DER-VET Task Force

ESIC Working Group 1: Grid Services and Analysis

Miles Evans | EPRI Suma Jothibasu | EPRI Andrew Etringer | EPRI

June 3, 2021



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Agenda

DER-VET Tool Updates

- Check-In on number of downloads
- Version 1.1 Release in July (tentative)
- How to submit Bug-Reports and Feature-Requests

Use-Case Database Planning

Recent ES Analysis Projects

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DER-VET Tool Updates



www.epri.com

DER-VET Download Counts

Since release of v1.0 on March 31, 2021:

– April Stats:

- Windows Download Count: 67
- Mac Download Count: 10
- der-vet.com Page Views: 367

– May Stats:

- Windows Download Count: 83
- Mac Download Count: 10
- der-vet.com Page Views: 655



User-Guide Access Map: <u>https://storagewiki.epri.com/</u>





Version 1.1 Release in July (tentative)

BUG FIXES

- Downloading Sample CSV files from the GUI
- Allow negative Day-Ahead energy price time series data when optimal sizing is turned OFF
- Saving the Optimization Horizon value
- Upload support for timeseries CSV file saved in Excel on a Mac

Version 1.1 Release in July (tentative) (II)

NEW FEATURES

- Less restrictive importing of Retail Tariff file
- Less restrictive process to import an existing project, and error messaging
- Validation on data received from project import .json file
- Add another pre-defined case (Electric Vehicles)

IMPROVEMENTS

- How-To video for installation on a Mac
- Better instructions for building DER-VET from source code



How-to submit Bug-Reports and Feature-Requests (I)





How-to submit Bug-Reports and Feature-Requests (II)

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https://www.der-vet.com/forum/



Use Case Database Planning



www.epri.com

Use Case Database

- Strong support, good indication of need
- No volunteers to start...
- Volunteering involves:
 - End product: Saved DER-VET case with associated description
 - Have an approach to solve a need using DER-VET
 - (optional) Engage with the Task Force to refine need/approach
 - Present the setup and results in a task force meeting
- Volunteers needed by 1 week from today
- Interested volunteers should email <u>mevans@epri.com</u>



Recent ES Analysis Projects



www.epri.com

Recent Microgrid Installation for Resilience

California Utility Operated DERs during PSPS

Enel X and Eaton Team Up on Solar and Storage Microgrid in Puerto Rico

Commercial and industrial customers are increasingly turning to solar-plus-storage for resilience.

EMMA FOEHRINGER MERCHANT DECEMBER 03, 2020



aton and Enel X will install the microgrid at Eaton's manufacturing facility in Arecibo. (Credit: Eaton)





Electric grid regulators said the U.S. will have to develop vast supplies of power storage – such as gigantic batteries – that rely on emerging technologies.





H-E-B, known for coming to the rescue with water and hot meals, added electricity to that list

Tired of power failures, including an embarrassing one at a store's grand opening, the grocer hooked up with a Houston energy technology company to install its own systems.



Microgrid Design for Customer Resilience

DER Technology Mix:

- BTM DERs
- Blue sky: ES+PV
- Island: ES+PV+DG

DER Sizing & Operation:

- Primary Objective: Customer Reliability/Resiliency e.g., 100% for 4 hours
- Secondary Objective: Maximize economic benefits (e.g., Bill Reduction)

Cost Effectiveness:

- DER ownership model: Customer owned and operated
- Life time of assets and replacement costs
 - ES 10 years, PV 20 years, DG 15 years
- Analysis time horizon: 20 years
- CBA Metrics: Cost of serving critical load, Annual bill reduction, Total project NPV





Financials Summary





How Reliability Target can be defined in DER-VET?

Planned Outages:

100% or <100% load coverage for target hours of **planned** outages

• Un-planned Outages:

100% or <100% load coverage for target hours (ex. 4 hours) of any possible un-planned outages

Relational Definition:

Reliability target for every outage length



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Microgrid is designed to have probabilistic reliability equal to or greater than the target



Microgrid Design for PSPS Events – California Case-Study

DER-VET Case-Study: Microgrid to support any 24-48hr outage in Summer during high winds season to avoid wildfire





Design Factor – Outage length

Microgrid size for various outage lengths



48hr load requirement – 55MWh

	Energy storage	Solar PV
24 hour	1.4 MW 17.6MWh	3.5 MW
36 hour	1.4MW 15.8MWh	5 MW
48 hour	1.4 MW 15.8MWh	7.5 MW



Design Factor – Load and PV Profile

The microgrid design depends on the load and PV profile input



- Magnitude (kW) of Load and PV
- Load and PV generation co-incidence
- The load shape and its variation at different levels customer level, service transformer level or substation level
- PV Variability consideration



Design Factor – PV Variability Assumptions

PV Dependability Assumptions

Solar plus Storage for different PV dependability%





Upcoming Analysis Needs

- Modeling battery services as the regulatory environment changes
- BTM uses cases for ES + Solar

- VPP

- Valuation benchmarks for IFOM storage in various configurations across regional markets
 - European Markets
 - Ancillary services
- storage as transmission asset for optimization of transmission network for evacuation of RE
 - Storage vs transmission for RE integration
 - Optimize storage and net generation profile for 5-7GW of renewable energy under 3-5GW transmission limit
 - Transmission utilization maximization
 - How does this change over time as storage costs fall and need changes?

Regularly-Scheduled Meetings

Next Meeting – Thursday July 1st, 11:00 am Pacific Time



Together...Shaping the Future of Electricity