Final Report
October 18, 2006

2006 Energy Advisor Report to the Utah Legislature: Energy Policy and Development in Utah

Delivered To:
The Office of Governor Jon M. Huntsman, Jr.
Public Utilities and Technology Interim Committee and
Natural Resources, Agriculture and Environment Interim Committee

EXECUTIVE SUMMARY

HB 46, which passed during the 2006 Utah Legislative session, codified the position of the Governor's Energy Advisor, identified parameters of a State energy policy, and articulated reporting responsibilities of the Energy Advisor. This document is provided in compliance with the reporting requirements contained in that legislation. It includes a review and update of Utah energy activities and priorities, comments on resource status within the State, and makes specific recommendations for legislative and administrative action.

Given that this is the first report provided to Governor Huntsman and to the Utah Legislature under HB 46, herein is provided background on the actions resulting in the creation development of the current Utah Energy Policy framework that has emerged subsequent to the dissolution of the former Utah Energy Office. An update on the activities previously housed in the Energy Office is also provided, accompanied by recommendations where a need is identified.

BACKGROUND

Since the early 1980's, a Utah Energy Office addressed the energy issues that arose in the State. This changed in May 2005 with the abolition of the office by Senate Bill 199.

Provisions of SB 199 called for moving the Clean Fuels Vehicle program and fund from the Department of Natural Resources, where the Utah Energy Office was located, to the Department of Environmental Quality and transferred authority for certain federally-related programs and the Renewable Energy Tax Credit to the Utah Geological Survey. The State Buildings Energy Efficiency Program (SBEEP) was transferred to the Division of Facilities Construction and Management.

The new look at energy policy for the State would be coordinated with the newly-standing Governor Jon M. Huntsman's economic policy of balanced growth of the State's economy. As an aid to that policy, the Governor appointed an Energy Advisory Council to assist in his efforts. The council drew expertise from industry, government, academia, legislators, and an interested citizenry. This same council assisted the governor in

choosing an Energy Policy Advisor and was created to support energy economic growth opportunities and guide a wise use policy in development of energy resources. As a member of the Governor's senior staff, the Advisor's function is partly to closely confer with other staff members and their agencies, coordinate on regional and national issues, and work on creating a comprehensive energy policy. There were seven top energy priorities for the Advisor to address: energy efficiency, renewable energy projects, coal, oil shale and tar sands, natural gas, oil, and interstate and intrastate transmission.

In the 2006 legislative session, House Bill 46 codified the position of Energy Advisor and identified reporting requirements back to the legislature. The Bill also added the need for including the study of nuclear power as a segment of the State's energy supply and established principles for a state energy policy.

The Governor's Energy Advisor submits this report in compliance with the requirements of HB 46.

UPDATE: POLICY PRIORITIES and RECOMMENDATIONS

RENEWABLE ENERGY RESOURCES

***Background and Update*:**

Utah has an abundance of both renewable and non-renewable natural resources. Historically, Utah's energy development has been based on predominantly non-renewable resources.

At present, renewable resources account for about 322.7 megawatts (MW) of electric generation capacity in the State.[1] This includes wind, biomass, geothermal, and hydro production. On the other hand, nameplate coal fired generation capacity in the State is 5,133.3 MW and natural gas fired plants accounted for 1,406.7 MW.[2] Clearly, Utah has the opportunity to diversify its energy portfolio to include more renewable resources.

A more diverse energy portfolio provides protection against rising fuel prices and shortages, can reduce our dependence on foreign energy sources, and produces more affordable power over the long term.

Utah has a significant renewable energy potential and is poised to utilize increased amounts of its renewable energy resources for both electricity production and other end use energy needs such as fueling. The State Anemometer Loan Program, now housed in Utah Geologic Survey, is demonstrating that Utah has more wind potential than

[1] Based on current Utah Geological Survey data.
[2] Utah Geological Survey 2005 Energy Data

previously thought, and developers are looking at wind opportunities across the State. However wind development is constrained by limited capacity in the State.

The competitiveness of renewable resources has improved in recent years, but there are still challenges to their development in Utah. Other states in the region have addressed these barriers and are rapidly developing their renewable energy resources. As Utah moves to diversify our energy supply and capitalize on our vast renewable potential, there is a need to address both assistance with commercialization and scale commercial research and development, depending on the renewable research. For example, large-scale commercial wind and solar photovoltaic projects are being developed in states across the nation, while cellulosic ethanol, concentrating solar, and biomass have yet to bridge the gap between R&D and commercialization.

Incentivize commercialization of renewables and fund sound research and development efforts will help create a broader spectrum of resource options, advance innovative technologies, spur economic development opportunities, and provide Utahns with a balanced energy portfolio.

Overcoming minor cost barriers and seeking advancement of renewable energy sources today will have long-term benefits for the State.

Recommendations for Legislative Action

The following legislative action items are recommended to encourage additional development of renewable resources in the State:

(1) Reinstate the corporate renewable energy tax credit
(2) Develop an alternative energy incentive program

Renewable Energy Tax Credit

The Renewable Energy Tax Credit is currently administered through the Utah Geological Survey (UGS) State Energy Program. It offers personal and corporate income tax credit for renewable projects. It is set to sunset on December 31, 2006. It has supported additional development of renewable resources in the State and has been utilized more extensively in the last year as Utah's renewable energy potential is better understood and documented. Reinstating the corporate component of the tax credit will ensure that these options continue to be pursued to the economic benefit of rural communities[3], low income citizens,[4] and developers.

[3] Renewable energy development, wind for example, is quite accommodating of multiple land use and provides an additional outlet for many in the agricultural community for the allocation of and return on investment dollars.
[4] The corporate tax credit has helped to support the addition of solar panels on low-income housing units in Salt Lake City thus providing greater insulation from energy price spikes to those most at risk of being significantly impacted by price spikes.

Alternative Energy Incentive/Fund

It is proposed that 3% of annual severance tax dollars collected on energy minerals be utilized to establish an alternative energy incentive program in the State. One-third of the total 3% allocation would be used as "seed" funds for new projects demonstrating strong economic potential for the State and utilizing and advancing progressive alternative energy technologies. Preference could be given to productive capacities that the State is most interested in pursuing and that support development opportunities across industries (e.g. incentives for ethanol production that have co-benefits of either complementing forestry management or agricultural strategies).

It is recommended that assessment of the aforementioned project proposals and allocation of benefits be managed through the Governor's Office of Economic Development, as this office already handles review of economic incentive programs for development. Review of projects would be coordinated with the Energy Advisor with final decisions made by the GOED board and the Energy Advisor. Establishment of Utah based energy projects would help to further build the Energy cluster within the State, which is a goal commensurate with the activities of GOED. Energy minerals severance taxes collected for Fiscal Year 2006 totaled approximately $77,802,352 and the amount budgeted for Fiscal Year 2007 is approximately $65,000,000; this action would divert about $1,959,000 from the energy minerals severance taxes collected in FY 2007.

The remaining two-thirds of the total 3% annual allocation would be used as the fiscal support for a production-based incentives, whereby financial credits are only given when actual production ensued. In this way, the State would avoid the risk of funding projects that do not ultimately perform and deliver the diversity benefits to the State.

Recommendations for Administrative Action

The Governor's Office will continue to support small scale renewable programs across the State through utilization of the (Federally administered) Petroleum Violation Escrow (PVE) Funds. The use of these funds is restricted to energy efficiency and alternative energy development and the funds are finite in nature. The Governor's Office, with support of the Energy Advisor, reviewed and supported--with the coordination with the State Energy Program--three solar projects in FY 2006: Goblin Valley State Park, Yuba State Park and the Department of Natural Resources on West North Temple in Salt Lake City. The latter project also consisted of a demonstration component for educational purposes. This year the Governor's Office will continue to seek and review opportunities to fund renewable distributed generation projects in concert with the Governor's Energy Efficiency Plan, the goals for renewable development in the State, and within the federally defined parameters for utilization of PVE monies.

ENERGY EFFICIENCY

Background and Update

Energy Efficiency and energy conservation are the most expedient solutions to the State's growing energy demand and represent highly cost-effective options for responding to rising energy prices. "Conservation" implies an immediate reduction in use that may be provided on a voluntary or incentive basis. Voluntary reductions occur when citizens opt to simply use less energy for a short duration of time. For example, the state-private sector program, PowerForward, asks citizens to exercise additional conservation, such as thermostat temperature changes and reduction in appliance use during certain hours of the day, when the electric supply situation is viewed as particularly "tight." Under some circumstances such short-term reductions are compensated based on a pre-arranged agreement between a participating customer and the local utility. As an example, Rocky Mountain Power offers a program called "Cool Keeper" that compensates residential customers who allow the utility to cycle their home air conditioning units during the summer season. Conservation is a useful tool for mitigating short-term energy price spikes and responding to tight energy supply conditions.

Energy Efficiency is a long-term prospect where the goal is to reduce overall energy usage. Reductions can be achieved without sacrificing quality of the "energy service." Because these are reductions of overall energy use, they do not focus on limiting use at a specific point in time, as conservation measures often do. In terms of a resource portfolio within the utility sector, energy efficiency is often referred to as "demand side management." Programs are designed to be based on a cost effectiveness analysis as compared with "supply-side" options for meeting long-term energy demand. Energy Efficiency offers an opportunity to diversify the predominantly supply-based energy portfolio, providing mitigation for future price spikes.

Energy efficiency can also be realized in transportation. When consumers make alternative decisions about car purchases based on performance or purchase "hybrid" vehicles they are considering the benefits of reduced energy use over time. Similar decisions can be made within State fleets with analogous benefits.

The Governor's energy plan, released on April 26, 2006 was designed with the objectives of reducing long-term energy use over multiple end uses. It calls for a 20% increase in energy efficiency in the State by 2015 through reductions in usage within State buildings, building private-public partnerships, education, and transportation initiatives.

House Bill 80, which passed the legislature in the 2006 session, supports the realization of increased energy efficiency within State-owned buildings. The State Energy Advisor is working in coordination with the State Buildings Energy Efficiency manger to identify projects, build an inter-agency energy team, and to measure efficiency gains.

Recommendations for Legislative Action

Removal of Regulatory Barriers to Energy Efficiency Measures

The Energy Advisor recommends that the legislature consider any actions that may be necessary to facilitate the removal of regulatory barriers to enhanced demand-side (DSM, or "energy efficiency") measures. For example, should it be determined that the role of the Public Service Commission needs to be clarified to ensure that it has the authority to issue a policy decision on utility tariff structures that facilitates enhanced energy efficiency, it is recommended that such legislation be pursued. However, no specific language or change is recommended at this time.

Support for Energy Efficiency Programs

Secondly, it is recommended that the legislature consider dedicating a portion of agency Energy Budgets to support energy efficiency programs. An effective policy would be designed to "reward" early actors; it would incorporate opportunity for agencies to recover from any energy deficits that might have emerged as a direct result of rising energy prices; and it would not reduce energy budgets for energy efficiency gains. No specific language is herein defined but consultation and consideration for such a recommendation could be coordinated with the Division of Facilities Construction and Management.

Transportation Efficiency Policies

It is also recommended that the legislature consider development of policy for State fleets similar to the energy efficiency program developed for State buildings through HB 80. For example, legislation should look at advancing fleet performance measures when purchasing fleet vehicles. Specific legislative language is not identified here but coordination with the State Clean Vehicles Program in the Division of Air Quality and with State Fleets is recommended.

For private sector transportation options, the Energy Advisor supports policies that would add additional fuels and technologies to the Clean Vehicles Fuel program. Potential legislative language could be developed in coordination with the State Clean Vehicles Fuel Program.

State Energy Efficiency Goals

Finally, the Energy Advisor would support a Legislative Resolution adopting aggressive energy efficiency goals and actions for our State consistent with the Governor's Energy Efficiency Plan and goal to increase energy efficiency by 20% by 2015.[5]

Recommendations for Administrative Action

[5] The full plan is available at www.energy.utah.gov.

Through Executive Order, the Governor has required all cabinet members to provide annual reporting on all activities and efforts to improve energy efficiency within their agency(ies). Reports are submitted to the Department of Environmental Quality for compilation and delivery to the Governor.

The Energy Advisor manages a "Baseline" energy efficiency workgroup that will track the annual gains in energy efficiency across both the public and private sector. The group will also be utilized as an advisory panel for identifying best practices and program options for delivery of energy efficiency enhancements in the State. It is recommended that this effort continue to be managed through the Energy Advisor.

The State of Utah was invited this year to become part of the U.S. Environmental Protection Agency (EPA) Partnership on Energy and the Environment. The invitation was formally accepted by the Governor's Office, the Department of Administrative Services, and the Department of Environmental Quality. Utah has now become the fourteenth member of the Partnership.[6] This Partnership will provide technical expertise to help achieve energy efficiency goals and also provide regional and national recognition for the State of Utah's efforts. It is recommended that the Energy Advisor continue coordination of State efforts with the federal agencies in support of the State goals on energy efficiency and that this is consistent with the tasks of the Advisor as stated in House Bill 46.

ELECTRIC TRANSMISSION

Additional electrical-transmission capacity is needed in the State and in the West. New transmission investment allows for the delivery of clean, reliable, and cost effective electricity. Historically, transmission has been planned on an individual utility basis and based solely on the needs of that utility. While this has worked fairly well in the past when utility service was more localized, it fails to work well in an environment where resources are often remote from loads and where individual actions impact the structure of the entire interconnected system, often referred to as the "Western-grid." This type localized planning has also resulted in significant under-investment in new transmission.

To meet rising energy demands and to keep pace with the economic development of the West it is imperative that we plan and construct new transmission infrastructure, and that we coordinate regionally to do so. This is the reason that four governors (UT, NV, CA, WY) entered into an historic MOU in April 2005 to support the development of the Frontier Line, envisioned to deliver vast renewable and clean resources within and across our State and to the various load centers in the West.

While the Frontier Line is a regional effort, it does support our State objectives, including resource diversity, energy development, and improved electric reliability to meet our ever changing and growing State economy. This project will better connect

[6] Membership is by invitation only to states demonstrating leadership on energy and environmental issues.

Utah's electric grid with our neighbors and provide new markets for Utah's renewable and conventional energy production.

Much progress has been made on this effort since the MOU was signed. In April 2006, the governors' offices of the four states entered into an agreement with the utilities across the "footprint" of the envisioned project to conduct a feasibility study. A transmission feasibility study is underway and completion is expected in April 2007.

If the feasibility study demonstrates net benefits to the participating states, as it is anticipated it will, a financial plan and development strategy will ensue. However, construction of transmission is not an easy process. It faces environmental concerns, cost allocation considerations, (i.e. allocating who pays), and the NIMBY status. Thus, all these issues will have to be addressed.

Recommendations for Legislative Action

For resolving siting issues, Utah has developed a process to address issues for electric utilities siting facilities on private lands and where cities and/or counties hold public easements. Under UCA 54-14-102 coordination exists for siting electrical facilities at 34.5 KV and above, thus including main transmission and distribution facilities. Under the Code, the Electrical Facility Review Board, comprised of the three commissioners from the Public Service Commission and one representative each for the cities and counties, has backstop authority to resolve siting disputes. However, the legislation does not apply to siting for independent projects or address issues within the broader State or Federal land-ownership cases.

Specifically, the issue is that portions of any new transmission project may be constructed by private developers and there does not exist a specific agency or process to deal with what may be the new "business model" for construction of transmission infrastructure that could benefit many of Utah's communities but is outside the normal utility planning parameters. Additionally, assistance for siting across public lands could be facilitated through designation of a responsible agency. Since the Utah Public Lands Policy Office is responsible for delivering the State's land use polices to federal agencies, it seems reasonable that the siting issue be coordinated with that office in coordination with the benefits identified through the Review Board.

It is therefore recommended that: (1) the legislature consider extending the authority of the Electrical Facilities Review Board to review independent projects and (2) that a process be developed for coordinating the role of the Review Board for siting across public lands.

Additionally, it is recommended that the Utah legislature fund a study to evaluate the benefits of an Electrical Infrastructure Authority in the State that would function as a single repository and facilitator for siting and planning of major infrastructure projects. Development of such an authority is preferable to individual "Industrial Funds" that

subsidize specific projects and may actually hamper the development of projects that benefit the State as a whole.

Recommendations for Administrative Action

Addressing the cost allocation issue will require defining regional solutions that can be supported and endorsed by states, regional entities, and the Federal Energy Regulatory Commission (FERC). It is recommended that the Energy Advisor in collaboration with the Utah Public Service Commission, continue to work on these efforts through stakeholder collaboration to define options for resolution of inter-state cost allocation issues.

NATURAL GAS & PETROLUEM TRANSPORTATION PIPELINES

While there is some backstop authority for electrical transmission siting, there is no such authority for the siting of transportation for natural gas facilities. There also does not exist any review board or process for consideration of the benefits of additional natural gas, crude oil or petroleum product pipelines in the State.

Recommendation for Legislative Action

The Energy Advisor recommends that there be a study conducted under the auspices of HB 46 to evaluate the potential to expand UCA 54-14-102 to the review of natural gas and petroleum pipelines where needed. While FERC has authority over interstate natural gas pipelines, the study should consider the role of State authority and appropriate coordination with FERC. Similarly, backstop review of pipelines for petroleum products should be coordinated through the Utah Public Lands Policy Office and the DOGM to asses the overall benefits to the State of any proposed projects and to make recommendations to federal agencies where appropriate on State policy.

The legislature may also want to consider the development and funding of a study to evaluate whether such issues could be better addressed through formation of a pipeline authority. However, such a study should not limit defining any beneficial incremental steps, such as those defined above. Should a pipeline authority be preferred, processes already in place through UCA 54-14-102 and through the Utah Public Lands Policy Office and the DOGM could provide the basis for a new structure.

Recommendations for Administrative Action

The Energy Advisor in coordination with Utah Public Lands and Policy Office and also DOGM has been working with developers in Utah to assess issues with respect to transport for Utah natural gas and petroleum products. This is discussed further below under "Oil and Gas." It is recommended that the Energy Advisor continue to work with producers and coordinate with the requisite State agencies to define actions as needed.

OIL and NATURAL GAS

Oil and natural gas production have been "staples" of Utah's energy economy and development. Both activities bring benefits to rural economies in terms of economic development and also deliver revenues to the State through severance taxes and royalties.

The recent increase in oil and natural gas prices has benefited Utah's petroleum industry with Applications for Permits to Drill increasing by 35 percent, from 1054 to 1423 through August 2006 over the same period in 2005.[7] The average price received by the State's crude oil producers was $64.91 per barrel during June, 2006, up from $53.98 per barrel for 2005 and $24.09 per barrel for 2001.[8]

The high prices have stimulated increased production in Utah with 2005 production of 15.9 million barrels of crude oil, an increase of 21 percent from the low of 13.1 million barrels in 2003. Utah ranked 15th nationwide in crude oil production during 2005, out of 31 oil-producing states and two federal offshore areas (the Gulf Coast and the Pacific Coast), and was responsible for 0.85 percent of U.S. crude oil production.[9] Out of the State's 29 counties, Duchesne produced 40 percent of the total, followed by Uintah (26 percent), San Juan (26 percent) and Sevier (5 percent). Lesser amounts were produced in Summit, Grand, Garfield, Carbon, Emery, Daggett and Sanpete Counties.[10]

Utah oil reserves are estimated to make up about 221 million barrels of the total U.S. oil reserves of the approximate 22 billion barrels of US reserves. Currently, Utah has 7,630 oil and gas wells in production or capable of some production.

Utah produced 275 billion cubic feet of dry marketable natural gas during 2004 (the latest year for which complete data is available), ranking it twelfth in the nation for natural gas production with 1.5 percent of total production. Nationwide, natural gas was produced in 32 states and federal offshore areas in the Gulf of Mexico.[11] Within the State, Uintah County is the largest producers, with 52 percent of gross withdrawals for 2005, followed by Carbon (24 percent), and Duchesne (6 percent.) Natural gas was also produced in Emery, Summit, San Juan, Grand, Daggett, Garfield, and Sanpete Counties.[12]

Utah is a net exporter of natural gas. Gas produced in Wyoming and Colorado is imported to the State for consumption and transportation to other states. The Kern River Pipeline transports natural gas from Utah to Nevada and California while the Northwest Pipeline takes gas from Utah to Idaho, Oregon and Washington.

---

[7] Utah Division of Oil, Gas and Mining
[8] Energy Information Administration
[9] Energy Information Administration
[10] Utah Division of Oil, Gas and Mining
[11] Energy Information Administration
[12] Utah Division of Oil, Gas and Mining

At the consumer level, Utah leads the nation in heating with natural gas with 84.8 percent of Utah housing units utilitizing natural gas for space heating, compared to 51.2 percent nationwide.[13] Of the 125.8 billion cubic feed of gas delivered to Utah consumers during 2005, residential consumers consumed 58.0 billion cubic feet (46 percent) followed by commercial (27 percent), industrial (20 percent), and electric power generation (6 percent). There was also a minor amount used for motor vehicle fuel.[14]

There are impediments to expanded production of both natural gas and oil in the State. A significant impediment is access to public lands.[15] While the Bureau of Land Management (BLM) has worked to retain development options within its Resource Management Plans (RMP's), there are still a number of access issues, which the State has and can continue to assist in addressing. One such area is with respect to winter drilling stipulations. For some periods of the winter, drilling is not permitted because it could interfere with wildlife migratory patterns. However, there may be opportunities to achieve better mitigation for wildlife while still allowing for moderate winter drilling.

Additionally, there has been a great deal of discussion about the need for new refining capacity in the State to accommodate "black wax" production. Capacity may also be needed to meet the needs of traditional oil production and the potential increased production associated with the advancement of an oil shale and tar sands industry in the State.

Recommendation for Legislative Action

Please refer to recommendation for study of a pipeline authority noted above under "Transportation Pipelines."

Recommendations for Administrative Action

The Energy Advisor in coordination with the Utah Public Lands Policy Office has been working to promote additional balanced production in the State. For example, year round drilling options with enhanced mitigation are being explored. A final report on the first pilot from winter 2005-06 drilling is anticipated in late November at which time the Advisor can report further to the legislature.

Ultimately, it is recommended that the State develop an "external mitigation strategy" that can provide for additional mitigation and production. It is recommended that the Advisor in coordination with other agencies work to develop such a plan.

---

[13] U.S. Bureau of Census, 2000 Decennial Census

[14] Energy Information Administration

[15] Arguably, there are a number of public lands areas open to oil and gas drilling. However, proximity and geologic configurations can still be problematic when lands are non-contiguous. Thus, leasing activity is not likely to be an accurate indicator of activity and access. Continued coordination with Federal agencies to identify the best options for moderating the footprint of development while still allowing for reasonable and efficient opportunities for development must continue to be pursued.

The Advisor, the Division of Wildlife Resources (DWR) and DOGM have been actively engaged with developers to address the issue of transport and refinement of the "black wax" products produced in the State. The Advisor and DOGM have also consulted with refiners about the potential for expanded refining capacity in the State. It is recommended that this course of action be pursued and recommendations to identify options for resolving the issue.

COAL

Initial coal production occurred in Utah in 1854 and currently 13 mines operate in Carbon, Emery and Sevier Counties. Three additional coal mines are in various stages of permitting. Production in 2005 of 24.6 million tons ranked Utah 14th out of 26 coal-producing states and was 2.0 percent of nationwide production. The primary use for Utah coal, accounting for 82.4 percent of production, is electrical power generation, with the majority of the remainder going to industrial users. Many of these industrial users are actually cogeneration facilities and also produce electrical power. There are also lesser amounts used for residential and commercial heating. A noticeable amount of Utah production, 38.0 percent in 2005, is exported outside of the State.[16]

The Utah Geological Survey annually issues a report entitled "Annual Review and Forecast of Utah Coal Production and Distribution." This report details Utah coal production by field, operator, and county and distribution of coal by use and geographical destination. The report also outlines major developments in the Utah coal mining industry.

The issue of the exact amount of recoverable coal reserves in the State has been one of some debate and numerous studies have been performed in an attempt to assess the State's coal reserve status. To address this issue and to develop a reasonable confidence range for reserves, the Energy Advisor formed a "Coal Advisory Group." The group consisted of representatives from the relevant State agencies, the coal and mining industries, and utilities. The individuals representing these interests are considered to be experts in coal geology, mine development, coal marketing, and supply.

The first goal of the group was to consider the amount of coal remaining in Utah that can contribute to the State's economy in future years. The group worked to develop an independent objective study of reserves. The group reviewed numerous reports and evaluated the various assumptions that resulted in the different reserve measurements across studies.

The group then took the UGS full resource location map and identified fields with and without potential for development. This map entitled "Location of Utah Coal Resource Areas" is attached as B.1 with an associated explanation contained in item B.1.A. The pie chart entitled "Relative Sizes of Utah Coal Resource Areas" attached as B.1.B considers potential recoverable reserves by coal field. However, some of these

[16] Utah Geological Survey, Annual Review and Forecast of Utah Coal Production and Distribution - 2005

fields are not available today for extraction due to issues such as coal quality, depth, field geography, or legal/land use constraints which prevent development.

Based on the analysis and review, the group reached a consensus that Utah has a range of 15-48 years of coal reserves remaining assuming that 25 million tons is extracted annually. [17] This estimate relates only to the red area identified on the map, or those areas which are deemed to be "accessible," where this implies that there is not a current legal restriction to access. However, geologic, economic, and environmental considerations may impede development.

It should be emphasized that the *reserve* numbers are a development snapshot at this point in time. The group did not extrapolate further to specify what "could" be if development constraints were relaxed (e.g. improved exploration and development access and together with technological advancements in the areas of mining, exploration, and environmental.)

Even though it appears that there may be Utah coal available for the up to 48 years, the long-term large consumers of coal in the Utah marketplace, which sign 20-30 year coal contracts, are making decisions which question the reality of a 48-year coal supply. Coal imports into Utah from Colorado and Wyoming have occurred over recent years, with the percentage of coal imports increasing annually.

Another critically important issue for long-term large consumers of coal is the reliability of coal supply in-state where coal production is projected to decline from existing coal fields. A major unexpected mishap in the Utah coal industry (such as a mine fire, flooding, cave-in, lack of access to additional coal leases, etc.) could severely hamper the ability for a large coal consumer in Utah to get sufficient amount of coal.

Because of these concerns, new Utah power plants under consideration are being designed to burn Wyoming coal directly, or a combination of Utah or other state coals.

Estimate Assumptions

The 15 year estimate, or 380 million tons, is derived from financial reports submitted by companies. This is considered to be a fairly reliable, but conservative, estimate of the remaining coal reserves since companies tend to avoid overstating resources.

The 48 year estimate, or 1.5 billion tons, is based on UGS studies and BLM land management plan assessments. Estimates for the Emery, Wasatch Plateau, and Book Cliffs coalfields used in the BLM Resource Management Plans are based on thickness maps of the potentially minable coal beds using all of the available drill hole information.

[17] At present, the state does extract about 25 million tons annually but this rate is increasing. The state exports about 15 million tons so it is a net exporter. This situation will likely change as extraction rates change and internal demand rises.

The minable reserve base was calculated using a minimum coal bed thickness of 6 or 7 feet and a maximum thickness of 14 feet with overburden ranging from 200 to 2,500 feet. The "reserve" estimate was calculated by using a recovery factor provided by mining engineers who reviewed the coal thickness maps and projected a reasonable mine recovery. The BLM estimate used in the land use plan is conservative in the sense that it generally excluded coal thinner than 6 feet thick with overburden greater than 2,500 feet. However, this estimate did not consider issues with access and quality of the coal. For example, the "reserve" estimate includes the Willow Creek property at Castlegate and a block of coal between Scofield and Gordon Creek that are known to have major mining problems and would presently be considered as uneconomic or marginally economic. In addition, the estimate includes a poorly defined block of coal in the Candland Mountain area on the Manti-La Sal National Forest that is presently identified as roadless. Overall, the coal reserve estimate included in the BLM Resource Management Plan is considered to be realistic in showing that the remaining coal reserves in central Utah have a life of several tens of years rather than hundreds of years.

There was some discussion that minable coal reserves could stretch beyond the 48 years and this is discussed further in Attachment B.1.A. However, to go beyond this, say to 2060, implies exploring and developing coal resources that are presently not adequately defined and thus which are not economically recoverable at this time. It also assumes a constant annual rate of mining of 25 million tons. In the past 10 years, the annual production rate has fluctuated both above and below this level.

Where the map is color coded blue there is reserve potential but the resources in these areas are not adequately defined and some are not presently open for mining. For example, nearly all the Kapairowits Plateau coalfield is in the Grand Staircase-Escalante National Monument and so is essentially closed to mining; thus, the coal in this area was not counted as "reserves." This is because to qualify as reserves, the group agreed that the following conditions apply:

- Technical Considerations:
  - Coal must be accessible, developable, and transportable
  - Coal must be economically recoverable, marketable, and profitable
  - Coal must be cost effectively minable (based on thickness, quality, depth of cover, and geologic conditions)
- Legal considerations
  - Coal must be available for development with reconsiderations of land use designation prohibiting present and future use
- Environmental considerations:
  - Coal must not be restricted by undue environmental and permitting constraints

The Coal Advisory group will continue to refine the coal reserve estimates going forward given any changes in the technical, environmental, and legal constraints. Specifically, a reserve estimate represents the economically available resource at the time

of assessment but over time economic, technical, legal, and environmental conditions may change.

The group will also look at alternative utilization technology issues, such as coal-to-liquids or coal gasification, and the need for incentives. The legislative branch already passed SB 241 in 2006 which removed the severance tax for 10 years for gasified coal and coal to liquids production.

The Integrated Gasification Combined Cycle (IGCC) technology for generating electricity from coal is being followed very closely as a future technology. Regardless of its inherent increase in costs for power, IGCC is being considered seriously as the source of new power plants because of its obvious advantages in lessened air emissions, more efficient use of fuel, and its potential for carbon dioxide sequestration.

Recommendation for Legislative Action:

It is recommended that the legislature be guided in its policy given available reserves and with a view to the fact that significant legal, environmental, and permitting constraints currently exist preventing the access to additional economic coal development options. If Utah wishes to sustain a coal mining industry and utilize low-cost energy through coal-fired electric power generation, the State together with the coal industry and other stakeholders will have to look at the coal regions within the State where opportunities for balanced coal development exist.

Recommendation for Administrative Action

It is recommended that the Energy Advisor continue to coordinate with the Utah Public Lands Policy Office in addressing our energy development and land use issues with Federal agencies. These issues should include: 1) promoting the maximum economic recovery of the limited remaining coal reserves in the established coalfields of central Utah; 2) promoting access for exploration and development of new coal reserves in coalfields outside of the fields in central Utah;[18]and 3) promoting continued studies of the remaining coal resources in Utah.

It is also recommended that the Advisor continue to work with the Advisory group and other stakeholders to assess the development of alternative uses for Utah coal.

The Advisor is also working through regional groups to assess the potential for advancing coal technologies. This group will identify the need for coal development in the region, including Utah coal reserves, based on growing demand, and evaluate policies to promote advanced technologies. This group is being launched as the NextGen Energy Council and is made up of governors' office representatives, industry, utilities, and cooperating non-governmental organizations from across the region.

[18] Example discussed in the group included the Alton, Henry Mountains, Kolob, Kaiparowits Plateau, Salina Canyon, and Sego fields.

OIL SHALE and TAR SANDS

The development prospect for oil shale and tar sands in the State has been reinvigorated over the last year as a result of rising oil and fuel prices and with the passage of the Federal Energy Policy Act in 2005. It is estimated that U.S. shale reserves are 2 trillion barrels, with Utah holding roughly 320 billion barrels of the total. For tar sands, United States reserves are estimated at 58 billion barrels with 11 billion barrels of potential in Utah.

To address issues of oil shale and tar sands development it is imperative that Utah have an understanding of its resource and the impediments to any options for development. It is also important to coordinate with the Federal agencies and other states considering potential development so that we can recommend a viable federal policy to support our State options. A number of activities at the local and federal level have ensued over recent months to assess these issues. Those activities are described below.

Utah Oil Shale/Tar Sands Advisory Group:

The Energy Advisor chairs the Advisory Group comprised of individuals from local State and federal government, industry, law, academia, and environmental interests. The group was formed in early 2006 to address issues, answer questions, and generally advise the Governor on the impediments to development of these resources. Usually, the group meets every two months and considers reports from various interests that are germane to the subject. The long-term goal is to advise the Governor on policy and development issues.

Unconventional Fuels Task Force:

The Energy Policy Act of 2005 (EPACT) mandated that a group of states containing unconventional fuels (oil shale, tar sands, coal for conversion to liquids, and heavy hydrocarbons) gather with representatives of the Departments of Energy, Defense, and Interior along with EPA to make recommendations to the President for further steps that may be taken to endorse additional steps to encourage the development and use of fuels not now being commercially produced at this time. A preliminary report was sent to the President in September, 2006 and a final report is due to be produced in November, 2006. The Energy Advisor has been integrally involved with this group, having hosted its meeting in SLC, and is now under consideration to become Co-Chair along with another unconventional fuels state.

Research Development and Demonstration (RD&D) Oil Shale Leasing:

The Bureau of Land Management (BLM) is in the process of issuing a 160-acre lease on a part of what was a proposed commercial lease in the 1970's to the Oil Shale Exploration Company (OSEC). It is anticipated that this lease will be issued by January, 2007. The Energy Advisor has maintained an active role in coordinating the formation of

the State's policy position on this lease issuance and has assured that both the lessor and the lessee address required State issues and that the RD&D lease remains as a prime activity and consideration when oil shale leasing and development are discussed in any forum.

Programmatic Environmental Impact Statement (PEIS) for Oil Shale and Tar Sands Leasing:

The PEIS is being developed by BLM so that future oil shale leasing can take place more expeditiously on federal lands in Utah, Wyoming, and Colorado. The Energy Advisor has helped assure that the State attain "Cooperating Agency" status in the preparation of the PEIS with BLM. A nationally-based team of BLM officials is working on the document with the contractor, Argonne National Laboratory, and just finished drafting the cooperative agreement for participation with various interests as cooperating agencies. As mandated in the Energy Policy Act of 2005, the BLM in cooperation with the USGS and the UGS is working to update and better define the oil shale resources of Utah. A draft is scheduled to be completed in early summer, 2007.

NUCLEAR

The price of uranium is no exception to the recent rise in commodity prices. The price recently stood at $52 per pound[19], up from $36.50 per pound at the end of 2005 and $10.20 per pound at the end of 2002[20]. This is prompting exploration and over 5,000 new mining claims targeting uranium have been staked in the Four Corners area since the beginning of 2005.

There are opportunities for developing nuclear resources on School Institutional Trust Lands (SITLA) and federal lands in Utah. The BLM's Moab and Monticello Resource Management Plans, covering Grand and San Juan Counties, are addressing possible uranium-vanadium resource development issues in those areas. However social, political and economic constraints may pose significant impediments to development of a nuclear power facility in the State.

The State presently produces yellowcake uranium concentrate, but this must be further enriched and refined to uranium dioxide for fueling nuclear reactors. These enrichment and refining steps are not conducted in Utah. A renewed interest in uranium mining is taking place in areas in southeastern Utah that were previously mined for uranium in the 1950's, 60's, and 70's. The leader in the renewed interest, International Uranium Corporation currently operates the only uranium milling operation in the State, the White Mesa Mill at Blanding, Utah.

Most Utah yellowcake production over the past several years has been from recovering uranium contained in radioactive materials identified during environmental

[19] The Northern Miner, Sept. 15-21, 2006
[20] Bon, R.L., and K. A. Krahulec, Utah Annual Review. Mining Engineering. May 2006, vol. 58, no. 5. page 116.

remediation projects and not from processing uranium ores. However, two uranium mines are in the process of restarting production and more are likely to open under present market conditions[21].

Due to difficulties in developing a nuclear power facility, the major benefit of the nuclear power industry to the State will be increased employment in a revived uranium mining and milling industry and not additions to the Utah energy supply.

Recommendation for Legislative Action

To assess this issue close coordination with SITLA is required, since SITLA lands would likely be the location of any such project. Thus, it is recommended that a full study be funded and coordinated between the Energy Advisor and SITLA, and it is also recommended that the study consider transportation and waste storage options.

OTHER ISSUES

Streamlining

The Advisor has been working with agencies to address the issue raised by the legislative Energy Task Force and Working group on the need to streamline siting and permitting in the State. Some of these areas were addressed above but at least three more are of important note:

First, Division of Oil Gas and Mining has been working extensively to streamline both permitting and reporting. The agency has made significant strides through providing great internet information and access.

Secondly, the Department of Environmental Quality (DEQ) offers a "pre-design" meeting process. The Advisor has been following this process closely and working with DEQ to determine whether expanding it may help to fulfill the legislative mandate to develop a process to coordinate Utah agency actions in energy project permitting.

As a third item, the energy website for the State was launched this year and provides links to energy related activities across State agencies and also within the Governor's Office and provides links to other useful information. The website can be found at www.energy.utah.gov. In recent months, the Governor's energy efficiency policies have been posted to this site as have key conservation messages, particularly those in regard to gasoline pricing and conservation. The website will be regularly updated as policies and plans are further developed.

Low Income Issues

[21] International Uranium Corporation. Press release dated September 14, 2006.

Energy prices have increased dramatically and have had a lot of volatility in recent years and this has had a major impact on low income households. Presently there are two key assistance programs in Utah which help these households cover some of their home energy costs: the Federal Low Income Housing Energy Assistance Program (LIHEAP) Program (known as HEAT in Utah) and the Home Electric Lifeline Program (HELP) funded through Rocky Mountain Power's electric tariff rates.

LIHEAP funding in Utah has been historically low with primary reliance on federal funding dollars. However, funding has not been commensurate with rate increases, remaining relatively flat over its 20-year history. It is also anticipated that federal funds will decline and that this year's base funding will be similar or slightly lower than last year.

Under the HELP program, dollars are collected through a minor line-item on customers' electric bills. To date, the Public Service Commission has limited the funding level for the program strictly to what can be demonstrated as being cost effective within traditional limited utility parameters (e.g. reduction in shut-offs, unpaid bills, etc.) However, there may be additional benefits could be delivered through an expansion of the program, as well as by establishing energy efficiency and rate assistance programs for natural gas customers if the Public Service Commission were given more explicit authority in statute.

Recommendation for legislative Action

The following three items are recommended for legislative action:

(1) Modify existing statue to give the Public Service Commission explicit authority to expand existing programs such as HELP and to enact new programs to help with low income rate assistance and/or low income energy efficiency efforts through the utility rate structure.
(2) Appropriate State funds to supplement federal LIHEAP (Utah HEAT) funds in the amount of $5 million would fund low income rate assistance to households at the same level as during the last heating season.
(3) Allocate State dollars to leverage utility funds to do some targeted low cost energy efficiency measure to low and moderate income households.

Workforce Training and Education

One common thread that runs through each of the energy priorities discussed above is the need for increased education and training. Whether the focus is on conservation, energy efficiency, or workforce development, it is vital that the State create and support educational programs that focus on energy-related matters. Without such support, citizens will not be conservation-focused or efficiency-wise to the extent desired. In addition, the economy will suffer substantial losses if the burgeoning energy industries cannot find a workforce to meet the needs of the industry.

Thousands of new workers are needed to handle the growth and thousands more will be needed as the impending retirement cliff arrives, leaving many sectors severely underhanded. From 2001 to 2005, the energy industry experienced 11.2% growth. The average annual wage of the workers is $70,400. The opportunities are and will remain great: the State can best benefit economically from the energy sector by aiding in the development of the workforce. New Mexico, Colorado, Wyoming, and North Dakota have created energy training centers to address their needs. Presently, most of the energy training in Utah is centered at the College of Eastern Utah's Western Energy Training Center and at the Uinta Basin Applied Technology College. Both operate on limited or soft money budgets.

Recommendations for Legislative or Administrative Action:

It is recommended that in order to remain competitive in the region, be progressive in matters of conservation and efficiency, and avoid increased labor shortages, the legislature earmark funding for education and training in the energy sectors. Funding can be directed through the Department of Workforce Services, the office of the Energy Advisor, the Governor's Office of Economic Development, or through higher education appropriations. Funding could come from a portion of the severance tax, bonus payments, royalties paid to the State from minerals' extraction, or other available sources that stem from the energy boom.

It is also recommended that the Energy Policy (Utah Code Section 63-53b-301) be modified as follows to reflect that energy education of all types is a priority in this State:

> *(X). Utah will promote training and education programs that focus on energy-related matters, including such issues as conversation, energy efficiency, and workforce development.*

BUDGET for the ENERGY ADVISORY FUNCTIONS and RESPONSIBILITIES

Currently, the Energy Advisory function is allocated $87,900 in general funds. It is recommended that funding for the function be increased by $98,100 for a total funding of $186,000.[22] This would fully fund the Energy Advisor's salary and support delivery of key reports and responsibilities as articulated and codified in HB 46. The full budget request is provided as Attachment A to this report.

[22] This budget request is being made through the regular process for doing so but is provided here as a preliminary identification of the funding requirements for accomplishing the multitude of energy initiatives.

Final Report: Attachment A
October 18, 2006

BUDGET for the ENERGY ADVISORY FUNCTIONS and RESPONSIBILITIES

Budget items

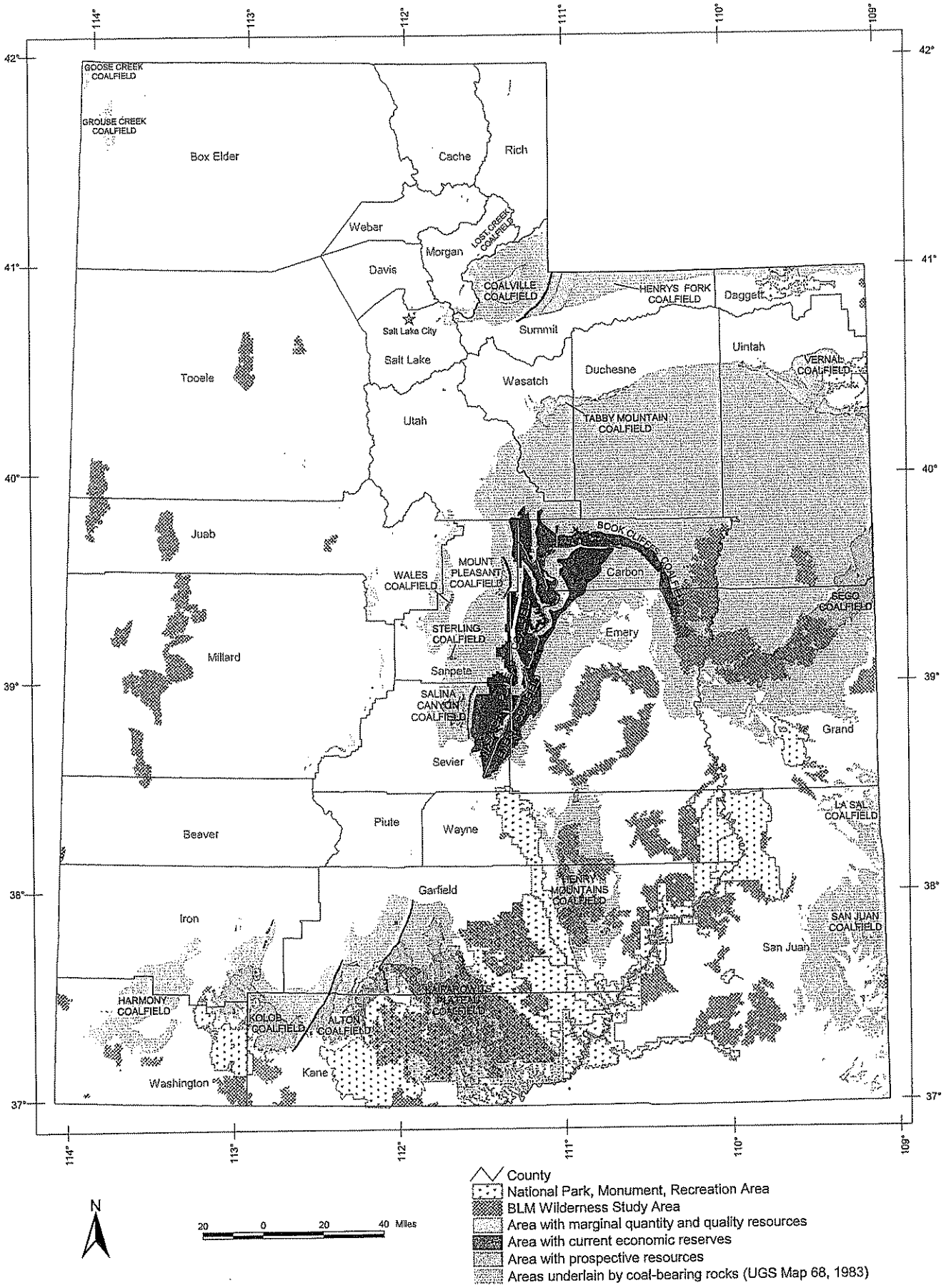
1. Total general funds is currently 87,900
2. Current personnel budget is $250,000
3. Studies requested under HB 46 costs is estimated to be between 90,000-165,000
4. State buildings Energy efficiency Program $300,000
5. GOPB Economist 25,000 and GOPB Financial, payroll, and travel support: $15,000 for a total of $40,000.
6. Homeland security for Energy Emergency planner: $80,000
7. Membership dues
    a. Western Interstate Energy Board (Energy Arm of the Western Governor's Association and we are members): $18,000
    b. National Association of Energy Offices: $2,050
    c. Other technical contracts: $2,000 year (supports economic function in OPB)

Recommendations on Funding

1. Change funding mix to allow full flexibility on Advisor's work product and task list:: $140,000 general fund annually
2. Funding studies: $25, 000 in general funds annually to fund progress on the following studies:
    a. Nuclear
    b. Refinery
    c. Coal
3. Economic support through OPB at $25,000. This does not need to be fully funded through general funds, but to the extent it is paid for through PVE dollars only specific studies commensurate with the federal guidelines of use of those funds can be pursued. Recommended funding level is $20,000 general fund to allow for the greatest flexibility in performing studies of traditional resource development and energy needs in the state.
4. **Total increase in general funds of $98,100 for a total funding of $186,000**
5. Transfer funding responsibilities to other agencies
    a. Homeland Security: Energy Emergency planner. This is currently being funded by PVE dollars but the issue is broader than the use of those funds allow. To provide permanence and flexibility of this position and tasks and to fulfill the objectives related to an Energy Emergency function as codified in HB46, it is recommended that this position be funded through general funds allocated to the Division of Homeland Security.
    b. DFCM: The SBEEP program is very important to the state and we are currently funding the positions for this program. However, we only have a small pot of finite funds. It is our recommendation that some support for staffing for SBEEP be provided through general funds and that this will also support delivery of the DFCM responsibilities under HB80. The recommended level of general funds allocated directly to DFCM is 150,000. The remainder will continue to be funded through PVE dollars.)
        i. Could be done with portion of 1.1% in building valuation funds that is allocated to capital improvement projects

Attachment B.1

LOCATION OF UTAH COAL RESOURCE AREAS



Attachment B.1.A
Overview of Coal Map 1

Coal Resource Report to the Utah State Legislature

The Utah Coal Resource Advisory Committee has produced a map showing where Utah's coal resources and currently economic reserves are located. On this map, the total extent of the coal-bearing rocks is shown in grey, and this essentially defines the various basins in Utah where coal is found. Locally within these basins coal beds of sufficient thickness (>4 feet thick) and with shallow enough cover (<3000 feet) can be defined, and these areas of thicker, shallower coal have been noted on the map as the red, blue, and green areas within the grey basins.

Five of the grey basins in Utah are devoid of thick or shallow coal deposits, and these areas are not attractive for mining. These areas include the Goose Creek and Grouse Creek coalfields of Box Elder County, the Lost Creek coalfield of Morgan County, the La Sal coalfield of Grand and San Juan counties, and the Harmony coalfield of Iron and Washington counties.

Three areas in the state have seen significant coal mining development in the past 100 years and are currently being mined at present. These important coal-bearing areas are the Book Cliffs, Emery, and Wasatch Plateau coalfields of Carbon, Emery, Sanpete, and Sevier counties. Mining in these three fields has extracted over 920 million tons of coal through 2004 (elsewhere in the state only slightly more than 10 million tons of coal has been extracted. Because these three fields have been the focus of industry attention, much is known of their coal resources, and, in fact, much of the coal can be so well delineated as to be classified as coal "reserves," or deposits that can be economically extracted under current market conditions.

The 921 million tons of coal mined in central Utah through 2004 comes from a fairly well understood minable reserve base of 2348 million tons, so about 39 percent of the reserve base has been depleted. The reserve base reported in this study is more conservative than some others reported in that we only look at coalbeds that are at least 6 feet thick and under less than 2500 feet of cover. Other reports use a 4-foot minimum coalbed thickness, and look to depths of 3000 feet, but such thin and deep coal is not typically mined in Utah under current market conditions.

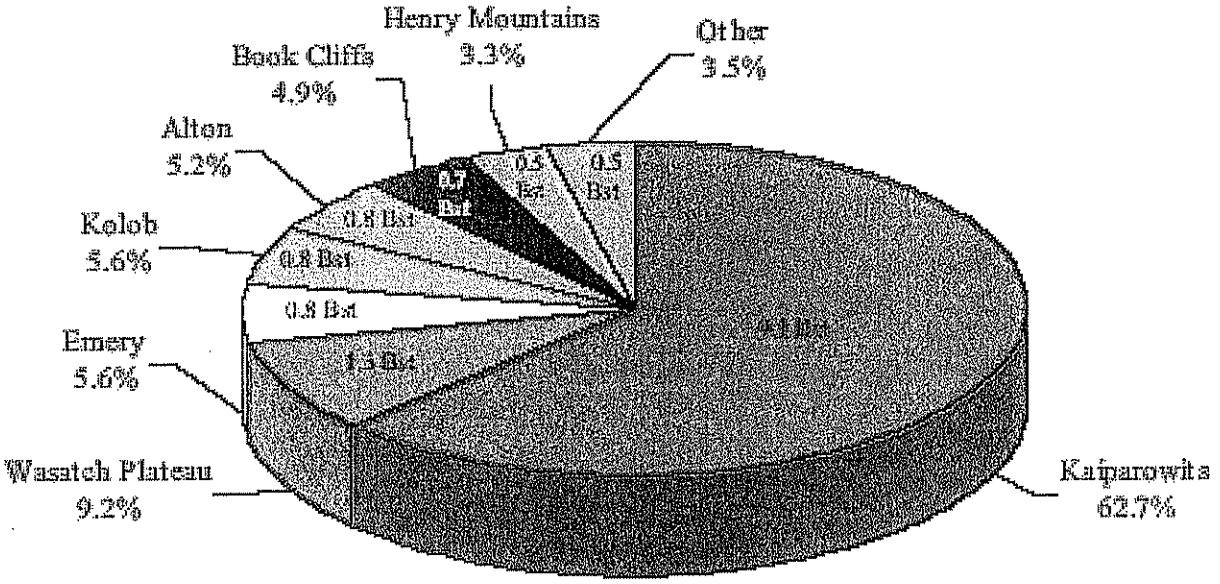
Current publicly traded mining operations list on their books, coal reserves of about 380 million tons, or a 15-year reserve base, which would be the minimum remaining life of the coal in central Utah. Assuming a constant future mining rate of 25 million tons per year, the estimated 1427 million tons of remaining coal in the three central Utah coal areas could last about 55 years, or until 2060. It should be noted that more than 100 years of mining has extracted much of the easiest to mine and best quality coal from central Utah; the remaining reserves will tend to be deeper and slightly poorer quality, and thus more expensive to extract, than the coal extracted to date. Thus, when the reserves of minable coal start to run out in about 50 years**, if Utah wishes to sustain**

a coal mining industry and use coal-fired electric power generation, the State and the coal industry will have to look to other coal areas in the state for minable coal.

Six significant blue-colored coal areas are noted on the coal resource map of Utah included in this report; these are the areas the Utah Coal Resource Advisory Committee believes Utah's coal industry will have to look for life beyond 2060. These six areas, which hold the future of Utah's coal industry, are the Alton, Kaiparowits Plateau, Kolob, Henry Mountains, Salina Canyon, and Sego coalfields. To date, limited exploration and mining has occurred in these areas, and thus the most of the coal in these areas are classified as resources, and cannot be considered well enough defined to be classified as economically recoverable reserves. Other than one attempt to open a new coal mine in the Kaiparowits Plateau coalfield in the 1990s (an area now off limits to development because of the creation of a national monument), most of the exploration and resource delineation in these areas dates back to the last U.S. energy crisis of the 1970s and 1980s. Although these areas are somewhat remote from current markets, the availability of shallow, thick coal in these fields can make the cost to mine coal in these fields low enough to offset the transportation cost disadvantage created by their remoteness.

Therefore it is not unreasonable in the next 50 years for some companies to look to these six blue areas for potential coal supply as the red deposits of central Utah become more depleted. A current example of this sort of effort is occurring in the Alton coalfield. The coal thickness, coal quality, and the undisturbed nature of the large coal resources in the six blue areas makes them logical targets for future exploration and development efforts from a coal industry seeking to meet the energy needs of a modern technological society.

Coal production and consumption remained fairly low until several late 1970s and early 1980s when several large coal-fired electric generation plants were built in Utah. From 1870 through 1981, 416.7 millions tons of coal were mined in Utah, or an average rate of 3.8 million tons per year over the 111 year period. However, in the 22 years from 1982 through 2004, another 490.1 million tons of coal have been mined, or an average rate of 22.3 million tons per year over that period. Thus, Utah coal resources are being depleted at a much more rapid rate than in the past.

Attachment B.1.B

RELATIVE SIZES OF UTAH COAL RESOURCE AREAS