

Highlights from the Quarterly Report on the New York ISO Electricity Markets Third Quarter 2015

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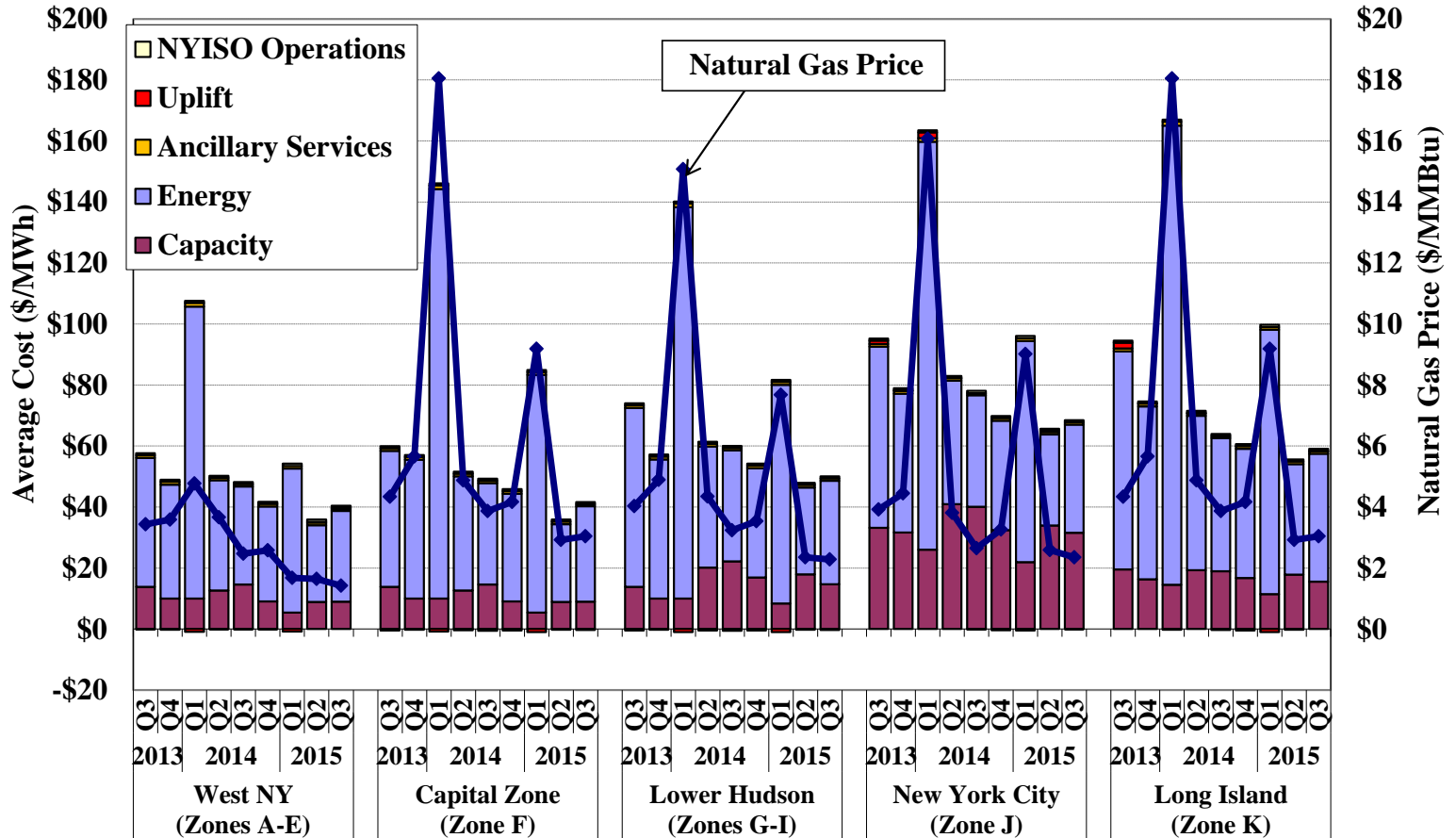


Highlights and Market Summary: Energy Market

- This report summarizes market outcomes in the third quarter of 2015.
- The energy markets performed competitively and variations in wholesale prices were driven primarily by changes in fuel prices, demand, and supply availability.
- Average all-in prices ranged from roughly \$41/MWh in West NY to \$68/MWh in NYC, down 7 to 16 percent from the third quarter of 2014. (see slide 9)
 - ✓ In addition to the LBMP reductions mentioned below, capacity costs fell 18 percent (Long Island) to 38 percent (West NY and Capital) from 2014-Q3.
- RT LBMPs averaged \$34/MWh statewide, down 5 percent from a year ago.
 - ✓ Gas prices fell 12 to 46 percent across NY primarily because of a 19 percent YoY increase in production from the Marcellus and Utica shales. (see slides 10, 12)
 - ✓ Average nuclear and hydro generation rose 450 MW because of fewer deratings and outages, contributing to the decrease in LBMPs. (see slide 15)
 - ✓ However, the reduction in LBMP was partly offset by:
 - Transmission outages on UPNY-SENY interface and into Long Is. (see slide 17);
 - Higher load levels (average load up 6% and peak load up 5%, see slide 11); and
 - RGGI allowance price increases, which have added ~\$0.60/MWh to the cost of a typical CC unit since 2014-Q3.



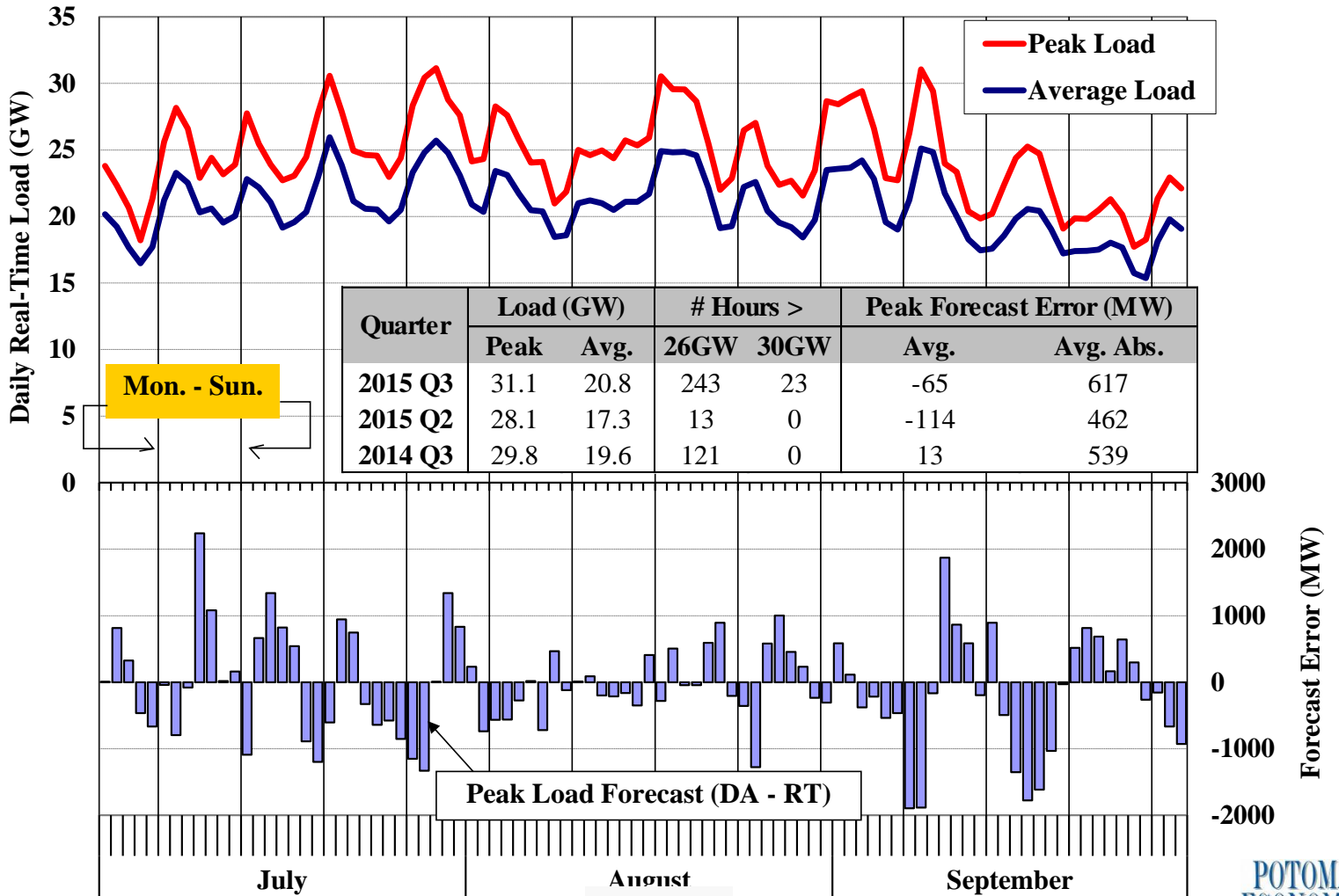
All-In Energy Price by Region



Note: Natural Gas Price is based on the following gas indices (plus a transportation charge of \$0.20/MMBtu): the Dominion North index for West NY, the Iroquois Zone 2 index for the Capital Zone, the average of Texas Eastern M3 and Iroquois Zone 2 for Lower Hudson, the Transco Zone 6 (NY) index for New York City, and the Iroquois Zone 2 index for Long Island.

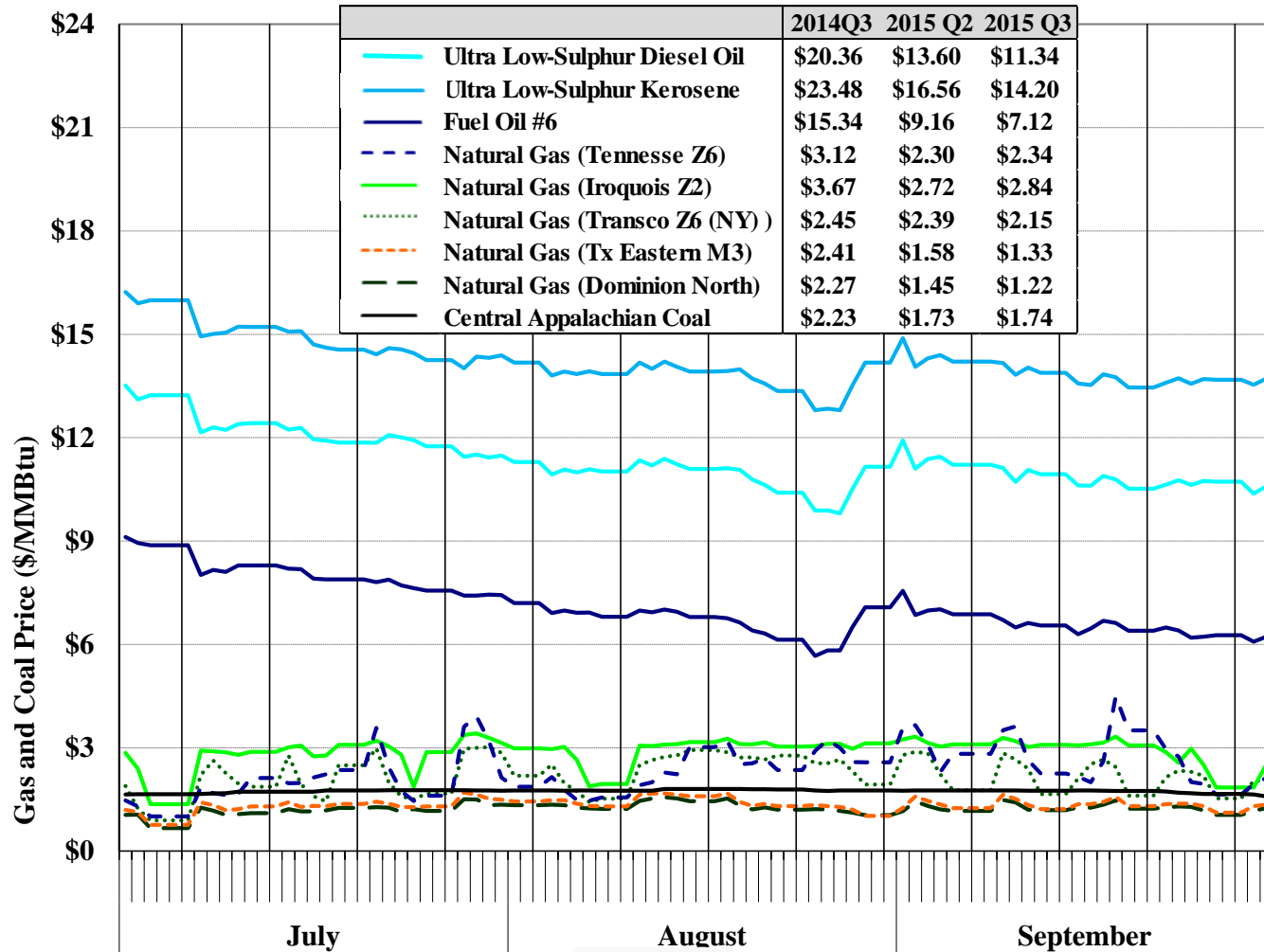


Load Forecast and Actual Load



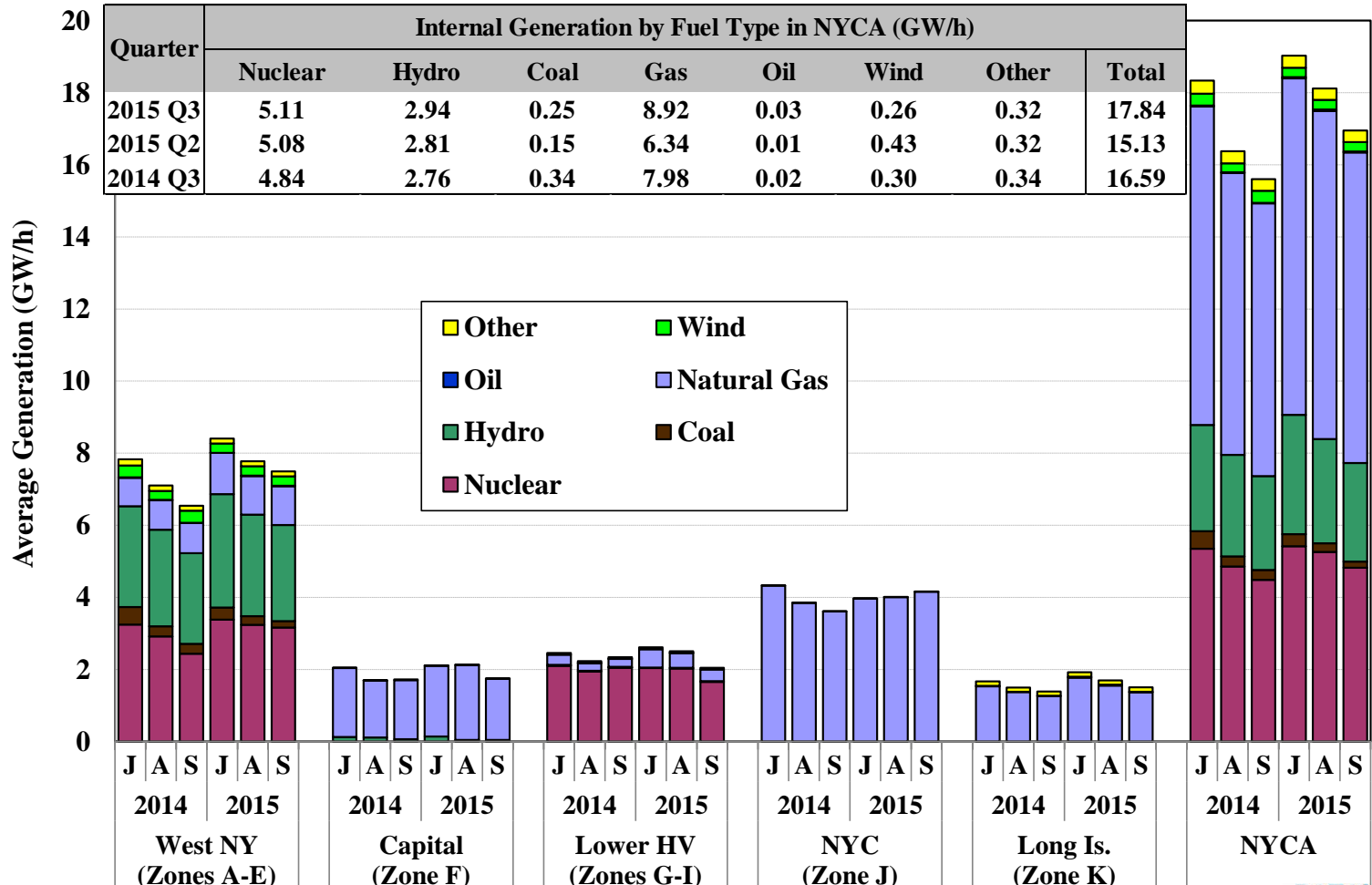


Coal, Natural Gas, and Fuel Oil Prices





Real-Time Generation Output by Fuel Type



Notes: Pumped-storage resources in pumping mode are treated as negative generation. "Other" includes Methane, Refuse, Solar & Wood.

Efficiency of Intra-Hour Scheduling Under CTS Primary PJM Interface

			Export (NY to PJM)			Import (PJM to NY)			Average/ Total
			Jul-15	Aug-15	Sep-15	Jul-15	Aug-15	Sep-15	
% of All Intervals			26%	33%	31%	36%	41%	42%	70%
Average Flow Adjustment (MW)			-58	-65	-57	62	63	70	11 (Net) / 63 (Gross)
Production Cost Savings (\$ Million)	Projected at Scheduling Time		\$0.15	\$0.15	\$0.29	\$0.53	\$0.47	\$0.29	\$1.9
	Unrealized Savings Due to:	NY Fcst. Err.	-\$0.05	-\$0.09	-\$0.07	-\$0.27	-\$0.32	-\$0.07	-\$0.9
		PJM Fcst. Err.	-\$0.06	-\$0.11	-\$0.24	-\$0.17	\$0.00	-\$0.09	-\$0.7
		Other	-\$0.01	\$0.00	-\$0.03	\$0.00	-\$0.02	\$0.00	-\$0.1
Actual		\$0.03	-\$0.06	-\$0.05	\$0.08	\$0.13	\$0.13	\$0.3	
Interface Prices (\$/MWh)	NY	Actual	\$24.30	\$28.55	\$32.14	\$31.76	\$33.55	\$34.74	\$31.31
		Forecast	\$22.55	\$25.77	\$29.19	\$36.11	\$39.87	\$34.35	\$32.11
	PJM	Actual	\$26.59	\$26.78	\$29.17	\$32.71	\$28.32	\$32.10	\$29.50
		Forecast	\$33.40	\$32.08	\$39.62	\$33.07	\$28.63	\$30.19	\$32.49
Price Forecast Errors (\$/MWh)	NY	Fcst. - Act.	-\$1.84	-\$2.78	-\$2.98	\$4.35	\$6.22	-\$0.41	\$0.76
		Abs. Val.	\$5.85	\$6.29	\$8.12	\$14.89	\$17.04	\$11.74	\$11.17
	PJM	Fcst. - Act.	\$6.68	\$5.30	\$10.41	\$0.36	\$0.23	-\$1.93	\$2.95
		Abs. Val.	\$12.68	\$10.25	\$18.60	\$11.26	\$7.87	\$13.29	\$12.11

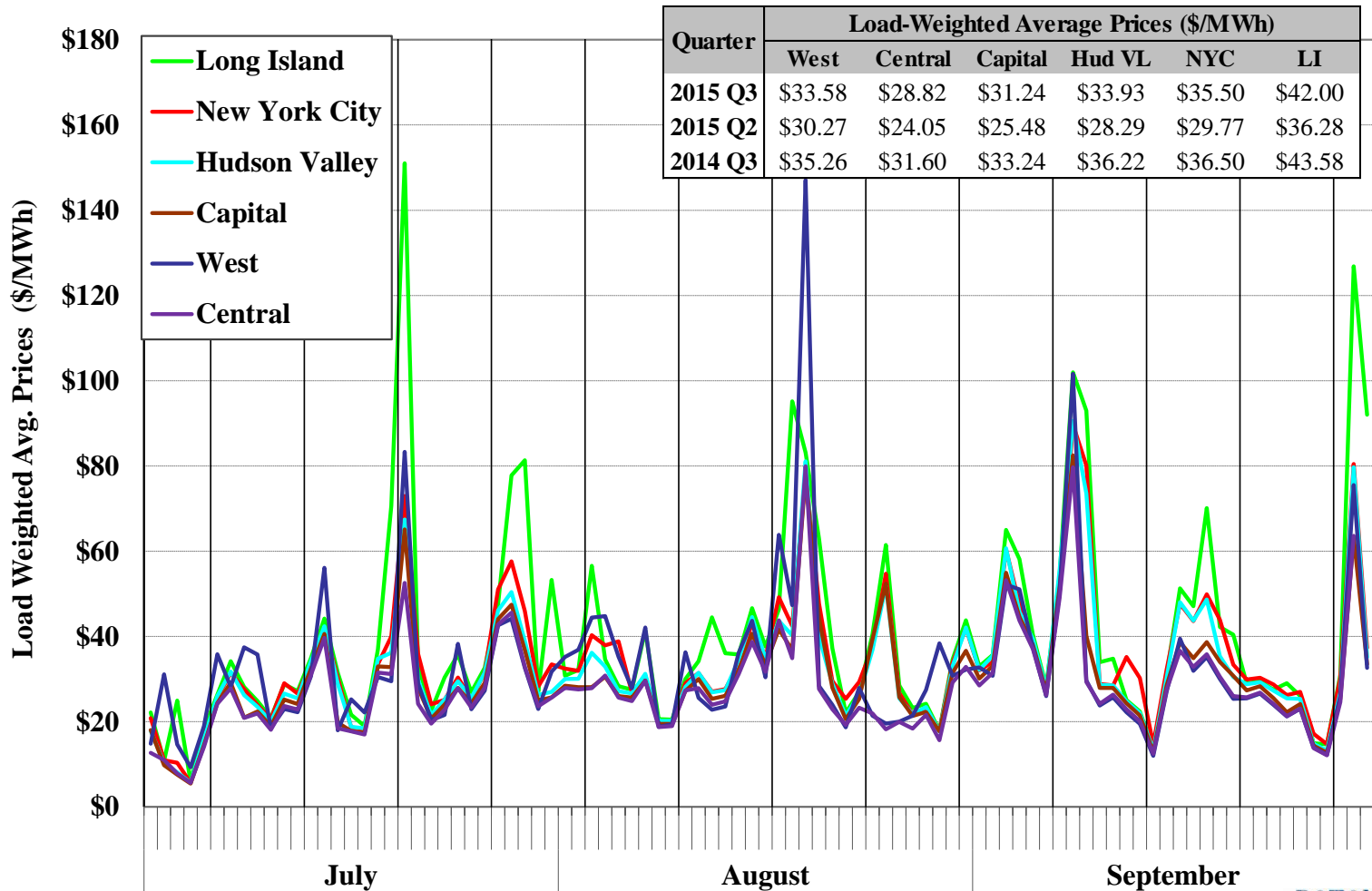


Highlights and Market Summary: Congestion Patterns

- DAM congestion revenue rose \$92 million (or 101 percent) from the third quarter of 2014 partly because of higher load levels (see slides 45-48, 50).
- West Zone 230 kV lines accounted for 31 percent of DA congestion revenue.
 - ✓ These constraints have become more prevalent as coal-fired generation in the West Zone (which relieves these constraints) has been reduced by low natural gas prices.
- Capital to Hudson Valley lines accounted for 22 percent of DA congestion revenue.
 - ✓ Transmission outages reduced transfer capability in late-August and September.
 - ✓ Large natural gas price spreads between Western NY and NYC and Long Island contributed to the congestion (see slide 12).
- Long Island accounted for 22 percent of DA congestion revenue.
 - ✓ Transmission outages reduced transfer capability from upstate NY to Long Island throughout July.
- New York City constraints accounted for 13 percent of DA congestion revenue.
 - ✓ Greenwood/Staten Island congestion was partly driven by outages.
 - ✓ Relatively high gas price spreads in NYC contributed to the congestion.

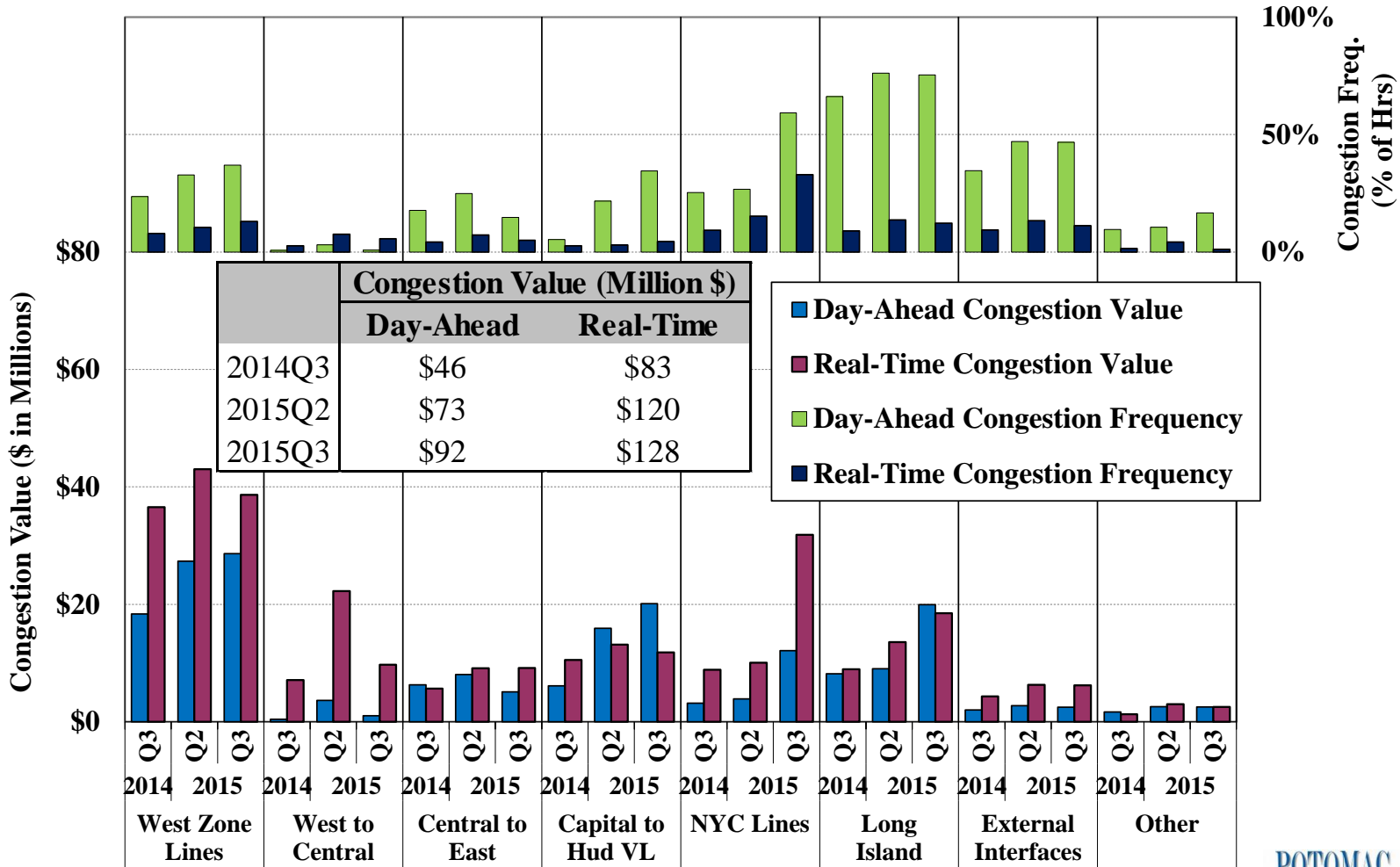


Real-Time Electricity Prices by Zone





DA and RT Congestion Value and Frequency by Transmission Path

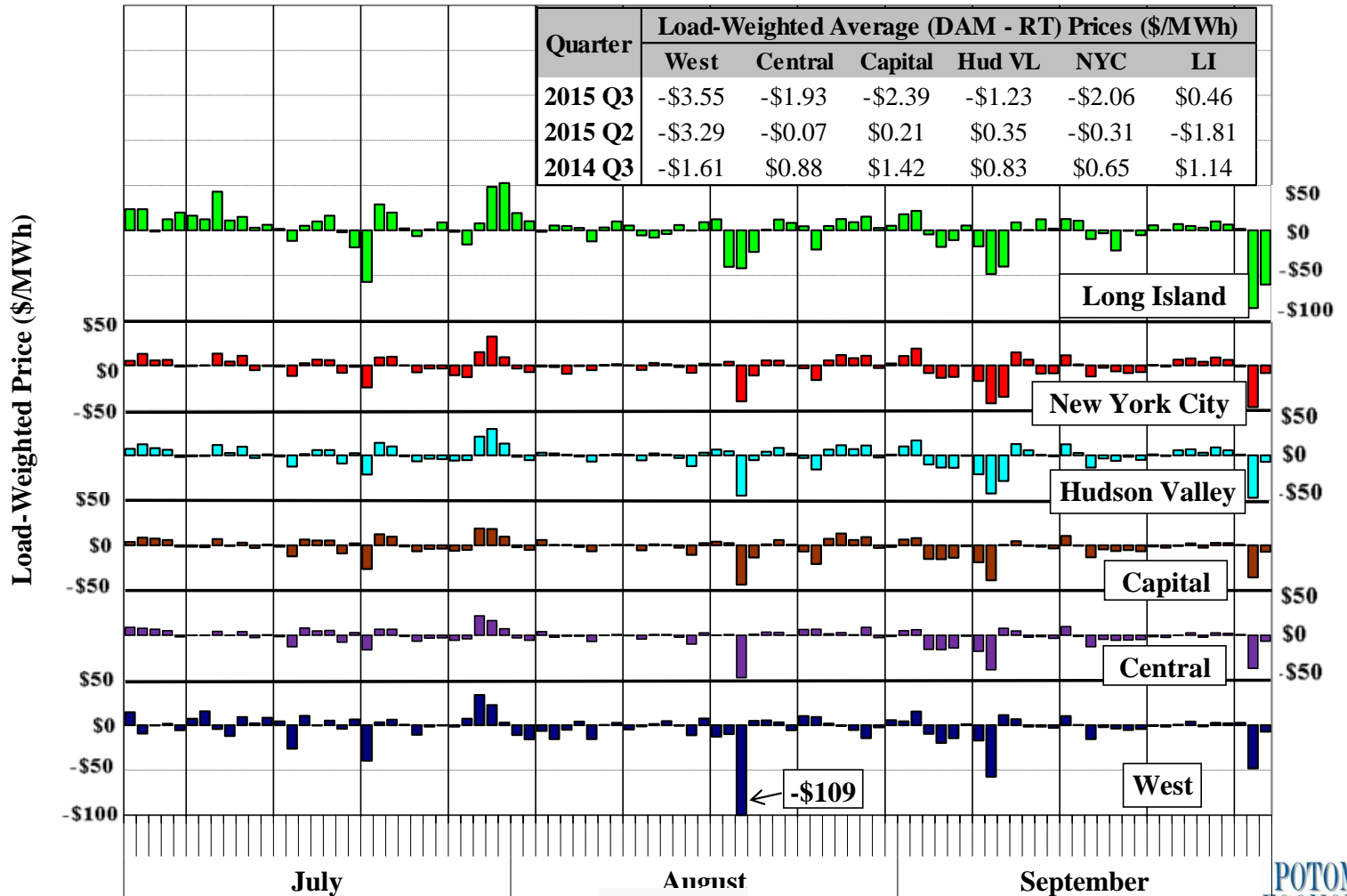




Highlights and Market Summary: DA to RT Energy Price Convergence

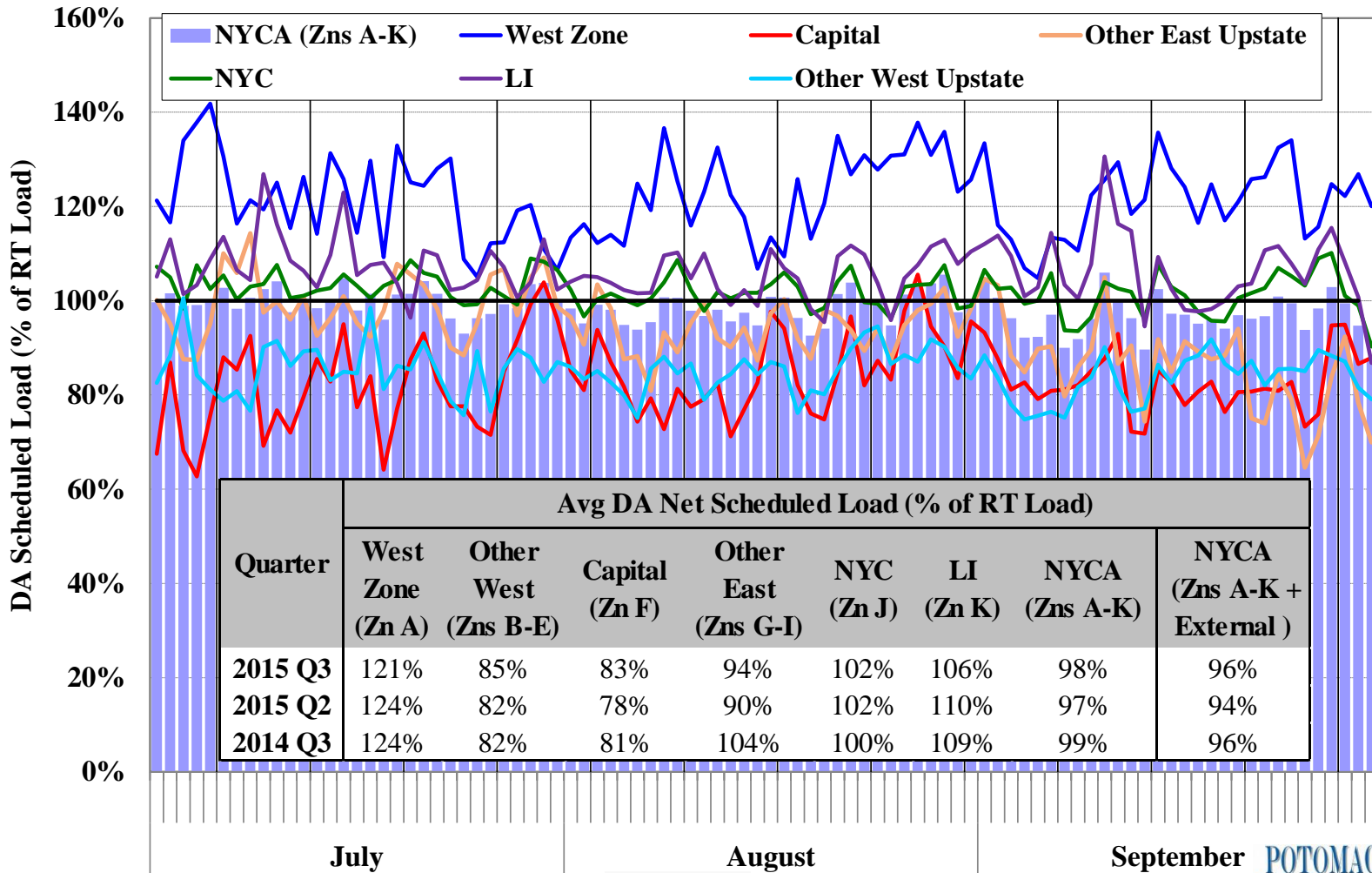
- Intra-zonal congestion was more severe and volatile in the RT than in the DAM on some paths. (see slides 46, 48, 50)
- In the West Zone, congestion on 230kV facilities often increased in RT because:
 - ✓ Volatile Lake Erie loop flows can cause severe RT congestion (see slide 40);
 - ✓ Incomplete utilization of parallel 115kV lines (to unload 230kV constraints);
 - ✓ Ontario imports and renewable generation in West NY rose from DA to RT; and
 - ✓ Operation of the Ramapo PARs (to relieve Central-East and SENY congestion) increased flows across 230kV lines in the West Zone (see slides 48, 52).
- This pattern led virtual traders to schedule supply (~300 MW) at the Ontario proxy bus and load (~400 MW) at the West Zone in the DAM (see slides 29, 33). These virtual trades contributed to downstream commitments that relieved congestion.
- In the Central Zone, congestion on exports from the Oswego Complex increased in RT as a result of changes in offer patterns between the DAM and RT.
- In New York City, congestion into the Greenwood load pocket was:
 - ✓ Higher in RT because of: (a) offer price changes after the DAM; and (b) brief small transmission constraint violations with very high RT shadow prices; and
 - ✓ Under-stated in the DAM because of uneconomic scheduling of GTs by the SCUC model (units were uneconomically scheduled in approx 100 hours).
 - NYISO is working on concepts to address this in 2016.

Convergence Between Day-Ahead and Real-Time Prices

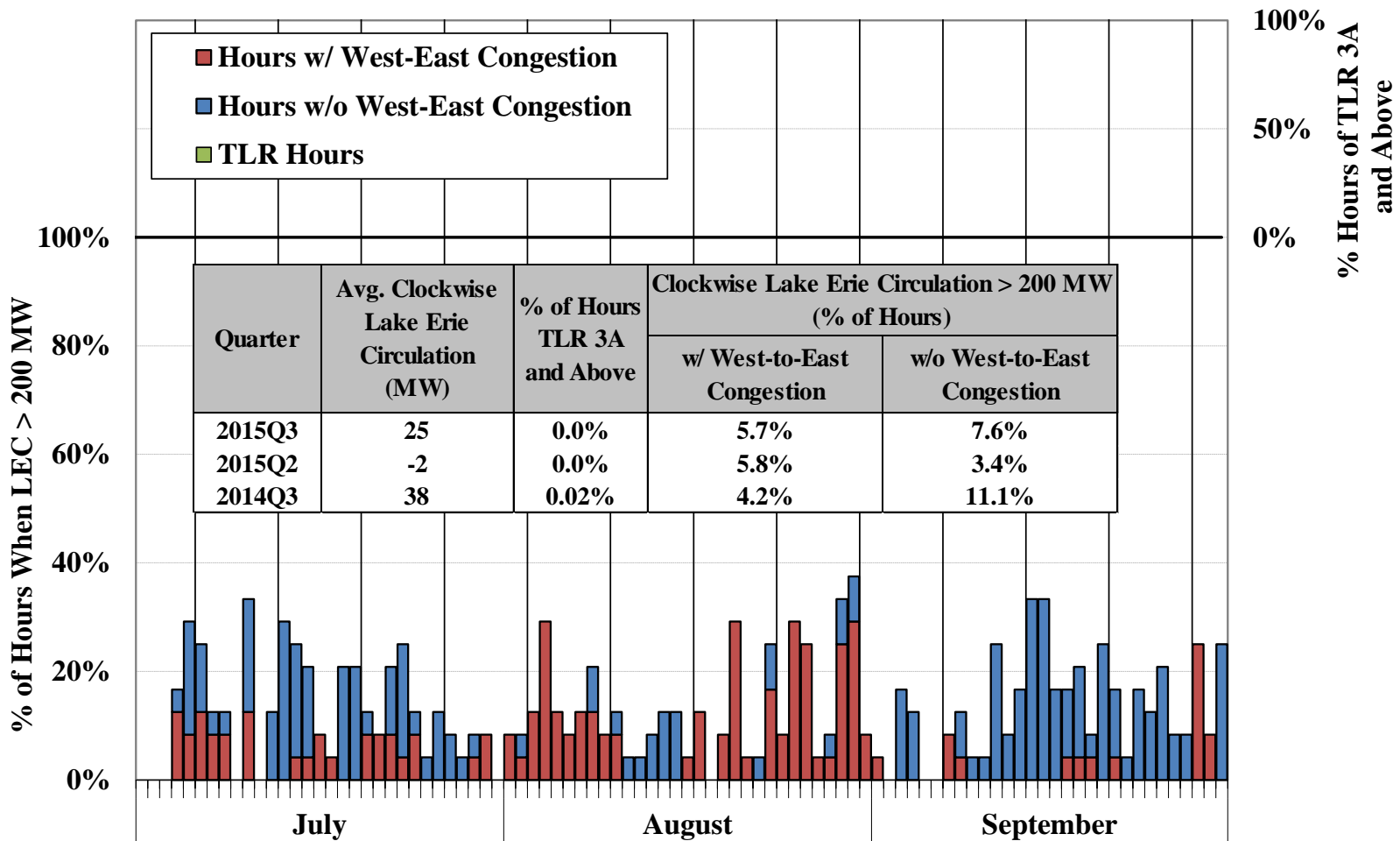




Day-ahead Scheduled Load and Actual Load Daily Peak Load Hour



Clockwise Lake Erie Circulation and TLR Calls



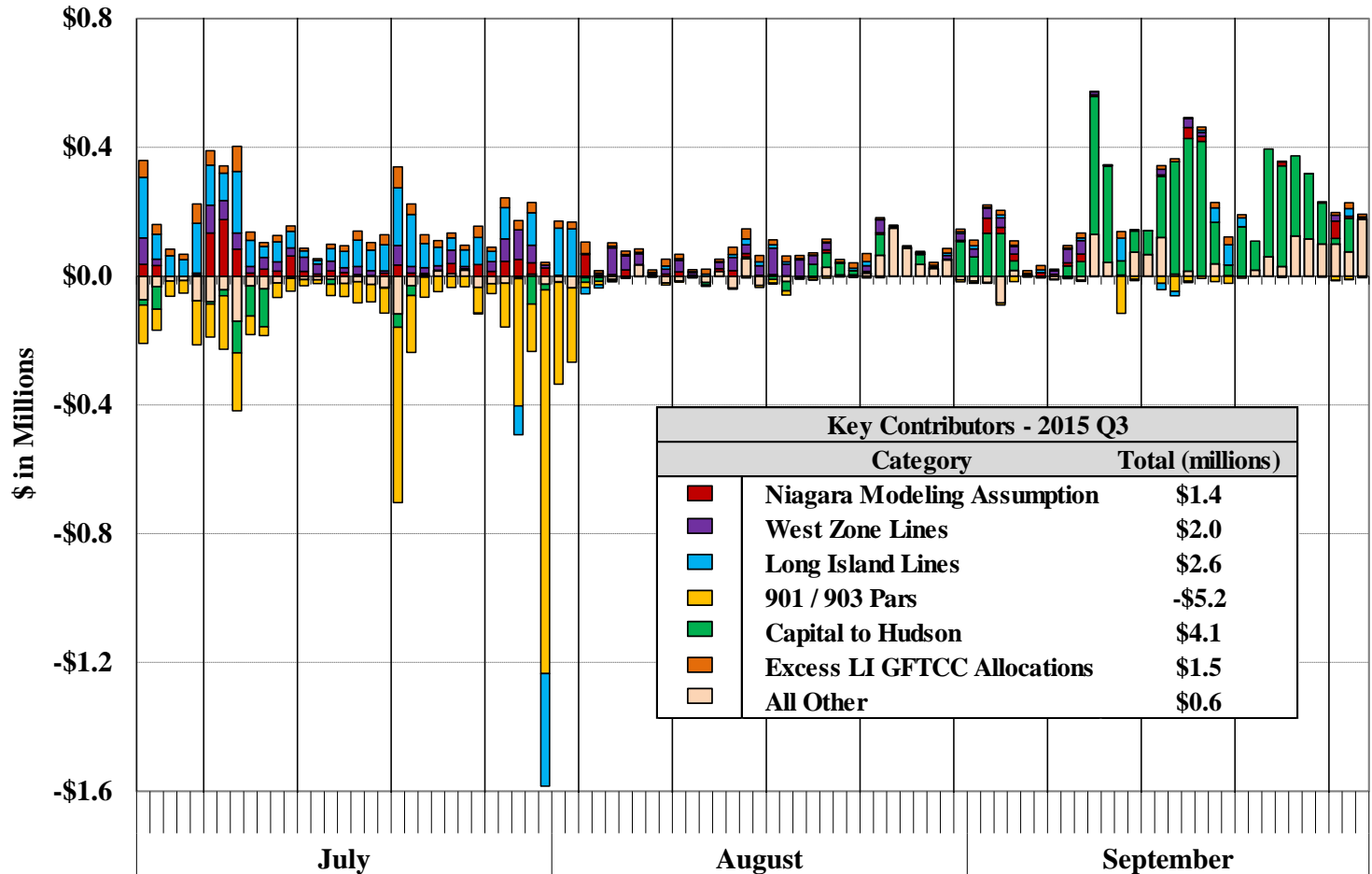


Highlights and Market Summary: Uplift and Revenue Shortfalls

- Guarantee payments were \$20.3M, up 22 percent primarily because of higher costs for OOM dispatch in Long Island and Western NY. (see slides 62-64, 67, 69-71)
 - ✓ Higher load levels led to increased OOM instructions to dispatch peaking generators to manage voltage constraints on the East End of Long Island.
 - ✓ Lower LBMPs led several coal-fired and gas-fired units to be DARUed and/or OOMed more frequently to manage post-contingency flows on 115kV facilities.
- DAM congestion shortfalls were \$7M, down \$1M from 2014-Q3. (slides 47, 51)
 - ✓ Transmission outages into SENY and Long Is. accounted for \$7M of shortfalls.
 - ✓ West Zone constraints accounted for \$3.4M of shortfalls largely because of assumptions related to loop flows and Niagara generator modeling.
 - ✓ The 901 & 903 lines were not used to deliver power from Long Island to NYC in July because the Y50 line was OOS. Typically, these deliveries are uneconomic, so the reduced deliveries generated \$5.2M of surpluses.
- Balancing congestion shortfalls totaled \$6M, down \$1M. (see slides)
 - ✓ \$5.0M of shortfalls were associated with congestion in the West Zone primarily because of differences between the DAM and RT regarding loop flows. Although average loop flows are similar between the DA and RT, loop flows can be volatile and lead to severe RT congestion.



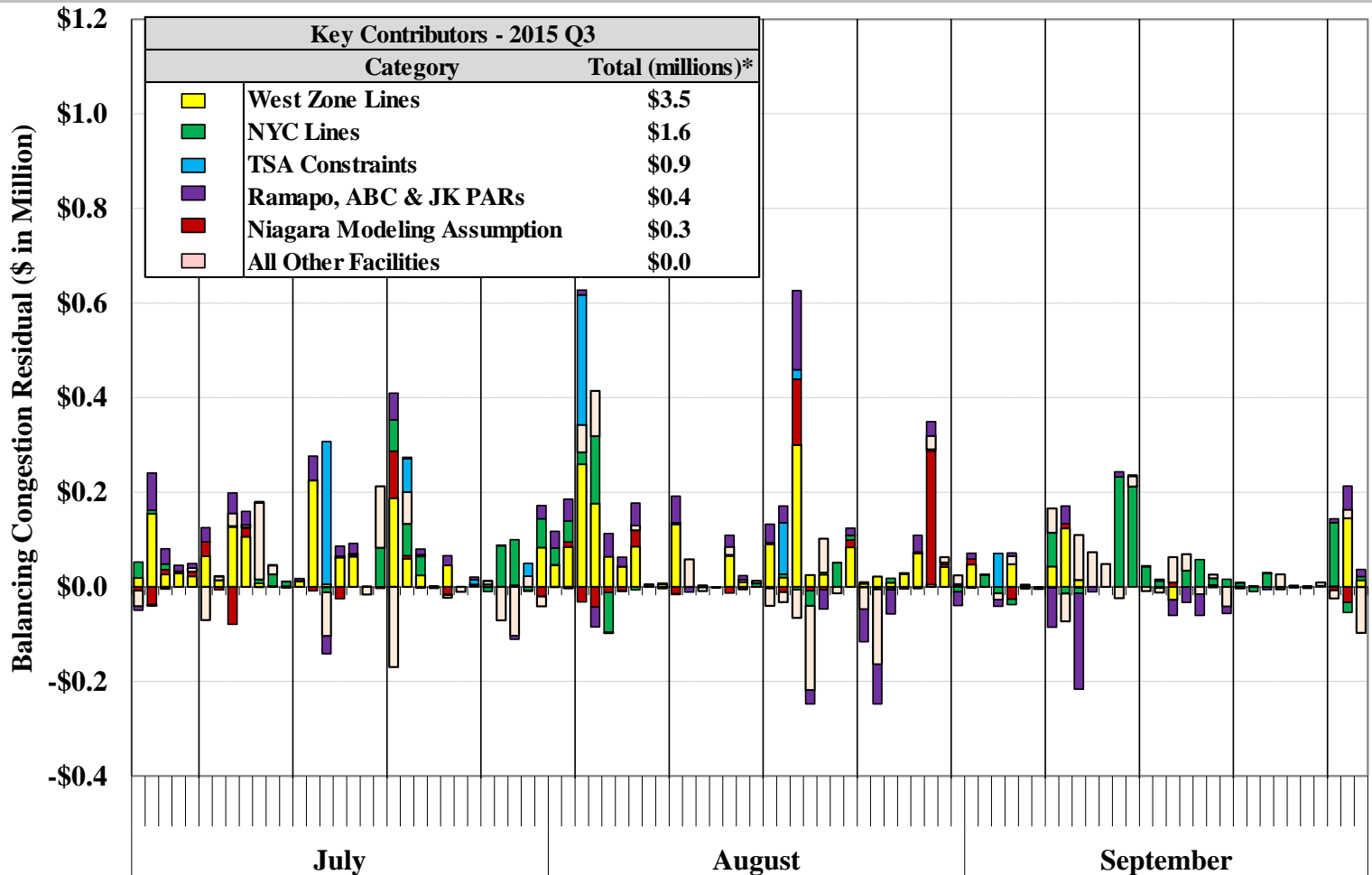
Day-Ahead Congestion Revenue Shortfalls by Transmission Facility



Note: "Niagara Modeling Assumption" estimates the shortfalls resulted from differences in assumed generation at the Niagara 115 kV Buses between TCC and DAM (for DAMCR) and between DAM and RT actual (for BMCR).



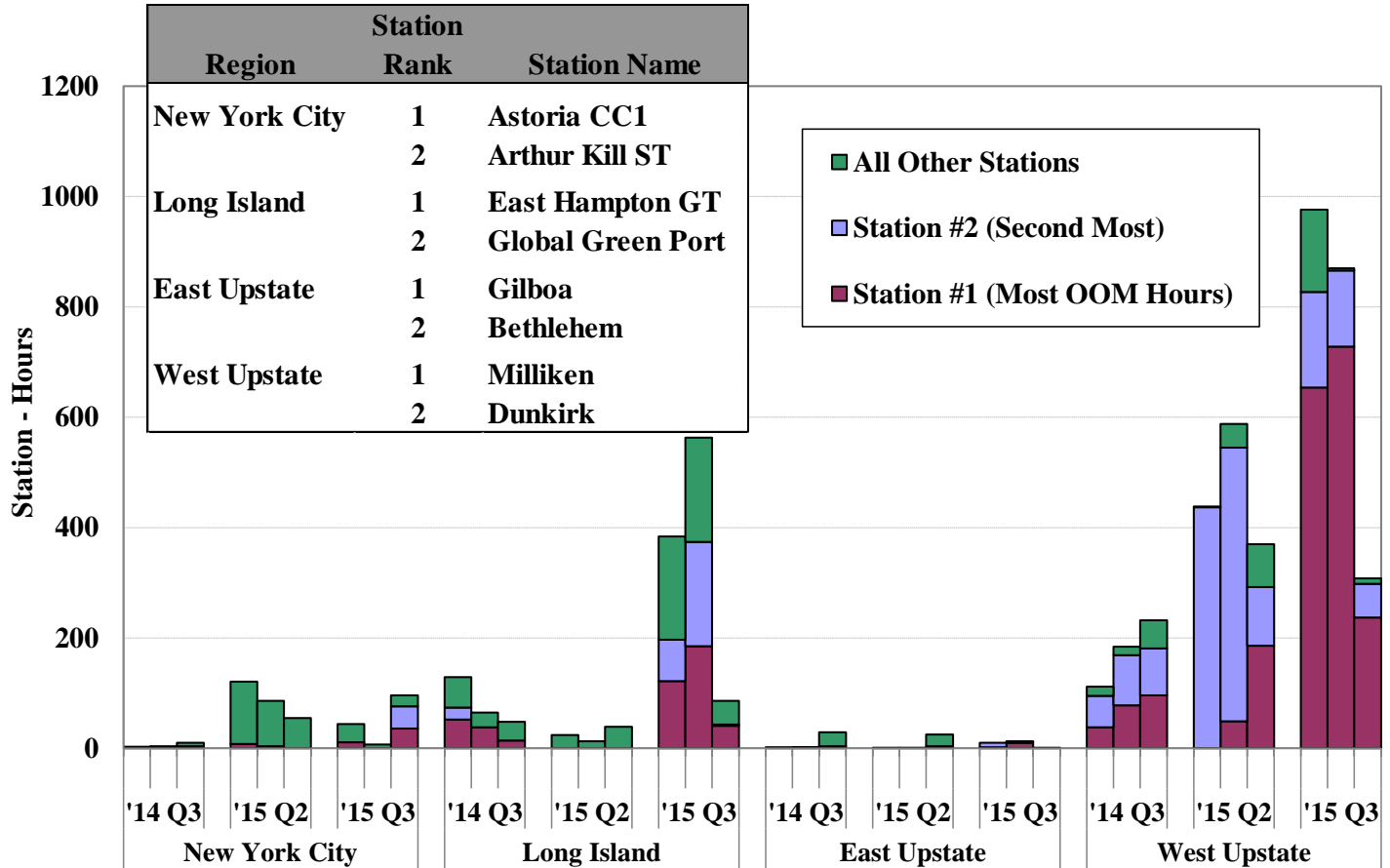
Balancing Congestion Shortfalls by Transmission Facility



Note: The BMCR estimated above may differ from actual BMCR because the figure is partly based on real-time schedules rather than metered values.



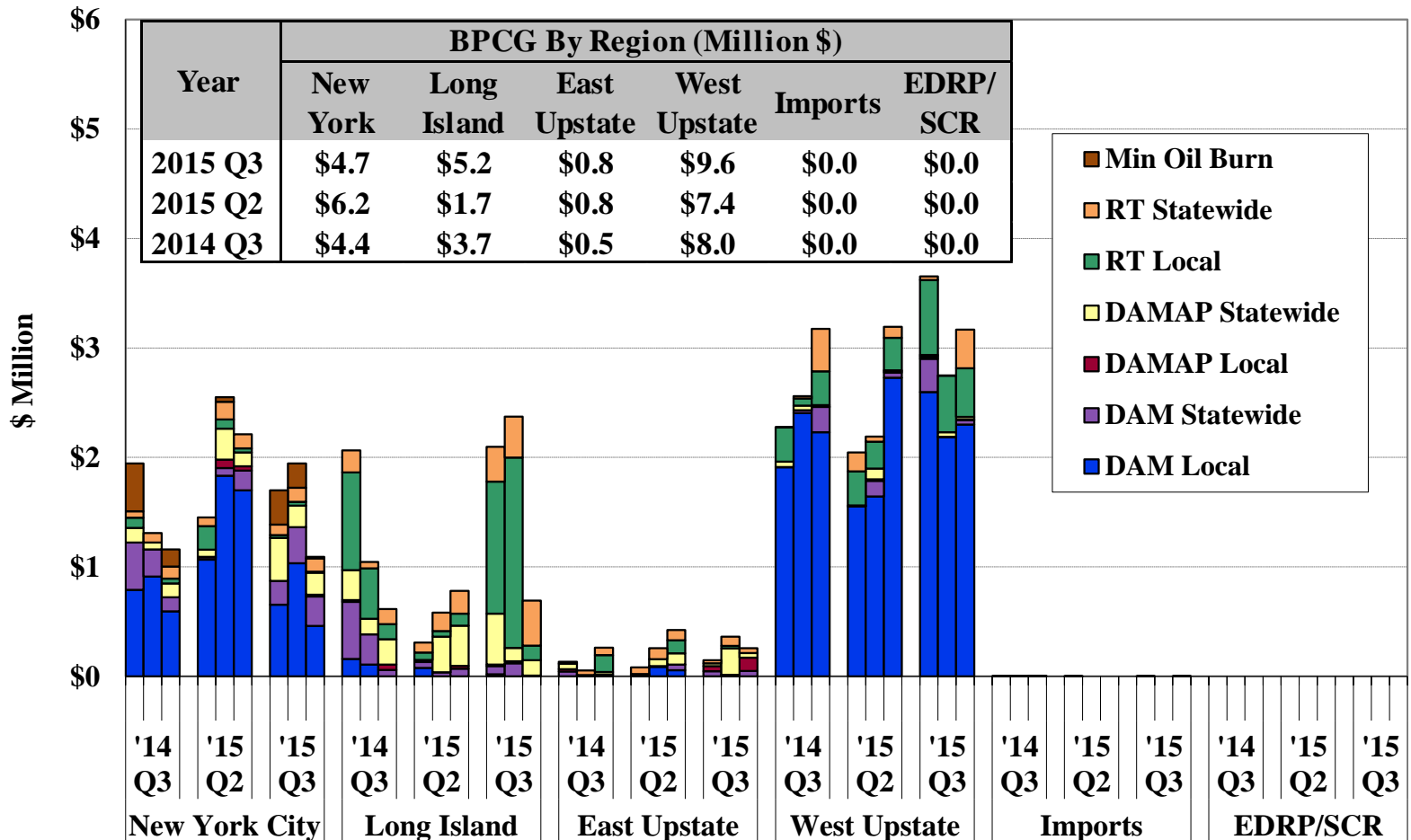
Frequency of Out-of-Merit Dispatch by Region by Month



Note: The NYISO also instructed Niagara to shift output among the generators at the station in order to secure certain 115kV and/or 230kV transmission facilities in 531 hours in 2014-Q3, 797 hours in 2015-Q2, and 790 hours in 2015-Q3. However, these were not classified as Out-of-Merit in hours when the NYISO did not adjust the UOL or LOL of the Resource.



Uplift Costs from Guarantee Payments By Category and Region



Note: BPCG data are based on information available at the reporting time and do not include some manual adjustments to mitigation, so they can be different from final settlements.

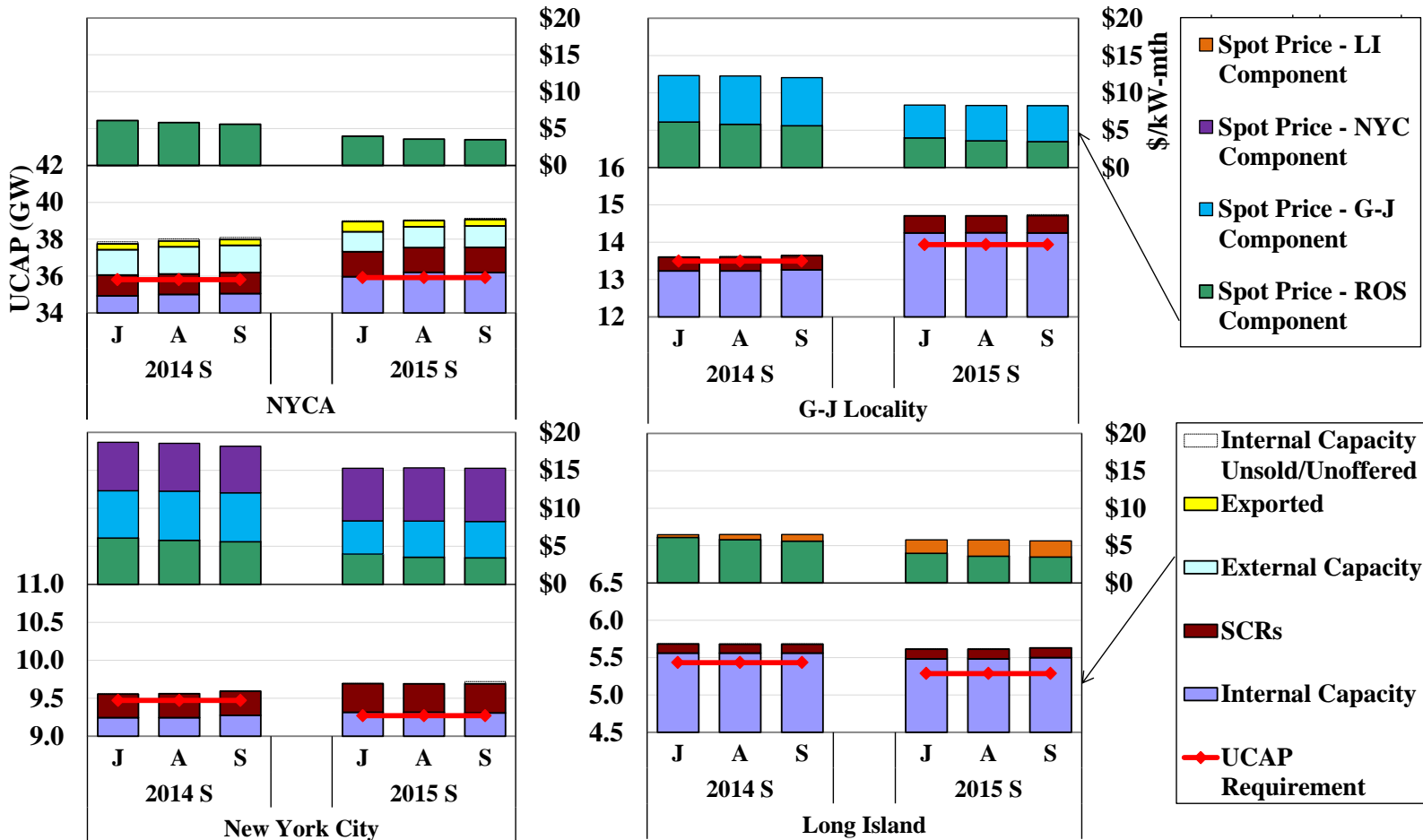


Highlights and Market Summary: Capacity Market

- UCAP spot prices fell notably from the third quarter of 2014. UCAP prices:
 - ✓ In New York City fell 17 percent to an average of \$15.28/kW-month;
 - ✓ In the G-J Locality fell 32 percent to an average of \$8.32/kW-month;
 - ✓ On Long Island fell 12 percent to an average of \$5.72/kW-month;
 - ✓ In Rest of State fell 37 percent to an average of \$3.68/kW-month.
- Capacity spot prices fell across the system (see slides 79-81) because:
 - ✓ The return-to-service of multiple units and new wind capacity additions increased internal capacity supply by 850 MW in Zone G, 170 MW in NYC, and 100+ MW in West NY.
 - ✓ Average sales from SCRs rose 70 MW in NYC, 80 MW in the G-J Locality, and 230 MW in NYCA.
 - ✓ The ICAP requirement fell 115 MW (0.3 percent) in NYCA, 54 MW (0.5 percent) in NYC, and 148 MW (3 percent) in Long Island.
 - However, the ICAP requirement rose 451 MW (3 percent) in the G-J Locality, offsetting the decrease of UCAP prices in the G-J Locality.
 - The LCR reductions in NYC and Long Island and the increased LCR in the G-J Locality resulted primarily from recent capacity additions in Zone G.



Capacity Market Results: Third Quarter 2014 & 2015



Note: Sales associated with Unforced Deliverability Rights (“UDRs”) are included in “Internal Capacity,” but unsold capacity from resources with UDRs is not shown.



2015-Q3 State of the Market Report

- The full 2015-Q3 State of the Market Report may be found at:
www.nyiso.com/public/markets_operations/documents/studies_reports/index.jsp
 - ✓ Click on “Reports”
 - ✓ Click on “MMU Quarterly Reports”