Energization studies that took weeks now run in minutes

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL® Company

Southern California Edison ran automated energization studies on ThinkLabs' physics-informed AI digital twin, evaluating 3-year, 8760 forecasts and generating solutions inside its own secure Azure environment.

SOUTHERN CALIFORNIA EDISON / DISTRIBUTION AND SUB-TRANSMISSION NETWORKS

~120	8760	5
DISTRIBUTION CIRCUITS ANALYZED	3 YEARS OF 8760-HOUR STUDY FORECAST	VIOLATION TYPES SCREENED AUTOMATICALLY

01 / THE CHALLENGE

More requests than existing planning tools could study

Energization requests arrived faster than SCE's distribution and sub-transmission teams could study them. Clearing one request meant testing a full year of conditions against a system of roughly 120 circuits, and commercial planning tools were built for snapshots rather than years. Planners ran a peak-hour case and set curtailment, topology reconfiguration, and mobile battery utilization by trial and error, which stretched each study into weeks.

A peak-hour study fails in both directions. It rejects capacity that is deliverable for most of the year, and it can miss the hour the network is most constrained.

Cost of delay: Long backlogs mean developers without an energization date go elsewhere.

Cost of conservatism: Worst-case assumption modeling is revenue missed and cost the ratepayer carries.

Cost of hiring gap: The engineering required and retirements mean the problem cannot be hired away.

02 / THE ENGAGEMENT

What was deployed, and how

CLIENT PROFILE

Southern California Edison

- Serves 15 million people
- Separate T&D planning teams
- Data center and DER growth

Distribution and sub-transmission co-simulation deployment, ~120 circuits.

DURATION
Engagement focused on distribution and sub-transmission planning

ENVIRONMENT
SCE's own Azure GPU environment, Kubernetes orchestrated

INTEGRATIONS
Trained on PSLF sub-transmission and CYME/Panda Power distribution data

ECOSYSTEM
Partnered with Microsoft on Azure

> "Innovative AI-driven power flow technology such as that developed by ThinkLabs, will be a key enabler for our grid digitalization efforts, **supporting more efficient planning and operations for the feasibility, timeliness and affordability of the future grid.**
>
> Shinjini Menon | SVP System Planning

03 / THE USE CASES

What the digital twin was asked to do

1 8760 power flow
Full 3-year, 8760-hour time series across three forecast scenarios, rather than a peak-hour snapshot.

2 Automated violation detection
Every hour screened across 5 constraint types, with thermal and voltage violations classified automatically rather than reviewed by hand.

3 Automated solutioning
The twin generates a ranked solution recommendations, including load curtailment, energy storage and topology reconfiguration, alone or in combination.

4 T&D co-simulation
Sub-transmission trained on PSLF and distribution trained on CYME, validated against SCE's own classical solver.

04 / THE RESULTS

What changed for planning teams

2.5 min
FULL 3-YEAR, 8760-HOUR POWER FLOW STUDY ACROSS ~120 CIRCUITS

>99%
POWER FLOW ACCURACY, 3-YEAR 8760 ANALYSIS

1.5 min
END-TO-END ENERGIZATION STUDY

DIMENSION	BEFORE	AFTER
Study time	Weeks (manual/legacy study)	2.5 minutes
Analysis horizon	Peak-hour snapshot	3-year, 8760-hour series, 3 scenarios
Violation detection	Manual review	Automated across 5 constraint types
Curtailment schedule	Set by trial and error	Generated automatically, hourly
Solutioning	Manual, one at a time	Automated, ranked across options
Engineering Analysis Report	Weeks; manual write-up	1.5 minutes

Planners get a model they trust, and AI agents that run the studies end to end at the pace the queue sets.

05 / WORKING WITH THINKLABS

Your environment, your access, your partners

The digital twin deploys inside your security boundary, on infrastructure you already trust.

- **Runs where your data lives**
  On-premise or in your own cloud tenant, GPU accelerated. Network models never leave your security boundary.
- **Planners work in a UI with a Chat Interface**
  Study setup, results and reports without touching a command line.
- **Systems call the API**
  REST and CLI endpoints, orchestrated on Kubernetes, so results land in the tools your teams already run.

PARTNERS

Microsoft NVIDIA

What this looks like on your network. Your model in, digital twin trained in your environment, accuracy benchmarked against your classical solver, hourly hosting capacity out. Weeks from environment setup to first study.

Scope a deployment
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