dcenergy

CRR Future Credit Exposure Improvements

April 2020

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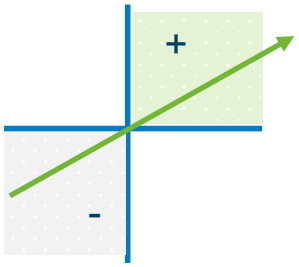
The treatment of CRR PTP Options and CRR PTP Obligations within forward exposure calculation are not equitable

Forward Exposure Example

-Illustrative example of risk exposure for opposite path positions-

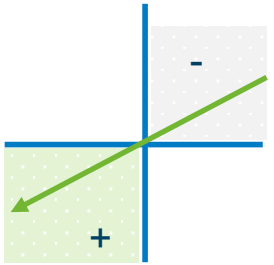
Portfolio XY

Obligation A-B



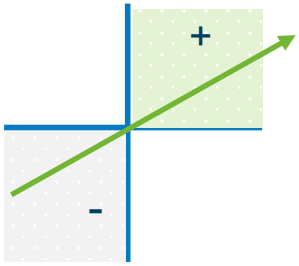
Positions cancel out both the downside and upside exposure

Obligation B-A



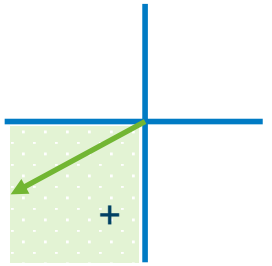
Portfolio ZY

Obligation A-B



Downside risk is eliminated and upside remains, but yet calculated exposure is negative (liability)

Option B-A



Both portfolios have no downside risk, however Portfolio ZY is treated as a liability despite being exposed to positive settlement only. This inequality is due to option and obligation exposures being aggregated together after the worst case is determined (i.e. each have a separate Portfolio Weighted Adder)

 |

CRR PTP Obligation positions on opposite paths perfectly offset, which reflects actual risk

Offsetting Obligation Example

- Risk exposure for opposite path positions with equal volume -

	5x16 SETTLED DAM PRICES	
	Path 1	Path 2
Day 1	$ 0.19	$ (0.19)
Day 2	$ 0.09	$ (0.09)
Day 3	$ (0.51)	$ 0.51
Day 4	$ (0.02)	$ 0.02
Day 5	$ 0.01	$ (0.01)
Day 6	$ (0.05)	$ 0.05
Day 7	$ (0.07)	$ 0.07
Day 8	$ (0.07)	$ 0.07
Day 9	$ (0.39)	$ 0.39
Day 10	$ (0.29)	$ 0.29
Day 11	$ (0.01)	$ 0.01
Day 12	$ (0.17)	$ 0.17
Day 13	$ 0.02	$ (0.02)
Day 14	$ (0.02)	$ 0.02
Day 15	$ (0.04)	$ 0.04
Day 16	$ 0.03	$ (0.03)
Day 17	$ 0.00	$ (0.00)
Day 18	$ 0.05	$ (0.05)
Day 19	$ 0.21	$ (0.21)
Day 20	$ (0.00)	$ 0.00
Day 21	$ (0.04)	$ 0.04
Day 22	$ (0.03)	$ 0.03
Day 23	$ 0.06	$ (0.06)
Day 24	$ (0.01)	$ 0.01
Day 25	$ 0.00	$ 0.00
Day 26	$ (0.03)	$ 0.03
Day 27	$ (0.03)	$ 0.03
Day 28	$ (0.02)	$ 0.02
Day 29	$ 0.15	$ (0.15)
Day 30	$ 0.22	$ (0.22)

1

DAM Prices used to calculate a rolling average price data series

	5x16 ROLLING AVERAGE (18 Days)	
	OBL Path 1	OBL Path 2
Rolling Avg. 1	$ (0.07)	$ 0.07
Rolling Avg. 2	$ (0.07)	$ 0.07
Rolling Avg. 3	$ (0.07)	$ 0.07
Rolling Avg. 4	$ (0.05)	$ 0.05
Rolling Avg. 5	$ (0.05)	$ 0.05
Rolling Avg. 6	$ (0.05)	$ 0.05
Rolling Avg. 7	$ (0.04)	$ 0.04
Rolling Avg. 8 *	$ (0.04)	$ 0.04

2

Calculate the volume weighted rolling average price for total portfolio by month and TOU

One-to-one offset reflects actual exposure

	Month OBL $/MW
Rolling Avg. 1	$ 0
Rolling Avg. 2	$ 0
Rolling Avg. 3	$ 0
Rolling Avg. 4	$ 0
Rolling Avg. 5	$ 0
Rolling Avg. 6	$ 0
Rolling Avg. 7	$ 0
Rolling Avg. 8*	$ 0

3

OBL Adder = $0/MWh

OBL portfolio adder is the 100th percentile of the volume weighted rolling average portfolio price series over a month for each TOU

* Stopped rolling avg. period at 8 to conserve space

Replacing the obligation with an option erroneously results in a credit liability despite the potential for positive settlement only (zero downside)

Obligation with Offsetting Option Example

- Risk exposure for opposite path positions with equal volume -

	5x16 SETTLED DAM PRICES	
	Path 1	Path 2
Day 1	$ 0.19	$ (0.19)
Day 2	$ 0.09	$ (0.09)
Day 3	$ (0.51)	$ 0.51
Day 4	$ (0.02)	$ 0.02
Day 5	$ 0.01	$ (0.01)
Day 6	$ (0.05)	$ 0.05
Day 7	$ (0.07)	$ 0.07
Day 8	$ (0.07)	$ 0.07
Day 9	$ (0.39)	$ 0.39
Day 10	$ (0.29)	$ 0.29
Day 11	$ (0.01)	$ 0.01
Day 12	$ (0.17)	$ 0.17
Day 13	$ 0.02	$ (0.02)
Day 14	$ (0.02)	$ 0.02
Day 15	$ (0.04)	$ 0.04
Day 16	$ 0.03	$ (0.03)
Day 17	$ 0.00	$ (0.00)
Day 18	$ 0.05	$ (0.05)
Day 19	$ 0.21	$ (0.21)
Day 20	$ (0.00)	$ 0.00
Day 21	$ (0.04)	$ 0.04
Day 22	$ (0.03)	$ 0.03
Day 23	$ 0.06	$ (0.06)
Day 24	$ (0.01)	$ 0.01
Day 25	$ 0.00	$ 0.00
Day 26	$ (0.03)	$ 0.03
Day 27	$ (0.03)	$ 0.03
Day 28	$ (0.02)	$ 0.02
Day 29	$ 0.15	$ (0.15)
Day 30	$ 0.22	$ (0.22)

1

DAM Prices used to calculate a rolling average price data series

	5x16 ROLLING AVERAGE (18 Days)	
	OBL Path 1	OPT Path 2
Rolling Avg. 1	$ (0.07)	$ 0.07
Rolling Avg. 2	$ (0.07)	$ 0.07
Rolling Avg. 3	$ (0.07)	$ 0.07
Rolling Avg. 4	$ (0.05)	$ 0.05
Rolling Avg. 5	$ (0.05)	$ 0.05
Rolling Avg. 6	$ (0.05)	$ 0.05
Rolling Avg. 7	$ (0.04)	$ 0.04
Rolling Avg. 8	$ (0.04)	$ 0.04

2

Rolling average price for the volume weighted OBL portfolio is <u>separate</u> from the option position

Option provides partial offset, but yet the settlement only has upside

	5x16 ROLLING AVERAGE (18 Days)	
	OBL Month $/MWh	OPT Month $/MWh
Rolling Avg. 1	(0.07)	0.07
Rolling Avg. 2	(0.07)	0.07
Rolling Avg. 3	(0.07)	0.07
Rolling Avg. 4	(0.05)	0.05
Rolling Avg. 5	(0.05)	0.05
Rolling Avg. 6	(0.05)	0.05
Rolling Avg. 7	(0.04)	0.04
Rolling Avg. 8	(0.04)	0.04

3

OBL Adder = $(.07)/MWh

OPT Adder = $0.04/MWh

OPT adder is the 99th percentile of the rolling average portfolio price series over a month for each TOU

DC energy's recommendation combines the portfolio adders into one, which reflects the offsetting value of the option while keeping the credit requirements in a conservative state

Obligation with Offsetting Option Example

- Risk exposure for opposite path positions with equal volume -

	5x16 SETTLED DAM PRICES	
	Path 1	Path 2
Day 1	$ 0.19	$ (0.19)
Day 2	$ 0.09	$ (0.09)
Day 3	$ (0.51)	$ 0.51
Day 4	$ (0.02)	$ 0.02
Day 5	$ 0.01	$ (0.01)
Day 6	$ (0.05)	$ 0.05
Day 7	$ (0.07)	$ 0.07
Day 8	$ (0.07)	$ 0.07
Day 9	$ (0.39)	$ 0.39
Day 10	$ (0.29)	$ 0.29
Day 11	$ (0.01)	$ 0.01
Day 12	$ (0.17)	$ 0.17
Day 13	$ 0.02	$ (0.02)
Day 14	$ (0.02)	$ 0.02
Day 15	$ (0.04)	$ 0.04
Day 16	$ 0.03	$ (0.03)
Day 17	$ 0.00	$ (0.00)
Day 18	$ 0.05	$ (0.05)
Day 19	$ 0.21	$ (0.21)
Day 20	$ (0.00)	$ 0.00
Day 21	$ (0.04)	$ 0.04
Day 22	$ (0.03)	$ 0.03
Day 23	$ 0.06	$ (0.06)
Day 24	$ (0.01)	$ 0.01
Day 25	$ 0.80	$ (0.80)
Day 26	$ (0.03)	$ 0.03
Day 27	$ (0.03)	$ 0.03
Day 28	$ (0.02)	$ 0.02
Day 29	$ 0.15	$ (0.15)
Day 30	$ 0.22	$ (0.22)

1

DAM prices used to calculate a rolling average price data series

	5x16 ROLLING AVERAGE (18 Days)	
	OBL Path 1	OPT Path 2
Rolling Avg. 1	$ (0.07)	$ 0.07
Rolling Avg. 2	$ (0.07)	$ 0.07
Rolling Avg. 3	$ (0.07)	$ 0.07
Rolling Avg. 4	$ (0.05)	$ 0.05
Rolling Avg. 5	$ (0.05)	$ 0.05
Rolling Avg. 6	$ (0.05)	$ 0.05
Rolling Avg. 7	$ (0.04)	$ 0.04
Rolling Avg. 8	$ (0.04)	$ 0.04

2

Volume weighted rolling average price for portfolio by month and TOU is **combined** ***for options and obligations***

5x16 ROLLING AVERAGE (18 Days)	
	Month Combined $/MW
Rolling Avg. 1	0
Rolling Avg. 2	0
Rolling Avg. 3	0
Rolling Avg. 4	0
Rolling Avg. 5	0
Rolling Avg. 6	0
Rolling Avg. 7	0
Rolling Avg. 8	0

3

Combined Adder = $0/MWh

Option provides a one-to-one offset. Note, again settlement exposure only has upside

Combined portfolio adders calculated at the nth percentile

CRR PTP Obligation positions on opposite paths perfectly offset and the additional obligation on path 2 results in a credit asset for the overall portfolio

Offsetting Obligation Example-2

- Risk exposure of portfolio with additional obligation -

	5x16 SETTLED DAM PRICES	
	Path 1	Path 2
Day 1	$ 0.19	$ (0.19)
Day 2	$ 0.09	$ (0.09)
Day 3	$ (0.51)	$ 0.51
Day 4	$ (0.02)	$ 0.02
Day 5	$ 0.01	$ (0.01)
Day 6	$ (0.05)	$ 0.05
Day 7	$ (0.07)	$ 0.07
Day 8	$ (0.07)	$ 0.07
Day 9	$ (0.39)	$ 0.39
Day 10	$ (0.29)	$ 0.29
Day 11	$ (0.01)	$ 0.01
Day 12	$ (0.17)	$ 0.17
Day 13	$ 0.02	$ (0.02)
Day 14	$ (0.02)	$ 0.02
Day 15	$ (0.04)	$ 0.04
Day 16	$ 0.03	$ (0.03)
Day 17	$ 0.00	$ (0.00)
Day 18	$ 0.05	$ (0.05)
Day 19	$ 0.21	$ (0.21)
Day 20	$ (0.00)	$ 0.00
Day 21	$ (0.04)	$ 0.04
Day 22	$ (0.03)	$ 0.03
Day 23	$ 0.06	$ (0.06)
Day 24	$ (0.01)	$ 0.01
Day 25	$ 0.00	$ 0.00
Day 26	$ (0.03)	$ 0.03
Day 27	$ (0.03)	$ 0.03
Day 28	$ (0.02)	$ 0.02
Day 29	$ 0.15	$ (0.15)
Day 30	$ 0.22	$ (0.22)

1

DAM Prices used to calculate a rolling average price data series

	5x16 ROLLING AVERAGE (18 Days)	
	1MW OBL Path 1	2MW OBL Path 2
Rolling Avg. 1	$ (0.07)	$ 0.07
Rolling Avg. 2	$ (0.07)	$ 0.07
Rolling Avg. 3	$ (0.07)	$ 0.07
Rolling Avg. 4	$ (0.05)	$ 0.05
Rolling Avg. 5	$ (0.05)	$ 0.05
Rolling Avg. 6	$ (0.05)	$ 0.05
Rolling Avg. 7	$ (0.04)	$ 0.04
Rolling Avg. 8 *	$ (0.04)	$ 0.04

2

Calculate the volume weighted rolling average price for total portfolio by month and TOU

	Month $/MWh
Rolling Avg. 1	0.023
Rolling Avg. 2	0.023
Rolling Avg. 3	0.023
Rolling Avg. 4	0.017
Rolling Avg. 5	0.017
Rolling Avg. 6	0.017
Rolling Avg. 7	0.013
Rolling Avg. 8*	0.013

3

Opposite path positions offset and the additional obligation result in positive exposure

OBL Adder = $.013/MWh

OBL portfolio adder is the 100th percentile of the volume weighted rolling average portfolio price series over a month for each TOU

* Stopped rolling avg. period at 8 to conserve space

Replacing the obligations with options on path 2 erroneously reduces the credit value of the portfolio despite a reduction in actual risk and the potential for positive settlement only (zero downside)

Obligation with Offsetting Option Example-2

- Risk exposure of portfolio with additional option -

	5x16 SETTLED DAM PRICES	
	Path 1	Path 2
Day 1	$ 0.19	$ (0.19)
Day 2	$ 0.09	$ (0.09)
Day 3	$ (0.51)	$ 0.51
Day 4	$ (0.02)	$ 0.02
Day 5	$ 0.01	$ (0.01)
Day 6	$ (0.05)	$ 0.05
Day 7	$ (0.07)	$ 0.07
Day 8	$ (0.07)	$ 0.07
Day 9	$ (0.39)	$ 0.39
Day 10	$ (0.29)	$ 0.29
Day 11	$ (0.01)	$ 0.01
Day 12	$ (0.17)	$ 0.17
Day 13	$ 0.02	$ (0.02)
Day 14	$ (0.02)	$ 0.02
Day 15	$ (0.04)	$ 0.04
Day 16	$ 0.03	$ (0.03)
Day 17	$ 0.00	$ (0.00)
Day 18	$ 0.05	$ (0.05)
Day 19	$ 0.21	$ (0.21)
Day 20	$ (0.00)	$ 0.00
Day 21	$ (0.04)	$ 0.04
Day 22	$ (0.03)	$ 0.03
Day 23	$ 0.06	$ (0.06)
Day 24	$ (0.01)	$ 0.01
Day 25	$ 0.00	$ 0.00
Day 26	$ (0.03)	$ 0.03
Day 27	$ (0.03)	$ 0.03
Day 28	$ (0.02)	$ 0.02
Day 29	$ 0.15	$ (0.15)
Day 30	$ 0.22	$ (0.22)

1

DAM Prices used to calculate a rolling average price data series

	5x16 ROLLING AVERAGE (18 Days)	
	1 MW OBL Path 1	2MW OPT path 2
Rolling Avg. 1	$ (0.07)	$ 0.07
Rolling Avg. 2	$ (0.07)	$ 0.07
Rolling Avg. 3	$ (0.07)	$ 0.07
Rolling Avg. 4	$ (0.05)	$ 0.05
Rolling Avg. 5	$ (0.05)	$ 0.05
Rolling Avg. 6	$ (0.05)	$ 0.05
Rolling Avg. 7	$ (0.04)	$ 0.04
Rolling Avg. 8	$ (0.04)	$ 0.04

2

Rolling average price for the volume weighted OBL portfolio is separate from the option position

	5x16 ROLLING AVERAGE (18 Days)	
	OBL Month $/MW	OPT Month $/MW
Rolling Avg. 1	$ (0.07)	$ 0.07
Rolling Avg. 2	$ (0.07)	$ 0.07
Rolling Avg. 3	$ (0.07)	$ 0.07
Rolling Avg. 4	$ (0.05)	$ 0.05
Rolling Avg. 5	$ (0.05)	$ 0.05
Rolling Avg. 6	$ (0.05)	$ 0.05
Rolling Avg. 7	$ (0.04)	$ 0.04
Rolling Avg. 8	$ (0.04)	$ 0.04

3

Option only provides partial offset, which reduces the overall credit value of the portfolio

OBL Adder = $(.07)/MWh
OPT Adder = $0.04/MWh
Net effective = $0.003/MWh

OPT adder is the 99th percentile of the rolling average portfolio price series over a month for each TOU

DC energy's recommendation combines the portfolio adders into one, which reflects the offsetting value of the option while keeping the credit requirements in a conservative state

Obligation with Offsetting Option Example-2

- Risk exposure of portfolio with additional option -

	5x16 SETTLED DAM PRICES	
	Path 1	Path 2
Day 1	$ 0.19	$ (0.19)
Day 2	$ 0.09	$ (0.09)
Day 3	$ (0.51)	$ 0.51
Day 4	$ (0.02)	$ 0.02
Day 5	$ 0.01	$ (0.01)
Day 6	$ (0.05)	$ 0.05
Day 7	$ (0.07)	$ 0.07
Day 8	$ (0.07)	$ 0.07
Day 9	$ (0.39)	$ 0.39
Day 10	$ (0.29)	$ 0.29
Day 11	$ (0.01)	$ 0.01
Day 12	$ (0.17)	$ 0.17
Day 13	$ 0.02	$ (0.02)
Day 14	$ (0.02)	$ 0.02
Day 15	$ (0.04)	$ 0.04
Day 16	$ 0.03	$ (0.03)
Day 17	$ 0.00	$ (0.00)
Day 18	$ 0.05	$ (0.05)
Day 19	$ 0.21	$ (0.21)
Day 20	$ (0.00)	$ 0.00
Day 21	$ (0.04)	$ 0.04
Day 22	$ (0.03)	$ 0.03
Day 23	$ 0.06	$ (0.06)
Day 24	$ (0.01)	$ 0.01
Day 25	$ 0.80	$ (0.80)
Day 26	$ (0.03)	$ 0.03
Day 27	$ (0.03)	$ 0.03
Day 28	$ (0.02)	$ 0.02
Day 29	$ 0.15	$ (0.15)
Day 30	$ 0.22	$ (0.22)

1

DAM prices used to calculate a rolling average price data series

5x16 ROLLING AVERAGE (18 Days)			
	1MW OBL Path 1	2MW OPT Path 2	**Volume Weighted**
Rolling Avg. 1	$ (0.07)	$ 0.07	$ 0.023
Rolling Avg. 2	$ (0.07)	$ 0.07	$ 0.023
Rolling Avg. 3	$ (0.07)	$ 0.07	$ 0.023
Rolling Avg. 4	$ (0.05)	$ 0.05	$ 0.017
Rolling Avg. 5	$ (0.05)	$ 0.05	$ 0.017
Rolling Avg. 6	$ (0.05)	$ 0.05	$ 0.017
Rolling Avg. 7	$ (0.04)	$ 0.04	$ 0.013
Rolling Avg. 8	$ (0.04)	$ 0.04	$ 0.013

2

Volume weighted rolling average price for portfolio by month and TOU is* combined *for options and obligations

5x16 ROLLING AVERAGE (18 Days)	
	Month $/MW
Rolling Avg. 1	0.023
Rolling Avg. 2	0.023
Rolling Avg. 3	0.023
Rolling Avg. 4	0.017
Rolling Avg. 5	0.017
Rolling Avg. 6	0.017
Rolling Avg. 7	0.013
Rolling Avg. 8	0.013

Option provides a one-to-one offset, which brings the credit value of the portfolios to parity. Note, settlement exposure only has upside

3

Combined Adder = $0.013MW/h

Combined portfolio adders calculated at the nth percentile

DC Energy's recommendation would bring symmetry to the credit rules and better reflect actual risk

DC Energy's Recommendation

- **Our recommendation is to calculate one portfolio adder that includes options and obligations together**
- **This modification brings symmetry to the portfolio adder by appropriately accounting for the impact of options and obligations in portfolio before determining its worst case**
- **The change would reflect the risk reducing value of the option product and the actual risk of a portfolio**

