Optimizing nuclear power plant maintenance

Quadratic assignment problem

- Placement of nuclear fuel assemblies in pools
- Minimizing the completion time of the operations
- Inducing millions of variables
- Out of scope of MIP solvers

Testimonial by EDF R&D

"LocalSolver follows the claims made by its designers. It was able to adapt and to provide good-quality solutions to the problem of placement of nuclear fuel assemblies in pools, in reasonable running times, short or even very short, on a standard computer. His strength relies on the number of iterations and moves performed. It was able to compete with a simulated annealing algorithm which, however, took into account the structure of the problem. It is a serious way to resolve the quadratic assignment problems encountered by EDF."

Hydro valley optimization

Long-term management of hydro valleys

- Many hydroelectric dams with several pumps per dam
- Many thermal power plants
- Water inputs and energy prices variable over the horizon
- A large number of time steps

→ Highly-nonlinear large-scale dynamic system with mixed-variable (on/off + quantitative) decisions and hard coupling constraints

MIP solvers: tricky linearization, slow resolution

LocalSolver : easy modeling without approximation, near-optimal solutions in minutes