

# Transmission and Distribution network long term maintenance

---

Considering the Transmission and Distribution Network long term Maintenance (TDNM), it is necessary to ensure that tripping out a branch for maintenance does not impact the network reliability and security. The TMS constraints are therefore globally the same as those for power plants, after all the system is unique, (e.g., time windows for maintenance tasks, resource requirements, demand satisfaction, etc). Of course the equipment in this case are the network's ones. It seems that TDNM has received less attention than power plant one at least in the scientific literature. The network can be modeled as either a transportation model (i.e. without imposing Kirchhoff's law) or a more complex but more realistic [DC power model](#) or even with a full [A C representation](#) for some critical areas. The TSO has to coordinate the submitted schedules; the cheapest transmission lines and generators might be overloaded. If TDNM is not solved jointly with the power plants one, network constraints can be introduced once power plant one is solved. Alternatively one can obviously see another example of big single problem that the TSO will to solve in a single process with iterative approaches like those described before.

For both classes of problems, we refer to [5] or an extensive review of the subject in the scientific literature.

## References:

- [1] F. Brandt, "Solving a Large-Scale Energy Management Problem with Varied Constraints", Diploma Thesis At the Department of Informatics Institute of Theoretical Informatics.
- [2] Adam Wojciechowski, "On the optimization of opportunistic maintenance activities", Department of Mathematical Sciences, Chalmers University of Technology Department of Mathematical Sciences, University of Gothenburg SE-412 96 Göteborg, Sweden 2010.
- [3] Salvador Perez Canto, "Using 0/1 mixed integer linear programming to solve a reliability-centered problem of power plant preventive maintenance scheduling", Optimization and Engineering September 2011, Volume 12, Issue 3, pp 333-347
- [4] Lobato, E. Sanchez-Martin, P. Saiz-Marin, E., "Long Term Maintenance Optimization of CCGT Plants", Power and Energy Engineering Conference (APPEEC), 2012 Asia-Pacific, 27-29 March 2012, pp 1-4.
- [5] Froger, A., Gendreau, M., Mendoza, J. E., Pinson, É., & Rousseau, L. M. (2016). Maintenance scheduling in the electricity industry: A literature review. *European Journal of Operational Research*, 251(3), 695-706.
- [6] K. Dahal, K. Al-Arfa j, and K. Paudyal. Modelling generator maintenance scheduling costs in deregulated power markets. *European Journal of Operational Research*, 240(2):551561, 2015.
- [7] X. Xu and M. Kezunovic. Mobile agent software applied in maintenance scheduling. In *Proc. 2001 North American Power Symposium*, 2001.

## Contributors:

Dr. Fabrizio Lacalandra, QuanTek