MSc thesis proposal

❖ Title of the research

Resilience of energy production plants exposed to Natural-Technological (Natech) scenarios of increasing frequency and severity in the climate change context

❖ Objectives of the research

Climate change is increasing frequency and severity of extreme natural events. The impact of natural events, such as floods, storms and earthquakes on energy production plants leads to severe technological accidents, called Natech scenarios. It is, thus, fundamental to protect such plants, by designing and deploying safety barriers prevent/mitigate and recover from the consequences of such accidents. Guaranteeing the performance of the safety barriers during such complex scenarios is a key trigger to resilience. In the scientific literature, methodologies have been provided for evaluating the performance of passive/active barriers under natural events.

The thesis will address the open question of how to find the optimal set of barriers to achieve a given resilience target.

The research activity will entail:

- Developing and applying innovative sensitivity analysis methods;
- Defining tailored resilience metrics;
- Solving the resilience optimization problem.

The project activities will be performed at the "Laboratorio di Analisi di Segnale e Analisi di Rischio" (Signal and Risk Analysis Laboratory, LASAR, www.lasar.polimi.it) of the Department of Energy of Politecnico di Milano, in collaboration with Università di Bologna (UNIBO, www.unibo.it), within the "Progetto di Rilevante Interesse Nazionale" (PRIN) titled "Assessment of Cascading Events triggered by the Interaction of Natural Hazards and Technological Scenarios involving the release of Hazardous Substances"

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