

Fast Start Metrics Update

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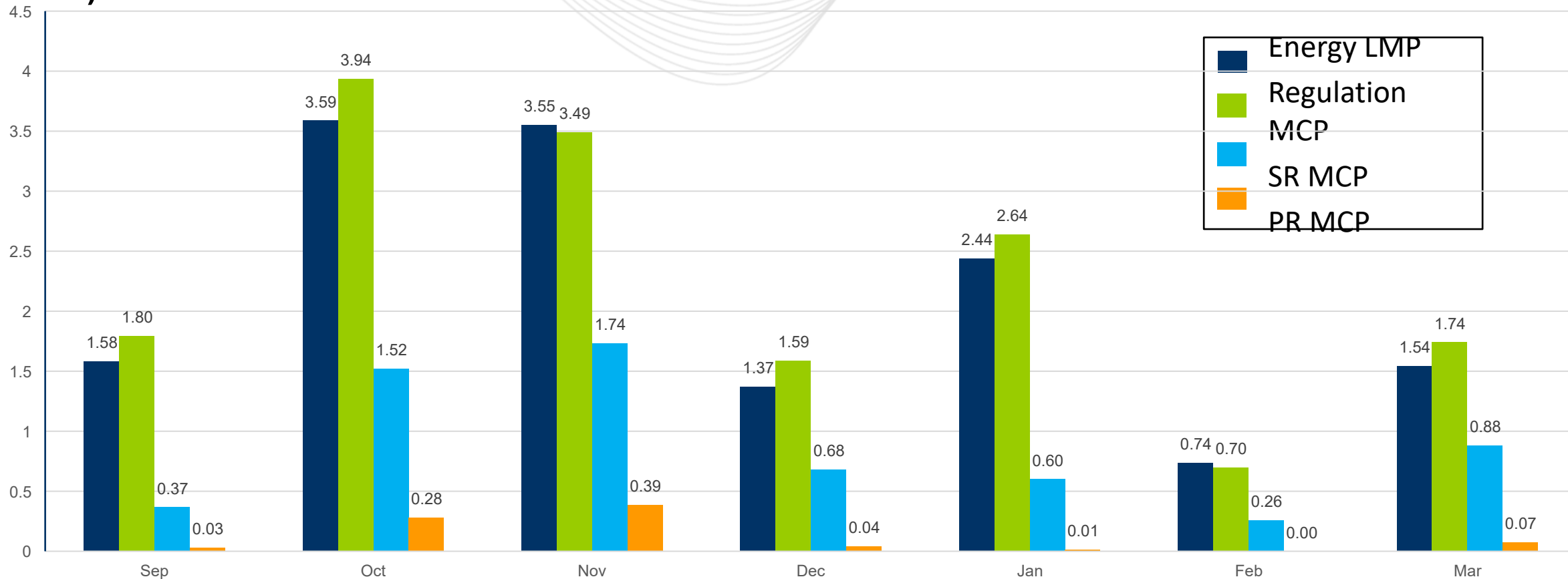
April 13, 2022

- The average energy price increase was \$2.1/MWh, which is 4.2 percent of average system energy LMP from September, 2021 to March, 2022
 - The increase from February to March is due to:
 - More transmission outages



Fast-Start Pricing: Sep, 2021 – Mar, 2022

Average Increase (\$/MWh)



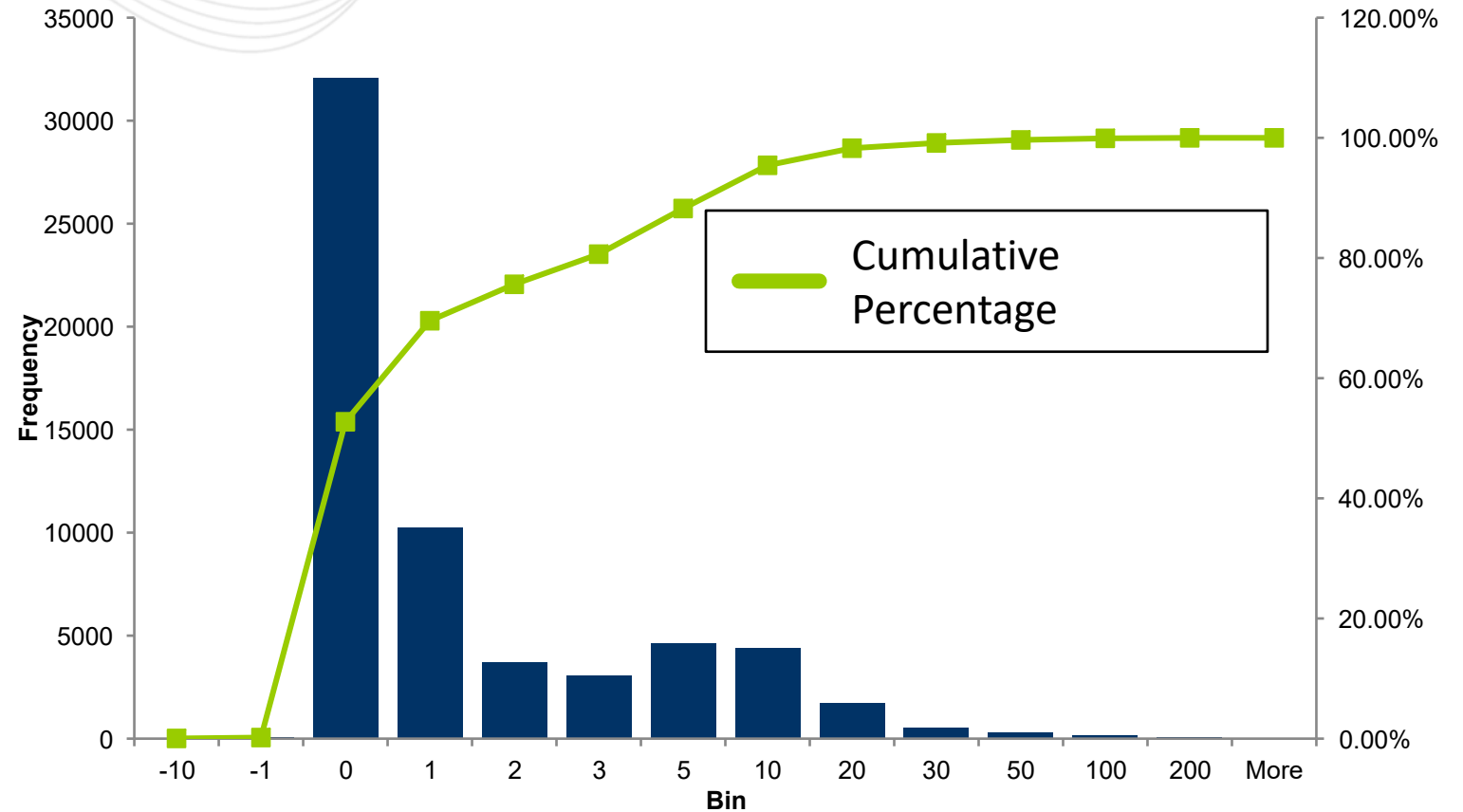
Key Takeaway: Energy and Ancillary Service Market clearing prices all increased due to co-optimization.



Fast-Start Energy LMP Increase (Histogram): Sep, 2021 – Mar, 2022

Energy LMP Increase	Frequency	Cumulative
$(-\infty, -10]$	20	0.03%
$(-10, -1]$	90	0.18%
$(-1, 0)$	356	0.76%
0	31735	51.98%
$(0, 1]$	10267	69.56%
$(1, 2]$	3703	75.62%
$(2, 3]$	3065	80.64%
$(3, 5]$	4638	88.24%
$(5, 10]$	4392	95.43%
$(10, 20]$	1736	98.27%
$(20, 30]$	535	99.15%
$(30, 50]$	306	99.65%
$(50, 100]$	161	99.91%
$(100, 200]$	52	100.00%

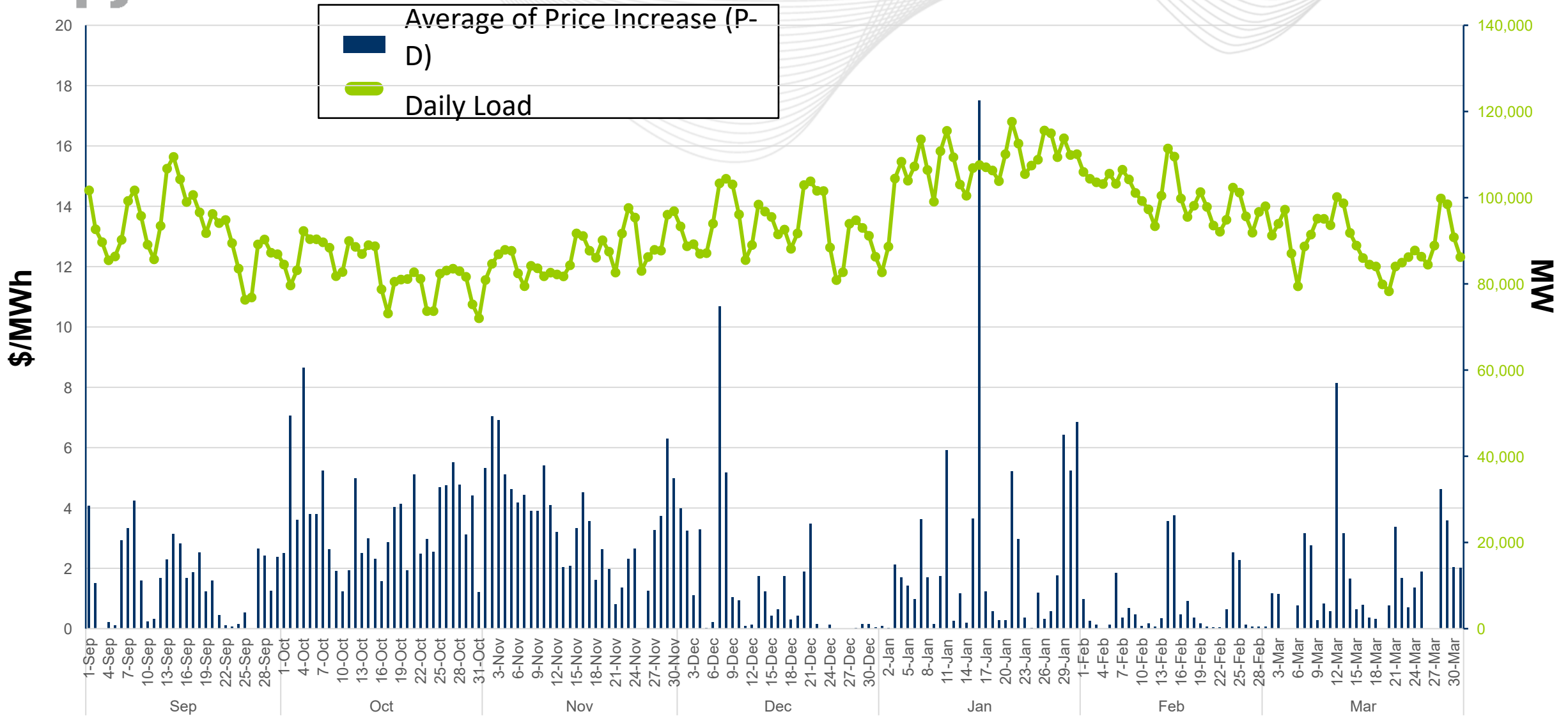
Frequency
(Number of Intervals)



Key Takeaway: Over 50% of the time, there was zero impact on Energy LMPs.

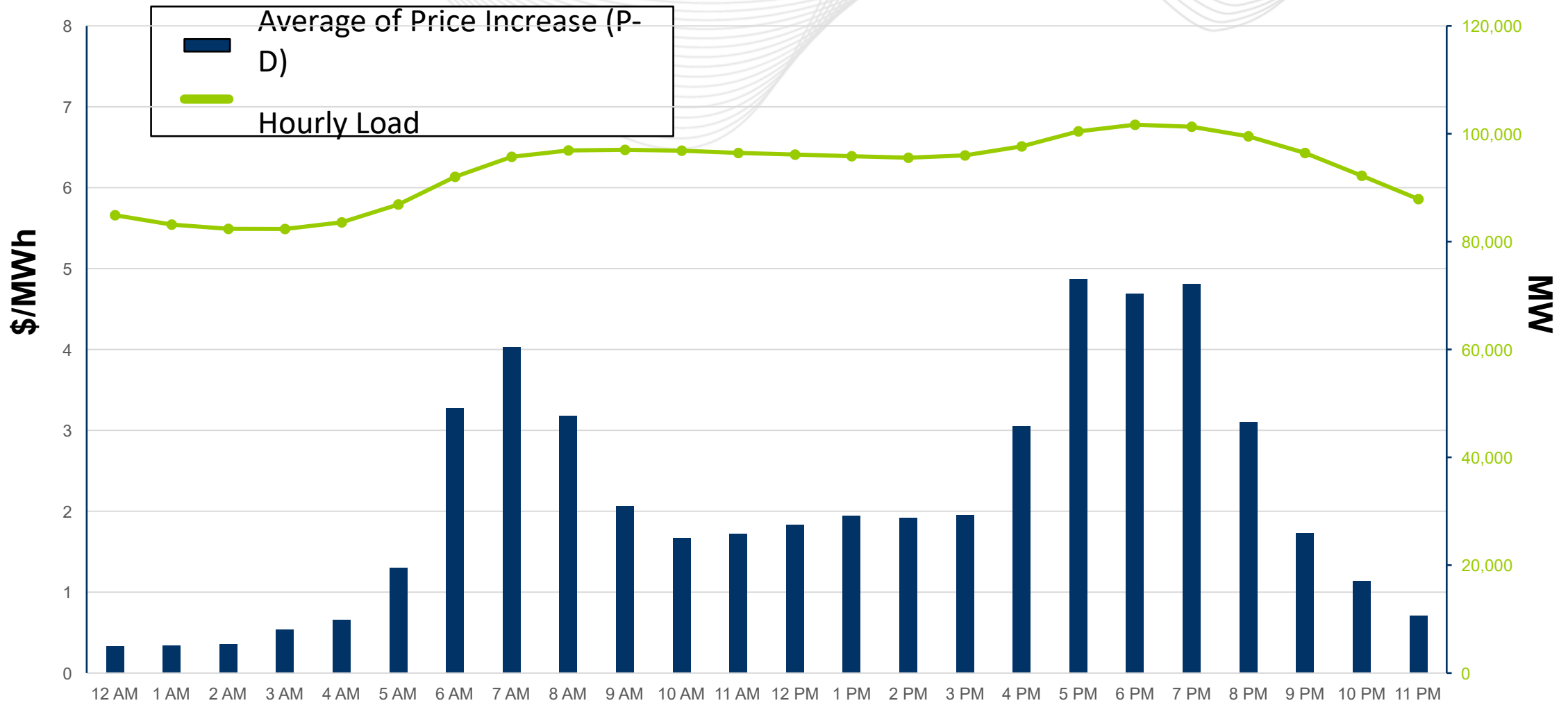


Fast-Start Daily Distribution: Sep, 2021 – Mar, 2022



Key Takeaway: LMP increases are more impacted by the system energy LMP, outages and load from September, 2021 to March, 2022.

Fast-Start Hourly Distribution: Sep, 2021 – Mar, 2022



Key Takeaway: Largest impact on LMPs occur during on-peak hours.

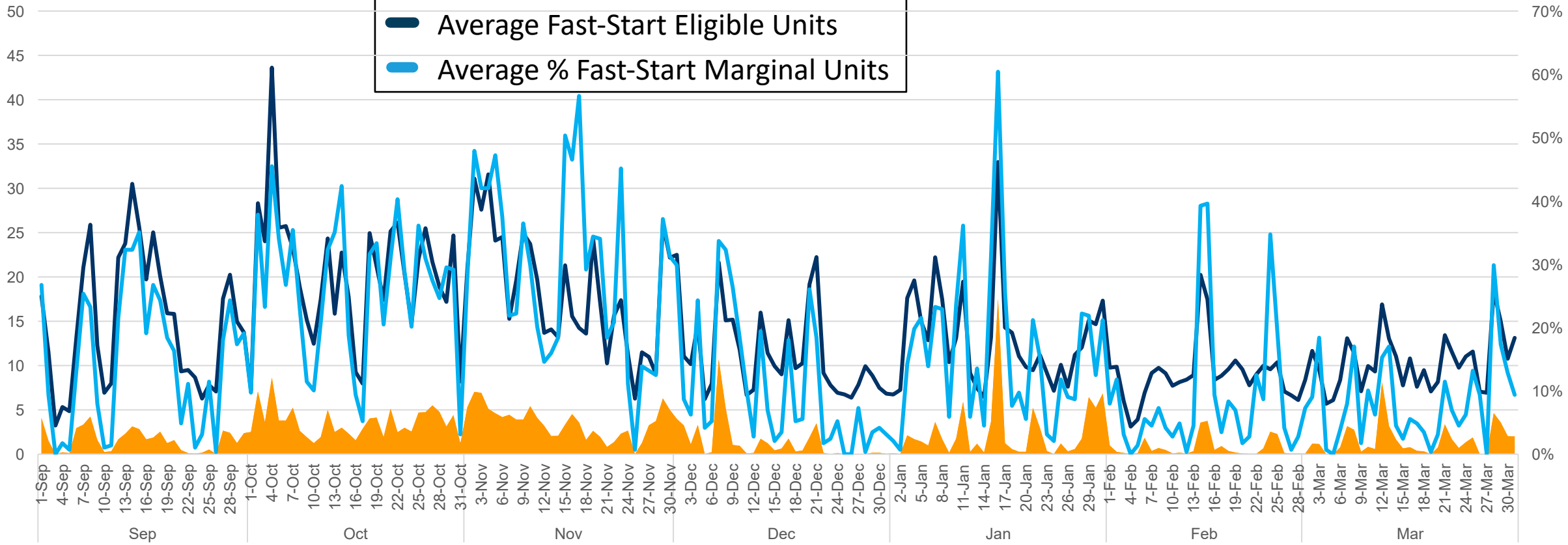


Fast-Start Eligible and Marginal Units: Sep, 2021 – Mar, 2022

FS Eligible Units Count

Average %

- Average Energy LMP Increase (P-D)
- Average Fast-Start Eligible Units
- Average % Fast-Start Marginal Units



Key Takeaway: Fast-start units and price increase are correlated.

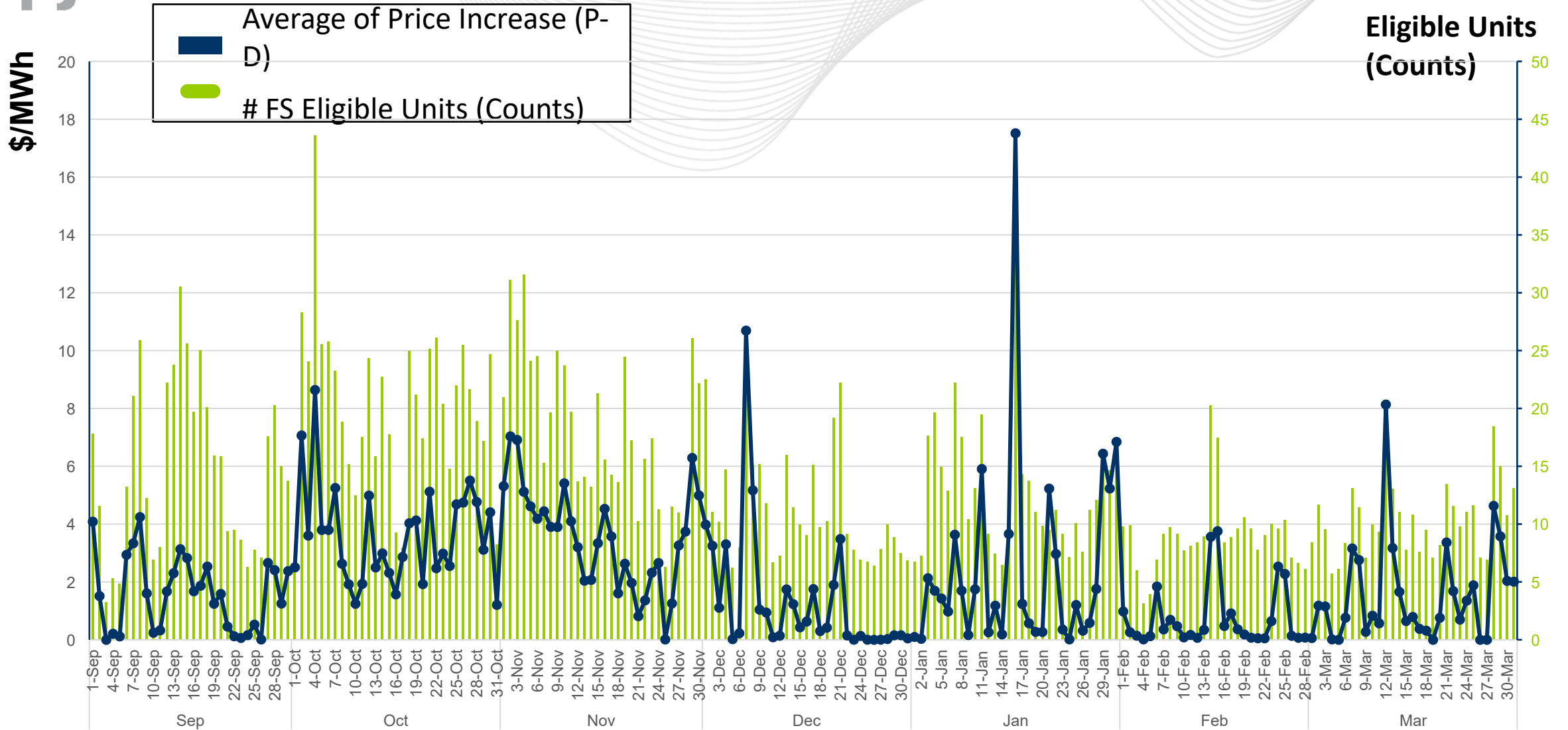


Fast-Start Eligible and Marginal Units: Sep, 2021 – Mar, 2022

	EnergyLMP Increase (\$/MWh)	FS Eligible Units	% FS Marginal
September	1.58	15	15%
October	3.59	20	26%
November	3.55	18	29%
December	1.37	11	11%
January	2.44	13	16%
February	0.74	9	9%
March	1.54	10	8%



Fast Start Eligible Units vs. Energy Price Increase



Key Takeaway: More Fast-start eligible units leads to higher energy price increase.

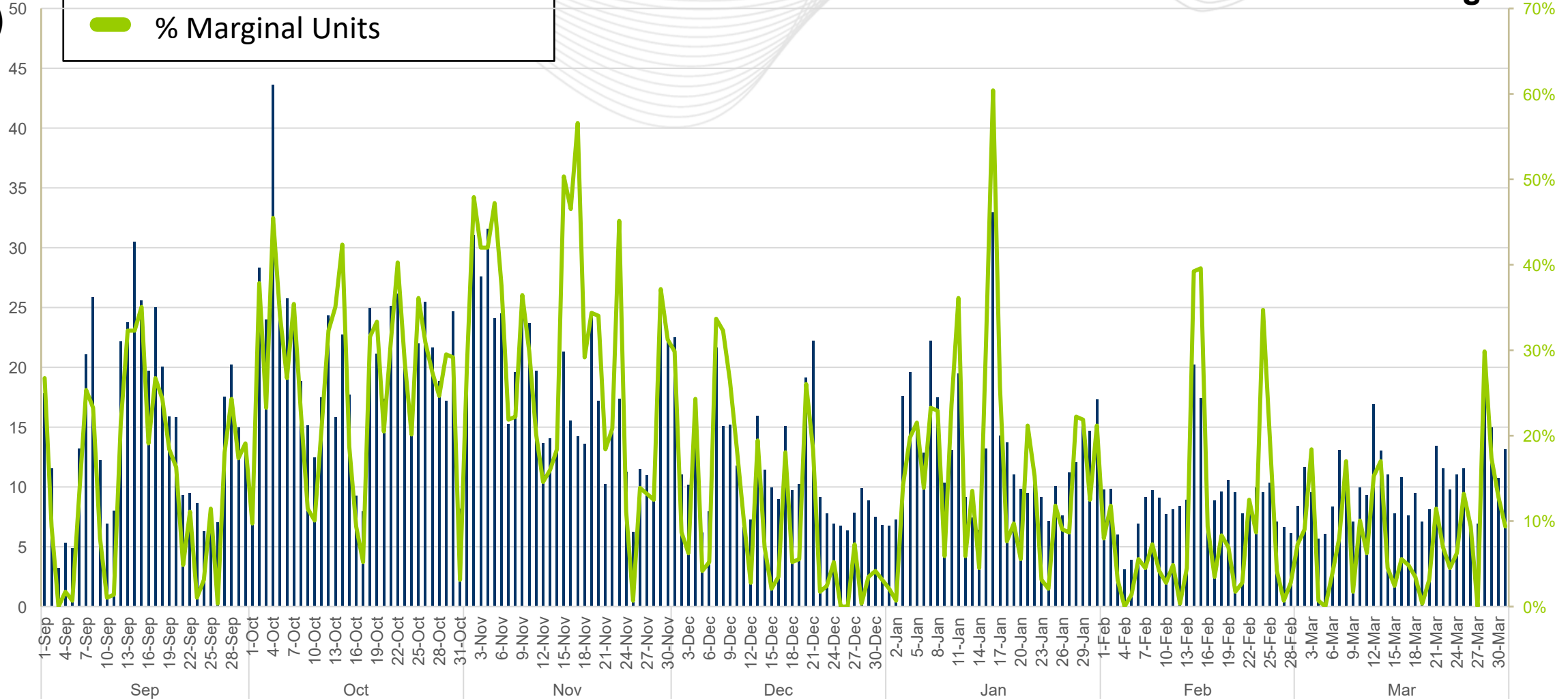


Fast Start Eligible Units vs. % Fast Start on Marginal

Eligible Units (Counts)

- # FS Eligible Units (Counts)
- % Marginal Units

Average %



Key Takeaway: On average Fast-start units are marginal 16% of the time.

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Fast Start Metrics Update



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