Alternative Evaluation Study

Southern Montana Electric Generation and Transmission Cooperative

October 2004

Revision 1

Stanley Consultants INC.
A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

SME
Southern Montana Electric
Generation & Transmission Cooperative, Inc.

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Acronyms and Abbreviations

AES	Alternative Evaluation Study
BACT	Best Available Control Technology
BPA	Bonneville Power Administration
Btu	British Thermal Units
CFB	Circulating Fluidized Bed
CH_4	Methane
C&I	Commercial and Industrial Generators
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CTGs	Combustion Turbine Generators
DOE	U.S. Department of Energy
EERE	U.S. DOE Energy Efficiency and Renewable Energy
EIA	U.S. DOE Energy Information Administration
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESP	Electrostatic Precipitator
°F	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FGD	Flue Gas Desulfurization
GHGs	Greenhouse Gases
HAPs	Hazardous air pollutants
Hg	Mercury
HRSG	Heat Recovery Steam Generator
H2S	Hydrogen Sulfide
IGCC	Integrated Gasification Combined Cycle
INEEL	U.S. DOE Idaho National Engineering and Environmental Laboratory
IR	Ingersol Rand
kW	Kilowatts
KWh	Kilowatt Hours
lb	Pound
LFG	Landfill Biogas
LMOP	Landfill Methane Outreach Program
MACT	Maximum Achievable Control Technology
MAPP	Mid-Continent Area Power Pool
MEPA	Montana Environmental Policy Act
MSW	Municipal Solid Waste
MW	Megawatts
mWh	Megawatt Hours
NEMS	National Energy Modeling System
NEPA	National Environmental Policy Act
NGCC	Natural Gas Combined Cycle
NH_3	Ammonia
NITS	Network Integrated Transmission Service

Acronyms and Abbreviations, cont'd

NOx	Nitrogen Oxides
NPHR	Net Plant Heat Rate
NWE	NorthWestern Energy
PC	Pulverized Coal
PM10	Particulate Matter
PMA	Federal Power Marketing Agencies
Ppm	Parts Per Million
PRB	Powder River Basin
PSD	Prevention of Significant Deterioration
PV	Photovoltaic
RDF/yr	Refuse-Derived Fuel Per Year
REC	Rural Electric Cooperative
REPI	Renewable Energy Production Incentive
RUS	Rural Utility Service
SCF	Standard Cubic Foot
SCR	Selective Catalytic Reduction
SNCR	Selective Non-Catalytic Reduction
SME	Southern Montana Electric Generation and Transmission Cooperative
SO_2	Sulfur Dioxide
SNR	Selective Non-Catalytic Reduction
SPCC	Spill Prevention Control And Countermeasures
STG	Steam Turbine Generator
URGE	Uniform Rating of Generating Equipment
Wh/m2/day	Watt-Hours Per Square Meter Per Day
WAPA	"Western" - Western Area Power Administration
WSCC	Western System Coordination Council
WWTP	Wastewater Treatment Plant

1.0 Introduction

This report represents the results of an Alternative Evaluation Study (AES) conducted by Southern Montana Electric Generation and Transmission Cooperative (Southern Montana) for the purpose of determining an appropriate source of wholesale electric energy and related services post 2008. The AES followed the requirements established in the Rural Utility Service (RUS) Bulletin 1794A-603 ***Scoping Guide for RUS Funded Projects Requiring Environmental Assessments with Scoping and Environmental Impact Statements***, February 2002. The AES identified supply alternatives that could be considered in lieu of the proposed alternative, including a "no build" option. The evaluation of the "no build" option included energy conservation and efficiency and was based primarily on load information maintained by Southern Montana. The information that was used to evaluate the option of purchasing capacity and energy was the result of a solicitation for power supply proposals from regional power suppliers.

Southern Montana's request for proposal (RFP) invited regional owners of electric generation to participate in a competitive bidding process focused on securing a contractually based source of wholesale electric energy and related services that would meet the needs of the member systems served by Southern Montana. The RFP process was conducted in November 2003 and was reviewed by RUS prior to distribution. A summary of the results of the RFP are included in this AES and should now only be viewed as "indicative" of the price regional suppliers were willing to offer at the time the RFP was issued. Regional suppliers participated in the RFP process with the caveat that the offer contemplated in the RFP was to be kept "confidential". The information in this AES should now be viewed as a representation of sample prices available at the time the RFP was conducted. Since the time the RFP was issued, prices for long term sales of electric energy by qualified regional suppliers have migrated upward from the indicative prices stated in this AES. A copy of the results of the RFP as compiled by our consulting engineering firm, Electrical Consultants Incorporated (ECI), has been forwarded to RUS.

This AES will provide an analysis of alternatives that Southern Montana has considered to meet its wholesale energy and related supply obligations currently met through the use of power purchase agreements with federal power marketing agencies (PMA's) such as the Bonneville Power Administration (BPA) and the Western Area Power Administration (WAPA). The alternatives studied by Southern Montana were evaluated in terms of cost-effectiveness, technical feasibility, and environmental soundness. The alternatives considered by Southern Montana were:

1. Energy conservation and efficiency - Demand side management and the ability of increased energy efficiency to offset the projected increases in energy demand.

2. Power Purchase Agreements – Power purchases from existing regional suppliers of wholesale electric energy and related services.

3. Noncombustible renewable energy resources – Renewable energy technologies considered included wind, photo voltaic (solar), hydroelectric and geothermal.

4. Combustible renewable energy sources – Renewable combustible technologies considered included biomass, biogas, landfill gas, and municipal solid waste.

5. Nonrenewable combustible energy resources – Traditional combustible technologies considered included:

   (i) natural gas-fired boilers and combustion turbines - both simple and combined cycle configurations
   (ii) oil and coal
   (iii) other carbon-based fuels including fluid-bed combustion and integrated gasification combined cycle (IGCC) technology.

The cost-effectiveness of each alternative was addressed by evaluating the initial capital costs of the various energy options, as well as the long-term cost of operation and maintenance. Included in the economic analysis of each option was the cost of fuel over the projected life of the project. The estimated costs for fuel were developed primarily by Stanley Consultants with the assistance of Southern Montana. A great deal of this information is readily available and could be considered general industry information.

In order for a power purchase proposal to receive serious consideration, Southern Montana researched the availability of a suitable transmission path from the generation source to the load control area in which Southern Montana's member systems are located. There are a number of transmission constraint points in Montana through which additional firm deliveries are not possible without tremendous investments in transmission infrastructure. Southern Montana has a long tradition of utilizing firm Network Integrated Transmission Service (NITS) agreements for the purpose of making wholesale power purchase transactions and assuring delivery of those transactions on a "firm" basis to the member systems it serves. Non-Firm transmission paths were not considered a viable option.

The technical feasibility of each generation option was evaluated on the basis of the proven implementation of the respective production alternative, and the alternative's ability to provide a highly reliable source of generation compatible with Southern Montana's needs as defined in the statement of "Purpose and Need" (see following section). The ability of certain generation options, such as solar and wind, to meet the operational requirements of Southern Montana was an important factor in evaluating the technical feasibility of utilizing this alternative. The environmental attributes of the various energy options was an important consideration. In addition to environmental consideration the supply alternatives were also reviewed from an engineering and operations perspective, mitigation of environmental impact, and traditional constraints (e.g., air emissions, water use and discharge, land area requirement, and the likelihood of obtaining the necessary permits).

1.1 Purpose and Need

Southern Montana, located in Billings, Montana, is an "all requirements" provider of wholesale electricity and related services to 5 electric distribution cooperatives and 1 municipal utility. Southern Montana's service area encompasses 22 counties in 2 states (Montana, and Wyoming). The member systems of Southern Montana have provided affordable, reliable and quality electrical energy and related services to their member owners in central and south central Montana for over 60 years. The primary focus of this study will be the needs of the five rural electric cooperative systems. Although the City of Great Falls is a member of Southern Montana and their needs will be considered as an attribute of Southern Montana's total requirement for project subscription purposes, the needs of the City have been evaluated separately as the City will have a different source for long term financing.

Southern Montana's total electric load requirement represents the combined system needs of the five electric distribution cooperative members and one municipal utility. For the purpose of this analysis the load requirement of Southern Montana was further refined into the traditional utility classification for customers: residential (which includes both urban and farm customers), commercial, and industrial - which range from small retail to heavy industrial customers. There are also several minor contributors to system load, including irrigation, water treatment facilities, street and highway lighting, public schools and municipal buildings.

1.2 Estimated Electric Load

An estimate of the projected load requirements of the aforementioned consumer classifications is as follows. Figure 1-1 summarizes graphically by consumer classifications the future growth expected on the SME system.

1.2.1 Residential

Historically, residential loads have accounted for approximately 67 percent of projected total sales made by Southern Montana to the member cooperatives. The number of residential customers served by the member systems of Southern Montana has been increasing at an annual rate of approximately 1.75 percent over the last 10 years, with most of this growth coming from residential subdivisions being developed on the peripheral edges of Billings, Montana in Yellowstone Valley Electric Cooperative's service territory. The rate of increase in residential customers ranges from less than one half of one percent (.5%) in Mid Yellowstone Electric Cooperative's service territory, to approximately four percent (4.0%) in Yellowstone Valley Electric Cooperative's service territory. The number of "farm customers" is reflective of a national trend and has declined somewhat over the last decade. This reduction is due to a number of reasons ranging from farm economics to consolidation of smaller operations into larger corporate holdings.

Southern Montana projects a system increase in residential customers of approximately 2.5 percent annually over the next 20 years. The primary contributing factor to Southern Montana's increase in residential customers will be the continued expansion of the City of Billings into the area served by Yellowstone Valley Electric Cooperative. Southern Montana also anticipates additional growth in the residential customer segment of the member systems it serves in some of the more attractive rural locations in close proximity to areas known to offer recreational and "quality" lifestyle opportunities. As a general rule where the is a combination of "trees, scenery and water" there will be growth – if these qualities are not present there is little or no growth.

The amount of electricity used on a per residential customer basis is expected to remain relatively constant to increasing slightly over the course of the next 20 years. Factors influencing individual residential customer use of electricity are the following:

- Steady to a moderate decrease in electricity use for household heating, due to more efficient heating appliances.
- Increased use of air conditioning
- Steady to a moderate decrease in electricity use for water heating due to more efficient water heaters.
- More efficient refrigerators and freezers
- More efficient lighting
- Increased electricity use by "farm customers" resulting from an increase in farm size and enhanced mechanization.

As already mentioned, Southern Montana predicts that the average annual energy use per residential customer at the G&T level will remain constant to increasing slightly over the course of the next 20 years. This increase will primarily be the result of an increase in the use of air conditioning. Total electricity sales to residential customers is expected to increase 3.3% per year over the next 10 years primarily as a result of significant residential development in the area surrounding Billings and a number of projected subdivisions in the Clark, Wyoming area. The Wyoming subdivisions will be primarily full time residential, although there may be an occasional seasonal dwelling. Once the already planned developments are built, Southern Montana anticipates the surge in growth will subside and future load growth will return to more traditional levels. Based on current projections, most of the anticipated growth is expected to occur in the period 2004-2014.

In addition to traditional load development, Southern Montana anticipates a continued increase in the use of air conditioning and a reduction in the number of homes selecting natural gas as a home heating fuel. The recent increases in the price of natural gas has seriously eroded the economic advantage natural gas previously enjoyed as the fuel of choice for home heating purposes. In fact, if the rapid increase in the price of natural gas continues as a result of the wide spread use of natural gas in combined cycle and simple cycle gas turbines, while electric prices remain stable or increase at a more gradual pace, we may see an increase in the number of homes using electric heat. This increase in the use of electric heat would most likely come in the form of high efficiency electric heat pumps offering the added advantage of air conditioning.

Even though Southern Montana anticipates sustainable growth in the residential sector of member system loads, Southern Montana foresees a slight shift in the "mix" of its existing customer base. For the period 1971 through 2003 residential load accounted for approximately 67% of Southern Montana's supply requirements. Due to increased industrial activity currently under way in Fergus Electric's service territory and planned methane gas development in Tongue River Electric's service territory, residential customer load is expected to decline to approximately 56% of Southern Montana's service obligation for the period 2003-2018, with the bulk of that shift occurring in the period 2003-2008.

1.2.2 Commercial and Industrial

Southern Montana partitions its "commercial and industrial customers" into small commercial and large commercial customer classifications. The small commercial customer classification includes restaurants, retail stores, "cottage industries", and small manufacturing facilities. Large commercial customers are mostly "larger" manufacturing facilities, industrial sites and facilities with sizable motor loads such as compressor stations. The number of small commercial and industrial customers is expected to increase by 1.5 percent per year over the next 20 years. This increase would be in line with projected growth in the region for petroleum product extraction and the continued growth in the development of the methane gas wells in southeastern Montana in Tongue River's service area.

An additional illustration of the impact of the aforementioned trend in natural gas price is occurring in Beartooth Electric's service territory and will put upward pressure on Beartooth's commercial energy requirements. Beartooth has been notified by one of its small commercial customers in the Clark, Wyoming area of the customers plans to discontinue using natural gas pumped from their wells to "self generate" electricity to power an existing compressor station. The owner/operator of this facility has determined that it is far more economical to sell the gas previously used to self generate in the gas market, and buy electric energy for the compressor station from Beartooth Electric. Long term projections of natural gas prices show no signs of the price of natural gas retreating to the point it can seriously be considered as a economic choice for fuel in the generation of base load electric production.

Although Southern Montana does not expect a dramatic increase in the consumption rates of small commercial and industrial users of electricity on a per customer basis, Southern Montana does anticipate a significant increase in the overall requirements of these customer classes. This increase will be the result of two large pumping stations on Fergus Electric's system and the expected growth in the Methane gas industry in Tongue River Electric's service area located in close proximity to the Powder River Basin (PRB) coal fields. Fergus Electric has received a deposit to cover the cost to construct facilities necessary to serve approximately 16,000 horsepower of new load by the end of first quarter 2005. The impact of the installation of this large pumping load, in concert with ongoing methane gas development, represent a projected increase in sales to the large commercial segment of Southern Montana's load base of approximately 40% over the 2003-2008 time frame.

Tongue River Electric Cooperative projects the development of the Methane gas industry to result in an additional large commercial load requirement of 3,000 horsepower in 2007, 3,000 horsepower in 2008 and 4,000 horsepower in 2009. The Methane gas load development in Montana reflects the established trend in other regions such as northern Wyoming. Southern Montana estimates the total increase in the load requirements of Tongue River's large industrial class to be approximately 10,000 horsepower, or an increase to Southern Montana of approximately 25% over projected 2004 requirements. These projections are rather conservative estimates when compared to the actual growth and future projections made by neighboring utilities experiencing similar industrial activity. At one point Powder River Energy just across the border in Wyoming was predicting its Methane gas load at approximately 300 mW , thirty times greater than Tongue River's projection.

The aforementioned increases in the load requirements of large industrial consumers will contribute substantially to the increase in Southern Montana's wholesale power requirements during the period 2004 through 2013. If it were not for the increased obligation fostered by these two predictable activities, Southern Montana would anticipate a more modest growth rate of approximately 3% over the 2003-2009 period.

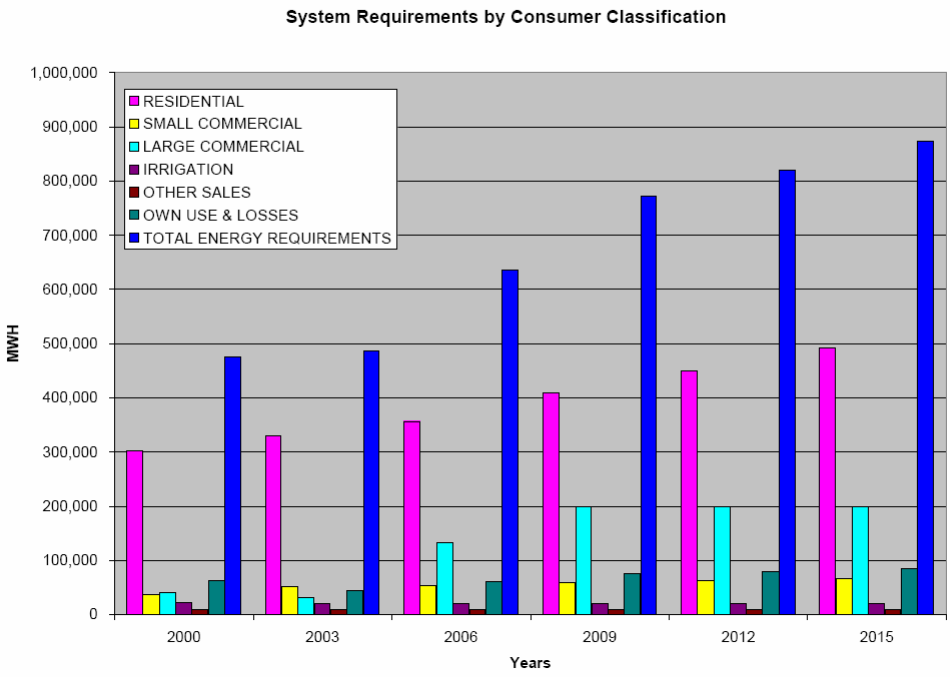
If the efforts by local governmental agencies such as the City of Great Falls are successful in encouraging industrial development and strong regional economic growth, the projected increases in the load requirements of the member systems for small commercial and industrial customers would need to be adjusted accordingly. For the purpose of this study, a more conservative approach was taken in projecting the future load requirements of the small commercial and industrial customer sector. In order for a load to be considered in the context of this study there must be considerable assurance that the load is likely to develop before it was included in the forecast algorithm.

For the period 2003-2018 Southern Montana anticipates a 1.7 % increase in the wholesale energy requirements of the member systems small commercial loads. Large industrial customer load is expected to increase approximately 40% over the 2003-2008 time frame, and approximately 15% when the window of analysis is expanded to 2003-2016. A review of the period 2008-2013 indicates that by 2009 the "requirement spike" will have passed and growth moderates to 2.66%. For the period 2013-2018 load growth with have "flattened" to a rate of less than 1%.

1.2.3 Other Classes

Southern Montana expects electricity use for irrigation, street lighting, and public authorities to remain relatively flat over the next 20 years. This sector presently accounts for approximately 6.75 percent of Southern Montana's total supply requirement. For the period 2003-2018 the combined requirements of the irrigation and "others" is expected to decline to approximately 3.9%. This decline is not a reflection of an actual decrease in the needs of this important segment of our member system requirements, but an indication in the shift of member system load to higher level of industrial need.

Figure 1-1 SME System Growth



1.2.4 Forecasting Parameters

Montana has an extensive history of "boom and bust" resource development and Southern Montana has made a conscious effort to conservatively estimate the impact of the recent flurry of activity in the

oil and gas industry on the future wholesale energy requirements of its member systems. It could be said that Southern Montana is in an area “prime” for development and Southern Montana should be more “optimistic” in forecasting load requirements and the need for resource development. However, the load forecast that serves as the basis for this AES may represent the underpinning for the construction of member owned generation. With a clear focus on avoiding the serious repercussions of “over building”, Southern Montana has avoided the temptations to be caught up in “Chamber of Commerce enthusiasm” and has taken a more conservative approach to load forecasting. Unless there was a valid reason to depart from the load growth patterns established over the past 32 years, historic usage served as the primary tool for load forecasting.

1.3 Generation and Supply

1.3.1 Generating-Capacity Mix

The most economical means of supplying the cyclical load on an electric power system is to have three basic types of generating capacity available:

a. Base load capacity
b. Intermediate load range capacity
c. Peaking capacity

Base load capacity runs near its full rating continuously, day and night, all year long. It is economical to design these units with a maximum of fuel-economizing features, highest practical steam temperatures and pressures, extensive use of regenerative boiler-feed water heaters, reheat and double-reheat boiler-turbine arrangements, and large condensers with minimum-temperature cooling water. These items increase the cost of the plant but are justifiable because the fuel-cost saving is large due to the large amount of power produced by having the unit run continuously.

The design of the plant is optimized to obtain the balance between high first cost and low fuel cost that will give the lowest overall power cost under the assumption that the unit will be heavily loaded for many years. The best design will vary depending on the unit size, money costs, and fuel type and cost.

Peaking capacity is run only during daily peak-load periods during the seasonal peak times of the year and during emergencies. Because the total annual output is low, high efficiency is not as necessary as for base load units. Very low first cost is important. Combustion turbines and pumped-stage hydro units are the typical peaking units.

Intermediate load range capacity fits between the base load capacity and peaking capacity in both first cost and fuel cost. It generally is designed to be "cycled", that is, turned off regularly at night or on weekends and loaded up and down rapidly during the time it is on the line to take the load swings on the system. Some additional cost is required to allow for repeated starts and stops without equipment damage or the need for larger operating staffs. However, owing to the lower annual production, some reduction in efficiency is justified.

Older small base load units and hydro units with restrictions on water use are sometimes used for intermediate and peaking service.

1.3.2 Southern Montana’s Existing Supply Resources

Southern Montana currently meets its wholesale electric energy and related services obligations through the use of power purchase agreements with BPA and WAPA. Southern Montana covers approximately 80% of its wholesale supply requirements with a power purchase agreement with BPA and the remaining 20% through a power purchase agreement with WAPA. The WAPA power purchase agreement allows Southern Montana to purchase “fixed” amounts of demand and energy at contractually defined points of delivery. Member system demand and energy requirements in excess of the level of service provided by WAPA is met with purchases from BPA under the terms and conditions of an “all supplemental requirements” contract that went into affect on 22 June 2000.

Until the advent the Energy Policy Act of 1992, and Federal Energy Regulatory Commission (FERC) Orders number 888 and 889, Southern Montana's member systems could only view with hope the obvious benefits of aligning supply needs contractually with BPA. Absent the provisions of the Energy Policy Act (and subsequent FERC orders), Southern Montana's members did not have access to transmission facilities necessary to deliver its entitlement of highly valued BPA resources such as the "Hungry Horse Reservation" to its member systems. With the help of quality BPA Account Executives, in June 2000 all the "pieces were in place" and Southern Montana was able to bridge the gap that would allow a previously energy supply deficient segment of Montana's electric consumers access to public power generated in the Pacific Northwest.

On 22 June 2000, Southern Montana's members began purchasing electric energy and related supply services from BPA to meet the needs of our member systems in NorthWestern Energy's (NWE) load control area. Southern Montana was very appreciative of having gained access to BPA resources because with the addition of this resource to its wholesale power supply portfolio, Southern Montana was a 100% hydro based services provider. For obvious reasons the member systems of Southern Montana viewed this power purchase agreement with BPA as a much-needed breath of fresh air in a region that has not always shared fully in the robust economic opportunities enjoyed in the more populous areas of the Pacific Northwest.

Despite the many positive attributes of our contract with BPA, there is a condition of this agreement that manifested itself as an "Achilles heal" to what originally appeared to be an ideal compliment to Southern Montana's power supply portfolio. Specifically, the provision of the power sales agreement between BPA and Southern Montana that allowed BPA to recall the Excess Federal Power (EFP) portion of our purchase rights beginning in 2008, and the remaining power purchase rights of the contract by 2011. Even though the contract was not set to expire until 2017, this recall provision was triggered by BPA's statutory obligation to be a full service provider to public power entities in BPA's defined service territory. Because Southern Montana's service territory lies east of the continental divide, Southern Montana is considered an "extra-regional" customer with purchase rights "secondary" to "act beneficiary loads' located west of the continental divide.

Southern Montana made several attempts to persuade BPA to reconsider its decision to recall the power purchase rights Southern Montana had enjoyed for such a short period of time. Unfortunately, BPA did not waiver in its stance on the issue and beginning in 2008 Southern Montana will experience a 50 mW reduction in its EFP power purchase rights with BPA. By 2011 Southern Montana's power purchase rights with BPA will fully expire leaving Southern Montana approximately 160 mW short of being able to meet the wholesale energy and related supply service requirements of the member systems it serves. The recall of EFP was made in accordance with Section 508(a) and 508(b) of Public Law 104-46, 16 U.S.C. 832m, and was consistent with Bonneville's Excess Federal Power Policy.

In 2011 when the inherent power purchase rights in the BPA contract fully expire, Southern Montana will have a projected load of approximately 180 mW. At that time Southern Montana will have residual power purchase rights with WAPA of approximately 20 mW. It should be noted that WAPA has the right to reduce this power purchase right for a number of reasons and has historically made periodic reduction to purchase rights on a scheduled basis. Southern Montana is clearly between a "rock and a hard spot". The wholesale power supply shortcoming left in the wake of demise of the power purchase rights provided for in the BPA contract fostered the need for Southern Montana to embark on this AES in search of an appropriate solution to the wholesale power requirements of the member systems it serves. Southern Montana is "living proof" that the promise that electric restructuring would foster a robust wholesale electric supply market, with competitive rates lower than what existed in a regulated supply environment, has not come to fruition – in fact the direct opposite is true. Overlay this wholesale power supply deficit with regional transmission constants

and the magnitude of the problem increases exponentially. Faced with this less than fortunate predicament, Southern Montana must now focus clearly on putting in place a long term solution to this defined wholesale power need that will ensure Southern Montana's ability to provide affordable, reliable, quality electric energy and related services to its member systems.

Southern Montana conducted an extensive search in the power supply market place for a suitable source of energy to meet its member system requirements with a power purchase agreement secured from an existing source of generation within the WSCC. The lack of affordable generation capacity in the WSCC, combined with ever increasing transmission constraints has yielded a less than "pleasant picture" of the future viability of purchasing capacity from existing sources of wholesale supply. The WSCC, of which Southern Montana is a member, has relied completely on very expensive gas fired generation to meet future regional supply requirements. A review of the response Southern Montana received to its most recent RFP strongly indicates that the forward price of a power purchase agreement will closely track the forward price of natural gas. With the cost of natural gas fired generation constituting the future marginal cost for wholesale electric energy and related supply services, shadowed with the price volatility of natural gas, the price Southern Montana would pay for power supply would be nearly double its current costs for this service commodity. Based on the results of Southern Montana's RFP, and analysis of related transmission issues, negotiating an acceptable power purchase agreement does not appear to be a viable option.

Figure 1-2, 1-3, and 1-4 show the results of Southern Montana's most recent RFP on the basis of the cumulative cost of the proposal for 10, 15 and 20 year periods

Figure 1-2: Summary of the results of Southern Montana's November 2003 RFP 10 Year Evaluation

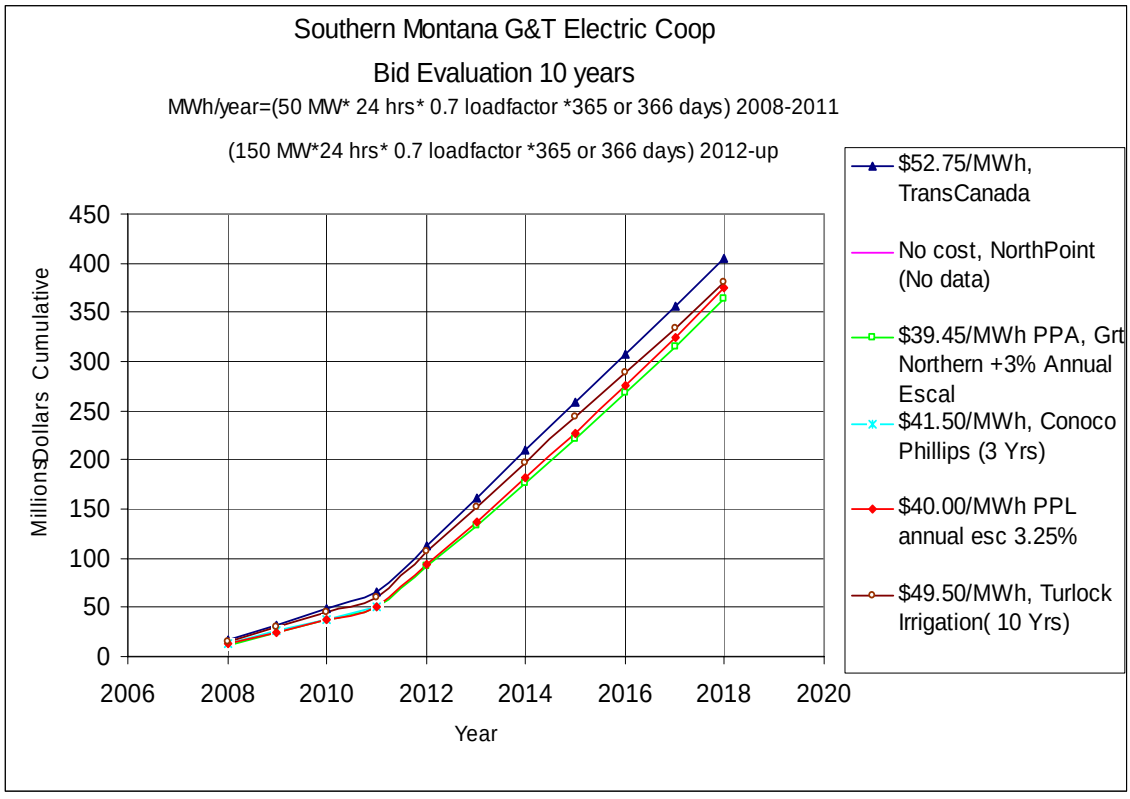


Figure 1-3: Summary of the results of Southern Montana's November 2003 RFP 15 Year Evaluation

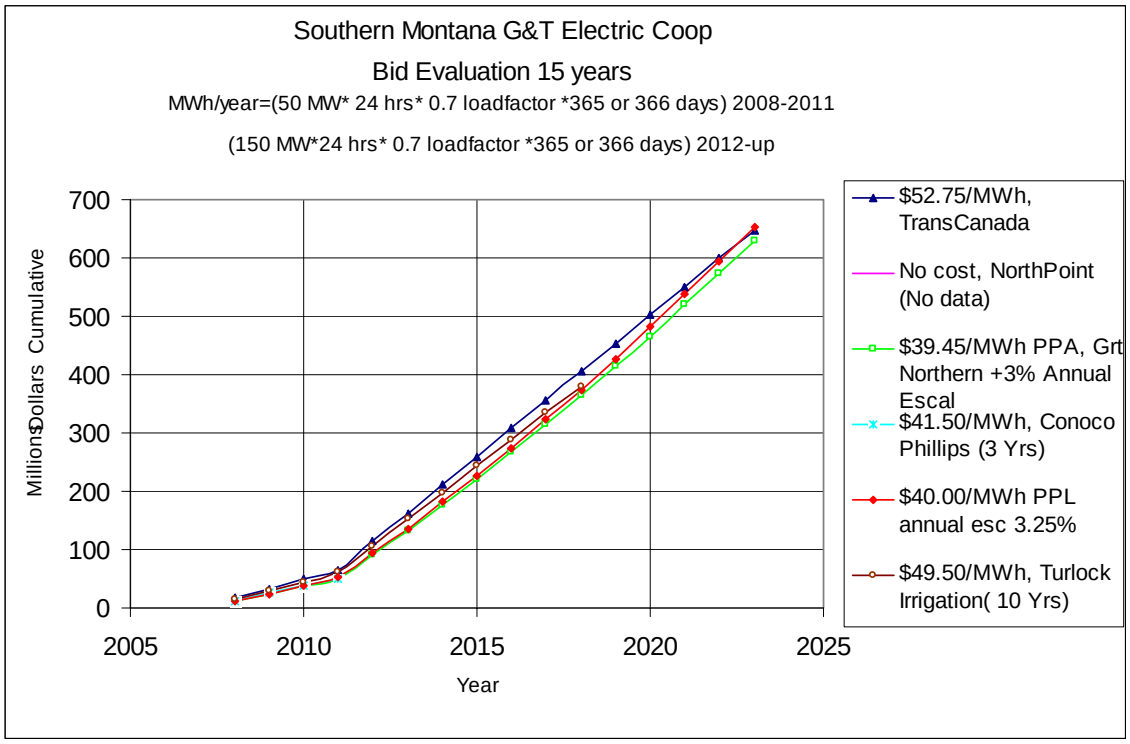
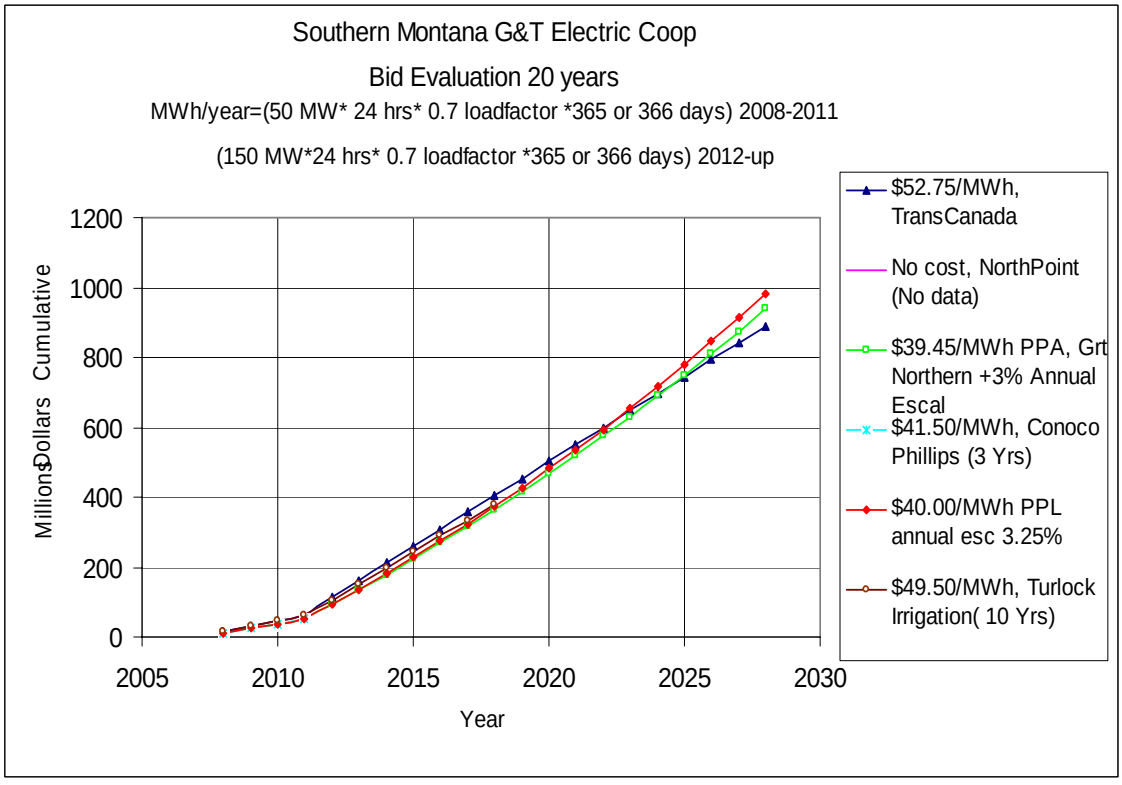


Figure 1-4: Summary of the results of Southern Montana's November 2003 RFP 20 Year Evaluation



1.3.3 Natural Gas Supply, Demand and Pricing

In the early 1970's the issue of energy supply, demand and pricing was on the forefront of everyone's mind. There were long lines at the gas pump, the need for "gas guzzling" automobiles was questioned, thermostats were lowered, and what fuel should America turn to for heating purposes was a topic of major discussion. This heightened level of attention on the use of natural gas had a number of positive results on building standards and seemed to indicate that there would be a concerted effort to extend the time this most important resource could be turned to as a quality heating fuel of choice. The 1970's national "energy crisis" drew needed attention to the fact that the use of natural gas and supply were interrelated. In Montana, sweaters came out of the closet and "conservation" was now important.

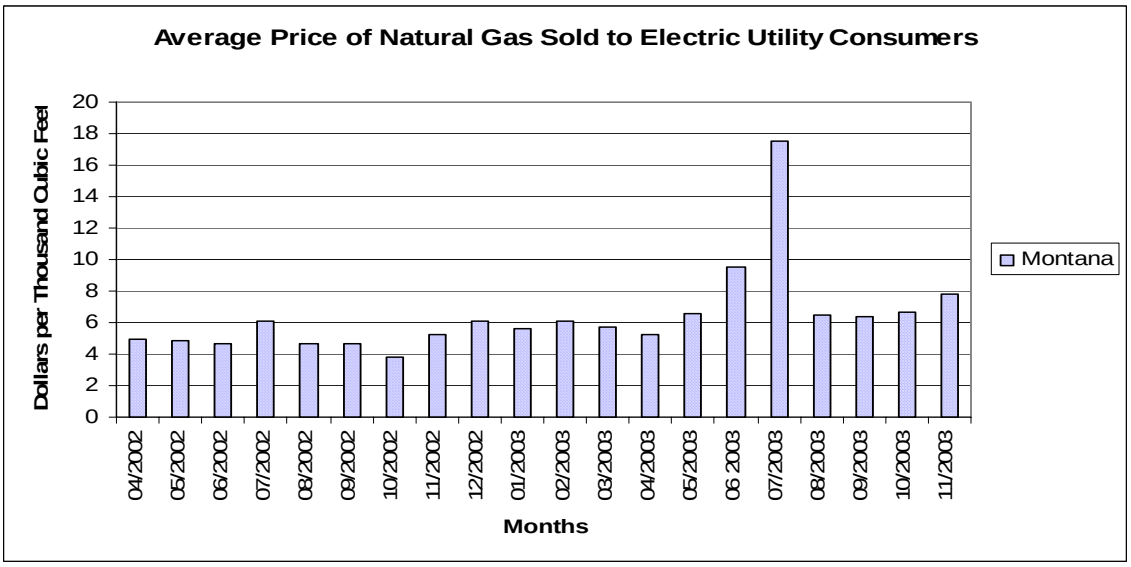
Unfortunately, this concern was short lived and in the early 1990's as the Pacific Northwest was faced with a shortage of another most important commodity – electricity, the conservation lessons of the 1970's were cast aside and natural gas was called upon to serve double duty. It would continue to play a major role as a heating fuel of choices for homes, commercial and business establishments, and become the premier fuel for new electric generation. Virtually all new generation built in the region would be in the form of combined or simple cycle gas turbines. Easy to locate, economical, "environmentally" friendly, and popular, natural gas fired generation was "on a roll".

From an energy supply perspective, it appears the region has taken the "path of least resistance" and placed a significant share of its contemporary energy production future in the hands of the natural gas industry. Rather than develop a more comprehensive, balanced and diversified supply portfolio the region decided the benefits of gas fired generation outweighed the risk associated with the inherent volatility in the price of natural gas. Yes, wind power has gained considerable attention and is being developed, but as we shall see later on in this AES, wind generation is not quite there yet as base load generation. For now, natural gas fired generation enjoys "center stage".

As the region started to see last winter, the increased supply burden placed on natural gas has produced an "unintended consequence". The price of natural gas is increasing at a troublesome rate affecting not only the price of electricity produced by gas-fired generation, but also the cost to heat homes and businesses. This "unintended consequence" most likely have the greatest adverse affect on those that can afford it least - "fixed" and low-income families.

Figure 1-5 shows typical wholesale natural gas prices for Montana.

Figure 1-5: Typical Wholesale Natural Gas Prices for Montana



1.4 Load and Generating Capability

1.4.1 Growth in Generation to Serve Base Load

At this time Southern Montana does not own base load generation and meets it wholesale power requirements through the use of power purchase agreements with BPA and WAPA. As stated above, the BPA contract begins to expire in 2008 and by 2012 Southern Montana will have supply deficit of approximately 170 mW which includes the WAPA component. Table 1-1 is a summary of Southern Montana's projected capacity requirements. Given the unfavorable conditions of the power purchase option this table may also represent Southern Montana's need for a generation resource suitable to meet this requirement. The following information is based on the assumption that Southern Montana will continue to have the opportunity to purchase approximately 20 mW from WAPA. If the power purchase rights extant in WAPA power purchase agreement were reduced, the following projections would need to be increased accordingly. If the WAPA power purchase agreement was to be completely withdrawn, Southern Montana would have a projected requirement of approximately 160 mW in 2008 escalating to approximately 180 mW by 2012. Table 1-1 is a summary of Southern Montana's projected capacity requirements for the period 2004 through 2018.

Table1-1

Southern Montana Electric G&T
System Requirements: Peak Demand in mW 2004-2018

Year	System Peak Avg. L.F.	Western Unadj.	Wind or EPP	Option 1 Less WAPA	System Peak 2003 L.F.	Western Unadj.	Wind or EPP	Option 2 Less WAPA	BPA Residual	Maxi-mum Requir.
2004	106	20	1	85	110	20	1	89		0
2005	132	20	1	111	136	20	1	115		0
2006	136	20	1	115	140	20	1	119		0
2007	145	20	1	124	149	20	1	128		0
2008	154	20	1	133	159	20	1	138	93	45
2009	165	20	1	144	170	20	1	149	33	116
2010	168	20	1	147	174	20	1	153	31	122
2011	172	20	1	151	177	20	1	156	29	127
2012	175	20	1	154	181	20	1	160	0	160
2013	179	20	1	158	185	20	1	164	0	164
2014	183	20	1	162	189	20	1	168	0	168
2015	187	20	1	166	193	20	1	172	0	172
2016	191	20	1	170	197	20	1	176	0	176
2017	195	20	1	174	201	20	1	180	0	180
2018	199	20	1	178	205	20	1	184	0	184

Option 1: Peak Demand Projections based on average system load factor for period 2001-2004 less WAPA

Option 2: Peak Demand Projection based on annual system load factor for 2003 less WAPA

Maximum Requirement Represents Total Demand Requirement Less Residual BPA Purchase Rights

EPP: Environmentally Preferred Product

Table 1-2 offers a summary of Southern Montana's system energy requirements for the period 2004 through 2018. The estimated energy requirements and associated rates of growth are segmented by customer classification. Table 1-2 is a summary of Southern Montana's projected energy requirements for the period 2004 through 2018.

Table 1-2

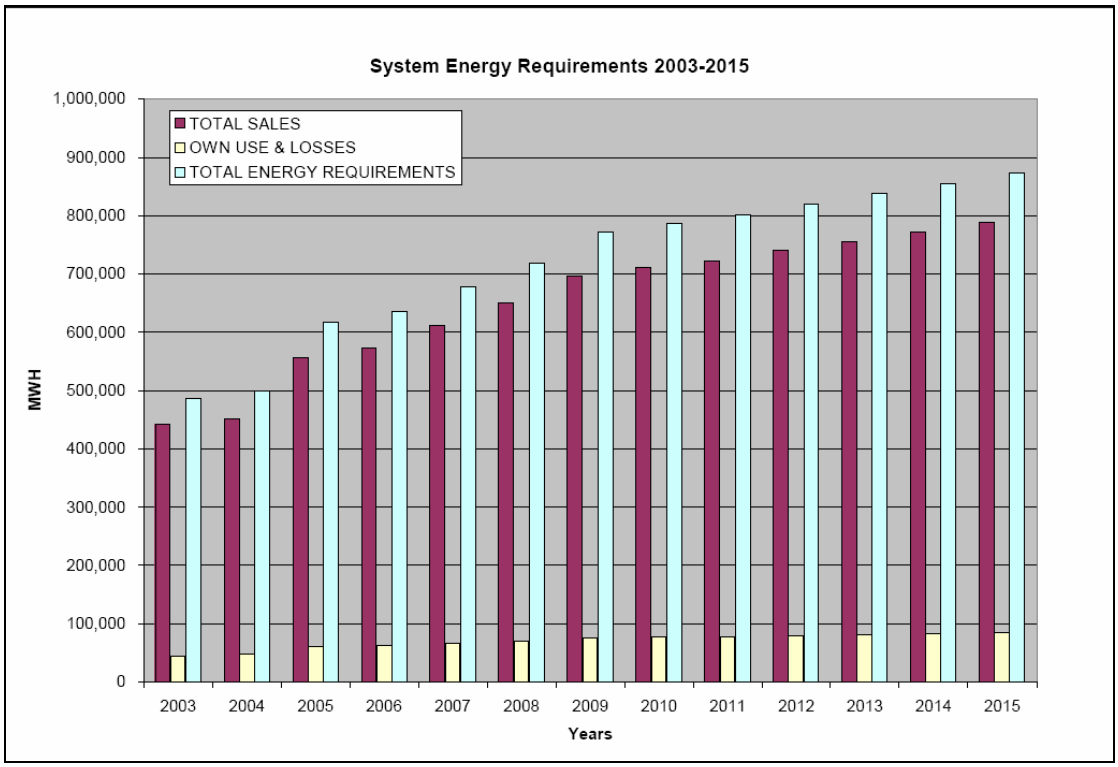
Southern Montana Electric G&T

SYSTEM ENERGY REQUIREMENTS BY CONSUMER CLASSIFICATION (mWh)

Southern Montana G&T	YEAR	RESIDEN-TIAL	SMALL COM-MERCIAL	LARGE COM-MERCIAL	IRRIGA-TION	OTHER SALES	TOTAL SALES	OWN USE & LOSSES	TOTAL ENERGY REQUIRE-MENTS
HI	1971	109,356	16,564	9,765	4,413	14,880	154,978	16,425	171,403
ST	1993	276,505	33,779	39,590	12,700	9,858	372,432	34,611	407,043
ORY	1998	287,688	36,349	39,471	20,577	9,957	394,042	38,435	432,477
	2003	329,497	51,270	31,077	19,944	10,001	441,789	44,737	486,526
	2004	338,229	52,105	31,600	19,294	10,042	451,268	47,749	499,018
P	2005	347,265	53,030	127,123	19,366	10,043	556,827	60,188	617,015
R	2006	356,669	53,882	133,180	19,426	10,043	573,201	61,988	635,190
O	2007	371,884	55,658	154,017	19,486	10,043	611,088	66,046	677,133
J	2008	387,576	57,475	174,864	19,548	10,043	649,508	70,149	719,657
E	2009	408,731	59,514	198,354	19,611	10,043	696,252	75,156	771,409
C	2010	421,723	60,506	198,605	19,674	10,043	710,551	76,613	787,164
T	2011	435,101	58,518	198,859	19,738	10,043	722,259	78,113	800,372
E	2012	448,876	62,550	199,117	19,804	10,043	740,389	79,653	820,042
D	2013	463,062	63,603	199,376	19,870	10,043	755,953	81,237	837,190
	2014	477,671	64,677	199,637	19,937	10,043	771,965	82,864	854,828
	2015	492,718	65,771	199,901	20,005	10,043	788,438	84,537	872,975
	2016	508,215	66,880	200,169	20,075	10,043	805,382	86,258	891,640
	2017	524,191	68,016	200,439	20,145	10,043	822,834	88,028	910,861
	2018	540,625	69,174	200,710	20,217	10,043	840,769	89,848	930,617
	YEAR	RESID.	SM COMM.	L. COMM.	IRRIG.	OTHER	T. SALES	USE & LOSS	T. REQ.
Growth Rate	1971-2003	3.72%	3.59%	3.68%	4.83%	-1.23%	3.33%	3.18%	3.31%
Historic	1993-2003	1.76%	2.10%	-1.20%	2.28%	0.07%	0.83%	1.51%	0.90%
	1998-2003	2.75%	7.12%	-4.67%	-0.62%	0.09%	2.31%	3.08%	2.38%
Growth Rate	2003-2008	3.30%	2.30%	41.27%	-0.40%	0.00%	8.01%	9.41%	8.14%
Projected	2003-2016	3.39%	2.06%	15.40%	0.05%	0.00%	4.72%	5.18%	4.77%
	2008-2013	3.62%	3.15%	2.66%	0.33%	0.00%	3.08%	2.98%	3.16%
	2013-2018	3.15%	1.69%	0.13%	0.35%	0.00%	2.15%	2.04%	2.14%
Historical									
% of Total	1971-2003	66.98%	9.21%	8.01%	3.85%	2.98%	91.04%	8.96%	100.00%
Projected									
% of Total	2004-2018	56.11%	7.84%	22.50%	2.55%	1.30%	90.29%	9.71%	100.00%

Figure 1-6 shows the system energy requirements for the years 2003-2015.

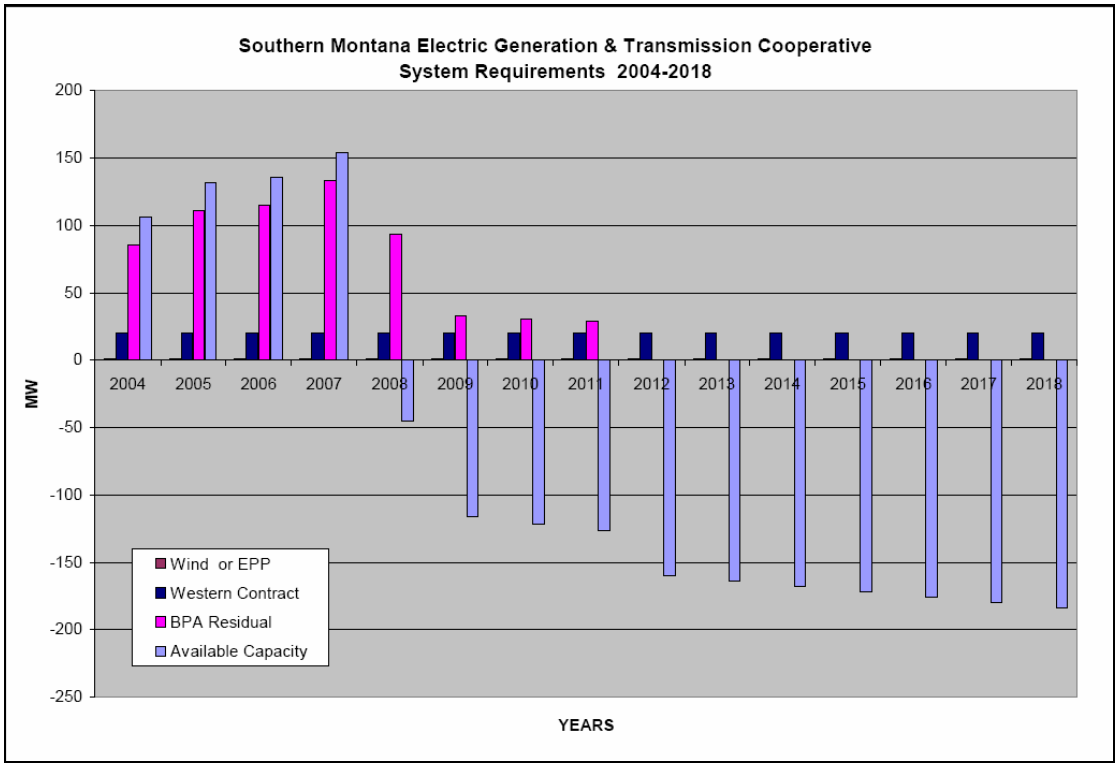
Figure 1-6 System Energy Requirements



1.4.2 Combined Base Load Generation and Power Purchase Option:

Over the course of the past 60 years the member systems of Southern Montana have meet their total wholesale power supply requirements through the use of traditional power purchase agreements. Prior to June 22, 2000, the member system supply needs were met through a combination of purchases from the former Montana Power Company (MPC) and the Western Area Power Administration. The member systems had a defined "allocation" from Western that satisfied approximately 20% of the supply requirement, with MPC meeting the remaining need under the terms and conditions of an "all supplemental power requirements contract" that expired on June 22, 2000. Since the expiration of the MPC contract, the portion of the member system requirements previously supplied by MPC has been met with purchases from BPA. Unfortunately, the BPA purchase opportunity will begin to expire in 2008 and disappear completely in 2011. Figure 1-7 represents graphically, the capacity deficit which will occur.

Figure 1-7 System Requirements



In the wake of the "Energy Policy Act" passed by congress in 1992 and the "Electric Utility Industry Restructuring and Customer Choice Act" passed by the Montana Legislature in 1997, MPC embarked on a process to divest itself of its generation assets. MPC's generation assets were purchased by Pennsylvania Power and Light (PPL) in 1999, removing from the regulatory process wholesale power transactions involving energy produced by these assets. With the exception of wholesale power purchases made from non-FERC regulated federal power marketing agencies such as BPA and Western, all wholesale power transactions in Montana today are consummated at "market rates". Montana ratepayers, at both the retail and wholesale level, no longer have access to electric energy at a regulated rate for service. With the exception of limited purchases from BPA and Western, electric energy prices in Montana are "market based".

Prior to broadening its list of options to include the concept of securing an equity position in a yet to be constructed generating facility, Southern Montana made several attempts to engage in meaningful discussions with owners of existing generation to secure an affordable replacement for the BPA contract. The most recent effort to secure a power purchase agreement was through the release of an RFP that was issued in November 2003. On the basis of the results of repeated efforts to secure an affordable power purchase agreements, Southern Montana does not believe that continuing to rely solely on traditional power supply agreements is acting in the best interest of the member systems it serves. Market volatility, transmission capacity issues, and the unwillingness of current owners of existing generation to sell the output of their facilities at prices less than "what the market will bear", offers a compelling reason for Southern Montana to seek a supply option that provides a higher level of control over its existing and future supply needs. Clearly, the ideal situation would have been for Southern Montana to continue meeting approximately 80% of its needs with purchases from BPA, unfortunately that is no longer an option.

The member systems of Southern Montana have thought long and hard about a decision to consider embarking on a plan to build generation resources. Included in those deliberations is the concept of continuing to meet a portion of its energy requirements with traditional power purchase agreements. As shown in Table 1-1, in 2009 Southern Montana will meet approximately 20% of its wholesale power needs with continued use of its allocation from Western and purchases from regional suppliers of an environmentally preferred product that will include wind. Based on a review of existing alternatives, it would appear that Southern Montana's best option for the near term would be to meet its wholesale power requirements with a combination of purchases from Western, Environmentally Preferred Product, and its portion of the production from a new environmentally compliant resource. Alternatives for post 2016 requirements would remain open, allowing for the timely evaluation of newly emerging resources that would complement Southern Montana's contemplated diverse supply portfolio.

The following calculations reflect the estimated cost of a new resource that would utilize "clean coal " technology and how the cost of that resource would be priced to the members of Southern Montana. The member system rates would fully cover the cost of developing that resource through member purchases, make allowances for "off peak" sales, and reflect revenue from the sale of capacity secured for future loads. Options 1 and 2 reflect scenarios were Southern Montana would meet its needs above Western and EPP with its own base load resource. Options 3 and 4 represent the increase in cost if Southern Montana was to purchase an additional market purchase of 40 mW at $45 per mWhr.

Figure 1-8 offers an analysis of the level at which the member purchases of wholesale power and related services would need to be priced in order to cover the embedded cost of developing a new resource.

Option 1 describes a scenario in which Southern Montana would secure an equity position in the new facility commensurate with 175 mW of the unit's total 250 mW. Southern Montana would utilize 135 mW of its entitlement to meet load, sell 40 mW of its capacity under the terms of a contract that would contemplate receiving 95% of a market price of $45 per mWh, and sell "off peak" energy at 85% of the market price of $45. In order to fully cover debt service, O&M and related costs of ownership, under this scenario the cost for this portion of the members requirement would need to be minimally priced at $39.79 per mWh.

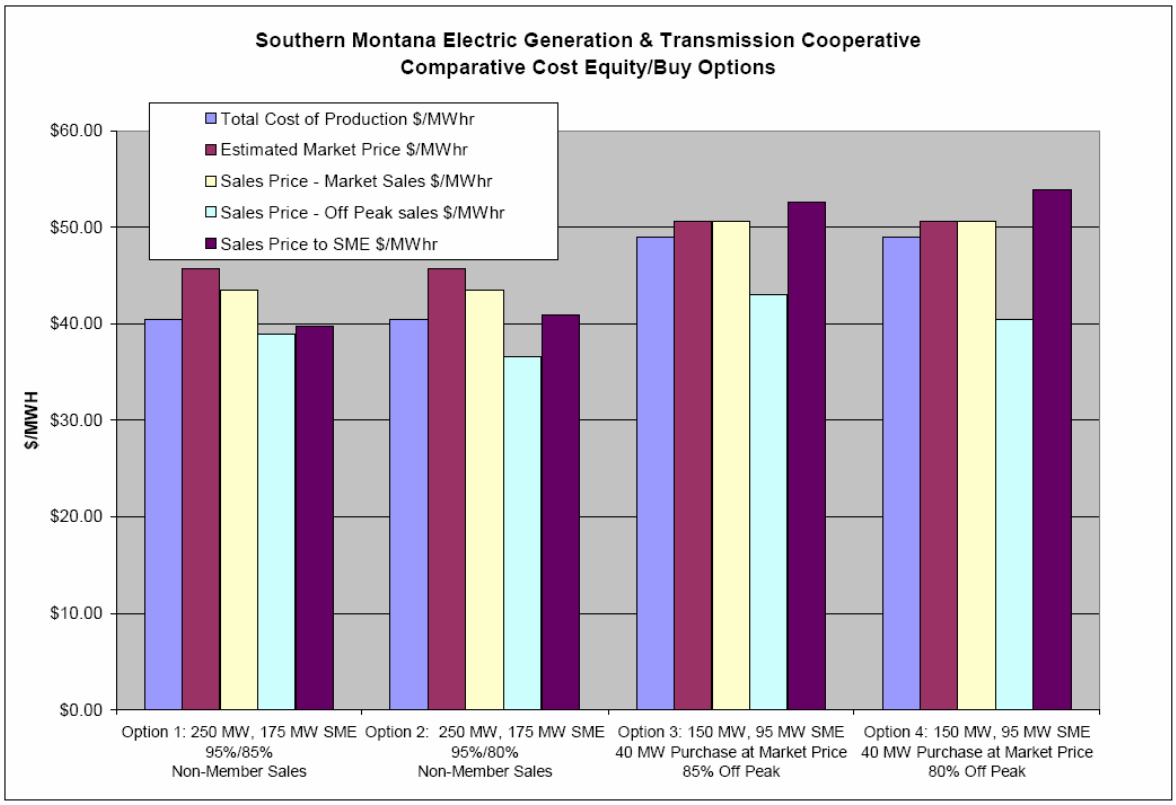
Option 2 describes a scenario in which Southern Montana would secure an equity position in the new facility commensurate with 175 mW of the unit's total 250 mW. Southern Montana would utilize 135 mW of its entitlement to meet load, sell 40 mW of its capacity under the terms of a contract that would contemplate receiving 95% of a market price of $45 per mWh, and sell "off peak" energy at 80% of the market price of $45. In order to fully cover debt service, O&M and related costs of ownership, under this scenario the cost for this portion of the members requirement would need to be minimally priced at $40.92 per mWh.

Option 3 analysis describes a scenario in which Southern Montana would secure an equity position in the new facility commensurate with 95 mW of the unit's total 150 mW. Southern Montana would utilize 95 mW of its entitlement to meet load, purchase 40 mW of its capacity under the terms of a contract that would contemplate a market price of $45 per mWh, and sell "off peak" energy at 85% of the market price of $45. In order to fully cover debt service, O&M, related costs of ownership and the difference in cost for the energy purchase under this scenario the cost for this portion of the members requirement would need to be minimally priced at $52.62 per mWh.

Option 4 describes a scenario in which Southern Montana would secure an equity position in the new facility commensurate with 95 mW of the unit's total 150 mW. Southern Montana would utilize 95 mW of its entitlement to meet load, purchase 40 mW of its capacity under the terms of a contract that would contemplate a market price of $45 per mWh, and sell "off peak" energy at 80% of the market price of $45. In order to fully cover debt service, O&M, related costs of

ownership and the difference in cost for the energy purchase under this scenario the cost for this portion of the members requirement would need to be minimally priced at $53.87 per mWh.

Figure 1-8 Comparative Cost Equity/Buy Options



1.5 Conclusion

Based on Southern Montana's existing and projected capacity and energy requirements, in 2009 Southern Montana will have a resource requirement of approximately 116 mW. By 2012 Southern Montana's resource requirement will increase to approximately 160 mW as the BPA power purchase agreement no longer allows Southern Montana to meet a major portion of its supply requirements with this resource. Given the price volatility of natural gas and the lack of viable wholesale power purchase options, Southern Montana will need to give serious consideration to developing an alternate wholesale power supply resource. This alternate wholesale power supply resource could take the form of participating in the development of a variety of generation options to complement its ability to make limited purchases from Western and purveyors of an Environmentally Preferred Product.

Southern Montana understands the difference between base load production and peak requirements and believes it in the best interest of the members to integrate base load capacity into its resource portfolio. Given the volatility of he regional supply market, and he high cost of "going to the market" to meet peak requirements, Southern Montana believes that the likelihood of being able to offer affordable, reliable, and stable wholesale electric energy and related services will be much greater if it has the ability to cove system peak with its own resources. The forecasted prices for off peak and temporary surplus sales through resource ownership than being placed in the situation where a market purchase totally negates any cost savings realized from resource ownership. The economics of increasing reliance on

power purchases beyond the Western resource deteriorate even more dramatically if the cost of transmission to deliver the contract purchase to NWE's load control area is factored into the cost algorithm.

There are several important issues that must be addressed in detail to gain a clear understanding of the total cost of resource development. Those issues include, but are not limited to, debt service, cost of operation and maintenance including fuel, operating reserves, spinning reserves, load control area services and facility dispatch. Southern Montana is not contemplating a "merchant facility" and must there fore ensure service in the event the project ceases production on a scheduled or unscheduled basis. To that end, Southern Montana has engaged in discussions with large regional hydroelectric based generators who have expressed significant interest in working with Southern Montana to ensure that the total output of a contemplated facility would be economically dispatched with the participating generators sharing risk and benefits. The estimated costs in the models reflect the cost of this service.

Clearly a decision to consider the construction of member owned generation should be approached with caution and an appropriate level of concerted scrutiny. The member systems of Southern Montana have had a long history of meeting the wholesale electric service requirements of the consumers they serve with affordable electric energy and related services. Unfortunately, the wholesale supply industry in this region has changed, requiring the members of Southern Montana to view possible participation in this proposed project as a way for Southern Montana to serve its members with a much higher level of confidence than can be afforded by a traditional power purchase agreement – particularly in a restructured wholesale electric supply market place.

The environmental, technical, and economic viability of available generation options will be discussed in the next section of this AES.