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Defining a Use Case for the ADMS Test Bed: Fault Location, Isolation, and Service Restoration with Distributed Energy Resources

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Background

- An advanced distribution management system (ADMS) is an integrated platform that hosts advanced applications such as fault location, isolation, and service restoration (FLISR).

- The ADMS must function properly and reliably in the presence of distributed energy resources (DERs) to support grid modernization.

- The ADMS test bed at NREL can be used by utilities and vendors to study the potential benefits of advanced applications for their system.

- This paper presents a methodology for studying the impact of DERs on a commercially available FLISR application.

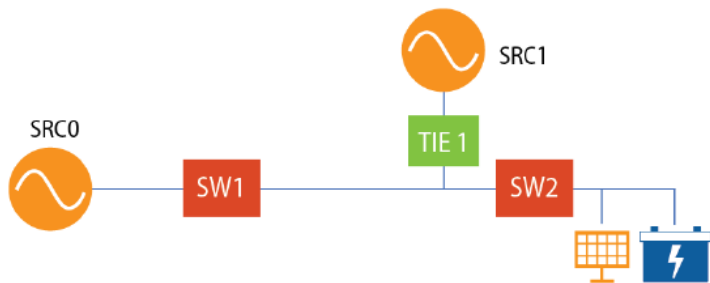# FLISR with DERs Use Case: Test Scenarios

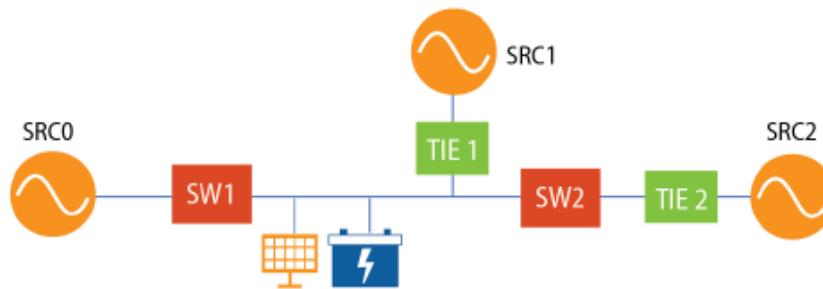**DER Location Options**

Fig. 1. DER at a single end-of-line location
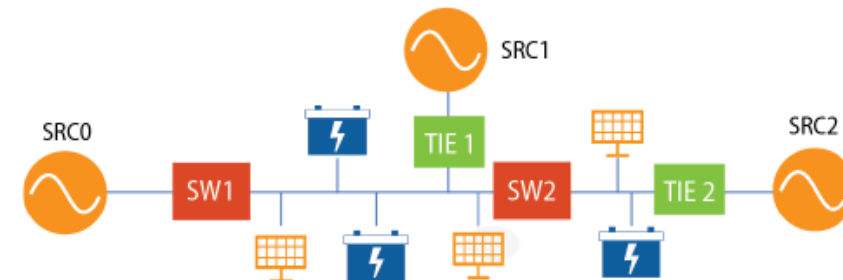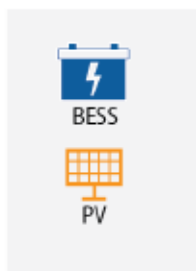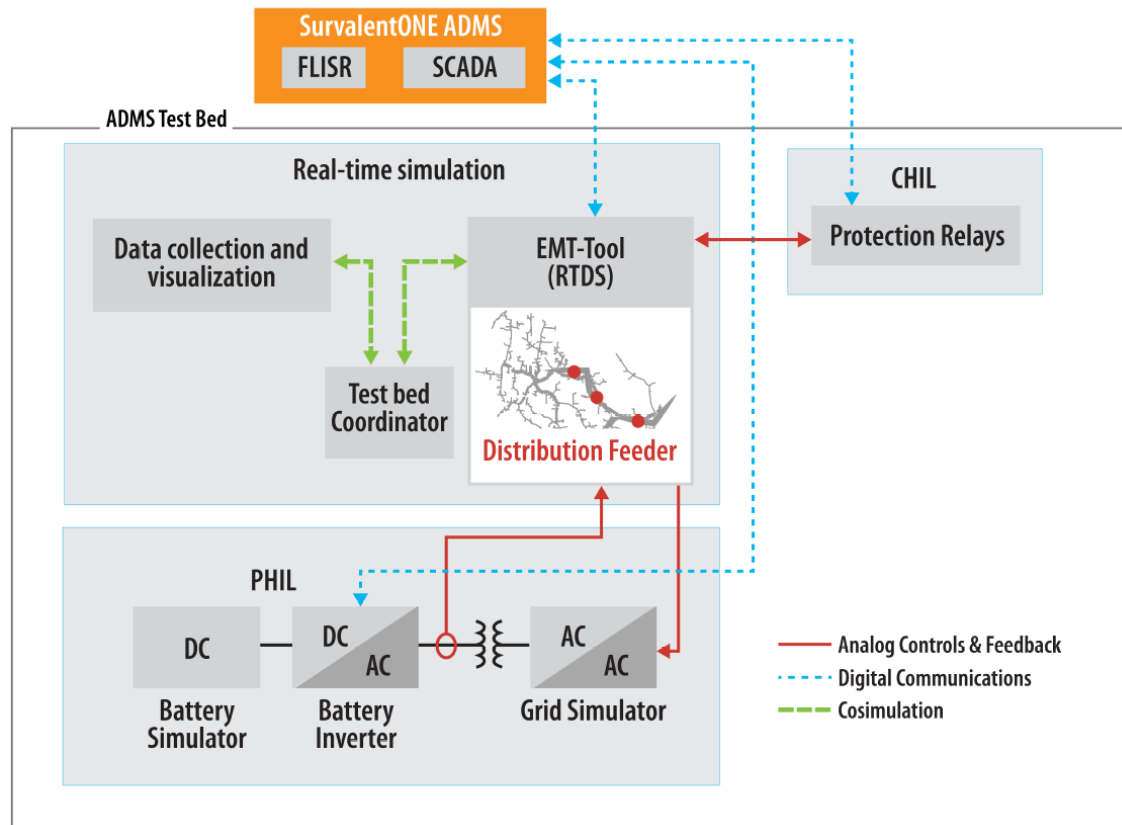
Fig. 2. DER at a single mid-feeder location

Fig. 3. DERs at multiple mid-feeder locations

SRC0: Primary source
SRC1, SRC2: Secondary sources
SW1, SW2: Remotely controlled, normally closed line switches
TIE1, TIE2: Normally open tie switches

Test Setup and Metrics

ADMS Test Bed Setup for the Use Case

Test metrics:

- FLISR response time
- Time to recovery
- Cumulative customer-hours of outages
- Cumulative customer energy demand not served
- Number of customer outages
- Voltage excursions.

Conclusions

- Utility adoption of ADMS accelerates grid modernization through deployment of advanced applications like FLISR.

- The use case presents an approach to evaluate the performance of a FLISR application in a distribution feeder with DERs.

- Results of this use case will be disseminated to the electric utility and research communities to develop insights into the challenges and benefits that DERs present to FLISR applications.