

SDDP 17.2

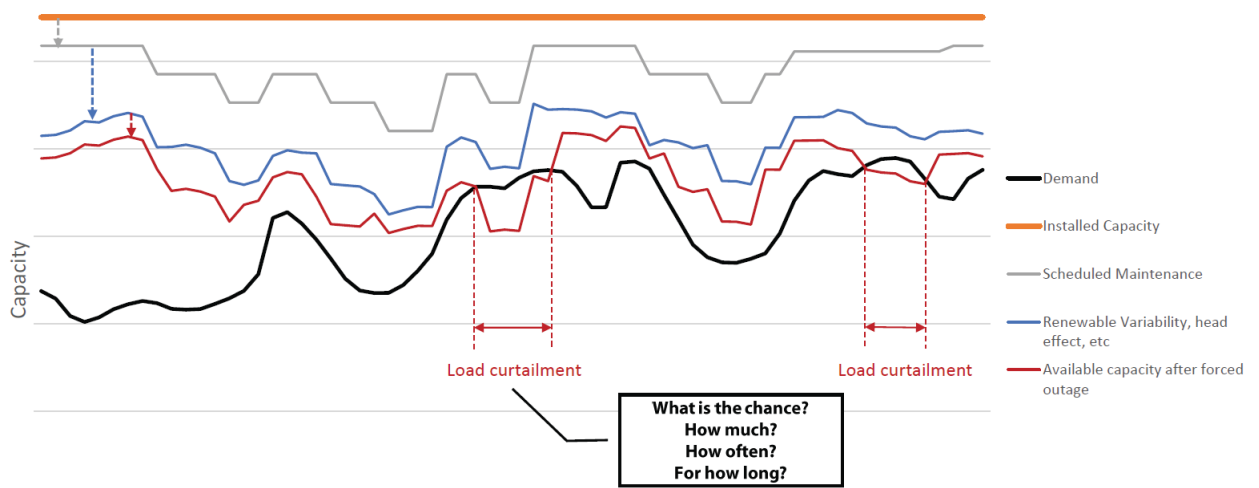
New features

5 SDDP-CORAL

Planning and operating energy systems consistently and safely is a challenging task that demands sophisticated mathematical tools, especially with the advent of new fast dynamic response technologies such as batteries. Extending traditional methods such as the non- and pseudo-sequential Monte Carlo simulations to represent such new components could lead to an intense computational burden depending on system complexity and dimension.

SDDP-CORAL is our Composite Reliability Analysis and Resource Adequacy tool, and the new version brings the novel "pseudo-interval" method developed by PSR. It efficiently represents the operators' ability to re-dispatch batteries along the duration of the component failures, such as generating units, transmission lines, and transformers.

SDDP-CORAL is part of SDDP and is available for all licensed users at no extra cost.



For more details on CORAL, please refer to the CORAL user and methodology manuals.



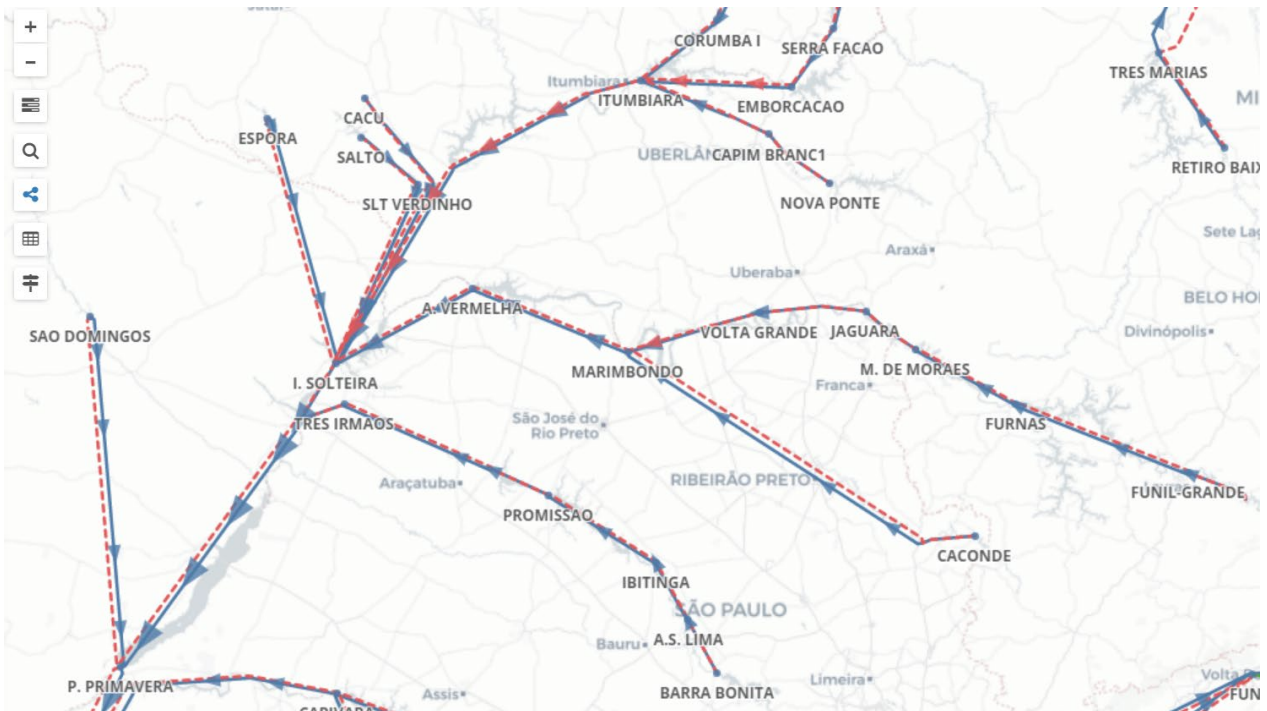
Hydro bypass

The new SDDP version adds more flexibility to the hydro topology representation by introducing a new element: the hydro bypass. A bypass can connect hydro plants and reservoirs, allowing new water flows, subject to minimum and maximum requirements. A hydro bypass can be defined in the “Basic data > Hydro plants > Hydro bypass configuration” screen. It is also possible to define chronological flow constraints in the “Complementary data > Hydro plants > Hydro bypass flow constraints” screen.



New hydro topology visualizer

HydroView is an immersive and elegant way of visualizing hydroelectric topology just inside of SDDP platform. With a simple click on the new HydroView button, which is in the SDDP main menu, the user will be able to see all the hydro cascades, as well as a better visualization of the model outputs.



Other improvements



- New hybrid stage resolution strategy in policy phase: SDDP could always take advantage of approximating the time resolution within each stage by reducing the problem size to a single average block in the policy phase. This strategy is very convenient for speeding-up execution times and give good results especially for problems with large regulation capacity and without significant load peaks. However, this strategy might not be applicable in all cases. Now, SDDP can apply a hybrid strategy by representing the policy with a single-average block in the initial iterations and switch to the full block configuration later. This strategy aims to generate a quick approximation of the future cost function with valid cuts and then refine it with better cuts as it gets closer to the optimal solution. These options are available on the “Execution options > Economic dispatch > Solution strategy” screen.
- The maximum number of blocks has been extended to 24.
- Transmission network:
 - New options for selecting circuits for flow limit monitoring available on the “Execution options > Economic dispatch > Transmission and gas pipeline” screen:
 - Selected circuits and circuits between areas
 - Circuits between areas
 - New option to represent overloading in monitored circuits, available on the “Execution options > Economic dispatch > Transmission and gas pipeline” screen.



Activate/deactivate demand

New option available on the “Basic data > Load > Demand configuration” screen, allowing to easily select which demands should be considered in the case.



New features for the hourly representation:

- Partial and total cooling times: these new parameters are now available on the “Complementary data > Thermal plants > Operating constraints” screen.
- Warm and cold startup costs: these two additional startup costs are now available on the “Complementary data > Thermal plants > Operating constraints” screen. If the user defines them, the startup cost defined on the “Basic data > Thermal plants > Thermal plant configuration” screen will be treated as the hot startup cost. Furthermore, for these two new startup costs to be used by the model, the partial and total cooling times must also be defined.
- Maximum uptime: the user can now define the maximum number of hours that a thermal plant can continuously operate (if this limit is reached, the plant will be automatically turned off by the SDDP model). This new option is available on the “Complementary data > Thermal plants > Operating constraints” screen.

New outputs

The main new outputs of the SDDP model are presented below:



Hydro bypass:

- "Hydro bypass flow": hydro bypass flow in [m³/s] (operating decision)
- "Min. hydro bypass viol.": minimum hydro bypass flow violation in [m³/s]
- "Max. hydro bypass viol.": maximum hydro bypass flow violation in [m³/s]
- "Min. hydro bypass viol. cost": minimum hydro bypass flow violation cost in [k\$]
- "Max. hydro bypass viol. cost": maximum hydro bypass flow violation cost in [k\$]
- "Hydro bypass marginal cost": hydro bypass flow marginal cost in [k\$/m³/s]

Future changes

- In the next major release, the 32-bit SDDP version will be deprecated. In case you are still using this version, please contact PSR.
- The Graph 3.1 will also be deprecated and the Graph 4 will become the new default graph tool.

PSR Cloud



PSR Cloud is our web-based computational environment that enables running SDDP without the need of investing in high-performance computers. It is a pay-per-run and per processor scheme in which the users may select the desired number of processors for each execution. The machines available for execution are constantly upgraded. More details about PSR Cloud at <http://psr.cloud/>



PSR offers to all SDDP users the free use of up to 64 processor-hours in PSR Cloud; please contact PSR at sddp@psr-inc.com for more details.