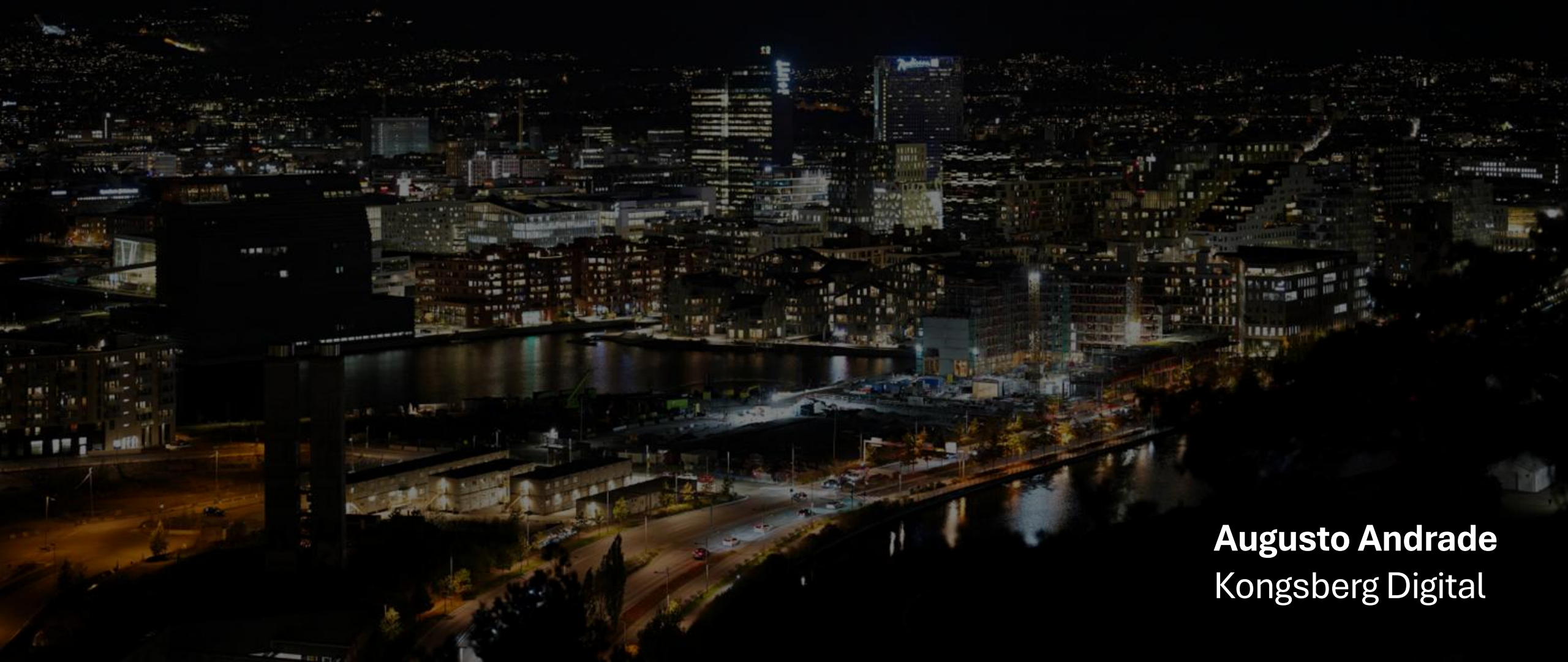


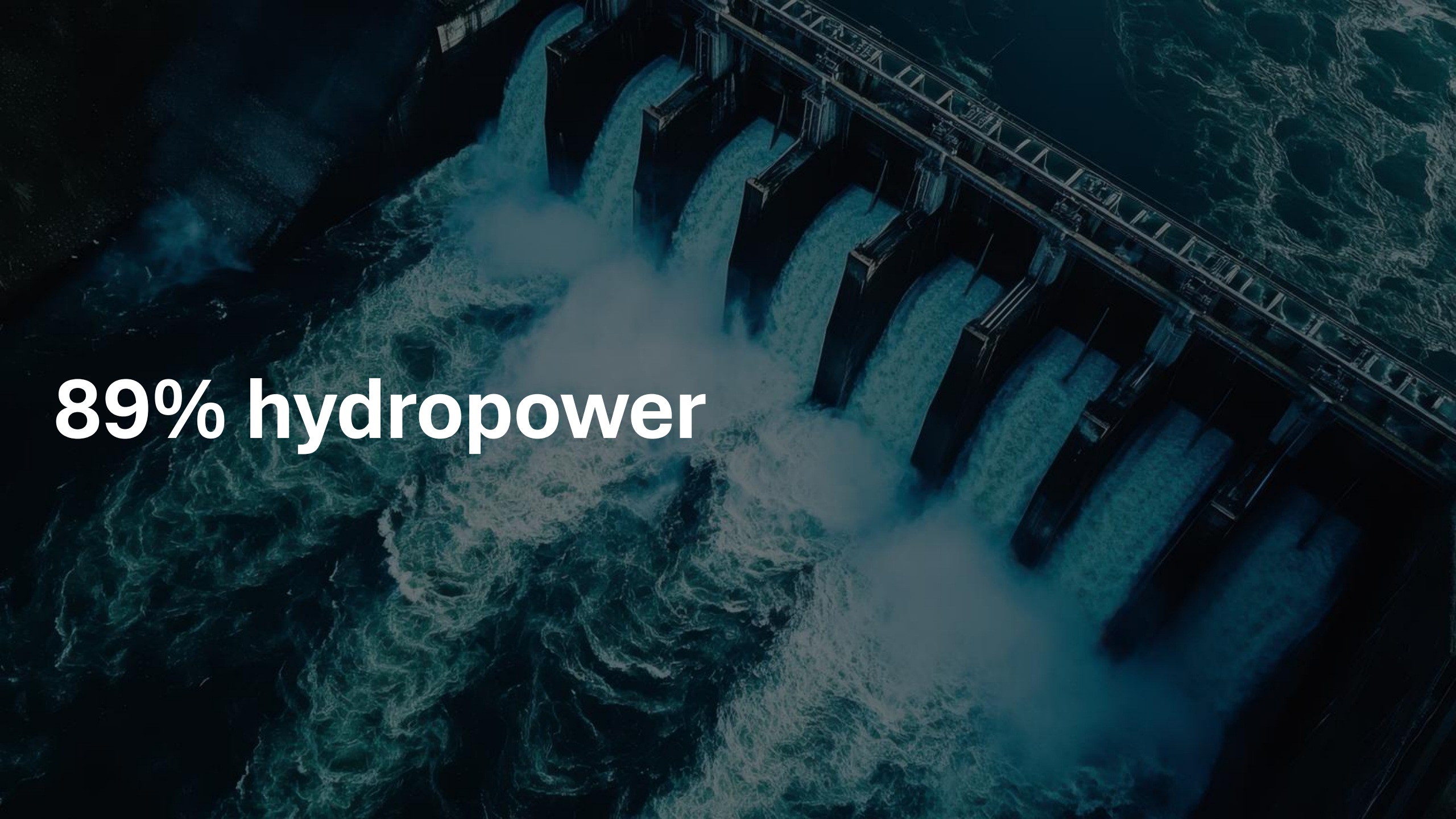
# **Lessons from the world's most electrified country**

## **Next generation active distribution grid operations in Norway**



**Augusto Andrade**  
Kongsberg Digital



An aerial photograph of a large dam with multiple spillways. Water is cascading over the spillways, creating white foam and rapids. The image has a dark, teal-blue color grade. The text "89% hydropower" is overlaid in white on the left side.

**89% hydropower**

**9% wind power**





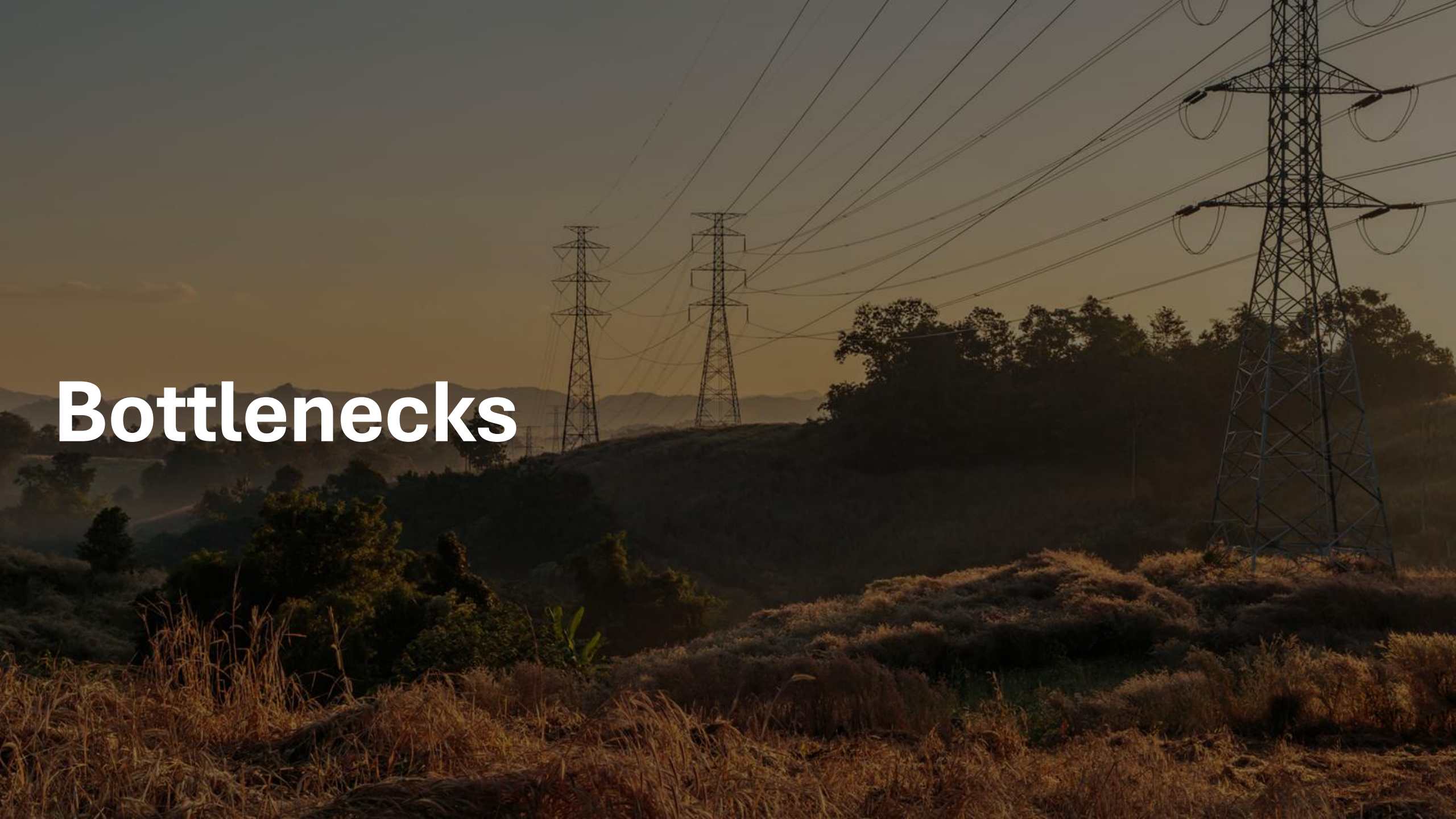
A futuristic, sleek electric car is parked at a modern charging station in a city at night. The scene is illuminated by ambient city lights and the glow of the charging station, creating a high-tech, urban atmosphere. The car is positioned behind the charging station, and its design is aerodynamic and modern. The charging station is a tall, rectangular unit with a charging cable plugged into it. The background shows blurred city buildings and lights, suggesting a busy urban environment.

**90% new cars solds are EV**



# Norway

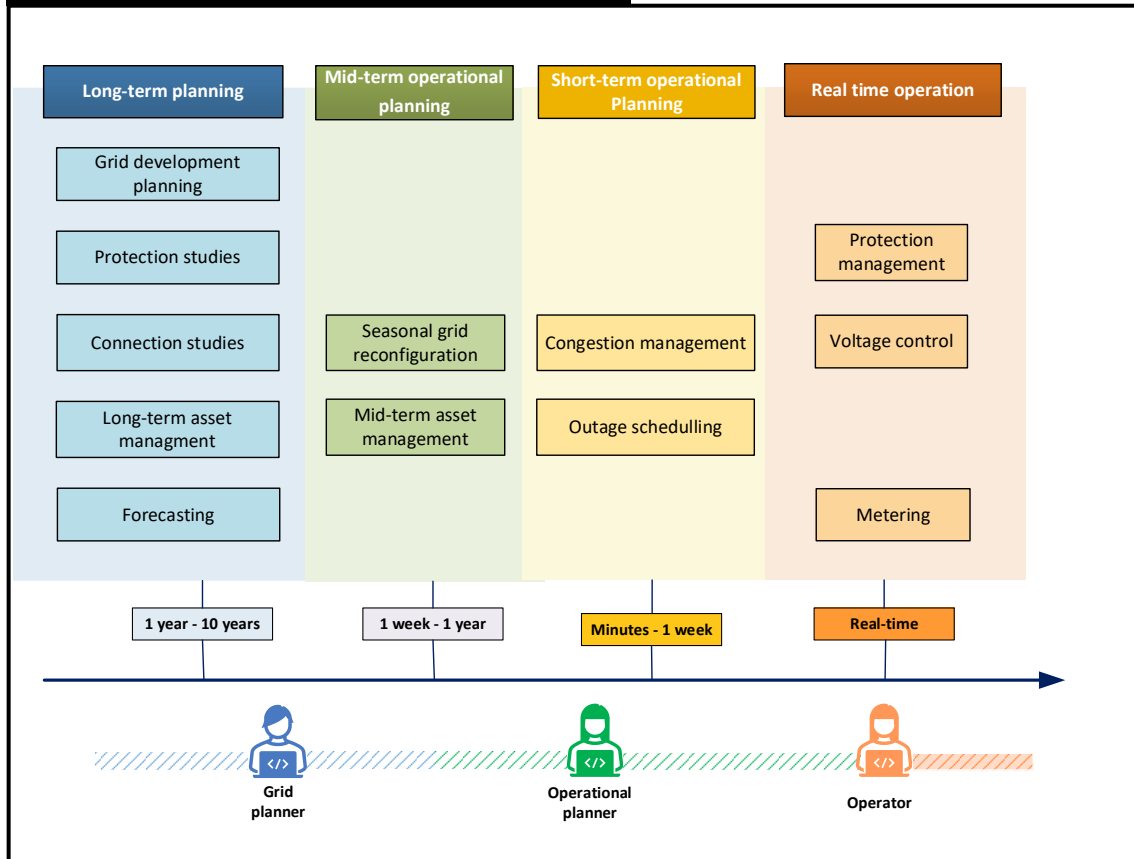




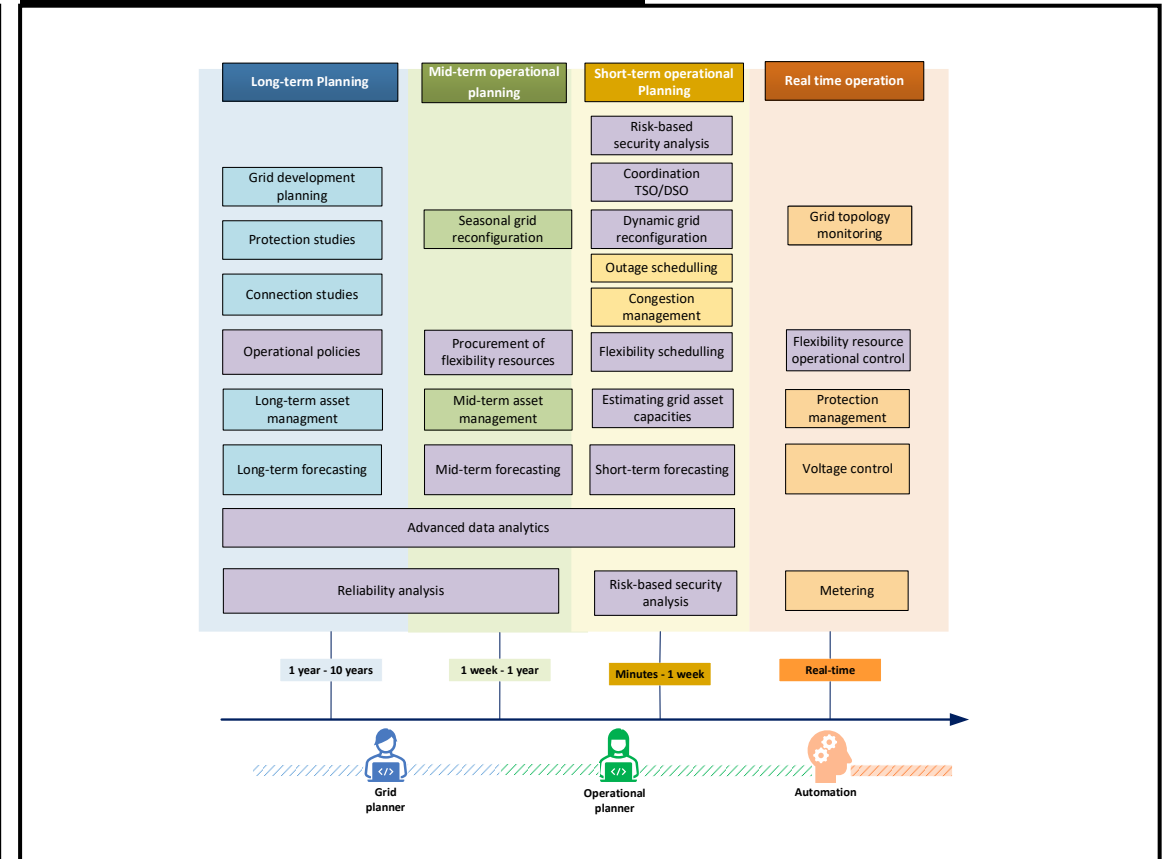
# Bottlenecks

# DSO planning processes needed to change

## Traditional DSO planning



## Required changes



A close-up photograph of four hands working together to assemble a large puzzle made of brown cardboard pieces. The hands are positioned at the top, bottom, left, and right edges of the puzzle, with fingers gripping the edges of the pieces. The puzzle is in the center of the frame, and the background is a soft, out-of-focus light color. The overall tone is warm and collaborative.

# Nextgrid

Elvia Fagne

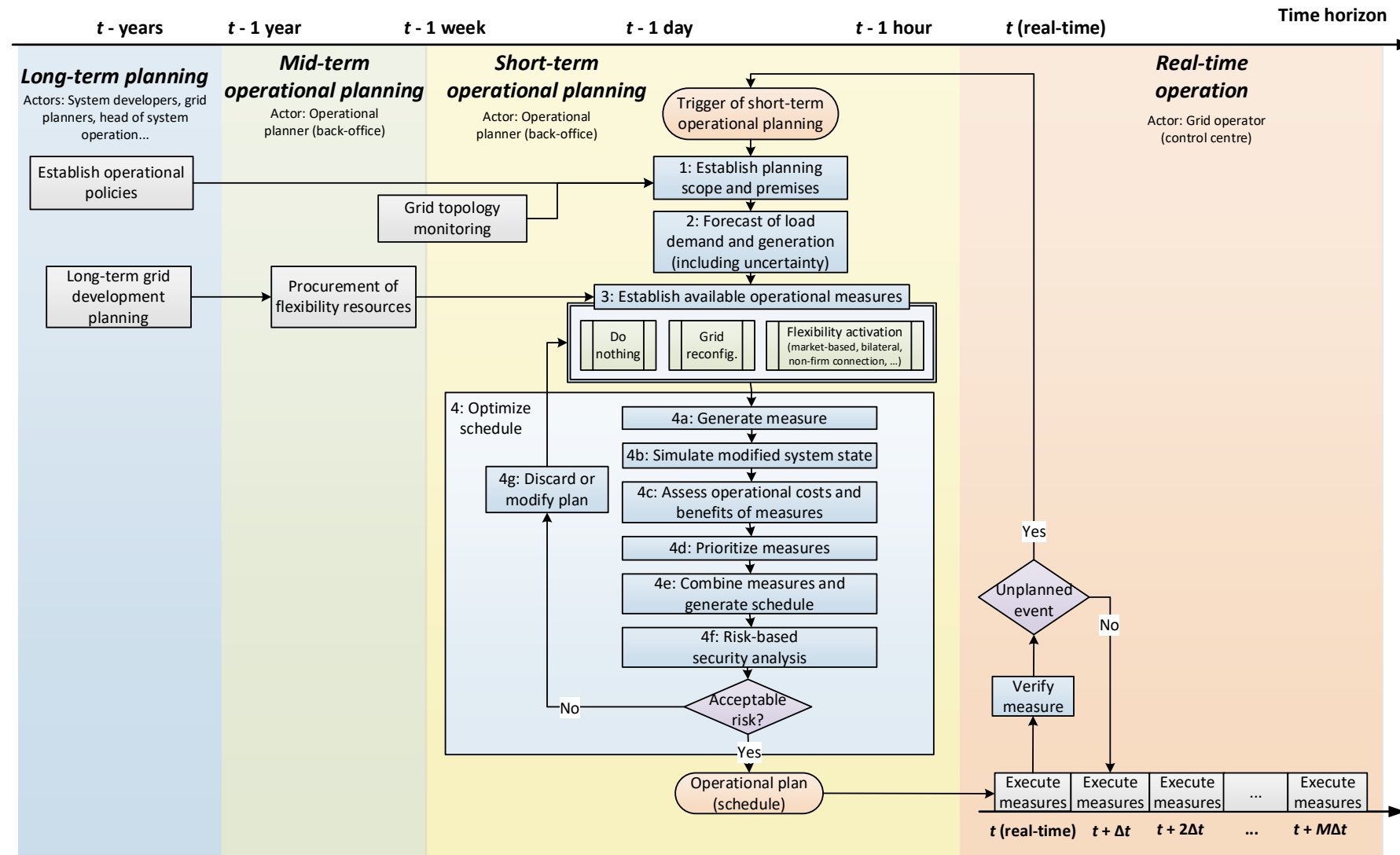
Linja TENSIO



KONGSBERG



# Planning framework for active distribution grids



A photograph of a power line tower and sagging power lines heavily covered in ice, with a snow-covered tree in the background. The scene is a winter landscape with a heavy ice storm. The power lines are sagging significantly under the weight of the ice. The background shows a dense forest of snow-covered trees.

# Tool #1: Dynamic Line Rating



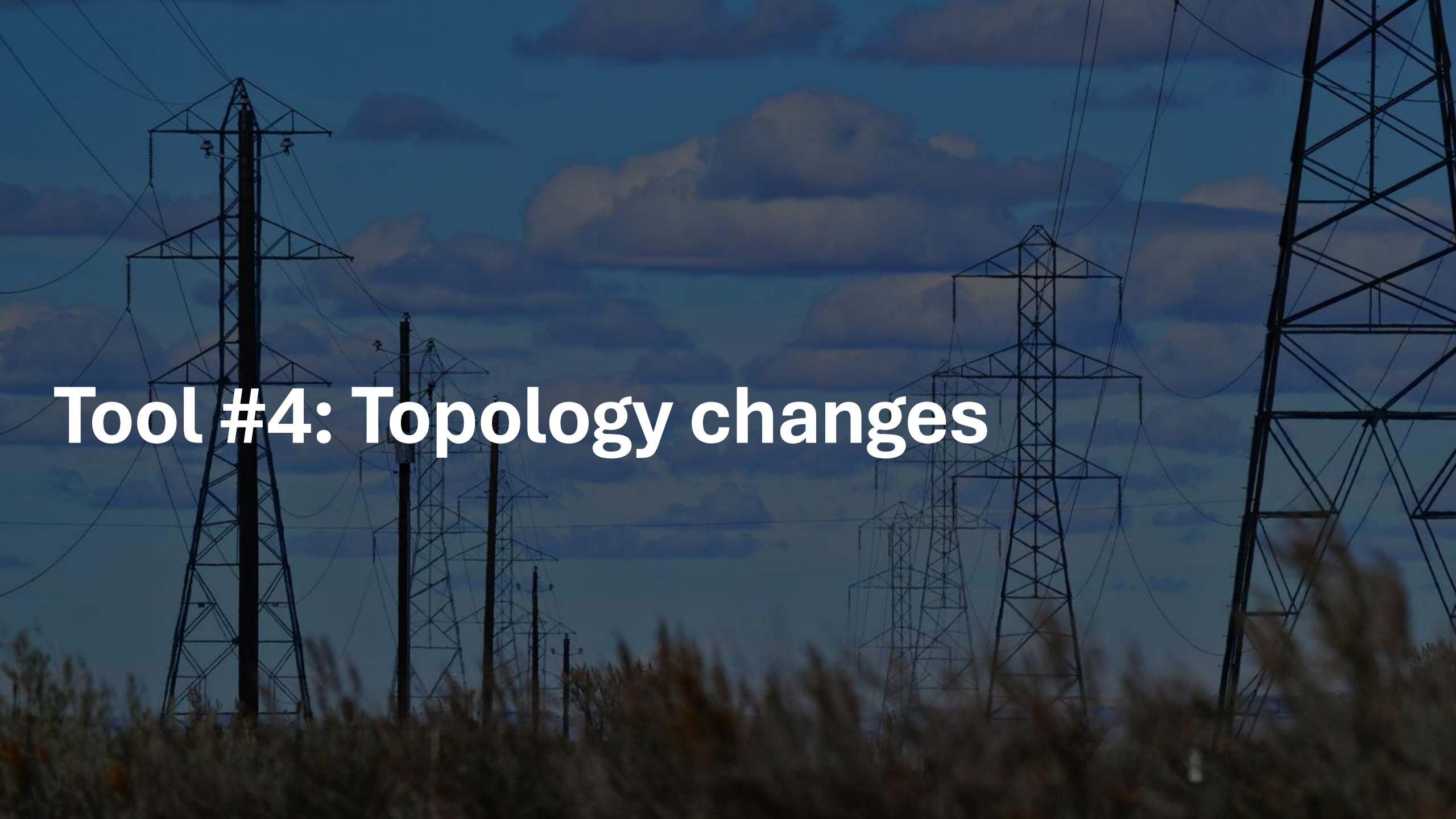


# Tool #2: Flexibility markets

A person in a dark suit and white shirt is holding a black pen over a large sheet of paper. Another person's hands are clasped together in the background. The scene is dimly lit, with a window in the background.

# **Tool #3: Flexibility contracts**





# Tool #4: Topology changes

# Digital twin: a key enabler

