H1 and H2 Component Analysis

Current Conditions
and
Treaty Continues with Called Upon Operations
Hydsim Studies

SRT Meeting – February 28, 2013

H1 and H2 Study Objectives

H1 Modeling Objective:

To assess the potential to improve optimization of the joint U.S. and Canadian Columbia Basin hydrosystem for power revenue.

H2 Modeling Objective:

To assess the potential to improve optimization of the joint U.S. and Canadian Columbia Basin hydrosystem for power revenue as constrained by U.S. biological opinion and Canadian fish operating objectives.

H1 and H2 Study Assumptions

Current Condition Modeling Design (H1-CC and H2-CC):

- Current FCOP flood risk management operation for U.S. and Canadian reservoirs
- No FCOP On-Call flood risk management operations

Post 2024 Modeling Design (H1-CU and H2-CU):

- Flood risk management operation from 2A-TC
- Includes Called Upon flood risk management operation for Canadian reservoirs
- Includes Effective Use flood risk management operation for U.S. reservoirs

H1 and H2 CC Results - Study using 2010 Gas Prices

	Federal Generation (aMW)	Mid-C Generation (aMW)	Canadian Generation (aMW)	Joint Generation (aMW)
1RC-CC Treaty	9497	2735	3361	15593
H1 Optimization	9553	2761	3329	15643
Difference	56	26	-32	50
1RC-CC with ESA	8445	2524	3310	14279
H2 Optimization with ESA	8505	2546	3277	14328
Difference	60	22	-33	49
H2 Optimization minus H1	-1048	-215	-52	-1315

	Federal Value ($M)	Mid-C Value ($M)	Canadian Value ($M)	Joint Value ($M)
1RC-CC Treaty	3069	905	1144	5118
H1 Optimization	3117	918	1142	5177
Difference	47	13	-2	59
1RC-CC with ESA	2764	837	1125	4726
H2 Optimization with ESA	2817	854	1120	4791
Difference	54	17	-5	66
H2 Optimization minus H1	-299	-65	-22	-385

H1and H2 CU Results - Study using Aurora Prices

	Federal Generation (aMW)	Mid-C Generation (aMW)	Canadian Generation (aMW)	Joint Generation (aMW)
2A-TC Treaty	9430	2746	3337	15513
H1 Optimization	9453	2759	3331	15543
Difference (aMW)	23	13	-6	30
Incremental Value ($M)	7	4	0	11
2A-TC with ESA and Canadian Flex	8448	2523	3328	14299
H2 Optimization with ESA and Canadian Flex	8474	2526	3313	14313
aMW Difference	26	3	-15	14
Incremental Value ($M)	9	2	-3	8
H2 minus H1 (aMW)	-979	-233	-18	-1230

- H1 Optimization added approximately 30 aMW's and 11 $M to the Joint Operation
- H2 Optimization with ESA and Canadian Flex added 14 aMW's and 8 $M to the Joint Operation
- MW's and value shifted from Canada to U.S. system

H1 and H2 Summary

- Canadian and Grand Coulee storage was used to shift generation from the late winter and spring into the summer and fall to capture higher price periods and increase joint generation and value
- The gain in generation in the joint system is small, less than 0.3% for the CC studies and less than 0.2% for the CU studies
- The gain in joint value is small, less than 1.5% for the CC studies and less than 0.2% for the CU studies
- The CU studies used a flatter price curve than the CC studies which impacted the ability to achieve gains in value by shifting reservoir storage
- Refill was allowed to be impacted to increase joint generation and value
- The shifting of water is translated down to The Dalles and has a negative impact in meeting ESA Chum and Vernita Bar fishery operations