

# WESTERN ENERGY IMBALANCE MARKET

## Briefing on Western Energy Imbalance Market

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EIM Governing Body Meeting

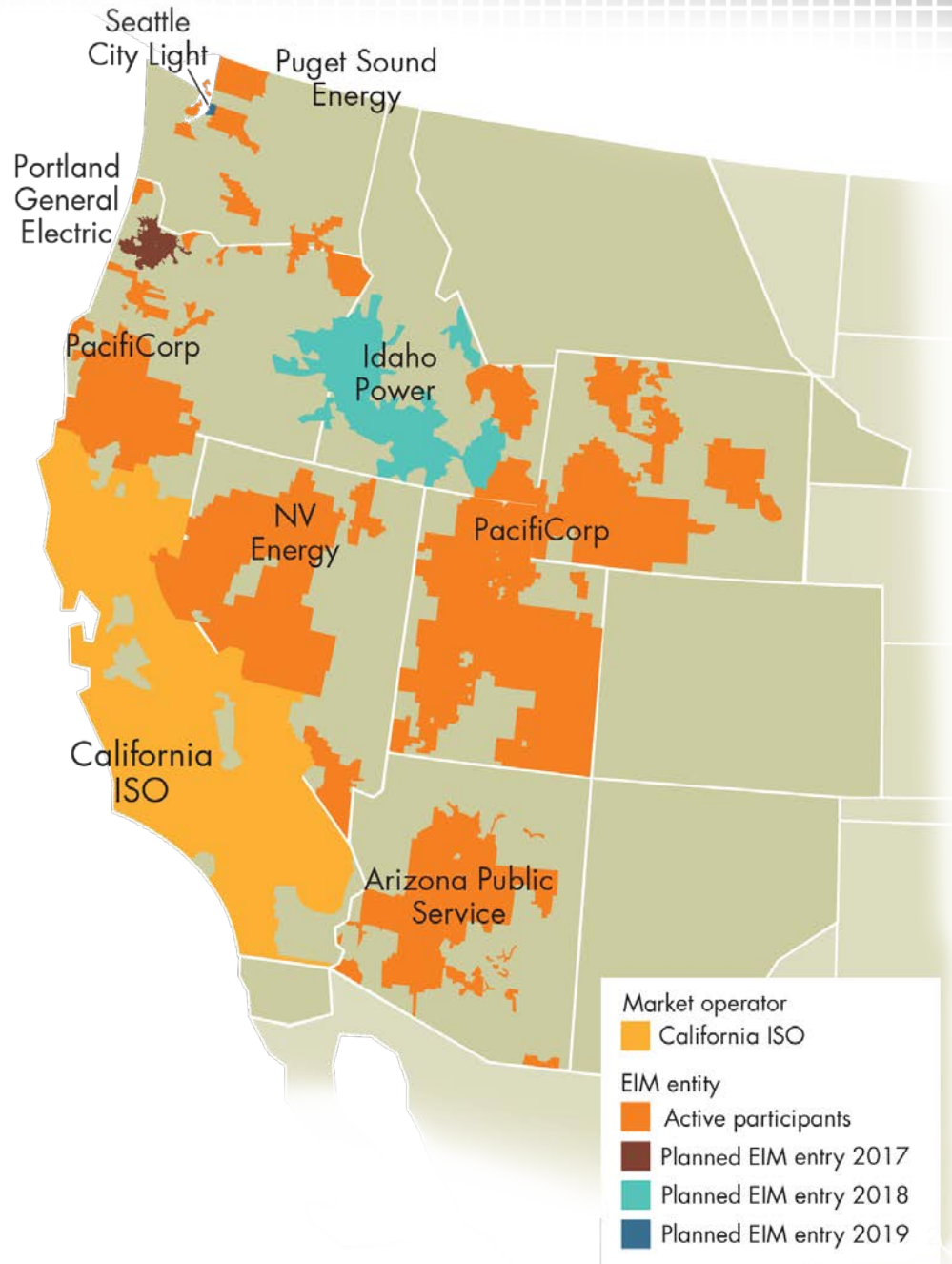
General Session

February 1, 2017



# Implementation update

- Portland General and Idaho implementation process continues for October 2017 and April 2018 respectively.
- Seattle City Light has signed an implementation agreement and filed with FERC, for a scheduled EIM entry in 2019.
- BANC-SMUD working on agreement allowing SMUD to participate.
- CENACE is finalizing terms of EIM study.



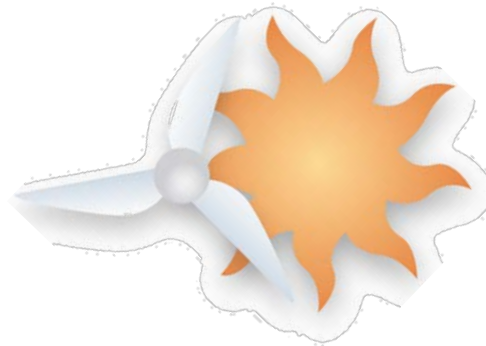
# Gross economic benefits since start of EIM = \$142.62M

BAA	4 <sup>th</sup> Qtr 2014	1 <sup>st</sup> Qtr 2015	2 <sup>nd</sup> Qtr 2015	3 <sup>rd</sup> Qtr 2015	4 <sup>th</sup> Qtr 2015	1 <sup>st</sup> Qtr 2016	2 <sup>nd</sup> Qtr 2016	3 <sup>rd</sup> Qtr 2016	4 <sup>th</sup> Qtr 2016	Total
APS									5.98	5.98
CAISO	1.24	1.44	2.46	3.48	5.28	6.35	7.89	5.44	8.67	42.25
NVE	-	-	-	-	0.84	1.70	5.20	5.60	3.07	16.41
PAC	4.73	3.82	7.72	8.52	6.17	10.85	10.51	15.12	8.99	76.43
PSE									1.56	1.56
<b>Total</b>	5.97	5.26	10.18	12.00	12.29	18.90	23.60	26.16	28.27	<b>142.62</b>

BAA	October	November	December	Q4 – 2016 Total
APS	2.81	1.68	1.49	5.98
CAISO	1.62	3.10	3.95	8.67
NVE	1.00	1.47	0.60	3.07
PAC	3.24	1.89	3.86	8.99
PSE	0.25	0.66	0.65	1.56
<b>Total</b>	<b>8.92</b>	<b>8.8</b>	<b>10.55</b>	<b>28.27</b>

# Continued to observe reduced renewable curtailment in 4<sup>th</sup> quarter, 2016

Reduced Renewable Curtailment	1 <sup>st</sup> Qtr 2015	2 <sup>nd</sup> Qtr 2015	3 <sup>rd</sup> Qtr 2015	4 <sup>th</sup> Qtr 2015	1 <sup>st</sup> Qtr 2016	2 <sup>nd</sup> Qtr 2016	3 <sup>rd</sup> Qtr 2016	4 <sup>th</sup> Qtr 2016	Total To-Date
Mwh curtailment avoided	8,860	3,629	828	17,765	112,948	158,806	33,094	23,390	359,320
Estimated metric tons of CO2 displaced	3,792	1,553	354	7,521	48,342	67,969	14,164	10,011	153,706

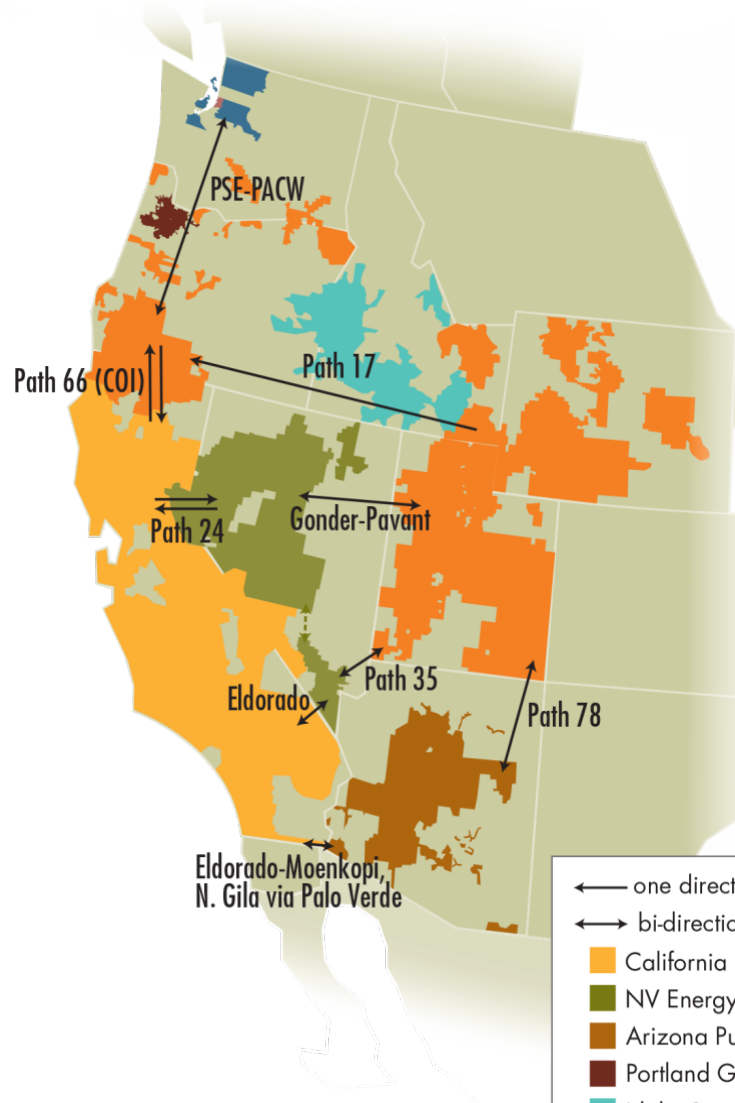


# Flexible ramping procurement diversity savings for 4<sup>th</sup> quarter, 2016

	October		November		December	
Direction	Up	Down	Up	Down	Up	Down
Average MW saving	490	N/A	415	474	399	482
Sum of BAA requirements	986	N/A	1,238	1,162	1,236	1,166
Percentage savings	50%	N/A	33%	41%	32%	41%

The percentage of savings is the average MW savings divided by the sum of the four individual BAA requirements.

# Energy transfer capability in 4<sup>th</sup> quarter, 2016

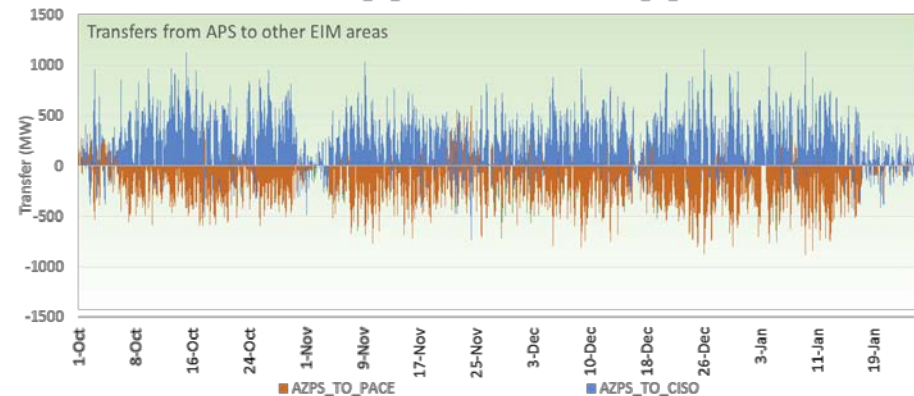
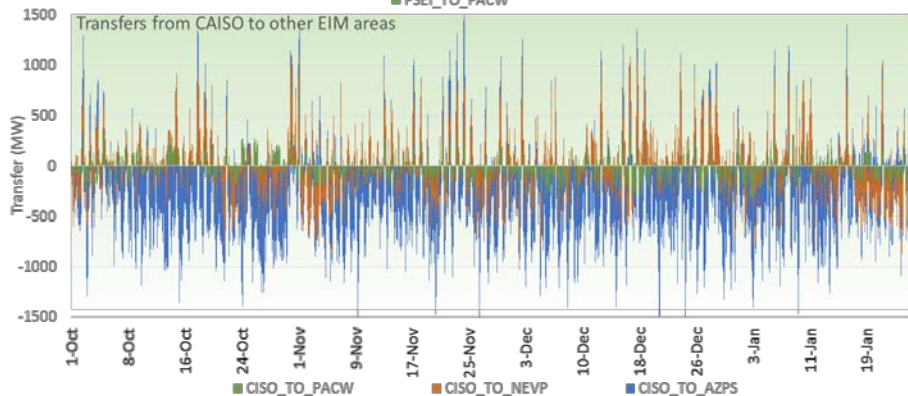
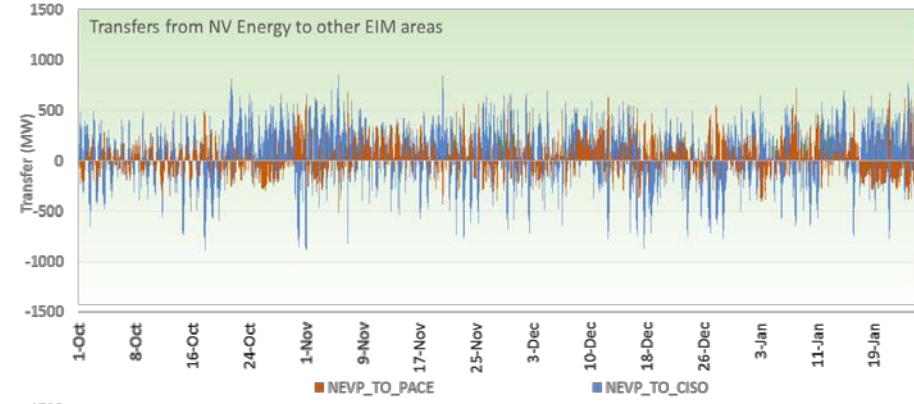
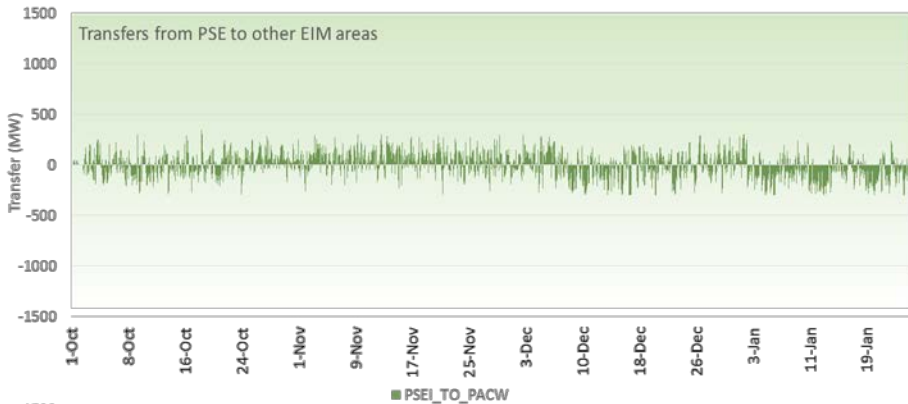
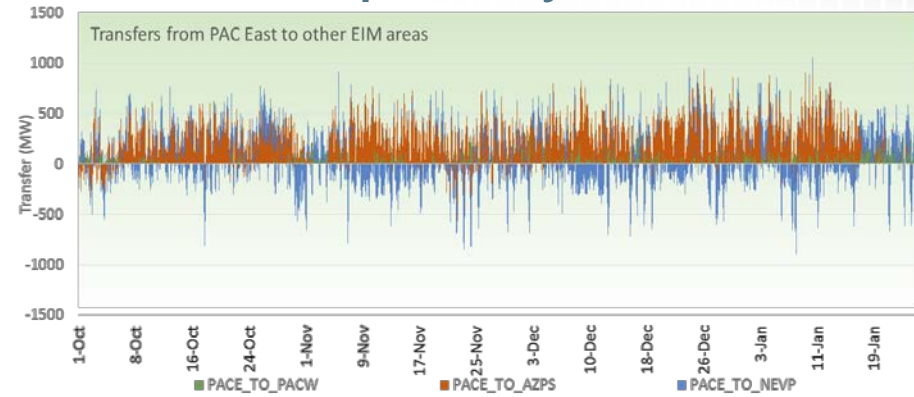
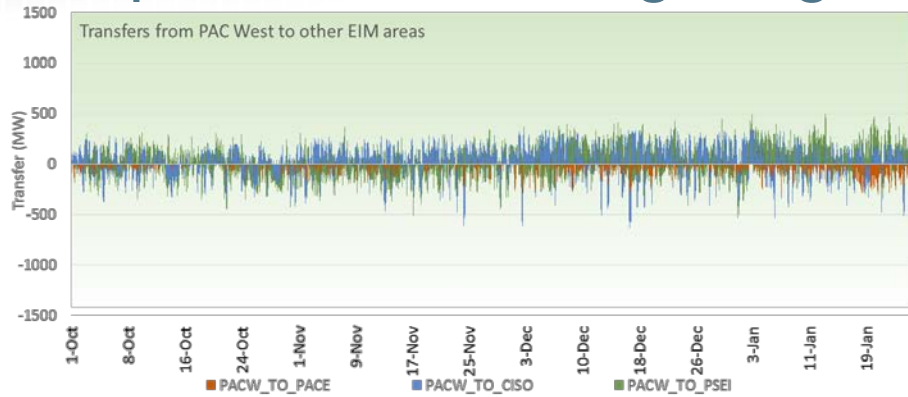


Path	Estimated Max Capacity (MW)*
Path 24 (west to east)	100
Path 24 (east to west)	35-90
Eldorado	1,500
Path 35 (west to east)	580
Path 35 (east to west)	538
Gonder-Pavant	130
Path 66 (ISO to PACW)	331
Path 66 (PACW to ISO)	432
Path 17	200
PSE to PACW	300
Eldorado, Moenkopi, N. Gila, Palo Verde	2,500
Path 78	600

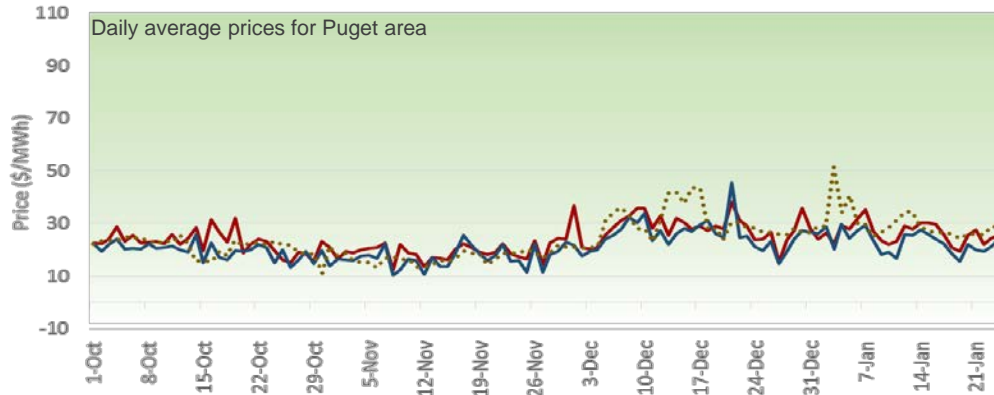
← one direction  
 ↔ bi-directional

- California ISO
- NV Energy
- Arizona Public Service
- PacifiCorp
- Portland General Electric (planned entry 2017)
- Idaho Power Company (planned entry 2018)
- Seattle City Light (planned entry 2019)

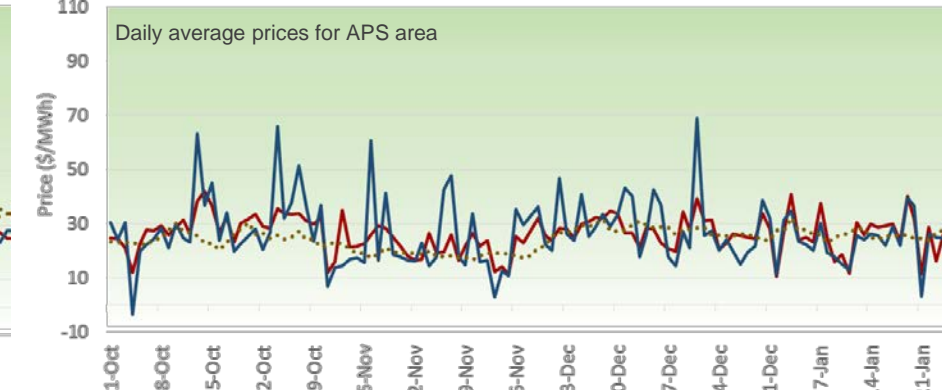
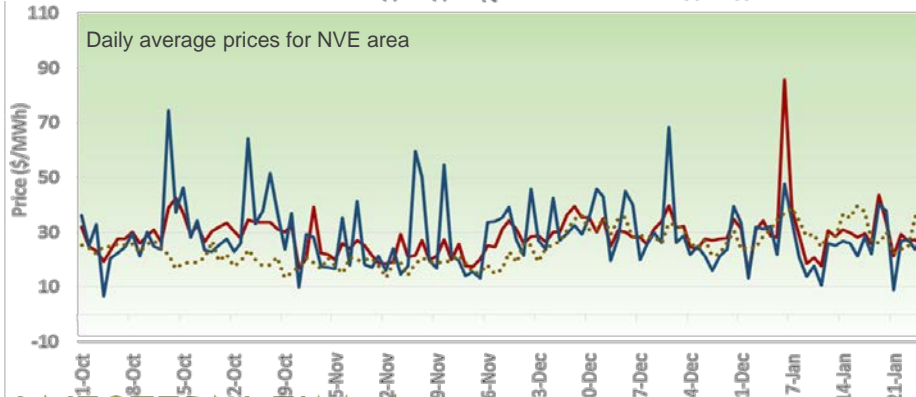
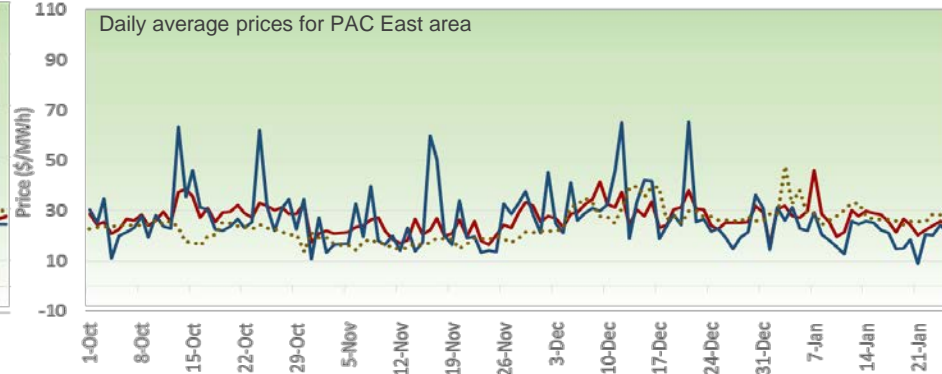
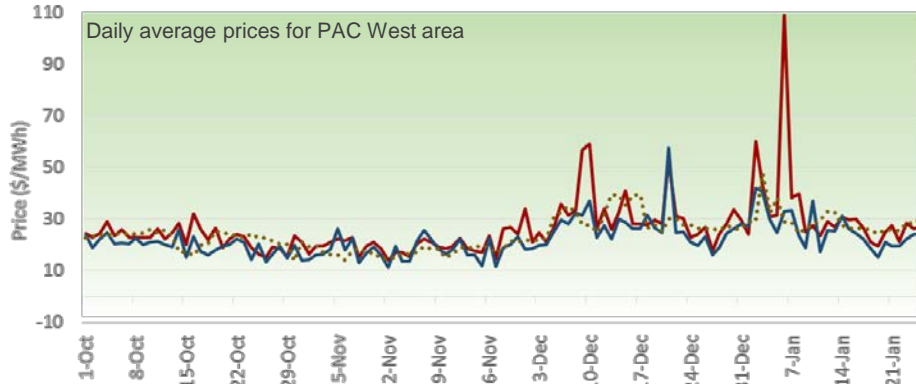
# Dispatch result using range of transfer capability



# Daily average prices in EIM areas

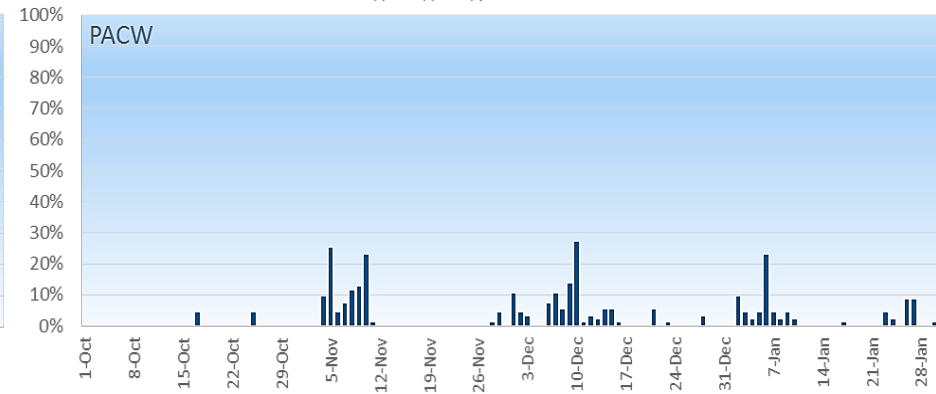
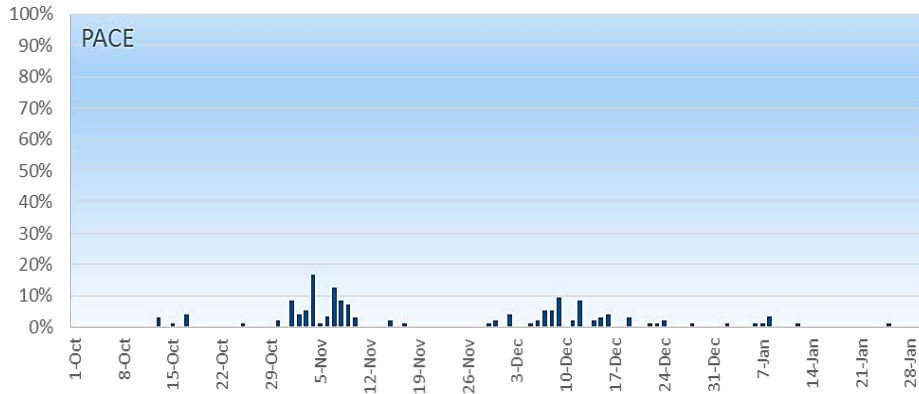
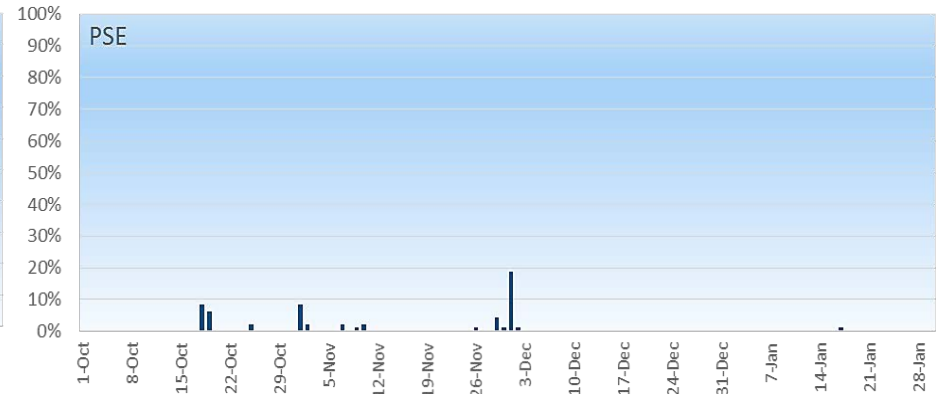
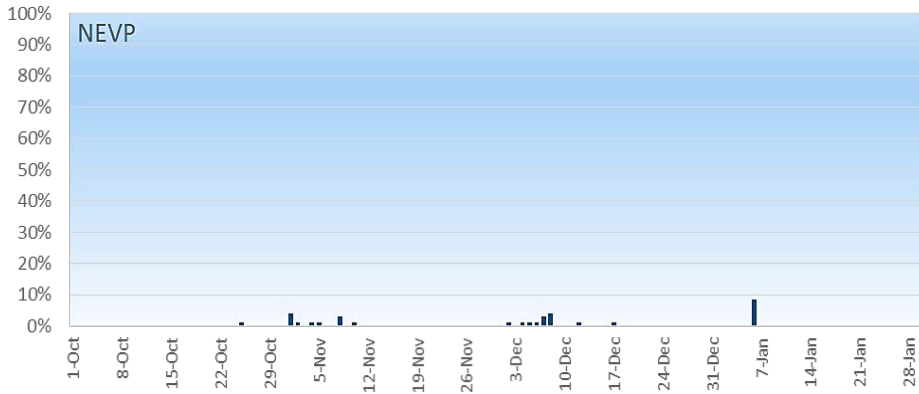
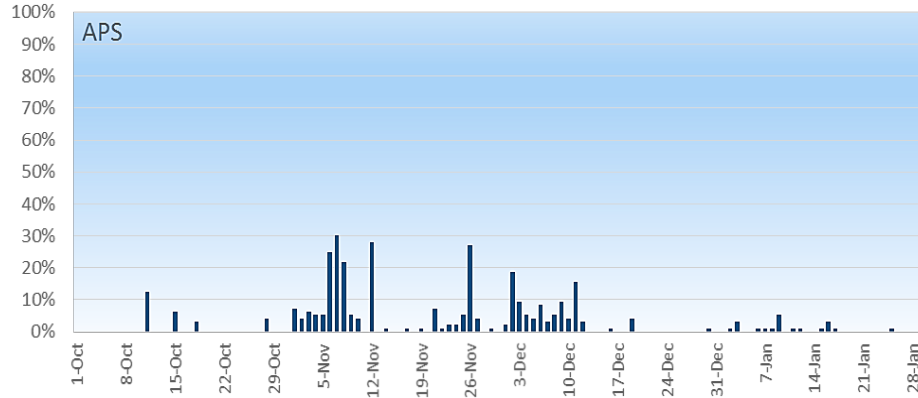


- FMM ELAP
- RTD ELAP
- ⋯ Estimated Proxy

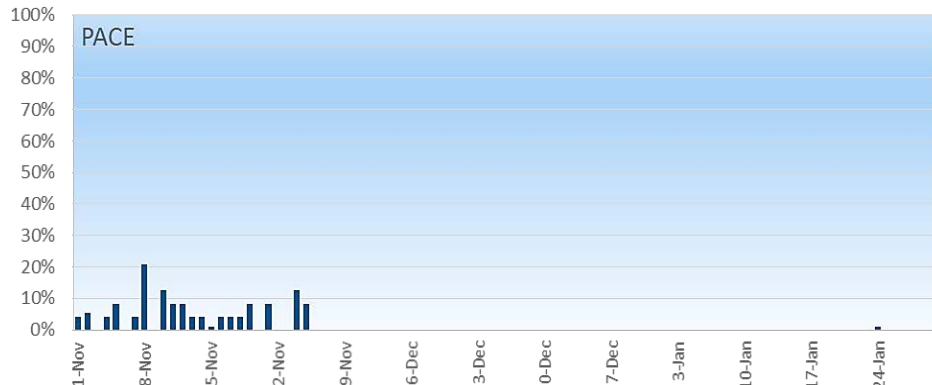
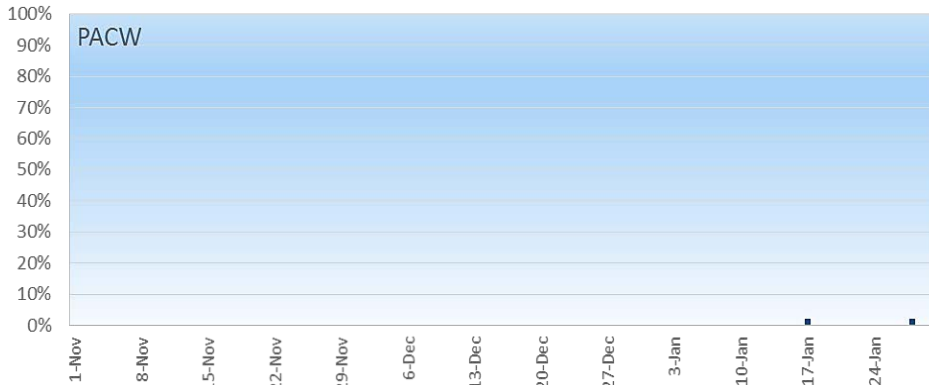
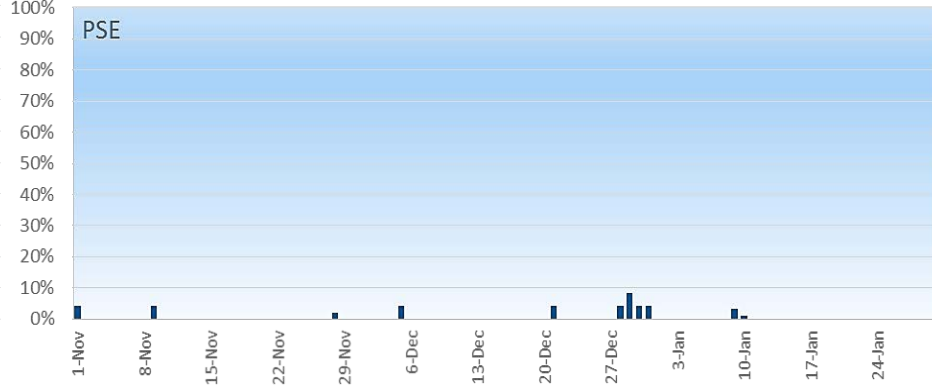
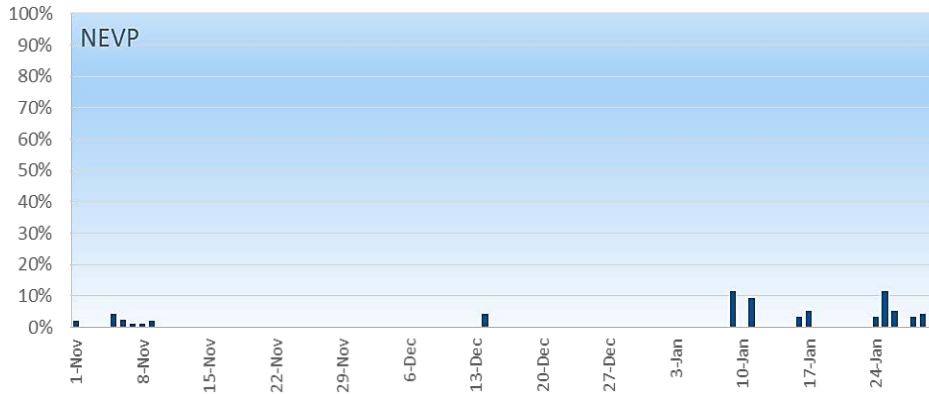
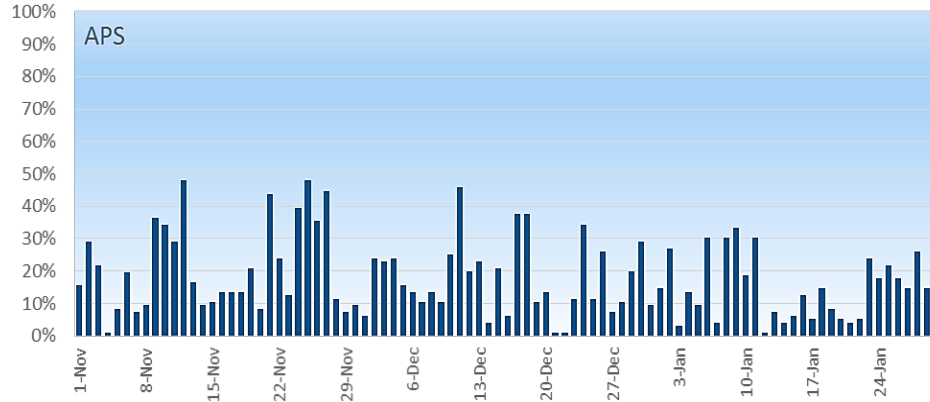




# Frequency of flex test failures - Upward



# Frequency of flex test failures - Downward



# QUESTIONS / DISCUSSION