City Council Meeting

Public Comments

August 28, 2024

Submitted values are:

Board or Commission for Public Comment City Council

Email aeb8150@gmail.com

Council Meeting Date August 28, 2024

Item # 13 - 2024 - 113

Subject Regulating BESS

Position In Favor

First and Last Name April Bevins-Cooper

Are you an Escondido Resident? Yes

Comments Please help keep our communities safe from BESS in residential areas.

Board or Commission for Public Comment City Council

Email info@captainbenbrown.com

Council Meeting Date 8/28/2024

Item # 13

Subject Stop lithium battery storage facility in residential rural property

Position No Position

First and Last Name Benjamin

Are you an Escondido Resident? Yes

Comments

I cannot urge the city council enough to stop the Seguro battery storage facility plans in a rural residential property . This personally affects me and my six children and 100 animals living on the property . It is an important tool for our world, but absolutely should never be placed in a residential area.

Board or Commission for Public Comment City Council

Email billgosborn@gmail.com

Council Meeting Date 8/28/2004

Item # 13

Subject Resolution 2024-113

Position In Favor

First and Last Name Bill Osborn

Are you an Escondido Resident? No

Comments

While not a direct resident, my community is in the sphere of influence. It is extremely important to properly zone and regulate BESS installations. It is common place for a battery fire to occur within the fist few years of them being brough online and communities should not suffer the consequences. These projects are extremely profitable and companies can easily afford placing them in proper areas such as industrial zones, areas a mile or more from housing... and hospitals in the case of the Seguaro AES project.

Board or Commission for Public Comment City Council

Email billp38@yahoo.com

Council Meeting Date 8/28/2024

Item # 13

Subject Oppose BESS Battery Storage Facilities

Position In Favor

First and Last Name Bill Porter

Are you an Escondido Resident? No

Comments

I am making a comment for my 87 year old mother who lives on Milpas Drive off of Country Club Lane in unincorporated Escondido. We are opposed to having BESS facilities so close to residential areas like my mother's home where a proposed facility is currently in the development planning stage. We would like the city to explicitly oppose Seguro due to its impacts on Escondido residents living nearby, the Hospital and the hundreds of households that are within 100ft of the facility. Our mother's home would be surrounded on two sides of her property, and we would have to drive right through the middle of the proposed BESS facility.

Board or Commission for Public Comment City Council

Email magnumforc@yahoo.com

Council Meeting Date 8/28/24

Item # Resolution No. 2024-113

Subject Battery Energy Storage Systems

Position In Favor

First and Last Name Bruce Schryver

Are you an Escondido Resident? Yes

Comments

I laud your efforts to regulate the installation of BESS within or in close proximity to residential and high wildfire danger areas. Having spent my entire career in investigations of fires, accidents and injuries I am well aware of the severe burden these systems place on a community and its resources. In addition to the fire danger from runaway thermal reactions, the smoke and fumes are detrimental to humans and animals alike, and the runoff from fire suppression efforts fouls groundwater and environmentally sensitive areas, such as Escondido Creek. Also, in the case of Seguro, placing the facility in the proposed location is only to benefit the developer and installer as well as SDG&E, as it's less costly to build and run electrical service lines than if they did it right and placed it within an industrial complex. Once again developer greed and not public safety is the dominant factor.

Please regulate the placement of these facilities to help reduce the exposure to residents and the environment. Thank you.

Board or Commission for Public Comment City Council

Email descloud79@gmail.com

Council Meeting Date 8/26/24

Item # 2024-113

Subject Stop battery plant

Position In Favor

First and Last Name Charlotte Davis

Are you an Escondido Resident? Yes

Comments Please don’t allow this to be built in our neighborhood.

Board or Commission for Public Comment City Council

Email descloud79@yahoo.com

Council Meeting Date 8/26/24

Item # 2024 -113

Subject Stoping battery plant in Escondido

Position In Favor

First and Last Name Desiree Cloud

Are you an Escondido Resident? Yes

Comments

Please don’t put us all in harms way. This is a neighborhood with families and livestock.

Board or Commission for Public Comment City Council

Email dmcarey@gmail.com

Council Meeting Date 2024-08-27

Item # 2024-113

Subject Energy Storage

Position In Favor

First and Last Name Dustin Carey

Are you an Escondido Resident? Yes

Comments

Here's a more compassionate and convincing ve

In support of this measure, my family and I wish to express our deep concerns about the proposed unregulated battery storage facility within a residential neighborhood, just a few hundred yards from North County's largest critical medical facility, Palomar Hospital.

We recognize the inherent risks this facility poses due to its proximity to homes and high fire-risk open spaces. However, we must also consider the significant danger it presents to our broader community, particularly given its closeness to Palomar Hospital.

In the unfortunate event of a fire at this facility, it could burn and emit toxic fumes for weeks. These fumes would not only threaten the health and safety of our entire valley, including Eden Valley, Harmony Grove, and surrounding areas, but could also force the shutdown of the hospital. This would jeopardize the trauma center and life flight helicopters, critical resources for emergency medical care.

We cannot envision a future where such a high-risk project is allowed to proceed, endangering our community's well-being. I urge our council to carefully evaluate the incentives for the corporation to build this facility and weigh them against the potentially devastating consequences. Imagine if your child or loved one needed trauma care and the helicopter couldn't bring them to life-saving treatment due to a prolonged battery fire next to the hospital.

For the safety and health of our community, I strongly support this measure and call on our council to take decisive action.

Board or Commission for Public Comment City Council

Email basilgary@gmail.com

Council Meeting Date 8-28-24

Item # agenda item 13, Resolution 2024-113

Subject seguro bess

Position In Favor

First and Last Name gary basil

Are you an Escondido Resident? Yes

Comments

bess is needed but NOT in our small valley in a wild fire area surrounded by homes siting below Palomar hospital.

Board or Commission for Public Comment City Council

Email virginiaeye@gmail.com

Council Meeting Date 8/28/2024

Item # 13

Subject Proposed Segura Battery Storage Facility

Position In Favor

First and Last Name Ginny

Are you an Escondido Resident? Yes

Comments

Please be intelligent to know it will be a death sentence foe all residents in Eden Valley and surrounding areas, not only for families and children but for livestock, drinkable water and breathable air, also a dangerous threat to nearby schools and Palomar Hospital. Once there's a runaway thermal fire, it can't be put out by water and will poison and kill us.

Board or Commission for Public Comment City Council

Email jackbatchie@gmail.com

Council Meeting Date 8/28/24

Item # 13

Subject Battery Storage System

Position In Opposition

First and Last Name Jack Batchie

Are you an Escondido Resident? No

Comments

We live in un incorporated Escondido. Our residence is very close to the proposed Seguro Lithium Batttery Storage System. We are completely opposed to this system type due to the past and recent history of Dangerous fires and toxious fumes emitting for a long period of time:

Board or Commission for Public Comment City Council

Email jennifer33cook@gmail.com

Council Meeting Date 8/28/24

Item # 13

Subject Thank you for looking out for your constituents.

Position In Favor

First and Last Name Jennifer Cook

Are you an Escondido Resident? Yes

Comments

Board or Commission for Public Comment City Council

Email jfdorman@gmail.com

Council Meeting Date 08/27/2024

Item # Item 13 for resolution 2024-113

Subject In favor of item 113

Position In Favor

First and Last Name John Dorman

Are you an Escondido Resident? Yes

Comments

This proposed seguro Bess is dangerous and irresponsible. Not only will it present an immense danger to human and animal life, it will wipe out 20-40 million in homeowner equity through lowered property values. Additionally we will likely become uninsurable. Battery storage centers are a good idea when they are not located in an incredibly high fire risk residential area.

Board or Commission for Public Comment City Council

Email julianne.koehler10@gmail.com

Council Meeting Date 8/28/24

Item # 113

Subject BESS moratorium and regulations

Position In Favor

First and Last Name Julianne Koehler

Are you an Escondido Resident? No

Comments

I live in Harmony Grove Village, unincorporated SD County adjacent to Escondido. I support the city's proposed moratorium on BESS projects until appropriate regulations can be developed.

Board or Commission for Public Comment City Council

Email Lawrence.odell777@gmail.com

Council Meeting Date August 28th 2024

Item # 13

Subject Resolution 2024-113

Position In Favor

First and Last Name Lawrence O'Dell

Are you an Escondido Resident? Yes

Comments

I am very concerned about the presence of a battery farm in our community and the fire dangers and health risks that will inevitably arise from the presence of such a facility. I am in favor of any regulations of such a potential facility

Board or Commission for Public Comment City Council

Email lindseyyung@gmail.com

Council Meeting Date 08/27/24

Item # 13

Subject Stop The Seguro Battery Energy Storage System

Position In Favor

First and Last Name Lindsey Tuthill

Are you an Escondido Resident? No

Comments

I am a neighbor to Escondido and would be directly impacted if the city allows the Seguro Battery Energy Storage System. I am in favor of agenda item 13, Resolution 2024-113. PLEASE DO NOT ALLOW BESS IN OR NEAR RESIDENTIAL AREAS. This will endanger lives and it's the city's responsibility to protect the residents! Thank you.

Board or Commission for Public Comment City Council

Email MzMaryAnnAnderson@gmail.com

Council Meeting Date Wednesday 8/28

Item # 13

Subject Resolution Against Battery Facilities

Position In Opposition

First and Last Name MaryAnn Anderson

Are you an Escondido Resident? Yes

Comments

It is negligent to move ahead with this project knowing what we know about fire safety issues that have already proven to be hazardous elsewhere. We do not have the infrastructure for this.

Board or Commission for Public Comment City Council

Email mlkhawand@gmail.com

Council Meeting Date 08/28

Item # 13

Subject BESS

Position In Favor

First and Last Name Myriam El Khawand

Are you an Escondido Resident? Yes

Comments

We support the efforts to keep our communities safe by keeping battery energy storage facilities away from residential neighborhoods.

Board or Commission for Public Comment City Council

Email nsestina@gmail.com

Council Meeting Date 8/27/2024

Item # 13

Subject In favor of agenda item 13, Resolution 2024-113.

Position In Favor

First and Last Name Niki Sestina

Are you an Escondido Resident? Yes

Comments Request the City Council adopt Resolution 2024-113

Board or Commission for Public Comment City Council

Email racytango@yahoo.com

Council Meeting Date Aug 28, 2024

Item # 13

Subject NO to Seguro Battery Storage

Position In Favor

First and Last Name Rachel Gertsch

Are you an Escondido Resident? Yes

Comments

Please do the right thing by Escondido residents and ban this type of development/infrastructure in close proximity to residential neighborhoods. Thank you for taking into consideration the people who are very affected by this kind of safety risk, health risk.

Board or Commission for Public Comment City Council

Email richard.goss.925@gmail.com

Council Meeting Date 08/28/2024

Item # 13

Subject Resolution 2024-113

Position In Favor

First and Last Name Richard Goss

Are you an Escondido Resident? No

Comments

I live near Escondido, in the Harmony Grove Village development. We are very concerned about the Seguro Battery Energy Storage System Project, that could potentially be built near us on Country Club Drive. The potential for an uncontrolled fire in the battery units is too high to consider installing one of these systems near residential areas, and very close to a large hospital that serves the area. If this project was approved and built, and a fire happened, it would endanger people in nearby buildings, as well as cause a major issue for residents driving in this area.

Board or Commission for Public Comment City Council

Email monkmans@gmail.com

Council Meeting Date Aug 28 2024

Item # 13

Subject Opposition to Battery Storage Projects

Position In Favor

First and Last Name Shauna Monkman

Are you an Escondido Resident? Yes

Comments

I am in favor of this motion. I would like the city to oppose Seguro and any similar companies/projects due to their impacts on residents, the hospital and homes nearby - especially those within 100 ft of the facility.

Board or Commission for Public Comment City Council

Email furnmed@aol.com

Council Meeting Date 8/27/24

Item # Battery storage

Subject Battery storage

Position In Opposition

First and Last Name Shawn Dolan

Are you an Escondido Resident? Yes

Comments

STRONGLY against, There's enough information out there already that this is an idiot idea to place a toxic energy storage in a residential/agricultural area. Additionally, for the exact same type of plant in San Diego, took 10 days to put out, this is also located within a mile of a hospital . Anyone who votes for this should not be representing Escondido residence. My entire neighborhood feels the exact same way I do.

Board or Commission for Public Comment City Council

Email virginiaeye@gmail.com

Council Meeting Date 8/28/2024

Item # Resolution 2024-113

Subject No to the Seguro Battery Storage

Position In Favor

First and Last Name Virginia Izquierdo

Are you an Escondido Resident? Yes

Comments

No to Seguro Battery Storage proposed for Eden Valley. Should not be permitted to build in residential area that includes Palomar Hospital, schools, families and children, livestock, etc. It will put many lives in danger when a runaway thermal fire occurs. Look at their track history!!! Please don't poison us with toxic spew fire that will take days, weeks to extinguish!!

Board or Commission for Public Comment City Council

Email kec_correia329@yahoo.com

Council Meeting Date 6/19/24

Item # TBD

Subject Staff/experts funds in 24/25 budget for BESS facility review and ordinances

Position In Favor

First and Last Name Kendra Correia

Are you an Escondido Resident? Yes

Comments

Mayor White and Council Members,
The 320mw Seguro battery energy storage (BESS) facility is being purposed on Country Club Road in Escondido. Placement of these dangerous facilities, in densely populated areas is not the industry standard. The hazards Seguro poses to the surrounding residents, some less than 20ft from it's perimeter, are numerous; Release of toxic fumes during battery fires from thermal runaway, toxic water runoff from firefighters attempts to cool the batteries, evacuations of residents, livestock, daycare facilities, Palomar Hospital and surrounding medical facilities, low income mobile home parks, road and freeway closures, all lasting for days to weeks. The insurance and financial impacts to residents include;Evacuation costs on going for the 35 yr span of the BESS, prior to decommissioning, home insurance cancelations or astronomical premiums due to a high fire district, that now is inhabited by an incendiary storage facility. Home sales will be impacted by the hazardous facility disclosures and strained home insurance acquisition,that would impact the ability to obtain a mortgage. The surrounding communities would be highly sacrificed and their daily lives would be drastically impacted for decades.
Locally there have been 2 fire/thermal runaway events at the Valley Center BESS in just it's first year in operation, and a fire that burned for almost 2 weeks, at the Otay Mesa BESS. Both facilities are 10mw or less verses the huge 320mw Seguro BESS.
I ask that you please deny the easement for the Seguro genti lines across Escondido city property. Palomar Hospital has recently released a public statement, stating they fully recognize the dangers Seguro poses to the local residents, Palomar patients and staff. As a result of the given dangers, they would not allow Seguro an easement on hospital property.
I also ask that you please allot funds in the 24/25 budget, for staff and experts to review the future proposed BESS projects. Experts are needed to confirmed the technology and safety mechanisms being used, assess the risks to the public and define what the energy companies must disclose to Escondido. Ordinances are needed that can guide the alternate energy industries that want to operate in Escondido.

Board or Commission for Public Comment City Council

Email ashley@regalpropertyshoppe.com

Council Meeting Date June 26, 2024

Item # TBD

Subject Seguro Battery Energy Storage Project

Position In Opposition

First and Last Name Ashley Robertson Bedard

Are you an Escondido Resident? Yes

Comments

On Monday, there was an explosion at the Aricell lithium-ion battery facility in South Korea that killed 22 people and injured eight. The facility housed 35,000 battery cells. If the Seguro BESS Project is installed in the residential neighborhood of Eden Valley, it will store approximately 4 million battery cells. The Gateway BESS fire in Otay Mesa this past May prompted a 600-foot evacuation radius, a 1.5-mile shelter-in-place order and expended essential personnel. Hazmat, the Sheriff's bomb squad, and nearly 50 firefighters battled the fire for 15 days. Meanwhile toxic gases were continuously being emitted. When a similar incident occurs at the Seguro BESS Project, the 78 freeway will need to be shut down between the 15 merger and Woodland Pkwy, the City of Escondido industrial park and nearly 300 residents will be evacuated. Shelter-in-place orders would be implemented for an additional 1200 or so residents, Palomar Hospital, Rady Children's Urgent Care, five preschools, and portions of Auto Pkwy, W Valley Pkwy, and Nordahl. What happens if a larger explosion occurs, as did this week in South Korea? We ask that you stand with the residents of Escondido and San Marcos in opposition to the Seguro Project and that you decline easement access to AES across Auto Pkwy.

Board or Commission for Public Comment Planning Commission

Email leewrightglobal@gmail.com

Council Meeting Date 7/28/2024

Item # 1

Subject Resolution regarding BESS systems in and near City of Escondido

Position In Favor

First and Last Name Brenda D Wright

Are you an Escondido Resident? Yes

Comments

I live in unincorporated Escondido, very near to the proposed site for Seguro. I strongly support the City's development of zoning, safety and planning for proposed BESS facilities.

August 27, 2024

The Honorable Dane White
Mayor, City of Escondido
201 North Broadway
Escondido, CA 92025

RE: Proposed Resolution 2024-113 (Battery Energy Storage System Projects)

Dear Mayor White,

The undersigned stakeholders write to you regarding your proposed resolution expressing concerns about battery energy storage systems (BESS) in, and adjacent to, the City of Escondido. We represent a diverse group of stakeholders who believe BESS projects are critical in meeting our region's climate goals while providing reliable and affordable energy to residential neighborhoods, small businesses, and more. We appreciate the opportunity to provide feedback on this proposal and request that the consideration of the resolution is paused until after the County of San Diego's Board of Supervisors meeting on September 11th where options for BESS development standards will be presented by staff and considered by the Board.

BESS projects throughout the State of California are necessary in preventing blackouts, brownouts, and public safety power shutoffs when energy is in high demand, like on sweltering summer days when air-conditioning units are in use. With more electric vehicles and all-electric buildings joining California's energy grid, grid resilience must be at the center of our conversations. BESS projects contribute significantly to grid stabilization and guarantee a continuous supply of clean energy, thereby decreasing dependence on fossil fuels and reducing greenhouse gas emissions. Furthermore, BESS are essential to ensuring residents across the county have access to reliable power sources, needed for business and residents alike. Escondido's own climate action goals would likely require the development and deployment of local BESS projects.

These projects also create local green jobs in a multitude of sectors and have other positive economic opportunities, including new tax revenue to their respective jurisdictions. Any potential moratorium on BESS projects would have a dramatic impact on the economy, stymying our regional supply chain involved in BESS, solar, and photovoltaic (PV) industries. This has the potential to cause our region to lose important manufacturing, engineering, and electrical jobs that employ thousands of San Diegans.

Safety of residents is a top concern of our coalition, and we understand the fear or discomfort modern technologies can cause in communities. That is why we are supportive of federal guidelines and the 2022 California Fire Code regulations (Section 1207: Electrical Energy Storage Systems), which has also been adopted by the County of San Diego. BESS developed in 2024 are almost exclusively developed in purpose-built outdoor BESS enclosures (as opposed to systems developed in warehouses) – these newer systems are designed with robust safety protocols including fire propagation control, thermal management systems, automatic shutoff technology, physical barriers, and 24/7 real-time monitoring. Experts and fire officials also regularly inspect these systems.

We would be happy to meet with you to discuss any questions or concerns you or Escondido Councilmembers may have and hope the City of Escondido will collaborate with us to strengthen our grid, create new jobs, and invest in our local economy. You may reach out to Lauren Cazares (LCazares@sdchamber.org), Policy Advisor at the San Diego Regional Chamber of Commerce, to connect with the undersigned stakeholders. Thank you for your consideration.

Sincerely,

Jerry Sanders
President & CEO
San Diego Regional Chamber of Commerce

Karin Burns
Chief Executive Officer
San Diego Community Power

Jeremy Abrams
Business Manager
IBEW 569

Serena Pelka
Policy Advocate
Climate Action Campaign

Jason Anderson
President & CEO
Cleantech San Diego

CC:
Honorable Deputy Mayor Christian Garcia
Honorable Councilmember Consuelo Martinez
Honorable Councilmember Joe Garcia
Honorable Councilmember Michael Morasco
Economic Development Director Jennifer Schoeneck
City Manager Sean McGlynn
City Attorney Michael R. McGuinness

August 28, 2024

City of Escondido
201 North Broadway
Escondido, CA 92025

Dear Mayor White and Members of the City Council,

We write to urge you to vote no on the proposed resolution regarding battery energy storage system projects at today's city council meeting (Item 13, Resolution 2024-113). As currently drafted, the resolution contains several misleading and inaccurate claims that are not supported by any evidence.

First, the resolution states that "BESS projects do not bring realistic economic benefits to the City, including jobs and new local tax revenue." This statement is not supported by evidence, and recent local studies show that the opposite is true. An economic impact study from the San Diego North Economic Development Council found significant positive impacts in terms of employment and local tax revenue resulting from the proposed Seguro Battery Energy Storage project in Eden Valley (unincorporated San Diego County), just west of the Escondido city limits. These economic benefits include:

- 458 temporary direct jobs and $11.5 million in local tax revenue during construction
- 18 permanent direct jobs and 17 permanent indirect/induced jobs after construction
- $5.8 million in local property tax revenue reoccurring annually, including
    - Over $3.6 million annually to Escondido Union School District and Escondido Union High School District
    - Over $1 million annually to the County of San Diego

Beyond direct and indirect tax benefits, BESS project developers frequently partner with local governments and community organizations to create community benefit packages, which often include ongoing support for local charitable programs and infrastructure that benefits the community.

Second, the resolution states that BESS projects do not increase land values and have a "negative impact on existing residential land values; disincentivizing employers and businesses from locating in the area." These statements are not supported by evidence. The areas surrounding the BESS project that currently exists within the City of Escondido is thriving economically. In fact, the deployment of BESS facilities helps to ensure grid reliability and flexibility, especially during times of high energy demand, thereby ensuring that businesses and employers are not impacted by brownouts or blackouts.

Third, the resolution also states that thermal runaway events are "extremely difficult to extinguish" and suggests that BESS projects are harmful to general health and safety. This statement is misleading as it does not acknowledge how BESS safety standards and design approaches have changed in the last three to five years. As we stated in our July 2024 letter to the City Council, Escondido is no stranger to battery energy storage. In 2017, SDG&E

inaugurated a 30 MW battery energy storage system at the Escondido substation near Auto Park Way, which at the time was considered one of the largest battery storage systems in the world. The Escondido battery storage system has been safely serving and supporting the local grid ever since.

Since that facility was built in 2017, standards and design approaches to battery energy storage systems have rapidly evolved to better address safety concerns, including safety controls and fire suppression systems at the battery module level (roughly the size of a DVD player), dramatically reducing the potential for a thermal runaway to spread within a container. As a result, in the unlikely event of a thermal runaway event under the design standards and requirements being deployed today, fire is contained to a single unit and burn tests have generally shown that it is extinguished within a matter of hours. Also, since 2018, the rate of incidents at battery storage facilities has dropped significantly, even as the number of energy storage facilities operating has risen dramatically (see graph below). [1]

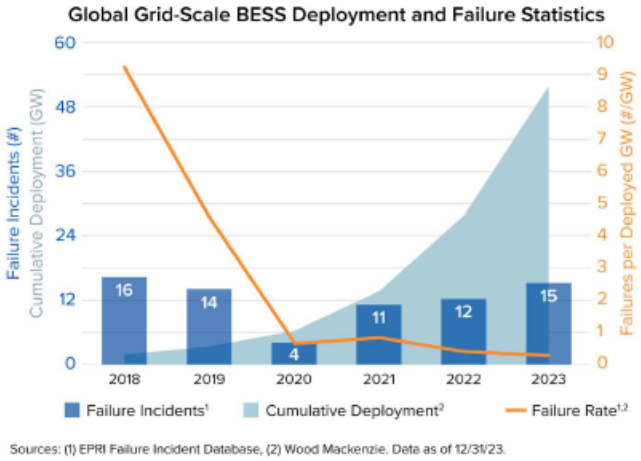


Figure 1. Global Grid-Scale BESS Deployment and Failure Statistics

Finally, the resolution fails to acknowledge that the City's legally enforceable Climate Action Plan (CAP) sets the ambitious goal of achieving 100 percent zero-carbon electricity in Escondido by 2035 by increasing grid-supply renewables. Due to the intermittent nature of solar and wind energy resources, achieving the City's goal is only possible with BESS facilities that can capture excess renewable energy produced during periods of lower demand and release that energy during periods of high demand. In other words, BESS projects are essential to achieving the greenhouse gas emissions reductions called for in the City's CAP. Further, one of the key strategies within the City's CAP is to develop and implement a mitigation plan for power outages, in which one of two options is to "adopt an ordinance that requires new senior housing or large care facilities to install air conditioning in all units and on-site home energy batteries and energy storage." The proposed resolution would be in direct conflict with this measure which has a target adoption year of 2027.

[1] EPRI, Insights from EPRI's Battery Energy Storage Systems (BESS) Failure Incident Database: Analysis of Failure Root Cause, https://www.epri.com/research/products/000000003002030360

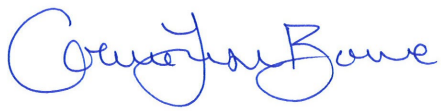
Regardless of the problematic claims made in the draft resolution, AES supports strong standards and regulations and encourages the City of Escondido to engage with us and other experts and stakeholders to ensure that any BESS standards or regulations the City might adopt are consistent with best practices across the U.S. AES experts already participate in various industry technical groups responsible for creating and updating safety standards, such as the NFPA 855 on Energy Storage Systems, which establishes standards for mitigating hazards associated with energy storage systems.

We urge the City Council to reject the resolution as currently drafted, and, as an alternative to passing a resolution at this time, direct City staff to work with stakeholders and subject matter experts to research ways in which the City can strengthen existing regulations and develop new guidelines to support the safe and efficient development of new BESS projects in and around Escondido.

Enclosed is additional information about the latest technology and safety standards that will be used for the AES Seguro Battery Energy Storage project.

We thank you for your consideration.

Sincerely,



Corinne Lytle Bonine
Director, Permitting

cc: Sean McGlynn, City Manager
Zack Beck, City Clerk
Michael R. McGuinness, City Attorney

Seguro Battery Energy Storage

Latest technology and standards prioritize safety

Utility-scale battery energy storage systems (BESS) are the bridge between a reliable power grid and our clean energy future. Energy storage provides backup for short-term power outages and interruptions; delivers dispatchable energy to meet periods of peak demand; provides ancillary services to maintain the stability of the grid; and supports steadily increasing renewable energy resources on the grid.

For all these reasons, investment and deployment of utility-scale battery storage is accelerating across California. According to the California Energy Commission, from 2018 to 2024, battery storage capacity in the state increased from 500 megawatts (MW) to more than 10,300 MW, with an additional 3,800 MW to come online by the end of 2024. The state projects 52,000 MW of battery storage will be needed by 2045 to meet the state's clean energy goals.

Fire and safety incidents are rare

While two recent fire incidents at battery storage facilities in San Diego County have raised questions about BESS safety, it's important to remember that fire incidents at battery storage facilities are rare occurrences. BESS technology, system design, safety features, and operational practices have advanced significantly in just the past few years.

According to research from the Electric Power Research Institute (EPRI), which collects and analyzes data about BESS fires, "the technology's overall safety record is strong and improving." There were about the same number of fires in 2023 as there were in 2019, even as global battery storage deployments have increased 20-fold. According to EPRI, there were fewer than 10 BESS failure events in the U.S. in 2023.

New safety standards and technologies

The energy storage technology being deployed today looks and operates very differently from the technology installed just three to five years ago. The industry has also developed a much deeper understanding of the technical and safety management of thermal hazards.

More importantly, a new generation of BESS installations, including AES' proposed Seguro BESS facility in north San Diego County, California, near Escondido, will incorporate the latest design standards and safety features that greatly reduce the possibility of fire and thermal runaway.

Lessons learned from previous incidents have resulted in the adoption of new, rigorous standards and codes like UL 9540 Standard for Safety of Energy Storage Systems and Equipment and National Fire Protection Association (NFPA) 855 Standard for the Installation of Stationary Energy Storage Systems, in addition to continual design safety improvements that AES integrates into its energy storage facilities.

All battery cells and modules that AES deploys now undergo testing compliant with the UL 9540A Standard for Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems, both to characterize the hazards associated with battery energy storage fires and to demonstrate the effectiveness of new fire mitigation mechanisms.

Advanced fire prevention and protection

In addition, new layered protections are designed to address specific battery failure modes to greatly diminish the likelihood of any singular battery cell failure from cascading into a larger thermal runaway event or fire. Containment, at the cell level, enclosure level, and system level, is key to managing and mitigating thermal hazards in the unlikely event of occurrence.

AES is working closely with local fire departments and emergency responders to develop Hazard Mitigation Analysis and Emergency Response Plans in the unlikely event of an incident at the site.

Safety is our top priority. New and rigorous safety standards and technologies are incorporated into the design of the Seguro BESS facility making it safer than current installations in operation.

Today's BESS safety features and practices provide:

- → Hazard Mitigation Analysis
- → Battery Management Systems
- → Emergency Shutdown
- → Flammable Gas Detection
- → Fire Detection and Alarm
- → Direct Injection Fire Suppressant
- → Exhaust Ventilation
- → Deflagration Venting
- → First Responder Training
- → Emergency Response Plans

Earlier vs. current BESS safety standards/features

	Earlier BESS Design	Current, Advanced BESS Design
Enclosure Type	Walk-in design	Non-walk-in (electrical equipment)
Battery Management System Protection	Yes	Yes
Gas Detection & Explosion Prevention	No	Gas detection, ventilation, deflagration panels
Smoke & Heat Detection	Yes	Yes
Fire Suppression	Non-targeted clean agent or sprinkler system	Targeted suppression at module level (clean agent, aerosol, water, etc.)
NFPA 855 Compliant	No	Yes
UL9540A Tested	No	Yes

Seguro Storage meets rigorous new safety standards

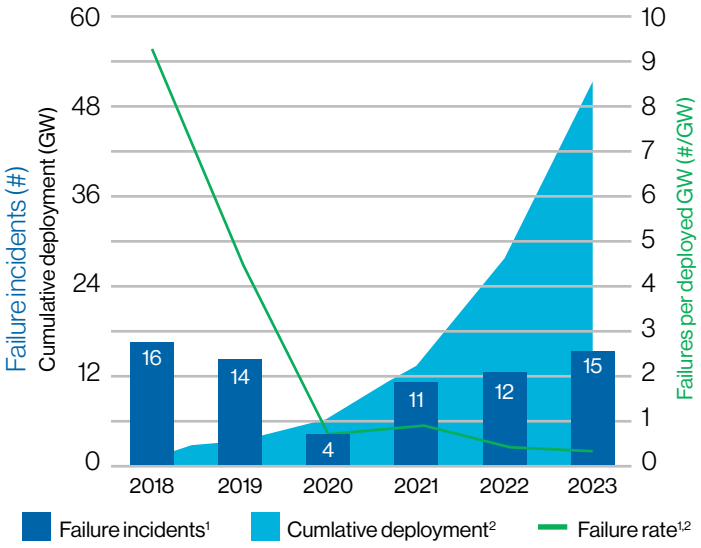
Fire professionals, fire protection experts, and safety leaders have developed a suite of standards that keep energy storage projects safe. These standards play an important role in guiding consistent safety strategies and practices across the United States.

NFPA 855 provides mandatory requirements for the design, installation, commissioning, operation, maintenance and decommissioning of energy storage facilities. The standard includes requirements for metrics such as maximum energy and spacing between units and includes several submittals that must be made to the regulating governmental entity, including 1) Hazard Mitigation Analysis (HMA), 2) Emergency Response Plan, 3) details of all safety systems, and more.

UL 9540 is the safety standard for energy storage equipment, including batteries, that is required under NFPA 855. NFPA 855 requires that batteries included in energy storage projects are listed to the safety specifications included in UL 9540 and undergo rigorous fire testing. This standard ensures that equipment incorporated into battery energy storage facilities are tested, certified and safe for operation on the electric grid.

By locating battery cells in specially designed enclosures equipped with advanced safety and fire suppression systems, today's BESS systems greatly diminish the likelihood that any singular battery cell failure will cascade into a larger thermal runaway event or fire.

Global grid-scale BESS deployment and failure statistics



Sources: (1) ERPI failure incident database, (2) Wood Mackenzie, Data as of 12/31/23

According to EPRI statistics, BESS fire incidents are decreasing while deployments are increasing substantially. The rate of BESS failure incidents fell 97% between 2018 and 2023. During this time, codes and standards regulating BESS have rapidly evolved to better address safety concerns.

New BESS systems, including the design for Seguro Storage, feature layered active and passive safety, monitoring and fire suppression systems, including flammable gas detection, fire detection and alarm, direct injection fire suppressant and exhaust/deflagration ventilation.

For more detailed information about today's BESS safety, visit here:

Seguro energy storage project | AES

Energy Storage | ACP

www.aes.com

CITY OF ESCONDIDO
OFFICE OF THE CITY CLERK
201 NORTH BROADWAY
ESCONDIDO, CA 92025

RE: AES SEGURO STORAGE PROJECT LOCATED AT 925 COUNTRY CLUB DRIVE

DEAR SIR:

THIS IS A LETTER TO PROTEST THE PROPOSED ENERGY BATTERY STORAGE SYSTEM ON 22.5 ACRES, APPROXIMATELY 350 FEET FROM HILL VALLEY DRIVE

THERE ARE MULTIPLE REASONS TO DENY SUCH A POTENTIALLY DANGEROUS STORAGE AREA FOR HIGHLY IGNITABLE BATTERIES TO CLOSE TO HOUSES AS WELL AS A COMMERCIAL AREA.

1-COUNTRY CLUB DRIVE IS THE MAIN EGRESS DRIVE TO EXIT IN CASE OF FIRE FOR THE ENTIRE HARMONY GROVE AREA, AS WELL AS THE RECENTLY CONSTRUCTED DEVELOPMENTS WHICH HAS EXPANDED THE HUMAN OCCUPANCY IN THIS AREA. IN THE LAST MAJOR COCOS FIRE 7/19/2014.

2-THIS FACILITY CAN BY ITSELF START A FIRE DUE TO THE FLAMMABLE PROPERTIES OF THE MATERIAL THEY INTEND TO STORE. EVEN IF THIS WERE NOT THE CASE, A FIRE SIMILAR TO THE COCOS FIRE, IF IT SHOULD TOUCH THIS FACILITY WOULD CREATE A HUGE FIRE EVENT OF CATASTROPHIC PROPORTIONS.

3-THIS SEGURO STORAGE FACILITY WOULD ADD UNSUPPORTABLE TRUCK, AND PROBABLY TRACTOR TRAILER TYPE TRAFFIC IN VERY NARROW DRIVING SURFACE OF COUNTRY CLUB DRIVE.

4-THIS FACILITY WOULD ALSO ADD TO THE ALREADY CONGESTED TRAFFIC LIGHT SYSTEM AT NORDAHL AND AUTO PARKWAY TRAFFIC. THE SURFACE ROAD CONDITIONS AT NORDAHL TELL THE STORY OF THE PUNISHMENT TO THE ASPHALT WITH MULTIPLE DEEP GOUGES AND POTHOLES CAUSED BY THE HEAVY TRUCK TRAFFIC. NEITHER THE CITY NOR THE COUNTY SEEM TO BE INTERESTED IN FIXING THIS AS IT HAS GONE FOR MANY MONTHS.

5-THIS FACILITY WITH HIGHLY FLAMMABLE BATTERIES WILL BE ALSO UNACCEPTABLY CLOSE TO THE MAIN HOSPITAL IN THIS AREA THAT WE RELY ON FOR EMERGENCIES AND TRAUMA, THE PALOMAR HOSPITAL OR NORTH

COUNTY.

PLEASE DENY THIS PERMIT AND INCLUDE THESE COMMENTS IN THE COMING REVIEW PROCESS BY THE CALIFORNIA ENVIRONMENTAL QUALITY ACT. PROJECTS OF THIS NATURE VIOLATE THE GOODWILL PREMISE OF THIS ACT.

THANK YOU FOR YOUR CONSIDERATION,

CITY OF ESCONDIDO
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THANK YOU FOR YOUR CONSIDERATION,

Nancy Stubblefield

CITY OF ESCONDIDO
OFFICE OF THE CITY CLERK
201 NORTH BROADWAY
ESCONDIDO, CA 92025

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THANK YOU FOR YOUR CONSIDERATION,

Justin Grubbs

July 8, 2024

City of Escondido
201 North Broadway
Escondido, CA 92025

Dear Mayor White and Members of the City Council,

We write today to urge you to delay taking any formal action regarding the Seguro Battery Energy Storage project, which is proposed on private property along Country Club Drive in unincorporated San Diego County, outside of Escondido city limits.

A City Council resolution regarding the Seguro project would not be prudent at this time because not all the information about the project has been presented to the public. The project is currently in an in-depth environmental review process in compliance with the California Environmental Quality Act. AES is working with County staff and third-party technical consultants to prepare an Environmental Impact Report (EIR), which will be circulated for public review once the County deems it ready. Before the City Council takes any position on the project, all interested community members should carefully review the Draft EIR and provide any comments. Once all comments have been evaluated and addressed, a final EIR will be circulated for public review. Only after the publication of the Final EIR would it be appropriate for the City Council to consider a resolution regarding the project.

Escondido is no stranger to battery energy storage. In 2017, SDG&E inaugurated a 30 MW battery energy storage system at the Escondido substation near Auto Park Way, which at the time was considered one of the largest battery storage systems in the world. The Escondido battery storage system has been safely serving and supporting the local grid ever since.

Since that facility was built in 2017, standards and design approaches to battery energy storage systems have rapidly evolved to better address safety concerns, including the requirement for safety controls to be installed at the module level (roughly the size of a DVD player), dramatically reducing the potential for a thermal event to spread within a container. Also, since 2017, the percentage of incidents at battery storage facilities has been small compared to the significant increase in energy storage deployments across the U.S. More and more utility-scale battery energy storage systems are being built closer to residential areas to enhance grid reliability and provide backup power in local communities. SDG&E, for example, recently inaugurated new battery storage facilities within the residential neighborhoods of Paradise Hills, Tierrasanta, Clairemont, and Fallbrook.

Safety is a top priority for AES, and we are deeply committed to constructing and operating the safest battery energy storage system. The project will meet or exceed the safety standards set forth by the National Fire Protection Association (NFPA) 855, the gold standard for energy storage safety developed by fire service professionals and fire protection experts. Furthermore,

the project will be built in coordination with skilled laborers who are equipped with battery storage installation training.

We are continuing to work closely with the local fire agencies and have facilitated discussions with fire representatives from the San Marcos Fire Protection District, San Diego County, the City of Escondido, the Rancho Santa Fe Fire District, and CALFIRE. These interagency discussions will continue as we work with government and fire officials to build the world's safest battery storage project.

Additionally, we continue to engage with the community to provide as much information about the project, answer questions, and receive feedback. This includes a series of well-attended community workshops from March to May this year. The project is still in the early stages of design, which provides us the flexibility to continue to avoid and minimize impacts and incorporate community feedback. As a result of our public engagement, we have already made critical changes to the project, including reducing the size of the project, increasing setbacks from residences, undergrounding the transmission line from the project to the substation, and improving and adding access and circulation within the project area. We are also soliciting ideas for community benefits that we can incorporate into the project, and likely some of those will involve the City of Escondido and our neighbors within the city's boundaries.

AES is committed to continuing to engage with residents and the community. We also understand that our success as a company is only as strong as our partnerships with the communities where we operate. That's why we partner with local educational institutions and community organizations, including the Escondido Education Foundation, Palomar College, and the San Diego Children's Discovery Museum.

The Seguro project will provide numerous benefits to the community and the region. It will keep the local grid reliable, minimize power outages, and contribute to reducing local air pollution and greenhouse gas emissions from the electrical grid, helping to meet San Diego and California's decarbonization goals. An economic impact analysis conducted by the San Diego North Economic Development Council shows that the project will provide significant local economic benefits, including hundreds of jobs and more than $11 million in local tax revenue during construction. When the project goes into operation, the property will be reassessed and will provide almost $6 million annually in property tax payments, with $3.6 million going to Escondido schools.

We strongly urge the City Council to delay any formal action regarding this project until after the Final EIR has been published. In the meantime, we hope to continue our dialogue with members of the City Council as well as City and Escondido Fire Department staff. When the Draft EIR is published, we invite the City and all interested members of the community to review and provide comments. We also welcome the opportunity to present the project at a City Council meeting and answer questions.

Enclosed is additional information about the Seguro project, how battery storage systems are designed for safety, and the benefits of battery storage.

We thank you for your consideration.

Sincerely,

Corinne Lytle Bonine
Director, Permitting

cc: Sean McGlynn, City Manager
Zack Beck, City Clerk
Michael R. McGuinness, City Attorney

Seguro Energy Storage

Seguro Storage is a proposed battery energy storage project in north San Diego County, California, near Escondido and San Marcos, that provides a critical and cost-effective source of reliable power to support the electric grid in the region.

Energy storage enables power generated during the day to be stored and delivered during periods of high demand, thereby helping stabilize the power grid while also reducing California's reliance on fossil fuels. The flexibility provided by the Seguro Storage project will be critical to helping the San Diego region meet its decarbonization goals and California achieve 100% carbon-free energy by 2045.

Project overview

- → Up to 320 megawatts (MW) / 1,280 megawatt hours (MWh) capacity*
- → Enough stored energy to power nearly 240,000 California homes for four hours
- → Supports the electric grid reliability by providing a flexible energy resource
- → Utilizes land near existing electric grid infrastructure to minimize the need for long, overhead transmission lines

*Note: The proposed original size for the Seguro BESS was 400 MW / 1600 MWh. The size has been reduced due to stakeholder and community feedback and project design requirements.

The proposed project will be located on a 22.5-acre site of private land on Country Club Drive in the Eden Valley area of unincorporated San Diego County, southwest of the junction CA Highway 78 and Interstate 15.

Energy storage facility design

The Seguro Storage project will feature metal storage containers, approximately 8 to 10 feet in height, that will house racks of battery modules equipped with insulation and robust safety monitoring and management systems.

The battery storage system will connect to the power grid via a new substation that will be built on the project site. That substation will connect to the nearby existing San Diego Gas & Electric (SDG&E) Escondido Substation via an electric transmission line. Equipment will also be installed to enable remote monitoring and control of the facility.

The project will meet all of San Diego County's standards, including for lighting, noise, landscaping, and other project elements, such as setbacks, height limitations, and stormwater management.

Project Timeline

2021-2025
Development/
Siting/Permitting

late 2026
Operations

2025-2026
Construction

Environmental Review

The project will be reviewed under the California Environmental Quality Act (CEQA). Environmental and technical studies for the project will include a Phase I Environmental Site Assessment, hydrology, geotechnical, cultural resources, land, topography, biological, wetlands, economic impact and other studies. AES will work with the relevant government and regulatory agencies to comply with all environmental requirements for the project.

Community engagement

AES is committed to being a good neighbor and partner to the communities where our projects are located. This includes informing and engaging project stakeholders and the public throughout all phases of the project. AES also supports local contractors, community organizations and programs.

Local economic benefits

The project is expected to provide the following benefits to the local economy:

- → Jobs during construction and operations, while supporting indirect employment and businesses in the area
- → Long-term tax revenue to the local community, school districts, and county

About AES

The AES Corporation is a global energy company accelerating the future of energy. Together with our many stakeholders, we're improving lives by delivering the greener, smarter energy solutions the world needs.

In California, AES has been developing and delivering innovative clean and reliable energy solutions, creating jobs, and investing in communities since 1989, with currently 2.8 gigawatts (GW) of reliability assets and more than 1.5 GW of solar, wind, and battery storage facilities in operation.

www.aes.com

Last updated 3/18/24

For more information

Website: https://www.aes.com/california/project/seguro-energy-storage-project

Email: seguroproject@aes.com

Phone: 760-546-2228

Last updated 3/19/24

Seguro Energy Storage Project
Frequently Asked Questions

GENERAL PROJECT QUESTIONS

1. What is the Seguro Energy Storage project?

The proposed Seguro Energy Storage project is a battery energy storage system (BESS) with a capacity of up to 320 megawatts (MW) / 1,280 megawatt-hours (MWh)*, which is enough stored energy to power approximately 240,000 homes for a duration of four hours. The BESS will feature metal storage enclosures, approximately 8 to 10 feet in height, which will house racks of battery modules equipped with insulation and robust safety monitoring and management systems.

The BESS will connect to the power grid via a new substation that will be built on the project site. That substation will connect to the nearby existing San Diego Gas & Electric (SDG&E) Escondido Substation via an electric transmission line.

This is a standalone BESS project, meaning there are no solar panels, wind turbines, or other generation technologies included in the project.

AES will be the long-term owner and operator of this BESS facility.

**Note: The proposed original size for the Seguro BESS was 400 MW / 1600 MWh. The size has been reduced in response to stakeholder and community feedback and project design requirements.*

2. What is battery storage and why is it important?

BESS technology provides a highly flexible energy resource and a critical safety net to the electrical grid operator during periods of high demand. BESS facilities can support entire buildings or the broader electrical grid during extreme weather events and service disruptions or outages. BESS facilities enable us to keep the lights on, keep air-conditioning or heating systems operating, and keep critical equipment such as medical, public services, and business technology online; preventing disruption to essential electrical infrastructure that keeps people safe.

Energy storage also enables electricity to be saved and used at a later time, when and where it is most needed. The flexibility of energy storage systems makes them an effective complement and accelerator for intermittent renewable energy sources. By introducing more flexibility into the electrical grid, energy storage helps integrate more clean, renewable power sources – like solar, wind, and hydropower – and enables more people to rely on and use distributed energy resources, such as rooftop solar and electric vehicles. All these resources, supported by energy storage, contribute to reducing local air pollution and greenhouse gas emissions from our electrical grid.

The flexibility that battery storage provides is also critical to helping the San Diego region meet its decarbonization goals and for California to achieve 100% carbon-free energy by 2045.

3. How was the project site location selected?

The proposed project site is located on 22.5 acres of privately-owned land along County Club Drive in unincorporated San Diego County, near Escondido and San Marcos.

AES evaluated many sites before selecting this proposed project location. As part of the siting process, many factors were considered, including proximity to electricity demand (or "load"), availability of existing electric grid infrastructure and access (rights of way, etc.), potential environmental impacts, cost-effectiveness, and availability of suitable land. This site was also chosen because of its close proximity to the SDG&E Escondido Substation, its size and physical characteristics, the minimal environmental impacts it presents, and its zoning designation per County rules that allow utility infrastructure in this area.

By utilizing land that is near the existing electric grid and energy production infrastructure, as well as other existing energy-intensive industrial uses, this project location also minimizes the need for long, overhead transmission lines.

4. Is this project compatible with current zoning/land use rules and what are the key aspects of the project's permitting process?

The project site is zoned Agriculture (A70). Section 2704 of San Diego County's Zoning Code lists both Minor Impact Utilities and Major Impact Utilities as an allowable use in areas zoned A70 upon issuance of a Minor Use Permit or Major Use Permit. The County has determined that battery energy storage falls under these allowable use categories.

The project will be reviewed by all relevant government and regulatory agencies under the California Environmental Quality Act (CEQA). This review process includes various environmental and technical studies.

AES submitted the Seguro Energy Storage project application to San Diego County for a Minor Use Permit in January 2023. Based on public feedback and discussions with the County, AES decided to move forward with a Major Use Permit application, which was submitted in September 2023. The County is in the process of preparing an Environmental Impact Report (EIR) for the project.

As required by CEQA, the EIR will include a full analysis of the project and alternatives. It will also include the sites that were evaluated as part of AES' site selection process and will detail why those sites were not considered feasible.

The project will meet all of San Diego County's standards, including for lighting, noise, landscaping, and other project elements, such as setbacks, height limitations and stormwater management. The project will also comply with all environmental requirements and mitigation measures.

5. How will you engage the community?

Engaging with the local community and gathering feedback from project stakeholders is an essential part of our project development process.

Our outreach has included:

- Sent multiple mailers to residents and businesses near the project site, beyond minimum notification radius requirements set forth by the County, to provide details about the project and information about how to connect with the project team
- Walked door-to-door to residences nearest to the project site to share information and answer questions
- Provided a project site visit and a formal presentation to the San Dieguito Community Planning Group
- Provided briefings to government officials in San Diego County, cities of Escondido and San Marcos, community and business leaders, and other stakeholders
- Engaged in ongoing meetings with the San Marcos Fire Department and nearby fire agencies
- Provided briefings to executive staff at Palomar Health District
- Established a project information website (https://www.aes.com/california/project/seguro-energy-storage-project), email address (seguroproject@aes.com), and hotline (**760-546-2228**) to receive and respond to questions and comments

AES will continue to engage with and provide updates to the community throughout the development process. We are hosting a series of community workshops in Spring 2024 to provide the latest project information, answer questions, and receive feedback from the community. Community members will also have the opportunity to provide comments as part of the project's environmental review and permitting process.

6. How will this project benefit the local community?

The Seguro Energy Storage project will serve as a critical, cost-effective source of reliable power to support the region's electric grid. It will provide enough stored energy to power about 240,000 homes for a duration of 4 hours.

The project's expected economic benefits include new local tax revenue to support local schools, infrastructure and public services, and the creation of local jobs. There will be more than 450 jobs and more than $11 million in tax revenue generated during project construction. There will be about 8-10 permanent jobs and almost $6 million in tax revenue generated annually throughout the operational life of the project.

The project also includes the build-out and dedication of existing trail easements to provide a segment of the proposed trail that will increase pedestrian connectivity and access to future trail segments.

AES is committed to being a good neighbor and partner to the communities where our projects are located, and we support local contractors, community partnerships and programs.

7. How many employees will be on-site?

A team of 8-10 operations and maintenance employees will staff the facility. Members of this team will be on-site during regular business hours to monitor equipment and conduct maintenance (including vegetation management), staffed across multiple shifts. This team will also be on call outside of regular business hours to respond to any operational issues. Additionally, the facility will be monitored remotely 24/7 from AES' remote operations control center, which is fully staffed 24/7.

PROJECT DESIGN / ENVIRONMENTAL REVIEW QUESTIONS

8. What measures are you taking to minimize lighting from the facility?

The facility will be equipped with lighting for safety and security reasons. The project will be designed to meet County requirements, including the San Diego County Lighting Ordinance, and all feasible measures to minimize lighting overcast outside project property boundaries will be implemented accordingly. Lighting will be directed downward, fully shielded, and may consist of low-pressure sodium lamps or narrow-spectrum amber fixtures. AES' design approach includes CCTV cameras and photosensitive lighting, which are off at night unless personnel are present.

9. How will this project minimize visual impacts?

A Visual Impact Analysis will be completed as part of the Environmental Impact Report (EIR), which will include visual renderings of the project. Perimeter trees will be maintained to the extent practical. Additional screening options, including a wall consistent with the surrounding character and drought-tolerant and fire-resistant landscaping, will be evaluated upon completion of relevant studies. AES will work with the County to implement appropriate measures to the extent feasible with consideration for nearby neighbors' views at various lighting and elevation levels.

10. What components of this project generate noise and how will AES approach noise management and mitigation?

Typically, the most significant source of noise for a project like this comes from the HVAC equipment and inverters, within BESS equipment, and from the transformer, within the project's on-site substation. A noise study will be conducted to ensure County noise requirements, including a strict nighttime noise requirement, are met. As part of this process, various noise mitigation measures, including sound barriers of various types, will be considered. Any mitigation measures deemed necessary per the noise study and California Environmental Quality Act (CEQA) process will be implemented in the project design.

AES limits construction activities to approved daytime hours to minimize impact during the project's construction phase. The project will be designed to meet acceptable ambient noise levels at all points along the property line.

11. How will AES ensure that water and air quality are not negatively impacted by this project?

In accordance with local authority requirements, AES will develop and complete several studies, including a Hazard Consequence Analysis, Hazard Mitigation Assessment, detailed air quality and greenhouse gas analyses to determine potential impact, a stormwater quality management plan, a hydrology study, extensive equipment testing, and a robust maintenance plan. The current design proposes the installation of on-site detention basins to collect, treat and store stormwater. The project will adhere to all air quality and stormwater regulations during construction and operations.

12. What studies and processes will be performed related to other environmental impacts of this project?

An Environmental Impact Report (EIR) will be prepared as part of the project's California Environmental Quality Act (CEQA) compliance. This will include numerous technical studies to understand potential impacts and mitigation measures related to the natural environment and the surrounding community. The studies that will be completed as part of the EIR include, but are not limited to, air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, paleontological resources and wildfire.

13. How will you prevent flooding and runoff during rains?

The site has been designed to ensure that stormwater is collected on the property instead of flowing to neighboring properties, in compliance with all state and local regulations. The site will be graded so that stormwater flows into storm drains that empty into pond-like detention basins on the property. In addition to AES' observation of relevant requirements and best practices related to stormwater management, we take a prudent design approach to ensure the safe operation and preservation of our projects, which are typically very time- and capital-intensive to develop and build.

14. What types of industrial toxins or hazardous materials will be kept on-site? How will the surrounding environment be protected from industrial pollution?

As part of the Environmental Impact Report (EIR) preparation required for California Environmental Quality Act (CEQA) compliance, third-party experts are preparing a Hazard Consequence Analysis (HCA). The HCA provides a detailed study of all possible hazards presented by the proposed project. AES will use the results of this analysis to adjust the design of the project to mitigate those potential hazards.

SAFETY QUESTIONS

15. How will you prevent the battery modules from starting a fire?

Fires and "thermal runaway" events are very unlikely under the most current federal, state, and local standards that support the safe design, planning, and operations of BESS facilities. The project will comply with the latest and most rigorous design and safety standards for BESS systems. The project design will also be National Fire Protection Association (NFPA) compliant.

AES will develop and complete an Emergency Response Plan, a Hazard Consequence Analysis, an arc flash risk assessment, equipment testing, and a maintenance plan as part of the preparation and permitting process for this project. These steps will help to identify the most effective strategies to prevent and respond to any potential hazards, including fire safety hazards. As part of this emergency management preparation, local fire and EMS personnel will be trained on the equipment and emergency response protocols.

The BESS facility will be staffed by a team of operations and maintenance professionals who will be onsite during regular business hours and on call outside of regular business hours. The facility will also be remotely monitored 24/7 from AES' remote operations control center.

16. How much of a concern is fire risk or thermal runaway?

Safety is always the top priority for AES. AES' approach to mitigating risk always begins with preventing the hazard from occurring in the first place, which is done through establishing rigorous codes and standards for energy storage systems. AES participates on industry technical committees such as the NFPA 855 on Energy Storage Systems, which establishes standards for mitigating hazards associated with energy storage systems, continually improving industry safety best practices.

AES implements a multitude of risk management layers in our system designs: the battery management system maintains nominal operations and separates a battery string from hazards when necessary; site SCADA systems identify hazardous conditions and can automatically stop the system and alert response personnel; and non-battery fires that may result in a battery fire are managed using the same measures as non-battery sites (fire-resistant construction, defensive posturing, and material-specific suppression). If a thermal runaway event or battery fire were to take place, the enclosures planned for this site are designed to release fire suppressant in large concentrations directly into the initiating cell, removing heat and preventing thermal runaway throughout the enclosure.

The AES energy storage solution integrates battery modules inside steel containers that are equipped with fire-rated insulation and several redundant layers of hazard controls, including passive and active measures that both inhibit and (when necessary) suppress hazardous conditions. The UL 9540 certification addresses safety and requires UL 9540a test results to be available for review. The 9540a tests of this system indicate adequate prevention of thermal runaway. The Seguro BESS is required to achieve UL

9540 certification prior to site commercial operation. AES will build a BESS facility that meets or exceeds all safety requirements and standards.

17. Should patients and staff at Palomar Medical Center be worried about toxic fumes from a potential fire at the BESS facility?

The design of the Seguro project will ensure that if a battery module fails, that failure is contained within the module and cannot cause an ignition, explosion, or spread of fire to nearby equipment. In the rare case that a thermal event or fire did occur, it would be managed without endangering the broader community. A study for the New York State Energy Research & Development Authority (NYSERDA) showed that the average level of toxicity of battery fires is similar to that of plastics fires involving materials such as sofas, mattresses, or office furniture. During a BESS battery fire, only trace amounts of chemicals are detected in sampling around the event, and overall air quality remains at safe levels.

The Palomar Medical Center is approximately 1,600 feet away from the proposed project; therefore, toxic fumes from an incident at the project site do not present a significant risk to the hospital. In addition, the hospital already maintains a comprehensive Emergency Management Program (EMP) based on a Hazard Vulnerability Analysis that is reviewed and updated at least once a year as part of the hospital's normal operations. The hospital's existing EMP addresses risks from wildfires and hazardous material emissions, among others, and Palomar Health is confident in its ability to safely respond to these risks. If any additions or updates to the EMP need to be made in connection with the Seguro Energy Storage project, they will be made well before the proposed facility begins operations.

Palomar Medical Center Escondido is already situated near several facilities that present similar or greater risks, and these risks have been incorporated into the hospital's existing EMP, as applicable. These facilities include a battery energy storage system (BESS) installed at the SDG&E Escondido Substation, less than 1,700 feet to the northeast of the hospital; a 580-megawatt gas-fired power plant, less than 1,200 feet to the southeast of the hospital; and numerous large industrial facilities in the vicinity of Auto Park Way and West Mission Road.

18. How would neighbors evacuate or safely shelter in place in the event of an incident at the BESS facility?

It is unlikely that a fire or thermal runaway incident at the BESS facility would require a shelter-in-place or evacuation order. In the unlikely event of a fire or thermal runaway incident, the facility's design will keep flames within the container and any toxic vapors within a safe distance from humans or livestock. Typically, shelter-in-place or evacuation orders are issued at the discretion of local fire authorities out of an abundance of caution. The logistics of any potential shelter-in-place or evacuation orders will be determined through analyses and plans that are currently being developed.

Unobstructed access via Milpas Drive, which crosses the approximate center of the project site from east to west, will be preserved to allow residents and first responders to enter and evacuate. The roadway will also be improved to allow residents and first

responders to move along Milpas Drive more efficiently. Additionally, an alternative access route will be added, connecting Milpas Drive and the portion of Country Club Drive that runs parallel to Milpas Drive, to the north of the facility, so that residents and first responders will have more than one access route. Both this second access route and the existing Huston Ranch Road to the south of the project site will also be improved to support more efficient ingress/egress and regular access by residents.

19. What is the decommissioning plan for the project's end of life? Will materials be recycled?

When a project reaches the end of its life, the project owner (AES) is responsible for executing the approved decommissioning plan, which includes abiding by all local and state decommissioning requirements. This involves the removal, recycling, and/or responsible disposal of all equipment and other structures associated with the project, as applicable. The land surface within the project site area will be sensitively restored to pre-project conditions to enable a return to agricultural or other uses consistent with the land-use policies at the time. Through our supply chain process, we identify and prioritize equipment manufacturers that align with our environmental, safety and human rights commitments. Some of these commitments include buying equipment from manufacturers whose supply chains and suppliers comply with a national recycling program. We also seek to buy high-efficiency products, which reduce the total volume of raw materials and parts required for each project.

20. Once the project is operational, can't AES abandon or sell it to someone else?

AES is a Fortune 500, financially strong global company and a leader in developing clean energy solutions. We've been powering California and supporting the state's grid reliability needs for more than three decades. AES will be the long-term owner and operator of the facility.

21. If you don't yet know the exact type of battery that will be used, how do you know it will be safe?

The battery modules are just one component of the larger system. The design of the system is what ensures safe operation, regardless of the specific type of battery technology that is ultimately selected. The critical determinant of a project's safety are the criteria for its design standards and safety features; these criteria remain the same, even though the battery modules might differ slightly depending on vendor or product line availability when components are procured.

As previously mentioned, the project design will be NFPA 855-compliant, and all project components will be independently tested and certified to several industry standards (UL 1642, UL 1973, UL 9540). The UL 9540 certification addresses safety and requires UL 9540a test results of this system, which indicate adequate prevention of thermal runaway, to be available for review. The Seguro Energy Storage system is required to achieve UL 9540 certification prior to site commercial operation. The project will be designed to meet or exceed these rigorous safety standards.

22. When and how will the batteries be charged and discharged?

The batteries will be charged through the transmission lines connecting the facility to the electric grid. Being connected to the electric grid means the batteries can be charged by a wide range of energy resources, ranging from rooftop solar panels to large wind turbines. As this is a standalone battery energy storage system (BESS), not a hybrid BESS with onsite power generation, we anticipate it will draw mostly renewable power during daytime hours when the California grid has surplus renewable power generation, thereby enabling that power to be harvested (rather than wasted) for later use. After solar generation dips with the sunset, usually between 4:00 and 9:00 pm, we anticipate this BESS discharging its stored power to support the evening energy demand spike.

23. Why should we trust that this project will be safe when there have been multiple incidents at battery energy storage facilities?

As a technology, battery storage has evolved rapidly over the past decade and even more so in the past few years. Below is a table that shows the key differences between earlier and today's BESS systems.

	Earlier BESS Design	**Current, Advanced BESS Design**
Enclosure Type	Walk-in design	Non-walk-in (electrical equipment)
Battery Management System Protection	Yes	Yes
Gas Detection & Explosion Prevention	No	Gas detection, ventilation, deflagration panels
Smoke & Heat Detection	Yes	Yes
Fire Suppression	Non-targeted clean agent or sprinkler system	Targeted suppression at the module level (clean agent, aerosol, water, etc.)
NFPA 855 Compliant	No	Yes
UL9540A Tested	No	Yes

AES has been operating a global fleet of battery energy storage systems (BESS) for more than 15 years. Fire incidents at energy storage facilities are rare occurrences and remain isolated. Earlier fires or thermal events have reshaped the energy storage industry's approach to BESS system design and safety. Lessons learned have resulted in the adoption of UL9540 and NFPA 855 standards, in addition to design changes to AES' energy storage solutions. We understand the technical and safety management of thermal hazards at a much greater level of detail today. The energy storage technology planned for the Seguro project will look and operate very differently from the technology used just a few years ago, as AES continues to incorporate the most advanced technology and safety standards into our BESS facilities.

24. How can fires at BESS facilities be unlikely when there have been dozens of incidents in recent years?

Design codes and safety standards have come a long way since the first utility-scale BESS projects were built, and they continue to be updated and improved in response to real-world incidents. The current standard, NFPA 855, was most recently updated in 2023. AES is designing the Seguro Energy Storage project to meet all of the latest codes and standards applicable to this jurisdiction.

According to research from the Electric Power Research Institute (EPRI), which collects and analyzes data about BESS fires, "the technology's overall safety record is strong and improving." There were about the same number of fires in 2023 as there were in 2019, even as global battery storage deployments have increased 20-fold.

Additionally, we are not aware of any examples of fire spreading off-site from a utility-scale battery storage facility.

25. Will nearby schools and childcare facilities be safe in the event of a fire or other incident at Seguro?

The project will comply with the latest and most rigorous design and safety standards for BESS systems. AES is required to develop various plans as part of the preparation and permitting process for the Seguro project, which will help to identify the most effective strategies to prevent and respond to any potential hazards, including fire safety hazards. As part of the emergency management preparation for the project, appropriate local fire and EMS personnel will be trained on the equipment and emergency response protocols. Please refer to the previous safety questions for additional information.

26. If a battery module does catch fire, how long will it take to burn out?

AES will conduct UL9540a testing on the equipment proposed for the project. UL9540a is a test method for evaluating thermal runaway fire propagation in a battery energy storage system. As part of the UL9540a testing, a series of burn tests must be completed at the cell, module, and unit level to collect data to show that the types of battery modules used in the project design meet or exceed safety requirements, with burn time being one component of that analysis. If a battery module does not meet UL9540a test criteria, it cannot and will not be UL certified nor will it be part of the Seguro project's design.

The Seguro Energy Storage project is designed to not only prevent fire from spreading from one battery module to another, but also to prevent fire spreading between groups of battery modules due to its containerized layout. In addition, the project is divided into two sub-sites to the north and south of Milpas Drive. Each sub-site is fully enclosed by a barrier wall made of fire-resistant materials, which serves to further minimize the risk of any fire spread.

27. Would it not be safer and more effective to install batteries in people's homes rather than concentrating so many of them in one place?

BESS systems like the Seguro Energy Storage project are subject to much more comprehensive safety and environmental regulations and standards than batteries installed as part of home storage systems, which lack safety features like advanced battery management systems, dedicated operations and maintenance staff, and multi-layered fire suppression common to larger facilities. While it is beneficial for those who can afford to do so to consider residential solar and storage systems, there is a demonstrated need for larger BESS projects to provide the scale and cost efficiencies to support a reliable electric grid as California works towards its goals of 100% carbon-free energy by 2045.

OTHER QUESTIONS

28. Will this project impact the resale value of neighboring homes?

Home values are shaped by a variety of macroeconomic and local factors. There is no evidence we're aware of that suggests that battery energy storage system (BESS) projects have any impact on the resale value of neighboring homes. Homes near the proposed Seguro Energy Storage project site have recently sold above the original asking price since the project was publicly announced. Local property values already take into account existing commercial and industrial sites nearby.

29. Will this project impact nearby residents' ability to get homeowners insurance? Will it cause our rates to go up?

The property insurance market in California is complex and constantly evolving, and a variety of factors are affecting the cost and availability of insurance all over California. There is no evidence we're aware of that suggests battery energy storage projects have any impact on the cost or availability of property insurance on neighboring properties.

As a matter of policy, AES obtains insurance through the commercial market for projects like Seguro Energy Storage. AES can only obtain this insurance by meeting insurance brokerage guidelines and requirements. For example, insurance brokers will require the project to meet the latest safety standards such as NFPA 855, conduct UL9540a burn testing, and meet specific design criteria like equipment spacing. The safety features of the project design – including containerized systems, equipment spacing, gas/smoke detection equipment, fire hydrants, fire-resistant construction materials, improved brush management, and walls designed to stop wildfire from advancing through the site – may actually serve to improve the overall fire safety of the neighborhood and thus improve the cost or availability of insurance for nearby property owners.

30. How does AES approach sourcing lithium and the other raw materials required for its projects?

AES is deliberate and thoughtful in selecting our suppliers and contractors, who we see as partners in helping us build safe, reliable and sustainable projects. We hold them to

the same high ethical standards that we have for ourselves, and through our supplier relationships, we work to promote acceptable working conditions and environmentally responsible management. AES' Supplier Code of Conduct defines the basic requirements and expectations applicable to all suppliers, contractors, consultants and third-party intermediaries of the company and its affiliates. This Supplier Code of Conduct is incorporated into our contracts with suppliers, who are responsible for ensuring that all subcontractors are in compliance, as well.

What Is Energy Storage?

Energy storage powers our daily lives

We use energy storage all the time in our everyday lives. The batteries that power your phone, computer, and other electronic devices are small-scale forms of the battery energy storage systems connected to our electrical grid. The same technology that powers your personal devices is used today to provide back-up power to homes and businesses, limit power outages, make our electrical grid more reliable, and to enable our communities to run on clean, affordable energy.

How does it work?

Just like charging your phone while you sleep, energy storage systems efficiently and conveniently capture electricity so that it can be used when it's most needed. Grid-connected energy storage doesn't move or emit any pollution. A grid-connected battery storage system consists of batteries, racks for the batteries, inverters that convert DC energy to AC energy, communications equipment that allow control and monitoring of the batteries, and equipment that ensures the batteries can operate safely. These components and battery systems are housed in specially engineered enclosures. Various types of energy storage have been utilized for more than a century, and the oldest battery storage projects currently in operation have been serving the electrical grid for more than a decade.

What does it look like and where is it located?

Energy storage systems connected to the electrical grid are housed in specially engineered shipping containers, outdoor-rated cabinets, or purpose-built buildings. While customer-sited residential systems are generally installed on the exterior of homes and about the size of whole-home HVAC systems, grid-scale facilities vary in size. A typical new utility-scale project can have dimensions ranging from a hockey rink or basketball court to a soccer field. There are currently hundreds of utility-scale energy storage projects operating and in construction throughout the entire United States, including in extremes of arctic and desert environments, each tailored for the unique setting and community it serves. Energy storage facilities are located in dense, urban centers as well as rural and remote areas. These operating energy storage projects, wherever they are located, provide valuable services to electrical grid in communities across the country.

Wärtsilä Energy

To learn more about energy storage technologies, visit **cleanpower.org**.

How is energy storage useful?

Enhancing Reliability, Reducing Costs, Protecting the Environment, and Supporting Local Economies

Energy storage systems enable a more efficient and resilient electrical grid, which produces a variety of benefits for consumers, businesses, and communities. Deployment of energy storage:

- **Reduces outages and enhances resilience:** Similar to household devices operating with back-up batteries, like smoke alarms, or back-up generators, energy storage systems can support entire buildings or even the larger electrical grid during extreme weather events and other disruptions. Keeping the lights on, air-conditioning or heating systems operating, and critical infrastructure working is important to keeping people safe.
- **Reduces costs & saves money:** By storing energy when the price of electricity is low and discharging that energy later during periods of high demand, energy storage can reduce costs for utilities and save families and businesses money. Also, by enhancing grid resilience and providing back-up power, energy storage can prevent costly damages to families and businesses associated with power outages.
- **Bolsters a sustainable electrical grid:** Energy storage enables electricity to be saved and used at a later time, when and where it is most needed. By introducing more flexibility into the electrical grid, energy storage helps integrate more clean, renewable power sources—like solar, wind, and hydropower—and enables more people to rely on distributed energy resources, like rooftop solar and electric vehicles. All of these resources enabled by energy storage contribute to reducing local air pollution and greenhouse gas emissions from our electrical grid.
- **Supports local economies:** Energy storage projects boost local economies and broaden tax bases, reducing local tax burdens without adding pressure on other governmental services. The U.S. energy storage industry supports over 60,000 jobs at companies leading cutting-edge technological innovations, advanced manufacturing, engineering and construction, and more.

AES

Energy Storage & Safety

Safety is a Critical Aspect of the Entire Electrical System, from Power Lines to Your Outlets

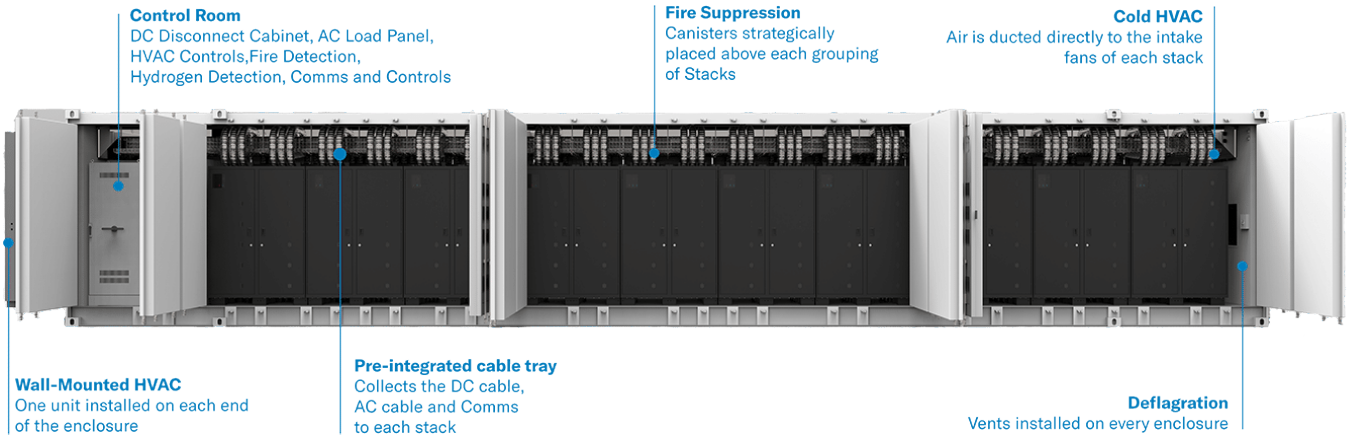
Safety is fundamental to all parts of our electric system, including energy storage. Each component of the electric system presents risks—from transformers and gas lines to power plants and transmission lines—and their safe operation is critical to provide the electricity that keeps our lights on, our refrigerators running, our homes air conditioned and heated, and our businesses operating. Energy storage is no different: with use of best practices and the proper design and operations, these facilities can mitigate risks and maintain safety while supporting reliable, clean electric service.

Battery Energy Storage Uses Technologies We Rely on Each Day

Batteries are present in every part of our lives, from mobile phones to laptops to electric vehicles – even toothbrushes and lawn mowers. Energy storage projects that power the electric grid, homes, and businesses utilize the same core technology as the battery that powers the phone in your pocket, just at a larger scale.

Energy Storage Systems are Regulated & Held to National Safety Standards

Because we rely on batteries in so many ways, the technologies have some of the most well-established safety features. On top of that, all energy storage projects must meet rigorous codes and standards to be permitted to operate – just like any other part of the electric system. Every battery technology that is installed on the electrical grid comes from a certified source. Every energy storage project integrated into our electrical grid is required to comply with national fire protection standards that are frequently updated to incorporate the best practices for hazard mitigation tools and strategies. State and local governments ensure energy storage facilities are installed and operated in compliance with their current standards.



Best Practices For Energy Storage Safety


Enel

Energy Storage Projects Use Numerous Strategies to Maintain Safety

Energy storage facilities use established safety equipment and strategies to ensure that risks associated with the installation and operation of the battery systems are appropriately mitigated. At every stage, from manufacturing to installation to operation, battery technologies and storage facilities use a variety of strategies to keep them safe. These strategies can include:

- **Pre-Installation Standards and Testing:** All modern batteries are designed and manufactured to adhere to and pass standard safety tests prior to operation. These safety standards and performance tests help to ensure that the technologies deployed in energy storage facilities uniformly comply with the highest global safety standards.
- **Proper Temperature Management:** All energy storage projects have thermal management systems, such as fans, ventilation, and heating and cooling equipment to maintain safe operating temperatures for the batteries.
- **Sensors that Regulate Temperature:** All projects are equipped with sensors that track battery temperatures and enable storage facilities to turn off batteries if they get too hot or too cold. A Battery Management System manages the charging and discharging of batteries similar to the system in your phone or computer.
- **Safety Equipment:** Energy storage facilities include equipment and systems designed to detect and suppress fires, to vent gasses, and incorporate fire-proof barriers. This safety equipment includes well-established tools deployed at all types of facilities across our electrical system.
- **System & Component Certification:** The Occupational Safety and Health Administration's (OSHA) Nationally Recognized Testing Laboratories (NRTL) provide screening, testing, and evaluation for battery energy storage technologies and components. Many energy storage technologies are also contained within certified enclosures designed to safely house them.
- **24/7 Monitoring by Trained Personnel:** Energy storage facilities are monitored 24/7 by trained personnel prepared to maintain safety and respond to emergency events.


Enel

- **Emergency Response Plans:** All energy storage operators develop and maintain emergency response plans to ensure that, if there were an event, it is handled safely and according to best practices. Energy storage developers work with local fire departments and first responders for training and to share information about risks, response plans, and safety measures.

Relying on these measures, energy storage facilities are operated with a safety record consistent with the other technologies we rely on every day for electric service.

ADVANCING ENERGY STORAGE SAFETY STANDARDS

Energy Storage is a Critical Part of America's Energy Future

Energy storage is an increasingly important component of America's electric grid infrastructure, serving as a leading technology for enhancing grid reliability and keeping electricity costs low. Energy storage can mitigate the impact of power outages by providing backup power during emergencies, support an efficient and cost-effective energy system, and ensure broader electric grid reliability and stability.

AS ENERGY STORAGE DEPLOYMENT GROWS, SAFETY IS A TOP PRIORITY

Energy storage safety incidents are very rare — there have been less than 20 incidents at operating energy storage facilities in the United States. However, as part of an effort for continuous improvement, the industry is prioritizing the incorporation of the latest best practices and strategies to maintain safety. State and local governments can support the responsible deployment and operation of energy storage by pursuing clear, uniform, and rigorous standards.

The clean energy industry, represented by the American Clean Power Association (ACP), encourages state and local jurisdictions to incorporate or adopt **National Fire Protection Association (NFPA) 855, Standard for the Installation of Stationary Energy Storage Systems**, to guide energy storage safety.


Photo credit: Fluence

ESTABLISHED SAFETY STANDARDS MAKE ENERGY STORAGE SAFE

Fire Professionals, fire protection experts, and safety leaders have developed a suite of standards that keep energy storage projects safe. These standards play an important role in guiding consistent safety strategies and practices across the United States.

Adopting the most up-to-date edition of the National Fire Protection Association standard for energy storage systems ensures evidence-based, expert-driven rules govern the safety of energy storage projects. Uniformity in adopting and implementing this standard across states and jurisdictions will ensure that clear, evidence-based rules guide the future development and operation of energy storage facilities.

- **NFPA 855** provides mandatory requirements for the design, installation, commissioning, operation, maintenance, and decommissioning of energy storage facilities. The standard includes requirements for metrics such as maximum energy and spacing between units and lists several submittals that must be made to the regulating governmental entity, including 1) hazard mitigation analyses (HMA), 2) emergency Response plans, 3) details of all safety systems, and more.
- **UL 9540** is the safety standard for energy storage equipment, including batteries, that is required under NFPA 855. NFPA 855 requires that batteries included in energy storage projects are listed to the safety specifications included in UL 9540 and undergo rigorous fire testing. This standard ensures that equipment incorporated into battery energy storage facilities are tested, certified, and safe for operation on the electric grid.

COLLABORATION BETWEEN ENERGY STORAGE COMPANIES AND THE FIRE SERVICE IS ESSENTIAL

Energy storage companies and fire professionals engage in frequent collaboration throughout both the development and lifetime operation of the project. Regular and transparent communication, training, and site visits foster partnerships that enhance coordination and maintain safety during the life of an energy storage facility. The energy storage industry is committed to proactively engaging the fire service, and energy storage developers and operators engage in early, frequent, and ongoing communication with the fire service of jurisdiction for every project.

Claims vs. Facts

Energy Storage Leading on Safety


Photo credit: Fluence

Utility-scale battery energy storage is safe and highly regulated, growing safer as technology advances and as regulations adopt the most up-to-date safety standards.

Background

Energy storage systems (ESS) are critical to a clean and efficient electric grid, storing clean energy and enabling its use when it is needed. Installation is accelerating rapidly—as of Q3 2023, there was seven times more utility-scale energy storage capacity operating than at the end of 2020. This growth is driving job creation, investment in American manufacturing, and is improving grid resilience and energy security.

However, because energy storage technologies are generally newer than most other types of grid infrastructure like substations and transformers, there are questions and claims related to the safety of a common battery energy storage technology, lithium-ion (Li-ion) batteries. All of these questions and claims can be addressed with facts. The industry continues to address these concerns to ensure community confidence in this increasingly essential electric grid infrastructure.

CLAIM: The incidence of battery fires is increasing.

FACTS: Energy storage battery fires are decreasing as a percentage of deployments.

- Between 2017 and 2022, U.S. energy storage deployments increased by more than 18 times, from 645 MWh to 12,191 MWh[1], while worldwide safety events over the same period increased by a much smaller number, from two to 12[2].
- During this time, codes and standards regulating energy storage systems have rapidly evolved to better address safety concerns.


Photo credit: Fluence

CLAIM: Today's larger battery systems use tens of thousands of cells, so fires are inevitable.

FACTS: Cell failure rates are extremely low, and safety features in today's designs further reduce the probability of fires.

- One estimate from 2012 quotes a failure rate ranging from 1 in 10 million to 1 in 40 million cells[3], and there are undoubtedly improvements from these levels.
- Lithium-ion batteries experience extremely low failure rates, as shown by electric vehicle data.
  - Tesla alone sold nearly 900,000 vehicles in the first half of 2023[4]. These sales of new vehicles represent around three-quarters of a billion cells, but safety events involving all EVs on the road globally, from all manufacturers, amounted to just a few dozen fires.
- Today's energy storage systems (ESSs) predominantly use safer lithium-iron phosphate (LFP) chemistry, compared with the nickel-manganese-cobalt (NMC) technology found in EVs.
  - LFP cell failure results in less energy release and a lower probability of fire.
- ESS designs incorporate features to avoid propagation of cell failure within the battery, contributing to improved safety.

1 US Energy Storage Monitor, Q1 2023 full report and 2022 Year in Review, Wood Mackenzie Power & Renewables/American Clean Power Association, https://www.woodmac.com/industry/power-and-renewables/us-energy-storage-monitor/

2 Electric Power Research Institute, BESS Failure Event Database, https://storagewiki.epri.com/index.php/BESS_Failure_Event_Database

3 D. Doughty, Vehicle Battery Safety Roadmap Guidance, National Renewable Energy Laboratory, October 2012, https://doi.org/10.2172/1055366.

4 EV sales: Hyundai overtakes GM, but Tesla's U.S. dominance continues

CLAIM: E-bike and e-scooter fires have resulted in deaths—so large batteries for energy storage may be even more deadly.

FACTS: No deaths have resulted from energy storage facilities in the United States. Battery energy storage facilities are very different from consumer electronics, with secure, highly regulated electric infrastructure that use robust codes and standards to guide and maintain safety.

- E-mobility devices have been lightly regulated in the past, and some products have used poor-quality battery cells and ineffective safety systems.
  - They are also charged inside homes, sometimes along egress routes, creating a high level of risk.
- Like EV batteries, ESS battery systems are highly regulated and subject to stringent certification and testing requirements.
  - The difference in regulation is evident in vehicle statistics. Worldwide, for the first half of 2023, EV FireSafe cites 500+ light electric vehicle (E-bike and E-scooter) battery fires, but only 44 passenger EV fires[5].
  - Additionally, utility-scale energy storage systems are located within secure facilities with site plans explicitly designed around maximizing safety of those operating the facilities and their neighbors.
- The ESS industry meets with and shares best practices with first responders and communities.
  - Lessons learned from earlier ESS incidents have been reflected in the evolution of codes and standards. Often, companies go beyond mandatory testing to test more extreme failure scenarios.
- Altogether, like other electric grid infrastructure, energy storage systems are highly regulated and there are established safety designs, features, and practices proven to eliminate risks to operators, firefighters, and the broader community.
- The industry is committed to meeting these standards, such as NFPA 855, which are regularly updated to reflect the latest evidence-based best practices.

Photo credit: AES

CLAIM: Battery fires emit toxic fumes and pose a risk to the community

FACTS: Past incidents demonstrate that fires are contained within the facility, and air quality in neighboring areas remains at safe levels.

- Laboratory testing of emissions from Li-ion cells in thermal runaway shows that emissions are similar to those found in plastics fires[6].
- During an ESS battery fire, only trace amounts of chemicals are detected in sampling around the event, and overall air quality remains at safe levels.
- During a fire at a Tesla Megapack at Moss Landing in California, air-quality testing showed no hazards to human health[7].

CLAIM: Fire suppression systems should be mandatory for all lithium-ion battery systems.

FACTS: Regulations that aren't vetted by organizations like the National Fire Protection Association or are inconsistent with the International Fire Code may make projects less safe.

- Established national and international codes and standards already require BESS to incorporate the appropriate safety features to contain any potential fires or thermal events.
- Successful suppression of a fire does not guarantee that the underlying thermal runaway event has been terminated, so containing a fire is the best way to protect first responders and communities.
- The energy storage industry is working to avoid events such as the explosion at an installation in McMicken, Arizona, in which four firefighters were injured[8]. Prior to this event, the industry was focused on extinguishing fires as quickly possible, but McMicken showed that explosion can be a greater hazard and fire containment is a better strategy.
- The accepted best practice for the rare ESS fires that do occur is to contain them, managing the burn of the limited affected unit in a controlled manner while protecting nearby structures and equipment. This strategy eliminates any explosion hazard, avoids issues with stranded energy and reignition, and minimizes contaminated runoff of firefighting water.
- Codes and standards are changing to reflect this practice, placing an emphasis on explosion prevention. One proposal for the 2026 edition of NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems*, would forbid installation of traditional clean-agent or aerosol fire suppression systems unless testing demonstrates that use of such systems does not create an explosion risk.

5 EV FireSafe, All Electrified Transport LIB Fire Incidents, Global, 1st January to 30th June 2023, https://www.evfiresafe.com/ev-battery-fire-overview.
6 DNV-GL, Considerations for ESS Fire Safety, Report for Consolidated Edison and NYSERDA, 2017
7 Air quality testing showed no hazards to human health amid battery fire in Moss Landing
8 Arizona ESS Explosion Investigation and Line of Duty Injury Reports Now Available

https://www.icf.com/insights/energy/battery-energy-storage-blackouts-california

How new battery capacity helped California avoid another blackout

By Devarsh Kumar, Timothy Roell, and Karthik Viswanathan

FEB 15, 2023
1 MIN. READ

Key takeaways

- New battery capacity in the form of battery energy storage (BES) units was a key difference-maker that contributed, along with demand response, to preventing blackouts during California's extreme heatwave in September 2022.
- The August 2020 heatwave resulted in a surge in demand to a peak of 46.8 GW, which resulted in blackouts. Even though the September 2022 heatwave caused a higher demand of 51.4 GW, new BES provided 3.4 GW of peak generation to help prevent the blackouts.
- As the U.S. experiences more extreme heatwaves and the Inflation Reduction Act further improves the economics of BES, regions across the country should consider battery storage as a critical component for enabling grid reliability.

Persistent heatwave conditions—which prevailed over most parts of California and the broader western U.S. from August 30 to September 6, 2022—resulted in a record peak, testing the grid's reliability. At 51.4 GW, the actual gross peak demand reached its apex on the last day of the heatwave.

The August 2020 heatwave resulted in a surge in demand to a peak of 46.8 GW, which resulted in blackouts. Even though the September 2022 heatwave caused a higher demand of 51.4 GW, new BES contributed 3.4 GW of peak generation to help prevent the blackouts.

What made this possible? Setting aside demand response, as the exact amount of demand response data that occurred during each 5-minute block is not yet known, one key difference between 2022 and 2020 was the additional battery capacity recently brought online in California.

Forecast vs. actual peak demand

We compared the actual peak demand against CAISO's forecasted demand. In May 2022, CAISO published its 2022 Summer Loads and Resources Assessment report. This report includes the 1-in-2 (or base case) load forecast, plus two plausible high case scenarios characterized as 1-in-5 and 1-in-10 case forecasts, which are not most likely but still have a

chance to happen. The 1-in-2 forecast is used by ICF for a wide range of assessments including all CAISO base case market studies, locational marginal price (LMP) forecasting, long-term capacity expansion planning to meet the RPS targets, etc. The high scenario forecasts are used for reliability planning studies and to assess the system under stressed conditions.

Table 1: CAISO report - Forecasted CAISO gross peak demand

2022 SLRA report	Unit	Weather normal demand forecasts
1 in 2 (Median)	MW	45,866
1 in 5 (80th percentile)	MW	47,852
1 in 10 (90th percentile)	MW	51,469

Source: CAISO 2022 Summer Assessment Report, ICF

CAISO operates both day-ahead (DA) and real-time (RT) markets. The DA market is a forward market that establishes the generation needed to meet the forecasted demand for the next day. On the load side, the DA market also considers the demand forecast for each time period for the next day. The RT market is a spot market in which utilities can buy power to meet the last few increments of demand not covered in their day ahead schedules. Similar to the DA market, the RT market also considers the demand forecast on 45 min to hour-ahead time intervals. The DA demand forecast, and the hour-ahead (HA) demand forecasts are shown in Table 2, for September 6, 2022. The key point to note here is that the demand forecast deviations are met by the quick ramping battery units, thereby fulfilling the grid reliability aspect.

Table 2: Actual and forecasted gross peak demand for September 6, 2022

Category	Unit	Weather normal demand forecasts
Day-ahead forecast	MW	50,906
Hour-ahead forecast	MW	51,558
Actual demand	MW	51,425

Source: CAISO data

Using the months-ahead demand forecast from the CAISO report and the DA/HA forecasts from each previous day during the heat wave week, we compared the actual demand values with reference to the forecasts. We see that towards the end of the heat wave week, the actual demand values were in the 85th and 90th percentiles. Given the extreme heatwave, higher prevailing temperatures during the late evening hours (even after 6:00 p.m.)

resulted in much higher residential and commercial cooling loads. The table below shows the peak demand for each day during the heat wave, and how it compares against the 2022 report.

Table 3: Actual gross peak demand by heatwave day

Heatwave week (8/30/2022 - 9/6/2022)	Actual gross peak demand (MW)	Percentile
Day 1, Tue	42,199	~30th percentile
Day 2, Wed	45,157	~50th percentile
Day 3, Thu	46,959	~65th percentile
Day 4, Fri	45,523	50th percentile
Day 5, Sat	44,023	~40th percentile
Day 6, Sun	44,130	~40th percentile
Day 7, Mon	**48,947**	**~85th percentile**
Day 8, Tue	**51,425**	**90th percentile**

Source: CAISO Data, ICF

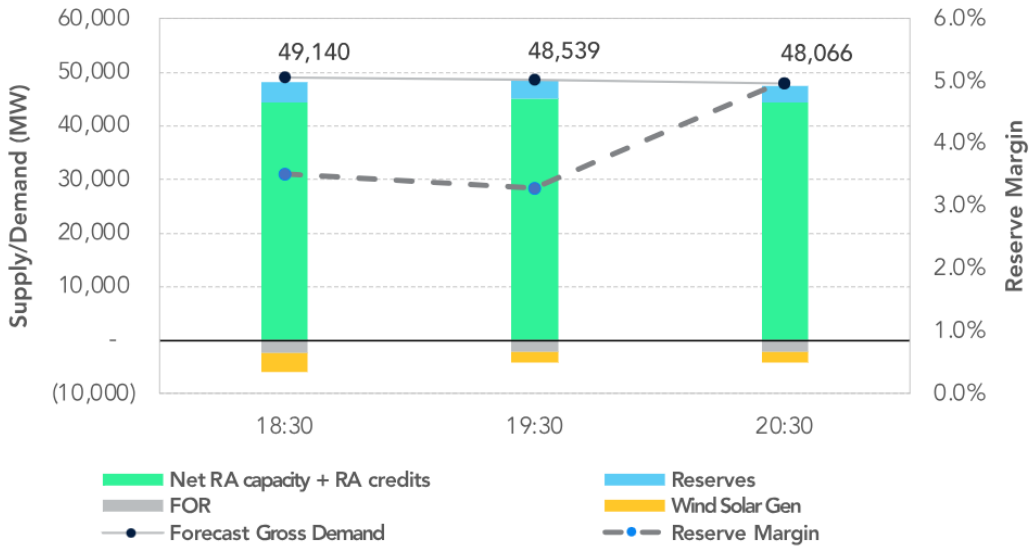
For example, on day 8, the observed gross peak demand was 51.425 MW. This was closer to the 1-in-10 forecast in the report (i.e., the 90th percentile forecast value). Given these sustained periods of peak demand, it is important to assess how well reserve margins held up and how blackouts were averted.

Operating Reserve Margins

Operating Reserve Margin refers to the availability of excess reserve capacity (supply), on top of the expected peak demand, to meet emergency conditions. The chart below shows the net RA capacity plus credits, plus the reserves and forced outages during the three specific five-minute time intervals on September 6, 2022. The three representative time slots were chosen such that they occur after the sun had set and the solar generation starts decreasing, on the chosen day (i.e., September 6) when the max peak demand occurred.

Following the same methodology used in the calculation of the planning reserve margins, the RA capacity credits plus reserves net of forced outages are divided by the net demand (gross demand minus wind and solar generation) to calculate the reserve margins during these three specific time slots.

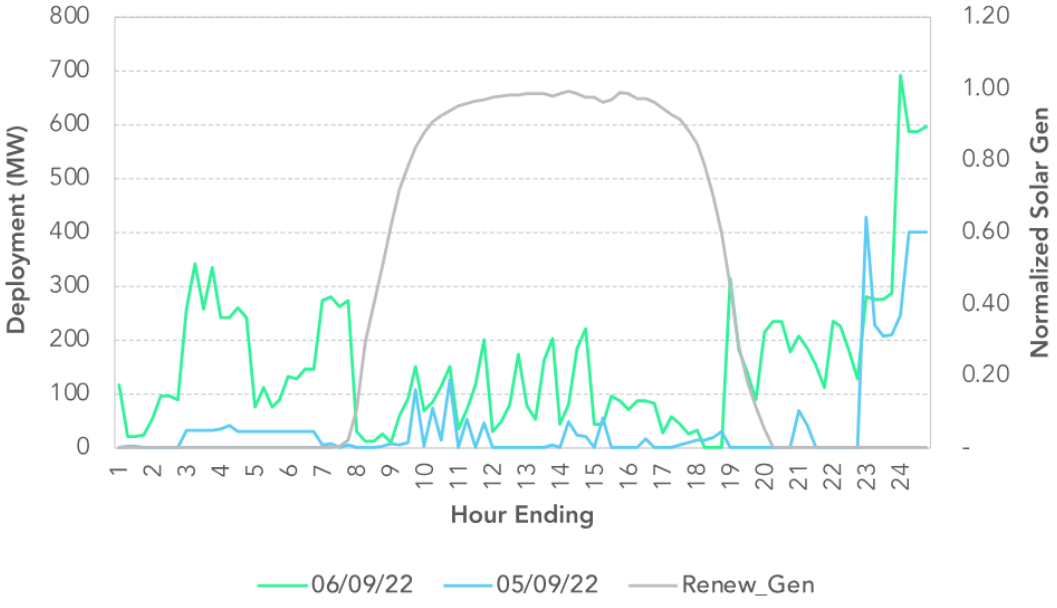
Figure 1: Supply and demand at three specific time slots



Source: OASIS Data (CAISO), ICF, CAISO – Curtailed and Non-Operational Generators rpt

The CAISO Open Access Same-time Information System (OASIS) data indicates that the deployment of reserves increased post 6:00 p.m., when the solar generation declined for September 5–6, 2022.

Figure 2: Actual reserve deployment vs. solar generation profile



Source: OASIS Data (CAISO), ICF

Battery performance

Battery energy storage units generated about 85.4 GWh of energy from August 30 until September 6, 2022. On a five-minute interval basis, we saw that nearly all the storage units were dispatched for energy on the grid. If we consider the peak demand time slot for each day, the BES contribution to meet peak demand varies from an average of 4% to as high as 6% (calculated as the ratio of BES's discharge MW to the demand MW in the peak time slot).

Table 4 shows the summary of key parameters, observed using the CAISO market data during the heat wave week. The data in the table indicate that other corresponding parameters when the day's peak demand occurred (such as what was the LMP during the specific 5-min interval, etc.).

Table 4: Battery contribution during peak demand

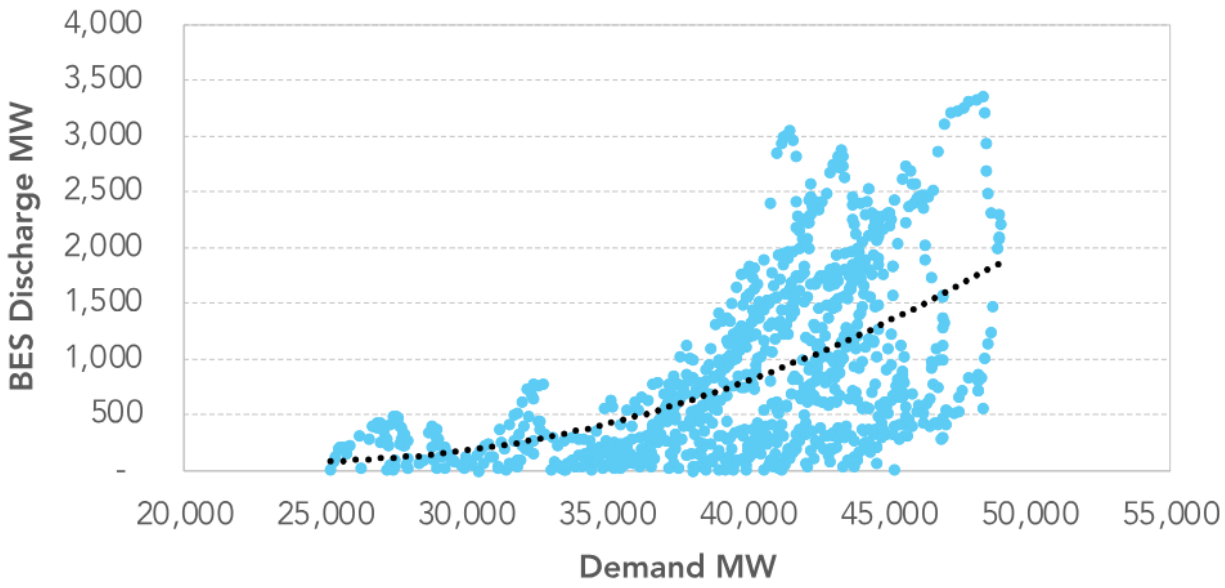
Date	Gross peak load (MW)	Time	Battery display (MW)	RT LMP ($/MWh)	Battery contribution (%)
8/30/2022	42,199	18:00	2,461	$229.80	5.8%
8/31/2022	45,157	17:55	1,840	$159.20	4.1%
9/1/2022	46,959	17:45	1,331	$247.70	2.8%
9/2/2022	45,523	17:55	1,031	$105.10	2.3%
9/3/2022	44,023	17:50	1,722	$114.50	3.9%
9/4/2022	44,130	17:50	1,657	$115.60	3.8%
9/5/2022	48,947	18:00	2,219	$658.00	4.5%
9/6/2022	51,426	16:55	1,012	$1,866.30	2.0%

Source: CAISO data, ICF

BES discharge vs. demand

The BES units' discharge patterns were largely tracking demand, as seen in the figure below. Higher GW contributions from the BES units were concentrated during the late evening high-demand hours from 5:30 p.m. to 9:00 p.m., which coincides with the decrease in solar generation. BES generation increases exponentially with increase in demand.

Figure 3: Battery discharge vs. demand



Source: CAISO Data, ICF

It should be noted that the BES units' max contribution was 3.36 GW, which occurred at 6:30 p.m., about 30 minutes after the peak demand for the day occurred. Nevertheless, it was still in the peak demand hours window. At this same instant, CAISO's overall BES contributions stood at 6.9% of the peak demand.

During the evening hours from 5:00 p.m. to 9:00 p.m., when the grid was experiencing very high demand levels, the BES units discharged 1.5 GW or more continuously (reaching as high as ~3.36 GW) and contributed directly to averting blackout conditions.

Table 5: Summary of parameters at the time of max battery dispatch

Date	Gross peak load (MW)	Time	Battery Disp (MW)	RT LMP ($/MWh)	Battery contribution (%)
9/5/2022	48,342	18:30	3,359	$1,857	7%

Source, CAISO data, ICF

Planning for the future

Climate change represents a significant challenge for California. Climate scientists have found that Southern California heat waves are becoming more frequent, more intense, and longer-lasting, as well as exhibiting higher nighttime temperatures and humidity—particularly in inland urban areas.

There are five key climate-related hazards for California: higher temperatures and extreme heat events; more severe wildfires; more frequent and intense droughts; flooding due to extreme precipitation events; and coastal flooding and erosion from sea-level rise. Of these five hazards, periods of sustained high temperatures and extreme weather readings will have the most direct impact on the peak demand forecast, leading to more frequent scarcity condition events when electricity supply and demand becomes severely imbalanced.

Towards the end of the September 2022 heat wave, the actual peak demand values were greater than 80th percentile of the forecasted values used in the 2022 Summer Loads Assessment report. As the impacts of climate change continue to wreak havoc on long-held approaches to forecasting demand in California, ICF believes it will be important for CAISO to incorporate the occurrence of prolonged Heating Degree Days (with the daily temperature delta above 65 F) or Cooling Degree Days (with the daily temperature delta below 65 F) into its weather simulation model.

By properly maintaining the state of charge, battery units can serve unplanned load deviations for durations as observed during the California heat wave. The strong performance of battery storage in helping CAISO prevent rotating blackouts recently is a positive sign for grids across the US, particularly as the incentives in the Inflation Reduction Act lead to increased battery deployment as well as (on the demand side) electrification of vehicles, heat pumps, and other technologies. Events such as winter storm Uri or heat waves resulting in prolonged high temperatures will, however, also require longer duration batteries, along with other dispatchable capacity and demand response events in order to maintain grid reliability.

Meet the authors

1. Devarsh Kumar, Energy Markets Consultant
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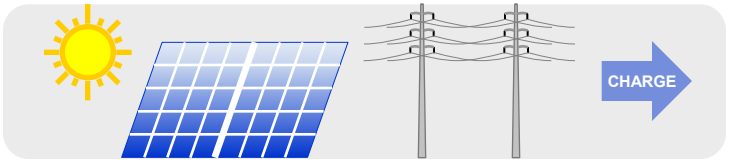
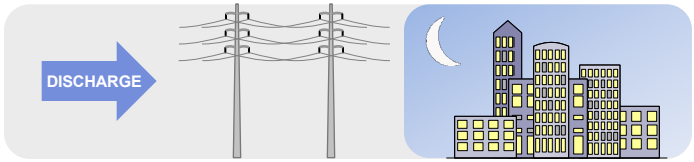


LARGE SCALE ENERGY STORAGE:

A Brief History

of a Brief Existence



Joe Rowley

July 3, 2024

Contents – A Brief History (of a Brief Existence)

Joe Rowley – Credentials and Experience

- P.E. Mechanical Engineering, BS Chemical Engineering
- General Superintendent – IID Power
  - El Centro Unit 2 – 115 MW gas-fired combined cycle – in service 1993 – First CEC permitted utility power plant
  - System Operating Center – responsible for power grid operation and control
  - California ISO – contributing member of the team that created the CAISO's operating protocols
- Director – Project Development, Sempra Energy Resources
  - Elk Hills Power – 570 MW gas-fired combined cycle – in service 2003
  - Mesquite Power – 1,250 MW gas-fired combined cycle – in service 2003
  - Palomar Energy – 550 MW gas-fired combined cycle – in service 2006
- VP – Asset Management, Sempra Generation
  - Power Plant Operations – launched the organization, managed its initial 5 years
- VP – Project Development, Sempra USGP (U.S. Gas & Power)
  - Copper Mountain Solar – 458 MW solar PV – first 150 MW in service 2012
  - Mesquite Solar – 700 MW solar PV – first 165 MW in service 2012
  - ESJ Wind – 600 MW – first 156 MW in service 2014
  - Auwahi Wind – 21 MW + 5 MWh BESS – in service 2012
- Retired from Sempra in 2014 (began consulting work, including BESS development)

What Are Batteries?

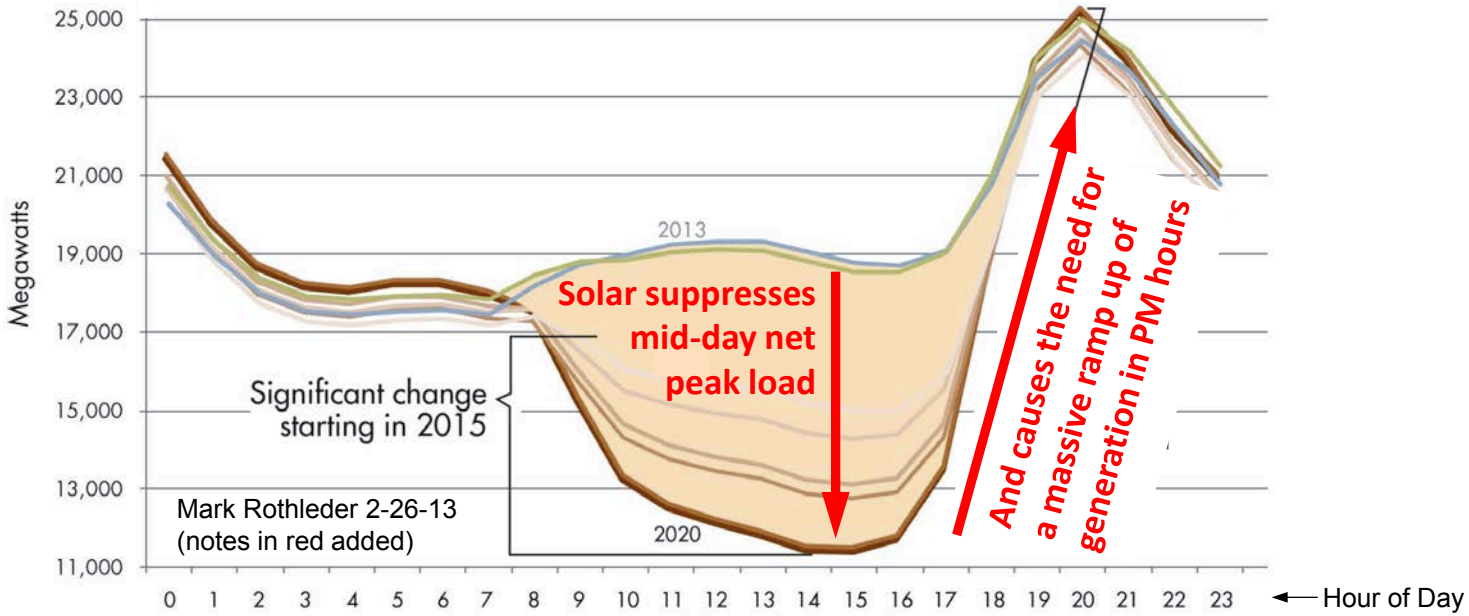
- Batteries are *not* an *electrical* device
  - Batteries do *not* store *electricity*
    - Not in the literal sense, as does an electrical capacitor
- Batteries are an *electrochemical* device that performs 3 functions:
  - Converts electricity to chemical energy
  - Stores chemical energy
  - Re-converts chemical energy back to electricity
- Batteries perform these functions very reliably
  - And quite efficiently – only about 10% of the energy is lost on the round-trip
- An individual battery cell is extremely safe and reliable, but . . .
  - When large numbers of batteries are co-located, the chance of failure is significant
  - Battery installations are modular
    - Battery cells, battery modules, racks, and container systems are replicated over and over
    - Consequently, an installation's projected failure rate is proportional to installation size
    - Regardless of whether failures occur in cells, battery modules, racks, or container systems

In the Beginning . . . (2011-2012)

- The first “large scale” Battery Energy Storage Systems (BESS)
  - Two early examples below
- Kahuku Wind BESS (Developer: First Wind)
  - Size: 10 MWh (15 MW for 40 minutes)
  - Technology: Lead-acid batteries by Xtreme Power
  - Location: Oahu
  - In Service: 2011
  - Status: 2012 destroyed by fire
  - XP CEO: “We believe energy storage is safe and we are learning from this fire”
- Auwahi Wind BESS (Developer: Sempra USGP)
  - Size: 5 MWh (10 MW for 30 minutes)
  - Technology: Lithium-ion batteries by A123
  - Location: Maui
  - In Service: 2012
  - Status: **2016** ranking by Forbes: at just 5 MWh, still 9th largest in the world

2013: California Jump-Starts the BESS Industry

- CAISO publishes its “Duck Curve”



- CPUC issues D-13-10-040
  - Mandates 1,325 MW energy storage (MWh or hours not specified) by end of 2024
- BESS industry begins rapid growth

2019 – Wake-Up Call

Image: FSRI

2 MWh Surprize, AZ BESS

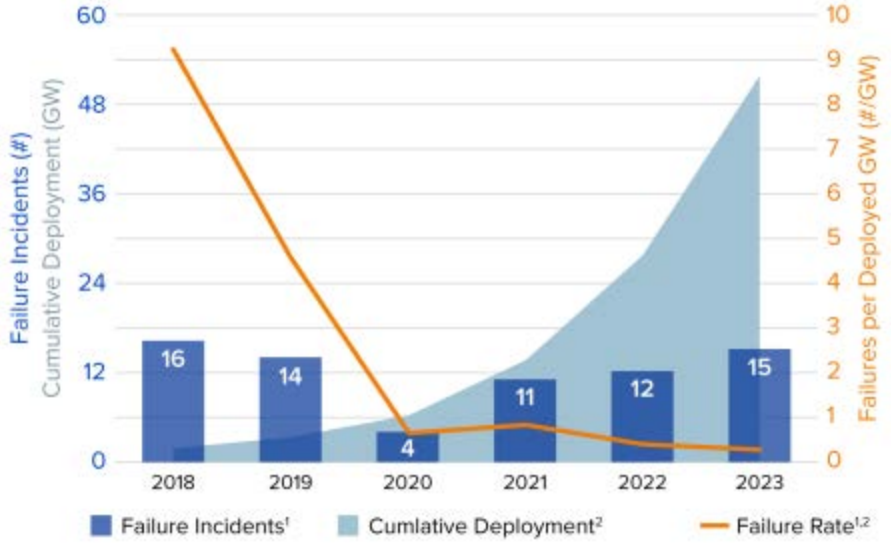
2019 – Wake-Up Call, Initial Response

- 2 MWh BESS explodes in Surprise, AZ on April 19, 2019
  - 4 HAZMAT-trained firefighters severely injured
- National Fire Protection Association – develops codes & standards
  - NFPA 855 – Standards for stationary battery systems
    - First issued August 2019 (2020 Edition); development began in 2016
    - Update issued Oct 2022 (2023 Edition); work on the 2026 Edition is ongoing
- UL (fka Underwriters Laboratories) – develops manufacturing standards
  - UL 9540 – Standards for stationary battery systems
    - First published November 2016
    - New edition published May 2020 and again June 2023; further revision is ongoing
  - UL 9540A – "Thermal runaway" test methods
    - First published November 2017, updated Jan 2018 and June 2018
    - New edition published Nov 2019; further revision is ongoing
- Electric Power Research Institute – performs R&D for electric utilities
  - EPRI's BESS Failure Incident Database – initiated in 2021 in response to . . .

"the concentration of lithium ion BESS fires in South Korea and the Surprise, AZ incident"

2020-2024 – Municipalities React, Industry Defends

- Municipalities become aware that BESS installations pose safety risk
  - Example: New York State publishes its "Model Law" for municipality consideration
    - Tier 1 – BESS installations < 0.6 MWh may be located in any zoning
    - Tier 2 – BESS installations > 0.6 MWh require a Special Use Permit and are restricted to zoning districts to be specified by the municipality
- EPRI adds a graph to its BESS Failure Incident Database webpage
  - Graph shows dramatic drop in failure rates, *implying* recent failure rates are low



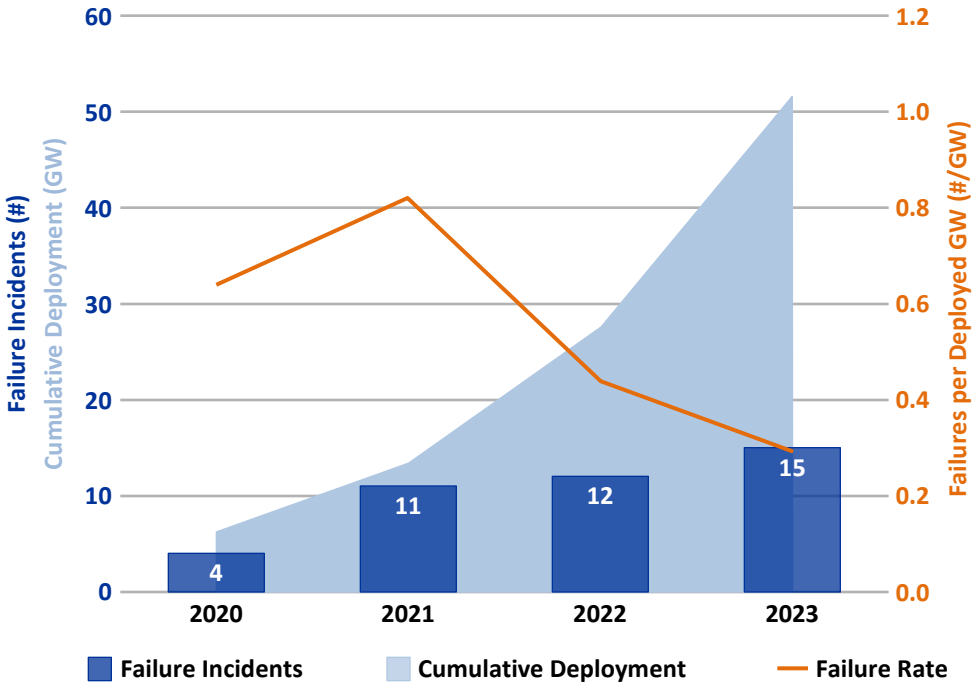
But are the recent failure rates significant (in absolute terms)?

Notes:

1. Database is worldwide.
2. Database relies on news media for failure reporting, so the number of failures is probably understated.

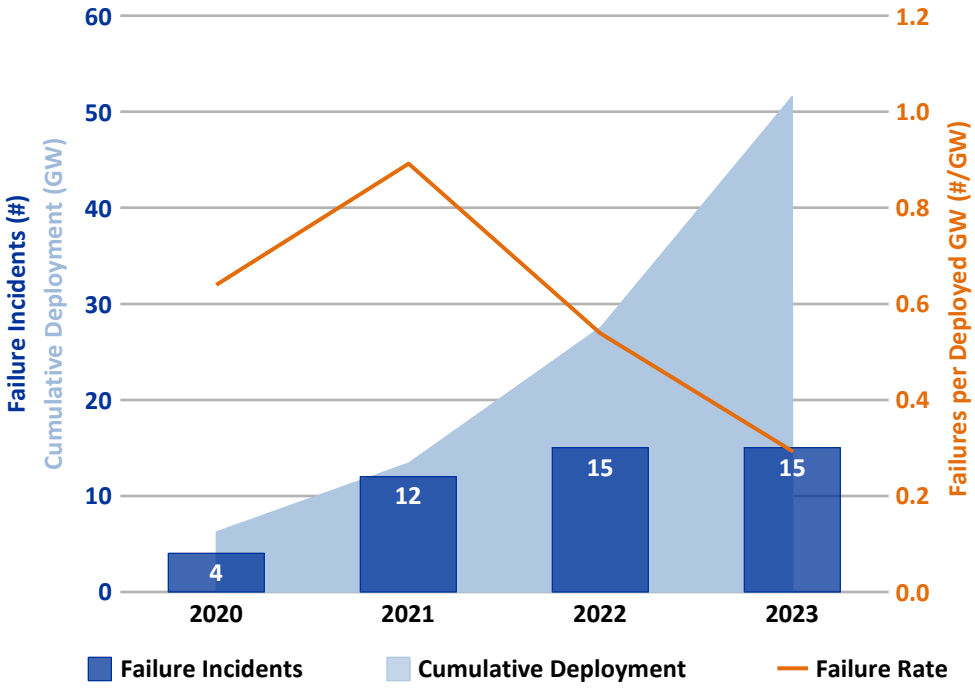
EPRI BESS Failure Rate Graph – Analysis page 1

- Ignore the high failure rates in 2018-2019, re-scale the graph
  - No change in input data



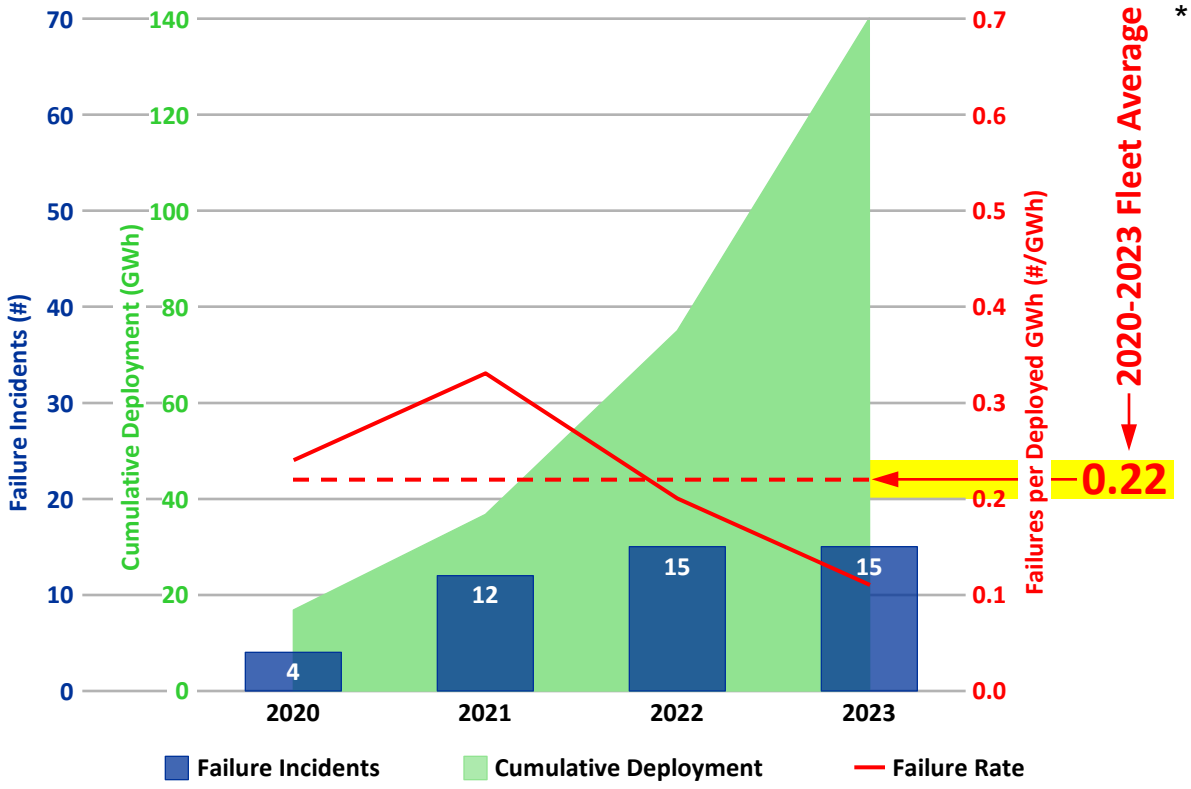
EPRI BESS Failure Rate Graph – Analysis page 2

- Add incidents included in the database but missing from the graph
  - No other changes in input data



EPRI BESS Failure Rate Graph – Analysis page 3

- Convert basis to gigawatt-hours (GWh) instead of gigawatts (GW)
  - GWh indicates the physical quantity of batteries (GW is just their discharge rate)
  - Conversion based on weighted average of 2.72 storage hours*



* Assumes storage hours reported in the BESS Failure Incident Database are representative of fleet storage hours. Accordingly, 2.72 hours may be overstated, as BESS with higher storage hours are more likely to incur failures, because higher storage hours means more batteries.

To the extent 2.72 hours is overstated, 0.22 failures/GW per yr is understated, and is further understated due to the following factors:

- Failures cannot happen until after GWh have been deployed. This lagging effect causes each year's failure rate to be understated. This effect is especially strong during a period of high growth in deployment, as in 2020-2023.
- The entire fleet is early in its life cycle, so failure rates do not reflect aging batteries that are likely more prone to failure.

Conclusions

- The EPRI database shows that BESS failure rates remain high
  - 0.22 Failures/GWh per year means:
    - 1,000 MWh BESS has a 22% chance of failure each year
    - 1,280 MWh Seguro BESS would have a 28% chance of failure each year
    - But a 0.6 MWh BESS (NY Model Law) has only a 0.013% chance of failure each year
- NFPA & UL codes and standards for BESS are new and evolving
  - Consider the decades it took for the UBC and NEC to reach maturity
    - Codes and standards evolve in response to 1) failures and 2) changing technology.
- BESS technology is nascent, in flux; basic questions are unresolved
  - Should thermal runaway suppression be based on use of water or chemicals?
    - Neither has been particularly successful, but projects continue to propose one or the other.
  - Should BESS batteries be housed in containers or grouped in blocks in a building?
    - An Oct 2023 PNNL report to DOE states this is an economic choice.
    - But that choice has safety implications not yet effectively addressed by codes & standards.
- Large BESS installations are an industrial land use and pose safety risk

Recommendations

1. Limit the size of BESS installations located near “sensitive receptors”
   - ❑ Hospitals, schools, residences
   - ❑ Set maximum overall size (MWh) based on acceptably low likelihood of failure
2. Establish additional, related development standards
   - ❑ Minimum allowable separation distances between containers or blocks*
     - Physical separation is the only proven method of stopping failure propagation
     - Closer proximity presents greater risk of propagation
   - ❑ Maximum allowable sizes of containers or blocks*
     - Larger containers or blocks pose greater risk
     - Near sensitive receptors vs. other land uses
   - ❑ Size thresholds for mandatory Offsite Consequences Analysis (OCA)
     - OCA estimates downwind concentrations of hazardous airborne chemicals
     - Overall installation size vs. container or block* size

* “Blocks” are groups of batteries co-located in a common building.

Fire at 250 MWh Otay Mesa BESS (image: Fox 5 San Diego)

Fire at a 450 MWh Victoria BESS (image: Sydney Morning Herald)

Cal Fire Sprays Water at Otay Mesa BESS Fire (image: San Diego UT)

Fire at Neermoor Battery Storage Site (image: Nonstop News DE)

Appendix 1 – Why Battery Fires Are of Particular Concern

- Battery fires are very difficult to stop – it can take days or weeks
  - Lithium-ion batteries are subject to “thermal runaway”
    - A out-of-control chemical chain reaction that consumes battery materials
    - The chemical reaction produces heat that accelerates the reaction, leading to fire
    - The chemical reaction does not require air or oxygen
    - Consequently, conventional fire suppression methods are ineffective
    - Firefighters cool neighboring structures with water, wait for the fire to burn itself out
- Battery fires produce a plume of extremely toxic airborne chemicals
  - Hydrogen fluoride, hydrogen cyanide, sulfur dioxide, hydrogen chloride
    - Deadly in high concentrations, debilitating lung damage in low concentrations
  - Firefighters generally do not enter a burning battery facility
    - Regardless if the batteries are housed in containers, or grouped in blocks in a building
    - Neighboring structures are cooled with water sprayed from a distance
  - The toxic plume requires evacuation of the surrounding area
    - Shelter-in-place becomes feasible at greater distances

Appendix 2 – The Measure of a BESS: Megawatt-Hours

- How big is a storage tank? For example, consider a tank that holds:
  - 1,280 gallons
    - "320 gallons per hour" is not responsive – that's flow rate, not storage capacity.
- How big is a BESS? For example, the proposed Seguro project:
  - 1,280 megawatt-hours
    - "320 megawatts" is not responsive - that's energy flow rate, not storage capacity.
  - Megawatt-hours (*not* megawatts) tell us the physical size of a BESS
    - Indicates the number and size of structures onsite, acreage required
    - Indicates the quantity of battery cells, battery modules, racks, and container systems
    - BESS installation's projected failure rate is proportional to installed megawatt-hours
    - Regardless of whether failures occur in cells, battery modules, racks, or container systems
- For purposes of land use regulation governing BESS
  - Megawatt-hours is the yardstick for measuring project size
    - Megawatts (without "hours") is not relevant