BEFORE THE
CORPORATION COMMISSION OF THE STATE OF OKLAHOMA

IN THE MATTER OF THE APPLICATION OF **OKLAHOMA GAS AND ELECTRIC COMPANY** FOR AN ORDER OF THE COMMISSION GRANTING PRE-APPROVAL TO CONSTRUCT A TRANSMISSION LINE, AUTHORIZING A RECOVERY RIDER AND APPROVING OTHER ASSOCIATED TARIFFS IN REGARD TO ITS RENEWABLE PLAN	))))))))	CAUSE NO. PUD 200800148

Direct Testimony

of

Leon Howell

On behalf of

Oklahoma Gas & Electric Company

(REDACTED VERSION)

May 19, 2008

Leon Howell
Direct Testimony

I. INTRODUCTION

Q. **Please state your name, your employer, and your business address.**

A. My name is Leon Howell. I am employed by Oklahoma Gas and Electric Company ("OG&E" or "Company") and my business address is 321 N. Harvey, P. O. Box 321, Oklahoma City, Oklahoma 73101.

Q. **What position do you hold with OG&E?**

A. I hold the position of Manager Resource Planning. I am responsible for OG&E's resource planning group including the preparation of resource plans and resource planning analyses that are performed on an ongoing basis as opportunities arise.

Q. **Please summarize your professional experience and educational background.**

A. I have been employed by OG&E since 1996. I earned a Bachelor of Science Degree in Electrical Engineering from the University of Oklahoma (1985) and a Masters Degree in Business Administration (2000) from Oklahoma City University. I am a registered Professional Engineer (#16018) in the State of Oklahoma. Prior to joining OG&E in 1996, I was employed by Western Farmers Electric Cooperative as a Senior Transmission Planning Engineer. Since joining OG&E, I have held various operations and engineering positions. Most recently, I have been responsible for OG&E's resource planning efforts.

Q. **Have you testified previously before the Oklahoma Corporation Commission ("Commission")?**

A. Yes. I have previously filed testimony supporting OG&E's application in Cause No. PUD 200800086. In that application, the Company is seeking a Commission order granting pre-approval to acquire a 51 percent interest in the Redbud generating from Kelson Holdings, LLC (Kelson). The purpose of my testimony in that proceeding is to describe OG&E's resource planning efforts initiated subsequent to the Commission's Red Rock decision (the "Post-Red Rock Analysis"), as well as to describe analyses that support OG&E's decision to acquire Redbud (the "Redbud Analyses"). Both analyses are

described in a document titled "Resource Planning Analysis Oklahoma Gas & Electric March 20, 2008" which I have attached as Exhibit LCH-1.

Q. **What is the purpose of your testimony in this proceeding?**

A. The purpose of my testimony is to describe the modeling of wind resources in both the Post Red-Rock and Redbud Analyses. I will focus this testimony on the evaluation of wind options as it relates most directly to the request for pre-approval of transmission facilities to deliver wind from western Oklahoma to OG&E's load centers.

Q. **How significant is the potential contribution of wind energy to OG&E's portfolio?**

A. From a resource planning standpoint wind energy is attractive because of its low variable costs and zero emissions. Wind acts as a complement to natural gas generation facilities as they can be coupled to provide energy from wind with load following capacity from natural gas. Wind also contributes to base load energy requirements throughout the year and serves to mitigate high natural gas prices and potential CO_2 costs. However, a substantial expansion of wind capacity depends on the availability of transmission facilities which are not in place today.

Q. **Please summarize the principal findings and conclusions of your analyses.**

A. My testimony presents evidence to support the following findings and conclusions:

1. The analyses indicated that a combination of 640 MW of wind, demand-side management ("DSM") programs and natural gas-fired resources comprise the lowest reasonable cost resource plan with consideration given to a range of future planning environments or "planning scenarios", and sensitivity analyses that captured the uncertainty of future CO_2 and natural gas prices; and
2. Expanded sensitivity analyses reinforce the conclusion that wind resources mitigate high natural gas and CO_2 prices.

Q. **How is the balance of your testimony organized?**

A. In the Section II of my testimony, I will review the pertinent elements of my testimony in Cause No. PUD 200800086 related to OG&E's commitment to expand wind generation.

I will describe the results of more recent sensitivity analyses in Section III of my testimony.

II. "POST-RED ROCK" AND "REDBUD" ANALYSES: WIND RESOURCE OPTIONS

Q. **Was wind an option in the Post-Red Rock analysis?**

A. Yes. As described in my Redbud testimony, subsequent to the Order in the Red Rock application, the resource planning team conducted screening analysis to identify potentially viable resource options for the Company. We then developed a set of four clearly distinct resource plans that captured the range of viable options. The amount of wind generation was a primary distinguishing characteristic of these four plans with wind resources that ranged from 320 MW to 1,280 MW. Exhibit LCH-2 describes these options.

Q. **Why did your team elect to include wind resources as an element of each resource plan?**

A. It was an obvious choice. Wind is an abundant resource in our region, making it the most viable renewable option OG&E has available. OG&E currently has 170 MW of wind generation capability, of which the most recent is the 120 MW Centennial wind farm. The Company's wind generation has been beneficial to our customers and is an important start toward establishing a balanced generation portfolio. Public concerns and discussions of environmental policy have continued to increase. There is a strong risk of increased cost of production due to CO_2 taxes. A mandatory increase in renewable energy is also a possibility.

Q. **Did OG&E test these distinct resource plans?**

A. Yes. We tested these four distinct resource plans under each of the four planning scenarios (three developed by Cambridge Energy Research Associated or "CERA" and one OG&E "expected" scenario). We calculated the Net Present Value of Revenue Requirements (NPVRR) for each of the 16 cases (four resource plans times four planning

scenarios) using the PAR model (Exhibit LCH-3). The ranking of NPVRR based on this analysis are presented in Table 1.

Table 1
Ranking of Resource Plans

Resource Plan	OGE Expected	CERA Asian Phoenix	CERA Global Fissures	CERA Mercury Rising
320 MW Wind/Coal	1	1	1	2
640 MW Wind/CC	2	2	2	3
640 MW Wind/Coal	4	4	3	4
1280 MW Wind/CC	3	3	4	1

The resource plan that scored best under most planning scenarios paired 320 MW of wind with a new coal plant in 2015 and is referred to in the table as "*320 MW Wind/Coal*".

Q. **Did OG&E conclude that the *320 MW Wind/Coal* resource plan was the best resource plan?**

A. No. First of all, the *320 MW Wind/Coal* reflects a transmission-constrained environment. The relief requested in this application will address that issue. Secondly, the lower NPVRR results are attributable to lower production costs associated with the availability of a 750 MW coal plant beginning in 2015. OG&E's management determined it was not feasible to construct a coal plant of this size by 2015 due in large part to continued global warming concerns. Third, the matrix does not reflect the results of risk sensitivity analyses for natural gas and CO_2 prices. Finally, selection of the coal plant option assumes that OG&E will not be required to develop more wind resources in response to potential new RPS standards. For all of these reasons, OG&E concluded that the *640 MW Wind/CC* resource plan is the best plan to pursue.

Q. **Did OG&E perform any other sensitivity analyses?**

A. Yes. We modeled a "*No Wind*" resource plan to test the theory that wind helps to mitigate the risk associated with high natural gas and high CO_2 prices (Exhibit LCH-4). The *640 Wind/CC* resource plan clearly mitigates the risk associated with natural gas and CO_2 costs (Exhibit LCH-5).

Q. **How did the Post Red Rock results compare to the results of the Redbud Analysis?**

A. The NPVRR results for the *640 MW Wind/CC* resource plan in the Post Red Rock runs are virtually identical to the Redbud resource plan across all four planning scenarios. Exhibit LCH-6 is a side-by-side depiction of the *640 MW Wind/CC* and the *Redbud Portfolio*. In the OG&E Expected planning scenario, the *640 MW Wind/CC* resource plan had a 28-year NPVRR of $23,596 million; the Redbud resource plan had an NPVRR of $23,600 million (Exhibit LCH-7). The Redbud resource plan has slightly lower capital costs and slightly higher production costs than the *640 MW Wind/CC* resource plan. The new CC has a higher capital cost than Redbud but is assumed to be slightly more efficient than Redbud. The plans are virtually identical in terms of mitigating natural gas and CO_2 risks (Exhibit LCH-8).

III. MORE RECENT ANALYSES

Q. **Did OG&E perform any additional analyses in preparation for this filing?**

A. Yes. We conducted sensitivity analyses that compare the Redbud resource plan with 640 MW of wind to the *No Wind* resource plan under high gas cost and high CO_2 price assumptions. These results are presented in Table 2 below.

Table 2
Sensitivity Matrix
NPVRR ($ millions)

Expected CO_2 Cost			
	Low Gas	Expected Gas	High Gas
640 MW Wind/Redbud	19,724	23,600	31,465
0 MW Wind/Redbud	19,239	23,408	31,862
Δ with and without Wind	485	192	-397
High CO_2 Cost			
	Low Gas	Expected Gas	High Gas
640 MW Wind/Redbud	24,972	29,180	36,988
0 MW Wind/Redbud	24,721	29,234	37,622
Δ with and without Wind	251	-54	-635

Q. **What do these results tell you about OG&E's commitment to wind?**

A. They indicate that 640 MW of wind provides a hedge against high natural gas prices and high CO_2 prices when compared to an OG&E portfolio without any additional wind resources.

Q. **Did all of the analyses performed by OG&E include transmission costs?**

A. Yes. At the time the analysis was performed, the Resource Planning team developed a rough proxy for transmission costs by grossing up the results from a transmission service request for a wind generation facility in western Oklahoma upgrading the 138 kV system to accommodate 120 MW of wind energy. This process resulted in an assumption that the transmission costs for an additional 640 MW of wind would be approximately $48 million.

Q. **How does that cost compare with the projected cost of the Woodward to Oklahoma City line which is the subject of this application?**

A. The Company is estimating the cost of the Woodward to Oklahoma City line to be approximately $197 million before AFUDC is included. This cost is for a 345 kV transmission line which will accommodate 600 MW of wind development benefiting OG&E's customers as well as additional wind development in western Oklahoma. The original calculation included only a portion of the total construction cost under the assumption that SPP would designate the upgrades for base plan funding.

Q. **What transmission cost estimate is used to calculate the customer impacts being sponsored by the testimony of Mr. Roger Walkingstick?**

A. Transmission cost of $211 million, which includes AFUDC, is included in the customer impact calculation shown in Exhibit RDW-7, page 1.

Q. **Did you provide any other information to Mr. Walkingstick?**

A. Yes. The Resource Planning group also provided production cost calculations to Mr. Walkingstick. The production costs were based on modeling which compared the Redbud resource plan with 640 MW of wind to the *No Wind* resource plan.

1 Q. **Does this conclude your prepared direct testimony?**

2 A. Yes, it does.

Exhibit LCH-1

Resource Planning Analysis

Oklahoma Gas & Electric

March 20, 2008

(REDACTED VERSION)

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EXECUTIVE SUMMARY

The resource planning efforts reflected in this document began soon after the Commission's final order in the Red Rock proceeding in October 2007[1], driven by the long lead time required to develop new resources through self-build or RFP options. OG&E executed a 300 MW Purchase Power Agreement ("PPA") with Redbud to address OG&E's capacity needs in 2008 and 2009, but thereafter OG&E requires 424 MW of capacity in 2010 increasing to 731 MW by 2013. The resource planning efforts were accelerated toward the end of 2007 in order to properly evaluate the opportunity to acquire Redbud, a 1,230 MW gas-fired facility that is located in OG&E's service area.

This document reflects two resource planning analyses conducted by the Resource Planning group ("Resource Planning"). The first analysis is the "Post-Red Rock Analysis" that reflects the removal of Red Rock as a resource option but does not include the acquisition of Redbud as an option. The second analysis builds off of the first analysis and is focused on including the Redbud plant in OG&E's future generation portfolio (the "Redbud Analysis").

Before performing these analyses, Resource Planning updated assumptions related to the load forecast, DSM capacity, fuel prices, emissions costs, and existing resource performance metrics. Resource Planning also updated its planning scenarios based on the work of Cambridge Energy Research Associates ("CERA"). We also reviewed the modeling approach that we used in the 2006 IRP submittal and made certain changes to improve the approach. These changes included modifications to the screening process designed to ensure that we identified distinct resource plans for subsequent evaluation.

We considered a wide range of supply options, including IGCC, nuclear and various levels of commitment to wind. Many of these supply options are subject to significant planning uncertainties. For example, it is now apparent that new coal plants will not be viable options earlier than 2015 or until such time as carbon regulations are settled and it is possible to begin a coal plant development effort. There is a vast potential for wind energy development in Western Oklahoma, however a substantial expansion of wind capacity depends on the availability of transmission facilities which are not in place today. New nuclear capacity is also showing renewed promise but there are significant hurdles, including waste disposal, that remain before it can be considered a viable option within a reasonable timeframe. Resource Planning does not believe that nuclear energy will be a viable option until 2020.

As a second step in the process, OG&E reviewed potential resource options identified during the screening process to develop a set of clearly distinct resource plans that captured the range of viable options. We also sought to reduce the number of resource plans for subsequent and time-consuming modeling steps, but strove to do so without limiting the range of viable options. Based on this review, we concluded that the viable alternatives could be captured with four distinct resource plans.

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[1] Order No. 545240 dated October 11, 2007 in Cause No. PUD 200700012, "Final Order Regarding the Need of Oklahoma Gas and Electric Company for Additional Baseload Generation Capacity".

The four resource plans are each comprised of gas-fired combustion turbines (CT) and combined cycle (CC) units, coal units and wind generation facilities. The distinction among the four distinct plans is based on technology choices, the size of the additions and the years in which they are added to the portfolio. In almost all of the screening analyses that we performed, the models selected a 506 MW CC in 2010 in order to meet our estimated capacity needs. For identification purposes, the resource plans are referred to as:

1. *320 MW Wind/Coal*: includes a 506 MW CC in 2010, 80 MW of wind in each of the years 2010-13, a 750 MW coal plant in 2015 with three CTs to meet peak demand over the next ten years;

2. *640 MW Wind/CC*: includes a 506 MW CC in 2010, 320 MW of wind in both 2010 and 2011, 506 MW CC in 2016, and four 102 MW CTs over the period;

3. *640 MW Wind/Coal*: the 2010 CC is replaced by five CTs along with an additional CT every year until a 500 MW coal plant is added in 2016 and 320 MW of wind in 2010 and 2011,;

4. *1280 MW Wind/CC*: includes a 506 MW CC in 2010, 320 MW of wind in each of the years 2010-2013, a second 506 MW CC in 2015, and three CTs over the period.

The *320 MW Wind/Coal* resource plan performs the best under most planning scenarios based on the projected Net Present Value of Revenue Requirements (NPVRR); the *640 MW Wind/CC* is the second best resource plan. Although the *320 MW Wind/Coal* resource plan has a lower NPVRR, we concluded that the *640 MW Wind/CC* is the best plan to pursue. The lower NPVRR results are attributable to lower production costs associated with the availability of a 750 MW coal plant beginning in 2015. OG&E may not be able to construct a coal plant of this size by 2015 due to continued global warming concerns. The 320 MW Wind/Coal plan also assumes that OG&E will not be required to develop more wind resources in response to potential new RPS standards, if imposed.

In summary, our analyses suggest that OG&E should pursue a CC plant to meet capacity needs beginning in 2010 while also pursuing development of additional wind, at least until such time as a determination is made regarding necessary transmission investments. The results clearly indicate that OG&E will need new gas-fired capacity to meet its resource requirements, irrespective of the amount of wind energy added to the portfolio, to bridge the gap until coal or other new technologies (e.g., IGCC, nuclear) become viable options. Our analysis indicates that DSM and DR will make an important contribution to meeting capacity margin requirements. They also suggest that coal is a viable option in the 2015-2016 timeframe, depending on the outcome of new carbon regulations and the development of wind.

The Redbud Analysis was performed by substituting Redbud for the first CC (2010 in three of the cases) and the first CT. The results indicate that the NPVRR of the *Redbud* resource plan is virtually identical to the *640 MW Wind/CC* resource plan. However, the rising costs of plant construction and the resulting construction cost risk for plants that require years to construct contribute to a preference for existing operating plants over new build options. This implies that

OG&E should complete the Redbud transaction and focus on the assessment of wind and development of necessary transmission facilities. In 2010, OG&E should then consider how to best meet its needs in the 2015-2016 timeframe.

I. INTRODUCTION

The Resource Planning group for Oklahoma Gas & Electric ("OG&E") has prepared this Resource Planning Analysis to brief the Oklahoma Corporation Commission ("Commission") and other interested parties on our ongoing resource planning efforts. These efforts began anew after the Commission's final order in the Red Rock proceeding in October 2007. They were accelerated toward the end of 2007 in order to properly evaluate the opportunity to acquire Redbud, a 1,230 MW gas-fired facility that is located in OG&E's service area.

Given the lead time required to develop new resources through self-build or RFP options, OG&E immediately began the steps necessary to produce a detailed resource planning analysis. This process began with an update of assumptions have changed since our 2006 IRP submittal. For example, Resource Planning has updated its resource planning analysis to reflect changes to forecast assumptions including the load forecast, natural gas prices and CO_2 prices.

After updating these assumptions, including an update of the planning scenarios used to test alternative resource plans, we performed two analyses. The first analysis is the "Post-Red Rock Analysis" that considers the impact of removing Red Rock as a resource option but does not consider the acquisition of Redbud to be an option. The second analysis builds off of the first analysis and is focused on the Redbud acquisition (the "Redbud Analysis").

This report describes the process of updating assumptions and performing the two analyses. It contains four sections, following this Introduction.

Section II describes the changes to planning assumptions to reflect current conditions and forecasts, including updated "planning scenarios" and also reviews certain changes that we have made to our modeling approach;

Section III presents an updated assessment of OG&E's resource gap or needs, focusing on the next ten years;

Section IV presents the analysis and results of what we refer to as the Post-Red Rock resource planning analysis;

Section V presents the analysis performed by Resource Planning to assess the Redbud acquisition from a resource planning perspective[2] and;

Section VI presents brief conclusions.

[2] OG&E also relied on independent evaluations of the value of Redbud.

II. ASSUMPTIONS, PLANNING SCENARIOS AND METHODOLOGY

This section describes the steps taken in preparation for conducting the Post-Red Rock and Redbud resource planning analyses. These efforts include updates to assumptions and updates to planning scenarios based on the work of Cambridge Energy Resource Associates ("CERA"). We also reviewed the modeling approach that we used in the 2006 IRP submittal and made certain changes to improve the approach.

A. UPDATES TO PLANNING ASSUMPTIONS

The resource plan relies on a series of modeling assumptions that reflect current operational, market and regulatory circumstances as well as the outlook for key decision drivers. Resource Planning routinely updates these assumptions as part of its periodic resource planning analyses.

The following assumptions have been modified since performing the 2006 IRP:

1) OG&E's load forecast;
2) Capacity and energy from demand-side management ("DSM") resources;
3) Fuel prices;
4) Emissions costs;
5) Existing generation plant and PPA performance metrics; and
6) New supply option costs and operating characteristics.

1. Load Forecast

OG&E updates its load forecast each year to support the annual budgeting process and ongoing resource planning efforts.

The 2007 load forecast was prepared by Quantec, LLC and is based on an econometric modeling framework that estimates energy demand for each revenue class. The key drivers are a forecast of service area economic and population growth as reported in the *Oklahoma Economic Outlook* prepared by Oklahoma State University ("OSU"), actual and normal weather data, and projections of electricity prices for price-sensitive customer classes. According to OSU's forecast, high natural gas and oil prices will continue to drive economic expansion in Oklahoma and particularly in Oklahoma City, even as the United States economy experiences a slowdown.

The load responsibility peak demand forecast is also prepared by Quantec, LLC and is based on an hourly econometric model of energy sales, weather and economic effects on OG&E's hourly load responsibility series. The modeling framework also reflects the following:

- Impact of different weekdays on hourly system load;
- Impact of different summer months on hourly system load;
- Influence of heat buildup during heat waves;
- Impact of the combined effects of humidity and warm temperatures; and
- Non-linearity in the load and temperature relationships at very high temperatures.

The current forecasts of energy and demand for customers is shown in Table 1.

Table 1
OG&E Load Forecast

	Peak (MW)	Energy (GWh)
2008	6,106	29,249
2009	6,234	29,845
2010	6,328	30,425
2011	6,426	30,985
2012	6,507	31,547
2013	6,619	32,084
2014	6,725	32,701
2015	6,845	33,379
2016	6,955	34,104
2017	7,111	34,872

As shown in this table, OG&E expects it energy demands to grow at an annual rate of 2.0 % over the 2007-2017 period. Peak demands are expected to grow at a slightly lower rate of 1.7 % over this same period. The forecasted growth in peak demands is consistent with OG&E's experienced growth of approximately 100 MW per year.

OG&E's 2007 load forecast includes wholesale contracts with nine entities for approximately 300 MW or 5% of load. As shown in Table 2 on the following page, these customers account for a minor portion of OG&E's annual load growth.

Table 2
Wholesale Load Forecast

	Peak (MW)	Energy (GWh)
2008	333	1,695
2009	337	1,732
2010	341	1,770
2011	345	1,807
2012	350	1,844
2013	355	1,882
2014	359	1,919
2015	364	1,956
2016	369	1,994
2017	374	2,031

2. Demand Response ("DR") and DSM Resources

i. DSM Programs

DSM is accounted for in two ways. First, DSM savings that are attributable to a continuation of existing programs that fall into 3 categories. These existing programs are identified in Table 3.

Table 3
Existing DSM Programs

Demand Response		
Load Curtailment	Interruptible Service	Energy Curtailment
Demand Side Management		
Real Time Pricing	Time of Use	
Energy Efficinecy		
Positive Energy Home	Geo-Thermal Home	Heat Pumps
Home Weatehrization	Rate Tamer	Power Factor Correction

As shown in Table 4, we estimate that the contribution from DR is 113.3 MW in 2008 to offset demand during system peak hours. This level is forecast to grow modestly based on the forecast of demand. Demand side management and energy efficiency programs that have been in place since 2001 and are already reflected in our econometric-based demand forecast and contribute approximately 5.8 MW in 2008, growing to 33.1 MW by 2017.

Table 4
DSM and DR Peak Demand Savings (MW)

	Existing Programs	New Programs	DR	TOTAL
2008	5.8	7.3	113.3	126.4
2009	8.9	11.0	115.6	135.5
2010	11.9	18.7	117.4	148.0
2011	14.9	28.0	119.2	162.1
2012	18.0	36.6	120.7	175.3
2013	21.0	46.9	122.8	190.7
2014	24.0	56.0	124.8	204.8
2015	27.1	66.1	127.0	220.2
2016	30.1	75.3	129.0	234.4
2017	33.1	84.2	131.9	249.3

Second, OG&E anticipates implementing new DSM programs in response to the ongoing Commission DSM rulemaking that will serve as an incremental source of savings. We refer to these as "incremental" savings because they are attributable to new programs.

OG&E has two initiatives to generate additional DSM savings. The first set of programs is referred to as the "Quick Start" program that is being proposed to begin in July of 2008.

Table 5

QUICK START PROGRAMS			
Compact Flourescent Lights	Weatherization	Energy Efficiency Education	Customized Energy Report
Commercial Lighting	Living Wise	Motors Replacement	

The second set of new programs is more comprehensive and is being develop by Frontier Associates and will be summarized in a report due to be complete later this year.

Table 6

FUTURE POTENTIAL PROGRAMS			
Insulation	HVAC	Water Heaters	Windows
Compressed Air	Programmable Thermostats	Duct Efficiency Improvement	Air Infiltration

Resource Planning based its estimate for these programs, as well as the Quick Start programs, on the most recent version of the proposed rules which require a 10% reduction in the energy growth rate and a 15% reduction in the demand growth rate for the period ending December 31, 2011. As shown in Table 4, these proposed savings rates increase to 12% and 19%, respectively, after 2011. The impact of these new programs are reflected as an offset to the load forecast and are projected to grow from 7.3 MW in 2008 to 84.2 MW in 2017.

3. Fuel Prices

OG&E updates its fuel price forecasts for resource planning purposes periodically as new forecasts based on the latest information becomes available. The expected fuel price forecasts included in this update are based on Fall 2007 Midwest Reference Case fuel price forecast produced by Global Energy Decision ("GED"). These forecasts are presented in Table 7.

Table 7
FUEL PRICE FORECAST

	Coal ($/ton)	Natural Gas ($/MMBtu)
2008		
2009		
2010		
2011		
2012		
2013		
2014		
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
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2030		
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2032		
2033		
2034		
2035		
2036		

4. Emissions Prices

Resource Planning updated its forecasts of CO_2, SO_2, and Hg prices based on GED's Fall 2007 Midwest Reference Case. Although there are different approaches to emissions regulations either in place or under discussion, the most straightforward way to model these approaches is to incorporate a $/unit tax on the production of each unit of emissions. GED is projecting an implementation date of new carbon regulations in 2012 to reflect the difficulty of enacting environmental legislation in an election year.

As shown in Table 8, the "expected" forecast of CO_2 prices increases from $[redacted]/ton in 2012 to over $[redacted]/ton by 2021.

Table 8
EMISSIONS ALLOWANCE PRICE FORECAST

	CO2 ($/ton)	SO2 ($/ton)	Hg ($/lb)
2008	[redacted]	[redacted]	[redacted]
2009	[redacted]	[redacted]	[redacted]
2010	[redacted]	[redacted]	[redacted]
2011	[redacted]	[redacted]	[redacted]
2012	[redacted]	[redacted]	[redacted]
2013	[redacted]	[redacted]	[redacted]
2014	[redacted]	[redacted]	[redacted]
2015	[redacted]	[redacted]	[redacted]
2016	[redacted]	[redacted]	[redacted]
2017	[redacted]	[redacted]	[redacted]
2018	[redacted]	[redacted]	[redacted]
2019	[redacted]	[redacted]	[redacted]
2020	[redacted]	[redacted]	[redacted]
2021	[redacted]	[redacted]	[redacted]
2022	[redacted]	[redacted]	[redacted]
2023	[redacted]	[redacted]	[redacted]
2024	[redacted]	[redacted]	[redacted]
2025	[redacted]	[redacted]	[redacted]
2026	[redacted]	[redacted]	[redacted]
2027	[redacted]	[redacted]	[redacted]
2028	[redacted]	[redacted]	[redacted]
2029	[redacted]	[redacted]	[redacted]
2030	[redacted]	[redacted]	[redacted]
2031	[redacted]	[redacted]	[redacted]
2032	[redacted]	[redacted]	[redacted]
2033	[redacted]	[redacted]	[redacted]
2034	[redacted]	[redacted]	[redacted]
2035	[redacted]	[redacted]	[redacted]
2036	[redacted]	[redacted]	[redacted]

Resource Planning also updated its forecasts of SO_2, and Hg prices based on the GED forecasts. These revised forecasts are also presented in Table 8. It should be noted that GED forecasts that NO_x prices will be zero in our region.

CO_2 prices will have a significant impact on the economics of new coal plants. However, the impact of SO_2 prices will be muted as OG&E's planned investment in scrubbers at three of our existing coal plants will reduce SO_2 emissions dramatically. These investments are expected to be completed over the 2013-2015 timeframe. It is difficult to predict the impact of Hg prices as a 2005 Environmental Protection Agency ("EPA") proposal to implement a cap-and-trade approach for Hg emissions was overturned by the US Court of Appeals on February 7, 2008. As it is not yet evident how the EPA will redesign its approach to regulation of Hg emissions, we are continuing to use the GED forecast at this time.

5. Existing Supply Resources

Resource Planning updated the performance data (e.g., heat rate, fixed and variable O&M costs, forced outage rates, etc.) used in the optimization model to reflect the most recent experience for each of our power plants.[3] OG&E's generation resources include coal-fired units, gas-fired steam units, gas-fired combined cycle (CC) units, gas-fired combustion turbine (CT) units, and wind turbine units. OG&E's "net dependable rated capability" is reported on the OG&E 2007 Capability Report that is published on the last day of each year. The capabilities are determined from unit testing during the summer months in accordance with SPP Criteria 12. The latest Capability Report was published on December 31, 2007 and reported a "net dependable rated capability" of 6,113 MW from OG&E's nine power plants; this number is the basis for OG&E's capacity margin for 2008.

There are two significant changes to OG&E's portfolio. First, OG&E terminated its 110 MW PPA with Mid-Continent Power Company, Inc. ("MCPC") on December 31, 2007.

Second, on May 29, 2007 OG&E issued an RFP for firm energy or capacity for the four summer months of May through August in 2008, 2009 and 2010. This ultimately led to an agreement to purchase 300 MW of capacity from Westar Energy from the Redbud plant for the summer months in 2008 and 2009.

OG&E sought bids from potential suppliers for a minimum of 50 MW and maximum of 500 MW. In order to reach as many suppliers as possible, OG&E identified and sent a draft RFP through e-mail to likely bidders based on a review of registered merchants in our NERC region. The Company also posted a notice of the draft RFP on the OG&E website and hosted a technical conference to solicit input into the draft RFP. Under the oversight by an Independent Monitor, OG&E issued a final RFP and analyzed 16 bids from 5 suppliers that complied with the RFP requirements. The analysis of the bids considered price, operational requirements and deliverability for a total cost consideration. Certain options were deemed to be undeliverable to OG&E without investments in transmission. It was determined after considering all cost factors, including necessary transmission investments, that a 300 MW Purchase Power Agreement ("PPA") with Westar sourced from the Redbud plant was the best option. OG&E then entered negotiations of a suitable final agreement with Westar. After several months of negotiations, OG&E and Westar were able to agree on terms and signed an agreement to purchase 300 MW Capacity and Purchase Power Agreement ("PPA") in 2008 and 2009. The Company declined all bids for 2010 due to pricing concerns.

[3] Realized heat rate and other operating data are commercially sensitive and are not provided in this report.

B. PLANNING SCENARIOS

OG&E makes its resource decisions in an environment that is influenced by local, regional, national and, increasingly relevant, global developments. These changes are impacting research on emerging technologies, development of current technologies and the uncertainties associated with commitments to specific technologies.

In performing the 2006 IRP analyses, Resource Planning relied on CERA's North American Gas & Power Scenarios to assess the impact of alternative future environments. These scenarios have been updated twice since that time, most recently in November 2007. In brief, CERA currently produces three planning scenarios:

> **"ASIAN PHOENIX"**: a strong global economy results in growth in energy demands, combined with global competition that impedes the development of more aggressive carbon regulations.
>
> **"GLOBAL FISSURES"**: slower economic growth and increased concern over the security of domestic energy supplies with countries focusing on their own economic issues and a reversion by states to more traditional regulatory oversight and reemergence of vertically integrated utilities.
>
> **"MERCURY RISING"**: heightened global warming concerns with an emphasis on new technologies and an increased reliance on competitive market forces.

Resource Planning also developed a fourth scenario, the "**OG&E EXPECTED**" scenario based on the medium forecasts of coal, natural gas and emissions prices published in GED's Fall 2007 Midwest Reference Case.

The scenarios are represented for modeling purposes as a set of assumptions for key input variables. Resource Planning updated six sets of assumptions in order to accurately portray the most recent CERA scenarios. These are natural gas prices, CO_2 prices, SO_2 prices, Hg prices, the energy forecast and the demand forecast. For example, the Mercury Rising scenario combines a relatively high set of CO_2 prices with a set of high natural gas prices as it is expected that stricter carbon regulations will lead to an increase in the demand for natural gas as a fuel for generating electricity. These assumptions are presented in Figures I though VI.

Figure I
Gas Price Forecast

Figure II
Forecast of CO_2 Prices

Figure III
Forecast of SO_2 Prices

Figure IV
Forecast of Hg Prices

Figure V
Forecast of Energy Demand

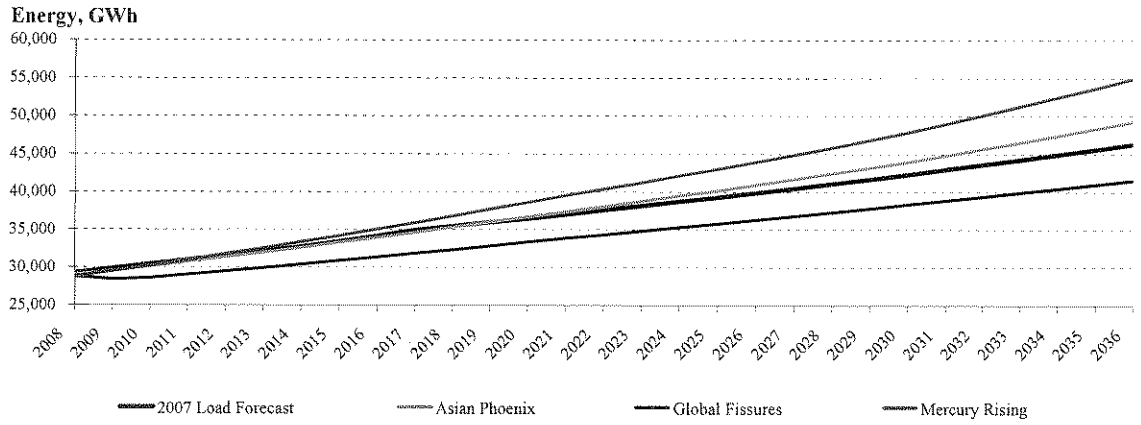
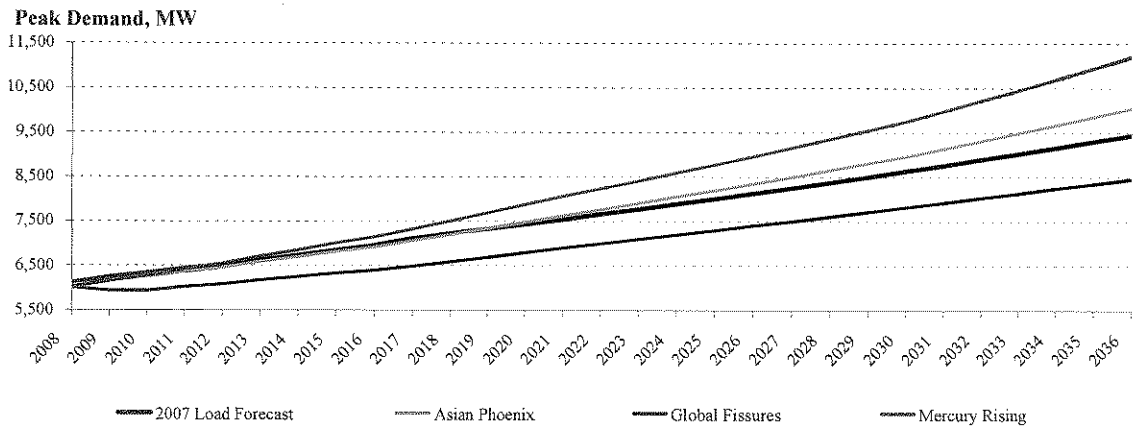


Figure VI
Forecast of Peak Demand



C. MODELING APPROACH

In this section, we describe the resource plan modeling effort that determines a preferred portfolio and specific resource commitments based on cost, risk and other factors. After the Red Rock proceeding, Resource Planning determined that the process could be improved and streamlined.

More specifically, we modified the screening process to ensure that we identified distinct resource plans for subsequent evaluation. Furthermore, each of these alternative resource plans was tested against alternative views of the future (the CERA scenarios) in order to determine which plans performed best under a range of possible future conditions. We also expanded our sensitivity analyses by applying them to the four distinct resource plans identified in the screening analysis. We believe that the impact of key risk factors is now easier to understand.

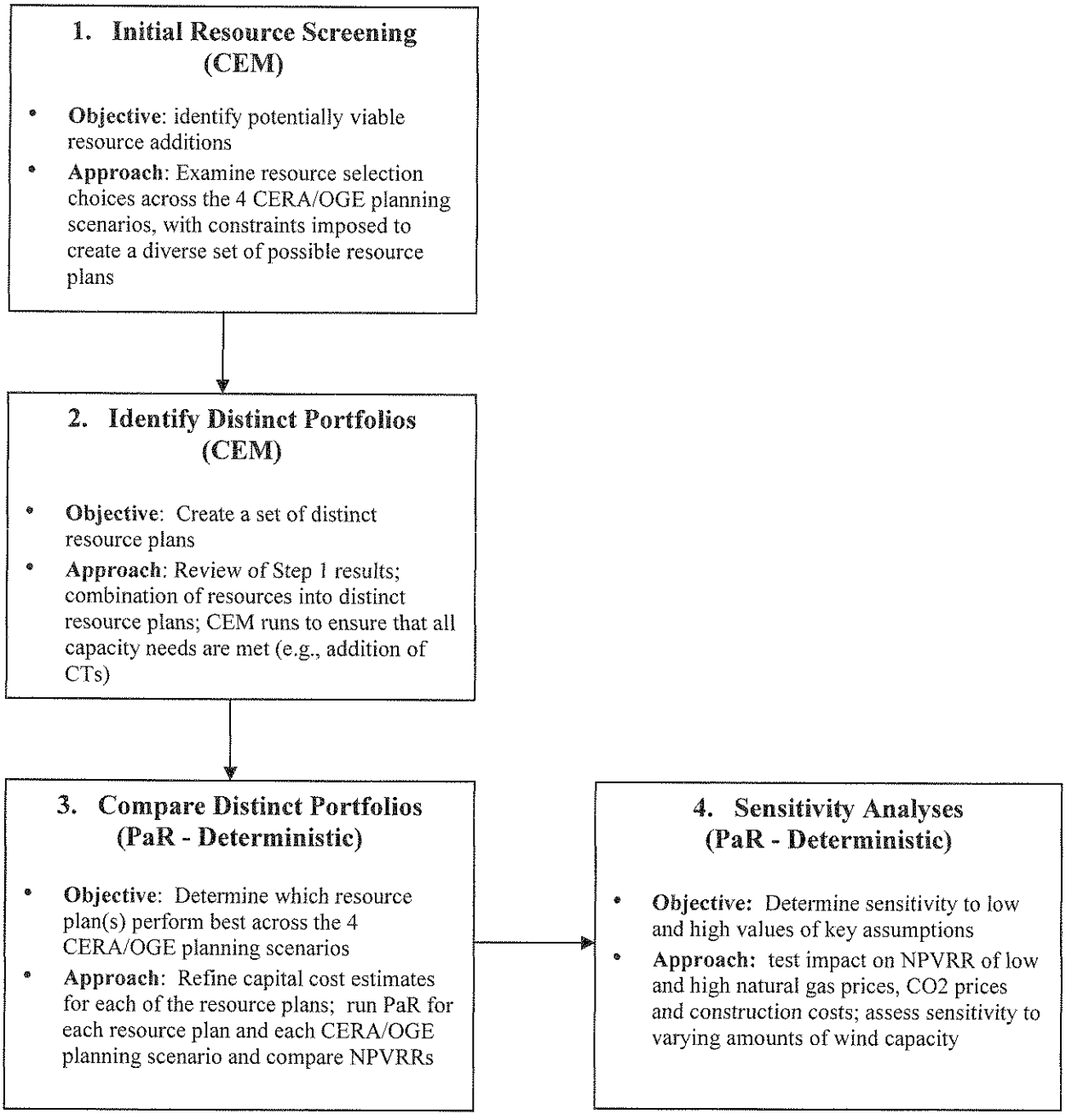
In our view, these changes produce a more robust resource plan, while significantly reducing the number of model runs and overall complexity of the process.

The revised approach, as applied in the Post-Red Rock Analysis, is presented in the Figure VII on the following page. As noted in this figure, Resource Planning continues to rely on a suite of models licensed from GED: the Capacity Expansion Module ("CEM") and the Planning and Risk ("PAR") module.

Briefly, as a first step, we performed a screening analysis to identify resources and combinations of resources that were selected by CEM. The screening examined these alternatives across a range of potential future environments as represented by three CERA and the OG&E Expected scenarios.

After reviewing these results, we developed four distinct portfolios (Step 2) and compared these portfolios using GED's Planning and Risk (PAR) module in Step 3. As a last step we performed sensitivity risk analyses on each of the four portfolios using the PAR module. Each of these steps is described in more detail in this section.

FIGURE VII
RESOURCE PLANNING ANALYSIS MODELING APPROACH



III. OG&E'S CAPACITY NEEDS

Resource Planning calculated estimates of required new supply resources by comparing the load forecast to our projection of capacity provided by existing resources. For purposes of this calculation, we assumed that new DSM resources would be brought on line as projected and that OG&E continues to meet the requirements of its wholesale contracts. The resource "gap" is shown in Table 9.

Table 9
OG&E Demand, Supply and Capacity Needs

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
A. Resources (MW)										
Total Owned Capacity (MW)	6,141	6,141	6,141	6,141	6,141	6,127	6,127	6,127	6,120	6,120
Purchase Contracts (MW)	771	771	471	471	471	471	471	471	471	471
Total Capability	6,912	6,912	6,612	6,612	6,612	6,598	6,598	6,598	6,591	6,591
B. Demand (MW)										
Demand Forecast (MW) (Include Wholesale)	6,112	6,243	6,340	6,441	6,525	6,640	6,749	6,873	6,985	7,144
(Includes Impact of Existing DSM Programs)	(6)	(9)	(12)	(15)	(18)	(21)	(24)	(27)	(30)	(33)
Net Demand Forecasr (MW)	6,106	6,234	6,328	6,426	6,507	6,619	6,725	6,845	6,955	7,111
Curtailable and Interruptible Capacity	(113)	(116)	(117)	(119)	(121)	(123)	(125)	(127)	(129)	(132)
New DSM Program Impacts	(7)	(11)	(19)	(28)	(37)	(47)	(56)	(66)	(75)	(84)
Net On System Demand	5,986	6,107	6,192	6,279	6,349	6,449	6,544	6,652	6,750	6,895
C. Needed Capacity and Associated Capacity Margin With Wholesale										
Capacity Margin (MW)	926	834	844	857	867	880	893	908	921	941
Capacity Needed to Satisfy 12% Margin	**0**	**29**	**424**	**524**	**604**	**731**	**839**	**962**	**1,080**	**1,245**
Percent Capacity Margin	13.4%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%

As shown in this table, the Redbud PPA allows OG&E to satisfy its SPP capacity margin requirements in 2008 and 2009, but thereafter OG&E requires 424 MW of capacity in 2010 increasing to 731 MW by 2013. Capacity needs are defined as the additional capacity required to meet the Company's customer requirement and to satisfy SPP's 12% capacity margin requirement. In practice, OG&E consistently exceeds the 12% minimum requirement to ensure that we remain above the requirement at all times to ensure reliability. There are also occasions when OG&E acquires an asset, constructs a new resource or executes a new PPA in anticipation of future capacity needs. The addition of capacity will usually cause the Company to exceed the 12% minimum for a year or longer depending on the size of the addition.

IV. POST RED-ROCK ANALYSIS

The purpose of the effort was to determine how best to meet our future requirements without Red Rock. This effort began shortly after the Commission's Red Rock decision was issued because of the long lead time required for new build options. The primary objective was to determine how the "preferred portfolio" would change if Red Rock were no longer an option. This is referred to as the Post-Red Rock Analysis and is described in this section. We also determined at

that time that it was appropriate to update our assumptions, update the planning scenarios, and take a fresh look at our modeling approach before beginning an extensive modeling effort. These changes were described in Section II.

New Supply Options

We considered a wide range of supply options, including IGCC, nuclear and various levels of commitment to wind. It is worth noting that every potential major new source of supply is characterized by significant uncertainties at this time. For example, at least two of these options (IGCC and nuclear) may not be commercially available for a decade or more. It is also apparent that new coal plants will not be viable options earlier than 2015 or until such time as carbon regulations are settled and it is possible to begin a coal plant development effort. As described in this section, until such time as coal is a viable option, OG&E is focusing on DSM resources, wind farm development and electricity produced by natural-gas.

There is a vast potential for wind energy development in Western Oklahoma. Wind energy is attractive because of its low variable costs and zero emissions. Wind acts as a complement to natural gas generation facilities as they can be coupled to provide energy from wind with load following capacity from natural gas. Wind also contributes to base load energy requirements throughout the year and serves to mitigate high natural gas prices. However, a substantial expansion of wind capacity depends on the availability of transmission facilities which are not in place today.

The State of Oklahoma is focusing on the development of wind resources in the western part of the State. Development of Oklahoma's indigenous wind resources is proceeding ahead of any statewide or national RPS. The recently established Oklahoma Electric Power Transmission Task Force was created to assess Oklahoma's transmission needs. As part of this charter, the task force will address transmission investments that will be necessary to deliver wind power from the Panhandle and western Oklahoma to major load areas, including Oklahoma City. The task force was initially due to report to the legislature by January 31, 2008. A preliminary report was submitted on this date, indicating that a final report will be issued within 30 days after the SPP completes a transmission study being prepared at the request of the task force. The SPP intends to complete its report in April. Any legislative action in this session would have to occur before the scheduled end of the term in May. OG&E will assess the potential impact of the SPP analysis and legislative report on regional markets and our resource planning activities after the Oklahoma legislature takes action, should it decide to do so.

Most importantly, OG&E has announced a proposal to build transmission capacity necessary to support a dramatic increase in its wind power production from 170 MW currently installed to approximately 770 MW. This transmission line will require approval as part of the SPP transmission planning process.

Coal generation remains a long-term resource option because coal is an abundant resource with low and relatively stable prices. However, it is unlikely that new coal plants will be developed until project sponsors can reasonably assess the costs attributable to carbon emissions. For modeling purposes, we have assumed that coal is a potential resource beginning in 2015. Several

new technologies are being developed in response to global warming concerns, including Integrated Gasification Combined Cycle (IGCC) and ultra-supercritical pulverized coal plants similar to the one proposed by OG&E. IGCC is now in the demonstration phase with current development efforts underway by AEP, Duke and Southern Company. Experience is needed to assess construction cost and operating performance uncertainties associated with this promising technology. Most recently, increasing attention is being paid to carbon sequestration but this technology is still in the research phase.

New nuclear capacity is also showing renewed promise but there are significant hurdles, including waste disposal, that remain before it can be considered a viable option within a reasonable timeframe. These hurdles also include capital cost uncertainties, development timeframes such as construction, licensing and siting, and cost recovery concerns. For these reasons, OG&E does not believe that nuclear energy will be a viable option until 2020. Nonetheless, according to a report published by the Nuclear Energy Institute, over 15 companies have submitted or planned to submit applications for licenses to construct and operate new plants.

There is one planning uncertainty that is having an impact on all technologies. Construction costs have escalated significantly over the past two to three years for all new power plant developments. A September 2007 study prepared by The Brattle Group cited several factors that are contributing to escalating power plant construction costs including dramatically increased materials costs, a shortage of shop capacity necessary to build major equipment, and a tightening market for Engineering, Procurement and Construction (EPC) services.

More recently, on February 14, 2008, a newly published Power Capital Costs Index ("PCCI") developed by IHS Inc. and CERA indicates that the cost of new power plant construction in North America increased 27 percent in 2006 (over 2005) and an additional 19 percent in the first six months of 2007, reaching a level 130 percent higher than in 2000. Competition from Asian markets is thought to be the major factor behind these increases.

The rising costs of plant construction and the resulting construction cost risk for plants that require years to construct are resulting in a greater preference for operating plants over new build options. Construction cost risks also present financing and regulatory approval challenges. Thus, construction cost risk must be considered when comparing new build options to asset purchase options or PPAs.

The four steps taken to identify specific resource additions, and combinations or resources or "resource plans" are described below.

Step 1: Initial Resource Screening

The first step in the resource planning process is to identify potential resource options over the planning horizon. This is accomplished by using CEM to test the economic viability of viable resource options (natural gas-fired combined cycle plants, natural gas-fired combustion turbines, wind farms, and coal-fired generation, including IGCC) under each of the four planning scenarios. Resource options that are prohibitively expensive are screened out during this step.

For example, the screening showed that IGCC and nuclear technologies were not viable resource options at the present time with capital costs of approximately $3,100/kW and $4,500/kW ($ 2006), respectively. It is conceivable that technology advances and capital cost decreases may change this result in future studies.

In some cases, we imposed resource option restrictions on the CEM model in order to ensure that we had a wide variety of resources (defined by technology, size, and implementation date) to consider in the next step. For example, in certain cases we limited the availability of wind to determine which other resource options would be selected by the CEM model.

In general, wind and gas-fired resources were preferred during the first ten years. Coal was not selected as an option until 2015.

Step 2: Identify Distinct Portfolios

As a second step in the process, Resource Planning reviewed potential resource options identified during the screening process to develop a set of clearly distinct resource plans that captured the range of viable options. We also sought to reduce the number of resource plans for subsequent and time-consuming modeling steps, but strove to do so without limiting the range of viable options. Based on this review, we concluded that the viable alternatives could be captured with four distinct resource plans.

The four resource plans are each comprised of gas-fired combustion turbines (CT) and combined cycle (CC) units, coal units and wind generation facilities. The distinction among the four distinct plans is based on technology choices, the size of the additions and the years in which they are added to the portfolio. In almost all of the screening analyses that we performed, the models selected a 506 MW CC in 2010 in order to meet our estimated capacity needs. For identification purposes, they are referred to as:

1. *320 MW Wind/Coal*
2. *640 MW Wind/CC*
3. *640 MW Wind/Coal*
4. *1280 MW Wind/CC*

All four of the resource plans include wind generation facilities but they differ as to the size of the commitment, ranging from 320 MW to 1,280 MW of new wind capacity in the first ten years. The variations are appropriate to reflect the uncertainty of the cost and timing of new transmission facilities that will be required to connect wind to the grid and deliver it to load centers in Oklahoma. In all cases, wind has important portfolio impacts that are reflected in the plans. In simple terms, wind tends to serve as a complement to load following natural gas capacity and acts as a source for base load energy that is needed if additional coal is not developed. In other words, more wind implies less new coal; less wind makes room for more new coal in the portfolio.

Thus, the low wind resource plan, *320 MW Wind/Coal,* reflects a transmission-constrained environment that identifies a coal plant in 2015 as the least cost option to serve base load needs.

The next two resource plans include 640 MW of wind to be developed in 2010 and 2011. The *640 MW Wind/Coal* resource plan assumes that new transmission facilities are built and that gas CTs will meet OG&E's immediate needs and that the uncertainty around CO_2 costs will be resolved in a timeframe that permits a new coal plant to be placed in service in 2016. The *640 MW Wind/CC* resource plan assumes that coal is not a viable option until after the first ten years and that gas-fired CCs provide intermediate and baseload needs.

The final resource plan is the *1280 MW Wind/CC* resource plan. This plan also assumes that new transmission facilities are developed. The development of transmission facilities could be spurred by adoption of a Renewable Energy Portfolio Standards ("RPS") adopted at either the state or federal level or by high CO_2 prices. This resource plan includes gas CCs to complement the more aggressive commitment to wind.

The final four resource plans are summarized in Table 10.

Table 10
Distinct Resource Plans

Year	320 Wind/Coal	640 Wind/CC	*640 MW Wind/Coal*	1280 Wind/CC
2008	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)
2009	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)
2010	CC - 506 MW Wind - 80 MW	CC - 506 MW Wind - 320 MW	CT - 81 MW CT - 102 MW (4) Wind - 320 MW	CC - 506 MW Wind - 320 MW
2011	CT - 102 MW Wind - 80 MW	Wind - 320 MW	Wind - 320 MW	Wind - 320 MW
2012	Wind - 80 MW	CT - 102 MW	CT - 102 MW	CT - 102 MW Wind - 320 MW
2013	CT - 102 MW Wind - 80 MW	CT - 102 MW	CT - 102 MW	CT - 102 MW Wind - 320 MW
2014	CT - 81 MW	CT - 102 MW	CT - 81 MW	CT - 102 MW
2015	Coal - 750 MW	CT - 102 MW	CT - 102 MW	CC - 506 MW
2016	None	CC - 506 MW	Coal - 500 MW	None
2017	None	None	None	None

In three of the four portfolios, it is assumed that a CC will be added in 2010 (or a PPA priced at a CC). In the fourth portfolio, CTs are relied upon along with 640 MW of wind to meet requirements until a base load resource is needed. Coal and CC compete after 2014 to meet base load requirements.

Step 3: Compare Distinct Portfolios

In the third step, we then tested these four distinct resource plans under each of the four planning scenarios and calculated the Net Present Value of Revenue Requirements (NPVRR) for each of the 16 cases (four resource plans times four planning scenarios) using the PAR model. As these runs focused on NPVRR, we also refined our capital cost estimates for each of the resource plans to reflect financing, tax effects, rate cases, and other likely financial circumstances. These results are presented in Table 11 on the following page.

As shown in this table, the resource plan that performs the best under most planning scenarios is *320 MW Wind/Coal* and a new coal plant in 2015. The second best resource plan, *640 MW Wind/CC* reflects the complementary relationship between wind energy and natural gas capacity. The most aggressive commitment to wind, the *1280 MW Wind/CC* resource plan, is preferred in the Mercury Rising planning scenario where environmental regulations are the most stringent.

It should be noted that this matrix does not reflect the results of risk analysis or other factors that should also be considered when comparing resource plans. These other factors include the timing and capacity of new transmission facilities to deliver wind energy from Western Oklahoma, the substance and form of new carbon regulations, and the distinct possibility that it may be difficult to construct a new coal plant in the 2015-2016 timeframe.

Although the *320 MW Wind/Coal* resource plan has a lower NPVRR, we concluded that the *640 MW Wind/CC* is the best plan to pursue. The lower NPVRR results are attributable to lower production costs associated with the availability of a 750 MW coal plant beginning in 2015. OG&E may not be able to construct a coal plant of this size by 2015 due to continued global warming concerns. The 320 MW Wind/Coal plan also assumes that OG&E will not be required to develop more wind resources in response to potential new RPS standards, if imposed.

Table 11
Comparison of Resource Plans
NPVRR ($ millions)

PRODUCTION COSTS

Resource Plan	OGE Expected	CERA Asian Phoenix	CERA Global Fissures	CERA Mercury Rising
320 MW Wind/Coal	19,497	19,688	12,670	27,014
640 MW Wind/CC	19,765	19,815	12,917	27,007
640 MW Wind/Coal	19,804	19,973	12,953	27,331
1280 MW Wind/CC	19,586	19,607	13,029	26,458

CAPITAL COSTS

Resource Plan	OGE Expected	CERA Asian Phoenix	CERA Global Fissures	CERA Mercury Rising
320 MW Wind/Coal	3,706	3,706	3,706	3,706
640 MW Wind/CC	3,831	3,831	3,831	3,831
640 MW Wind/Coal	4,158	4,158	4,158	4,158
1280 MW Wind/CC	4,246	4,246	4,246	4,246

TOTAL COSTS

Resource Plan	OGE Expected	CERA Asian Phoenix	CERA Global Fissures	CERA Mercury Rising
320 MW Wind/Coal	23,203	23,394	16,376	30,720
640 MW Wind/CC	23,596	23,646	16,748	30,838
640 MW Wind/Coal	23,962	24,131	17,111	31,489
1280 MW Wind/CC	23,832	23,853	17,275	30,704

RANKING OF RESOURCE PLANS

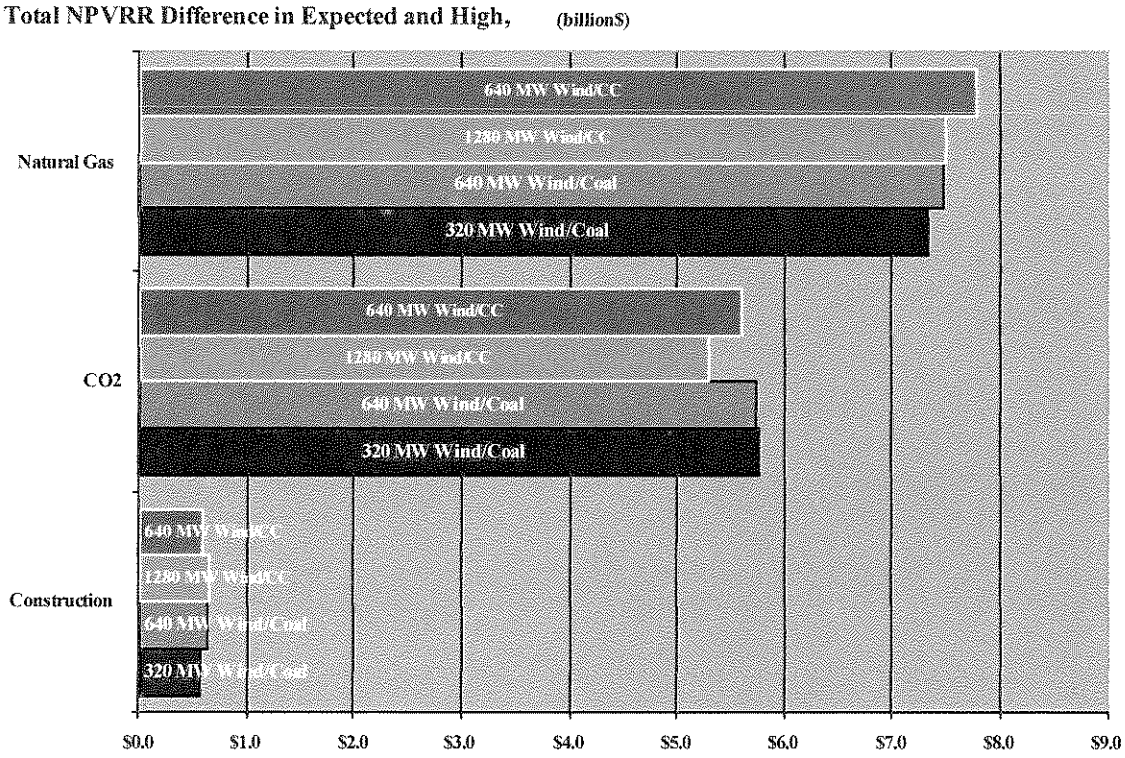
Resource Plan	OGE Expected	CERA Asian Phoenix	CERA Global Fissures	CERA Mercury Rising
320 MW Wind/Coal	1	1	1	2
640 MW Wind/CC	2	2	2	3
640 MW Wind/Coal	4	4	3	4
1280 MW Wind/CC	3	3	4	1

Step 4: Risk Sensitivity Analyses

Resource Planning performed risk sensitivity analysis to examine the impact of low and high values for natural gas prices, CO_2 prices, and construction costs. The sensitivity of each resource plan, as measured by the change in NPVRR, to these three sets of assumptions was calculated using the PAR model. This analysis focuses on the upside risk as that tends to be of material interest in selecting a resource plan. The upside risk is defined as the difference between the high end of the risk-adjusted value and the expected value. It does not reflect the "downside" risk that natural gas prices, CO_2 prices and construction costs will be lower than their expected values. A major uncertainty affecting electric utility resource plans is the prospect for national legislation that will regulate carbon emissions from stationary sources including coal and natural-gas fired power plants.

The risk sensitivity results, expressed as the difference in the high-end and the expected NPVRR are presented in Figure VIII.

Figure VIII
Resource Plan Upside Risk
($ Billion)



The sensitivity ranges were defined as follows. Natural gas prices were assumed to be half as high as the expected values in the low case and twice as high in the high case. CO_2 prices were assumed to be half as high as the expected values in the low case and three times as high in the

high case, reflecting the greater uncertainty associated with projecting CO_2 prices. Finally, construction costs were assumed to be 10% lower than the expected values in the low case and 15% higher in the high case.

The resource plans that include coal are relatively less sensitive to high natural gas prices but relatively more sensitive to high CO_2 prices. More specifically, the *640 MW Wind/CC* resource plan has greater natural gas price risk than the other plans but also has lower CO_2 price risk than all but the *1280 Wind/CC* resource plan. There is much less impact from construction cost risk as these only impact plant additions whereas natural gas and CO_2 prices have an impact on OG&E's entire portfolio.

We also specified a *"No New Wind/CC"* resource plan to test the theory that wind helps to mitigate the risk associated with high natural gas and high CO_2 prices. This "No-Wind" resource plan substitutes natural gas and coal energy for wind energy in approximately equal proportions and is presented in Table 12.

Table 12
No New Wind/CC Resource Plan

Year	640 Wind/CC	No New Wind
2008	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)
2009	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)
2010	CC - 506 MW Wind - 320 MW	CC - 506 MW
2011	Wind - 320 MW	None
2012	CT - 102 MW	CT - 102 MW
2013	CT - 102 MW	CT - 102 MW
2014	CT - 102 MW	CT - 102 MW
2015	CT - 102 MW	CT - 102 MW
2016	CC - 506 MW	CC - 506 MW
2017	None	None

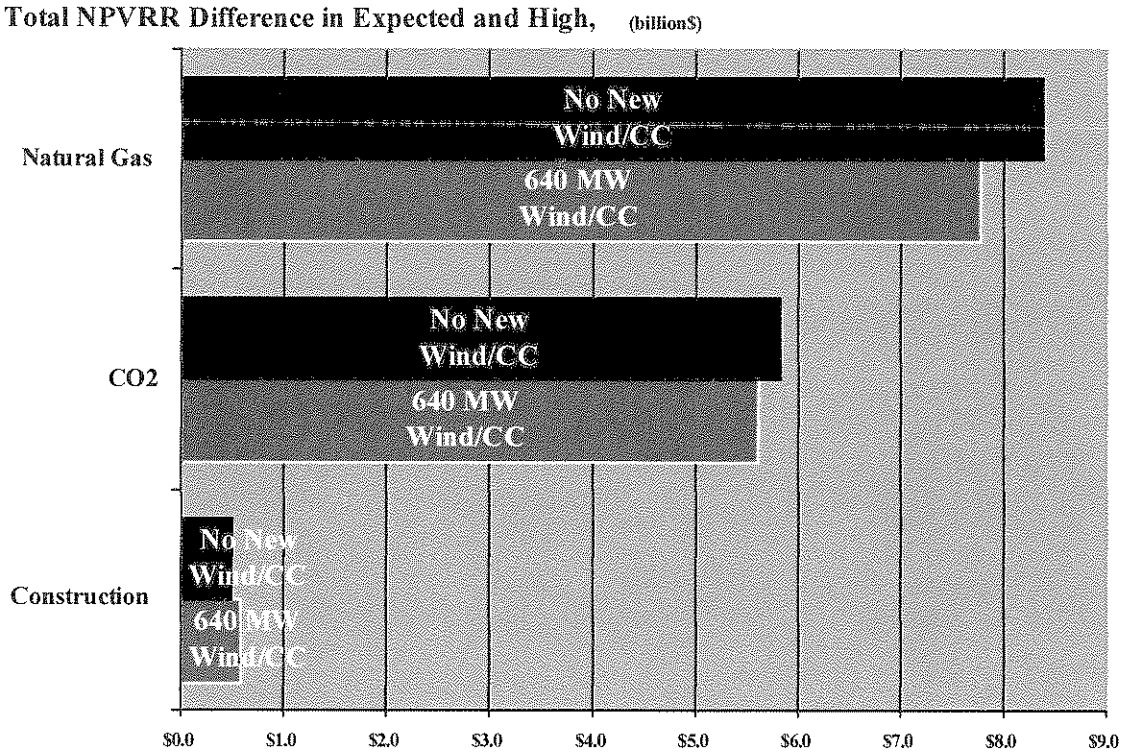
As shown in Table 13, the *No New Wind/CC* resource plan has lower capital costs and higher production costs than the *640 MW Wind/CC* resource plan and performs modestly better over all.

Table 13
Comparison of *No New Wind/CC* to the *640 MW Wind/CC* Resource Plan
NPVRR ($000)

Portfolio	Capital Cost	Production Cost	Total Cost
640 MW Wind/CC	3,831	19,765	23,596
No New Wind/CC	3,277	20,161	23,438
Difference	**554**	**(396)**	**158**

However, as shown in Figure IX, *the No New Wind/CC* resource plan has a significantly larger upside risk with respect to these two sets of assumptions than the *640 MW Wind/CC* resource plan. It also has the lowest risk associated with high construction costs.

Figure IX
No Wind Resource Plan Upside Risk



Finally, we performed a nuclear plant sensitivity case by substituting a nuclear plant for a 750 MW coal plant in 2020, based on the *640 MW Wind/CC* resource plan. As shown in Table 14, the resource plan that includes a nuclear plant has lower production costs but significantly higher capital costs. In fact, it has the highest total cost of any of the cases that been have discussed.

Table 14
Comparison of Nuclear to the *640 MW Wind/CC* Portfolio
NPVRR ($000)

Portfolio	Capital Cost	Production Cost	Total Cost
640 MW Wind/CC	3,831	19,765	23,596
Nuclear in 2020	5,210	19,283	24,493
Difference	**(1,379)**	**482**	**(897)**

These risk sensitivity analyses do not change our conclusion that the *640 MW Wind/CC* resource plan is the best plan to pursue.

Post-Red Rock Analysis Conclusions

The results clearly indicate that OG&E will need new gas-fired capacity in 2010 to meet its resource requirements, irrespective of the amount of wind energy added to the portfolio, to bridge the gap until coal or other new technologies (e.g., IGCC, nuclear) become viable options. The results suggest that OG&E should pursue development of additional wind, at least until such time as a determination is made regarding necessary transmission investments. The results indicate that DSM and DR will make an important contribution to meeting capacity margin requirements. They also suggest that coal is a viable option in the 2015-2016 timeframe, depending on the outcome of new carbon regulations and the development of wind.

V. PROPOSED ACQUISITION OF REDBUD

The purpose of the subsequent and more detailed analysis was to determine how our resource plan would be affected if we modeled terms of the Redbud transaction, including the performance attributes of the Redbud plant. This effort used the more comprehensive Post-Red Rock analysis as a starting point.

OG&E assessed how Redbud fit into the *640 MW Wind/CC* resource plan by substituting the Redbud plant in place of three elements of the preferred Post-Red Rock portfolio: the 2009 Redbud PPA, the 506 MW CC in 2010 and the 102 MW CT in 2012.[4] This *"Redbud"* resource plan is compared to the *640 MW Wind/CC* resource plan in Table 15. In modeling the Redbud option we used the transaction price ($434.52 million) as the capital cost and Redbud's expected performance characteristics as validated during the due diligence process. We subjected the Redbud resource plan to the same sensitivity and stochastic risk analyses as conducted in the Post-Red Rock Analysis.

[4] OG&E's share of the summer capacity of Redbud in 609 MW, based on the test results indicating a total summer capacity of 1,195 MW.

Table 15
Comparison of Portfolios

Year	640 Wind/CC	Redbud
2008	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)
2009	Redbud PPA - 300 MW (1 yr)	Redbud CC - 600 MW
2010	CC - 506 MW	None
	Wind - 320 MW	Wind - 320 MW
2011	Wind - 320 MW	Wind - 320 MW
2012	CT - 102 MW	None
2013	CT - 102 MW	CT - 102 MW
2014	CT - 102 MW	CT - 102 MW
2015	CT - 102 MW	CT - 102 MW
2016	CC - 506 MW	CC - 506 MW
2017	None	None

As shown in Table 16, the NPVRR results between the *640 MW Wind/CC* and Redbud resource plans are virtually identical across all four planning scenarios. In the OG&E Expected planning scenario, the *640 MW Wind/CC* resource plan had a NPVRR of $23,596 million; the Redbud resource plan had an NPVRR of $23,600 million. The Redbud resource plan has slightly lower capital costs and slightly higher production costs than the *640 MW Wind/CC* resource plan. This is attributable to the fact that a new CC is slightly more efficient than Redbud but has a slightly higher capital cost.

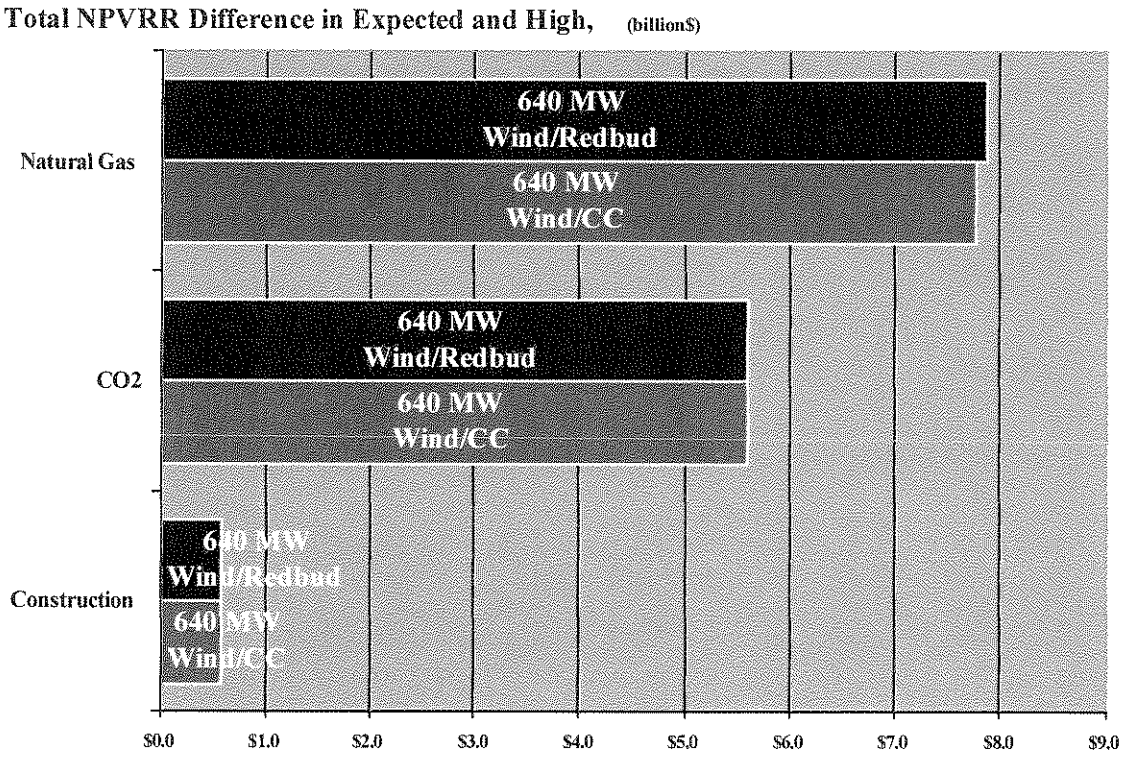
Table 16
Comparison of Redbud Resource Plan to *640 MW Wind/CC* Resource Plan
NPVRR ($000)

Portfolio	OGE Expected	CERA Asian Phoenix	CERA Global Fissures	CERA Mercury Rising
640 MW Wind/CC	23,596	23,646	16,748	30,838
640 MW Wind/Redbud	23,600	23,637	16,750	30,823
Difference	**(4)**	**9**	**(2)**	**15**

It is also important to note that the Redbud resource plan is not subject to construction cost risk for the first 600 MW of gas-fired capacity. To the extent that all or some portion of this 600 MW is met by new build resources in the *640 MW Wind/CC in 2016* case, then it will be subject to construction cost risk.

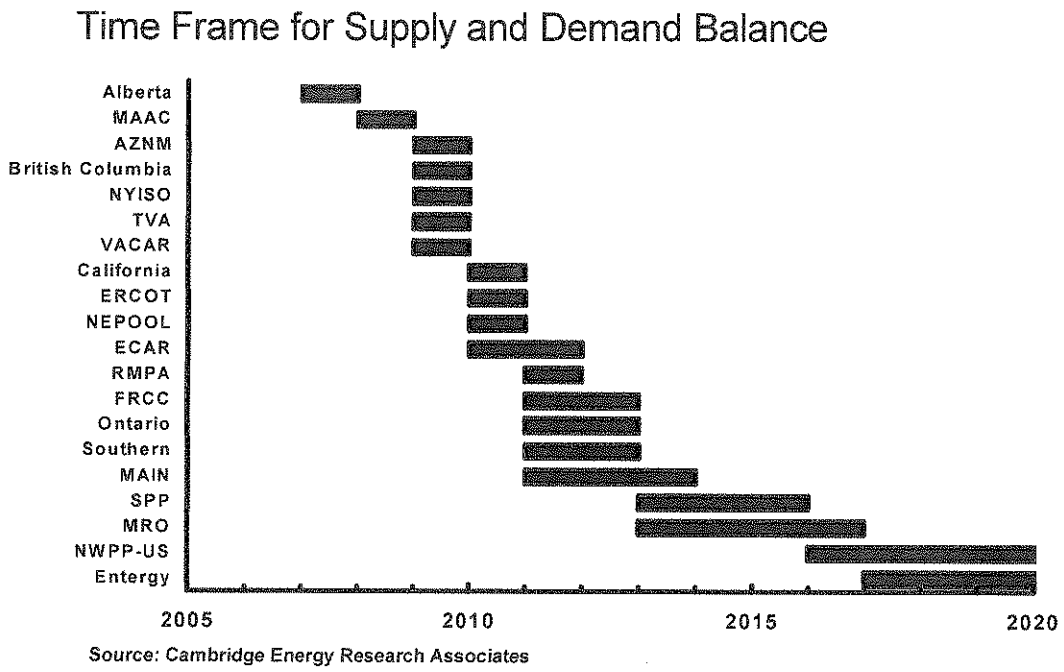
As shown in Figure X, the *Redbud* resource plan has slightly more natural gas price risk than the *320 MW Wind/Coal* resource plan and its CO2 risk is virtually identical.

Figure X
Redbud Resource Plan Upside Risk



As a final analysis, Resource Planning evaluated the Redbud purchase against a strategy of relying on PPAs to meet capacity needs. The SPP has been characterized by excess capacity as a result of overbuilding earlier in the decade. The projected return to a balance between demand and supply and the timing of such a return will be the major driver of capacity costs for acquisitions and PPAs. As shown in Figure XI, CERA forecasts that the SPP market will return to a balanced state in the 2011-13 timeframe.

Figure XI



GED projects a return to equilibrium in the 2013-2014 timeframe as the capacity surplus within SPP has begun to decline. Although the projected timelines may differ somewhat, it is clear that the excess generation capacity that currently exists in the SPP market will diminish over the next five years and that bi-lateral market capacity prices will increase over this period. They should approach new build costs as the balance between supply and demand is restored.

A PPA-based strategy involves entering the market at various times to secure capacity at then-prevailing market prices. We modeled this by assuming that OG&E enters the market each year and acquires blocks of capacity at the GED forecast of SPP capacity prices. The capacity prices are based on an estimate of market prices provided by GED and capacity prices tht we receive in response to our short-term RFP. The energy prices are based on the pricing provisions of our 2008-09 Redbud PPAs. The results are presented in Table 17.

Table 17
Comparison of Redbud to PPAs
NPVRR ($000)

Portfolio	Capital Costs	Production Costs	Total Costs
Redbud	3,780	19,820	23,600
PPAs	3,317	20,282	23,599
Difference	463	(462)	1

As shown in this table, the results are virtually identical. The differences are attributable to an assumption that under a PPA strategy, OG&E would not purchase 600 MW in 2010 but would grow to this quantity in 2011. This decreases the capital costs of a PPA strategy. This is offset by the contribution of Redbud to lower production costs over this same period as Redbud replaces the need to generate electricity from less efficient units. It is important to note that this comparison does not account for potentially significant costs from the imposition of an imputed-debt premium under a PPA strategy. It may also be conservative as the forecast of capacity prices by GED may be conservative because the forecasted capacity value never exceeds the cost of a new combustion turbine. As the market tightens, capacity values could exceed this level and be closer to the cost of a new CC.

VI. CONCLUSIONS

The results clearly indicate that OG&E will need new gas-fired capacity to meet its resource requirements (assuming wind is developed) to bridge the gap until coal or other new technologies (e.g., IGCC, nuclear) become viable options. Thus, OG&E should pursue a CC plant to meet capacity needs beginning in 2010 while also pursuing development of an additional 640 MW of wind, at least until such time as a determination is made regarding necessary transmission investments. The CC and wind additions are also complementary as natural-gas fired capacity provides load-following capabilities that are required to absorb significant wind additions. Our analysis indicates that DSM and DR will make an important contribution to meeting capacity margin requirements. They also suggest that coal is a viable option in the 2015-2016 timeframe, depending on the outcome of new carbon regulations and the development of wind.

With respect to Redbud, the results indicate that the *Redbud* resource plan is virtually identical to the *640 MW Wind/CC* resource plan. Moreover, the rising costs of plant construction and the resulting construction cost risk for plants that require years to construct contribute to a preference to acquire relatively new operating plants over new build options. This implies that OG&E should complete the Redbud transaction and focus on the assessment of wind and development of necessary transmission facilities. In 2010, OG&E should then consider how to best meet its needs in the 2015-2016 timeframe.

Exhibit LCH-2

ALTERNATIVE RESOURCE PLANS

Year	320 Wind/Coal	640 Wind/CC	*640 MW Wind/Coal*	1280 Wind/CC
2008	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)
2009	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)
2010	CC - 506 MW Wind - 80 MW	CC - 506 MW Wind - 320 MW	CT - 81 MW CT - 102 MW (4) Wind - 320 MW	CC - 506 MW Wind - 320 MW
2011	CT - 102 MW Wind - 80 MW	Wind - 320 MW	Wind - 320 MW	Wind - 320 MW
2012	Wind - 80 MW	CT - 102 MW	CT - 102 MW	CT - 102 MW Wind - 320 MW
2013	CT - 102 MW Wind - 80 MW	CT - 102 MW	CT - 102 MW	CT - 102 MW Wind - 320 MW
2014	CT - 81 MW	CT - 102 MW	CT - 81 MW	CT - 102 MW
2015	Coal - 750 MW	CT - 102 MW	CT - 102 MW	CC - 506 MW
2016	None	CC - 506 MW	Coal - 500 MW	None
2017	None	None	None	None

COMPARISON OF ALTERNATIVE RESOURCE PLANS
NPVRR ($000)

PRODUCTION COSTS

Resource Plan	OGE Expected	CERA Asian Phoenix	CERA Global Fissures	CERA Mercury Rising
320 MW Wind/Coal	19,497	19,688	12,670	27,014
640 MW Wind/CC	19,765	19,815	12,917	27,007
640 MW Wind/Coal	19,804	19,973	12,953	27,331
1280 MW Wind/CC	19,586	19,607	13,029	26,458

CAPITAL COSTS

Resource Plan	OGE Expected	CERA Asian Phoenix	CERA Global Fissures	CERA Mercury Rising
320 MW Wind/Coal	3,706	3,706	3,706	3,706
640 MW Wind/CC	3,831	3,831	3,831	3,831
640 MW Wind/Coal	4,158	4,158	4,158	4,158
1280 MW Wind/CC	4,246	4,246	4,246	4,246

TOTAL COSTS

Resource Plan	OGE Expected	CERA Asian Phoenix	CERA Global Fissures	CERA Mercury Rising
320 MW Wind/Coal	23,203	23,394	16,376	30,720
640 MW Wind/CC	23,596	23,646	16,748	30,838
640 MW Wind/Coal	23,962	24,131	17,111	31,489
1280 MW Wind/CC	23,832	23,853	17,275	30,704

RANKING OF RESOURCE PLANS

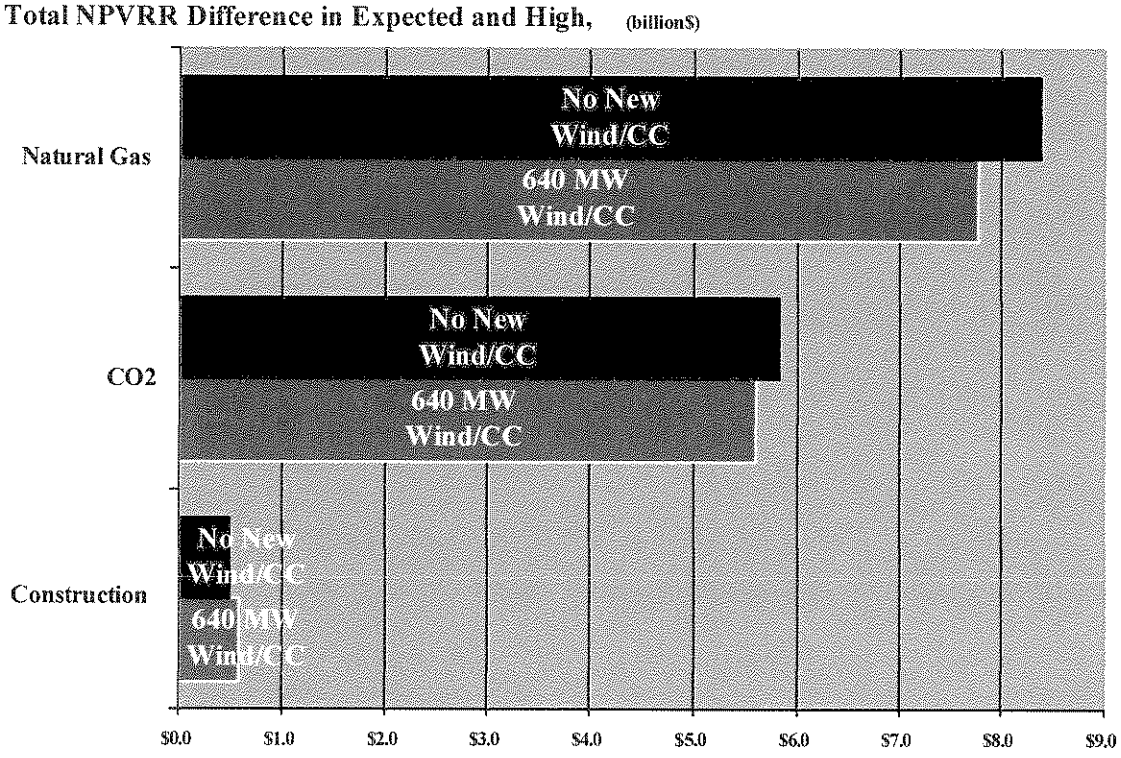
Resource Plan	OGE Expected	CERA Asian Phoenix	CERA Global Fissures	CERA Mercury Rising
320 MW Wind/Coal	1	1	1	2
640 MW Wind/CC	2	2	2	3
640 MW Wind/Coal	4	4	3	4
1280 MW Wind/CC	3	3	4	1

NO-WIND PORTFOLIO

Year	640 Wind/CC	No New Wind
2008	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)
2009	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)
2010	CC - 506 MW Wind - 320 MW	CC - 506 MW
2011	Wind - 320 MW	None
2012	CT - 102 MW	CT - 102 MW
2013	CT - 102 MW	CT - 102 MW
2014	CT - 102 MW	CT - 102 MW
2015	CT - 102 MW	CT - 102 MW
2016	CC - 506 MW	CC - 506 MW
2017	None	None

Exhibit LCH-5

NO-WIND PORTFOLIO - SENSITIVITY RESULTS



REDBUD PORTFOLIO

Year	640 Wind/CC	Redbud
2008	Redbud PPA - 300 MW (1 yr)	Redbud PPA - 300 MW (1 yr)
2009	Redbud PPA - 300 MW (1 yr)	Redbud CC - 600 MW
2010	CC - 506 MW	None
	Wind - 320 MW	Wind - 320 MW
2011	Wind - 320 MW	Wind - 320 MW
2012	CT - 102 MW	None
2013	CT - 102 MW	CT - 102 MW
2014	CT - 102 MW	CT - 102 MW
2015	CT - 102 MW	CT - 102 MW
2016	CC - 506 MW	CC - 506 MW
2017	None	None

Exhibit LCH-7

REDBUD PORTFOLIO - NPVRR COMPARISON

Comparison of Redbud Resource Plan to *640 MW Wind/CC* Resource Plan
NPVRR ($000)

Portfolio	OGE Expected	CERA Asian Phoenix	CERA Global Fissures	CERA Mercury Rising
640 MW Wind/CC	23,596	23,646	16,748	30,838
640 MW Wind/Redbud	23,600	23,637	16,750	30,823
Difference	**(4)**	**9**	**(2)**	**15**

Exhibit LCH-8

REDBUD PORTFOLIO - SENSITIVITY RISK