



Wood River
Electrical Plan

Prepared by
Delivery Planning
Department in
Cooperation with the
Wood River Electrical
Plan Community
Advisory Committee

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Acronyms/Definitions

BLM – U.S. Bureau of Land Management

CAC – Community Advisory Committee

KING – King Transmission Station, located in Hagerman

kV – kilovolts (thousands of volts). 1,000 volts = 1 kV

kW – kilowatts (thousands of watts). 1,000 watts = 1 kW

MPSN – Midpoint Substation, located south of Shoshone

MW – megawatt (millions of watts). 1,000,000 watts = 1 MW

SNRA – Sawtooth National Recreation Area

Station – A facility that provides transmission line switching *without* electrical transformation (voltage reduction) to distribution voltages that serve local area loads.

Substation – A facility that provides transmission line switching *with* electrical transformation (voltage reduction) to distribution voltages that serve local area loads.

USFS – U.S. Forest Service

WDRI – Wood River Transmission Station, located north of Hailey

WREP – Wood River Electrical Plan

Relationship between Power and Voltage – There are two quantities referred to in this report when describing the electrical system; Power and Voltage.

Power: the amount of work performed in one second. The term is used to express the electrical workload of the Wood River Valley and the capability of a transmission line to move electricity. Power is measured in watts (kilowatts and megawatts).

Voltage: A component of power that enables the power to flow on a transmission line. It is the “push” behind the power. In general, a higher voltage line can carry more power than a lower voltage line. Voltage is measured in volts at your household (110 and 220-v) and kilovolts in the transmission network (138-kV).

Executive Summary

Current Conditions

The Wood River Valley (the Valley) is a rapidly growing region and so is its demand for electricity. The population of the Valley is currently growing at a rate of over 2% per year with a projected population of over 76,000 at buildout. Along with the population growth, businesses and residents of the Valley are more dependent on electricity today than ever before. New technology increasingly drives the need for electricity and it will continue on into the foreseeable future. Where 25 years ago, few owned a personal computer (PC), now many residents have multiple personal computers. Many people work from home and are dependent on their PC and internet to do business. The construction of new homes to support a growing population continues, and in many cases, with increasing size and associated electrical demand. Most homes have more television sets now...and they are getting larger and consuming more energy. Most, if not all, businesses now have electronic or even computer-driven cash registers. And the wintertime ski industry, which is a substantial factor in the Valley's economy, depends on electricity for an increasing use of high-speed chair lifts and expanded snow-making. The importance of a reliable electrical system to skiing operations was even evident this past summer when snow-making equipment was used to protect Bald Mountain facilities during the Castle Rock fire. For these reasons, Idaho Power must be proactive in planning for new infrastructure to serve the needs of the Wood River Valley.

The Need

The existing electrical delivery systems and infrastructure do not adequately meet the Valley's current or future needs for dependable and adequate power.

The system lacks sufficient dependability due to several factors:

- The electrical system serving the North Valley has only one line and provides no redundancy (two separate lines that can handle extreme peak loads alone without rotational power outages)
- The electrical system south of Hailey has two lines, but neither line has the capability to provide 100% of the electricity needed for extreme peak loads without rotational power outages

The system lacks sufficient capacity to satisfy projected electricity needs:

- Current power demands at peak load are approximately 99.5 MW and future demand at buildout will be approximately 320 MW, using current usage patterns to project future use
- The current system capacity is about 120 MW
- The system needs 200 MW of increased capacity and delivery infrastructure to serve the Valley's buildout needs

Purpose of the Wood River Electrical Plan

The purpose of the Wood River Electrical Plan is to outline and prioritize improvements and additions to the high voltage transmission and substation infrastructure to address the Valley's "Need" from now through buildout. The development of the Plan was accomplished through a

cooperative effort with the Community Advisory Committee (CAC). The CAC consisted of 19 members representing Blaine County, the cities of Sun Valley, Ketchum, Hailey, Bellevue, Picabo and Carey, Blaine County planning administrators, private business/developers, area residents, the BLM, USFS and the Nature Conservancy. Lincoln County was also included due to the location of potential infrastructure improvements in Lincoln County that transmit power into the Valley. The Plan specifies locations for major transmission lines serving the Valley for many years to come and provides direction for the location of a new distribution/transmission substation to serve the southern part of the Valley. Individual projects resulting from this Plan will still require jurisdictional approval and will be put through a public siting process. This plan, however, will give the jurisdictions and citizens a heads-up as to where high-voltage transmission equipment may be located and allow them to plan accordingly.

In preparing the WREP, Idaho Power has also considered the effect that demand-side management could have on future load in the Wood River Valley. Idaho Power is committed to reducing electrical load through the use of demand-side management at all customer levels. In conjunction with activities outside Idaho Power's control – such as expected improvements in Idaho building standards, customer involvement, and energy efficiency technology advancements – Idaho Power expects new electrical load can be reduced by 20 to 30 percent. Actual reduction in power consumption will be taken into account as infrastructure improvements are implemented. However, even if new electrical load is reduced by 20 to 30 percent, new electrical infrastructure will still be required to serve the remaining new load since the existing electrical system is nearly out of capacity.

The Committee's Recommendations (see recommendations map; Figure 1)

Through the consensus agreement of the CAC, the WREP recommends the following infrastructure improvements and additions:

South Valley – South of Timmerman

- Develop a new substation south of Timmerman Hill to serve the south Valley load and to act as a switching station for new transmission.
- Construct a new 138,000-volt transmission line from Midpoint Station (near Shoshone) to the new substation south of Timmerman Hill. This line would be installed in parallel with Highway 75.
- Construct a new 138,000-volt transmission line from the new substation south of Timmerman Hill to Moonstone Substation (located east of Fairfield).
- Construct a new 138,000-volt transmission line from the new substation south of Timmerman Hill to Silver Substation (located near Picabo).
- Convert the existing King Transmission Station (located in Hagerman) to Moonstone Substation (located east of Fairfield) 138,000-volt transmission line to 230,000-volts. This will increase its capability.

Mid Valley – Timmerman to Hailey

- Improve the capability of the existing 138,000-volt transmission lines feeding from Silver Substation (near Picabo) and Moonstone Substation into the Wood River Transmission Station in Hailey. This would be accomplished with higher capacity wire with the

operating voltage remaining at 138,000-volts. The existing structure would be maintained where possible and new structures would not increase the transmission line height or visual impacts.

North Valley – Hailey to Ketchum

- Construct an additional 138,000-volt transmission line between Wood River Transmission Station (located in Hailey) and Ketchum Substation to increase the dependability of the electrical supply to the north end of the Valley. Today there is only one transmission line feeding north from Hailey to Ketchum. The committee recommended that this line run in parallel with and immediately adjacent to Highway 75. This route was considered the most sensible option because it follows the Valley's main transportation corridor. The committee as a whole did not specify whether this line should be installed overhead or underground. There was a preference among a few members that this line be placed underground if cost wasn't an overriding factor. Photographic overlays showing an example of a new 138,000-volt overhead transmission line along Highway 75 south of Ketchum can be found in Appendix J of this report.

The cost for this infrastructure to serve the buildout projected load is about \$78 million, in 2007 dollars. Future changes in technology may make some of these improvements unnecessary or, at least, delay their need. These types of shifts, however, are impossible to predict; therefore, Idaho Power can only monitor them and acknowledge that no matter how good the present plans are, external forces may change them. The recommendations outlined in this Plan may be adjusted as needed to respond to external forces and changes in technology.

Idaho Power extends a heartfelt thank you to every member of the CAC. The time and effort the committee gave to this project was tremendous and has provided Idaho Power with a framework from which the public siting processes may commence. This report is a result of the committee's efforts and will serve as the basis for further studies to refine, stage and request permitting for future infrastructure improvements in the Wood River Valley.

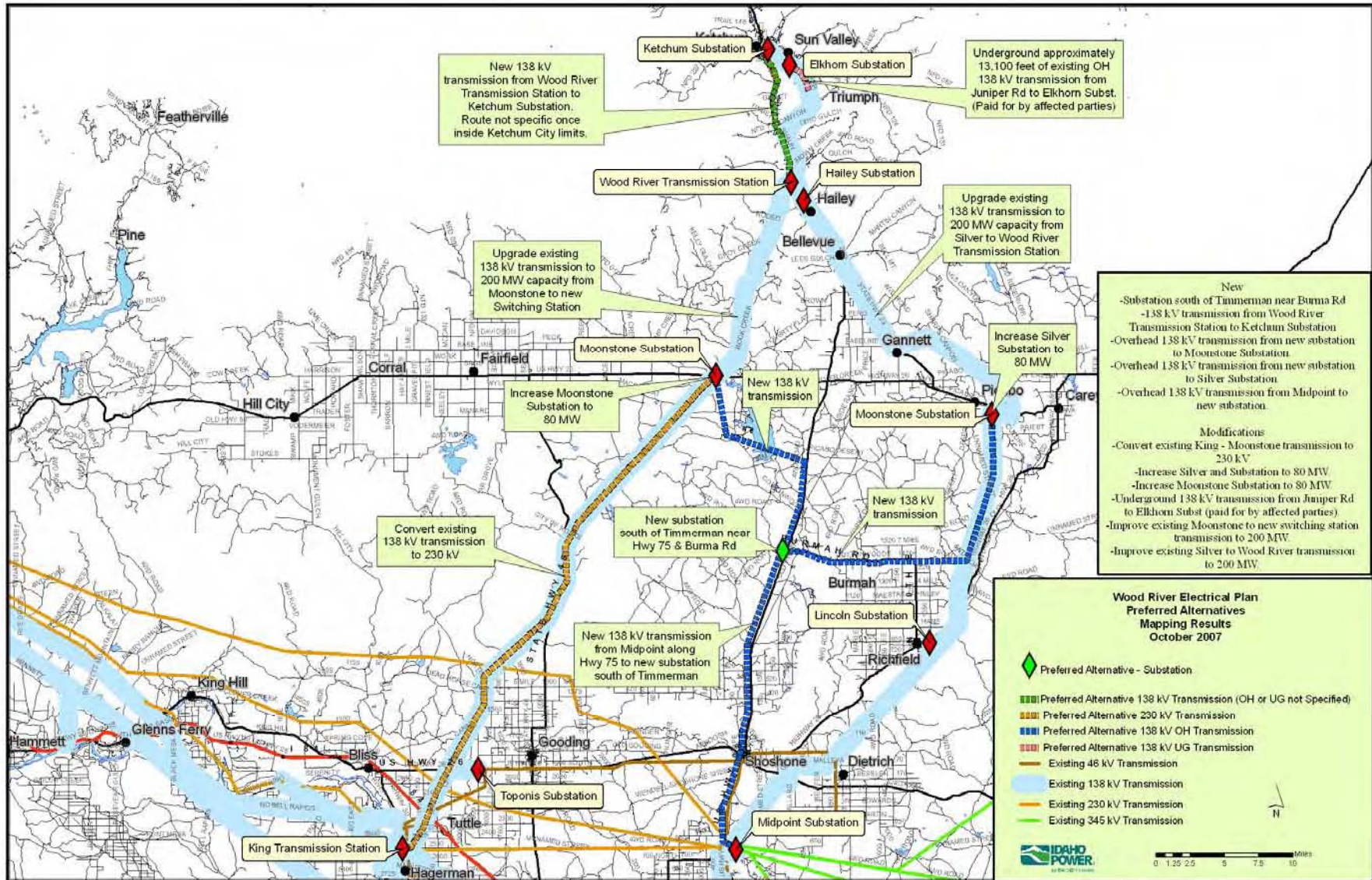


Figure 1. Committee Recommendations Map

Introduction

Located in South-central Idaho, the Wood River Valley is a rapidly growing area that includes the cities of Ketchum, Sun Valley, Hailey and Bellevue. The economy of these communities has become more and more dependent upon electricity as both businesses and residents install increasing amounts of electrical technology. The Valley's growth and increasing reliance on electricity makes it important that Idaho Power improve its infrastructure serving the Valley to ensure that the dependability of the electrical system does not degrade. This growth also makes it important that plans be made for additional power supply to the Valley prior to the existing transmission lines reaching their full capability.

The electrical needs of the Wood River Valley can be described using two separate, though interrelated concepts: *dependability* and *adequacy*. In the first case, the electrical system must be dependable. When you flip a light switch, you expect it to turn on a light. When you push the power button on your computer, you expect it to turn-on. And you expect that to happen every time you flip the switch or push the button. To maximize its dependability, an electrical system must be redundant. That is, it must have more than one transmission line feeding an area so that if one transmission line is damaged, the other can still provide the electricity. This is not the case in the north end of the Wood River Valley today. To date, the single transmission line that feeds Sun Valley and Ketchum has been very dependable, but it was built in 1962 and needs more and more maintenance to maintain that dependability. And to a great extent, this line's dependability is reliant upon the forces of nature. A major winter storm or summer brush fire could damage the line to the extent that the north end of the Valley could be without power for a day or more.

The second concept is adequacy. As the electrical load in the Wood River Valley grows, the two transmission lines feeding into Hailey from the south will soon not have the capability to serve the Valley adequately while maintaining the dependability of the Valley's electrical supply. While the Valley doesn't need more transmission lines feeding into Hailey from the south, the existing capability of the two transmission lines will have to be increased.

Idaho Power invited members of the Wood River Valley community to be involved in a Community Advisory Committee (CAC) to help layout the Wood River Electrical Plan to address the dependability and adequacy of the Wood River Valley's electrical supply. The Plan specifically outlines the electrical infrastructure needs of the Valley from today through the Valley's population and load buildout. The committee was made up of city and county planning representatives, local politicians, environmental interest groups, Forest Service and BLM representatives, major land-owners and community activists. Idaho Power also invited representation from Lincoln County because any new transmission infrastructure built into the Wood River Valley would likely cross through Lincoln County. A complete list of members can be found in Appendix A. This report documents the study process and the committee's consensus recommendations pertaining to the power system serving the Wood River Valley.

Background

Population and Electrical Load Projections

Idaho Power uses future population to estimate the long-term power needs for the Wood River Valley. For the area of Blaine County from Timmerman Hill to SNRA Headquarters north of Ketchum, Idaho Power estimates the 2006 population to be 21,600. During the winter of 2006, this population consumed 99.5 megawatts (99,500,000 watts) of electricity at peak. Using two different methods to determine the population at Valley buildout, the projected population will be nearly 76,000 people and the electrical power requirements will be around 320 megawatts, or 320% of what is used today. That is, when the Valley has reached population saturation, it will require 3 times as much power as it uses today. Of course this is assuming that present consumption is representative of future consumption. Idaho Power, along with the Community Advisory Committee hopes that consumption will decrease as energy efficiency measures become more effective but the present trends are not positive. While new appliances, lighting and equipment continually become more efficient, individual homes and businesses have more of them and people are finding new ways to use electricity.

Existing Wood River Valley Electrical Supply System

The Wood River Valley is served entirely by transmission lines. There are no electrical generation facilities located within the Valley. Figure 2 shows the transmission system feeding the Valley.

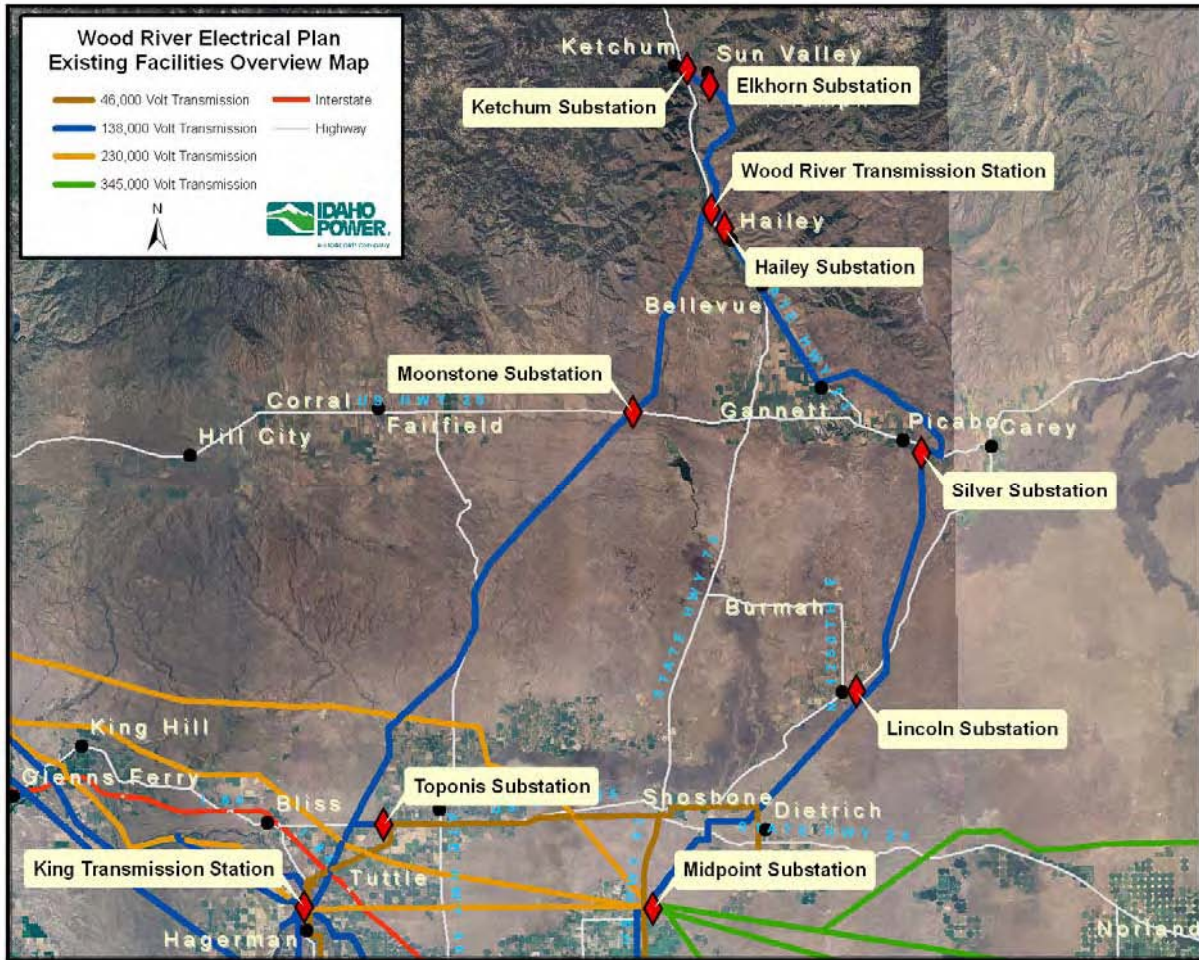


Figure 2. Wood River Valley Electrical Supply Overview Map.

There are two 138,000-volt transmission lines serving the Valley up to Hailey (blue lines running north on the drawing),

- King Transmission Station to Wood River Transmission Station
- Midpoint Substation to Wood River Transmission Station

The King to Wood River transmission line was built in 1962 and enters the Valley northwest of Hailey. The Midpoint to Wood River transmission line was built in 1989 and has the higher capacity of the two lines; its wires are larger so it can carry more power. It enters the Valley east of Picabo. Idaho Power refers to these two lines combined as the *Wood River loop*.

From the Wood River Transmission Station in Hailey to the Ketchum/Sun Valley area, there is one transmission line. This line was built in 1962.

There are five substations within the Wood River Valley that reduce the transmission voltage to a lower distribution voltage and route the power onto smaller lines for delivery to end users. These substations are:

- Ketchum Substation – Located in Ketchum on Sun Valley Road
- Elkhorn Substation – Located in Sun Valley near the intersection of Elkhorn and Juniper
- Hailey Substation – Located in Hailey on Carbonate Road
- Moonstone Substation – Located along Highway 20 about 18 miles east of Fairfield
- Silver Substation – Located just east of Picabo

Note, the Wood River Transmission Station in Hailey does not reduce voltage; it is only used to control the transmission lines feeding into the Valley from the south and the transmission line feeding north from Hailey toward Ketchum/Sun Valley.

Existing Dependability

The southern half of the Wood River Valley, from Hailey south, is served by two transmission lines, giving it redundant power service a majority of the year. However, the northern part of the Valley is served by a single transmission line. When a storm, accident or brush fire damages the line, there is no alternative way to provide power to the Ketchum/Sun Valley area. Idaho Power maintains and patrols this single line to a much higher standard than most other transmission lines in its service territory for just this reason. The line is, however, over 45 years old and will require even greater care in the future.

The two transmission lines serving as far north as Hailey provide better dependability than would a single transmission line. Presently, the combination of these two lines can serve the most extreme peak usage in the Valley at any time. However, the lines individually do not have the capability to serve the entire valley load at winter peak. This means that if one of the lines was to be taken out-of-service during the winter when Valley loads are the highest, the remaining line would not be able to carry the entire Valley load. The load would have to be reduced through the use of rotational outages for the duration of the outage. Depending on the cause and extent of the damage that caused the line to go out-of-service, the rotational outages could extend for several days.

Obviously, if the transmission line serving from the Wood River Transmission Station north to Ketchum/Sun Valley is taken out-of-service at any time of year, there would be no way to serve most of the load in the north end of the Valley. As mentioned before, because of the potential hardships an outage of this line could cause to the citizens and businesses of the north Valley, Idaho Power maintains and patrols this line to a significantly higher degree than it does most other transmission lines in the Idaho Power system. But as this line ages, it will become more and more difficult to maintain its dependability. The line was built in 1962 and as the years go by, it can be expected that more failures will occur. And no matter how much maintenance is done on this line, forces of nature can cause it to fail.

Committee Process and Input

Idaho Power engaged KMP Planning of Twin Falls to facilitate the Community Advisory Committee meetings. The meetings started in January 2007 with a bus tour of Idaho Power facilities, beginning a series of primarily educational meetings that were held monthly through March 2007. Through these educational sessions, the CAC was introduced to electrical generation, substations, transmission, demand-side management, and regulatory affairs. Additionally, the CAC was presented with a view, from production to delivery, of Idaho Power's electrical system. Using the education gained from the meetings held from January through March, the CAC set to work in April and May to lay out proposed Wood River Valley transmission line routes and substation sites.

Alternative Energy Generating Technologies

During the initial committee meeting, a presentation was given by Idaho Power that outlined various alternative energy generation technologies that could deliver energy to the Wood River Valley and thus decrease the need for additional power lines. The technologies discussed included wind turbines, geothermal generators, photovoltaic (solar), combustion turbines and fuel cells. A detailed description and discussion concerning alternative energy generating technologies can be found in Appendix C.

The amount of energy produced by renewable resources and delivered into Idaho is increasing at a rapid pace. Idaho Power is currently contracting for all the energy from the Fossil Gulch wind turbine facility near Hagerman and also contracts for all the energy from the Raft River geothermal project in eastern Idaho. A large scale wind turbine facility is currently being built in eastern Oregon and Idaho Power will receive all the energy from that facility. Many small to mid-sized wind turbine facilities are proposed for the Magic Valley and construction on some of them should start soon. Idaho Power, in a joint venture with PacifiCorp, is planning 500,000-volt transmission coming into Idaho from Wyoming which will enable the wind resources in Wyoming to be developed. However, all these resources will still require transmission infrastructure and equipment in order to deliver energy to end users. Only small-scale solar (roof mounted photovoltaic) and residential sized fuel cells could likely serve as an alternative to the need for new transmission lines in the Wood River Valley.

Energy Efficiency

Another way to reduce the need for additional transmission resources in the Wood River Valley would be to aggressively pursue energy efficiency technologies or in utility terms, demand-side management (DSM). Idaho Power is currently providing many programs funded by a Customer Conservation Charge to customer bills that promote the use of DSM to reduce electricity usage. Idaho Power's 2004 Integrated Resource Plan (IRP) called for an average of 41 megawatts of energy savings due to DSM by 2014. The 2006 IRP calls for an average of 90 megawatts of energy savings due to DSM by 2024. Table 1 shows the current Idaho Power programs. The Idaho Power Website at www.idahopower.com contains full descriptions of these programs.

<i>Residential</i>	<i>Commercial/Industrial/Irrigation</i>
A/C Cool Credit	Irrigation Peak Rewards
Weatherization Assistance	Irrigation Efficiency
Rebate Advantage	Building Efficiency
Energy Star® Homes	Easy Upgrades
Energy Star® Lighting	Customer Efficiency
Energy House Calls	

Table 1. Idaho Power Demand Side Management Programs

Additionally, Idaho Power currently has rates that vary by season, with summer electricity rates being higher than winter rates in order to encourage lower energy use in the summer when the overall electricity usage on the Idaho Power system is highest. In the Wood River Valley, these seasonally varying rates do nothing to reduce power usage when the reduction is needed most...in the winter.

Idaho Power is also investigating using time-of-day pricing and critical peak pricing that would encourage customers to use less energy during the peak times (such as late afternoon and early evening).

Idaho Power Company Energy Efficiency activity and Programs in the Wood River Valley

Idaho Power offers ten distinct Energy Efficiency programs in the Wood River Valley as well as throughout most of its service territory. A listing of each program follows with a brief description of each. More information of each of the programs can be found at www.idahopower.com/energycenter.

Residential Programs:

- **ENERGY STAR® Homes Northwest**
A \$750 incentive is paid to builders for each home built to the ENERGY STAR® standards. These standards are 30 percent more efficient than one built to the Idaho building code.
- **Energy House Calls**
This program offers a free package of services (inc. duct sealing) designed to help save energy for residents of manufactured homes heated by an electric furnace or heat pump.
- **Rebate Advantage**
This program offers \$500 payment to Idaho Power customers who purchase a new ENERGY STAR® manufactured home.
- **Weatherization Assistance for Qualified Customers**
This program offers free weatherization measures for electrically heated homes of qualified customers to help them maintain a comfortable and efficient home environment.
- **ENERGY STAR® Lighting**
This program is a specialty bulb promotion offered in conjunction with BPA (Change a Light, Change the World) to provide a buy-down of bulbs at large retailers. Future programs offer promotions of other bulbs at various retailers.

- **Heating and Cooling Efficiency Program**

This program provides cash incentives to residential customers (and HVAC contractors) for choosing and installing qualified energy-efficient heating and cooling equipment and services through approved HVAC contractors

Commercial and Industrial Programs:

- **Custom Efficiency**

This program offers financial incentives for large commercial and industrial energy users with large and complex projects to improve the efficiency of their electrical systems or process.

- **Building Efficiency**

This program offers incentives of up to \$100,000 designed to offset part of the additional capital expenses for more efficient lighting and cooling designs in small and mid-size commercial construction projects

- **Easy Upgrades**

This program offers Incentives of up to \$100,000 for a menu of simple commercial, industrial building retrofit projects. Incentives are available for lighting, HVAC, motors, building shell, plug loads and grocery refrigeration and are based on each measure's assumed energy savings.

Agricultural Programs:

- **Irrigation Efficiency Rewards**

This program offers an incentive which pays up to 75 percent of the cost for irrigation customers who improve the energy efficiency of an existing pump system or up to 10 percent when installing a new efficient system.

- **Irrigation Peak Rewards**

This program offers a demand credit for specific irrigation customers who allow Idaho Power to use electric timers to turn off their pumps for a few hours on selected summer days reducing afternoon peak demand and lowering the customer's electric bills.

Wood River Valley projects:

Although Idaho Power doesn't commonly track Energy Efficiency programs specifically by area or city, a manual examination of the Energy Efficiency incentive records show that from 2005 to October 2007 Idaho Power has identified 24 individual projects completed in the Wood River Valley area. These projects were completed in Ketchum, Bellevue, Hailey, Sun Valley, Fairfield, Carey, and Picabo. Four projects were under the Custom Efficiency Program. One project was completed under each of the Building Efficiency, Easy Upgrades and Rebate Advantage programs and seventeen projects were completed under the Irrigation Efficiency Rewards program. Idaho Power paid a total of \$130,290 dollars in incentives for an annual energy savings of approximately 1,342,602 kilowatt hours (kWh) and 155 kilowatts (KW) in demand savings for the non-irrigation programs. Under the Irrigation Efficiency Rewards program, Idaho Power paid \$28,637 in incentives for an annual savings of approximately 205,717 kWh and about 57 savings in KW.

There are many other activities in addition to those sponsored by Idaho Power that customers could undertake to reduce their energy use and, like the alternative generating resources discussed previously, it will be up to the local residents, businesses and governments to make them a reality.

Goals Document

The first step in developing proposed solutions to the electrical needs of the Wood River Valley was to develop a Goals Document that could be used to guide the committee's efforts to develop and evaluate alternatives. The committee spent a significant amount of time refining the Goals Document to ensure it represented their desires for a responsible, reliable and affordable electrical system. Much discussion took place concerning the preservation and improvement of view corridors, cost issues and comparing new lines to existing lines. The goals were divided into 6 areas:

- **Reliable Power:** Provide reliable power to the entire Wood River Valley
- **New Infrastructure Design:** Develop new transmission and delivery infrastructure as appropriate when providing for current and future power needs
- **Energy Conservation:** Implement programs that reduce demand for additional energy
- **Environment:** Cause no or minimum impacts to the natural, physical, cultural, historic, social and aesthetic environment due to development and operation of power facilities and delivery systems
- **Political Support:** Develop solutions that are politically supported throughout the Wood River Valley
- **Cost Effectiveness:** Develop solutions that are cost effective and provide associated benefits

The CAC developed a number of bullets describing the goals more fully. These can be found in Appendix C, Page 6.

The CAC also came up with a list of siting criteria. These criteria may not all be completely achievable, but they are measures to be strived for when developing and evaluating alternatives.

- **North of Wood River Transmission Station (WDRI)**
 - *Provide both redundancy and capacity to meet electrical needs north of WDRI*
 - *Do not use the existing 138,000-volt transmission corridor without new technology to avoid new impacts*
 - *Preserve the scenic corridor*
 - *Maintain the ordinance-required 150 ft setback from residences when using overhead transmission lines*
 - *Conform to existing hillside ordinances*
 - *Install underground lines in locations where the necessary additional funding is available.*
- **South of Wood River Transmission Station (WDRI)**
 - *Provide electrical infrastructure and systems that meet Lincoln County electrical needs*
 - *Improve structures and transmission lines in Lincoln County as needed to accommodate future growth*
 - *Maintain scenic corridors*
 - *Cause no environmental impact to wetlands and habitat*

- *Use existing corridors and transmission equipment where possible*
- *The use of overhead lines and infrastructure is acceptable until the affected community can afford to fund a different proposal*
- *Maintain or reduce pole size in Bellevue*

Mapping Exercise

Using the education provided in January through March and the goals developed in March and April, the CAC set to work in April laying out proposed Wood River Valley transmission routes and substation locations. The CAC also used the load block diagrams developed by Idaho Power personnel to aid them in determining the size of lines needed to support the Valley's load. The exercise was divided into three sub-areas for planning: South of Timmerman, Mid Valley and North Valley.

The committee was broken into three groups. Each group was given a large aerial photograph showing the terrain from Ketchum in the north to Midpoint and King Substations in the south. Using the goals and siting criteria as a guide, each group developed feasible alternatives to meet buildout requirements. The following guidelines were used in forming the small groups:

- Groups were designated A, B and C for alternative discussion purposes
- Each group included committee members from throughout the planning area
- Each group included an Idaho Power representative to provide technical support and a facilitator to capture the details for each of the alternatives

The three groups came up with a total of 6 alternatives covering various parts of the Valley. To aid in screening the alternatives developed by the three groups, a screening matrix was developed that each CAC member could fill in to see numerically how each alternative ranked. It must be noted that a numerical screening of alternatives was just an initial tool to evaluate the alternatives against one another. The final decision as to which alternative or alternatives to designate as the most feasible going forward is a consensus decision reached within the CAC and the matrix was just part of this decision process. Appendix C contains detailed results of the screening matrix exercise.

Committee Consensus on Alternatives

Using the results of the scoring matrix as a basis for discussion, the committee went on to reach consensus on each of the three sub-areas of the Plan; South of Timmerman, Mid Valley and North Valley. Figure 3 is a combination of the preferred alternatives for each of the three Valley sub-areas. This figure is also in Appendix D, page 8 in a larger, more readable size.

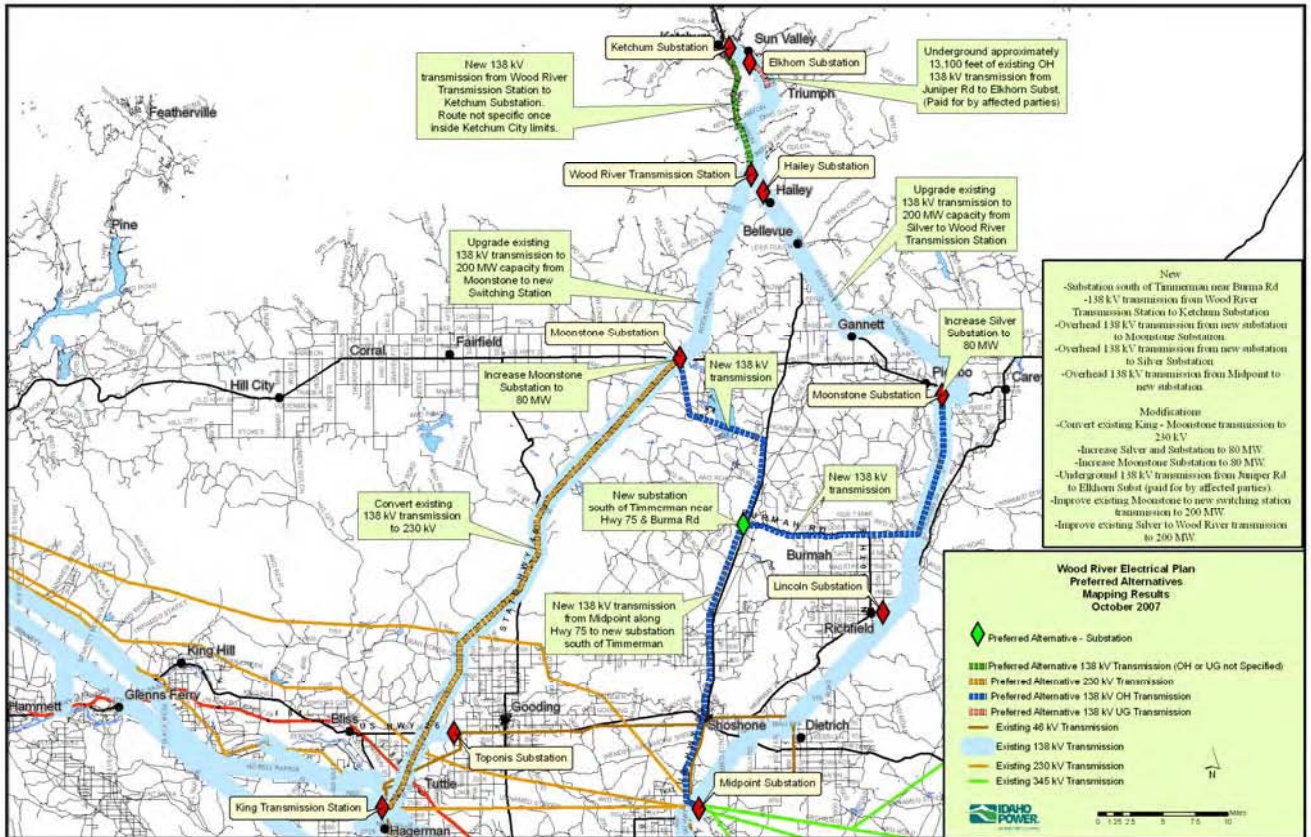


Figure 3. Preferred Alternatives

South Valley

For South Valley, the preferred alternative would convert the existing 138,000-volt transmission from King Substation to Moonstone Substation to 230,000-volt. It would install a new Substation south of Timmerman Hill along Highway 75 near the intersection of Highway 75 and Burmah Road (depending on land availability). For reference, this new substation will be referred to as Burmah Substation. It would then install a new 138,000-volt transmission line from Midpoint Substation to the new Burmah Substation and a 138,000-volt transmission line from the new substation to Moonstone Substation. It would also install a new 138,000-volt transmission line from the new Burmah Substation to Silver Substation routed along Burmah Road until it reached the existing 138,000-volt line. The new circuit would then be run on common towers with the existing 138,000-volt circuit until it reached Silver Substation.

The preferred alternative designates that both Silver and Moonstone substations be upgraded to 80 MW capacity. It is noted that the existing 138,000-volt transmission from Juniper Road near Sun Valley to Elkhorn Substation is to be placed underground (paid for by affected parties).

Mid-Valley

The preferred alternative for Mid-Valley would upgrade the existing Moonstone to Wood River Transmission from 105 megawatts to 200 megawatts and upgrade the existing Silver to Wood River Transmission from 120 megawatts to 200 megawatts. The Moonstone to Wood River

transmission structures would have to be rebuilt, but the net result will be that the visual impact of this line will not change.

North Valley

The preferred alternative for the North Valley region constructs an additional 138,000-volt transmission line between Wood River Transmission Station (located in Hailey) and Ketchum Substation to increase the dependability of the electrical supply to the north end of the Valley. Today there is only one transmission line feeding north from Hailey to Ketchum. The committee recommended that this line run in parallel with and immediately adjacent to Highway 75. This route was considered the most sensible option because it follows the Valley's main transportation corridor. The committee as a whole did not specify whether this line should be installed overhead or underground. There was a preference among a few members that this line be placed underground if cost wasn't an overriding factor. Photographic overlays showing an example of a new 138,000-volt overhead transmission line along Highway 75 south of Ketchum can be found in Appendix J of this report.

Overhead vs Underground Transmission

By far the most challenging issue the committee addressed was overhead vs underground transmission, particularly for new transmission from Hailey to Ketchum/Sun Valley. As regulated by the Idaho Public Utilities Commission (IPUC), Idaho Power is obligated to build its infrastructure in the most cost effective manner possible. Based on past experience, underground transmission is generally 10 times more expensive than overhead transmission. Idaho Power cannot construct underground facilities unless there are extenuating circumstances that would require it. These circumstances could include environmental issues or land availability issues. If a community wishes that transmission be placed underground for aesthetic reasons, the cost difference between overhead and underground transmission would have to be provided for by that community before the transmission could be placed underground.

One committee member discussed at length the belief that right-of-way costs for underground transmission in the North Valley would be significantly lower than for overhead transmission because landowners would be more willing to grant easements for underground transmission. The cost difference for the right-of-way could overshadow the material cost difference between overhead and underground transmission. The member also asserted that the political and legal costs would be quite high if Idaho Power were to attempt to install 138,000-volt overhead transmission in the North Valley. It was suggested that Idaho Power analyze this potential difference in right-of-way costs. While Idaho Power agrees that community acceptance for underground transmission would be greater, there is no valid method that can be used to estimate the cost difference for right-of-way between overhead and underground transmission short of actually going out and attempting to purchase the easements. It should be noted that some other committee members believed that there would actually not be a great difference between overhead and underground easement costs.

The committee as a whole did not specify whether this line should be installed overhead or underground. There was a preference among a few of the members that this line be placed underground if cost wasn't an overriding factor.

Implementation Plan

The recommendations of the Community Advisory Committee cover infrastructure improvements to the Idaho Power system that will deliver sufficient power at the Wood River Valley's buildout. Not all the facilities are needed in the near term and will be phased in as the Valley's load increases. The following is Idaho Power's recommended implementation plan:

5 Year

- Build a second 138,000-volt transmission line between the Wood River Transmission Station in Hailey and Ketchum Substation. This is the top priority project.
- Site and build the new Burmah Substation south of Timmerman Hill
- Build a new 138,000-volt transmission line from Midpoint Substation near Shoshone to the new Burmah Substation
- Build a new 138,000-volt transmission line from Burmah Substation to Silver Substation (near Picabo)
- Build a new 138,000-volt transmission line from Burmah Substation to Moonstone Substation (east of Fairfield)

10 Year

- Upgrade Moonstone to Wood River transmission line to 200 megawatts
- Add new 230,000-volt to 138,000-volt transformer at Midpoint Substation
 - The existing transformer capacity will be inadequate to serve the Wood River Valley load at this point.

15 Year

- Add new voltage control device at Ketchum Substation
 - Won't require new lines into Ketchum Substation
 - Won't require that Ketchum Substation be enlarged

20 Year

- Add distribution feeders from Wood River Transmission Station
 - Currently, this station only serves to switch the transmission, it doesn't directly feed any of the load around Hailey
 - This would relieve some of the load from Hailey Substation

30 Year

- Upgrade Silver to Wood River transmission line to 200 megawatts
 - This will provide more capacity to the growing Valley load
 - This will also help to support the voltage at Ketchum and Elkhorn substations

When load levels require, the King to Moonstone 138,000-volt transmission line will be converted to 230,000-volts. This will require that the line be completely rebuilt but it will likely be installed in the existing right-of-way. Moonstone Substation will also require improvements at this point to accommodate the higher voltage.

Conclusion/Results

The Wood River Valley is a rapidly growing region and so is its demand for electricity. Along with growth-related increases in electricity demand, the businesses and residents of the Wood River Valley are more dependent on electricity today than ever before. Where 25 years ago, few owned a personal computer, now many residents have multiple PCs. Many people work from home and are dependent on their PC and home network to do business. Most homes have more television sets now...and they are getting larger and consuming more energy. Most, if not all, businesses now have electronic or even computer driven cash registers. New technology increasingly drives the need for electricity and it will continue on into the foreseeable future. And the wintertime ski industry depends on electricity for both chair lifts and snow making. The importance of a reliable electrical system to skiing operations was even evident this past summer when snow making equipment was used to protect Bald Mountain facilities during the Castle Rock fire. For these reasons, Idaho Power must be proactive in planning for new infrastructure to serve the needs of the Wood River Valley.

The Wood River Electrical Plan lays out high voltage transmission and substation infrastructure from now through Valley population and load buildout. In a cooperative effort with the Community Advisory Committee, the Plan determines locations for major transmission lines serving the Valley for many years to come and provides direction for the location of a new distribution/transmission substation to serve the southern part of the Valley. Individual projects resulting from this plan will still require jurisdictional approval and will be put through a public siting process. This first step, however, will give the jurisdictions and citizens a heads-up as to where high-voltage transmission equipment may be located and allow them to plan accordingly.

In preparing the WREP, Idaho Power has taken into account the effect that demand-side management will have on future load in the Wood River Valley. Idaho Power is committed to reducing electrical load through the use of demand-side management at all customer levels. In conjunction with activities outside Idaho Power's control – such as expected improvements in Idaho building standards, customer involvement, and energy efficiency technology advancements – Idaho Power expects new electrical load can be reduced by 20 to 30 percent.

Through the consensus agreement of the CAC, the WREP recommends the following:

- An additional 138,000-volt transmission line between Wood River Transmission Station (located in Hailey) and Ketchum Substation to increase the dependability of the electrical supply to the north end of the Valley. Today there is only one transmission line feeding north from Hailey to Ketchum. The committee recommended that this line run in parallel with Highway 75. This route was considered the most sensible option because it follows the Valley's main transportation corridor. Though there was a preference among a few members that this line be placed underground, the committee as a whole did not specify whether this line should be installed overhead or underground.
- The location for a new substation south of Timmerman Hill near the intersection of Highway 75 and Burmah Road to serve the South Valley load and to act as a switching station for new transmission. For reference, this substation is named Burmah Substation.

- Construction of a new 138,000-volt transmission line from the new Burmah Substation to Moonstone Substation (located east of Fairfield).
- Construction of a new 138,000-volt transmission line from the new Burmah Substation to Silver Substation (located near Picabo).
- Increased power supply from south of the Wood River Valley to the Wood River Transmission Station in Hailey to serve the increasing electrical load in the Valley. This increased supply includes;
 - Construction of a new 138,000-volt transmission line from Midpoint Substation (near Shoshone) to a new substation south of Timmerman Hill. This line would be installed in parallel with Highway 75.
 - Conversion of the existing King Transmission Station (located in Hagerman) to Moonstone Substation 138,000-volt transmission line to 230,000-volts. This will increase its capability.
 - Improve the capability of the existing 138,000-volt transmission lines feeding from Silver Substation (near Picabo) and Moonstone Substation into the Wood River Transmission Station in Hailey. This would be accomplished with larger wire installed on the existing structures if possible with the operating voltage remaining at 138,000-volts.

The cost for this infrastructure to serve the buildout projected load is about \$78 million, in 2007 dollars. Future changes in technology may make some of these improvements unnecessary or, at least, delay their need. These types of shifts, however, are impossible to predict; therefore, Idaho Power can only monitor them and understand that no matter how good the present plans are, external forces can change them.