

2019 INTEGRATED RESOURCE PLAN (IRP) REFERENCE SHEET

2019– 2038

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What is the IRP?

A comprehensive look at the present and future needs of Idaho Power’s system, as well as a plan to meet those needs.

Goals

1. Identify sufficient resources to reliably serve the growing demand for energy and system flexibility within Idaho Power’s service area throughout the 20-year planning period.
2. Ensure the selected resource portfolio balances cost, risk, and environmental concerns.
3. Give equal and balanced treatment to supply-side, demand-side, and transmission resources.
4. Involve the public in the planning process in a meaningful way.

Process

1. Forecast the needs of Idaho Power’s system (energy, peaking capacity, and flexible capacity).
2. Examine current supply- and demand-side resources.
3. Determine whether Idaho Power’s current resources will meet forecasted system needs.

4. If they will not, determine what resources Idaho Power can use to make up shortfalls.
5. Determine which combination of existing and new resources is best to serve future system needs, based on the goals.

2017 IRP

Preferred Portfolio (P7) Resources

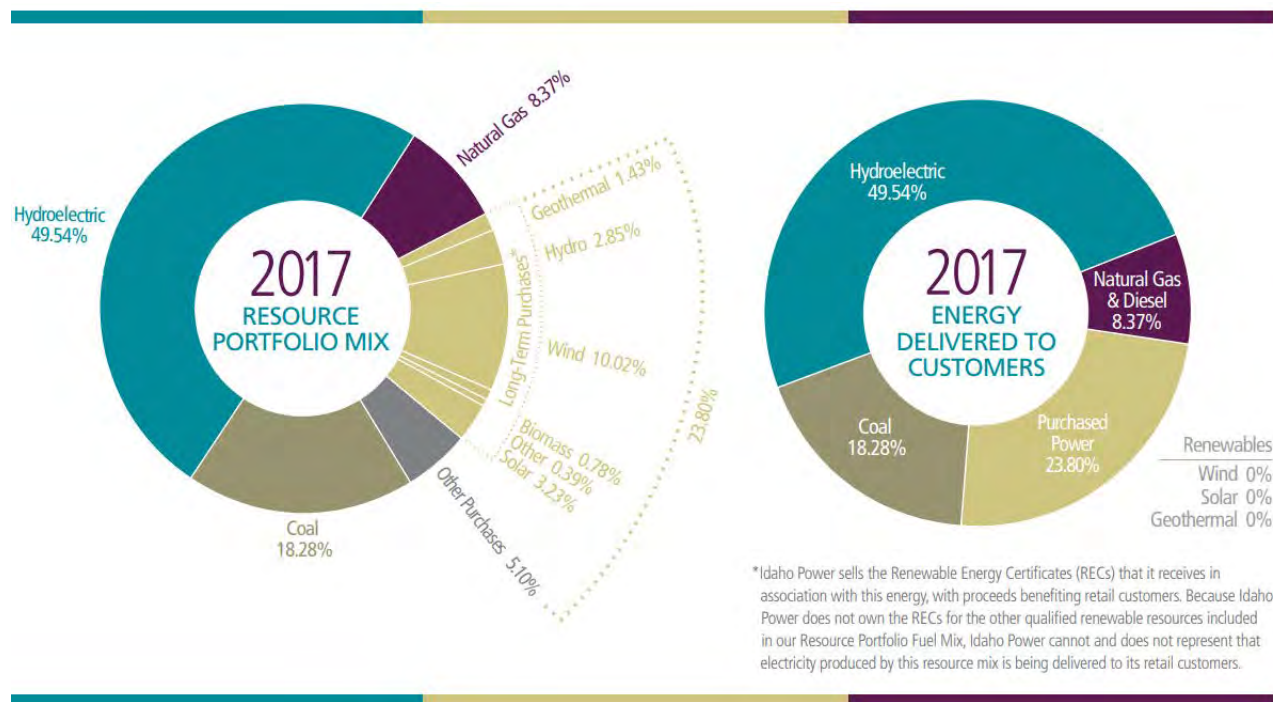
Date	Resource	Installed Capacity
2026	B2H	500 MW transfer capacity, Apr–Sep 200 MW transfer capacity, Oct–Mar
2031	Reciprocating engines	36 MW
2032	Reciprocating engines	36 MW
2033	CCCT (1x1)	300 MW
2035	Reciprocating engines	54 MW
2036	Reciprocating engines	54 MW

Five-Year Action Plan (2017–2021)

Year	Resource	Action	Action Number
2017–2018	EIM	Continue planning for western EIM participation beginning in April 2018.	1
2017–2018	Loss-of-load and solar contribution to peak	Investigate solar PV contribution to peak and loss-of-load probability analysis.	2
2017–2019	North Valmy Unit 1	Plan and coordinate with NV Energy Idaho Power's exit from coal-fired operations by year-end 2019. Assess import dependability from northern Nevada.	3
2017–2021	Jim Bridger units 1 and 2	Plan and negotiate with PacifiCorp and regulators to achieve early retirement dates of year-end 2028 for Unit 2 and year-end 2032 for Unit 1.	4
2017–2020	B2H	Conduct ongoing permitting, planning studies, and regulatory filings.	5
2018–2026	B2H	Conduct preliminary construction activities, acquire long-lead materials, and construct the B2H project. In-service date of 2024 or later.	6
2017–2021	Boardman	Continue to coordinate with PGE to achieve cessation of coal-fired operations by year-end 2020 and the subsequent decommission and demolition of the unit.	7
2017–2021	Gateway West	Conduct ongoing permitting, planning studies, and regulatory filings.	8
2017–2021	Energy efficiency	Continue the pursuit of cost-effective energy efficiency.	9
2017–2021	Carbon emission regulations	Continue stakeholder involvement in CAA Section 111(d) proceedings, or alternative regulations affecting carbon emissions.	10
2017–2021	North Valmy Unit 2	Plan and coordinate with NV Energy Idaho Power's exit from coal-fired operations by year-end 2025.	11

Current Resources

Supply Side



Demand Side

Demand-side resources are the first selected resources in each IRP. No supply-side generation resource is considered as part of Idaho Power's plan until all future cost-effective, achievable potential energy efficiency and forecasted demand response is accounted for and credited against future loads.

A complete review of Idaho Power's DSM programs, evaluations, and cost-effectiveness can be found in the 2016 annual report, *Demand-Side Management 2016 Annual Report; Supplement 1: Cost-Effectiveness*; and *Supplement 2: Evaluation*, which are all available on Idaho Power's website at idahopower.com/EnergyEfficiency/reports.cfm.

Common Terms

AURORA—A software tool used to model the energy market. This tool models resource operations and costs for the IRP planning period.

Capacity—The maximum amount of power an element of the power system can handle or produce. Measured in megawatts (MW). 1,000,000 watts = 1,000 kW = 1 MW

Current—How electricity moves. Measured in amperes (A).

Customer generation—Small energy-making devices connected to the distribution system (e.g., rooftop solar). Previously called net metering.

Demand response (DR)—Programs that help customers use less energy when energy is most used by everyone (peak demand). These programs help delay or keep Idaho Power from building new resources to meet energy needs.

Demand-Side Resource—Consists of energy efficiency or demand response resources.

Distribution line—Lines that move lower voltages of energy to individual customers.

Energy efficiency—Ways to use less energy, such as using LEDs instead of incandescent light bulbs.

Levelized cost of capacity (LCOE)—A number used to compare the fixed costs (costs that don't change) of resources. The LCOE is the amount (in dollars per kW) a resource will cost over its useful lifetime, averaged out by month. These costs include the initial resource investment and associated capital cost and fixed O&M estimates.

Levelized cost of energy (LCOE)—A number used to compare the costs of resources. The LCOE represents the estimated annual cost (in dollars per MWh) of a resource, assuming that resource creates a certain amount of energy (called its capacity factor) over its useful lifetime. The LCOE includes the capital cost, non-fuel O&M, fuel, integration costs, and wholesale energy for transmission and storage resources.

Loss-of-load expectation (LOLE)—The number of hours annually that, over time, supply is expected to not meet demand.

Loss-of-load probability (LOLP)—How likely it is there will not be enough energy (e.g., 1 day in 10 years). This is not allowed to be higher than 5 percent.

Market purchases—Energy Idaho Power buys from the market.

Peak demand—The highest amount of power used at one time. This is when our customers use the most energy, usually in the summer. Measured in megawatts (MW). Our all-time peak demand is 3,422 MW and occurred on July 7, 2017.

Portfolio—A group of resources. Idaho Power analyzes multiple portfolios to see which best meets its IRP needs.

Renewable energy certificate (REC)—Certificates that represent the renewable (or “green”) attributes of energy produced by certain resources, such as wind or solar. One MW of energy generated also generates one REC. When Idaho Power receives RECs, it sells them, and the proceeds benefit retail customers.

Renewable portfolio standard (RPS)—A government policy requiring a minimum amount (usually a percentage) of the electricity a utility delivers to customers to come from qualified renewable energy sources. Idaho does not have an RPS.

Substation—Converts high-voltage energy to lower voltages while protecting power lines.

Total resource cost (TRC) test—A test that compares the benefits of a demand-side management program to the costs of that program.

Transmission line—Lines that move higher voltages of energy.

Supply-Side Resource—Consists of Idaho Power-owned generation resources, such as hydroelectric and natural gas facilities, as well as other generation resources, including market purchases and independent producers that sell to Idaho Power, such as wind, solar and geothermal projects.

Voltage—The pressure that moves electricity. Measured in kilovolts (kV) for power lines.

Acronyms and Abbreviations

A/C—Air Conditioning

AC—Alternating Current

AEG—Applied Energy Group

AEO—Annual Energy Outlook

AFUDC—Allowance for Funds Used During Construction

AgI—Silver Iodide

akW—Average Kilowatt

aMW—Average Megawatt

ATC—Available Transmission Capacity

B2H—Boardman to Hemingway

BLM—Bureau of Land Management

BPA—Bonneville Power Administration

BSER—Best System of Emissions Reduction

CAA—*Clean Air Act of 1970*

CAISO—California Independent System Operator

CAMP—Comprehensive Aquifer Management Plan

CCCT—Combined-Cycle Combustion Turbine

cfs—Cubic Feet per Second

CHP—Combined Heat and Power

CHQ—Corporate headquarters

Clatskanie PUD—Clatskanie People's Utility District

CO₂—Carbon Dioxide

COE—United States Army Corps of Engineers

CREP—Conservation Reserve Enhancement Program

CSPP—Cogeneration and Small-Power Producers

CWA—*Clean Water Act of 1972*

D.C.—District of Columbia

DC—Direct Current

DER—Distributed Energy Resources

DOE—Department of Energy
DSM—Demand Side Management
EEAG—Energy Efficiency Advisory Group
EGU—Electric Generating Unit
EIA—Energy Information Administration
EIM—Energy Imbalance Market
EIS—Environmental Impact Statement
EPA—Environmental Protection Agency
ESA—*Endangered Species Act of 1973*
ESPA—Eastern Snake River Plain Aquifer
ESPAM—Enhanced Snake River Plain Aquifer Model
F—Fahrenheit
FCRPS—Federal Columbia River Power System
FERC—Federal Energy Regulatory Commission
FPA—*Federal Power Act of 1920*
FWS—US Fish and Wildlife Service
GWh—Gigawatt-Hour
GWMA—Ground Water Management Area
HCC—Hells Canyon Complex
HRSG—Heat Recovery Steam Generator
IDWR—Idaho Department of Water Resources
IGCC—Integrated Gasification Combined Cycle
INL—Idaho National Laboratory
IPUC—Idaho Public Utilities Commission
IRP—Integrated Resource Plan
IRPAC—IRP Advisory Council
IWRB—Idaho Water Resource Board
kV—Kilovolt
kW—Kilowatt
kWh—Kilowatt-Hour
LCOC—Levelized Cost of Capacity
LCOE—Levelized Cost of Energy
LiDAR—Light Detection and Ranging
LOLE—Loss-of-Load Expectation
LOLP—Loss-of-Load Probability
LTP—Local Transmission Plan
m²—Square Meters
MATL—Montana–Alberta Tie Line
MOU—Memorandum of Understanding
MSA—Metropolitan Statistical Area

MW—Megawatt
MWh—Megawatt-Hour
NEEA—Northwest Energy Efficiency Alliance
NEPA—*National Environmental Policy Act of 1969*
NERC—North American Electric Reliability Corporation
NO_x—Nitrogen Oxide
NPV—Net Present Value
NREL—National Renewable Energy Laboratory
NTTG—Northern Tier Transmission Group
NWPCC—Northwest Power and Conservation Council
NWPP—Northwest Power Pool
O&M—Operation and Maintenance
OATT—Open Access Transmission Tariff
ODEQ—Oregon Department of Environmental Quality
ODOE—Oregon Department of Energy
OEMR—Office of Energy and Mineral Resources
OPUC—Public Utility Commission of Oregon
ORS—Oregon Revised Statute
pASC—Preliminary Application for Site Certificate
PCA—Power Cost Adjustment
PGE—Portland General Electric
PM&E—Protection, Mitigation, and Enhancement
PPA—Power Purchase Agreement
PURPA—*Public Utility Regulatory Policies Act of 1978*
PV—Photovoltaic
QA—Quality Assurance
QF—Qualifying Facility
RAAC—Resource Adequacy Advisory Committee
REC—Renewable Energy Certificate
RFP—Request for Proposal
RH BART—Regional Haze Best Available Retrofit Technology
ROD—Record of Decision
ROI—Return on Investment
ROR—Run-of-River
ROW—Right-of-Way
RPS—Renewable Portfolio Standard
SCCT—Simple-Cycle Combustion Turbine
SCR—Selective Catalytic Reduction
SIP—State Implementation Plan
SMR—Small Modular Reactor
SO₂—Sulfur Dioxide
SRBA—Snake River Basin Adjudication

SRPM—Snake River Planning Model
T&D—Transmission and Distribution
TEPPC—Transmission Expansion Planning Policy Committee
TES—Thermal Energy Storage
TRC—Total Resource Cost
UAMPS—Utah Associated Municipal Power Systems
US—United States
USBR—Bureau of Reclamation
USFS—United States Forest Service
VRB—Vanadium Redox-Flow Battery
WDEQ—Wyoming Department of Environmental Quality
WECC—Western Electricity Coordinating Council