



# Exro Technologies' Commercial and Industrial Energy Storage System: California Full-Service Restaurant Demand Charge Management Case Study

# Introduction

In order to showcase the potential energy cost reductions offered by Exro's Cell Driver™, we carried out a research study that examined the energy usage of a commercial building and assessed the prospective effects of incorporating Exro's energy storage solution. The main objective is to demonstrate how the integration of Exro's fully-integrated commercial and industrial energy storage system can provide significant benefits to a business.

## THE COMPANY

### Exro Technologies Inc.

Exro Technologies Inc. is a leading clean technology company that has developed new generation power electronics that change how the world optimizes energy by expanding the capabilities of electric motors and batteries. The company's innovative technologies bridge the performance-cost gap in energy storage (Cell Driver™) and e-mobility (Coil Driver™) to accelerate adoption towards a circular electrified economy by delivering more with less – minimum energy for maximum results.



## THE CLIENT

### Full-Service Restaurant in the State of California

Our client manages a dining establishment located in California. Due to the high electricity consumption mainly occurring during peak hours for lunch and dinner, they face considerable electrical expenses. As a result, they are considering the integration of battery energy storage systems to address this issue.



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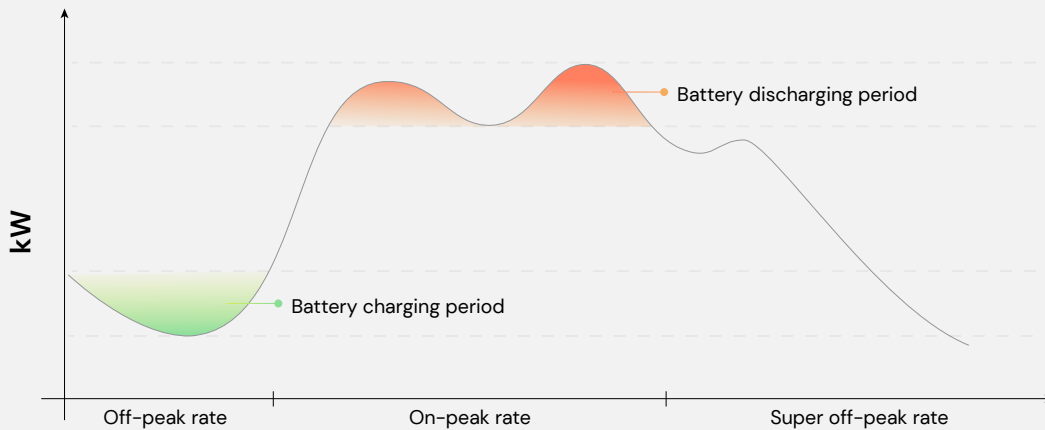
## PROBLEM STATEMENT

# High Charges for Commercial Electricity Usage

Electricity costs for businesses are significantly influenced by three primary types of charges: demand charges, time-of-use charges, and power supply charges. Seasonal variations, including increased HVAC loads on hot summer afternoons, can lead to fluctuations in these costs, making it challenging for business owners to accurately plan their energy budgets and potentially affecting profit margins. As a result, embracing sustainable approaches can be beneficial for optimizing energy consumption and enhancing business profitability. Exro and its certified

partners are well-equipped to support businesses as they navigate this transition. Another essential aspect, which is not explored in this case study but serves as a significant incentive for businesses considering battery storage systems, relates to grid stability and resilience. Battery energy storage systems with backup power capabilities, such as Exro's Cell Driver™, can seamlessly switch to backup power to support critical loads, maximizing uptime and minimizing expenses associated with grid outages.

## Peak shaving with battery energy storage system



\*This graphic is a simplified representation for illustrative purposes only.

**Electricity demand charges** are a type of rate structure used by utility companies to charge commercial and industrial customers for their peak electricity usage during a billing period. The charge is based on the highest amount of electricity used during a set period, typically measured in 15-minute increments.

**Time-of-use (TOU)** electricity charges are a type of rate structure used by utility companies to charge customers for the electricity they use based on the time of day and dependent on aggregated demand on the electrical grid.

**Power supply charges** reflect the costs of generating, transmitting, and distributing electricity to the end-users, and they vary depending on the region and type of customer.

**Non-bypassable charge (NBC)** is an unavoidable part of commercial electrical bills. It covers public policy programs, system costs, and social benefits, such as low-income assistance, energy efficiency, and regulatory requirements. All grid-connected customers must pay NBC charges.



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## THE SOLUTION

# Exro's Commercial and Industrial Energy Storage System

Exro's Cell Driver™ is a fully integrated energy storage system designed for commercial and industrial applications. Equipped with Exro's proprietary Battery Control System™, the Cell Driver™ actively manages battery cells based on their state-of-health and state-of-charge to optimize operation, enhance safety, and extend lifetime. The active cell balancing feature

allows for deeper discharge rates, which expands the accessible capacity of the unit, and enables micro-protection mechanisms that electronically isolate faults without causing system disruptions. These features make the Exro Cell Driver™ the safest and most advanced commercial and industrial energy storage system manufactured in North America.

## VALUE PROPOSITION

### What Makes the Cell Driver™ Unique?

#### Proprietary Battery Control System™

- Increases depth-of-discharge (DoD) and expands accessible capacity.
- Electronically isolates faults and defective cells without system disruptions.

#### Flexibility

- Modular design, scalable by base name plate capacity.
- Direct energy exchange between grid and battery cells without the need for intermediary power conversions.

#### Compatibility

- Non-invasive installation process and small footprint.
- Compatible with all major solar PV inverter brands.



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## METHODOLOGY

### Where Did the Data Come From?

To illustrate the potential energy savings achievable by implementing Exro's Cell Driver™, our client provided a full year of electricity bills, which detailed their electricity usage and associated costs from March 2022 to March 2023. We noticed that the client's billing was based on a range of rates, determined by seasonal factors and other time-of-use rates, including super off-peak, off-peak, on-peak, and flat rate periods.

To summarize, calculating the expense of electricity usage involves a multifaceted procedure, taking into account a wide range of rates and factors. The significant variation in these rates presents difficulties for businesses striving to accurately plan their energy budgets. To gain a deeper insight into these rates, we can analyze the differences in electricity usage and costs between the highest and lowest bills during the one-year period under review.

### Highest Electricity Bill (July/2022 – August/2022)

On Peak Energy Use (kWh)	Off Peak Energy Use (kWh)	Super Off Peak Energy Use (kWh)	Max Demand (kW)	NBC Charge (\$USD)	Energy Charge (\$USD)	Demand Charge (\$USD)	Other Charges (\$USD)	Total Monthly Bill (\$USD)
14,518	23,683	10,795	129	\$1,857	\$9,870	\$11,110	\$226	\$23,063

### Lowest Electricity Bill (February/2023 – March/2023)

On Peak Energy Use (kWh)	Off Peak Energy Use (kWh)	Super Off Peak Energy Use (kWh)	Max Demand (kW)	NBC Charge (\$USD)	Energy Charge (\$USD)	Demand Charge (\$USD)	Other Charges (\$USD)	Total Monthly Bill (\$USD)
9,338	11,919	7,954	92	\$1,107	\$5,796	\$5,873	\$226	\$13,002

## SEAMLESS MANAGEMENT

### How Does the Cell Driver™ Optimize Energy Management?

The Exro Cell Driver™ Commercial and Industrial energy storage system features a power rating of 90kW and a capacity of 192kWh. It serves three main purposes in this particular case. First, the Cell Driver™ helps minimize demand charges by leveling out demand peaks. Second, it shifts electricity consumption from 'On Peak' periods to 'Super Off Peak' periods, reducing the cost

of energy usage. Lastly, the Cell Driver™ can also offer backup power through reserving a portion of the battery capacity to protect the business from potential grid outages, which can prove essential for a restaurant in maintaining customer safety during outages and keeping refrigerators operational to prevent food waste and the associated costs.



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## BEFORE

### Energy Consumption Without Cell Driver™

The following table displays the client's electricity utility charges over a 12-month period before the integration of Cell Driver™ technology:

NBC Charge (\$USD)	Energy Charge (\$USD)	Demand Charge (\$USD)	Other Charges (\$USD)	Total Annual Expense (\$USD)
\$17,374	\$91,553	\$94,147	\$2,708	\$205,782

Demand charges hold considerable importance in the overall electricity expenditure, as they make up 46% of the yearly electricity bill expense. These cost fluctuations provide opportunities for innovative

solutions like Exro's Cell Driver™, which seeks to minimize variability and boost energy efficiency through the use of smart storage systems.

## RESULTS

### Energy Consumption With Cell Driver™

The subsequent table presents the client's electricity utility charges over the same 12-month period, assuming the use of Cell Driver™ technology:

NBC Charge (\$USD)	Energy Charge (\$USD)	Demand Charge (\$USD)	Other Charges (\$USD)	Total Annual Expense (\$USD)
\$17,645	\$82,439	\$70,669	\$2,708	\$173,460

To better gauge the impact of Cell Driver™ integration, we can assess these charges by comparing them to the original values in terms of percentage change:

NBC Charge	Energy Charge	Demand Charge	Other Charges	Total Annual Expense (\$USD)
1.5% Increase	10% Saving	25% Saving	No Change	16% Saving (\$32,322)

This case study highlights the considerable annual electricity savings of \$32,322 achieved through the integration of Cell Driver™, significantly reducing commercial electricity demand and energy charges.

It is important to note that this example focuses on the stand-alone benefits of Cell Driver™ without the involvement of renewable energy sources, showcasing its effectiveness in independent operation.



## SMART INVESTMENT


### Incentives and Tax Credits<sup>1</sup>

Acquiring an Energy Storage System (ESS) for your business can be a valuable investment, offering both financial advantages and energy security. To make the investment even more appealing, numerous incentives, rebates, and tax credits exist.

Under the federal Modified Accelerated Cost Recovery System (MACRS), businesses can recuperate investments in specific property types via depreciation deductions. MACRS sets a predefined lifespan for various property categories, during which the property can be depreciated. In the case of ESS systems, the taxable basis of the equipment must be reduced by 50% of any associated federal tax credits.

Additionally, the Inflation Reduction Act has increased the Investment Tax Credit (ITC) to 30% for both standalone storage and solar-plus-storage applications. This credit is available for a 10-year fixed term, but construction must begin before Jan 1, 2025. This presents an opportunity for businesses to secure their energy needs of tomorrow, invest in sustainable sources of energy, and maximize financial benefits. Facilities may be eligible for up to a 70% reduction on their initial investment based on available incentives and tax credits, which have specific requirements and qualifications that vary significantly depending on geographical location and local utility companies.

**Customers may save up to 70% on the Cell Driver™**, as long as the project is maintained for 10 years and all policy requirements are met. The following incentives are available: \*

- A base credit amount of 6% for every energy storage project.
  - Credit increased to 30% if wage and apprenticeship requirements are met during construction and through the first 10 years of operation.
  - An additional 10% if project equipment and/or materials are manufactured and sourced in the US.
  - An additional 10% if the project is located in an "energy community" (an area previously dependent on fossil fuels).
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- An additional 10% if the project is paired with wind or solar and installed in a low-income community. If this project is also part of a low-income residential building project, then an additional 20% is possible.

**The total potential savings with ITC is 70%**

<sup>1</sup>Information based on 'A Guidebook to the Inflation Reduction Act's Investments in Clean Energy and Climate Action' by The White House.

\*To obtain accurate information about local incentives and tax credits, please contact your local government representatives and electricity utility company. It's important to note that credits can vary significantly depending on the project's application, location, and scope.



## RETURN ON INVESTMENT

### An Investment That Pays for Itself

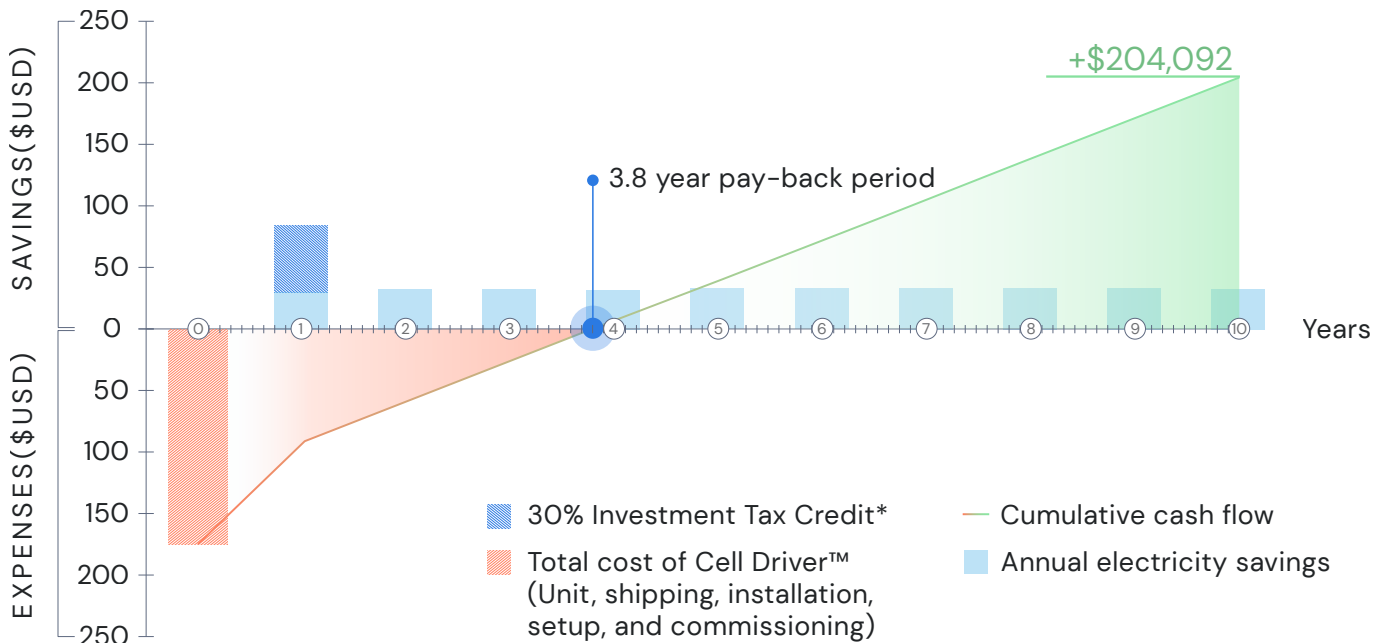
Opting to integrate Exro's Cell Driver™ is a wise choice, considering both the application benefits and the tax rebates and incentives linked to the purchase. In fact, the savings generated by the Exro Cell Driver™ far exceed the potential costs of acquiring, integrating, and operating the system.

In this particular case, the payback period is a mere 3.8 years, considering only the 30% IRA tax credit (credits can reach up to 70%, based on various factors mentioned earlier). Additionally, throughout the unit's warranty period

of 10 years, which does not imply the end of its useful life, the Cell Driver™ would yield nearly three times its initial upfront cost, including both the unit and installation.

Ultimately, whether you choose to purchase the unit outright or utilize the savings to finance it over time, it is evident that incorporating the Cell Driver™ into your operations would result in substantial cost savings. This impressive return on investment makes Exro's Cell Driver™ an attractive option for businesses seeking to enhance their energy efficiency and reduce costs.

### Cost, Annual Savings, and Cumulative Cash Flow: Cell Driver™



\* Example utilizes a conservative 30% tax credit. Higher credits may be available.



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## Conclusion

This case study highlights the potential cost savings for commercial and industrial buildings that incorporate Exro's cutting-edge energy storage system, the Cell Driver™. The system can significantly lower electricity expenses, whether used in conjunction with renewable energy sources or as a stand-alone ESS.

As illustrated in this case study, the Cell Driver™ can be effectively utilized for managing demand charges and time-of-use rates. Moreover, it can be a valuable resource during grid outages, ensuring critical loads continue to function, minimizing any costs resulting from power disruptions. Providing businesses with an effective solution to manage electricity costs and improve energy security.

Interested in becoming a certified energy storage partner?  
[Scan here to connect.](#)



With the Cell Driver™ in the final phases of UL certification and with production in place for rapid deployment in 2024, Exro is actively certifying energy storage partners and initiating the onboarding process. Connect today to take advantage of this unique opportunity.

