



# Phase Shifter Settings from Power Flow

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# Power Flow Data

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- Spring Cases

- 2021 Heavy
- 2029 Heavy
- 2030 Heavy

- Summer Cases

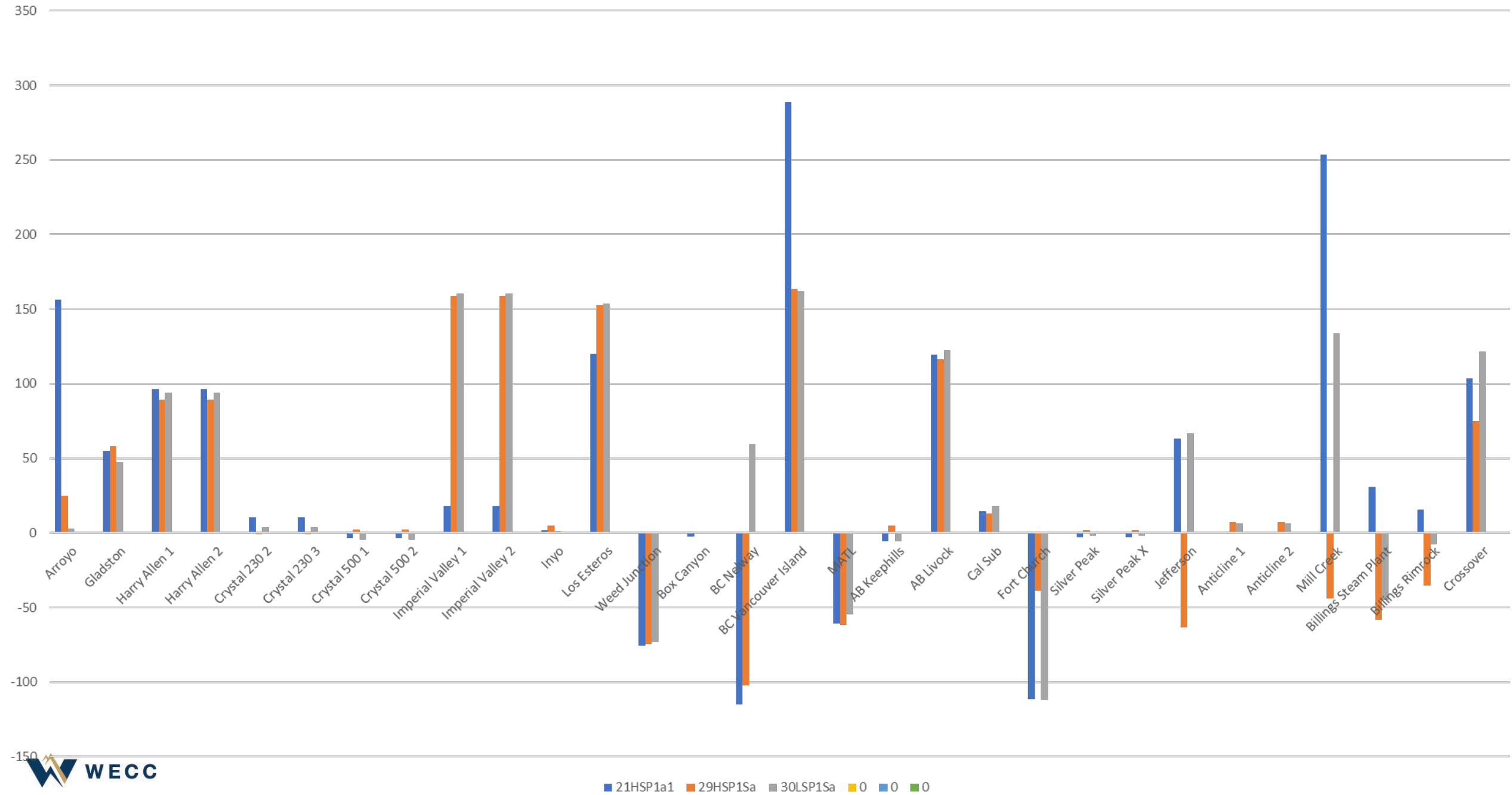
- 2021 Light
- 2021 Heavy
- 2029 Heavy
- 2030 Heavy
- 2031 Heavy

- Winter Cases

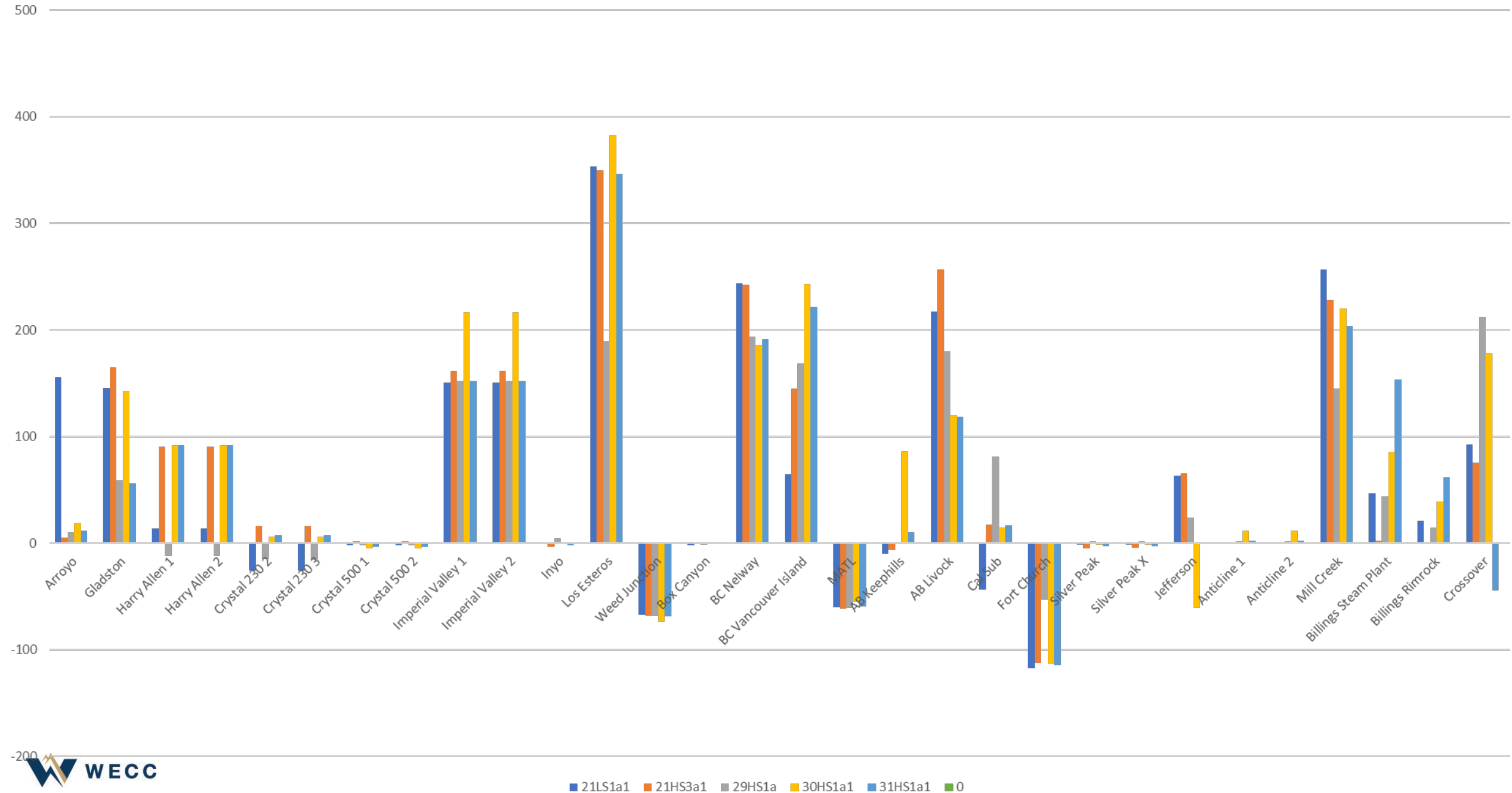
- 2021 Light
- 2021 Heavy
- 2029 Heavy
- 2030 Heavy
- 2031 Heavy

Name	Spring				Summer				Winter			
	Max (Max)	Min (Min)	Max (Act)	Min (Act)	Max (Max)	Min (Min)	Max (Act)	Min (Act)	Max (Max)	Min (Min)	Max (Act)	Min (Act)
Arroyo	425	-300	156.33	2.94	425	-300	155.41	5.53	425	-300	167.96	-4.13
Gladston	190	40	58.02	47.07	190	40	165.21	56	190	40	131.23	50.49
Harry Allen 1	92	80	96.55	89.13	300	-300	91.74	-11.89	300	-300	85.62	12.47
Harry Allen 2	92	80	96.55	89.13	300	-300	91.74	-11.89	300	-300	85.62	12.47
Crystal 230 2	50	-50	10.24	-0.91	670	-670	15.86	-25.62	670	-670	40.89	-6.62
Crystal 230 3	50	-50	10.18	-0.98	670	-670	15.8	-25.71	670	-670	40.86	-6.69
Crystal 500 1	5	-5	2.06	-4.24	5	-5	1.49	-4.55	10	-10	3.57	-2.23
Crystal 500 2	5	-5	2.06	-4.24	5	-5	1.49	-4.55	10	-10	3.57	-2.23
Imperial Valley 1	400	-200	160.3	18.14	400	-200	216.64	150.39	400	-200	152.62	-93.16
Imperial Valley 2	400	-200	160.3	18.14	400	-200	216.64	150.39	400	-200	152.62	-93.16
Inyo	50	-50	4.53	1	50	-50	4.48	-3.58	50	-50	28.49	-9.54
Los Esteros	420	0	153.85	120.11	420	0	382.46	188.99	420	0	351.59	171.87
Weed Junction	-66	-76	-72.83	-75.61	-66	-76	-66.85	-73.68	-66	-76	-67.51	-73.26
Box Canyon	2.75	-5	0.45	-2.33	2.75	-5	0.13	-1.93	2.75	-5	0.44	-4.88
BC Nelway	52.8	-142.8	59.67	-115.17	235.8	180	243.95	185.58	2.8	-152.8	-2.15	-162.51
BC Vancouver Island	282.9	159.5	288.71	161.81	246.78	72	243.19	64.81	437.64	332.27	432.2	339.63
MATL	-58	-62	-54.84	-62	-50	-75	-54.78	-61.24	-55	-65	-55.51	-62.53
AB Keephills	600	-600	4.67	-5.61	600	-600	86.46	-10.06	600	-600	127.3	-5.34
AB Livock	122	110	122.22	116.49	260	115	256.74	118.21	180	115	175.99	118.39
Cal Sub	20	10	18.06	12.74	90	-50	81.24	-43.75	55	10	50.33	12.91
Fort Church	-30	-115	-38.67	-112.14	-50	-170	-52.76	-116.97	100	-135	6.76	-130.96
Silver Peak	17	-17	1.86	-2.78	17	-17	1.28	-4.49	17	-17	3.69	-2.86
Silver Peak X	5	-5	1.86	-2.77	5	-7	1.28	-4.48	5	-5	3.69	-2.86
Jefferson	70	-70	66.67	-63.45	70	-70	65.01	-60.58	70	-70	68.77	-58.14
Anticline 1	17.4	-11.7	7.41	6.25	17.4	-11.7	11.43	1.45	17.4	-11.7	9.19	0.47
Anticline 2	17.4	-11.7	7.41	6.25	17.4	-11.7	11.43	1.45	17.4	-11.7	9.19	0.47
Mill Creek	300	-300	253.27	-44.09	300	-300	256.9	145.23	300	-300	240.12	55.66
Billings Steam Plant	-73.2	-95.3	31.07	-58.35	-71.8	-91.9	153.36	1.99	-71.5	-83.5	22.69	-74.24
Billings Rimrock	-34.1	-50.1	15.37	-35.12	-33.3	-48.4	61.66	1.21	-33.2	-44.2	15.93	-67.42
Crossover	-32.7	-55.8	121.54	74.86	-36.1	-56.2	212.3	-43.94	-44.5	-56.5	99.45	-50.73

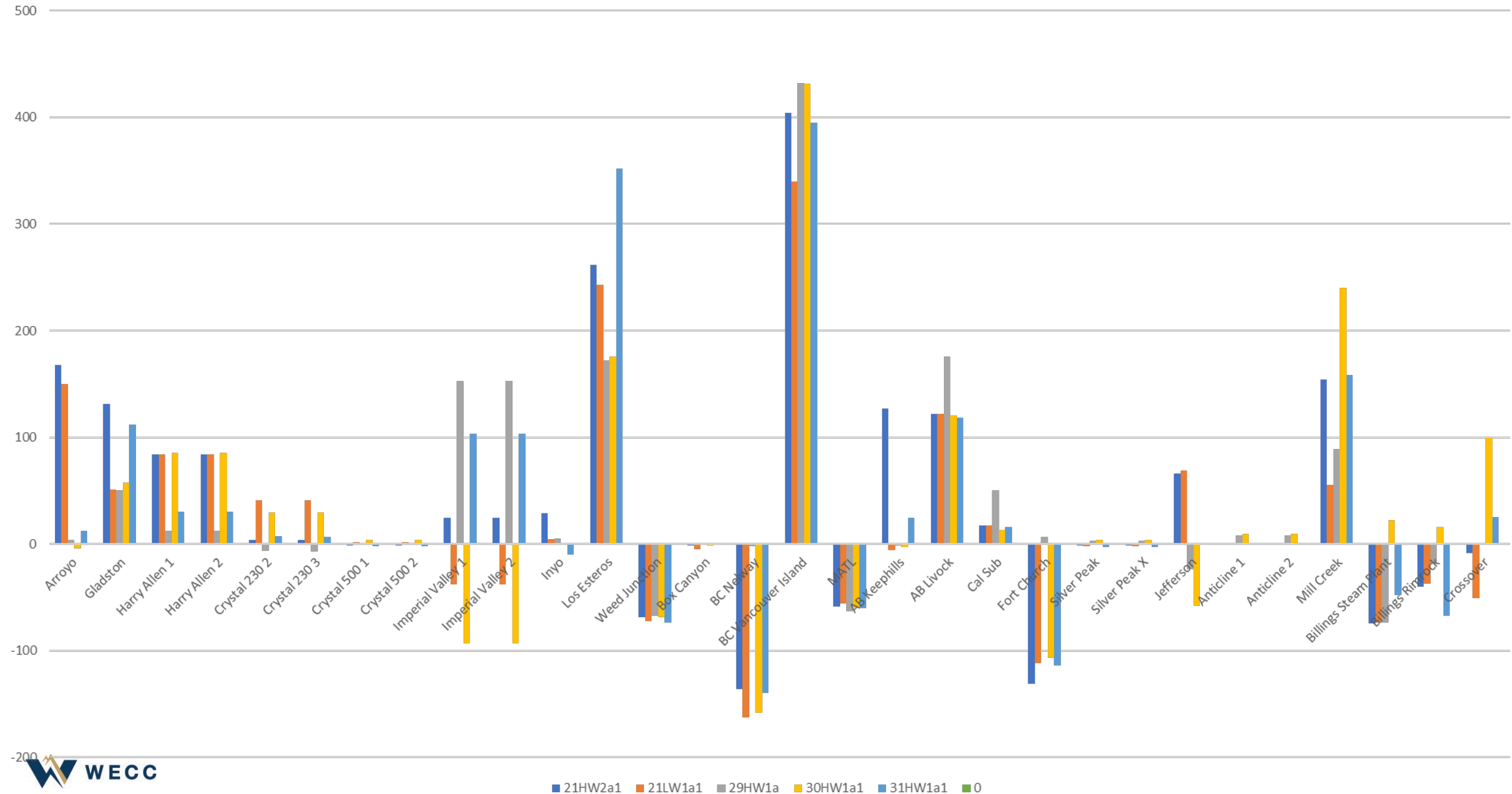
# Spring Actual Flow (MW)



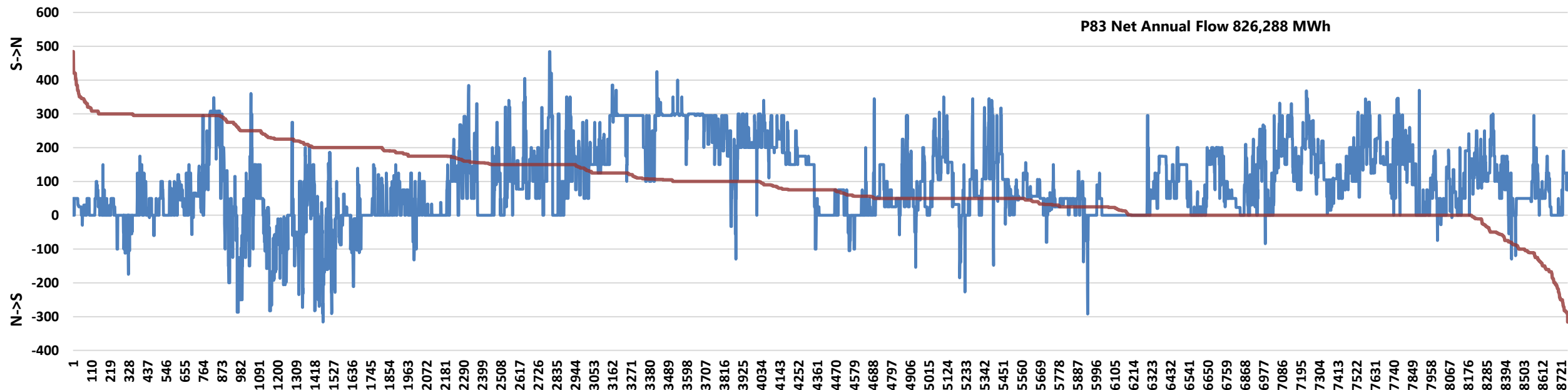
# Summer Actual Flow (MW)



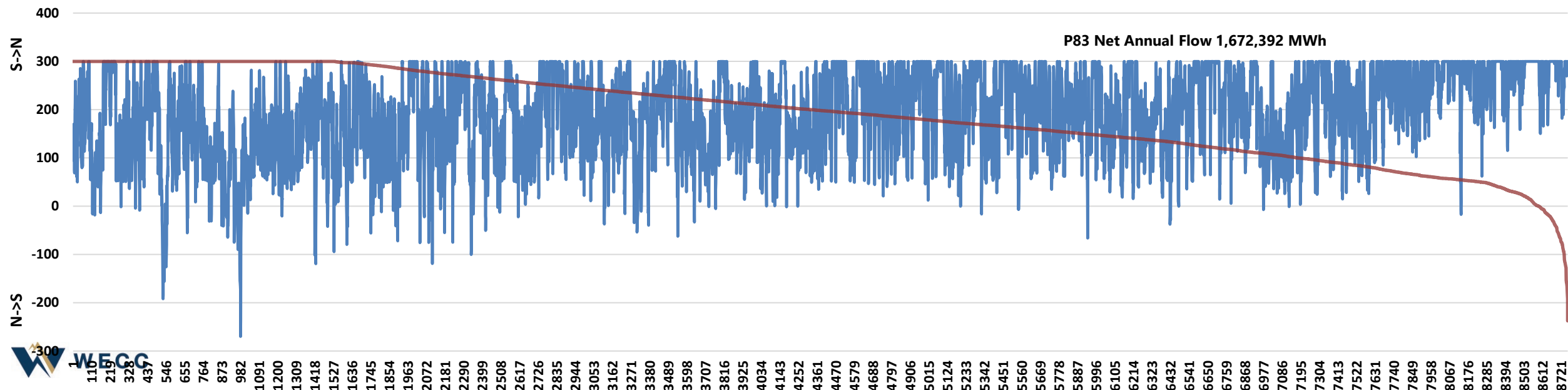
# Winter Actual Flow (MW)



### Path 83 - 2019 Actual Hourly Flows (MWh)



### Path 83 2030 ADS V1.4.8 Hourly Flows (MWh)



# Suggestion

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- Stick with ranges from the power flow cases, knowing that
  - If we stick with the ranges from the power flows, we may not represent reality
    - Example is MATL, where the flows go from 325 MW,  $N > S$ , and up to nearly 500 MW,  $S > N$
- Let GridView decide how to regulate the phase shifters and don't constrain the flow limits





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