2012 BPA Final Rate Proposal

Generation Inputs Study Documentation

July 2011

BP-12-FS-BPA-05A

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Table 2.1						
Forecast of Installed Generation Capacity for the FY 2012-2013 Balancing Reserve Capacity Quantity Forecast (Values in MW)						
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	FEDERAL THERMAL
	A	B	C	D	E	F
1	Oct-11	3,792	0	2,550	5,690	1,276
2	Nov-11	3,792	0	2,550	5,690	1,276
3	Dec-11	3,792	0	2,558	5,690	1,276
4	Jan-12	3,792	4	2,558	5,690	1,276
5	Feb-12	3,792	4	2,558	5,690	1,276
6	Mar-12	4,042	4	2,558	5,690	1,276
7	Apr-12	4,332	14	2,558	5,690	1,276
8	May-12	4,332	14	2,558	5,690	1,276
9	Jun-12	4,332	29	2,558	5,690	1,276
10	Jul-12	4,332	29	2,558	5,690	1,276
11	Aug-12	4,673	29	2,558	5,710	1,276
12	Sep-12	4,764	29	2,558	5,710	1,276
13	Oct-12	4,764	29	2,653	5,710	1,276
14	Nov-12	4,764	29	2,653	5,710	1,276
15	Dec-12	5,222	29	2,653	5,710	1,276
16	Jan-13	5,222	29	2,653	5,710	1,276
17	Feb-13	5,297	29	2,653	5,710	1,276
18	Mar-13	5,297	29	2,653	5,710	1,276
19	Apr-13	5,297	29	2,653	5,710	1,276
20	May-13	5,297	29	2,653	5,710	1,276
21	Jun-13	5,297	29	2,653	5,710	1,276
22	Jul-13	5,347	29	2,653	6,369	1,276
23	Aug-13	5,525	29	2,653	6,369	1,276
24	Sep-13	5,525	29	2,653	6,369	1,276
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**1,276**

Table 2.2

Map of Wind Facilities in FY 2012-2013 Balancing Reserve Capacity Quantity Forecast

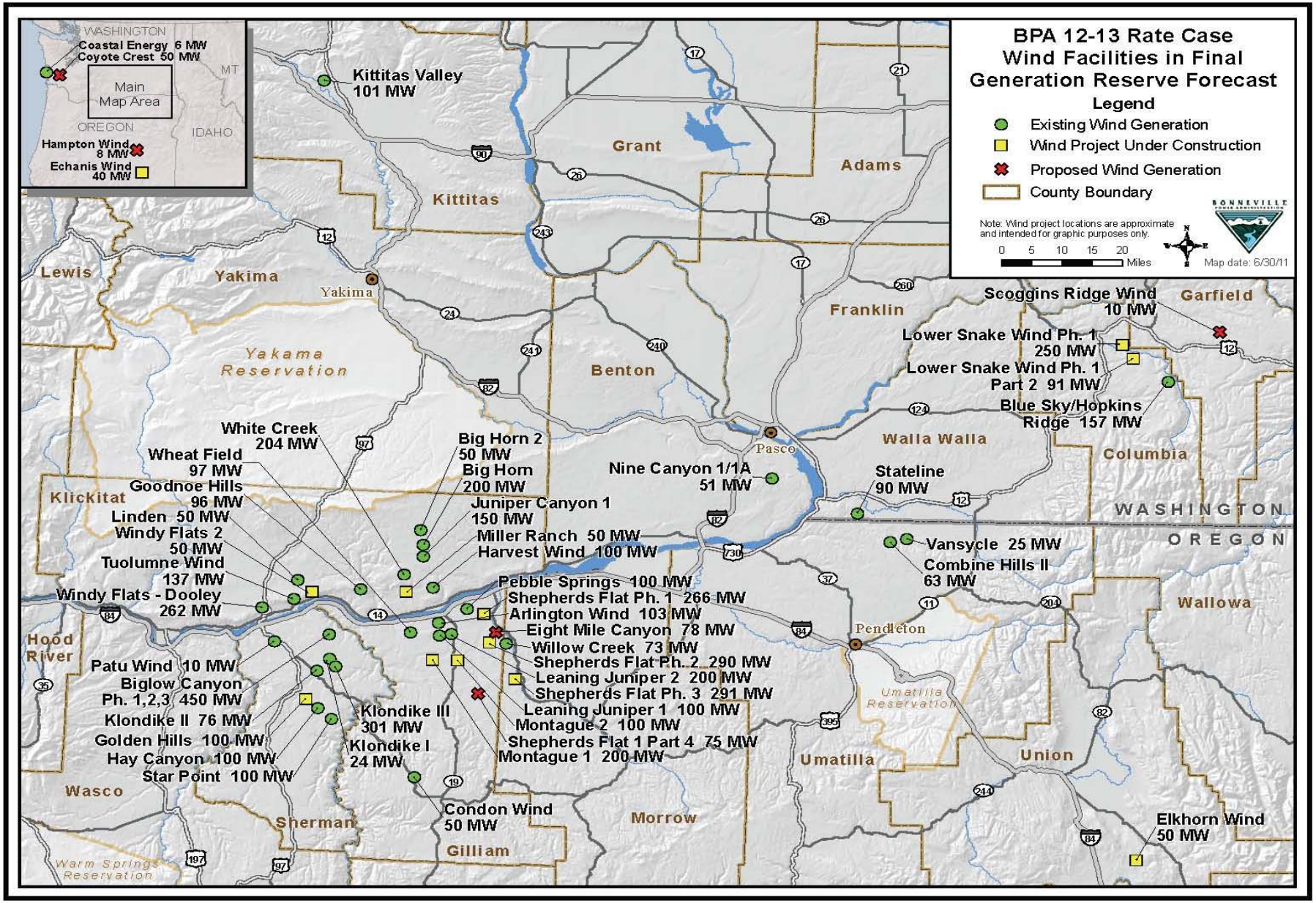


Table 2.3

Wind Facilities in FY 2012-2013 Balancing Reserve Capacity Quantity Forecast

	Project Name or Generation Interconnection Number	Nameplate Capacity (MW)	Start Month and Year	Reference Plant 1	Reference Plant 2	Reference Plant 3	Reference Plant 1 Scale	Reference Plant 2 Scale	Reference Plant 3 Scale	Reference Plant 1 Time Offset (minutes)	Reference Plant 2 Time Offset (minutes)	Reference Plant 3 Time Offset (minutes)
	A	B	C	D	E	F	G	H	I	J	K	L
1	Vansycle Wind Project	25	Oct-98	Stateline Wind Project	Blue Sky/Hopkins Ridge	White Creek Wind	35%	33%	31%	-7	106	-147
2	Stateline Wind Project	90	Dec-01	Vansycle Wind Project	Blue Sky/Hopkins Ridge	White Creek Wind	35%	33%	31%	7	99	-132
3	Klondike Phase I	24	Jan-02	Klondike Phase II	Leaning Juniper Phase 1	White Creek Wind	36%	33%	30%	0	29	26
4	Condon Wind Project	50	Jun-02	Big Horn Wind Project	White Creek Wind	Vansycle Wind Project	33%	33%	33%	60	73	145
5	Klondike Phase II	76	Jun-05	Klondike Phase I	Leaning Juniper Phase 1	White Creek Wind	35%	33%	31%	0	24	17
6	Blue Sky/Hopkins Ridge	157	Nov-05	Stateline Wind Project	Vansycle Wind Project	White Creek Wind	34%	33%	32%	-99	-106	-223
7	Leaning Juniper Phase 1	100	Aug-06	Klondike Phase II	White Creek Wind	Klondike Phase I	33%	33%	33%	-24	-5	-29
8	Big Horn Wind Project	200	Oct-06	White Creek Wind	Leaning Juniper Phase 1	Stateline Wind Project	36%	32%	31%	-2	15	132
9	Klondike III	226	Oct-07	Klondike Phase II	Klondike Phase I	Leaning Juniper Phase 1	34%	33%	32%	-1	-2	23
10	White Creek Wind	204	Oct-07	Big Horn Wind Project	Leaning Juniper Phase 1	Stateline Wind Project	35%	33%	31%	2	5	132
11	Biglow Canyon Wind Phase 1	126	Nov-07	Klondike Phase II	Leaning Juniper Phase 1	Klondike Phase I	34%	33%	32%	0	22	-2
12	Goodnoe Hills	96	Apr-08	White Creek Wind	Big Horn Wind Project	Leaning Juniper Phase 1	34%	33%	32%	10	8	9
13	Nine Canyon 1/1A	51	May-08	Stateline Wind Project	Vansycle Wind Project	Big Horn Wind Project	34%	33%	32%	20	30	-87
14	Klondike IIIa	75	Jun-08	Klondike Phase II	Klondike Phase I	Leaning Juniper Phase 1	34%	33%	32%	2	0	29
15	Arlington Wind	103	Dec-08	Leaning Juniper Phase 1	Klondike Phase II	White Creek Wind	35%	32%	32%	1	-19	2

Table 2.3

Wind Facilities in FY 2012-2013 Balancing Reserve Capacity Quantity Forecast

	Project Name or Generation Interconnection Number	Nameplate Capacity (MW)	Start Month and Year	Reference Plant 1	Reference Plant 2	Reference Plant 3	Reference Plant 1 Scale	Reference Plant 2 Scale	Reference Plant 3 Scale	Reference Plant 1 Time Offset (minutes)	Reference Plant 2 Time Offset (minutes)	Reference Plant 3 Time Offset (minutes)
	A	B	C	D	E	F	G	H	I	J	K	L
16	Pebble Springs	100	Jan-09	Leaning Juniper Phase 1	Klondike Phase II	White Creek Wind	35%	32%	32%	-7	-35	-9
17	Willow Creek Wind	73	Jan-09	Leaning Juniper Phase 1	Klondike Phase II	White Creek Wind	34%	33%	32%	-15	-55	-22
18	Hay Canyon	100	Feb-09	Klondike Phase II	Klondike Phase I	Leaning Juniper Phase 1	34%	33%	32%	3	2	37
19	WheatField Wind	97	Mar-09	Leaning Juniper Phase 1	Klondike Phase II	Klondike Phase I	35%	32%	32%	6	-10	-16
20	Tuolumne Wind	137	May-09	White Creek Wind	Klondike Phase II	Leaning Juniper Phase 1	34%	33%	32%	10	-10	3
21	Biglow Canyon Wind Phase 2	149	Aug-09	Klondike Phase II	Leaning Juniper Phase 1	White Creek Wind	34%	33%	32%	-1	20	20
22	Windy Flats Dooley	232	Nov-09	Klondike Phase II	Leaning Juniper Phase 1	Klondike Phase I	34%	33%	32%	5	26	0
23	Windy Flats Energizer	30	Nov-09	White Creek Wind	Big Horn Wind Project	Leaning Juniper Phase 1	35%	33%	31%	20	21	15
24	Harvest Wind	100	Dec-09	White Creek Wind	Big Horn Wind Project	Leaning Juniper Phase 1	34%	33%	32%	0	0	0
25	Combine Hills II	63	Jan-10	Stateline Wind Project	Vansycle Wind Project	Blue Sky/Hopkins Ridge	34%	34%	32%	-9	-5	97
26	Star Point	100	Jan-10	Klondike Phase II	Klondike Phase I	Leaning Juniper Phase 1	34%	33%	32%	-1	-6	15
27	Coastal Energy	6	Jun-10	White Creek Wind	Big Horn Wind Project	Condon Wind Project	34%	34%	31%	-182	-226	-220
28	Linden Wind	50	Jun-10	White Creek Wind	Leaning Juniper Phase 1	Big Horn Wind Project	34%	32%	32%	24	30	25
29	Biglow Canyon Wind Phase 3	175	Aug-10	Klondike Phase II	Leaning Juniper Phase 1	White Creek Wind	34%	33%	32%	7	30	29
30	Big Horn Wind Phase 2	50	Oct-10	Big Horn Wind Project	White Creek Wind	Leaning Juniper Phase 1	35%	34%	30%	5	1	8

Table 2.3

Wind Facilities in FY 2012-2013 Balancing Reserve Capacity Quantity Forecast

	Project Name or Generation Interconnection Number	Nameplate Capacity (MW)	Start Month and Year	Reference Plant 1	Reference Plant 2	Reference Plant 3	Reference Plant 1 Scale	Reference Plant 2 Scale	Reference Plant 3 Scale	Reference Plant 1 Time Offset (minutes)	Reference Plant 2 Time Offset (minutes)	Reference Plant 3 Time Offset (minutes)
	A	B	C	D	E	F	G	H	I	J	K	L
31	Leaning Juniper 2 part 1	91	Oct-10	Klondike Phase II	Klondike Phase I	Leaning Juniper Phase 1	34%	33%	32%	-30	-30	4
32	Kittitas Valley Wind Project	101	Nov-10	Vansycle Wind Project	Condon Wind Project	Stateline Wind Project	35%	32%	32%	0	-108	5
33	Patu Wind	10	Nov-10	Klondike Phase II	Klondike Phase I	Leaning Juniper Phase 1	34%	33%	32%	1	0	25
34	Leaning Juniper 2 part 2	109	Dec-10	Klondike Phase II	Klondike Phase I	Leaning Juniper Phase 1	34%	33%	32%	-30	-30	4
35	Juniper Canyon 1	150	Feb-11	Big Horn Wind Project	Goodnoe Hills	-	50%	50%	-	5	20	-
36	Shepherds Flat Wind Project Phase 1	266	Aug-11	Vansycle Wind Project	Klondike Phase I	Klondike Phase II	33%	33%	33%	-40	41	40
37	Lower Snake Wind Phase 1	250	Mar-12	Stateline Wind Project	Blue Sky/Hopkins Ridge	-	50%	50%	-	60	-25	-
38	Shepherds Flat Wind Project Phase 2	290	Apr-12	Vansycle Wind Project	Klondike Phase I	Klondike Phase II	33%	33%	33%	-45	45	46
39	Shepherds Flat Wind Project I part 3	291	Aug-12	Vansycle Wind Project	Klondike Phase I	Klondike Phase II	33%	33%	33%	-35	55	56
40	Windy Flats 2	50	Aug-12	Leaning Juniper Phase 1	Biglow Canyon Wind Phase 1	-	50%	50%	-	-30	-10	-
41	Lower Snake Wind Phase 1 part 2	91	Sep-12	Stateline Wind Project	Blue Sky/Hopkins Ridge	-	50%	50%	-	60	-25	-
42	CEP - Echanis Wind Project	40	Dec-12	Condon Wind Project	Stateline Wind Project	Blue Sky/Hopkins Ridge	34%	33%	33%	-60	200	220
43	Elkhorn Wind	50	Dec-12	Klondike Phase I	Nine Canyon 1/1A	-	50%	50%	-	90	60	-
44	Golden Hills (BP South Wind)	100	Dec-12	Klondike Phase I	Klondike Phase II	Leaning Juniper Phase 1	33%	33%	33%	-11	-10	-30
45	Hampton Wind	8	Dec-12	Condon Wind Project	Stateline Wind Project	Blue Sky/Hopkins Ridge	34%	33%	33%	-60	200	220

Table 2.3												
Wind Facilities in FY 2012-2013 Balancing Reserve Capacity Quantity Forecast												
	Project Name or Generation Interconnection Number	**Nameplate Capacity (MW)**	**Start Month and Year**	**Reference Plant 1**	**Reference Plant 2**	**Reference Plant 3**	**Reference Plant 1 Scale**	**Reference Plant 2 Scale**	**Reference Plant 3 Scale**	**Reference Plant 1 Time Offset (minutes)**	**Reference Plant 2 Time Offset (minutes)**	**Reference Plant 3 Time Offset (minutes)**
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**
46	Miller Ranch	50	Dec-12	Klondike Phase I	Klondike Phase II	White Creek Wind	33%	33%	33%	40	41	10
47	Montague 1	200	Dec-12	Klondike Phase I	Klondike Phase II	Leaning Juniper Phase 1	33%	33%	33%	45	46	20
48	Scoggins Ridge Wind	10	Dec-12	Blue Sky/Hopkins Ridge	Vansycle Wind Project	Stateline Wind Project	34%	33%	32%	-10	-40	-30
49	Shepherds Flat Wind Project I part 4	75	Feb-13	Goodnoe Hills	Klondike III	Biglow Canyon Wind Phase	33%	33%	33%	-5	-15	-10
50	Coyote Crest Wind	50	Jul-13	Big Horn Wind Project	Goodnoe Hills	-	50%	50%	-	-150	-120	-
51	Eight Mile Canyon	78	Aug-13	Klondike Phase I	Leaning Juniper Phase 1	Biglow Canyon Wind Phase	33%	33%	33%	60	20	40
52	Montague 2	100	Aug-13	Willow Creek Wind	Leaning Juniper Phase 1	Arlington Wind	33%	33%	33%	0	-8	-12

Table 2.4
Example of Load Net Wind Net Other Generation Types

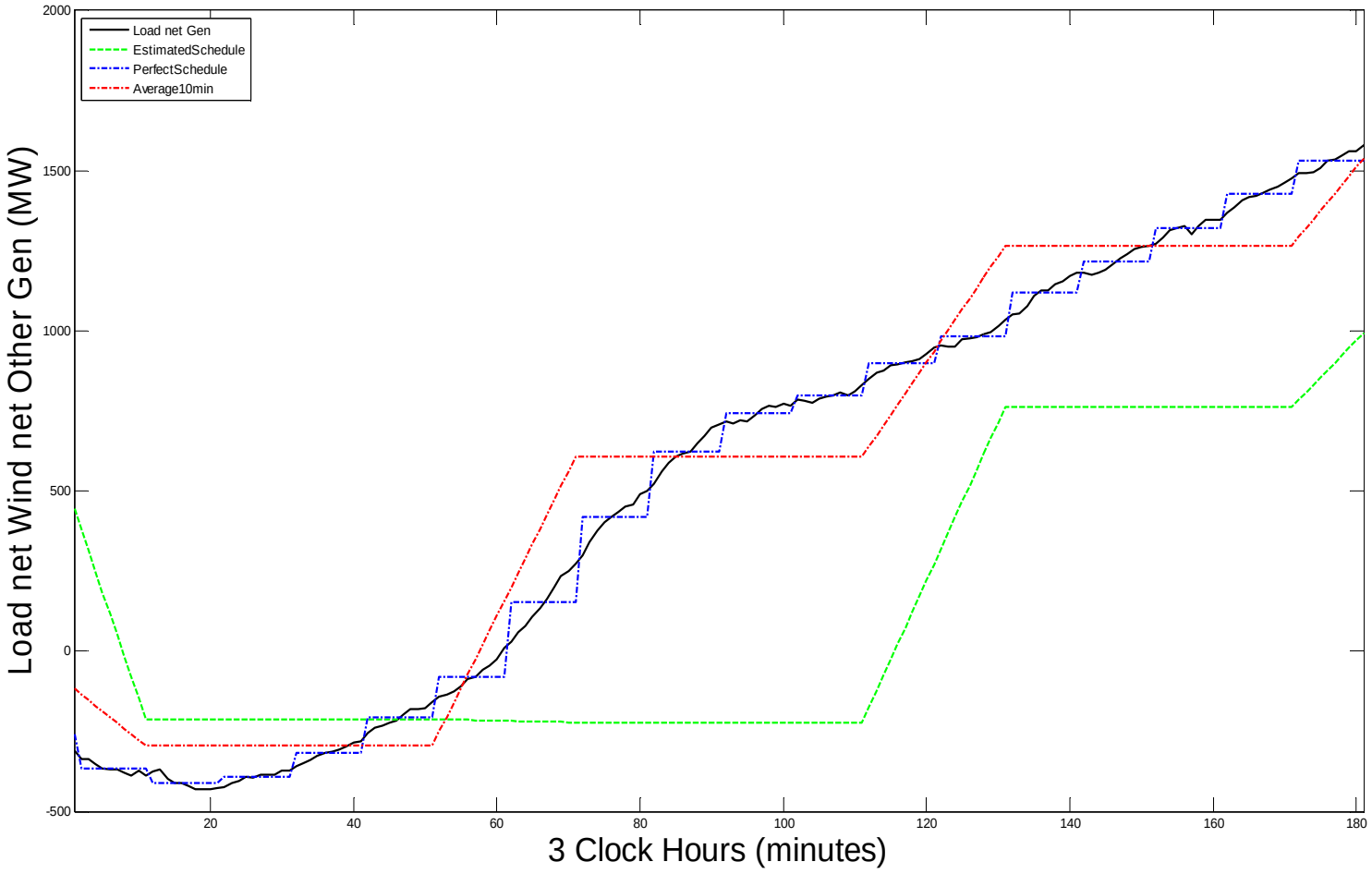


Table 2.5
Incremental Standard Deviation Calculation Example

$$\text{Reg } inc_{\text{Load HE1}} = \text{Total Reg } inc * R_{\text{Load Reg HE1, Total Reg HE1}} * S_{\text{Load Reg HE1}} / S_{\text{TotalReg HE1}}$$

$$\text{Reg } inc_{\text{Wind HE1}} = \text{Total Reg } inc * R_{\text{Wind Reg HE1, Total Reg HE1}} * S_{\text{Wind Reg HE1}} / S_{\text{TotalReg HE1}}$$

$$\text{Reg } inc_{\text{Hydro HE1}} = \text{Total Reg } inc * R_{\text{Hydro Reg HE1, Total Reg HE1}} * S_{\text{Hydro Reg HE1}} / S_{\text{TotalReg HE1}}$$

$$\text{Reg } inc_{\text{Fed Thermal HE1}} = \text{Total Reg } inc * R_{\text{Fed Thermal Reg HE1, Total Reg HE1}} * S_{\text{Fed Thermal Reg HE1}} / S_{\text{TotalReg HE1}}$$

$$\text{Reg } inc_{\text{Non-Fed Thermal HE1}} = \text{Total Reg } inc * R_{\text{Non-Fed Thermal Reg HE1, Total Reg HE1}} * S_{\text{Non-Fed Thermal Reg HE1}} / S_{\text{TotalReg HE1}}$$

Where Total Reg *inc* is defined in Section 2.7.2

Reg is Regulating Reserves

HE1 is Hour Ending 1

$R_{\text{Load Reg HE1, Total Reg HE1}}$ = correlation between Load Reg HE1 and Total Reg HE1

$S_{\text{Load Reg HE1}}$ = standard deviation of Load Reg HE1

$S_{\text{Total Reg HE1}}$ = Standard deviation of Total Reg HE1

Table 2.6
Load Regulation Incremental Reserves Example

$$\text{Reg } inc_{\text{Load}} = \text{Total Reg } inc * \text{Reg } inc_{\text{Load Max24}} / \text{Reg } inc_{\text{Total Max24}}$$

Where Total Reg *inc* is defined in Section 2.7.2

Reg is Regulating Reserves

$$\text{Reg } inc_{\text{Load Max24}} = \text{MAX}(\text{Reg } inc_{\text{Load HE1}}, \text{Reg } inc_{\text{Load HE2}}, \ldots, \text{Reg } inc_{\text{Load HE24}})$$

$$\text{Reg } inc_{\text{Total Max24}} = \text{Reg } inc_{\text{Load Max24}} + \text{Reg } inc_{\text{Wind Max24}} + \text{Reg } inc_{\text{Hydro Max24}} + \text{Reg } inc_{\text{Fed Thermal Max24}} + \text{Reg } inc_{\text{Non-Fed Thermal Max24}}$$

Table 2.7
Total Balancing Reserve Capacity Requirement (99.5% Reserves and No Self-Supply) (Values in MW)

		INSTALLED CAPACITY				TOTAL							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	100	-106	303	-318	430	-661	833	-1,085
2	Nov-11	3,792	0	2,550	5,690	100	-106	303	-318	430	-661	833	-1,085
3	Dec-11	3,792	0	2,558	5,690	100	-106	303	-318	430	-661	833	-1,085
4	Jan-12	3,792	4	2,558	5,690	100	-106	303	-318	430	-661	833	-1,085
5	Feb-12	3,792	4	2,558	5,690	100	-106	303	-318	430	-661	833	-1,085
6	Mar-12	4,042	4	2,558	5,690	101	-106	307	-321	432	-674	840	-1,101
7	Apr-12	4,332	14	2,558	5,690	104	-109	315	-330	459	-719	878	-1,157
8	May-12	4,332	14	2,558	5,690	104	-109	315	-330	459	-719	878	-1,157
9	Jun-12	4,332	29	2,558	5,690	104	-109	316	-330	459	-719	878	-1,158
10	Jul-12	4,332	29	2,558	5,690	104	-109	316	-330	459	-719	878	-1,158
11	Aug-12	4,673	29	2,558	5,710	105	-111	327	-341	487	-773	920	-1,225
12	Sep-12	4,764	29	2,558	5,710	106	-111	330	-342	490	-780	925	-1,232
13	Oct-12	4,764	29	2,653	5,710	107	-112	331	-344	489	-778	927	-1,233
14	Nov-12	4,764	29	2,653	5,710	107	-112	331	-344	489	-778	927	-1,233
15	Dec-12	5,222	29	2,653	5,710	112	-117	353	-365	551	-870	1,017	-1,352
16	Jan-13	5,222	29	2,653	5,710	112	-117	353	-365	551	-870	1,017	-1,352
17	Feb-13	5,297	29	2,653	5,710	113	-118	357	-370	561	-884	1,031	-1,372
18	Mar-13	5,297	29	2,653	5,710	113	-118	357	-370	561	-884	1,031	-1,372
19	Apr-13	5,297	29	2,653	5,710	113	-118	357	-370	561	-884	1,031	-1,372
20	May-13	5,297	29	2,653	5,710	113	-118	357	-370	561	-884	1,031	-1,372
21	Jun-13	5,297	29	2,653	5,710	113	-118	357	-370	561	-884	1,031	-1,372
22	Jul-13	5,347	29	2,653	6,369	114	-119	359	-372	565	-889	1,039	-1,380
23	Aug-13	5,525	29	2,653	6,369	116	-121	370	-381	589	-932	1,075	-1,433
24	Sep-13	5,525	29	2,653	6,369	116	-121	370	-381	589	-932	1,075	-1,433
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**107**	**-112**	**333**	**-346**	**501**	**-786**	**941**	**-1,245**

NOTES:

*** Load includes all Non-AGC-Controlled Hydro and Federal Thermal**

**** Wind includes Solar assessed at 1/2 the reserve need of Wind for Regulation & Load Following**

***** Thermal includes new Thermal and Biomass as an allocated amount by nameplate capacity with a 20.9% reduction in INC Reserves**

Table 2.8
Load Balancing Reserve Capacity Requirement (99.5% Reserves and No Self-Supply) (values in MW)

		INSTALLED CAPACITY				LOAD*							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	60	-61	144	-149	62	-95	266	-304
2	Nov-11	3,792	0	2,550	5,690	60	-61	144	-149	62	-95	266	-304
3	Dec-11	3,792	0	2,558	5,690	60	-61	144	-149	62	-95	266	-304
4	Jan-12	3,792	4	2,558	5,690	60	-61	144	-149	62	-95	266	-304
5	Feb-12	3,792	4	2,558	5,690	60	-61	144	-149	62	-95	266	-304
6	Mar-12	4,042	4	2,558	5,690	60	-61	144	-149	60	-92	264	-302
7	Apr-12	4,332	14	2,558	5,690	60	-61	146	-151	60	-93	266	-305
8	May-12	4,332	14	2,558	5,690	60	-61	146	-151	60	-93	266	-305
9	Jun-12	4,332	29	2,558	5,690	60	-61	146	-151	60	-93	266	-305
10	Jul-12	4,332	29	2,558	5,690	60	-61	146	-151	60	-93	266	-305
11	Aug-12	4,673	29	2,558	5,710	59	-60	148	-153	60	-94	267	-307
12	Sep-12	4,764	29	2,558	5,710	59	-60	149	-152	59	-93	267	-305
13	Oct-12	4,764	29	2,653	5,710	60	-61	150	-154	60	-95	271	-310
14	Nov-12	4,764	29	2,653	5,710	60	-61	150	-154	60	-95	271	-310
15	Dec-12	5,222	29	2,653	5,710	61	-62	155	-158	60	-94	276	-314
16	Jan-13	5,222	29	2,653	5,710	61	-62	155	-158	60	-94	276	-314
17	Feb-13	5,297	29	2,653	5,710	61	-62	155	-159	60	-93	276	-314
18	Mar-13	5,297	29	2,653	5,710	61	-62	155	-159	60	-93	276	-314
19	Apr-13	5,297	29	2,653	5,710	61	-62	155	-159	60	-93	276	-314
20	May-13	5,297	29	2,653	5,710	61	-62	155	-159	60	-93	276	-314
21	Jun-13	5,297	29	2,653	5,710	61	-62	155	-159	60	-93	276	-314
22	Jul-13	5,347	29	2,653	6,369	61	-62	156	-159	60	-93	276	-314
23	Aug-13	5,525	29	2,653	6,369	61	-62	158	-161	59	-92	279	-315
24	Sep-13	5,525	29	2,653	6,369	61	-62	158	-161	59	-92	279	-315
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**60**	**-61**	**150**	**-154**	**60**	**-94**	**271**	**-309**

NOTES:

*** Load includes all Non-AGC-Controlled Hydro and Federal Thermal**

Table 2.9
Wind Balancing Reserve Capacity Requirement (99.5% Reserves and No Self-Supply) (Values in MW)

		INSTALLED CAPACITY				WIND*							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	28	-28	142	-147	345	-523	515	-699
2	Nov-11	3,792	0	2,550	5,690	28	-28	142	-147	345	-523	515	-699
3	Dec-11	3,792	0	2,558	5,690	28	-28	142	-147	345	-523	515	-699
4	Jan-12	3,792	4	2,558	5,690	28	-28	142	-147	345	-523	515	-699
5	Feb-12	3,792	4	2,558	5,690	28	-28	142	-147	345	-523	515	-699
6	Mar-12	4,042	4	2,558	5,690	28	-29	145	-150	351	-539	524	-718
7	Apr-12	4,332	14	2,558	5,690	31	-31	153	-157	377	-584	561	-773
8	May-12	4,332	14	2,558	5,690	31	-31	153	-157	377	-584	561	-773
9	Jun-12	4,332	29	2,558	5,690	31	-31	153	-157	377	-584	561	-773
10	Jul-12	4,332	29	2,558	5,690	31	-31	153	-157	377	-584	561	-773
11	Aug-12	4,673	29	2,558	5,710	33	-34	163	-168	406	-637	602	-838
12	Sep-12	4,764	29	2,558	5,710	34	-34	165	-169	409	-644	608	-847
13	Oct-12	4,764	29	2,653	5,710	34	-34	165	-169	408	-641	606	-844
14	Nov-12	4,764	29	2,653	5,710	34	-34	165	-169	408	-641	606	-844
15	Dec-12	5,222	29	2,653	5,710	38	-39	183	-187	470	-735	692	-961
16	Jan-13	5,222	29	2,653	5,710	38	-39	183	-187	470	-735	692	-961
17	Feb-13	5,297	29	2,653	5,710	39	-39	186	-191	481	-750	706	-980
18	Mar-13	5,297	29	2,653	5,710	39	-39	186	-191	481	-750	706	-980
19	Apr-13	5,297	29	2,653	5,710	39	-39	186	-191	481	-750	706	-980
20	May-13	5,297	29	2,653	5,710	39	-39	186	-191	481	-750	706	-980
21	Jun-13	5,297	29	2,653	5,710	39	-39	186	-191	481	-750	706	-980
22	Jul-13	5,347	29	2,653	6,369	39	-39	187	-191	482	-750	708	-980
23	Aug-13	5,525	29	2,653	6,369	40	-41	195	-198	506	-793	742	-1,032
24	Sep-13	5,525	29	2,653	6,369	40	-41	195	-198	506	-793	742	-1,032
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**34**	**-34**	**167**	**-171**	**419**	**-650**	**620**	**-856**

NOTES:

*** Wind includes Solar assessed at 1/2 the reserve need of Wind for Regulation & Load Following**

Table 2.10
Non-Federal Thermal Balancing Reserve Capacity Requirement (99.5% Reserves and No Self-Supply) (Values in MW)

		INSTALLED CAPACITY				NON-FEDERAL THERMAL*							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	13	-17	17	-22	22	-43	52	-82
2	Nov-11	3,792	0	2,550	5,690	13	-17	17	-22	22	-43	52	-82
3	Dec-11	3,792	0	2,558	5,690	13	-17	17	-22	22	-43	52	-82
4	Jan-12	3,792	4	2,558	5,690	13	-17	17	-22	22	-43	52	-82
5	Feb-12	3,792	4	2,558	5,690	13	-17	17	-22	22	-43	52	-82
6	Mar-12	4,042	4	2,558	5,690	13	-17	17	-22	22	-42	52	-81
7	Apr-12	4,332	14	2,558	5,690	13	-17	17	-22	21	-42	51	-80
8	May-12	4,332	14	2,558	5,690	13	-17	17	-22	21	-42	51	-80
9	Jun-12	4,332	29	2,558	5,690	13	-17	17	-22	21	-42	51	-80
10	Jul-12	4,332	29	2,558	5,690	13	-17	17	-22	21	-42	51	-80
11	Aug-12	4,673	29	2,558	5,710	13	-17	16	-21	21	-42	50	-80
12	Sep-12	4,764	29	2,558	5,710	13	-17	16	-21	21	-42	50	-80
13	Oct-12	4,764	29	2,653	5,710	13	-16	16	-21	21	-42	50	-79
14	Nov-12	4,764	29	2,653	5,710	13	-16	16	-21	21	-42	50	-79
15	Dec-12	5,222	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
16	Jan-13	5,222	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
17	Feb-13	5,297	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
18	Mar-13	5,297	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
19	Apr-13	5,297	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
20	May-13	5,297	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
21	Jun-13	5,297	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
22	Jul-13	5,347	29	2,653	6,369	14	-18	17	-22	23	-46	55	-87
23	Aug-13	5,525	29	2,653	6,369	14	-18	17	-22	23	-46	55	-86
24	Sep-13	5,525	29	2,653	6,369	14	-18	17	-22	23	-46	55	-86
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**13**	**-17**	**16**	**-21**	**22**	**-43**	**51**	**-80**

NOTES:

*** Thermal includes new Thermal and Biomass as an allocated amount by nameplate capacity with a 20.9% reduction in INC Reserves**

Table 2.11
Total Balancing Reserve Capacity Requirement (99.7% Reserves and No Self-Supply) (Values in MW)

		INSTALLED CAPACITY				TOTAL							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	113	-118	335	-354	464	-739	912	-1,211
2	Nov-11	3,792	0	2,550	5,690	113	-118	335	-354	464	-739	912	-1,211
3	Dec-11	3,792	0	2,558	5,690	113	-118	335	-354	464	-739	912	-1,211
4	Jan-12	3,792	4	2,558	5,690	113	-118	335	-355	464	-739	912	-1,211
5	Feb-12	3,792	4	2,558	5,690	113	-118	335	-355	464	-739	912	-1,211
6	Mar-12	4,042	4	2,558	5,690	114	-119	340	-356	466	-764	920	-1,240
7	Apr-12	4,332	14	2,558	5,690	116	-122	349	-366	498	-808	963	-1,295
8	May-12	4,332	14	2,558	5,690	116	-122	349	-366	498	-808	963	-1,295
9	Jun-12	4,332	29	2,558	5,690	117	-122	350	-366	498	-808	964	-1,295
10	Jul-12	4,332	29	2,558	5,690	117	-122	350	-366	498	-808	964	-1,295
11	Aug-12	4,673	29	2,558	5,710	119	-124	362	-377	533	-861	1,014	-1,362
12	Sep-12	4,764	29	2,558	5,710	120	-124	363	-379	535	-866	1,017	-1,369
13	Oct-12	4,764	29	2,653	5,710	120	-125	364	-380	535	-866	1,019	-1,371
14	Nov-12	4,764	29	2,653	5,710	120	-125	364	-380	535	-866	1,019	-1,371
15	Dec-12	5,222	29	2,653	5,710	126	-131	394	-405	595	-967	1,115	-1,504
16	Jan-13	5,222	29	2,653	5,710	126	-131	394	-405	595	-967	1,115	-1,504
17	Feb-13	5,297	29	2,653	5,710	127	-132	399	-411	607	-983	1,132	-1,526
18	Mar-13	5,297	29	2,653	5,710	127	-132	399	-411	607	-983	1,132	-1,526
19	Apr-13	5,297	29	2,653	5,710	127	-132	399	-411	607	-983	1,132	-1,526
20	May-13	5,297	29	2,653	5,710	127	-132	399	-411	607	-983	1,132	-1,526
21	Jun-13	5,297	29	2,653	5,710	127	-132	399	-411	607	-983	1,132	-1,526
22	Jul-13	5,347	29	2,653	6,369	128	-134	400	-414	613	-987	1,141	-1,535
23	Aug-13	5,525	29	2,653	6,369	130	-135	415	-423	637	-1,034	1,182	-1,592
24	Sep-13	5,525	29	2,653	6,369	130	-135	415	-423	637	-1,034	1,182	-1,592
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**121**	**-126**	**370**	**-385**	**543**	**-877**	**1,033**	**-1,388**

NOTES:

Load includes all Non-AGC-Controlled Hydro and Federal Thermal
Wind includes Solar assessed at 1/2 the reserve need of Wind for Regulation & Load Following
Thermal includes new Thermal and Biomass as an allocated amount by nameplate capacity with a 20.9% reduction in INC Reserves

Table 2.12
Load Balancing Reserve Capacity Requirement (99.7% Reserves and No Self-Supply) (Values in MW)

		INSTALLED CAPACITY				LOAD *							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	67	-68	159	-166	67	-106	294	-339
2	Nov-11	3,792	0	2,550	5,690	67	-68	159	-166	67	-106	294	-339
3	Dec-11	3,792	0	2,558	5,690	67	-68	159	-166	67	-106	294	-340
4	Jan-12	3,792	4	2,558	5,690	67	-68	159	-166	67	-106	294	-340
5	Feb-12	3,792	4	2,558	5,690	67	-68	159	-166	67	-106	294	-340
6	Mar-12	4,042	4	2,558	5,690	67	-68	160	-165	65	-105	292	-338
7	Apr-12	4,332	14	2,558	5,690	67	-68	162	-167	65	-105	294	-340
8	May-12	4,332	14	2,558	5,690	67	-68	162	-167	65	-105	294	-340
9	Jun-12	4,332	29	2,558	5,690	67	-68	162	-167	65	-105	294	-340
10	Jul-12	4,332	29	2,558	5,690	67	-68	162	-167	65	-105	294	-340
11	Aug-12	4,673	29	2,558	5,710	67	-68	164	-169	65	-104	296	-340
12	Sep-12	4,764	29	2,558	5,710	67	-67	164	-169	64	-103	295	-340
13	Oct-12	4,764	29	2,653	5,710	68	-69	165	-171	66	-105	299	-344
14	Nov-12	4,764	29	2,653	5,710	68	-69	165	-171	66	-105	299	-344
15	Dec-12	5,222	29	2,653	5,710	68	-69	173	-176	65	-104	306	-349
16	Jan-13	5,222	29	2,653	5,710	68	-69	173	-176	65	-104	306	-349
17	Feb-13	5,297	29	2,653	5,710	68	-69	174	-177	65	-104	306	-349
18	Mar-13	5,297	29	2,653	5,710	68	-69	174	-177	65	-104	306	-349
19	Apr-13	5,297	29	2,653	5,710	68	-69	174	-177	65	-104	306	-349
20	May-13	5,297	29	2,653	5,710	68	-69	174	-177	65	-104	306	-349
21	Jun-13	5,297	29	2,653	5,710	68	-69	174	-177	65	-104	306	-349
22	Jul-13	5,347	29	2,653	6,369	68	-69	173	-177	65	-103	306	-349
23	Aug-13	5,525	29	2,653	6,369	68	-69	177	-179	64	-102	310	-351
24	Sep-13	5,525	29	2,653	6,369	68	-69	177	-179	64	-102	310	-351
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**68**	**-68**	**167**	**-171**	**65**	**-104**	**300**	**-344**

NOTES:

*** Load includes all Non-AGC-Controlled Hydro and Federal Thermal**

Table 2.13
Wind Balancing Reserve Capacity Requirement (99.7% Reserves and No Self-Supply) (Values in MW)

		INSTALLED CAPACITY				WIND *							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	31	-32	157	-164	373	-585	561	-781
2	Nov-11	3,792	0	2,550	5,690	31	-32	157	-164	373	-585	561	-781
3	Dec-11	3,792	0	2,558	5,690	31	-32	157	-164	373	-585	561	-781
4	Jan-12	3,792	4	2,558	5,690	31	-32	157	-164	373	-585	561	-781
5	Feb-12	3,792	4	2,558	5,690	31	-32	157	-164	373	-585	561	-781
6	Mar-12	4,042	4	2,558	5,690	32	-32	161	-166	378	-612	571	-810
7	Apr-12	4,332	14	2,558	5,690	35	-35	169	-175	409	-656	613	-866
8	May-12	4,332	14	2,558	5,690	35	-35	169	-175	409	-656	613	-866
9	Jun-12	4,332	29	2,558	5,690	35	-35	169	-175	409	-656	613	-866
10	Jul-12	4,332	29	2,558	5,690	35	-35	169	-175	409	-656	613	-866
11	Aug-12	4,673	29	2,558	5,710	38	-38	180	-185	444	-710	662	-932
12	Sep-12	4,764	29	2,558	5,710	38	-38	181	-187	447	-716	667	-941
13	Oct-12	4,764	29	2,653	5,710	38	-38	181	-187	446	-714	665	-938
14	Nov-12	4,764	29	2,653	5,710	38	-38	181	-187	446	-714	665	-938
15	Dec-12	5,222	29	2,653	5,710	43	-43	204	-208	507	-817	755	-1,068
16	Jan-13	5,222	29	2,653	5,710	43	-43	204	-208	507	-817	755	-1,068
17	Feb-13	5,297	29	2,653	5,710	44	-44	208	-212	519	-834	771	-1,090
18	Mar-13	5,297	29	2,653	5,710	44	-44	208	-212	519	-834	771	-1,090
19	Apr-13	5,297	29	2,653	5,710	44	-44	208	-212	519	-834	771	-1,090
20	May-13	5,297	29	2,653	5,710	44	-44	208	-212	519	-834	771	-1,090
21	Jun-13	5,297	29	2,653	5,710	44	-44	208	-212	519	-834	771	-1,090
22	Jul-13	5,347	29	2,653	6,369	44	-44	208	-212	523	-833	774	-1,090
23	Aug-13	5,525	29	2,653	6,369	45	-46	218	-220	548	-880	812	-1,146
24	Sep-13	5,525	29	2,653	6,369	45	-46	218	-220	548	-880	812	-1,146
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**38**	**-39**	**185**	**-190**	**454**	**-725**	**677**	**-954**

NOTES:

*** Wind includes Solar assessed at 1/2 the reserve need of Wind for Regulation & Load Following**

Table 2.14
Non-Federal Thermal Balancing Reserve Capacity Requirement (99.7% Reserves and No Self-Supply) (Values in MW)

		INSTALLED CAPACITY				NON-FEDERAL THERMAL*							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	15	-19	19	-25	24	-48	57	-91
2	Nov-11	3,792	0	2,550	5,690	15	-19	19	-25	24	-48	57	-91
3	Dec-11	3,792	0	2,558	5,690	15	-19	19	-25	24	-48	57	-91
4	Jan-12	3,792	4	2,558	5,690	15	-19	19	-25	24	-48	57	-91
5	Feb-12	3,792	4	2,558	5,690	15	-19	19	-25	24	-48	57	-91
6	Mar-12	4,042	4	2,558	5,690	15	-19	19	-25	23	-48	57	-91
7	Apr-12	4,332	14	2,558	5,690	15	-19	18	-24	23	-47	56	-90
8	May-12	4,332	14	2,558	5,690	15	-19	18	-24	23	-47	56	-90
9	Jun-12	4,332	29	2,558	5,690	15	-19	18	-24	23	-47	56	-90
10	Jul-12	4,332	29	2,558	5,690	15	-19	18	-24	23	-47	56	-90
11	Aug-12	4,673	29	2,558	5,710	15	-19	18	-23	23	-47	56	-89
12	Sep-12	4,764	29	2,558	5,710	15	-19	18	-23	23	-47	55	-89
13	Oct-12	4,764	29	2,653	5,710	14	-18	18	-23	23	-47	55	-88
14	Nov-12	4,764	29	2,653	5,710	14	-18	18	-23	23	-47	55	-88
15	Dec-12	5,222	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
16	Jan-13	5,222	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
17	Feb-13	5,297	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
18	Mar-13	5,297	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
19	Apr-13	5,297	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
20	May-13	5,297	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
21	Jun-13	5,297	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
22	Jul-13	5,347	29	2,653	6,369	16	-21	19	-24	25	-51	61	-96
23	Aug-13	5,525	29	2,653	6,369	16	-21	19	-24	25	-51	60	-96
24	Sep-13	5,525	29	2,653	6,369	16	-21	19	-24	25	-51	60	-96
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**15**	**-19**	**18**	**-23**	**23**	**-47**	**56**	**-90**

NOTES:

*** Thermal includes new Thermal and Biomass as an allocated amount by nameplate capacity with a 20.9% reduction in INC Reserves**

Table 2.15

Total Balancing Reserve Capacity, Total GI and Wind Total, Wind GI at 99.5% *with* Self-Supply (Values in MW)

		Installed Capacity		SELF SUPPLY WIND*	
		WIND		GI	
		TOTAL	Self Supply	INC	DEC
	A	B	C	D	E
1	Oct-11	3,792	1,301	140	-212
2	Nov-11	3,792	1,301	140	-212
3	Dec-11	3,792	1,301	140	-212
4	Jan-12	3,792	1,301	140	-212
5	Feb-12	3,792	1,301	140	-212
6	Mar-12	4,042	1,301	139	-213
7	Apr-12	4,332	1,301	139	-215
8	May-12	4,332	1,301	139	-215
9	Jun-12	4,332	1,301	139	-215
10	Jul-12	4,332	1,301	139	-215
11	Aug-12	4,673	1,301	137	-215
12	Sep-12	4,764	1,301	137	-215
13	Oct-12	4,764	1,301	136	-214
14	Nov-12	4,764	1,301	136	-214
15	Dec-12	5,222	1,501	164	-256
16	Jan-13	5,222	1,501	164	-256
17	Feb-13	5,297	1,501	165	-258
18	Mar-13	5,297	1,501	165	-258
19	Apr-13	5,297	1,501	165	-258
20	May-13	5,297	1,501	165	-258
21	Jun-13	5,297	1,501	165	-258
22	Jul-13	5,347	1,501	165	-258
23	Aug-13	5,525	1,601	177	-278
24	Sep-13	5,525	1,601	177	-278
25	BPA-12 AVG	**4,693**	**1,393**	**150**	**-233**
	NOTES:				
	*	**Self Supply Wind GI is the amount that Wind GI, Wind Total, Total GI and Total Balancing Reserves is reduced based on Iberdrola's election on May 2, 2011, to Self Supply GI during the FY 2012-2013 rate period.**			

Table 2.16
Total Balancing Reserve Capacity Requirement (99.5% Reserves with Self-Supply) (Values in MW)

		INSTALLED CAPACITY				TOTAL							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	100	-106	303	-318	290	-449	694	-873
2	Nov-11	3,792	0	2,550	5,690	100	-106	303	-318	290	-449	694	-873
3	Dec-11	3,792	0	2,558	5,690	100	-106	303	-318	290	-449	694	-873
4	Jan-12	3,792	4	2,558	5,690	100	-106	303	-318	290	-449	694	-873
5	Feb-12	3,792	4	2,558	5,690	100	-106	303	-318	290	-449	694	-873
6	Mar-12	4,042	4	2,558	5,690	101	-106	307	-321	294	-460	702	-888
7	Apr-12	4,332	14	2,558	5,690	104	-109	315	-330	320	-504	739	-943
8	May-12	4,332	14	2,558	5,690	104	-109	315	-330	320	-504	739	-943
9	Jun-12	4,332	29	2,558	5,690	104	-109	316	-330	320	-504	739	-943
10	Jul-12	4,332	29	2,558	5,690	104	-109	316	-330	320	-504	739	-943
11	Aug-12	4,673	29	2,558	5,710	105	-111	327	-341	350	-558	783	-1,010
12	Sep-12	4,764	29	2,558	5,710	106	-111	330	-342	353	-564	789	-1,017
13	Oct-12	4,764	29	2,653	5,710	107	-112	331	-344	353	-564	791	-1,019
14	Nov-12	4,764	29	2,653	5,710	107	-112	331	-344	353	-564	791	-1,019
15	Dec-12	5,222	29	2,653	5,710	112	-117	353	-365	387	-614	853	-1,096
16	Jan-13	5,222	29	2,653	5,710	112	-117	353	-365	387	-614	853	-1,096
17	Feb-13	5,297	29	2,653	5,710	113	-118	357	-370	396	-626	866	-1,114
18	Mar-13	5,297	29	2,653	5,710	113	-118	357	-370	396	-626	866	-1,114
19	Apr-13	5,297	29	2,653	5,710	113	-118	357	-370	396	-626	866	-1,114
20	May-13	5,297	29	2,653	5,710	113	-118	357	-370	396	-626	866	-1,114
21	Jun-13	5,297	29	2,653	5,710	113	-118	357	-370	396	-626	866	-1,114
22	Jul-13	5,347	29	2,653	6,369	114	-119	359	-372	399	-631	873	-1,123
23	Aug-13	5,525	29	2,653	6,369	116	-121	370	-381	411	-654	898	-1,156
24	Sep-13	5,525	29	2,653	6,369	116	-121	370	-381	411	-654	898	-1,156
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**107**	**-112**	**333**	**-346**	**350**	**-553**	**791**	**-1,012**

NOTES:

Load includes all Non-AGC-Controlled Hydro and Federal Thermal
Wind includes Solar assessed at 1/2 the reserve need of Wind for Regulation & Load Following
Thermal includes new Thermal and Biomass as an allocated amount by nameplate capacity with a 20.9% reduction in INC Reserves

Table 2.17
Load Balancing Reserve Capacity Requirement (99.5% Reserves with Self-Supply) (Values in MW)

		INSTALLED CAPACITY				LOAD *							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	60	-61	144	-149	62	-95	266	-304
2	Nov-11	3,792	0	2,550	5,690	60	-61	144	-149	62	-95	266	-304
3	Dec-11	3,792	0	2,558	5,690	60	-61	144	-149	62	-95	266	-304
4	Jan-12	3,792	4	2,558	5,690	60	-61	144	-149	62	-95	266	-304
5	Feb-12	3,792	4	2,558	5,690	60	-61	144	-149	62	-95	266	-304
6	Mar-12	4,042	4	2,558	5,690	60	-61	144	-149	60	-92	264	-302
7	Apr-12	4,332	14	2,558	5,690	60	-61	146	-151	60	-93	266	-305
8	May-12	4,332	14	2,558	5,690	60	-61	146	-151	60	-93	266	-305
9	Jun-12	4,332	29	2,558	5,690	60	-61	146	-151	60	-93	266	-305
10	Jul-12	4,332	29	2,558	5,690	60	-61	146	-151	60	-93	266	-305
11	Aug-12	4,673	29	2,558	5,710	59	-60	148	-153	60	-94	267	-307
12	Sep-12	4,764	29	2,558	5,710	59	-60	149	-152	59	-93	267	-305
13	Oct-12	4,764	29	2,653	5,710	60	-61	150	-154	60	-95	271	-310
14	Nov-12	4,764	29	2,653	5,710	60	-61	150	-154	60	-95	271	-310
15	Dec-12	5,222	29	2,653	5,710	61	-62	155	-158	60	-94	276	-314
16	Jan-13	5,222	29	2,653	5,710	61	-62	155	-158	60	-94	276	-314
17	Feb-13	5,297	29	2,653	5,710	61	-62	155	-159	60	-93	276	-314
18	Mar-13	5,297	29	2,653	5,710	61	-62	155	-159	60	-93	276	-314
19	Apr-13	5,297	29	2,653	5,710	61	-62	155	-159	60	-93	276	-314
20	May-13	5,297	29	2,653	5,710	61	-62	155	-159	60	-93	276	-314
21	Jun-13	5,297	29	2,653	5,710	61	-62	155	-159	60	-93	276	-314
22	Jul-13	5,347	29	2,653	6,369	61	-62	156	-159	60	-93	276	-314
23	Aug-13	5,525	29	2,653	6,369	61	-62	158	-161	59	-92	279	-315
24	Sep-13	5,525	29	2,653	6,369	61	-62	158	-161	59	-92	279	-315
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**60**	**-61**	**150**	**-154**	**60**	**-94**	**271**	**-309**

NOTES:

*** Load includes all Non-AGC-Controlled Hydro and Federal Thermal**

Table 2.18
Wind Balancing Reserve Capacity Requirement (99.5% Reserves with Self-Supply) (Values in MW)

		INSTALLED CAPACITY				WIND *							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	28	-28	142	-147	206	-312	376	-487
2	Nov-11	3,792	0	2,550	5,690	28	-28	142	-147	206	-312	376	-487
3	Dec-11	3,792	0	2,558	5,690	28	-28	142	-147	206	-312	376	-487
4	Jan-12	3,792	4	2,558	5,690	28	-28	142	-147	206	-312	376	-487
5	Feb-12	3,792	4	2,558	5,690	28	-28	142	-147	206	-312	376	-487
6	Mar-12	4,042	4	2,558	5,690	28	-29	145	-150	212	-326	386	-505
7	Apr-12	4,332	14	2,558	5,690	31	-31	153	-157	238	-369	422	-558
8	May-12	4,332	14	2,558	5,690	31	-31	153	-157	238	-369	422	-558
9	Jun-12	4,332	29	2,558	5,690	31	-31	153	-157	238	-369	422	-558
10	Jul-12	4,332	29	2,558	5,690	31	-31	153	-157	238	-369	422	-558
11	Aug-12	4,673	29	2,558	5,710	33	-34	163	-168	269	-422	465	-624
12	Sep-12	4,764	29	2,558	5,710	34	-34	165	-169	273	-429	471	-632
13	Oct-12	4,764	29	2,653	5,710	34	-34	165	-169	272	-427	470	-630
14	Nov-12	4,764	29	2,653	5,710	34	-34	165	-169	272	-427	470	-630
15	Dec-12	5,222	29	2,653	5,710	38	-39	183	-187	306	-478	528	-704
16	Jan-13	5,222	29	2,653	5,710	38	-39	183	-187	306	-478	528	-704
17	Feb-13	5,297	29	2,653	5,710	39	-39	186	-191	315	-492	541	-722
18	Mar-13	5,297	29	2,653	5,710	39	-39	186	-191	315	-492	541	-722
19	Apr-13	5,297	29	2,653	5,710	39	-39	186	-191	315	-492	541	-722
20	May-13	5,297	29	2,653	5,710	39	-39	186	-191	315	-492	541	-722
21	Jun-13	5,297	29	2,653	5,710	39	-39	186	-191	315	-492	541	-722
22	Jul-13	5,347	29	2,653	6,369	39	-39	187	-191	316	-492	542	-723
23	Aug-13	5,525	29	2,653	6,369	40	-41	195	-198	329	-516	565	-754
24	Sep-13	5,525	29	2,653	6,369	40	-41	195	-198	329	-516	565	-754
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**34**	**-34**	**167**	**-171**	**268**	**-417**	**469**	**-623**

NOTES:

*** Wind includes Solar assessed at 1/2 the reserve need of Wind for Regulation & Load Following**

Table 2.19
Non-Federal Thermal Balancing Reserve Capacity Requirement (99.5% Reserves with Self-Supply) (Values in MW)

		INSTALLED CAPACITY				NON-FEDERAL THERMAL*							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	13	-17	17	-22	22	-43	52	-82
2	Nov-11	3,792	0	2,550	5,690	13	-17	17	-22	22	-43	52	-82
3	Dec-11	3,792	0	2,558	5,690	13	-17	17	-22	22	-43	52	-82
4	Jan-12	3,792	4	2,558	5,690	13	-17	17	-22	22	-43	52	-82
5	Feb-12	3,792	4	2,558	5,690	13	-17	17	-22	22	-43	52	-82
6	Mar-12	4,042	4	2,558	5,690	13	-17	17	-22	22	-42	52	-81
7	Apr-12	4,332	14	2,558	5,690	13	-17	17	-22	21	-42	51	-80
8	May-12	4,332	14	2,558	5,690	13	-17	17	-22	21	-42	51	-80
9	Jun-12	4,332	29	2,558	5,690	13	-17	17	-22	21	-42	51	-80
10	Jul-12	4,332	29	2,558	5,690	13	-17	17	-22	21	-42	51	-80
11	Aug-12	4,673	29	2,558	5,710	13	-17	16	-21	21	-42	50	-80
12	Sep-12	4,764	29	2,558	5,710	13	-17	16	-21	21	-42	50	-80
13	Oct-12	4,764	29	2,653	5,710	13	-16	16	-21	21	-42	50	-79
14	Nov-12	4,764	29	2,653	5,710	13	-16	16	-21	21	-42	50	-79
15	Dec-12	5,222	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
16	Jan-13	5,222	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
17	Feb-13	5,297	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
18	Mar-13	5,297	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
19	Apr-13	5,297	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
20	May-13	5,297	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
21	Jun-13	5,297	29	2,653	5,710	13	-16	15	-20	21	-42	49	-78
22	Jul-13	5,347	29	2,653	6,369	14	-18	17	-22	23	-46	55	-87
23	Aug-13	5,525	29	2,653	6,369	14	-18	17	-22	23	-46	55	-86
24	Sep-13	5,525	29	2,653	6,369	14	-18	17	-22	23	-46	55	-86
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**13**	**-17**	**16**	**-21**	**22**	**-43**	**51**	**-80**

NOTES:

*** Thermal includes new Thermal and Biomass as an allocated amount by nameplate capacity with a 20.9% reduction in INC Reserves**

Table 2.20
Total Reserve, Total GI and Wind Total, Wind GI at 99.7% with Self-Supply
(Values in MW)

		Installed Capacity WIND		SELF SUPPLY WIND* GI	
		TOTAL	Self Supply	INC	DEC
	A	B	C	D	E
1	Oct-11	3,792	1,301	151	-237
2	Nov-11	3,792	1,301	151	-237
3	Dec-11	3,792	1,301	151	-237
4	Jan-12	3,792	1,301	151	-237
5	Feb-12	3,792	1,301	151	-237
6	Mar-12	4,042	1,301	150	-242
7	Apr-12	4,332	1,301	151	-241
8	May-12	4,332	1,301	151	-241
9	Jun-12	4,332	1,301	151	-241
10	Jul-12	4,332	1,301	151	-241
11	Aug-12	4,673	1,301	150	-239
12	Sep-12	4,764	1,301	149	-239
13	Oct-12	4,764	1,301	149	-238
14	Nov-12	4,764	1,301	149	-238
15	Dec-12	5,222	1,501	177	-285
16	Jan-13	5,222	1,501	177	-285
17	Feb-13	5,297	1,501	179	-287
18	Mar-13	5,297	1,501	179	-287
19	Apr-13	5,297	1,501	179	-287
20	May-13	5,297	1,501	179	-287
21	Jun-13	5,297	1,501	179	-287
22	Jul-13	5,347	1,501	180	-286
23	Aug-13	5,525	1,601	192	-308
24	Sep-13	5,525	1,601	192	-308
25	**BPA-12 AVG**	**4,693**	**1,393**	**163**	**-260**

NOTES:

*** Self Supply Wind GI is the amount that Wind GI, Wind Total, Total GI and Total Balancing Reserves is reduced based on Iberdrola's election on May 2, 2011, to Self Supply GI during the FY 2012-2013**

Table 2.21

Total Balancing Reserve Capacity Requirement (99.7% Reserves with Self-Supply)

		INSTALLED CAPACITY				TOTAL							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	113	-118	335	-354	313	-502	762	-975
2	Nov-11	3,792	0	2,550	5,690	113	-118	335	-354	313	-502	762	-975
3	Dec-11	3,792	0	2,558	5,690	113	-118	335	-354	313	-502	762	-975
4	Jan-12	3,792	4	2,558	5,690	113	-118	335	-355	313	-502	762	-975
5	Feb-12	3,792	4	2,558	5,690	113	-118	335	-355	313	-502	762	-975
6	Mar-12	4,042	4	2,558	5,690	114	-119	340	-356	317	-522	771	-998
7	Apr-12	4,332	14	2,558	5,690	116	-122	349	-366	347	-566	813	-1,054
8	May-12	4,332	14	2,558	5,690	116	-122	349	-366	347	-566	813	-1,054
9	Jun-12	4,332	29	2,558	5,690	117	-122	350	-366	347	-566	813	-1,054
10	Jul-12	4,332	29	2,558	5,690	117	-122	350	-366	347	-566	813	-1,054
11	Aug-12	4,673	29	2,558	5,710	119	-124	362	-377	383	-622	864	-1,122
12	Sep-12	4,764	29	2,558	5,710	120	-124	363	-379	386	-627	868	-1,130
13	Oct-12	4,764	29	2,653	5,710	120	-125	364	-380	386	-628	870	-1,133
14	Nov-12	4,764	29	2,653	5,710	120	-125	364	-380	386	-628	870	-1,133
15	Dec-12	5,222	29	2,653	5,710	126	-131	394	-405	418	-683	938	-1,219
16	Jan-13	5,222	29	2,653	5,710	126	-131	394	-405	418	-683	938	-1,219
17	Feb-13	5,297	29	2,653	5,710	127	-132	399	-411	428	-697	953	-1,239
18	Mar-13	5,297	29	2,653	5,710	127	-132	399	-411	428	-697	953	-1,239
19	Apr-13	5,297	29	2,653	5,710	127	-132	399	-411	428	-697	953	-1,239
20	May-13	5,297	29	2,653	5,710	127	-132	399	-411	428	-697	953	-1,239
21	Jun-13	5,297	29	2,653	5,710	127	-132	399	-411	428	-697	953	-1,239
22	Jul-13	5,347	29	2,653	6,369	128	-134	400	-414	433	-701	962	-1,249
23	Aug-13	5,525	29	2,653	6,369	130	-135	415	-423	445	-726	990	-1,284
24	Sep-13	5,525	29	2,653	6,369	130	-135	415	-423	445	-726	990	-1,284
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**121**	**-126**	**370**	**-385**	**380**	**-617**	**870**	**-1,127**

NOTES:

Load includes all Non-AGC-Controlled Hydro and Federal Thermal
Wind includes Solar assessed at 1/2 the reserve need of Wind for Regulation & Load Following
Thermal includes new Thermal and Biomass as an allocated amount by nameplate capacity with a 20.9% reduction in INC Reserves

Table 2.22
Load Balancing Reserve Capacity Requirement (99.7% Reserves with Self-Supply)

		INSTALLED CAPACITY				LOAD*							
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	REG		LF		GI		TOTAL	
						INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	67	-68	159	-166	67	-106	294	-339
2	Nov-11	3,792	0	2,550	5,690	67	-68	159	-166	67	-106	294	-339
3	Dec-11	3,792	0	2,558	5,690	67	-68	159	-166	67	-106	294	-340
4	Jan-12	3,792	4	2,558	5,690	67	-68	159	-166	67	-106	294	-340
5	Feb-12	3,792	4	2,558	5,690	67	-68	159	-166	67	-106	294	-340
6	Mar-12	4,042	4	2,558	5,690	67	-68	160	-165	65	-105	292	-338
7	Apr-12	4,332	14	2,558	5,690	67	-68	162	-167	65	-105	294	-340
8	May-12	4,332	14	2,558	5,690	67	-68	162	-167	65	-105	294	-340
9	Jun-12	4,332	29	2,558	5,690	67	-68	162	-167	65	-105	294	-340
10	Jul-12	4,332	29	2,558	5,690	67	-68	162	-167	65	-105	294	-340
11	Aug-12	4,673	29	2,558	5,710	67	-68	164	-169	65	-104	296	-340
12	Sep-12	4,764	29	2,558	5,710	67	-67	164	-169	64	-103	295	-340
13	Oct-12	4,764	29	2,653	5,710	68	-69	165	-171	66	-105	299	-344
14	Nov-12	4,764	29	2,653	5,710	68	-69	165	-171	66	-105	299	-344
15	Dec-12	5,222	29	2,653	5,710	68	-69	173	-176	65	-104	306	-349
16	Jan-13	5,222	29	2,653	5,710	68	-69	173	-176	65	-104	306	-349
17	Feb-13	5,297	29	2,653	5,710	68	-69	174	-177	65	-104	306	-349
18	Mar-13	5,297	29	2,653	5,710	68	-69	174	-177	65	-104	306	-349
19	Apr-13	5,297	29	2,653	5,710	68	-69	174	-177	65	-104	306	-349
20	May-13	5,297	29	2,653	5,710	68	-69	174	-177	65	-104	306	-349
21	Jun-13	5,297	29	2,653	5,710	68	-69	174	-177	65	-104	306	-349
22	Jul-13	5,347	29	2,653	6,369	68	-69	173	-177	65	-103	306	-349
23	Aug-13	5,525	29	2,653	6,369	68	-69	177	-179	64	-102	310	-351
24	Sep-13	5,525	29	2,653	6,369	68	-69	177	-179	64	-102	310	-351
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**68**	**-68**	**167**	**-171**	**65**	**-104**	**300**	**-344**

NOTES:

*** Load includes all Non-AGC-Controlled Hydro and Federal Thermal**

Table 2.23

Wind Balancing Reserve Capacity Requirement (99.7% Reserves with Self-Supply) (Values in MW)

		INSTALLED CAPACITY				WIND *							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	31	-32	157	-164	222	-349	410	-544
2	Nov-11	3,792	0	2,550	5,690	31	-32	157	-164	222	-349	410	-544
3	Dec-11	3,792	0	2,558	5,690	31	-32	157	-164	222	-349	410	-544
4	Jan-12	3,792	4	2,558	5,690	31	-32	157	-164	222	-349	411	-544
5	Feb-12	3,792	4	2,558	5,690	31	-32	157	-164	222	-349	411	-544
6	Mar-12	4,042	4	2,558	5,690	32	-32	161	-166	229	-370	422	-569
7	Apr-12	4,332	14	2,558	5,690	35	-35	169	-175	259	-415	462	-624
8	May-12	4,332	14	2,558	5,690	35	-35	169	-175	259	-415	462	-624
9	Jun-12	4,332	29	2,558	5,690	35	-35	169	-175	259	-415	463	-625
10	Jul-12	4,332	29	2,558	5,690	35	-35	169	-175	259	-415	463	-625
11	Aug-12	4,673	29	2,558	5,710	38	-38	180	-185	294	-470	512	-693
12	Sep-12	4,764	29	2,558	5,710	38	-38	181	-187	298	-477	517	-702
13	Oct-12	4,764	29	2,653	5,710	38	-38	181	-187	297	-475	516	-700
14	Nov-12	4,764	29	2,653	5,710	38	-38	181	-187	297	-475	516	-700
15	Dec-12	5,222	29	2,653	5,710	43	-43	204	-208	330	-532	578	-783
16	Jan-13	5,222	29	2,653	5,710	43	-43	204	-208	330	-532	578	-783
17	Feb-13	5,297	29	2,653	5,710	44	-44	208	-212	341	-547	593	-803
18	Mar-13	5,297	29	2,653	5,710	44	-44	208	-212	341	-547	593	-803
19	Apr-13	5,297	29	2,653	5,710	44	-44	208	-212	341	-547	593	-803
20	May-13	5,297	29	2,653	5,710	44	-44	208	-212	341	-547	593	-803
21	Jun-13	5,297	29	2,653	5,710	44	-44	208	-212	341	-547	593	-803
22	Jul-13	5,347	29	2,653	6,369	44	-44	208	-212	343	-547	595	-803
23	Aug-13	5,525	29	2,653	6,369	45	-46	218	-220	356	-572	620	-838
24	Sep-13	5,525	29	2,653	6,369	45	-46	218	-220	356	-572	620	-838
25	BPA-12 AVG	4,693	21	2,604	5,784	38	-39	185	-190	291	-465	514	-694

NOTES:

*** Wind includes Solar assessed at 1/2 the reserve need of Wind for Regulation & Load Following**

Table 2.24

Non-Federal Thermal Balancing Reserve Capacity Requirement (99.7% Reserves with Self-Supply) (Values in MW)

		INSTALLED CAPACITY				NON-FEDERAL THERMAL*							
						REG		LF		GI		TOTAL	
		WIND	SOLAR	HYDRO	NON-FEDERAL THERMAL	INC	DEC	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Oct-11	3,792	0	2,550	5,690	15	-19	19	-25	24	-48	57	-91
2	Nov-11	3,792	0	2,550	5,690	15	-19	19	-25	24	-48	57	-91
3	Dec-11	3,792	0	2,558	5,690	15	-19	19	-25	24	-48	57	-91
4	Jan-12	3,792	4	2,558	5,690	15	-19	19	-25	24	-48	57	-91
5	Feb-12	3,792	4	2,558	5,690	15	-19	19	-25	24	-48	57	-91
6	Mar-12	4,042	4	2,558	5,690	15	-19	19	-25	23	-48	57	-91
7	Apr-12	4,332	14	2,558	5,690	15	-19	18	-24	23	-47	56	-90
8	May-12	4,332	14	2,558	5,690	15	-19	18	-24	23	-47	56	-90
9	Jun-12	4,332	29	2,558	5,690	15	-19	18	-24	23	-47	56	-90
10	Jul-12	4,332	29	2,558	5,690	15	-19	18	-24	23	-47	56	-90
11	Aug-12	4,673	29	2,558	5,710	15	-19	18	-23	23	-47	56	-89
12	Sep-12	4,764	29	2,558	5,710	15	-19	18	-23	23	-47	55	-89
13	Oct-12	4,764	29	2,653	5,710	14	-18	18	-23	23	-47	55	-88
14	Nov-12	4,764	29	2,653	5,710	14	-18	18	-23	23	-47	55	-88
15	Dec-12	5,222	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
16	Jan-13	5,222	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
17	Feb-13	5,297	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
18	Mar-13	5,297	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
19	Apr-13	5,297	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
20	May-13	5,297	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
21	Jun-13	5,297	29	2,653	5,710	14	-18	17	-22	23	-46	54	-87
22	Jul-13	5,347	29	2,653	6,369	16	-21	19	-24	25	-51	61	-96
23	Aug-13	5,525	29	2,653	6,369	16	-21	19	-24	25	-51	60	-96
24	Sep-13	5,525	29	2,653	6,369	16	-21	19	-24	25	-51	60	-96
25	**BPA-12 AVG**	**4,693**	**21**	**2,604**	**5,784**	**15**	**-19**	**18**	**-23**	**23**	**-47**	**56**	**-90**

NOTES:

*** Thermal includes new Thermal and Biomass as an allocated amount by nameplate capacity with a 20.9% reduction in INC Reserves**

Table 2.25
Impact of Committed Intra-Hour Scheduling on the Total Balancing Reserve Capacity

		Installed Capacity WIND	60 MIN SCHEDULING BAA TOTAL		30 MIN SCHEDULING BAA TOTAL		DELTA BAA TOTAL	
		TOTAL	INC	DEC	INC	DEC	INC	DEC
	A	B	C	D	E	F	G	H
1	Oct-11	3792	833 MW	-1085 MW	666 MW	-844 MW	167 MW (20%)	241 MW (22.2%)
2	Nov-11	3792	833 MW	-1085 MW	666 MW	-844 MW	167 MW (20%)	241 MW (22.2%)
3	Dec-11	3792	833 MW	-1085 MW	666 MW	-844 MW	167 MW (20%)	241 MW (22.2%)
4	Jan-12	3792	833 MW	-1085 MW	666 MW	-844 MW	167 MW (20%)	241 MW (22.2%)
5	Feb-12	3792	833 MW	-1085 MW	666 MW	-844 MW	167 MW (20%)	241 MW (22.2%)
6	Mar-12	4042	840 MW	-1101 MW	672 MW	-852 MW	169 MW (20.1%)	249 MW (22.6%)
7	Apr-12	4332	878 MW	-1157 MW	694 MW	-884 MW	184 MW (21%)	273 MW (23.6%)
8	May-12	4332	878 MW	-1157 MW	694 MW	-884 MW	184 MW (21%)	273 MW (23.6%)
9	Jun-12	4332	878 MW	-1158 MW	694 MW	-885 MW	184 MW (20.9%)	273 MW (23.6%)
10	Jul-12	4332	878 MW	-1158 MW	694 MW	-885 MW	184 MW (20.9%)	273 MW (23.6%)
11	Aug-12	4673	920 MW	-1225 MW	726 MW	-931 MW	194 MW (21.1%)	293 MW (23.9%)
12	Sep-12	4764	925 MW	-1232 MW	729 MW	-936 MW	197 MW (21.3%)	296 MW (24%)
13	Oct-12	4764	927 MW	-1233 MW	730 MW	-938 MW	197 MW (21.2%)	295 MW (23.9%)
14	Nov-12	4764	927 MW	-1233 MW	730 MW	-938 MW	197 MW (21.2%)	295 MW (23.9%)
15	Dec-12	5222	1017 MW	-1352 MW	791 MW	-1020 MW	226 MW (22.3%)	332 MW (24.6%)
16	Jan-13	5222	1017 MW	-1352 MW	791 MW	-1020 MW	226 MW (22.3%)	332 MW (24.6%)
17	Feb-13	5297	1031 MW	-1372 MW	800 MW	-1036 MW	232 MW (22.5%)	336 MW (24.5%)
18	Mar-13	5297	1031 MW	-1372 MW	800 MW	-1036 MW	232 MW (22.5%)	336 MW (24.5%)
19	Apr-13	5297	1031 MW	-1372 MW	800 MW	-1036 MW	232 MW (22.5%)	336 MW (24.5%)
20	May-13	5297	1031 MW	-1372 MW	800 MW	-1036 MW	232 MW (22.5%)	336 MW (24.5%)
21	Jun-13	5297	1031 MW	-1372 MW	800 MW	-1036 MW	232 MW (22.5%)	336 MW (24.5%)
22	Jul-13	5347	1039 MW	-1380 MW	807 MW	-1043 MW	232 MW (22.3%)	338 MW (24.5%)
23	Aug-13	5525	1075 MW	-1433 MW	833 MW	-1080 MW	242 MW (22.5%)	353 MW (24.6%)
24	Sep-13	5525	1075 MW	-1433 MW	833 MW	-1080 MW	242 MW (22.5%)	353 MW (24.6%)
25	**BPA-12 AVG**	**4693**	**941 MW**	**-1245 MW**	**739 MW**	**-949 MW**	**202 MW (21.5%)**	**296 MW (23.8%)**

Table 2.26
Impact of Committed Intra-Hour Scheduling on the Wind Balancing Reserve Capacity

		Installed Capacity WIND	60 MIN SCHEDULING WIND TOTAL		30 MIN SCHEDULING WIND TOTAL		DELTA WIND TOTAL	
		TOTAL	INC	DEC	INC	DEC	INC	DEC
	A	B	D	D	E	F	G	H
1	Oct-11	3792	515 MW	-699 MW	348 MW	-458 MW	167 MW (32.4%)	241 MW (34.5%)
2	Nov-11	3792	515 MW	-699 MW	348 MW	-458 MW	167 MW (32.4%)	241 MW (34.5%)
3	Dec-11	3792	515 MW	-699 MW	348 MW	-458 MW	167 MW (32.4%)	241 MW (34.5%)
4	Jan-12	3792	515 MW	-699 MW	348 MW	-458 MW	167 MW (32.4%)	241 MW (34.5%)
5	Feb-12	3792	515 MW	-699 MW	348 MW	-458 MW	167 MW (32.4%)	241 MW (34.5%)
6	Mar-12	4042	524 MW	-718 MW	356 MW	-469 MW	169 MW (32.1%)	249 MW (34.7%)
7	Apr-12	4332	561 MW	-773 MW	377 MW	-500 MW	184 MW (32.8%)	273 MW (35.4%)
8	May-12	4332	561 MW	-773 MW	377 MW	-500 MW	184 MW (32.8%)	273 MW (35.4%)
9	Jun-12	4332	561 MW	-773 MW	377 MW	-500 MW	184 MW (32.8%)	273 MW (35.3%)
10	Jul-12	4332	561 MW	-773 MW	377 MW	-500 MW	184 MW (32.8%)	273 MW (35.3%)
11	Aug-12	4673	602 MW	-838 MW	408 MW	-545 MW	194 MW (32.2%)	293 MW (35%)
12	Sep-12	4764	608 MW	-847 MW	411 MW	-551 MW	197 MW (32.4%)	296 MW (34.9%)
13	Oct-12	4764	606 MW	-844 MW	409 MW	-549 MW	197 MW (32.5%)	295 MW (35%)
14	Nov-12	4764	606 MW	-844 MW	409 MW	-549 MW	197 MW (32.5%)	295 MW (35%)
15	Dec-12	5222	692 MW	-961 MW	465 MW	-629 MW	226 MW (32.7%)	332 MW (34.6%)
16	Jan-13	5222	692 MW	-961 MW	465 MW	-629 MW	226 MW (32.7%)	332 MW (34.6%)
17	Feb-13	5297	706 MW	-980 MW	474 MW	-644 MW	232 MW (32.8%)	336 MW (34.3%)
18	Mar-13	5297	706 MW	-980 MW	474 MW	-644 MW	232 MW (32.8%)	336 MW (34.3%)
19	Apr-13	5297	706 MW	-980 MW	474 MW	-644 MW	232 MW (32.8%)	336 MW (34.3%)
20	May-13	5297	706 MW	-980 MW	474 MW	-644 MW	232 MW (32.8%)	336 MW (34.3%)
21	Jun-13	5297	706 MW	-980 MW	474 MW	-644 MW	232 MW (32.8%)	336 MW (34.3%)
22	Jul-13	5347	708 MW	-980 MW	475 MW	-643 MW	232 MW (32.8%)	338 MW (34.4%)
23	Aug-13	5525	742 MW	-1032 MW	499 MW	-679 MW	242 MW (32.7%)	353 MW (34.2%)
24	Sep-13	5525	742 MW	-1032 MW	499 MW	-679 MW	242 MW (32.7%)	353 MW (34.2%)
25	**BPA-12 AVG**	**4693**	**620 MW**	**-856 MW**	**417 MW**	**-560 MW**	**202 MW (32.6%)**	**296 MW (34.6%)**

Table 2.27

Chart of the Quality of Service Levels in Excess of 99.5 Percent
Magnitude of Additional Wind *Inc* Reserves Needed for the Forecast Number of DSO 216 Tag Curtailments Per Year

	DSO 216 Curtailment Frequency	Multiple of Balancing Reserves above the 99.5% Base level of Service	DSO 216 Curtailment Frequency (continued)	Multiple of Balancing Reserves above the 99.5% Base level of Service(continued)
1	A	B	C	D
2	0	1.692	57	0.260
3	1	1.577	58	0.250
4	2	1.329	59	0.246
5	3	1.210	60	0.246
6	4	1.183	61	0.233
7	5	1.138	62	0.217
8	6	1.096	63	0.217
9	7	1.052	64	0.217
10	8	0.998	65	0.206
11	9	0.979	66	0.200
12	10	0.938	67	0.200
13	11	0.900	68	0.192
14	12	0.844	69	0.175
15	13	0.829	70	0.175
16	14	0.806	71	0.160
17	15	0.790	72	0.158
18	16	0.758	73	0.152
19	17	0.742	74	0.150
20	18	0.710	75	0.150
21	19	0.692	76	0.140
22	20	0.667	77	0.140
23	21	0.631	78	0.138
24	22	0.621	79	0.125
25	23	0.619	80	0.119
26	24	0.604	81	0.115
27	25	0.575	82	0.100
28	26	0.550	83	0.100
29	27	0.548	84	0.100
30	28	0.531	85	0.100
31	29	0.508	86	0.100
32	30	0.500	87	0.100
33	31	0.471	88	0.090
34	32	0.463	89	0.088
35	33	0.446	90	0.083
36	34	0.444	91	0.069
37	35	0.429	92	0.058
38	36	0.415	93	0.056
39	37	0.410	94	0.050
40	38	0.406	95	0.050
41	39	0.383	96	0.050
42	40	0.379	97	0.050
43	41	0.379	98	0.050
44	42	0.352	99	0.040
45	43	0.338	100	0.040
46	44	0.329	101	0.040
47	45	0.329	102	0.040
48	46	0.329	103	0.038
49	47	0.321	104	0.033
50	48	0.310	105	0.021
51	49	0.302	106	0.021
52	50	0.300	107	0.019
53	51	0.300	108	0.002
54	52	0.296	109	0.002
55	53	0.281	110	0.002
56	54	0.279	111	0.000
57	55	0.277	112	0.000
58	56	0.263	113	0.000

Table 2.28

Graph of the Quality of Service Levels in Excess of 99.5 Percent
Magnitude of Additional Wind *Inc* Reserves Needed for the Forecast Number of DSO 216 Tag Curtailments Per Year

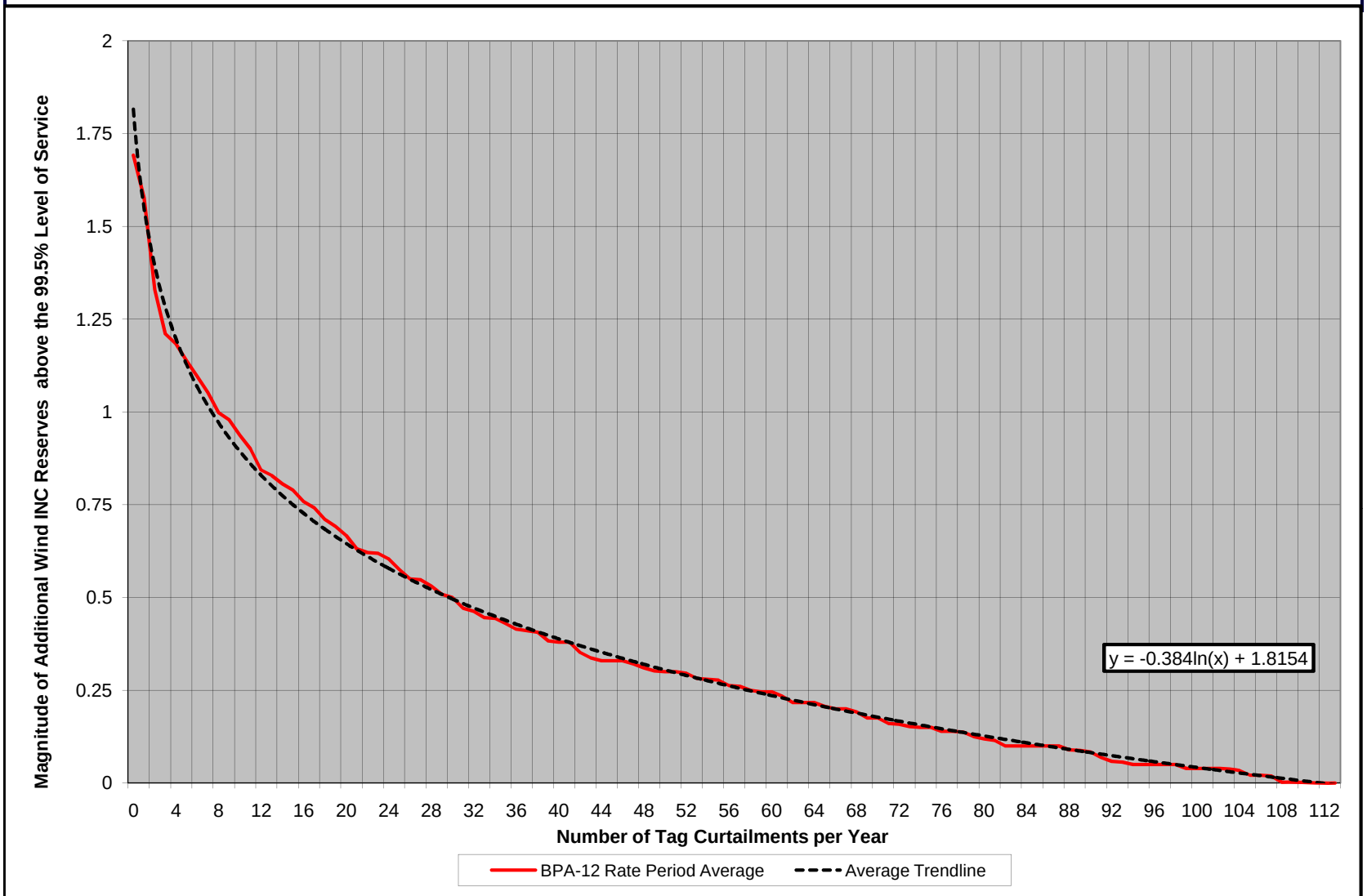


Table 3.1
Regulated Federal Hydro 120-Hour Peaking Capacity for FY 2012 and FY 2013 Adjusted for Transmission Losses

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
			Annual Average	Oct	Nov	Dec	Jan	Feb	Mar	1-Apr	16-Apr	May	Jun	Jul	1-Aug	16-Aug	Sep
1	**FY 2012**																
2	Regulated Hydro (120 Hr.)	Capacity	**10,718**	7,424	8,974	9,134	12,690	12,411	11,523	11,873	11,963	13,555	13,613	10,942	9,174	8,116	7,789
3	Regulated Hydro (120 Hr.)	Energy	**8,528**	5,610	6,901	6,810	9,516	9,082	8,335	10,123	10,500	13,092	12,169	8,117	6,775	6,243	5,966
4	**FY 2013**																
5	Regulated Hydro (120 Hr.)	Capacity	**10,658**	7,319	8,962	9,170	12,636	12,377	11,494	11,859	12,031	13,536	13,328	10,833	9,169	7,948	7,737
6	Regulated Hydro (120 Hr.)	Energy	**8,461**	5,610	6,901	6,810	9,509	9,071	8,335	10,123	10,500	12,915	11,575	8,117	6,775	6,243	5,966
7	**Annual Average for FY 2012-2013**																
8	Regulated Hydro (120 Hr.)	Capacity	**10,688**	**7,371**	**8,968**	**9,152**	**12,663**	**12,394**	**11,508**	**11,866**	**11,997**	**13,546**	**13,470**	**10,888**	**9,171**	**8,032**	**7,763**
9	Regulated Hydro (120 Hr.)	Energy	**8,495**	**5,610**	**6,901**	**6,810**	**9,512**	**9,076**	**8,335**	**10,123**	**10,500**	**13,003**	**11,872**	**8,117**	**6,775**	**6,243**	**5,966**
10	Transmission Losses at 3.35% Loss Factor		**358**														
11	Regulated Federal Hydro Projects 120-Hour Peaking Capacity Adjusted for Transmission Losses		**10,330**														

Table 3.2
Big 10 Hydro Projects as a Percent of Regulated Hydro Projects Based on Energy for FY 2012-2013

		A	B	C
	Energy (aMW)	FY 2012	FY 2013	Average for FY 2012-2013
	Regulated Hydro Projects			
1	Albeni Falls	26	26	26
2	**Bonneville**	**558**	**555**	**556**
3	**Chief Joseph**	**1,309**	**1,248**	**1,279**
4	Dworshak	218	218	218
5	**Grand Coulee**	**2,425**	**2,426**	**2,425**
6	Hungry Horse	104	104	104
7	**Ice Harbor**	**232**	**231**	**232**
8	**John Day**	**1,076**	**1,075**	**1,075**
9	Libby	216	216	216
10	**Little Goose**	**300**	**299**	**299**
11	**Lower Granite**	**291**	**291**	**291**
12	**Lower Monumental**	**314**	**314**	**314**
13	**McNary**	**646**	**645**	**645**
14	**The Dalles**	**815**	**813**	**814**
15	**Total Regulated Hydro**	**8,528**	**8,461**	**8,494**
16	**Total Big 10 Hydro**			**7,930**
17	**Big 10 Hydro Projects as a percent of Regulated Hydro**			**93%**
	Big 10 Hydro Projects shown in bold.			

Table 3.3
Federal System
120-Hour Regulated Hydro Peaking Capacity
Curve from HOSS
Example for January 2012

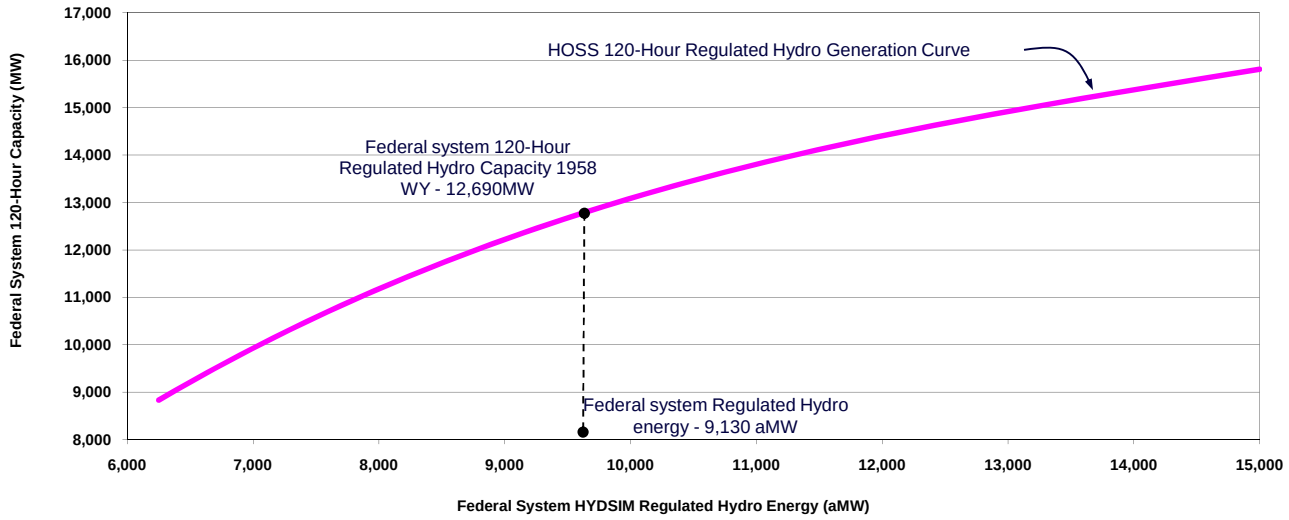


Table 3.4
Balancing Reserve Capacity Amounts Used as Inputs to HOSS
99.5% Level of Service with Customer-Supplied Generation Imbalance

	A	B	C	D
	Month	Installed Wind Capacity (MW)	Total *Inc* (MW)	Total *Dec* (MW)
1	Oct-11	3,792	694	(873)
2	Nov-11	3,792	694	(873)
3	Dec-11	3,792	694	(873)
4	Jan-12	3,792	694	(873)
5	Feb-12	3,792	694	(873)
6	Mar-12	4,042	702	(888)
7	Apr-12	4,332	739	(943)
8	May-12	4,332	739	(943)
9	Jun-12	4,332	739	(943)
10	Jul-12	4,332	739	(943)
11	Aug-12	4,673	783	(1,010)
12	Sep-12	4,764	789	(1,017)
13	Oct-12	4,764	791	(1,019)
14	Nov-12	4,764	791	(1,019)
15	Dec-12	5,222	853	(1,096)
16	Jan-13	5,222	853	(1,096)
17	Feb-13	5,297	866	(1,114)
18	Mar-13	5,297	866	(1,114)
19	Apr-13	5,297	866	(1,114)
20	May-13	5,297	866	(1,114)
21	Jun-13	5,297	866	(1,114)
22	Jul-13	5,347	873	(1,123)
23	Aug-13	5,525	898	(1,156)
24	Sep-13	5,525	898	(1,156)
25	**FY 2012-2013 Annual Average**	**4,693**	**791**	**(1,012)**

Table 3.5
Balancing Reserve Capacity Reserve
Power Net Revenue Requirement for
Big 10 Projects in BPA Balancing Authority Area
($ in thousands)

	A	B	C	D
		FY 2012	FY 2013	Annual Average for FY 2012-FY 2013
1	**All Hydro Projects 1/**			
2	O&M	$ 223,103	$ 231,060	**$ 227,081**
3	Depreciation	$ 75,547	$ 78,519	**$ 77,033**
4	Net Interest	$ 100,563	$ 108,051	**$ 104,307**
5	Minimum Required Net Revenues	$ 17,692	$ 6,364	**$ 12,028**
5	Planned Net Revenues for Risk	$ -	$ -	**$ -**
6	**Total Revenue Requirement**	$ 416,905	$ 423,994	**$ 420,449**
7	**Fish & Wildlife**			
8	O&M	$ 290,881	$ 299,235	**$ 295,058**
9	Amortization/Depreciation	$ 41,439	$ 44,305	**$ 42,872**
10	Net Interest	$ 48,997	$ 54,957	**$ 51,977**
11	Minimum Required Net Revenues	$ 8,620	$ 3,236	**$ 5,928**
11	Planned Net Revenues for Risk	$ -	$ -	**$ -**
12	**Subtotal**	$ 389,937	$ 401,732	**$ 395,835**
13	**A&G Expense 2/**	$ 122,964	$ 125,269	**$ 124,117**
14	**Total Revenue Requirement**	$ 929,807	$ 950,995	**$ 940,401**
15	**Revenue Credits**			
16	4h10C (non-operations)	$ 58,321	$ 59,131	**$ 58,726**
17	Colville payment Treasury Credit	$ 4,600	$ 4,600	**$ 4,600**
18	Synchronous Condensing	$ 318	$ 296	**$ 307**
19	**Net Revenue Requirement**	$ 866,568	$ 886,968	**$ 876,768**

1/ Excludes Boise, Minidoka-Palisades, Green Springs (Reclamation) and Lost Creek (COE).

2/ Power Marketing Sales & Support, Power Scheduling, Generation Oversight, Corporate Expense and 1/2 Planning Council

Table 3.6
Cost Allocation for Embedded Cost Portion of Balancing Reserve Capacity Reserves

	A	B
	Average water conditions (1958 water)	Annual Average of FY2012-FY2013
	Assumptions for Calculation:	
1	Regulated Hydro Projects Adjusted for Transmission Losses (MW)	10,330
2	Regulating Reserve (MW)	60
3	Operating Reserve less Operating Reserve on rest of System (MW) 1/	530
4	Following Capacity Reserve (MW)	211
5	Variable Energy Resource Balancing Service Reserve (MW)	470
6	Dispatchable Energy Resource Balancing Service Reserve (MW)	51
	Forecast of Hydro Capacity System Uses:	
7	Big 10 Hydro Projects Capacity (Line 1 * .93)	9,607
8	Total PS Reserve Obligation (Line 2+3+4+5+6)	1,322
9	Hydro Projects Capacity System Uses (Line 7+8)	10,929
	Adjusted Revenue Requirement:	
10	PS Net Revenue Requirement for Big 10 Hydro Projects	$ 876,768,000
11	Hydro Projects Capacity System Uses (Line 9)	10,929
12	Total kW/month/year Hydro Project Capacity System Uses (Line 11 * 12 months * 1000 kW/MW)	131,146,564
13	**Unit Cost Allocation of Capacity System Uses $/kW/month (Line 10 / Line 12)**	$ 6.69
	Revenue Forecast for Embedded Unit Cost by Balancing Reserve Capacity Service	
14	Regulating Reserve (Line 2 * Line 13 * 12 months * 1000 kW/MW)	$ 4,816,800
15	VERBS Reserve (Line 5 * Line 13 * 12 months * 1000 kW/MW)	$ 37,731,600
16	DERBS Reserve (Line 6 * Line 13 * 12 months * 1000 kW/MW)	$ 4,094,280
	1/ The 555 MW for Operating Reserve is adjusted to account for 9% of the Non-Spinning portion (half of the total Operating Reserve) being supplied by the rest of the system. .	

Table 3.7
Super Peak Market Prices for FY 2012 by Month and Water Year
($/MWh)

	A	B	C	D	E	F	G	H	I	J	K	L	M
	Water Year	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12
1	1929	31.69	35.52	40.82	45.64	46.17	42.50	37.02	35.04	37.04	44.62	44.35	41.94
2	1930	38.18	46.66	51.15	50.30	50.41	47.67	41.87	40.04	43.50	48.12	50.32	47.62
3	1931	37.41	41.92	49.18	48.23	49.81	47.73	42.54	37.43	45.71	49.97	51.48	46.31
4	1932	38.45	45.95	49.46	45.61	46.12	40.85	35.36	34.00	34.45	44.61	47.27	44.12
5	1933	38.89	46.05	45.54	38.96	39.12	38.27	36.94	36.52	36.30	42.12	43.87	45.90
6	1934	33.39	35.78	37.01	35.61	35.71	35.57	35.54	36.04	39.42	46.97	50.07	45.77
7	1935	37.22	43.52	45.78	38.88	38.99	38.40	35.88	35.96	36.81	43.51	43.93	44.19
8	1936	35.58	40.90	44.49	46.15	46.83	43.19	35.10	32.50	33.98	42.69	44.10	39.83
9	1937	37.53	45.07	50.58	48.90	46.34	43.26	39.03	33.30	36.15	42.09	42.95	40.96
10	1938	32.32	37.40	40.71	35.08	34.13	33.64	32.20	31.35	33.14	40.23	43.51	41.57
11	1939	32.75	40.14	44.49	42.71	42.80	39.96	35.20	34.74	37.49	44.87	47.30	42.37
12	1940	33.12	40.57	43.16	44.95	43.70	36.74	35.09	34.56	36.30	44.36	47.50	44.93
13	1941	33.67	40.55	40.42	44.47	42.74	40.83	36.18	34.22	36.51	43.46	44.91	41.71
14	1942	32.81	38.37	39.93	36.25	41.43	38.76	35.55	35.29	36.43	41.78	43.22	42.03
15	1943	31.64	37.58	40.07	35.01	35.92	35.05	31.02	31.64	33.24	39.74	44.39	43.11
16	1944	32.38	37.62	42.03	43.18	43.30	40.74	35.30	36.19	41.41	46.41	45.96	44.20
17	1945	34.76	39.86	47.70	43.14	46.69	46.98	42.71	37.14	38.21	47.42	48.14	45.23
18	1946	32.87	38.21	40.15	34.51	35.41	33.35	31.78	30.02	31.54	37.98	38.81	36.40
19	1947	33.69	38.57	37.04	35.09	33.76	33.71	35.00	33.20	33.87	39.99	43.11	40.51
20	1948	33.69	38.91	42.65	38.18	38.13	37.26	36.37	33.16	33.88	40.81	43.09	42.06
21	1949	32.51	36.19	40.25	37.61	35.44	31.99	31.29	29.83	31.86	39.97	44.28	40.71
22	1950	34.43	40.18	43.29	35.09	35.56	33.47	34.59	34.02	35.27	41.19	44.29	40.34
23	1951	31.83	34.96	36.21	34.71	34.13	33.04	34.11	33.02	34.52	40.28	43.17	40.58
24	1952	31.00	35.04	37.93	35.30	35.56	34.89	33.77	31.78	33.13	40.73	44.58	45.24
25	1953	36.02	43.66	48.80	45.06	41.89	40.03	38.67	37.60	37.39	44.56	48.11	47.22
26	1954	32.93	38.35	39.40	36.63	35.99	37.62	35.76	34.70	35.30	39.49	43.57	42.77
27	1955	33.52	37.25	40.05	40.50	44.01	39.70	35.88	34.09	33.49	38.07	41.97	44.59
28	1956	33.85	35.80	34.99	33.25	33.40	33.66	34.27	33.13	34.16	40.26	44.94	44.20
29	1957	31.06	37.15	36.61	37.78	41.18	34.28	33.58	30.59	31.79	43.29	46.19	43.79
30	1958	34.49	39.08	45.09	37.14	35.73	34.51	33.84	31.25	33.00	42.46	44.35	41.43
31	1959	34.59	37.23	35.89	33.66	34.94	35.11	35.66	34.70	35.24	40.83	43.56	40.71
32	1960	32.01	36.00	36.91	37.47	41.14	39.82	37.06	36.40	39.70	46.98	48.83	48.22
33	1961	35.51	39.42	41.87	36.03	34.50	31.94	33.23	32.72	33.32	41.17	42.69	41.32
34	1962	38.58	43.95	48.06	42.50	41.95	44.08	37.51	35.84	38.54	48.64	49.48	48.30
35	1963	34.63	39.51	40.77	38.74	40.25	41.09	40.23	38.64	39.34	45.78	47.73	44.43
36	1964	34.64	40.06	40.12	40.19	40.05	39.75	36.53	35.76	35.61	40.67	44.36	43.27
37	1965	33.30	37.36	37.96	32.79	31.99	31.85	33.56	32.11	32.67	39.74	39.48	40.45
38	1966	34.21	38.54	40.76	38.94	41.70	42.34	37.65	37.85	39.44	46.28	47.97	48.24
39	1967	35.20	41.15	40.16	36.39	34.69	35.31	38.27	36.57	34.20	41.85	46.69	45.92
40	1968	31.39	36.13	38.72	35.92	37.11	35.39	37.07	35.51	35.77	41.39	42.48	39.95
41	1969	32.66	35.22	37.08	33.14	31.21	31.54	31.61	27.43	30.19	38.28	41.30	39.19
42	1970	33.45	35.75	39.07	35.92	35.86	36.12	35.77	34.08	34.21	42.44	45.95	44.09
43	1971	33.15	38.60	40.39	33.64	34.36	32.32	33.89	32.33	31.00	38.21	43.51	42.74
44	1972	33.24	37.89	41.51	37.09	36.06	32.96	32.99	32.23	32.36	40.01	44.24	44.18
45	1973	33.76	37.59	37.95	36.31	35.77	37.10	36.02	34.47	35.27	41.67	42.72	39.53
46	1974	34.13	40.46	40.76	32.52	31.57	29.34	29.27	29.00	30.06	35.19	37.08	37.60
47	1975	31.72	34.50	36.27	33.72	31.47	31.27	32.49	29.43	30.28	38.04	41.56	40.31
48	1976	32.44	35.23	38.08	37.24	36.15	34.92	36.01	33.20	34.77	39.70	41.32	38.35
49	1977	32.25	36.53	42.95	45.16	49.95	46.98	42.67	44.59	49.30	53.09	50.51	50.79
50	1978	37.19	41.90	40.58	39.40	38.45	37.16	36.45	34.14	36.97	43.53	44.45	39.30
51	1979	35.26	41.12	46.16	44.86	45.21	40.01	40.04	37.52	37.94	47.01	48.57	44.95
52	1980	33.54	39.42	44.39	40.73	41.68	42.11	35.83	33.66	36.26	45.82	48.96	43.34
53	1981	34.25	40.46	37.90	35.32	36.90	37.13	37.96	37.42	36.72	44.12	44.01	46.46
54	1982	34.52	40.48	41.41	36.55	33.51	30.92	33.26	33.64	34.44	41.05	41.85	39.62
55	1983	32.84	37.30	40.13	37.35	36.68	38.15	39.71	38.59	40.87	46.63	47.20	45.00
56	1984	31.30	32.60	34.79	33.86	35.89	36.48	35.20	35.46	36.99	42.02	43.89	40.11
57	1985	33.14	36.91	38.60	39.70	39.55	37.68	33.59	31.95	33.67	43.11	44.65	42.23
58	1986	36.16	37.54	45.04	38.81	39.15	37.54	38.33	38.43	40.79	46.18	48.63	44.65
59	1987	35.50	39.30	41.27	45.78	46.56	40.62	40.12	37.85	39.32	46.86	51.36	46.64
60	1988	37.63	43.16	46.98	44.46	45.47	41.86	38.29	37.20	38.42	42.89	43.87	42.20
61	1989	34.58	37.80	43.09	36.95	38.44	35.78	34.00	32.27	34.88	39.06	40.92	39.94
62	1990	35.56	37.99	37.35	35.53	36.27	35.97	34.64	34.59	37.55	42.34	44.21	42.28
63	1991	35.84	35.05	39.89	36.08	34.54	33.89	34.54	33.76	36.33	41.17	40.26	40.11
64	1992	33.91	38.43	42.15	39.48	41.20	36.72	36.55	36.34	38.18	45.26	48.05	44.00
65	1993	37.04	42.59	42.72	40.17	44.85	41.99	38.66	38.16	39.91	48.85	48.26	45.01
66	1994	36.64	38.85	44.38	46.96	47.02	45.96	43.01	41.52	43.83	52.04	51.02	46.96
67	1995	37.86	41.84	43.95	37.35	34.60	32.55	32.86	31.55	33.53	39.63	41.87	39.44
68	1996	35.56	37.50	39.37	37.66	37.50	36.61	36.93	36.36	37.59	44.15	45.12	47.73
69	1997	34.01	39.84	41.64	32.02	30.69	28.93	29.85	32.25	33.53	37.21	39.19	38.29
70	1998	32.05	35.90	41.61	40.76	38.54	36.65	36.93	34.64	35.17	43.21	45.05	41.29

Super peak is the eight highest load hours of each day.

Table 3.8
Super Peak Market Prices for FY 2013 by Month and Water Year
($/MWh)

	A	B	C	D	E	F	G	H	I	J	K	L	M
	Water Year	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13
1	1929	43.16	46.32	52.28	52.79	55.86	52.57	45.64	42.01	46.65	48.81	50.39	50.58
2	1930	50.23	49.83	57.58	58.59	61.00	60.85	52.91	45.52	54.62	56.42	59.91	55.87
3	1931	45.47	46.47	51.35	49.48	51.53	44.85	36.24	33.61	34.00	43.37	48.08	47.36
4	1932	43.46	45.04	44.98	41.65	41.77	41.59	38.04	37.39	36.34	42.27	45.50	49.35
5	1933	42.40	39.48	41.98	42.94	41.35	40.96	38.63	38.25	40.47	48.90	55.17	51.42
6	1934	44.63	45.74	51.44	47.65	49.69	48.27	41.49	39.13	42.26	50.04	51.74	53.44
7	1935	42.88	43.78	49.84	52.79	52.91	47.67	36.96	33.78	34.94	43.32	46.38	47.59
8	1936	40.29	42.65	47.88	52.26	54.97	50.56	44.53	37.34	40.76	45.83	47.78	46.78
9	1937	40.21	42.95	47.85	44.15	46.18	44.63	40.00	38.53	39.99	47.25	50.05	48.71
10	1938	41.10	44.52	49.56	52.36	52.73	52.76	41.47	40.39	41.44	49.91	52.98	51.92
11	1939	39.67	42.39	46.21	46.40	45.12	37.82	33.44	33.03	35.88	42.78	47.49	46.60
12	1940	43.15	46.42	52.10	53.72	55.65	54.50	44.87	43.32	46.33	51.66	53.41	51.84
13	1941	38.92	42.24	41.03	40.89	47.06	45.41	39.12	38.39	38.24	42.41	45.52	44.91
14	1942	38.54	41.97	47.72	42.52	43.48	43.67	36.85	36.81	38.28	44.61	49.94	46.04
15	1943	41.42	43.13	48.03	50.03	52.32	49.98	42.56	41.33	48.20	49.44	49.46	48.32
16	1944	42.16	42.24	51.91	50.49	54.75	55.26	49.62	41.83	42.85	50.70	52.96	51.81
17	1945	44.12	47.94	51.41	46.34	50.66	46.25	40.72	38.50	38.51	45.86	50.73	50.49
18	1946	34.72	36.62	37.09	37.23	38.99	40.57	39.21	38.78	38.63	44.46	48.23	47.62
19	1947	36.43	38.00	41.04	40.26	40.91	41.44	37.30	35.14	35.29	42.02	46.47	48.65
20	1948	37.86	40.30	43.78	45.77	47.83	42.67	39.07	38.25	39.50	47.26	54.13	50.78
21	1949	38.59	41.79	44.17	37.81	39.04	36.89	34.41	33.87	34.01	39.63	42.92	44.59
22	1950	36.87	36.64	38.80	39.73	40.78	37.07	36.48	37.43	38.70	46.43	50.03	50.52
23	1951	35.98	37.79	39.56	38.21	39.69	38.38	34.59	33.12	35.24	42.57	44.97	44.41
24	1952	45.65	48.73	56.73	53.51	52.12	47.90	43.29	40.74	39.97	46.29	51.67	53.62
25	1953	43.71	44.57	49.10	46.84	46.67	46.35	42.77	39.38	39.78	43.69	47.35	46.86
26	1954	40.05	40.74	45.36	49.09	51.55	48.08	40.89	39.12	37.99	41.63	44.95	50.73
27	1955	40.52	38.61	41.13	39.71	39.76	38.30	36.78	35.06	35.45	41.89	47.63	48.24
28	1956	39.03	42.12	46.00	48.09	51.92	42.11	38.80	34.95	35.91	46.33	52.35	51.10
29	1957	42.70	45.36	52.51	43.42	44.29	44.59	40.45	37.62	38.26	46.36	51.00	49.08
30	1958	39.47	39.13	39.17	37.38	37.64	38.17	36.31	34.98	35.93	42.66	46.81	43.18
31	1959	35.90	35.84	39.04	41.52	44.80	43.48	37.87	37.99	39.84	46.69	52.79	52.17
32	1960	44.14	44.18	53.22	47.84	48.26	46.89	45.07	43.15	42.59	52.20	58.45	55.21
33	1961	41.29	43.38	50.60	46.43	50.46	49.87	39.35	38.65	39.95	50.71	51.56	51.86
34	1962	45.45	45.28	47.37	47.57	48.00	47.84	43.63	42.42	43.59	48.33	53.10	52.08
35	1963	41.42	43.33	45.77	44.20	46.72	46.02	39.00	37.85	36.71	41.76	47.04	47.59
36	1964	39.92	41.22	40.73	38.75	39.65	39.71	38.48	37.94	38.69	45.67	46.43	49.10
37	1965	36.94	37.42	42.40	41.17	44.31	45.94	37.30	36.63	38.69	45.47	50.30	51.15
38	1966	46.66	48.20	50.11	45.21	43.59	43.04	43.26	41.28	38.17	45.36	52.04	51.19
39	1967	40.44	41.50	44.36	40.71	42.32	41.38	40.87	39.77	39.53	44.42	48.44	47.16
40	1968	36.92	38.09	39.46	40.27	39.76	40.03	37.55	34.34	34.11	41.88	47.28	45.82
41	1969	36.89	38.95	44.12	40.68	41.86	43.42	40.56	39.24	38.38	45.74	50.61	49.75
42	1970	40.93	43.93	45.47	39.95	40.42	37.75	36.58	37.49	35.29	41.63	45.94	47.33
43	1971	40.33	42.11	44.98	40.98	40.39	36.35	34.06	34.22	33.66	38.83	43.46	43.26
44	1972	43.12	44.95	47.76	45.58	48.21	50.28	46.00	44.35	45.40	50.52	58.53	57.57
45	1973	37.80	39.53	40.02	35.72	33.18	34.16	31.87	33.98	33.03	38.51	42.35	46.05
46	1974	37.32	39.49	40.65	38.74	36.82	38.49	37.33	35.07	35.26	43.57	50.77	51.33
47	1975	35.91	35.82	36.73	38.44	39.96	39.93	37.71	37.80	38.79	43.06	45.72	45.53
48	1976	37.94	42.12	47.43	49.82	53.83	51.42	44.05	45.69	50.25	50.84	52.54	52.49
49	1977	48.17	48.80	48.60	47.86	43.81	43.25	40.09	39.07	40.75	46.81	48.33	48.61
50	1978	38.14	41.51	45.15	45.73	47.31	43.03	41.12	37.64	39.77	47.80	53.79	50.21
51	1979	44.66	46.01	52.49	51.76	55.63	55.15	42.75	40.83	41.72	51.44	55.17	51.08
52	1980	41.75	44.06	41.80	42.89	41.81	43.49	42.36	40.51	39.49	45.63	48.90	52.77
53	1981	43.61	43.09	48.64	44.66	40.76	39.88	39.68	39.36	39.69	46.67	47.23	45.70
54	1982	37.28	40.06	41.83	39.78	41.20	37.95	37.57	37.38	38.61	44.12	45.88	45.76
55	1983	42.00	40.45	43.77	41.81	44.86	43.97	40.15	38.85	41.26	46.46	48.87	48.51
56	1984	38.61	38.94	44.87	47.35	49.18	47.14	39.66	38.34	40.26	49.26	53.59	50.64
57	1985	40.60	39.02	46.67	43.02	42.68	40.60	39.16	39.33	41.16	45.56	48.04	47.47
58	1986	44.08	42.50	46.48	51.56	54.55	47.62	44.74	41.40	42.90	50.98	56.40	53.66
59	1987	45.80	47.98	53.09	52.64	53.02	49.75	42.73	42.15	43.65	46.59	48.32	47.59
60	1988	42.11	43.63	50.31	47.39	51.24	46.10	41.85	40.51	43.35	47.84	52.50	54.18
61	1989	39.17	37.19	41.00	39.91	43.69	44.45	40.20	40.10	41.83	46.43	49.02	47.82
62	1990	42.19	37.27	42.19	41.66	41.64	42.64	40.25	39.36	40.02	44.52	45.37	49.19
63	1991	40.35	41.58	48.75	47.13	47.28	44.25	41.11	39.35	42.38	50.54	54.93	54.34
64	1992	42.66	42.72	47.12	45.99	52.16	50.28	44.11	41.42	42.23	49.85	52.36	48.75
65	1993	45.27	42.51	49.41	48.78	50.99	49.91	44.39	42.14	46.15	52.87	55.75	52.23
66	1994	48.82	47.00	53.50	49.00	45.06	42.64	40.45	38.81	40.31	45.60	52.14	49.10
67	1995	36.94	34.95	36.02	37.13	37.65	37.67	36.34	35.87	37.38	42.95	44.41	49.59
68	1996	44.62	45.37	46.75	38.25	35.99	36.40	34.34	36.00	37.14	40.46	44.83	46.30
69	1997	35.75	36.60	41.79	43.01	42.82	44.47	42.76	39.44	39.80	45.99	48.00	45.85
70	1998	38.18	41.28	48.37	52.97	55.13	52.65	44.50	40.82	41.98	48.35	52.17	46.83

Super peak is the eight highest load hours of each day.

Table 3.9
Graveyard Market Prices for FY 2012 by Month and Water Year
($/MWh)

	A	B	C	D	E	F	G	H	I	J	K	L	M
	Water Year	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12
1	1929	23.94	26.29	28.68	30.45	31.37	30.13	28.92	25.19	23.07	28.51	26.92	28.17
2	1930	27.38	31.94	33.18	33.37	34.43	33.55	32.89	27.63	25.71	29.50	29.42	31.15
3	1931	26.82	29.13	32.68	32.10	34.10	34.11	31.90	26.57	28.43	31.12	30.43	31.37
4	1932	27.35	31.10	32.04	30.32	31.58	29.74	26.78	16.04	15.58	28.75	27.77	29.59
5	1933	28.18	31.46	32.05	29.40	29.52	28.88	28.65	22.72	15.40	19.56	23.82	31.08
6	1934	24.92	26.73	23.87	22.60	25.27	26.05	20.22	19.88	22.34	29.10	29.90	30.97
7	1935	26.95	30.08	30.87	29.03	29.47	28.31	28.28	21.67	23.09	25.52	26.31	29.66
8	1936	26.02	28.66	29.45	30.45	31.87	30.28	27.83	16.84	17.70	26.87	25.85	26.63
9	1937	27.35	31.13	32.84	32.49	31.91	30.57	30.01	22.22	22.20	26.29	26.78	28.05
10	1938	24.35	26.90	29.21	25.47	25.37	25.08	21.37	15.20	17.56	22.58	25.85	27.91
11	1939	24.75	28.36	30.53	29.47	29.91	28.96	25.38	19.47	22.93	26.18	28.22	29.69
12	1940	24.83	28.88	30.47	30.41	29.89	27.85	25.26	21.42	21.99	27.72	27.10	30.84
13	1941	25.55	28.60	28.16	30.18	29.88	29.27	28.89	21.95	23.12	25.90	27.01	27.28
14	1942	24.70	27.84	28.75	26.42	30.09	29.35	27.02	20.89	18.64	22.02	25.26	26.85
15	1943	24.49	27.07	28.68	24.19	27.09	26.29	10.96	11.65	12.27	20.36	25.07	29.14
16	1944	24.55	27.32	29.13	29.99	30.29	28.88	28.42	23.98	25.19	28.27	27.49	29.62
17	1945	25.74	28.94	32.28	29.87	32.57	34.12	33.59	17.22	19.37	29.45	26.67	30.23
18	1946	24.97	27.65	28.94	25.13	26.85	24.70	16.61	12.12	14.60	20.50	23.09	24.56
19	1947	25.66	28.41	23.22	23.63	23.15	24.74	22.61	16.15	15.40	21.86	24.27	26.89
20	1948	22.98	28.77	30.65	25.38	29.69	27.27	22.52	11.37	13.09	20.33	21.93	28.92
21	1949	24.28	26.65	29.32	27.23	26.30	23.27	18.73	13.29	16.28	25.50	25.98	26.82
22	1950	26.05	29.01	30.71	23.19	26.58	22.06	18.71	15.39	14.72	20.86	22.44	27.43
23	1951	23.92	25.80	22.50	21.48	20.86	21.07	17.86	15.86	17.63	19.92	24.62	27.46
24	1952	22.76	26.74	27.23	26.06	26.96	25.88	20.66	14.02	17.13	23.44	25.10	29.78
25	1953	26.64	30.48	32.69	31.89	31.40	29.92	29.44	19.43	15.87	20.72	27.44	31.47
26	1954	24.94	28.17	29.13	25.43	27.23	28.08	25.09	17.48	15.65	17.53	19.90	26.29
27	1955	25.40	27.60	29.26	28.83	30.90	28.94	28.41	21.42	14.06	18.17	23.65	29.93
28	1956	25.43	26.85	23.94	21.02	21.90	24.51	18.47	15.01	14.10	20.38	26.04	29.59
29	1957	23.42	27.00	26.84	27.52	29.96	25.68	23.00	13.57	14.23	27.32	27.06	29.77
30	1958	25.19	27.48	29.77	27.64	27.44	25.89	23.50	12.28	15.46	26.83	27.33	27.70
31	1959	26.03	27.73	24.49	22.19	24.26	25.46	23.11	18.50	16.20	23.69	24.50	23.77
32	1960	22.02	25.31	26.54	27.43	31.65	29.33	18.16	19.25	18.62	27.26	28.50	31.82
33	1961	26.48	28.95	30.03	26.70	25.89	22.84	23.85	18.73	15.61	25.51	25.53	27.67
34	1962	28.34	31.28	34.04	31.30	31.62	32.61	16.55	16.52	17.39	31.45	28.29	32.64
35	1963	26.27	28.97	27.69	27.83	30.57	30.94	30.60	20.36	20.70	26.17	28.42	29.23
36	1964	25.84	28.64	28.73	29.01	29.56	29.26	26.66	18.94	12.34	17.86	24.33	28.82
37	1965	25.06	27.89	24.68	19.96	20.14	23.08	21.85	15.39	17.40	23.09	22.65	27.28
38	1966	25.95	28.59	29.70	28.14	31.37	31.28	19.73	17.57	18.59	21.98	28.33	32.62
39	1967	26.16	29.00	29.54	21.49	22.59	26.64	27.94	17.07	11.21	18.71	27.86	29.91
40	1968	24.02	27.27	28.90	25.05	26.30	25.61	27.88	21.08	17.52	21.71	25.96	26.57
41	1969	24.26	25.26	25.80	19.62	21.70	22.74	14.69	7.31	11.69	18.86	22.39	24.82
42	1970	24.82	26.68	28.01	23.92	26.68	26.02	22.74	15.48	14.37	25.05	26.50	29.44
43	1971	25.17	27.42	29.02	19.19	14.57	22.66	17.34	11.11	10.18	16.44	19.69	28.52
44	1972	24.96	27.92	29.71	19.85	18.99	10.56	12.98	10.14	9.62	15.05	17.20	27.25
45	1973	25.45	27.66	26.73	23.17	26.79	26.09	27.25	18.68	18.42	24.36	24.47	26.67
46	1974	25.81	28.58	28.73	9.22	10.31	13.30	9.28	8.23	8.60	11.05	14.84	23.68
47	1975	23.36	25.40	26.37	15.37	18.90	18.12	22.46	8.04	15.06	18.43	24.97	26.31
48	1976	24.70	25.42	17.06	21.03	22.94	22.27	17.79	12.13	13.76	17.98	15.79	19.63
49	1977	24.41	27.65	31.37	31.92	34.30	33.85	33.79	29.20	28.96	31.45	29.76	34.44
50	1978	27.53	30.30	29.58	26.31	27.34	28.07	23.62	20.40	21.44	24.14	25.34	25.43
51	1979	27.42	30.73	33.65	30.34	33.69	29.85	30.92	20.80	23.75	27.41	28.97	30.28
52	1980	25.15	28.13	30.23	28.42	29.15	29.88	27.16	16.08	18.65	28.68	28.86	29.25
53	1981	25.71	29.35	25.17	24.71	27.17	27.70	29.87	21.91	16.15	21.86	23.72	31.95
54	1982	25.87	29.52	28.98	22.40	15.95	17.20	19.62	16.51	16.15	21.26	19.57	25.37
55	1983	24.94	27.42	27.42	24.34	26.94	26.39	26.79	17.60	17.17	21.94	25.41	26.83
56	1984	24.08	22.35	23.41	24.04	27.72	26.71	21.08	19.67	17.96	22.40	24.61	28.22
57	1985	25.14	27.37	28.11	29.04	28.59	27.88	24.95	18.45	20.08	27.35	26.51	28.18
58	1986	26.77	27.26	32.83	24.83	30.17	21.07	20.53	19.69	18.63	24.77	25.75	31.59
59	1987	26.50	28.72	30.04	31.83	32.64	31.04	30.58	21.12	23.35	28.57	30.35	31.27
60	1988	26.97	30.06	31.58	30.01	31.88	30.65	29.63	23.24	22.58	24.55	24.67	29.39
61	1989	25.56	27.56	30.25	25.11	27.30	26.74	22.59	20.26	20.22	23.21	24.38	27.41
62	1990	26.32	27.78	27.10	24.42	27.00	27.35	23.68	21.06	19.39	24.52	24.10	28.70
63	1991	26.52	25.28	28.54	23.06	25.95	25.16	22.41	18.46	19.95	19.10	20.19	27.50
64	1992	25.84	28.23	30.40	27.01	30.27	27.42	27.83	21.16	23.17	26.77	27.91	29.87
65	1993	27.14	30.08	29.87	26.54	31.03	30.51	29.67	21.24	24.06	27.79	27.35	30.71
66	1994	27.41	28.79	31.84	33.43	34.29	34.16	34.43	25.68	25.12	31.69	29.43	32.71
67	1995	27.29	29.80	29.96	27.38	26.62	24.41	24.68	21.90	19.30	23.24	25.14	26.81
68	1996	26.89	27.05	12.97	20.31	17.93	25.20	19.01	15.34	15.81	18.77	24.25	32.81
69	1997	25.13	28.83	28.84	12.39	15.01	11.78	11.96	12.84	12.43	13.32	19.15	23.55
70	1998	19.69	25.17	27.30	24.42	29.25	26.62	24.52	13.97	16.00	22.41	25.02	28.05

Graveyard is the period of clock hours 01:00-04:00 each day.

Table 3.10
Graveyard Market Prices for FY 2013 by Month and Water Year
($/MWh)

	A	B	C	D	E	F	G	H	I	J	K	L	M
	Water Year	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13
1	1929	30.90	32.31	34.60	36.12	38.23	37.62	34.79	31.88	27.02	29.29	30.39	33.54
2	1930	35.83	35.17	38.04	40.01	41.79	44.01	39.87	34.64	31.00	32.80	35.54	36.70
3	1931	32.95	32.35	33.88	33.64	35.23	32.25	27.06	20.11	17.24	28.17	28.48	31.38
4	1932	31.62	31.96	31.61	31.09	30.76	31.23	29.27	26.22	16.56	18.75	26.69	33.30
5	1933	31.17	29.47	26.88	26.53	27.98	30.50	23.53	25.43	22.36	29.77	33.10	34.40
6	1934	32.54	32.43	34.64	34.92	36.19	34.75	32.14	27.59	23.77	26.99	30.28	35.37
7	1935	30.88	30.87	32.80	35.60	35.92	33.89	29.49	20.31	18.79	26.24	27.32	31.48
8	1936	29.42	30.28	31.47	35.36	37.09	35.74	33.71	28.69	23.73	27.05	29.05	30.76
9	1937	30.11	30.70	33.42	31.38	34.61	32.54	26.56	20.14	20.66	24.68	30.42	33.52
10	1938	30.92	31.85	33.56	36.58	36.18	38.14	31.54	25.27	24.24	27.54	32.48	35.08
11	1939	30.35	30.78	32.05	32.04	31.12	28.25	24.81	23.59	21.79	25.32	28.32	31.21
12	1940	32.08	33.00	35.32	37.00	38.17	39.45	36.07	30.60	26.35	28.44	31.35	35.41
13	1941	30.10	30.71	28.59	29.96	34.17	33.47	30.56	25.72	19.23	21.38	27.95	29.67
14	1942	29.70	30.57	33.15	28.92	32.17	32.80	12.91	14.48	13.85	20.82	29.22	31.29
15	1943	31.24	31.47	32.62	35.21	36.29	35.88	34.66	30.16	26.63	28.24	29.75	32.89
16	1944	31.51	30.29	35.17	35.37	38.31	40.53	39.12	21.53	19.57	28.97	30.47	35.88
17	1945	33.39	33.95	36.28	33.03	37.70	34.19	22.85	16.12	16.56	21.74	28.78	33.62
18	1946	26.01	26.52	22.88	25.18	27.04	30.96	27.20	21.76	17.53	21.88	28.28	32.96
19	1947	24.22	28.01	28.90	26.36	31.67	30.28	24.53	14.23	13.60	17.86	22.69	32.22
20	1948	27.88	28.40	30.29	32.73	35.16	30.07	23.09	17.18	17.42	27.04	31.63	33.89
21	1949	29.45	30.17	30.65	25.19	28.90	24.64	20.72	18.57	16.77	20.35	23.52	29.49
22	1950	26.83	24.72	24.62	24.04	25.48	23.66	22.05	20.28	18.90	21.56	28.78	33.27
23	1951	25.99	28.18	28.25	27.23	29.39	28.37	22.47	19.27	19.05	23.50	27.69	29.78
24	1952	33.74	34.25	38.13	38.14	37.86	35.13	33.13	25.53	17.02	20.98	30.01	36.22
25	1953	32.57	32.08	34.81	31.39	34.91	34.59	30.69	22.48	17.35	17.60	22.34	30.33
26	1954	30.43	29.22	32.38	34.90	35.54	34.53	32.71	28.41	15.73	18.15	25.29	33.83
27	1955	30.09	27.57	25.40	23.32	26.14	26.12	21.01	19.37	14.76	18.96	29.11	32.26
28	1956	28.86	30.78	32.67	34.56	36.16	31.80	26.86	17.58	16.92	28.51	31.03	33.84
29	1957	31.47	32.36	35.20	31.43	32.72	33.72	27.22	16.06	16.18	26.60	29.73	33.67
30	1958	29.25	28.30	26.62	23.72	27.83	28.20	25.85	23.45	18.12	23.32	28.39	27.42
31	1959	24.49	24.83	26.90	29.89	32.62	31.99	21.45	24.84	20.40	26.70	31.55	34.61
32	1960	32.58	32.00	37.08	34.36	35.16	32.16	32.59	26.28	17.54	30.34	34.64	37.13
33	1961	30.71	31.20	35.12	33.85	37.49	36.03	17.95	21.51	18.14	30.94	30.38	35.04
34	1962	33.97	32.36	32.38	33.79	37.12	35.34	34.43	26.03	21.95	26.16	32.22	34.90
35	1963	31.00	31.06	32.43	31.92	34.02	34.16	28.77	24.33	15.06	18.28	26.78	31.25
36	1964	30.06	29.75	25.98	21.30	24.45	29.27	26.29	20.28	18.41	24.86	26.71	33.16
37	1965	27.58	27.02	29.91	29.82	32.26	33.83	22.67	21.60	19.79	22.85	31.39	34.10
38	1966	34.58	34.61	35.17	24.77	28.31	32.01	34.04	22.62	13.07	20.35	31.32	33.93
39	1967	29.49	30.00	31.23	26.63	30.74	30.37	32.15	26.13	18.10	21.62	29.67	30.94
40	1968	27.67	24.47	26.09	22.06	26.69	28.98	16.97	10.99	12.93	18.56	25.04	30.25
41	1969	26.93	24.42	29.67	25.51	31.22	30.98	28.83	19.42	15.80	25.70	30.39	33.30
42	1970	30.69	30.34	30.82	21.12	17.66	25.28	20.81	15.79	12.16	16.30	23.26	31.72
43	1971	30.06	28.29	30.07	20.85	21.49	12.98	14.70	13.85	11.22	15.70	18.07	28.60
44	1972	32.46	29.95	29.45	29.30	36.77	35.88	37.22	23.88	19.64	25.65	31.83	40.60
45	1973	29.05	27.09	27.74	10.38	10.73	14.60	11.67	11.55	9.02	10.25	15.43	28.54
46	1974	26.09	25.25	26.28	18.14	23.22	21.88	27.32	11.43	16.74	18.26	29.60	34.09
47	1975	26.86	21.35	16.94	23.48	25.64	24.94	19.92	16.52	16.59	18.16	18.69	24.08
48	1976	28.91	28.82	31.01	34.74	36.63	36.31	34.86	33.71	27.50	27.89	31.28	34.57
49	1977	35.46	35.31	33.37	32.67	32.35	32.32	27.54	25.60	23.00	24.32	27.39	31.15
50	1978	29.80	30.02	29.33	31.83	33.80	31.33	32.24	24.86	24.05	27.10	32.36	34.34
51	1979	33.13	32.62	34.99	36.33	38.70	38.91	33.62	20.90	18.53	31.29	32.62	34.19
52	1980	31.68	32.02	26.13	29.39	30.54	32.22	32.98	28.85	18.87	21.74	27.08	36.36
53	1981	32.46	31.33	34.37	25.01	17.63	20.39	25.10	20.50	17.60	20.89	23.53	29.74
54	1982	27.53	28.29	28.69	25.97	31.30	25.75	24.86	21.88	18.77	20.97	26.04	28.71
55	1983	32.40	24.51	28.41	26.71	32.46	32.88	24.27	25.06	18.67	22.03	28.43	33.53
56	1984	29.38	27.64	32.08	34.21	35.13	34.39	29.78	23.66	22.47	29.52	31.89	34.07
57	1985	29.98	28.13	32.49	27.36	33.51	23.99	24.95	26.04	19.85	24.59	27.25	32.68
58	1986	33.45	29.50	31.87	36.02	38.66	35.59	35.43	26.70	23.25	29.32	34.15	36.44
59	1987	33.08	32.96	35.35	36.00	36.84	36.50	33.93	30.82	23.07	25.32	28.33	33.27
60	1988	31.67	30.95	33.91	31.88	36.73	34.78	29.10	27.56	22.25	25.15	32.50	37.09
61	1989	28.69	27.21	28.27	27.82	32.50	32.61	28.61	27.74	20.20	24.28	27.16	33.13
62	1990	31.20	26.46	28.52	24.51	29.95	32.21	27.10	23.84	21.46	19.77	22.37	33.04
63	1991	30.26	29.91	32.76	32.91	33.95	33.60	32.27	26.89	24.83	28.07	32.59	36.70
64	1992	31.70	30.96	31.33	29.63	36.85	36.70	35.03	27.04	24.26	27.37	30.10	33.99
65	1993	33.00	28.68	32.81	34.20	36.18	36.73	35.77	31.48	24.84	30.71	33.11	35.49
66	1994	35.57	33.69	36.22	35.26	32.85	31.72	30.31	26.91	20.03	23.89	31.76	32.93
67	1995	27.61	23.12	13.92	21.43	21.18	25.96	21.91	19.49	17.51	17.83	25.72	33.28
68	1996	32.72	32.76	32.84	13.81	17.23	15.32	15.54	16.67	14.04	13.32	21.86	29.47
69	1997	18.78	23.55	24.55	27.48	33.72	33.15	29.14	18.13	17.54	21.47	27.70	31.55
70	1998	29.33	28.95	31.63	35.69	37.16	37.37	34.47	31.32	24.67	29.62	31.15	31.08

Graveyard is the period of clock hours 01:00-04:00 each day.

Table 3.11
Variable Costs Sub-Categories of
Stand Ready and Deployment Costs from the GARD Model

	A	B	C
		Annual Average $	Annual Average MWh
1	Energy Shift *dec*	-14,979,908	-1,310,116
2	Energy Shift Non-Spinning *inc*	-2,678,914	-89,379
3	Energy Shift Spinning *inc*	-5,935,277	-401,475
4	Efficiency Loss *dec*	1,230,831	30,580
5	Efficiency Loss Non-Spinning	290,262	7,523
6	Efficiency Loss Spinning	-624,340	-13,594
7	Cycling Loss *dec*	-114,489	-2,802
8	Cycling Loss Non-Spinning	-5,499	-138
9	Cycling Loss Spinning	-75,614	-1,988
10	Spill Losses Non-Spinning	-170,083	-6,108
11	Spill Losses Spinning	-1,167,011	-35,636
12	Deployment Response Losses *inc*	-616,140	-15,620
13	Deployment Response Losses *dec*	-878,837	-21,689
14	Deployment cycling Loss *inc*	-117,319	-2,937
15	Deployment cycling Loss *dec*	-60,741	-1,510
16	Deployment Spill Loss *dec*	-2,916	-90
17	Total	-25,905,994	-1,864,979

Table. 3.12
Variable Costs by Service Under 99.5% Level of Service with Customer-Supplied Generation Imbalance

	Service	$
	A	B
1	Regulating Reserve	1,784,250
2	VERBS Reserve	9,801,896
3	Operating Reserve - Spinning	4,100,264
4	DERBS Reserve	1,659,163
5	Load Following and Energy Imbalance	5,560,421
6	**Total Variable Costs**	**22,905,994**

Source of the data is the GARD Model except for the VERBS Reserve cost, which is the GARD Model output reduced by $3 million for the *Dec* Acquisition Pilot as described in the Study, sections 3.3.2 and 3.4.5.

Table. 3.13
Variable Costs Components for VERBS Under 99.5% Level of Service with Customer-Supplied Generation Imbalance

	Component	MW	$	$
	A	B	C	D
1	Regulating Reserve *inc*	34.0	502,968	502,968
2	Regulating Reserve *dec*	34.5	504,514	340,527
3	Following Reserve *inc*	166.6	1,797,729	1,797,729
4	Following Reserve *dec*	171.1	2,502,959	1,678,200
5	Imbalance reserve *inc*	268.4	1,392,353	1,392,353
6	Imbalance reserve *dec*	417.0	6,101,373	4,090,119

Source of the data for Column C is the GARD Model. Column D shows the GARD Model output reduced by $3 million for the *Dec* Acquisition Pilot as described in the Study, sections 3.3.2 and 3.4.5.

Table. 3.14
Variable Costs Components for DERBS Under 99.5% Level of Service with Customer-Supplied Generation Imbalance

	Component	MW	$
	A	B	C
1	Regulating Reserve *inc*	13.1	194,095
2	Regulating Reserve *dec*	16.8	246,212
3	Following Reserve *inc*	16.3	175,379
4	Following Reserve *dec*	21.1	308,922
5	Imbalance reserve *inc*	21.7	112,495
6	Imbalance reserve *dec*	42.5	622,060
7	**Total Reserve *inc***	**51.1**	**481,969**
8	**Total Reserve *dec***	**80.5**	**1,177,193**

Table 4.1
Total Balancing Authority Area Reserve Obligation
WECC Operating Reserve Standard BAL-STD-002-0

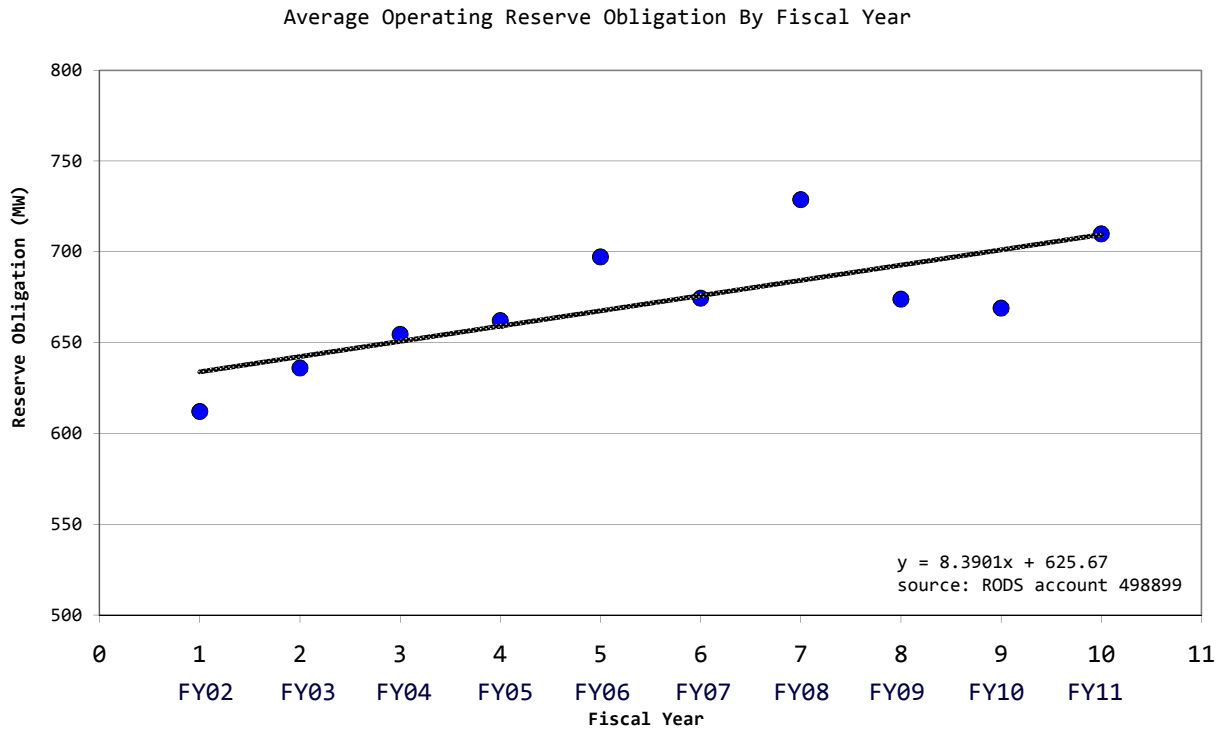
Balancing Authority Operating Reserve Obligations (RODS Account 498899) Average by Month (in MW)

		FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11
	A	B	C	D	E	F	G	H	I	J	K
1	OCT	423.9	559.9	590.3	618.3	587.6	641.2	595.1	621.5	640.7	623.1
2	NOV	535.1	610.2	649.6	686.6	663.0	613.4	650.2	627.6	614.6	692.7
3	DEC	592.0	672.6	674.7	728.8	710.2	711.2	746.4	734.8	760.1	713.5
4	JAN	640.6	622.8	688.6	719.0	656.5	756.2	792.2	771.5	634.2	774.0
5	FEB	608.6	608.0	675.1	686.4	703.5	659.3	745.2	690.2	622.6	755.9
6	MAR	576.6	629.8	628.3	662.5	644.2	680.6	732.8	707.6	661.1	741.9
7	APR	633.8	644.1	622.4	618.3	747.7	698.2	720.9	681.9	614.0	670.9
8	MAY	651.5	619.7	654.4	600.3	758.8	686.0	756.4	615.4	595.8	710.3
9	JUN	752.9	665.3	724.8	617.5	806.7	649.3	866.3	677.1	764.3	710.3
10	JUL	707.2	699.3	694.2	723.7	744.7	719.3	766.1	715.8	717.3	710.3
11	AUG	650.7	691.6	642.1	681.8	702.2	674.9	700.3	623.3	708.0	710.3
12	SEP	573.3	607.1	611.4	600.6	645.1	598.7	673.5	618.8	690.8	710.3
13	**FY AVG**	**612.1**	**636.1**	**654.6**	**662.1**	**697.3**	**674.5**	**728.7**	**673.9**	**669.0**	**709.9**

Column B to J: FY 2002 to 2010 Balancing Authority Operating Reserve Obligation actuals.

Column K: FY 2011 forecast based on actual Balancing Authority Operating Reserve Obligation from October 2010 through April 2011 and forecast for May 2011 through September 2011 based on the average of October 2010 through April 2011.

Table 4.2
Total Balancing Authority Reserve Obligation
WECC Operating Reserve Standard BAL-STD-002-0



FY 2002 through FY 2010 are BPA Balancing Authority Operating Reserve Obligation actuals. FY 2011 is a forecast year based on actuals for October 2010 through April 2011 and a forecast for May 2011 through September 2011.

Table 4.3
Total BPA Balancing Authority Area Reserve Obligation
WECC Operating Reserve Standard BAL-STD-002-0

	A	B	C	D
	(MW)	**Total BPA BAA Reserve Obligation**	**Total Third-Party Supply/ Self-Supply Reserve Obligation**	**Total BPA BAA Reserve Obligation Provided by BPA PS**
1	FY 2012	717.9	107.7	610.2
2	FY 2013	726.3	107.7	618.6
3	**Annual Average of FY 2012 to FY 2013**	**722.1**	**107.7**	**614.4**

Column C: Total Third Party and Self-Supply is based on customer election for FY 2012-2013.

Column D: BPA Power Services share of the Operating Reserve Obligation is Column B minus Column C.

Table 4.4
Calculation of Total Balancing Authority Reserve Obligation
Proposed WECC OR Standard BAL-002-WECC-1

	A	B	C	D	E	F
	Fiscal Year	**BPA Area Load (MW)**	**Total System Generation (MW)**	**3% BA Load (MW)**	**3% BA Generation (MW)**	**Total BPA BAA Reserve Obligation (MW)**
1	2005	5,289	11,523			
2	2006	5,441	12,200			
3	2007	5,752	11,869			
4	2008	6,429	12,593			
5	2009	6,099	11,848			
6	2010	5,945	11,631			
7	2011 Forecast	6,063	12,431	182	373	554.8
8	2012 Forecast	6,057	12,419	182	373	554.3
9	2013 Forecast	6,143	12,595	184	378	562.1
10	**FY 2012-2013 Average**					**558.2**

BPA area load from RODS (account 242200) from FY 2005 through FY 2010. FY 2011 through FY 2013 is forecast based on Agency Load forecast.

BPA total system generation (account 202100) to load ratio is 2.11:1 based on historical average.

Table 4.5
Total BPA Balancing Authority Area Reserve Obligation
Proposed WECC OR Standard BAL-002-WECC-1

	A	B	C	D
		Total BPA BAA Reserve Obligation (MW)	**Total Third-Party Supply/Self-Supply Reserve Obligation (MW)**	**Total BPA BAA Reserve Obligation Provided by BPA PS (MW)**
1	FY 2012	554.3	62.1	492.2
2	FY 2013	562.1	62.1	500.0
3	**Annual Average of FY 2012-2013**	**558.2**	**62.1**	**496.1**

Column C: Total Third Party and Self-Supply is based on customer election for FY 2012-2013.
Column D: BPA Power Services share of the Reserve Obligation is Column B minus Column C.

Table 4.6
Balancing Authority Reserve Obligation Provided by BPA PS by Month

	A	B	C	D
		FY 2012 (MW)	FY 2013 (MW)	FY 2012-2013 Average
1	Oct	566.6	464.3	
2	Nov	565.8	463.6	
3	Dec	644.4	528.0	
4	Jan	636.8	521.7	
5	Feb	566.4	464.1	
6	Mar	612.8	502.1	
7	Apr	597.9	489.9	
8	May	616.2	504.9	
9	Jun	639.4	523.9	
10	Jul	662.8	543.1	
11	Aug	642.8	526.7	
12	Sep	570.9	467.7	
13	**FY Average**	**610.2**	**500.0**	**555.1**

Column B: BAL-STD-002-0 effective for FY 2012

Column C: BAL-002-WECC-1 effective for FY 2013

Table 4.7
Total Regulated Hydro and Independent Hydro Projects in BPA Balancing Authority Area Capable of Supplying Operating Reserves Adjusted for Transmission Losses

			Annual Average for FY 2012-2013	Oct	Nov	Dec	Jan	Feb	Mar	1-Apr	16-Apr	May	Jun	Jul	1-Aug	16-Aug	Sep
	All values in MW	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**
1	Regulated Hydro (120 Hr.)	Capacity	**10,688**	7,371	8,968	9,152	12,663	12,394	11,508	11,866	11,997	13,546	13,470	10,888	9,171	8,032	7,763
2	Transmission Losses at 3.35% Loss Factor		**358**														
3	Regulated Federal Hydro Projects 120-Hour Capacity Adjusted for Transmission Losses		**10,330**														
4	Big Cliff	Capacity	**16**	15	22	23	23	22	10	12	16	18	13	10	8	8	12
5	Bonneville Fishway 1/	Capacity	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Chandler	Capacity	**9**	8	13	13	13	13	13	10	10	8	8	5	5	5	4
7	Cougar	Capacity	**23**	29	29	24	25	29	8	30	26	30	21	11	20	21	28
8	Detroit	Capacity	**100**	100	100	100	100	100	100	100	100	100	100	100	100	100	100
9	Dexter	Capacity	**13**	16	18	18	19	19	8	17	11	12	14	6	10	11	8
10	Foster	Capacity	**14**	10	14	18	19	21	9	19	23	15	9	7	7	7	13
11	Green Peter	Capacity	**72**	62	79	93	88	89	48	69	92	60	40	60	71	76	86
12	Hills Creek	Capacity	**25**	29	36	31	32	33	9	9	28	33	31	13	10	10	28
13	Lookout Point	Capacity	**106**	124	131	99	132	137	82	143	58	84	143	74	89	92	73
14	Roza	Capacity	**9**	5	4	6	6	13	13	13	13	13	13	13	13	13	0
15	Total Independent Hydro Capable of Providing Operating Reserve		**388**														
16	Transmission Losses at 3.35% Loss Factor		**13**														
17	Total Independent Hydro Capable of Providing Operating Reserve Adjusted for Transmission Losses		**375**														
18	Total Regulated Hydro and Independent Hydro Capable of Providing Operating Reserve Adjusted for Transmission Losses (Line 3 + Line 17)	Capacity	**10,705**														

1/ The Bonneville Fishway capacity is included in the Regulated hydro information for Bonneville dam.

Table 4.8
Operating Reserve
Power Revenue Requirement for
All Hydroelectric Projects in BPA Balancing Authority Area
($ in thousands)

		FY 2012	FY 2013	Annual Average for FY 2012-FY 2013
	A	B	C	D
1	**All Hydro Projects 1/**			
2	O&M	$ 271,429	$ 281,386	**$ 276,407**
3	Depreciation	$ 92,859	$ 96,183	**$ 94,521**
4	Net Interest	$ 131,488	$ 136,377	**$ 133,933**
5	Minimum Required Net Revenues	$ 23,133	$ 8,032	**$ 15,583**
5	Planned Net Revenues for Risk	$ -	$ -	**$ -**
6	**Total Revenue Requirement**	$ 518,909	$ 521,978	**$ 520,443**
7	**Fish & Wildlife**			
8	O&M	$ 310,060	$ 318,965	**$ 314,512**
9	Amortization/Depreciation	$ 44,171	$ 47,226	**$ 45,698**
10	Net Interest	$ 52,228	$ 58,580	**$ 55,404**
11	Minimum Required Net Revenues	$ 9,189	$ 3,449	**$ 6,319**
11	Planned Net Revenues for Risk	$ -	$ -	**$ -**
12	**Subtotal**	$ 415,647	$ 428,220	**$ 421,934**
13	**A&G Expense 2/**	$ 131,072	$ 133,529	**$ 132,301**
14	**Total Revenue Requirement**	$ 1,065,629	$ 1,083,727	**$ 1,074,678**
15	**Revenue Credits**			
16	4h10C (non-operations)	$ 62,166	$ 63,030	**$ 62,598**
17	Colville payment Treasury Credit	$ 4,600	$ 4,600	**$ 4,600**
18	Synchronous Condensing	$ 318	$ 296	**$ 307**
19	**Net Revenue Requirement**	$ 998,544	$ 1,015,801	**$ 1,007,173**

1/ Excludes Boise, Minidoka-Palisades, Green Springs (USBR) and Lost Creek (COE).

2/ Power Marketing Sales & Support, Power Scheduling, Generation Oversight, Corporate Expense and 1/2 Planning Council

Table 4.9
Cost Allocation for Embedded Cost Portion of Operating Reserve

	A	B
	Average water conditions (1958 water)	Annual Average of FY2012-2013
	Assumptions for Calculation:	
1	Regulated + Independent Hydro Projects Adjusted for Transmission Losses (MW)	10,705
2	Regulating Reserve (MW)	60
3	Operating Reserve (MW)	555
4	Following Capacity Reserve (MW)	211
5	Variable Energy Resource Balancing Service Reserve (MW)	470
6	Dispatchable Energy Resource Balancing Service Reserve (MW)	51
	Forecast of Hydro Capacity System Uses:	
7	Regulated + Independent Hydro Projects Capacity (Line 1)	10,705
8	Total PS Reserve Obligation (Line 2+3+4+5+6)	1,347
9	Regulated + Independent Hydro Projects Capacity System Uses (Line 7+8)	12,052
	Adjusted Revenue Requirement:	
10	PS Net Revenue Requirement for Regulated + Independent Hydro Projects	$ 1,007,173,000
11	Regulated + Independent Hydro Projects Capacity System Uses (Line 9)	12,052
12	Total kW/month/year Hydro Project Capacity System Uses (Line 11 * 12 months * 1000 kW/MW)	144,624,000
13	**Unit Cost Allocation of Capacity System Uses $/kW/month (Line 10 / Line 12)**	$ 6.96
	Revenue Forecast for Embedded Cost Portion of Operating Reserve:	
14	Operating Reserve Embedded Cost (Line 3 * Line 13 * 12 months * 1000 kW/MW)	$ 46,353,600

Table 5.1
Synchronous Condenser Projected Motoring Hours, Hourly Energy Consumption and Energy Costs

	Generating Project	Nameplate rating (MW/unit)	Motoring power consumption (MW/unit)	Projected Units to be used	Condensing Hours FY 2007	Condensing Hours FY 2008	Condensing Hours FY 2009	Average Annual Condensing hours/year [(E+F+G)/3]	Energy Consumption MWhrs/year [H * C]	Total Cost of Energy [I * Market Price Forecast of energy]
	A	B	C	D	E	F	G	H	I	J
1	John Day, units 11-14	155	3.0	units 11-14	2,697	4,005	4,127	3,610	10,829	$ 386,270
2	The Dalles, units 15-20	99	1.5	units 15-20	3,006	2433	3,085	2,841	4,262	$ 152,026
3								**SUBTOTAL - SOUTHERN INTERTIE***	**15,091**	**$ 538,296**
4	Grand Coulee, units 19-24	690 (units 19-21) 805 (units 22-24)	11.0	units 19-21	2,240	2,848	2,376	2,488	27,368	$ 976,217
5	Dworshak (small units)	103	4.0	units 1-2	25	6	10	14	55	$ 1,950
6	Dworshak (big unit)	259	8.0	unit 3	154	15	142	104	829	$ 29,582
7	Palisades, units 1-4	44	0.6	units 1-4	2320	1,773	1,177	1,757	1,054	$ 37,596
8	Detroit, units 1-2	58	2.0	units 1-2	NA	NA	NA	0	0	$ -
9	Green Peter, units 1-2	46	1.2	units 1-2	NA	NA	NA	0	0	$ -
10	Lookout Point, units 1-3	46	1.1	units 1-3	NA	NA	NA	0	0	$ -
11	Hungry Horse, units 1-4	107	2.5	units 1-4	0	0	0	0	0	$ -
12								**SUBTOTAL - NETWORK***	**29,306**	**$ 1,045,345**
13								**TOTAL ENERGY COST**	**44,397**	**$ 1,583,641**
14	Market Price Forecast of energy ($/MWh)	35.67								

***Synchronous condensing costs for the John Day and The Dalles projects are allocated to the Southern Intertie segment. Costs of all other projects are allocated to the Network segment.**

Table 5.2
Determination of Synchronous Condenser Plant Modification Costs*
($ thousands)

	A	B	C	D
		FY 2012	FY 2013	Annual Average of FY 2012 - FY2013
1	**Synchronous Condensers Net Plant**	6,370	6,267	6,319
2	Total Corps/Reclamation Average Net Plant	6,007,710	6,251,635	6,129,673
3	**percent**	0.11%	0.10%	0
4	Corps/Reclamation Net Interest	172,194	181,568	176,881
5	**Sync Cond Net Interest**	183	182	183
6	Corps/Reclamation MRNR	30,295	10,693	20,494
7	**Sync Cond MRNR**	32	11	22
8	**Sync Cond Depreciation**	103	103	103
9	**Total Sync Cond Plant Modification Costs**	**318**	**296**	307

* These are costs for plant modifications at John Day and The Dalles to enable synchronous condenser operation. These costs are allocated to the Southern Intertie segment.

Table 5.3
Summary of Synchronous Condenser Costs
($ thousands)

		FY 2012	FY 2013	Annual Average of FY 2012 - FY2013
	A	B	C	D
1	Modifications at John Day and The Dalles*	$ 318	$ 296	$ 307
2	**Energy Consumption - John Day and The Dalles**	$ 538	$ 538	$ 538
3	**Subtotal - Southern Intertie**	**$ 856**	**$ 834**	**$ 845**
4	**Energy Consumption - Network**	$ 1,045	$ 1,045	$ 1,045
5	**Total Synchronous Condenser Costs**	**$ 1,902**	**$ 1,880**	**1,891**

* These are costs for plant modifications at John Day and The Dalles to enable synchronous condenser operation. These costs are allocated to the Southern Intertie segment.

Table 6.1
ESTIMATED COSTS OF "GENERATION DROP" OF UNIT 22, 23, OR 24 AT THE GRAND COULEE THIRD POWERHOUSE

	Equipment	Incremental Equipment Deterioration, Replacement or Overhaul Costs			Incremental Routine Operation and Maintenance Costs			Incremental Lost Revenue In The Event of Replacement or Overhaul				Total Cost Per Drop
		% Life Reduction Per Drop	Cost of Major Overhaul (1)	Cost/Drop	% Increase O&M Per Drop	Annual O&M Cost	Cost/Drop	Probability of Failure	Months of Downtime	Downtime Cost (2)	Cost/Drop	
	A	B	C	D	E	F	G	H	I	J	K	L
1	550kV Circuit Breaker (50% of replacement)	0.04%	$ 722,310	$ 289	0.04%	$ 4,941	$ 2	0.04%	1	$ 1,714,300	$ 686	**$ 977**
2	Main Power Transformer (equal to replacement)	0.015%	$ 8,244,305	$ 1,237	0.015%	$ 57,069	$ 9	0.018%	1	$ 1,714,300	$ 309	**$ 1,554**
3	Generator (rewinding)	0.71%	$ 18,346,682	$ 130,261	0.71%	$ 450,000	$ 3,195	0.71%	18	$ 30,857,404	$ 219,088	**$ 352,544**
4	Turbine (refurbished)	0.24%	$ 1,444,621	$ 3,467	0.24%	$ 450,000	$ 1,080	0.05%	16	$ 27,428,803	$ 13,714	**$ 18,261**
5	500 kV Cable (replacement)	0.055%	$ 3,762,000	$ 2,069	0.055%	$ 281,779	$ 155	0.055%	1	$ 1,714,300	$ 943	**$ 3,167**
6	**Total Cost Per Drop**			**$ 137,323**			**$ 4,441**				**$ 234,739**	**$ 376,503**

(1) Updated to FY2012-FY2013 from original Harza Engineering Company study using the Handy-Whitman Index to calculate cost multiplier

1.44

(2) The downtime cost from last unit out at Coulee analysis, assumes normal unit availability at Coulee and then the loss of an additional big unit. The current Value of Availability is adjusted to forecasted cost of energy during the FY 2012-2013 rate period. This analysis includes a planned overhaul of one big unit at Grand Coulee starting in 2013.

Table 6.2
Revenue Forecast for Generation Dropping

	Average Number of Drops Per Year	Cost Per Drop	Revenue Forecast
	A	**B**	**C**
1	1	$ 376,503	$ 376,503

Table 7.1
Discretionary Redispatch Under Attachment M
October 2008 through September 2010

	A	B	C	D	E	F	G	H	I
	Location	**Amount Requested (MWh)**	**Amount Delivered (MWh)**	**Total Cost**	**$/MWh**	**Duration of Redispatch Event (Hours)**	**Units Incremented**	**Units Decremented**	**Cause**
1	**North of Hanford Flow Gate:**								
2	10/16/2008	100	63	$ 2,016	$ 32.00	1	JDA	GCL	Actual flows above OTC
3	3/14/2009	400	214	$ 9,630	$ 45.00	2	-	GCL	
4	4/2/2009	900	753	$ 7,530	$ 10.00	4	GCL	JDA	
5	4/3/2009	500	493	$ 4,930	$ 10.00	5	GCL	JDA	
6	5/14/2009	300	278	$ 7,784	$ 28.00	3	GCL	TDA	
7									
8	**Coulee-Chief Area:**								
9	10/4/2008	160	96	$ 3,840	$ 40.00	2	CHJ	GCL	Coulee Chief #3 500kv line outage, Actual flows above OTC
10									
11	**North of John Day Flow Gate:**								
12	6/21/2010	133	133	$ 1,333	$ 10.00	2	JDA	GCL	Path 73 over SOL
13	9/27/2010	458	458	$ 11,458	$ 25.00	5	GCL	TDA	
14									
15	**Ice Harbor Area:**								
16	10/13/2009	20	12	$ 308	$ 25.67	1	IHR	GCL	Overloading of Franklin Bank #4
17									
18	**Columbia Injection:**								
19									
20	**Cross Cascades North Flow Gate:**								
21	5/18/2010	459	343	$ 4,465	$ 13.00	2	MCN, JDA,	GCL	Cross Cascades North over SOL
22	5/19/2010	1368	1368	$ 13,683	$ 10.00	8	MCN, JDA,	GCL	Cross Cascades North over SOL
23									
24	**South of Allston:**								
25									
26	**Tri-Cities Area:**								
27	12/14/2008	120	109	$ 3,270	$ 30.00	3	IHR	GCL, MCN	Relief of loading issues in Tri-Cities area
28	12/15/2008	300	284	$ 4,260	$ 15.00	4	IHR	GCL	Relief of loading issues in Tri-Cities area
29	12/16/2008	270	270	$ 9,450	$ 35.00	4	IHR	GCL	Relief of loading issues in Tri-Cities area
30	12/17/2008	308	280	$ 10,955	$ 39.13	4	IHR	GCL	Relief of loading issues in Tri-Cities area
31	12/18/2008	555	504	$ 21,005	$ 41.68	7	IHR	GCL, MCN	Relief of loading issues in Tri-Cities area
32	12/19/2008	430	390	$ 11,750	$ 30.13	6	IHR	GCL	Relief of loading issues in Tri-Cities area
33	12/20/2008	300	252	$ 7,560	$ 30.00	8	IHR	GCL	Relief of loading issues in Tri-Cities area
34	12/21/2008	1335	1255	$ 46,725	$ 37.23	15	IHR	GCL	Relief of loading issues in Tri-Cities area
35	12/22/2008	465	385	$ 14,045	$ 36.48	7	IHR	GCL	Relief of loading issues in Tri-Cities area
36	7/20/2009	60	51	$ 1,020	$ 20.00	2	IHR	MCN	Extreme heat
37									
38	**Paul-Allston Flow Gate:**								
39	9/3/2009	200	93	$ 4,387	$ 47.17	2	JDA, TDA	GCL	Over OTC at Paul-Allston
40	4/18/2010	793	793	$ 7,917	$ 9.98	2	MCN,	GCL	
41	4/19/2010	244	244	$ 2,442	$ 10.00	2	MCN, JDA,	GCL	
42									
43	**McNary Area:**								
44	4/5/2010	483	483	$ 4,833	$ 10.01	5	MCN	GCL	
45									
46	**Discretionary Redispatch Total:**			$ 216,596					
47									
48	**FY 2009 Total:**			$ 170,157					
49	**FY 2010 Total:**			$ 46,439					

Table 7.2
NT Redispatch Resulting from the Purchase of Energy or Transmission for Planned and Unplanned Outages
October 2008 through September 2010

		A	B	C
		MWh	Cost	$/MWh
1	Oct-08	0	$ -	
2	Nov-08	36,156	$ 165,427	$ 4.58
3	Dec-08	0		
4	Jan-09	0		
5	Feb-09	54	$ 209	$ 3.87
6	Mar-09	0		
7	Apr-09	29,536	$ 129,745	$ 4.39
8	May-09	0		
9	Jun-09	192	$ 566	$ 2.95
10	Jul-09	0		
11	Aug-09	0		
12	Sep-09	33,356	$ 96,215	$ 2.88
13	Oct-09	716	$ 1,202	$ 1.68
14	Nov-09	0		
15	Dec-09	330	$ 1,765	$ 5.35
16	Jan-10	0		
17	Feb-10	4,240	$ 14,546	$ 3.43
18	Mar-10	572	$ 364	$ 0.64
19	Apr-10	0		
20	May-10	5,204	$ 15,030	$ 2.89
21	Jun-10	7	$ 40	$ 5.71
22	Jul-10	305	$ 7,653	$ 25.09
23	Aug-10	1,501	$ 8,661	$ 5.77
24	Sep-10	0		
25	**Total**	**112,169**	**$ 441,423**	
26	**FY 2009 Total**		**$ 392,162**	
27	**FY 2010 Total**		**$ 49,261**	

Table 8.1
Corps of Engineers Transmission Segmentation

BONNEVILLE DAM

A major rehab was done to the Bonneville Dam switchyard in 1999.
The current plant in service costs provided by the COE are:

	Prop ID	Plant Item		Book Cost
	A	B		C
1	BONNE-13361	Power transformers	$	27,997,022
2	BONNE-13358	Switchyard circuit breaker		1,499,685
3	BONNE-13559	Switchyard circuit breaker		1,499,960
4	BONNE-13360	Switchyard circuit breaker		1,500,514
5		**Total:**	**$**	**32,497,181**
6	The power transformers are assigned to Power.			
7	Circuit breakers are allocated to Network & Generation Integration based on use.			
8	There are six 115 kV circuit breakers; two Generation Integration and four Network.			
9	BONNE-13358	Switchyard circuit breaker	$	1,499,685
10	BONNE-13559	Switchyard circuit breaker		1,499,960
11	BONNE-13360	Switchyard circuit breaker		1,500,514
12		**Total Circuit Breakers:**	**$**	**4,500,159**
13	Since four of the six circuit breakers at the switchyard serve the Network function and two serve the Generation Integration function, 4/6 of the total cost of the breakers will be allocated to the Network function and 2/6 of the costs will be assigned to the Generation Integration function.			
14	**Network Allocation (4/6 of the Total Circuit Breakers)**		**$**	**3,000,106**
15	**Generation Integration Allocation (2/6 of the Total Circuit Breakers)**		**$**	**1,500,053**

Table 8.2
COLUMBIA BASIN (GRAND COULEE) COST SUMMARY

	As of 9/30/2009		
	A	B	C
1	**TOTAL TRANSMISSION**		
2	**Segment**	**Investment**	**Percent**
3	Network	59,890,350	29.11%
4	Generation Integration	145,065,918	70.52%
5	Delivery	764,155	0.37%
6	**Total**	**205,720,422**	**100.00%**
7			
8	**THIRD POWERHOUSE (500 kV Facilities)**		
9	Network	28,650,930	21.66%
10	Generation Integration	103,647,960	78.34%
11	**Total**	**132,298,890**	**100.00%**
12			
13	**FIRST & SECOND POWERHOUSE & OTHERS**		
14	Network	31,239,420	42.55%
15	Generation Integration	41,417,958	56.41%
16	Delivery	764,155	1.04%
17	**Total**	**73,421,532**	**100.00%**
18			
19	Investment includes interest during construction (IDC).		

Table 8.3
COLUMBIA BASIN COSTS (Grand Coulee)
Bureau Of Reclamation data for investments as of 9/30/2009

	A	B	C	D	E	F
1			Segment			
2			Network	Generation Integration	Delivery	Source
3						
4	13.031 Pump Generator Switchyard		4,742,053	4,742,053	4,742,053	3/ From USBR Schedule 1
5	Times: Percentage Allocated to Segment		0.00%	100.00%	0.00%	
6	Subtotal		0	4,742,053	0	
7	Add: Interest During Construction (@ 11.94%)		0	565,989	0	
8	Equals: Amount Allocated		0	5,308,043	0	
9						
10	13.034 500kV & Other Switchyard	118,128,949				3/ From USBR Schedule 1
11	Add: 500 kV & Other Switchyard Land	70,623				
12	Less: 500kV cables 6/	(22,789,063)				From detailed USBR records on 500kV
13	Equals: Amount to be Segmented	95,410,509	95,410,509	95,410,509	95,410,509	
14	Times: Percentage Allocated to Segment		26.83%	73.17%	0.00%	Based on typical costs
15	Subtotal		25,597,941	69,812,567	0	
16	Add back: 500 kV cables (all GI)		0	22,789,063	0	
17	Subtotal		25,597,941	92,601,630	0	
18	Add: Interest During Construction (@ 11.94%)		3,052,989	11,046,330	0	8/ IDC is not calculated for land
19	Equals: Amount Allocated		28,650,930	103,647,960	0	
20						
21	13.035 Modified Left Switchyard	60,850,641				4/ From USBR Schedule 1
22	Less: Lines 7/	(4,309,008)				From detailed USBR records on Modified Left Switchyard
23	Equals: Amount to be Segmented	56,541,633	56,541,633	56,541,633	56,541,633	
24	Times: Percentage Allocated to Segment		49.36%	49.43%	1.21%	Based on typical costs; Left Yard only 115/12 kV
25	Subtotal		27,908,403	27,950,556	682,674	
26	Add back: Lines (all GI)		0	4,309,008	0	
27			27,908,403	32,259,564	682,674	
28	Add: Interest During Construction (@ 11.94%)		3,331,016	3,850,351	81,481	
29	Equals: Amount Allocated		31,239,420	36,109,915	764,155	
30						
31	Total For Segment		59,890,350	145,065,918	764,155	

NOTES:

32 1/ Assume all transmission costs to be segmented are included in the USBR Schedule 1 for the Columbia Basin (Grand Coulee) project.

33 2/ Assume this is in pump gen switchyard and power plant.

34 3/ Assume this includes all 500 kV line and substation costs; IDC not included.

35 4/ Assume this includes all 230 kV and other transmission costs; IDC not included.

36 5/ IDC is allocated based on ratio of investment to total investment.

37 6/ Assumes that (a) cables are all in 500 kV yard and can be removed as a group and (b) these cables are part of generation integration.

38 7/ Assumes that (a) all lines are part of left yard and can be removed as a group and (b) these cables are part of generation integration..

39 8/ The Bureau of Reclamation does not accrue IDC on Electric Land in Service. These calculations therefore do not apply IDC on Land investments.

Table 8.4
NETWORK INVESTMENT RATIO-ASSIGNMENT BASED ON TYPICAL SUB COSTS
Based on BPA Typical Costs of Facilities - 12/11/98

	A	B	C	D	E	F	G	H	I	J	K
1			No. Units			Unit Cost					
2	Items	Total	Network	Gen Int	Delivery	$000	Total	Network	Gen Int	Delivery	Notes
3	**500 kV Switchyard**										
4	500 kV terminal (1&1/2)	11	5	6	0	4,500	49,500	22,500	27,000	0	
5	Step-ups 7-800 MVA	6	0	6	0	8,000	48,000	0	48,000	0	3/
6	Reactive Equipment	1	1	0	0	5,000	5,000	5,000	0	0	
7	**Total**						**102,500**	**27,500**	**75,000**	**0**	
8	500kV - Network % =	26.83%									
9	500kV - GI % =	73.17%									
10	**Total**	**100.00%**									
11											
12	**Left Switchyard (includes 230 & 115 yards)**										
13	230 kV PCB 1/	22	17	5	0	560	12,320	9,520	2,800	0	
14	500/230 tx 1200MVA	1	1	0	0	9,800	9,800	9,800	0	0	
15	230/287kV tx	1	1	0	0	2,600	2,600	2,600	0	0	
16	230/115 tx 230MVA	1	1	0	0	2,600	2,600	2,600	0	0	
17	115kV PCB	7	7	0	0	375	2,625	2,625	0	0	
18	Delivery - 20 MVA tx	2	0			1,010	2,020	0	1,616	404	2/
19	Delivery- feeder terminals	11	0			130	1,430	0	1,170	260	2/
20	Step-ups 1-125MVA	18	0	18	0	1,200	21,600	0	21,600	0	4/
21	**Total**						**54,995**	**27,145**	**27,186**	**664**	
22											
23	Left Yard -- % Network	49.36%									
24	Left Yard -- % GI	49.43%									
25	Left Yard -- % Delivery	1.21%									
26	**Total**	**100.00%**									
27	**NOTES:**										
29	1/ Some breakers are for bus tie, etc.; these are Network.										
30	2/ Delivery transformer split 20% to Delivery; based on estimate of 25 MVA with low and hi side PCB.										
31	Delivery terminals based on 12.5kV feeder cost; split based on 2 for Delivery and rest for station service.										
32	3/ Cost of 500 kV step-ups are similar to 500/230, so cost of 700MVA without breakers is used.										
33	4/ Cost of 230 kV step-ups are similar to 230/69, so cost of 75MVA without breakers is used.										
34	5/ Includes costs of Coulee-Bell additions -- based on 11/06/02 cost estimate										

Table 8.5
USBR SEGMENTATION - OTHER PROJECTS

As of 9/30/2009 - Based on data from USBR

	A	B	C	D	E
1	**PROJECT**	**TRANSMISSION INVESTMENT 1/**	**NETWORK**	**GENERATION INTEGRATION**	**UTILITY DELIVERY**
2	Hungry Horse	9,766,773	2,040,818	7,725,955	0
3	Boise 2/	1,827,450	0	1,827,450	0
4	Yakima (Rosa) 3/	3,356,857	0	3,356,857	0
5	Green Springs	178,988	0	178,988	0
6	Minidoka	1,700,557	898,181	802,375	0
7	Palisades	2,224,806	414,388	1,411,990	398,427
8	**Total 4/**	**19,055,431**	**3,353,387**	**15,303,615**	**398,427**
9					
10	Segment investment is total investment times the segment percentage determined below.				
11	Segment percent is estimated using 1998 typical BPA facility costs as proxy.				
12					
13	1/ Total from Bureau of Reclamation Transmission Plant In Service (with IDC allocation) and Electric Land In Service (for the Roza Division of the Yakima Project, the Minidoka Division of the Minidoka-Palisades Project, and the Boise Project), subaccount 13 (without IDC allocation). Plant in Service totals = $19,046,797; Land in Service totals = $8,634				
14	2/ Includes Anderson Ranch and Black Canyon				
15	3/ Includes the Roza and Kennewick divisions				
16	4/ Totals may not add due to rounding				
17					
18	SEGMENT PERCENTAGES FOR MULTI-SEGMENT PLANTS				
19	Hungry Horse				
20	Item	Cost	Network	Gen Int	
21	2-230kV terminals	1,120,000	1,120,000	0	
22	2-230kV terminals	1,120,000	0	1,120,000	
23	2-180MVA step-ups	3,120,000	0	3,120,000	
24	*Total*	5,360,000	1,120,000	4,240,000	
25	*Percent of total*	100.0%	20.9%	79.1%	
26	Step-up transformer cost based on 230/69kV 75 MVA with disconnects.				
27					
28	Minidoka-Palisades				
29	Minidoka sub	Cost	Network	Gen Int	Delivery
30	5-138kV terminal	2,250,000	1,500,000	750,000	0
31	1 Step-up to 138kV	590,000	0	590,000	0
32	*Total*	2,840,000	1,500,000	1,340,000	0
33	*Percent of total*		52.8%	47.2%	0.0%
34	Palisades				
35	9-115kV terminals	3,375,000	1,265,625	1,687,500	421,875
36	4-35MVA step-ups	2,360,000	0	2,360,000	0
37	10MVA 115/12.5kV	1,060,000	0	265,000	795,000
38	*Total*	6,795,000	1,265,625	4,312,500	1,216,875
39	*Percent of total*		18.6%	63.5%	17.9%
40					
41	**NOTES:**				
42	Minidoka terminals - use 115kV terminal cost of $375,000;				
43	Minidoka terminals - 4 Network, 2 Generation Integration, 1 bus tie				
44	Minidoka step-up - use 115/34.5kV 25 MVA transformer cost				
45	Palisades - 9 PCB/8 terminals - 4 GI, 3 Net, 1 Del				
46	Palisades step-ups - use 115/34.5kV 25 MVA transformer cost				
47	Palisades - delivery is for Lower Valley and station service				
48	Base delivery tx on cost of 115/12.5 sub 25MVA				
49	Split station service facilities 25% to delivery & 75% to station service/GI				

Table 8.6
Segmentation Summary -- All COE and Reclamation Projects

	A	B	C	D
		Generation Integration	Network	Utility Delivery
1	**Reclamation Projects:**			
2	Columbia Basin (Grand Coulee) Project	145,065,918	59,890,350	764,155
3	Other Projects	15,296,399	3,353,388	398,427
4	**Total Reclamation Projects**	**160,362,317**	**63,243,738**	**1,162,581**
5	**COE Projects:**			
6	**Total Bonneville Project**	**1,500,053**	**3,000,106**	**0**
7	**TOTAL ALL PROJECTS:**	**161,862,370**	**66,243,844**	**1,162,581**

Table 8.7
COE/Reclamation Transmission Costs
($ in thousands)

		A	B	C	D	E	F	G	H	I
		FY 2012			**FY 2013**			**Annual Average for FY 2012-2013**		
		Total	**Network**	**Utility Delivery**	**Total**	**Network**	**Utility Delivery**	**Total**	**Network**	**Utility Delivery**
1	O&M	4,881	4,541	340	4,884	4,526	358	4,883	4,534	349
2	Depreciation	899	884	15	899	884	15	899	884	15
3	Interest Expense	1,257	1,235	22	1,248	1,226	22	1,253	1,231	22
4	MRNR	221	217	4	74	73	1	148	145	3
5	**Total COE/Reclamation Transmission Costs**	**7,258**	**6,877**	**381**	**7,105**	**6,709**	**396**	**7,183**	**6,794**	**389**

Table 9.1
Load Factor Calculation for Station Service Energy Use Analysis

	Substation Name	Installed Transformation (kVA)	Historical Average Monthly Usage (kWh)	Calculated Load Factor
	A	B	C	D
1	**Large**			
2	Alvey	2,267	96,923	
3	Bell	2,250	149,000	
4	Snohomish	1,250	78,000	
5	Olympia	1,100	132,738	
6	Covington	946	108,333	
7	Pearl	875	28,067	
8	Longview	825	38,317	
9	McNary	800	108,717	
10	Chemawa	725	18,140	
11	Anaconda	600	42,910	
12	Columbia	600	18,292	
13	John Day	500	65,896	
14	Santiam	400	25,740	
15	St. Johns	310	15,858	
16	Port Angeles	300	49,920	
17	Valhalla	300	17,592	
18	Fairview	300	12,560	
19	**Subtotal**	14,348	1,007,003	
20	**Medium**			
21	Oregon City	225	13,663	
22	Walla Walla	150	6,919	
23	LaGrande	150	5,663	
24	Ellensburg	100	3,897	
25	Roundup	75	5,708	
26	Boardman	75	1,595	
27	Drain	65	1,654	
28	Reedsport	55	3,922	
29	**Subtotal**	895	43,021	
30	**Small**			
31	Sappho	45	2,363	
32	Lookout Point	40	3,387	
33	The Dalles	38	2,657	
34	Bandon	25	1,746	
35	Gardiner	25	1,402	
36	Creston	15	1,122	
37	Hauser	10	1,525	
38	Duckabush	10	1,192	
39	Ione	5	1,028	
40	**Subtotal**	213	16,422	
41	**TOTAL**	**15,456**	**1,066,446**	**9.45%**

Load factor calculation is the Historical Average Monthly Usage divided by Installed Transformation divided by 730 average hours in the month.
D = C / B / 730.

Table 9.2
Calculated Monthly Usage for Station Service Energy Use Analysis

	Facility Name	Installed Transformation (kVA)	Average Calculated Load Factor	Calculated Average Monthly Usage (kWh)
	A	B	C	D
1	Large	39,978	9.45%	**2,758,435**
2	Medium	4,823	9.45%	**332,781**
3	Small	1,448	9.45%	**99,910**
4	Total	46,249		**3,191,127**

Calculated Average Monthly Use is Installed Transformation times Average Calculated Load Factor times 730 average hours in a month.
D = B * C * 730.

Table 9.3
Total Monthly Usage for Station Service Energy Use Analysis

	Facility Name	Calculated Average Monthly Usage (kWh)	Measured Historical Average Monthly Usage (kWh)	Total Average Monthly Usage (kWh)
	A	B	C	D
1	Big Eddy/Celilo Complex		1,822,937	
2	Ross Complex		1,749,300	
3	Large	2,758,435		
4	Medium	332,781		
5	Small	99,910		
6	Total Month Usage	**3,191,127**	**3,572,237**	**6,763,364**

Total Average Monthly Usage is Calculated Average Monthly Usage plus Measured Historical Average Monthly Usage.
D = B + C.

Table 9.4
Total Annual Usage for Station Service Energy Use Analysis

		Total Monthly Usage (kWh)	Months in a Year	Total Annual Usage (kWh)
	A	B	C	D
1	**Total Annual Usage (kWh)**	**6,763,364**	**12**	81,160,370

Total Annual Usage is Total Monthly Usage times Months in a Year.
D = B * C.

Table 9.5
Network Transmission Losses for Station Service Energy Use Analysis

		Total Annual Usage (kWh)	BPA Transmission Network Loss Factor	Network Losses (kWh)	Adjusted Annual Usage (kWh)
	A	B	C	D	E
1	Total Station Service Use (kWh)	81,160,370	1.9%	1,542,047	82,702,417

Adjusted Annual Usage is Total Annual Usage plus Transmission Network Losses.
E = B + D.

Table 9.6
Cost Allocation for Station Service

	Amount of Station Service Energy Forecasted per Year (kWh)	Amount of Station Service Energy Forecasted per Year (MWh)	Annual Average Market Price Forecast ($/MWh)	Cost Allocation for Station Service per Year ($)
	A	B	C	D
1	82,702,417	82,702	$ 35.67	$ 2,949,980

Cost Allocation for Station Service per Year is Amount of Station Service Energy Forecasted per Year times Annual Average Market Price Forecast.
D = B * C.

Table 10.1
Summary of Persistent Deviation Events October 2009-September 2010

Events defined as hourly deviations greater than both 20 MW and 15 percent of generation, for four or more hours in the same direction

	Plant	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	1			21	20	14	31	27	27	19	22	17	10	208
2	2	7	17	3		1	12	5	2	3	2	2		54
3	3	4	13	8	1	1	3	2	1		1	1		35
4	4	1	2		1	1	8	5	1	3	1	1		24
5	5	7	9	2	1	1	1	1			1			23
6	6	1	3	3			2	1	1					11
7	7	2	2	2	1		3		1					11
8	8	3	6									1		10
9	9		3	3			1		1					8
10	10				1		5	1		1	1			9
11	11		1		2		3							6
12	12				2	1			1					4
13	13						3					1		4
14	14	1	1		1							1		4
15	15						1			1				2
16	16								1					1
17	17							1						1
18	18									1				1
19	19						1							1
20	20													
21	21													
22	22													
23	23													
24	24													
25	25													
26	*SubTotal	26	57	21	10	5	43	16	9	9	6	7		209
27	Total	26	57	42	30	19	74	43	36	28	28	24	10	417

*SubTotal – sum of all plants excluding Plant 1

Table 10.2 Imbalance Accumulation by Month (in MWh)											
		Wind Generation Imbalance			monthly cap factor	Other Generation Imbalance			Energy Imbalance		
	Month	Negative	Positive	Net		Negative	Positive	Net	Negative	Positive	Net
	A	B	C	D	E	F	G	H	I	J	K
1	Oct 09	(34,148)	27,293	(6,855)	27%	(10,795)	9,201	(1,594)	(15,093)	14,360	733
2	Nov 09	(39,501)	30,266	(9,235)	27%	(7,550)	6,361	(1,189)	(14,183)	16,528	2,345
3	Dec 09	(22,185)	17,497	(4,688)	11%	(10,284)	13,454	3,170	(18,517)	19,852	1,335
4	Jan 10	(30,077)	27,405	(2,672)	15%	(7,496)	9,112	1,616	(22,892)	15,230	(7,662)
5	Feb 10	(17,692)	22,340	4,648	8%	(6,584)	7,941	1,357	(27,866)	13,125	(14,741)
6	Mar 10	(65,982)	39,768	(26,214)	27%	(10,925)	12,805	1,880	(19,520)	16,475	(3,045)
7	Apr 10	(56,572)	42,802	(13,770)	43%	(10,642)	8,976	(1,666)	(18,626)	14,520	(4,106)
8	May 10	(52,251)	46,307	(5,944)	39%	(5,488)	7,810	2,322	(19,526)	16,475	(3,051)
9	Jun 10	(49,993)	39,276	(10,717)	43%	(4,538)	5,230	692	(20,074)	14,620	(5,454)
10	Jul 10	(43,794)	40,782	(3,012)	35%	(14,355)	11,511	(2,844)	(15,852)	13,051	(2,801)
11	Aug 10	(47,921)	43,905	(4,016)	38%	(13,942)	10,212	(3,730)	(13,676)	13,296	(380)
12	Sep 10	(29,958)	32,256	2,298	24%	(5,929)	4,918	(1,011)	(3,714)	7,317	3,603
13	total	(490,074)	409,897	(80,177)		(108,528)	107,531	(997)	(209,539)	174,849	(33,224)
14	Pct of Total	-7.28%	6.09%	-1.19%		-0.45%	0.44%	0.00%	-1.10%	0.92%	-0.17%
15	Total Sch	6,733,437				24,387,800			19,002,188		

Table 10.3 Wind Ramps Meeting Persistent Deviation Criteria								
		Count of events by duration in consecutive hours					No. of plants	Hours in Month
	Month	1 Hour	2 Hours	3 Hours	4 Hours	5 Hours		
	A	B	C	D	E	F	G	H
1	Oct 2009	1,226	147	12	1		23	744
2	Nov 2009	1,328	135	6	2		23	720
3	Dec 2009	668	64	3			24	744
4	Jan 2010	1,047	85	7			26	744
5	Feb 2010	698	54	7	1		26	672
6	Mar 2010	1,716	203	20	2		26	744
7	Apr 2010	1,854	211	25	2		26	720
8	May 2010	1,859	214	18	1		26	744
9	Jun 2010	1,693	205	28	5	1	27	720
10	Jul 2010	1,622	170	16	5	1	27	744
11	Aug 2010	1,756	218	25	2		27	744
12	Total events	15,467	1706	167	21	2		8040
13	Percent of hours per plant	7.53%	1.66%	0.24%	0.04%	0.005%	205,368 plant-hours	

Table 10.4 Revised Persistent Deviation Criteria	
	A
1	a. Hourly Deviations greater than both 10 MW and 7.5% of schedule, in the same direction for six or more hours;
2	b. Hourly deviations greater than 5 MW and 1.5% of schedule in the same direction for 12 or more hours;
3	c. Hourly deviations greater than 2 MW and 1.5% of schedule in the same direction for 24 or more hours.

Table 10.5
Percent of Hours of Persistent Deviations in FY 2009, Prior to Penalty Implementation

	Studies	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Status Quo, 4 hour	1.4	1.7	2.0	2.1	0.9	2.5	2.0	1.6	2.0	1.4	1.8	1.7

Table 10.6
Percent of Hours of Persistent Deviations Based on FY 2010 Data, with Additional Criteria

	Studies	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
	A	B	C	D	E	F	G	H	I	J	K	L
1	**1.** Actual scheduling; current 4-hr Persistent Deviation criteria (status quo)	1.1	1.8	1.0	0.9	0.6	2.5	1.3	1.1	0.8	0.8	0.6
2	**2.** 30 minute persistence schedule; 3-hr window for 20 MW and 15% of schedule and Table 4 criteria	0.9	0.8	0.5	0.8	0.4	1.6	1.6	1.4	1.6	1.6	1.9
3	**3.** 30 minute persistence schedule; current 4-hr Persistent Deviation criteria and Table 4 criteria	0.3	0.4	0.1	0.3	0.1	0.6	0.5	0.7	0.4	0.8	1.0
4	**4.** Actual scheduling; 3-hr window for 20 MW and 15% of schedule and Table 4 criteria	4.5	6.3	3.3	3.0	1.7	9.2	8.7	5.0	5.9	4.8	4.6
5	**5.** Actual scheduling; current 4-hr Persistent Deviation criteria and Table 4 criteria.	3.0	4.9	2.4	1.9	0.9	7.0	6.1	3.0	4.1	3.1	2.8

Table 10.7
Capture of Imbalance Accumulation with Additional Persistent Deviation Criteria with Negative Deviations

	Month	Wind GI MWh	Status Quo MWh	% of GI	4abc MWh	% of GI	3abc MWh	% of GI
	A	B	C	D	E	F	G	H
1	**Oct 09**	(34,148)	(5,212)	15.3%	(8,454)	24.8%	(14,264)	41.8%
2	**Nov 09**	(39,501)	(9,534)	24.1%	(15,359)	38.9%	(20,658)	52.3%
3	**Dec 09**	(22,185)	(5,241)	23.6%	(8,000)	36.1%	(11,307)	51.0%
4	**Jan 10**	(30,077)	(3,741)	12.4%	(6,302)	21.0%	(12,182)	40.5%
5	**Feb 10**	(17,692)	(1,685)	9.5%	(1,940)	11.0%	(5,673)	32.1%
6	**Mar 10**	(65,982)	(15,504)	23.5%	(29,058)	44.0%	(41,383)	62.7%
7	**Apr 10**	(56,572)	(6,358)	11.2%	(16,917)	29.9%	(28,241)	49.9%
8	**May 10**	(52,251)	(5,924)	11.3%	(10,426)	20.0%	(21,558)	41.3%
9	**Jun 10**	(49,993)	(5,581)	11.2%	(12,698)	25.4%	(20,400)	40.8%
10	**Jul 10**	(43,794)	(4,241)	9.7%	(8,614)	19.7%	(16,298)	37.2%
11	**Aug 10**	(47,921)	(3,171)	6.6%	(6,196)	18.7%	(13,975)	29.2%
12	**Total**	**(460,116)**	**(66,192)**	**14.4%**	**(123,964)**	**26.9%**	**(205,939)**	**44.8%**

Table 10.8 Capture of Imbalance Accumulation with Additional Persistent Deviation Criteria with Positive Deviations								
	Month	Wind GI MWh	Status Quo MWh	% of GI	4abc MWh	% of GI	3abc MWh	% of GI
	A	B	C	D	E	F	G	H
1	Oct 09	27,293	1,895	6.9%	3,571	13.1%	9,333	34.2%
2	Nov 09	30,266	3,364	11.1%	6,226	20.6%	10,664	35.2%
3	Dec 09	17,497	2,275	13.0%	3,576	20.4%	5,883	33.6%
4	Jan 10	27,405	3,548	12.9%	4,744	17.3%	7,962	29.1%
5	Feb 10	22,340	2,632	11.8%	3,554	15.9%	5,402	24.2%
6	Mar 10	39,768	8,922	22.4%	13,182	33.1%	20,220	50.8%
7	Apr 10	42,802	7,352	17.2%	11,824	27.6%	20,411	47.7%
8	May 10	48,593	6,042	12.4%	7,901	16.3%	16,088	33.1%
9	Jun 10	39,276	2,829	7.2%	7,007	17.8%	13,742	35.0%
10	Jul 10	40,782	5,087	12.5%	8,812	21.6%	13,726	33.7%
11	Aug 10	43,905	2,750	6.3%	8,230	18.7%	17,251	39.3%
12	Total	**379,927**	**46,696**	**12.3%**	**78,627**	**20.7%**	**140,682**	**37.0%**

BONNEVILLE POWER ADMINISTRATION
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