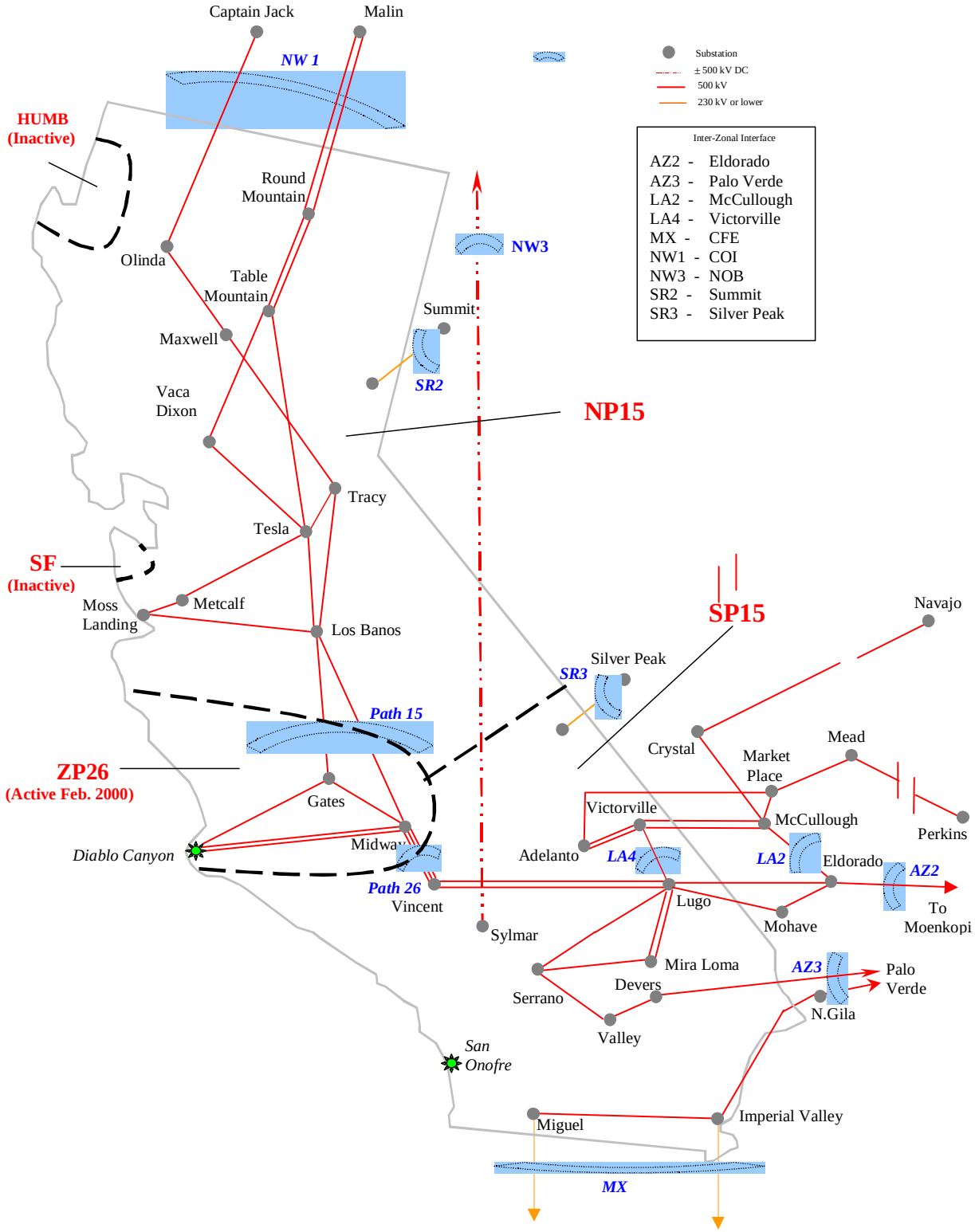
5. Interzonal Congestion Management Market

5.1 Summary of 2003 Interzonal Congestion Management Market

5.1.1 Overview

Under the current zonal model, the CAISO manages congestion in the forward market only on major inter-ties and two large internal paths (Path 15 and Path 26). It uses adjustment bids to mitigate the congestion while minimizing the cost of schedule adjustments and keeping each SC's schedule in balance. The marginal SC establishes the usage charge for the *interzonal* interface. All SCs pay this charge based on their accepted, scheduled flow on the interface. The CAISO pays the net amount of congestion charges it collects to the transmission owners (TOs) and the owners of firm transmission rights (FTRs). Figure 5.1 shows the congestion zones and main interzonal pathways in the CAISO grid.

Figure 5.1 Congestion Zones and Main Interzonal Pathways in the CAISO Grid



The *interzonal* congestion market worked well in 2003 and was characterized by historically low congestion costs. Total congestion costs in 2003 were approximately $28 million, lower than the $42 million in 2002, and significantly lower than $108 million in 2001 and $400 million in 2000. Although the congestion market as a whole performed well, we observed frequent congestion on some of the major paths, especially Path 26 (north to south), COI (import), NOB (import), Palo Verde (import), and Path 15 (south to north). Unexpected events occurred on the existing transmission system that had large and prolonged affects on both congestion and energy markets. For example, due to a fire at the Vincent Substation on March 18, 2003, Path 26 capacity rating was reduced for the most of the remainder of 2003. Congestion costs on Path 26 reached $12 million, almost double the congestion cost reported for 2002.

A significant continuing problem in the interzonal congestion market is the prior allocation of substantial portions of interzonal transmission capacity to the holders of existing transmission contracts (ETC) rights. Substantial portions of ETC capacity went unscheduled and created the phenomenon of phantom congestion.[1] The presence of phantom congestion not only compromises market efficiency, but also creates difficulties in actual grid management. Most of the congestion in the major interfaces could have been avoided if unscheduled ETC had been utilized in the day-ahead markets.

[1] Because the CAISO does not release the unscheduled portion of ETC until twenty minutes before the operating hour, a portion of ETC could go unscheduled. Therefore, it is conceivable that if a path is congested in the forward market, this congestion would have not occurred if all unscheduled ETC were available to the forward market. This kind of congestion in the forward market is called phantom congestion.

5.1.2 Interzonal Congestion Frequency and Magnitude

This section summarizes the frequency and average congestion price for the major interzonal interfaces (branch groups) in 2003. Table 5.1 lists all interzonal interfaces (or Branch Groups) that the CAISO managed in its forward congestion market in 2003. Table 5.2 shows annual congestion frequencies and average congestion prices by branch group, by direction (import and export), and by market type (day-ahead and hour-ahead). Congestion occurred primarily on five branch groups: COI (import), NOB (import), Palo Verde (import), Path 15 (south to north), and Path 26 (north to south direction). The congestion patterns, categorized by congested branch groups, congestion frequencies, and direction of congestion, were similar to 2002. Most congestion on inter-ties occurred in the import direction. For instance, COI (import) was the most frequently congested path in 2003, being congested in 20 percent of hours in the day-ahead market. Of the internal paths, Path 15 was frequently congested in the south to north direction, while Path 26 was more congested in the north to south direction.[2] We also found that the average congestion prices for these major paths were low.[3] Among these five paths, Path 26 had the highest average congestion price of $6/MWh. Finally, we found the frequencies of congestion were lower and congestion prices were higher in the hour-ahead markets than in the day-ahead markets. This is not surprising because, since most congestion was managed in the day-ahead market, congestion in the hour-ahead market was less frequent. Fewer available adjustment bids in the hour-ahead often lead to higher congestion prices if congestion exists.

[2] For all the congestion frequencies statistics, congestion involving less than 1 MWh of curtailment or scheduled, we excluded new firm use.

[3] Realizing that a significant portion of congestion on these internal paths, particularly on Path15, was phantom congestion (which will be discussed in great detail in the later part of this section) and that its schedule would not likely cause congestion in the real-time market, a load serving entity would provide a zero-priced adjustment bid in the day-ahead market to avoid the congestion charges.

Table 5.1 Summary of Branch Groups in the CAISO Market, 2003

BRANCH GROUP	TIE POINT	ISO ZONE	OUTSIDE ZONE	OUTSIDE REGION	MAX OTC IN IMPORT DIRECTION (MW)	MAX OTC IN EXPORT DIRECTION (MW)
BLYTHE _BG	BLYTHE_1_WALC	SP15	LC2	SW	218	72
CASCADE _BG	CASCAD_1_CRAGVW	NP15	NW2	NW	100	30
CFE _BG	IVALLY_2_23050	SP15	MX	SW	800	408
CFE _BG	TJUANA_2_23040	SP15	MX	SW		
COI _BG	CAPJAK_5_OLINDA	NP15	NW1	NW	4,800	3,675
COI _BG	MALIN_5_RNDMTN	NP15	NW1	NW		
ELDORADO _BG	ELDORD_5_MOENKP	SP15	LA2	SW	1,555	1,555
ELDORADO _BG	MOENKO_5_PSUEDO	SP15	AZ2	SW		
ELDORADO _BG	FCORNR_5_PSUEDO	SP15	AZ2	SW		
ELDORADO _BG	ELDORD_5_PSUEDO	SP15	AZ2	SW		
ELVTHRLY _BG	ELVRTA_2_ELVRTW	NP15	SMDW	CA	2,459	2,459
ELVTHRLY _BG	HURLEY_2_WAPA	NP15	SMDW	CA		
IID-SCE _BG	DEVERS_2_COCHLA	SP15	II1	CA	600	100
IID-SCE _BG	MIRAGE_2_COCHLA	SP15	II1	CA		
IID-SDGE _BG	IVALLY_2_230S	SP15	II2	CA	225	225
INYO _BG	INYOS_2_LDWP	SP15	LA3	CA	56	56
LAUGHLIN _BG	MOHAVE_5_500KV	SP15	NV3	SW	-	222
LAUGHLIN _BG	MOHAVE_6_69KV	SP15	NV3	SW	-	
LUGOGONDR_BG	LUGO_5_GONDER	SP15	SR4	SW	43	9
LUGOIPPDC_BG	LUGO_5_IPPDC	SP15	LA5	SW	534	391
LUGOMKTPC_BG	LUGO_5_MKTPLC	SP15	LC4	SW	340	340
LUGOTMONA_BG	LUGO_5_MONA	SP15	PC1	SW	460	543
LUGOWSTWG_BG	LUGO_5_WSTWNG	SP15	AZ6	SW	93	93
MCCULLGH _BG	ELDORD_5_MCLLGH	SP15	LA2	SW	2,598	2,598
MEAD _BG	MEAD_2_WALC	SP15	LC1	SW	1,460	1,460
MERCHANT _BG	MRCHNT_2_ELDORD	SP15	NV4	SW	645	645
N.GILABK4_BG	NGILA_5_NG4	SP15	AZ5	SW	240	240
NOB _BG	SYLMAR_2_NOB	SP15	NW3	NW	2,071	1,426
PATH15 _BG			ZP26	NP15	3,950	1,850
PATH26 _BG			SP15	ZP26	3,000	3,000
PALOVRDE _BG	PVERDE_5_DEVERS	SP15	AZ3	SW	2,823	2,823
PALOVRDE _BG	PVERDE_5_NG-PLV	SP15	AZ3	SW		
PARKER _BG	PARKR_2_GENE	SP15	LC3	SW	220	60
PASADENA _BG	GOODRH_2_PASA	SP15	SP15	CA	300	300
PASADENA _BG	GOODRH_2_PASA	SP15	SP15	CA		
RNCHLAKE _BG	RANCHO_2_BELOTA	NP15	SMDE	CA	2,004	2,004
RNCHLAKE _BG	LAKE_2_GOLDHL	NP15	SMDE	CA		
SILVERPK _BG	SLVRPK_7_SPP	SP15	SR3	NW	17	17
SUMMIT _BG	SUMITM_1_SPP	NP15	SR2	NW	120	100
SYLMAR-AC_BG	SYLMAR_2_LDWP	SP15	LA1	SW	1,200	1,200
VICTVL _BG	LUGO_5_VICTVL	SP15	LA4	CA	2,400	900

* Maximum import and export capacities for each branch group were based on the hourly Total Transmission Capacity (TTC) for each branch group in 2003.

Table 5.2 Congestion Frequency, 2003

	Day-Ahead Market				Hour-ahead Market			
	Percentage of Hours Being Congested (%)		Average Congestion Price ($/MWh) [a]		Percentage of Hours Being Congested (%)		Average Congestion Price ($/MWh) [a]	
	Import	Export	Import	Export	Import	Export	Import	Export
COI _BG	19.7	0.0	$2		11.0	0.0	$10	
NOB _BG	9.7	0.0	$1		6.7	0.1	$13	$5
PATH15 _BG	7.2	0.0	$0	$0	2.1	0.0	$22	$3
PALOVRDE _BG	6.5	0.0	$3		3.5	0.0	$17	
CASCADE _BG	3.6	0.0	$0		1.3	0.0	$2	
LUGOTMONA_BG	3.6	0.0	$5		0.1	0.0	$30	
SUMMIT _BG	1.3	0.0	$1		0.2	0.0	$3	
ELDORADO _BG	0.9	0.0	$28		0.6	0.0	$22	
LUGOIPPDC_BG	0.5	0.0	$128		0.5	0.0	$30	
MEAD _BG	0.4	0.0	$8		0.8	0.0	$31	
LUGOWSTWG_BG	0.3	0.0	$12		0.1	0.0	$4	
BLYTHE _BG	0.1	0.0	$168		0.2	0.0	$105	
PATH26 _BG	0.0	13.1		$6	0.1	4.5	$13	$13
SILVERPK _BG	0.0	0.3		$30	0.0	0.0	$176	
IID-SDGE _BG	0.0	0.2		$30	0.0	0.0		
CFE _BG	0.0	0.0			0.0	0.0	$30	
N.GILABK4_BG	0.0	0.0			0.0	0.1		$43
RNCHLAKE _BG	0.0	0.0			0.0	0.0		$30
SYLMAR-AC_BG	0.0	0.0			0.0	0.1		$140
VICTVL _BG	0.0	0.0			0.0	0.1		$227

[a] Average congestion price is the simple average price for hours in which the paths were congested.

5.1.3 Interzonal Congestion Usage Charge and Revenues

Table 5.3 shows the annual congestion revenues for the major CAISO branch groups in 2003.[4] The total congestion revenue of $28 million in 2003 decreased from $42 million in 2002. Of the total $28 million in congestion revenue, approximately $12 million was attributable to Path 26 in the north to south direction. COI, Palo Verde, LUGOIPPDC, El Dorado, and NOB are other branch groups that reported more than $1 million in congestion revenue.

[4] All the SCs who have accepted NFU schedule on the congested interfaces would pay the usage charge. The net account of congestion charge collected by the CAISO is paid to transmission owner or the FTR holders.

Figure 5.2 compares the congestion revenues between 2002 and 2003 for the selected major paths. Congestion revenue was significantly higher on Path 26 in 2003 than in 2002, but lower on COI, Palo Verde, El Dorado, and NOB. The increase in congestion revenue on Path 26 was mainly due to the fire at the Vincent transformer bank in May that damaged one substation there. The resulting line capacity deratings caused significant congestion in the north to south direction. The decreases in congestion revenue on other paths were mainly due to competitive adjustment bids in the forward congestion market. LUGOIPPDC was a new branch group created in 2003. The significant increase in congestion revenue on Path 26 was due to an extended line derating as a result of the Vincent substation fire on March 18. Because of time needed for substation replacement and test work, the line capacity was lowered to north-south capacity of 2,500 MW (down from a normal capacity of 3,000 MW) for the remainder of 2003.

The $2 million in congestion costs on Lugo IPPDC branch group occurred on two days in July (HE700 to HE2200 on July1, and HE700-HE1200 and HE2100-HE2200 on July 27). During these hours, the congestion price exceeded $200/MWh. Lugo IPPDC became a branch group at the beginning of this calendar year. It has an import capacity of 370 MW. When the operation of this transmission line was transferred to the CAISO, FTRs were distributed to help former owners hedge against possible congestion charges. The congestion price spikes were due to the fact that one municipal utility submitted a schedule that exceeded their FTR entitlements without any adjustment bids. However, most of the congestion revenue was paid back to transmission owners and FTR holders. Therefore, these price spikes had a small overall market impact.

Figure 5.3 further demonstrates the seasonal pattern of congestion revenues on major paths. As expected, the congestion revenue was higher in the summer months (from May to October) than in the lower-load winter months. To meet the higher load in the summer months, California imported significant amounts of energy from the Pacific Northwest in late spring and early summer when hydro energy was available. When hydropower was depleted in the late summer, California relied more on imports from the southwest. The higher demand for imports resulted in higher congestion cost on the major paths, such as COI, Path 26, and Palo Verde.

In 2003, the hour-ahead market generated approximately $2.3 million in congestion revenue. This congestion revenue was minimal compared to day-ahead revenues, mainly due to the fact that hour-ahead congestion typically occurs after SCs have adjusted their day-ahead schedule or if there was a change in line ratings from the day-ahead markets to the hour-ahead markets. Often, only those SCs who changed their schedules in the hour-ahead markets were required to pay the congestion charges in the hour-ahead markets. Therefore, the volume of transaction in the hour-ahead market was much smaller.

Table 5.3 Congestion Revenue, 2003

Branch Group	Day-ahead		Hour-ahead		Total Congestion Cost		Total Congestion Cost		Total Congestion Cost
	Import	Export	Import	Export	Export	Import	Day-ahead	Hour-ahead	
PATH26 _BG	$0	$11,793	$8	$142	$8	$11,935	$11,793	$150	$11,943
COI _BG	$3,271	$0	$278	$0	$3,549	$0	$3,271	$278	$3,549
PALOVRDE _BG	$3,366	$0	$70	$0	$3,436	$0	$3,366	$70	$3,436
LUGOIPPDC_BG	$2,028	$0	$6	$0	$2,034	$0	$2,028	$6	$2,034
ELDORADO _BG	$1,790	$0	$92	$0	$1,882	$0	$1,790	$92	$1,882
NOB _BG	$1,212	$0	$248	$18	$1,460	$18	$1,212	$266	$1,478
PATH15 _BG	$218	$0	$459	$1	$677	$1	$218	$460	$678
MEAD _BG	$286	$0	$312	$0	$598	$0	$286	$312	$598
BLYTHE _BG	$348	$0	$83	$0	$431	$0	$348	$83	$431
SYLMAR-AC_BG	$0	$0	$0	$405	$0	$405	$0	$405	$405
IID-SDGE _BG	$0	$380	$0	$0	$0	$380	$380	$0	$380
LUGOTMONA_BG	$270	$0	$4	$0	$274	$0	$270	$4	$274
N.GILABK4_BG	$0	$241	$0	$0	$0	$241	$241	$0	$241
VICTVL _BG	$0	$0	$0	$157	$0	$157	$0	$157	$157
LUGOWSTWG_BG	$25	$0	$0	$0	$25	$0	$25	$0	$25
CASCADE _BG	$1	$0	$20	$0	$21	$0	$1	$20	$21
SILVERPK _BG	$0	$12	$3	$0	$3	$12	$12	$3	$15
SUMMIT _BG	$13	$0	$0	$0	$13	$0	$13	$0	$13
IID-SCE _BG	$0	$0	$0	$10	$0	$10	$0	$10	$10
RNCHLAKE _BG	$0	$0	$0	$7	$0	$7	$0	$7	$7
CFE _BG	$0	$0	$6	$0	$6	$0	$0	$6	$6
ELVTHRLY _BG	$0	$0	$0	$0	$0	$0	$0	$0	$0
LAUGHLIN _BG	$0	$0	$0	$0	$0	$0	$0	$0	$0
MCCULLGH _BG	$0	$0	$0	$0	$0	$0	$0	$0	$0
LUGOMKTPC_BG	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$12,828**	**$12,427**	**$1,590**	**$739**	**$14,418**	**$13,166**	**$25,254**	**$2,330**	**$27,584**

Figure 5.2 Congestion Revenues on Selected Paths, 2002 vs. 2003

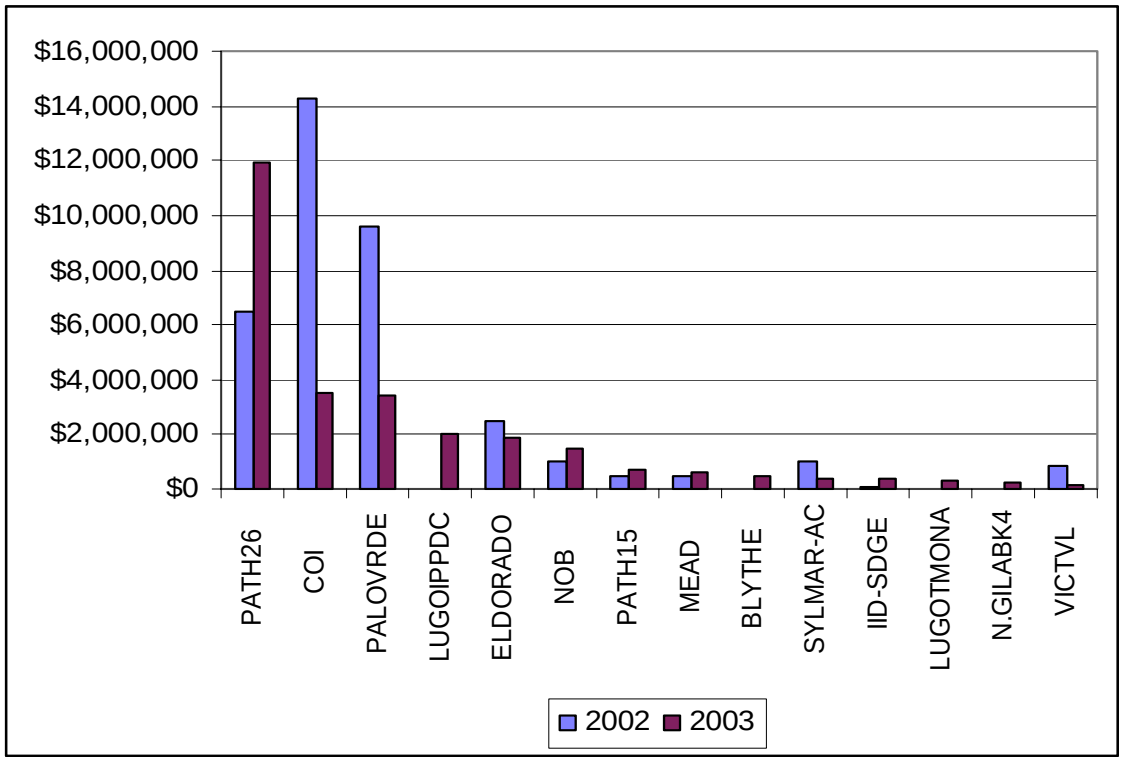
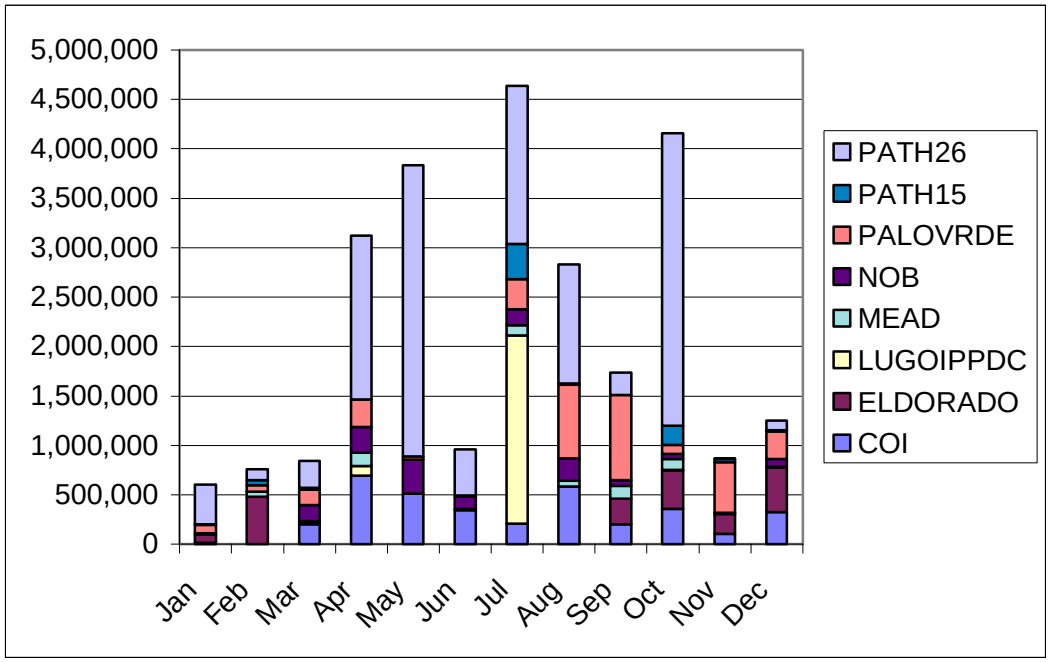


Figure 5.3 Monthly Congestion Charges of Selected Major Paths, 2003

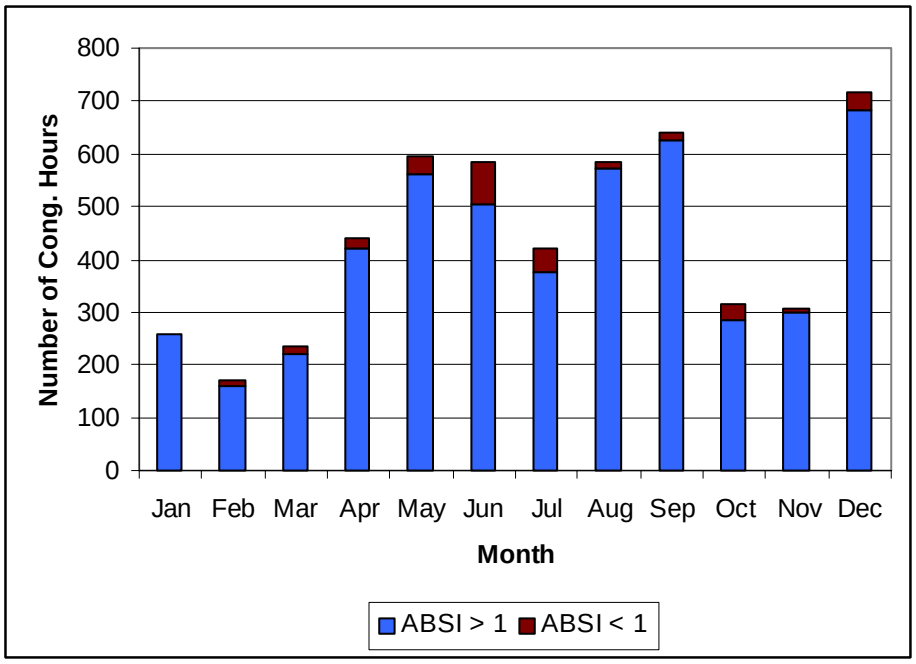


5.1.4 Adjustment Bid Sufficiency

One phenomenon identified in the congestion market in previous years has been the absence of adequate adjustment bids to manage congestion. To mitigate the congestion, the current market rules require the CAISO to adjust each SC's schedule in a balanced manner (or follow the so-called market separation rule). This can only be done if SCs submit adjustment bids on both sides of a congested interface so that an incremental (INC) bid on one side of the interface can be matched with an equal-size decremental (DEC) bid on the other side within the same SC's portfolio. If enough matched bids are submitted to fully mitigate the congestion, we say there is bid sufficiency. Conversely, when the adjustment bid pairs are exhausted and CAISO has to use *pro rata* schedule curtailments, there is bid insufficiency. To track and measure the extent of this problem, CAISO uses an Adjustment Bid Sufficiency Index (ABSI). The ABSI is the ratio of the quantity of the available adjustment bids to the adjustment quantity needed to resolve the congestion.

Figure 5.4 shows that the adequacy of adjustment bids improved in 2003. The maximum number of congested hours in any month with an ABSI less than 1 was 98 in June 2003. This is significantly lower than the 197 hours reported in July 2002. Also, except for a few occasions, most identified adjustment bid deficiencies occurred on smaller and less critical paths in 2003. For instance, on Path 26 (north to south), the adjustment bid deficiency occurred in only 10 hours in March 2003. This shows that the competitiveness of the forward congestion market increased in 2003.

Figure 5.4 Adjustment Bid Sufficiency Index in the Day-ahead Market, 2003

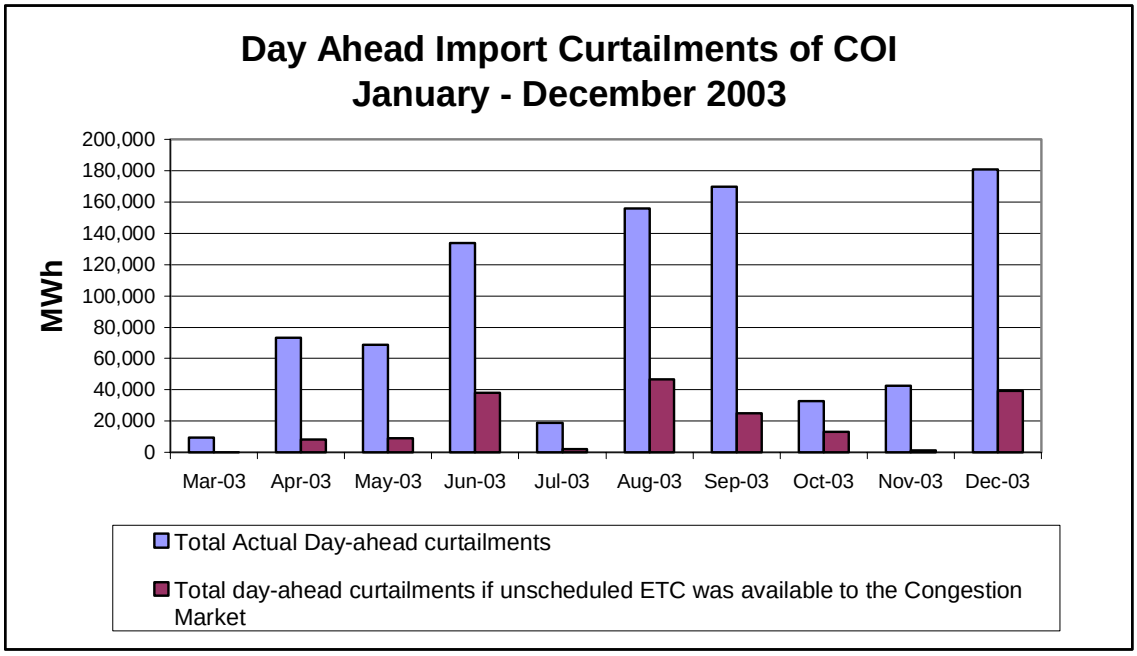


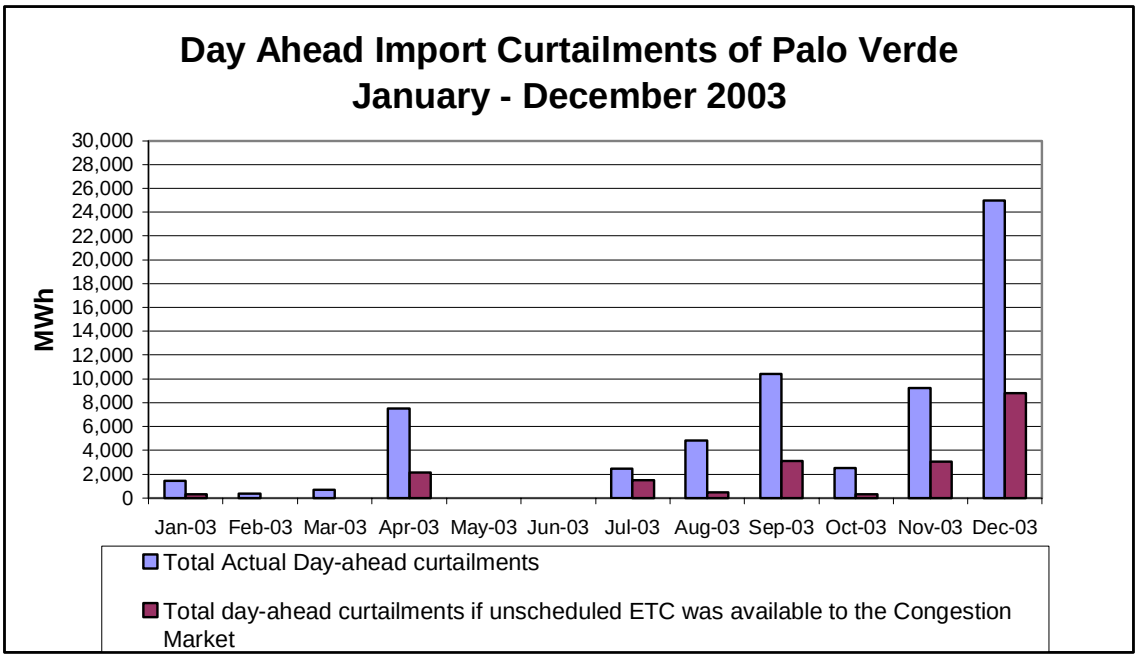
5.1.5 Existing Transmission Contracts and Phantom Congestion

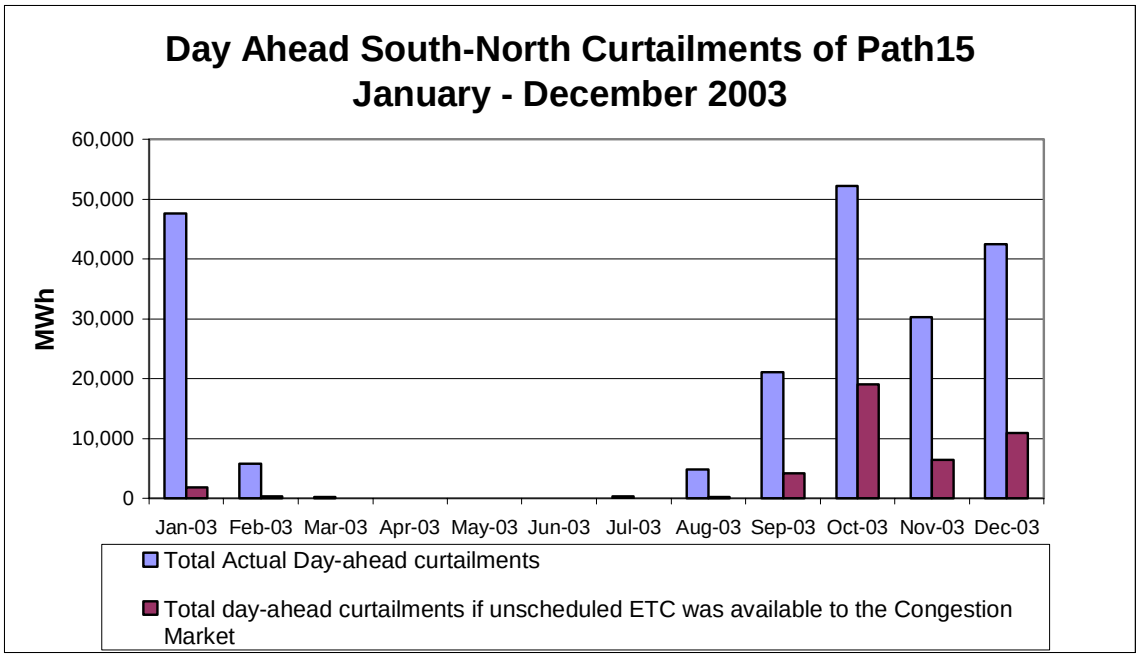
We noted in our *2002 Annual Report* that the treatment of Existing Transmission Contract (ETC) rights was an issue of concern from a market efficiency perspective. It remained a problem in the congestion market in 2003. Under the current market rules, ETC holders have the full amount of their ETC capacity reserved for them in the day-ahead and hour-ahead markets whether they actually use it or not. The unused capacity is only released 20 minutes before the operating hour. Often this capacity cannot be fully utilized with such short notice due to factors such as ramping limits of generating facilities or that market participants have already made other arrangements to meet their load obligations.

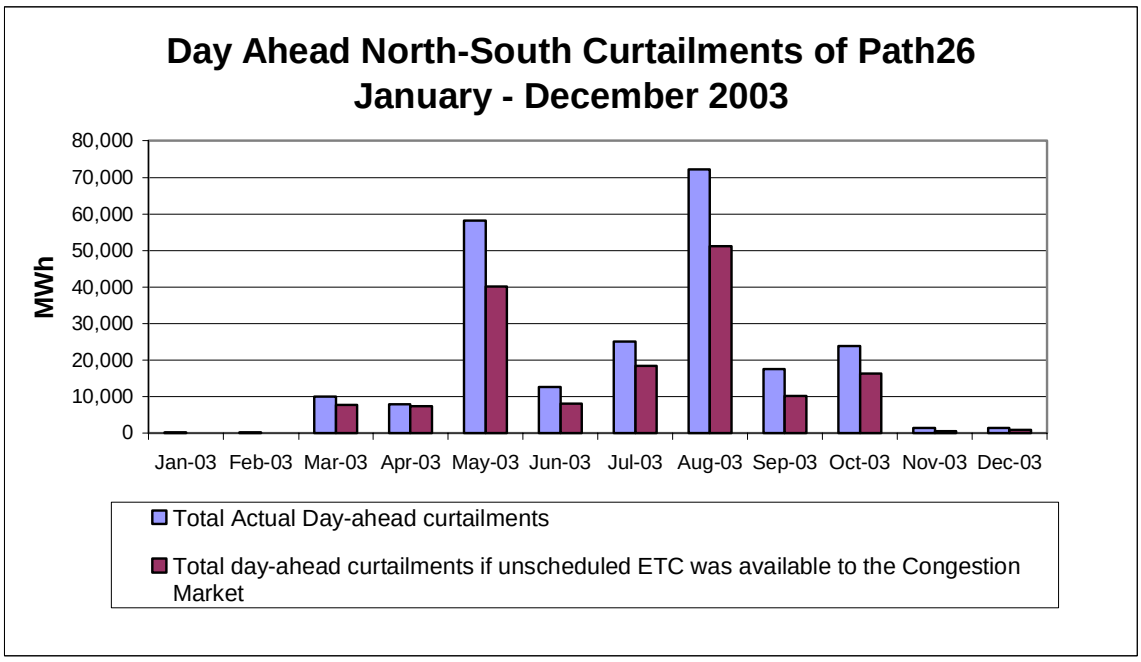
Figure 5.5 demonstrates, for the most congested paths in 2003, the extent to which the observed day-ahead congestion was due to phantom congestion, or the inability to make unscheduled ETC capacity available to the day-ahead market. This analysis clearly indicates that releasing unscheduled ETC can significantly reduce the congestion frequencies for all the major paths. For instance, the release of unscheduled ETC would have significantly reduced the congestion on Path15 in the south to north direction. In actuality, CAISO had to curtail about 50,000 MW in January 2003. These curtailments could have been significantly reduced if unscheduled ETC would have been released to the market. Phantom congestion compromises market efficiency and can potentially increase the total costs to the final consumers.

Figure 5.5 Phantom Congestion on Major Paths, 2003









Note: For inter-ties, unscheduled ETC is based on the amount of ETC reserved in the DA market that went unscheduled in the real-time market. For internal paths such as Path 15 and Path 26, unscheduled ETC is based on the amount of ETC that was reserved in the DA but went unscheduled through the HA market (the CAISO does not have real-time schedule data for internal paths).

5.2 Overview of FTR Market Performance

In the California market, a Firm Transmission Right (FTR) is defined as a one-MW portion of the available transmission capacity (ATC) on a specific inter-zonal transmission interface or inter-tie, going in one direction only, from an originating zone to a contiguous receiving zone. FTRs have both a financial and physical attribute. The financial attribute entitles the owner to a share of the path's congestion revenues, and as such, they provide a financial hedge for scheduling on that path. The physical aspect pertains to the fact that the day-ahead energy schedules of FTR holders have higher priority against curtailment than the schedules of non-FTR holders. However, there is no FTR scheduling priority in the hour-ahead market.

The CAISO does not require that FTR owners be CAISO scheduling coordinators (SCs). FTRs may be purchased by any qualified bidder purely as an investment to enable the owner to receive a stream of income from the congestion usage revenues. In order to be used in scheduling, however, an FTR must be assigned to one of the SCs. In addition, an owner may resell the FTR or the scheduling rights may be unbundled from the revenue rights and sold or transferred to another party. All these sales, transfers or assignments are considered "secondary market transactions" and must be recorded in the CAISO secondary registration system (SRS).

Currently, the CAISO conducts an FTR auction at the beginning of each year. The FTRs auctioned are effective April 1 of the auction year to March 31 of the following year.[5]

5.2.1 Concentration of FTR Ownership and Control

In the 2003 FTR market, the UDCs owned most of the FTRs on the major paths in the CAISO market. For instance, Southern California Edison has complete ownership of all FTRs on IID-SDGE, Palo Verde, and Silverpeak in the import direction and owns 80 and 77 percent of FTRs on ELDORADO and IID-SC respectively. Similarly, Pacific Gas and Electric owns 69 percent of FTRs on COI in the import direction. Currently, UDCs are usually net energy buyers in the market so their high FTR ownership concentrations on these paths do not currently cause concerns of market manipulation. Other paths, such as BLYTHE (import direction), CFE (import direction), and Silverpeak (export direction), also have a high FTR concentration ratio, but we observe little congestion on these paths. Therefore, in 2003 FTR concentration did not cause concerns of market manipulation.

[5] The FTR auction in 2004 was postponed to a late February due to the concerns about the intra-zonal congestion problems in the San Diego area and potential creation of new zone and new interfaces in the area.

5.2.2 FTR Scheduling

In the 2003 FTR cycle, the average amount of FTRs scheduled was low. On average, only 29 percent of the total FTRs were scheduled in the day-ahead markets. However, on some paths FTR scheduling percentages were high and FTRs were used to establish the scheduling priority in the day-ahead markets. As shown in Table 5.4 below, a high percentage of FTRs were scheduled on some paths (86% on Eldorado, 69% on IID-SCE, 80% on Palo Verde, and 99% on Silverpeak in the import direction). Southern California Edison (SCE1) owned the majority of FTRs on those paths.

Table 5.4 FTR Scheduling Statistics, April 1 – December 31, 2003*

		MW FTR Auctioned	Avg MW FTR Sch	Max MW FTR Sch	Max Single SC FTR Scheduled	% FTR Schedule - Dir
IMP	BLYTHE _BG	167	17	167	167	10%
IMP	COI _BG	745	258	725	500	35%
IMP	ELDORADO _BG	510	439	510	510	86%
IMP	IID-SCE _BG	600	411	480	460	69%
IMP	LUGOIPPDC_BG**	370	336	367	235	91%
IMP	LUGOTMONA_BG**	167	85	117	77	51%
IMP	LUGOWSTWG_BG**	93	28	46	28	30%
IMP	MEAD _BG	516	36	225	150	7%
IMP	NOB _BG	686	99	434	197	14%
IMP	PALOVRDE _BG	627	504	625	602	80%
IMP	SILVERPK _BG	10	10	10	10	99%
IMP	VICTVL _BG	991	6	64	64	1%
EXP	LUGOMKTPC_BG**	247	1	10	10	1%
EXP	LUGOTMONA_BG**	543	6	132	132	1%
EXP	MEAD _BG	464	12	266	141	3%
EXP	NOB _BG	664	16	83	83	2%
EXP	PATH26 _BG	1425	660	1365	575	46%

* only those paths on which 1% or more of FTRs were attached are listed

** FTRs on these paths were awarded to municipal utilities that converted their lines to the CAISO, and were not released in the primary auction.

5.2.3 FTR Revenue Per MW

The current FTR market cycle begins on April 1, 2004 and ends on March 31, 2005. Figure 5.5 summarizes the FTR revenues from April 1, 2003 to December 31, 2003.

During the current FTR cycle, we expect only two paths (IID-SDGE: export direction, and Silver Peak: export direction) to have total FTR revenue greater than their auction prices. One straightforward conclusion is that most FTR holders did not financially benefit from their investment in the FTR market. This is not surprising. As mentioned earlier, the FTR holders of major paths are also transmission owners. The FTR auction revenues are used to reduce the transmission revenue requirement (TRR). As a result, the FTR-owning UDCs are financially neutral in the FTR market. Also, besides the FTR revenue, the FTR provides additional benefits to the holders. Schedules with FTR rights are entitled to scheduling priority in the day-ahead market and FTRs can serve as insurance to hedge against possible high congestion charges.

Finally, consistent with the congestion patterns, the FTR revenues were significant on a few of the most congested paths (See Table 5.5). FTR revenue on Blythe (import), COI (import), El Dorado (import), and Palo Verde (import), and Path 26 (north to south) all exceeded $1,000 per MW as of December 31, 2003. [6]

[6] The FTR revenues on some other paths, such as LOGOIPPDC and LUGOTMONA, were also significant. However, these FTRs were created and allocated to the previous owners of the lines after they transferred these lines to the CAISO control. FTRs on these lines were not sold in the primary auction, nor were they traded in the secondary market.

Table 5.5 FTR Revenue Statistics ($/MW), April 2003 to December 2003

Branch Group	Direction	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Cumm Net REV	Pro Rated Annual NET Rev	FTR Auction Price
IMPORT	BLYTHE	69	0	231	1,422	376	0	0	0	0	2,097	2,797	5,460
IMPORT	COI	723	536	299	138	440	192	352	100	284	3,065	4,087	59,484
IMPORT	ELDORADO	0	0	1	0	0	268	516	248	576	1,609	2,146	33,888
IMPORT	LUGOIPPDC**	272	0	0	5,151	8	0	30	2	0	5,463	7,284	N/A
IMPORT	LUGOTMONA**	0	715	7	0	15	310	461	24	4	1,537	2,049	N/A
IMPORT	LUGOWSTWG**	3	0	0	0	0	9	0	0	261	273	365	N/A
IMPORT	MEAD	166	0	14	150	85	137	158	4	3	716	955	46,920
IMPORT	NOB	249	203	68	96	118	42	68	5	86	935	1,246	73,470
IMPORT	PALOVRDE	233	15	5	251	355	413	49	249	139	1,710	2,280	88,167
IMPORT	PATH26	0	0	5	0	0	0	0	0	0	5	6	1470
IMPORT	SUMMIT	108	0	0	0	0	0	0	0	0	108	145	2,600
EXPORT	IID-SDGE	0	480	0	0	5,651	0	0	0	0	6,131	8,175	364
EXPORT	NOB	0	0	0	0	0	0	3	0	21	24	32	5,085
EXPORT	PATH15**	0	5	0	0	0	0	0	0	0	5	7	N/A
EXPORT	PATH26	1,147	1,500	224	780	572	113	1,433	1	41	5,812	7,749	34,408
EXPORT	SILVERPK	0	0	720	0	0	0	0	0	0	720	960	100

* Pro-rate annual FTR revenue based on the actual FTR revenue collected in this FTR cycle and assume that FTRs would collect same rate of revenue in the remaining months of the cycle.

** FTRs on these paths were awarded to municipal utilities that converted their lines to the CAISO, and were not released in the primary auction.

5.2.4 FTR Trades in the Secondary Markets

Market participants are allowed to conduct further FTR transactions in the secondary markets. However, no FTR transactions in the secondary markets were reported in 2003. One explanation is that FTR prices were too high to make it profitable (mainly due to the aggressive bidding behavior of UDCs). As we indicated earlier, FTR revenues only exceeded their prices on two paths in 2003, and most of the investments in FTRs did not generate positive financial profits. Therefore, there was little incentive for market participants to purchase additional FTRs in the secondary market.