Flexible resource adequacy criteria and must offer obligation - phase 2 discussion

Revised draft framework proposal

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Market Surveillance Committee Meeting

February 2, 2018

Basis of a new flexible RA framework in five steps

1) Identify the ramping needs that flexible RA should be procured to address
2) Define the product to be procured
3) Quantify the capacity needed to address all identified needs
4) Establish criteria regarding how resources qualify for meeting these needs
5) Allocation of flexible capacity requirements based on a sound causal principles

Changes to flexible RA should closely align with ISO operational needs and align with ISO market runs

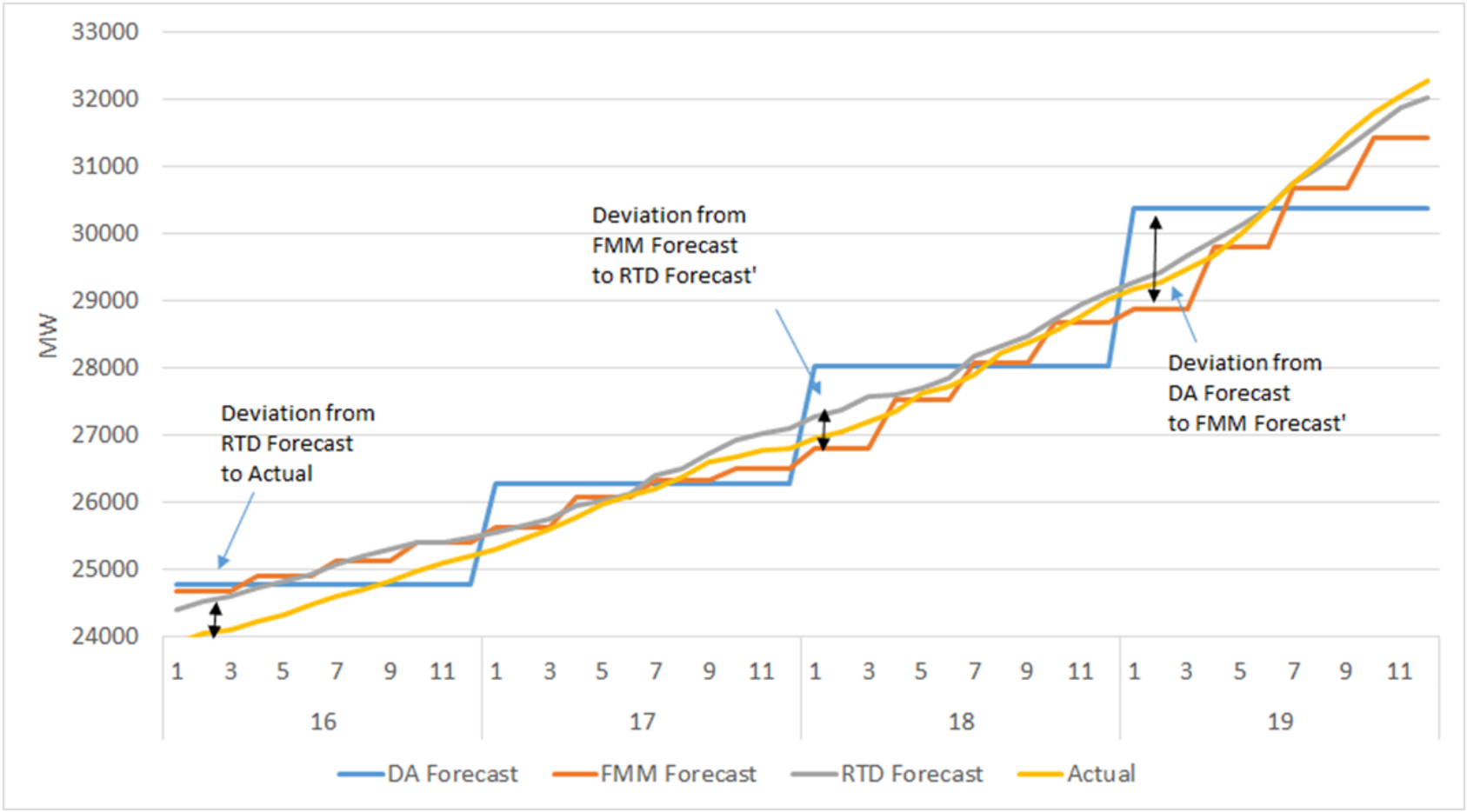
- Flexible capacity needs break down into two categories
  1) Predictable: known and/or reasonably forecastable ramping needs, and
  2) Unpredictable: ramping needs caused by load following and forecast error

- ISO will develop three flexible RA products:
  - Day-ahead load shaping
  - Fifteen-minute
  - Five-minute

Economic must offer obligation applies to each Flexible RA capacity product

- Generic RA may self-schedule or economically bid into day-ahead and real-time markets
- Flexible RA capacity has must offer requirements to economically bid
  - 5 and 15 minute products
    - Economically bid into both day-ahead and real-time markets
  - DALS
    - Economically bid into day-ahead,
    - Can self-schedule day-ahead awards
    - Economically bid additional available capacity

Propose to establish new requirements to address uncertainty between market runs



The ISO will propose using the maximum identified needs for both predictable and unpredictable ramps

Overall flexible capacity need

Maximum Forecasted 3-Hour ramp (including reconstituted renewable curtailments) + ½ Max(MSSC, 6% expected monthly peak load) + ε

5 Minute product

Max forecasted uncertainty between FMM and RTD + fixed MW quantity to account for overlap with regulation

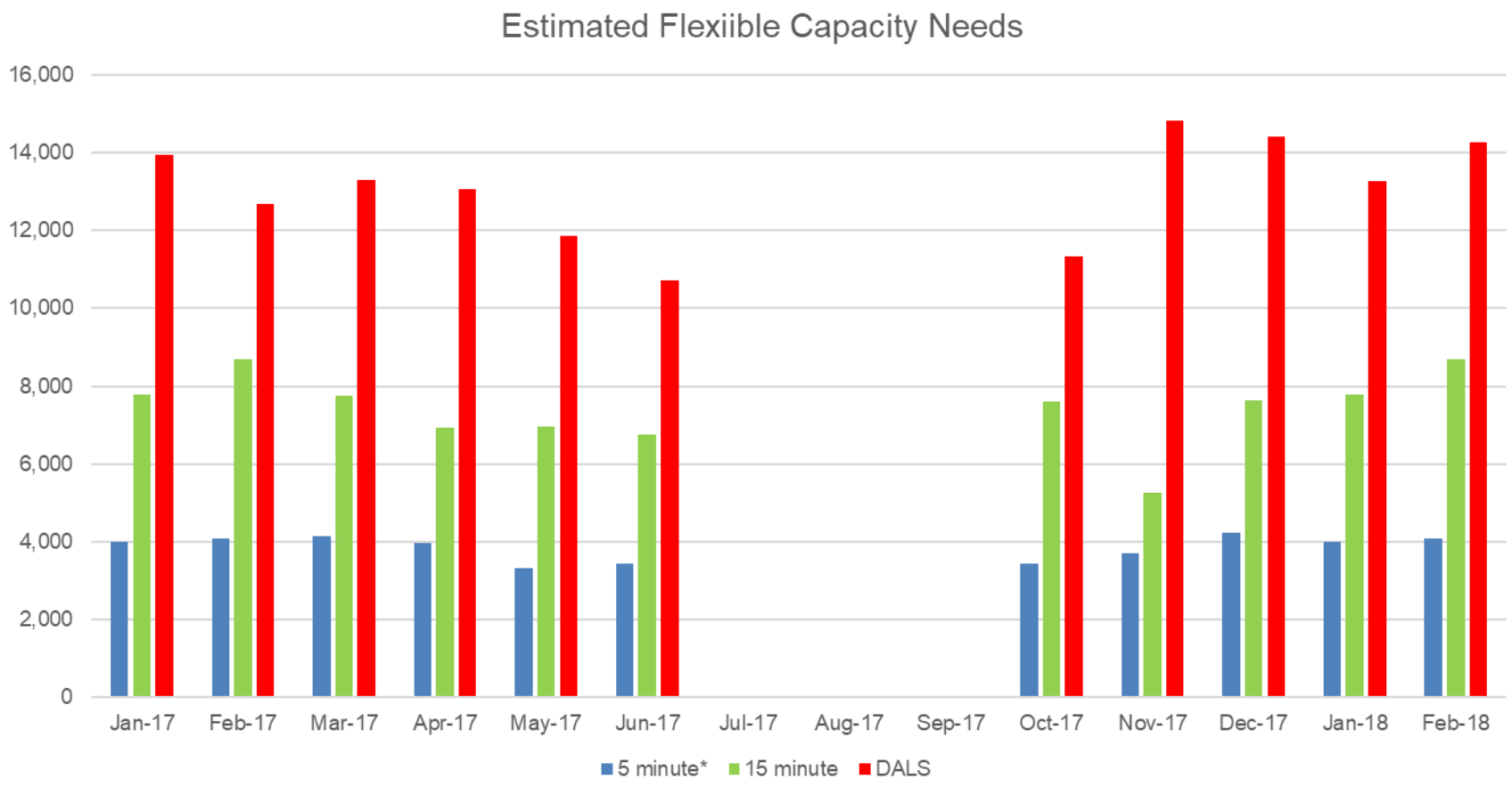
15 Minute product (5 Minute product count towards requirement)

Max forecasted uncertainty between IFM and FMM

Day Ahead Load Shaping (5 and 15 Minute products count towards requirement)

Overall flexible capacity need

Requirements should cover the widest range of uncertainty for real-time flexible capacity products



Eligibility criteria focuses on technical capabilities and deliverability

- RA counting for a given product will be based on resource's capabilities within a defined time frame
- Start-up time 60 minutes or less for real-time products
- Must be studied for flexible capacity deliverability to get an EFC

Eligibility criteria focuses on technical capabilities and deliverability (Cont.)

- Solar resources would be eligible, but ISO would place an initial cap of no more than 25% of any product
- ULRs would be eligible, but must provide replacement capacity if UL reached
- EIM resources and purely external resources would be eligible
  - Purely external resources would be eligible to provide only DALS and 15 minute product

Assessment of historic Flex RA showings using new counting rules vs estimated needs

	MW Available			Showings			Need			Deficiency		
	5 minute	15 minute	DALS	5 minute	15 minute	Day-Ahead LS	5 minute*	15 minute	DALS	5 minute	15 minute	DALS
Jan-17	10,133	14,458	33,099	4,397	6,483	14,059	4,001	7,789	13,947	0	1,306	0
Feb-17	10,033	14,347	32,959	4,231	6,272	13,609	4,098	8,697	12,681	0	2,425	0
Mar-17	10,104	14,494	33,073	3,977	5,892	13,484	4,140	7,763	13,300	163	1,871	0
Apr-17	10,321	14,934	33,469	4,194	5,980	13,409	3,980	6,941	13,053	0	961	0
May-17	10,338	14,862	33,353	3,863	5,553	12,416	3,326	6,971	11,857	0	1,418	0
Jun-17	10,404	15,068	33,027	3,417	4,585	11,216	3,457	6,750	10,728	40	2,165	0
Jul-17	10,385	15,015	32,935	3,386	4,782	10,449	TBD	TBD	9,766	TBD	TBD	0
Aug-17	10,358	14,962	32,855	3,677	5,029	10,338	TBD	TBD	9,686	TBD	TBD	0
Sep-17	10,211	14,626	32,525	3,672	5,039	11,734	TBD	TBD	11,295	TBD	TBD	0
Oct-17	10,224	14,580	32,603	3,997	5,372	11,824	3,434	7,606	11,326	0	2,234	0
Nov-17	10,229	14,621	32,780	4,996	6,793	15,263	3,699	5,264	14,814	0	0	0
Dec-17	10,253	14,670	32,907	5,201	7,044	15,428	4,236	7,638	14,418	0	594	0
Jan-18	10,133	14,458	33,099	4,433	5,926	13,674	4,001	7,789	13,253	0	1,863	0
Feb-18	10,033	14,347	32,959	4,481	6,262	14,379	4,098	8,697	14,252	0	2,435	0

*includes a flat 600 MW adder in all months to account for ISO procured regulation

Allocation of requirements will be based on similar causation rules as are used today

- Each product would be allocated based on proportion of need caused by load and VER uncertainty and proportion of each LSE or LRA share
- Allocation proportions would apply requirements for a given product
  - Only need to procure lower quality product to fill residual need once higher quality product is accounted for

The ISO will only examine individual LSE showings if system deficiencies are identified

- First assess if sufficient system-wide flexible RA capacity has been shown for each product
  - If sufficient, the ISO will not assess individual showings
  - If deficient, then the ISO will look to determine which LRA(s) is deficient and then which of its jurisdictional LSEs are deficient
- The ISO may conduct backstop procurement if deficiencies are not cured
  - Costs allocated to deficient LSE's
  - If there are deficiencies in multiple products, the ISO will procure capacity that meets that highest quality deficient product first
    - Will allocate costs first to the LSE(s) that was deficient in the highest quality product
    - Any remaining deficiencies of lower quality products will be allocated to the entities deficient in that product

Example of allocations

5 min	Total Cause			Percent to LSE			MW to LSE			LSE Product Obligation	Residual Need
	load	wind	solar	load	wind	solar	load	wind	solar		
LSE1	1500	750	250	25%	30%	25%	375	225	62.5	662.5	
LSE2	1500	750	250	20%	25%	20%	300	187.5	50	537.5	
LSE3	1500	750	250	35%	30%	30%	525	225	75	825	
LSE4	1500	750	250	15%	5%	5%	225	37.5	12.5	275	
LSE5	1500	750	250	5%	10%	20%	75	75	50	200	
Total				100%	100%	100%	1500	750	250	2500	
15 min	load	wind	solar	load	wind	solar	load	wind	solar		
LSE1	2750	1200	550	25%	30%	25%	687.5	360	137.5	1185	522.5
LSE2	2750	1200	550	20%	25%	20%	550	300	110	960	422.5
LSE3	2750	1200	550	35%	30%	30%	962.5	360	165	1487.5	662.5
LSE4	2750	1200	550	15%	5%	5%	412.5	60	27.5	500	225
LSE5	2750	1200	550	5%	10%	20%	137.5	120	110	367.5	167.5
Total				100%	100%	100%	2750	1200	550	4500	2000
DALS	load	wind	solar	load	wind	solar	load	wind	solar		
LSE1	4000	1500	2500	25%	30%	25%	1000	450	625	2075	890
LSE2	4000	1500	2500	20%	25%	20%	800	375	500	1675	715
LSE3	4000	1500	2500	35%	30%	30%	1400	450	750	2600	1112.5
LSE4	4000	1500	2500	15%	5%	5%	600	75	125	800	300
LSE5	4000	1500	2500	5%	10%	20%	200	150	500	850	482.5
Total				100%	100%	100%	4000	1500	2500	8000	3500

THANK YOU

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