

Securing Idaho's Energy Future: *The Role of Energy Efficiency and Renewables*



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The Role of Energy Efficiency
and Natural Resources

EXECUTIVE SUMMARY

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ABOUT THIS REPORT

This study was authored by the Athena Institute (www.athenacompany.com), an independent firm providing research, consulting, and events for those seeking strategic advantage from clean and sustainable innovations. Athena helps businesses, buildings, utilities and regions find solutions that are more economically valuable, environmentally sound, and secure.

The study was commissioned by Climate Solutions through a grant from the Energy Foundation. Climate Solutions is a non-profit organization dedicated to accelerating practical, profitable solutions to global warming and to building a powerhouse clean energy industry in the Northwest (Oregon, Washington, Idaho and Montana) that employs tens of thousands of people. Climate Solutions is working with leaders from Idaho's agricultural community, business sector and non-profit organizations on the Energy Independence for Idaho campaign, which is designed to advance homegrown renewable energy in Idaho.

Work on this study began in October 2007. Over the course of the next 8 months the study team gathered available consumption and resource potential data, generated preliminary outputs and facilitated extensive review. Earlier drafts of the study were sent to a number of people working on energy issues in Idaho. This included all members of the 25x'25 Renewable Energy Council while it was under the direction of Agriculture Director Celia Gould, renewable energy and energy efficiency experts, renewable energy developers, academicians working in the field of energy, business and agriculture leaders, members of the Idaho state legislature and public utilities commission and relevant agency staff. We provided them with an opportunity to review and comment on the contents of this study and consequently integrated much of the input we received. After the first round of review, we worked with a team of experts in the renewable energy and energy efficiency field to provide an extensive and in depth review of study content, facts and figures. Over the time frame of the study, upgraded information became available from the Energy Information Agency and other sources, and so the study was adjusted to include new estimates, where available.

This preliminary study was not scoped to include in-depth analysis and complex modeling around energy uses and sources that a true energy plan should entail. Instead, the study began to draw the relevant data about Idaho's energy options into one place and illustrate the benefits of a more aggressive look at natural resources and energy efficiency and stimulate discussion around the merits of specific resources. The study was also focused on the long-term energy security value of particular resources rather than their environmental attributes. Therefore, information around climate performance of a resource is not included except where those attributes have a significant impact on its economics or acceptance.

Responsibility for content, conclusions and any factual errors in the report remain with the authors. That noted, the authors gratefully acknowledge valuable review comments provided by a number of individuals, including: Milt Adam, Steve E. Aumeier, PhD, Stan Boyd, Dave Chase, Treena Colby, Mike Costanti, Beth Doglio, Amy Frykman, John Gardner, Doug Glaspey, Todd Haynes, Nancy Hirsh, Jim Kempton, Glenn Ikemoto, Winston Inouye, Brian Jackson, Suzanne Malakoff, Paul Mann, Patrick Mazza, Ken Miller, Dar Olberding, Tim Raphael, Rich Rayhill, Rhys Roth, John Steiner, Garth Taylor, Kiki Tidwell, Joe Weatherby, John Weber, and Bob Zemetra.

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STUDY OVERVIEW

The future of energy in Idaho is critical to the overall health and economic well-being of the state. Idaho has traditionally benefited from a strong, lower-cost energy portfolio. But the state now faces a serious threat to its economy in the form of rising energy costs and energy security issues associated with its heavy reliance on out-of-state imports of natural gas, coal and petroleum. At the same time, Idaho is rich in untapped natural resource and energy efficiency opportunities that could serve important roles in meeting the state's energy needs. Developing these in-state resources will not only reduce Idaho's dependence on fossil fuel imports, but bring substantial new jobs and revenue to the state.

Idaho recognizes its need for a clear vision and commitment to a secure energy future that is economically viable, environmentally sound, stable and secure; state leaders took a number of important steps in 2007 in this direction. An energy plan issued by the legislature outlined energy goals for the state, prioritizing renewable energy and energy efficiency resources. In addition, Governor Butch Otter recently established the Office of Energy Resources to oversee the state's energy planning, policy, conservation and coordination, thereby elevating energy policy to the highest levels of state government. The Governor also established Idaho's 25X'25 Council to create a strategy to supply 25 percent of Idaho's energy from renewable sources on Idaho's working lands by the year 2025. Finally, the Idaho Public Utilities Commission, along with other Idaho agencies, joined a nationwide effort to enhance energy security and protect the environment by encouraging public and private organizations to implement energy efficiency measures.

In light of this clear commitment by the state to address Idaho's energy portfolio, the purpose of this study is to provide Idaho citizens and decision makers with information on the natural resources and energy efficiency opportunities available in Idaho. To that end, this study examined the growth of Idaho's energy demand, the vulnerabilities in its current portfolio and the natural resources and energy efficiency opportunities that are technically and economically feasible for the state. To illustrate the rich store of in-state resources, it maps out the feasibility of moving from today's portfolio—which is 80 percent dependent on out-of-state imports—to a portfolio in which energy conservation is fully leveraged and a much greater share of Idaho's power comes from in-state natural resources by 2025. Recommendations provided in this report aim to facilitate robust development of these resources and opportunities and maximize the resulting economic benefits for Idaho communities.

Tapping only existing publicly available data, this report provides a high-level overview of some important concepts that should be explored in more depth as Idaho works towards its energy goals. To strengthen the state's knowledge of its in-state opportunities, further research will be needed, perhaps leading to different conclusions on certain types of resources. But the basic tenet remains: natural resources and energy efficiency should play a key role in Idaho's energy future.

HIGHLIGHTS OF KEY RESULTS

A number of key conclusions have emerged as a result of this study's research synthesis and analysis:

Idaho Consumes Significant Energy, Largely from Imports. Idahoans consume more energy per person than any other Northwest state or province. These energy needs are expected to grow; this study estimates statewide demand for all energy types will grow from 503 British Thermal Units (Btu) per year in 2004 to over 650 Btu/Yr in 2025. In 2007, Idahoans were spending \$3.7 billion annually for all forms of energy.¹ But because approximately 80 percent of Idaho's overall energy supply for electricity and fuels is imported from out of state, the state is sending billions of dollars to support the jobs and revenues of communities outside of Idaho.

Idaho's Current Energy Portfolio is Not Secure. Historically, energy has been thought of as plentiful and cheap in Idaho because of abundant hydroelectric resources and affordable, reliable gasoline, diesel and natural gas supplies. Idaho's primary in-state energy source continues to be hydropower, but the state has also built up a heavy reliance on coal, natural gas and petroleum imports as core elements in the energy portfolio. Increasing market pressures, however, are impacting the economics and capacity of all the resources Idaho relies upon, including issues such as a growing demand for energy, fossil fuel price volatility, restrictions on existing power generation, the growing likelihood of greenhouse gas regulation and further environmental constraints and increasing competition for natural gas resources. These dynamics – largely beyond the control of Idaho leaders - will take their toll on the state's energy portfolio, exposing residents, agriculture and industry to potentially substantial increases and volatility in fuel and power costs. This will negatively impact many sectors of Idaho's economy and populace that for decades have relied on stable, low-cost power.

Natural Resources and Energy Efficiency Could Play a Central Role. While Idaho may not be able to exert much influence on the markets outside forces that are impacting short- and long-term costs of energy, the state can nevertheless take charge of its energy security. Idaho can become more energy independent by developing local renewable resources and maximizing energy efficiency. Idaho is a large state with extensive natural resources and a relatively small—but growing—population base. Wind, geothermal, solar and biomass resources in the state are in abundance, thereby providing the opportunity for Idaho to develop the capacity to serve much of its electrical load with in-state sources over time. On the demand side, advances in energy efficient heating, cooling, power and transportation technologies are providing new options for optimizing the state's energy system. This strategy is also a natural extension of the state's identity; Idaho has a very strong sense of pride, independence and self-reliance. It has a long history of developing its natural resources in agriculture and mining industries. On a personal level, Idahoans place a high value on their unique quality of life and are very close to the land for both work and recreation.

There are Multiple Ways to Leverage Natural Resources and Efficiency. There are any number of technology and policy combinations that could enable Idaho to tap its natural resource and energy efficiency potential. To illustrate the significant potential for efficiency and renewable energy, this study generates three example scenarios that increase the share of in-state resources in the state's energy portfolio from about 20 percent today to 50 percent in 2025

The three scenarios:

- Envision Idaho replacing a portion of its petroleum usage with alternative fuels and vehicle electrification (including all-electric and hybrid electric vehicles, public transit electrification, etc.).
- Project different adoption levels for system efficiencies at the plant and distribution, and energy efficient end-use technology replacements, upgrades and conversions that yield 10, 20 or 30 percent reductions in total projected energy needs.
- Involve a significant commitment to wind and solar energy, continued development of geothermal and biofuels/biomass energy, and investment in efficiency upgrades at existing hydro facilities, as well as some microhydro projects.

The three scenarios differ in the degree of build-out of particular resources, with varying levels of wind, solar and bioenergy resource development in each scenario.

Table 1: Scenarios for Developing Natural Resources and Energy Efficiency in the State		
Portion of Estimated 653 Trillion Btu/Yr 2025 Demand		Example Scenarios of Energy Production Resources in Trillion Btu/Yr
Efficiency Assumption	50% In-State Natural Resources (TBtu/Yr)	
High Efficiency (30% or 195.9 TBtu/Yr)	228.6	99.6 Wind 42.0 Solar Electric/Solar Thermal 27.0 Geothermal Electric/Geothermal Direct 21.0 Biofuels/Biomass 39.0 Hydro (currently 38.8)
Medium Efficiency (20% or 130.6 TBtu/Yr)	261.2	116.6 Wind 47.0 Solar Electric/Solar Thermal 27.0 Geothermal Electric/Geothermal Direct 28.4 Biofuels/Biomass 42.2 Hydro
Low Efficiency (10% or 65.3 TBtu/Yr)	293.9	141.0 Wind 47.0 Solar Electric/Solar Thermal 27.0 Geothermal Electric/Geothermal Direct 33.5 Biofuels/Biomass 45.4 Hydro

The scenarios are based on analysis of existing data on Idaho’s resources and opportunities. However, that data is scarce in several areas; more robust and valid data would enable more refined projections of the realistic development potentials of the various resources.

The full economics of these portfolios are difficult to assess without more complete economic and operational modeling which was beyond the scope of the study. More in-depth analysis of these resources needs to be conducted which factors in specific resource economics, operational profiles, grid capacity and environmental impacts. In absence of full economic, operational, and risk analysis, we are not offering these scenarios forward as recommended

courses of action. They do serve illustrative purposes, however, and demonstrate the value to be had by undertaken more robust modeling that would look to harness the power resident locally in natural resources and energy efficiency.

It is true, though, that the costs of renewable energy and energy efficient technologies are generally declining relative to traditional energy sources over time, for a number of reasons:

- Costs for traditional sources continue to increase.
- Governments are implementing policies that encourage adoption, allowing renewables to achieve economies of scale.
- An influx of venture capital and institutional investment will continue to bring new innovation and positive movements down the costs curve.

Natural Resource Development and Energy Efficiency Would Also Bring Jobs and Revenue.

Not only would natural energy resources play a critical role in serving the needs for energy security, these projects and companies would bring jobs and revenue to the state's rural and urban communities. Development, management and delivery of larger scale renewable projects offer numerous family-wage jobs, many of these in rural areas. Distributed small-scale resources and energy efficiency projects create opportunities for information system integrators, engineering firms, installers and maintainers. Beyond the projects themselves, an active energy sector will also attract design and manufacturing firms specializing in these various technologies. In fact, the state is already beginning to attract significant solar (Hoku), biomass (Pacific Ethanol), geothermal (US Geothermal), and wind (Nordic Windpower) manufacturers and developers. Scaling up in-state renewable and energy efficiency resources could help control the cost of natural gas, the rising cost of which is impacting Idaho's agriculture producers because it is a primary factor that drives the costs of farm fertilizer. Finally, the success of these scenarios will increase tax revenues to counties and the state that could be used to strengthen infrastructure and local economies across Idaho.

Overall, this study has confirmed that the outlook for Idaho is positive. It demonstrates that taking into account energy efficiency and some transformation of the energy system, it may be possible to meet 50 percent of Idaho's energy demand with natural resources by 2025.

SUMMARY OF RECOMMENDATIONS

Idaho stands at a crucial energy and economic crossroads. There are several areas and opportunities for Idaho to increase its energy efficiency and in-state energy production. The following are specific recommendations that would put Idaho on the path to becoming energy independent, creating jobs and bolstering the local economy. The following section identifies a series of recommendations for the state to address its underlying needs for energy security.

1. Create a Statewide Energy Security Plan with clear strategies, targets and accountability for results.
2. Align state legislative policies, regulatory policies, and state agency activity under the Energy Security Plan.
3. Build Idaho's clean energy industry, develop its clean energy workforce and invest in innovation.

Leverage the Existing Momentum with a Clear Plan. Redirecting Idaho’s energy future to reduce imports aggressively is not trivial; developing natural resources and energy efficiency will require commitment. While transitioning the energy system in Idaho poses challenges, the growing interest in energy and energy security stands ready to be harnessed. Idaho is not starting from scratch; several key agencies and organizations have already spearheaded and developed plans and initiatives around energy, water and economic development. Coordination – or at least some sort of information sharing – amongst all parties interested and/or responsible for these initiatives is essential. Even more paramount to this effort is a statewide energy plan with clear expectations, targets and inputs from counties and communities, combined with an ongoing approach to update the energy plan. Developing this next generation of the Energy plan will take some education of policymakers and residents, many of whom may still be under the false impression that a notably large portion of statewide electric power is from hydro sources and that the state’s energy future is relatively secure. The plan should make a real commitment to a more specific path towards increasing domestic resources to cost-effectively achieve the 2025 goal. Policy should encourage utilities to strengthen integrated resource planning to be consistent with the statewide energy security plan. The plan should outline the key advances necessary to position the state to effectively compete for investment capital against others in the region, most of which have already moved ahead on renewable energy and fuels. Policy discussions and approaches should also focus on preparing for a future in which organizations will be charged for their fossil fuel emissions.

Align Key Government Activities to Bring Industry and Consumers Along. To further encourage investment from the private and public sectors, the state should look at sending strong signals to the market indicating Idaho’s commitment to developing natural resources and energy efficiency. Beyond producing the plan itself, the state should provide resources to administrate the plan and establish a link and expectations around the various state-agencies who can contribute to growing this opportunity. The state should also establish statewide initiatives concerning transmission capacity, smart grid technologies and T&D efficiency—all of which will aid in the transmission of renewable electricity. The state needs to facilitate development of appropriately sited renewable energy projects by establishing effective state and local transmission site and zone policies and leveraging its own lands and role in the overall transmission planning process. There should be strong incentives for the development and deployment of renewable generation technologies for both small-scale customer-owned and large-scale utility-owned facilities. By implementing the above and by building an open access electrical grid that allows for easy interconnections of smaller-scale renewable generators, Idaho would be in line to be an energy leader in renewables. And to lead the way, the state government should start by building markets for new renewable electricity generation by committing to run state government facilities on new renewables.

The state has a number of legislative tools to facilitate the development of new energy resources and energy efficiency. Specific renewable energy initiatives could encourage locally produced renewable electricity, fuels, fuel infrastructure, and energy efficiency implementations. This can be achieved through a Governor’s challenge, governmental department mandates, market incentives, renewable energy targets and/or standards for fuels and the power portfolio, appliance energy standards and more. Legislative action around economic incentives such as tax credits, tax exemptions and other investment incentives are needed to grow the adoption of renewable vehicle fuels and provide the fuel commodities and local infrastructure to deliver fuel to the consumer. Providing strong production incentive

payments for ethanol and biodiesel production and/or consumption will level the economic playing field with gasoline and diesel. Providing incentives for building up the Idaho biofuels delivery network will help guarantee a free market for biofuels and renewable fuels. Building markets for flex-fuel vehicles capable of operating on E85, other alternative fuel vehicles and fuel efficient vehicles such as hybrids through public fleet purchases and tax exemptions will also move the state towards making renewable vehicle fuels a market reality.

Commit to the Economic Potential of Clean Technology Jobs with Commercialization and Growth Support. Additionally, promoting and funding Idaho's universities, overall R&D and the collaboration of universities and industry around key technology areas and more general topics would ramp up the development and deployment of technologies within the state, leading to jobs and revenues from technology production and manufacturing. This leadership role could extend nationwide with the abundance of developing technologies both privately and in conjunction with Idaho National Laboratory. Key areas such as dairy waste to energy, biomass initiatives and other R&D capabilities regarding the farming and dairy industries (and their byproducts) would increase the long-term economic opportunity and vitality for one of Idaho's largest industries. Further developing and broadening Idaho's economy to include renewable energy and clean technology firms would also bring potential collaboration between traditional industries and newer clean tech companies in these areas.

A shift to emphasize local renewable resources and energy efficiency is an absolute must to keep Idaho economically prosperous and secure, and to secure more of the job growth and tax revenue gains that result from the development of local energy resources. With state and local leadership, with a commitment to planning and incentives, and with specific initiatives around renewable electricity and renewable fuels advances, the state can maximize and leverage the potential benefits from these important resources in Idaho's energy future.

¹ *Cascadia Scorecard* (2008), Sightline Institute