

DER-VET Task Force

ESIC Working Group 1: Grid Services and Analysis

Andrew Etringer | EPRI

Ram Ravikumar | EPRI

October 7, 2021



Antitrust Guidelines

Antitrust laws apply to EPRI, its members, funders, advisors, licensees, contractors, and vendors. Violations can lead to civil and criminal liability.

DO NOT DISCUSS...

- Pricing, production capacity, or cost information which is not publicly available;
- Sales territories, market shares, future product offerings;
- Confidential market strategies or business plans;
- Other competitively sensitive information;
- Advise or try to influence others on their business decisions (except to the extent that they are already public);
- Complaints or disparaging remarks concerning customers/suppliers/competitors.

DO NOT AGREE...

- To discriminate against or refuse to deal with a supplier (boycott);
- To only do business on certain terms and conditions;
- To set (or fix) prices;
- To divide markets or technologies;
- To allocate customers/suppliers/territories;
- To suppress a technology;
- To the use, promotion or endorsement of particular vendors, contractors, consultants or products.

Webcast and Recording Notification

- The webcast is being recorded along with all Q&A. Your participation provides consent to that recording.
- As a result, please make sure your phone is on mute throughout the webcast unless speaking. Do not place your phone on hold.

DER-VET Task Force

ESIC Working Group 1: Grid Services and Analysis

Andrew Etringer | EPRI

Ram Ravikumar | EPRI

October 7, 2021



www.epri.com

© 2021 Electric Power Research Institute, Inc. All rights reserved.



Agenda

- DER-VET update
- Case Study



DER-VET Update

You Are Here: [Home](#) > [Software](#)

Latest Software Release

. DER-VET™ Version 1.1

- Released: 2021-09-15 (GUI version 1.1.2)
- **Download GUI App (use the form below)**
- **Access the User Guide**
- **License**
- **EPRI's public GitHub Repositories** [DER-VET-GUI](#) | [DER-VET](#) | [storageVET](#)
 - **Command-Line DER-VET** (Python source code) can be downloaded directly from these GitHub pages above
- **Requirements for GUI App:** A recent Windows or Mac Operating System
- **Citation** (please include this when using DER-VET):

Distributed Energy Resource Value Estimation Tool (DER-VET™ v1.1), Program 94. EPRI, Palo Alto, CA: 2021. 3002022479. Software retrieved from <http://der-vet.com>

Access the **CHANGELOG.md** files

EXIT



ELECTRIC POWER
RESEARCH INSTITUTE

DER-VET GUI Changelog (v1.1.2)

GUI repo

▪ Added

- adds plotly button to reset axes in lower Results Dispatch, Results Reliability, and Results Summary plots
- adds Choose Install Location option in Windows installation

▪ Changed

- Results Deferral plot has less plotly options
- Changed the expected type to float for yearly_degrade battery input

▪ Fixed

- Save buttons were fixed so as not to reset all project data
- The size of the DER-VET brand in the Top Navigation Bar was adjusted to not get very large when zooming and re-sizing the app window
- The unit label of variable o&m cost was again fixed to match the backend
- Fixed bug that was prevented saving the Minimum Power for a Diesel Generator Technology
- Fixed bug with Retail Tariff file Import

Backend Python DER-VET Changelog (v1.1.2)

DER-VET repo

- **Changed**
 - Changed the expected type to float for yearly_degrade battery input
- **Fixed**
 - Degradation Fix: more descriptive column header names on Results files
 - Simplifies system_requirements infeasibility checks
 - Fix to allow minimum battery sizing user constraints to work

StorageVET repo

- **Changed**
 - Changed the expected type to float for yearly_degrade battery input
- **Fixed**
 - a bug that checks infeasibility in User Services timeseries inputs was fixed
 - Degradation Fixes
 - State of Health calculation was corrected
 - Application of calendar degradation was corrected
 - Simplifies system_requirements infeasibility checks
 - removed place where this being checked redundantly
 - fixed a bug that reports a contributor list to an error

You Are Here: [Home](#) > Help

Link to User Guide

- [User Guide: Main Page](#)

Troubleshooting Help

- [User Guide: Frequently Asked Questions](#)

Report Bugs and/or Request Features

Question	Answer
How can I determine what version of the DER-VET app I am using?	<p>There are two ways to determine the version:</p> <ol style="list-style-type: none"> 1. From the main starting page of the GUI, click the link titled About this Application. found at the bottom of the page. The first line of text shown displays the version of DER-VET. 2. With the DER-VET app open, find the drop-down menu bar items (<i>DER-VET, File, Edit, View, etc.</i>), click DER-VET, and then About DER-VET. This action opens a small window that displays the version of DER-VET. The drop-down menu bar items are located: <ul style="list-style-type: none"> • <i>Windows users:</i> along the top-left portion of the GUI window • <i>Mac users:</i> along the top-left portion of your screen.



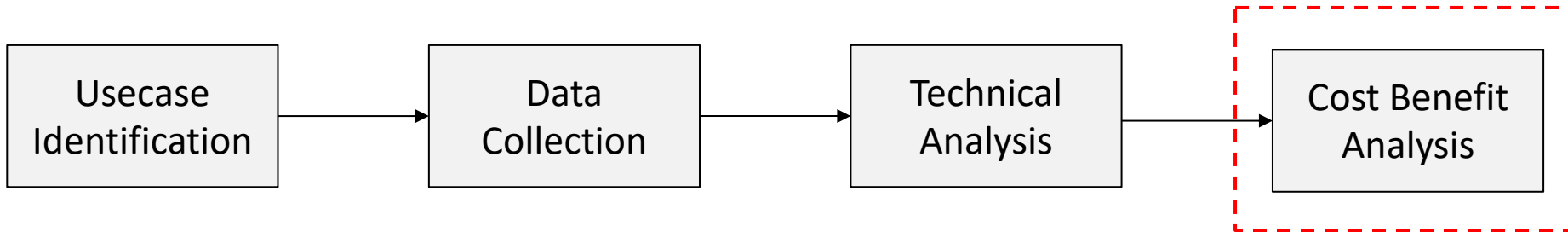
ELECTRIC POWER
RESEARCH INSTITUTE

DER-VET Feedback



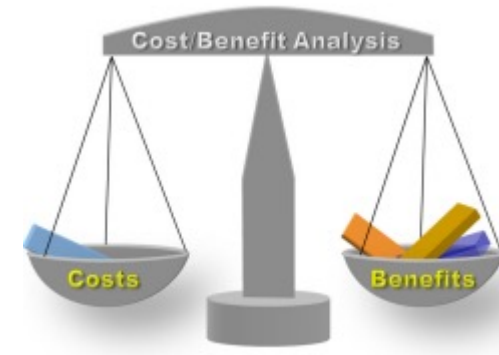
Case Study

Cost Benefit Analysis (CBA) Approach



Common Research Questions:

- Does the project benefits outweigh the costs?
- What is the conventional solution to the problem that the BESS is trying to solve?
- Is the avoided cost of providing the primary service high enough to justify BESS installation?
- How do the different cost and benefit components affect project economics?



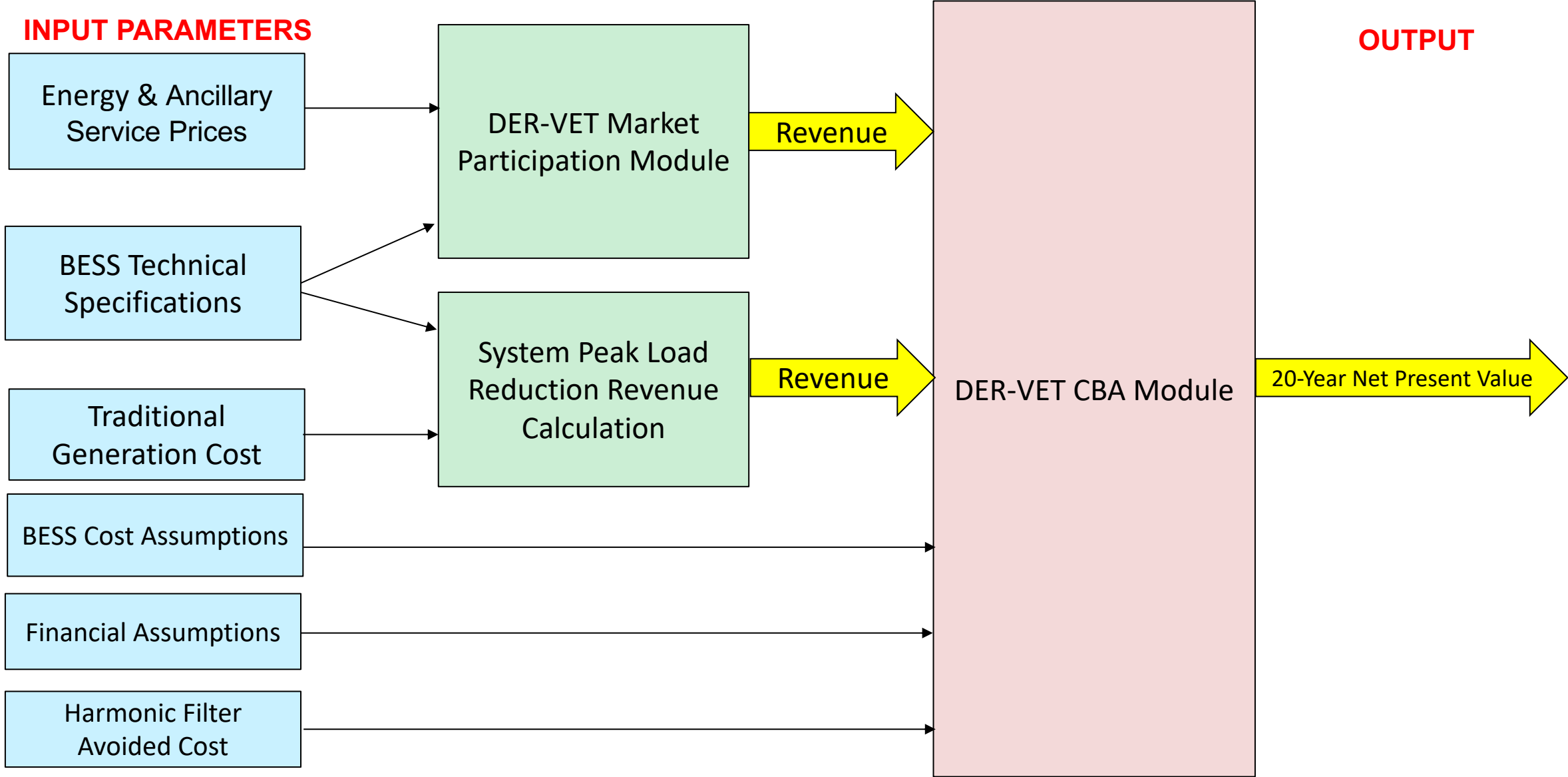
Cost & Benefit Streams

- The analysis involved comparing a base case *without* BESS to a change case with BESS
- The objective is to determine whether the value streams considered would be sufficient to cover the BESS capital and O&M costs, and possibly yield a net economic return

	Costs	Benefits
	<ul style="list-style-type: none">• Turnkey cost of the BESS• Replacement cost of the BESS• Fixed & Variable O&M Cost	<ul style="list-style-type: none">• System peak load reduction• Avoided distribution upgrade (harmonic filter)• Revenues from energy and ancillary services

- Analysis Horizon: 20 Years
- Inflation and Discount rates apply

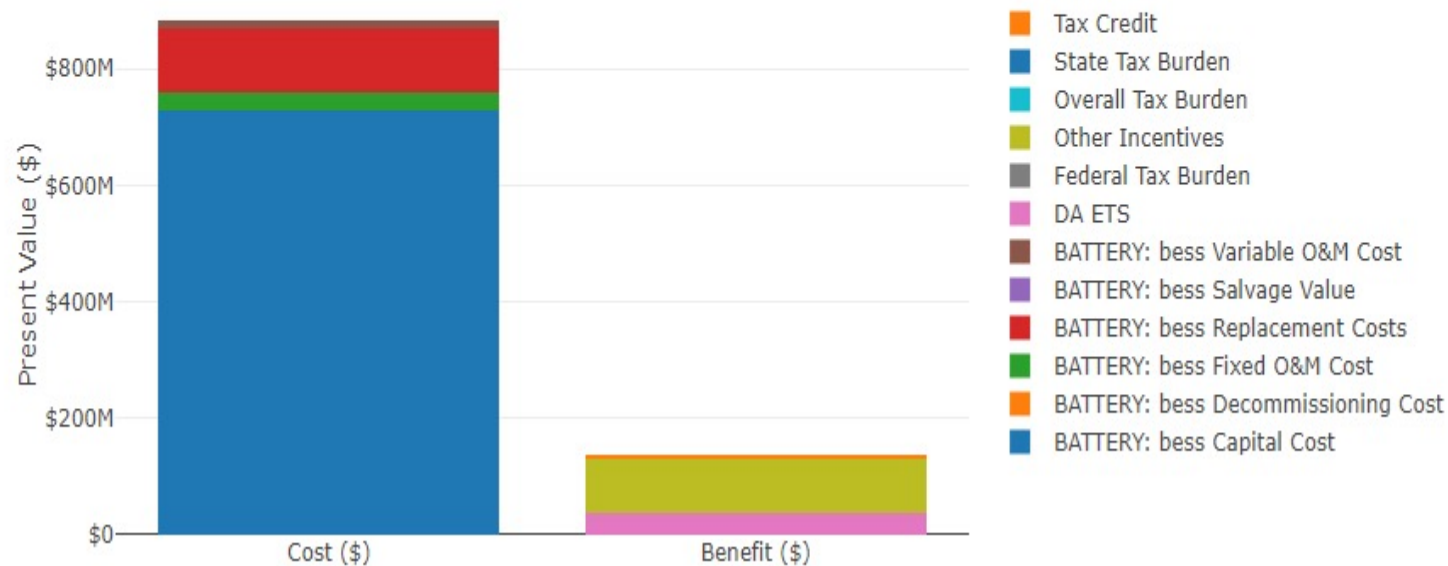
DER-VET Modeling Approach



Financial Result Summary

Simple Payback Period: 38 years

Cost versus Benefit by Value Stream



	In Dollars
BESS CAPEX	\$1214/kW
BESS Breakeven Cost	\$159/kW

- Avoided cost of primary service not high enough to justify BESS installation
- Lessons learnt from the CBA can be used as a screening criteria for choosing the right usecase/site/technology selection

A blue-tinted photograph of four people standing in a row. From left to right: a woman with curly hair and glasses wearing a lab coat; a man with glasses wearing a lab coat; a woman wearing a hard hat and safety glasses, also in a lab coat; and a man with glasses and a beard wearing a button-down shirt. The lab coats and hard hat have the 'EPRI' logo on them. The background is a solid blue gradient.

Together...Shaping the Future of Electricity