

ANALYSIS OF ANNUAL LOAD LOSS DUE TO VOLTAGE SAGS IN INDUSTRIAL DISTRIBUTION NETWORK WITH PVS



COLLABORATION WITH:



PROJECT BY:

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Phd in Electrical and Computer Engineering | Year 5

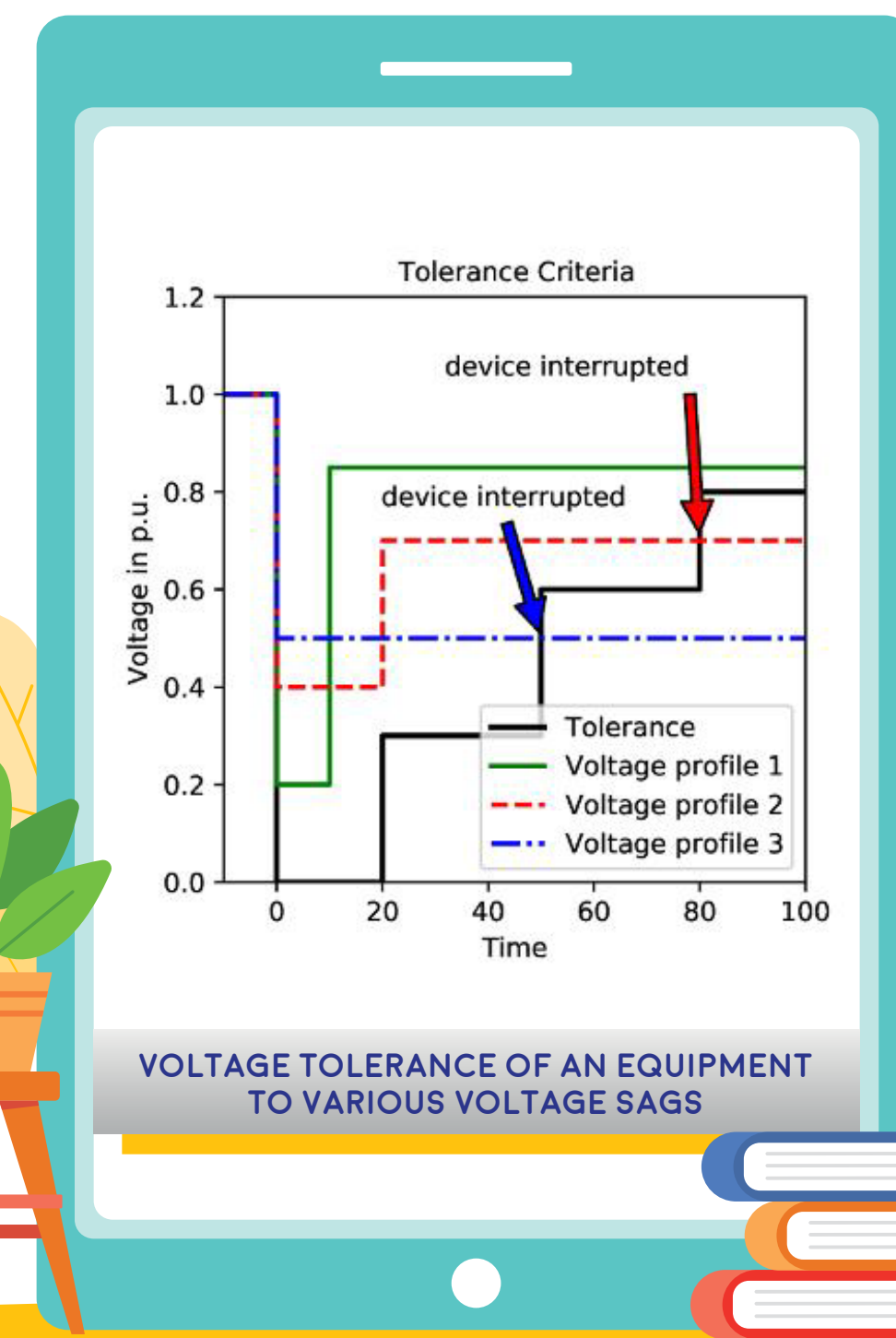
PROJECT OBJECTIVE

To develop a simulation-based method to calculate the economic impact of voltage sags on industrial distribution systems with Distributed PVs, by considering voltage tolerance requirements of industrial loads.

To find out how distributed PVs help to reduce the cost of annual load disconnections for industries.

PROJECT SUMMARY

In industry, the analysis of load disconnection indices is essential in determining annual economic loss because of the high cost of load interruption. Industries use specialised devices like STATCOM to protect devices from voltage sags. However, PV inverters can also work like STATCOM and help reduce the impact of voltage sag-related disruptions. When calculating load disconnection indices in the presence of a PV inverter, a new method that can consider dynamic P-Q injection of PV and voltage tolerance of industrial load is needed. Thus, a method that relies on dynamic simulation for estimation of load loss due to voltage sag is presented. The indices are determined by employing statistical experiments which account for annual variability of daily solar and load profiles, using the least number of dynamic simulation runs.

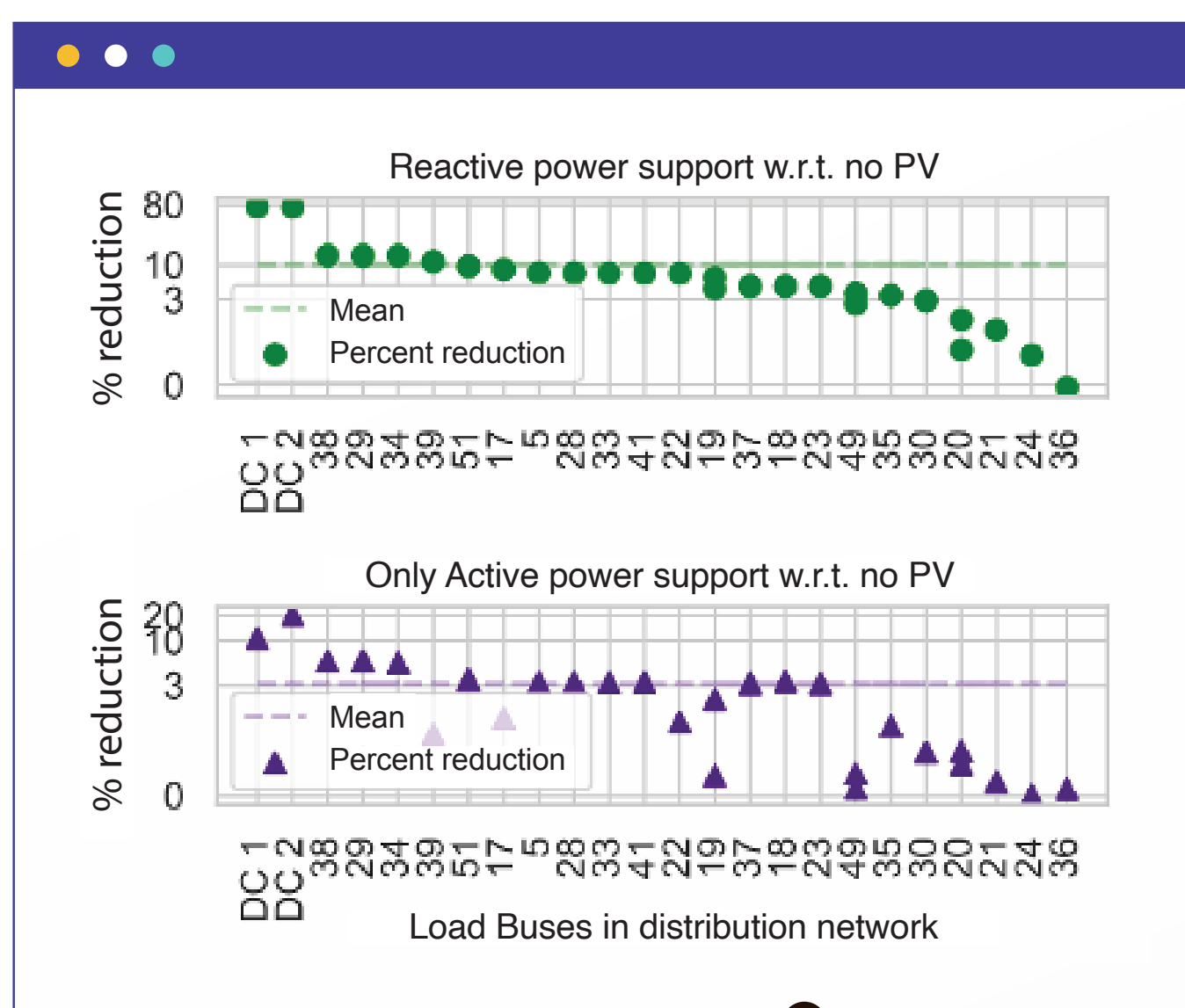


PROJECT OUTCOMES

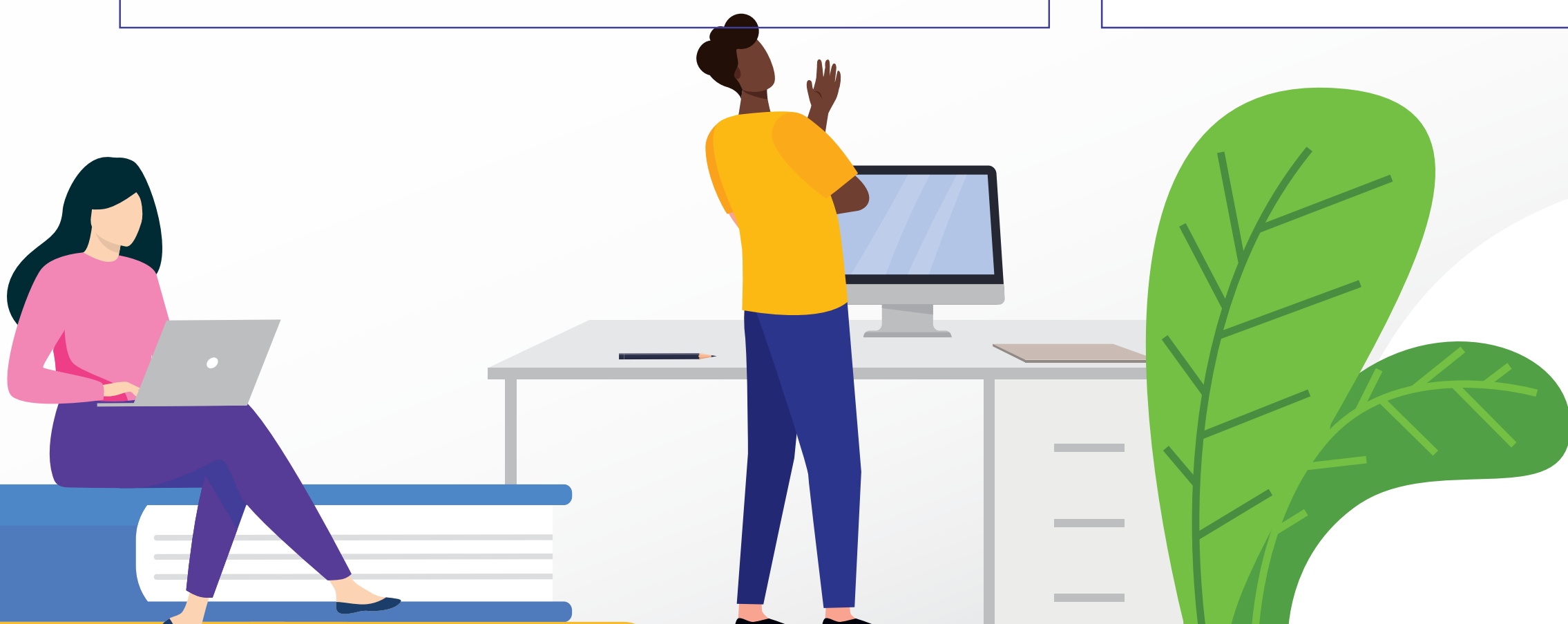
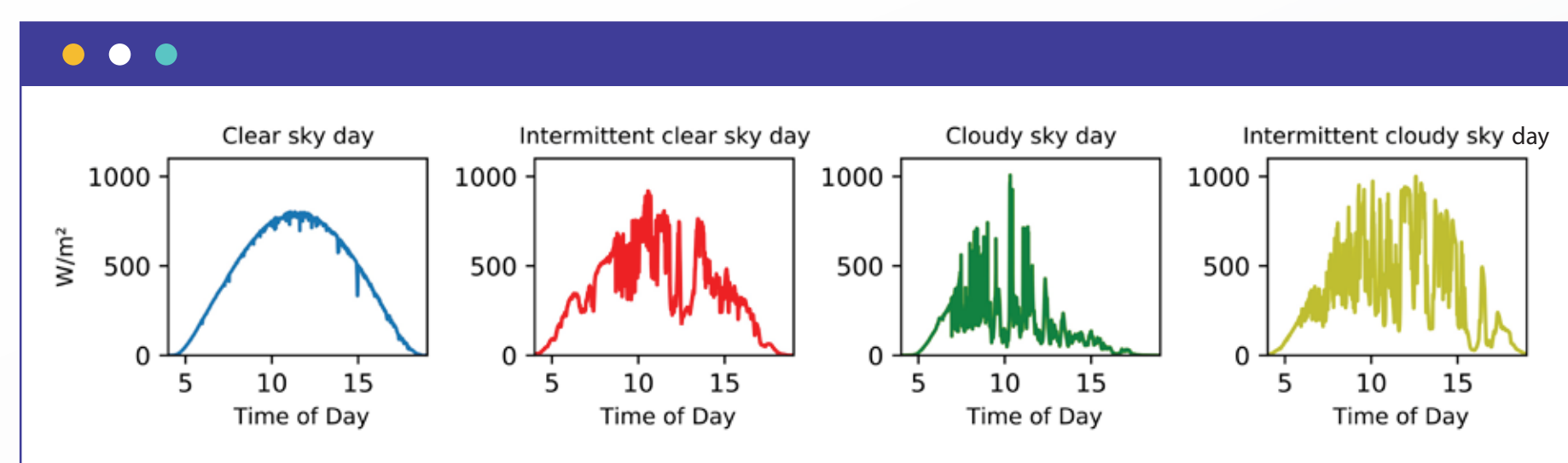
The proposed method is applied to calculate load disconnection indices for an IEEE 399-1997 industrial distribution system and the following results are presented:

- A comparative analysis of the cost of disconnection under different solar penetration and operation scenarios is performed.
- Advantage of having a distributed PV with regard to a reduction in load loss.
- A methodology to identify PV inverter placement inside the industrial distribution network to reduce annual load disconnection.

PERCENTAGE REDUCTION IN NUMBER OF DISCONNECTIONS WITH AND WITHOUT REACTIVE POWER WITH NO PV



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