

# FTR Settlement

## Overview

FTR Holders are entitled to receive a portion of the Inter-Zonal congestion Usage Charge revenues in the associated FTR Market for both the Day-Ahead and Hour-Ahead markets.

FTR Holders are also subject to the “TO Debit” charge. This charge is applied when after the close of Day-Ahead market the inter-zonal interface is derated and congestion occurs in the Hour-Ahead market.

FTR Holders receive Usage Charge revenues in the associated FTR Market based on the following ISO charge types:

## Calculations

### Day-Ahead Market:

- CT 204: DA Inter-Zonal Congestion Refund to FTR Holders and TOs =

$$(Total\ DA\ Loading) * (DA\ congestion\ price) * (Percentage\ of\ congestion\ revenue\ allocation)$$

Note: *Percentage of congestion revenue allocation applies to both the DA and HA markets*

### Hour-Ahead Market:

- CT 253: Hour Ahead Inter-zonal Congestion Charges due to SCs=

$$(HA\ schedule - DA\ schedule) * (HA\ congestion\ price)$$

- CT 254: Hour Ahead Inter-zonal Congestion Settlement due to TOs and FTR Holders=

$$(Total\ DA\ Loading - Total\ HA\ Loading) * (HA\ congestion\ price) * (Percentage\ of\ Congestion\ Revenue\ Allocation)$$

Note: *Percentage of congestion revenue allocation applies to both the DA and HA markets*

## TO Debit

### Hour Ahead Market: TO Debit

The TO Debit charge applies when an Inter-Zonal interface is congested in the Day-Ahead market and, after the close of the Day-Ahead market, the Inter-Zonal interface is derated, the New Firm Use (NFU) capacity in the Hour-Ahead market is less than in the Day-Ahead and congestion is present in the Hour-Ahead market.

FTR Holders and the Transmission Owners (TOs) buy back transmission capacity from the Scheduling Coordinators (SCs) whose schedules were cut in the Hour-Ahead based on the Day-Ahead congestion price.

- CT 255: (HA Loading < DA Loading); Hour Ahead Inter-zonal Congestion Debit due to TOs and FTR Holders =

$$(Total\ DA\ loading - Total\ HA\ Loading) * (DA\ Congestion\ Price) * (Percentage\ of\ congestion\ revenue\ allocation)$$

- CT 256: (HA Loading < DA Loading); Hour Ahead Inter Zonal Congestion Debit due to SCs =

$$(Total\ HA\ Debit - TO\ Debit) * [(each\ SC's\ DA\ schedule\ in\ direction\ of\ congestion) / (Total\ DA\ loading\ in\ direction\ of\ congestion)]$$

Determination of  $K_{ym}$ ; (Percentage of Congestion Revenue Allocation)

- $K_{ym}$  is calculated according to the following conditions:
  - DA NFU capacity < Pre-DA NFU capacity  
The entitlement of FTR Holders is not reduced until the entitlements of TOs associated with that FTR Market have been reduced to zero.
  - DA NFU capacity > Pre-DA NFU capacity  
The entitlements of FTR Holders associated with that FTR Market shall not be increased.

### For FTR Holders

- If DA NFU Capacity > Total FTR Capacity  
 $K_{ym} = \text{FTR Holder Capacity} / \text{DA NFU Capacity}$
- If DA NFU Capacity <= Total FTR Capacity  
 $K_{ym} = \text{FTR Holder Capacity} / \text{Total FTR Capacity}$

### For TOs

- If DA NFU Capacity > Total FTR Capacity  
 $K_{ym} = (\% \text{ ownership}) * (\text{DA NFU Capacity} - \text{Total FTR capacity}) / \text{DA NFU Capacity}$

- If DA NFU Capacity  $\leq$  Total FTR Capacity  
 $K_{ym} = 0$

**Example: Determination of  $K_{ytn}$**

Pre-DA New Firm Use (NFU) capacity = 1000 MW  
 FTR Capacity = 250 MW

BA	Entitlement	Percentage of Congestion Revenue Allocations in both DA and HA Markets $K_{ytn}$					
		DA NFU cap = Pre-DA NFU cap DA NFU cap = 1000	DA NFU cap < Pre-DA NFU cap		DA NFU cap > Pre-DA NFU cap		DA NFU cap > Pre-DA NFU cap
			DA NFU cap > = FTR cap	DA NFU cap < FTR cap	DA NFU cap < FTR cap	DA NFU cap > FTR cap	
FTR 1	100 MW	100/1000 = 10%	DA NFU cap = 500 100/500 = 20%	DA NFU cap = 250 100/250 = 40%	DA NFU cap = 100 100/250 = 40%	DA NFU cap = 1200 100/1200 = 8.3%	
FTR 2	80 MW	80/1000 = 8%	80/500 = 16%	80/250 = 32%	80/250 = 32%	80/1200 = 6.7%	
FTR 3	70 MW	70/1000 = 7%	70/500 = 14%	70/250 = 28%	70/250 = 28%	70/1200 = 5.8%	
TO 1	40%	40% (1000-250) / 1000 = 30%	40% (500-250) / 500 = 20%	0	0	40% (1200-250) / 1200 = 31.7%	
TO 2	50%	50% (1000-250) / 1000 = 37.5%	50% (500-250) / 500 = 25%	0	0	50% (1200-250) / 1200 = 39.6%	
TO 3	10%	10% (1000-250) / 1000 = 7.5%	10% (500-250) / 500 = 5%	0	0	10% (1200-250) / 1200 = 7.9%	
Total		100%	100%	100%	100%	100%	

**Example 1: DA Congestion & HA Congestion (NFU Capacity does not change)**



DA NFU capacity = 400 MW = Pre-DA NFU capacity  
 FTR Capacity = 100 MW

**Day Ahead Settlement**

BA	TO/FTR Holder	$K_{j,m}$	Final DA Schedule (MW)	DA Adj Bid Diff (\$)	DA Settlement for SCs (\$) (CT 203)	DA Settlement for FTR/TO (\$) (CT 204)
SC1			100	\$10 *	\$1000	
SC2			100	\$20	\$1000	
SC3			100	\$30	\$1000	
SC4			100	\$40	\$1000	
SC5			0	--	0	
FTR 1	50 MW	$50/400 = 12.5\%$				$-(12.5\%) (10) (400) = -500$
FTR 2	30 MW	$30/400 = 7.5\%$				$-(7.5\%) (10) (400) = -300$
FTR 3	20 MW	$20/400 = 5\%$				$-(5\%) (10) (400) = -200$
TO1	40%	$40\% (400-100) / 400 = 30\%$				$-(30\%) (10) (400) = -1200$
TO2	50%	$50\% (400-100) / 400 = 37.5\%$				$-(37.5\%) (10) (400) = -1500$
TO3	10%	$10\% (400-100) / 400 = 7.5\%$				$-(7.5\%) (10) (400) = -300$
<b>Total</b>		100%	400		\$ 4000	$-(400)(10) = - \$ 4000$

\* Day Ahead Congestion Price

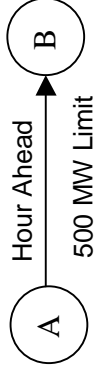
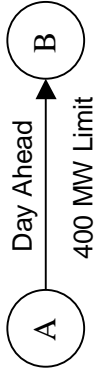
**Example 1 (cont'd): DA Congestion & HA Congestion (NFU Capacity does not change)**

**Hour Ahead Settlement**

BA	TO/FTR Holder	$K_{syn}$	DA Schedule (MW)	HA Schedule (MW)	HA Adj Bid Diff (\$)	HA Settlement for SCs (\$) (CT 253)	HA Settlement for FTR/TO (\$) (CT 254)
SC1			100	250	\$100	(250-100)(\$30) = \$ 4500	
SC2			100	0	\$20	(0-100)(\$30) = -\$ 3000	
SC3			100	0	\$25	(0-100)(\$30) = -\$ 3000	
SC4			100	50	\$30**	(50-100)(\$30) = -\$ 1500	
SC5			0	100	--	(100-0)(\$30) = \$ 3000	
FTR 1	50 MW	12.5%					-12.5% (400-400) (30) = 0
FTR 2	30 MW	7.5%					-7.5% (400-400) (30) = 0
FTR 3	20 MW	5%					-5% (400-400) (30) = 0
TO1	40%	30%					-30% (400-400) (30) = 0
TO2	50%	37.5%					-37.5% (400-400) (30) = 0
TO3	10%	7.5%					-7.5% (400-400) (30) = 0
		100%	400	400		\$ 0	- (400-400) (30) = \$ 0

\*\* Hour Ahead Congestion Price

**Example 2: Congestion in both DA & HA markets (HA NFU capacity increased)**



DA NFU capacity = 400 MW = Pre-DA NFU capacity  
 FTR Capacity = 100 MW

**Day Ahead Settlement**

BA	TO/FTR Holder	$K_{syn}$	Final DA Schedule (MW)	DA Adj Bid Diff (\$)	DA Settlement for SCs (\$) (CT 203)	DA Settlement for FTR/TO (\$) (CT 204)
SC1			100	\$10 *	\$1000	
SC2			100	\$20	\$1000	
SC3			100	\$30	\$1000	
SC4			100	\$40	\$1000	
SC5			0	--	0	
FTR 1	50 MW	$50/400 = 12.5\%$				$-(12.5\%) (10) (400) = -500$
FTR 2	30 MW	$30/400 = 7.5\%$				$-(7.5\%) (10) (400) = -300$
FTR 3	20 MW	$20/400 = 5\%$				$-(5\%) (10) (400) = -200$
TO1	40%	$40\% (400-100) / 400 = 30\%$				$-(30\%) (10) (400) = -1200$
TO2	50%	$50\% (400-100) / 400 = 37.5\%$				$-(37.5\%) (10) (400) = -1500$
TO3	10%	$10\% (400-100) / 400 = 7.5\%$				$-(7.5\%) (10) (400) = -300$
<b>Total</b>		100%	400		\$ 4000	$-(400)(10) = -\$ 4000$

**Example 2 (cont'd): Congestion in both DA & HA markets (HA NFU capacity increased)**

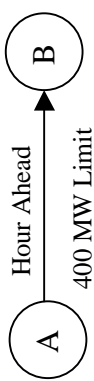
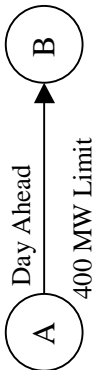
**Hour Ahead Settlement**

BA	TO/FTR Holder	$K_{ym}$	HA Schedule (MW)	HA Adj Bid Diff (\$)	HA Settlement for SCs (\$) (CT 253)	HA Settlement for FTR/TO (\$) (CT 254)
SC1			100	\$100	(100-100) (\$ 30) = 0	
SC2			0	\$20	(0-100) (\$ 30) = -\$ 3000	
SC3			0	\$25	(0-100) (\$ 30) = -\$ 3000	
SC4			100	<b>\$30**</b>	(100-100) (\$ 30) = 0	
SC5			300	--	(300-0) (\$ 30) = \$ 9000	
FTR 1	50 MW	12.5%				-12.5% (500-400) (30) = -375
FTR 2	30 MW	7.5%				-7.5% (500-400) (30) = -225
FTR 3	20 MW	5%				-5% (500-400) (30) = -150
TO1	40%	30%				-30% (500-400) (30) = -900
TO2	50%	37.5%				-37.5% (500-400) (30) = -1125
TO3	10%	7.5%				-7.5% (500-400) (30) = -225
<b>Total</b>		100%	500		\$ 3000	- (500-400) (30) = - \$ <b>3000</b>

\* Day Ahead Congestion Price

\*\* Hour Ahead Congestion Price

**Example 3: No DA Congestion. HA Congestion [NFU Capacity does not change (interface loading increases in HA)]**



DA NFU capacity = 400 MW = Pre-DA NFU capacity  
 FTR Capacity = 100 MW

**Hour Ahead Settlement**

BA	TO/FTR Holder	$K_{yin}$	DA Schedule (MW)	HA Schedule (MW)	HA Adj Bid Diff (\$)	HA Settlement for SCs (\$) (CT 253)	HA Settlement for FTR/TO (\$) (CT 254)
SC1			100	250	\$100	(250-100) (\$ 30) = \$ 4500	
SC2			100	0	\$20	(0-100) (\$ 30) = -\$ 3000	
SC3			100	0	\$25	(0-100) (\$ 30) = -\$ 3000	
SC4			0	50	<b>\$30**</b>	(50-0) (\$ 30) = \$ 1500	
SC5			0	100	--	(100-0) (\$ 30) = \$ 3000	
FTR 1	50 MW	12.5%					-12.5% (400-300) (30) = -375
FTR 2	30 MW	7.5%					-7.5% (400-300) (30) = -225
FTR 3	20 MW	5%					-5% (400-300) (30) = -150
TO1	40%	30%					-30% (400-300) (30) = -900
TO2	50%	37.5%					-37.5% (400-300) (30) = -1125
TO3	10%	7.5%					-7.5% (400-300) (30) = -225
		100%	300	400		<b>\$ 3000</b>	<b>-(400-300) (30) = - \$ 3000</b>

\*\* Hour Ahead Congestion Price

### Example 4A (Hour Ahead Derate): Congestion in both DA & HA markets



DA NFU capacity = 400 MW = Pre-DA NFU capacity  
 FTR Capacity = 100 MW

#### Day Ahead Settlement

BA	TO/FTR Holder	$K_{ym}$	Final DA Schedule (MW)	DA Adj Bid Diff (\$)	DA Settlement for SCs (\$) (CT 203)	DA Settlement for FTR/TO (\$) (CT 204)
SC1			100	\$10*	\$1000	
SC2			100	\$20	\$1000	
SC3			100	\$30	\$1000	
SC4			100	\$40	\$1000	
SC5			0	--	0	
FTR 1	50 MW	$50/400 = 12.5\%$				$-(12.5\%)(10)(400) = -500$
FTR 2	30 MW	$30/400 = 7.5\%$				$-(7.5\%)(10)(400) = -300$
FTR 3	20 MW	$20/400 = 5\%$				$-(5\%)(10)(400) = -200$
TO1	40%	$40\%(400-100) / 400 = 30\%$				$-(30\%)(10)(400) = -1200$
TO2	50%	$50\%(400-100) / 400 = 37.5\%$				$-(37.5\%)(10)(400) = -1500$
TO3	10%	$10\%(400-100) / 400 = 7.5\%$				$-(7.5\%)(10)(400) = -300$
<b>Total</b>		100%	400		\$ 4000	- (400)(10) = - \$ 4000

**Example 4A (cont'd) (Hour Ahead Derate): Congestion in both DA & HA markets**

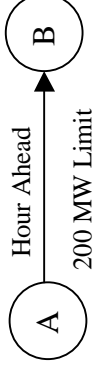
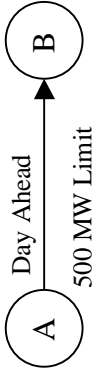
**Hour Ahead Settlement**

BA	TO/FTR Holder	$K_{ym}$	HA Schedule (MW)	HA Adj Bid Diff (\$)	HA Settlement for SCs (CT 253)	TO Debit (CT 255)	SC Debit (CT 256)	Total HA Inter-Zonal Congestion Settlement
SC1			50	\$100	(50-100) (\$ 30) = -\$ 1500		(\$6000-\$2000) * (100/400) =-\$1000	-\$500
SC2			0	\$20	(0-100) (\$ 30) = -\$ 3000		(\$6000-\$2000) * (100/400) =-\$1000	-\$2000
SC3			0	\$25	(0-100) (\$ 30) = -\$ 3000		(\$6000-\$2000) * (100/400) =-\$1000	-\$2000
SC4			120	<b>\$30**</b>	(120-100) (\$ 30) = \$ 600		(\$6000-\$2000) * (100/400) =-\$1000	\$1600
SC5			30	--	(30-0) (\$ 30) = \$ 900		0	\$900
FTR 1	50 MW	12.5%				12.5% (400-200) (10) = 250		\$250
FTR 2	30 MW	7.5%				7.5% (400-200) (10) = 150		\$150
FTR 3	20 MW	5%				5% (400-200) (10) = 100		\$100
TO1	40%	30%				30% (400-200) (10) = 600		\$600
TO2	50%	37.5%				37.5% (400-200) (10) = 750		\$750
TO3	10%	7.5%				7.5% (400-200) (10) = 150		\$150
<b>Total</b>			<b>200</b>		<b>-\$ 6000</b>	<b>(400-200) (10) = \$ 2000</b>	<b>\$ 4000</b>	<b>0</b>

\* Day Ahead Congestion Price

\*\* Hour Ahead Congestion Price

**Example 4B (Hour Ahead Derate): No Congestion DA. HA Congestion Only**



DA NFU capacity = 500 MW = Pre-DA NFU capacity  
 FTR Capacity = 100 MW

**Hour Ahead Settlement**

BA	TO/FTR Holder	$K_{syn}$	Final DA Schedule (MW)	HA Schedule (MW)	HA Adj Bid Diff (\$)	HA Settlement for SCs (CT 253)	TO Debit (CT 255)	SC Debit (CT 256)	Total HA Inter-Zonal Congestion Settlement
SC1			100	50	\$100	(50-100) (\$ 30) = -\$ 1500		(\$6000-\$0) * (100/400) =-\$1500	0
SC2			100	0	\$20	(0-100) (\$ 30) = -\$ 3000		(\$6000-\$0) * (100/400) =-\$1500	- \$ 1500
SC3			100	0	\$25	(0-100) (\$ 30) = -\$ 3000		(\$6000-\$0) * (100/400) =-\$1500	- \$ 1500
SC4			100	100	\$30**	0		(\$6000-\$0) * (100/400) =-\$1500	\$ 1500
SC5			0	50	--	(50-0) (\$ 30) = \$ 1500		0	\$ 1500
FTR 1	50 MW	12.5%					0		
FTR 2	30 MW	7.5%					0		
FTR 3	20 MW	5%					0		
TO1	40%	30%					0		
TO2	50%	37.5%					0		
TO3	10%	7.5%					0		
			400	200		<b>-\$ 6000</b>	<b>\$ 0</b>	<b>\$ 6000</b>	<b>0</b>

\*\* Hour Ahead Congestion Price

### Example 4C (Hour Ahead Derate) : Congestion in both DA and HA markets with Counter Schedules



DA NFU capacity = 400 MW = Pre-DA NFU capacity  
 FTR Capacity = 100 MW

#### Day Ahead Settlement

BA	TO/FTR Holder	$K_{ym}$	Final DA Schedule (MW)	DA Adj Bid Diff (\$)	DA Settlement for SCs (\$) (CT 203)	DA Settlement for FTR/TO (\$) (CT 204)
SC1			200	\$10 *	\$2000	
SC2			200	\$20	\$2000	
SC3			200	\$30	\$2000	
SC4			-200	-\$10	-\$2000	
SC5			0	--	0	
FTR 1	50 MW	$50/400 = 12.5\%$				$-(12.5\%) (10) (400) = -500$
FTR 2	30 MW	$30/400 = 7.5\%$				$-(7.5\%) (10) (400) = -300$
FTR 3	20 MW	$20/400 = 5\%$				$-(5\%) (10) (400) = -200$
TO1	40%	$40\% (400-100) / 400 = 30\%$				$-(30\%) (10) (400) = -1200$
TO2	50%	$50\% (400-100) / 400 = 37.5\%$				$-(37.5\%) (10) (400) = -1500$
TO3	10%	$10\% (400-100) / 400 = 7.5\%$				$-(7.5\%) (10) (400) = -300$
<b>Total</b>		100%	400		\$ 4000	$-(400)(10) = -\$ 4000$

**Example 4C (cont'd) (Hour Ahead Derate) : Congestion in both DA and HA markets with Counter Schedules**

**Hour Ahead Settlement**

BA	TO/FTR Holder	$K_{ym}$	HA Schedule (MW)	HA Adj Bid Diff (\$)	HA Settlement for SCs (CT 253)	TO Debit (CT 255)	SC Debit (CT 256)++	Total HA Inter-Zonal Congestion Settlement for SCs
SC1			133	\$100	(133-200)(\$20) = -\$ 1333		(\$4000-\$2000) * (200/600) =-\$667	-\$667
SC2			67	\$20**	(67-200)(\$20) = -\$ 2667		(\$4000-\$2000) * (200/600) =-\$667	-\$ 2000
SC3			200	\$30	0		(\$4000-\$2000) * (200/600) =-\$667	\$ 667
SC4			-100	-\$10	(-100+200)(\$20) = \$ 2000		0	\$ 2000
SC5			-100	-\$10	(-100-0)(\$20) = - \$ 2000		0	- \$ 2000
FTR 1	50 MW	12.5%				12.5% (400-200) (10) = 250		\$250
FTR 2	30 MW	7.5%				7.5% (400-200) (10) = 150		\$150
FTR 3	20 MW	5%				5% (400-200) (10) = 100		\$100
TO1	40%	30%				30% (400-200) (10) = 600		\$600
TO2	50%	37.5%				37.5% (400-200) (10) = 750		\$750
TO3	10%	7.5%				7.5% (400-200) (10) = 150		\$150
			200		<b>-\$ 4000</b>	<b>(400-200) (10)= \$ 2000</b>	<b>\$ 2000</b>	<b>0</b>

\* Day Ahead Congestion Price

\*\* Hour Ahead Congestion Price

+++ Note: 600 MW is the total of the SC's DA schedules in the direction of congestion

**Example 5: Congestion in both DA & HA markets (FTR Capacity > DA NFU Capacity > DA NFU Capacity & NFU capacity increases in HA)**



(DA NFU capacity = 200 MW) < (Pre-DA NFU capacity=1000  
FTR Capacity = 250 MW)

**Day Ahead Settlement**

BA	TO/FTR Holder	$K_{ym}$	Final DA Schedule (MW)	DA Adj Bid Diff (\$)	DA Settlement for SCs (\$) (CT 203)	DA Settlement for FTR/TO (\$) (CT 204)
SC1			100	\$50 *	\$5000	
SC2			100	\$.60	\$5000	
FTR 1	150 MW	150/250 = 60%				-(60%) (200) (50) = -6000
FTR 2	70 MW	70/250 = 28%				-(28%) (200) (50) = -2800
FTR 3	30 MW	30/250 = 12%				-(12%) (200) (50) = -1200
TO1	40%	0				0
TO2	50%	0				0
TO3	10%	0				0
<b>Total</b>		100%	200		\$ 10,000	-(200)(50) = - \$ <b>10,000</b>

**Example 5 (cont'd): Congestion in both DA & HA markets (FTR Capacity > DA NFU Capacity & NFU capacity increases in HA)**

**Hour Ahead Settlement**

BA	TO/FTR Holder	$K_{yn}$	HA Schedule (MW)	HA Adj Bid Diff (\$)	HA Settlement for SCs (\$) (CT 253)	HA Settlement for FTR/TO (\$) (CT 254)
SC1			100	\$20	(100-100) (\$ 10) = 0	
SC2			0	\$5	(0-100) (\$ 10) = -\$ 1000	
SC3			100	<b>\$10**</b>	(100-0) (\$ 10) = \$ 1000	
SC4			300	--	(300-0) (\$ 10) = \$ 3000	
FTR 1	150 MW	60%				-(60%) (300) (10)= -1800
FTR 2	70 MW	28%				-(28%) (300) (10)= -840
FTR 3	30 MW	12%				-(12%) (300) (10)= -360
TO1	40%	0				0
TO2	50%	0				0
TO3	10%	0				0
<b>Total</b>		100%	500		\$ 3000	-(500-200) (10)= - \$ <b>3000</b>

\* *Day Ahead Congestion Price*

\*\* *Hour Ahead Congestion Price*

