

HydroSimm

HydroSimm™ simulates hydro-electricity generation by incorporating weather simulations (WeatherSimm™) and other important determining factors into a state-space time series simulation model to simulate generation for large and small hydro systems

Analytical Questions Addressed

- What is the distribution of the hourly, daily, and monthly hydro-electric generation over the next 1-20 years?
- How do generation profiles change with hydro levels?
- What is the uncertainty in hydro-electric generation caused by weather variability?
- What is the impact of a 1 in 20 hydro year on super-peak net position and super-peak prices?
- What generation locations are more weather sensitive?
- What are the impacts of production, pondage use, and cascading systems operations under different hydro levels?

Applications

HydroSimm™ has a broad range of analytical applications from pricing of competitive retail offerings to rate cases, resource planning, and near-term position uncertainty. HydroSimm™ helps drive decisions beyond expected values and scenario analysis by capturing the elements of uncertainty.

HydroSimm™ can incorporate causal information into the simulations, such as:

- Weather Simulations
- Long term weather forecasts and simulations
- Maintenance schedules
- Dispatch schedules
- Regulatory and environmental constraints

Uncertainty abounds in electric markets; HydroSimm™ uses a system of state space and time series models to capture uncertainty in hydro-generation. By using simulated weather from WeatherSimm™ across multiple locations, HydroSimm™ captures the climatic variability that is fundamental to hydro-generation. The simulation of weather enables you to capture the effect of climatic variability on future generation. For complete uncertainty analysis, tie HydroSimm™ to WeatherSimm™ and PriceSimm™.

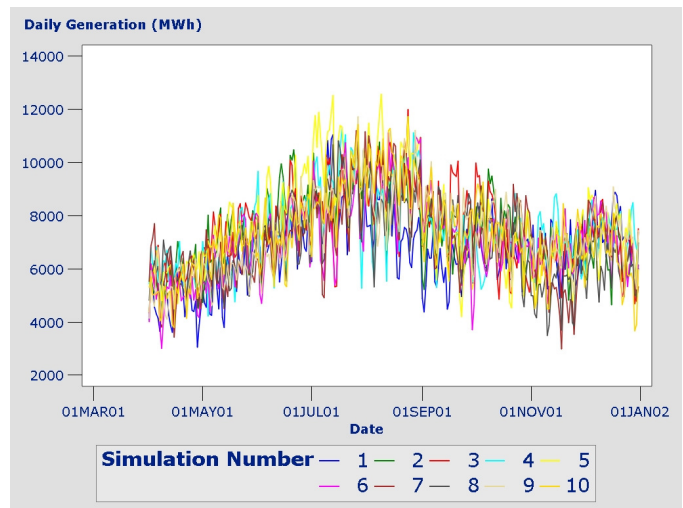
Output

- Hourly, daily, and monthly hydro-electric generation simulation forecasts
- Monthly peak generation simulation forecasts
- Weather-based uncertainty analysis
- Weather event probabilities tied to hydro-generation simulation forecasts

Figure 1 Example hourly hydro generation simulation comparison for each month – actual compared with simulated

Month	Type	Number of simulated days	Hydro Generation Mean	Hydro Generation Standard Deviation	Hydro Generation 5th Percentile	Hydro Generation 95th Percentile
1	Actual	NA	262.5	93.9	115.0	404.9
1	Simulated	30000	268.8	90.4	122.1	419.3
2	Actual	NA	232.1	81.0	91.2	342.1
2	Simulated	30000	237.0	77.3	110.8	365.4
3	Actual	NA	338.1	99.5	168.0	474.8
3	Simulated	30000	343.5	97.3	178.4	506.3
4	Actual	NA	352.1	125.5	159.8	518.8
4	Simulated	30000	357.9	110.9	169.2	529.0
5	Actual	NA	342.9	125.3	179.3	544.5
5	Simulated	30000	349.0	111.4	168.3	534.6
6	Actual	NA	325.9	115.5	165.7	514.1
6	Simulated	30000	331.6	102.2	165.6	499.4
7	Actual	NA	283.0	76.4	157.3	419.0
7	Simulated	30000	287.6	81.5	154.5	423.1
8	Actual	NA	292.7	69.6	196.1	395.7
8	Simulated	30000	296.4	79.5	183.4	401.7
9	Actual	NA	288.1	64.2	197.0	382.7
9	Simulated	30000	292.4	81.2	181.3	396.7
10	Actual	NA	272.5	62.5	169.8	371.2
10	Simulated	30000	276.2	76.0	152.9	401.6
11	Actual	NA	235.9	71.1	131.1	349.1
11	Simulated	30000	241.0	63.7	137.7	346.6
12	Actual	NA	254.3	81.2	135.8	376.1
12	Simulated	30000	262.8	76.5	137.8	390.5

Figure 2 Example daily hydro-generation simulations (10 realizations)



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