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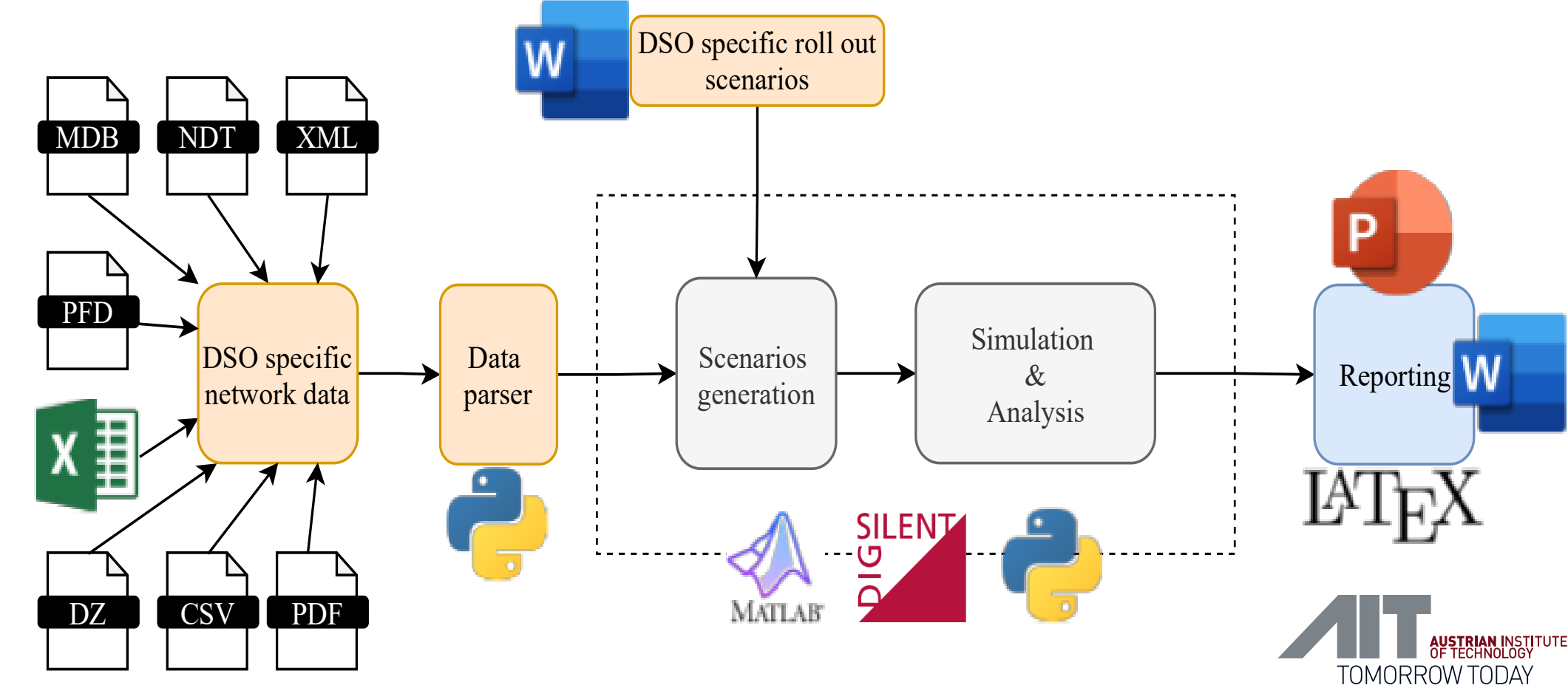
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INTRODUCTION

- The increase of renewable energy sources (RES) connected within medium voltage (MV) and low voltage (LV) networks, along with their system integration, is expected to continue to expand and increase their presence for the foreseeable future.
- It is necessary to analyse the potential impact of the integration of these sources into the network and also to quantify their impact, in combination with their respective control strategies which are implemented, when the devices are deployed within the MV or LV network.

SCALABILITY AND REPLICABILITY ANALYSIS FRAMEWORK



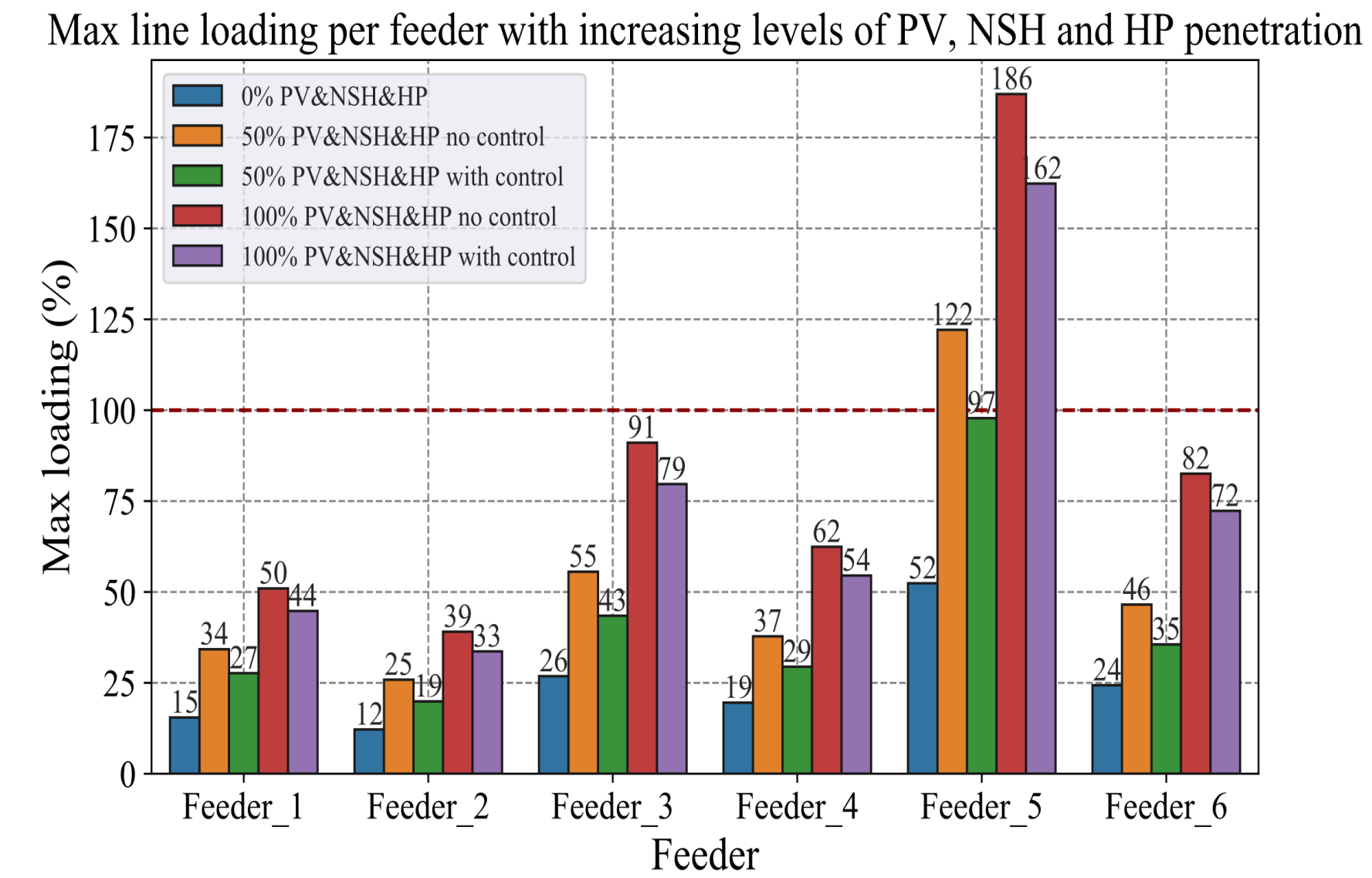
- Hosting capacity
- Network reinforcements
- Curtailment statistics
- Flexibility maximization provision
- Grid management

FRAMEWORK IMPLEMENTATION AND RESULTS

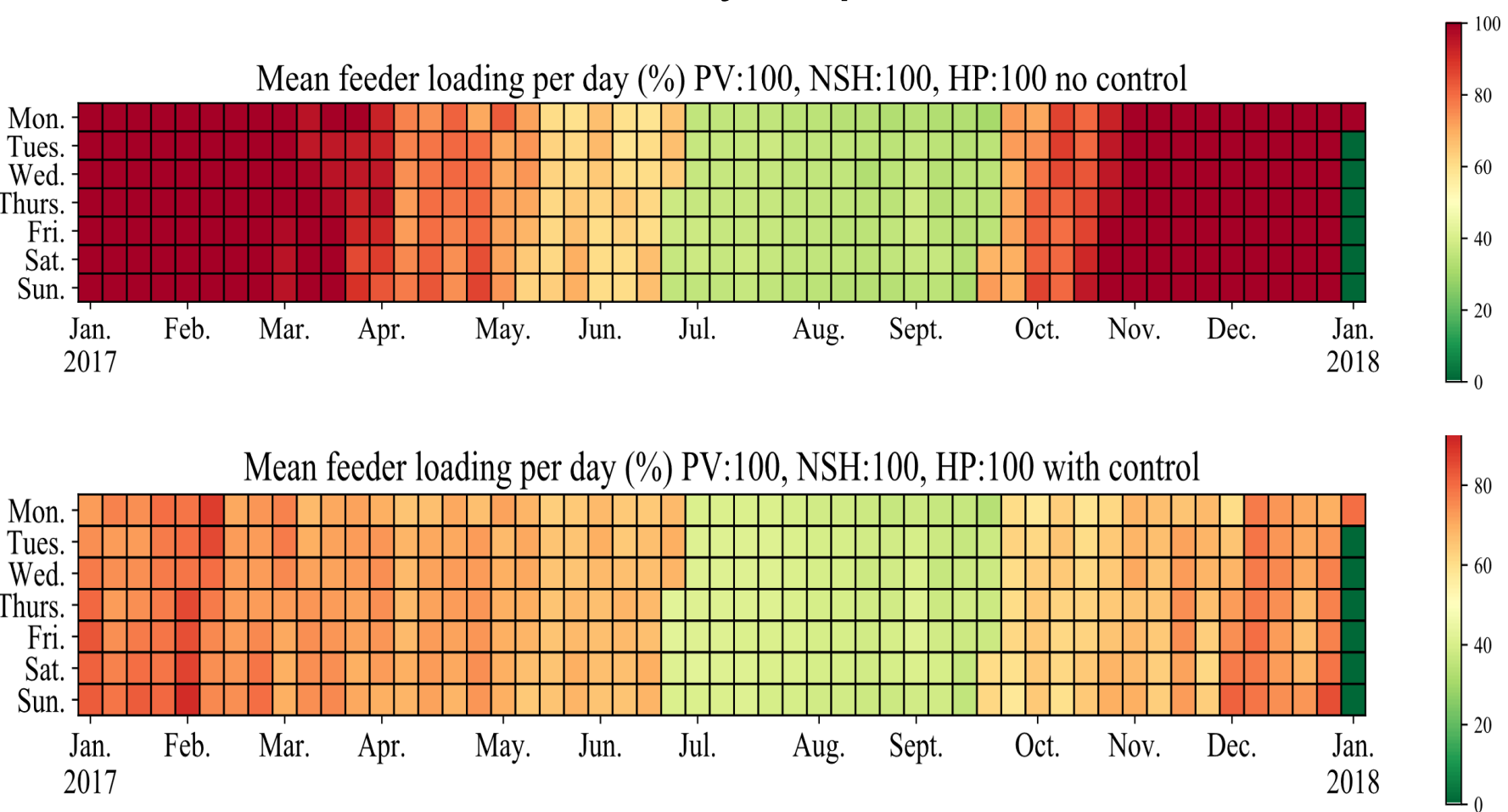
interFLEX



Scalability: increased penetration of flexible PV, NSH and HP, with and without control functions.



Replicability: assessment of seasonal impact since the devices are seasonally dependent.

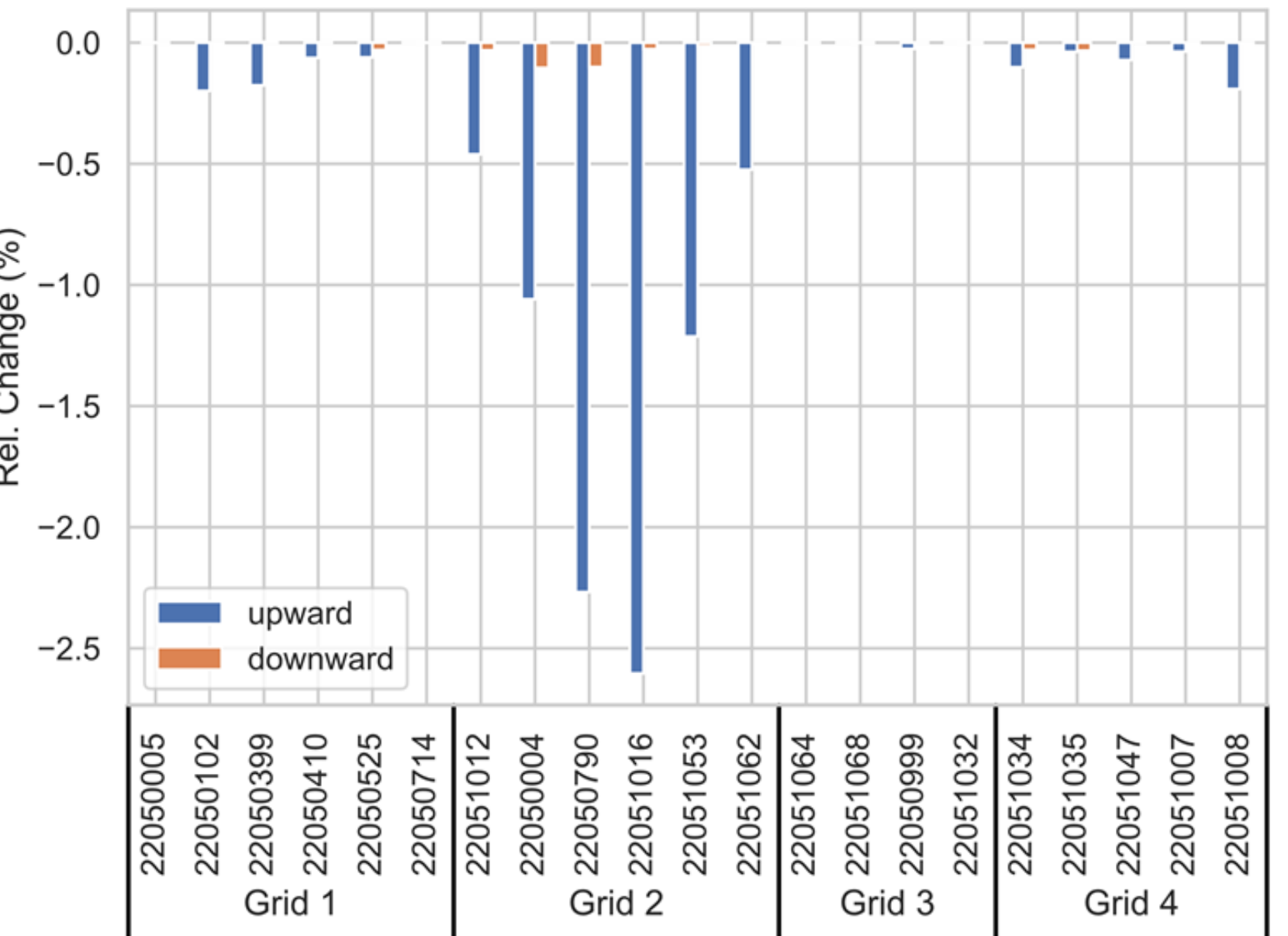


integrid



Scalability: increased penetration of flexibility and network sizes to test the performance of the traffic light system.

Replicability: bid prices (economically driven) vs distributed generation location (technically driven) are compared within different network types (urban and rural).

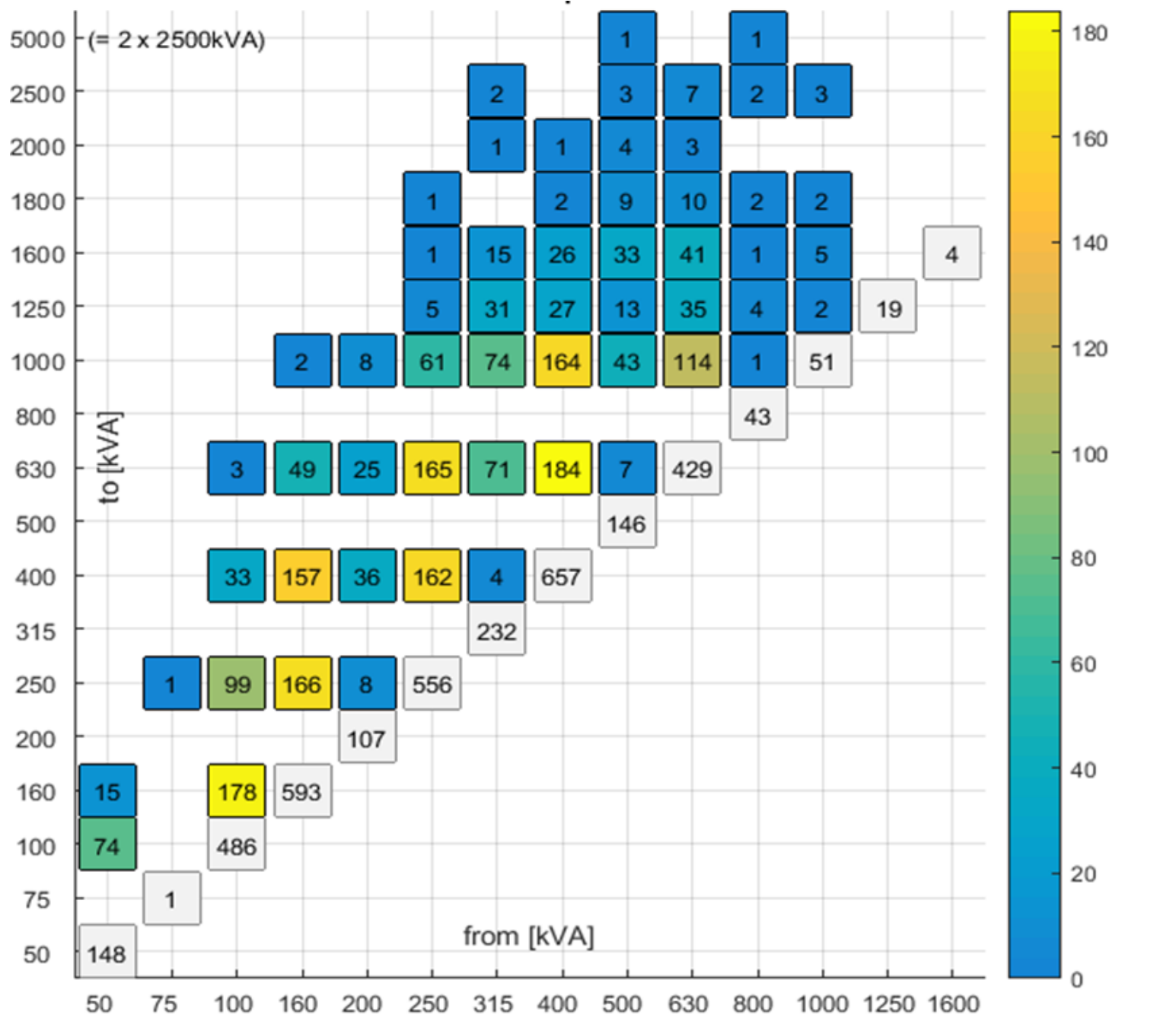


Maximum total flexibility of the units connected to feeders between a technical and an economic scenario:

leaves



Scalability: increased penetration of PV and EV with and without control strategies.



Necessary transformer upgrade for future EV scenario: x- and y-axis show the transformer nominal power, the grey boxes show the DSO's transformer inventory, the boxes above show the number that need to be upgraded. Upgrade-boxes colored according to the absolute upgrade incidence.

CONCLUSION

The scalability and replicability analysis framework is able to perform investigations into the impact of increased penetration of RES, with and without control strategies, on MV and LV networks. This enables DSOs to make informed decisions during network planning and operation and to provide alternative solutions to costly network reinforcements.