SPONGE Microgrids

Commercial Solar + Battery Assessment for: SAMPLE CUSTOMER

A Comparison of system types for Class B Customers

2025.07.16

CONTENTS

Cost & Incentive Breakdown

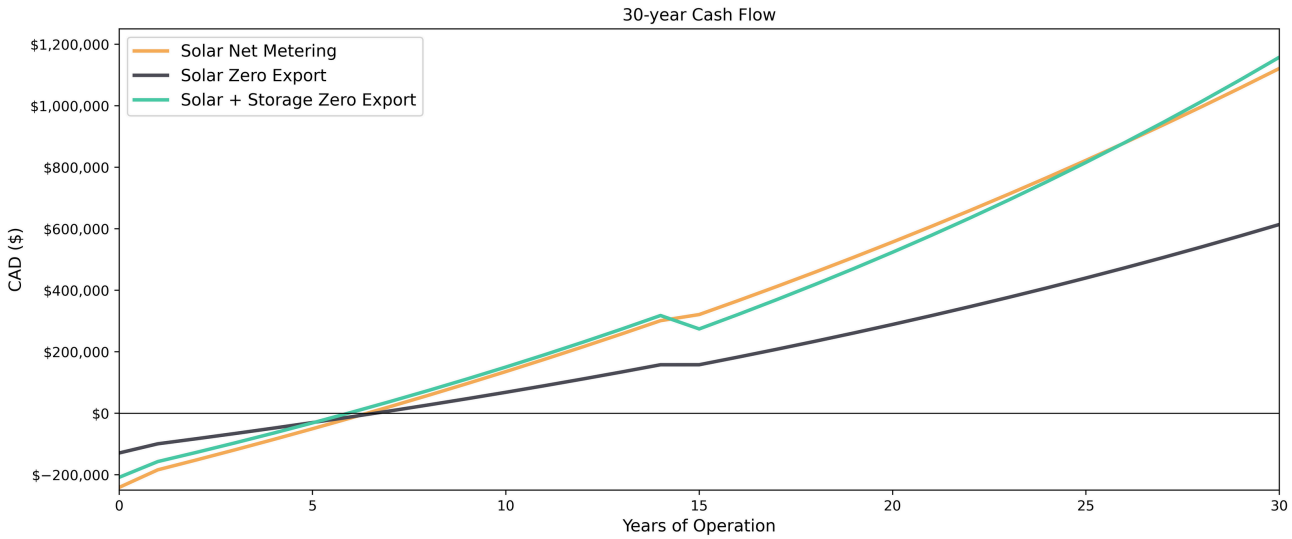
Option	Net Meter Solar	Zero-Export Solar	Zero Export Solar + Storage
Solar Capacity (kW dc)	189	189	189
Battery Capacity kWh/kW	0/0	0/0	200/100
BUDGET COST	**$340,910**	**$341,785**	**$451,533**
Load Displacement Incentive	$0	$159,100	$159,100
Federal Investment Tax Credit (20%)	$68,182	$36,537	$58,467
Acceleration Capital Cost Allowance	$31,500	$16,880	$27,020
NET COST	**$241,227**	**$129,267**	**$206,926**
Future Capital Cost Allowance	$26,254	$14,266	$21,129

COST BREAKDOWN

Financial Performance

Option	Solar Net Metering	Solar Zero-Export	Solar + Storage Zero Export
Net Cost	$241,227	$129,267	$206,926
Energy Savings	$28,485	$13,386	$17,819
Demand Savings	$3,212	$3,212	$11,275
Total Annual Savings	$31,697	$16,598	$29,094
Payback Period	**6.1**	**6.6**	**5.9**
IRR	16.3%	15.9%	17.7%
NPV	**$502,204**	**$270,270**	**$516,757**

Comparative Lifecycle Cash Flow



Financial Assumptions

- Demand Cost Escalation: 5%
- Energy Cost Escalation: 3%
- Discount Rate: 4%
- Asset Life: 30 Years
- Solar Degradation Rate: 0.4%/yr
- Battery Degradation Rate: 1%/yr
- Maintenance Cost: $1000/yr
- ITC Claim Rate: 20%
- Marginal Tax Rate: 21%

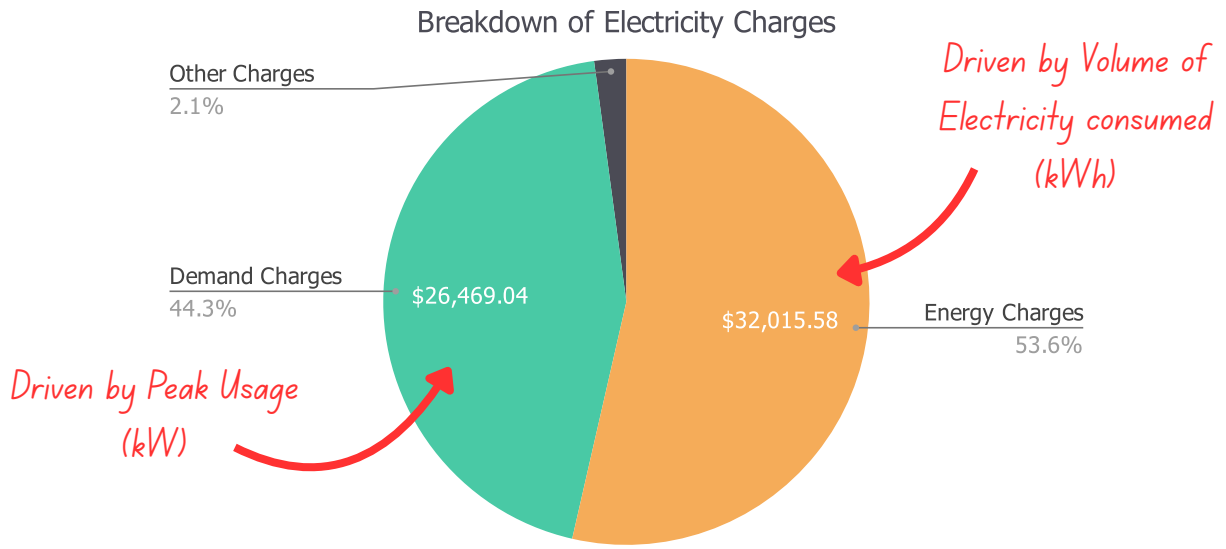
FINANCIALS

Facility Background

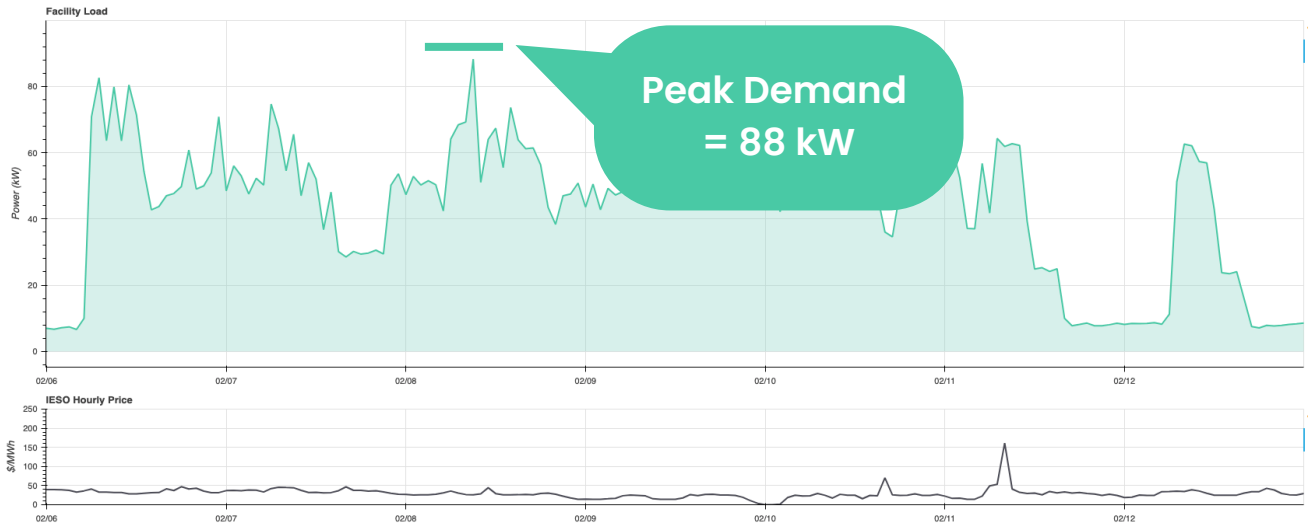
The Facility under study is a Class B manufacturing facility in Central Ontario, connected the Hydro One's distribution grid. They recently ungraded their service, and have a monthly average peak load of 88 kW.

Load Statistics

$61,021 Annual Electricity Cost	**$26,469** Annual Demand Charge	**$32,015** Annual Energy Charge
2.82 Peak Index	**88 kW** Average Monthly Peak	**279 MWh** Annual Energy Usage



Load Profile Sample



LOAD ANALYSIS

Definitions:

Demand Charges = Delivery Fees - Fixed portion

The 'Demand Charge' is the total annual 'Delivery' Fees **(3)** from your bill Your bills Delivery Fees are a complex combination of other fees, most of which are influenced by your Peak Demand. Adding solar will have a small impact on demand charges, assuming that your monthly peak demand occurs during a period of solar production. Adding a battery specifically deployed to offset demand peaks can significantly reduce your monthly delivery fees.

Average Monthly Peak (kW)

The maximum amount of power that your facility drew from the grid each month averaged across a period of one year.

Peak Index

The ratio between your peak consumption and your average hourly consumption. The larger the multiplier, the greater potential for demand charge reduction.

Energy Charges = Electricity + Global Adjustmemt + Regulatory

Annual Energy Charges are the total of Electricity **(1)** and Global Adjustment **(2)** fees listed on your bill. For Class B customers with Hydro One, both Electricity and Global Adjustment fees are variable rates which change hourly. The rates that you see on your bill are the average rate over the course of the month. Both Solar and Battery investments can reduce your total Energy Charges by offsetting the volume of electricity that you pull from the grid.

[redacted] - Sample Bill

hydro one

Service address: [redacted]

Your account number: [redacted]

How we calculated your charges

Balance forward	Amount of your last bill	$11,299.50
	Balance forward	**$11,299.50**

Your electricity charges

Your service type is General Service - Demand

Electricity - kWh
Meter J3923297 for billing period April 29, 2023 to May 30, 2023
Your metered hourly interval usage in kilowatt-hours = 18,527.8500 kWh
Adjusted usage in kilowatt-hours (18,527.8500 x 1.0610*) = 19,658.0489 kWh
(For more details on your usage information - sign on to our portal)

Demand - kW
Your hourly peak for billing purposes occurred on May 01, 2023 at hour ending 1 PM
Actual maximum hourly kW was = 86
Total demand in kilowatts = **86 kW**

Demand - kVA
Your hourly peak for billing purposes occurred on May 03, 2023 at hour ending 9 AM
Actual maximum hourly kVA was = 97
97 x 90% = 88 kVA
Total demand in kVA = **88 kVA**

Your Power Factor is 86 kW ÷ 97 kVA = 88%.

The 'distribution' portion of your delivery charge is based on 88 kVA as it is higher of 90% kVA and 100% kW.

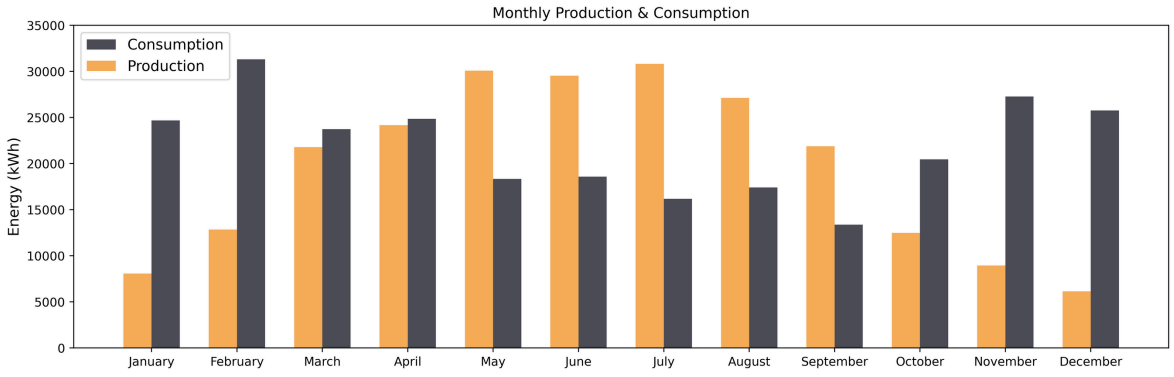
1	Electricity: Electricity by Active Energy	$428.38
	YOU ARE BUYING YOUR ELECTRICITY FROM ACTIVE ENERGY INC	
	1-866-628-9427, www.activeenergy.ca	
2	Global Adjustment: 19,658.0489 kWh @ 8.248988 ¢	$1,621.59
	Global Adjustment Rate Rider: 18,527.8500 kWh @ -0.090000 ¢	$16.68 CR
3	Delivery	$2,304.33
	Regulatory Charges	$102.22
	HST (87086-5821-RT0001)	$577.18
	Total of your electricity charges	**$5,017.02**

PV ARRAY SPECS

PV System Design

Our analysis begins by sizing the solar PV array as any designer would in a typical net metering scenario - maximizing the output from the roof subject to shading and annual usage constraints.

189 kW	229 MWh	10°
Total DC Capacity	Annual Generation	South-facing Tilt



*A PV Array can significantly reduce Energy Charges (kWh) but will have little effect on Demand Charges (kW).

Battery Size Recommendation

200 kWh	100 kW	10 yr
Storage Capacity	Power Capacity	Warranty Life

A suitable battery is selected for your facility based on a combination of factors, including:

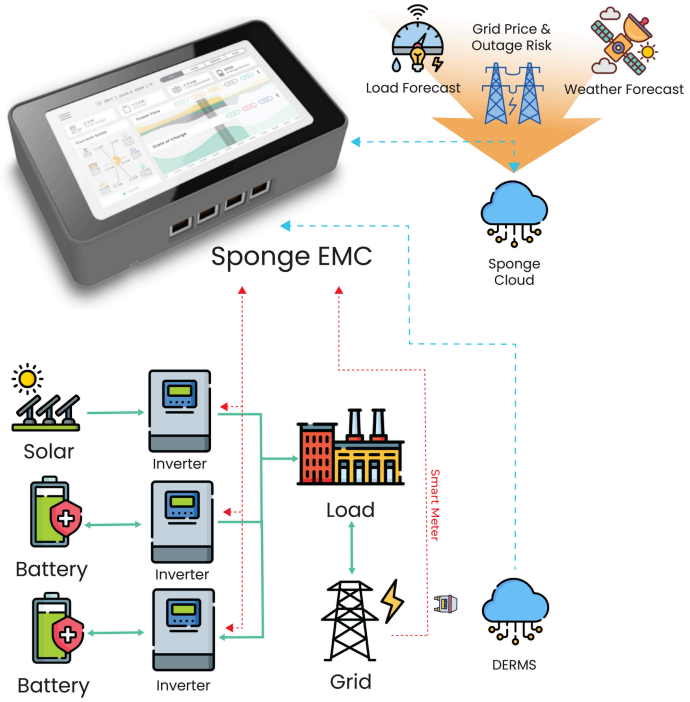
01. **Self Consumption:** How much storage is required to absorb the typical daily excess PV production that would otherwise be curtailed/lost?.

02. **Demand Management:** How much storage and at what power level is required to shave the typical load peaks observed in the load data?

03. **Market Availability:** What products are available in the market that offer the closest match to these target specs?

Battery sizing comes down to a question of economic design optimization. This is a process that requires the iterative assessment of battery capacity and cost against energy offset goals and long-term savings. The battery size presented above maximizes your RoI by providing capacity to service both self-consumption and demand charge reduction.

Sponge Energy Management Controls



The Sponge EMC is the intelligent control solution that harnesses the battery's storage capacity to minimize your energy bill.

The EMC's patented, industry-leading forecasting mechanism allows the it to balance multiple energy savings objectives at once.

*Adding a Sponge Controlled Battery allows for targeted reduction of both Energy Charges (kWh) AND Demand Charges (kW)

BATTERY SPECS

DESIGN OPTIONS

01. NET METER SOLAR ONLY

Net Metering means that all excess solar not consumed by onsite load is immediately exported to the grid. The utility uses a bidirectional meter to measure how much power flows back to grid, and applies a 1:1 credit to the energy bill based on the the price of electricity at the time of export.

If the 40 kWh of energy are exported to the grid when the cost of energy is 12 cents/kWh, the bill is credited $4.80.

02. Zero Export Solar Only

Excess power being exported to the grid under net-metering programs can cause grid stability problems. For this reason, many governments, including Ontario, choose to design programs which provide an upfront capital rebate if the system owner agrees to not export to the grid. Under this condition, the solar inverter is controlled to only produce up to what the facility is using. While government incentives can significantly reduce the capital burden of installing solar, 'Zero Export' projects typically have lower return on investment potential, since less solar energy is produced.

03. Zero Export Solar + Storage

To mitigate losses created by Zero-Export constraints, many renewable system owners opt to add battery storage. Batteries capture and store excess solar energy, and deploy it after panels have stopped producing.

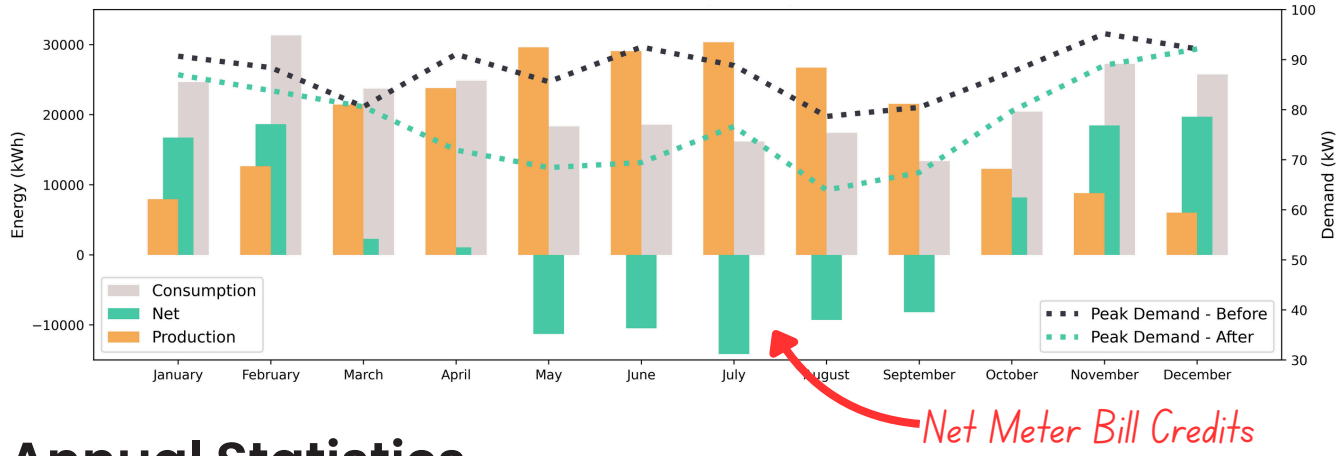
Batteries can add a significant capital expense to solar projects, but the current incentive environment makes them a highly competitive solution.

Once batteries are installed, intelligent control solutions like the Sponge EMC allow them to be utilized for targeted cost saving efforts.

Option 1: Net Meter Solar

- Highest Capital Cost: $**245,731**
- Strong Net Present Value: **$498,163**
- Savings primarily derived from reducing volume of energy procured from the grid.
- A small amount of savings derived from reducing peak consumption

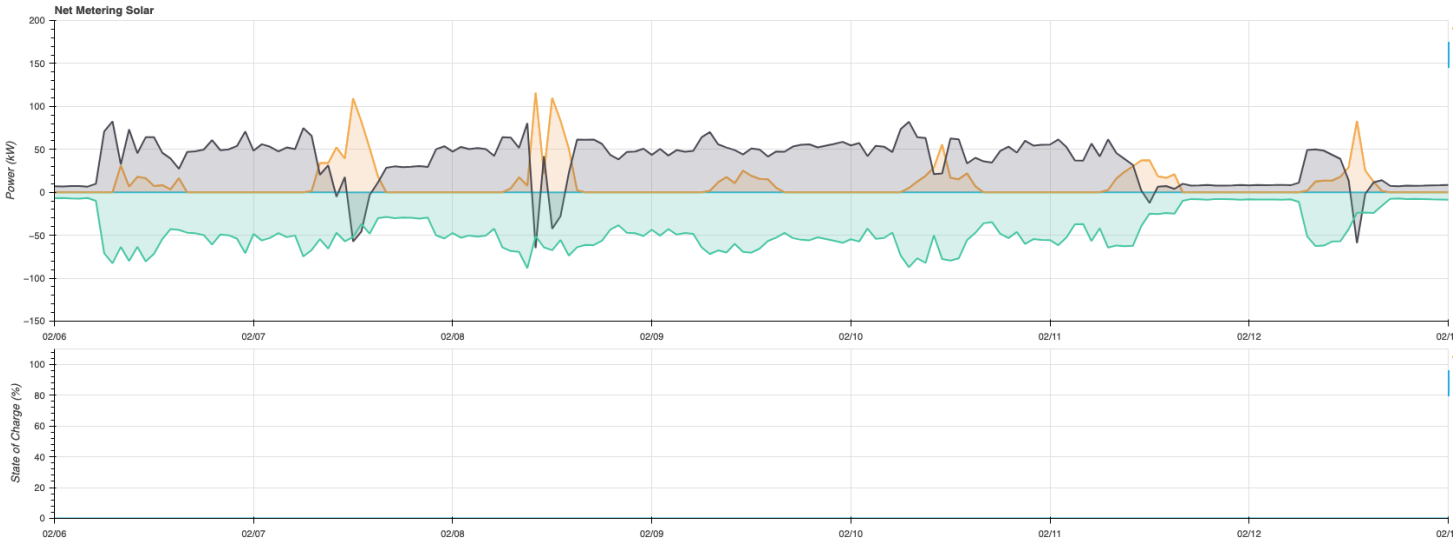
Monthly Production Summary



Annual Statistics

229 kWh	$28,485	78 kW	$3,212
Utilized Generation	Energy Savings	Average Peak	Demand Savings

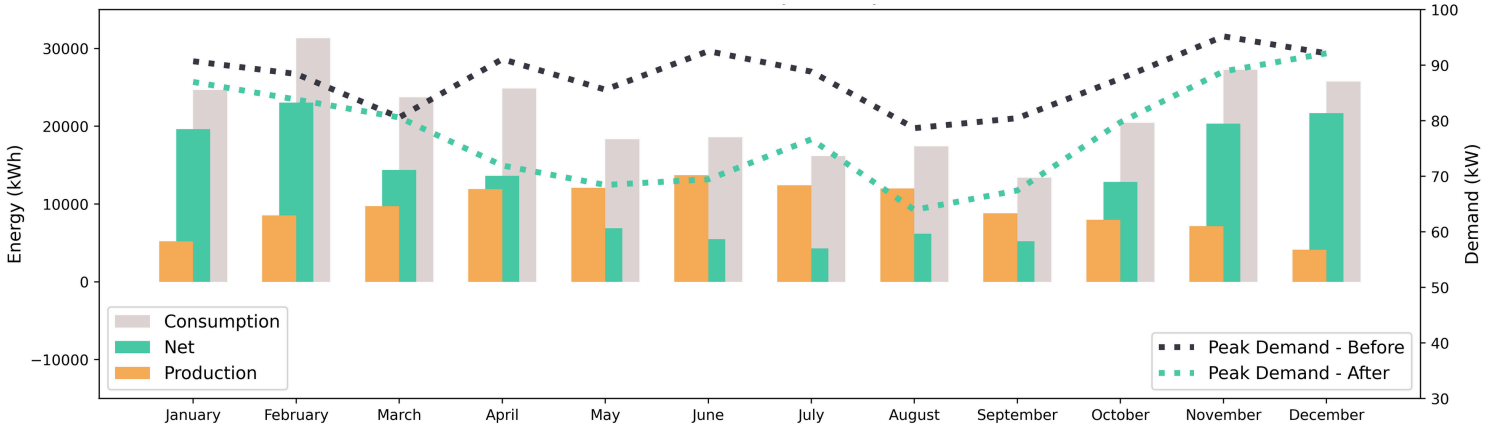
Sample Energy Performance



Option 2: Zero Export Solar

- Lowest Capital Cost: **$133,524**
- Lowest Net Present Value: **$266,452**
- Significantly reduces volume of solar produced, resulting in lower NPV
- A small amount of savings derived from reducing peak consumption

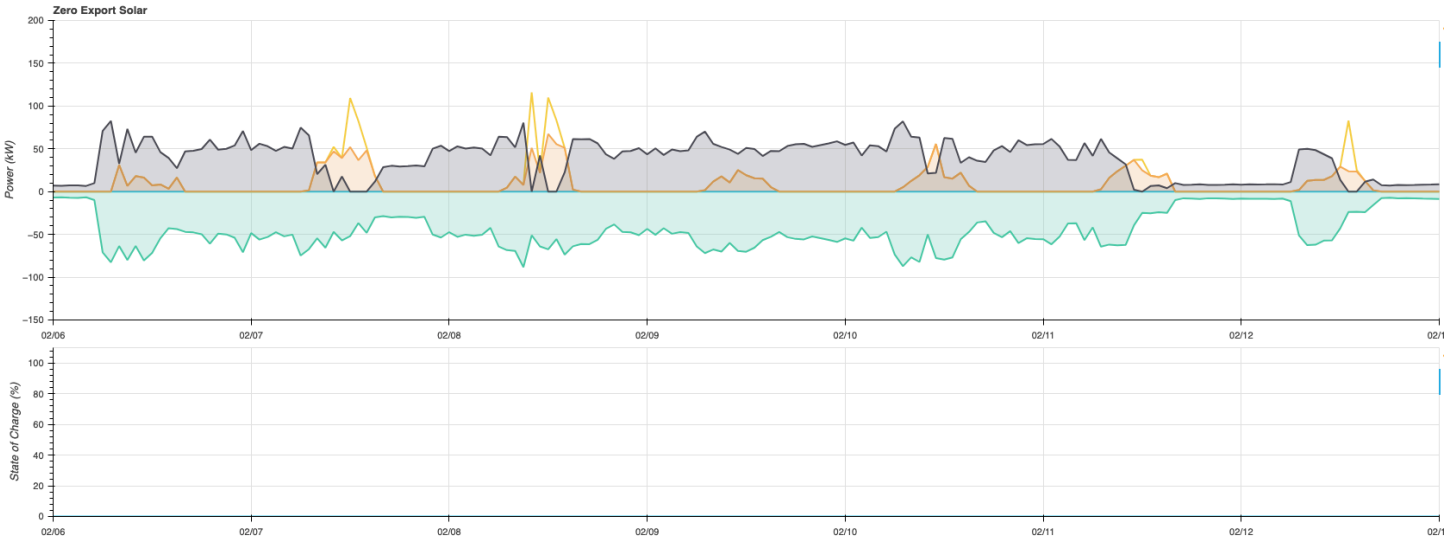
Monthly Production Summary



Annual Statistics

108 kWh	$13,386	78 kW	$3,212
Utilized Generation	Energy Savings	Average Peak	Demand Savings

Sample Energy Performance

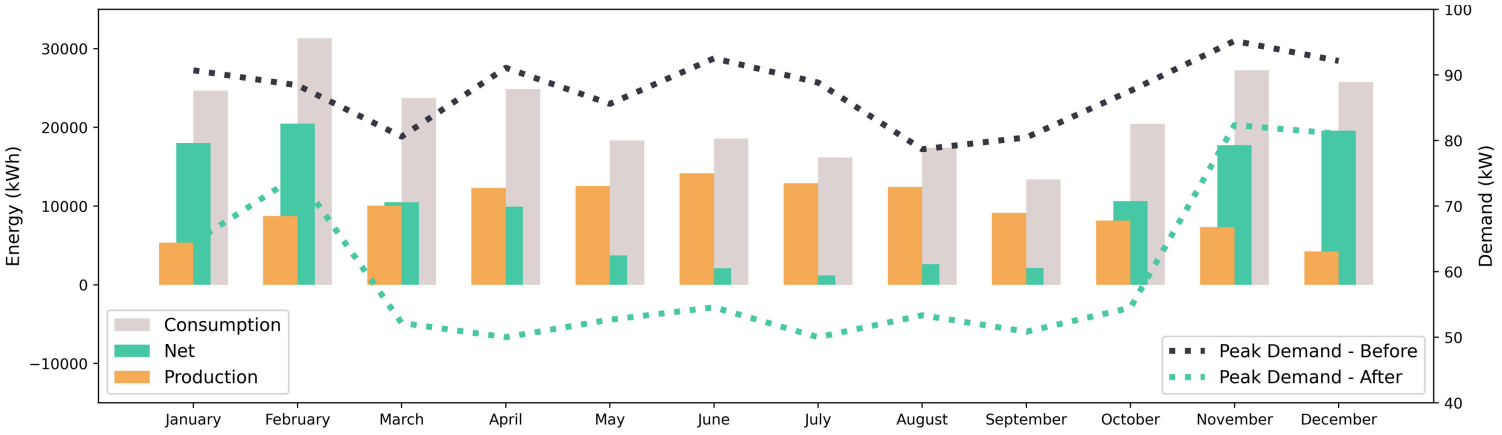


Option 3: Zero Export + Storage

- Capital Cost: **$197,763**
- Fastest Payback Period: **5.6 Years**
- Batteries add capital costs, but are subsidized by government incentives
- Savings driven by reduction in energy volume and in peak demand
- Intangible benefits include potential for back-up power, and energy diversification

Managed by: SPONGE

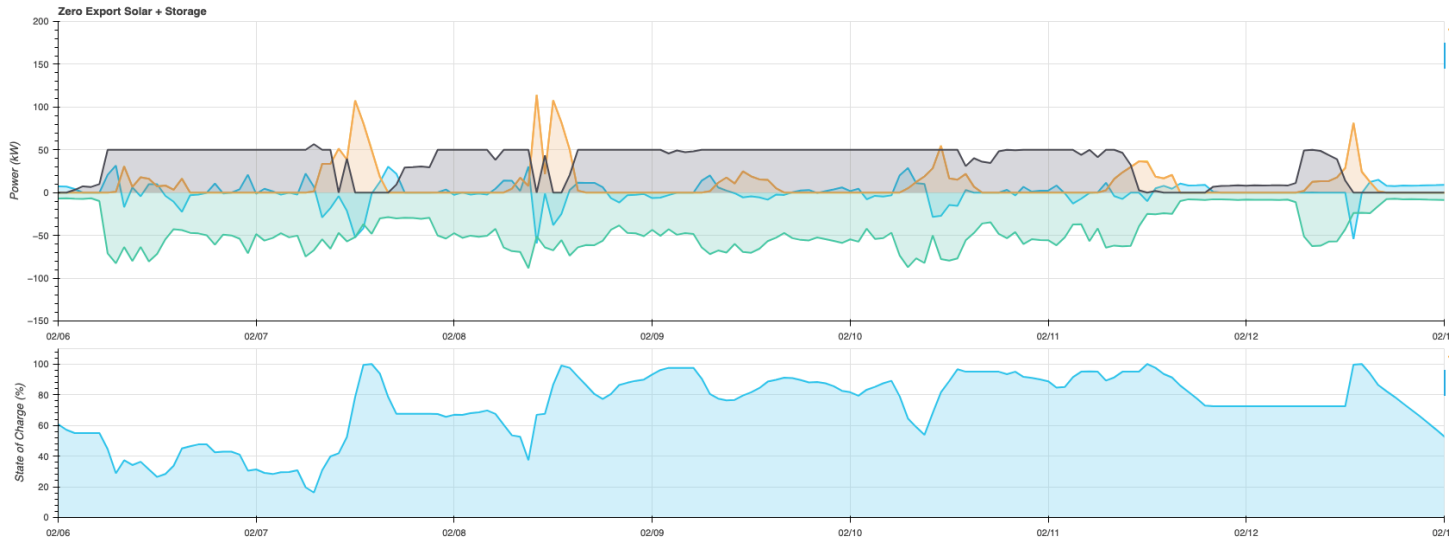
Monthly Summary



Annual Statistics

146 MWh	$17,819	51 kW	$11,275
Utilized Generation	Energy Savings	Average Peak	Demand Savings

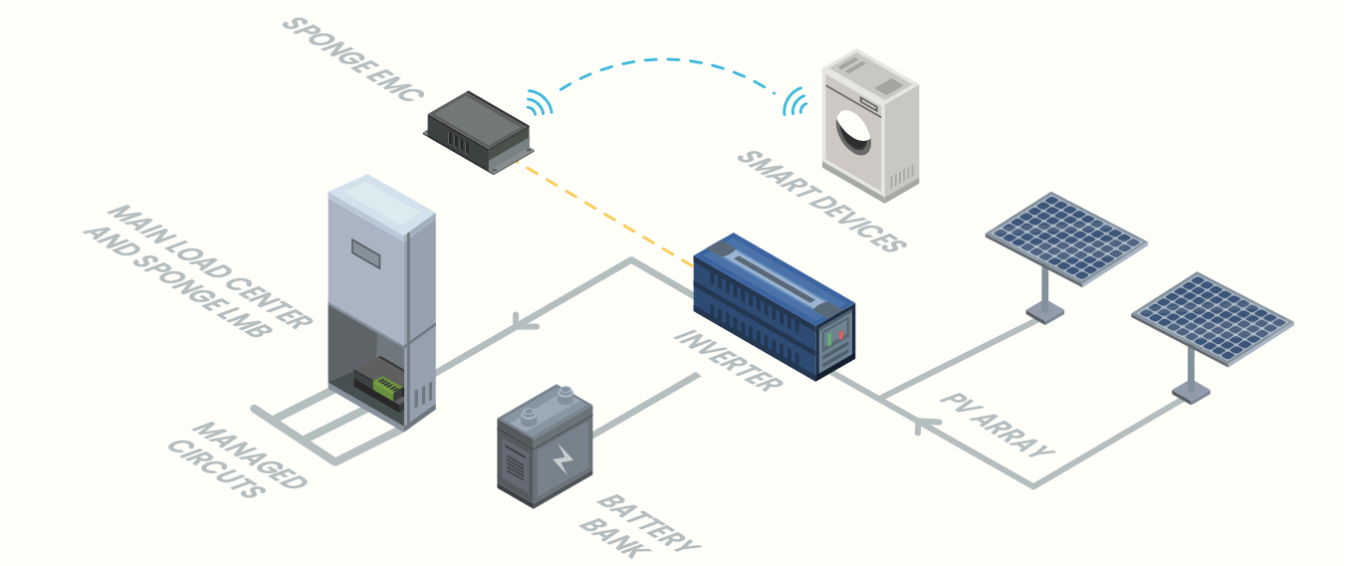
Sample Energy Performance



WHY SPONGE

Sponge Offering

The Sponge solution includes the delivery, installation and commissioning of our Energy Management Controller, which operates our proprietary control algorithms. But it doesn't stop there. Our team has full remote access to every system we deploy, enabling over-the-air updates, remote monitoring, system maintenance and most importantly, quality assurance.

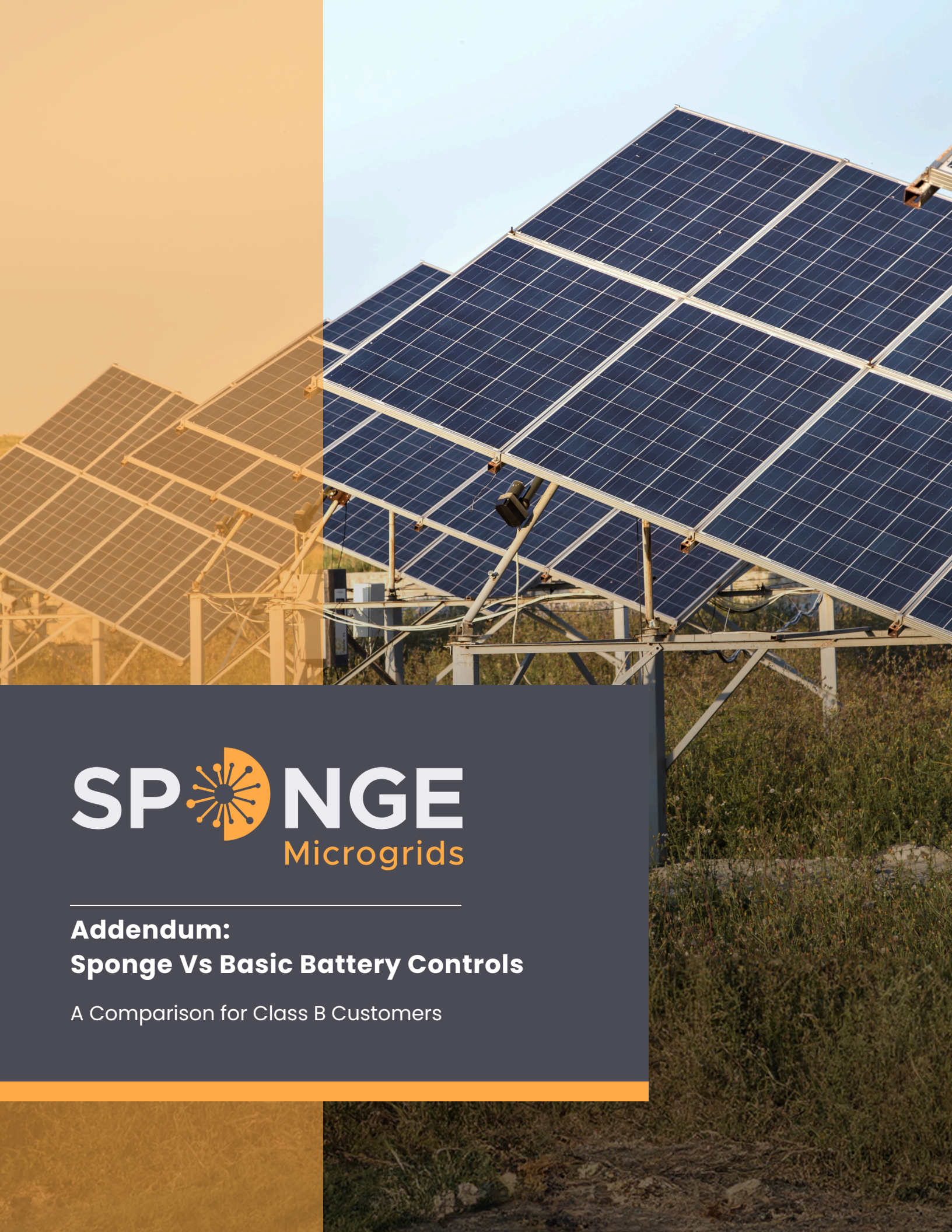


Control Philosophy

At Sponge, we respect that system reliability is paramount. Thats why our control approach is simple and nonintrusive. Our controls operate completely outside the loop of mission critical system operations and simply make adjustments to targeted set points as required in order to instigate the performance we want to see. After the control action, defaults settings are restored. This means that there is no incremental complexity or reliability risk introduced, just added value and improved performance.

Performance Guarantee

We stand by our system and offer a full performance guarantee. In parallel to the active control loop our software runs a counterfactual simulation, keeping track of its performance relative to the baseline controls that were in place previously. That means we can continuously track the performance boost we are providing, and ensure it's meeting our expectations.



SPONGE
Microgrids

Addendum:
Sponge Vs Basic Battery Controls

A Comparison for Class B Customers

Problem

Capture maximum value from **Batteries** in a **HydroOne Class B Billing** scenario.

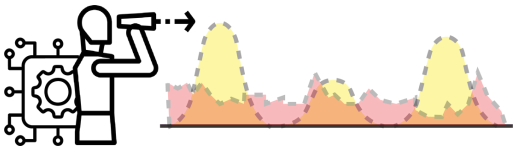
Solution

Hybrid PV Optimization

Smart Storage & Load Shifting

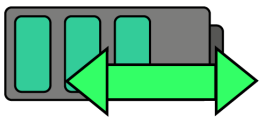
How it Works:

Forecast



Sponge EMC generates production & usage forecasts and monitors energy rates...

Control



to charge and discharge batteries when it is most cost effective.

Maximize Savings

By leveraging forecast-based simulations Sponge can balance multiple storage value creation strategies - here we examine **Load Displacement + Peak Shaving**

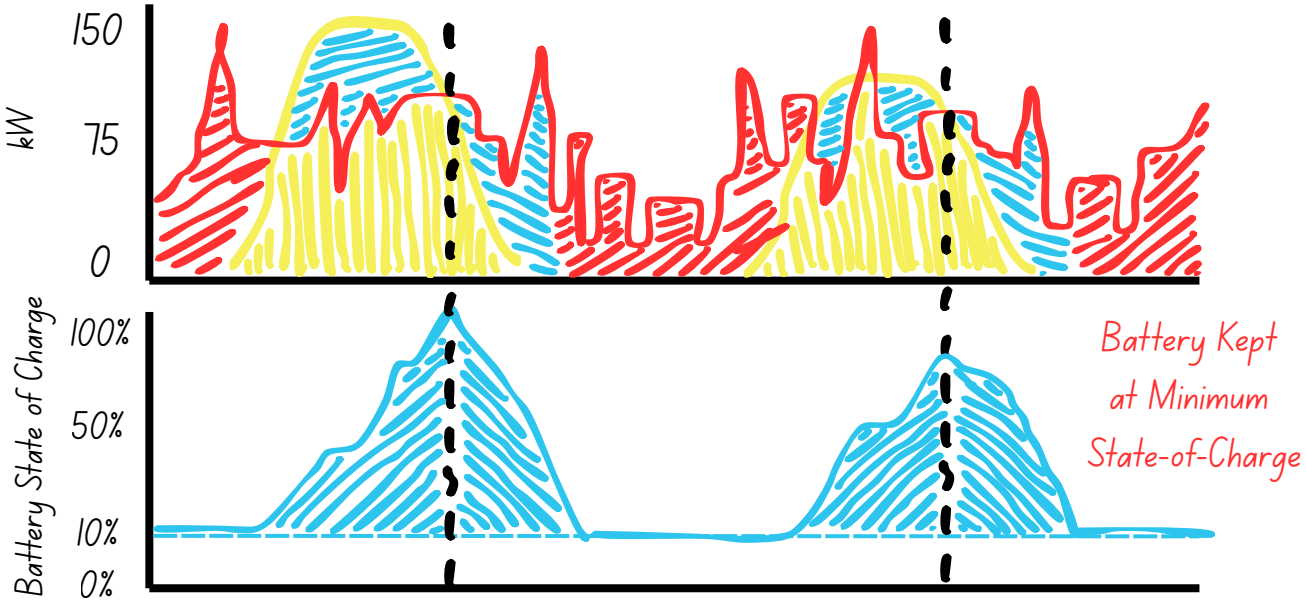
Set & Forget

Updated every 10 minutes, Sponge battery optimizations adapt over time to changing seasons, billing rates and electricity usage - **without the need to reset parameters.**

Understand Battery Storage Strategies

Storage Strategy

Zero Export | Load Displacement

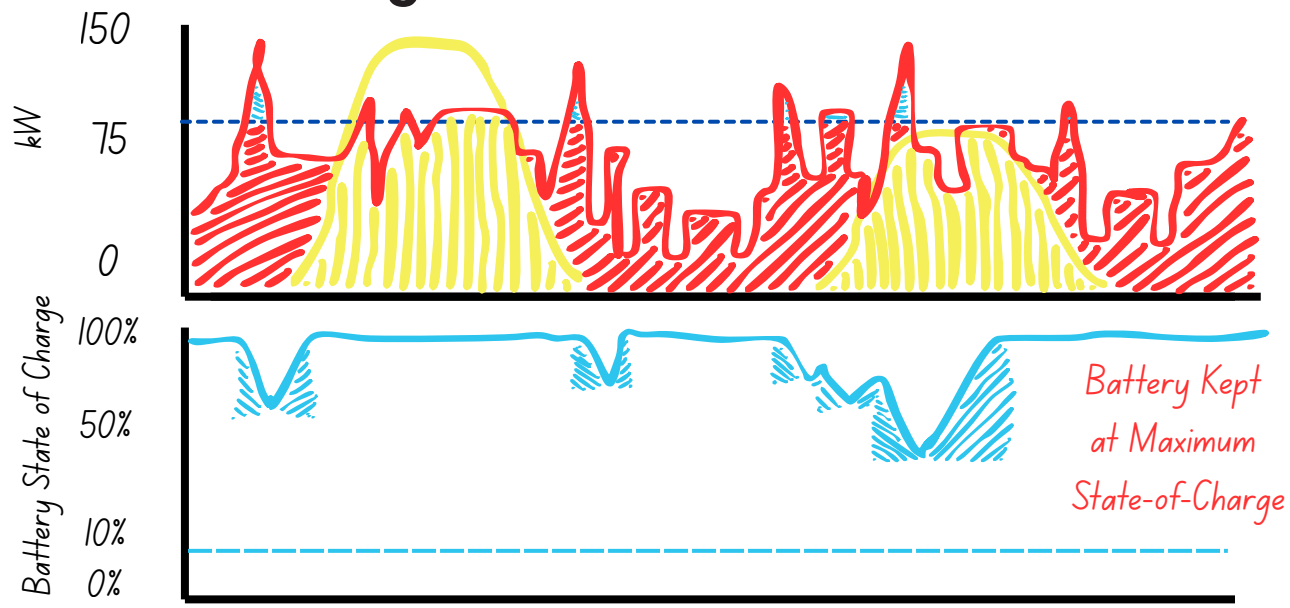


Strategy:
Capture excess solar, not consumed by the load in the battery, for use after solar production is finished.

Demand Savings: **$3,973**

Energy Savings: **$17,043**

Peak Shaving



Strategy:
Utilize battery to ensure demand does not exceed a target threshold - lowing demand charges.

Demand Savings: **$9,412**

Energy Savings: **$13,411**

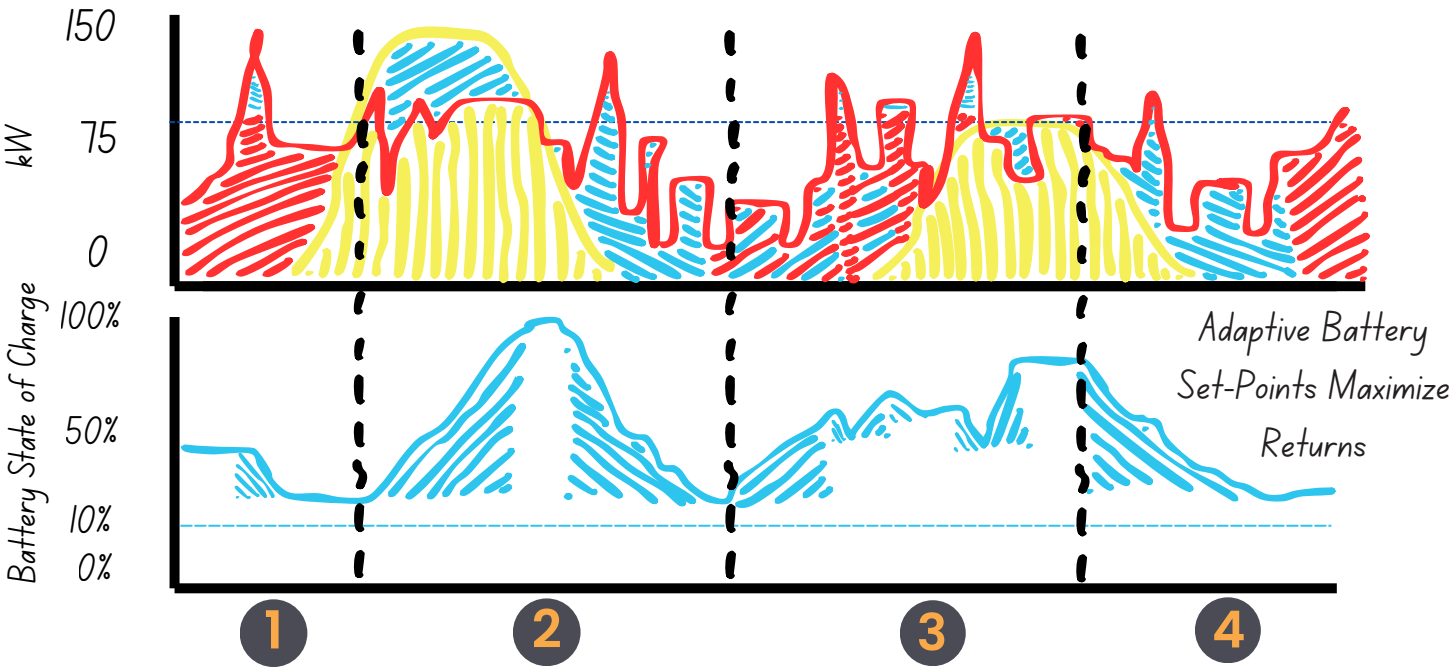
Experience the SPONGE Advantage

P1. Most commercial Battery Systems can only pursue **one storage strategy at a time.**

P2. Most battery storage strategies are defined by **fixed inverter set-points** that do not adapt to changing weather *(production)* or energy usage *(consumption)* patterns, so they **leave money on the table.**

By continually updating inverter set-points to control battery state of charge, Sponge ensures your microgrid **responds to the environment** so you can **maximize solar capture** and **minimize energy bills** using a **multi-pronged storage strategy.**

Load Displacement + Peak Shaving



1. Sponge starts the day with battery at 50% SoC. It's calculated there is enough energy to manage a peak load event and is leaving room to capture the excess solar production predicted in the coming hours.
2. Sponge charges the battery on solar energy and discharges fully through the evening.
3. Anticipating low solar production the coming day, Sponge charges the battery overnight, managing demand peaks as they occur.
4. Sponge discharges the battery in the evening, reducing volume of energy consumed from grid.

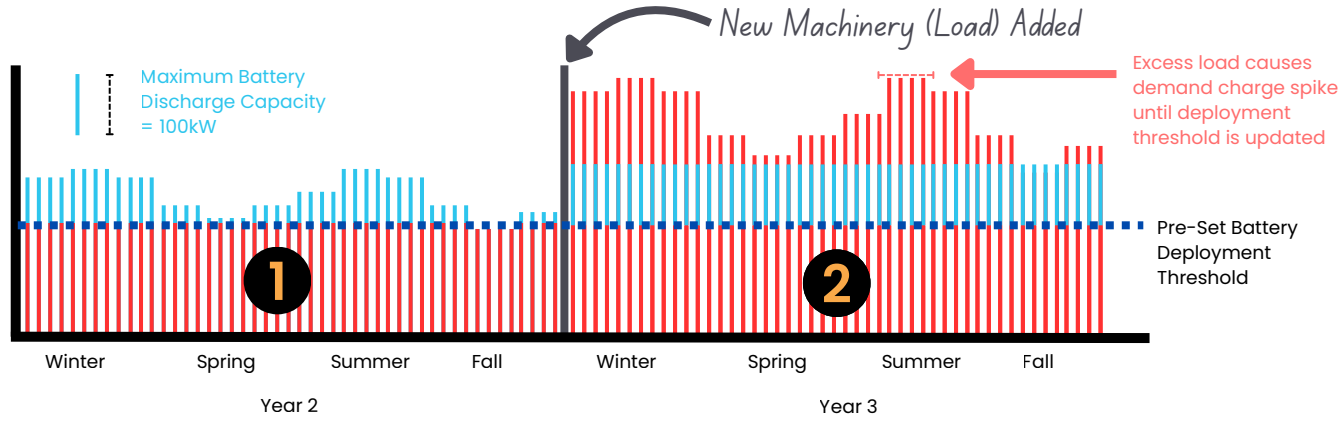
Demand Savings: **$11,275**

Energy Savings: **$17,819**

SPONGE Peak-Shaving Optimization

Continuous Improvement

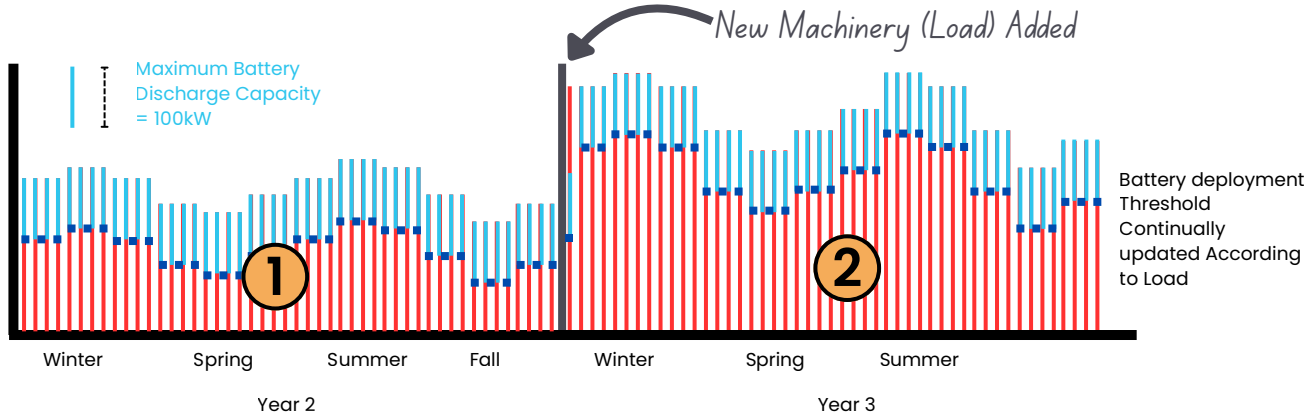
Typical Peak Shaving Control



Problem: Most batteries have **manually-set** deployment thresholds.

1. The threshold must be set conservatively to protect against maximum annual demand, so opportunities for seasonal savings are lost.
2. If the load profile of the facility changes over time, the deployment thresholds must be reset, but who is responsible for continuously adjusting the inverter?

SPONGE Controlled Peak Shaving



Sponge Solution: Deployment thresholds **adapt** to changing load patterns.

1. Many businesses experience seasonal energy variance. Sponge alters the battery deployment threshold to maximize demand charge reduction every month.
2. Business energy consumption changes over time. Sponge can recognize significant changes to the load profile and shift its strategy **with no outside intervention.**

Battery Strategy Financial Performance

Option	Load Displacement	Peak Shaving	Sponge Peak Shaving + Load Displacement
Energy Savings	$17,043	$13,411	$17,819
Demand Savings	$3,973	$9,412	$11,275
Total Annual Savings	$21,017	$22,824	$29,094
Payback Period	**7.2**	**6.7**	**5.9**
IRR	13.8%	15.1%	17.6%
NPV	**$313,410**	**$366,266**	**$516,757**