Balancing Wildfire Risk and Power Outages Through Optimized Power Shut-Offs

Electric grid faults can ignite catastrophic wildfires, particularly in regions with high winds and low humidity. In short-term operations, electric utilities have few options to mitigate the risk of wildfire ignitions, leading to use of disruptive measures such as proactive de-energization of equipment, frequently referred to as public safety power shut-offs. Decisions of how to operate the grid in situations with high wildfire risk has significant impacts on customers, who may loose access to electricity in an attempt to protect them from fires.

This talk discusses our proposed optimal power shut-off problem, an optimization model to support operational decision making in the context of extreme wildfire risk. Specifically, the model optimizes grid operation to maximize the amount of power that can be delivered, while proactively minimizing the risk of wildfire ignitions by selectively de-energizing components in the grid. This is the first optimization model to consider optimization of preventive wildfire risk measures in a short-term, operational time-frame. The effectiveness of the method is demonstrated on an augmented version of the IEEE-RTS GMLC test case, and compared against two simpler approaches. We discuss how the optimization-based model reduces both wildfire risk and lost load shed relative to the benchmarks.