MINUTES OF MEETING
SENATE NATURAL RESOURCES
January 23, 1981

The second meeting of the Natural Resources Committee was called to order by Senator Harold L. Dover, Chairman, at 1:00 P.M., on the above date in Room 405 of the State Capitol Building.

ROLL CALL: Upon roll call, all members were present with the exception of Senators Keating, Manley and Van Valkenburg.

CONSIDERATION OF SENATE BILL 141:

> AN ACT TO ALLOW THE DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION TO AWARD LOANS FROM THE ALTERNATIVE ENERGY RESEARCH DEVELOPMENT AND DEMONSTRATION, AND COMMERCIALIZATION OF ALTERNATIVE RENEWABLE ENERGY SOURCES; AND TO ALLOW GRANTS FOR COMMERCIALIZATION OF SUCH SOURCES;

Chairman Dover turned the meeting over to Vice Chairman Etchart as Senator Dover sponsored this bill. The purpose of the bill is to help provide for the commercialization of alternative energy in Montana. The intent of the bill is to allow for loans through Montana's lending institutions for commercialization purposes, while maintaining the core of the program of research, development and demonstration of alternative energy by Montanans. (Statement Attached)

Vice Chairman Etchart called for any other proponents to SB 141.

Leo Berry, Department of Natural Resources and Conservation (Energy), is in support of this bill and feels that it will give the agency the ability to expand the energy resources program and increase some productivity in this area, which will in turn increase revenue and employment within the state of Montana. The loans will be handled through the financial institutions rather than through agencies. All monies for this act must be appropriated by the legislature in advance.

Will Garvin, Engineer in Helena, also supports this bill. (Statement Attached)

Bob Fitzgerald supports this bill in that he has proposed a wind power plant in the Livingston area and would be able to get financing if this bill were to pass. He commented that anything the state can do to bring about more jobs and resources for the state would be a benefit to the state.

Representative Kathleen McBride, District 85, supports this bill indicating there is a growing need for such a program expansion to include commercialization.

Senator Etchart then called for any opponents to SB 141. There being no opponents to this bill Vice Chairman Etchart asked for questions from the committee.

There were several questions from the committee relative to grants that are given out, follow-up on grants and basically how the program is controlled. William S. Gosnell stated they had just finished a report to the Montana Legislature entitled "Renewable Energy Program" which would be available to the Senators upon request, which would answer any questions in this regard. (See attached copy)

Senator Ryan questioned why a loan would be applied for if a grant were available. Senator Dover answered by stating that a grant might not be given to you. A committee will be set up to determine the merits of a loan or grant for each case.

Vice Chairman Etchart turned the meeting over to Chairman Dover.

CONSIDERATION OF SB 95:

AN ACT TO ESTABLISH A POLICY OF MULTIPLE USE MANAGEMENT FOR STATE FOREST LANDS

Chairman Dover called on Senator Boylan, District #38, to present SB 95. This bill came up because of a problem in Senator Boylan's immediate area, but there are also problems throughout the state of Montana. A party comes in and buys a small block of land and gets a large piece of Forest Service land to go with it. The land is then posted and used for a private hunting ground. Money from these lands go into a school foundation program and Senator Boylan feels that more money could be obtained for this fund if the land were put to a multiple use. The specific case in question, people came into the Bear Canyon area, bought 160 acres of private land and for $360.00 obtained control of 5400 acres of state forest land. The land is not productive as far as grazing land. The adjoining neighbors to this land, who have used the land for hunting and fishing prior to the lease of the 5400 acres, are not allowed on the land. Senator Boylan asked for testimony from witnesses from the Bear Canyon area.

R. P. Myer supports this bill. He lives adjoining the above mentioned land and objects that an out-of-stater can buy 160 acres of private land and get 5400 acres of Forest Service land for such a minimal fee for private use. He feels that the state should study these leases a little more and check with the people in the area before they give out a lease.

John Metcalf also supports this bill. He feels the land was leased for grazing land and it is against the law to take hunters on it.

Jack Nash is in support of this bill as he feels that a person should not be able to lease a piece of ground for little or nothing and then keep everybody out. Posting the land so that they can bring in their own hunters is not right.

Milton Schaplour supports this bill and feels that the Department of Natural Resources should ask for a little more local input

There being no other proponents to SB 95, Chairman Dover asked for opponents.

Robert N. Helding, Attorney, Montana Wood Products Association, opposes this bill simply because we already have a statutethat directs state land to be managed under the multiple use principal, Section 77-1-203 of the Montana Codes. The proponents have some merit but they can be handled administratively and the Administator, Forestry Division, Department of Natural Resources and Conservation is here today and will answer questions. The problems we have with this bill is that you are dealing with state school rates, the prime source of money for the school foundation program. The law directs that they be managed to derive income in an orderly manner and as this bill is proposed there would be conflict.

Senator Brown asked Senator Boylan if what he really wanted to accomplish was for the state lands to be administered in conformity with the uses of the adjacent lands. Senator Boylan said that not necessarily managed in that manner but managed for what they were leased as. In this case grazing land.

Gareth Moon, Administrator, Forestry Division, Department of Natural Resources and Conservation was requested to testify by Senator Boylan. The reason for the bill is already being handled by statute and is being followed. As leases expire we have started to submit requests for multiple use leases and to provide access across national forest or prime recreational areas. Currently the board's rules provide that the individual leasee can limit access to state lands. The purpose of this is for fire control purposes as the leasee is responsible for damage done to the land.

Pete Jackson testified in response to Mr. Moon's statement. I had a forest fire on my land and the forest service put it out as it was close to forest service land and then handed me a bill for $25,800. You need some management of the land.

Senator Boylan closed saying that the state needs to review these leases before issuing and if there are problems should be able to open them up again.

Chairman Dover closed the hearing on SB 95 at 2:05 P.M.

EXECUTIVE SESSION: Chairman Dover would like to get approval to introduce a resolution to study the process of combining coal with methanol or ethanol to get methocoal or ethocoal.

There were six yes votes to adopt resolution. Since a two-thirds vote is needed, Chairman Dover will have to ask individual members of the committee not in attendance at the meeting.

DISPOSITION OF SB 141: Senator Brown moved that SB 141 receive a DO PASS with the Statement of Intent as prepared by Legislative Counsel. Senator O'Hara seconded the motion. Senator Brown made a substitute motion that the amendment as prepared should be changed from "allow" to "require". After discussion from the committee, Senator Brown made a motion that SB 141 receive a DO PASS with the Statement of Intent and amendments as prepared by Legislative Counsel. The motion carried unanimously.

DISPOSITION OF SB 95: Senator Brown moved that SB 95 receive a DO NOT PASS. Senator O'Hara seconded the motion.

Chairman Dover called for a vote on Senator Brown's motion. The motion carried unanimously.

ADJOURNMENT: There being no further business, the meeting was adjourned at 2:30 P.M.

Harold L. Dover

HAROLD L. DOVER, CHAIRMAN

ROLL CALL

NATURAL RESOURCES COMMITTEE

47th LEGISLATIVE SESSION - - 1981 Date 1/23/81

NAME	PRESENT	ABSENT	EXCUSED
Harold Dover, Chairman	✓		
Mark Etchart, Vice Chairman	✓		
Thomas Keating			
Roger Elliott	✓		
Larry Tveit	✓		
Jesse O'Hara	✓		
John Manley			
William Hafferman	✓		
Steve Brown	✓		
Dave Manning	✓		
Patrick Ryan	✓		
Fred Van Valkenburg			

Each day attach to minutes.

Testimony on Senate Bill 141

Senator Dover

SB 141 has been introduced at the request of the Department of Natural Resources and Conservation. The purpose of the bill is to help provide for the commercialization of alternative energy in Montana. The intent of the bill is to allow for loans through Montana's lending institutions for commercialization purposes.

The Alternative Energy Grant Program has been in existence since 1975, utilizing a percentage of the coal severance taxes. The program originally intended to provide grants to Montana individuals for research, development and demonstration of alternative energy sources, and to reduce our dependence on fossil fuels. In 1979 Senator Towe and I co-sponsored legislation to amend the original act to allow for grants for commercialization of alternative energy in Montana. This legislation passed, and during the current biennium many grants were made for commercial purposes.

The alternative energy program has matured to the point that we can anticipate the need for financial assistance in seeking other funds from other sources to establish this young industry in Montana. The results of the demonstration and development grants of the past grant cycles, the National Energy Security Act of 1980, and substantial growing interest by the private sector in alternative energy sources indicate that the next logical step in the development of this program is to provide to the best of our financial ability the funds needed to attract and expand this industry in Montana. This bill allows for

grants or loans for commercialization purposes, and maintains the core program of research, development and demonstration of alternative energy by Montanans.

The potential effectiveness of this program can be highlighted by the following facts.

1. For the first five years of existence of this program, approximately $5 million in grants have been awarded. This $5 million will help in generating an additional $62 million in matching funds from other sources, both private and federal, and will have provided for approximately 240 new jobs in Montana. This represents a return of 12 to 1 on our state funds, a remarkable return for a young industry. Further, virtually all of the matching funds have been generated during the past two years since the 1979 Legislature provided for commercial grants.

2. One of the original goals of the program is to reduce our dependence on fossil fuels. Data indicates to date that approximately $4.5 million have been saved in equivalent oil costs as a result of the alternative energy program. These savings do not reflect the savings that are expected from the production of alcohol for gasohol in the future. As you know, each gallon of gasohol represents a 10% savings in petroleum. These data indicate that the program is already paying for itself, without considering the impact of matching funds.

3. The use of coal severance tax funds for alternative energy

purposes is considered a "benevolent use" of the funds, and strengthens the state's argument for the 30% severance tax.

4. By providing loans for commercial purposes, portions of the coal severance taxes will be returned to the state for use in the future. Administrative detail as to how the loan program will be administered is in the formative stages. Lending methods such as loan guarantees, interest subsidies, or others will be developed by the Department in conjunction with the lending institutions before the loan program is put in place. The Department is authorized to develop rules to implement this program, within the intent of the act.

In summary, the alternative energy program is producing results. This bill will help ensure economic development and the establishment of new industries, create new jobs and attract capital, and help reduce our dependence on fossil fuels in Montana.

I recommend "do pass".

Renewable Energy Program

report to the

montana legislature

january 1981

Leo Berry, Jr.
Director, DNRC

William S. Gosnell
Administrator
Energy Division

John W. Orndorff, Chief
Renewable Energy ~~Division~~ Bureau

ENERGY DIVISION

DEPARTMENT OF NATURAL RESOURCES
AND CONSERVATION

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INTRODUCTION

Few issues have catapulted to the forefront of the world political and economic scene as quickly as energy. Within this complex field, no other aspect holds more promise, has generated more interest, or has spawned more ideas than renewable energy. Wind, water, wood and waste, along with energy from the natural heat of the sun and earth, have virtually unlimited potential for reducing dependence on finite fuel reserves.

Montana is a natural for renewable energy. Among the riches of the Treasure State are vast reserves of renewable resources: hundreds of streams and rivers, plenty of sunlight, timber and farmland and more wind than we can ever tap.

Early settlers in Montana often built homesteads on the east sides of hills, sheltered from the prevailing westerlies but still exposed to the warming rays of the sun. Many homesteaders, or "honyockers," built right into the hillside, using the earth for shelter and insulation. Where wood was scarce, dried cow or buffalo manure provided the principal fuel for heating and cooking.

By the early part of this century, windmills dotted the high plains of eastern Montana, turning electric generators or pumping water for irrigation. Many of these early windmills are still in use, pumping drinking water for livestock from deep wells. Wood became prominent with the development of the timber industry in western Montana, and hydroelectricity came on line in 1912 with the completion of Hauser and Madison Dams on the Missouri and Madison Rivers.

Recognizing our State's renewable energy potential, the 1975 Montana Legislature passed Senate Bill 86, authorizing the Montana Alternative Renewable Energy Sources Program. The program set out to increase Montanans' understanding of energy alternatives and to demonstrate the feasibility of renewable energy. Charged by the Legislature with reducing Montana's reliance on fossil fuels, program staff set a goal of "20 percent by 2000" — seeing to it that renewable sources supply one-fifth of the state's energy by the end of this century.

Drawing funds from the tax on a nonrenewable source of energy — coal — the Renewable Energy Program began in 1976 to offer grants to Montanans researching, demonstrating, or developing renewable energy. Through the Program, the state's coal severance tax provides a link to the future, helping to develop sustainable energy sources.

In the early years of the program, the primary emphasis in the grants was on solar energy. Of the renewable energy forms, solar was perhaps the best established and required the lowest degree of engineering proficiency. As the Program succeeded in making Montanans aware of the options available in the renewable energy field, more grants involving other sources were awarded.

Administered through the Montana Department of Natural Resources and Conservation (DNRC), the program is the specific responsibility of the Renewable Energy Bureau of DNRC's Energy Division. In addition to the grant program, the Bureau also includes geothermal and solar energy programs funded in part by the U.S. Department of Energy. These efforts and resources are coordinated to make the Bureau the focal point for renewable energy in Montana.

The Bureau is assisted by the Renewable Energy Advisory Council (REAC) and the Gasohol and Biofuels Advisory Council (GBAC). Council membership includes legislators, farmers and ranchers, educators and business people from across Montana. These people review grant proposals and make funding recommendations, suggest program directions and in general advise the Department on policy matters and program emphasis. The councils offer a crucial link between bureau staff and the people of Montana, helping us to see the program through the eyes of the people we're serving.

The strength of the program has been its ability to reach the individual: the farmer who wants to turn cull potatoes or surplus wheat into combine fuel, the western Montanan who wants to power her ranch from a mountain stream, the eastern Montanan who wants to power his home from the prairie wind. Perhaps the greatest resource this program has tapped is neither the sun nor the earth, not water, wind or wood, but the people of Montana. Montanans are an independent breed, and the area of energy is no exception. They're used to doing things for themselves, solving their own problems and meeting their own needs. Montanans have come to the program with their ideas and have left with a commitment to put them into practice, to make them work.

Montanans understand the need for renewable energy. They realize the importance of setting aside some of what we take from the land, keeping a portion to plow back into the ground, giving the soil a chance to renew itself. That's what the State of Montana is trying to do through the Renewable Energy Program. We're setting aside some of the revenue from harvesting coal and plowing that revenue back into Montana, making sure there will always be enough resources to sustain the state, its people and their way of life.

GUIDELINES AND PROCEDURES FOR FUNDING

Applicants for funding for renewable energy projects must be Montana residents; projects must be conducted in Montana and applicable to this state's energy needs. Among the items considered inappropriate for funding are: previously completed projects, excessive energy users such as home air conditioners and private swimming pools, and basic energy conservation measures such as insulation and weatherstripping.

Applications that meet these criteria go through a competitive screening process. Proposals must follow the format set forth in the regulations and they must contain sufficiently complete and accurate technical business and budget information to allow a substantive evaluation of the proposed project. This format is outlined in the DNRC booklet "Guidelines for Preparing Grant Proposals to the Renewable Energy Program." Proposals that do not conform to these criteria are returned to the applicant with an explanation of deficiencies. The applicant can make corrections or supply more information and resubmit the application during a subsequent grant period.

Once the proposal is accepted for review, the program staff considers the project's technical feasibility. Is the system likely to work? Are all the calculations correct? Does the applicant have the necessary ability to undertake the proposed project? If not, the applicant may be encouraged to find a consultant with the necessary technical knowledge and experience. Technical problems are noted and the proposal undergoes the next review.

In this review, each project's potential for practical application and development in Montana is evaluated by DNRC and the Renewable Energy Advisory Council. Biofuels projects are also reviewed by the Gasohol and Biofuels Advisory Council. The project's merits, its value to Montana citizens and how well it meets program goals are all considered.

The combined recommendations of the staff and the Council are then submitted to the DNRC Director, who reviews each proposal, considers the recommendations and makes the final decision on grant awards. After a proposal has passed the review and has been approved by the Director, the Department and the grantee enter into an agreement and the project begins. As part of this agreement, grantees are required to submit quarterly progress reports as well as a final report evaluating the completed project.

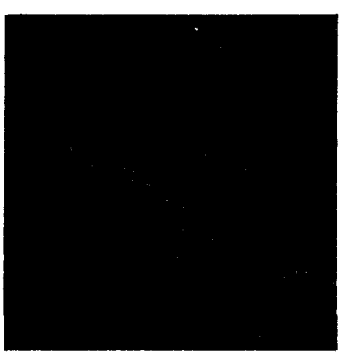
THE PROGRAM AND THE PROJECTS

BIOMASS

Each area of expanding technology seems to be allocated a quota of words to create or redefine, adapting them to meet its needs. "Biomass" probably heads the list of terminology for the renewable energy field. Originally used to designate the amount of living matter in a given area, biomass is now used almost exclusively in reference to energy produced from organic waste.

Sources of biomass energy include wood, animal waste, garbage, agricultural crops and crop residue. Energy can be produced through direct combustion or through chemical conversion to fuel such as methane or alcohol. Benefits of biomass include energy generation, production of valuable by-products such as livestock feed, and alleviation of disposal problems through productive use of waste materials.

Fuel from farms — turning our surplus crops and crop residue into alcohol fuel for our tractors and trucks, our combines and cars — is the focus of a Renewable Energy grant in Polson. This process doubles the importance of Montana farmers, involving them in the two most important commodites in the world today: food and fuel.



Taking cull potatoes from this year's crop failure in the Flathead Valley, the Lake County Resource Recycling Company demonstrated ethanol distillation to area farmers in a grand opening August 27, 1980. Lieutenant Governor Ted Schwinden was on hand to speak and to drive a tractor fueled by the 170 proof ethanol.

Biomass projects under the Renewable Energy Program run the gamut from small-scale demonstration systems to research on more efficient methods of combustion or conversion. In Polson, the Lake County Resource Recycling Company has distilled fuel alcohol for farm machinery from waste potatoes and surplus barley. Another project near Glasgow is studying the feasibility of constructing a large-scale ethanol production plant at Valley Industrial Park, the former Air Force base north of town.

Jim and Doris Ekstrom of Rock Creek built and installed a composting digester under a renewable energy grant. The natural heat from bacterial decomposition of manure in the digester is used in conjunction with a woodburning stove to heat the Ekstrom's house and attached greenhouse. Although the stove provides adequate heat, the Ekstroms are considering modifying the digester to increase its efficiency.

Wood, a form of biomass, can be thought of as stored solar energy - released simply by burning. Most grant projects in this category involve combustion: designing innovative systems that increase heating efficiency while reducing pollution from burning wood, or marketing these products and bringing them within the economic reach of the average Montana homeowner. Other projects are underway to study wood as a feedstock for producing alcohol.

Under a technical assistance grant to the Butte-based Center for Innovation, the Renewable Energy Program helped Whitehall inventor Darrow Hippert market his Hippert Furnace, a highly efficient, forced air, woodburning furnace developed and manufactured entirely in Montana. Other projects are investigating wood densification, the conversion of waste wood into chips or pellets to produce versatile heating fuel.

GEOTHERMAL

The Rocky Mountain Indians once considered steaming, bubbling geothermal springs as evil spirits — not only because they stayed warm all winter, defying snow and ice, but also because of their sulfurous odor and clouds of steam. Later, enterprising settlers built resorts near these springs and advertised the mineral baths as healing cures for many ailments. Today, Montana's hot springs are being studied as a source of renewable energy — geothermal power — through the coordinated efforts of the Renewable Energy Program and the U.S. Department of Energy's state geothermal team.

Under grants from the Renewable Energy Program, Mountain View Memorial Hospital in White Sulphur Springs and Warm Springs State Hospital are being studied for geothermal heating. Another grant helped bring about the nation's first geothermally heated bank — the First National Bank, also in White Sulphur Springs. Other projects, in St. Ignatius and Helena, have demonstrated effective geothermal heating systems in single-family homes. In addition, Montana's geothermal commercialization team is cooperating with private oil companies to identify abandoned oil wells with geothermal potential for possible use in municipal heating systems.

The nation's first geothermally heated bank — the First National Bank in White Sulphur Springs — taps a pocket of naturally hot water 1,000 feet below the building. The area seems to have excellent geothermal potential; a crew recently laying sewer pipe in the vicinity of the springs had to pump hot water from the trench at the rate of 500 gallons per minute to complete the job.

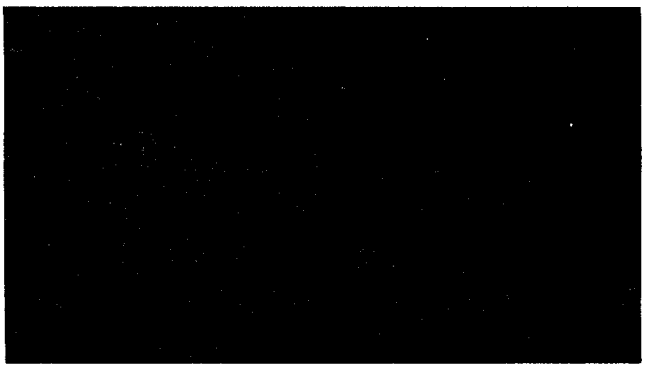
SMALL-SCALE HYDROPOWER

Since the mid 1900's, most of Montana's electricity has been generated by falling water, through major dams such as Hungry Horse, Yellowtail, Libby, Noxon and Fort Peck. Although most large-scale hydroelectric sites have been developed, the small-scale hydropower potential of Montana's countless streams and rivers is still largely untapped.

The pressure exerted as the water falls, referred to as the "head," is multiplied by the rate of flow of water to determine the hydroelectric potential of a river, stream or creek. Thus a small stream with a high head may furnish as much power as a large stream with a low head.

In a typical small-scale hydropower system, a small diversion dam is built across a stream. A pipe then carries water from the dam to a downstream power station the size of a small tool shed. Located at any convenient point out of the reach of floods, the power station contains a water turbine connected to an electric generator, battery storage and an inverter, which changes the direct current produced by the generator to alternating current for home use. Other systems are based on waterwheels in the river or stream itself, either turning on a fixed axis or mounted on a floating mechanism that adjusts to changes in water level.

Projects under the Renewable Energy Program include development of prototype high- and low-head systems as well as installation and demonstration of small hydropower systems in a variety of settings. At the K Bar L, an outfitter's ranch near Augusta, Richard Klick has installed a hydrosystem to replace gas generators in supplying all the ranch's electricity. Similar systems are being built by Rick and Earlene Ostberg of Power and Terry Savage of Lolo.



In the Sun River country west of Augusta, Richard and Nancy Klick have an outfitter's ranch that receives all of its power from a small hydro-electric system, installed through a Renewable Energy Program grant.

SOLAR

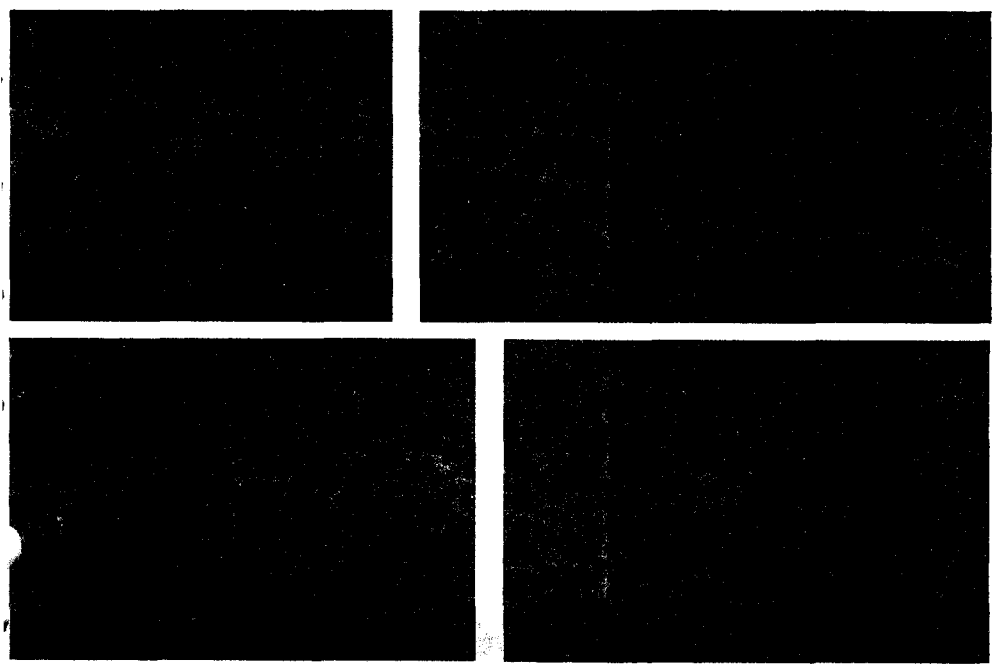
As Earth's primary source of energy, the sun has generated more interest, excitement and speculation than any other power source in human history. Solar projects have constituted the major category each year since the Renewable Energy Program began. Although other renewable sources are now coming into their own, solar energy remains the most popular and widespread alternative in Montana and across the country.

When the program began, the biggest challenge was to determine whether solar energy could be effective in Montana's climate. Accordingly, the program has supported projects that research, develop or demonstrate many different solar applications; other projects obtain or analyze information on solar radiation and solar use throughout the state. Efforts to integrate solar with other forms of renewable energy, such as wind, wood and water, have also been supported.

Solar projects have run the gamut from active and passive heating systems to photovoltaics, the direct conversion of sunlight to electricity. Several collectors have been demonstrated, including flatplate, concentrating, trickle and air collectors. Most collectors are fixed in position, though some projects have used tracking collectors, which follow the sun's path for maximum radiation.

Drawing on the one renewable energy source available throughout Montana, solar projects range from solar-heated municipal swimming pools in Hamilton and Shelby to Dennis Howard's active solar home in Glendive. Horizon Lodge, an 84-unit retirement apartment building in Conrad, was retrofitted with solar collectors that provide half the heat needed for the building's domestic hot water. The Life of Montana Building in Bozeman demonstrates effective solar heating of a relatively large office building, while a solar greenhouse project at Two Eagle River School in Dixon has been incorporated in several aspects of the curriculum at this alternative school. A radio repeater station powered by photovoltaic cells has been installed on Eaglehead Mountain, 30 miles south of Bozeman, providing VHF communication for amateur radio operators in the area.

Monitoring and evaluation of various solar systems is being accomplished through follow-up grants under the program. Several residential heating systems across the state are being monitored under a contract with Fowlkes Engineering of Bozeman, to determine which systems perform most efficiently under a variety of Montana weather conditions. Under a separate grant, Charless Fowlkes is coordinating a program to measure solar radiation, or insolation, at 30 stations across Montana. This project, which involves high school students and science teachers at each location, will provide data needed to determine proper size and type of solar heating systems across Montana. A solar data manual and a handbook of solar experiments for junior high and high school students have been produced through the project.



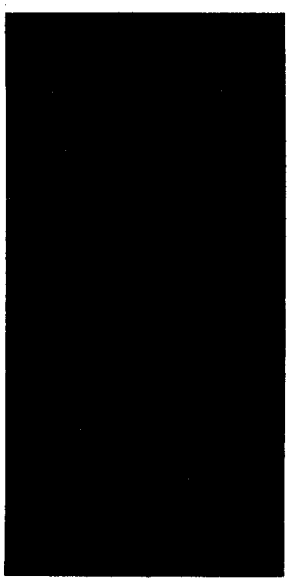
(Clockwise from upper left). By the time the sun's rays first strike John Means' earth-sheltered, passive solar house in the mountains near Missoula, they have already begun heating the water in the trickle collectors on Otis Johnson's house in Turner. Moving west, the sun is put to work heating the various buildings and hot water tanks at Jocko Hollow Campground near Arlee. At Dixon, near the confluence of the Jocko and Flathead Rivers, it heats a greenhouse built by carpentry and science students at the Two Eagle River School.

WIND

The wind blowing across our eastern Montana prairies has long been recognized as a force to be reckoned with, often in terms of resisting its effect. Prior to the 1930's and the rise of rural electric associations, the land was dotted with many small windmills that captured this power for irrigation, stock pumps and household use. But when low-cost electricity became readily available, wind power lost favor.

Montana's winds vary considerably, from calm periods to storms with winds in excess of 100 miles per hour. Designers of wind machines for this state must recognize the intermittent nature of the wind, making their machines strong enough to last through years of winter storms, yet sensitive enough to make the most of light winds. Wind machines in Montana face ice, driving rain and temperatures ranging from -40 °F to over 100 °F.

Many wind projects are oriented toward increased efficiency and lower costs for wind systems in the future. These projects research new designs, develop improvements of existing designs, or test different combinations of wind systems and storage devices. Most projects have involved development of residential-sized wind systems. In Chinook, Jerry McGillivray is constructing a wind system to power his earth-sheltered home. Under another Renewable Energy grant, LeRoy Gustafson of Cut Bank designed, built and tested a paddlewheel windmill, built out of scrap material. This design has great potential for use by Montana farmers and ranchers as it was built at minimum cost using common tools.



Combining the efforts of the Renewable Energy Program, the Montana Power Company and MERDI to explore large-scale use of windmill electricity, a wind project at Livingston is tied in with the utility power grid. Choosing a site for this project was no problem. According to one resident, Livingston is "the only place in the world where you can walk around the block and have the wind in your face every direction."

The Hi-Line town of Chinook is named after the unseasonably warm winter winds that blow down the east slopes of the Rockies. On a windy ridge south of town, Jerry McGillivray is putting this power to work, installing a wind system to provide electricity to his earth-sheltered home.

Before wind-generated electricity can be used on a widespread basis, it will be necessary to explore problems in incorporating these systems in the utility power grid. A major Renewable Energy Program grant to the Montana Energy and Magnetohydrodynamics Research and Development Institute (MERDI) is investigating these possibilities. In cooperation with the Montana Power Company, MERDI has set up a 25 kilowatt wind turbine generator at Livingston and has connected the wind system to the utility grid.

Other, smaller-scale projects involving wind system testing are also being tied in with Montana Power Company. For example, Drapes Engineering of Great Falls has set up a 2 kilowatt wind electric system in Tracy as part of a research project exploring alternatives for storing excess energy. A synchronous inverter converts the direct current from the wind generator into alternating current that can be fed into the utility power lines or used at the site.

Accurate wind resource data is another prerequisite for developing wind power. Several projects across the state are continuously monitoring wind conditions, often as a prelude to installing a system. Using monitoring equipment from past projects, the Bureau loans equipment to individuals or groups wanting to gather wind data at particular sites. Individuals in Choteau, Geraldine and Rudyard are currently participating in the loan program; more sites will be involved as more equipment is acquired.

EDUCATION AND TECHNICAL ASSISTANCE

Projects involving specific energy systems show which forms of renewable energy work best; education and technical assistance grants take the next step, communicating this information to the public. Projects in this diverse category range from an energy use and design course for contractors and architects to the "New Western Energy Show," a traveling theatrical troupe that offers hands-on workshops and demonstrations of renewable energy systems.

In cities and small towns across the state, Montanans are learning about renewable energy and conservation from "The New Western Energy Show." This traveling theatrical troupe is the brainchild of the Alternative Energy Resources Organization (AERO), a Billings-based group that has pioneered renewable energy in Montana.

High school and college faculty from across Montana were able to attend a "Summer Energy Institute" at Montana State University. Participants were exposed to an interdisciplinary perspective on U.S. energy policy and renewable energy alternatives. As part of the Institute program, participants in turn conducted energy courses in their communities. Another project involving classrooms across the state is the solar insolation measurement discussed in the section on solar grants.

A video-tape series examining Montana's renewable energy resources is currently being produced by WarWood Productions of Helena. A half-hour documentary on solar monitoring has been completed and the company is currently working on a segment on geothermal energy. Other projects in this category include an analysis of solar heating systems funded through the Renewable Energy Program and a study of the legal and institutional mechanisms that affect development and use of renewable energy. The Bureau will also participate in the Montana Renewable Energy Viability Project, which will use a multi-disciplinary approach to determine feasibility of various renewable energy sources in Montana. Information from the study will be valuable in directing future efforts of the Bureau.

PUBLIC INFORMATION

Renewable energy is a rapidly growing, rapidly changing field. New concepts and designs are being tested constantly; many of these innovations could have substantial impact on Montana's energy consumption. Because energy is an issue affecting all of us, it is important that relevant information be made available to Montanans.

The Renewable Energy Bureau has begun an active public information campaign to inform Montanans of the program and to promote renewable energy concepts across the state. Newspaper articles, slide shows and special publications are a few of the media involved. Bureau staff participate in fairs and workshops across the state, giving demonstrations and answering questions for civic groups, elementary and high school students and other organizations. In February 1980, the Renewable Energy Bureau held a statewide conference on gasohol, discussing various methods for establishing production and distribution facilities in Montana.

Some of the most effective public information comes from the grantees themselves. Neighbors and passers-by will notice a new windmill, a waterwheel or a solar collector and will stop in to find out more about it. As interest builds in their communities, grantees may end up giving presentations themselves or conducting tours of their systems. In a rural state like Montana, this grassroots network is often the most effective way of letting people know about a new program.

SUMMARY AND EVALUATION

As Montana enters the 1980s, it goes with an awareness of a changing energy scene. Even our state's most abundant fossil fuel reserves are finite; more and more people are beginning to realize it's time to explore long-range energy alternatives seriously.

In its five years of existence, the Renewable Energy Program has helped foster this energy awareness. With projects reaching from Miles City to Noxon, the Program has shown Montanans first-hand the variety of ways renewable resources can produce usable energy. The approach has been oriented to the needs of our rural states: most grants have gone to individuals for small-scale residential power systems. Grantees have been typical, independent Montanans, used to doing things for themselves and meeting their own needs.

The program's success comes from the interest it has generated among these people. It has reached farmers and ranchers, teachers and students, public utilities and nonprofit energy organizations. Uniting diverse interests toward a common goal, the Renewable Energy Program has started people across the state thinking about the vast energy potential of wind, water, wood and waste, of natural heat from the earth and the sun. In the most recent open grant period, autumn 1980, the Renewable Energy Bureau received a record 175 proposals for a total of over $5.5 million. Grant proposals came in from all the state's major cities as well as from scores of rural communities such as Opheim, Absarokee and Alder. Projects ranged from small residential systems to major ethanol production plants, with an increasing number of education and technical assistance proposals.

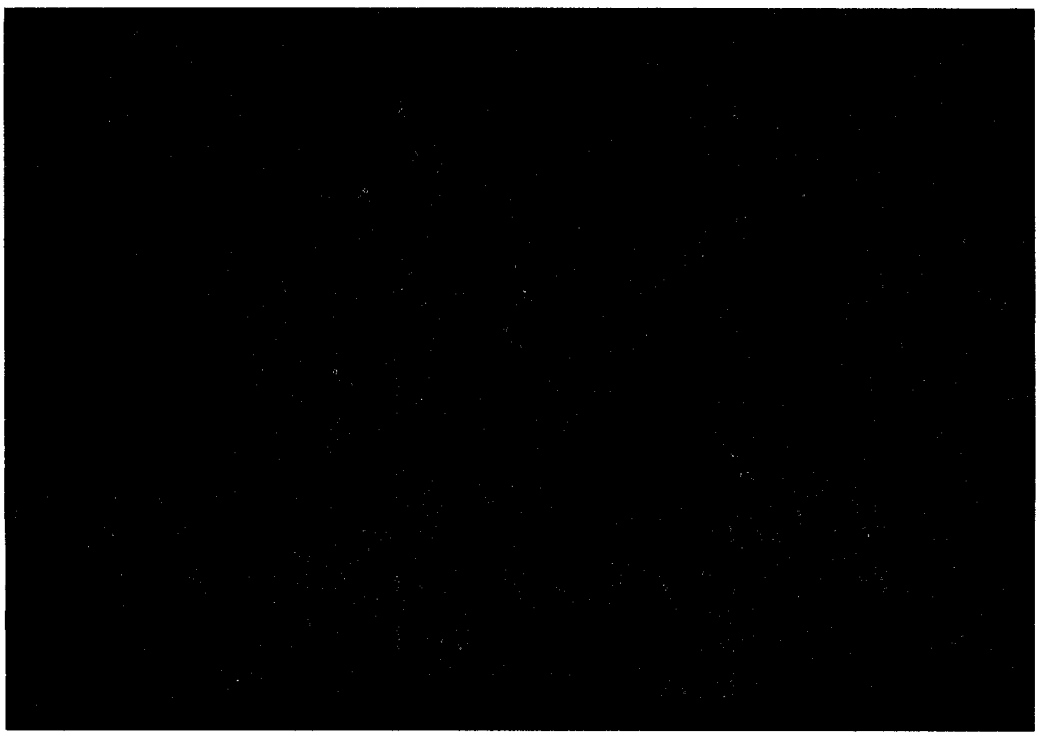
Judging from this response alone, the basic foundation has been laid for developing renewable energy in Montana. But with this emerging energy awareness come some hard questions: How can we make a truly significant impact on Montana's energy production? Are we ready to consider larger, community-scale projects? Can the program evolve to encompass these projects without losing its grassroots emphasis?

If renewables are to play a significant role in Montana's future — supplying 20 percent of our energy by the year 2000 — the program must expand its scope to include larger buildings and neighborhood and town-sized projects and perhaps to encourage the creation of the new businesses that will carry on this emerging industry. Bureau personnel are already studying electricity-generating garbage burning plants for the Cities of Bozeman and Helena, as well as a municipal geothermal heating system for the town of Baker. A few projects have demonstrated solar heating in relatively large buildings, while others have assisted in marketing renewable energy products.

These projects are a start, testing the waters of a potential expansion. In 1975, the Renewable Energy Program was established with a charge to emphasize small-scale individual grants. This approach is still crucial today, but renewable energy is five years older and growing fast. The technology is advancing by leaps and bounds, and Montanans are interested. Housing contractors are looking toward entire subdivisions of passive solar houses and institutional buildings are being studied for conversion to geothermal heat.

To accommodate those rapid changes, the Renewable Energy Program must broaden its scope. But if the Program does evolve to include municipal projects and commercialization, it must not be at the expense of individual grants, the grass-roots approach on which the success of the program hinges. From Plentywood to Hot Springs, from Chinook to Sun River, Montanans are looking at renewable energy. These are the people who had windmills and shelter belts, waterwheels and wood stoves long before renewable energy development became national policy.

For decades Montanans have been plowing surplus back into the soil, replenishing rather than depleting, looking toward the future. The Renewable Energy Program builds on this tradition, setting aside some of the revenue from harvesting coal and plowing it back into Montana. The program is now ready to encompass new aspects of renewable energy development. But it also must maintain its foundation, reaching the individual Montanan whose independence, innovation and initiative have earned renewable resources a position in Montana's energy picture.

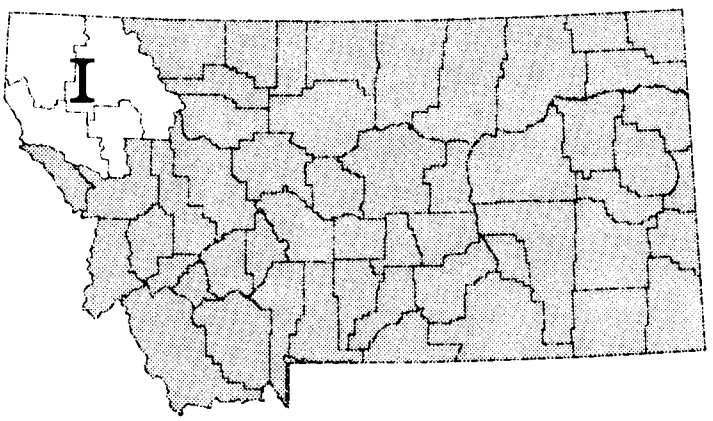


Charless Fowlkes of Fowlkes Engineering examines data collected by monitoring several of the residential solar heating systems funded through the program. This information, along with solar insolation data from the SIMM project, will help Montanans decide what solar systems will work best in their particular locations.

GRANTEES AND THEIR PROJECTS

AREA I

Lincoln
Flathead
Sanders
Lake



BIOMASS

Gary Kent Universal Services Unlimited Box 151 Thompson Falls, MT 59873	Feasibility study and design of ethanol plant using wood feedstock	$25,000
Dan Miles Lake County Resource Recycling Center Box 679 Polson, MT 59860	Fuel alcohol distilled from surplus and waste agricultural products	$ 2,500

GEOTHERMAL

Dave Harriman Post Creek St. Ignatius, MT 59865	Geothermal spring for heat pump	$ 4,000

SMALL-SCALE HYDROPOWER

Bill Delp Independent Power Developers Box 1467 Noxon, MT 59853	Small-scale hydroelectric system	$19,885
Bill Delp Independent Power Developers	Low-head, low-impact hydroelectric system	$25,000

SOLAR

Ronald Breese P. O. Box 221 Whitefish, MT 59937	Develop and test five tracking parabolic solar collectors	$ 5,000

SOLAR COMBINATIONS

Phillip Schmitz Ronan, MT 59864	Solar space heating for carpenter's shop—air collectors with wood assist	$ 4,649

WIND

John Kelly and Dale Williams Star Route Libby, MT 59923	Small-scale wind generation system	$ 3,500
Bill Delp	Domestic sized wind-electric system	$70,681

WOOD

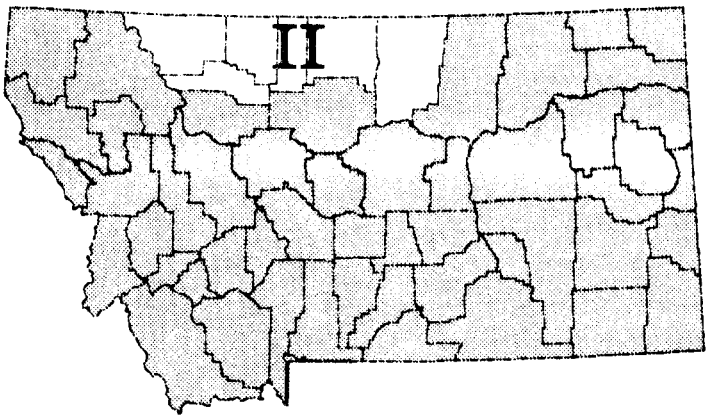
Bill Delp	Automatic high-efficiency wood furnace	$ 6,968
Ron Carter	Solid fuel gasification	$ 5,942

EDUCATIONAL AND TECHNICAL ASSISTANCE

Victor Charlo Two Eagle River School Star Route Dixon, MT 59831	Solar greenhouse for use as an educational tool	$ 3,000

AREA II

Glacier
Pondera
Toole
Liberty
Hill
Blaine



SOLAR

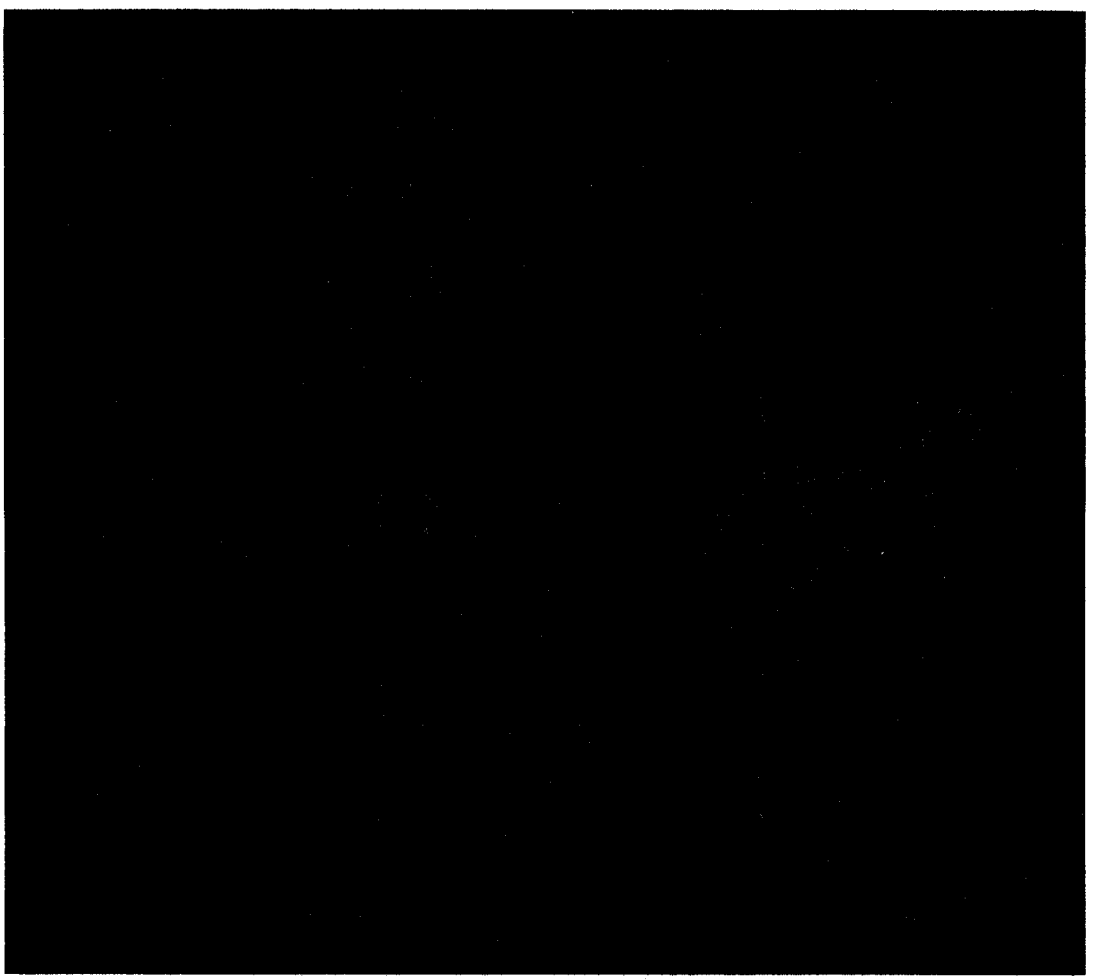
Horizon Lodge Major Caldwell 701 S. Wisconsin Conrad, MT 59425	Solar hot water system for retirement home	$79,013
Orville Oien C-E Ranch, Inc. Rural Route 3, Box 89 Conrad, MT 59425	Solar space and hot water heating	$ 7,276
J. Levi Hanson Box 1776 Gilford, MT 59525	Attached solar greenhouse for passive space heating	$ 6,446
Dick King and Wayne Cross Dist. #4 Human Resources Council Box 1509 Havre, MT 59501	Solar hot air collectors for 20 low-income homes	$ 6,076
John Allemeier Havre, MT 59501	Solar space and hot water heating air collectors	$ 6,093
City of Shelby Rae Kalbfleish, Mayor P. O. Box 518 Shelby, MT 59474	Solar heated swimming pool	$36,800
Otis Johnson Box 157 Turner, MT 59542	Solar space heating and hot water —trickle collectors	$ 7,000

SOLAR COMBINATION

Bruce McCallum P. O. Box 607 Chester, MT 59522	Attached solar greenhouse using liquid collectors and wood stove for heating—also wind study	$ 3,159

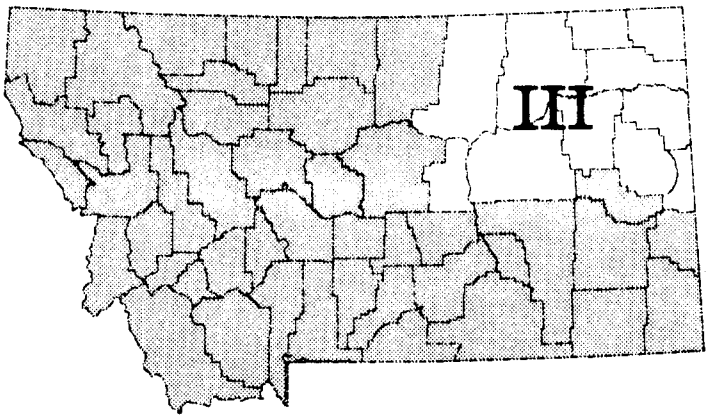
WIND

LeRoy Gustafson Box 1168 Cut Bank, MT 59427	Paddlewheel-type windmill	$ 4,800
Jerry McGillivray Route 1, Box 78 Chinook, MT 59523	Demonstration of 10 kilowatt wind system	$27,500



AREA III

Phillips
Valley
Daniels
Sheridan
Roosevelt
Petroleum
Garfield
McCone
Richland
Dawson
Wibaux



BIOMASS

Agri Processors, Inc. c/o Mayor Jim Smrcka Glasgow, MT 59230	Construction of a gasohol facility	$30,000

SOLAR

Dennis Howard River Road Glendive, MT 59330	Solar space heating—air collectors	$ 6,000
Mike Stoltz 109 5th Highland Park Glendive, MT 59330	Solar space heating—air collectors	$ 3,805
Stan Steadman 109 E. Power Glendive, MT 59330	Passive solar greenhouse	$ 1,240

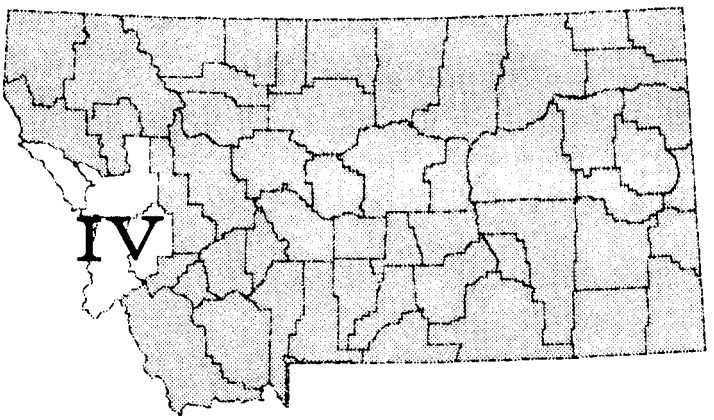
SOLAR COMBINATIONS

John Brown Box 216 Circle, MT 59215	Energy self-sufficient solar greenhouse with wind power and compost heat	$12,500

AREA IV

Mineral
Missoula

Ravalli
Granite



BIOMASS

Jim and Doris Ekstrom P. O. Box 1010, Route 1 Clinton, MT 59825	Greenhouse using composting heat source	$ 3,149

SMALL-SCALE HYDRO

Terry Savage P. O. Box 26 Lolo, MT 59847	12 kilowatt hydroelectric system	$14,050

SOLAR

City of Hamilton Ray Thraikill, Mayor Box 709 Hamilton, MT 59840	Solar municipal swimming pool	$38,320
Mike Barton Dist. #11 Human Resources Council 207 E. Main Missoula, MT 59801	Solar domestic hot water systems for low-income homes	$15,000
HRDC #11	Revisions to above solar air collector system to improve efficiency	$ 4,705
Ken Boggs Dist. #11 Human Resources Council	Low cost solar heating systems for mobile homes—air collectors	$26,000
Ken Boggs	Solar collector systems for low-income homes—air collectors	$26,875

John Means Route 5 Pattee Canyon Missoula, MT 59801	Solar home heating	$ 4,000
John Means	Passive solar trombe wall and earth sheltered home	$10,220
Stephen and Gail Goheen NE 1522 Willow Creek Road Corvallis, MT 59828	Solar space heating air collectors	$ 5,680
Donald Peterson Robert Heath 1 Carriage Way Missoula, MT 59801	Solar home space and hot water heating—air collectors	$ 7,000
Gail Owen 7001 Bitterroot Road Route 5 Missoula, MT 59801	Solar space heating—air collectors; solar domestic hot water heating —liquid collectors	$11,362
Richard Sheridan Botany Department U of M Missoula, MT 59801	Solar collectors and partitioned storage	$ 8,000
John MacDonald Route 1, Box 53C Stevensville, MT 59870	Solar space and hot water heating for home using water heat	$ 4,314

SOLAR COMBINATIONS

John Fisher Jocko Hollow Alternative Energy Effort Arlee, MT 59821	Four retrofit solar projects —solar greenhouse —active hot water heating system for cabin —drum wall for space heating of cabin —solar shower, laundry facility	$20,000
John Duffield Route 5 Pattee Canyon Missoula, MT 59801	Passive solar trombe wall with wood assist for space and hot water heating	$ 9,640
Anthony Terzo Route 4 Piltzville Missoula, MT 59801	Passive solar with wood for space and hot water heating	$10,000
Richard Dill Route 2, Box 50A Stevensville, MT 59870	Solar space heating and development of high-efficiency wood stove	$ 6,361

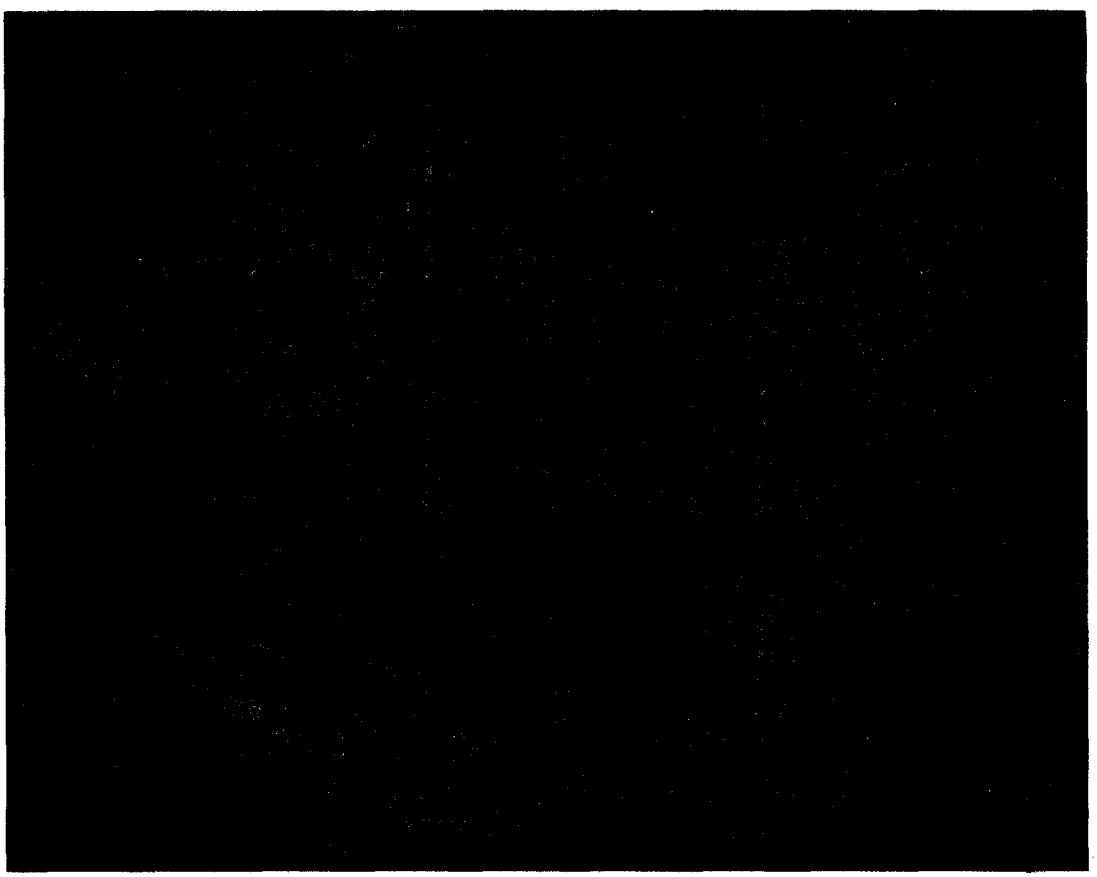
Tom Power Bass Creek Commune Route 2 Stevensville, MT 59870	Solar, wind and wood for power and space heating of home	$12,095

WOOD

John Badgley Institute of the Rockies 622 Evans Missoula, MT 59801	Feasibility study for underground wood heated conference center	$ 3,675
John Badgley	Earth sheltered conference center using passive solar and wood heat	$30,000

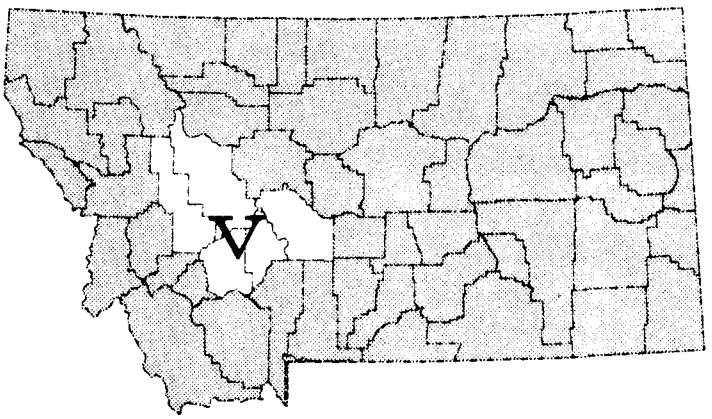
EDUCATIONAL AND TECHNICAL ASSISTANCE

Scott Sproull AERO West 323 W. Alder Missoula, MT 59801	Solar heated office and renewable library information center	$ 6,498



AREA V

Powell
Lewis & Clark
Jefferson
Meagher



BIOMASS

City of Helena 316 No. Park Helena, MT 59601	Feasibility study for a cogeneration solid waste recovery system at Fort Harrison Hospital	$49,235

GEOTHERMAL

William Spilker Box 244 Helena, MT 59601	Study and model for geothermal energy use in subdivision	$15,000
Michael Grove First National Bank White Sulphur Springs, MT 59645	Geothermally heated bank	$43,500
John Bartos Mountain Memorial Hospital Box Q White Sulphur Springs, MT 59645	Drill and test well for geothermal potential	$ 2,000

SMALL-SCALE HYDRO POWER

Richard and Nancy Klick K Bar L Ranch Box 287 Augusta, MT 59410	5KW high-head hydroelectric system	$ 8,785

SOLAR

Lowell Anderson 1311 University Helena, MT 59601	Development of semicircular hot air solar collector	$ 4,000
Thomas Stewart 8945 Douglas Circle Helena, MT 59601	Research into covenants for solar subdivision development	$ 3,000

James Taylor 2715 Airport Way Helena, MT 59601	Solar space and hot water heating —air collectors	$12,750
Montana Department of Highways 2701 Prospect Helena, MT 59601	Solar designs for a state maintenance building	$ 3,000
Montana Department of Highways	Active and passive solar applications to a state maintenance building	$80,000
William Harbrecht 716 Broadway Helena, MT 59601	Solar home heating	$10,000
David Orndoff 1063 Breckenridge Helena, MT 59601	Solar space heating	$ 5,000

SOLAR COMBINATIONS

Phillip Pallister Jaybird Ranch Boulder, MT 59632	Solar space and water heating with wood assist	$ 8,000
Sherman Cook Lincoln, MT 59639	Solar space heating with wood-fired boiler	$10,500

WIND

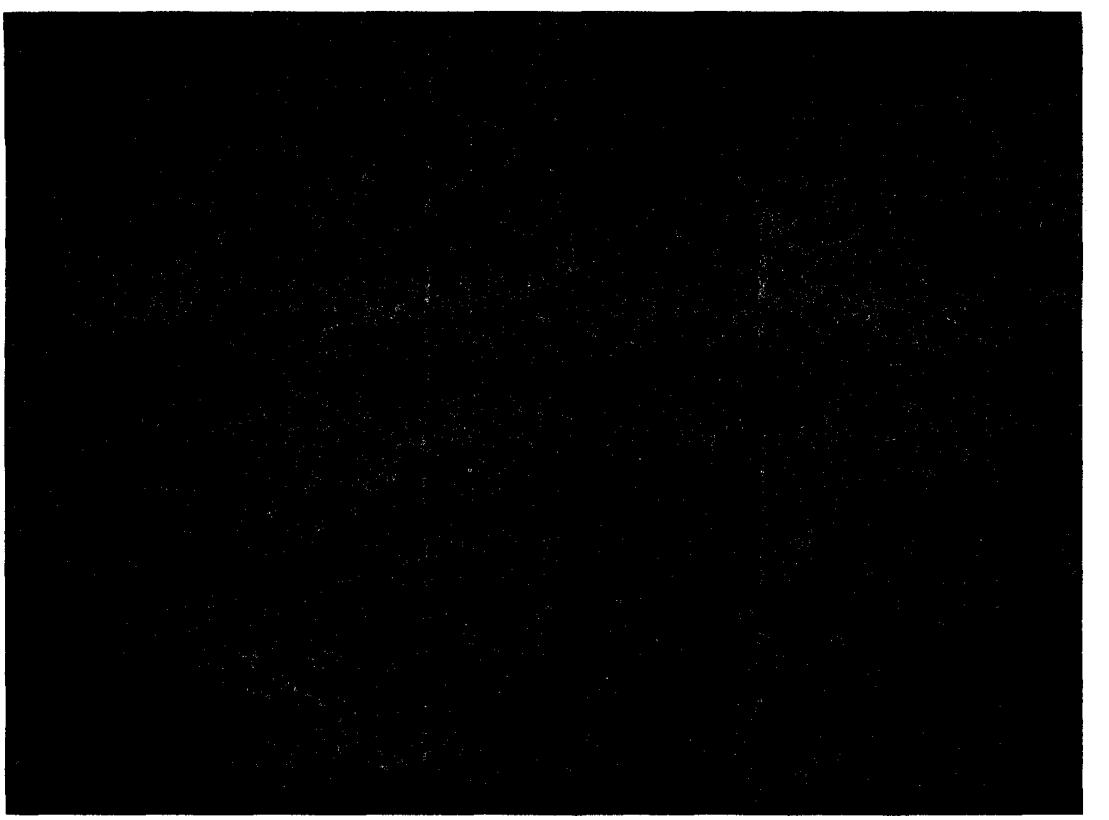
Dana Gunderson Gunderson Consulting Service 115 N. Davis Helena, MT 59601	Wind monitoring—Caretaker Project (RFP)	$ 8,854

WOOD

John Mason Lot 2 - Block 7 Blue Sky Heights Clancy, MT 59634	Hippert wood furnace for space heating	$ 510
Leland Smith 2425 Chaparral Road Helena, MT 59601	Double wood stove heating system	$ 2,837
Herb Winsor Box 706 Helena, MT 59601	Feasibility study—market analysis of wood waste conversion for community use	$ 5,763

EDUCATIONAL AND TECHNICAL ASSISTANCE

Richard Klinger 619 First St. Helena, MT 59601	Study legal and institutional barriers to renewable energy	$10,000
Ed Eschler Office of Public Instruction Capitol Building Helena, MT 59620	Energy environment simulator	$ 3,000
Dick Bourke Western Analysis Box 287 Helena, MT 59601	Economic modeling of solar homes	$ 9,972
Dennis Woodhouse 206 W. Lawrence Helena, MT 59601	Video Documentary (funded through a request for proposals—RFP)	$ 6,356
Dennis Woodhouse and Leo Ward	Video: Phase II	$33,715
Eric Trimble 326 Clay St. Missoula, MT 59801	Special report on finished solar projects	$ 2,500



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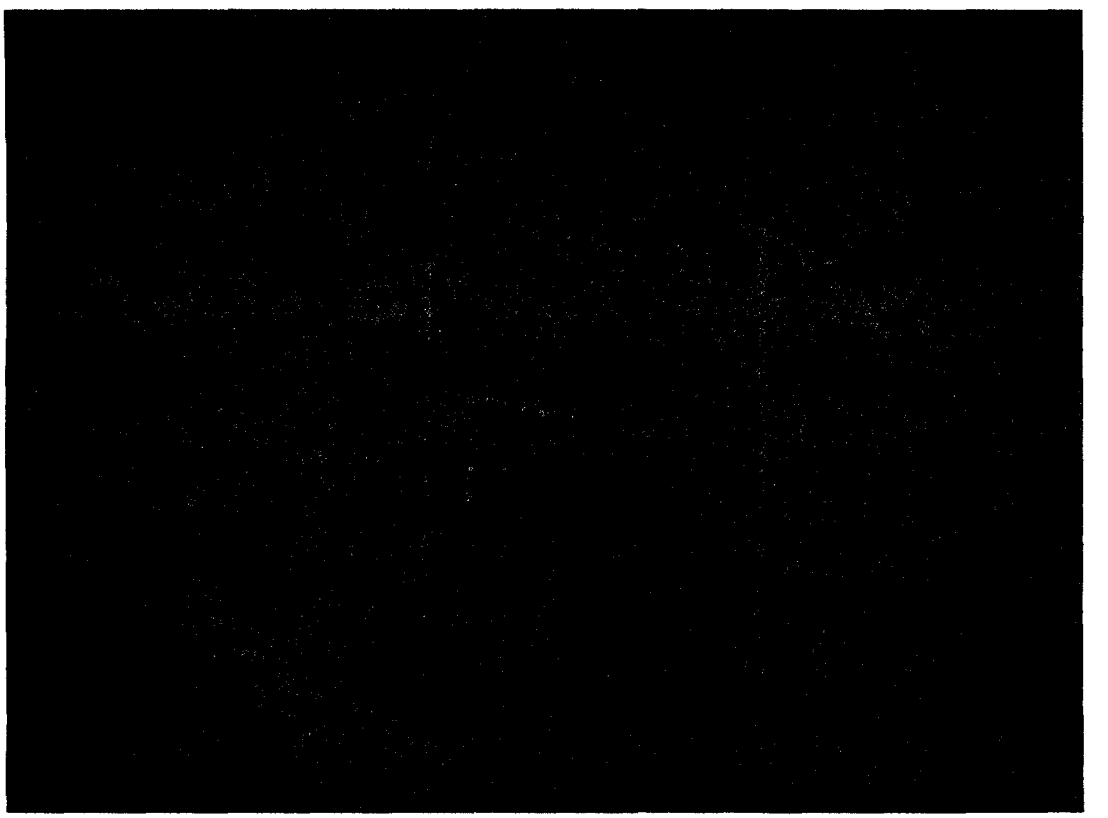
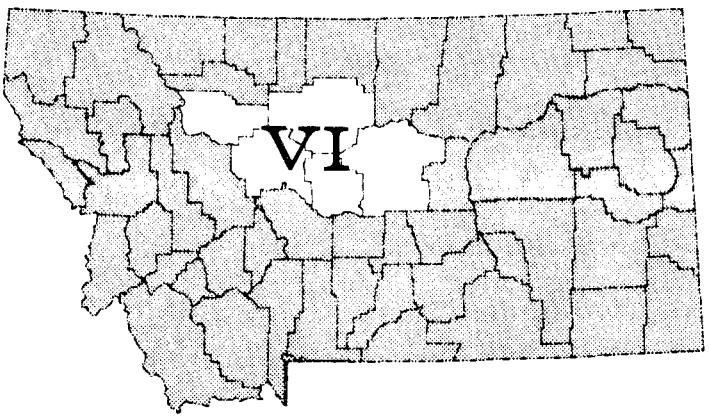


AREA VI

Teton
Choteau
Cascade

Judith Basin
Fergus



SMALL-SCALE HYDRO POWER

Rick and Earlene Ostberg Rural Rt 1 Power, MT 59468	Hydro system for home and farm use	$25,000

SOLAR

Susan Brown/Barbara Clowers 700 Seventh Ave. No. Great Falls, MT 59401	Solar hot water system	$ 2,800
William Kilby 3131 Fifth Ave. No. 1 Great Falls, MT 59405	Solar concentrating collector system for hot water	$14,100
L. Clark MacDonald Bootlegger Trail Great Falls, MT 59401	Active and passive solar collection for space heating	$ 8,743
William Tomlinson 403 Colorado Ave. N.W. Great Falls, MT 59401	Solar/heat pump heating system	$ 7,166
Lawrence Truchot Route 2 South, Box 937 Great Falls, MT 59401	Solar hot water system trickle collector	$ 7,500

SOLAR COMBINATIONS

Gregory Cunniff 742-33 "B" Ave. N.E. Great Falls, MT 59404	Solar space heating with wood assist	$16,850
Gary Franklin 4428 Sixth Ave. So. Great Falls, MT 59401	Passive solar greenhouse with wood assist for home heating	$ 5,000

WIND

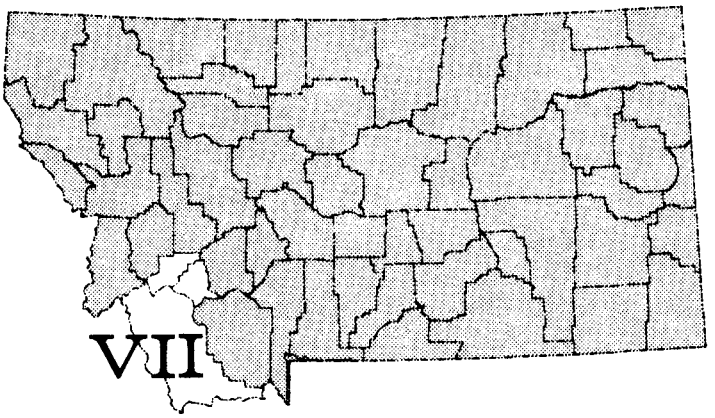
Bill Stockton Grass Range, MT 59032	Home-made wind powered air compressor	$ 1,385
John Gordon Cascade, MT 59421	Wind monitoring near Cascade	$ 2,000
Wayne Lersbak, Supt. School Dist. #3 & 3B Cascade, MT 59421	Wind monitoring	$10,000
Drapes Engineering 292 Eklund Great Falls, MT 59401	2 kw wind generation system with utility interface	$19,375
Drapes Engineering	Wind monitoring of site (Tracy)	$ 5,093

EDUCATIONAL AND TECHNICAL ASSISTANCE

Ray Wirth Great Falls Federal Savings & Loan Association 25 5th St. North Great Falls, MT 59401	Digital monitoring display for solar system on Conrad branch office	$ 1,600

AREA VII

Deer Lodge
Silverbow
Beaverhead



BIOMASS

John McBride National Center for Appropriate Technology P.O. Box 3838 Butte, MT 59701	Biogas assessment	$25,624
Ed O'Hair MERDI Box 3809 Butte, MT 59701	Feasibility study for straw-burning heating plant	$38,736
Ed O'Hair	Biomass ethanol assessment	$20,000

GEOTHERMAL

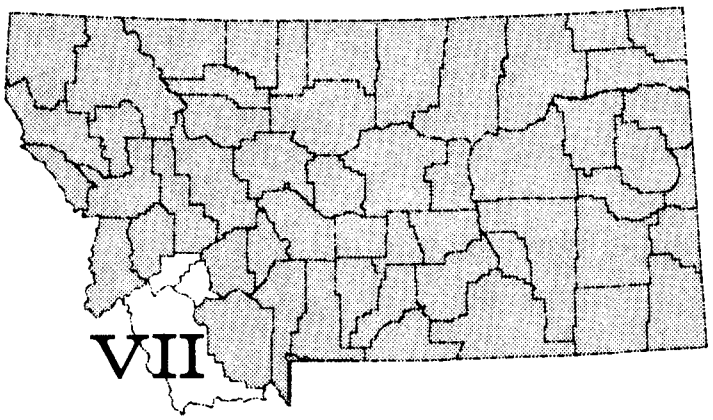
Karen Barclay MERDI P.O. Box 3809 Butte, MT 59701	Conceptual design for geothermal energy use at Warm Springs State Hospital	$ 9,000
C. Wideman Montana College of Mineral Science and Technology Butte, MT 59702	Geothermal development of Warm Springs area	$10,265
John Sonderegger Bureau of Mines & Geology Montana College of Mineral Science and Technology Butte, MT 59701	Geothermal resource evaluation in four valleys	$30,000

SOLAR

Robert Corbett P.O. Box 3706 Butte, MT 59701	Passive solar heating through greenhouse for space heating assist	$ 5,913

AREA VII

Deer Lodge
Silverbow
Beaverhead



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GEOTHERMAL

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John Sonderegger Bureau of Mines & Geology Montana College of Mineral Science and Technology Butte, MT 59701	Geothermal resource evaluation in four valleys	$30,000

SOLAR

Robert Corbett P.O. Box 3706 Butte, MT 59701	Passive solar heating through greenhouse for space heating assist	$ 5,913

Charles Herndon/Nels Anderson Engineering Sciences Dept. Montana College of Mineral Science and Technology Butte, MT 59701	Solar heating for office space-full instrumentation and system analysis	$16,000
Nels Anderson Mineral Research Center Box 3708 Butte, MT 59701	Solar collector test facility	$30,700
Charles Herndon Engineering Sciences Dept. Montana College of Mineral Science and Technology Butte, MT 59701	Solar heating systems evaluation	$16,800
Tom Shelley Montana College of Mineral Science and Technology Butte, MT 59701	Performance testing of solar collectors and working fluids systems	$14,812
Butte-Silver Bow Anti-Poverty Council 107 E. Granite Butte, MT 59701	Solar hot water heater and greenhouse	$ 4,148
Pete Antonioli Box 791 Butte, MT 59701	Development of fluorescent-tube solar collector	$ 5,000

WOOD

Denny Driscoll Boys Home Rev. J. F. Finnegan P.O. Box 3903 Butte, MT 59701	Hippert furnace for boys' home and solar air collectors for office	$26,217

EDUCATIONAL AND TECHNICAL ASSISTANCE

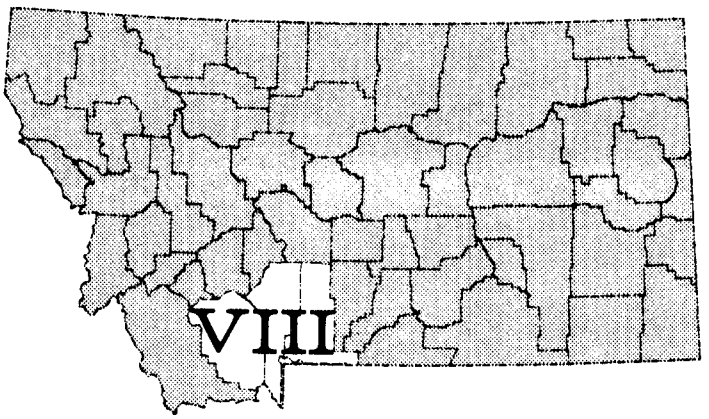
Dr. Jerry Plunkett MERDI P.O. Box 3809 Butte, MT 59701	Center for Innovation	$77,880
	Continuation of above	$29,806

WIND

Ed O'Hair MERDI Box 3809 Butte, MT 59701	Wind development program for Livingston and Whitehall	$100,000

AREA VIII

Madison
Gallatin
Park



BIOMASS

Don Brelsford Brelsford Engineering P.O. Box 1552 Bozeman, MT 59715	Feasibility study of producing energy from crops and crop residues	$25,000
John Robbins Chemistry Dept. Montana State University Bozeman, MT 59717	Biological, biochemical and chemical engineering techniques for using biomass as energy source	$19,480
	Continuation of above	$37,732
	Continuation of above	$28,601
John Robbins	Bioconversion of waste — increased efficiency	$32,307
David Ward Microbiology Dept. Montana State University Bozeman, MT 59717	Survey of biological methane production from agricultural, domestic, and industrial sources	$23,410
	Continuation of above	$33,433
D. O. Blackketter and C. R. Wimberly Montana State University Bozeman, MT 59715	Feasibility study for a Bozeman municipal solid waste recovery and energy generation system	$30,816

GEOTHERMAL

Charles Page Rte. 4, Box 142 Bozeman, MT 59715	Geothermal subsurface feasibility study	$15,000

SOLAR

Harry Erickson Belgrade Public Schools School Dist. #44 Belgrade, MT 59714	Feasibility and pre-engineering study for solar junior/senior high school (Phase I)	$10,750
Harry Erickson	Design plan for solar junior/senior high school (Phase II)	$ 1,500
Harry Erickson	Construction of solar junior/senior high school	$91,360
Lee Barrett Electronics Research Lab Montana State University Bozeman, MT 59717	Solar electric radio signal repeater (photovoltaic)	$ 5,314
John Drumheller Physics Dept. Montana State University Bozeman, MT 59717	Study of natural reflective surface efficiencies	$12,990
Charless Fowlkes Fowlkes Engineering 31 Gardner Park Drive Bozeman, MT 59715	Solar space heating and storage combination system for mobile home — air collectors	$25,000
Charless Fowlkes Fowlkes Engineering	Detailed monitoring of installed solar systems for efficiency and economic analysis	$30,000
Charless Fowlkes Fowlkes Engineering	Solar insolation monitoring measurement (SIMM) at 20 locations	$29,790
	Continuation of above	$35,490
	Continuation of above	$35,765
	Continuation of above	$37,400
Charless Fowlkes Fowlkes Engineering	Performance monitoring (RFP)	$45,000
Charless Fowlkes Fowlkes Engineering	Performance monitoring of Hamilton solar pool	$10,145
Peter Gobby 208 S. Willson Bozeman, MT 59715	Solar heated greenhouse for winter operation	$12,000
David Leavengood Bridger Canyon Route 2 Bozeman, MT 59715	Solar space heating — air collectors	$10,500

Richard Lloyd-Jones Route 1 Ennis, MT 59729	Passive solar greenhouse for home space heating assist	$ 1,849
George Mattson 109 E. Main Bozeman, MT 59715	Solar space heating — air collectors	$ 8,000
Ken Nordtvedt, Jr. Physics Dept. Montana State University Bozeman, MT 59717	Solar heating of domestic hot water for apartment complex use	$ 4,000
James Orvis Route 1, Box 347 Bozeman, MT 59715	Solar mobile home heating	$ 3,700
Herb Richards Life of Montana Insurance Co. 28 N. Black Ave. Bozeman, MT 59717	Solar heated insurance building	$59,500
Mechanical Engineering Dept. Montana State University Bozeman, MT 59715	Development of a solar test facility (RFP)	$35,894

SOLAR COMBINATIONS

Fowlkes Engineering	Passive solar home with high-efficiency wood furnace	$10,000
Jack Kreitinger Route 1, Box 195 Three Forks, MT 59752	Solar space and hot water heating with wood assist	$ 4,315

WIND

Brelsford Engineering Donald Brelsford P.O. Box 1252 Bozeman, MT 59715	Wind survey of Livingston area	$17,295
Robert Leo Electronics Research Lab Montana State University Bozeman, MT 59717	Small-scale wind generation	$ 8,650
V. Hugo Schmidt Physics Dept. Montana State University Bozeman, MT 59717	Wind energy/synchronous inverter	$ 7,346

V. Hugo Schmidt	Continued synchronous inverter and ducted rotor wind generator development	$19,640
V. Hugo Schmidt	DC/AC inverter bench testing	$ 5,841

WOOD

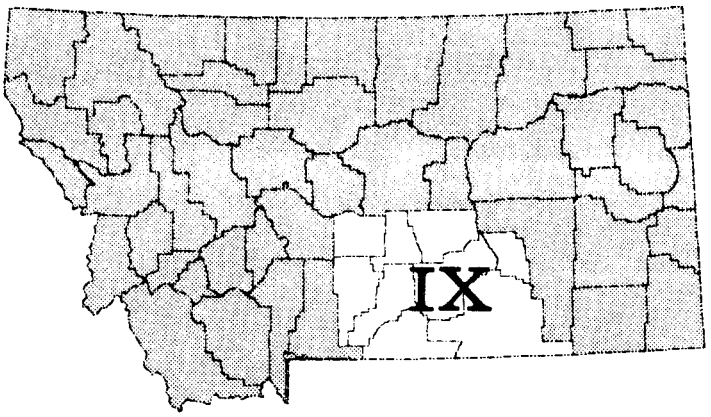
Alvin Fiscus Route 3, Box 60 Bozeman, MT 59715	Monitor wood fireplace for supplementary home heating	$ 800
S. Richard Hagan/Doug Polette Industrial Engineering Dept. Montana State University Bozeman, MT 59717	High-efficiency wood furnace	$ 4,000
Robert Zychek Route 1, Box 89A Bozeman, MT 59715	Wood fireplace with water coils for space heating of home using water heat	$ 1,000

EDUCATIONAL AND TECHNICAL ASSISTANCE

Lauren McKinsey Political Science Dept. Montana State University Bozeman, MT 59717	1979 Summer Energy Institute for college and high school teachers	$ 2,681
Lauren McKinsey	1980 Summer Institute	$ 3,038
Charless Fowlkes Fowlkes Engineering	Infrared scanner	$35,583
Donald Weaver, Jr. 2404 Spring Creek Dr. Bozeman, MT 59717	Develop a digitized heat control and energy monitoring system	$ 6,000
John Charles/Robert Warrington Mechanical Engineering Dept. Montana State University Bozeman, MT 59717	Energy use and design course for contractors, builders and architects	$21,006
Robert Warrington	Compile and publish handbook from energy use and design course	$ 3,810

AREA IX

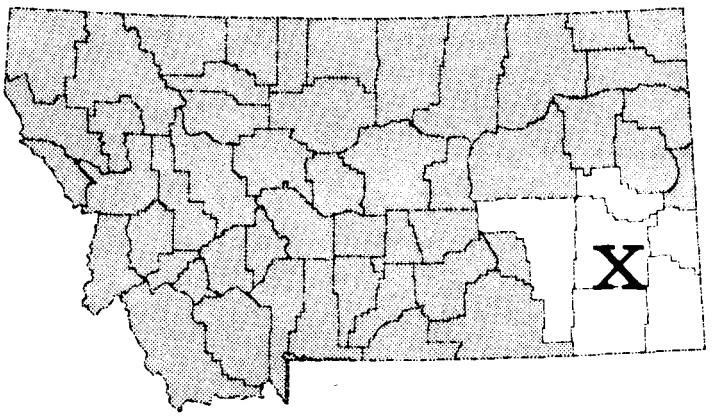
Wheatland
Golden Valley
Musselshell
Sweet Grass
Stillwater
Yellowstone
Treasure
Carbon
Big Horn



SOLAR

Kurt Hughes 120 N. Custer Ave. Miles City, MT 59301	Passive solar home	$ 5,400
Max Leighty 2212 Bullard St. Miles City, MT 59301	Solar space heating — air collectors	$ 3,553

AREA X



Rosebud
Custer
Fallon

Powder River
Carter

SOLAR

James Coons 208 N. 29th, Suite 212 Billings, MT 59101	Solar space and hot water heating	$11,000
Peter Rectfertig 1030 Harvard Billings, MT 59102	Passive solar space heating	$ 1,265
Norm Sulenes 2218 Fairview Place Billings, MT 59102	Passive solar heated home — freon used in the collectors	$10,760
John Alexander Box 426, McLeod Route Big Timber, MT 59011	Solar space heating — air collectors hot water preheat tank with wood assist	$10,972
Phil Morrow Box 30214 Billings, MT 59102	Solar space heating with concentrating collectors	$12,500
United Church of Christ* Rocky Mountain College 1511 Poly Drive Billings, MT 59101	Solar shower and domestic hot water heating for summer camp	$ 1,300

EDUCATIONAL AND TECHNICAL ASSISTANCE

Kye Cochran Alternative Energy Resource Organization (AERO) 435 Stapleton Bldg. Billings, MT 59101	New Western Energy Show	$22,453
Kye Cochran and Wilbur Wood AERO	New Western Energy Show	$44,800
Kye Cochran AERO	Energy demonstration center for New Western Energy Show	$24,800

*Grant cancelled because of potential church/state conflict.

APPENDIX A

ADMINISTRATIVE COSTS BY FISCAL YEAR

BUDGET ITEM	FISCAL YEAR				
	1976	1977	1978	1979	1980
Personal Services	$29,461.68	$35,593.18	$46,853.14	$ 92,721.20	$ 96,538.07
Contracted Services	184.23	480.90	3,388.54	25,399.32	18,290.18
Supplies & Materials	111.73	161.99	325.17	2,356.71	3,461.91
Communications	3,991.98	266.32	1,372.22	4,385.37	2,776.18
Travel	489.87	1,866.99	4,099.61	5,572.40	10,686.01
Rent	7,500.00	4,408.92	6,302.39	10,714.50	6,767.78
Other Expenses	124.00	197.70	726.10	1,992.50	3,247.14
TOTAL	**$41,863.49**	**$42,976.00**	**$63,067.17**	**$143,141.60**	**$141,767.27**

APPENDIX B

GRANT REQUESTS RECEIVED AND AWARDED BY GRANT SUBMITTAL PERIOD

GRANT PERIOD ONE

1976

Energy Category	Number of Applications Received	Funds Requested	Number of Grants Awarded	Amount of Funding
Solar	61	$1,828,404	18	$218,136
Wind	11	218,924	4	87,920
Wood	4	97,209	2	5,000
Biomass	6	184,658	1	19,480
Geothermal	3	144,971	1	15,000
Hydro	3	156,327	1	19,885
Educational/Technical	5	319,441	2	100,333
TOTAL	**93**	**$2,939,934**	**29**	**$465,754**

GRANT PERIOD TWO

WINTER 1977

Energy Category	Number of Applications Received	Funds Requested	Number of Grants Awarded	Amount of Funding
Solar	83	$1,994,307	31	$328,209
Wind	10	244,755	5	61,174
Wood	4	10,105	4	36,822
Biomass	8	427,005	0	——
Geothermal	5	175,117	3	56,500
Hydro	3	162,182	1	25,000
Educational/Technical	13	644,051	3	71,806
TOTAL	**126**	**$3,657,522**	**47**	**$579,511**

GRANT PERIOD THREE

SUMMER 1977

Energy Category	Number of Applications Received	Funds Requested	Number of Grants Awarded	Amount of Funding
Solar	72	$1,941,611	16	$210,529
Wind	7	77,677	2	3,385
Wood	2	13,188	1	3,675
Biomass	3	169,349	3	80,717
Geothermal	1	2,000	1	2,000
Hydro	3	61,037	1	14,050
Educational/Technical	10	421,729	5	79,881
TOTAL	**98**	**$2,686,591**	**29**	**$394,237**

GRANT PERIOD FOUR

WINTER 1978

Energy Category	Number of Applications Received	Funds Requested	Number of Grants Awarded	Amount of Funding
Solar	71	$1,230,559	9	$ 83,080
Wind	8	129,777	1	17,295
Wood	3	103,277	1	510
Biomass	2	50,624	2	28,767
Geothermal	6	91,415	1	10,265
Hydro	2	17,334	0	——
Educational/Technical	8	265,598	1	3,810
TOTAL	**100**	**$1,888,584**	**15**	**$143,727**

NOTE: To comply with State Budget and Accounting System (SBAS) procedures, the program switched at this point from calendar year grant periods to state fiscal year cycles.

GRANT PERIOD FIVE

FY 1979

Energy Category	Number of Applications Received	Funds Requested	Number of Grants Awarded	Amount of Funding
Solar	36	$ 874,587	6	$230,470
Wind	5	274,321	2	105,841
Wood	4	73,258	0	——
Biomass	3	74,967	3	100,770
Geothermal	1	16,475	1	15,000
Hydro	4	15,101	1	8,785
Educational/Technical	5	132,023	1	2,681
TOTAL	**58**	**$1,460,732**	**14**	**$463,547**

GRANT PERIOD SIX

FY 1980

Energy Category	Number of Applications Received	Funds Requested	Number of Grants Awarded	Amount of Funding
Solar	19	$ 620,062	6	$ 204,599
Wind	10	241,895	2	36,354
Wood	7	496,135	3	41,705
Biomass	22	862,152	7	195,283
Geothermal	6	113,336	1	30,000
Hydro	1	26,961	1	25,000
Educational/Technical	12	119,747	7	88,387
TOTAL	**77**	**$ 2,479,788**	**27**	**$ 621,328**
GRAND TOTALS	**552**	**$15,113,151**	**161**	**$2,668,104**

APPENDIX C

MEASURABLE BENEFITS

Reducing reliance on fossil fuels is a basic charge of the Renewable Energy Program. Program staff has estimated that since the Program began, demonstration grants have resulted in direct fuel savings of more than 625 billion BTU's (British Thermal Units). Converting to more familiar terms, this is equivalent to about 108,000 barrels of crude oil or about $3.5 million at current prices. These figures are expected to increase by 30 to 60 percent during Grant Period Seven, depending on funds available for Fiscal Year 1981. In addition to direct BTU savings, indirect savings are also resulting from demonstration projects and from Program-sponsored research, development and commercialization.

In addition to this significant return on investment, the $2.6 million in state grant money has brought in more than $18 million in federal or private matching funds and has created 66 permanent, full-time jobs as well as additional part-time employment. During FY 1981 the Bureau anticipates an additional $44 million in matching funds and creation of up to 176 more full-time jobs, contingent on funding level.

F Y 1981

GRANTS AWARDED IN FALL 1980

FROM THE

RENEWABLE ENERGY GRANTS PROGRAM

Definite Grants	$ 480,040.00
Tentative Grants	1,819,948.00
Earmarked for Requests for Proposals (RFP's)	381,000.00
TOTAL	$2,679,988.00

DEPARTMENT OF NATURAL RESOURCES

AND CONSERVATION

January, 1981

DETAIL OF SPRING 1981 REQUESTS FOR PROPOSALS (RFP's)

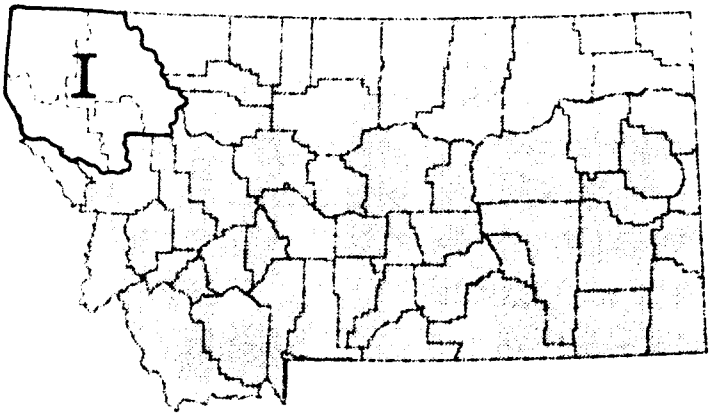
Designs for model earth-sheltered homes in Montana	$ 10,000.00
Development of eutectic salt as solar heat storage	$ 28,000.00
Research into solar photo-chemical energy in production of hydrogen	$ 50,000.00
Reduction and analysis of data from Wind Monitoring Loan Program	$ 30,000.00
Development of a wind generator and electrolysis cell to produce hydrogen	$ 8,000.00
Wood stove test facility	$ 90,000.00
Research and publication into building orientations and solar access in subdivisions	$ 15,000.00
Research and publication of manual for assistance to small businesses for development of their renewable energy goods and services capability	$ 70,000.00
Development of a home energy computer to assist homeowners in determining the feasibility of installing renewable energy systems	$ 50,000.00
Purchase of additional wind monitoring equipment for use throughout the state	$ 30,000.00
TOTAL RFP's	$ 381,000.00

FY 81 PROJECTS

AREA I

Lincoln
Flathead

Sanders
Lake



AREA I
DEFINITE

Troy Schools % Wayne Fletcher Drawer O Troy, MT 59935	Renewable energy education program	$ 1,333.00
Marc Carstens Route 1, Box 99 Polson, MT 59860	Alcohol and oil extraction from seed crops	$ 5,000.00
Richard Wrench 115 Garland Street Kalispell, MT 59701	Prototype fireplace insert	$ 7,500.00
Richard Wrench 115 Garland Street Kalispell, MT 59701	Two "do-it-yourself" pamphlets on renewable energy	$ 2,000.00
William C. Black Box 138 Troy, MT 59935	Wind-powered electric system	$ 4,500.00

AREA I
TENTATIVE

Salish Kootenai Community College % Gerlad Slater Box 117 Pablo, MT 59855	Solar heating, cooling and lighting of multi-use facility	$ 20,000.00
Matt Keane Route 3, Box 19-C Thompson Falls, MT 59873	Solar heated/earth-sheltered housing design	$ 14,000.00
James R. Brown Quinn's Hot Springs Box 187 Paradise, MT 59857	Geothermal heating system	$ 5,000.00
Dan Miles AGRI-Fuels Corporation Box 3371 Polson, MT 59860	Farm-scale alcohol still	$ 50,000.00

Energy Engineering Box 1997 Kalispell, MT 59901	Major alcohol plant using geothermal heat	$100,000.00
Vista Lago Land- owners Assoc. Jane Pitkin, President East Lake Shore Bigfork, MT 59911	Small hydroelectric system for subdivision	$ 60,000.00

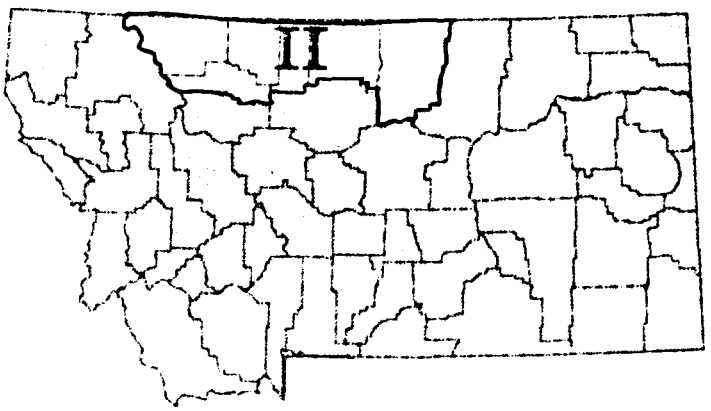
AREA I
TENTATIVE

Orlena Barnard 1395 Swan Highway Bigfork, MT 59911	Residential hydroelectric system	See note below
Merle Jore Route 2, Box 58A Ronan, MT 59864	Residential hydroelectric system	See note below

NOTE: These and two hydroelectric projects in Area IX were approved contingent on hiring an engineering consultant, through a request for proposals process, to provide technical assistance to the grantees. The Department approved definite funding of $16,000.00 for consultant service to all four projects. Also approved was definite funding of $16,000.00 for a system at the most feasible site and tentative funding of $50,000.00 for systems at the remaining sites.

AREA II

Glacier
Pondera
Toole
Liberty
Hill
Blaine



AREA II
DEFINITE

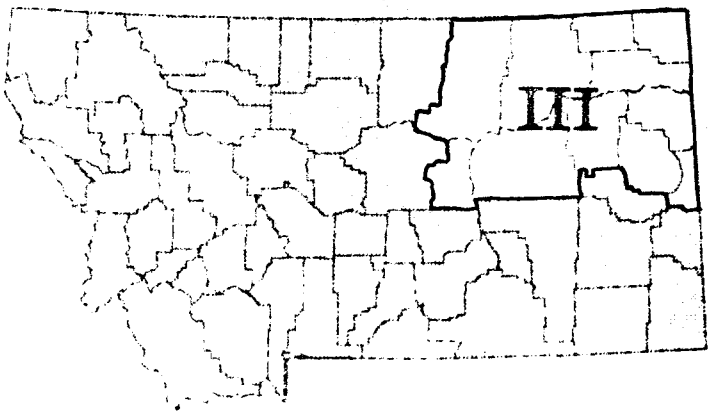
Patrick E. Wyse 406 South Virginia Street Conrad, MT 59425	Passive solar heating of large commercialbuilding	$ 15,213.00

AREA II
TENTATIVE

Orville & David Oien RR 3, Box 89 Conrad, MT 59425	Farm-scale methane digester	$ 94,045.00

AREA III

Phillips
Valley
Daniels
Sheridan
Roosevelt
Petroleum
Garfield
McCone
Richland
Dawson
Wibaux



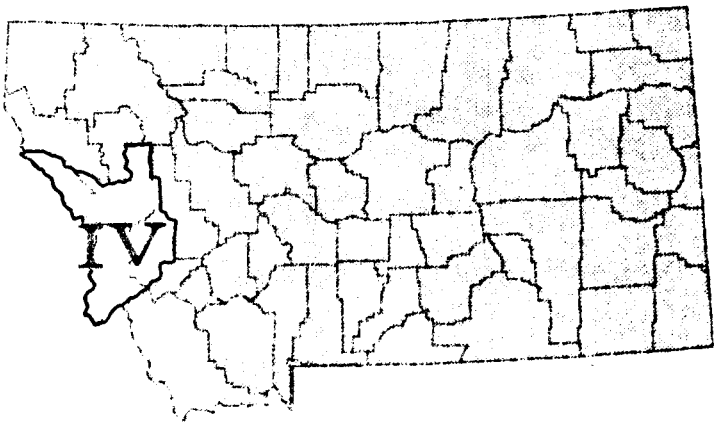
AREA III
DEFINITE

Dwain Prellwitz Box 1408 Malta, MT 59538	Portable, homemade solar furnace	$	900.00
Ron Audet Box 423 Scobey, MT 59263	Wood and solar heating system	$	2,500.00
Harlow Strandlund Homestead, MT 59242	Biomass furnace	$	4,530.00
Randy Holton Archer Star Rt, Box 11 Plentywood, MT 59254	Solar shop heating	$	1,000.00
Medicine Lake High School Karl Fiske, Supt. Medicine Lake, MT 59247	Solar panels for space heating of school complex	$ $	12,000.00 D 63,000.00 T
Ben D. Bollwitt 216 5th St. H.P. Glendive, MT 59330	Low-cost solar heating system	$	2,550.00

AREA III
TENTATIVE

AGRI-Processors % Jim Smrcka Glasgow, MT 59230	Commercial alcohol plant	$150,000.00
David Erickson 735 Knapp St. Wolf Point, MT 59201	Wind-powered electric system	$ 9,245.00
Bruce Bannister	Wind energy study of eastern Montana (See Area IX)	

AREA IV



Mineral
Missoula

Ravalli
Granite

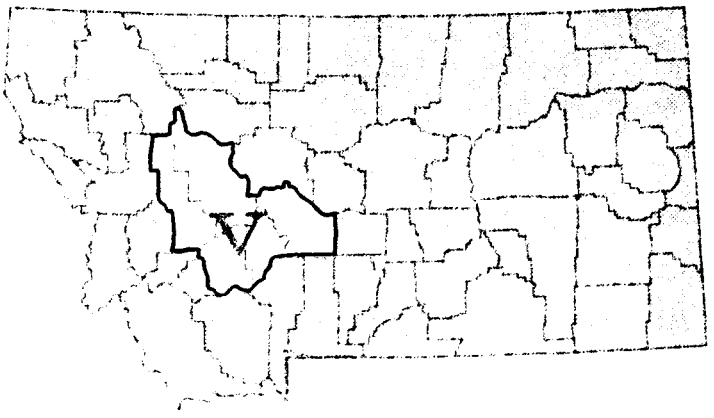
AREA IV
DEFINITE

Carol & Mike Gauthier 1364 East Dickinson Missoula, MT 59801	Installation and monitoring of low-pollution, wood-fired boiler	$ 9,374.00
Tom Montgomery Wextern Timber Utilization Group 2801 Russell Missoula, MT 59801	Feasibility study of using forest thinnings as fuel	$ 15,500.00
Steve Loken 1342 Van Buren Missoula, MT 59801	Guide to passive solar housing in Montana	$ 7,515.00

AREA IV
TENTATIVE

Benjamin Stout Forestry School University of Montana Missoula, MT 59801	Solar lumber kiln	$ 35,528.00
Charles Gividen Route 1, Box 66-B Victor, MT 59875	Solar greenhouse for for home heating	$ 4,461.00

AREA V



Powell
Lewis & Clark

Jefferson
Meagher

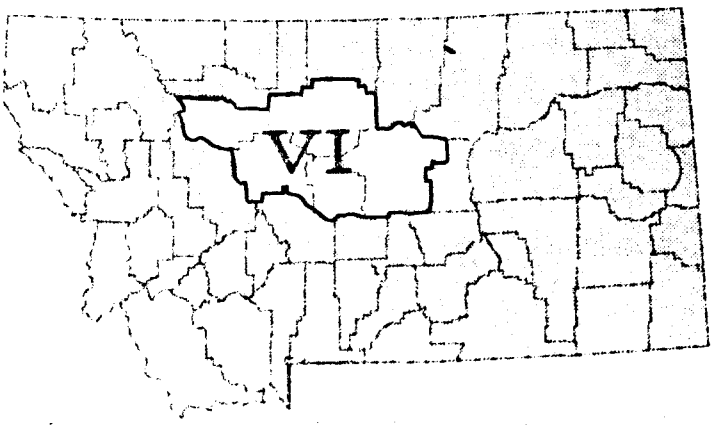
AREA V
DEFINITE

Tom Harpole Earth Energy Institute Box 304 Avon, MT 59713	Geothermal greenhouse for commercial use	$ 13,321.00
Lewis and Clark Library 120 S. Last Chance Gulch Helena, MT 59601	Energy collection development program	$ 19,994.00

AREA V
TENTATIVE

New Western Energy Show 226 Power Block Helena, MT 59601	Energy education kit for schools	$ 21,056.00

AREA VI



Teton
Choteau
Cascade

Judith Basin
Fergus

AREA VI
DEFINITE

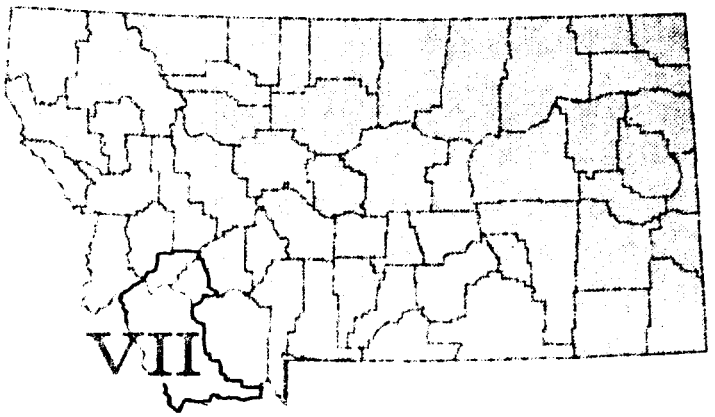
Rick McIntyre Box 686 Hobson, MT 59452	Wind monitoring study	$ 403.00
Russell Hansen 715 West Pine Lewistown, MT 59457	Solar space and water heating retrofit	$ 4,529.00

AREA VI
TENTATIVE

AG NRG % Joe Renders Box 1243 Helena, MT 59624	Commercial alcohol facility in Great Falls	$200,000.00
The Fagenstrom Company Box 2623 Great Falls, MT 59403	Prototype solar and earth-sheltered building	$ 7,000.00
Sun Prairie Energy % Mary Holtz Route #1 Fairfield, MT 59436	Feasibility study of commercial alcohol plant	$ 10,000.00
	-Purchase of boiler, if feasible	$ 60,000.00
Dave & Vicki Gustafson Box 162 Simms, MT 59477	Farm-scale wind-powered generator	$ 3,175.00
Charles Bronec Star Route Geraldine, MT 59446	Farm-scale alcohol plant	$ 37,000.00
Fergus Electric Cooperative, Inc. % Dick Peck Box 58 Lewistown, MT 59547	Wind monitoring study	$ 51,410.00
Clark Carter 101 Mountain View Lewistown, MT 59457	Study of aspen as alcohol feedstock	$ 32,800.00
Richard Meade 4600 10th Avenue North Great Falls, MT 59401	Energy self-sufficient village using biomass	$ 50,000.00

AREA VII

Deer Lodge
Silverbow
Beaverhead



AREA VII
DEFINITE

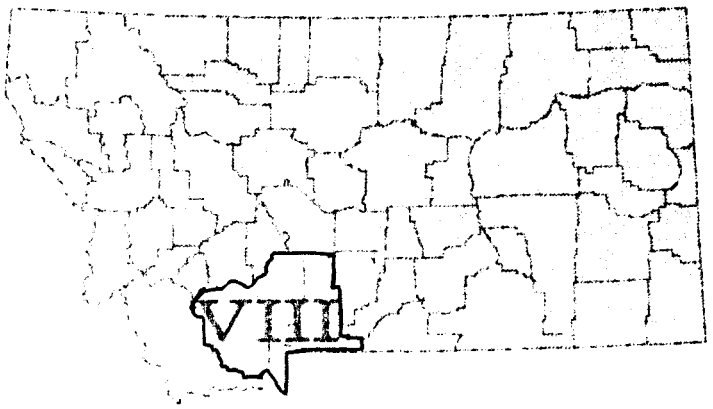
Western Montana College % Thomas Briggs Dillon, MT 59725	Feasibility study of garbage burning generation	$ 6,000.00

AREA VII
TENTATIVE

Larry & Peggy Racicot 2040 Roberts Butte, MT 59701	Passive solar/wood stove residential heating system	$ 6,491.00
Montana Energy and MHD Research and Development Institute Box 3809 Butte, MT 59701	Feasibility study of commercial alcohol plant (in Anaconda)	$100,000.00

AREA VIII

Madison
Gallatin
Park



AREA VIII
DEFINITE

A. E. Montana, Inc B. G. Kania, Pres. 717 South 14th Avenue Bozeman, MT 59715	Commercial alcohol facility in Amsterdam	$ 25,000.00 D $ 50,000.00 T
Department of Admin. A/E Division-Design Bureau 1500 East Sixth Avenue Helena, MT 59601	Solar heating system of Bozeman Job Service building	$ 76,000.00

D. O. Blackketter and C. R. Wimberly Dept. of Mech. Engrng. MSU Bozeman, MT 59717	Feasibility study of a garbage burning generation system	$ 73,314.00
Richard Hodder 2479 Bear Canyon Road Bozeman, MT 59715	Compost space heater	$ 1,200.00
Brelsford Engineering Box 1252 Bozeman, MT 59715	Alcohol distillation process using solar heat	$ 13,135.00
Karen McKinsey Dept. of Political Science MSU Bozeman, MT 59715	Summer Energy Institute	$ 3,136.00
Charless Fowlkes 31 Gardner Park Drive Bozeman, MT 59715	Solar insolation monitoring at 30 high schools	$ 37,400.00
Community Development Office City of Livingston % Ed Stern Livingston, MT 59047	Wind-powered electric generators for municipal sewer lagoon	$ 25,000.00 D $ 28,250.00 T
Marcus McBeen Box 64 Gardiner, MT 59030	Solar domestic hot water system	$ 4,837.00
Mont. St. University Roy Linn Extension Safety and Energy Specialist 409 Cobleigh Hall Bozeman, MT 59717	Biofuel and other renewable energy forum	$ 6,025.00

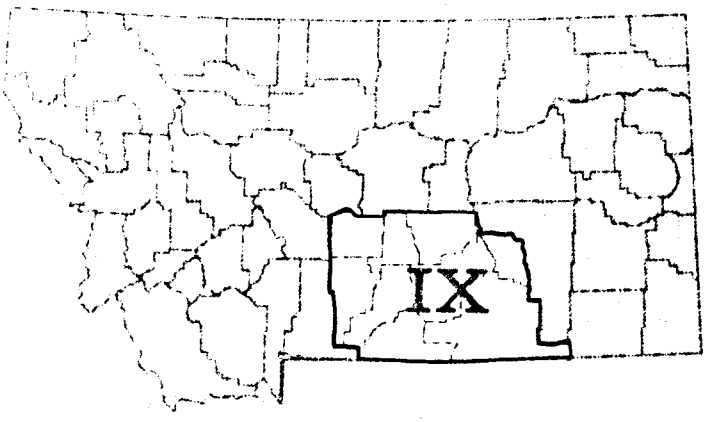
AREA VIII
TENTATITVE

Human Resources Development Council District Nine 234 East Main Bozeman, MT 59715	Solar greenhouse renovation in Three Forks	$ 11,304.00
Charless Fowlkes	Performance monitoring of solar heating projects	$ 38,379.00
Brelsford Engineering Box 1252 Bozeman, MT 59715	Biomass pilot plant	$ 32,800.00
John Robbins Chemistry Department MSU Bozeman, MT 59715	Research in anerobic digestion	$ 23,000.00

David Ward Dept. of Microbiology MSU Bozeman, MT 59715	Research in methane conversion	$ 14,052.00
Warren Scarrah Dept. of Chem. Engrg. MSU Bozeman, MT 59715	Testing of barley grain and straw in water absorption from hydrous alcohol	$ 15,413.00
Bair Electric, Inc. %Richard D. Cook Box 725 Livingston, MT 59047	Wind-powered electric system	$ 7,200.00
Harold Johnson Springdale, MT 59082	Wind-powered electric system	$ 4,800.00
Joseph & Diana Gilliam 616 North "L" Livingston, MT 59047	Solar greenhouse for home heating	$ 5,055.00

AREA IX

Wheatland
Golden Valley
Musselshell
Sweet Gras
Stillwater
Yellowstone
Treasure
Carbon
Big Horn



AREA IX
DEFINITE

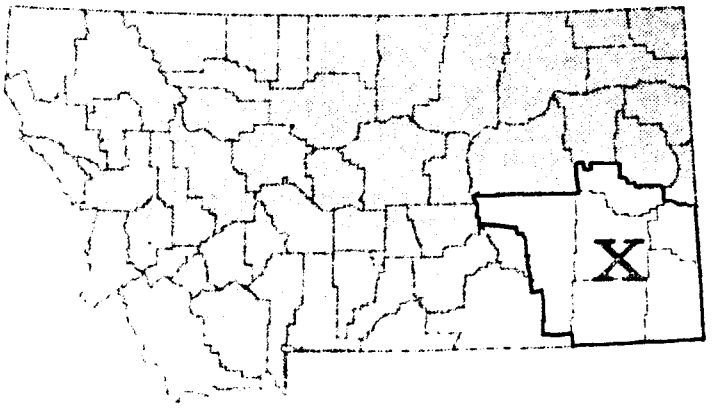
Bruce Bannister Box 795 Billings, MT 59103	- Wind monitoring at Rosebud - Electric generator, if feasible - Wind monitoring of 10 other eastern Montana sites	$ 5,000.00 Also: $ 50,000.00 Tent. $ 10,000.00 Tent.
David Coles Molt, MT 59057	Wind powered electric system	$ 5,541.00
Alternative Energy Resources Organization 424 Stapleton Building Billings, MT 59101	Community Energy Outreach Program	$ 15,682.00
Harlowton High School % Gary Olsen Harlowton, MT 59036	Vo-ag solar energy program	$ 6,457.00
Dan Aadland Box 549 Absarokee, MT 59001	Residential solar addition	$ 10,000.00
Northern Plains Resource Council 419 Stapleton Building	Rural energy outreach	$ 20,165.00

George Siemion Box 484 YRS Hardin, MT 59034	Small-scale hydroelectric project	$ 5,000.00

AREA IX
TENTATIVE

Ron Cole 670 Sapphire Billings, MT 59101	Vertical-axis windmill design	$ 28,000.00
Virgil Jones Klein Star Route Roundup, MT 59072	Solar greenhouse	$ 4,670.00
Stanley Wiatr Dept. of Biology Eastern Montana College Billings, MT 59101	Study of biomass potential of fodder beets and cattails	$ 28,913.00
DeVries Alcohol Fuel, Inc. Rockvale, MT	Commercial alcohol plant	$100,000.00
Jim Dick 113 Henry Road Billings, MT 59102	Small-scale hydroelectric system	See note Area I
James Murnion Box 55 Shawmut, MT 59078	Small-scale hydroelectric system	See note Area I

AREA X



Rosebud
Custer
Fallon

Powder River
Carter

AREA X
DEFINITE

Bruce Bannister	Wind monitoring at Rosebud (See Area IX, definite)	

AREA X
TENTATIVE

Lange Farms, Inc. Box 1232 Miles City, MT 59301	Commercial alcohol plant	$100,000.00
Bruce Bannister	Wind monitoring of eastern Montana (see Area IX, definite)	

CUMULATIVE MEASURABLE BENEFITS
THROUGH FY 1981

Renewable Energy Bureau staff has estimated energy savings resulting directly from demonstration projects from the first grants in 1976 through the definite grants awarded in FY 1981. This direct cumulative savings is estimated at 803 billion BTU's (British Thermal Units). This is equivalent to about 138,000 barrels of crude oil or about $4.5 million at current prices. Significant additional BTU savings would result through the tentative grants, and indirect savings are also happening from demonstration grants and from Program-sponsored research, development and commercialization.

In addition to this significant return on investment, the approximately $5 million in state grant money (including FY81 definite and tentative funding amounts) is bringing in more than $62 million in federal or private matching funds and is creating more than 240 permanent, full-time jobs, as well as additional part-time employment.

NAME: WILL GARVIN DATE: 23 JAN 91

ADDRESS: 1539 GALLATIN - HELENA

PHONE: 442-6297

REPRESENTING WHOM? NRM - GARVIN ENGINEERS

APPEARING ON WHICH PROPOSAL: SB 141

DO YOU: SUPPORT? ✓ AMEND? _____ OPPOSE? _____

COMMENTS: I WORK WITH SCHOOLS IN ASSISTING THEM WITH THEIR ENERGY CONSERVATION PROGRAMS. IN THAT CAPACITY I HAVE DISCOVERED THAT NOT ONLY CAN INCREDIBLE SAVINGS BE REALIZED THROUGH THIS CONSERVATION (PAYBACK PERIODS CONSISTENTLY LESS THAN 3 YEARS) BUT ALSO THERE EXISTS A TREMENDOUS ENERGY WASTE INERTIA IN THIS COUNTRY. GRANTS SUCH AS EXIST THROUGH THE INSTITUTIONAL BLDG. GRANTS PROGRAM AND THE RENEWABLE ENERGY PROGRAM ARE QUITE BENEFICIAL IN OVERCOMING THIS INERTIA. EXPANDING THE RENEWABLE ENERGY PROGRAM TO INCLUDE LOANS WOULD ADD EVEN MORE IMPETUS TO OVERCOMING INERTIA TO A GREATER PERCENTAGE OF OUR POPULATION AND, IN VIEW OF THE SAVINGS TO BE REALIZED, WOULD DEFINITELY SERVE THE PEOPLE — AND THAT, OF COURSE, IS OUR JOB.

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY

NAME: William S Gosnell DATE: 1/23/91

ADDRESS: DNRC - Energy Division

PHONE: 449-3780

REPRESENTING WHOM? DNRC

APPEARING ON WHICH PROPOSAL: SB141

DO YOU: SUPPORT? ✓ AMEND? _____ OPPOSE? _____

COMMENTS: None

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY

NAME: Les BERRY DATE: _____

ADDRESS: _____

PHONE: 3712

REPRESENTING WHOM? DNRC

APPEARING ON WHICH PROPOSAL: 141

DO YOU: SUPPORT? ✓ AMEND? _____ OPPOSE? _____

COMMENTS: _____

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY

NAME: Kathleen Monroe DATE: 1-23-81

ADDRESS: 211 Carty St Butte, Montana 59701

PHONE: _____

REPRESENTING WHOM? _____

APPEARING ON WHICH PROPOSAL: SB 141

DO YOU: SUPPORT? ✓ AMEND? _____ OPPOSE? _____

COMMENTS: _____

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY

DATE January 23, 1981

COMMITTEE ON NATURAL RESOURCES BILL NO. 141

VISITOR'S REGISTER

NAME	REPRESENTING	Check One: Support	Check One: Oppose
WILL GARVIN	NRM - GARVIN ENGINEERS	✓	
Cregg Coughlin	LWV of Mont.		
W S Gosnell	DNRC - Energy	✓	
Leo Berry	"	✓	
Richard Varner	Leg Auditor		
Doreen Stickler	LWV of Montana		
Ellen Ditzler	EIC		
William Van Orden	Sen. Steve Brown		
Gareth C Moon	Land Commissioner		
[illegible]	EIC		
Kathleen McBride		✓	
Bruce Johnson			
[illegible]	Mt Coal Council		

(Please leave prepared statement with Secretary)

STANDING COMMITTEE REPORT

January 23, 19 81

MR. President

We, your committee on Natural Resources

having had under consideration Statement of Intent, Senate Bill No. 141

Respectfully report as follows: That Statement of Intent, Senate Bill No. 141 be adopted.

STATEMENT OF INTENT RE: SB 141

It is the intent of this bill to allow the Department of Natural Resources and Conservation to make loans through financial institutions in Montana for commercialization of alternative renewable energy. The grant of rule making authority includes the power to establish criteria to be used in determining whan a grant or a loan should be granted under the limitations of the act.

First adopted by the Natural Resources Committee on the 23rd day ~~XXXXXX~~ of January, 1981.

~~DO PASS~~

H. A. Dover G.A.

HAROLD DOVER Chairman.

STATE PUB. CO.
Helena, Mont.

STANDING COMMITTEE REPORT

January 23 19 81

MR. President

We, your committee on NATURAL RESOURCES

having had under consideration Senate Bill No. 141

Respectfully report as follows: That Senate Bill No. 141

introduced bill be amanded as follows:

1. Page 1, Line 24.
Following: "research."
Insert: "Furthermore it is the purpose of this part to allow the department to make loans through financial institutions in Montana for commercialization of alternative renewable energy."

DO PASS

HAROLD DOVER

Chairman.

STATE PUB. CO.
Helena, Mont.

DATE January 23, 1981

COMMITTEE ON NATURAL RESOURCES BILL NO. 95

VISITOR'S REGISTER

NAME	REPRESENTING	Check One	
		Support	Oppose
Glenn Dompier			
Peter Jackson	WITA		
Ken Hoovestol	MT. Snowmobile Assn.	X	
[illegible]			
[illegible]			
[illegible]			
[illegible]			
[illegible]			
Bill Hanson			

(Please leave prepared statement with Secretary)

STANDING COMMITTEE REPORT

January 23 19 81

MR. President

We, your committee on NATURAL RESOURCES

having had under consideration Senate Bill No. 95

Respectfully report as follows: That Senate Bill No. 95

~~XXXXXX~~
~~DO PASS~~
DO NOT PASS

G.Q

Harold Dover
Chairman.

HAROLD DOVER

STATE PUB. CO.
Helena, Mont.