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DER-VET Task Force

ESIC Working Group 1: Grid Services and Analysis

Miles Evans | EPRI
Andrew Etringer | EPRI

February 3, 2022

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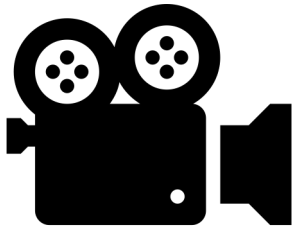
Webcast Reminders



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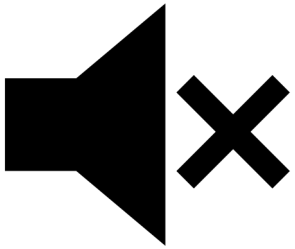

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Abide by Antitrust Guidelines

Chat to “Everyone” for maximum interaction

The slides and recordings will be posted to www.der-vet.com/esictf/

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Agenda:

- DER-VET Software Update
- Converting GUI Project .json files
- Polling & Task Force 2022 Priorities
- DER-VET Application: Vehicle to Building Backup Power

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DER-VET Software Update

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DER-VET: New Release is coming soon

- Bug Fixes (*Python backend, GUI*)
- Improved fuel cost methods (*Python backend, GUI*)
- Support for Python 3.8
- New Thermal Load Technologies (*Python backend only*)
- User Experience Improvements (*GUI*)

Thank you for reporting bugs to us.

Please do send any new bug reports to us and we will address them.

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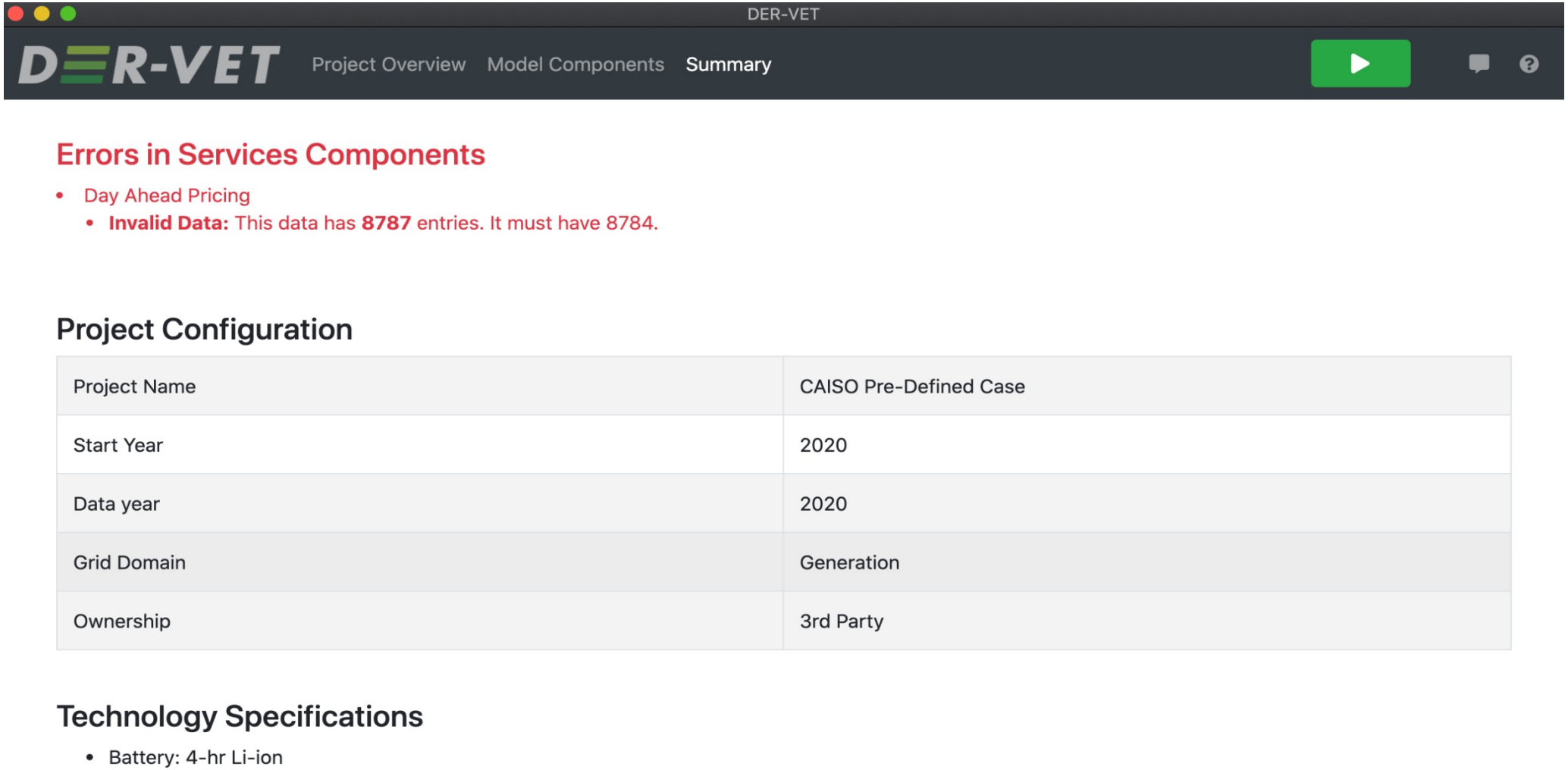
DER-VET: New Release is coming soon

GUI User Experience Improvement: Imported Projects will undergo time series data validation



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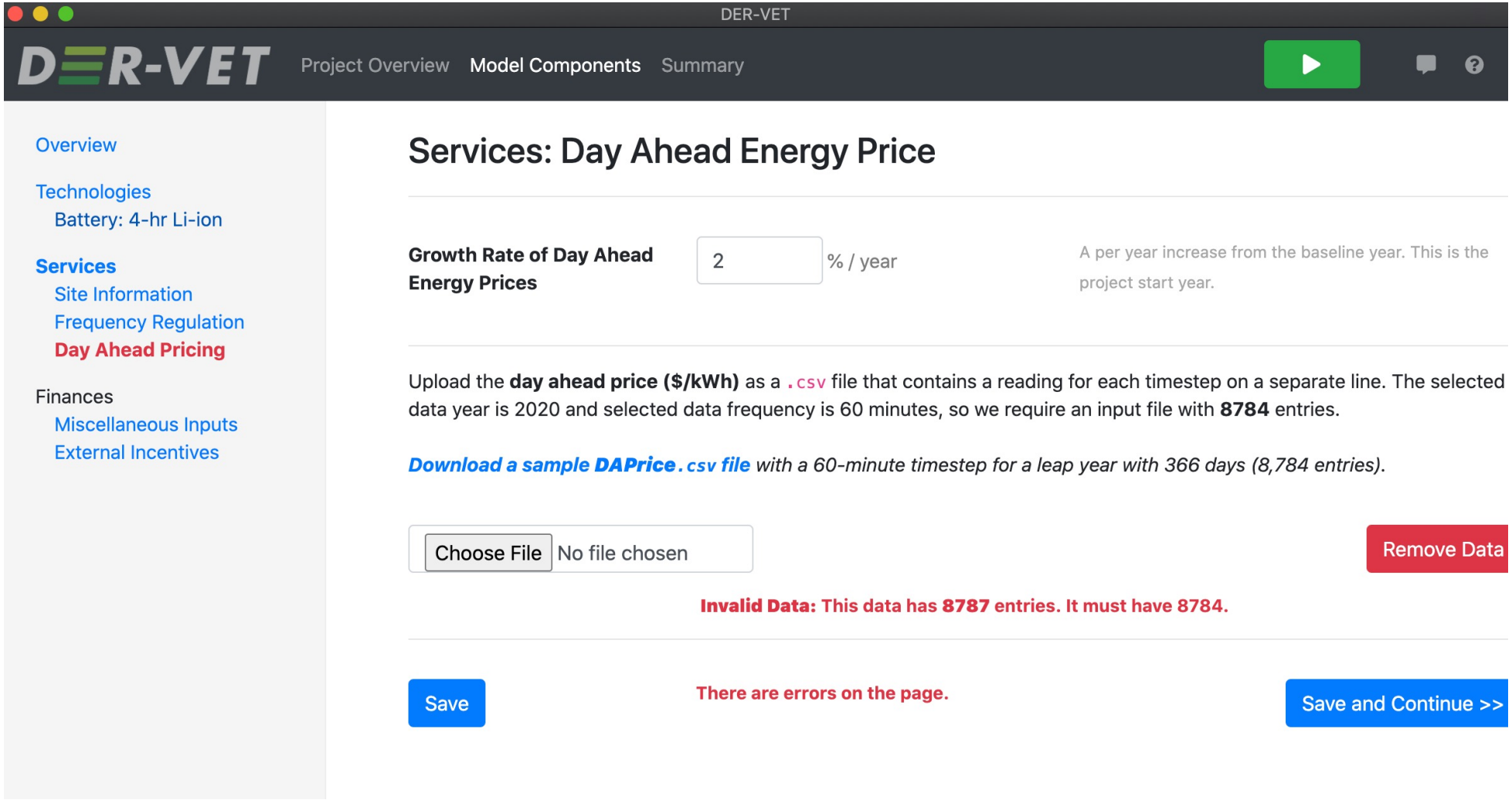
DER-VET: New Release is coming soon



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Converting GUI Project .json files

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DER-VET GUI Project .json files

- a **project.json** file is created when you export a project from the GUI

- The next DER-VET GUI release (v1.2) has re-structured the format of this file
  - **project.json files created with the current DER-VET GUI (v1.1) will not be directly compatible in v1.2, and vice versa**
  - We have created a simple python script to translate a v1.1 **project.json** file so that it can be Imported in DER-VET GUI v1.2
  - The script will live in the DER-VET Backend Python repository (available on GitHub)
  - Run it on the command-line in the same manner as run_DERVET.py

- Example Usage (in a terminal window):

```
python migrate_project_DERVET_GUI.py <project-folder-path>
```


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DER-VET GUI Project .json files

- python migrate_project_DERVET_GUI.py –h

```
usage: migrate_project_dervet_GUI.py [-h] v1_directory_name

This script converts an existing version 1.1 DER-VET GUI Project into a new
'project.json' file for import into version 1.2 of the DER-VET GUI. A single
argument (a directory/path which contains a project.json file) is required.
This directory will not be altered. A new directory is created (with '_v2'
appended to the name) which will contain the new converted 'project.json'
file. Should be used with Python 3.2 or greater

positional arguments:
  v1_directory_name  specify the directory name to work on

optional arguments:
  -h, --help         show this help message and exit

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```


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DER-VET GUI Project .json files

Example Usage (in Terminal):

```
> python migrate_project_DERVET_GUI.py ~/Downloads/Bill-Reduction-Project/

Input v1 DER-VET GUI Project file:
  /Users/paet001/Downloads/Bill-Reduction-Project/project.json

A v2 project.json was created:
  /Users/paet001/Downloads/Bill-Reduction-Project_v2/project.json
```


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DER-VET Application: Vehicle to Building Backup Power

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V2B Case Setup

- EV technology in DER-VET is only capable of managed charging
- Two options for V2B backup power
  - For foreseen outages (e.g. PSPS, hurricanes, etc.), use a battery with 100% SOC to model the vehicle
  - For unforeseen outages, we can model different starting SOCs to understand the likelihood of surviving an outage

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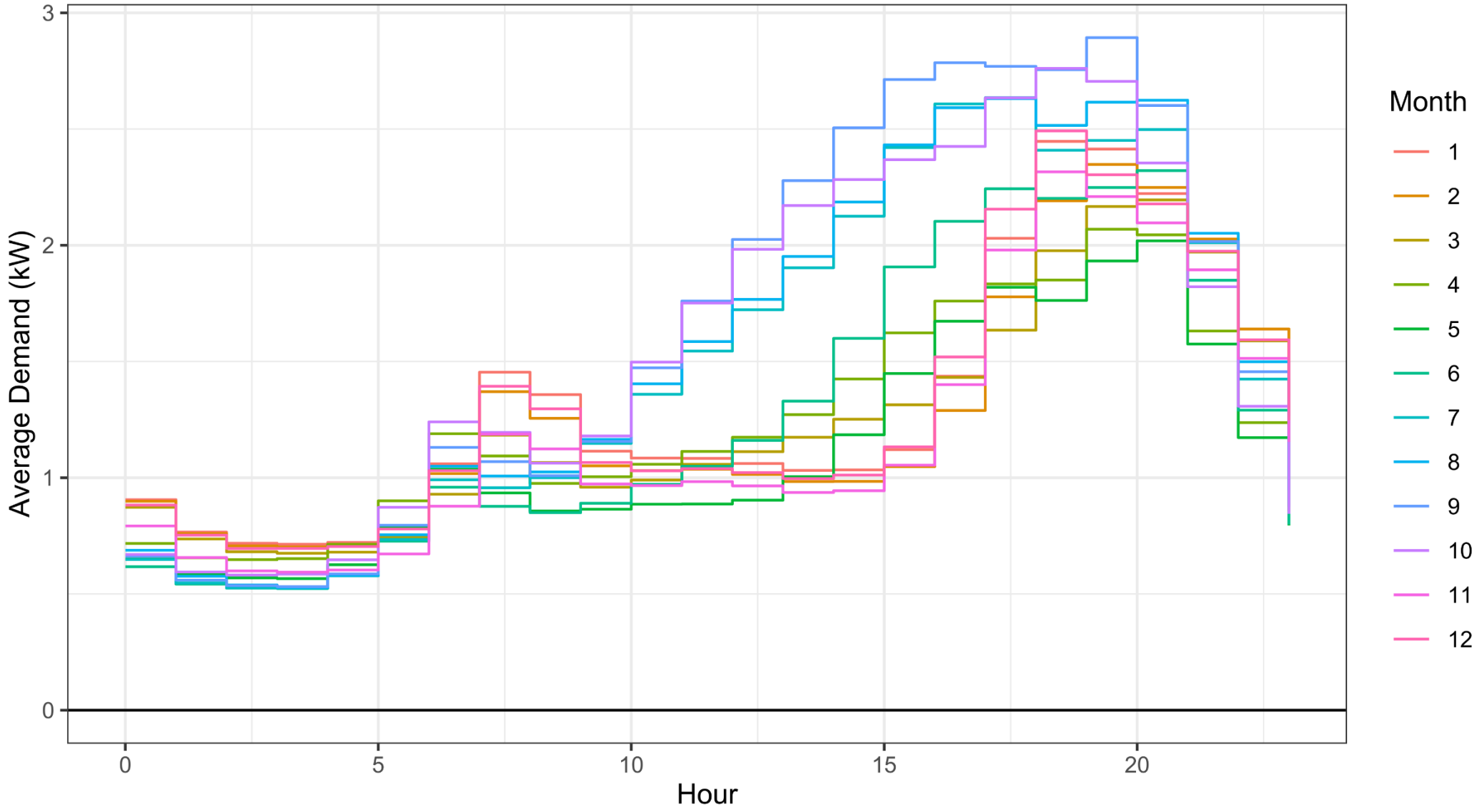
V2B Case Setup



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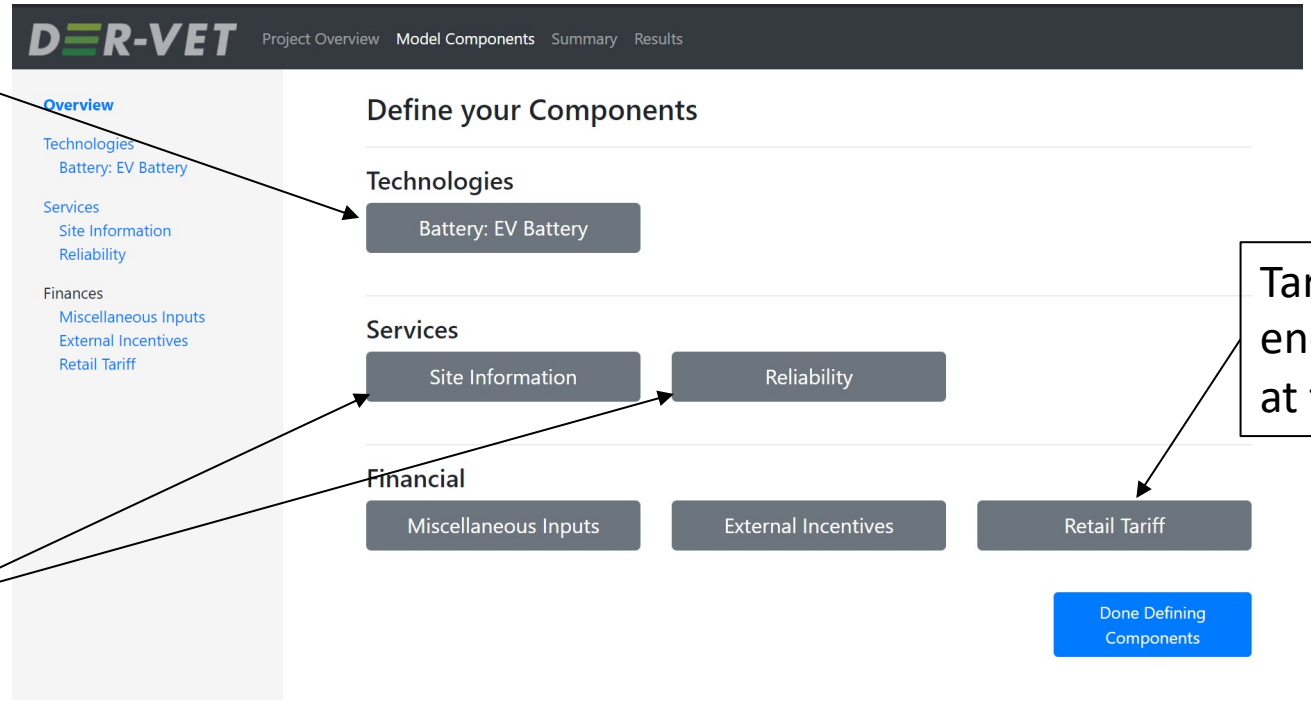
V2B Case Setup

150 kW/60 kWh simple battery

Maximum SOC and target SOC are based on EV SOC at beginning of outage



Tariff imposes a flat energy price to keep SOC at target for all hours

Site Load and Critical Load are the single family home

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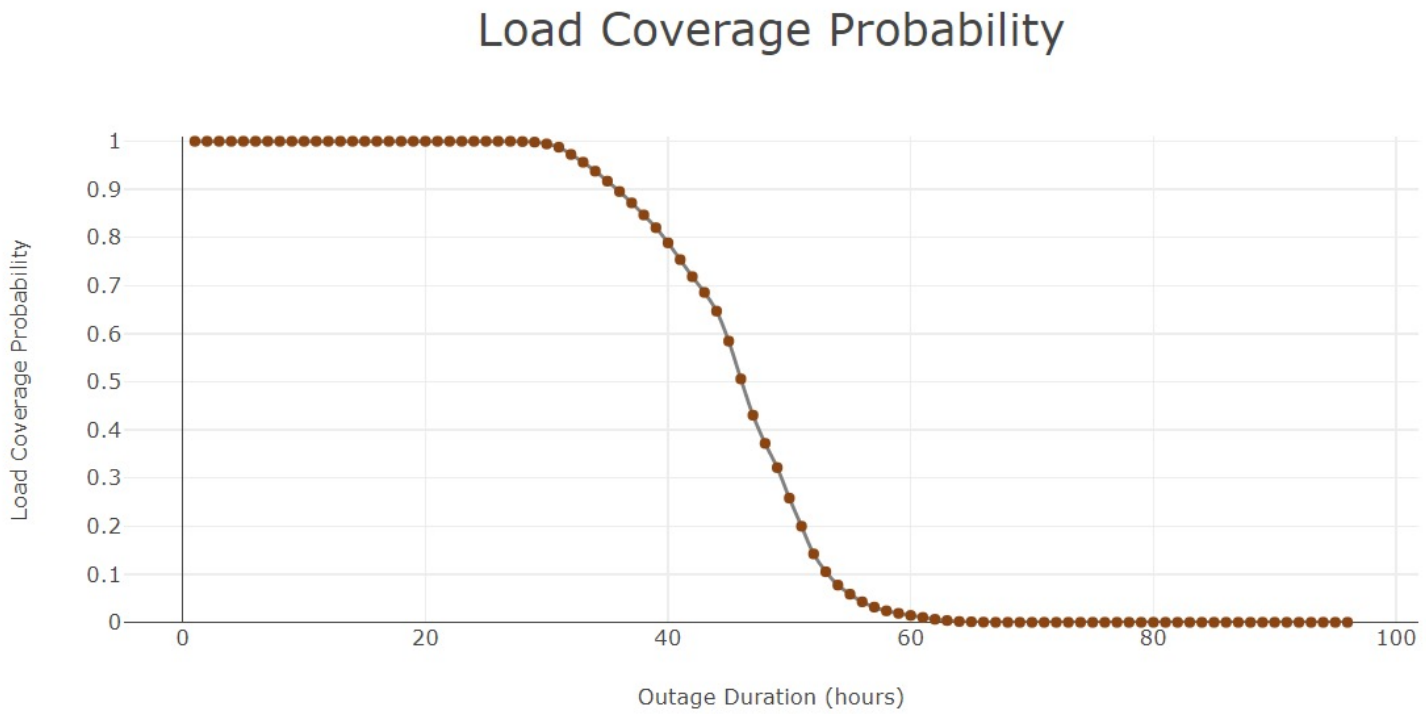
V2B Case Setup

- Hypothetical 60 kWh usable EV battery
- Whole home backup, no load shedding
- Planned outage – 100% SOC



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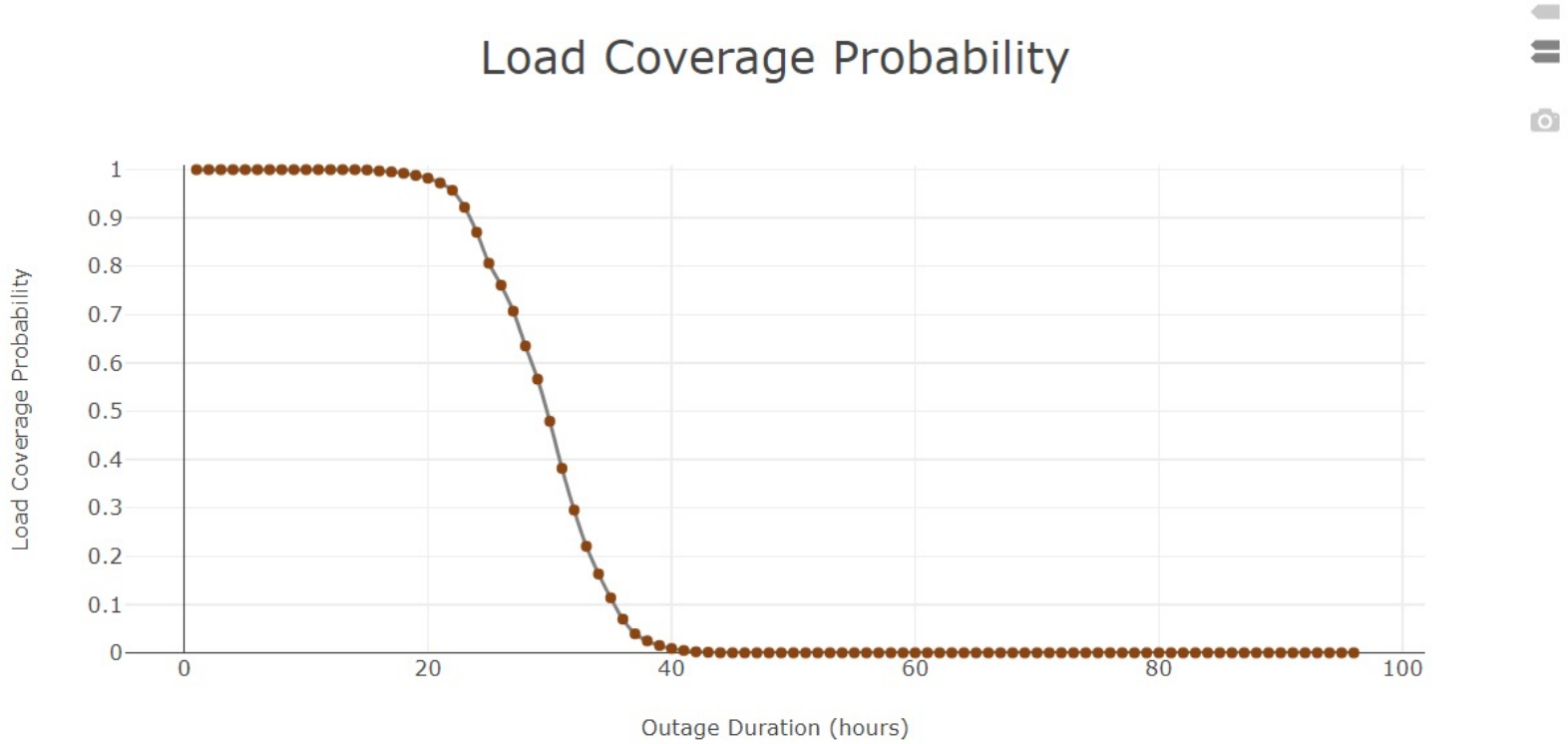
What if the vehicle only has 80% SOC?



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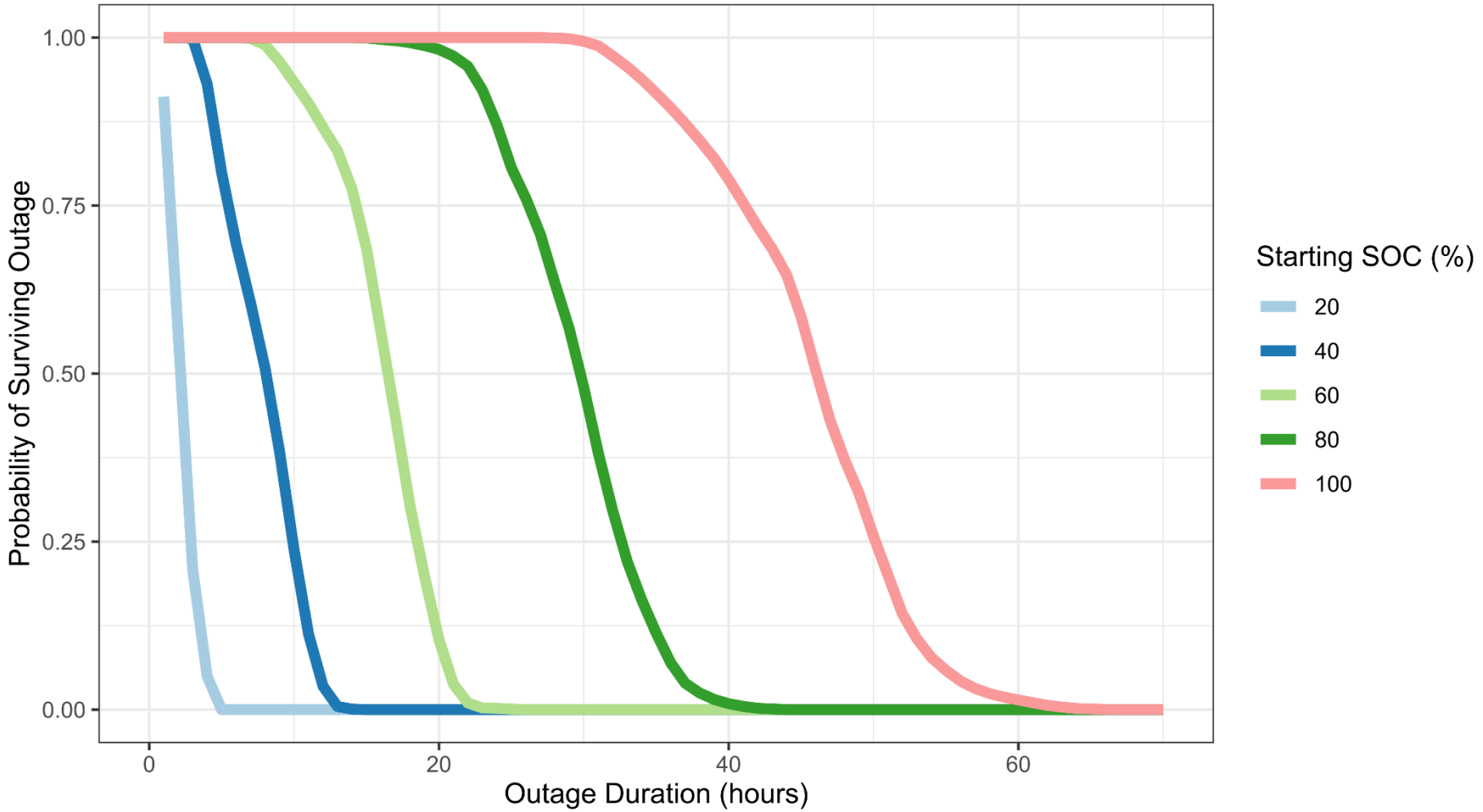
EV may start an unplanned outage at any SOC



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EV Schedule

- 9 hours per day away
- Returns at 20% SOC
- Charges for 4 hours to 100% SOC
  - 1 hr at 40%, 1 hr at 60%, etc.

Hour	Available SOC (%)	Probability of Covering 24-hr Outage	Probability of Covering 4-hr Outage
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	20	0	0.049560352
11	40	0	0.930912413
12	60	0.001945748	1
13	80	0.870436076	1
14	100	1	1
15	100	1	1
16	100	1	1
17	100	1	1
18	100	1	1
19	100	1	1
20	100	1	1
21	100	1	1
22	100	1	1
23	100	1	1
24	100	1	1
Overall Probability		**0.494682576**	**0.582519699**

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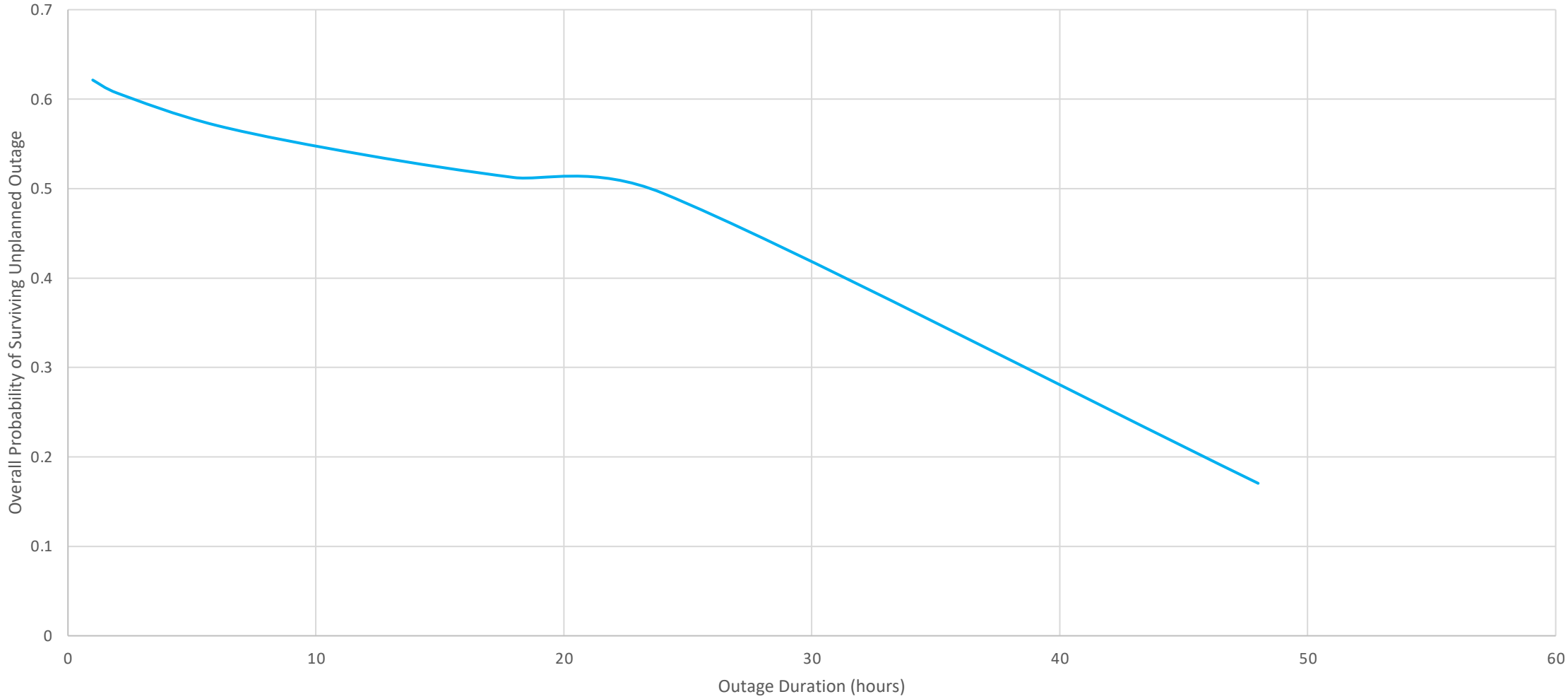
Overall Probability of Covering Unplanned Outages



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Polling & Task Force 2022 Priorities

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Next Meeting March 3, 2022
11 AM Pacific Time

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