Transmission Congestion Contracts

Kelly Stegmann

Senior Market Trainer, Market Training, NYISO

New York Market Orientation Course (NYMOC)

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TCC Module Objectives

- Describe TCC Fundamentals
- Identify Process to Obtain TCCs
- Describe and Calculate TCC Congestion Rent and Settlement
- TCC Hedging Examples

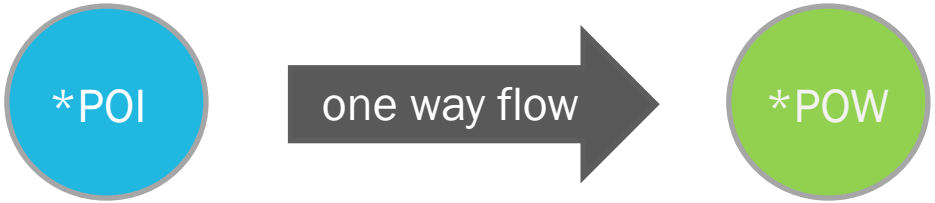
TCC Fundamentals

Defining TCCs

- **Transmission Congestion Contracts (TCCs) are**
  - Financial instruments that can be used to hedge costs resulting from transmission system congestion
  - Representative of a Right to Collect or Obligation to Pay
    - Day-Ahead Market (DAM) Congestion Rents associated with 1 MW of transmission
    - Between a specified Point of Injection (POI) & Point of Withdrawal (POW)

Types of POI and POW

- TCCs can be any combination of the following:



- Gen Bus
- Proxy Bus
- Zone
- Reference Bus

- Gen Bus
- Proxy Bus
- Zone
- Reference Bus

**Excludes Scheduled Proxy Lines*

**** Combinations cannot be electronically Equivalent*

Sample TCC POI & POW

Attachment E. Points of Injection and Withdrawal (POI and POW) for the Autumn 2019 Centralized TCC Auction and the Winter 2019-2020 Reconfiguration Auctions

PTID Name	PTID	Zone
59TH STREET_GT_1	24138	N.Y.C.
74TH STREET_GT_1	24260	N.Y.C.
74TH STREET_GT_2	24261	N.Y.C.
ADK RESOURCE___RCVRY	23798	CAPITL
ADK_NYS___DAM	23527	CAPITL
ALBANY___LFGE*	323615	CAPITL
ALLEGHENY___COGEN	23514	GENESE
ALTONA_WT_PWR	323606	NORTH
AMERICAN_REF_FUEL	24010	WEST
ARKWRIGHT___SUMMIT_WT_PWR	323751	WEST
ARTHUR KILL_GT_1	23520	N.Y.C.
ARTHUR_KILL_2	23512	N.Y.C.
ARTHUR_KILL_3	23513	N.Y.C.
ARTHUR_KILL_COGEN	323718	N.Y.C.
ASHOKAN___	23654	HUD VL
ASTORIA_EAST_ENERGY_CC1	323581	N.Y.C.
ASTORIA_EAST_ENERGY_CC2	323582	N.Y.C.
ASTORIA_GT2_1	24094	N.Y.C.

Attachment E – Example TCC POI & POW

POI & POW Types	PTID Name	PTID	Zone
GEN BUS	59th STREET_GT_1	24138	N.Y.C.
PROXY BUS	HQ_GEN_CEDARS_PROXY	323590	H.Q.
ZONE	WEST	61752	WEST
REFERENCE BUS	NYISO_LBMP_REFERNCE	24008	MHK VL

TCC Holders

- **Market Participants (MPs) may participate exclusively in the TCC market without participating in other NYISO products and/or markets.**
- **Primary Holders of TCCs include:**
  - Power Suppliers
  - Load Serving Entities (LSEs)
  - Transaction Customers
  - Transmission Owners
  - Financial Institutions

TCC Fundamentals

- **NYISO-Administered TCC Auction**
  - Awarded to a Primary Holder
  - For an effective period-of-time
- **Non-Auction Procurement Methods**
  - Awarded by NYISO separate and distinct from TCC auction process
  - Eligibility criteria applies

TCC Fundamentals

- **Constraints and Congestion**
  - Transmission transfer limits create constraints on the optimum economic flow of energy in the power system
  - Transmission constraints cause congestion to develop
    - As a result, generators from different buses are dispatched to meet load due to limits in transfer capability.

Total Transfer Capability = Min(Thermal Limit, Voltage Collapse Limit, Stability Limit)

TCC Fundamentals

- **The TCC Automated Market System (AMS)**
  - Is a secure, web-based application
  - Provides a bid/offer platform to support MP TCC participation
  - The AMS allows a participant to review TCC market information, such as:
    - TCCs owned
    - Auction Results
    - TCC Market Award Invoices

Obtaining TCCs

Obtaining TCCs

- TCC can be procured through the following:

NYISO Administered Auction	Non-Auction Procurement Methods
• Centralized TCC Auction • Monthly Reconfiguration Auction	• Secondary Market • Direct Sale • Existing Transmission Agreements • Non-Historical Fixed Price TCCs • Incremental TCCs

Pre-Auction Activities Summary

- **NYISO Responsibilities**
  - Develop TCC Auction Model and update available capacity
    - Optimal Power Flow
  - The OPF determines optimal set of TCCs to award by Considering:
    - Reserved system capability
    - TCCs already awarded
    - Scheduled Transmission Outages
  - Post Auction Timeline, and Auction related information*
    - Number of Rounds, percentage of Capacity to be sold/Round

** A complete list of auction related information is posted by NYISO*

Pre-Auction Activities Summary

- **MP Responsibilities**
  - Pass TCC Competency Exam
    - Prior to the NYISO granting bidding rights to an MP
    - Self learning training available online
  - Establish Initial Creditworthiness for Market Activation
    - Details found in MST Attachment K
  - Post Collateral to Cover Current TCC Portfolio Position and Bidding Minimums per MW to Enter Bids into Auctions
    - Details found in TCC Manual Section 3.2.5 – Cross reference to MST Attachment K

Obtaining TCCs

- **Central TCC Auctions**
  - TCC duration options
    - Two Year *(optional to hold)*
    - One Year *(required to hold)*
    - Six Month *(required to hold)*
      - *November through April (Autumn Centralized TCC Auction)*
      - *May through October (Spring Centralized TCC Auction)*
  - Usually multiple rounds per Sub-Auction (i.e., duration)
    - A set % of capacity is available in each round
    - Multiple rounds allow for price discovery
    - Agreement required by certain TOs to hold less than 4 rounds in a Sub-Auction

Obtaining TCCs

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Centralized TCC Auction Example			
% System Capacity (S.C.) Offered	**Sub-Auction (Duration)**	**Round #**	**% Split/Round**
5% of S.C.	2-Year	Round 1	100%
25% of S.C.	1-Year	Round 2	20%
		Round 3	24%
		Round 4	28%
		Round 5	28%
45% of S.C.	6-Month	Round 6	27%
		Round 7	33%
		Round 8	40%
25% of S.C	System Capability already spoken for from prior Centralized TCC Auction's 2-Yr (5%) & 1-Yr (20%) TCCs (Fixed Injection)		
100% of System Capacity			

Obtaining TCCs

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Centralized TCC Auction Round Example

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Legend

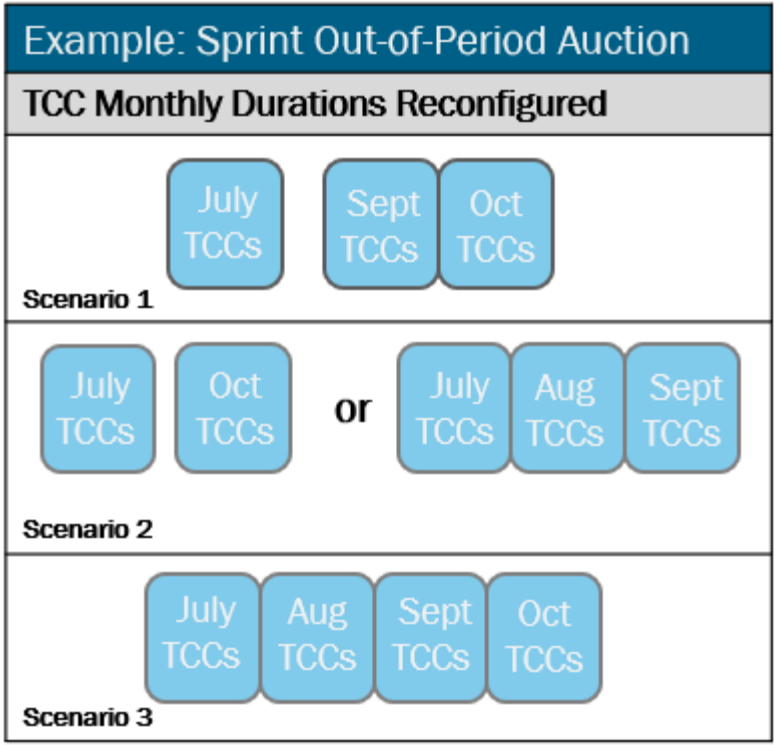
- Offering and Bidding Period
  Fri 0800 to Mon 1700
- NYISO Performs Analysis in 2 days
- NYISO Posts Awards on TCC Automation site no later than 2100

*** Always refer to posted timelines (TCC Manual Att. D)

Obtaining TCCs

- **Reconfiguration Auctions**
  - Balance-of-Period Auction
    - Covers the month or combination of months remaining in Capability Period, beginning with month that follows month in which the auction is conducted
      - Autumn Capability Period
        - » *November through April*
      - Spring Capability Period
        - » *May through October*
    - Performed in Decoupled Mode
      - Simultaneous single-period solution within a single auction for all remaining months of the Capability Period
      - Each bid/offer can only apply to adjust positions
    - Provides for the opportunity to adjust positions
    - Captures short-term changes in transmission capacity

Obtaining TCCs



*** Decoupled mode awards TCCs for each month separately

Obtaining TCCs

Reconfiguration Auction Balance-of-Period Example

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Legend

- Offering and Bidding Period
  Fri 0800 to Mon 1700
- NYISO Performs Analysis in 8 days
- NYISO Posts Awards on TCC Automation site no later than 2100

*** Always refer to posted timelines (TCC Manual Att. D)

Obtaining TCCs

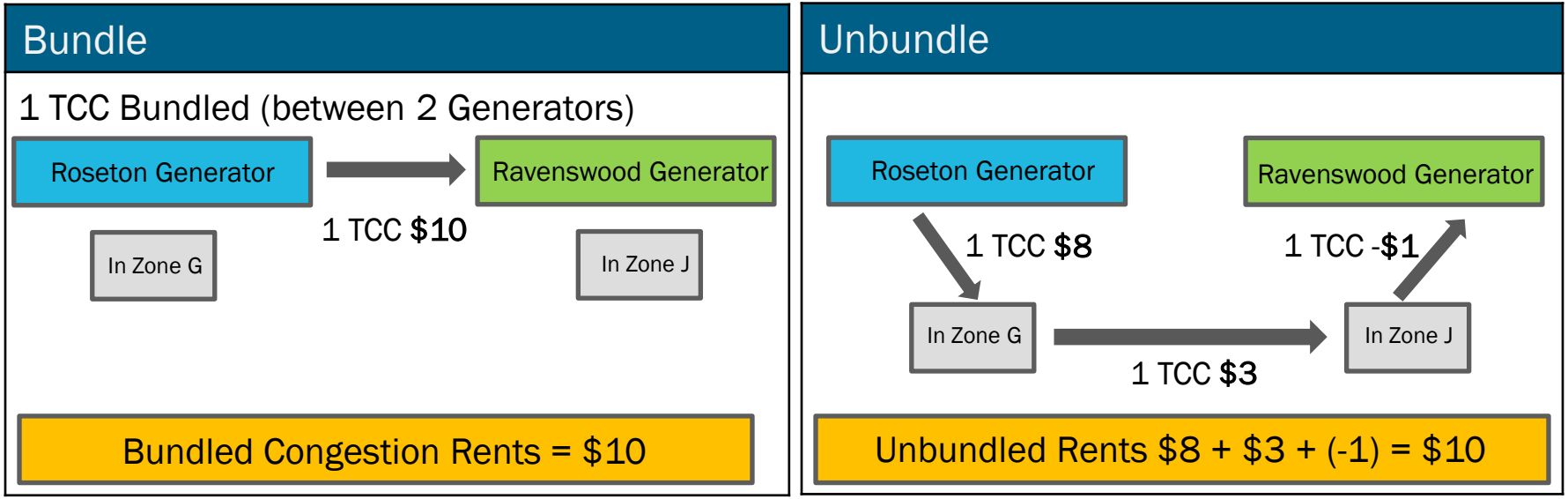
- **Offer Parameters to Sell**
  - MPs provide the following information per offer
    - Inventory ID (TCC Contract #)
    - # of TCCs Offered for Sale
    - Minimum Offer Price ($/TCC)
    - Period ID for Balance-of-Period

Obtaining TCCs

- **Offer Parameters to Buy**
  - MPs provide the following information per bid
    - POI & POW
    - # of TCCs Desired to Buy
    - Maximum Bid Price ($/TCC)
    - Period ID for Balance-of-Period Auction
    - Bundle or Unbundle

Obtaining TCCs

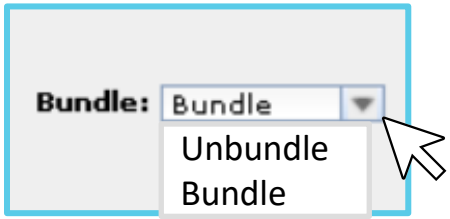
- **Bundle vs. Unbundle Scenario**



*** Irrespective of Bundle vs. Unbundle, the Congestion Rent amount is always equal

Obtaining TCCs

- **Bundle vs. Unbundle**
  - Bundle is default option
  - Unbundling option
    - Allows TCC holder to sell components of TCC in future auction
    - Has an impact on credit requirements at time of bidding and after the TCC is awarded
  - Does not change:
    - Capacity
    - Value
    - Market-Clearing Price



Let's Review

In order to participate in the TCC market, a TCC holder must also participate in the Energy market. True or False?

True

False

Let's Review

One of the main functions of the Optimal Power Flow is to determine the available system capacity for upcoming TCC auctions. True or False?

True

False

Let's Review

Unbundling a TCC allows the holder to sell components of the TCC in a future auction. True or False?

True

False

TCC Market-Clearing Price (MCP)

- **Upfront cost for obtaining TCCs**
  - Established at the end of round/auction
- **Once an MP is awarded a TCC, an auction settlement occurs**
  - Invoiced through the TCC AMS at the end of auction
  - The settlement is calculated as the number of MWs awarded multiplied by the MCP

TCC Market-Clearing Price (MCP)

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TCC Market – Clearing Price Example

Four MPs have requested a total of 60 MW from Gen A to Zone B

- Bids are for $ per MW for the duration of the TCC
- In this example, 50 MW is available from Gen A to Zone B

Bids for TCCs from Gen A to Zone B

Company	Bid MW	Bid Price
Trans IT	20	$5,000/MW
L&D Power	20	$4,000/MW
EMC Bank	15	$3,000/MW
New Power	5	$2,000/MW

TCC Auction Process Summary

Obtaining TCCs

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Non-Auction Procurement Methods

Secondary Market	• Primary Holder arranges sale with a third party • Primary Holder can change ownership to purchaser • NYISO settles with Primary Holder ***See TCC Automated Market System User's Guide***
Direct Sale	• Transmission Owner can sell TCCs directly, such offers must be posted on NYISO OASIS
Existing Transmission Agreements	• Pre-NYISO, wholesale loads arranged for power delivery through transmission agreements with transmission provider - e.g., the vertically integrated utility companies • These ETAs were preserved when NYISO came into existence through the creation of Grandfathered Rights or Grandfathered TCCs over the same paths as the power deliveries that were contemplated in the ETAs • These ETAs are listed in the Tariffs (OATT Att. L), along with MW quantity and path associated with each ETA

Obtaining TCCs

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Non-Auction Procurement Methods

Historic Fixed Priced TCCs (HFPTCCs)	• Awarded to Load Serving Entities (LSEs) with expiring Grandfathered TCCs or Grandfathered Rights with pricing determined based on historic market data
	  • LSE can choose between a 10 year duration of the price or a 5 year duration with an opportunity to renew for another 5 years at a reset price
	  • Renewed on a yearly basis

Non-Historic Fixed Priced TCCs (NHFPTCCs)	• LSEs with qualifying amounts of average load can purchase NHFPTCCs that sink in the load zone(s) where they serve load • Original term is 2 years with prices based off two-year TCC auction prices • LSE has opportunity to renew in 1 year increments up to a total maximum duration of 10 years with renewal prices based on one-year TCC auctions prices
Incremental TCCs	• Awarded at no cost to MPs that increase the transfer capability of the system by constructing new, or improving existing, transmission facilities • Must meet certain eligibility criteria

TCC Congestion Rent and Settlement

TCC Congestion Rent and Settlement

- **Congestion Rent**
  - An hourly credit or charge to a TCC holder in the DAM
  - Hourly credits/charges are rolled up to a daily value, then rolled up to a weekly level
    - Through the Consolidated Invoicing Process
  - MP is paid/charged the difference in congestion at sink and source
    - Occurs going forward for the duration of the TCC

TCC Congestion Rent and Settlement

- **Congestion Rent**
  - The Congestion Rent is settled against DAM Congestion Component only
    - Calculated for each hour, using the formula:

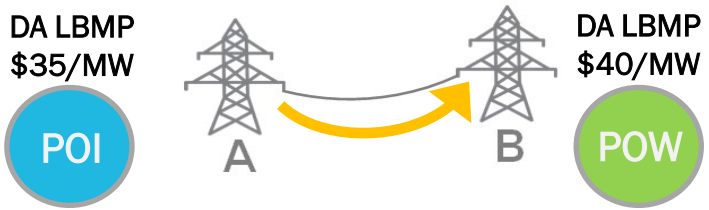
[(-1 x DAM Cong. Sink Price$) – (-1 x DAM Cong. Source Price$)] x #TCCs

TCC Congestion Rent and Settlement

- Flow vs. Counterflow

Flow

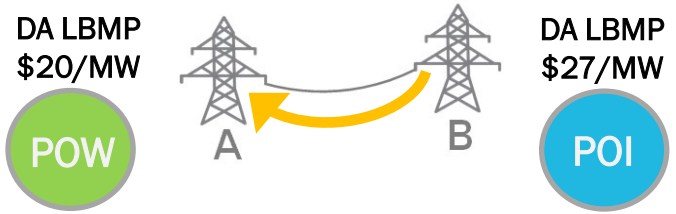
- Positively priced TCCs
  - In the direction of predominately positive congestion



Rents = $5

Counterflow

- Negatively priced TCCs
  - Opposite direction of predominately negative congestion



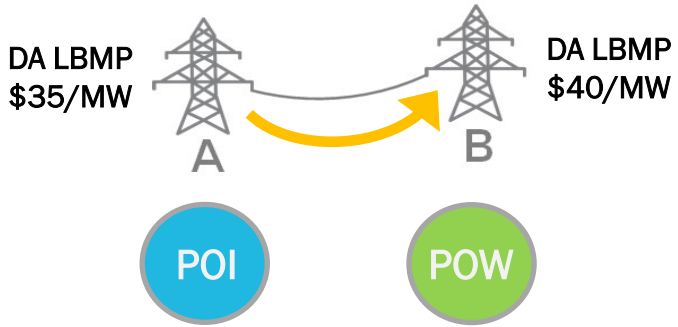
Rents = -$7

*** Note that LBMPs do not always reflect direction of flow!

TCC Congestion Rent and Settlement

- Hourly DAM Congestion Rent Example:

Company "Power Tower" owns 20 TCCs from A to B



LBMP Components:

A @ $35 LBMP Components

Energy	$35
Loss	$0
Congestion	$0

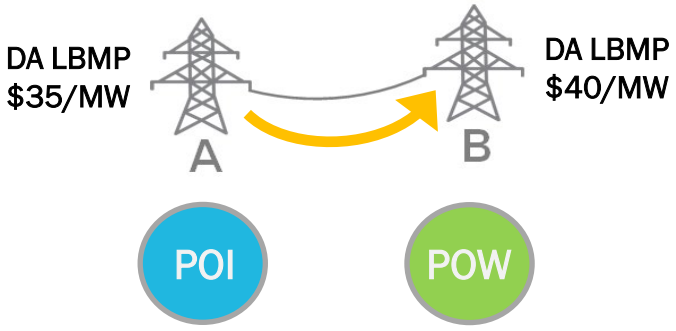
B @ $40 LBMP Components

Energy	$35
Loss	$0
Congestion	-$5

TCC Congestion Rent and Settlement

- Hourly DAM Congestion Rent Example:

Company "Power Tower" owns 20 TCCs from A to B



A @ $35 LBMP Components		B @ $40 LBMP Components	
Energy	$35	Energy	$35
Loss	$0	Loss	$0
Congestion	$0	Congestion	-$5

[(-1 x DAM Cong. Sink Price$) – (-1 x DAM Cong. Source Price$)] x #TCCs

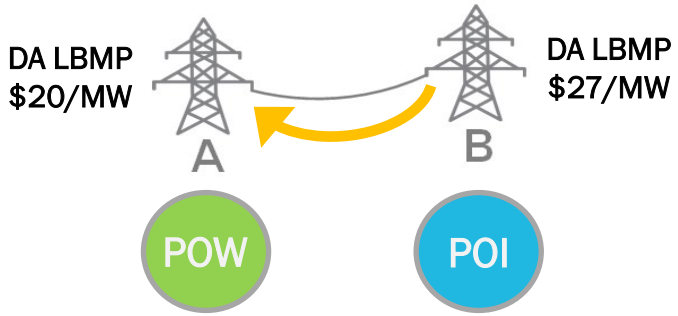
[(-1 x -$5) – (-1 x $0)] x 20
($5 - $0) x 20
$5 x 20
$100

TCC Holder Collects Rent

TCC Congestion Rent and Settlement

- Hourly DAM Congestion Rent Example:

Company "Power Tower" owns 10 TCCs from B to A



LBMP Components:

B @ $40 LBMP Components

Energy	$20
Loss	$0
Congestion	-$7

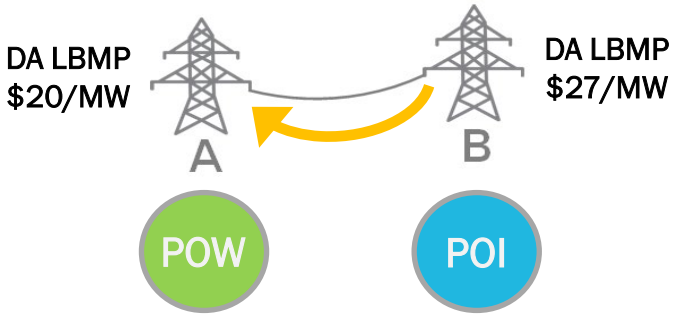
A @ $35 LBMP Components

Energy	$20
Loss	$0
Congestion	$0

TCC Congestion Rent and Settlement

- Hourly DAM Congestion Rent Example:

Company "Power Tower" owns 10 TCCs from B to A



A @ $35 LBMP Components		B @ $40 LBMP Components	
Energy	$20	Energy	$20
Loss	$0	Loss	$0
Congestion	$0	Congestion	-$7

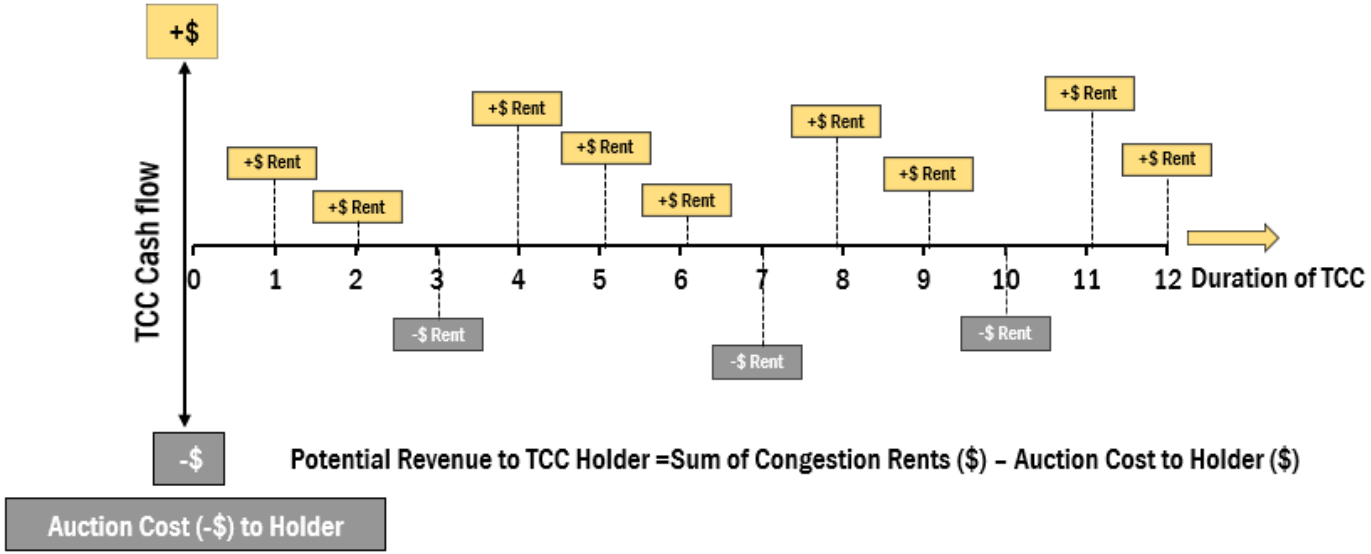
[(-1 x DAM Cong. Sink Price$) – (-1 x DAM Cong. Source Price$)] x #TCCs

[(-1 x -$0) – (-1 x -$7)] x 10
($0 - $7) x 10
-$7 x 10
-$70

TCC Holder Pays Rent

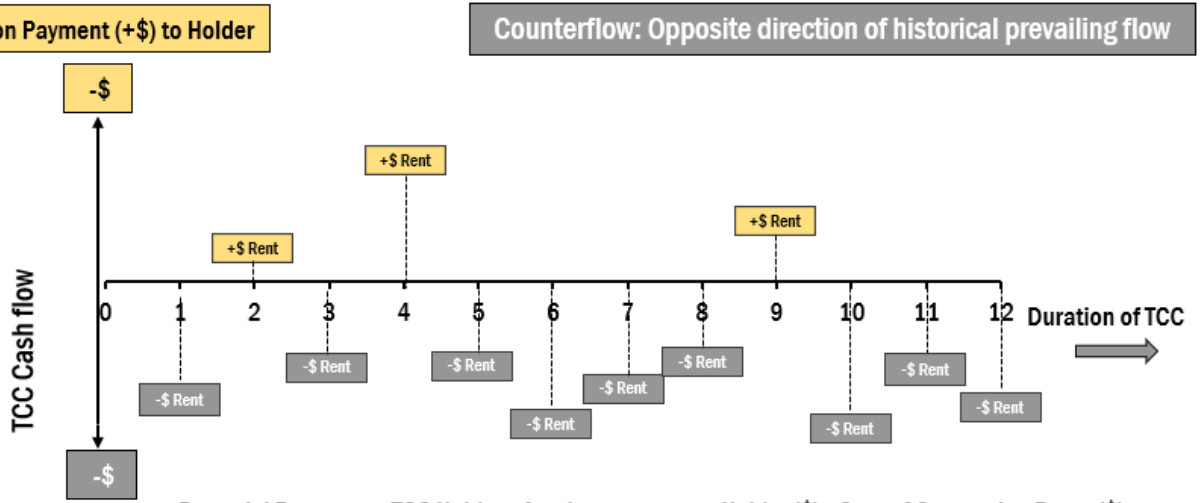
TCC Potential Net Revenue

"Big Picture" Cash Flow Example – Positively Priced TCC



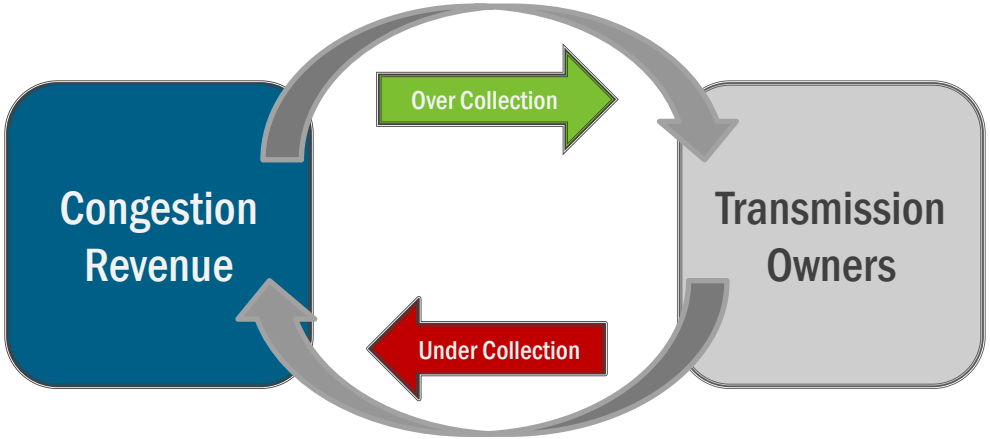
TCC Potential Net Revenue

"Big Picture" Cash Flow Example – Counterflow TCC



TCC Settlements: Congestion Revenue

- The TCC Market is always fully funded
  - Over collection or under collection is settled with the respective TOs



TCCs in Action

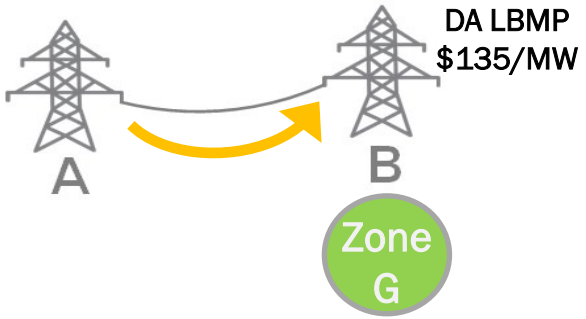
TCCs in Action

- **Why would a Market Participant want to acquire a TCCs for the following reasons:**
  - To collect Congestion Rents in order to hedge against Day-Ahead Market congestion costs
    - Alleviates price uncertainty
  - Hedge TUC for Transactions
  - To provide a potential revenue stream via Congestion Rents

LSE Hedging Example

- **Scenario: LSE buys 20 MWh Energy in the Day-Ahead Market at Zone G LBMP of $135 for 1 Hr.; Owns 20 TCCs from A to B**
  - **Step 1:** Determine Day-Ahead Market Energy Position for 1 Hr.

Step 1



LBMP Components

Energy	$30
Loss	$5
Congestion	-$100

Day-Ahead Market Hourly Energy Procurement:

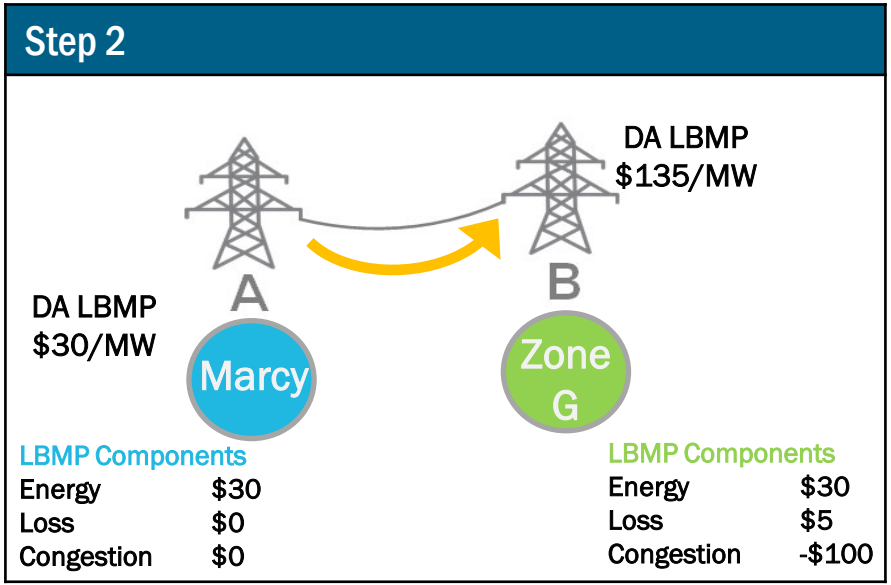
Cost of 20MWh DAM Energy:

Energy	[$30 x 20MW]	= $600
Loss	[$5 x 20MW]	=$100
Congestion	[-1(-$100) x 20MW]	=$2,000

Total Cost for DA LBMP for 1 Hr = $2,700

LSE Hedging Example

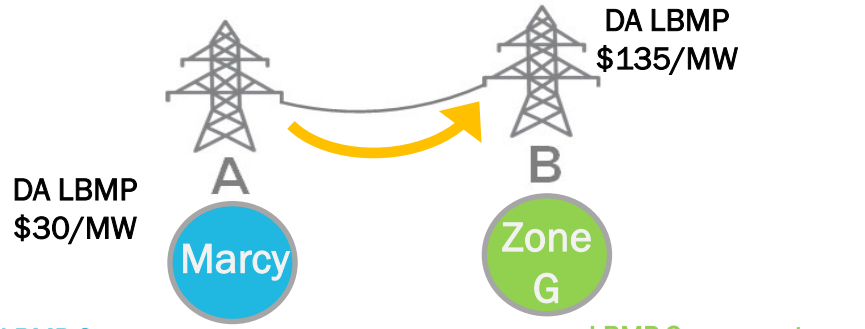
- Scenario: LSE buys 20 MWh Energy in the Day-Ahead Market at Zone G LBMP of $135 for 1 Hr.; Owns 20 TCCs from A to B
  - Step 2: Determine TCC Congestion Rent for same hour
    - Extract Congestion Component of the LBMP at the Sink and Source point of TCC



LSE Hedging Example

- Scenario: LSE buys 20 MWh Energy in the Day-Ahead Market at Zone G LBMP of $135 for 1 Hr.; Owns 20 TCCs from A to B
  - **Step 3:** Calculate Hourly DAM Congestion Rent using Congestion Rent formula

Step 3



LBMP Components	
Energy	$30
Loss	$0
Congestion	$0

LBMP Components	
Energy	$30
Loss	$5
Congestion	-$100

[(-1 x DAM Cong. Sink Price$) – (-1 x DAM Cong. Source Price$)] x #TCCs

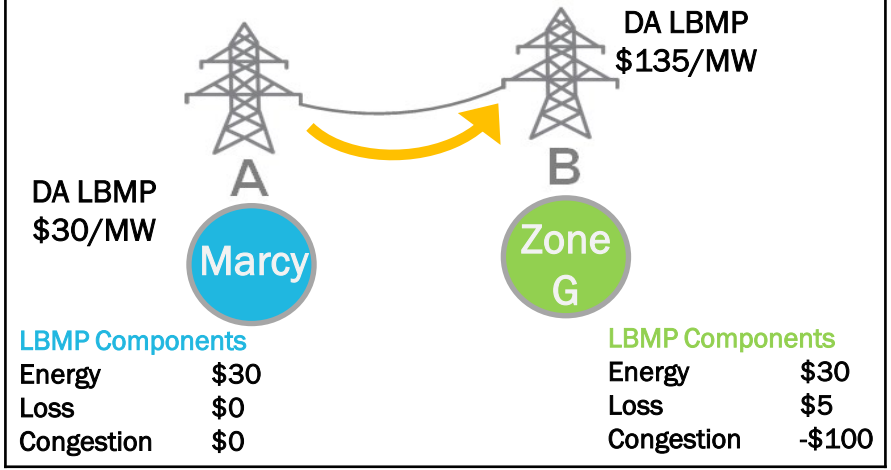
[(-1 x -$100) – (-1 x $0)] x 20
($100 - $0) x 20
$100 x 20
$2,000

TCC Holder Collects Congestion Rent for 1 Hr

LSE Hedging Example

- Scenario: LSE buys 20 MWh Energy in the Day-Ahead Market at Zone G LBMP of $135 for 1 Hr.; Owns 20 TCCs from A to B
  - Step 4: Putting it all together

Step 4



Calculated Outcome of Hedge

DAM Hourly Energy Procurement (Step 1): $2,700
(Paid by LSE)
Less: DA Hourly TCC Rent (Step 2): $2,000
(Paid to LSE)

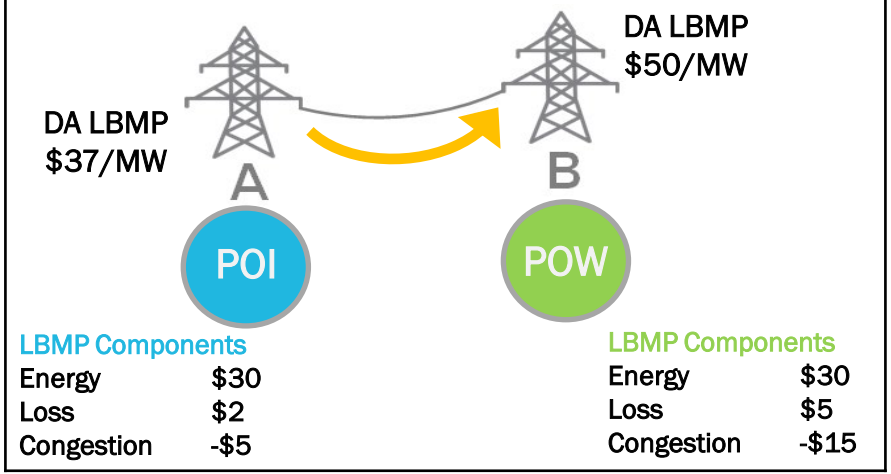
$2,700 - $2,000

Net Cost/MWh = $700 (Positive Hedge)

Energy Transaction Hedging Example

- Scenario: Transaction holder procures a DA Energy Transaction of 20 MWh from POI A to POW B (*Note: Losses are considered in this example*)
  - **Step 1:** Determine Day-Ahead Market Transaction Position for 1 Hr.

Step 1



LBMP Components	
Energy	$30
Loss	$2
Congestion	-$5

LBMP Components	
Energy	$30
Loss	$5
Congestion	-$15

Calculate Transmission Usage Charge (TUC):

TUC = [(1-Sink LBMP ($/MW) – (1-Source LBMP ($/MW)] X MWs

[(-1 x -$50) – (-1 x -$37)] x 20
($50 - $37) x 20
$13 x 20

Total Transmission Usage Charge = $260

Energy Transaction Hedging Example

- Scenario: Transaction holder procures a DA Energy Transaction of 20 MWh from POI A to POW B (*Note: Losses are considered in this example*)
  - Step 2: Determine TCC Congestion Rent for the same hour
    - Extract Congestion Component of the LBMP at the Sink and Source point of TCC

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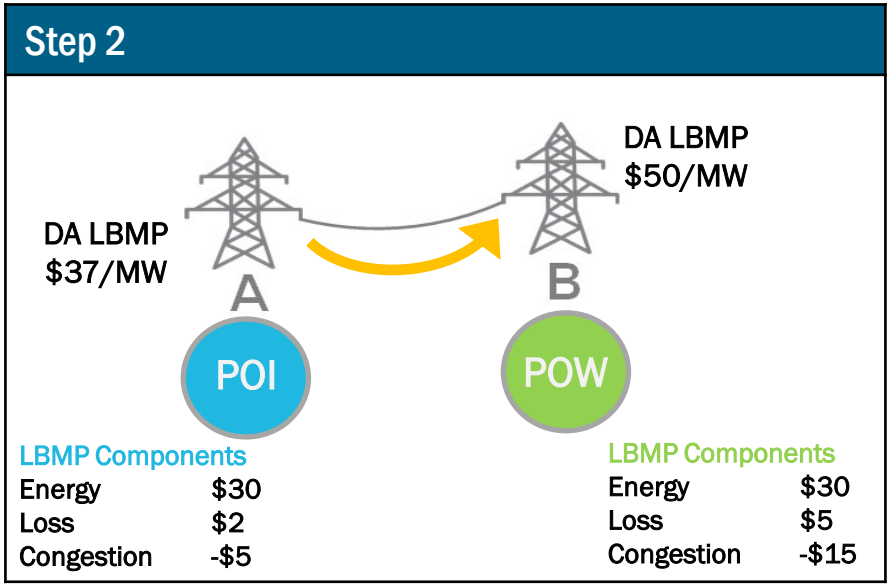
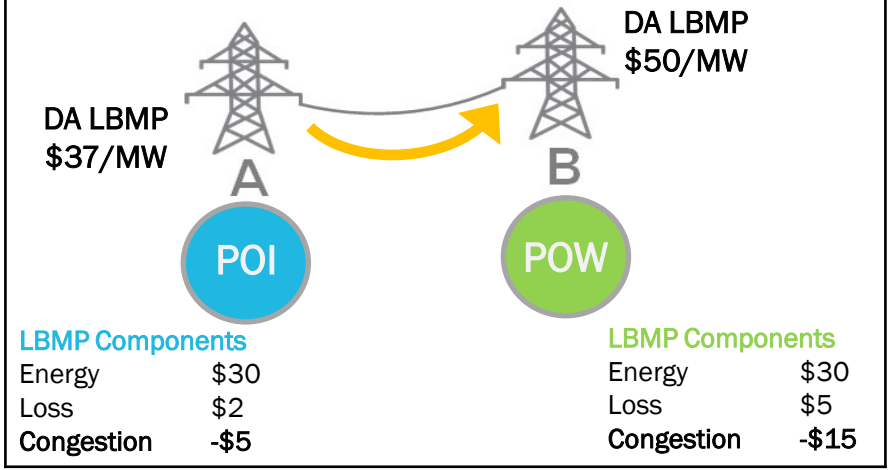


Energy Transaction Hedging Example

- Scenario: Transaction holder procures a DA Energy Transaction of 20 MWh from POI A to POW B (*Note: Losses are considered in this example*)
  - **Step 3:** Calculate Hourly DAM Congestion Rent using Congestion Rent formula

Step 3



:

[(-1 x DAM Cong. Sink Price$) – (-1 x DAM Cong. Source Price$)] x #TCCs

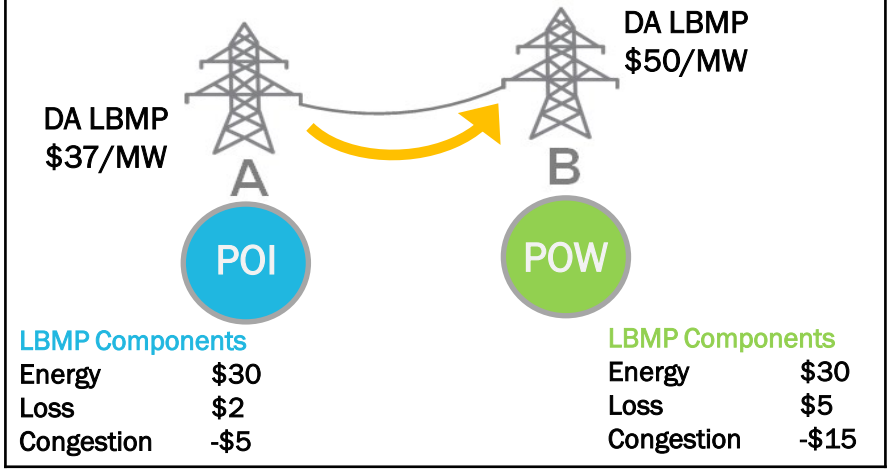
[(-1 x -$15) – (-1 x -$5)] x 20
($15 - $5) x 20
$10 x 20
$200

TCC Holder Collects Congestion Rent for 1 Hr

Energy Transaction Hedging Example

- Scenario: Transaction holder procures a DA Energy Transaction of 20 MWh from POI A to POW B (*Note: Losses are considered in this example*)
  - Step 4: Putting it all together

Step 4



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Calculated Outcome of Hedge

DAM Hourly TUC Charge (Step 1): $260 (Paid by LSE)
Less: DA Hourly TCC Rent (Step 2): $200 (Paid to LSE)

$260 - $200

Net Cost/MWh = $60 (Positive Hedge)

TCCs in Action – Real World Example

March 20XX Balance-of-Period Auction

Highest Auction Clearing Price (positively-priced TCC):
$12,889.50/MW (TCC)*
POI @ Dunwoodie Zone to POW @ Sandy Pond (N.E._Gen_Sandy_PD)

Eastern Date Hour		Zone Name	Zone PTID	DAM Zonal LBMP	DAM Zonal Losses	DAM Zonal Congestion	see bottom of column N.E Less Dunwoodie $
3/1/20XX	0:00	DUNWOD				0	
3/1/20XX	0:00	N.E_GEN_SANDY_PD				0	$0.00
3/1/20XX	1:00	DUNWOD				-112.89	
3/1/20XX	1:00	N.E_GEN_SANDY_PD				-132.22	19.33
3/31/20XX	23:00	DUNWOD				0	
3/31/20XX	23:00	N.E_GEN_SANDY_PD				0	0
						Rents	$ 8,643.92
						Auction	$ (12,889.50)
						Profit or (Loss)	$ (4,245.58)

If you purchased this TCC @ $12,889.50, you would have received $8,643.92 in Congestion Rents over the month (or 743 DAM hours) for a loss of $4,245.58

*sign reversed from posted number

TCCs in Action – Real World Example

March 20XX Balance-of-Period Auction

Largest Negative Clearing Price (Counterflow TCC):
$-22,243.25/MW (TCC)*
POI @Sandy Pond (N.E._GEN_SANDY_PD) to POW @Genesee Zone

Eastern Date Hour		Zone Name	Zone PTID	DAM Zonal LBMP	DAM Zonal Losses	DAM Zonal Congestion	see bottom of column Genesee Less N.E. $
3/1/20XX	0:00	GENESE				0	$0.00
3/1/20XX	0:00	N.E_GEN_SANDY_PD				0	
3/1/20XX	1:00	GENESE				-13.72	-118.5
3/1/20XX	1:00	N.E_GEN_SANDY_PD				-132.22	
3/31/20XX	3:00	GENESE				0	0
3/31/20XX	3:00	N.E_GEN_SANDY_PD				0	
						Rents	$ (16,597.82)
						Auction Profit or (Loss)	$22,243.25
							$ 5,645.43

If you received $22,243.25 in the TCC auction for this Counterflow TCC, you would have paid $16,597.82 in Congestion Rents over the month, for a gain of $5,645.43

*sign reversed from posted number

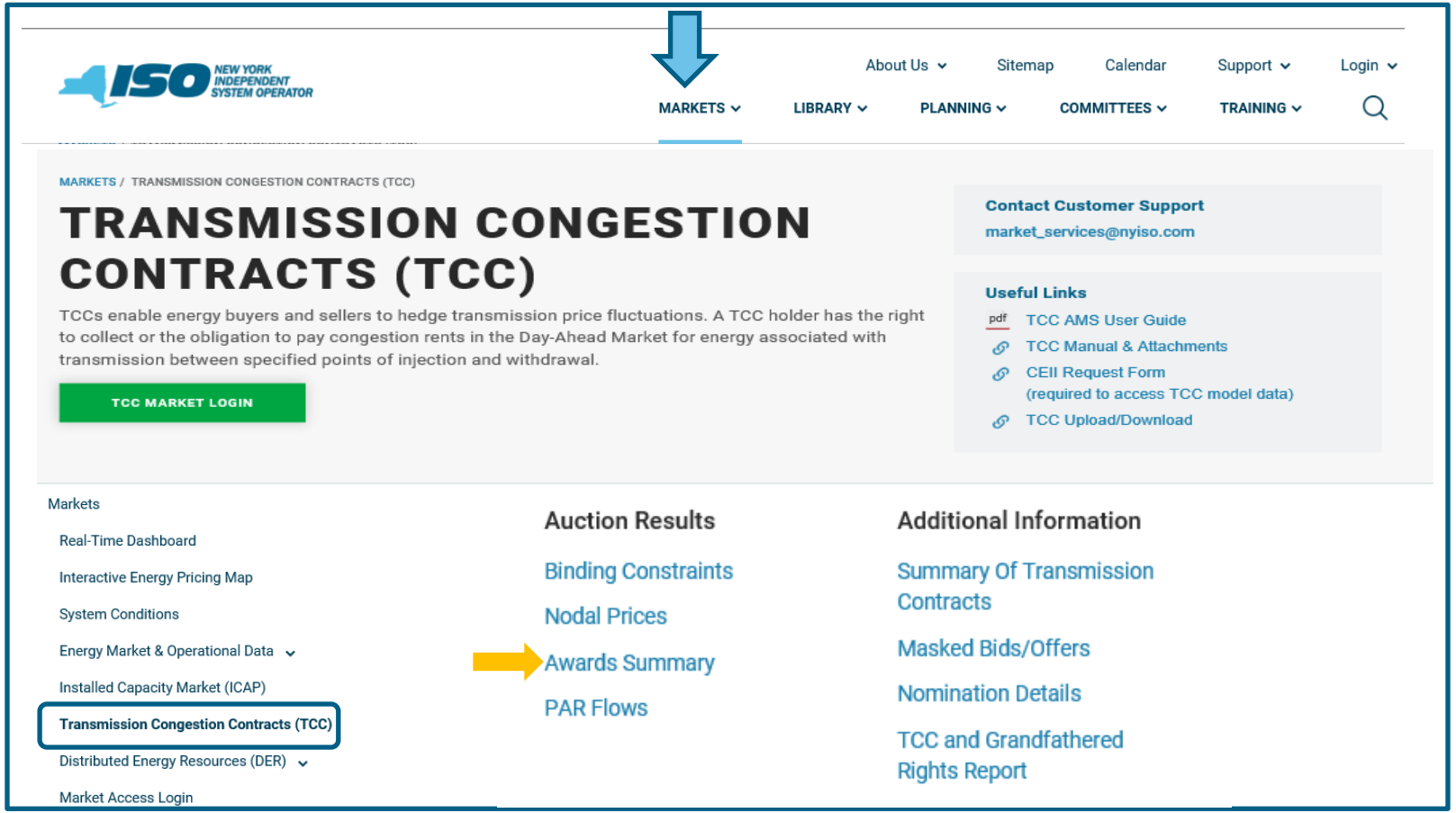
Transmission Congestion Contracts

New York ISO
Independent System Operator

- **Summary**
  - TCCs
    - Financial, not physical
    - Settled against DAM only
  - Procuring TCCs
    - Auction process
    - Non-Auction procurement methods
  - DAM Congestion Rent
    - Settled through invoice process
  - Fully Funded by Certain Transmission Owners
    - Over or under collection of congestion revenues
  - TCCs in Action
    - Used as a hedging mechanism or financial instrument

Transmission Congestion Contracts
NYISO Website Information

TCC – Main Page



Awards Summary - Example

Round: 2018 Winter Balance-of-Period Auction January 2019 (Ver 1 - Finalized) **Display**

Download XLSX **Download CSV**

Binding Constraints
Winter 2018-2019
Balance-of-Period Auction
January 2019
Version #1
Current Status - Finalized
Posted: December 20, 2018

Period ID	Period Name	Start Date	End Date	Period Duration (# of months)	Constraint Name	Contingency Elements	Constraint Group ID	Shadow Price of Constraint ($/MW-Period Duration)
1	January 2019	01/01/2019	01/31/2019	1	Central East Interface	BASE-CASE	37773	$25,218.86
1	January 2019	01/01/2019	01/31/2019	1	EGRDNCTV - VALLYSTR 138 kV (From Bus 454 - To Bus 568 - Circuit ID 1)	for stuck breaker contingency: FREEPORT - NEWBRDGE 138 kV (From Bus 465 - To Bus 508 - Circuit ID 1)	37786	$18,105.16
1	January 2019	01/01/2019	01/31/2019	1		NEWBRDGE 138/69 kV Transformer (From Bus 508 - To Bus 507 - Circuit ID 1)	37786	
1	January 2019	01/01/2019	01/31/2019	1	ABC Interconnection Scheduling Constraint	BASE-CASE	37701	$10,758.14
1	January 2019	01/01/2019	01/31/2019	1	GOWANUS 138 kV PAR (From Bus 181 - To Bus 183 - Circuit ID 1)	BASE-CASE	37689	$9,566.62
1	January 2019	01/01/2019	01/31/2019	1	JK Interconnection Scheduling Constraint	BASE-CASE	37702	($8,649.26)
1	January 2019	01/01/2019	01/31/2019	1	5018 Interconnection Scheduling Constraint	BASE-CASE	37703	($7,870.75)
1	January 2019	01/01/2019	01/31/2019	1	GREENWD - VERNON 138 kV (From Bus 197 - To Bus 291 - Circuit ID 1)	for tower contingency: FRESHKLS - GOETHALS 345 kV (From Bus 171 - To Bus 175 - Circuit ID 1)	37782	$7,835.04
1	January 2019	01/01/2019	01/31/2019	1		FRESHKLS - GOETHALS 345 kV (From Bus 171 - To Bus 175 - Circuit ID 2)	37782	
1	January 2019	01/01/2019	01/31/2019	1	DUNWODIE - SHORE_RD 345 kV (From Bus 367 - To Bus 550 - Circuit ID 1)	for loss of: SPRNBRK - EGRDNCTR 345 kV (From Bus 387 - To Bus 452 - Circuit ID 1)	37781	$7,715.25
1	January 2019	01/01/2019	01/31/2019	1	PACKARD - SAWYER 230 kV (From Bus 691 - To Bus 700 - Circuit ID 1)	for multiple contingency: NIAGARA - PACKARD 230 kV (From Bus 680 - To Bus 689 - Circuit ID 1)	37778	$7,325.43
1	January 2019	01/01/2019	01/31/2019	1		PACKARD - SAWYER 230 kV (From Bus 690 - To Bus 699 - Circuit ID 1)	37778	
1	January 2019	01/01/2019	01/31/2019	1		PACKARD 230/115 kV Transformer (From Bus 689 - To Bus 687 - Circuit ID 1)	37778	
1	January 2019	01/01/2019	01/31/2019	1	NIAGARA - PACKARD 230 kV (From Bus 680 - To Bus 689 - Circuit ID 1)	for tower contingency: NIAGARA - PACKARD 230 kV (From Bus 680 - To Bus 689 - Circuit ID 2)	37784	$5,363.99
1	January 2019	01/01/2019	01/31/2019	1		PACKARD - BECK 230 kV (From Bus 689 - To Bus 1999 - Circuit ID 1)	37784	
1	January 2019	01/01/2019	01/31/2019	1	FRESHKLS 138 kV PAR (From Bus 168 - To Bus 169 - Circuit ID 1)	BASE-CASE	37690	$4,325.63
1	January 2019	01/01/2019	01/31/2019	1	MOTTHAVN - DUNWODIE 345 kV (From Bus 231 - To Bus 369 - Circuit ID 1)	for loss of: MOTTHAVN - DUNWODIE 345 kV (From Bus 231 - To Bus 368 - Circuit ID 1)	37779	$3,485.59
1	January 2019	01/01/2019	01/31/2019	1	ADIRNDCK - MOSES 230 kV (From Bus 798 - To Bus 1347 - Circuit ID 2)	for multiple contingency: MARCY - MASSENA 765 kV (From Bus 845 - To Bus 1338 - Circuit ID 1)	37780	$3,398.41
1	January 2019	01/01/2019	01/31/2019	1		MASSENA - CHATGUAY 765 kV (From Bus 1338 - To Bus 1422 - Circuit ID 1)	37780	
1	January 2019	01/01/2019	01/31/2019	1		CHATGUAY 120 kV Bus (Bus 6001)	37780	
1	January 2019	01/01/2019	01/31/2019	1		CHATNYCA 120 kV Bus (Bus 1424)	37780	
1	January 2019	01/01/2019	01/31/2019	1	MECO 69 kV Net Injection Limit (Bus 931; Gen PTID 323630)	BASE-CASE	37704	$3,115.83

TCC – Main Page, Documents