

**WASHINGTON**

**Attachment B**

**PacifiCorp's Avoided  
Cost Calculation**

## **PacifiCorp's Avoided Cost Calculation**

### **Washington – August 2003**

The starting point for the avoided cost calculation is the loads and resource balance developed in conjunction with the Company's Integrated Resource Plan (IRP) filed in Washington in January 2003. It should be noted that the input assumptions for the IRP were fixed in August 2002, in order to enable completion of the IRP in early 2003. Due to the age of the input assumptions, many of the inputs have been updated for known changes for purposes of this avoided cost calculation.

#### **Loads and Resources**

The load forecast included in the January 2003 IRP was developed in early 2002. Due to the age of the forecast, it was replaced with a more current forecast dated March 2003.

Long-term sales and purchase contracts were also updated to include information available as of July 2003. These changes include the addition or revision of several long-term purchase contracts, including Pinnacle West, Grant County (Priest Rapids) and P4 Production.

Table 1 shows the Company's loads and resource balance. Table 1 shows an energy surplus of 596 aMW in 2003 declining to an energy deficit of 226 aMW in 2007 and a summer capacity deficit of 670 MW in 2003. The winter peak has a capacity surplus of 853 MW in 2003 declining to a capacity deficit of 520 MW in 2008.

#### **Avoided Cost Calculation**

Based on the loads and resource balance shown in Table 1, the avoided cost calculation is separated into two distinct periods: (1) the Short Run – a period of energy sufficiency (2003-2006) in which the avoided costs are based on the marginal production cost of existing resources plus the cost of purchasing summer capacity; and (2) the Long Run – a period (2007 and beyond) in which new resources are required to provide both summer and winter capacity and energy to meet the Company's resource requirements. Avoided costs during the second period are based on the cost of a combined cycle combustion turbine, which the Company considers to be a reasonable proxy for the cost of future resources.

##### **1. *Short Run Avoided Costs***

During periods of resource sufficiency, the Company's avoided energy costs are based on the displacement of purchased power and existing thermal resources as modeled by the Company's GRID model. The model input data includes the monthly load and resource data, which are the basis for the annual summary of loads and resources shown in Table 1. To calculate short-run avoided costs, two production cost studies are prepared.

The only difference between the two studies is an assumed fifty (50) average megawatt increase, at zero running cost, in system resources. The 50 average megawatt resource serves as a proxy for qualifying facility generation. The avoided energy cost could be viewed as the highest variable cost incurred to serve total system load from existing and non-deferrable resources. The outputs of the production cost model run are provided as Table 2.

Summer capacity costs in this period are based on three-month capacity purchases. Since the purchases would be for only one-fourth of the year, the annual value as shown in Table 3 is one-fourth of the capacity cost of a simple cycle combustion turbine (SCCT).

## **2. Long Run Avoided Costs**

During periods of resource inadequacy, the avoided costs are determined to be the fixed and variable costs of the planned resource that could be avoided or deferred. For this purpose, the Company uses a combined cycle combustion turbine (CCCT) as a proxy of future resource costs.

Since CCCTs are built as base load units that provide both capacity and energy, it is appropriate to split the fixed costs of this unit into capacity and energy components. The fixed cost of a SCCT, which is usually acquired as a capacity resource, defines the portion of the fixed cost of the CCCT that is assigned to capacity. Fixed costs associated with the construction of a CCCT which are in excess of SCCT costs are assigned to energy and are added to the variable production (fuel) cost of the CCCT to determine the total avoided energy costs. Table 3 shows this calculation.

The fuel cost of the CCCT defines the avoided variable energy costs. The gas price forecast used as the basis for the CCCT fuel cost is discussed later in this document. Table 4 shows the CCCT fuel cost, the addition of capitalized energy costs at an assumed 85% capacity factor and the total avoided energy costs.

Since energy generated by a qualifying facility may not exactly match the 85% capacity factor shown in Table 4, we have revised the calculation at 75%, 85% and 95% to illustrate the impact of differing generation levels. This calculation is shown in Table 5.

Avoided energy costs can be differentiated between on-peak and off-peak periods. To make this calculation, the Company assumed that all capacity costs are incurred to meet on-peak load requirements. On an annual basis, approximately 57% of all hours are on-peak and 43% are off-peak. Table 6 shows the calculation of on-peak and off-peak avoided energy prices.

For informational purposes, Table 7 shows a comparison between the avoided costs currently in effect in Washington and the proposed avoided costs in this filing.

Table 8 shows the calculation of the total fixed costs and fuel costs that are used in Table 3 and Table 4.

### Gas Price Forecast

Gas prices used in this filing were developed by the Company's Market Price Steering Committee and represent the Company's "Official Market Price Projections." The Market Price Steering Committee developed three different scenarios that represent a reasonable range of future market prices. The medium future titled "Base Case" was used in this calculation.

The Official Forward Gas Curve consists of a blend of the July 22, 2003 market gas curve and the gas prices used in the Company's market price clearing model (Midas) to produce the power curve. (The Midas input gas prices, in turn, were a combination of the July 15, 2003 market gas projections and PIRA long-term gas forecast dated April 10, 2003.) The proportions used in this blending are shown in the table below.

	Market	Midas
Through August, 2006	100%	0%
September 2006-February 2007	75%	25%
March 2007-August 2007	50%	50%
September 2007-February 2008	25%	75%
March 2008 onward (Midas/PIRA)	0%	100%

Table 9 shows the natural gas price used in this avoided cost calculation.

**Table 1**  
**Loads and Resources**

	2003	2004	2005	2006	2007	2008	2009
<b>Peak (July)</b>							
Net Load	8,029	8,214	8,682	8,944	9,230	9,552	9,863
Long Term Sales	<u>1,397</u>	<u>1,101</u>	<u>940</u>	<u>968</u>	<u>696</u>	<u>554</u>	<u>479</u>
Total Requirements	9,426	9,315	9,622	9,912	9,926	10,106	10,342
Long Term Purchases	2,089	1,693	1,251	1,407	1,075	1,069	1,064
Thermal Generation	6,641	6,641	6,641	6,641	6,400	6,400	6,400
Other Generation	621	567	567	621	621	621	621
Reserves	<u>(594)</u>	<u>(592)</u>	<u>(592)</u>	<u>(594)</u>	<u>(577)</u>	<u>(577)</u>	<u>(577)</u>
Total Resources	8,756	8,309	7,867	8,074	7,518	7,512	7,507
Surplus / (Deficit)	(670)	(1,006)	(1,754)	(1,837)	(2,408)	(2,593)	(2,834)
Percent Surplus / (Deficit)	-7.1%	-10.8%	-18.2%	-18.5%	-24.3%	-25.7%	-27.4%
<b>Peak (January)</b>							
Net Load	7,326	7,586	7,925	8,010	8,202	8,398	8,610
Long Term Sales	<u>1,232</u>	<u>989</u>	<u>836</u>	<u>828</u>	<u>558</u>	<u>509</u>	<u>509</u>
Total Requirements	8,558	8,575	8,761	8,838	8,760	8,907	9,119
Long Term Purchases	2,577	2,441	2,221	2,206	2,212	1,777	1,774
Thermal Generation	6,641	6,641	6,641	6,641	6,400	6,400	6,400
Other Generation	871	871	871	871	871	871	871
Reserves	<u>(678)</u>	<u>(678)</u>	<u>(678)</u>	<u>(678)</u>	<u>(661)</u>	<u>(661)</u>	<u>(661)</u>
Total Resources	9,411	9,275	9,055	9,040	8,822	8,387	8,384
Surplus / (Deficit)	853	700	294	202	62	(520)	(734)
Percent Surplus / (Deficit)	10.0%	8.2%	3.4%	2.3%	0.7%	-5.8%	-8.1%
<b>aMW</b>							
Net Load	5,936	6,148	6,369	6,491	6,645	6,822	6,971
Long Term Sales	<u>829</u>	<u>706</u>	<u>585</u>	<u>532</u>	<u>398</u>	<u>383</u>	<u>343</u>
Total Requirements	6,765	6,854	6,953	7,023	7,042	7,205	7,314
Long Term Purchases	1,258	1,248	1,164	1,189	922	718	908
Thermal Generation	6,124	6,124	6,124	6,124	5,898	5,898	5,898
Other Generation	585	585	585	585	585	585	585
Reserves	<u>(605)</u>	<u>(606)</u>	<u>(605)</u>	<u>(605)</u>	<u>(589)</u>	<u>(590)</u>	<u>(589)</u>
Total Resources	7,361	7,352	7,268	7,293	6,816	6,610	6,801
Surplus / (Deficit)	596	497	315	270	(226)	(594)	(513)
Percent Surplus / (Deficit)	8.8%	7.3%	4.5%	3.8%	-3.2%	-8.2%	-7.0%

(1) Summer peak is August rather than July  
(2) Loads - March 2003 update

**Table 2**

**2003 Avoided Cost Prices for Purchase Power  
Summary of GRID Avoided Cost Results  
\$/MWH**

Year	Winter Season				Summer Season						Winter Season	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2003								42.38	39.94	38.81	38.25	42.07
2004	41.64	40.26	34.49	30.29	24.92	24.10	33.15	40.80	39.03	36.66	36.72	40.93
2005	39.18	37.89	35.09	29.73	24.03	22.48	34.26	39.41	35.61	33.11	35.31	39.79
2006	38.70	37.33	34.70	29.09	23.75	21.92	33.84	43.46	38.03	34.08	34.50	39.94

Year	Non-firm Energy Prices			Seasonal Differentiated
	Winter	Summer	Annual	
2003			40.29 (1)	Summer May through October
2004	37.39	33.11	35.25	Winter November through April
2005	36.17	31.48	33.82	
2006	35.71	32.51	34.11	

**Source**

Produced as the difference of two GRID Net Power Cost studies.  
A base case study including existing and committed resources, and a comparison study which includes a 50 aMW zero cost Mid-Columbia resource as a proxy for QF generation.

Each monthly figure represents the change in net power cost divided by the 50 aMW resource  
(1) 2003 Annual costs are based on a partial year August to December 2003.

Updated August 2003

**Table 3**  
**Capitalized Energy Costs**

Year	Combined Cycle CT Fixed Costs	Simple Cycle CT Fixed Costs	Capitalized Energy Costs	Capitalized Energy Costs 85% CF
	(\$/kW-yr)	(\$/kW-yr)	(\$/kW-yr)	(\$/MWH)
	(a)	(b)	(c)	(d)
			(a) - (b)	(c)/(8.76*0.85)

**Avoided Resource**

2003	\$17.17 (1)
2004	\$17.60
2005	\$18.04
2006	\$18.49

**Combined Cycle**

2007	\$96.31	\$75.81	\$20.49	\$2.75
2008	\$98.71	\$77.71	\$21.00	\$2.82
2009	\$101.18	\$79.65	\$21.53	\$2.89
2010	\$103.71	\$81.64	\$22.07	\$2.96
2011	\$106.30	\$83.69	\$22.62	\$3.04
2012	\$108.96	\$85.78	\$23.18	\$3.11
2013	\$111.68	\$87.92	\$23.76	\$3.19
2014	\$114.48	\$90.12	\$24.36	\$3.27
2015	\$117.34	\$92.37	\$24.97	\$3.35
2016	\$120.27	\$94.68	\$25.59	\$3.44
2017	\$123.28	\$97.05	\$26.23	\$3.52
2018	\$126.36	\$99.48	\$26.89	\$3.61
2019	\$129.52	\$101.96	\$27.56	\$3.70
2020	\$132.76	\$104.51	\$28.25	\$3.79
2021	\$136.08	\$107.12	\$28.95	\$3.89
2022	\$139.48	\$109.80	\$29.68	\$3.99
2023	\$142.97	\$112.55	\$30.42	\$4.09
2024	\$146.54	\$115.36	\$31.18	\$4.19
2025	\$150.20	\$118.25	\$31.96	\$4.29
2026	\$153.96	\$121.20	\$32.76	\$4.40
2027	\$157.81	\$124.23	\$33.58	\$4.51

**Columns**

- (a) Table 8 Column (f)
- (b) Table 8 Column (f)

(1) Capacity payment is for 3 months (Table 8 Column (f) / 4)

**Table 4**  
**Total Avoided Energy Cost**

Year	Combined Cycle		Capitalized Energy Costs 85% CF	Total Avoided Energy Cost
	Gas Price	Energy Cost		
	(\$/MMBtu)	(\$/MWH)	(\$/MWH)	(\$/MWH)
	(a)	(b)	(c)	(d) (b) + (c)

**Avoided Resource**

2003	\$40.29 (1)
2004	\$35.25
2005	\$33.82
2006	\$34.11

**Combined Cycle**

(a) x 7.074

2007	\$4.29	\$30.35	\$2.75	\$33.10
2008	\$4.38	\$30.97	\$2.82	\$33.79
2009	\$4.29	\$30.38	\$2.89	\$33.27
2010	\$3.97	\$28.08	\$2.96	\$31.05
2011	\$3.82	\$27.02	\$3.04	\$30.06
2012	\$3.94	\$27.88	\$3.11	\$31.00
2013	\$4.06	\$28.75	\$3.19	\$31.94
2014	\$3.64	\$25.74	\$3.27	\$29.01
2015	\$3.72	\$26.31	\$3.35	\$29.66
2016	\$3.97	\$28.10	\$3.44	\$31.53
2017	\$4.20	\$29.73	\$3.52	\$33.26
2018	\$4.32	\$30.56	\$3.61	\$34.17
2019	\$4.45	\$31.46	\$3.70	\$35.16
2020	\$4.58	\$32.42	\$3.79	\$36.21
2021	\$4.58	\$32.42	\$3.89	\$36.31
2022	\$4.71	\$33.30	\$3.99	\$37.29
2023	\$4.84	\$34.23	\$4.09	\$38.31
2024	\$4.97	\$35.18	\$4.19	\$39.37
2025	\$5.12	\$36.25	\$4.29	\$40.54
2026	\$5.27	\$37.31	\$4.40	\$41.71
2027	\$5.43	\$38.38	\$4.51	\$42.89

**Columns**

- (a) Table 9 Column (d)
- (c) Table 3 Column (d)
- (d) For 2003-2006 Table 2

(1) 2003 Energy costs are based on a partial year August to December 2003.



**Table 5**  
**Total Avoided Cost**

Year	Avoided Firm Capacity Costs	Total Avoided Energy Cost	Total Avoided Costs At Stated Capacity Factor		
			75%	85%	95%
	(\$/kW-yr)	(\$/MWH)	(\$/MWH)	(\$/MWH)	(\$/MWH)
	(a)	(b)	(c)	(d)	(e)
			(b)+((a)/8.76 x 0.75)	(b)+((a)/8.76 x 0.85)	(b)+((a)/8.76 x 0.95)

**Avoided Resource**

2003	\$17.17	\$40.29 (1)	\$42.90	\$42.59	\$42.35
2004	\$17.60	\$35.25	\$37.93	\$37.61	\$37.36
2005	\$18.04	\$33.82	\$36.57	\$36.25	\$35.99
2006	\$18.49	\$34.11	\$36.93	\$36.59	\$36.33

**Combined Cycle**

2007	\$75.81	\$33.10	\$44.64	\$43.28	\$42.21
2008	\$77.71	\$33.79	\$45.62	\$44.23	\$43.13
2009	\$79.65	\$33.27	\$45.39	\$43.97	\$42.84
2010	\$81.64	\$31.05	\$43.47	\$42.01	\$40.86
2011	\$83.69	\$30.06	\$42.80	\$41.30	\$40.12
2012	\$85.78	\$31.00	\$44.05	\$42.52	\$41.30
2013	\$87.92	\$31.94	\$45.32	\$43.75	\$42.51
2014	\$90.12	\$29.01	\$42.73	\$41.12	\$39.84
2015	\$92.37	\$29.66	\$43.72	\$42.07	\$40.76
2016	\$94.68	\$31.53	\$45.94	\$44.25	\$42.91
2017	\$97.05	\$33.26	\$48.03	\$46.29	\$44.92
2018	\$99.48	\$34.17	\$49.31	\$47.53	\$46.12
2019	\$101.96	\$35.16	\$50.68	\$48.86	\$47.41
2020	\$104.51	\$36.21	\$52.12	\$50.25	\$48.77
2021	\$107.12	\$36.31	\$52.62	\$50.70	\$49.18
2022	\$109.80	\$37.29	\$54.00	\$52.03	\$50.48
2023	\$112.55	\$38.31	\$55.44	\$53.43	\$51.84
2024	\$115.36	\$39.37	\$56.93	\$54.86	\$53.23
2025	\$118.25	\$40.54	\$58.54	\$56.42	\$54.75
2026	\$121.20	\$41.71	\$60.16	\$57.99	\$56.27
2027	\$124.23	\$42.89	\$61.79	\$59.57	\$57.81

**Columns**

- (a) Table 3 Column (b)
- (b) Table 4 Column (d)

(1) 2003 Energy costs are based on a partial year August to December 2003.

**Table 6**  
**On- & Off- Peak Energy Prices**

Year	Avoided Firm Capacity Costs	Total Avoided Energy Cost	Capacity Cost Allocated to On-Peak Hours	On-Peak 4,993 Hours	Off-Peak 3,767 Hours
	(\$/kW-yr)	(\$/MWH)	(\$/MWH)	(\$/MWH)	(\$/MWH)
	(a)	(b)	(c)	(d)	(e)
			(a)/(8.76 x 85% x 57%)	(b) + (c)	(b)

**Avoided Resource**

2003	\$17.17	\$40.29 (1)	\$4.05	\$44.33	\$40.29
2004	\$17.60	\$35.25	\$4.15	\$39.40	\$35.25
2005	\$18.04	\$33.82	\$4.25	\$38.08	\$33.82
2006	\$18.49	\$34.11	\$4.36	\$38.47	\$34.11

**Combined Cycle**

2007	\$75.81	\$33.10	\$17.86	\$50.96	\$33.10
2008	\$77.71	\$33.79	\$18.31	\$52.10	\$33.79
2009	\$79.65	\$33.27	\$18.77	\$52.04	\$33.27
2010	\$81.64	\$31.05	\$19.24	\$50.28	\$31.05
2011	\$83.69	\$30.06	\$19.72	\$49.78	\$30.06
2012	\$85.78	\$31.00	\$20.21	\$51.21	\$31.00
2013	\$87.92	\$31.94	\$20.72	\$52.66	\$31.94
2014	\$90.12	\$29.01	\$21.23	\$50.25	\$29.01
2015	\$92.37	\$29.66	\$21.76	\$51.43	\$29.66
2016	\$94.68	\$31.53	\$22.31	\$53.84	\$31.53
2017	\$97.05	\$33.26	\$22.87	\$56.12	\$33.26
2018	\$99.48	\$34.17	\$23.44	\$57.61	\$34.17
2019	\$101.96	\$35.16	\$24.02	\$59.19	\$35.16
2020	\$104.51	\$36.21	\$24.62	\$60.83	\$36.21
2021	\$107.12	\$36.31	\$25.24	\$61.55	\$36.31
2022	\$109.80	\$37.29	\$25.87	\$63.16	\$37.29
2023	\$112.55	\$38.31	\$26.52	\$64.83	\$38.31
2024	\$115.36	\$39.37	\$27.18	\$66.55	\$39.37
2025	\$118.25	\$40.54	\$27.86	\$68.40	\$40.54
2026	\$121.20	\$41.71	\$28.56	\$70.27	\$41.71
2027	\$124.23	\$42.89	\$29.27	\$72.16	\$42.89

**Columns**

- (a) Table 3 Column (b)
- (b) Table 4 Column (d)

(1) 2003 Energy costs are based on a partial year August to December 2003.

**Table 7**  
**Comparison between Proposed and Current Avoided Costs**

Year	Total Avoided Costs at 85% CF		
	Proposed Avoided Costs (\$/MWH) (a)	Current Avoided Costs (\$/MWH) (b)	Difference (\$/MWH) (c) (a) - (b)
2003	\$42.59 (1)	\$18.67	\$23.92
2004	\$37.61	\$20.48	\$17.13
2005	\$36.25	\$21.22	\$15.03
2006	\$36.59	\$23.90	\$12.69
2007	\$43.28	\$24.63	\$18.65
2008	\$44.23	\$27.00	\$17.23
2009	\$43.97	\$31.31	\$12.66
2010	\$42.01	\$37.09	\$4.92
2011	\$41.30	\$38.37	\$2.93
2012	\$42.52	\$39.69	\$2.83
2013	\$43.75	\$41.06	\$2.69
2014	\$41.12	\$42.48	-\$1.36
2015	\$42.07	\$43.95	-\$1.88
2016	\$44.25	\$45.47	-\$1.22
2017	\$46.29	\$47.07	-\$0.78
2018	\$47.53	\$48.67	-\$1.14
2019	\$48.86	\$50.36	-\$1.50
2020	\$50.25	\$52.11	-\$1.86
2021	\$50.70	\$53.93	-\$3.23
2022	\$52.03	\$55.81	-\$3.78
2023	\$53.43	\$57.75	-\$4.32
2024	\$54.86	\$59.77	-\$4.91
2025	\$56.42	\$61.85	-\$5.43
2026	\$57.99	\$64.02	-\$6.03
2027	\$59.57	\$66.26	-\$6.69

Columns

(a) Table 4 Column (d)

(b) Avoided Costs Filed March 1996 - Attachment 4

(1) 2003 Energy costs are based on a partial year August to December 2003.

**Table 8  
Total Cost of Gas Turbine Resources**

Year	Estimated Capital Cost \$/kW	Fixed Capital Cost at Real Levelized Rate \$/kW-yr	Fixed O&M \$/kW-yr	Variable O&M \$/MWH	Total O&M at Expected CF \$/kW-yr	Total Resource Fixed Costs \$/kW-yr	Fuel Cost \$/MMBtu	Fuel Cost \$/MWH	Total Avoided Costs \$/MWH
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
<b>Simple Cycle</b>									
2003	\$554	\$53.13	\$11.43	3.14	\$15.56	\$68.68			
2004		\$54.46	\$11.72	\$3.22	\$15.94	\$70.40			
2005		\$55.82	\$12.01	\$3.30	\$16.34	\$72.16			
2006		\$57.21	\$12.31	\$3.38	\$16.75	\$73.97			
2007		\$58.64	\$12.62	\$3.47	\$17.17	\$75.81			
2008		\$60.11	\$12.93	\$3.55	\$17.60	\$77.71			
2009		\$61.61	\$13.26	\$3.64	\$18.04	\$79.65			
2010		\$63.15	\$13.59	\$3.73	\$18.49	\$81.64			
2011		\$64.73	\$13.93	\$3.83	\$18.95	\$83.69			
2012		\$66.35	\$14.27	\$3.92	\$19.43	\$85.78			
2013		\$68.01	\$14.63	\$4.02	\$19.91	\$87.92			
2014		\$69.71	\$15.00	\$4.12	\$20.41	\$90.12			
2015		\$71.45	\$15.37	\$4.22	\$20.92	\$92.37			
2016		\$73.24	\$15.76	\$4.33	\$21.44	\$94.68			
2017		\$75.07	\$16.15	\$4.44	\$21.98	\$97.05			
2018		\$76.95	\$16.55	\$4.55	\$22.53	\$99.48			
2019		\$78.87	\$16.97	\$4.66	\$23.09	\$101.96			
2020		\$80.84	\$17.39	\$4.78	\$23.67	\$104.51			
2021		\$82.86	\$17.83	\$4.90	\$24.26	\$107.12			
2022		\$84.93	\$18.27	\$5.02	\$24.87	\$109.80			
2023		\$87.06	\$18.73	\$5.15	\$25.49	\$112.55			
2024		\$89.23	\$19.20	\$5.27	\$26.13	\$115.36			
2025		\$91.46	\$19.68	\$5.41	\$26.78	\$118.25			
2026		\$93.75	\$20.17	\$5.54	\$27.45	\$121.20			
2027		\$96.10	\$20.67	\$5.68	\$28.14	\$124.23			
<b>Combined Cycle</b>									
2003	\$767	\$66.04	\$8.03	1.77	\$21.21	\$87.25	\$ 4.54	\$ 32.11	43.83
2004		\$67.69	\$8.23	\$1.81	\$21.74	\$89.43	\$ 4.51	\$ 31.91	43.92
2005		\$69.38	\$8.44	\$1.86	\$22.28	\$91.67	\$ 4.25	\$ 30.04	42.35
2006		\$71.12	\$8.65	\$1.91	\$22.84	\$93.96	\$ 4.25	\$ 30.04	42.66
2007		\$72.89	\$8.86	\$1.95	\$23.41	\$96.31	\$ 4.29	\$ 30.35	43.28
2008		\$74.72	\$9.09	\$2.00	\$24.00	\$98.71	\$ 4.38	\$ 30.97	44.23
2009		\$76.58	\$9.31	\$2.05	\$24.60	\$101.18	\$ 4.29	\$ 30.38	43.97
2010		\$78.50	\$9.55	\$2.10	\$25.21	\$103.71	\$ 3.97	\$ 28.08	42.01
2011		\$80.46	\$9.78	\$2.16	\$25.84	\$106.30	\$ 3.82	\$ 27.02	41.30
2012		\$82.47	\$10.03	\$2.21	\$26.49	\$108.96	\$ 3.94	\$ 27.88	42.52
2013		\$84.54	\$10.28	\$2.27	\$27.15	\$111.68	\$ 4.06	\$ 28.75	43.75
2014		\$86.65	\$10.54	\$2.32	\$27.83	\$114.48	\$ 3.64	\$ 25.74	41.12
2015		\$88.81	\$10.80	\$2.38	\$28.52	\$117.34	\$ 3.72	\$ 26.31	42.07
2016		\$91.04	\$11.07	\$2.44	\$29.24	\$120.27	\$ 3.97	\$ 28.10	44.25
2017		\$93.31	\$11.35	\$2.50	\$29.97	\$123.28	\$ 4.20	\$ 29.73	46.29
2018		\$95.64	\$11.63	\$2.56	\$30.72	\$126.36	\$ 4.32	\$ 30.56	47.53
2019		\$98.03	\$11.92	\$2.63	\$31.49	\$129.52	\$ 4.45	\$ 31.46	48.86
2020		\$100.49	\$12.22	\$2.69	\$32.27	\$132.76	\$ 4.58	\$ 32.42	50.25
2021		\$103.00	\$12.52	\$2.76	\$33.08	\$136.08	\$ 4.58	\$ 32.42	50.70
2022		\$105.57	\$12.84	\$2.83	\$33.91	\$139.48	\$ 4.71	\$ 33.30	52.03
2023		\$108.21	\$13.16	\$2.90	\$34.75	\$142.97	\$ 4.84	\$ 34.23	53.43
2024		\$110.92	\$13.49	\$2.97	\$35.62	\$146.54	\$ 4.97	\$ 35.18	54.86
2025		\$113.69	\$13.82	\$3.05	\$36.51	\$150.20	\$ 5.12	\$ 36.25	56.42
2026		\$116.53	\$14.17	\$3.12	\$37.43	\$153.96	\$ 5.27	\$ 37.31	57.99
2027		\$119.45	\$14.52	\$3.20	\$38.36	\$157.81	\$ 5.43	\$ 38.38	59.57

Source: (a)(c)(d) Plant Costs - Page 214, Table C.20 IRP 2003  
 (b) = (a) x Payment Factor - Page 214, Table C.20 IRP 2003  
 (e) = (d) x (8.76 x 'Capacity Factor') + (c)  
 (f) = (b) + (e)  
 (g) Natural Gas Price Forecast (\$/MMBtu)  
 (h) = 7074 x (g) / 1000  
 (i) = (f) / (8.76 x 'Capacity Factor') + (h)

SCCT	CCCT	
9.59%	8.61%	Payment Factor - Page 214, Table C.20 IRP 2003
15%	85%	Assumed Capacity Factor
12,176	7,074	Heat Rate in btu/kWh - Page 209, Table C.18 IRP 2003
2.50%	2.50%	Inflation Rate - page 358 IRP 2003

**Table 9**  
**Natural Gas Price Forecast ( \$/MMBtu )**

Year	Raw Fuel	Transport Cost	Distribution Cost	Combined Cycle CT Fuel Cost
	(a)	(b)	(c)	(d)
		(a) x .016 + 0.13	((a)+(b))x.015+0.09	(a) + (b) + (c)
2003	\$4.18	\$0.20	\$0.16	\$4.54
2004	\$4.15	\$0.20	\$0.16	\$4.51
2005	\$3.91	\$0.19	\$0.15	\$4.25
2006	\$3.91	\$0.19	\$0.15	\$4.25
2007	\$3.95	\$0.19	\$0.15	\$4.29
2008	\$4.04	\$0.19	\$0.15	\$4.38
2009	\$3.95	\$0.19	\$0.15	\$4.29
2010	\$3.63	\$0.19	\$0.15	\$3.97
2011	\$3.48	\$0.19	\$0.15	\$3.82
2012	\$3.60	\$0.19	\$0.15	\$3.94
2013	\$3.72	\$0.19	\$0.15	\$4.06
2014	\$3.32	\$0.18	\$0.14	\$3.64
2015	\$3.40	\$0.18	\$0.14	\$3.72
2016	\$3.63	\$0.19	\$0.15	\$3.97
2017	\$3.86	\$0.19	\$0.15	\$4.20
2018	\$3.98	\$0.19	\$0.15	\$4.32
2019	\$4.10	\$0.20	\$0.15	\$4.45
2020	\$4.22	\$0.20	\$0.16	\$4.58
2021	\$4.22	\$0.20	\$0.16	\$4.58
2022	\$4.35	\$0.20	\$0.16	\$4.71
2023	\$4.48	\$0.20	\$0.16	\$4.84
2024	\$4.61	\$0.20	\$0.16	\$4.97
2025	\$4.75	\$0.21	\$0.16	\$5.12
2026	\$4.89	\$0.21	\$0.17	\$5.27
2027	\$5.05	\$0.21	\$0.17	\$5.43

Columns

(a) Official Price Forecast July 2003 - Opal Index

		<u>Shrinkage</u>	<u>Fees</u>
(b)	Transport Cost	0.016	0.13
(c)	Distribution Cost	0.015	0.09