Australian National University

C3FN + DER Lab

Australia's New Facility for Research and Testing

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Fort Collins 2019 Symposium on Microgrids

Battery Storage and Grid Integration Program

Overview

1. DOE ENERGISE Program + the Berkeley team
2. C3FN: Control, Coordination and Cybersecurity in Future Networks
3. DER: Distributed Energy Resources Lab

Berkeley
UNIVERSITY OF CALIFORNIA

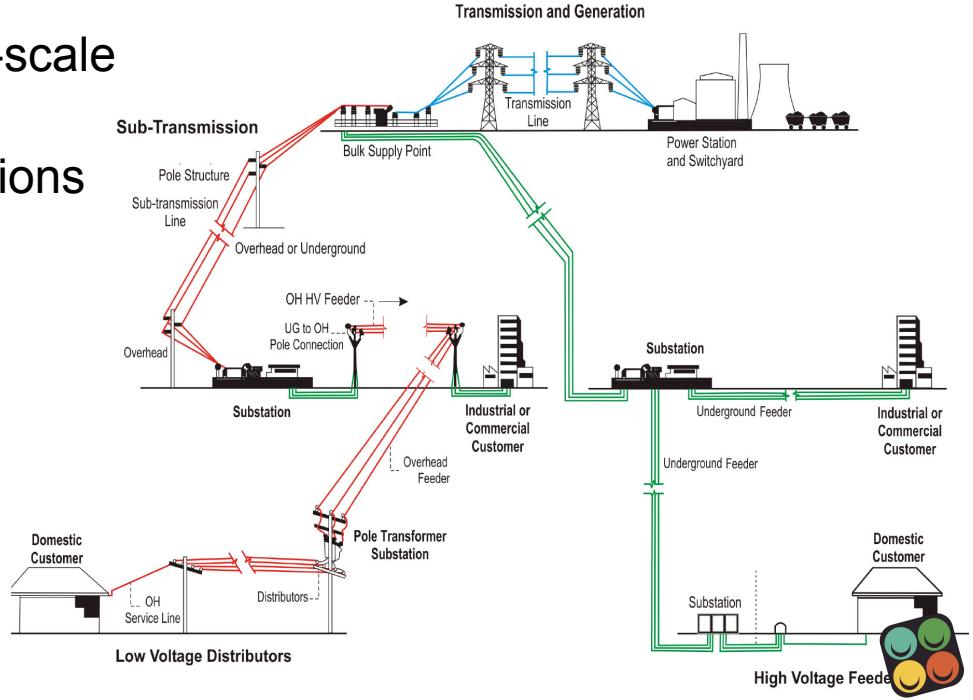
Australian National University

Australian National University

ENERGISE U.S. Department of Energy Award DE-EE0008008

Future electricity networks with increasing solar PV integration

1. 1,000,000 nodes → Distribution-scale
2. 1,000 feeders → ~50 substations
3. 100 controllable devices → HIL



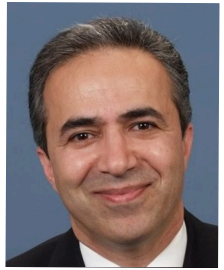
ENERGISE U.S. Department of Energy Award DE-EE0008008

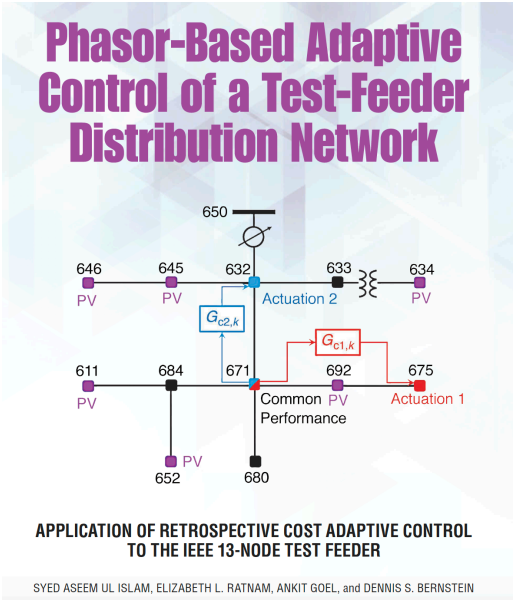
Phasor-based control for Scalable Solar PV Integration: 2017-2020, $2.573 million

The Berkeley team







https://www.energy.gov/sites/prod/files/2017/10/f38/ENERGISE%20Program%20Kickoff%20-%20UC%20Berkeley.pdf

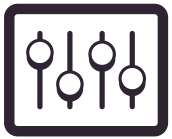
ENERGISE U.S. Department of Energy, Award DE-EE0008008

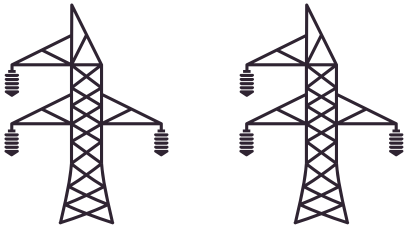
Phasor-Based Control (PBC)

To enable greater than 100% solar PV integration in the distribution grid

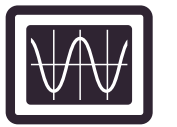
1. Supervisory S-PBC assigns phasor targets
2. Local controllers track S- PBC phasor targets (disturbance rejection)
3. HIL at the LBNL FlexLAB, FlexGrid facility

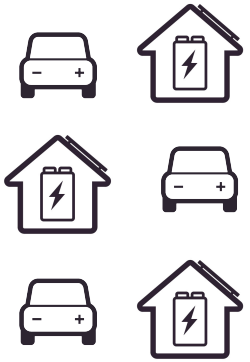
Supervisory controller





Local controller





C3FN: Control, Coordination and Cybersecurity in Future Networks

Power-HIL at scale to investigate

- Stable control and operation of DER at scale (10,000's-100,000's nodes)
- Credible cyber-threats and control architectures for improved resilience
- Optimal control and coordination of DER at scale (10,000's-100,000's nodes)

DER: Distributed Energy Resources Lab (Bjorn Sturmberg)

A joint initiative by

itp

THE AUSTRALIAN NATIONAL UNIVERSITY

UNSW THE UNIVERSITY OF NEW SOUTH WALES CANBERRA

evoenergy

DER: Distributed Energy Resources Lab

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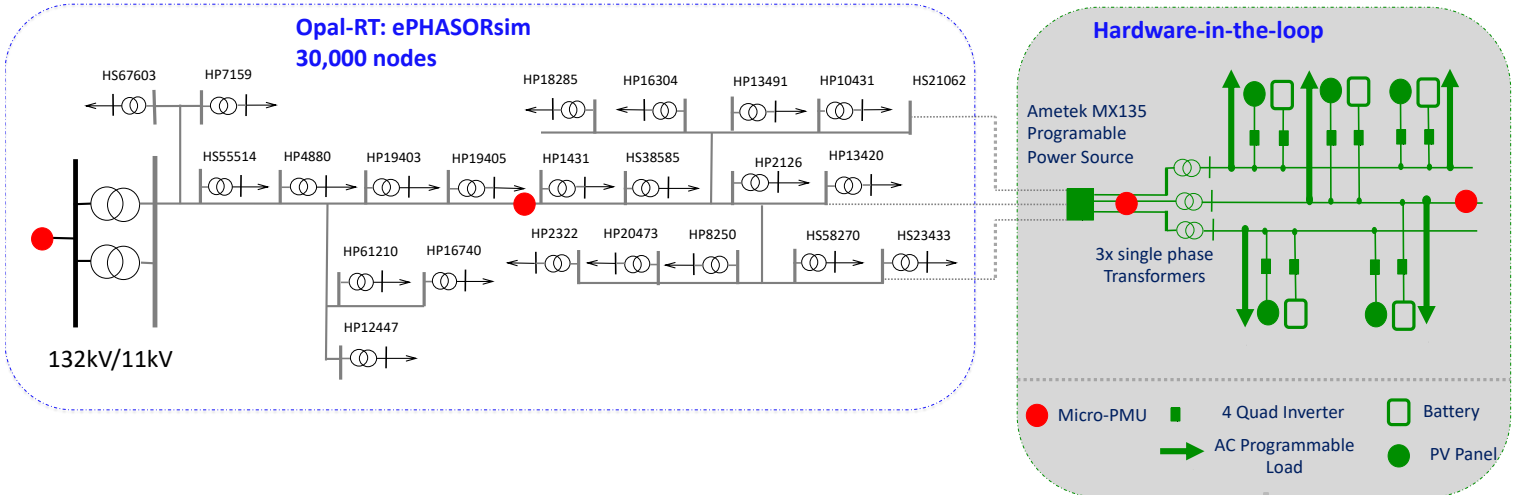

HIL

1. Opal-RT
2. Amplifiers
3. Transformers
4. LV Feeder
5. Inverters
6. Batteries
7. EV Charger
8. Loads

Thank you!