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ENERGY STORAGE IN MOSS LANDING

A SMOKY CHALLENGE TO A NEW CHAPTER

JAMES HERRERA - MONTEREY HERALD

The interior of Phase II of the Vistra Zero Moss Landing Energy Storage Facility showing thousands of lithium-ion battery racks in the facility, that along with the Phase I building store enough power from solar and wind sources for 300,000 homes.

By Graycen Wheeler and McKenzie Prillaman
newsroom@montereyherald.com

MOSS LANDING » As the sun dipped below the horizon one September evening in 2021, the North County Fire Protection District of Monterey County received an emergency call. A fire alarm's chirps were echoing through a building somewhere in the district.

Deputy Chief Joel Mendoza wasn't too concerned. Fire alarms could be triggered by anything, he said, and nine times out of 10, the cause doesn't warrant all hands on deck.

But as four firetrucks headed north on Highway 1, the crew received an update: The call came from one of the massive new battery energy storage facilities at Moss Landing's old power plant.

Mendoza started to worry. "What do we have, and how big is this?" he wondered. "Are the (safety) systems going to hold?"

Worldwide, utilities are on the hunt for reliable clean energy solutions flexible enough to meet their customers' fluctuating needs. Many have pinned their hopes on huge battery energy storage systems that can capture excess solar and wind energy from the power grid and save it for when demand is high. But in the decade since these technologies arrived, a deep look finds dozens of fires at the facilities all over the world have left some hobbled, including two in Moss Landing.

Rocky beginnings

The world's largest battery energy storage system (BESS for short) lies just below the iconic smokestacks of Moss Landing on the edge of the Monterey Bay National Marine Sanctuary. Vistra Corp., a Texas-based energy company, operates this 400-megawatt capacity system on the grounds of the old Moss Landing Power Plant. These two 300-megawatt and 100-megawatt facilities, which cost more than $400 million to build, hold promise for green energy and new jobs.

But two smoky incidents at these facilities led to a months-long shutdown

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TESS KENNY - MONTEREY HERALD

"This is just the next step in bringing clean energy, and a bright and prosperous future for all Californians," PG&E CEO Patti Poppe said at a ribbon cutting ceremony for PG&E's newest 182.5-megawatt Tesla Megapack battery energy storage system in Moss Landing on Monday.

CONGRESS

Senate negotiators announce a deal on guns

By Alan Fram
The Associated Press

WASHINGTON » Senate bargainers announced a bipartisan framework Sunday responding to last month's mass shootings, a noteworthy though limited breakthrough offering modest gun curbs and bolstered efforts to improve school safety and mental health programs.

The proposal falls far short of tougher steps long sought by President Joe Biden and many Democrats. Even so, the accord was embraced by Biden and enactment would signal a significant turnabout after years of gun massacres that have yielded little but stalemate in Congress.

Biden said in a statement that the framework "does not do everything that I think is needed, but it reflects important steps in the right direction, and would be the most significant gun safety legislation to pass Congress in decades."

Given the bipartisan support, "there are no excuses for delay, and no reason why it should not quickly move through the Senate

GUNS » PAGE 5

CAPITOL INSURRECTION

Panelists: Evidence uncovered to indict Trump

By Hope Yen
The Associated Press

WASHINGTON (AP) » Members of the House committee investigating the Capitol riot said Sunday they have uncovered enough evidence for the Justice Department to consider an unprecedented criminal indictment against former President Donald Trump for seeking to overturn the results of the 2020 election.

The committee announced that Trump's campaign manager, Bill Stepien, is among the witnesses scheduled to testify at a hearing Monday that focuses on Trump's effort to spread his lies about a stolen election. Stepien was subpoenaed for his public testimony.

As the hearings unfold, Rep. Adam Schiff said he would like

TRUMP » PAGE 5

NATO

Chief: Turkey has concerns over terrorism

General Jens Stoltenberg says Turkey has "legitimate concerns" over terrorism and other issues that need to be taken seriously. PAGE A5

CRISIS IN EUROPE

Officials try to solidify rule in Ukraine

Kremlin-installed officials began issuing Russian passports to residents in one city who requested them. PAGE A5

ON GARDENING

Karwin: White flowers blooming in June

Tom Karwin shares the remarkable abundance of his prized rambler, Rosa mulliganii. PAGE A2

COVID-19

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Energy

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of the entire system. This month, Vistra is finally bringing the battery energy site back online, and the company plans to nearly double the storage capacity at Moss Landing by 2023. As similar projects surge forward across the state, questions linger about whether this technology is ready to be safely used at such large scales.

The smoke incidents are serious and should be discussed more openly, said Ethan Quaranta, energy chair of the Sierra Club Ventana Chapter. But political factors pose a challenge.

"It's a fine line," he said. "If you cover it too much then that will undermine public confidence in the necessary green energy condition. It's a real tough dynamic."

The rise of Moss Landing's smokestacks

The Pacific Gas and Electric Company built Moss Landing's smokestacks in 1950 as part of the Moss Landing Power Plant.

When Vistra took ownership in 2018, the company proposed building a battery energy storage system at the site. With California searching for clean energy solutions, the project garnered attention and support, including from the Sierra Club.

The Club has previously criticized Vistra for being the nation's worst climate polluter in the power sector. The energy company has a "checkered past," admits Luis Amezcua, a former senior campaign representative at the Sierra Club who covered electricity issues.

But with Vistra turning toward renewable energy, that negative viewpoint began to change. The Sierra Club wrote a letter supporting the proposed energy storage site to the Monterey County Planning Commission in 2020.

"We were excited to finally retire and replace (the Moss Landing Power Plant) with clean energy because we knew it was something that historically our members in the area really cared about," Ameczua said. "But it was also a way for us to start replacing a lot of these more polluting power plants with clean energy."

Monterey County Supervisor John M. Phillips, who represents the district that includes Moss Landing, also approved.

California is moving toward wind and solar energy, according to him, but if you don't use that energy immediately, you lose it. "So battery storage is becoming, and will continue to become, a huge part of our community," Phillips said.

Vistra's first 300-megawatt facility opened in December 2020, followed by the 100-megawatt facility in August 2021. With that combined storage capacity, Moss Landing made headlines as home to the world's largest battery energy storage site.

Risk and reward

As much as they'd like to, power utilities can't control the weather. Sometimes, the sun shines down on solar panels when people aren't using much electricity. Even just a decade ago, power grids weren't equipped to save that extra energy for a literal rainy day, or even for a cloudy stretch during the after-work peak in electricity demand.

"Peak demand happens in the evenings when solar goes off," said Paul Doherty, PG&E's principal communications representative. "So all of a sudden, we're having to turn on these resources that emit CO2 at a higher level than solar, which is completely renewable."

Many experts and officials thought lithium-ion battery energy storage systems could solve this problem.

These huge battery systems that store energy for an entire power grid aren't terribly different from batteries you might find in your home. One lithium-ion battery cell is a little bit bigger than a AA battery. Many laptops use six of these cells to store energy; a Tesla electric vehicle needs almost 5,000.

"If you look at a grid-scale system, it might be closer to a million," said Yuliya Preger, a staff engineer in the Energy Storage Technology and Systems Group at Sandia National Labs. "It's similar to consumer electronics or an electric vehicle — it's just charged and discharged. The only difference is that the demand on the battery is different."

In the Moss Landing BESS facility, battery units slot neatly in racks about the size of a small coat closest. These racks are stacked and lined up in rows that fill the old turbine facility at the power plant, creating a labyrinth of electric potential.

But stringing so many battery cells together requires careful management to avoid cascading failure. BESS facilities use software that monitors the temperature of each cell.

"If one cell is overcharging a bit, its temperature starts increasing," said Gustavo Vianna Cezar, a staff engineer in the U.S. Department of Energy's SLAC National Accelerator Lab in Menlo Park. "If it catches on fire, the heat can spread and then a bunch of them catch on fire. It just becomes a hard thing to contain."

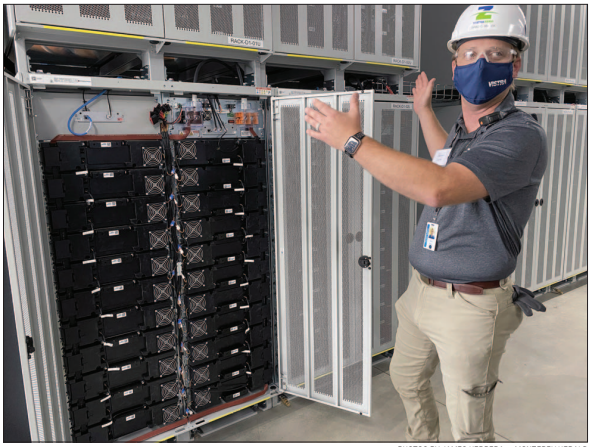
The worst-case scenario is a situation called "thermal runaway," in which a lithium-ion battery gets trapped in an uncontrolled self-heating cycle. Thermal runaway can cause smoke, fires and even explosive venting of gases from inside the battery. That's what happened at a 10-megawatt lithium-ion grid storage facility in Chandler, Arizona, this April, according to the local utility Salt River Project. Chandler firefighters used a robot to vent the batteries and avoid any injuries to first responders. But these incidents aren't always without casualties: An explosion injured several firefighters who were responding to a similar fire at another Arizona BESS in 2019.

The risk of thermal runaway lurks even in smaller lithium-ion batteries. That's why the post office always checks whether packages contain lithium batteries — they're classified as hazardous materials due to their flammability. A pattern of long-burning battery fires in electric vehicles has prompted investigations and recalls. And home battery systems, which are used to store electricity generated from private solar panels, are required to be housed behind doors that can withstand fire for hours before they collapse.

In Vistra's BESS facilities at Moss Landing, each of those closet-sized storage modules has its own management and safety systems, which monitor temperature and charging. A computer receives information from each module and coordinates even charging throughout the system.

Despite all these safety measures, experts still don't have all the kinks worked out of their battery management systems.

"They need to first make sure that the technology is reliable enough to sustain all the conditions and the issues that they face in the field," said Vianna Cezar, the battery expert from SLAC.



PHOTOS BY JAMES HERRERA — MONTEREY HERALD

Vistra employee, Brad Masek, talks about the enormous lithium-ion battery system housed in Phase II of the Vistra Zero Moss Landing Energy Storage Facility on August 19, 2021.

People stand near the iconic Moss Landing power smokestacks before the ribbon-cutting ceremony for the Vistra Battery Energy Storage System Phase II facility that takes in excess renewable solar and wind energy, stores it in lithium-ion batteries, and releases the zero-carbon energy to the power grid during peak-demand hours.

"It's very hard to replicate those in the lab, so that's why lately we have seen a lot of issues with large-scale use of batteries."

Still, many energy providers have moved forward with lithium-ion storage systems around the world. Almost 300 completed grid-scale lithium-ion BESS sites dot the globe, offering a means for utilities to store clean energy on every continent except Antarctica. But this explosion of BESS facilities hasn't been without incident: The Electric Power Research Institute has documented 50 BESS failure events, most of them occurring in just the past four years.

California is home to at least 67 completed lithium-ion energy storage sites according to a database from the Sandia National Laboratories. That's about a quarter of the existing lithium-ion BESS facilities around the world. PG&E has almost 1,000 megawatts of lithium-ion energy storage currently online, according to Doherty. That's enough to power more than 100,000 homes. They're scheduled to more than double that energy storage capacity by the end of next year. The Sandia database lists 84 new lithium-ion storage sites in development across California.

But the state is also already home to five decommissioned sites, and two of its largest BESS systems sat idle for months at Moss Landing after the smoke-related incidents. Lithium-ion energy storage could help California use less fossil fuels and save residents money, according to Doherty. Still, he said, "as with any new technology, there's the potential for conditions that can create delays."

Investigation revealed smoke but no fire

Five months after the first smoke incident at Moss Landing, Vistra announced on Jan. 21, its LG batteries weren't at fault. Instead, the company's investigation found that an air handling unit likely started smoking, triggering an overly sensitive fire suppression system — including sprinklers and a water system that sprays batteries to cool them down. The wet batteries, in turn, began short-circuiting and arcing, causing battery damage and more smoke, according to Vistra's report.

Just weeks after releasing these findings, however, another smoky affair took place at Vistra's remaining 100-megawatt facility. Vistra decided to shut down the entire site while it looked into causes and solutions.

Kyle Weeks, communications and media relations representative for Vistra, said the good news was that the two incidents were related to "water leaking from safety systems and were not caused by the batteries themselves."

"Safety remains our top priority," he said, "and Vistra has implemented a number of corrective actions to reduce the potential of similar incidents occurring in the future."

On May 9, Vistra announced it will bring the two Moss Landing BESS facilities back online this summer after months of corrective actions, including updates to the water-based heat suppression system. The company plans to have 200 megawatts available this month and 150 megawatts will come online incrementally in the following weeks. The remaining 50 megawatts will be available in August after damaged batteries are replaced, the company said.

Charging ahead with energy storage

Vistra continues to move forward with battery energy storage. During the months-long shutdown in Moss Landing, Vistra moved forward with plans to add 350 megawatts of battery energy storage to the site, bringing the total to 750 megawatts or 3,000 megawatt-hours — enough to power more than 1 million homes.

And that's just Vistra's batteries, which PG&E contracts to store energy. PG&E just opened its own Moss Landing facility right across the street from Vistra's. That system uses Tesla batteries to store up to 182.5 megawatts of power.

Further, Vistra is developing energy storage systems beyond the shadow of Moss Landing's smokestacks. The company is currently expanding an existing facility in Oakland to 36 megawatts and plans to convert Morro Bay's power plant into a 600-megawatt facility by the end of 2024.

California has become a massive testing ground for this new — and possibly revolutionary — technology. Doherty, the PG&E representative, said he expects good results.

"I don't think there's a question of whether or not these will work," Doherty said. "I think we're seeing that they are working."

He estimated that a facility like PG&E's Tesla BESS in Moss Landing could save utilities customers $100 million over the batteries' 20-year lifetime. Not to mention the environmental boons of using clean energy to alleviate some of the strain on California's power grid.

Others aren't so certain that lithium-ion battery energy storage will be the solution to global energy challenges.

"There is a lot of emotion in this space, and people try to push for one technology, hoping that it'll be the silver bullet for reaching emissions goals," said Vianna Cezar, the battery expert at SLAC. "But I think we need to step back a little bit and make sure that we are removing our bias and make sure that we're making decisions on the technology and the science."