

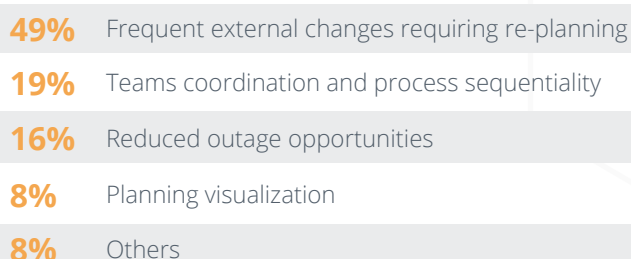
Webinar

From Feasible to Optimized Outage Planning: Leveraging the Power of Advanced Analytics at Elia Transmission Belgium

CONTEXT - Anticipating the challenges that come along with the full transition of the energy landscape is becoming crucial for System Operators to continuously guarantee the security of supply for their millions of consumers. More specifically, Outage Planning is becoming increasingly complex for System Operators but at the same time, the rise of Advanced Analytics is bringing new opportunities.

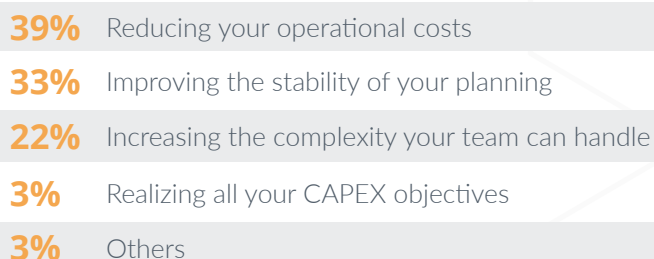


POLL 1 What is the most painful point in your outage planning process?



Almost half of the attendees agreed together that frequent unexpected external changes in the power system requiring re-planning is the most painful point of their outage planning process. This vision is also the one shared by Elia. Teams coordination and sequentiality of the process as well as the reduction in the number of outage opportunities are following in the list of challenges.

POLL 2 What is the main benefit you expect from using advanced analytics in your outage planning process?



Very tight match between the reduction of the operational costs and the increased stability of the operational planning as main benefits that come along the use of advanced analytics in the outage planning process. Increasing the complexity that the teams can handle is completing the podium.

Key takeways

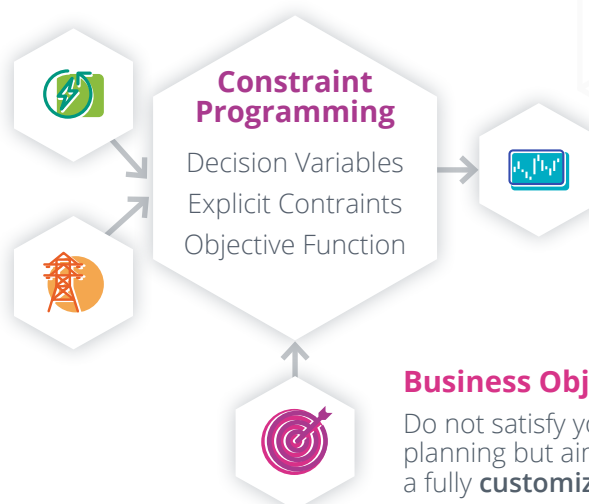
Moving from feasible to optimal intervention and outage planning with Constraint Programming

Needs

Consider **all** your **intervention** needs (daily granularity) along with their requested **outages** for all geographies and voltage levels in a **single problem**.

Constraints

Make sure your **planning** will be **feasible** by explicitly defining your **constraints** (*time, dependency, resource, network*) for all departments.



Optimized Work and Outage Planning

Combine the **business expertise** of your planning team with the **power** of advanced analytics to **validate** and **create** your **daily planning**.

Business Objective

Do not satisfy yourselves with a **feasible** planning but aim to an **optimal** one with a fully **customizable objective** function.

**A modular solution
implemented in
operations**

Advanced Analytics is currently being leveraged at Elia Transmission Belgium. A modular solution has been created, allowing an integrated outage planning with the consideration of fully customizable constraints and business objectives.

**Developed with the right
technology**

Constraint Programming has proven to be an efficient technique to solve the outage planning optimization problem. It allows a more agile planning of grid interventions when possible but also more stable when necessary.

**Bringing value
to the user**

Key tangible results for Elia Transmission Belgium:

- Reduction in the number and duration of outages, decreasing the overall stress on the grid
- Reduction in the workload for the field and planning teams
- Increase in the number of interventions realized each year and better use of the planned outages

Q&A

Q1: The outage plan is first optimized on a yearly basis to create a planning for the coming year. Is that outage plan fixed or do you have to move outages when new inputs are arriving? And is that acceptable at the maintenance department if you have to do that?

R1: In intra-year, a weekly re-optimization of the outage planning is performed. At that time, changes in the outage planning are allowed to keep the planning feasible even with changes in the expected operating conditions as well as to be able to plan newly identified interventions. The tradeoff between agility, optimality and stability is achieved thanks to the "inertia to change" sub-objective function.

Q2: How do you do if the constraints require doing several jobs at the same time on the same loop of a network? Is this problematic?

R2: Sometimes, depending on the constraints defined as input of the optimization problem, the tool is not able to plan all the interventions on the grid. In that case, the tool has to arbitrate between the different interventions based on their priorities. The interventions which cannot be scheduled by the optimizer are identified and the list of constraints preventing these interventions to be planned can be retrieved by the user.