2023_IRP_Update.pdf
[68] PacifiCorp. "2023 Integrated Resource Plan, Volume I." https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2023-irp/2023_IRP_Volume_I.pdf
[69] Rocky Mountain Power. "Building the Foundation for a Net-Zero Future." https://www.rockymountainpower.net/about/innovation-environment.html
[70] PacifiCorp. "2023 Integrated Resource Plan Update." https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2023_IRP_Update.pdf
[71] Rocky Mountain Power. "Blue Sky Block 2024 Prospective Produce Content Label." https://www.rockymountainpower.net/content/dam/pcorp/documents/en/rockymountainpower/blue-sky/RMP_BLOCK_PPCL.pdf

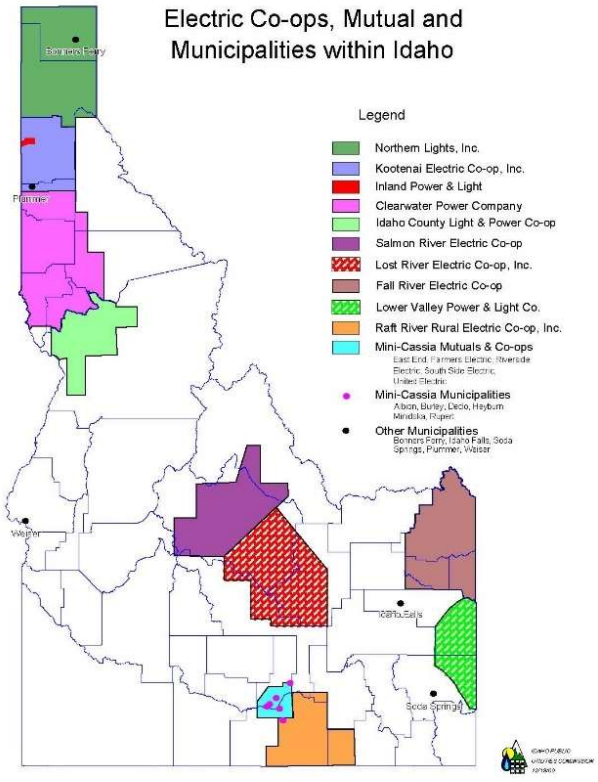
1.6 Municipal and Cooperative Utilities and the Bonneville Power Administration

A municipal utility is owned and operated by a municipality or a group of municipalities. A cooperative electric utility is a private, not-for-profit electric utility legally established to be owned and operated for the benefit of those using its service. It will generate, transmit, and/or distribute supplies of electric energy to cooperative members.

There are 29 municipal and cooperative utilities in Idaho. These utilities are not subject to PUC regulation. Instead, Idaho's municipal and cooperative electric utilities provide competitively priced energy services to their members and residents and are generally governed by an independently elected Board of Directors or city councils.

The Idaho Consumer-Owned Utilities Association (ICUA) has 21 members and serves over 130,000 Idahoans, or about 16% of total Idaho electricity customers. Not all Idaho municipal and cooperative utilities are members of ICUA.[72] Over 96% of ICUA power is purchased from the Bonneville Power Administration (BPA). However, some municipalities and cooperatives are beginning to acquire their own generation resources and are entering into Power Purchase Agreements (PPAs) with other energy providers.[73] For example, Idaho Falls Power owns and operates five hydroelectric projects, owns a portion of the Horse Butte Wind project, and operates a small amount of solar. The remainder of Idaho Falls Power's electricity needs are met by BPA agreements and market purchases, a small amount of which is nuclear generation.[74]

Figure 23: Idaho's Municipal and Cooperative Utilities Service Territories



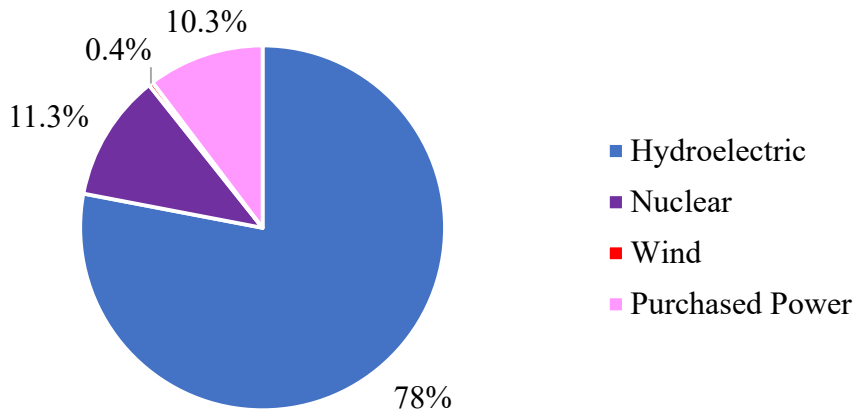
[72] Idaho Consumer-Owned Utilities Association. "Members." https://www.icua.coop/members/
[73] Ibid.
[74] Idaho Falls Power. "Power Portfolio." https://www.ifpower.org/about-us/generation-power-statistics

Idaho Falls Power, Lost River Electric Cooperative, Salmon River Electric Cooperative, and the Idaho Energy Authority are members of the Utah Associated Municipal Power Systems (UAMPS). UAMPS is a nonprofit headquartered in Salt Lake City, Utah, that supports its 50 members across seven Intermountain states with financial-, acquisition-, construction-, and operation-related energy services. UAMPS conducts resource planning, evaluation of power resources or services for its members, and develops power-generating facility projects. UAMPS members can choose to participate in any of UAMPS's 13 ongoing projects to support resource needs.[75]

Bonneville Power Administration

BPA is one of four Power Marketing Administrations under the U.S. Department of Energy (DOE) that supply power throughout their regions.[76] BPA is a separate and distinct entity in the DOE under the DOE Organization Act of 1977.[77] BPA is self-funded and has its own federal borrowing and procurement authorities which it utilizes to serve the Northwest. BPA's territory includes Idaho, Oregon, Washington, western Montana and small parts of eastern Montana, California, Nevada, Utah, and Wyoming. BPA serves publicly owned cooperatives, municipalities, and public utility districts that serve federal installations, regional IOUs, and direct-service industrial customers.[78] BPA supplies about 28% of regional power, primarily from hydroelectric generation.[79]

Figure 24: BPA Resource Portfolio, 2023 [80]



BPA sources power from 31 federal hydroelectric dams that are operated by the U.S. Army Corps of Engineers (USACE) and the Bureau of Reclamation (BOR). These dams are referred to as the Federal Columbia River Power System.[81] It also markets power generated from some non-federal

[75] UAMPS. "About Us." http://www.uamps.com/About-Us
[76] U.S. Energy Information Administration. "Federal Power Marketing Administrations operate across much of the United States." https://www.eia.gov/todayinenergy/detail.php?id=11651
[77] Department of Energy. "DOE Organization Act in U.S.C." https://www.energy.gov/sites/prod/files/2017/10/f38/DOE%20Organization%20Act%20in%20U.S.C..pdf
[78] Bonneville Power Administration. "Annual Report 2023." https://www.bpa.gov/-/media/Aep/finance/annual-reports/ar2023.pdf
[79] Bonneville Power Administration. Accessed October 2, 2024. https://www.bpa.gov/
[80] Bonneville Power Administration. "BPA Fuel Mix 2023." https://www.bpa.gov/-/media/Aep/power/fuel-mix/2023-bpa-fuel-mix.pdf
[81] Bonneville Power Administration. Brochure: Federal Columbia River Power System." August 2003. https://www.bpa.gov/-/media/Aep/power/hydropower-data-studies/fcrps_brochure_17x11.pdf.

plants in the Northwest, as well as additional power from the 1,169 MW Columbia Generating Station nuclear power plant in Richland, Washington.[82] BPA operates and maintains approximately 15,000 miles of high-voltage transmission lines and 262 substations servicing 323 transmission customers that serve about 14.4 million people in its service territory.[83]

Annually, BPA publishes a Pacific Northwest Loads and Resources Study (White Book) which documents regional retail loads and resource capabilities that serve the federal system and Pacific Northwest for 10 years. The most recent White Book details resource capabilities from 2024 through 2035. The White Book uses public resource planning reports submitted by individual utilities, the Northwest Power and Conservation Council (Council), and the Pacific Northwest Utilities Conference Committee. Under average water conditions, the Federal Columbia River Power System is projected to have annual energy surpluses throughout the study period.[84] Under the Northwest Power Act, BPA is responsible for providing the net load requirements of its requesting customers.

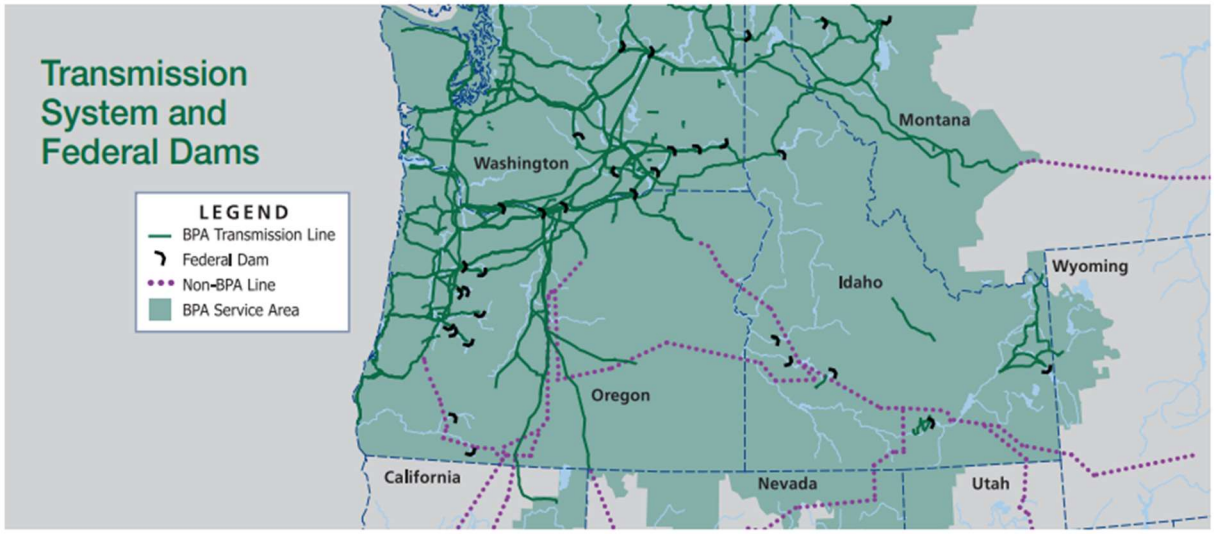
Under BPA's current 20-year power sales contract, Idaho municipal and cooperative utilities (customers) purchase power under a tiered rate methodology. Customers can purchase power sold at a Tier 1 rate locking in the federal base system's lowest cost generation portfolio. When the customer exceeds the amount of power they are eligible to purchase at a Tier 1 rate, they can purchase power from BPA at a Tier 2 rate, acquire resources independently, or jointly with other utilities to meet future demands. BPA's current 20-year contracts run through September 30, 2028.

BPA works with customers to fund and implement energy-efficiency programs. Since the early 1980s, BPA and its customers have acquired more than 2,505 aMW in electricity savings through energy efficiency.[85] In 2023, BPA updated its Energy Efficiency Action Plan targets to reflect new input from the Council's 2021 Power Plan and its own Resource Program analysis. BPA sets an energy efficiency incentive budget every two-year rate period.

Idaho cooperative and municipal utilities, through their power rates with BPA, invested over $5 million in energy efficiency measures through direct payments to customers in 2020 and 2021.[86] Cooperative and municipal utilities in Idaho have been utilizing energy efficiency programs to help meet additional resource needs for over 30 years.

[82] U.S. Nuclear Regulatory Commission. "Columbia Generating Station." https://www.nrc.gov/info-finder/reactors/wash2.html
[83] Bonneville Power Administration. "Fact Sheets." https://www.bpa.gov/-/media/Aep/about/publications/general-documents/bpa-facts.pdf
[84] Bonneville Power Administration. "2014 Pacific Northwest Loads and Resources Study." https://www.bpa.gov/-/media/Aep/power/white-book/2024-white-book.pdf
[85] Bonneville Power Administration. "Fiscal Year 2020 Red Book." https://www.bpa.gov/EE/Utility/researcharchive/Documents/The_Red_Book_FY2020.pdf
[86] Bonneville Power Administration. "Fiscal Year 2020 Red Book." https://www.bpa.gov/EE/Utility/researcharchive/Documents/The_Red_Book_FY2020.pdf

Figure 25: BPA Transmission System and Federal Dams[87]



2. Energy Stakeholders

2.1 State Entities

Idaho Governor's Office of Energy and Mineral Resources

OEMR coordinates energy and mineral planning, permitting processes, and policy development in the state of Idaho. OEMR works to ensure that Idaho's energy and mineral resources are developed and utilized in an efficient, effective, and responsible manner that sustains the quality of life for its residents and enhances the economy. OEMR serves as the clearinghouse and first point of contact for the state on energy and mineral matters. It oversees the Idaho Strategic Energy Alliance, serves as a resource for policymakers, and coordinates efforts with federal and state agencies and local governments.[88]

OEMR prepares publications such as the Idaho Energy and Mineral Landscape and the Idaho State Energy Security Plan.[89] A detailed list of recent publications can be found in Appendix C.

As of December 2024, OEMR administers the following energy-related programs. A detailed list of OEMR's programs can be found in Appendix B.

- Idaho Energy Resiliency Grant Program
- Energy Efficiency Conservation Block Grant Program
- Government Leading by Example
- State Energy Loan Program
- National Electric Vehicle Infrastructure Program
- Idaho Awards for Leadership in Energy Efficiency

[87] Bonneville Power Administration. "BPA Facts." https:// www.bpa.gov/-/media/Aep/about/publications/general-documents/bpa-facts.pdf
[88] Governor Brad Little. "Executive Order 2024-09." https://oemr.idaho.gov/wp-content/uploads/EO-2024-09.pdf
[89] Idaho Governor's Office of Energy and Mineral Resources. "Reports and Publications". https://oemr.idaho.gov/financial-information/reports-and-publications/

Idaho Public Utilities Commission

The PUC regulates Idaho's investor-owned electric, natural gas, telecommunications, and water utilities to ensure adequate service at just, reasonable, and sufficient rates. The PUC has quasi-legislative and quasi-judicial, as well as executive powers and duties. The PUC has authority to promulgate administrative rules under the Idaho Administrative Procedures Act.[90] Statutory authorities for the commission are established in Idaho Code Titles 61 and 62. The PUC consists of three commissioners, appointed by the Governor and subject to Senate confirmation, who serve staggered six-year terms. No more than two commissioners may be of the same political party. The PUC renders decisions about utilities based upon evidence presented in the case record. PUC orders may be appealed directly to the Idaho Supreme Court.[91]

The PUC holds formal hearings that resemble judicial proceedings and are recorded and transcribed by a court reporter. Technical hearings consist of formal parties that have been granted "intervenor status" and present testimony and evidence. During public hearings, members of the public can testify before the commission.

To ensure its decisions are based upon the best information available, the PUC employs engineers, accountants, economists, and investigators to analyze issues and provide recommendations. In the PUC's formal proceedings, the staff is a separate party to the case and may present its own testimony, evidence, and expert witnesses. Staff recommendations are considered by the PUC along with those of other parties to each case, which may include utilities, the public, and agricultural, industrial, business, or consumer groups.

Idaho Strategic Energy Alliance

ISEA, formed through Executive Order, is responsible for advising and providing information to elected officials, stakeholders, and the public through a Board of Directors in furtherance of the principles of Idaho's Energy Policy.[92] ISEA increases awareness and understanding of Idaho's diverse energy resources; increases awareness of cost-effective energy efficiency and conservation opportunities within Idaho; improves cooperation, collaboration, and communication among Idaho's public and private-sector entities in the areas of energy efficiency, conservation, and affordable and sustainable energy development; and provides a forum to showcase Idaho's new and innovative energy technologies.[93]

[90] Idaho Legislature. "Title 67 State Government and State Affairs. Chapter 52 Idaho Administrative Procedure Act." https://legislature.idaho.gov/statutesrules/idstat/Title67/T67CH52/
Idaho Statues § 61 and § 62. https://legislature.idaho.gov/statutesrules/idstat/Title61/ Idaho Statutes § 61and § 62." https://legislature.idaho.gov/statuterules/idstat/
[91] Idaho Public Utilities Commission. "About the Commission." https://puc.idaho.gov/Page/Info/35
[92] Governor Brad Little. "Executive Order 2024-10." https://gov.idaho.gov/wp-content/uploads/2024/10/eo-2024-10.pdf
[93] Idaho Governor's Office of Energy and Mineral Resources. "Executive Order No. 2024-10." https://gov.idaho.gov/wp-content/uploads/2024/10/eo-2024-10.pdf

ISEA's most recent reports cover alternative fuels, utility-scale storage, and energy resiliency and reliability.[94] Currently, ISEA's two active working groups are the State Energy Policy Working Group and the Advanced Nuclear Strategic Framework Working Group.

Leadership in Nuclear Energy Commission

The Leadership in Nuclear Energy Commission makes recommendations to the Governor on policies and actions of the State of Idaho to support and enhance the long-term viability and mission of INL and associated industries in Idaho.[95] Membership of the Commission includes cabinet officials, local government leaders, representatives from Idaho tribes, INL, Idaho universities, the nuclear industry, and members of the public.

Idaho Energy Resources Authority

The Idaho Energy Resources Authority (IERA) is an energy lending/financing entity authorized to issue revenue bonds to diversify and expand the state's economy through improvements in Idaho's electricity infrastructure. It was established by the Idaho State Legislature in 2005 to promote transmission, generation, and clean energy development in the state and the region.[96]

IERA allows Idaho's municipal and cooperative utilities to jointly own and finance transmission and generation projects for the benefit of their ratepayers. IERA can participate in planning, financing, constructing, developing, acquiring, maintaining, and operating electric generation and transmission facilities and their supporting infrastructure. While IERA has bonding authority to promote specific projects, it has no legislative appropriation, no full-time staff, and no ability to finance projects that are not backed by ratepayers. The services provided by IERA offer unique opportunities for Idaho's municipal and cooperative electric utilities to help materially lower the development costs of critical energy projects in the state.

Idaho Office of Emergency Management

The Idaho Office of Emergency Management (IOEM) is the state's emergency management agency and part of the Idaho Military Division. IOEM is tasked with assisting Idaho's 44 counties and Tribes in navigating disasters. IOEM prepares the state in preparing, protecting, and mitigating the effects and potential damages from all hazards including energy and fuel related response during disruptive events. IOEM oversees the Emergency Operations Plan, the Threat and Hazard Identification and Risk Assessment and Stakeholder Preparedness Review, State Hazard Mitigation Plan, and the Idaho Response Center (IRC).[97] The IRC is a space for stakeholders to facilitate response and

[94] Idaho Governor's Office of Energy and Mineral Resources. "Idaho Strategic Energy Alliance." https://oemr.idaho.gov/isea/
[95] Idaho Leadership in Nuclear Energy Commission 3.0. "LINE Home." https://line.idaho.gov and Governor Brad Little. "Executive Order 2019-05." https://gov.idaho.gov/wp-content/uploads/2019/05/eo-2019-05.pdf
[96] Idaho Energy Resources Authority. "Purpose". https://iera.info/purpose/
[97] Idaho Office of Emergency Management. "About." https://ioem.idaho.gov/about/

recovery operations resources during an emergency or disaster. The stakeholders may include but are not limited to federal, local, and tribal governments and the private sector.[98]

Idaho Department of Lands and Oil and Gas Conservation Commission

IDL leases and issues rights-of-way for energy projects on state endowment lands and provides some regulation of Idaho's mining industry.[99] Approximately 3.4 million acres of endowment lands exist in Idaho with 2.5 million acres of surface estate. The endowment beneficiaries are the Idaho Department of Corrections, Idaho State Department of Education, Idaho Division of Veterans Services, Idaho Educational Services for the Deaf and the Blind, University of Idaho, Lewis and Clark State College, Idaho State University (ISU), and the Idaho Capitol Commission.[100]

The Oil and Gas Conservation Commission consists of a county commissioner from an oil and gas producing county and four governor- appointed members: one member with expertise in oil and gas, holding a college degree in geosciences or engineering and at least five years of experience in the oil and gas industry, one member who is a mineral interest owner without an oil and gas lease in a county where oil and gas have been produced, and one member who is a resident of Idaho with expertise in land use, having at least five years of relevant experience.[101]

IDL reviews applications for drilling, well treatment, pit construction, and other activities in conjunction with the Idaho Department of Water Resources and the DEQ. The Oil and Gas Administrator may hold administrative hearings on certain types of applications for activities that may affect other mineral interest owners.[102]

Idaho Department of Environmental Quality

DEQ was created by the Idaho Environmental Protection and Health Act and is responsible for enforcing state environmental regulations and administers a number of federal environmental protection laws including the Clean Air Act, the Clean Water Act, and the Resource Conservation and Recovery Act.[103] DEQ issues permits for energy and mining projects under the Idaho Pollutant Discharge Elimination System, in which DEQ received full permitting authority as of July 1, 2021.[104] DEQ has six regional offices across the state that work in partnership with local communities, businesses, and citizens to identify and implement cost-effective environmental solutions for projects.[105] In addition to energy and mining related projects, DEQ has partnered with OEMR and the Idaho Transportation Department (ITD) to administer electric vehicle (EV) programs. DEQ administers the Vehicle Replacement Program (VRP), a

[98] Idaho Office of Emergency Management. "Operations." https://ioem.idaho.gov/operations/
[99] Idaho Department of Lands. "About Us." https://www.idl.idaho.gov/about-us/;
[100] Idaho Department of Lands. "Understanding Endowment Land." https://www.idl.idaho.gov/about-us/understanding-endowment-land/
[101] Idaho Code §47-314 (1)
[102] Idaho Code §47-328
[103] Idaho Department of Environmental Quality. "About." http://deq.idaho.gov/about-us/
[104] Idaho Department of Environmental Quality. "Idaho Pollutant Discharge Elimination System." http://deq.idaho.gov/water-quality/wastewater/
[105] Idaho Department of Environmental Quality. "Regional Offices & Issues." http://deq.idaho.gov/regional-offices/

rebate program to replace certain medium- and heavy-duty diesel vehicles with alternative fuel or new diesel fuel vehicles.[106]

Idaho State Department of Agriculture

Agriculture is Idaho's largest industry. The Idaho State Department of Agriculture (ISDA) oversees more than 60 sections of Idaho Code.[107] The Bureau of Weights and Measures (Bureau) is responsible for assuring the accuracy of commercial weighing and measuring devices such as petroleum meters, fuel pumps, and propane meters. The Bureau monitors gasoline octane levels and is responsible for Idaho's fuel quality and labeling.[108]

Idaho Department of Water Resources and Idaho Water Resource Board

The Idaho Department of Water Resources (IDWR) approves or denies proposals to appropriate water or change existing water rights, archives water right records, recommends and records adjudicated water rights, and oversees the delivery of water in times of shortage.[109] This is important in the development of energy and mineral projects to ensure all water rights during project construction and operation are protected. IDWR is responsible for the safety of dams, geothermal drilling permits, ground water protection (well construction oversight), the regulation of stream channel alterations, and coordination with local communities to comply with the National Flood Insurance Program.

The Idaho Water Resource Board (IWRB) is responsible for the formulation and implementation of a state water plan, financing of water projects, and the operation of programs that support sustainable management of Idaho's water resources. IWRB was created by the Idaho legislature in 1965 and merged with IDWR in 1974.[110]

Idaho Department of Fish and Game

The Idaho Department of Fish and Game (IDFG) protects, preserves, perpetuates, and manages Idaho's wildlife resources.[111] IDFG provides data and technical assistance for energy and mineral projects to evaluate potential effects to fish, wildlife, and habitat as in-state and out-of-state energy demands are addressed. IDFG cooperates with project developers to mitigate and reduce impacts to wildlife. The agency is split into seven regions and is coordinated from the headquarters in Boise.

[106] Alternative Fuels Data Center. "Biodiesel Laws and Incentives in Idaho." https://afdc.energy.gov/fuels/laws/BIOD?state=ID
[107] Idaho State Department of Agriculture. "About ISDA." https://agri.idaho.gov/main/about/about-isda/
[108] Idaho State Department of Agriculture. "Weights and Measures." https://agri.idaho.gov/main/weights-and-measures/
[109] Idaho Department of Water Resources. "Strategic Plan FY2022-2025." https://idwr.idaho.gov/wp-content/uploads/sites/2/general/IDWR-SP-FY22-25_FINAL.pdf
[110] Idaho Department of Water Resources. "Idaho Water Resource Board Responsibilities and Authority." https://idwr.idaho.gov/iwrb/about-the-iwrb/
[111] Idaho Department of Fish and Game. "About Fish and Game." https://idfg.idaho.gov/about

Idaho Governor's Office of Species Conservation

The Idaho Governor's Office of Species Conservation (OSC) is dedicated to planning, coordinating, and implementing the state's actions to preserve, protect and restore species listed as candidate, threatened, and endangered under the federal Endangered Species Act.[112] This work is done in coordination with other state agencies and input from the citizens of Idaho for energy and mineral projects to ensure responsible development of resources and adequate protection for species. OSC is headquartered in Boise and has staff in Salmon, Sandpoint, and Moscow.

Idaho Department of Parks and Recreation

The Idaho Department of Parks and Recreation (IDPR) is the state authority on outdoor recreation and resource stewardship. IDPR manages thirty state parks and recreation programs throughout the state. IDPR analyzes impacts to recreation from energy and mineral project development, and administers the recreation programs for boats, snowmobiles, and other off-highway vehicles.[113]

Idaho State Historic Preservation Office

The Idaho State Historic Preservation Office (SHPO) is administratively housed within the Idaho State Historical Society. SHPO offices nationwide encourage the preservation, documentation, and use of cultural resources. For energy and mineral projects, the Idaho SHPO consults with federal agencies to review effects to historic properties under Section 106 of the National Historic Preservation Act.[114] SHPO maintains the state inventory of documented cultural resources in the state, administers the Historic Rehabilitation Tax Incentive program, and provides educational and technical assistance on historic preservation issues.

Idaho Transportation Department

ITD is the state authority on transportation infrastructure. ITD maintains and operates existing roadways and plans transportation infrastructure for the future growth of the state. The agency is split into six districts and is headquartered in Boise.[115] ITD, OEMR, and DEQ, collectively referred to as the Interagency Working Group, administer the Idaho NEVI Program, discussed in Appendix B.

[112] Idaho Governor's Office of Species Conservation. "Home – About OSC." https://species.idaho.gov/
[113] Idaho Department of Parks and Recreation. "Strategic Plan Fiscal Year 2022." https://parksandrecreation.idaho.gov/wp-content/uploads/IDPR_2021-2025_Strategic_Plan.pdf
[114] Idaho State Historic Preservation Office. "Section 106 Project Review." https://history.idaho.gov/section-106/
[115] Idaho Transportation Department. "Home". https://itd.idaho.gov/

Idaho Department of Health and Welfare

The Idaho Department of Health and Welfare (DHW) promotes and protects Idahoans' health and safety. DHW provides services to promote healthy people, safe children, and stable families.[116] DHW administers the State of Idaho Weatherization Assistance Program (WAP). DHW contracts with local community action agencies and nonprofits to install weatherization improvements in low-income households throughout the state.[117] WAP conserves energy, saves money, and increases the comfort of homes.

2.2 Regional Entities

Northwest Power and Conservation Council

Congress created the Council in 1980 through the Northwest Power Act to better engage with Idaho, Montana, Oregon, and Washington to ensure an affordable and reliable energy system while enhancing fish and wildlife in the Columbia River Basin.[118] The Council is funded solely by wholesale power revenues from BPA. It forecasts future electricity load growth in the region and helps plan how to best meet future needs while informing the public about regional energy issues.

Every five years, the Council prepares and updates a least-cost 20-year Power Plan to advise BPA on electricity demand forecasts, electricity and natural gas price forecasts, an assessment of cost-effective energy efficiency that can be acquired over the life of the plan, and a least-cost generating resources portfolio. Since 1980, the Northwest has saved more than 7,800 aMW through energy efficiency. In 2024, energy efficiency was the fourth-largest energy resource in the Northwest. It accounted for 10% of the grid's capacity, behind hydropower (46%), wind (17%), and natural gas (13%). [119,120] The Council published the 2021 Power Plan in May 2022 which recommends that the region acquire between 750 and 1,000 aMW of cost-effective energy efficiency by the end of 2027 and at least 2,400 aMW by the end of 2041 to meet increasing demand.

Western Electricity Coordinating Council

WECC is the regional entity that monitors and enforces reliability standards in the Western Interconnection subject to oversight by NERC and FERC. These reliability standards apply to electric utilities and other entities that own or operate generation, transmission, or other facilities in the bulk power system. WECC promotes reliability in the Western Interconnection by serving as a central repository of data and other technical metrics about the grid.[121]

[116] Idaho Department of Health and Welfare. "Agency Overview." https://healthandwelfare.idaho.gov/about-dhw/our-mission
[117] U.S. Department of Energy. "Weatherization Assistance Program Fact Sheet." https://www.energy.gov/eere/wap/articles/weatherization-assistance-program-fact-sheet
[118] Northwest Power and Conservation Council. "About." https://www.nwcouncil.org/about
[119] Northwest Power and Conservation Council. "Northwest Continues to Lead on Energy Efficiency, Helping Address Forecasted Load Growth Data Centers & Tech Sector." https://www.nwcouncil.org/news/2024/09/19/pacific-northwest-energy-efficiency-survey-data-2023/
[120] Northwest Power and Conservation Council. "2021 Power Plan Summary". https://www.nwcouncil.org/media/filer_public/45/b0/45b02281-e3da-4788-ad74-355e5c755a75/2022-2.pdf
[121] Western Electricity Coordinating Council. "About WECC." https://www.wecc.biz/Pages/AboutWECC.aspx

Western Interstate Energy Board

The Western Interstate Energy Board (WIEB) is an organization of 11 western states and two western Canadian provinces. WIEB provides the instruments and framework for cooperative state efforts to enhance the economy of the west and contribute to the well-being of the region's people. The legal basis of WIEB is the Western Interstate Nuclear Compact.[122] WIEB achieves this by promoting energy policy that is developed cooperatively among member states and provinces and with the federal government.[123] WIEB's work is conducted through committees such as the Committee on Regional Electric Power Cooperation (CREPC), the High-Level Radioactive Waste Committee (HLRW), and the Western Interconnection Regional Advisory Body (WIRAB).

WIEB Committee on Regional Electric Power Cooperation

CREPC was established in the 1980s. CREPC is a joint committee of WIEB and the Western Conference of Public Service Commissioners. CREPC is comprised of the public utility commissions, energy and facility siting agencies, and consumer advocates in the western states and Canadian provinces and works to improve the efficiency of the western electric power system.[124]

WIEB Western Interconnection Regional Advisory Body

WIRAB was created under Section 215(j) of the Federal Power Act of 2005, which provides for the establishment of a federal regulatory system of mandatory and enforceable electric reliability standards for the nation's bulk power system.[125] WIRAB's membership is composed of representatives from all states and international provinces that consume electricity within the Western Interconnection. Members are appointed by Governors or Premiers.[126]

WIRAB was established in the Western Interconnection to advise the NERC, Federal Energy Regulatory Commission (FERC), and WECC on whether proposed reliability standards within the region, as well as the governance and budgets of NERC and WECC, are just, reasonable, not unduly discriminatory, or preferential, and in the public interest.

WIEB High-Level Radioactive Waste Committee

HLRW is composed of nuclear waste transportation experts appointed by the governors of 11 western states. HLRW works with the DOE to develop a safe and publicly acceptable system for transporting spent nuclear fuel and high-level radioactive waste under the Nuclear Waste Policy Act.[127] HLRW's primary management directives come from a series of western governors'

[122] Western Interstate Energy Board. "WIEB- Western Interstate Energy Board." https://www.westernenergyboard.org/western-interstate-energy-board/
[123] WIEB. "WIEB Board." https://www.westernenergyboard.org/western-interstate-energy-board/
[124] WIEB. "CREPC." https://www.westernenergyboard.org/committee-on-regional-electric-power-cooperation/
[125] United States Code, 2018 Edition. "Title 16-Conservation. Chapter 12- Federal Regulation and Development of Power." https://www.govinfo.gov/content/pkg/USCODE-2018-title16/html/USCODE-2018-title16-chap12-subchapII-sec824.htm U.S.C. Title 16 - CONSERVATION (govinfo.gov)
[126] WIEB. "WIRAB." https://www.westernenergyboard.org/western-interconnection-regional-advisory-body/
[127] U.S. Department of Energy. "Nuclear Waste Policy Act." https://www.energy.gov/sites/prod/files/edg/media/nwpa_2004.pdf

resolutions dating back to 1985, which express the governors' goal of safe transport of nuclear waste.[128]

Reliability Coordinator West

A Reliability Coordinator (RC) coordinates with electric utilities and transmission operators to ensure the bulk power system is operated within specified limits and that system conditions are stable across the area. RC West is currently the RC for 42 entities in the Western Interconnection, overseeing 87% of the load in the western U.S.[129]

California Independent System Operator

CAISO is one of nine independent system operators/regional transmission organizations (ISOs/RTOs) in the country and serves all three of Idaho's IOUs. ISOs/RTOs operate and provide non-discriminatory access to transmission systems for regions of the country where they provide wholesale energy marketplaces.

Western Energy Imbalance Market and Extended Day-Ahead Market

WEIM was launched in 2014 as an agreement between PacifiCorp and CAISO. WEIM's daily operations are managed by CAISO.[130] As of 2023, 22 utilities with service territories in the western U.S. and British Columbia, Canada have joined.[131] Idaho Power joined WEIM in April 2018, Avista joined in March 2022, and BPA joined in May 2022.

WEIM utilizes regional transmission systems to balance supply and demand across a large geographical footprint in real time. WEIM manages transmission congestion and optimizes energy production and demand through economic bids submitted by the EIM Participating Resource Scheduling Coordinators in the fifteen-minute and five-minute markets.[132]

In 2019, CAISO announced an initiative to develop the Extended Day-Ahead Market (EDAM) to improve market efficiency by integrating renewable resources using day-ahead unit commitment and scheduling across a larger area.[133] Fifteen WEIM entities participated in the EDAM Feasibility Assessment in January 2019. CAISO issued its draft final market design for the EDAM in December 2022.[134] In December 2022, PacifiCorp was the first utility to publicly announce plans to join the EDAM.[135] The EDAM design was jointly approved by the ISO Board of Governors and WEIM Governing Body in February 2023, and was filed with FERC in August 2023. Onboarding of the initial EDAM participants is expected to begin in 2024 and 2025.[136]

---

[128] WIEB. "High-Level Radioactive Waste." https://www.westernenergyboard.org/high-level-radioactive-waste-committee/

[129] California ISO. "RC West." http://www.caiso.com/informed/Pages/RCWest/Default.aspx

[130] Western Energy Imbalance Market. "About." https://www.westerneim.com/Pages/About/default.aspx

[131] Western Energy Imbalance Market. "About." https://www.westerneim.com/Pages/About/default.aspx

[132] Western Energy Imbalance Market. "EIM Track 2 Overview – Agreements." https://www.westerneim.com/Documents/EIMTrack2Overview-Agreements.pdf

[133] California ISO. "Public Comment Letter." http://www.caiso.com/Documents/PublicCommentLetter-EIMEntites-EDAM-Sep16-2019.pdf

[134] California ISO. "Initiative: Extended Day-Ahead Market." https://stakeholdercenter.caiso.com/StakeholderInitiatives/Extended-day-ahead-market

[135] PacifiCorp. "PacifiCorp to build on success of real-time energy market innovation as first to sign on to new Western day-ahead market." https://www.pacificorp.com/about/newsroom/news-releases/EDAM-innovative-efforts.html

[136] California ISO. "EDAM: Extended Day Ahead Market." http://www.caiso.com/Documents/extended-day-ahead-market-edam-fact-sheet.pdf

Figure 26: WEIM Entities[137]

Southwest Power Pool

The Southwest Power Pool (SPP) is an RTO that is mandated by FERC to provide reliable power sources, transmission infrastructure, and competitive electricity prices. SPP offers a variety of services to its members including transmission expansion, market operations, tariff administration, regional scheduling, reliability coordination, and training. Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming are members of the SPP. SPP has initiated service offerings in the Western Interconnection in recent years and currently provides technical services for the Western Resource Adequacy Program (WRAP) and operates the Western Energy Imbalance Service market for several Intermountain balancing areas.

SPP sources power from 949 generation plants with a generation capacity of 105,464 MW. SPP's energy production fuel types are shown in Figure 25 SPP operates and maintains 72,004 miles of transmission lines and 5,180 substations.[138]

SPP Markets+

SPP's Markets+ (Markets+) is a day-ahead market proposed by SPP aimed to simplify transmission services, centralize day-ahead markets, and efficiently integrate the new fleet of

[137] Western Energy Imbalance Market. "About." https://www.westerneim.com/Pages/About/default.aspx
[138] Southwest Power Pool. "Fast Fact." https://www.spp.org/about-us/fast-facts/

renewable generation. In 2022, SPP engaged western utilities in design of its proposed Markets+ day-ahead market, which could be an alternative market to the CAISO EDAM. SPP issued its final service offering in November 2022 and is seeking commitments from western utilities to share in funding its next phase of initial market design. In February 2023, BPA announced that they would contribute funds to the Markets+ Initiative but are still discussing market options.[139] BPA will collaborate with customers and constituents, through a series of public workshops, to develop a policy direction toward a specific day-ahead market option and potential participation. BPA anticipates issuing a decision by May 2025.[140]

Western Power Pool

The Western Power Pool (WPP) is a voluntary organization that coordinates power plant operational data and provides guidelines for power system operations in the west. WPP's members include electric utilities that own generating plants and sell power throughout the Western U.S. and Canada.[141]

Western Resource Adequacy Program

WPP coordinates activities related to a comprehensive review of resource adequacy in the WPP region and the development and implementation of the Western Resource Adequacy Program (WRAP). It aims to create a region-wide approach to addressing resource adequacy and enhancing reliability by engaging stakeholders to understand regional resource supply and demand.[142] WRAP has been in its implementation stage since 2021. In December 2022, 11 utilities formally committed to moving forward with the WRAP, including BPA, Idaho Power, PacifiCorp, and Avista.[143,144,145] In February 2023, FERC approved the tariff for the WRAP, creating a path for implementation of the region's first west-wide reliability program. [146]

NorthernGrid

Pursuant to rules adopted by FERC, Idaho's IOUs are required to participate in local and sub-regional transmission planning and to coordinate with neighboring sub-regional planning groups and local stakeholders.[147] NorthernGrid, the planning association which facilitates regional transmission planning across the Pacific Northwest and Intermountain West, is responsible for producing transmission expansion and economic study plans on a periodic

[139] Bonneville Power Administration. "BPA Will Contribute Funds to SPP Markets+ Phase 1 Development." https://www.bpa.gov/about/newsroom/news-articles/2023/20230224-bpa-will-contribute-funds-to-spp-markets-phase-1-development

[140] Bonneville Power Administration. "Day Ahead Market." https://www.bpa.gov/learn-and-participate/projects/day-ahead-market

[141] Western Power Pool. "Home". https://www.westernpowerpool.org/

[142] Western Power Pool. "WRAP FAQs." https://www.westernpowerpool.org/news/wrap-faqs

[143] Bonneville Power Administration. "Western Resource Adequacy Program." https://www.bpa.gov/learn-and-participate/projects/western-resource-adequacy-program

[144] Idaho Power. "Idaho Power Moves Forward with Regional Energy Adequacy Group." https://www.idahopower.com/news/idaho-power-moves-forward-with-regional-energy-adequacy-group/

[145] Western Power Pool. "WPP Welcomes First Participants for Next Phase of WRAP". https://www.westernpowerpool.org/news/wpp-welcomes-first-participants-for-next-phase-of-

[146] Wester Power Pool. "History." https://www.westernpowerpool.org/about/history/

[147] Federal Energy Regulatory Commission. "FERC Order Nos. 890 and 1000." https://ferc.gov/industries-data/electric/industry-activities/open-access-transmission-tariff-oatt-reform/summary-compliance-filing-requirements-order-no-890 and https://www.ferc.gov/electric-transmission/order-no-1000-transmission-planning-and-cost-allocation

basis.[148] These local, sub-regional, and regional planning processes identify transmission project costs, benefits, and risks and their allocation to customer group beneficiaries. It explores opportunities for project coordination at the sub-regional and regional levels to avoid costly duplication of facilities. OEMR and the PUC participate in the development of these plans.

A recent example of this coordination is NorthernGrid's involvement in the Engagement Period for FERC Order No. 1920. Order No. 1920 is a transmission and cost allocation rule that will help ensure the resiliency and reliability of the grid by establishing a process for long-term transmission planning and how it is funded.[149]

Northwest Energy Efficiency Alliance

The Northwest Energy Efficiency Alliance (NEEA) provides support to 140 regional utilities and groups, which provide services to over 13 million customers, to implement energy efficiency and conservation programs. A primary focus is to help meet future energy needs by recognizing different energy efficiency markets such as new products, services, practices, and approaches.[150] NEEA funds initiatives and serves as a forum for collective industry consensus on market acceptance of energy efficient products.[151] Idaho Power, BPA, and Avista participate in NEEA. The Idaho Governor has appointed the OEMR Administrator to serve on the NEEA Board of Directors.[152]

ChargeWest™

ChargeWest™ is an effort between Idaho, Montana, Wyoming, Nevada, Utah, Colorado, New Mexico, and Arizona to support consumer education, stakeholder engagement, and rural development of EV charging. The goal of ChargeWest™ is to remove investment barriers to enable private station development, identify key infrastructure gaps and develop solutions to deploy charging stations in rural regions required to complete corridors, and develop replicable educational tools to encourage EV consumer awareness.[153]

2.3 Federal Entities

Department of Energy

DOE administers national energy, environmental, and nuclear policies through science and technology solutions.[154] DOE oversees the nation's nuclear infrastructure, and operates energy research facilities throughout the nation, including 17 national laboratories, among them INL. DOE provides state energy program funding to states to enhance energy security, advance

[148] Northern Grid. "Purpose." https://www.northerngrid.net/northerngrid/purpose/
[149] Federal Energy Regulatory Commission. "Fact Sheet | Building for the Future Through Electric Regional Transmission Planning and Cost Allocation." https://www.ferc.gov/news-events/news/fact-sheet-building-future-through-electric-regional-transmission-planning-and
[150] The Northwest Energy Efficiency Alliance. "Working with the Market." https://neea.org/our-work/working-with-the-market
[151] Northwest Energy Efficiency Alliance. "About NEEA." http://neea.org/about-neea
[152] Northwest Energy Efficiency Alliance. "Board of Directors." https://neea.org/about-neea/board-of-directors
[153] ChargeWest™. "What is ChargeWest™?" https://chargewestev.org/
[154] U.S. Department of Energy. "About Us." https://www.energy.gov/about-us

state-led energy initiatives, improve grid resiliency, and maximize the benefits of decreasing energy waste.

Federal Energy Regulatory Commission

FERC is an independent regulatory agency within the DOE. FERC has jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas transmission and related services, pricing, oil pipeline rates and gas pipeline certification.[155]

North American Electric Reliability Corporation

NERC is a non-profit subject to oversight by the FERC and governmental authorities in Canada whose mission is to ensure the reliability and security of the bulk power system in North America. NERC accomplishes this by developing and enforcing reliability standards and assessing seasonal and long-term reliability. NERC has four interconnection regions, including the Western Interconnection. NERC's bulk power system serves approximately 400 million people.[156]

NERC hosts the GridEx exercise every two years. GridEx trains utilities on response and recovery from simulated coordinated cyber and physical security threats and incidents, strengthens crisis communications relationships, and provides a forum for lessons learned.

Army Corps of Engineers

USACE is a reporting unit of the U.S. Army that provides engineering services for energy, national security, and risk reduction.[157] USACE maintain and operate approximately 740 dams throughout the nation through their Dam Safety Program. The program provides several benefits to U.S. residents including conservation, flood mitigation, irrigation, recreation, and power. They also house the National Inventory of Dams database that acts as a central location for dam information across the U.S. This database includes USACE dams, as well as dams operated by other entities.[158] The database identifies 410 total dams in Idaho.[159]

[155] Federal Energy Regulatory Commission. "About FERC." https://ferc.gov/what-ferc
[156] North American Electric Reliability Corporation. "About NERC." https://www.nerc.com/aboutnerc/pages/default.aspx
[157] U.S. Army Corps of Engineers. "About Us." https://www.usace.army.mil/About/
[158] U. S. Army Corps of Engineers. "Dam Safety Program." https://www.usace.army.mil/Missions/Civil-Works/Dam-Safety-Program/
[159] National Inventory of Dams. "Dams of Idaho." https://nid.sec.usace.army.mil/#/

Nuclear Regulatory Commission

The Nuclear Regulatory Commission (NRC) is an independent federal agency that oversees licensing, safety, security, storage, and disposal of nuclear materials. The state works with NRC on nuclear projects at INL, and to ensure that materials transported through Idaho for disposal and the materials present at INL adhere to appropriate safety guidelines.[160] The Governor appoints a NRC liaison, who is currently the DEQ's INL Oversight Program Manager.

Department of the Interior

The Department of the Interior (DOI) manages public lands, territories, and tribal matters in the U.S. through the bureaus and offices it administers, which includes the Bureau of Land Management (BLM), BOR, the National Park Service, the U.S. Fish and Wildlife Service (USFWS), and many others. OEMR coordinates state agency comments on energy and mineral-related projects subject to National Environmental Policy Act review.[161]

DOI's management in Idaho includes BOR oversight of federal water resource management efforts and management of several dams in Idaho such as Anderson Ranch, Arrowrock, American Falls, and Palisades. It also includes BLM administration of energy and mineral leases throughout Idaho and USFWS analysis on the impact of energy generation and transmission on endangered species and migratory birds.

Forest Service

The U.S. Forest Service (USFS), administered under the U.S. Department of Agriculture, is responsible for managing and protecting national forests and grasslands. OEMR has worked with USFS on transmission rights-of-way through national forests, energy and mineral development on National Forest System lands, revision of forest land management plans, and development of woody biomass as a source of energy.[162]

National Marine Fisheries Service

The National Marine Fisheries Service (NMFS), administered under the U.S. Department of Commerce through the National Oceanic and Atmospheric Association, oversees endangered anadromous fish species, and ensures compliance with fisheries regulations. The state works closely with NMFS on fisheries issues, including those related to salmon, steelhead, and hydroelectric facilities in the Federal Columbia River Power System.[163]

[160] U.S. Nuclear Regulatory Commission. "The Commission." https://www.nrc.gov/about-nrc/organization/commfuncdesc.html

[161] U.S. Department of Interior. "About." https://www.doi.gov/about ; and National Environmental Policy Act. "Laws & Regulations." https://ceq.doe.gov/laws-regulations/states.html

[162] U.S. Forest Service. "Energy." https://www.fs.usda.gov/science-technology/energy-forest-products/energy

[163] National Oceanic and Atmospheric Administration Fisheries. "About Us." https://www.fisheries.noaa.gov/about-us

Environmental Protection Agency

The Environmental Protection Agency (EPA) establishes minimum standards for clean air, land and water in energy-generating processes including those involving nuclear, coal, and hydroelectric. EPA works closely with the state departments responsible for air and water quality, including DEQ, to develop and ensure compliance with environmental standards.[164] EPA administers the Comprehensive Environmental Response, Compensation, and Liability Act, commonly known as "Superfund," which allows EPA to clean up contaminated sites.[165] There are currently six sites in Idaho on the Superfund National Priorities List.[166]

Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA), an agency of the Department of Homeland Security, leads nationwide risk mitigation efforts and coordinates disaster response operations. The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) provides today's current disaster relief framework. FEMA has 10 regional offices; Idaho is located within FEMA Region 10. OEMR and the PUC work closely with FEMA Region 10 Emergency Support Function #12 (Energy) personnel in planning and response efforts.[167]

Department of Transportation

The Department of Transportation (DOT) was established in 1966 and serves the American people and economy through the safe, efficient, sustainable, and equitable movement of people and goods.[168]

The Federal Highway Administration (FHWA) is an agency within the DOT that supports State and local governments in the design, construction, and maintenance of the Nation's highway system and various federal- and tribal-owned lands.[169]

The Joint Office of Energy and Transportation facilitates collaboration between DOE and DOT. The organization supports the deployment of zero-emission, convenient, accessible, and equitable transportation infrastructure, including electric vehicle chargers, zero-emission fueling infrastructure, and zero-emission transit and school buses.[170]

2.4 Energy Research and Education in Idaho

Higher education institutions, community colleges, and research and development institutions located in Idaho are engaged in educating tomorrow's energy workforce.

---

[164] U.S. Environmental Protection Agency. "About EPA." https://www.epa.gov/aboutepa/our-mission-and-what-we-do
[165] U.S. Environmental Protection Agency. "What is Superfund?" https://www.epa.gov/superfund/what-superfund
[166] U.S. Environmental Protection Agency. "National Priorities List by State." https://www.epa.gov/superfund/national-priorities-list-npl-sites-state#ID
[167] Federal Emergency Management Agency. https://www.fema.gov/about/strategic-plan/about-fema.
[168] U.S. Department of Transportation. "What We Do." https://www.transportation.gov/about
[169] U.S. Department of Transportation Federal Highway Administration. "About FHWA." https://highways.dot.gov/about/about-fhwa
[170] Joint Office of Energy and Transportation. "About the Joint Office." https://driveelectric.gov/about

Idaho National Laboratory

As DOE's nuclear energy research, development, and demonstration center, Idaho National Laboratory (INL) is at the forefront of clean energy and national security innovation. With more than 6,200 employees, INL is one of the state's largest employers. It has an annual research budget exceeding two billion dollars and contributes nearly four billion dollars to the state's economy.

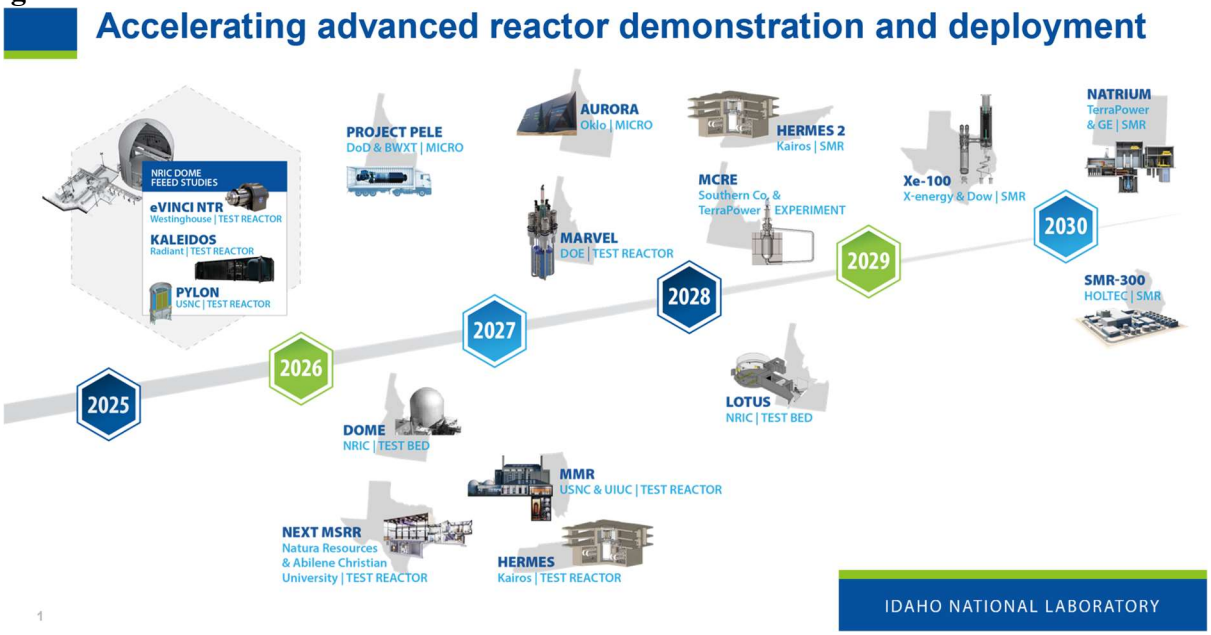
Located across an 890 square-mile site with an expanding campus in Idaho Falls, the INL houses world-class research facilities and comprehensive science and engineering capabilities that help fulfill its vision to change the world's energy future and secure the nation's critical infrastructure. INL is a leader in clean energy and battery technology research and a recognized world leader in cybersecurity and critical infrastructure protection.

Nuclear Science & Technology: INL is pioneering advanced nuclear energy technology to meet the demand for clean, affordable, carbon-free power. In the next several years, INL will demonstrate first-of-a-kind nuclear reactors, providing critical insights into the design, safety, licensing, and operations of new small and micro systems. These include:

- MARVEL, a microreactor producing about 20 kW, enough to power 10 homes.
- Project Pele, a mobile microreactor for the U.S. Department of Defense, providing reliable power to the military.
- MCRE, a microreactor experiment using molten chloride salts as fuel for more efficient heat generation.

By leading programs like the Gateway for Accelerated Innovation in Nuclear (GAIN) and the National Reactor Innovation Center, INL collaborates with the private sector to test and commercialize cutting-edge nuclear technologies. Several advanced reactor demonstrations are expected to be located at INL this decade.

Figure 27: INL Advanced Reactor Timeline[171]



[171] Picture courtesy of INL.

Energy Environment Science and Technology: INL researchers are accelerating the integration of diverse clean energy sources—nuclear, solar, wind, geothermal, and bio-based—onto the national grid. Collaborating with nuclear power providers, INL is advancing clean hydrogen production to decarbonize industrial processes. INL is also recovering critical materials and minerals for advanced manufacturing, energy, and defense needs. Through the Biomass Feedstock National User Facility, INL converts agricultural and municipal waste into energy and leads electric vehicle battery research and charging infrastructure development at its Battery Test Center.[172, 173]

The proposed Energy Technology Proving Ground will soon demonstrate and validate novel clean energy technologies on a commercial scale, integrating diverse clean energy systems into a single living laboratory. This industrial-scale complex will advance commercialization by providing comprehensive, impartial testing and validation, supporting industry partners in overcoming development hurdles.

Boise State University

Elective and certificate courses are offered in energy generation, energy efficiency, nuclear safeguards and security, cyber operations and resilience engineering and renewable energy at Boise State. The courses provide both non-science and engineering students with a solid grounding in energy fundamentals, which is helping Boise State educate a knowledgeable generation of energy consumers, policymakers, teachers, and business leaders.

The Micron School of Materials Science and Engineering (MSE) at Boise State University is home to one of the most productive materials science and engineering programs in the west. MSE's Advanced Nanomaterials and Manufacturing Laboratory formulates microscopic materials for energy applications.[174]

Boise State's Advanced Materials Research Group is engaged in a variety of research programs focused on materials processing and materials performance in extreme environments. Much of the current research is focused on nuclear enabling technologies, including advanced materials development and sensors developments for in-situ nuclear reactor applications.[175]

University of Idaho

The Department of Biological and Agricultural Engineering at University of Idaho (U of I) houses the Biodiesel Fuel Education Program which provides science-based information about biodiesel and assists in the development of educational tools for a national biodiesel outreach program. The program develops and distributes educational materials that support advances in biodiesel infrastructure, technology transfer, fuel quality, fuel safety, and increasing feedstock production.[176]

U of I's Integrated Design Lab performs research, education and outreach supporting energy efficiency in Idaho. Their team performs energy audits for OEMR's Government Leading by Example Program.[177]

[172] Idaho National Lab. "Biomass Feedstock National User Facility." https://inl.gov/bfnuf/
[173] Idaho National Lab. "Battery Test Center." https://inl.gov/document/inls-battery-test-center/
[174] Boise State University. "Micron School of Materials Science and Engineering." https://www.boisestate.edu/coen-materials/
[175] Boise State University. "Advanced Materials Laboratory." https://www.boisestate.edu/coen-aml/
[176] University of Idaho. "Biodiesel Education." http://biodieseleducation.org/
[177] University of Idaho "Integrated Design Lab." Integrated Design Lab | University of Idaho (uidaho.edu)

U of I also hosts the National Institute for Advanced Transportation Technology. This institute is focused on environmental protection through transportation research, technology transfer, and education. The institute contributes to the sustainability of the environment through the development of clean vehicles, alternative fuels, efficient traffic control systems, safe transportation systems, sound infrastructure, and the policies that support these systems.[178]

U of I offers two energy-related options under its B.S. Geology degree. The Sustainable Mining and Earth Resources option introduces students to modern mining methods through "hands-on" experiential work with regional employers to learn mining planning, implementation, restoration, and maintenance of the natural landscapes. The Energy Resiliency option introduces students to ways critical energy resources can be obtained and used in a sustainable and responsible manner.[179]

Idaho State University

ISU offers bachelor's and master's degree programs in nuclear engineering and prepares graduates to excel in a wide range of careers associated with nuclear reactors, the nuclear fuel cycle, and other applications of nuclear technology.[180] In 2022, NuScale Power collaborated with ISU to open the Energy Exploration Center, where students can experience hands-on nuclear learning opportunities similar to the control rooms they might see on the job.[181]

ISU established the Energy Systems Technology and Education Center (ESTEC) in its College of Technology. ESTEC integrates the education and training required for graduates to maintain existing plants. Students learn to install and test components in new plants in key areas of technology, including electrical engineering, instrumentation and control, mechanical engineering, wind engineering, instrumentation and automation, nuclear operations, and renewable energy.[182]

College of Southern Idaho

Since 1981, instructors at the College of Southern Idaho (CSI) in Twin Falls have trained the next-generation energy workforce through the Renewable Energy Systems Technology Program.[183] CSI received a $4.4 million Economic Development Administration federal grant in 2011 to build the Applied Technology and Innovation Center in Twin Falls. Completed in 2014, the 29,600 square foot energy efficient center houses the college's expanding HVAC, environmental technology, wind energy, and machine technology programs with classrooms, hands-on labs, and administrative offices.[184]

College of Eastern Idaho

College of Eastern Idaho (CEI) and ISU co-host the two-year Energy Systems Technology Program. Students complete their first year at the CEI campus in Idaho Falls and the second at ISU

[178] University of Idaho. "National Institute for Advanced Transportation Technology." www.uidaho.edu/engr/research/niatt
[179] University of Idaho. "B.S. Geology." https://www.uidaho.edu/sci/ess/bs-geology.
[180] Idaho State University. "Programs of Study." https://www.isu.edu/ne/
[181] Idaho State University. "NuScale Power, LLC and Idaho State University Open Energy Exploration Center." https://www.isu.edu/news/2022-fall/nuscale-power-llc-and-idaho-state-university-open-energy-exploration-center.html
[182] Idaho State University. "College of Technology." https://www.isu.edu/estec//
[183] College of Southern Idaho. "Renewable Energy Systems Technology Program." https://www.csi.edu/programs/renewable-energy-systems-technology/default.aspx
[184] U.S. Economic Development Administration. "CSI Applied Technology & Innovation Center." https://www.eda.gov/success-stories/workforce/stories/college-of-southern-id.htm

in Pocatello. The program equips students to become energy systems maintenance technicians with mechanical, electrical, and instrumentation and control skills.[185,186]

College of Western Idaho
The College of Western Idaho (CWI) provides in-demand energy engineering skills in its Advanced Mechatronics Engineering Technology program. This one-to-two-year program teaches students about electricity, robotics, wireless communication, renewable energy, instrumentation, and computerized control systems.[187] Additionally, CWI offers a HVAC apprenticeship program that teaches students about energy efficiency and how to install, maintain, and fix HVAC systems.[188] CWI also has an electrical apprenticeship program that offers education on energy codes and electrical theory while providing training opportunities and installation practice.[189]

Northwest Lineman College
The Northwest Lineman College (NLC), based in Meridian, trains lineman apprentices and educates students in construction, maintenance, and operation of the grid. NLC also develops customized training services for power and construction companies worldwide. With over 8,000 trainees annually, NLC has educated more Power Delivery trade professionals than any other educational institution in the U.S.[190]

Kootenai Electric Cooperative
Kootenai Electric Cooperative constructed a new headquarters and training facility in Rathdrum in October 2023. These facilities will host new hire orientation, internal safety trainings, and external trainings from the Northwest Line Joint Apprenticeship Training Committee, the Northwest Public Power Association, and more.[191]

3. Energy Sources

3.1 Hydroelectricity

Hydroelectricity is a carbon-free energy resource generated by using the force of moving water. Idaho has many generating hydroelectric power plants with a combined capacity of 6,748 MWh, which makes Idaho the seventh-largest hydroelectric power producer in the nation.[192] Idaho's largest hydroelectric power projects are the 1,167 MW Hells Canyon Complex (consisting of the Hells Canyon, Oxbow, and Brownlee dams) owned by Idaho Power, the 400 MW Dworshak dam operated by the USACE, and the 260 MW Cabinet Gorge Project owned by Avista.[193] Depending on water supply, the actual output of energy produced by hydroelectricity may vary.

---

[185] College of Eastern Idaho. "Energy Systems Technician." https://cei.edu/falcons/resources/programs/estec-packet.pdf http://www.cei.edu/programs-of-study/trades-industry/energy-systems-technician
[186] Idaho State University. "Energy Systems Technology and Education Center." https://www.isu.edu/estec/
[187] College of Western Idaho. "Advanced Mechatronics Engineering Technology." https://cwi.edu/program/advanced-mechatronics-engineering-technology
[188] College of Western Idaho. "HVAC Apprenticeship." https://cwi.edu/program/hvac-apprenticeship
[189] College of Western Idaho. "Electrical Apprenticeship." https://cwi.edu/program/electrical-apprenticeship#program_co
[190] Northwest Lineman College. https://lineman.edu/students-home/campuses/idaho/
[191] Kootenai Electric Cooperative. "Rathdrum Headquarters Update." https://www.kec.com/rathdrum-headquarters-update
[192] U.S. Energy Information Administration. "Where Hydropower is Generated." https://www.eia.gov/energyexplained/hydropower/where-hydropower-is-generated.php
[193] Idaho Governor's Office of Energy and Mineral Resources. "Hydroelectric." https://oemr.idaho.gov/sources/re/hydropower/

The flexible nature of hydroelectricity enables it to meet the fluctuating demands of the grid and mitigate losses of supply associated with intermittent resources such as wind and solar. Idaho's robust water resources allow for hydroelectricity to be a valuable baseload renewable energy resource that provides clean and reliable energy to the state. Hydroelectricity supplied about 43% of Idaho's in-state electricity generation and contributes to Idaho-based energy providers' ability to supply low-cost power to customers.[194]

In addition to providing clean and reliable energy, hydroelectric power plants also provide flood control, reliable irrigation for agriculture, and opportunities for recreation at reservoirs such as boating, fishing, rafting, and swimming throughout the state.

Figure 28: **Hells Canyon Complex**

Completed in 1967, the Hells Canyon Complex, located on the Idaho/Oregon border along the Snake River in Adams and Washington Counties, is the largest generation plant in Idaho. The Hells Canyon Complex generates approximately 1,167 MW and serves Idaho Power customers. The Hells Canyon Complex has been undergoing relicensing since 2003.

3.2 Wind

Wind is a clean energy resource that utilizes a turbine to generate electricity. Storage and dispatchable resources supplement demand when wind generation is not available due to its intermittent nature. These dispatchable resources include battery energy technology, hydroelectric power, nuclear power, and natural gas-fired generators.

Idaho's wind production grew 1,018% from 2008 to 2023.[195] Wind generates approximately 15% of Idaho's electricity and is produced by 598 wind turbines.[196,197] In 2023, the wind industry directly employed 1,065 Idahoans.[198]

Wind mapping studies estimate 213,000 MW of potential wind generation and 973 MW of installed capacity in Idaho.[199] The Snake River Plain in southern Idaho represents the state's

[194] U.S. Energy Information Administration. "Idaho: State Profile and Energy Estimates." https://www.eia.gov/state/?sid=ID#tabs-4
[195] U.S. Energy Information Administration. "Electricity Data Browser." https://www.eia.gov/electricity/data/browser/#/topic/0?agg=1,0,2&fuel=008&geo=00000000008&sec=o3g&linechart=ELEC.GEN.WND-ID-99.A&columnchart=ELEC.GEN.WND-ID-99.A&map=ELEC.GEN.WND-ID-99.A&freq=A&start=2001&end=2023&ctype=linechart&ltype=pin&rtype=s&maptype=0&rse=0&pin=
[196] U.S. Energy Information Administration. "Idaho Profile Analysis." https://www.eia.gov/state/analysis.php?sid=ID#:~:text=Idaho's%20electricity%20generation%20from%20utility,come%20online%20in%20mid%2D2024
[197] United States Geological Survey. "The U.S. Wind Turbine Database." https://eerscmap.usgs.gov/uswtdb/viewer/#7.06/43.224/-113.895
[198] U.S. Department of Energy "Energy Employment by State: 2024." https://www.energy.gov/sites/default/files/2024-09/USEER%202024%20States_0913.pdf
[199] Wind Exchange. "US Installed and Potential Wind Power Capacity and Generation." https://windexchange.energy.gov/maps-data/321

greatest wind resource potential.[200] Projects developed on endowment lands create income for the Idaho State Endowment Fund, which funds schools and other state institutions. Annually, wind projects in the state generate approximately $13 million for local communities.[201]

Figure 29*:* Cedar Creek Wind[202]

The Cedar Creek Wind Project began commercial operation in Bingham County in 2024. The project is 152 MW and will provide power for up to 41,000 homes annually. The project created 175 jobs during construction.[203]

3.3 Solar

Solar power is a clean energy resource that utilizes the energy from the sun. Solar energy produces electricity through photovoltaic (PV) solar cells or concentrated solar power (CSP). PV solar cells convert sunlight to electricity using solar plates stationed on an array angled towards the sun. CSP technologies reflect and concentrate sunlight from mirrors to receivers that convert the solar energy into heat. This thermal energy produces electricity through a steam turbine or heats an engine to drive a generator.[204]

Solar energy can heat water and residential and commercial buildings through active and passive heating systems. Active solar water heating systems circulate liquid, either water or an anti-freezing heat-transfer fluid, through a series of pumps and controls located in pipes throughout a home. Passive solar water heating systems use the movement of hot water rising and cool water sinking to push water through a pipe system in the home. Both types of systems require a water storage tank and solar panels to collect the heat.[205]

Utility-scale solar generation in Idaho began in August 2016 and produced 0.2% of the total power generation in Idaho that year. In 2024, the total installed solar had grown to approximately 992 MW, enough to power 137,483 homes. Idaho has 44 solar companies consisting of manufacturers, developers, and installers.[206]

---

[200] U.S. Energy Information Administration. "Profile Analysis." https://www.eia.gov/state/analysis.php?sid=ID#88
[201] American Wind Energy Association. "AWEA Wind Energy in the United States." https://public.tableau.com/app/profile/american.wind.energy.association/viz/WindEnergyintheUnitedStates/AnnualReportViz
[202] Image courtesy of the Clearway Energy Group. https://www.clearwayenergygroup.com/wp-content/uploads/2024/04/Cedar-Creek2-1024x680.png
[203] Utility Drive. "Clearway Announces Commercial Operations at Idaho Wind Farm. https://www.utilitydive.com/press-release/20240404-clearway-announces-commercial-operations-at-idaho-wind-farm/
[204] U.S. Department of Energy. "Solar Energy Technology Basics." https://energy.gov/eere/energybasics/articles/solar-energy-technology-basics
[205] U.S. Department of Energy. "Solar Water Heaters." https://energy.gov/energysaver/solar-water-heaters
[206] Solar Energy Industries Administration. "State Solar Spotlight, Idaho." https://seia.org/wp-content/uploads/2024/08/Idaho-1.pdf

Figure 30: Jackpot Solar Project

The Jackpot Solar Project located in Twin Falls County began operations in December 2023. This 120 MW project is Idaho's largest operational solar project.

3.4 Bioenergy

Bioenergy is renewable and derived from biological materials – or biomass. Biomass can include agricultural crop waste, energy crops, animal waste, algae, and wood products and can produce heat, electricity, and transportation fuels. Idaho has long been an innovator in bioenergy. Idaho is the first state to use farmed crop seeds for biodiesel production, is the first to use less toxic ethanol instead of methanol, and is the first place that a vehicle was driven 100,000 miles solely on biodiesel.

As of 2023, Idaho has one operating ethanol plant in Burley capable of producing 60 million gallons of ethanol per year. Wood waste biomass from Idaho forests, primarily, and other biomass and landfill gas provided about 3% of Idaho's electricity production in 2023.[207] Feedstock projections indicate that Idaho produces over 2.5 million metric tons of wood waste from forests, mills, and urban sources, respectively.[208] Idaho has three dedicated biomass manufacturing facilities and several research-based operations across the state.[209] Clearwater Paper, based in Lewiston generates roughly half of its energy through biomass and black liquor renewable biomass – black liquor is a by-product of paper mills.

The 2023 Idaho Deal Flow Report revealed that Idaho's biggest business deals involved bioenergy. The top tracked deal in 2023 was a $250,000,000 investment in Boise's Sevana Bioenergy, a biogas developer. Second was a $44 million deal for Vision Bioenergy Oilseeds, a company based in Nampa which develops energy crops to produce advanced biofuels.[210]

Figure 31: Dairy Innovation

In October 2024, South Ridge Dairy LLC, a family-owned farming operating located in Twin Falls County, received a $1 million USDA Rural Energy for America grant to install a lagoon dairy anaerobic digester for a 21,625-herd farm. This project is expected to save $3,015,040 per year and will replace 44,181,045 kWh per year, which is enough electricity to power 4,207 homes.

[207] EIA. "Idaho." https://www.eia.gov/state/analysis.php?sid=ID#:~:text=About%20two%2Dfifths%20of%20Idaho%20is%20covered%20by%20forests.&text=Biomass%2C%20primarily%20wood%20waste%20from,generate%20electricity%20in%20the%20state.
[208] U.S. Department of Energy. "Benefits of Biofuel Production and Use in Idaho." https://www.energy.gov/sites/prod/files/2015/10/f27/idaho_biofuels_benefits.pdf
[209] EIA. "Monthly Biomass Fuel Report." https://www.eia.gov/biofuels/biomass/#dashboard
[210] Idaho Deal Flow. "2023 Idaho Deal Flow Report." https://idahodealflow.com/2023-idaho-deal-flow-report-new/

3.5 Geothermal

Geothermal energy is a renewable carbon-free energy resource derived from the heat within the earth. Unlike intermittent resources, geothermal energy provides reliable baseload power generation, meaning it can be utilized 24/7, or whenever needed. An estimated 13,550 MW of untapped geothermal power exists in Idaho, much of it in the southern portions of the state.[211] Ormat Technologies manages Raft River Enhanced Geothermal System Project, the first commercial geothermal power plant in the Northwest. Located in Cassia County, the 11 MW project came online in 2008 and is Idaho's only operating commercial geothermal power plant.[212] Idaho is one of seven states with utility-scale electricity generation from geothermal energy.[213]

In addition to electric generation, direct use of geothermal waters is the oldest, most versatile, and most prevalent utilization of geothermal energy.[214] There are over 1,000 geothermal wells and 200 springs across Idaho. Geothermal wells are holes drilled to access subterranean geothermal resources, while geothermal springs are natural bodies of surface water heated by the earth's crust. Wells that have a bottom hole temperature greater than 85ºF and less than 212ºF are designated as low-temperature geothermal (LTG) resource wells.[215] These LTG resources are used for space heating, aquaculture, greenhouses, and recreation throughout the state.

Idaho's capital city, Boise, is home to the nation's first geothermal district heating system, Warm Springs Heating District, which was built in the late 19th century and continues to service over 300 customers in east Boise.[216] The City of Boise's geothermal heating utility delivers naturally heated water through over 20 miles of pipeline to over 6 million square feet of building space. Boise plans to expand by its geothermal system to help meet its goal to achieve carbon neutrality by 2050.[217]

The Capitol Mall Geothermal Energy Project was completed in 1982 and continues to provide low-cost space and hot water heating to the Idaho Statehouse and eight other state buildings. The Idaho Statehouse was the first geothermally-heated capitol in the nation.

3.6 Combined Heat and Power

Several Idaho facilities and industrial users have incorporated systems that generate on-site electricity and thermal energy in a process known as CHP. CHP is typically deployed at sites such as industrial operations and university or corporate campuses, which have high demand for electricity and hot water or steam. As of 2023, there are 21 CHP systems in Idaho with a capacity of 197 MW, predominantly used in wood product facilities, dairies, hotels, and large industrial food processors. Ten of Idaho's 21 CHP facilities utilize renewable fuels.[218]

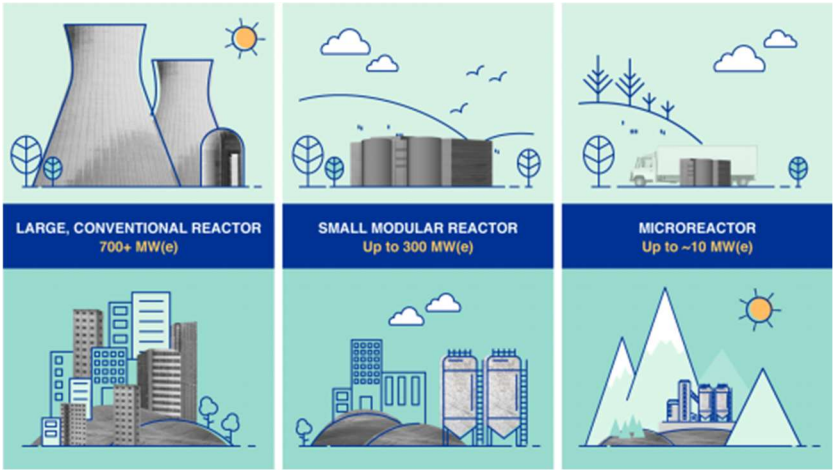
---

[211] Geothermal Energy Association. "Geothermal Development Needs in Idaho." https://www.idahogeology.org/pub/Geothermal/References/Miscellaneous/Fleischman.2006_GeothermalReport.pdf
[212] Ormat. "Global Projects." https://www.ormat.com/en/projects/all/main/
[213] U.S. Energy Information Administration. "Profile Analysis." https://www.eia.gov/state/analysis.php?sid=ID#88
[214] U.S. Department of Energy. "Low Temperature Deep Direct-Use Program Draft White Paper." http://energy.gov/eere/geothermal/low-temperature-deep-direct-use-program-draft-white-paper
[215] Idaho Department of Water Resources. "Geothermal Resource Wells." https://idwr.idaho.gov/wells/geothermal-wells/
[216] Boise Warm Springs Water District. "About." https://bwswd.com/about/
[217] City of Boise. "Boise's Climate Action Roadmap." https://www.cityofboise.org/media/18146/boise-climate-roadmap.pdf
[218] U.S. Department of Energy Combined Heat and Power and Microgrid Installation Databases. "Combined Heat and Power Installations in Idaho." https://doe.icfwebservices.com/state/chp/ID

3.7 Nuclear

Nuclear energy is a carbon-free power source. Nuclear power contributes nearly 20% of electricity in the nation and is the largest source of clean energy in the U.S.[219] As of April 2024, there are 54 commercially operating nuclear power plants with 94 nuclear power reactors in 28 states that, in total, generate over 100,000 MW.[220]

Figure 32: Nuclear Reactor Types[221]



INL, located in southeastern Idaho, is the nation's leading laboratory for nuclear energy research. INL is the birthplace of nuclear energy for electricity generation and has influenced every reactor designed in the U.S. INL researchers are working on several initiatives, including advanced nuclear reactors such as microreactors and small modular reactors as well as integrated energy systems, that will help shape the future of nuclear energy worldwide.[222]

Advanced nuclear reactors (ANRs) represent the cutting edge in nuclear technology. ANRs are being designed to more quickly adjust their electricity output to match demand, helping them stabilize the grid in areas with a high volume of intermittent renewables. Additionally, many ANRs are safer by design and can operate without the need for safety-related backup electrical systems. ANRs will use a variety of coolants including water, molten salt, high temperature gas and liquid metal, and come in a wide range of MW output, from a few MWs to more than 1,000 MW (like traditional nuclear reactors). ANR applications are attractive to smaller utilities and for isolated and distributed applications. Further, ANRs will offer a variety of benefits beyond electricity generation, such as water desalination, process heat and alternative fuels generation, and access to power beyond the grid. Some designs will also recover and recycle elements in used spent nuclear fuel that can still produce energy.[223] Many advanced reactors are still in the development phase, which requires expensive research and testing before they can even begin to bring return on

[219] U.S. Department of Energy. "Nuclear." https://www.energy.gov/nuclear#:~:text=Nuclear%20power%2C%20the%20use%20of,the%20electricity%20generated%20in%20America.
[220] U.S. Energy Information Administration. "How many nuclear power plants are in the United States, and where are they located?" https://www.eia.gov/tools/faqs/faq.php?id=207&t=21
[221] International Atomic Energy Agency. "What are Small Modular Reactors?" https://www.iaea.org/newscenter/news/what-are-small-modular-reactors-smrs
[222] Idaho National Laboratory. "About." https://inl.gov/about-inl/
[223] Nuclear Energy Institute. "Advanced Nuclear". https://www.nei.org/advanced-nuclear-energy/advanced-nuclear-101

investment. Cost-sharing partnerships between the federal government and developers are working to ease the burden, such as access to INL's GAIN program.[224]

Idaho supports the responsible development of nuclear energy and has taken action to protect Idahoans from nuclear waste. The Idaho Settlement Agreement, implemented in 1995, agreed to allow the U.S. Navy and DOE to bring small amounts of spent nuclear fuel (SNF) into the state for 40 years. DOE agreed to not send certain types of SNF to the state and agreed to treat and permanently remove waste and SNF from Idaho. Governor Batt had three conditions for the settlement agreement: Idaho will not become a default waste repository, DOE must address the waste already in Idaho, and INL must become a viable national lab. Since the Idaho Settlement Agreement in 1995, five agreements have been reached. These include: the Agreement to Implement of 2008, the Navy Addendum of 2004, the Commercial Fuel Memorandum of Agreement of 2011, the Supplemental Agreement of 2018, and the Advanced Test Reactor (ATR) Agreement.[225]

The ISEA facilitates a working group named the Advanced Nuclear Strategic Framework Taskforce. Its membership consists of industry, utilities, and government partners. Established in 2024, this group will formulate a strategic path forward for the State of Idaho to reduce regulatory barriers and formulate recommendations for the State to facilitate the deployment of new nuclear reactors.

Figure 33: Idaho Falls Nuclear Project

In 2024, Idaho Falls Power signed an MOU with Aalo Atomics, a nuclear engineering company pioneering small-scale, factory-built modular reactors for clean energy production. These reactors are based on INL's MARVEL program. When complete, the facility will have a total nameplate generating capacity of 75 MW. Currently, Idaho Falls Power is negotiating a power purchase agreement with Aalo that will give Idaho Falls Power the right to eventually purchase energy from the Idaho Falls Project.[226]

3.8 Natural Gas

Natural gas is a fossil fuel comprised mostly of methane and small amounts of other hydrocarbon liquids, carbon dioxide, and water vapor. Natural gas occurs naturally underground between and within certain rock formations. To extract it from the earth, developers drill a gas well down into the gas-bearing rock, install collectors, and collect it on the surface. Collected natural gas is then shipped to processing plants where contaminants are removed. After refining, natural gas pipelines carry the gas to end-use customers and electric generation plants.[227]

Natural gas is utilized in Idaho to heat homes, power businesses, move vehicles, and serves as a key component in many industrial processes. More than half of Idaho households use natural gas

[224] Idaho National Laboratory. "GAIN". https://gain.inl.gov/
[225] Idaho Governor's Office of Energy and Mineral Resources. "Nuclear." https://oemr.idaho.gov/sources/nuclear/
[226] Idaho Falls Power. "Idaho Falls Power negotiating agreement with Aalo Atomics." https://www.idahofallsidaho.gov/CivicAlerts.aspx?AID=2675
[227] U.S. Energy Information Administration. "Natural Gas Explained." https://www.eia.gov/energyexplained/natural-gas/

as their primary energy source to heat their home.[228] Natural gas power plants can adjust generation in real-time in response to the ebbs and flows of electricity generated by intermittent resources. Advances in gas turbine design and natural gas-fired internal combustion engines have improved the operating flexibility of natural gas generation. Natural gas reserves were detected in the Payette Basin of western Idaho in 2010.[229] These discoveries led to Idaho's first commercial production of natural gas and natural gas liquids in 2015.[230] In 2022, Idaho produced 2,409 million cubic feet of natural gas.[231]

As a transportation fuel, natural gas is used as compressed natural gas (CNG) or as LNG. Both compression and liquefaction are methods to increase the amount of natural gas storage in the vehicle and thus increase driving range. RNG is an emerging resource essentially made of biogas, the gaseous product of the decomposition of organic matter. Like conventional natural gas, RNG is pipeline-quality gas that is fully interchangeable with conventional natural gas and can be used as a transportation fuel in the form of CNG or LNG. Furthermore, RNG qualifies as an advanced biofuel under the Renewable Fuel Standard.[232]

Idaho has two public CNG vehicle refueling stations, one in Boise and another in Nampa.[233] Some municipal and commercial fleets utilize natural gas and operate their own CNG refueling stations. There are no commercial RNG facilities in Idaho as of 2023.

Figure 34: Southwest Idaho Play Wellhead in Payette County

In Idaho, the Southwest Idaho Play in Payette County produced 40,441 barrels of condensate, 2.74 billion cubic feet of natural gas, and created over $889,373 in tax revenue for Idaho in FY 2022.[234]

3.9 Propane

Propane is used to heat homes and businesses throughout the state, particularly in rural areas. Residential propane prices in Idaho fluctuated between $2.210/gallon to $2.567/gallon as of November 2024.[235] Propane consumption is seasonal, with peak consumption in fall and winter.

---

[228] U.S. Energy Information Administration. "Idaho State Profile and Energy Estimates – Profile Analysis." https://www.eia.gov/state/?sid=ID

[229] Dunnahoe, Tayvis. "Idaho enters ranks of hydrocarbon producing states." Oil and Gas Journal (February 6, 2017). https://www.ogj.com/exploration-development/article/17229353/idaho-enters-ranks-of-hydrocarbon-producing-states

[230] U.S. Energy Information Administration. "Natural Gas Gross Withdrawals and Production, Gross Withdrawals, Annual, 2012-2017." https://www.eia.gov/dnav/ng/NG_PROD_SUM_DC_NUS_MMCF_A.htm

[231] U.S. Energy Information Administration. "Idaho Gross Withdraws of Natural Gas." https://www.eia.gov/dnav/ng/hist/ngm_epg0_fgw_sid_mmcfa.htm

[232] U.S. Department of Energy. "Alternative Fuels Data Center." https://afdc.energy.gov/fuels/natural_gas_renewable.html

[233] U.S. Department of Energy Alternative Fuels Data Center. "Natural Gas Fueling Station Locations." https://afdc.energy.gov/fuels/natural_gas_locations.html#/find/nearest?fuel=CNG

[234] *2023 Annual Report.* Idaho Department of Lands. https://www.idl.idaho.gov/wp-content/uploads/sites/2/2024/01/IDL-AnnualReport-DIGITAL-Spreads-01042024.pdf

[235] U.S. Energy Information Administration. "Weekly Idaho Propane Residential Price (Dollar per Gallon)." https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=W_EPLLPA_PRS_SID_DPG&f=W

Propane is also used as a transportation fuel, for which there are nine publicly available stations for refueling in Idaho.[236] As a transportation fuel, propane is most used in specialized medium-duty and heavy-duty vehicles with engines capable of running on liquified petroleum gas.

3.10 Petroleum

Due to Idaho's rural nature, petroleum is a vital commodity to nearly every aspect of Idahoans' lives. Petroleum products include gasoline, diesel, and aviation fuel and are used in transportation, electricity production, and heating. See Section 1.2 for more information about petroleum infrastructure in Idaho.

3.11 Hydrogen

Hydrogen is the most abundant element in the universe. Today, hydrogen is commonly used for industrial aerospace operations, electricity generation, and vehicle transportation. Hydrogen can be blended in natural gas lines and combusted with natural gas, providing similar thermal output with lower carbon impact. While Idaho utilities do not currently utilize hydrogen, Idaho Power aims to add 340 MW of hydrogen power generation to two natural-gas-fired electricity plants by 2037.[237, 238]

3.12 Coal

Idaho has a small amount of estimated recoverable coal reserves but does not have any commercial coal production. Idaho utilities hold ownership shares in coal-fired power plants located in neighboring states. There are no longer any operating utility-scale coal-fired power plants in Idaho, but small amounts of coal are shipped to the state's industrial users by rail and truck from Utah, Colorado, and Pennsylvania.

4. Energy Efficiency and Energy Technologies

4.1 Energy Efficiency

Conservation, energy efficiency, and demand response are energy saving and economic strategies that can be utilized to meet energy needs. Conservation refers to personal actions that reduce energy use such as unplugging appliances not in use or opening curtains during the day and using sunlight instead of using power from a lightbulb. Energy efficiency is the utilization of technology that consumes less energy while providing sufficient service. For example, replacing drafty windows with EnergyStar certified windows can lower household energy bills by an average of 12% and reduce UV sun damage to carpets, floors and furniture.[239] Energy efficiency measures in buildings provides many potential benefits such as: saving money on utility bills, reducing maintenance costs, increasing comfort levels for occupants, and increasing energy resiliency for the community. Demand response refers to customers temporarily altering energy consumption

[236] U.S. Department of Energy. "Alternative Fuels Data Center." https://afdc.energy.gov/fuels/propane_locations.html#/find/nearest?fuel=LPG
[237] U.S. Energy Information Administration. "Hydrogen Explained." https://www.eia.gov/energyexplained/hydrogen/use-of-hydrogen.php
[238] Idaho Power Company. 2023 Integrated Resource Plan. https://docs.idahopower.com/pdfs/AboutUs/PlanningForFuture/irp/2023/2023-irp-final.pdf.
[239] Energy Star. "Energy Star Home Upgrade." https://www.energystar.gov/products/energy_star_home_upgrade

during times of higher demand for electricity, usually in response to signals from the utility or grid operator. Collectively, these strategies are often referred to as demand side management.

The PUC directs IOUs to conduct cost-effective conservation, energy efficiency, and demand response programs.[240] Each IOU calculates the level of cost-effective efficiency potential in their IRP and offers a suite of efficiency programs for customers. Cost-effectiveness is realized when the lifecycle energy, capacity, transmission, distribution, and other quantifiable savings to Idaho residents and businesses exceeds the direct costs of the measure to the utility and participant. Cost-effective energy measures provide economic benefits to Idaho utilities by reducing energy demand within their system.

Energy efficiency technologies have significantly improved over the past several decades. Today, there are many ways that people and businesses can save money and energy, see Table 1 for examples.

Figure 35: Energy Efficiency Sector & Technologies[241]

Residential	• High-efficiency home HVAC systems • Insulation • High performance windows and storm windows • Efficient appliances
Commercial	• Efficient consumer electronics • Commercial refrigeration • LED lighting with sensors
Industrial	• Fuel-efficient motors • Enhancements to the building envelope (e.g. roof, siding, windows)
Agriculture	• Efficient pumps and motors
Transportation	• Fuel economy standards • Fuel-saving tire design

Figure 36: Energy Efficiency and Conservation Block Grant Program (EECBG)[242]

In 2024, OEMR awarded 14 rural cities and counties with funding to complete and promote energy efficiency and conservation practices For example, The City of Wilder replaced non-efficient heating and cooling units in 20 low-income family housing units in the Chula Vista Complex with energy-efficient mini-split air conditioning and heating units. Installing energy-efficient mini-split units should reduce energy costs for low-income families.

[240] Idaho Public Utilities Commission. "CASE NO. IPC-E-1O-27, ORDER NO. 32245." www.puc.idaho.gov/fileroom/cases/elec/IPC/IPCE1027/ordnotc/20110517ORDER_NO_32245.PDF
[241] United States Agency International Development. "Overview of Energy-Efficient Technologies." https://www.usaid.gov/energy/efficiency/basics/technologies
[242] Photography: Courtesy of Chelsie Johnson with The City of Wilder.

4.2 Energy Technologies

Across the country, the grid is aging and reaching capacity. Various grid innovations aim to make this system more efficient and effective at meeting demand.

Reclosers

To adapt to changes in electricity demand and unexpected changes in load, today's distribution system commonly utilizes a sophisticated type of switch called a recloser. Reclosers are engineered to break the flow of electrical current when normal flow is interrupted. Most interruptions – about 80% – are not permanent (lighting strikes, animals, etc.).[243] When the recloser detects a change in normal current, the recloser will open the circuit for a few moments then close the circuit in hopes the fault has passed. If normal current has not been restored, the recloser will open again, this time for longer. If the fault is still present on the third close, the recloser will lock in the open position. Line crews must then address the issue on site before resetting the recloser to normal operation. Modern digital reclosers can be programmed for a variety of grid situations including high demand, inclement weather, and nearby wildfires. Each program can modify the sensitivity of the recloser and provide operators with the control to maintain reliability, protect distribution assets, and minimize the potential for electricity-related thermal events. Through its Energy Resiliency Grant Program, OEMR has provided funding to install or upgrade reclosers to several Idaho utilities.

SCADA Systems

SCADA stands for "supervisory control and data acquisition." SCADA systems are common in industrial applications and contain software and hardware components for a user to monitor system conditions and modify operations as needed in real time.[244]

In electrical grid applications, SCADA systems allow grid operators to monitor and control electric distribution. When faults occur in the system, imbedded equipment can isolate the fault, redirect current, and notify grid operators of the problem. Combined with a network of reclosers, cameras, sensors, digital meters, remote terminal units (RTUs), and programmable logic controllers (PLCs), SCADA systems support grid reliability and resiliency for operators and customers alike.[245] Through its Energy Resiliency Grant Program, OEMR provided funding to Clearwater Power to upgrade its command center with SCADA system capabilities for its service territory.

Distributed Energy Resources

Distributed energy resources (DERs), also called on-site, dispersed, or decentralized generation, are small power sources that can be combined to provide power to satisfy demand. Typically producing less than 10 MW, such sources can include micro-turbines, small natural gas-fueled generators, battery storage, or rooftop solar. [246] DERs are gaining popularity due to the potential for affordable renewable energy, and an increased desire for grid resiliency, largely motivated by

[243] *Transmission & Distribution*. "Auto-recloser – Safety and Minimising Downtime." February/March 2018 Ed., pg. 12. http://viewer.zmags.com/publication/643b6a63#/643b6a63/14

[244] SCADA International. "What is SCADA?" https://scada-international.com/what-is-scada/

[245] Medium. "SCADA and Smart Energy Grid Control Automation." https://helendarmi-hd.medium.com/scada-and-smart-energy-grid-control-automation-1f319a179be2

[246] Electric Power Research Institute. "The Integrated Grid: Realizing the Full Value of Central and Distributed Energy Resources 2014." https://www.energy.gov/sites/prod/files/2015/03/f20/EPRI%20Integrated%20Grid021014.pdf

increased occurrences of natural disasters such as storms and wildfires.[247] DERs may comprise 30-50% of nationwide generation capacity by 2031.[248]

RTOs/ISOs are required to open their electricity markets to participation by aggregated DERs. To comply, each RTO/ISO must file with FERC tariff provisions that establish market rules addressing specific technical and operational details impacting market participation by DER aggregations.[249]

Microgrids

A microgrid is a group of interconnected loads and DERs within clearly defined electrical boundaries that act as a single controllable entity. A microgrid can operate independently or connect and disconnect from the grid as needed.[250] Microgrids can optimize access to reliable, clean, and resilient energy through local, interconnected energy systems that incorporate loads, decentralized energy resources, battery storage, and control capabilities. In 2020, DOE's Office of Electricity began a Microgrid Program Strategy, its vision being, "By 2035, microgrids are envisioned to be essential building blocks of the future electricity delivery system to support resilience, decarbonization, and affordability."[251]

Energy Storage

Energy storage technologies provide the ability to store energy during periods of low demand for use at later times, adding enhanced control, reliability, and resiliency to the grid. Energy storage is important as the grid incorporates intermittent energy resources such as wind and solar. Most energy storage systems are located near distributed energy sources, such as solar and wind facilities.[252] Common storage technologies include mechanical (pumped-storage hydroelectric power and compressed air), electrochemical (lithium-ion batteries, flow batteries, and hydrogen), and thermal.

Energy storage can play a key role in providing overall grid security and resilience, while allowing critical infrastructure, hospitals, police stations, and essential services to remain operational during emergency situations. There are federal programs that promote the adoption of additional energy storage in the U.S. for resiliency purposes at critical facilities.

[247] North American Electric Reliability Corporation. "Distributed Energy Resources: Connection Modeling and Reliability Considerations." https://www.nerc.com/comm/Other/essntlrlbltysrvcstskfrcDL/Distributed_Energy_Resources_Report.pdf
[248] Sandia National Laboratories. "DOE OE 2021 Strategy White Papers on Microgrids: Program Vision, Objectives and R&D Targets in 5 and 10 Years – Topic Area #1." April 2021. https://www.energy.gov/sites/default/files/2022-12/Topic1%20Report.pdf
[249] Advanced Energy Economy. "Opening the Door to DERs." https://info.aee.net/hubfs/Order%202222%20Explainer%20final.pdf
[250] U.S. Department of Energy. "The U.S. Department of Energy's Microgrid Initiative." https://www.energy.gov/sites/prod/files/2016/06/f32/The%20US%20Department%20of%20Energy's%20Microgrid%20Initiative.pdf
[251] U.S. Department of Energy. "Microgrid Program Strategy." https://www.energy.gov/oe/microgrid-program-strategy
[252] U.S. Energy Information Administration. "Electricity Explained: Energy Storage for Electricity Generation." https://www.eia.gov/energyexplained/electricity/energy-storage-for-electricity-generation.php

In 2023, ISEA published the Utility-scale Storage Task Force Report which outlines opportunities for utility-scale energy storage in Idaho.[253] In 2022, the U.S. had 31.6 GW of installed energy storage.[254] Approximately 96% of existing storage is pumped-hydroelectric storage.[255]

Battery Storage: Battery storage can store excess energy at residential, commercial, and utility scales. Energy storage batteries work similarly to smaller batteries used in our everyday lives but have much greater storage capacities. Battery storage technology is rapidly growing and evolving due to scalability and accessibility. In 2023, operational and planned battery storage capacity equaled 16 GW; projections show over 30 GW of battery storage by the end of 2024.[256] Battery projects typically range from 10 kWh to 10 MWh. Small-scale batteries are being added to residential solar systems by the nation's leading solar installers. A fast-growing trend is utility-scale hybrid generation plants which combine renewable energy with on-site storage, offering increased stability and flexibility to the grid.

Batteries usually have short- to mid-range response times of seconds to hours. There are two categories of batteries used for energy storage, solid-state and flow batteries. Solid-state batteries utilize solid chemical compounds for varying grid services while flow batteries utilize chemical compounds that are dissolved in liquid within the battery to create a reaction that produces electricity. Typical solid-state battery types include the widely adopted lithium-ion and sodium-ion, but hybrid batteries and flow or redox (reduction-oxidation) flow batteries with a wide range of chemistries are becoming increasingly popular. Research continues across all battery storage types.[257]

Thermal Storage: Thermal storage traps energy temporarily in the form of heat or cold which allows the energy to be turned into electricity later. An example of this at utility-scale includes solar thermal power plants that use molten salt or other heat-retaining substances to store the sun's energy, which can be utilized later in steam-generating or other mechanical generating processes.[258]

Mechanical Storage: Mechanical storage systems use kinetic or potential energy to later transform into electricity. One example of a mechanical storage system is the flywheel, a device in which rotational energy is stabilized and maintained through movement of an accelerating wheel that can then store the energy kinetically for future use. A generator is then applied to easily convert the stored energy from mechanical to electrical energy. Flywheel storage systems with magnetic levitation (versus traditional bearings) can revolve up to 60,000 rotations per minute. Mechanical energy storage can also use compressed air, which spins a generation turbine

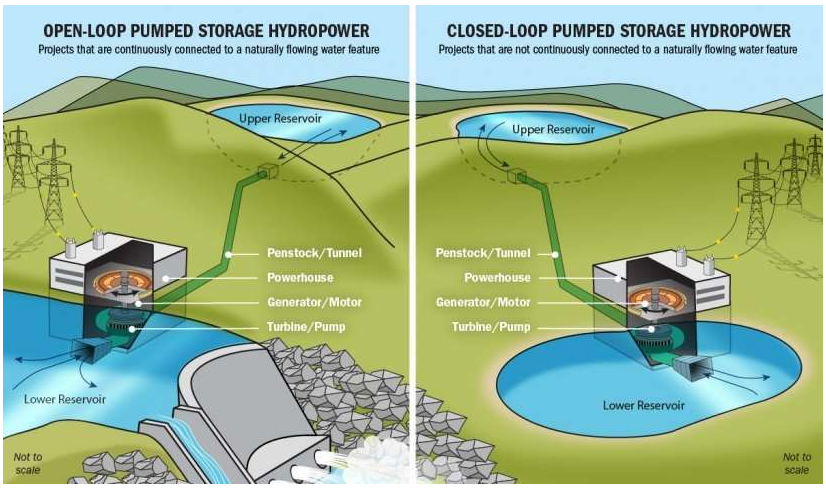
[253] Idaho Governor's Office of Energy and Mineral Resources. "ISEA Utility-Scale Storage Task Force Report." https://oemr.idaho.gov/wp-content/uploads/ISEA-Utility-Scale-Storage-Task-Force-Report_FINAL.pdf
[254] University of Michigan Center for Sustainable Systems. "U.S. Grid Energy Storage." https://css.umich.edu/sites/default/files/2023-10/U.S.%20Energy%20Storage_CSS15-17.pdf
[255] University of Michigan Center for Sustainable Systems. "U.S. Grid Energy Storage." https://css.umich.edu/sites/default/files/2023-10/U.S.%20Energy%20Storage_CSS15-17.pdf
[256] U.S. Energy Information Administration. "U.S. Battery Storage Capacity Expected to Nearly Double in 2024." https://www.eia.gov/todayinenergy/detail.php?id=61202
[257] Energy Storage Association. "Batteries." https://energystorageassociationarchive.org/why-energy-storage/technologies/solid-electrode-batteries/
[258] Energy Storage Association. "Thermal Energy Storage." https://energystorageassociationarchive.org/why-energy-storage/technologies/thermal-energy-storage/

upon discharge. Compressed air energy storage systems combined with heat transfer technologies are known as isothermal compressed air energy storage systems.[259]

Pumped Hydroelectric Storage: Pumped hydroelectric storage facilities, commonly referred to as pumped-hydro or pumped-storage, store energy with water and gravity. By utilizing excess electricity when energy demand is low, the system pumps water from a lower to a higher reservoir. When energy demand is high, the stored water is released through turbines to generate electricity. While pumped hydroelectric storage is a net consumer of energy, it is highly efficient (>80%) and provides added reliability or ancillary services.[260]

Much of the pumped hydroelectric storage infrastructure across the nation emerged during the 1970s. Pumped hydroelectric storage projects range from 10 MWh to 10 GWh. As of 2022, the U.S. grid had about 31 GW of utility-scale electrical storage capacity, of which pumped hydroelectric is about 70%.[261] There are currently no pumped hydroelectric storage projects in Idaho.

Figure 37: **Pumped Hydroelectric Storage**[262]



Hydrogen Storage: Electricity can be converted into hydrogen through a process called electrolysis. Electrolysis uses electricity to split water molecules into its constituent parts – oxygen and hydrogen. The resulting hydrogen can be stored and later re-electrified. Hydrogen projects range in size from 1 GWh to 1 TWh.

Like pumped-storage, hydrogen storage relies on using energy when demand is low (or generation is particularly high) for electrolytic hydrogen production. Hydrogen has a multitude of uses once it is created, such as fuel cells, power generation, natural gas blending, or stored as compressed gas. Hydrogen can be stored for long periods of time and in very large quantities.

---

[259] Energy Storage Association. "Mechanical Energy Storage." https://energystorageassociationarchive.org/why-energy-storage/technologies/mechanical-energy-storage/
[260] Energy Storage Association. "Pumped Hydropower." https://energystorageassociationarchive.org/why-energy-storage/technologies/pumped-hydropower/
[261] Office of Energy Efficiency and Renewable Energy. "2023 U.S. Hydropower Market Report." https://www.energy.gov/sites/default/files/2023-09/U.S.%20Hydropower%20Market%20Report%202023%20Edition.pdf
[262] U.S. Department of Energy. "Pumped Storage Hydropower." https://www.energy.gov/eere/water/pumped-storage-hydropower

Electric Vehicles

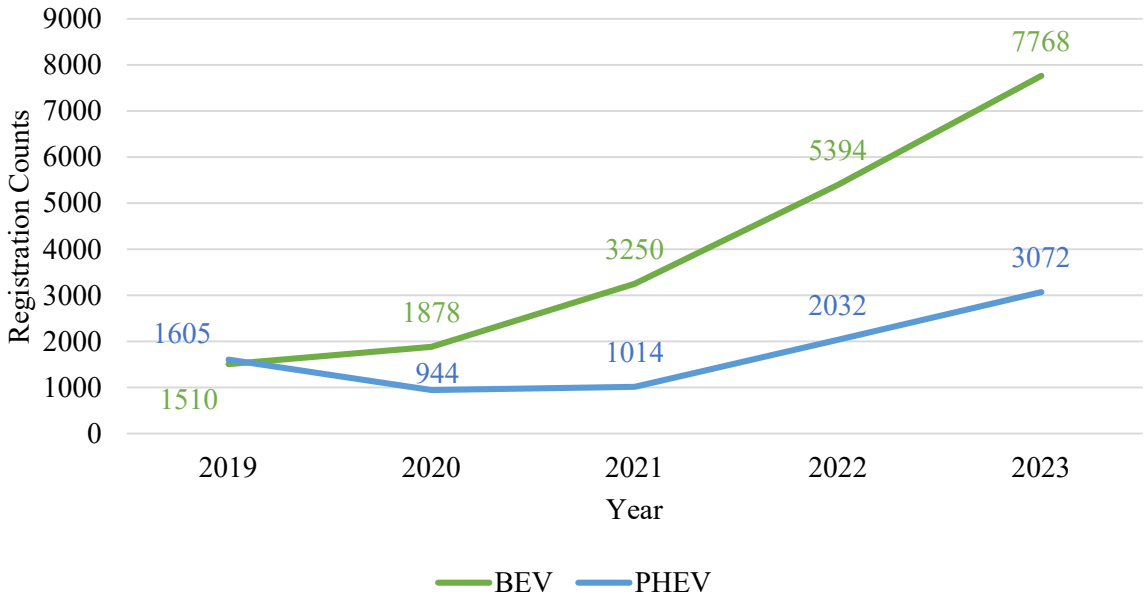
Battery electric vehicles (BEVs) run on batteries powered by electricity rather than a petroleum internal combustion engine. Plug-in hybrid EVs (PHEVs) are vehicles with both an ICE and an electric propulsion system. The battery can be charged from an external charging source, by the ICE, or through regenerative breaking (a process where the electric motor uses the car's momentum to generate electricity). EV adoption is increasing rapidly across the country as advancements in technology have improved battery performance and range. As of 2023, Idaho had a total of 7,768 BEV and 3,072 PHEV registrations. EV registrations have increased over 410% since 2019.

Figure 38: EVs at the 2024 Pocatello National Drive Electric Week

There are three "levels" of EV charging. EVs can be charged overnight via common 120-volt outlets, also called Level 1 charging. Level 2 charging stations have a 240-volt capacity, which can be installed at residences, businesses, or fleet locations to charge at a faster rate (about 3-5 hours for a full charge).[263] Lastly, direct current fast chargers (DCFC) require a specialized, 480-volt outlet and can provide a full charge after 20-30 minutes. Level 1 and 2 chargers are better suited to day-to-day use and DCFC are best suited for long-range road trips.[264] As of October 2024, Idaho has 204 EV station locations and 509 ports available to the public.[265]

[263] U.S. Department of Energy. "Charging Electric Vehicles at Home." https://afdc.energy.gov/fuels/electricity-charging-home
[264] U.S. Department of Energy. "Charging Electric Vehicles in Public." https://afdc.energy.gov/fuels/electricity-charging-public
[265] U.S. Department of Energy. "Electric Vehicle Charging Station Locations Idaho." https://afdc.energy.gov/fuels/electricity_locations.html#/analyze?fuel=ELEC

Figure 39: Idaho BEV and PHEV Registrations, 2019-2023 [266]



Hydrogen Fuel Cell Vehicles

Instead of using an electric battery to power an electric motor for vehicle propulsion, some vehicles use a hydrogen fuel cell to produce electricity for the electric motor. These vehicles are called fuel cell electric vehicles (FCEVs). Like electricity generation using stored hydrogen, FCEVs use onboard stored hydrogen, the air, and a fuel cell to create the electricity that drives the electric motor. Benefits of FCEVs include quick fueling times, high range, and the ability to use regenerative breaking for greater efficiency. Some automakers have experimented with FCEV deployment, but the lack of fueling existing fueling infrastructure makes wider adoption difficult.[267]

Micromobility

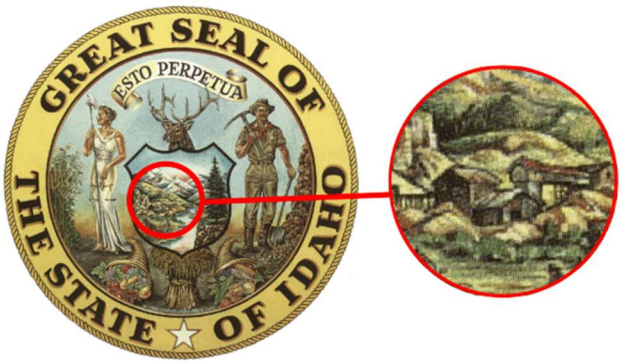
While the U.S.'s primary mode of transportation is personal vehicles, smaller modes of transportation are becoming increasingly popular, especially in urban areas. Micromobility refers to small, personal or shared transportation devices that usually operate at relatively low speeds (typically less than 30 miles per hour). Common micromobility devices include e-scooters, e-bikes, electric skateboards, and segways. Micromobility technologies aim to transport people over short distances or serve as "first- and last-mile" transportation options, connecting users to or from longer-range transportation options.[268] Shared micromobility (micromobility options used by multiple users[269]) trips topped 133 million in 2023, a 16% increase from 2022.[270] Federal, state, and local officials are actively investigating how micromobility can contribute to the overall transportation experience.

[266] Data courtesy of the Idaho Transportation Department.
[267] U.S. Department of Energy. "Fuel Cell Electric Vehicles." https://afdc.energy.gov/vehicles/fuel-cell
[268] U.S. Federal Highways Administration. "Public Roads – Spring 2021." https://highways.dot.gov/public-roads/spring-2021/02
[269] Transportation for America. "Shared Micromobility Playbook." https://playbook.t4america.org/
[270] National Association of City Transportation Officials. "Shared Micromobility in 2023." https://nacto.org/publication/shared-micromobility-in-2023/

5. Minerals

Minerals play an important role in the development of energy technologies. Idaho is home to a wealth of minerals that are integral to everyday life as well as the advancement of modern science. Idaho's mining legacy shaped the settlement of the state, brought worldwide recognition to Idaho's natural resources, and provides domestically sourced raw materials to advance modern technology. The essential application of minerals bolsters the economy, innovation, and national security.

Figure 40. Mining History in the Idaho Seal[271]



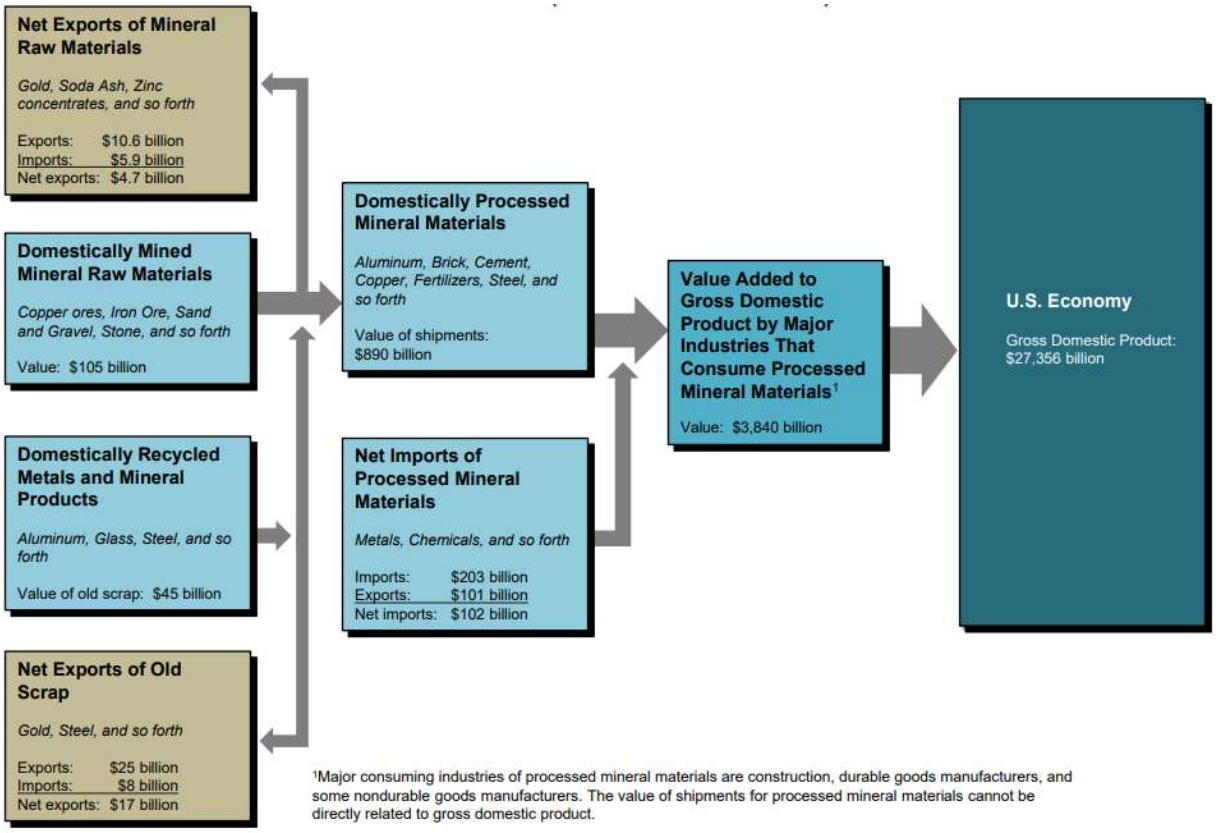
The Idaho State Seal depicts a miner as one of two prominent figures in the design. A historic mine is encompassed by the shield within the seal. These images emphasize the importance of the mining industry to Idaho's statehood. Mining was the leading industry in the state when Idaho was accepted to the Union in 1890.[272] The mining industry in Idaho is still thriving today.

Figure 41: Thompson Creek Mine[273]

In 2023, mining, quarrying and oil and gas extraction contributed $1.28 billion to Idaho's Gross Domestic Product (GDP). Currently mining in Idaho supports 13,801 direct and indirect jobs.[274] Direct mining jobs require highly specialized engineering and skilled labor, in addition to administrative support workers and transportation workers. As demand for domestically sourced raw materials increases, the mining industry will need a skilled and diverse workforce to meet the needs of the country's increased standard of living.

[271] Idaho Secretary of State. "The Great Seal of the State of Idaho." https://sos.idaho.gov/downloads/stateseal/ID-Seal-color.jpg
[272] Idaho Secretary of State. "Idaho State Seal History." https://sos.idaho.gov/elect/bluebook/Histseal.htm
[273] Photo courtesy of Centerra Gold.
[274] National Mining Association. "Economic Impact of Mining: Idaho." https://nma.org/pdf/state-map/id.pdf

Figure 42: The Role of Nonfuel Minerals in the U.S. Economy[275]



Minerals in Energy Technology

Conductive metals are used in electronic components for modern technologies. As renewable energy technology advances, demand for minerals is rapidly increasing. For instance, copper is used in the wiring of solar panels and is a critical component to function for wind turbines. Minerals are also vital for the development of EVs. Lithium, cobalt, manganese, and nickel are used in the lithium-ion batteries and the wiring that power EVs. Rare-earth elements are requisite for electronics such as smartphones, tablets, and nuclear reactor components.

Idaho has a reserve of naturally occurring raw critical minerals which contributes to the integrity of the national economy and plays an integral role in domestic supply chains, especially in light of federal Buy America requirements. In 2022, the U.S. Geological Survey, released a list of minerals deemed critical to national security for the U.S. This list changes with time as supply and society's needs shift. Idaho is home to many of these critical minerals, notably cobalt. Additionally, deposits of critical minerals, such as antimony, are in the permitting and exploration process.[276]

[275] U.S. Geological Survey. "Mineral Commodity Summaries 2024." https://pubs.usgs.gov/periodicals/mcs2024/mcs2024.pdf
[276] U.S. Geological Survey. "U.S. Geological Survey Releases 2022 List of Critical Minerals". https://www.usgs.gov/news/national-news-release/us-geological-survey-releases-2022-list-critical-minerals#:~:text=The%202022%20list%20of%20critical%20minerals%20includes%20the,ceramics%2C%20glass%2C%20metallurgy%2C%20and%20polishing%20compounds%20More%20items

Minerals in Manufacturing

Minerals are one of the most important raw materials used in manufacturing. For instance, platinum is used in over 20% of manufactured goods. To produce more manufactured goods domestically, more minerals and metals are needed to supply that demand. Aluminum, iron ore, steel, and titanium are fundamental components of most metallic manufactured goods. In 2023, mined materials contributed $3.864 trillion in value to the U.S. GDP, a 6% increase from 2022.[277]

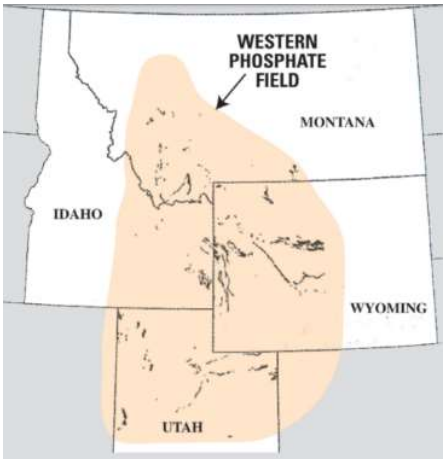
Minerals in Construction

Sand and gravel are the basic building blocks for all construction materials. Aggregate is used to pave roadways, create concrete building foundations, and serves important environmental functions like drainage for stormwater. Natural aggregates (construction sand and gravel and crushed stone) make up the largest component of nonfuel mineral materials consumed in the U.S.[278] Concrete is essential for the construction and long-term reliability of energy projects. Mineral materials used in construction are important to Idaho's construction industry, which employs nearly 88,000 Idahoans in 2021.[279]

Minerals in Agriculture

Minerals and agriculture share a common interest: fertilizer. Mineral fertilizer is essential to the productivity of farmland as the balance of minerals in soil is required for the growth and development of plant life. Phosphorus, calcium, and sulfur are some of the most common nutrient elements used for plant growth. Southeastern Idaho is home to one of the largest sources of phosphate ore in the U.S. This industry alone has contributed nearly $500 million to Idaho's economy and has distinguished itself as the largest mineral industry in the state.[280] Calcium is mined primarily from limestone deposits in Idaho. Small sulfur deposits throughout the state also contribute to the agricultural industry in Idaho.

Figure 43. Phosphate Reserves in Southeastern Idaho



Phosphate is a naturally occurring non-renewable mineral that plays a critical role in the agricultural industry. Phosphate is used in fertilizer, feed, and herbicides. The Western Phosphate Field, spanning 350,000 km across 4 states, is responsible for 30% of phosphate reserves and 12-14% of phosphate production in the United States. 4 of the 5 mines in this reserve are in Idaho.[281]

[277] U.S. Geological Survey. "Mineral Commodity Summaries 2023." https://pubs.usgs.gov/periodicals/mcs2023/mcs2023.pdf
[278] U.S. Geological Survey. "Materials in Use in U.S. Interstate Highways." https://pubs.usgs.gov/fs/2006/3127/2006-3127.pdf
[279] University of Idaho Extension Indicators. "Idaho: Employment by Industry." http://indicatorsidaho.org/DrawRegion.aspx?RegionID=16000&IndicatorID=17
[280] Idaho Geological Survey. "Idaho Mining and Geology." https://www.idahogeology.org/pub/GeoNotes/geonote_40.pdf
[281] U.S. Geological Survey. "Western Phosphate Field, U.S.A.: Science in Support of Land Management." https://pubs.usgs.gov/fs/fs-100-02/FS-100-02-508.pdf

Appendix A: List of Idaho Utilities

Investor-Owned Utilities

Avista Utilities	800-227-9187
Dominion Energy (formerly Questar)	800-323-5517
Idaho Power Company	800-488-6151
Intermountain Gas	800-548-3679
Rocky Mountain Power	888-221-7070

Municipal Electric Utilities

Albion Light and Water Plant	208-673-5352
Bonners Ferry Light and Water	800-626-4950
Burley Electric Department	208-878-2224
Declo Municipal Electric Department	208-654-2124
Heyburn Electric Department	208-679-8158
Idaho Falls Power	208-612-8280
Minidoka Electric Department	208-531-4101
Plummer Electric Department	208-686-1641
Rupert Electric Department	208-436-9600
Soda Springs Electric Light and Power	208-547-2600
Weiser Electric Department	208-414-1964

Rural Electric Cooperatives

Bonneville Power Administration	800-282-3713
Atlanta Power	208-459-7014
Clearwater Power	888-743-1501
East End Mutual Electric	208-436-9047
Fall River Rural Electric	800-632-5726
Farmers Electric	208-436-6384
Idaho County Light and Power	877-212-0424
Inland Power and Light	800-747-7151
Kootenai Electric Cooperative	800-240-0459
Lost River Electric Cooperative	208-588-3311
Lower Valley Energy	800-882-5875
Northern Lights Incorporated	800-326-9594
Missoula Electric Cooperative	800-352-5200
Raft River Rural Electric	800-342-7732
Riverside Electric Cooperative	208-436-3855
Salmon River Cooperative	208-879-2283
South Side Electric	208-654-2313
United Electric Co-Op Inc.	208-679-2222
Vigilante Electric Cooperative	800-221-8271

Appendix B: OEMR Programs

Idaho Energy Efficiency and Conservation Block Grant Program
The Idaho Energy Efficiency and Conservation Block Grant program (Idaho EECBG) offered competitive subawards of up to $100,000 to rural cities and counties. This funding is helping local governments promote energy efficiency and conservation practices while addressing the needs of growing communities, reducing tax burdens, and keeping energy rates low.

Under Section 40552 of the Bipartisan Infrastructure Law (BIL) federal formula grants are allocated to states to support subgrant funding opportunities for local governments. In 2024, OEMR awarded subgrants to 14 rural cities and counties through a competitive application process and projects are currently underway.

Idaho EECBG Subrecipients

Subrecipient	Award Amount	Project Description
City of Ammon	$100,000.00	Energy efficient streetlights
Blaine County	$66,439.82	Smart thermostats, snow sensors, and electric vehicle
City of Cascade	$100,000.00	Geothermal plan, heat pumps
Clearwater County	$53,577.85	Energy efficient server
City of Hailey	$100,000.00	Solar photo-voltaic system
Horseshoe Bend	$100,000.00	Energy efficient wastewater pump
City of Lewiston	$100,000.00	Energy efficient lighting in public library
City of Marsing	$93,500.00	Energy efficient wastewater pump
City of Pierce	$43,026.51	Weatherization of City Hall
City of Preston	$100,000.00	Outdoor energy efficient lighting
Shoshone County	$79,454.94	Weatherization of City Hall.
City of St. Maries	$74,592.30	Energy efficient wastewater pump
Teton County	$23,514.00	A/C mini-split units, garage door sealing
City of Wilder	$100,000.00	A/C mini-split units in low-income housing

Idaho Energy Resiliency Grant Program
The Idaho Energy Resiliency Grant Program (ERGP) promotes strategic investments that achieve measurable enhancements to grid resilience, modernize grid infrastructure, and mitigate risks associated with increased electrification and disruptive events. Funded by both state and federal sources, ERGP aims to strengthen Idaho's electric grid.

Federal funding is available to electric grid operators, electricity storage operators, electricity generators, transmission owners and operators, distribution providers, and fuel suppliers through subawards under Section 40101(d) of the BIL – Preventing Outages and Enhancing the Resilience of the Electric Grid Formula Grants to States and Indian Tribes. In 2024, OEMR recommended seven utility projects to DOE for approval, with subgrants expected to be awarded by the end of 2024.

The first round of the state-funded ERGP Pilot Program concluded in fall 2024, during which over $4 million was allocated to ten utilities for a total of 16 projects. These projects included undergrounding transmission lines in high-risk fire areas, fire-resistant wrapping for power poles, acquiring a new masticator for vegetation management, and enhancing automation and remote switching capabilities through the installation of Supervisory Control and Data Acquisition (SCADA) and modern reclosers.

State Energy Loan Program
The State Energy Loan Program is one of OEMR's longest running and widely used programs. Since the 1980s, it has provided low-interest loans to support energy projects for homes and businesses throughout Idaho. Eligible projects under the program include:

- HVAC replacement
- Efficient lighting
- Insulation
- Windows
- Weatherization
- Appliances
- Renewable energy projects

Borrowers can request up to $30,000 for single-family homes. A loan cannot be provided for energy retrofits that have already been completed or for new construction projects. All loans are assessed by a financial institution for creditworthiness and must be secured by real estate. A credit analysis fee of $100 applies to all loan applicants. Consumers can enhance their financing by accessing utility incentives, as well as federal and state tax credits and deductions, if available. Applications are accepted annually until the maximum funding amount is reached.

Government Leading by Example Program
The Government Leading by Example Program (GLBE) provides financial assistance to rural communities to conduct energy audits to discover potential efficiency upgrades within publicly owned facilities to save taxpayer dollars. OEMR continues to work with The University of Idaho's Integrated Design Lab. The Integrated Design Lab conducts a Level 1 American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) energy audit.

Upon completing the energy audit, a report is generated that informs the applicant and OEMR of recommended energy efficiency upgrades. Regularly, OEMR works with the applicant to identify funding sources to complete these upgrades. Energy upgrades that are often identified include:

- Building weatherization
- Lighting retrofits
- Insulation replacement/ upgrade
- Heating/Cooling unit replacement/ upgrade
- HVAC system repair
- Room/attic ventilation

Applications are accepted year-round until annual funding is expended.

Idaho Awards for Leadership in Energy Efficiency

The Idaho Awards for Leadership in Energy Efficiency Program recognizes businesses, industrial facilities and government organizations in Idaho for their achievements in reducing energy consumption and costs. Organizations are recognized for their efforts to minimize energy use through improved operational processes and behavioral changes, as well as upgrading their facilities with cost-effective and efficient technologies.

The awards are divided into three categories: small business, large business, and government entities, and four geographic regions: north, central, southwest, and southeast. An award is presented in each category within each region. Applications are evaluated based on the total electric and gas energy use, along with any physical or programmatic changes made.

From the applications received, one is selected to receive the Governor's Award for Leadership in Energy Efficiency, which recognizes the applicant that has made the most significant strides in reducing their energy use over the past year. Applications will reopen in Spring 2025.

National Electric Vehicle Formula Program

The National Electric Vehicle Infrastructure Program (NEVI) was enabled through the BIL and established by the Federal Highway Administration to provide states with federal funding to strategically deploy EV direct current fast charging stations (DCFC) and establish an interconnected network of EV charging across the U.S. Throughout Fiscal Years 2022-2026, Idaho is receiving approximately $29 million to install DCFC along designated Alternative Fuel Corridors and in rural and disadvantaged areas.

The Interagency Working Group (IAWG) leading Idaho's NEVI program consists of OEMR, ITD, and DEQ. In 2024, IAWG developed a Siting, Feasibility, and Access Study that is informing the strategic buildout of charging infrastructure and funding rounds. The IAWG will release a Request for Qualifications to identify and select qualified firms to participate in the first round of the Idaho NEVI program. Following the RFQ phase, The IAWG will release a Request for Applications to solicit applications for the Round 1 DCFC sites in Lewiston, Bliss, and Pocatello in early 2025.

Appendix C: Publications

Idaho State Energy Security Plan [2024]
The State Energy Security Plan 1) addresses all energy sources and regulated and unregulated energy providers, 2) provides a state energy profile, including an assessment of energy production, transmission, distribution, and end-use, 3) addresses potential hazards to each energy sector or system, 4) provides a risk assessment of energy infrastructure and cross-sector interdependencies, 5) provides a risk mitigation approach to enhance reliability and end-use resilience, and 6) addresses (A) multi-state and regional coordination, planning and response; and (B) coordination with Indian Tribes with respect to planning and response.

- The 2024 State Energy Security Plan can be found at: https://oemr.idaho.gov/financial-information/reports-and-publications/

ISEA Alternative Fuels Task Force Report [2023]
The report discusses the availability, economics, regulations, tax policy, and vehicle efficiencies with each alternative fuel, while acknowledging the barriers and recognizing the benefits associated with each alternative fuel type. The goal of this report is to provide information that allows readers to draw their own conclusions about areas where Idaho could improve its transportation sector and economy by incentivizing the adoption of alternative-fuel vehicles and the growth of alternative-fuel production capacity.

- View the 2023 ISEA Alternative Fuels Task Force Report here: https://oemr.idaho.gov/wp-content/uploads/ISEA-Alternative-Fuels-Task-Force-Report_FINAL.pdf

ISEA Reliability and Resiliency Task Force Report [2023]
The report reviews the opportunities and barriers to enhance energy reliability and resiliency in Idaho. This report 1) discusses the importance of energy reliability and resiliency for the State's economy and overviews Idaho's energy risk profile, energy emergency planning documents, and legal authorities, 2) reviews current state, local, federal, and private sector efforts to enhance reliability and resilience, 3) considers opportunities and challenges to further improve reliability and resilience in Idaho, including: funding, planning, investment in infrastructure modernization, vegetation management, cybersecurity, supply chain constraints, and permitting and siting constraints, and 4) discusses the importance of cost-effective investment in the state's energy infrastructure.

- View the 2023 ISEA Reliability and Resiliency Task Force Report here: https://oemr.idaho.gov/wp-content/uploads/ISEA-Reliability-and-Resiliency-Task-Force-Report_-FINAL.pdf

ISEA Utility-scale Storage Task Force Report [2023]
This report presents the opportunities and options for enhancing storage within Idaho. The report provides an introduction into utility-scale storage for the state but does not provide distinct recommendations. While most recent discussions of storage have focused on battery technologies, this report provides a full overview of options for the state including the integration of mechanical storage technologies including pumped hydro, electrical and electrochemical storage in the form of batteries and supercapacitors, and thermal storage. The report also

provides insight into the different scenarios and applications where storage can support grid operation.

- View the 2023 ISEA Utility-scale Task Force Report here: https://oemr.idaho.gov/wp-content/uploads/ISEA-Utility-Scale-Storage-Task-Force-Report_FINAL.pdf

OEMR Monthly Newsletter

OEMR releases a monthly newsletter covering news, programs, funding opportunities, upcoming events, and more.

- Sign up for the Monthly Newsletter at: https://oemr.idaho.gov/sign-up-for-our-newsletters/

OEMR Weekly Funding Opportunities Newsletter

OEMR releases a weekly newsletter sharing the latest funding opportunities relevant to energy and mining.

- Sign up for the Weekly Grants Newsletter at: https://oemr.idaho.gov/sign-up-for-our-newsletters/

State of Idaho NEVI Plan [2024]

The Idaho NEVI Plan outlines the State's plan for coordinated, strategic, and responsible deployment of EV charging infrastructure in Idaho consistent with the federal NEVI Formula Program requirements and the State's vision and goals.

- The NEVI Plan can be found at: https://www.evidaho.org/resources

Glossary

Average megawatt (aMW): An average megawatt is the amount of electricity produced by the continuous production of one megawatt over a period of one year. The term, sometimes also called average annual megawatt, defines power production in megawatt increments over time. Because there are 8,760 hours in a year, an average megawatt is equal to 8,760 megawatt-hours.

Baseload: The minimum amount of electric power or natural gas delivered or required over a given period at a steady rate. The minimum continuous load or demand in a power system over a given period.

British Thermal Units (BTUs): British Thermal Unit is a traditional unit of energy equal to about 1,055 joules. Production of 1 kWh of electricity generated in a thermal power plant requires about 10,000 BTUs. 1 gallon gasoline ≈ 125,000 BTUs.

Bulk power system: Facilities and control systems necessary for operating an interconnected electric energy transmission network (or any portion thereof) and electric energy from generation facilities needed to maintain transmission reliability.

Capacity (electric): The maximum power that can be produced by a generating resource at specified times under specified conditions.

Capacity (gas): The maximum amount of natural gas that can be produced, transported, stored, distributed or utilized in a given period of time under design conditions.

Cogeneration (CHP): The simultaneous production of heat (usually in the form of hot water and/or steam) and power utilizing one primary fuel. Cogeneration is often used to produce power as a secondary use of the waste steam/heat from a primary industrial process.

Conservation: Demand-side management (DSM) strategy for reducing generation capacity requirements by implementing programs to encourage customers to reduce their energy consumption. Program examples include incentives/savings for the installation of energy efficient appliances, lighting and electrical machinery, and weatherization materials.

Cooperative electric utility (Co-op): Private, not-for-profit electric utility legally established to be owned by and operated for the benefit of those using its service. It will generate, transmit and/or distribute supplies of electric energy to cooperative members. Such ventures are generally exempt from federal income tax laws. Many were initially financed by the Rural Electrification Administration, U.S. Department of Agriculture.

Cost-effective: Cost-effectiveness of an energy measure means that the lifecycle energy, capacity, transmission, distribution, and other quantifiable savings to residents and businesses exceed the direct costs of the measure to the utility and participant.

Demand: The amount of power consumers require at a particular time. Demand is synonymous with load. It is the amount of power that flows over a transmission line at a particular time. System demand is measured in megawatts.

Demand-side management (DSM): The term for all activities or programs undertaken by an electric system to influence the amount and timing of electricity use. Included in DSM are the planning, implementation and monitoring of utility activities that are designed to influence

customer use of electricity in ways that will produce desired changes in a utility's load shape such as, among other things, direct load control, interruptible load and conservation.

Distribution (electrical): The system of lines, transformers and switches that connect the high-voltage bulk transmission network and low-voltage customer load. The transport of electricity to ultimate use points such as homes and businesses. The portion of an electric system that is dedicated to delivering electric energy to an end user at relatively low voltages.

Distribution (gas): Mains, service connections and equipment that carry or control the supply of natural gas from the point of local supply to and including the sales meters.

Distributed generation: Electric power produced other than at a central station generating unit, such as that using fuel cell technology or on-site small-scale generating equipment.

Electric utility: A corporation, person, agency, authority or other legal entity that owns and/or operates facilities for the generation, transmission, distribution or sale of electric energy primarily for use by the public. Facilities that qualify as co-generators or small power producers under the Public Utility Regulatory Policies Act (PURPA) are not considered electric utilities.

Electricity generation: The process of producing electric energy by transforming other forms of energy such as steam, heat or falling water. The amount of electric energy produced is expressed in kilowatt-hours or megawatt-hours.

Electricity transmission congestion: Transmission congestion results when transmission lines reach their maximum capacity, so no additional power transactions can take place, regardless of power needs. Attempting to operate a transmission system beyond its rated capacity is likely to result in line faults and electrical fires, so this can never occur. The only ways the congestion can be alleviated are to tune the system to increase its capacity, add new transmission infrastructure, or decrease end-user demand for electricity.

Energy efficiency: The utilization of technology that consumes less energy while providing sufficient service.

Forecasting: The process of estimating or calculating electricity load or resource production requirements at some point in the future.

Generator nameplate capacity (installed): The maximum rated output of a generator or other electric power production equipment under specific conditions designated by the manufacturer. Installed generator nameplate capacity is commonly expressed in megawatts and is usually indicated on a nameplate physically attached to the generator.

Grid: The layout of the electrical transmission system or a synchronized transmission network.

Independent power producers (IPPs): A non-utility power generating entity, defined by the 1978 Public Utility Regulatory Policies Act, that typically sells the power it generates to electric utilities at wholesale prices.

Integrated Resource Plan (IRP): A plan that IOUs produce for regulators and customers to share their vision of how to meet the growing need for energy. These plans contain a preferred portfolio of resource types and an action plan for acquiring specific resources to meet the needs of customers including conservation measures. Specific resources will be acquired as individual projects or purchases and, when appropriate, through a formal request for proposals process.

Interconnection: A link between power systems enabling them to draw on one another's reserves in times of need to take advantage of energy cost differentials resulting from such facts as load diversity, seasonal conditions, time-zone differences and shared investments in larger generating units.

Interstate pipeline: A natural gas pipeline company that is engaged in the transportation of natural gas across state boundaries and is therefore subject to FERC jurisdiction and/or FERC regulation under the Natural Gas Act.

Investor-owned Utility (IOU): A utility that is a privately owned, often publicly traded corporation whose operations are regulated by federal and state entities.

Kilowatt (kW): A unit of electrical power or capacity equal to one thousand watts.

Kilowatt-hour (kWh): A unit of electrical energy that is equivalent to one kilowatt of power used for one hour. One kilowatt-hour is equal to 1,000 watt-hours. An average household will use between 800 and 1,300 kWhs per month, depending upon geographical area.

Load: The amount of electric power delivered or required at any specific point or points on a system. The requirement originates at the energy-consuming equipment of the consumers. The load of an electric utility system is affected by many factors and changes on a daily, seasonal and annual basis, typically following a general pattern. Electric system load is usually measured in megawatts (MW). It is synonymous with demand.

Megawatt (MW): A unit of electrical power equal to 1 million watts or 1,000 kilowatts. Plant power output is typically measured in megawatts.

Megawatt-hour (MWh): One million watt-hours of electric energy. A unit of electrical energy that equals one megawatt of power used for one hour.

Metering: Use of devices that measure and register the amount and/or direction of energy quantities relative to time.

Microgrid: A small network of electricity users with a local source of supply that is usually attached to a centralized national grid but is able to function independently.

Municipal utility (Muni): A utility owned and operated by a municipality or group of municipalities.

Network: An interconnected system of electrical transmission lines, transformers, switches and other equipment connected in such a way as to provide reliable transmission of electrical power from multiple generators to multiple load centers.

Peak demand: The maximum load during a specified period of time.

Pipeline system: A collection of pipeline facilities used to transport natural gas from source of supply to burner tip, including gathering, transmission or distribution lines, treating or processing plants, compressor stations and related facilities.

Power plant: A plant that converts mechanical energy into electric energy.

Regional Transmission Organization (RTO): A proposal advanced by FERC to establish regional groups to expedite the coordination of wholesale wheeling. The group is voluntary in each

region and may include transmission system owners, wholesale purchasers and independent power generators.

Reliability: the ability of the bulk power system to withstand sudden disturbances while avoiding uncontrolled cascading blackouts or damage to equipment.

Renewable resource: An energy source that is continuously or cyclically renewed by nature, including solar, wind, hydroelectric, geothermal, biomass or similar sources of energy.

Resiliency: The ability to avoid, prepare for, minimize, adapt to, and recover from anticipated and unanticipated energy disruptions.

Resource adequacy: The ability of a power system to supply enough electricity, at the right locations, to keep the lights on during all hours of the year. This means system planners must ensure the mix of resources can meet demand during hot summer afternoons and cold winter nights.

Service area: The territory in which a utility system is required or has the right to supply service to ultimate customers.

Substation: Equipment that switches, changes or regulates electric voltage. An electric power station that serves as a control and transfer point on an electrical transmission system. Substations route and control electrical power flow, transformer voltage levels and serve as delivery points to industrial customers.

Tariff: A document filed by a regulated entity with either a federal or state commission, listing the rates the regulated entity will charge to provide service to its customers as well as the terms and conditions that it will follow in providing service.

Thermal generation: The production of electricity from plants that convert heat energy into electrical energy. The heat in thermal plants can be produced from a number of sources such as coal, oil or natural gas.

Transmission: The network of high-voltage lines, transformers and switches used to move electrical power from generators to the distribution system (loads). This network is utilized to interconnect different utility systems and independent power producers together into a synchronized network.

Turbine: The part of a generating unit usually consisting of a series of curved vanes or blades on a central spindle that is spun by the force of water, steam or heat to drive an electric generator. Turbines convert the kinetic energy of such fluids to mechanical energy through the principles of impulse and reaction or a measure of the two.

Volt: A unit of measurement of electromotive force or electrical potential. It is equivalent to the force required to produce a current of one ampere through a resistance of one ohm. Typical transmission level voltages are 115 kV, 230 kV and 500 kV.

Watt: A measure of real power production or usage equal to one joule per second.