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Energy and Telecommunications Interim Committee

62nd Montana Legislature

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August 24, 2012

TO: ETIC members
FR: ETIC staff
RE: 20x10

During the Energy and Telecommunications Interim Committee (ETIC) meeting in July, the committee requested information from the Department of Environmental Quality (DEQ) about the 20x10 Initiative.

In 2007 Governor Brian Schweitzer announced a new initiative seeking a 20 percent reduction in energy consumption by state agencies. The goal was to achieve the 20 percent reduction in facility energy requirements by executive branch agencies, by the end of 2010. Reductions were to be sought in electricity, natural gas, propane, and fuel oil use.

According to the DEQ, calculating a percentage of savings is difficult because of the complexities of energy sources, facilities that are not buildings, and changes to buildings to meet building code requirements and new uses.

DEQ calculates the effectiveness of the State Buildings Energy Conservation Program according to dollar savings per project. DEQ received a large amount of one-time-only funding from the Department of Energy (DOE) to establish a revolving fund for retrofits to state buildings and reports to DOE on both dollar savings and energy savings. As the DOE funds came, the reporting focus changed to meet the grant requirements, so percentage of savings was not calculated. The savings from the projects funded is \$1.8 million. The allocation of savings to each individual project is provided in the biennial report on the State Buildings Energy Conservation Program.

Attached is the 2012 State Buildings Energy Conservation Program Report to the Governor provided in response to the ETIC's request for information.

Sonja Nowakowski

**State Buildings Energy Conservation Program
Report to the Governor**

**Department of Environmental Quality
September 1, 2012**

EXECUTIVE SUMMARY

The State Buildings Energy Conservation Program has continued its efforts to reduce energy use and costs in state government completing 87 projects in the 2009-2012 time period resulting in an estimated annual energy cost savings of \$1.8 million. This report covers two biennia because of the one-time-only investment of American Recovery and Reinvestment Act funds from the Department of Energy that crossed biennia. The most significant milestone of this time period is the establishment of a revolving fund for the program.

During this biennium:

- The Program completed 87 energy conservation projects across the state of Montana utilizing primarily federal and some state funds. Northwestern Energy utility rebates were leveraged in all qualifying energy conservation projects providing over \$1,000,000 in additional investments in state-owned facilities.
- The Program moved from general obligation bond funding to a revolving program utilizing one-time-only federal funding and enough state funding to show that the federal funds supplemented and did not supplant state funding. This provides a continued funding source for the program, but also brings federal oversight of the program including compliance with federal requirements and reporting.
- The Program invested more in the period of 2009-2012 years than it had in the previous 19 years from 1989-2008. While many energy studies were complete by 2008, there was a tremendous work load to get projects through design and construction by DEQ and the Department of Administration Architecture and Engineering Division. There will be a continued effort to monitor those projects in the next biennium.
- Investments in energy conservation will provide an estimated \$1.8 million in annual energy cost savings for electricity and natural gas in state-owned buildings.

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INTRODUCTION

This report summarizes the work and results of the State Buildings Energy Conservation Program (SBECP) from July 2009 through August 2012 and anticipated progress through the rest of the Biennium. It covers two biennia because of a one-time-only allocation of funds in 2009 that covered two biennia. It is required under the State Buildings Energy Conservation Act, Title 90, Chapter 4, Part 6, Montana Code Annotated.

BACKGROUND

The State Buildings Energy Conservation Program improves facilities and equipment at no net cost to state government when considering energy savings. Investments are made in energy and water efficiency resulting in reduced utility and other operating costs. The savings resulting from the projects are used to repay the investments. After an energy retrofit, a state agency uses funding that would have been used for energy and water bills to repay DEQ's investment in the project plus interest. This payment is equal to or less than the pre-retrofit energy costs it had been paying. Any additional savings accrue to the agency. After the investments are paid off, the state continues to realize energy and water savings, and the agency has continued benefits from the new equipment and improved buildings.

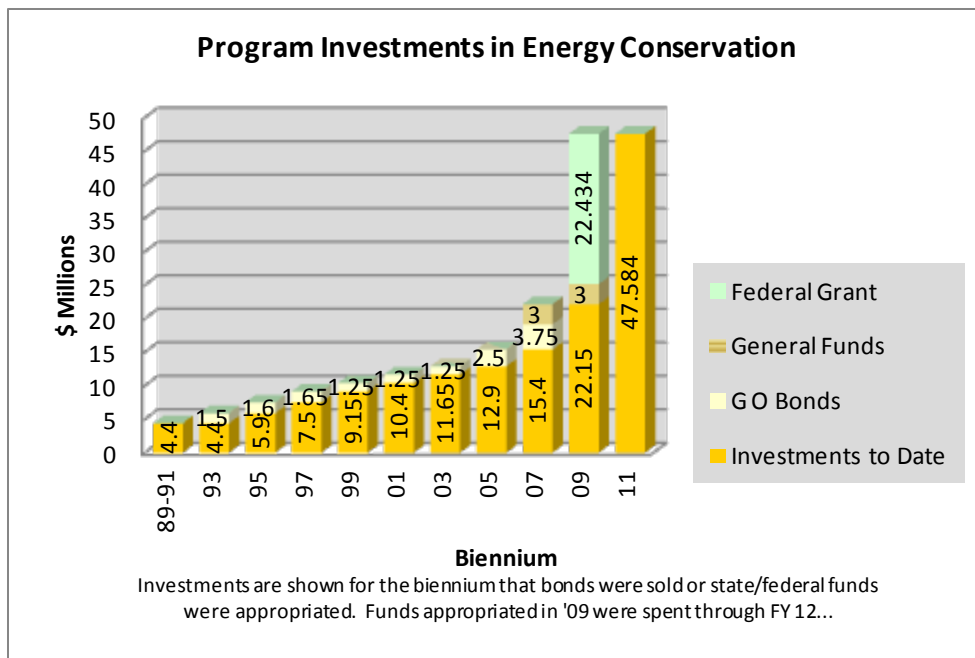
The State Buildings Energy Conservation Program started in 1989 with \$4.4 million in oil overcharge funds. These initial funds were used to finance the first four years of the program and to establish a revenue stream from repayments of energy savings that would provide cash flow for the sale of general obligation bonds. The Stripper Well funds allocation was a one-time funding from a federal court settlement provided to Montana. The first general obligation bonds were sold in 1993 and continued through 2006. These bonds will be paid back with energy savings through 2027.

In 2007, the program moved away from using general obligation bonds. While bonds had been an excellent long term funding source for the program, there were changes in the bond market that made bond sales somewhat uncertain. Many states were struggling with bond sales due to the economic recession. Montana did not sell bonds for its projects as part of a successful strategy to keep Montana's bond ratings high.

The 2007 Legislature, at the request of Governor Schweitzer, appropriated general funds for the State Buildings Energy Conservation Program. The energy costs savings resulting from 2007 projects are being collected in a manner similar to the bond project repayments, but with different benefits. Savings collected from projects under the bond program were first used to repay the bonds. The repayments were then used to fund the initial costs of the next round of bond projects including paying the interest and principal on the new bond while construction was underway on the projects. Then, excess savings were swept to the Long Range Building Program for the general benefit of funding future LRBP projects.

The 2007 Legislature set up the beginning framework for a revolving program with general funds. Energy costs savings were collected and placed in a repayment account that is used for future energy projects in state buildings and for operating the program. There is no sweep to the LRBP from the new program, although the sweep continues with excess bond repayments.

The graph below shows the history of the SBECP's investments in energy conservation using stripper well funding, general obligation bonds, state general funds, and federal grant money.



PROGRAM FUNDING GROWTH AND CHANGES

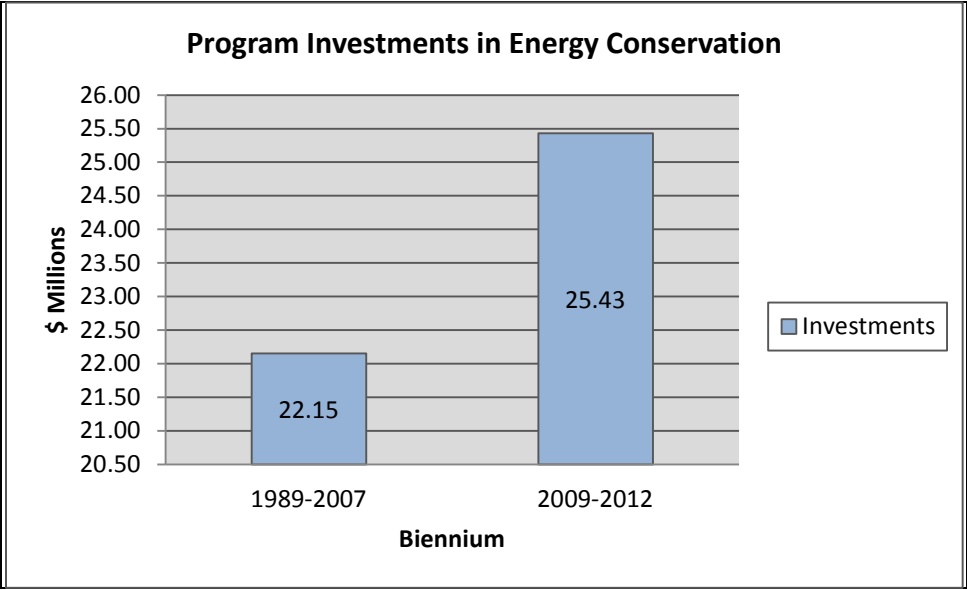
Self Funded Revolving Program

The most significant change to the program in its 20-year history was the change from the use of general obligation bonds to a self-funded revolving program. This change started with the use of state general funds in 2007, but was firmly established in 2009 with the use of federal funds from the Department of Energy's State Energy Program allocated on a one-time-only basis through the American Recovery and Reinvestment Act (ARRA.), and with Legislation in 2011 (HB51). While the bond program had worked very well, repayments were used to repay the cost of the bonds including principal, interest, and issuance costs. Once used and repaid, the program had to start over with additional financing. The revolving program allows the savings from the projects to be collected and then reinvested in additional projects and used to operate the program including analyzing additional buildings and evaluating projects. The use of the federal funds to establish the revolving program brings new oversight and requirements to the program as the funds will retain their federal character in perpetuity and all projects funded will need to comply with the federal Davis Bacon Act, Buy American provisions specifying that American components be used, and the State Historical Preservation Act. DOE will have oversight of the program in addition to the legislative oversight.

Montana received \$26 million in ARRA funding through the Department of Energy's State Energy Program and used \$22,433,988 for the SBEP with \$21,738,000 going into projects and the balance program operations. The DOE required that funds supplement and not supplant existing funding programs, so \$3,000,000 in general funds, the amount allocated in 2007, was allocated to the SBEP in 2009. Half of that amount, \$1.5 million, was used for capital projects bringing the total for projects to \$23,238,000. The other \$1.5 million was appropriated to DEQ for program operations. The DOE one-time-only funds were appropriated by the 2009 Legislature and covered a 3 year period, through April 30, 2012. No additional funding was requested or provided by the 2011 Legislature.

The amount of funding available to the program in fiscal years 2009-2012 was greater than the total amount of funding for the program from 1989-2008. These created a challenging work load and resulted in additional staff being needed on a temporary basis. This one-time infusion of funds was necessary to establish a revolving fund. Investments in projects in the future will be made at the level that funds are

returned to the program through repayments. This will bring the program back to more historical levels. The graph below shows the growth in the program from the 2009 biennium to the 2011 biennium.



COST EFFECTIVE ENERGY CONSERVATION AND FUTURE ENERGY COSTS

A key element of the SBECP is the need for projects to be cost-effective. Savings must accrue from the investments in conservation in an amount equal to or greater than the amount needed to repay the project. This cost-effectiveness need is always a challenge, but was particularly difficult this past biennium when the program was under pressure to spend all of the federal funds allocated to the program within 36 months, and when the cost of natural gas decreased well below expectations. The program uses average energy rates over the past year to determine the potential for cost savings and set the dollar amount that can be invested in a project. Normally energy costs increase from year to year resulting in additional saving benefits to the agencies in future years. However, natural gas costs decreased in the past biennium for many areas with the gas term contract for the larger State of Montana energy users dropping by 35%. This decrease in gas costs affected a number of projects in design and construction. Some modifications were made to projects and in many cases the length of the term for repayment was extended.

The next gas term contract is out to bid and is expected to remain low and possibly drop again. The future of natural gas is volatile, but it is speculated to remain low for the next few years and begin to increase at a slow rate (2-3% annually). Meanwhile, electricity costs have increased steadily and the forecast for electrical costs indicate continued slow increases. Therefore, the energy projects in the near future will focus more on electrical savings and demand conservation and less on gas savings. The one area of gas costs that will continue to be reviewed is the amount of non-interruptible Maximum Daily Delivered Quantity (MDDQ) required by agencies as reductions in this area can result in significant cost savings.

PROGRAM INVESTMENTS NOT MEETING COST EFFECTIVENESS

The SBECP focuses on cost-effective investments in energy conservation. However, occasionally investments are made that will not return savings to the program because analysis of a project does not show sufficient savings to warrant a project. There were three energy analyses completed that did not result in projects. In addition, as the deadline approached for the use of the one-time-only federal funds to be spent or lost, and some projects had difficulty providing sufficient savings because of the drop in the cost of natural gas, DEQ elected to invest some funds in two projects to determine the benefits of heat recovery that has the potential for good savings in the future and retro-commissioning that has potential for good savings, but where the savings could not be calculated reliably. Both projects will provide good

information for program growth in the future. Finally, to spend out the remaining DOE funds before the end of the grant, a small investment in meters was made for several buildings on the Montana State University and University of Montana campuses that will again result in future benefits for the program.

PROJECT MONITORING AND VERIFICATION

A primary aspect of energy conservation is the monitoring and verification that energy and cost savings occur on projects where energy funds have been expended. DEQ follows international protocols for project monitoring and savings verification that rely on engineering analyses and data collection. Baselines for energy use are established before a project is completed and in some cases adjusted to account for increases in energy use because of work done in conjunction with energy conservation remodels. DEQ is using EnergyCap, a software product from Good Steward Software to monitor energy-savings on completed projects. After projects are completed, the database provides a tracking means for DEQ staff to use to verify and characterize the project energy savings performance based on design. The past two biennia, the program has focused on getting projects constructed within the timeframes needed. In the next biennium, DEQ will utilize EnergyCap capabilities to review the projects completed and identify any underperforming projects to review and improve performance. See Appendix A for examples of project savings analysis using EnergyCap.

IDENTIFYING ENERGY SAVINGS OPPORTUNITIES

DEQ began an effort in 2007 to identify all state-owned facilities and began collecting energy information on these facilities. EnergyCap software was purchased to store the data and provide a tool to help identify potential energy-saving projects. Currently, the EnergyCap database tracks most of electric and natural gas metered accounts on about 4,000 structures dispersed widely across the state. The database is maintained by electronically importing monthly billing data from Northwestern Energy, Montana Dakota Utilities and 30-Electric Cooperatives. The database tracks 3,594 active accounts covering 7,049 meters.

The EnergyCap software tool will provide DEQ with the capability to locate potential energy projects by assessing energy use based on facility use type and size (area). Many state-owned buildings do not have individual meters so the software is not useful in identifying opportunities on those buildings. A small effort was made to install meters on buildings at some campuses to improve the ability to better target projects in the future.

CONTACTS WITH STATE AGENCIES

Communication with state agencies was frequent and ongoing throughout the 2012-2013 biennium. DEQ staff discussed potential energy related projects with each agency listed below. Those discussions included the opportunities for each agency to understand and participate in the SBECF. DEQ contacted the following agencies and universities:

Dept. of Administration	Dept. of Agriculture
Dept. of Commerce	Dept. of Corrections
Dept. of Environmental Quality	Dept. of Justice
Dept. of Labor and Industry	Dept. of Livestock
Dept. of Military Affairs	Dept. of Fish, Wildlife & Parks
Dept. of Natural Resources & Conservation	Dept. of Transportation
Dept. of Public Health & Human Services	MT. School for Deaf and Blind
MSU – Northern	Montana State University
MT. Tech of the University of Montana	MSU - Billings
	MSU - Western
	University of Montana

PROJECTS COMPLETED 2009 - 2012

State Buildings Energy Conservation Program Projects

Agency (of project) / Project Name	Funding Source: State Special or Federal	Energy Investment	Energy Costs Savings	Leveraged Utility Funds	State Leveraged Funds	Energy Savings (MMBTU)	Project City	Type of Project
DEPARTMENT OF ADMINISTRATION								
Capitol Complex Boiler Plant	Federal	\$182,650	\$15,300	\$0	\$131,656	1,700	Helena	Mechanical
Walt Sullivan Building	Federal	\$328,250	\$27,723	\$40,000	\$192,059	2,395	Helena	Mechanical
Department of Justice Building	Federal	\$225,000	\$17,089	\$53,287	\$262,802	856	Helena	Lighting
DEQ Lee Metcalf Building	Federal	\$215,000	\$16,330	\$34,435	\$60,028	784	Helena	Lighting
Cogswell Building	Federal	\$36,750	\$0	\$0	\$0	201	Helena	Mechanical
Fish, Wildlife and Parks Building	Federal	\$119,962	\$9,111	\$0	\$425,000	796	Helena	Mechanical
Cabinet Agency Mech. Insulation	Federal	\$227,965	\$42,082	\$0	\$0	4,875	Helena	Mechanical
Subtotal		\$1,335,577	\$127,635	\$127,722	\$1,071,545	11,607		
CABINET ENERGY PROJECTS								
Department of Fish, Wildlife, and Parks								
Hatchery, Miles City - statewide	State Special	\$12,000	\$6,271	\$30,788	\$296,812	500	Miles City	Lights & Mech
Regional HQ, Billings - Region 5	Federal	\$21,487	\$1,800	\$0	\$160,000	224	Billings	Lights & Mech
Regional HQ, Great Falls - Region 4	Federal	\$44,281	\$3,725	\$1,590	\$178,385	341	Great Falls	Lights & Mech
Regional HQ, Kalispell - Region 1	Federal	\$53,318	\$4,983	\$9,577	\$85,000	316	Kalispell	Mechanical
Regional HQ, Miles City - Region 7	Federal	\$27,122	\$1,919	\$3,268	\$40,000	160	Miles City	Lights & Mech
Department of Justice								
State Crime Lab	Federal	\$680,000	\$45,707	\$154,920	\$987,859	5,489	Missoula	Mechanical
Department of Labor and Industry								
Workforce Center, Great Falls	Federal	\$126,290	\$10,580	\$6,000	\$180,575	818	Great Falls	Mechanical
Workforce Center, Bozeman	Federal	\$16,145	\$2,364	\$2,866	\$98,814	111	Bozeman	Mechanical
Workforce Center, Helena	Federal	\$110,000	\$9,214	\$4,746	\$414,614	950	Helena	Mechanical
Department of Natural Resources & Conservation								
Spurgin Road Complex	Federal	\$43,903	\$3,678	\$5,703	\$32,671	215	Missoula	Lighting
Department of Transportation								
Helena Headquarters	Federal	\$550,000	\$37,969	\$63,000	\$264,218	3,454	Helena	Mechanical
Helena Shop	Federal	\$210,000	\$14,935	\$7,839	\$205,100	1,680	Helena	Lights & Mech
Billings Division Office	Federal	\$84,000	\$7,036	\$1,297	\$149,759	704	Billings	Lights & Mech
Missoula Division Offices	Federal	\$39,276	\$3,290	\$4,066	\$227,226	263	Missoula	Lights & Mech
Great Falls Division Offices	Federal	\$102,000	\$8,544	\$2,582	\$151,973	499	Great Falls	Lights & Mech
Lewistown Division Offices	Federal	\$22,796	NA	\$0	\$0	NA	Lewistown	Lights & Mech
Traffic Signals Statewide - Phase 1	Federal	\$159,183	\$83,191	\$0	\$0	4,806	Statewide	Lighting
Helena HQ and Shop Lighting	Federal	\$386,801	\$26,335	\$76,275	\$0	1,482	Helena	Lighting
Subtotal		\$2,688,602	\$271,541	\$374,515	\$3,473,006	22,012		
DEPARTMENT OF CORRECTIONS								
Close 3 Unit and Maximum Security Unit	Federal	\$646,069	\$36,860	\$57,000	\$179,531	3,667	Deer Lodge	Lights & Mech
Rothe and Low Support Unit	Federal	\$477,230	\$24,665	\$2,309	\$2,770,000	2,961	Deer Lodge	Lights & Mech
Riverside	Federal	\$260,138	\$20,877	\$2,443	\$274,307	2,183	Boulder	Mechanical
Watch East	Federal	\$290,000	\$19,493	\$28,180	\$770,588	1,691	Glendive	Lights & Mech
High Side Projects	Federal	\$1,310,880	\$88,112	\$35,000	\$658,000	10,361	Deer Lodge	Mechanical
Boot camp Biomass Boiler	State Special	\$251,601	\$21,076	\$0	\$76,300	1558	Deer Lodge	Mechanical
High Side CCD 3 (Low Side)	Federal	\$334,797	\$22,504	\$3,625	\$169,731	2629	Deer Lodge	Mechanical
Subtotal		\$3,570,715	\$233,587	\$128,558	\$4,898,457	25,050		
DEPARTMENT OF HEALTH AND HUMAN SERVICES								
Montana Veteran's Home Improvements	Federal	\$492,218	\$31,443	\$0	\$942,938	2,700	Columbia Falls	Mechanical
Montana Mental Health Nursing Care	Federal	\$166,850	\$12,673	\$10,215	\$24,000	603	Lewistown	Mechanical
Montana State Hospital	Federal	\$820,257	\$65,978	\$0	\$1,611,678	6,011	Warm Springs	Mechanical
Montana Developmental Center	Federal	\$336,664	\$27,495	\$4,098	\$0	1,342	Boulder	Mechanical
Montana Veteran's Home Chapel	Federal	\$28,547	\$1,435	\$0	\$38,000	186	Columbia Falls	Mechanical
Eastern MT Veteran's Home	Federal	\$266,536	\$28,838	\$28,143	\$20,000	3,270	Glendive	Mechanical
Warm Springs Gas Lines	Federal	\$734,000	\$55,749	\$45,286	\$863,000	6,180	Warm Springs	Mechanical
Warm Springs Support Buildings Lighting	Federal	\$94,162	\$8,336	\$7,659	\$0	336	Warm Springs	Mechanical
MDC Building 104	Federal	\$155,279	\$10,437	\$6,188	\$625,000	849	Boulder	Mechanical
Subtotal		\$3,094,513	\$242,384	\$101,588	\$4,124,616	21,477		
DEPARTMENT OF REVENUE								
Liquor Distribution Warehouse	State Special	\$420,322	\$31,925	\$18,572	\$1,089,063	2,208	Helena	Lights & Mech
Subtotal		\$420,322	\$31,925	\$18,572	\$1,089,063	2,208		
MONTANA SCHOOL FOR THE DEAF AND BLIND								
Vocational Building	State Special	\$25,000	\$2,218	\$0	\$38,424	242	Great Falls	Lights & Mech
Subtotal		\$25,000	\$2,218	\$0	\$38,424	242		

Agency (of project) / Project Name	Funding Source: State Special or Federal	Energy Investment	Energy Costs Savings	Leveraged Utility Funds	State Leveraged Funds	Energy Savings (MMBTU)	Project City	Type of Project
MONTANA UNIVERSITY SYSTEM								
UM Campus Steam Trap Repair	Federal	\$152,998	\$24,557	\$0	\$0	3,287	Missoula	Mechanical
UM Skaggs Building	Federal	\$1,300,000	\$96,765	\$147,269	\$292,511	7,593	Missoula	Lights & Mech
UM Education Building	Federal	\$214,323	\$15,471	\$2,909	\$106,621	1,242	Missoula	Lights & Mech
UM Bio Research Building	Federal	\$230,618	\$15,501	\$40,000	\$0	1,336	Missoula	Mechanical
UM Anderson Building	Federal	\$64,644	\$5,575	\$0	\$29,584	565	Missoula	Mechanical
UM Fine Arts Building	Federal	\$243,000	\$18,126	\$7,510	\$890,534	1,498	Missoula	Lights & Mech
UM Music Building	Federal	\$300,000	\$22,522	\$6,091	\$407,564	1,768	Missoula	Lights & Mech
UM Campus DHW Upgrade	Federal	\$225,000	\$18,847	\$54,000	\$131,381	NA	Missoula	Mechanical
UM Campus Lighting Upgrade - Phase 1	Federal	\$134,234	\$11,883	\$13,798	\$68,312	573	Missoula	Lighting
UM Lighting Continuation - Phase 2	Federal	\$275,778	\$35,419	\$54,979	\$31,305	1,734	Missoula	Lighting
UM Lighting Continuation - Phase 3	Federal	\$260,579	\$18,946	\$23,674	\$16,000	893	Missoula	Lighting
UM Missoula COT Lighting	Federal	\$57,646	\$9,253	\$42,385	\$0	461	Missoula	Lighting
UM Campus Facilities Lighting CTA	Federal	\$97,268	\$11,403	\$11,189	\$0	535	Missoula	Lighting
UM Campus Lighting CTA - Phase III	State Special	\$226,053	\$22,710	\$38,485	\$0	1,089	Missoula	Lighting
UM Campus Insulation	Federal	\$145,413	\$26,843	\$0	\$0	2,972	Missoula	Mechanical
UM Missoula COT Cooling Tower	Federal	\$41,304	\$3,656	\$0	\$73,000	122	Missoula	Water
MSU Billings Science Building	Federal	\$507,358	\$40,391	\$0	\$280,000	3,650	Bozeman	Mechanical
MSU Engineering Physical Sciences	Federal	\$278,679	\$47,799	\$80,000	\$0	3,521	Bozeman	Mechanical
MSU Cobleigh Building	Federal	\$932,000	\$79,461	\$54,923	\$624,250	7,042	Bozeman	Mechanical
MSU Lewis Hall Lighting	Federal	\$64,434	\$5,075	\$4,034	\$0	174	Bozeman	Lighting
MSU Reid Hall Lighting	Federal	\$62,147	\$5,814	\$9,935	\$0	322	Bozeman	Lighting
MSU Culbertson Lighting	Federal	\$32,292	\$4,050	\$4,698	\$0	181	Bozeman	Lighting
MSU Leon Johnson Building	Federal	\$1,160,000	\$92,349	\$99,600	\$2,574,893	14,256	Bozeman	Mechanical
MSU Wilson Building	Federal	\$698,000	\$59,340	\$23,347	\$440,000	3,497	Bozeman	Mechanical
MSU Student Union Building	Federal	\$158,575	\$22,858	\$17,330	\$35,898	1,416	Bozeman	Lights & Mech
MSU Viscom Lighting	Federal	\$64,006	\$5,666	\$9,394	\$16,000	322	Bozeman	Lighting
MSUN Physical Plant	Federal	\$25,000	\$2,149	\$0	\$68,342	227	Havre	Mechanical
MSUN Hagner Hall	Federal	\$275,845	\$18,541	\$24,112	\$1,064,316	1,517	Havre	Mechanical
MSUN Electronics Tech	Federal	\$73,761	\$4,958	\$0	\$165,000	392	Havre	Mechanical
MSUN Armory Gymnasium	Federal	\$149,936	\$11,937	\$8,290	\$0	1,345	Havre	Lighting
MT Tech Engineering Lab/Classroom	Federal	\$50,250	\$5,085	\$36,955	\$122,795	296	Butte	Lighting
MT Tech Campus Lighting	Federal	\$170,000	\$11,763	\$40,058	\$50,898	620	Butte	Lighting
MT Tech Mining and Geology Building	Federal	\$400,000	\$33,507	\$48,337	\$1,596,471	2,554	Butte	Mechanical
MT Tech Health, PE Building	Federal	\$150,000	\$20,211	\$16,855	\$3,479,541	1,537	Butte	Lighting
MT Tech Health Sciences Building	Federal	\$130,890	\$11,587	\$20,371	\$2,617,249	719	Butte	Lights & Mech
MT Tech Mechanical Insulation	Federal	\$296,999	\$32,099	\$0	\$0	5042	Butte	Mechanical
UM Helena COT Airport Campus	Federal	\$365,000	\$27,723	\$47,040	\$3,835,304	2,462	Helena	Lights & Mech
UM Helena COT Donaldson	Federal	\$400,000	\$27,926	\$80,000	\$225,000	2,657	Helena	Lights & Mech
UMW Library Admin SUB	Federal	\$230,598	\$17,000	\$2,923	\$245,000	1,070	Dillon	Lights & Mech
UMW Campus wide Lighting	Federal	\$127,570	\$11,995	\$15,920	\$0	722	Dillon	Lighting
UMW IT Woods	Federal	\$41,025	\$2,758	\$0	\$214,007	312	Dillon	Mechanical
UMW Block Hall Window Replacement	Federal	\$37,500	\$2,848	\$0	\$189,320	437	Dillon	Envelope
UMW Metals	Federal	\$53,957	\$3,627	\$0	\$457,000	365	Dillon	Lighting & Env.
Subtotal		\$10,904,680	\$965,994	\$1,086,412	\$20,348,096	82,323		
COMMUNITY COLLEGES								
Miles Community College	Federal	\$354,208	\$23,553	\$20,022	\$612,922	2,060	Miles City	Mechanical
Subtotal		\$354,208	\$23,553	\$20,022	\$612,922	2,060		
Projects expended without repayment opportunities								
Data Center Heat Reclaim		\$143,611	\$2,695			444	Helena	Demonstration
Corrections Meters		\$30,000	NA				Deer Lodge	Monitoring
UM Honors Building - Energy Study and Design		\$10,730	\$0				Missoula	Mechanical
UM Meters		\$37,570	NA				Missoula	Monitoring
MSU meters		\$18,584	NA				Bozeman	Monitoring
UM Natural Science Energy Analysis		\$8,400	\$0				Missoula	Lights & Mech
MSUN Metals Energy Study		\$5,464	\$0				Havre	Mechanical
MT Tech ELC/Chemistry Retro Comm		\$25,000	\$0				Butte	Mechanical
Subtotal		\$279,359	\$2,695					
TOTAL PROJECTS								
ARRA Projects - Budget (\$21,738,000)		\$21,738,000						
HB 5 General Funds - Budgeted (\$1,500,000)		\$934,976						
Total Spent through June 30, 2012		\$23,238,000						

2009 TO 2012 PROJECTS BY AGENCY/UNIVERSITY

Department of Administration

The energy program was able to leverage \$127,722 in Northwestern utility incentives to help fund the following projects:

- Capitol Boiler Plant replaced existing steam boiler burners with high-efficiency dual fuel burners and allows the State to move to interruptible gas supply for the boilers.
- Walt Sullivan Building replaced an inefficient hot water system with a new high-efficient system, variable speed pumping, and new digital controls. The building perimeter fan coils were automated to provide better comfort and turn off at night.
- Metcalf and Justice Buildings replaced inefficient T-12 lighting with new T-5 lighting and occupancy sensors. The fixtures were replaced and a more efficient lighting layout was implemented.
- Fish, Wildlife, and Parks Headquarters replaced boilers with more efficient units and the existing multi-zone air handler was replaced with a variable volume unit.
- Capitol Complex added insulation to un-insulated steam and hot water piping throughout the Helena Capitol complex.

Department of FWP

- Billings Regional Office received high efficiency furnaces, infrared heating units, and cooling in the computer room.
- Great Falls Regional Office received a new boiler, hot water heater and chiller along with upgrades to the air handler, making it a variable air valve system. Controls and new lighting were installed.
- Kalispell Regional Office received new high efficiency condensing units, a new boiler, repairs to ductwork, and outside air reset.
- Miles City Regional Office received a high efficiency boiler and direct digital controls.
- Miles City Hatchery received an energy analysis.

Department of Justice

The energy program leveraged over \$150,000 in utility rebates at the State Forensic Lab.

- State Forensic Lab replaced existing gas-fired outside air units with roof-top variable volume units with hot water coils. Four main lab units received innovative, high-efficiency variable volume units which included the following energy savings strategies: heat recovery from exhaust air, evaporative cooling, and lower lab air changes when unoccupied. A second part of the project installed high-efficiency condensing hot water boilers to replace inefficient gas-fired furnace sections on the air handlers, improving the ability to heat and cool different parts of the building year round. Digital controls were installed for all mechanical equipment allowing control of building schedules and nightly setbacks.

Department of Labor and Industry

The energy program was able to leverage just over \$13,000 in utility rebates on the following projects:

- Great Falls Job Service changed the constant volume operation of the air handlers to a variable volume operation. Digital Controls were added to improve temperature control.
- Bozeman Job Service replaced inefficient gas furnaces with high efficiency furnaces.
- Helena Job Service consolidated the building hot water system and replaced the existing inefficient boiler with high efficiency boilers. This project also replaced the existing

inefficient multi-zone air handler with a new variable volume air handler with temperature controls.

Department of Natural Resources & Conservation

- Spurgin Road Complex installed high-efficiency lamps and fixtures in several buildings.

Department of Transportation

The energy program was able to leverage more than \$155,000 for MDT energy projects.

- Helena Headquarters and Shop Complex received upgraded lighting in approximately 1,000 fixtures in the buildings and parking lots. The buildings also received new condensing boilers with digital controls and modulating gas burners, along with a new heating and ventilation system utilizing lower hot water temperatures from the boiler. Variable speed pumping on the hot water system and variable air volume units replaced inefficient systems.
- Helena Shop project replaced the existing heating and ventilation unit with high efficiency unit with heat recovery. This unit also utilizes heat removed from the nearby data center and transfers it to the outside air coming into the building.
- Great Falls District Office received upgraded lighting and mechanical systems.
- Billings District Office received upgraded lighting and mechanical systems.
- Missoula District Office received upgraded lighting and mechanical systems.
- Lewistown District Office received money to fund a project design.
- Statewide Traffic Light Conversion replaced 135 W incandescent lamps, 40 W incandescent lamps and 91 W incandescent lamps with high efficiency LED lamps in street lights and pedestrian walk lights for estimated savings of 1.4 million (kWh).

Department of Corrections

The energy program leveraged \$128,558 in Northwestern and MDU utility funds.

- Maximum Security and Close Unit 3 converted constant volume ventilation to variable air volume and direct expansion cooling, improving the ventilation system for prisoners and employees on the sides of the prison.
- Rothe and Low E Support buildings received new boilers, direct digital controls, domestic hot water heaters, heat recovery on the kitchen ventilation, and insulation in the walls and roof.
- Close Units 1 and 2 received new boilers, and variable air volume controls as well as roof insulation.
- High Side Gym received new boilers, air handling units, domestic hot water and insulation. A second phase installed new boilers, lighting and controls in the Low Side Gym while D Unit also received new boilers, domestic hot water, and variable frequency drives added to the ventilation system. Tag plant replaced the boiler-powered unit heaters with infra-red units and installed occupancy sensors to lighting and the Motor Vehicle Maintenance shop received new lighting.
- Treasure State Training Center installed a biomass boiler to provide hot water heat, eliminating the existing propane boilers.
- Riverside Youth Correctional Facility replaced all boilers on campus and installed a high efficiency furnace in the Multi-Purpose building along with upgraded lighting.
- Watch East Prison received new lighting with controls, resident wing windows, a new boiler, chiller and heat pump system that replaced window a/c units.

Department of Public Health & Human Services

The energy program leveraged \$101,588 in Northwestern and MDU utility incentives.

- Montana Veterans' Home received high efficiency boilers, installed a variable flow hot and chilled water loop, converted the old chiller to a new ground water cooling system and installed controls for building automation. In the Domicillary, the HVAC system was upgraded from constant to variable volume air flow. The Chapel converted steam boilers to high efficiency hydronic boilers and converted the water system from electric to gas-powered domestic hot water.
- Montana Developmental Center replaced constant volume pumps and air handlers with variable volume, added demand control ventilation in two buildings, upgraded the aquatic training facility boiler and air handling systems, and upgraded the lighting in several building along with direct digital controls. Another phase added actuators and drives to the air handling units, temperature controls, insulation in the roof and insulation on the steam and condensate lines along with upgraded lamps and ballasts.
- Montana State Hospital had significant issues in the gas piping system that runs through the campus. Old gas lines were repaired and replaced along with the installation of an interruptible gas system. The Xanthopoulos building was taken off the old steam plant, which was shut down, and given its own high efficiency boilers and air handling upgrades. Conversion of the geothermal water resource system upgraded the domestic hot water system. The support buildings on campus received upgraded lights and fixtures.
- Eastern Montana Veterans' Home received new boilers, a chiller, variable frequency drives, a new domestic hot water system, and upgraded lighting.

Montana State University

The energy program leveraged over \$300,000 in utility rebates with the following projects.

- Campus Lighting received upgraded lights and ballasts in five buildings.
- Cobleigh Building replaced the steam absorption chiller with a high efficiency magnetic chiller, pneumatic controls, dual duct variable air volume system, and direct digital controls.
- Wilson Hall added frequency drives to hot water pumps, the chilled water pumps and the fan system on the cooling tower. The constant volume multizone was replaced with variable volume air handlers and controls.
- Student Union Building installed variable frequency drives on the chilled water circulating pumps and on the fume hoods in two grill areas.
- Leon Johnson replaced the constant volume makeup air handlers with variable air volume air handlers with heat recovery, replaced individual lab exhaust with valves and central exhaust fans, removed the absorption chiller, installed a bank of heat pumps, and took the individual single pass direct expansion units off of city water and onto a chilled water system. An added phase installed water-source heat pumps to provide simultaneous heating and cooling within the building allowing the conversion to ground source heat in the future.
- Engineering Physical Science installed an Aircuity system on the lab supply and exhaust system which monitors the exhaust air and lab occupancy to only provide air changes as necessary.

MSU Billings

- Science Building installed an interactive system that included new boilers, a new air cooled chiller, variable air volume conversion, digital controls, and upgraded lighting.

MSU Northern

The energy program leveraged over \$32,000 in utility rebates.

- Physical Plant upgraded the existing steam boiler to a more energy efficient hot water system.
- Gymnasium upgraded lighting in the gym and weight room, added variable frequency drives on heating and ventilating units, added insulation on exposed steam and condensate piping, and installed demand ventilation controls.
- Electronics replaced the old boiler with two high efficiency boilers and added frequency drives and pumps to the primary heating loop.
- Hagener Hall converted the dual duct air system to a variable air volume system with VAV boxes in the lab. The exhaust system was upgraded to achieve building code compliance. The hot water boiler was replaced with a high efficiency boiler while the domestic hot water boiler was also replaced. Insulation on the roof was added and well as new lighting and occupancy sensors in the lab.

University of Montana

The energy program was able to leverage approximately \$400,000 in utility rebates for this campus.

- Campus Steam Trap Repair replaced or rebuilt steam traps in 8 different buildings.
- Skaggs Building added heat recovery to the main labs. The addition of controls and new variable air volume boxes allow the lab areas and office areas to reduce the amount of air changes when unoccupied.
- Education Building received upgraded pneumatic controls on the air handling units, direct digital controls, variable fan drives on the motor along, along with lighting and steam trap replacement.
- Anderson Hall had a dry fluid cooler installed to keep the heat pump loop within parameters when the well is not operational. This project also implements demand controlled ventilation.
- Bio Research Building project converted existing constant volume air handlers to variable volume units with zone sensors, variable speed drives were added to the hot water system, and the heat recovery system was upgraded.
- Fine Arts installed heat recovery to an air handling unit, a new variable air volume unit with direct expansion cooling which replaced the constant volume units, and pneumatic controls on some units with direct digital controls. The replacement and addition of equipment brought the building ventilation up to ASHRAE standards.
- Music Building received updated pneumatic controls on five single zone air handlers that were converted to direct digital control, dual duct units were modified to single zone VAV units using the existing cold ducts, and reheat for each zone and ground water cooling operations were implemented. The campus also had insulation installed on steam and condensate pipes in 18 mechanical rooms and pipe chases.
- Health and Business Building on the College of Technology, Missoula campus replaced the existing cooling tower and dampers with new piping and electrical connections. The project also installed a sump heater for the cooling tower.
- Campus Domestic Hot Water replaced electric water heaters with shell-and-tube heat exchangers and instantaneous steam water heaters. Expansion tanks were also installed with the new hot water system pumps to replace existing steam heaters in 12 buildings.

Montana Tech

The energy program leveraged over \$160,000 in utility rebates for this campus.

- Campus Lighting was upgraded in the Engineering Lab and the Health/PE Building, along with the Science and Engineering Building, the Museum, and the Engineering Hall.

- Mining and Geology retrofitted variable air volume air handling units, installed new direct digital controls, and new windows. The campus also had extensive insulation installed on steam and condensate pipes in approximately 12 buildings and tunnels.
- Health Sciences Building received lighting improvements along with the addition of insulation to the building shell, allowing for ventilation code compliance.
- Engineering Lab Classroom upgraded the T12 lamps to energy efficient T5 lamps.
- Health, Physical Education and Recreation Building upgraded the mechanical, electrical and safety systems by installing demand control ventilation on the heating and ventilation units and installed demand digital controls. Lighting was also upgraded.
- Campus Mechanical Insulation installed insulation on steam and condensate pipes and fittings in more than 12 campus buildings.

UM Helena College of Technology

The energy program was able to leverage \$127,040 in utility rebates

- Airport Campus upgraded the boiler and hot water system and installed new lab lighting and occupancy sensors. Inefficient gas-fired unit heaters were replaced with condensing gas unit heaters, a new variable air handler replaced three gas-fired rooftop units, and new overhead insulated garage doors were installed.
- Donaldson Building received a condensing boiler that will work in conjunction with two existing hydrotherm condensing boilers; two variable speed pumps were also added. Two multizone air handling units were replaced with one variable volume roof-top unit and lighting upgrades were added to the Maintenance and Truck Shop.

UM Western

The energy program was able to leverage \$18,843 in utility rebates.

- Campus Lighting upgraded lamps and ballasts in the PE Building, IT Woods and Block Hall.
- Library, Administration, and Student Union Buildings received upgraded lamps and ballasts and upgraded the constant volume air units to variable air volume units.
- Metals Building received upgraded T5 lamps and ballasts, added exterior insulation, and added insulation to the roof.
- Block Hall replaced single pane windows and doors with high efficiency windows.
- IT Woods received insulation in the attic and demand control ventilation.

Community College

The energy program was able to leverage \$20,022 from MDU incentive funds.

- Miles Community College installed unit ventilators, insulation, direct digital controls, domestic hot water pumps, boilers, lights, HVAC, and windows on the campus.

PROJECTS PLANNED FOR IN-DEPTH ENERGY ANALYSIS

The following projects have been identified as having the potential for energy savings and are entering into the energy analysis phase.

Department of Corrections

- Pine Hills Juvenile Facility Mechanical Upgrade
- Men's State Prison Laundry Facility Energy Improvement

Department of Revenue

- Liquor Warehouse Roof Improvement

Department of Military Affairs

- Fort Harrison Lighting Upgrades

Montana State University-Northern

- Brockman Center Retro-Commissioning

University of Montana

- Campus wide Retro-Commissioning Projects

Montana Tech of the University of Montana

- Chemistry & ELC Lab Improvements

Helena College

- Administration Area Energy Improvements

PROPOSED PROJECTS FOR NEXT BIENNIUM

Considering the large number of projects completed in 2009-2012, there will be a continuing effort to follow those projects. One major work component yet to be finished is the verification of energy savings on the completed projects. The scope of this work includes visiting the completed projects for a review of equipment operation, a review of utility bills and energy use information and adjusting projects for maximum effectiveness as needed.

Investments in future projects will utilize funds collected from the revolving fund using repayments of projects. Projects were allowed to repay early in 2010-2012 in order to have a good balance for the next biennium. No new state or federal funds are being requested of the 2013 Legislature. DEQ is coordinating closely with the DOA Architecture and Engineering Division on the projects proposed through HB 5 and will make adjustments throughout that planning process.

Agency (of project) / Project Name	Estimated Energy Investment	Description of Proposed Project
Department of Administration		
State Capitol Building	\$500,000	Upgrade mechanical equipment
Department of Fish, Wildlife & Parks		
Fort Peck Hatchery	\$50,000	Upgrade boiler
Department of Corrections		
Montana Men's Prison Laundry	\$600,000	Upgrade mechanical equipment
Pine Hill Correctional Facility	\$450,000	Upgrade mechanical equipment
Department of Military Affairs		
Fort Harrison Lighting Upgrades	\$100,000	Lighting upgrade
Montana University System		
Helena College	\$100,000	Administration Area Energy Improvements
Montana Tech	\$500,000	Lab Improvements
Montana State University - Northern	\$50,000	Brockman Retro-Commissioning
State-wide Energy Improvements		
	\$1,150,000	Energy Improvements in State Buildings
Total	\$3,500,000	

Department of Administration

There has been an extensive amount of work done on the Capitol Complex. There is a plan to upgrade equipment in the Capitol building, which will improve energy efficiency and comfort. The project is estimated to use \$500,000 in energy funds.

Department of Fish, Wildlife, & Parks

There are plans to investigate energy saving potential at the Fort Peck Hatchery. The project will concentrate on modifying process water flow and boiler operation, which is estimated to use \$50,000 in energy funds.

Department of Corrections

There has been an extensive amount of work done at the Men's State Prison. There is a plan to upgrade the Laundry facility at the prison, which is estimated to use \$600,000 in energy funds. The Pine Hills Correctional Facility is planning on improving energy efficiency and comfort in their administration building, which is estimated to use \$450,000 of energy funds. There are plans to look at the Women's Prison in Billings for energy savings potential.

Department of Military Affairs

There are plans to investigate energy savings potential at Fort Harrison. Most of the energy savings potential will be in lighting upgrades, which is estimated to use \$100,000 of energy funds.

Department of Public Health & Human Services

There has been an extensive amount of work done on the Warm Springs Campus, Montana Veteran's Home, Eastern Montana Veterans Home, and Montana Development Center. For the next biennium, most of the SBCEP effort will be to verify energy savings on past projects and review current equipment operation.

Montana Department of Transportation

There has been an extensive amount of work done on the Helena Headquarters and Shop, and District Offices across the state. For the next biennium, the SBCEP will verify energy savings on past projects and review current equipment operation.

University of Montana

There has been an extensive amount of work done on the University of Montana campus. For the next biennium, most of the SBECF effort will be to verify energy savings on past projects and review current equipment operation.

Montana Tech of the University of Montana

Montana Tech is planning on improving laboratory exhaust efficiency by replacing the constant volume exhaust system with a variable volume system in both the Engineering Lab Classroom and Chemistry building. The improvement in equipment and operation efficiency is estimated to allow \$500,000 of energy funds to be used in the project.

University of Montana – Western

There has been an extensive amount of work done on the Western Montana Dillon campus. For the next biennium, effort will go towards verifying energy savings on past projects and reviewing current equipment operations.

Helena College

The two main campus buildings at the Helena College of Technology have undergone extensive retrofits. For the next biennium, effort will go towards verifying energy savings on past projects and reviewing current equipment operations. There are plans to develop an energy improvement project in the administration area, which would upgrade existing mechanical systems. The budget energy dollars is \$100,000.

Montana State University

Many buildings on the Montana State University campus have undergone energy retrofits. For the next biennium, effort will go towards verifying energy savings on recent projects and reviewing current equipment operations.

Montana State University – Northern

There has been an extensive amount of work done on the Northern Montana Havre campus. For the next biennium, most of the SBECF effort will be to verify energy savings on past projects and review current equipment operation. There are plans to do a retro-commissioning project at Brockman, which is estimated to use \$50,000 of energy funds.

Montana State University – Billings

There has been an extensive amount of work done on the Montana State University - Billings campus. For the next biennium, most of the time will be used to verify energy savings on the Science Building and review current equipment operation.