2032 ADS PCM V1.4 Changes and Results

August 17, 2022

Tyler Butikofer

Jon Jensen

Incorporated Changes V1.4

- Capacity changes using VAR Marin Ratio
- Alberta CO2 price
- Line monitoring 230 kV+ and lines part of WECC paths
- CFE load Scaler of 95%
- Un-restrain path ratings for non-defined directions
- CFE auto calculate heat rates corrected

Capacity Changes (VAR Margin Ratio)

- Hourly Resources were modified in hourly table
- Hydro was not changed as to keep with the data PNNL developed
- Other types were fine

Generator Type	Number of affected Units	Total Capacity Before (MW)	Total Capacity After (MW)	Percent Change
Combined Cycle	38	4,689	4,289	-8.5%
Gas Turbines	145	8,436	7,416	-12.1%

Alberta CO2 Price

- Old Price 170 CA$/Long Ton of CO2
  - In GridView 0.060817 $/LB CO2

- Changed to match BC CO2 price of 50 CA$/Long Ton
  - In GridView 0.017887 $/LB CO2

Line Monitoring

- If branches and transformers >=230 kV on both sides, they are monitored
- All branches included as part of WECC paths are monitored

- Exception
  - Summer congested branches in BC causing unserved load many most hours in summer are only recorded

BC Branches that are Recorded Only

FromBusID	FromBusName	ToBusID	ToBusName	CKT	Summer Rating (MW)	Winter Rating (MW
50185	ALZ 230	50186	ROS 230	1	435	515.9
50187	BRT 230	51510	BR1 230	1	83.7	83.7
50456	SKA 287	50458	MIN 287	1	223.7	534.4
50458	MIN 287	50459	KIT 287E	1	314.2	596.5
50783	SEL 230	52502	BTS 230	1	450	568
50784	NLY 230	50822	NLY 2PS2	2	400	400
50830	BCK 274P	54329	POCATER7	1	87.7	143.4
54232	COLEMAN7	50776	NTL 138	1	99	131.9

Un-restrain path ratings for non-defined paths

- Path ratings when undefined were changed to -99999
- Branch limits are enforced and limiting the reverse flows on the path

Path	Old MIN Rating (MW)	New MIN Rating (MW)
P06 West of Hatwai	-4,277	-99,999
P30 TOT 1A	-650	-99,999
P31 TOT 2A	-690	-99,999
P33 Bonanza West	-785	-99,999
P82 TotBeast	-2,465	-99,999
P86 West of John Day	-4,760	-99,999
P87 West of McNary	-4,925	-99,999
P88 West of Slatt	-4,760	-99,999

Additional Changes to be Included in V2.0 Release

- Demand Response shape updates from Lawrence Berkeley Lab
- Turn off negative DR and EE loads
- Breakers changed to branches and imported into PCM
- Branch derates for derateB and derateC updated by Hitachi
  - Doesn't affect simulation but needed if contingencies are used
- All unused DAT files removed from case folder
- NEVP base case modification incorporated
  - Updated topology for some generators
- Branch Length, Area, and Zone information update

Results

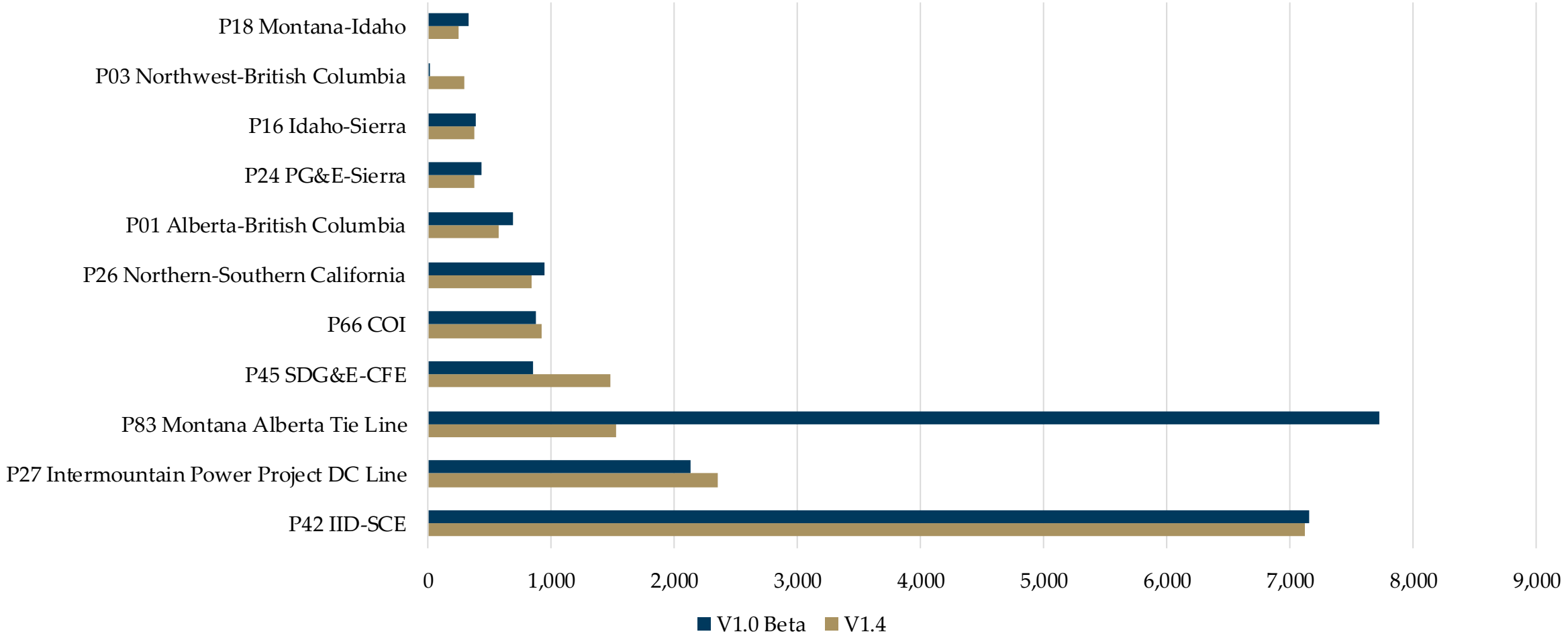
Unserved Load

- With splitting the run, WECC observed no unserved load
- Running straight through, Yi observed a small amount of unserved load in WACM and CFE
  - WACM: 21.5 MWh on 7-15, hr. 19
  - CFE: 198 MWh 7-26 hrs. 17-20
  - Caused by a different forced outage schedule
  - Load and Resource balance is very close in these areas

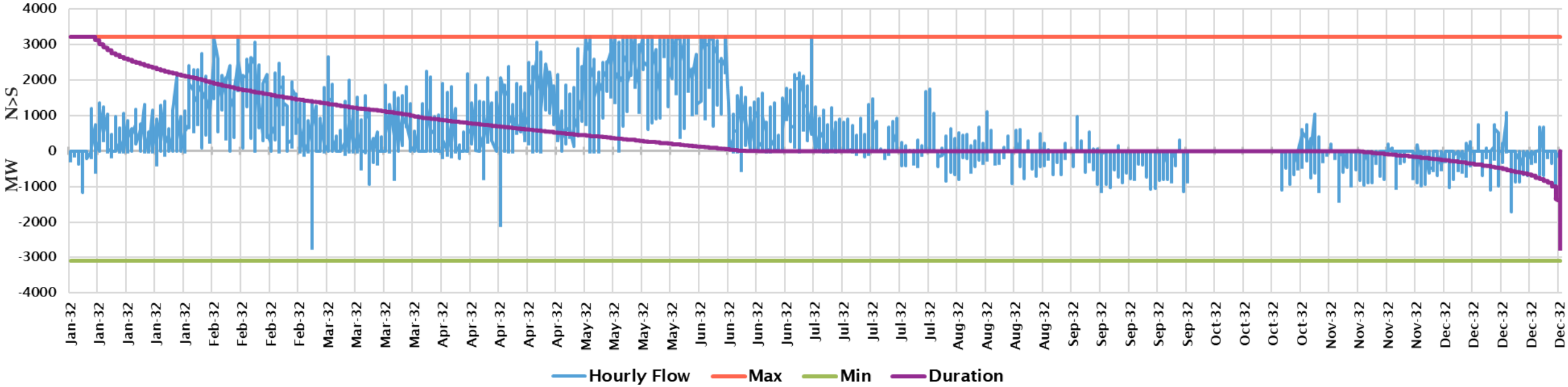
Path Congestion

Paths	Total Hours		Positive Hours		Negative Hours	
	V1.0 Beta	V1.4	V1.0 Beta	V1.4	V1.0 Beta	V1.4
P42 IID-SCE	7,152	7,117	7,152	7,117	0	0
P27 Intermountain Power Project DC Line	2,127	2,358	853	1,054	1,274	1,304
P83 Montana Alberta Tie Line	7,731	1,525	7,731	1,525	0	0
P45 SDG&E-CFE	852	1,481	730	422	122	1,059
P66 COI	870	925	870	925	0	0
P26 Northern-Southern California	940	835	1	0	939	835
P01 Alberta-British Columbia	688	574	0	42	688	532
P24 PG&E-Sierra	432	378	0	0	432	378
P16 Idaho-Sierra	384	376	48	109	336	267
P03 Northwest-British Columbia	1	298	1	296	0	2
P18 Montana-Idaho	333	250	28	0	305	250

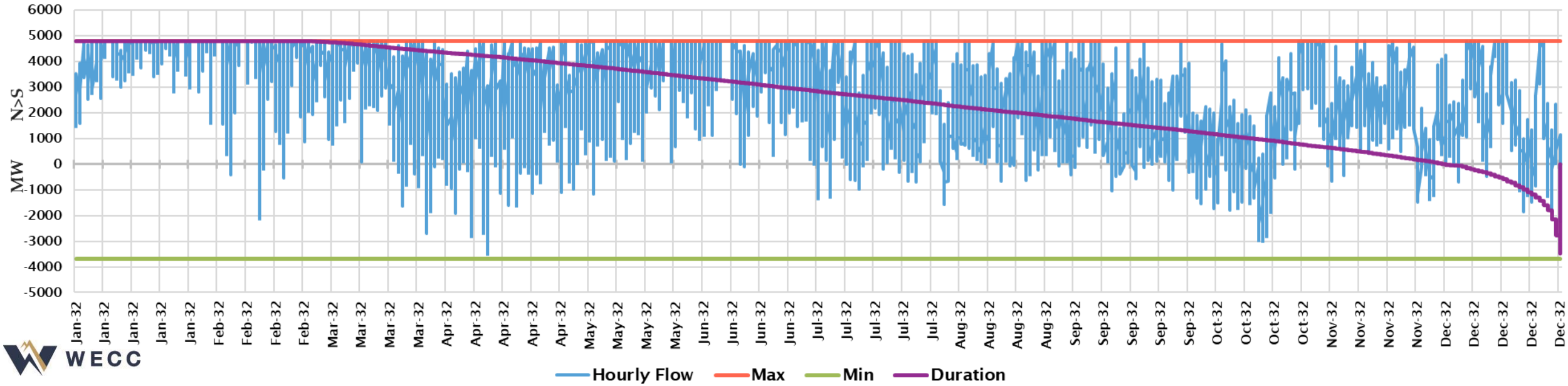
Total Congestion Hours



P65 Pacific DC Intertie (PDCI) - 2032 ADS v1.4 Chronological Hourly

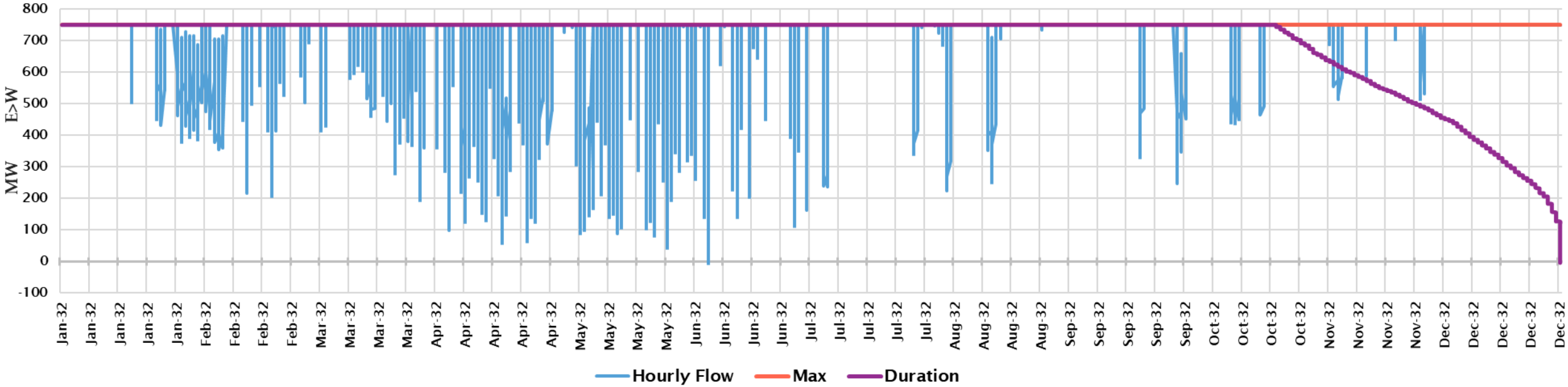


P66 COI - 2032 ADS v1.4 Chronological Hourly

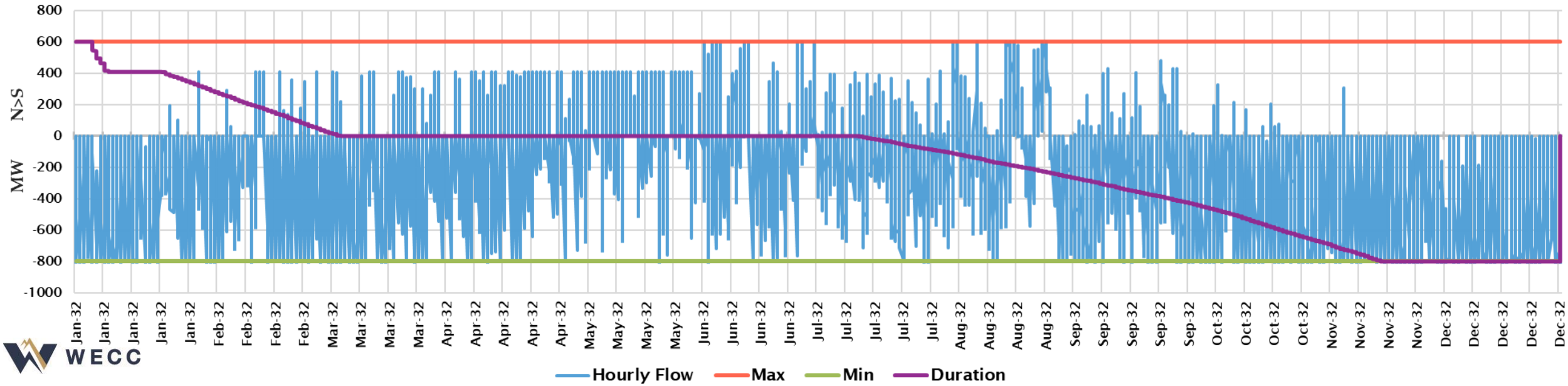


WECC

P42 IID-SCE - 2032 ADS v1.4 Chronological Hourly

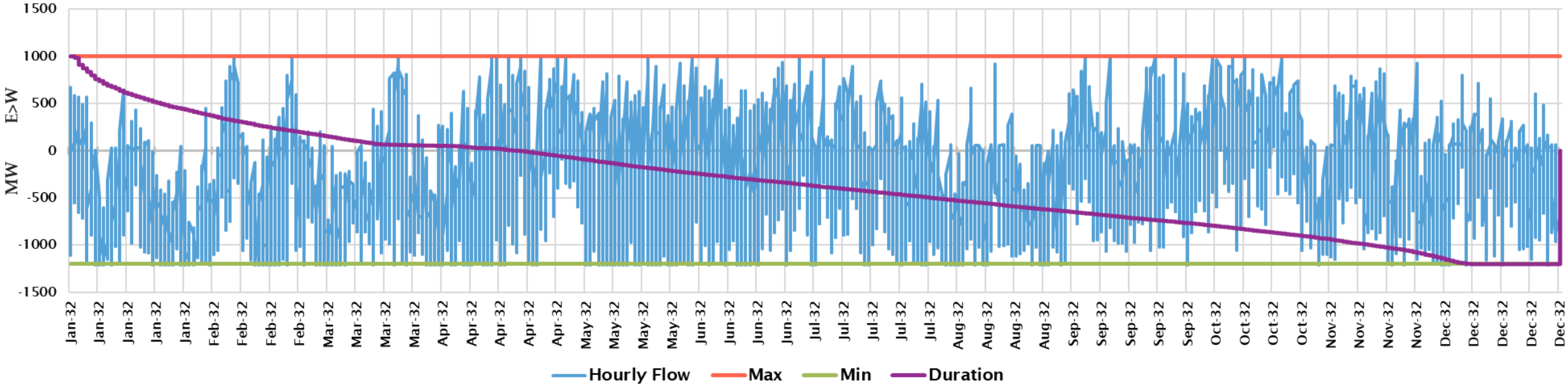


P45 SDG&E-CFE - 2032 ADS v1.4 Chronological Hourly

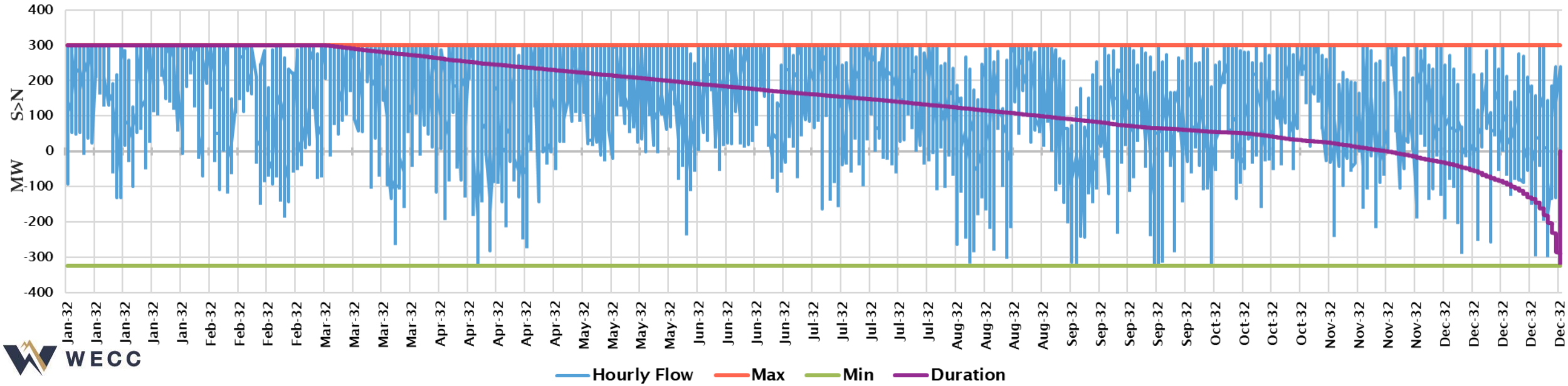


WECC

P01 Alberta-British Columbia - 2032 ADS v1.4 Chronological Hourly



P83 Montana Alberta Tie Line - 2032 ADS v1.4 Chronological Hourly



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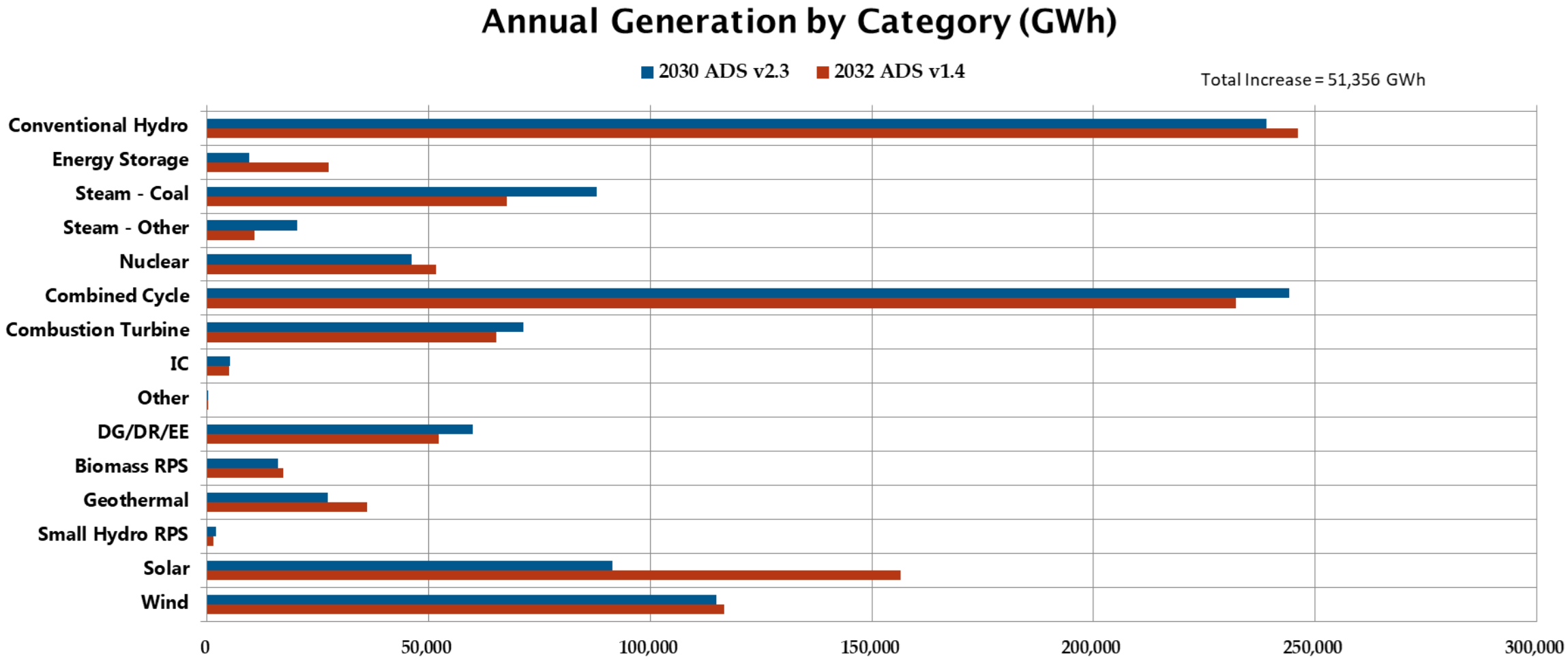
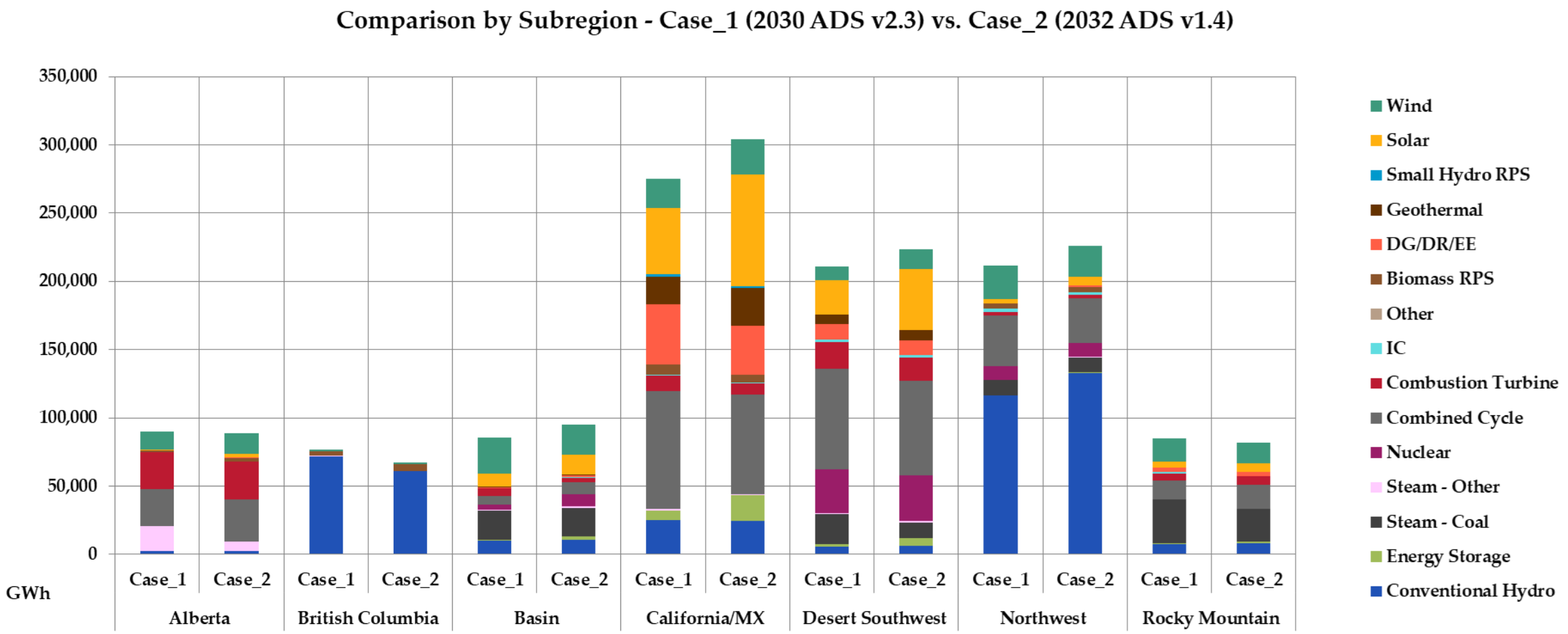
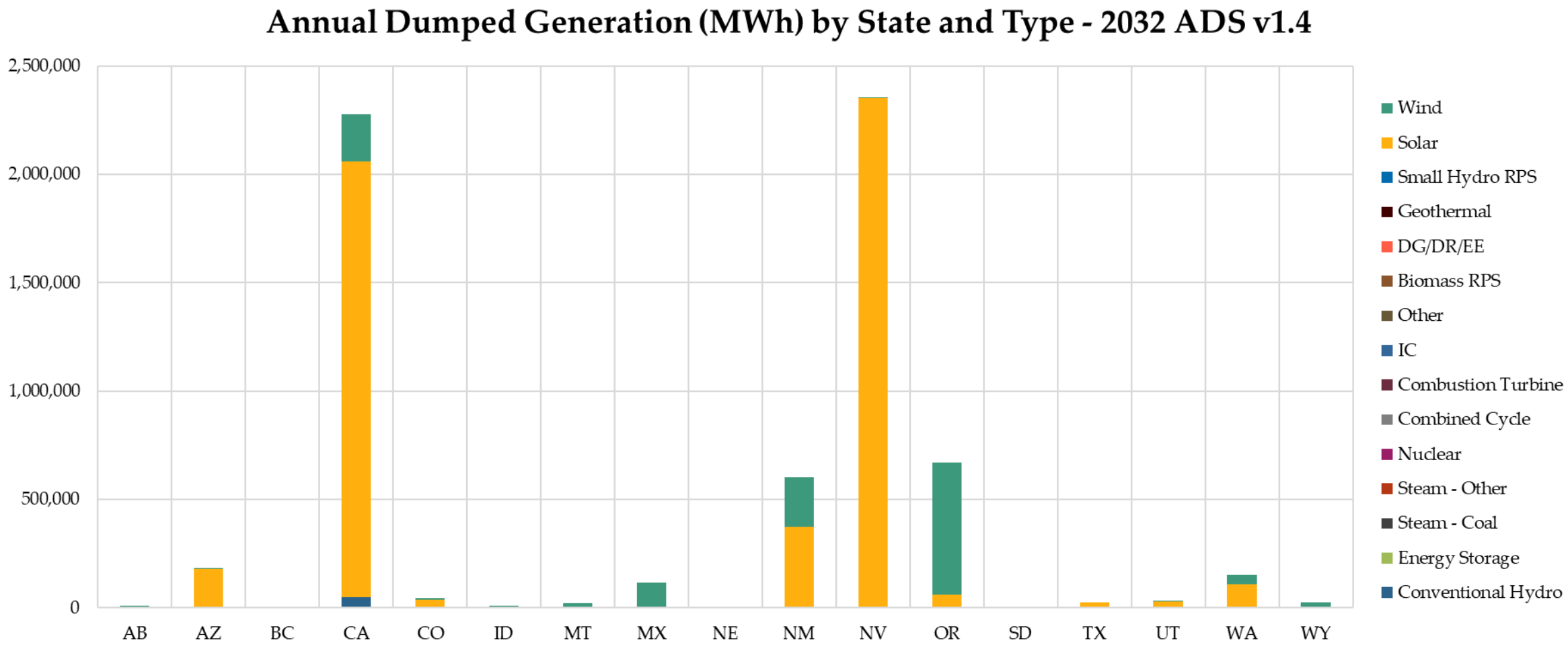
Yearly Generation Dispatch



Dispatch by Subregion



Spilled Energy



Average LMP (Weighted by Load) ($/MWh)

Area	Min	Max	Average
PSCO	-25.8043	1663.922	33.91612
WACM	-23.3097	826.3564	32.50757
CFE	-25.1352	421.1091	27.56302
IPMV	-25.7824	183.663	31.08413
PAWY	-26.0411	147.2884	26.57912
VEA	-68.9834	132.2229	31.71053
PNM	-35.1979	108.9208	23.37874
BANC	-28.6082	107.7974	58.62016
CIPV	-25.6843	107.6625	67.02867
TIDC	-28.8284	106.5276	59.24384
SRP	-24.1851	106.3117	28.31377
EPE	-25.557	104.2829	28.02298

Average LMP (Weighted by Load) ($/MWh)

- PSCO High LMP
  - High LMP doesn't propagate to surrounding areas
  - Not an issue just a result of the model and inputs

Date Hour	7/14/2032 18	7/14/2032 19	7/14/2032 20
PAID	$ 49.38	$ 50.19	$ 53.41
PAUT	$ 74.51	$ 70.72	$ 65.74
PAWY	$ 53.60	$ 36.66	$ 32.17
PNM	$ 79.28	$ 107.86	$ 108.92
PSCO	$1,663.92	$1,407.69	$1,151.17
WACM	$ 826.36	$ 694.63	$ 568.05

2032 ADS PCM V2.0 Approval

Kevin Harris's Opinion

- The purpose of the ADS PCM is to identify potential issues in the WECC system. The current status of the 2032 ADS PCM has met this need with some potential modeling issues found.
- The current issues I see in the 2032 ADS are modeling issues driven by data provided by WECC members.
- Finally, the purpose of the ADS dataset is to provide a public data starting point to represents WECC. This dataset will not fit all modeling needs and every entity makes adjustment. The current 2032 ADS dataset is a good starting point.
- Given the status of the ADS PCM I'm in favor of:
  - Release it as version 1.0
  - In the next 4-6 weeks WECC should develop scenarios to
    - Represent the Washington and Oregon CO2 market
    - Address data driven modeling issues like Alberta CO2, status of Colstrip, …

Approval Item

- *It is moved to approve the 2032 ADS PCM V2.0, Approved Version as described in the previous slides.*
  - *As changes are needed, they will be incorporated into change files and subsequent versions may be released if needed.*
  - *By Friday, August 19 before posting*
    - *Missing resources for PSCO and WACM which WECC receives will be incorporated.*
    - *CFE load will be reduced by 10% total*

WECC

Electric Reliability and Security for the West

Contact:

Tyler Butikofer—tbutikofer@wecc.org

Jon Jensen—jjensen@wecc.org