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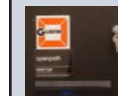
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Dear CEAC Members,

With a few inches of snow here and there, I think we have nearly escaped the clutches of winter unscathed. Our Family Fun Winter Fest was a fantastic event, and our thanks to Air Comfort and H.O.H. Water Technologies for their generous sponsorships. I would also like to thank all the Board Members for their active participation and to the Members and Associate Members for attending with your families.



As I wrote in last month's publication, our Board was tasked with emphasizing education during the general meetings. The goal is to identify topics and opportunities for our Members that will bring value back to their facilities. Our Board will proctor a short educational session with subject-matter experts to help solve some of the hurdles that can be associated with these projects. We will also work with our Associate Members to close the loop at the end of these sessions so that our Members have a resource to assist with completing these new projects.

We are also looking at opportunities for our vendors to host "lunch and learn" sessions at their respective facilities. The CEAC will be able to coordinate with our Associate Members to ensure that the Members receive the invites and appropriate information about these events. These venues will provide opportunities for the Chief Engineers and staff to become familiar with the facilities, services and support that our Associate Members can provide. If you have interest in supporting such a venue, please contact Alex Boerner for more information.

Our next event will be March 18 at the Irish American Heritage Center.

Sincerely,

Tom Phillips

IN BRIEF

Michigan State Green-Lights Installation of Solar Array

EAST LANSING, Mich. (AP) — Michigan State University officials on Friday, Feb. 14, approved the installation of a solar array as part of an effort to boost environmental sustainability.

The university’s Board of Trustees gave the go-ahead to install a 20-megawatt solar array on roughly 100 acres south of the East Lansing school’s main campus. It’s expected to produce energy equivalent to powering 4,400 homes and triple campus use of renewable energy, according to a release.

Once the work is completed, Michigan State’s solar arrays will span roughly 145 acres. That includes previously installed solar carports.

The project should cost about \$2.3 million, officials said, and save the university at least \$27 million over the next quarter-century. The new array is scheduled to start producing power by the end of 2022.

Residents Being Asked to Help Monitor Contamination

MAQUOKETA, Iowa (AP) — City officials plan to ask residents to enroll in a program to monitor vapor contamination from a carcinogenic chemical that’s spread from a factory site in the eastern Iowa city of Maquoketa.

The *Telegraph Herald* reported that the contamination stems from the operations of Clinton Machine Co., which built small engines in Maquoketa from 1950 into the 1990s. The factory used trichloroethene, commonly known as TCE, as a degreasing agent. Federal authorities have since determined that TCE is carcinogenic.

The city took over the site in 2000 and tore down much of the facility, leaving only the office building. It now houses the Clinton Engines Museum.

Contaminants have been detected in groundwater up to two-thirds of a mile away. Shelly Nellesen, the Iowa Natural Resources Department project manager for the factory site, said the TCE in groundwater also creates the potential for indoor contamination. As the contaminated water evaporates, TCE can be carried as a vapor into structures through foundation cracks.

Mike Fisher with Impact7G, an environmental company that took groundwater samples around the site, said the threat posed by the current levels is low.

“It’s above the EPA level, but we are still talking about a very low amount,” Fisher said.

New Mexico Panel OKs Plan to Spend \$100M to Fix State Dams

SANTA FE, N.M. (AP) — A plan to spend \$100 million to fix dams throughout New Mexico — a state with the highest percentage of high-hazard dams in the country — passed its first test Tuesday, Feb. 11, amid an urgent call to upgrade the facilities over worries about the loss of life.

The New Mexico Senate Conservation Committee voted 9-0 to move along a measure that would add funding to address the state’s dam infrastructure that advocates say is in dire need of repairs.

Sen. Pete Campos, D-Las Vegas, said the state had no choice but to get started soon on fixing dams or risk a tragedy in the future.

“This issue continues to come forward as an urgent matter,” Campos said. “We don’t want a loss of life and property.”

Campos said the \$100 million request would only cover around a third of the cost of fixing the state’s dams.

Trucks Haul Massive Beams for Rebuild of Mile Long Bridge

CHICAGO (AP) — Massive concrete beams destined for the Mile Long Bridge along the Tri-State Tollway’s heaviest-traveled section are getting police escorts from a Wisconsin factory to a tollway plaza in Chicago’s Southwest Suburbs.

Transport trucks hauling the 187-foot-long (57-meter-long) beams, each weighing 245,000 pounds (111,130 kilograms), will be traveling this month between 4:30am and noon on weekdays, weather-permitting.

The beams come from a County Materials factory in Janesville, Wisconsin. They’re being used in the \$4 billion rebuilding and re-widening of Interstate 294 near O’Hare International Airport, the Chicago Tribune reported.

Officials said the project can be done without raising tolls and is expected to be completed in 2026.

Plan to Upgrade Connecticut Pier for Wind Industry Approved

HARTFORD, Conn. (AP) — A plan to upgrade a southeastern Connecticut port so it can become a staging area for the offshore wind industry has been approved.

Members of the Connecticut Port Authority on Tuesday, Feb. 11, voted unanimously to authorize the \$157 million state pier project in New London. Democratic Gov. Ned Lamont, whose administration has been pushing for the public-private

partnership to redevelop the waterfront site, noted the process has taken longer than expected because of the multiple entities involved, but said it was worth the wait.

“This is one we got right,” he said, predicting Connecticut may someday become the “Saudi Arabia of wind power.”

Some Republican state lawmakers complained the process was still rushed. Senate Republican Leader Len Fasano of North Haven accused the Lamont administration of “moving full steam ahead with a major plan without considering the input of the public or lawmakers.”

Construction is expected to begin next year and be completed by August 2022.

Arizona Legislation Would Block Natural Gas Bans

PHOENIX (AP) — Arizona cities and counties would not be allowed to ban new natural gas hookups under legislation moving through the Arizona Legislature, an effort to prevent the spread here of gas bans being adopted by California cities to help combat climate change.

The measure cleared the House in a 35-25 vote Feb. 12, and similar legislation is advancing in the Senate. All Republicans were joined by a handful of Democrats in support.

The bill’s supporters say homeowners should be able to decide for themselves what kind of energy they want to use in their homes. They also say restaurants would suffer if they couldn’t cook on gas stoves.

“It’s ridiculous that any government will get down to that level that they’d tell someone how they can heat their house,” said Rep. Bob Thorpe, a Republican from Flagstaff.

Democrats say the state shouldn’t tie the hands of cities and counties to do what they think is best. Rep. Jennifer Engel, a Tucson Democrat, said no gas bans have been proposed in Arizona.

“Our utilities are very localized, and I think this is a matter we should leave to our local governments,” Engel said.

Hawaiian Electric Renewable Energy use Increased Last Year

HONOLULU (AP) — Hawaiian Electric’s use of renewable energy in 2019 increased over 2018 despite the unavailability of geothermal energy production on the Big Island and significantly lower wind energy production, the company said.

Hawaiian Electric said energy generated by renewable resources increased by 156,064 megawatt-hours in 2019, a 6.7 percent increase from the previous year, *The Honolulu*

Star-Advertiser reported Feb 13.

The company achieved a 28.4 percent consolidated renewable portfolio standard in 2019, surpassing 27 percent in 2018.

The state set a goal for 2045 of a 100 percent renewable portfolio standard, which is based on the amount of renewable energy used by customers as a percentage of total utility sales.

Michigan Capitol, State Buildings Closed Due to Lack of Heat

LANSING, Mich. (AP) — Many government buildings in downtown Lansing were closed in February due to a lack of heat following an issue at a power plant.

The Capitol building closed Tuesday, Feb. 11, after the Senate and House canceled voting sessions over the heating problems. Many legislative hearings also were canceled.

The state of Michigan and city of Lansing closed various buildings, including courts.

The Lansing Board of Water & Light said its natural gas-fired power plant had an outage around 1:00am due to equipment failure, causing about 200 downtown customers to lose steam heat. Repairs were made around 10:00am, and heat was restored.

The heating issue in the Capitol led to the postponement of a kickoff event for the state’s 2020 Census efforts.

The affected buildings reopened Feb. 13.

Project Doubling Indiana Michigan Power’s Solar Generation

GRANGER, Ind. (AP) — Construction is expected to start this spring on a project more than doubling Indiana Michigan Power’s electricity production from solar energy sources. The Fort Wayne-based company has won approval from the Indiana Utility Regulatory Commission for the solar farm planned for the Granger area just northeast of South Bend. Completion for the project is expected later this year and is expected to generate 20 megawatts of electricity a year, enough to power 2,700 homes, the *South Bend Tribune* reported. ■■

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300 tickets will be sold.

NEWS

Court Dismisses Court Challenge to Trans Mountain Pipeline

TORONTO (AP) — Canada's Federal Court of Appeal on Tuesday, Feb. 4, dismissed legal objections to the contentious Trans Mountain pipeline expansion that would nearly triple the flow of oil from the Alberta oil sands to the Pacific Coast.

In a 3-0 decision, the court rejected four challenges from First Nations in British Columbia to the federal government's approval of the project.

That means construction can continue on the project, though the First Nations have 60 days to appeal to the Supreme Court.

Natural Resources Minister Seamus O'Regan said the ruling proves that if consultations and reviews are done properly, major projects can be built in Canada.

"The courts have acknowledged that we listened and that we want to do things right," O'Regan said.

The pipeline expansion would triple the capacity of an existing line to carry oil extracted from the oil sands in Alberta across the snow-capped peaks of the Canadian Rockies. It would end at a terminal outside Vancouver, resulting in a seven-fold increase in the number of tankers in the shared

waters between Canada and Washington state.

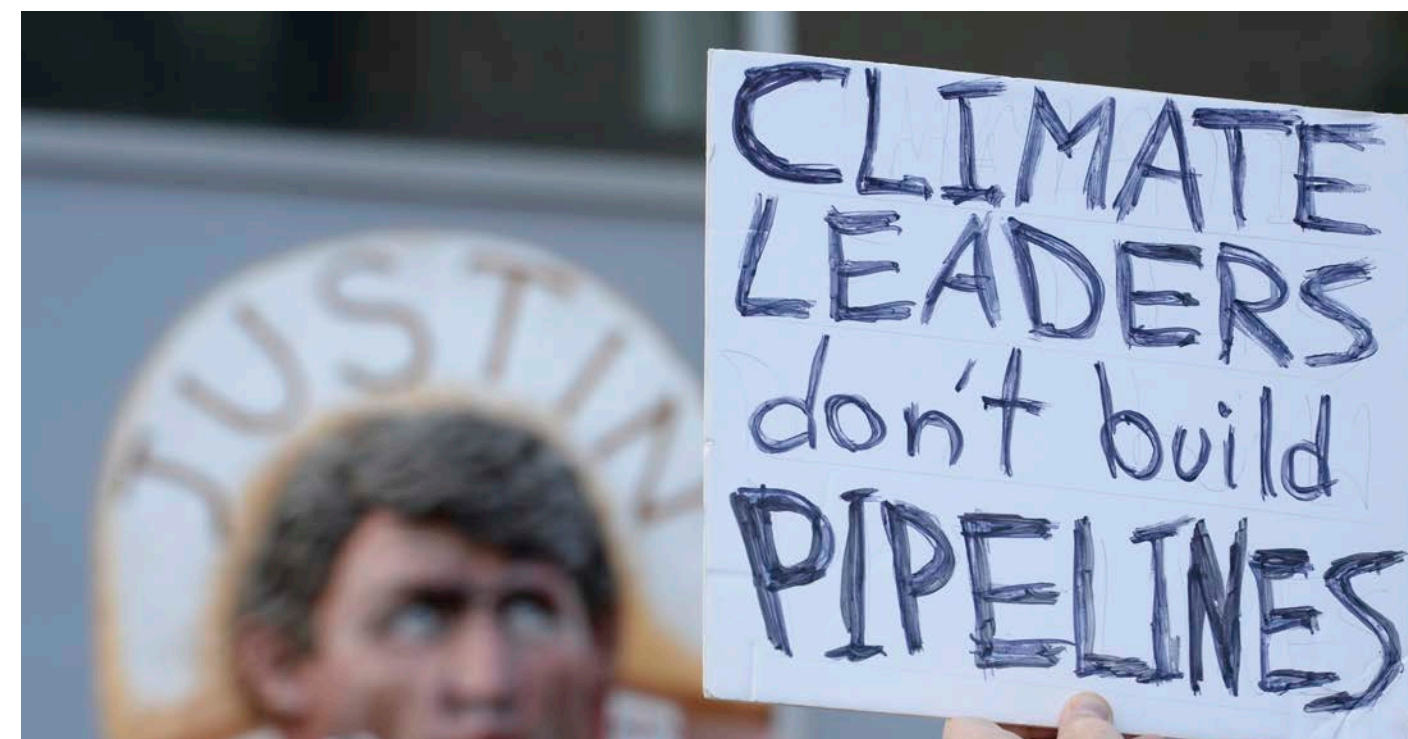
Tanker traffic is projected to balloon from about 60 to more than 400 vessels annually as the pipeline flow increases from 300,000 to 890,000 barrels per day.

The decision is a blow for indigenous leaders and environmentalists, who have pledged to do whatever necessary to thwart the pipeline, including chaining themselves to construction equipment.

Chief Lee Spahan of the Coldwater Indian Band said in a statement an appeal to the Supreme Court is under consideration.

Many indigenous people see the 620 miles (1,000 kilometers) of new pipeline as a threat to their lands, echoing concerns raised by Native Americans about the Keystone XL project in the U.S. Many in Canada say it also raises broader environmental concerns by enabling increased development of the carbon-heavy oil sands.

Trudeau's government bought the existing pipeline and the expansion plan in 2018 after political opposition to the project from the British Columbia government caused Kinder Morgan Canada to pull out from building the expansion.



Protesters take part in a pipeline expansion demonstration in downtown Vancouver, British Columbia, last year. In a 3-0 decision, Canada's Federal Court of Appeal recently rejected four challenges to the controversial Trans Mountain pipeline's expansion. (Jonathan Hayward/The Canadian Press via AP)

NEWS

CN Rail Warns of Closures If Blockades Remain

TORONTO (AP) — Canadian National Railway Co. said Feb. 11 that it would be forced to close significant parts of its Canadian network unless protest blockades impeding its rail lines are removed.

CN said more than 150 freight trains have been halted since Feb. 6, when demonstrators set up blockades in British Columbia and Ontario in solidarity with opponents of the Coastal GasLink pipeline project that crosses the traditional territory of the Wet'suwet'en First Nation in northwestern British Columbia.

Via Rail said 157 passenger trains had also been cancelled, affecting 24,500 travelers on routes between Montreal and Toronto and Ottawa and Toronto. Later, Via Rail cancelled service until the end of the day Feb. 13 on the Montreal-Toronto and Ottawa-Toronto routes because of the blockade near Belleville, Ontario.

Hundreds blocked the entrances to the British Columbia legislature. One protester, Shaylynn Sampson, said demonstrators planned to remain outside the legislature until the

province agrees to pressure the Royal Canadian Mounted Police and a natural gas company to withdraw from Wet'suwet'en traditional territories.

Alberta Premier Jason Kenney said he is concerned the blockades are a "dress rehearsal" for opposition to future energy projects.

Industry groups are also expressing concern about the shutdown, with the Canadian Manufacturers and Exporters association urging government officials to work with police to restore rail service.

"It's a real crisis," said Joel Neuheimer, head of international trade with the Forest Products Association of Canada.

Wood, pulp and paper producers have lost tens of millions of dollars so far, he said.

"We ship massive amounts of pulp to the United States and to places like Asia, so big negative impacts there," Neuheimer said.

CN chief executive JJ Ruest stressed the limited parking space in its network, with traffic backed up from Halifax to Windsor, Ontario, and in parts of British Columbia approaching Prince Rupert.

"We are currently parking trains across our network, but due to limited available space for such, CN will have no choice but to temporarily discontinue service in key corridors unless the blockades come to an end," Ruest said in a statement.

Federal Transport Minister Marc Garneau said he is working with the railways and his Ontario counterpart, Caroline Mulroney, to find a solution. He called the blockage of tracks "dangerous and illegal."



A man holds a warrior flag during the sixth day of blockade of the CN/VIA train tracks in Tyendinaga Mohawk Territory, near Belleville, Ont., on Tuesday, Feb. 11, 2020, in support of Wet'suwet'en's blockade of a natural gas pipeline in northern B.C. (Lars Hagberg/The Canadian Press via AP)

Conoco Ends Plan to Build Alaska Temporary Staging Island

ANCHORAGE, Alaska (AP) — ConocoPhillips has abandoned its plan to build a temporary island as a staging area for its oil discovery project on Alaska's North Slope, an official said.

The oil company has instead proposed to rely more heavily on the state's ice roads to move infrastructure to its remote Willow site. Alaska's Energy Desk reported Feb 10.

The change came in response to criticism from North Slope residents and groups opposed to the construction of the island, including the Arctic village of Nuiqsut, said Connor Dunn, Conoco development manager for the Willow project.

"We wanted to take those concerns seriously and took the opportunity to try and find a way to get the support of the community for a different option to bring these modules to the North Slope," Dunn said.

Over the past 15 years, the company has changed plans for bridge construction and power generation in response to

feedback from indigenous people and other local groups.

The Willow prospect is in the National Petroleum Reserve in Alaska and would be the North Slope's westernmost oil field if it is built.

Willow could produce more than 100,000 barrels of oil a day, Conoco said.

The U.S. Bureau of Land Management is conducting an environmental analysis of the proposed project. The agency announced in January that it has pushed back its final decision.

"This is very indicative of how public comments can help shape best decisions," said Lesli Ellis-Wouters, a bureau spokeswoman in Alaska.

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Honolulu Looks at Building-Code Changes to Reduce Energy Use

HONOLULU (AP) — A bill before the Honolulu City Council proposes to reduce the long-term carbon footprint of Oahu's buildings, but the measure has encountered opposition from Oahu's gas utility and construction industry, Hawaii Public Radio reported.

The changes to the building codes would be the first in more than a decade.

The U.S. Energy Information Administration reported that almost 40 percent of energy consumed in the United States is used to power buildings. That has led many state and local lawmakers to modify building codes in an effort to reduce carbon emissions.

Honolulu's Bill 25 includes provisions such as mandating more efficient insulation and lighting in buildings. But other parts of the bill have generated opposition.

The state's construction industry opposes the bill's proposed ban on gas water heaters in new single-family homes and a

requirement for more electric vehicle charging infrastructure in apartments and commercial buildings.

Solar water heaters and electric vehicle charging stations will increase prices and put housing even further out of reach for residents in what is already one of the country's most expensive markets, said Nathaniel Kinney of the Hawaii Construction Alliance. The construction alliance lobbied for units designated as affordable housing to be exempt from the requirements.

Advocates of more green building codes said the new rules would save homeowners money. While the changes may raise the cost of an initial down payment, consumers could save thousands of dollars in lower utility bills over the term of a mortgage, said Jeff Mikulina, director of Blue Planet Foundation.

The code changes could produce up to \$1 billion in savings over a 20-year period, he said.

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NEWS

Project Seeks to Convert Dairy Farm Manure to Natural Gas

Theresa Davis | The Albuquerque Journal

ALBUQUERQUE, N.M. (AP) — Harmful emissions from the agriculture sector are increasingly scrutinized as the climate changes. Now, energy companies want to help dairy farmers reduce emissions.

Virginia-based Dominion Energy and Vanguard Renewables Ag of Massachusetts have announced a \$200 million partnership to convert methane from cow manure into renewable natural gas.

The money will fund projects at dairy farms in New Mexico, Colorado, Utah, Nevada and Georgia.

“This is a huge win for the environment, for family farms and for our customers,” Ryan Childress, director of gas partnership business development at Dominion Energy, told The Albuquerque Journal. “It’s exciting to cross industries to team up agriculture and energy.”

Agriculture produced 11 percent of New Mexico’s greenhouse gas emissions in 2018, according to the state’s climate

change task force report released in November.

As manure breaks down, it produces methane, a greenhouse gas with a greater warming potential than carbon dioxide.

Instead of allowing methane to escape into the atmosphere, the companies capture the gas on the farms by placing manure in anaerobic digester tanks with large inflatable “bladders” on top.

Low-pressure pipes transport the gas to a nearby Dominion-run processing facility, where it is cleaned to industry standards and goes into existing distribution systems as a power source for homes and businesses. Natural gas collected from each cluster of dairy farms could power 2,800 to 4,000 homes.

Dairy farmers will receive payments from Dominion and Vanguard for the manure they place into the digester tanks, which the companies praised as a way to provide another revenue stream to local farmers.

“This allows the next generation of dairymen to focus on sustainable practices and better nutrient management,” said Kevin Chase, CEO of Vanguard Renewables Ag. “This is a 100-percent investment by our companies, at no cost to dairy owners.”

After methane is removed from the manure, the dairy farmers can use the nutrient-rich waste on their farms for fertilizer. The companies worked with the Dairy Farmers of America to identify where dense clusters of dairies would make transport to processing facilities more efficient.

Final locations of the farm projects haven’t been announced, but Chase did say southeast New Mexico is ideal for methane capture. Nearly 40 regional dairies supply milk to the Southwest Cheese Plant in Clovis, New Mexico.



Dairy cattle feed at a farm near Vado, New Mexico. Virginia-based Dominion Energy and Vanguard Renewables Ag of Massachusetts announced in January a partnership to convert methane from cow manure into renewable natural gas. The money will fund projects at dairy farms in New Mexico, Colorado, Utah, Nevada and Georgia. (AP Photo/Rodrigo Abd, File)

“We’re excited to collaborate on this opportunity with Dominion Energy and (to be) helping our family farm owners in their commitment to sustainability and renewable energy,” the Dairy Farmers of America said in a social media statement.

Dominion and Vanguard will soon file for project permits with the New Mexico Department of Agriculture, and Chase said the goal is to break ground on the digesters this year.

The \$200 million could fund projects at 10 to 20 farm clusters, depending on the size of each dairy.

Vanguard has five anaerobic digesters on dairy farms in Massachusetts and one under construction in Vermont.

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NEWS

Michigan Senate: No Permit to Protect Homes From High Water

By David Eggert | Associated Press

LANSING, Mich. (AP) — A split Michigan Senate voted Thursday, Jan. 30, to let homeowners and others with property along the Great Lakes temporarily install structures to combat erosion from record-high water levels without needing a state permit.

The legislation, which cleared the Republican-led chamber on a party-line 22-16 vote, was sent to the GOP-controlled House for future consideration.

The sponsor, Republican Sen. Roger Victory of Hudsonville, told a Senate committee last week that people should be able to save their homes “without red tape.”

The Michigan Department of Environment, Great Lakes, and Energy announced in October that it was expediting permits for actions such as placing rocks or building seawalls to prevent erosion, so they are issued in a matter of days if homes or infrastructure are at risk. The agency said that in most cases, the U.S. Army Corps of Engineers also needs to approve applications.

Victory said residents told him that the state’s expedited permitting process is “not very quick,” and that the department “was trying but coming up short.”

Under the bill, a permit would not be required for construction of a temporary erosion-control structure if certain conditions were met. The property owner would have a year-and-a-half to apply for a permit for a permanent structure to replace or remove the temporary structure. The temporary structure would have to be removed within three months if the application were denied.

Officials from the department, which opposes the bill, recently told lawmakers that they take the issue “extremely seriously” and are working to help homeowners during a “very

trying time.” Steps including rotating regulators from other areas to help with permits and authorizing overtime pay.

Democrats and environmentalists opposed the bill.

The Michigan Environmental Council said it would let people make drastic and in some cases permanent changes to the Great Lakes shoreline without oversight, when climate change will likely bring increasing variability in water levels.

“This bill seeks short-term ‘fixes’ for long-term problems and threatens the long-term viability of Michigan’s coastal communities instead of investing in better planning and resiliency strategies,” said Tom Zimnicki, the group’s program director for sustainable agriculture and ground and surface water policy.



A Moran tugboat nears the stern of the capsizing vessel Golden Ray near St. Simons Sound off the coast of Georgia. The salvage team salvage team is seeking a federal permit to surround the shipwreck with a giant mesh barrier to contain any debris when they cut the ship apart. (AP Photo/Stephen B. Morton, File)

Giant Crane, Cutting Chain to Saw Wrecked Ship Into 8 Pieces

By Russ Bynum | Associated Press

SAVANNAH, Ga. (AP) — Salvage workers plan to use a long cutting chain suspended from a floating crane to saw apart a large cargo ship that overturned nearly five months ago on the Georgia coast, the multiagency command overseeing the vessel’s removal said Wednesday, Feb. 5.

Plans released by the salvage team call for the South Korean ship Golden Ray to be carved into eight massive pieces, each weighing up to 4,100 tons. The capsized vessel would be straddled by a giant crane anchored to a barge on opposite sides of the ship. The crane would lift each chunk and load it onto a barge for removal.

The cutting had to wait until crews surrounded the wrecked ship with a giant mesh barrier designed to contain any loose debris as the vessel gets cut apart. Construction of that barrier began in mid to late February and is expected to take more than a month to complete, said Coast Guard Petty Officer 1st Class Nate Littlejohn, a spokesman for the salvage team.

The Golden Ray capsized Sept. 8 in the St. Simons Sound shortly after leaving the Port of Brunswick. All crewmembers were successfully rescued and the port reopened a few days later. Salvage experts concluded the ship couldn’t safely be returned upright and floated away intact, opting instead to take it out in pieces.

One big question that remains is how the salvage team will deal with 4,200 automobiles that remain in the Golden Ray’s cargo decks.

“We are still fine tuning how best to contain the debris and

the vehicles that remain inside the vessel as we cut into the hull,” Littlejohn said. “We have removal experts from around the world putting their heads together to tackle the car problem, which is just one component of the massive removal project.”

The salvage team is trying to get the big chunks of the ship removed before hurricane season begins June 1. Cleanup of smaller debris in the water could take much longer. The team is seeking a federal permit for the debris-containment barrier that would allow it to remain until December 2021.

Susan Inman of the Altamaha Riverkeeper said she’s worried cutting through the ship’s hull and removing it in massive pieces will increase the amount of debris and pollutants that end up in the water.

“This is going to be a huge mess in our environment,” Inman said. “It’s not going to be tidy at all. It just causes concern when you look at the length of the permit too.”

Crews have already drained the ship’s fuel tanks of more than 320,000 gallons (1.2 million liters) of oil mixed with water. Its rudder and propeller have also been removed.

The command overseeing the removal said in a news release it plans to use real-time monitoring to watch for pollutants spilling from the wreckage, and the mesh barrier surrounding the wreck will be topped with absorbent boom to soak up any fluids floating on the surface. Barges with magnets and other grabbing tools are planned for recovering smaller debris from the seafloor.

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NEWS

Ohio's Toxic Algae Plan Could Give Other States a Blueprint By John Seewer | Associated Press

TOLEDO, Ohio (AP) — Nearly halfway into a 10-year pledge to combat the toxic algae that turns Lake Erie a ghastly shade of green, Ohio has made little progress. Its patchwork of mostly voluntary efforts hasn't slowed the farm fertilizers that feed algae blooms, leading to contaminated drinking water and dead fish.

Ohio's governor has authorized an ambitious plan that this year will begin offering farmers financial incentives to adopt new agriculture practices and will create a network of wetlands to capture and filter runoff from fields.

The broad approach is being watched closely by states struggling with an increasing number of algae outbreaks. Some environmental groups are skeptical, but others that have been at odds with the farming industry are hopeful.

While there are no guarantees the strategy will revive the shallowest of the Great Lakes, there are potential pitfalls, including a lawsuit calling for tougher regulations, that

could upend the state's goal of drastically reducing nutrient pollution entering the lake's western end by 2025.

"We can't move forward as a state unless we preserve Lake Erie," Ohio Gov. Mike DeWine said when he announced plans to pay farmers to voluntarily participate, part of \$172 million targeted for water quality.

One of the biggest hurdles is that the state must convince farmers to make changes without any certainty they will be enough. And no matter how many get on board, progress will be slow because phosphorus from chemical fertilizer and manure has built up for years.

Backers of the state's plan worry that farmers could get discouraged and lawmakers may back away from committing more money if algae blooms continue to overwhelm the lake.

That's why the state's immediate focus is on convincing



A catfish appears on the shoreline in the algae-filled waters of North Toledo, Ohio. Ohio is rolling out a new strategy to save Lake Erie from the toxic algae that overwhelms it in the summer. Beginning in February, the state will start offering financial incentives to farmers who adopt new agriculture practices. Those are designed to reduce farm runoff that feeds the algae in the lake. Ohio's approach is being watched closely by states around the U.S. that are struggling with an increasing number of algae outbreaks in lakes and rivers. (Andy Morrison/The Blade via AP, File)

farmers in the western Lake Erie region to commit to some changes. "Our measure of success will be in how many farmers enroll in each county," said Dorothy Pelanda, Ohio's agriculture director.

They'll begin finding out in February how the state intends to distribute \$30 million worth of incentives and what the money will cover. That's a big concern for those who've been hurt by depressed commodity prices, the trade war with China and one of the rainiest years in memory.

Nathan Eckel, who raises cattle and farms with his family just outside Toledo, said he and many neighbors already are doing several recommended practices, including planting cover crops and vegetation along streams and mixing manure into the ground.

"We're doing what's most time efficient and what's best financially," he said.

One of the state's suggestions for reducing phosphorus runoff is to inject fertilizer into fields instead of on top, but that equipment costs close to \$200,000. "How do you justify that coming off a year like we just had?" Eckel said.

What holds back others are lingering questions about whether the recommended steps are feasible and effective, said Robyn Wilson, a behavioral researcher at Ohio State University.

"I can't blame the farmer," she said. "Even those committed to it aren't getting enough feedback."

Surveys have shown that while up to 20 percent might not be willing to change, a larger share are open to new ways but face barriers, many of them financial.

"It's a lot to accomplish in a short amount of time," she said.

Ohio's governor has said offering incentives is the key. "We cannot expect farmers to do things that will drive them out of business," said DeWine, who first talked about long-term solutions just months after he took office a year ago.

States throughout the U.S. will be monitoring Ohio's results because reducing nutrient pollution from farms has been a much bigger challenge than slowing it from sewage plants and factories, said Dan Obenour, an environmental engineer at North Carolina State University.

"In general, states are still trying to figure it out," Obenour said.

Ohio's leaders have been under pressure to fix the lake since algae toxins in 2014 left more than 400,000 people around Toledo unable to drink their tap water. Studies by have shown that roughly 85 percent of the phosphorus going into the lake comes from agriculture.

Many experts think the only way to reduce that is to order agriculture to make changes instead of relying on volunteers.

A federal lawsuit that could be ruled on this year is seeking to force Ohio to adopt enforceable regulatory standards. The state's agriculture director said they'll continue to move ahead with their plan, not knowing what will come from the courts.

There's a sense of urgency because Ohio's leaders say they're committed to sticking with the previous administration's promise to cut 40 percent of the phosphorus flowing into western Lake Erie within the next five years. If they fall short, the only choice may be tougher regulations that farmers have been trying to avoid.

An advertisement for W.J. O'Neil Chicago LLC. The top half shows a large industrial tank with a green valve and a pressure gauge. The company logo, a stylized 'WJO' in green, is in the top left, and the full name 'W.J. O'NEIL CHICAGO LLC' is in the top right. The bottom half features a dark background with white text. A large, bold headline reads 'KEEP IT SIMPLE'. Below it, in smaller text, is 'NO HASSLE. NO DELAY. NO BIG DEAL.' At the bottom, it says 'We make your priorities ours, then roll up our sleeves and get the job done.' followed by 'MECHANICAL CONTRACTING & SERVICE' and the phone number '312.470.6300 | WJO.COM'.

An advertisement for CCG. The top half shows a large industrial tank with a green valve and a pressure gauge. The company logo, 'CCG' in a stylized font, is in the top left. Below the logo, the text 'VENDOR-NEUTRAL, UNBIASED CORROSION AND PAINTING CONSULTING:' is written in white. Below this, there is a list of services with checkmarks: 'TANK LINING', 'SWIMMING POOLS', 'FLOORS', 'MASONRY', and 'WATERPROOFING'. At the bottom, it says 'CALL TODAY FOR DETAILS' followed by the phone number '847-423-2167 | FAX: 847-423-2176' and the website 'WWW.CHICAGOCORROSIONGROUP.COM'.

NEWS

Sell, Manage or Status Quo? Report Out on SC Public Utility

By Jeffrey Collins | Associated Press

COLUMBIA, S.C. (AP) — South Carolina could pay off billions in debt and end uncertainty over lawsuits if it sells its state-owned utility, Santee Cooper, but the move would cost ratepayers more money over the next 20 years, state fiscal officials say in a newly released report.

Lawmakers asked for the report from the state Department of Administration last year as they grapple with the fallout from abandoning construction on two new nuclear reactors in South Carolina in 2017. Scrapping the projects after billions were spent and not a watt of power generated forced a takeover of private utility Scana and put the future of Santee Cooper in doubt.

The Department of Administration spoke to 10 companies considering bids. As directed by lawmakers, the 111-page report released Feb. 11 identified the best bid to sell the company, the best bid for a private company to manage Santee Cooper and what the public utility could do if allowed to reform itself.

Santee Cooper has about 190,000 direct customers, but about 2 million people rely on its power through electric cooperatives in every county in South Carolina. The report noted the co-ops are bound to Santee Cooper by contract for nearly 40 more years unless the utility is sold, but says the co-ops would agree with the other two options.

The report also noted there are no comparable examples of a public utility sale in recent U.S. history.

The reactors "left the State with a \$4 billion problem — namely, how to provide relief to Santee Cooper's retail and wholesale customers burdened by the payments on debt incurred for a costly power plant that would never provide them with electricity," the report said.

It's now up to the state House and Senate to decide what to do.

NexEra out of Florida is offering to buy Santee Cooper and pay off up to \$6.9 billion in debt. NextEra is also offering more than \$540 million to settle a lawsuit by ratepayers over the nuclear debacle and \$400 million in additional relief for customers who use Santee Cooper's power.

But other aspects to the NextEra deal may trouble lawmakers. The Juno Beach, Florida, company said it will cut more than 700 jobs over a decade, or more than 40% of the utility's workers. NextEra's proposed rates over the next 20 years are expected to be more costly than Santee Cooper's if it is not sold. As a private company, NextEra would have to pay taxes, unlike the publicly owned utility.

Santee Cooper's own reform plan includes no guarantees how the ratepayer lawsuit might end. It offers reforms like term limits for board members and a promise to be more transparent on major projects and rate increases. The utility also promises lower rate increases and a plan that would only cut 300 jobs over a decade.

The document says Santee Cooper at times didn't fully cooperate with the people compiling the report, adding "Santee Cooper does not have a history of effecting the kinds of changes contemplated by the Reform Plan."

Santee Cooper was founded during the Great Depression to provide power to large parts of an agrarian state where private companies didn't want to serve. It has deep, generational ties to the community and runs two lakes and other public works projects.

The report offered the fewest specifics about the third option, allowing Santee Cooper to be managed by Dominion Energy of Virginia. Dominion would provide at least three



Construction is well underway for new nuclear reactors at the V.C. Summer Nuclear Station in Jenkinsville, S.C. South Carolina could pay off billions in debt and end uncertainty over lawsuits if it sells its state-owned utility, Santee Cooper, but the move would cost ratepayers more money over the next 20 years, state fiscal officials say in a report released Tuesday, Feb. 11, 2020. (AP Photo/Jeffrey Collins, File)

executives to Santee Cooper. The company touted benefits since it took over the territory powered by neighboring Scana after the reactors were mothballed. But officials couldn't fully estimate what would happen to power bills under Dominion's management.

Republican Gov. Henry McMaster said the report confirms Santee Cooper must be sold to let the state continue growing economically and keep South Carolina taxpayers from having to shoulder the utility's debt — a position he has pushed for more than two years. He didn't comment on the Dominion management proposal, but said Santee Cooper executives have proven they are incompetent.

"The more time that has passed, the more I've been convinced they cannot run themselves," McMaster said Feb. 11.

House Speaker Jay Lucas immediately scheduled eight meetings of the House Ways and Means budget writing committee through mid March. He said he hasn't read the report and has no opinion yet, but promised swift action to provide some certainty after 30 months of limbo once the reactors' construction was halted.

"The next 30 days will be a process for us like we never undertook," the Republican from Hartsville said. "It will be a decision that will be talked about for a long time." ☐

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NEWS

Minnesota Regulators Give Key Approvals for Line 3 Pipeline

ST. PAUL, Minn. (AP) — Minnesota utility regulators on Monday, Feb. 3, approved a court-ordered revised environmental review for Enbridge Energy's plan to replace its aging Line 3 crude oil pipeline across the state, then reinstated two key approvals that the company needs to proceed with the disputed project.

The state Public Utilities Commission voted 3-1 to approve the environmental impact statement for the \$2.6 billion project, saying the new review adequately addressed the impacts of a potential spill in the Lake Superior watershed.

Commissioner Matt Schuerger disagreed with the majority, saying the updated review "doesn't adequately represent the consequences of a spill," the *Star Tribune* reported.

But commissioner Valerie Means, who was not on the board in 2018 when the commission originally approved an environmental impact statement for the project, said she believes "there has been a sufficient evaluation."

Means, Chairwoman Katie Sieben and commissioner John Tuma all voted to approve the revised environmental impact statement. They also agreed, by the same 3-1 vote margin, to reissue a certificate of need and a route permit that had been vacated by an earlier court decision.

The new pipeline would replace Enbridge's Line 3, which was built in the 1960s. Enbridge, based in Calgary, Alberta, says the old line needs to be replaced because it is increasingly

prone to corrosion and cracking and can run at only about half its original capacity. Environmental and tribal activists have urged regulators to kill the project.

The commission approved an environmental review in March 2018. But the Minnesota Court of Appeals sent the previous final version of the project's environmental review back to the commission after finding that the massive document failed to adequately deal with the potential risks of an oil spill in the Lake Superior watershed. The state Department of Commerce then conducted additional modeling and concluded in the update that there was little chance of a spill reaching the lake.

During a public hearing Jan. 31, environmental and tribal activists argued against the project, saying climate change has reached a crisis stage. But the project's supporters, including union construction workers, testified that it's time to let project move forward.

Line 3 starts in Alberta and clips a corner of North Dakota before crossing northern Minnesota en route to Enbridge's terminal in Superior, Wisconsin. Enbridge said in a filing ahead of the Jan. 31 hearing that the record continues to show the project is needed.

The recent decisions clear the way for Enbridge to obtain some remaining state and federal permits it still needs, but further legal challenges are expected.



Opponents of Enbridge Energy's proposal to replace its aging Line 3 crude oil pipeline across northern Minnesota demonstrate in St. Paul, Minn. Minnesota regulators on Monday, Feb. 3, 2020, approved a revised environmental impact statement for Enbridge Energy's proposal to update and upgrade its Line 3 pipeline. (AP Photo/Steve Karnowski File)

Coal Shipping in Twin Ports Drops While Wind Cargo Surges

SUPERIOR, Wis. (AP) — The Twin Ports of Duluth-Superior recorded its lowest level of coal cargo in three decades during the 2019 shipping season, but says it handled a record amount of freight carrying components used for generating wind power.

The decline comes as demand for renewable energy sent a record 306,000 freight tons of wind turbines and other components through the port, Wisconsin Public Radio reported.

The transition is something people would not have thought possible until recently, according to Greg Nemet, a public affairs professor at the University of Wisconsin-Madison who researches energy and policy.

"It's really a competition between coal, natural gas, and renewables. It's cheaper to make electricity with natural gas and with solar," Nemet said. "Coal really can't compete with either of those."

Last year, around 8 million tons of coal moved through the Twin Ports, the lowest volume since 1985.

As coal production in the United States has decreased from 1.2 billion tons in 2008 to a projected 597 million tons for the coming year, power companies have transitioned away from fossil fuels to appease investors and states that have set renewable energy goals.

Last week, the U.S. Department of Energy announced \$125.5 million in new funding for solar technologies.

The U.S. Energy Information Administration projects coal will produce less than a quarter of the world's electricity by 2050, while renewable energy sources are expected to grow more than 20 percent during the same time span.



This is the James R. Barker entering the Duluth, Minn., ship canal on Sunday morning, March 20, 2005. Just 14 years later, the Twin Ports of Duluth-Superior report that they received their lowest level of coal cargo in three decades, at the same time handling a record amount of components for wind-power generation. (AP Photo/Jack Rendulich)

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NEWS

Rail Bridge OK'd to Seek Fed Funds; Tunnel Doesn't Make Cut

By David Porter | Associated Press

NEW YORK (AP) — Two long-delayed New York-area rail projects received mixed reviews from federal officials Monday, Feb. 10, as a plan for a replacement for a century-old bridge earned high enough marks to finally qualify for federal funding but a larger project to build a new tunnel under the Hudson River remained mired in a dispute over how much New York and New Jersey will pay.

The \$11 billion-plus tunnel plan received a rating of low in the category of local funding commitment, guaranteeing more delays for a massive project touted as essential by lawmakers and transit advocates but viewed skeptically by federal officials.

The Federal Transit Administration released its ratings Feb. 10 for infrastructure projects around the country as part of President Trump's proposed budget. Under FTA guidelines, projects rated below medium are ineligible for Capital Investment Grants, a critical source of funding.

Supporters of the \$1.6 billion project to build a new bridge

over New Jersey's Hackensack River received good news as the project was upgraded to a medium-high rating, making it eligible for federal grants.

Federal rail officials had said last summer that the bridge project, which has completed environmental and design work and is awaiting federal dollars to begin construction, was likely to receive a higher rating. The bridge, like the current Hudson River tunnel, is more than 100 years old and prone to malfunction.

New Jersey has committed \$600 million to the bridge project through a bond issue backed by the state's gas tax.

"Today's decision by USDOT puts us one step closer toward our ultimate goal: replacing this unreliable, century-old bridge and reducing delays for NJ Transit customers," Democratic New Jersey Gov. Phil Murphy said in a statement.

The Democratic congressional delegations from New York and New Jersey have accused the Trump administration of

holding up funding for the tunnel for political payback. The federal Department of Transportation has denied the allegations and has said the project needs more financial commitment from the states.

"This is a good first step, but of course we have to do much more," Democratic New York Sen. Chuck Schumer said in an email.

The project partners — Amtrak, New Jersey Transit and the Port Authority of New York and New Jersey — submitted a new plan last summer that whittled down the tunnel price tag, originally more than \$13 billion, by about \$1.5 billion using design and construction savings.

It wasn't known at the time how that would affect the proposal, since federal transportation officials had said the low ratings are justified because of the total cost of the request — the largest of any similar project in the country — and because the states' plan to fund their half of the project, between \$5 billion and \$6 billion, with federal loans. New York and New Jersey officials have argued that the practice is in line with what other states have done.

The tunnel is more than a century old and operates at peak capacity, accommodating roughly 400 trains and 200,000 passengers each day. An already aging electrical system and crumbling concrete walls were damaged by Superstorm Sandy in 2012, leading Amtrak, the tunnel's operator, to

estimate one of the tunnel's two tubes could fail within the next decade or so.

In early February, an electrical problem near the entrance to the tunnel left one train stranded inside that had to be towed into Penn Station and caused numerous cancellations and hours of delays for evening commuters. Incidents like that reinforce fears of what would happen if one of the two tubes had to be taken out of service for an extended period for repairs.

Rail officials have said that would reduce peak service by 75 percent and cause significant delays up and down the rail corridor between Boston and Washington, D.C.

Last year, an analysis commissioned by the Amtrak and New Jersey Transit found that passengers traveling between New Jersey and New York have experienced rail delays of two hours or more 85 times between 2014 and the end of 2018.

"Along with the Hudson Tunnel Project, the Portal North Bridge is a critical part of replacing a 109 year-old unreliable system," said Steven Cohen, head of the Gateway Development Corp., which oversees the overall project. "Now we need the new tunnel to also move forward to finally provide 21st Century rail transportation into and out of the nation's economic heart." ■

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NEWS

Advancements in Substation Automation Solutions Transform Usability for Field Teams

Electric utilities face the challenge of managing aging and unsupported legacy automation and monitoring equipment at their substations and pole-tops. This equipment is critical for accessing data from intelligent electronic devices (IEDs) for measurement and protection, automating key functions and enabling remote users to securely control power-system devices.

Increasingly, outdated legacy technology such as remote terminal units (RTUs) needs to be updated to keep up with evolving performance requirements, communication needs and increased security compliance protocols. The need can also be driven by concerns over vendor support or when there is a major deficiency a vendor is not addressing with the equipment.

When this occurs, utilities often take the opportunity to pilot and deploy new substation automation platforms as part of the upgrade. Given recent advances in automation, new all-in-one solutions effectively reduce the number of hardware components in each substation, improve integration with existing IEDs and RTUs, simplify data access and configuration through integrated, Web-based HMI, SCADA and alarm annunciator interfaces and facilitate cybersecurity compliance to meet NERC CIP requirements.

Electric utilities face the challenge of managing aging and unsupported legacy automation and monitoring equipment at their substations and pole-tops. This equipment is critical for accessing data from intelligent electronic devices (IEDs) for measurement and protection, automating key functions and enabling remote users to securely control power-system devices.

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A Window of Opportunity for SRP

Today, Salt River Project (SRP) is in the process of updating its substation automation platforms. The energy company manages a large field operation of over 300 substations across a 2,900-square-mile service area in central Arizona in support of over one million customers.

For SRP, the process of exploring upgrade options began more than two years ago when the vendor that supplied its RTUs discontinued support for the product.

"We have been using the primary RTUs in our system since the mid-'90s, and they were simply outdated," said Josh Manski PE, senior engineer at SRP.

"Although we began the project because our vendor discontinued support for the RTU, we really saw it as an opportunity to integrate the next generation of substation automation systems to assist our security compliance efforts and provide greater interoperability with other parts of the system."

After sending out a Request for Information/Proposal (RFP) to the nation's top vendors of RTUs and also communication and automation processors, SRP scheduled demos and conducted a full lab evaluation of all the products involved.

SRP ultimately selected Pennsylvania-based NovaTech, as their substation automation provider. The company has worked with customers in the electric power transmission and distribution substation market for more than 30 years.

The company's Orion Substation Automation Platform is a communication and automation processor that can connect to nearly any substation device in its native protocol, perform advanced math and logic, and securely present the source or calculated data to any number of clients in their own protocol.

The Orion can be integrated with any equipment, including competitors, and is often connected to microprocessor-based relays, meters, event recorders, IEDs and RTUs. It is then connected to an existing enterprise network or SCADA system.

According to Manski, NovaTech was selected, in part, based on its willingness to configure features of the Orion platform to meet SRP's specific requirements.

"Our engineering team tried to be really forward-thinking as we were implementing these upgrades," explains Manski. "We kept asking ourselves how we could configure the product so it would make our life a lot easier going forward."

For SRP this included ensuring field engineers or technical staff could modify the master configuration files to tailor the system to each site.

At SRP's distribution sites, there is greater consistency and the Orion platform easily supported existing standards and configurations used for decades. However, there was more variability in terms of configuration at each transmission substation and so a templated approach did not work as well.

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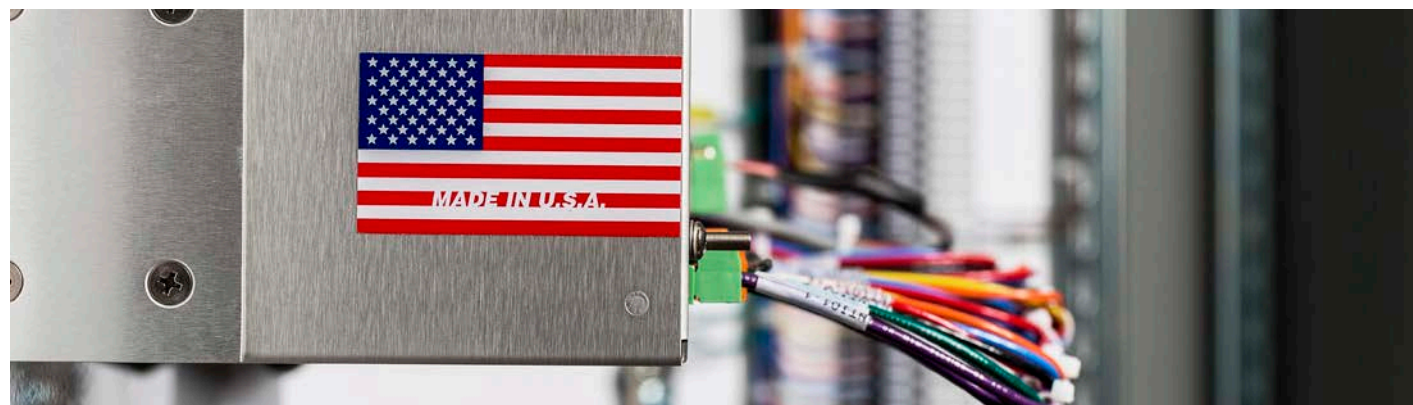
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Intuitive interfaces and "one-box" consolidations are part of a new generation of NovaTech RTUs

Using Orion, Manski and his team were able to build a master configuration file that encompassed SRP's base standards, but still allowed the field engineer to modify or delete aspects that did not apply to a given site.

(Continued on page 30)

News

This also simplified training, an important feature given SRP rotates new engineers through a variety of roles every six months as part of a two-year onboarding program. The training includes learning all the equipment, including the Orion, and how to program it.

“Our new and experienced engineers were very impressed by the ease of configuration and intuitiveness of the Orion platform — so much they stated they preferred working on it over the legacy equipment,” says Manski.

The system also uses open-source web technologies and pre-configured template pages to simplify the building of interactive SCADA and local HMI screens to view data from connected IEDs and RTUs using standard web browsers.

Beyond interface design improvements, the integration of key features such as an alarm annunciator application, is one of the areas that substation automation platforms have advanced significantly.

The alarm annunciator in the NovaTech platform is managed through the same WEBserver software and includes pre-configured pages for data archiving/sequence of events recording, alarm annunciation, one-line diagrams, IED faceplates, control screens, alarms, trending and communications diagnostics.

For example, any data point in the Orion database either obtained from attached IEDs or calculated can be designated as an alarm point and displayed on the tile annunciator.

This can save substantial time when upgrading sites with thousands of alarms.

“It used to take hours for us when we were upgrading a transmission site that had almost a thousand alarms,” says Manski.

Now two years removed from a successful pilot implementation, SRP this year is upgrading six transmission substations and nine distribution sites, with additional generation and distribution feeder automation planned. The utility anticipates it will ultimately replace more than 300 RTUs and install 500-600 Orion systems.

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Automation Upgrade at Hoosier Energy

In the Midwest, Bloomington Indiana-based Hoosier Energy also had to review its substation automation technologies. The electric cooperative, founded in 1949, provides whole-sale power and services to 18 members through a nearly 1,700-mile transmission network.

“Our RTU vendor went out of business,” explains Lance Simpson, a Hoosier Energy communication engineer. “We needed a vendor that would be a reliable source of maintenance and spare parts.”

The energy company used an extensive RFP process before selecting NovaTech.

“A large driver for our choice of system was the user interface and how comfortable our technicians felt with it,” says Simpson. “It needed to be user friendly not only from an engineering design perspective, but also from the technicians’ perspective. The ease of building master configuration files using the NovaTech Communications Director [NCD] makes their work easier.”

Hoosier Energy technicians often use the terminal interface to view traffic on the various communications ports. They also move files and save multiple configurations on the same box for the HMI. “With everything organized through the same interface, there is less training to do because the learning curve is not nearly as steep,” says Simpson.

The utility finds the simplicity of the interface particularly useful for testing when it will need to pull alarm logs off to view them and trend values over time. Consolidation of features in a single unit has also saved Hoosier Energy space and money. According to Simpson, “having an integrated tile annunciator tool has allowed us to install annunciator displays in stations where costs or space previously prohibited us from doing so.”

While the utility primarily sources off-the-shelf RTUs and parts such as terminal blocks, field wiring and power supplies from NovaTech, it also sources integrated distribution enclosures. These are complete cabinets or enclosures designed for distribution of SCADA applications in outdoor environments. Due to the challenging environmental conditions, these are larger in scope and require a separate battery-charging system and environmental controls.

The combined efficiencies that Hoosier Energy has discovered using the integrated technologies has had a significant overall impact. “Based on all the things the Orion platform can do, we have certainly seen a cost savings and just an overall improvement in ease-of-use,” said Simpson.

Since 2012, Hoosier Energy has deployed 10 new large RTUs at its transmission stations and 20 more smaller applications at the distribution level.

For more information on substation automation platforms, visit the NovaTech website at www.novatechweb.com or call 1-844-668-2832.

Letter: Chicago Suburb Workers Worry About Asbestos Exposure

HAZEL CREST, Ill. (AP) — Employees in a Chicago suburb filed a complaint with the Illinois Environmental Protection Agency saying that a contractor used unlicensed laborers to perform an improper asbestos abatement at a building that houses a police department.

The group of Hazel Crest village employees who work at the old Village Hall building are concerned they may have been exposed to asbestos during pre-construction work recently performed at the building.

The employees sent the complaint letter to the state agency anonymously earlier this month.

“We are writing this letter anonymously so that we don't get fired for reporting this violation,” the complaint says. “Please help us. We want to live a healthy and long life. They are taking this away from us.”

The state EPA confirmed to The Daily Southtown that it received the complaint and that it was referred to the Occupa-


tional Safety and Health Administration, the Illinois Department of Public Health and the Cook County Department of Environment and Sustainability.

The complaint letter says employees at the old Village Hall insist that an abatement happened in early December and that they weren't notified. The village didn't take any safety measures to protect employees, according to the complaint.


Dante Sawyer, the village manager, said he received a copy of the complaint. He insisted the claims are false, denying that asbestos abatement had occurred, but noting that Hazel Crest had begun the process of renovating the old Village Hall. An environmental assessment detected the presence of asbestos and an air quality inspection found air levels were below the permissible exposure limit for asbestos.

The actual asbestos abatement, during which the employees must be removed from the building, was scheduled to begin Thursday, Jan. 30, Sawyer said.

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NEWS

Industrial Electric Gas Boosters Promise Quieter, Cleaner, Hassle-Free Operation

By Del Williams

For many applications, industrial gases such as nitrogen, oxygen, argon, CO2 and others are delivered in steel cylinders at pressures of 2,000-2,600 PSI. If the gas is used below the supply pressure, the pressurized supply can be piped and controlled to the point of use with simple valving. However, if the gas needs to be a higher pressure than the supply, industrial gas boosters are utilized.

Unfortunately, traditional pneumatic and hydraulic gas boosters used for this purpose come with some inherent limitations. Pneumatic (air-powered) units work well to boost pressures at intermittent, low-flow rates, but are extremely noisy during operation. At higher flow rates the sound is further increased, since multiple units must fire in parallel. This also increases the amount of electricity required. Hydraulic-powered units, on the other hand, are more suited to continuous operation and are slightly quieter than pneumatic options, but come with the potential risk of hydraulic oil leaks and spills.

Now, a new category of advanced electric gas boosters is promising to provide quieter, cleaner, high-pressure, high flow rates up to 6,500 psi — along with improved monitoring and controls. These units are ideal for the automotive, aerospace, oil/gas and industrial gas supply industries for high pressure gas boosting, gas transference, cylinder charging and scavenging.

Electric gas boosters also open new possibilities for the food/beverage, cosmetics and pharmaceutical industries that require a high-pressure, high flow rate gas for supercritical CO2 extraction, a process that uses pressurized carbon dioxide to extract desired natural substances like fats, oils, or enzymes. One burgeoning market for supercritical extraction is for cannabis extraction to produce industrial hash oils used in vaporizer pens, salves, edibles and elixirs.

(Continued on page 35)



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Perhaps the most significant drawback of pneumatic and hydraulic industrial gas boosters is the sound levels produced during operation. In some cases, many multiples of the units are used in parallel, particularly when higher flow rates are required. The combined noise generated can be excessive.

"Pneumatic-driven gas boosters are extremely loud during operation, and even louder if multiple units work in parallel, which can make complying with OSHA regulations related to sound levels in the plant more difficult," says George Volk, Global Director of Sales and Business Development at Haskel, a division of Ingersoll Rand that manufactures gas/liquid transfer and pressurization technology.

According to Volk, the operation of typical air-operated and hydraulic-driven gas boosters can exceed the 85-dBA threshold, which can cause hearing loss. In fact, OSHA requires employers to implement a hearing conservation program when noise exposure is at or above 85 decibels averaged over 8 working hours, or an 8-hour time-weighted average.

Hearing conservation programs strive to prevent initial occupational hearing loss, preserve and protect remaining hearing, and equip workers with the knowledge and hearing protection devices necessary to safeguard themselves. Under OSHA's Noise Standard, the employer must reduce noise exposure through engineering controls, administrative controls, or Hearing Protection Devices (HPDs) to attenuate the occupational noise received by the employee's ears to within levels specified. In contrast, advanced industrial electric gas boosters such as the Q-Drive, which is scheduled for release in early 2020 by Haskel, is much quieter (<77 dBA) during operation, while still offering up to 6,500 psi for high-pressure applications.

"This eliminates the need for regulatory scrutiny, along with hearing conservation programs," says Volk. "The use of the electric units can also streamline production, since workers can spend more time in the vicinity without worrying about exceeding the regulations or potential hearing loss."

In addition to the noise produced (even though it is less than air-powered units), there can be some concern that hydraulic gas boosters might leak or spill hydraulic oil. This can be a deterrent for applications that mandate a certain level of cleanliness, including cleanrooms.

"Whenever you have hydraulics, there is the potential for leaks or spills," explains Volk. "That is essentially the reason the automotive industry moved away from hydraulics in their production line — because of the potential contamination issues."

Electric energy consumption is also a concern. Despite being electric-powered, the more advanced units are more energy efficient than both pneumatic and hydraulically driven boosters.

"Compared to pneumatic gas boosters, advanced electric

units use one-third of the energy and offer flow rates 10 to 20 times higher," says Volk. "Compared to hydraulic boosters, the electric units also provide energy savings due to lower cooling requirements."

Although there are several electric-driven gas boosters on the market, even within the category there can be significant design differences. Some of the early market entrants are designed with reciprocating motors, which increases complexity and the amount of maintenance required. More advanced units are built using a simplified linear actuator drive which enhances reliability and reduces the Mean Time Between Failure (MTBF).

Both pneumatic and hydraulic gas boosters can also be difficult to control with much specificity, which makes their operation less efficient. Today's more advanced unit include sophisticated remote and self-diagnostic capabilities. Units such as the Q-Drive come with human machine interface (HMI) and touchpad control to allow operators to monitor and control pressure and temperature closely and easily change setpoints.

Given the inherent drawbacks of pneumatic and hydraulic gas boosters, Volk believes quieter, cleaner, easier operation of electric-powered units will have considerable appeal for applications ranging from hydrogen fueling to pressure testing, refrigerant charging, relief valve testing, valve actuation and many others.

"With the considerable R&D investment in these more advanced electric gas boosters, many of the shortcomings of pneumatic and hydraulic units have been resolved and this opens up new possibilities for applications at high flow rates and pressures," concludes Volk.

For more information, call (818) 843-4000 or visit www.haskel.com.

Del Williams is a technical writer based in Torrance, California.

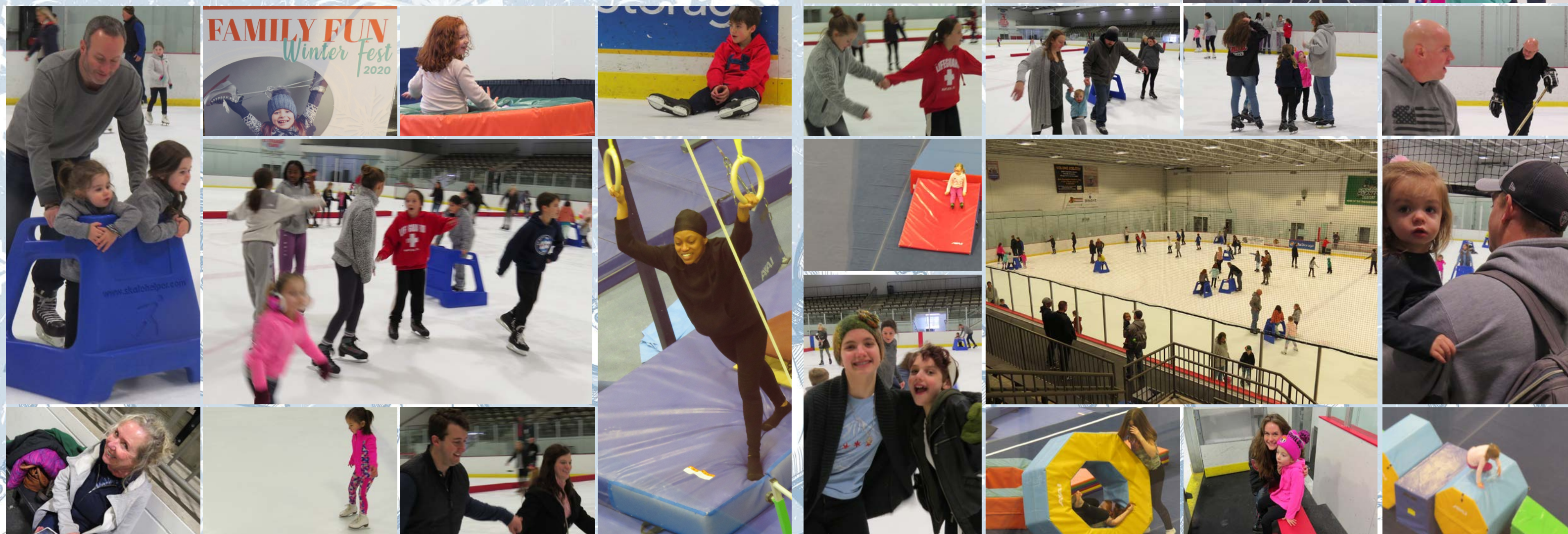
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FAMILY FUN Winter Fest

The Family Winter Fun Fest lived up to its name – a robust turnout with kids of all ages led to a fantastic time for everyone who came out to Morgan Park Sports Center last month. This year, in addition to open skating, hockey and free food and drinks, we had the gymnasium opened up for the kids, where they were able to jump into foam pits, bounce on trampolines, try out the balance beam and tumble to their hearts' content. We thank everyone who came out to participate in this memorable and athletic event.

We are especially grateful to our event sponsors, Air Comfort and HOH Water Technology, for their generous sponsorship of this event, as it's really one for the kids. As always, let's keep our vendors in mind when we're in need of their services. They're there when we need them – let's do our best in returning the favor.

This month, we're looking forward to the annual St. Patrick's Day meeting at the Irish American Heritage Center on Wednesday, March 18. Sponsors for this and all future events are encouraged to get in touch with Alex Boerner at AlexB@chiefengineer.org.





BY KARL J. PALOUCZEK

It started with a discussion about hacking and that oft-mentioned phrase, “the Internet of Things.” Talking with Glavin Security Specialists’ Account Manager Al Thomas, the question had to do with the potential hackability of their wireless lock options for access security, and the implications for those in building management and security who might be seeking out such solutions for their own building’s needs.

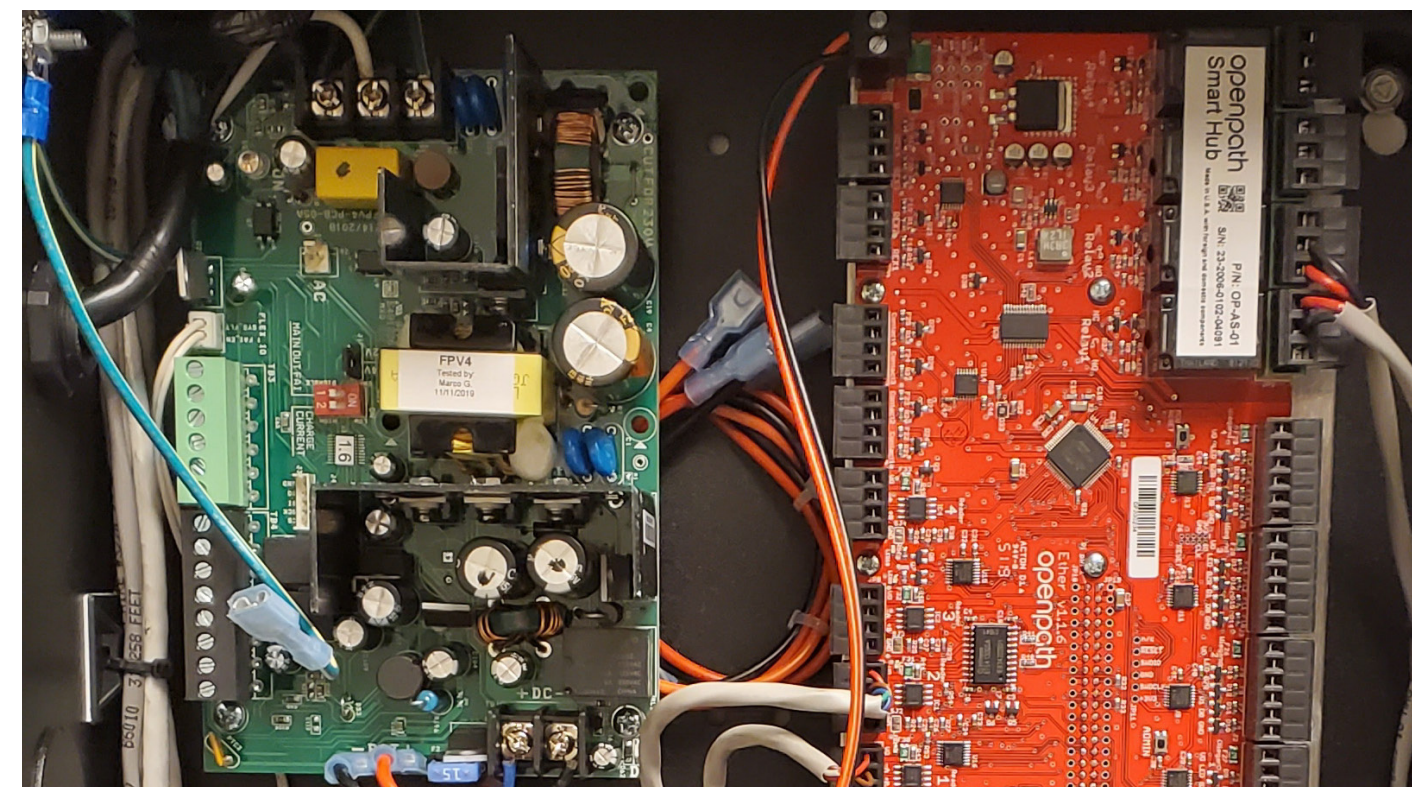
The good news is that this is a problem neither has had to address in their industry, because it has seldom surfaced. “If they want to compromise the door, they’re going to break it — force the lock open,” Thomas says. “It just doesn’t appear, with these, that anyone’s going to go out of their way to hack one of them.”

This may speak well for the reliability of the wireless lock systems that Glavin offers, but it’s far from their only attribute, and Glavin and Thomas were keen to elaborate on why chief engineers should consider them for the properties they manage.

From a functionality standpoint, the locks effectively are akin to the locks that are becoming more widespread in hotels these days. “The concept is pretty much the same,” Thomas says. “It’s a wireless. You have cards that you put up against the lock, the lock would open, and basically, it is just a transmitter that’s allowing that lock to work, and it goes back to a receiver, which you program — very similar to your garage door opener.”



Bluetooth/smartphone-capable reader.



Interior of the cloud-based access control panel.



Installation is easy enough that it can be done in-house.

How one sets the credentials for the locks can depend on how many locks need to be installed in your facility. If you’re only installing a few, you can set the credentials for each lock individually; if you’re installing a robust quantity of locks, they can be managed from a central source, via software on a desktop computer, for example. “Depending on the manufacturer and the system, there are apps that you can program, and it would just download it right to the lock,” Thomas suggests. “Some use just plain Wi-Fi that you can program from your laptop or your phone, and just upload it right to the lock.”

Ease of use is also paramount when it comes to access security — particularly for emergency situations, which is a priority issue for the folks at Glavin. “Everything now is about emergency response,” Thomas explains. “Can emergency responders open the door quickly and safely?”

It’s an important question, the answer to which people too often take for granted. Many people just assume the fire department can show up and break down any locked doors that need to be accessed. But that’s far from the reality of many, if not most situations. “God forbid if there’s an active shooter or something like that, they can’t be running around knocking doors down — they want access,” Thomas asserts.

(Continued on page 40)

FEATURE STORY

“THESE ARE THE PRODUCTS ENGINEERS SHOULD KNOW EXIST.”

- Al Thomas, Account Manager



Installing a Bluetooth/smartphone-capable reader.



Bluetooth/smartphone-capable reader.

“So what these wireless locks allow, at a very reasonable price — they allow very specific people to have access at very specific times. And you can audit who came in and went. So you have specific people, you have time zones for those specific people, and you can audit their activity. And that’s what people are looking for.”

Being able to track who accesses what doors in your facility may not always be important to your organization, but the application, when needed, has definite advantages, as Thomas explained. “We had a building — this is several years ago — where somebody was gaining access to the elevator rooms and damaging them,” he recalls. “So they didn’t want to manage this from a central location. If something bad happened, they wanted to go down and see who the last person in was. So the time and effort of walking up to the door, and auditing the door at the door was well worth it to them, because they weren’t going to do a lot of it. They were just going to find out who the last person in was. So that reduces the cost.”

And cost, of course, is its own crucial metric for any aspect

of facility management. When considering electronic security measures for the property you oversee, wireless protection offers great value for your investment. “I would say wireless is going to probably be at least half the expense,” Thomas estimates. “The material sometimes is a little bit more, but the labor costs you save are phenomenal when you go wireless versus a hardwired system,” he says, due to the fact that you’re not having to run wire

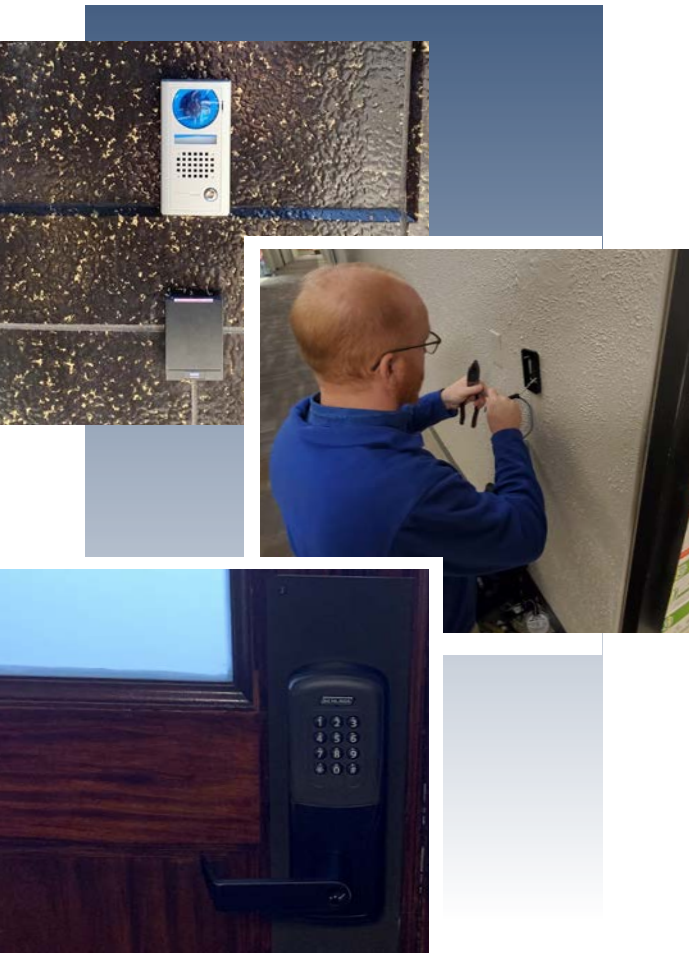
anywhere, nor disrupt operations tearing out surfaces to accommodate it.

One of the biggest advantages in terms of labor and expenses is the ease of installation. Because of the absence of wiring, installing a full wireless system easily can be managed by your onsite engineering team, instead of involving electricians in the process. “The lock is pretty much like installing a mechanical lock,” Thomas suggests. “It does have the electronic portion of it, but it’s really just installing the mechanical lock, and then it’s programming. Once you do the programming, you get used to it — it moves very quickly. ... Basically, it’s fitting in where the old lock went, with a

couple of extra holes. But we know engineers, and we know what they do, so this is nothing for them.”

Glavin Security Specialists is, of course, interested in engaging chief engineers on the subject of its security access technology, and to that end, has started developing a course for the engineers at Local 399. “Part of the class is to bring in some manufacturers, bring in some products, and have them walk around and look at them,” Thomas says. “These are the products engineers should know exist. A lot of these are what I would call back-pocket solutions — meaning, it’s not like a hotel where you’re buying 600 of them. They’re these solutions in which, when a certain situation happens, these are perfect solutions. They’re not a perfect solution for everything, but they’re a perfect solution for very particular situations.”

While this is an event still in the planning stages, Thomas assures that it will be something that chief engineers will want to be a part of. “There are certain security products out there that engineers need to know about. It’s their work.”



Top: The network video intercom call station and proximity card reader offers security and efficiency in a subtle-but-effective package.
Middle: Installation of wireless access security, shown here with cloud-based access control, cuts installation costs roughly in half versus traditional wired electronic security systems.
Bottom: Wireless access control locks offer a durable and convenient, easily managed solution.

...but what ABOUT those ‘Internet of Things’ concerns?

Even if hacking isn’t the likeliest of break-ins with regard to Glavin Security Specialists’ technologies, it doesn’t mean it could never happen, or that it’s not something about which they’re not concerned. Tom Glavin put us in touch with Rob Martens to discuss the subject a bit. Martens is Senior Vice President, Futurist and Chief Innovation & Design Officer at Allegion, electronic security manufacturers for Glavin Security Specialists’ technologies.

“Nothing — I don’t care what anybody says — is 100-percent secure, and anybody that says it is, is either naïve or dishonest,” Martens asserts. “When we talk about the Internet of Things, and we talk about connecting locks and associating what are really life-safety products to the Internet, there’s really a balance to be struck. And that balance is between security and convenience.”

According to Martens, there are three key things to ask yourself when considering any sort of IoT devices:

- **Security** – This means not only physically secure, which is the principal objective in this case, but digitally secure, as well. “There are a number of certifications and other things that you can do,” Martens says. “Going with known brands is not a bad idea. When you see startup-type of things that are kind of sexy, they have interesting things or interesting functions. The right question to always ask yourself is, ‘Hey — is there a reason why an Allegion, a Schlage, or the like hasn’t already done those things?’ Because the truth of the matter is, there’s probably a reason.”
- **Scalability** – Make sure the technology you’re investing in will function as planned whether on a small scale, or if you need to go much larger. “Is this thing going to handle however many million cycles, or tens of thousands, or what have you?” Martens offers. “[Likewise], if this thing is running on a software platform, and I put 1,000 people on it, it might run like clockwork. What if I put 10,000 on it? Or 20,000? Is it going to kind of start to fall down on the job?” These are crucial questions to ask.
- **Simplicity** – Ease of installation is important on the front end, but never discount the end user’s perspective. “From an end-user standpoint, how easy is it to use? Because you’re going to get that kind of feedback.”

Lastly, Martens suggests not confusing proprietary technology for security — a common misconception. “From an engineer’s perspective, what’s really important to understand is, when you start talking about a hacking community, when you hack a proprietary solution and that becomes open to folks, just by its very nature, you have less eyeballs looking at it.”

By relying on open architecture systems, with common interfaces and parts, not only is it advantageous from a cost standpoint, so that should any compromise occur, the whole system doesn’t need to be replaced, but over time, because more people are reporting vulnerabilities and putting out patches, ultimately, your system is that much more secure.



Dominion Energy's coal fired power plant along the James River in Chester, Va. Dominion announced in February its commitment to reaching net zero greenhouse gas emissions by the year 2050. (AP Photo/Steve Helber, File)

Dominion Announces New Greenhouse Gas Reduction Goals

By Sarah Rankin | Associated Press

RICHMOND, Va. (AP) — Dominion Energy announced Tuesday, Feb. 11, that it will aim to reach net zero greenhouse gas emissions by 2050, an acceleration of the goals the company had previously pledged to meet.

The Richmond, Virginia-based company, which operates in 18 states, said the goal covers both carbon dioxide and methane emissions from its electricity generation and gas infrastructure operations.

"Our mandate is to provide reliable and affordable energy — safely. We do that every day, all year long. But we recognize that we must also continue to be a leader in combating climate change," Thomas Farrell II, chairman, president and chief executive officer, said in a statement announcing the change.

The new goal is in line with a report by the Intergovernmental Panel on Climate Change that found emissions of the most abundant greenhouse gas, carbon dioxide, would need to be reduced to net zero by 2050 to keep global warming at 1.5 degrees Celsius (2.7 Fahrenheit), an aim of the 2015 landmark Paris climate change accord.

Dominion had previously committed to cutting methane emissions from its natural gas operations by 50 percent between 2010 and 2030 and carbon emissions from its power generating facilities by 80 percent between 2005 and 2050.

A growing number of investor-owned utilities, cities and states are making greenhouse gas-reduction pledges of similar ambition, said Amanda Levin, a policy analyst with the Natural Resources Defense Council.

With the pledge, Dominion joined 12 other investor-owned utilities that have pledged to go 100-percent clean or reach net zero carbon emissions — meaning any emissions are offset by reduction measures — by 2050 or sooner, Levin said.

Dominion said it would achieve the goal through extending the licenses of its nuclear generation fleet, promoting energy efficiency programs, and investing in wind, solar, natural gas and renewable natural gas programs.

The goal will also require the use of technologies that are not currently in widespread use, including carbon capture, the company said.



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NEWS

Tennessee Grand Jury Wants Criminal Coal Ash Investigation

KINGSTON, Tenn. (AP) — A grand jury in Tennessee said it would support a criminal investigation into claims that a Tennessee Valley Authority contractor failed to protect workers cleaning up a massive coal ash spill, many of whom later fell ill and some of whom died.

More than 200 of the former cleanup workers have sued Jacobs Engineering in four separate lawsuits. They all blame the contractor for exposing them to ash they say caused a slew of illnesses, including cancers of the lung, brain, blood and skin.

The first group of plaintiffs won a favorable verdict in November 2018 in the first phase of a two-part trial, but they won't get monetary damages unless they can prove exactly what caused their specific illnesses. That second phase is on hold after the judge, alluding to workers' urgent need for medical care, ordered mediation. No settlement has been announced. More than a hundred other plaintiffs await the outcome.

On Tuesday, Feb. 11, Roane County grand jurors filed a brief, handwritten addendum to their main report indicating they heard more than five hours of testimony from three witnesses about problems with the cleanup of the 2008 Kingston Fossil Plant spill that dumped more than a billion gallons of coal ash on the Swan Pond community.

The report suggests the Tennessee Bureau of Investigation should look into the workers' plight. "The grand jury concurred with the district attorney general's recommendation for him to predicate a TBI investigation into certain issues pertaining to cleanup worker safety," it reads.

It goes on to allude to accusations made during first trial, including that air monitoring results and other environmental tests were tampered with and that workers were not properly informed of the dangers of coal ash or protected from it. In addition to the criminal investigation, it suggests the district attorney pursue any possible state claims under the U.S. Clean Water Act.

The report does not specifically say whether District Attorney General Russell Johnson should look into the actions of the Tennessee Valley Authority, Jacobs Engineering or another party. The TVA is not a defendant in the worker lawsuits.

On Feb. 12, the utility issued a statement saying, "We cannot overstate how important the safety and well-being of our teammates is to us. Safety is our highest priority and we take every precaution to keep our teammates — both our employees and contractors — safe during operations at all TVA facilities."

Jacobs attorney Theodore Boutrous said the company "stands by its work assisting TVA with the difficult job of managing the cleanup of the Kingston coal ash spill. Jacobs did not cause the spill or cause any workers to be injured, and the allegations are baseless." ■■



The aftermath of a retention pond wall collapse at the TVA Kingston Fossil Plant in Harriman, Tenn. A grand jury in Tennessee's Roane County is supporting a criminal investigation into claims that a Tennessee Valley Authority contractor failed to protect workers cleaning up a massive coal ash spill. The grand jury report alludes to the workers' claims that air monitoring results and other environmental tests were tampered with by supervisors with contractor Jacobs Engineering. (AP Photo/Wade Payne, File)

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MEMBER NEWS

Lavin Engineering Team Honored With 2020 TOBY Award

On Thursday, Jan. 30, 2020, the Lavin Family Pavilion Property Management and Facilities Team was honored with the 2020 TOBY Award for the “Outstanding Building of the Year” in the Medical Office Building Category.

The entire Lavin team worked countless hours preparing the asset and providing narrative on the asset’s infrastructure and building operations.

“It is an honor to be recognized by the entire real estate community in the Chicago marketplace for such a prestigious award,” Senior Operations Manager of Commercial Properties, CBRE – Northwestern Memorial Hospital, Angelo Saccameno said. “As the manager for this WG, this was an amazing representation of team effort, collaboration and professional acumen. A great representation for CBRE!”

Saccameno bestowed a HIGH 5 award to the entire Lavin Engineering Team, and offered his congratulations.



Lavin Family Pavilion’s Property Management and Facilities Team was honored with a 2020 TOBY Award.


Chief Engineers Administer Generator Operator Class and Exam



A robust and eager group gathered at Local 399 Union Hall in Chicago for the Generator Operator class and exam on Saturday morning, Jan. 18th. Pictured as applicants take the exam are CEAC board members John McDonagh, Brian Staunton, Bryan McLaughlin and Doug Kruczek, joined here by Mike Hunter of LionHeart (center).

CHIEF ENGINEER MEMBER INFO AND REMINDERS

- Here are a few things to keep in mind about your membership and Chief Engineer events.
- Members are invited to monthly meetings that take place once a month October – May
- Events vary in location and activity from holidays and socials to education meetings
- Meetings begin at 5:30PM
- We understand many of you end your day before 5:00PM, however to allow for proper set up and to provide a well-executed meeting, we ask that you honor the start time of the event and arrive after 5:00PM.
- Members are welcome to bring one guest, one time, who is considering membership into the organization to the meetings
- Membership dues are good for one year. If not renewed, your membership becomes inactive and you will need to renew before or upon entering events




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NEWS

Virginia House Passes Major Renewable Energy Legislation

By Sarah Rankin and Alan Suderman | Associated Press

RICHMOND, Va. (AP) — The Virginia House passed sweeping energy legislation Feb. 11 that would overhaul how Virginia's utilities generate electricity and, supporters say, move the state from the back of the pack to the forefront of renewable energy policy in the United States.

Critics, though, warned that the legislation, drafted privately by a group that included industry representatives and environmental advocates, strips state regulators of some oversight and leaves ratepayers on the hook for what could be excessive costs.

The measure, called the Clean Economy Act, lays out a plan to get Virginia to 100-percent renewable generation. The House version would demand that goal be met by 2045 and the Senate's version sets a deadline of 2050, codifying a goal Democratic Gov. Ralph Northam issued in an executive order in September.

In a floor speech, House sponsor Del. Rip Sullivan called the bill "transformative," saying it would propel Virginia "into the future and into the top tier of states in terms of climate and energy policy."

The legislation paves the way for an enormous expansion of solar and offshore wind generation plus battery storage, and sets an energy efficiency standard that utilities must meet. It also includes language that would add Virginia to the Regional Greenhouse Gas Initiative, a carbon cap-and-trade program.

Both the House and Senate versions would effectively block new fossil fuel generation facilities in the short term while state officials study whether a permanent ban should be enacted. The House version contains a provision that says if

state officials determine by 2028 that the greenhouse gas reductions are not on target, then there will be a moratorium on the issuance of fossil fuel-fired generating facilities by 2030.

Bill sponsors said in committee hearings that hundreds of hours of negotiations had gone into crafting the legislation. Participants in those talks included Dominion Energy, influential environmental groups including the Virginia League of Conservation Voters and the Southern Environmental Law Center, plus solar interests and Advanced Energy Economy, a national association of businesses.

The lawmakers carrying the measure have said it will help address climate change by moving Virginia toward a carbon-free future while creating thousands of good-paying jobs at the same time.

The bill clears the way for the development of up to 5,200 megawatts of offshore wind, which is costlier than other forms of renewable energy, by declaring it in the public interest. Dominion currently has a small pilot project underway and has previously announced plans for a 220-turbine project in federal waters.

Advocates have noted that a race is underway among East Coast states jockeying for a spot in a supply chain expected to develop for the nascent offshore wind industry. They say Virginia could reap thousands of new, high-paying manufacturing and construction jobs, a boost to the state's port, and billions of dollars in private investment while supporting an industry that will help the environment.

But critics are raising concerns about the price tag.

"In this century, we now have technologies to produce electricity that are clean and cheap," Tom Hadwin, a former utility executive who does consulting work for Virginia environmental groups and reviewed the legislation, wrote in an email. "This bill encourages the 'clean' but loses the 'cheap.'"

Attorney General Mark Herring's office has cautioned lawmakers that language in the bill expressly eliminates the State Corporation Commission's role in determining whether "enormous costs" of implementing its plans are reasonable and prudent and therefore can be passed along to customers.

"In our view the legislation will prevent the regulator from being able to work to accomplish the Commonwealth's clean energy goals in a manner consistent with ratepayer protections," Senior Assistant Attorney General Meade Browder



Del. Delores McQuinn, D-Richmond, right, is the Virginia House sponsor of the Clean Economy Act, which aims to overhaul how the state's utilities generate electricity, and put Virginia in a leadership position for renewable energy policy in the U.S. (Bob Brown/Richmond Times-Dispatch via AP)

told a Senate committee considering the bill.

An SCC analysis of one version of the bill found that the typical residential customer would likely see an increase of \$23.30 a month between 2027 and 2030. The legislation currently includes provisions intended to protect low-income people from seeing a rate increase.

Some Democrats opposed the overall legislation, saying it didn't go far enough to address climate change. Republicans have pushed back too, raising concerns about cost and the shift away from coal. The legislation has gone through numerous changes since it was first introduced and more are expected.



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TECHLINE

Murphy: Electric Car Incentive App Could be Ready by June

TRENTON, N.J. (AP) — Consumers hoping to cash in on New Jersey's new electric vehicle incentives will have to wait, but if consumers bought eligible vehicles since the law was signed last month, they'll qualify for the rebates of up to \$5,000 once the application is ready, Democratic Gov. Phil Murphy said Monday, Feb. 10.

Murphy signed the legislation offering new incentives and setting lofty goals to get more electric vehicles on the road on Jan. 17, but the state is still developing an application for them.

The Board of Public Utilities — the regulator creating the application — could have it ready by the end of June, Murphy said in a statement.

The governor's statement comes as environmental groups said they faced consumers' questions about when they could start applying for the incentives.

The new law calls for 330,000 electric vehicles by 2025 and

2 million by 2035. It also calls for boosting the number of charging stations by offering a \$500 incentive for people to install their own at home and calls for New Jersey Transit to transition buying only zero-emission buses by 2032.

The incentives are meant to be a one-time payment to the buyer or lessee of electric vehicles. The incentives are worth \$25 per mile of electric-only range as rated by the Environmental Protection Agency. They're worth up to a maximum of \$5,000.



A man uses his smartphone as he stands near a billboard for Chinese technology firm Huawei at the PT Expo in Beijing. Trump administration officials, increasingly intent on preventing China from global technological domination, keep floating the idea that the U.S. government should take a more direct hand in running next-generation 5G wireless networks. (AP Photo/Mark Schiefelbein, File)

Barr's Call for U.S. Control of 5G Providers Quickly Rebuked

By Tali Arbel | AP Technology Writer

NEW YORK (AP) — Trump administration officials, increasingly intent on preventing Chinese global technological domination, keep floating the idea that the U.S. government should take a more direct hand in running next-generation 5G wireless networks.

But the notion isn't terribly popular — not even within the administration.

On Thursday, Feb. 6, Attorney General William Barr said the U.S. government should consider taking a "controlling stake" in the European companies Nokia and Ericsson to thwart the global ambitions of China-based Huawei, which holds a leading share of the market for 5G wireless equipment. The federal government could do so directly or via a consortium of U.S. companies and private investors, Barr said.

The backlash didn't take long. In an interview on CNBC the following day, Vice President Mike Pence said "the best way forward" on 5G relies on private enterprise, not government takeovers. The Federal Communications Commission, which regulates the nation's airwaves, already plans to auction off additional radio spectrum for 5G.

"That's the plan the president has endorsed," Pence said. Later on Friday, Feb. 7, Trump economic adviser Larry Kudlow also argued against the idea, telling reporters at the White House that "the U.S. government is not in the business of buying companies, whether they're domestic or foreign."

Trump has not tweeted about the proposal.

(Continued on page 52)

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Depending on how you count it, Barr’s speech is the second or third time people in Trump’s administration or 2020 campaign have suggested direct federal involvement in 5G networks, which boast faster speeds and promise a variety of new applications. Barr suggested in his speech that 5G speeds will turn wireless networks into “the central nervous system of the next generation of Internet, called the ‘Industrial Internet,’” with potentially dramatic economic consequences.

In 2018, leaked National Security Council documents obtained by Axios proposed a U.S. government-built 5G network. That plan went nowhere.

Then in 2019, members of Trump’s reelection team offered up an idea, first reported by Politico, to create a new “wholesale” 5G network run under government contract that would provide bandwidth to network operators on an as-needed basis. Trump himself repudiated that notion after criticism from industry and other government officials, telling reporters that 5G remains “private-sector driven and private-sector led.”

Barr’s speech, however, appears to be the first time a member of the Trump administration has publicly endorsed direct U.S. government ownership of 5G suppliers. The specific steps he suggested carry echoes of “ industrial policy,” which calls for a level of government involvement in the free mar-

ket anathema to many economists and, at least previously, most Republican politicians.

The idea enjoyed brief U.S. popularity in the 1980s amid fears that Japan’s government-backed companies were destroying the U.S. technology industry. It then subsided as American tech companies surged ahead in the 1990s. Critics of free trade frequently note that China and Europe still run their own industrial policies.

Barr argued that Huawei — and, by extension, the Chinese government — stands to dominate the “industrial Internet” and reap the economic rewards unless the U.S. and its allies take quick, dramatic and unprecedented action. Huawei is the world’s largest maker of telecom equipment.

“I would call that crazy,” Michael Thelander, CEO of telecom consultancy Signals Research Group, said of Barr’s idea of taking over European equipment companies. For the government to effectively take over a corporate entity “doesn’t sound like a very Republican position,” he said.

AT&T CEO Randall Stephenson criticized Barr’s idea of a government stake in private companies during a CNBC interview, and said that investing in software would help get around the need for Huawei.

The Trump administration has positioned the transition to

5G as a race, particularly with China. It has cast Huawei as a de facto arm of the Chinese government that could enable global espionage. Huawei has denied these allegations.

Despite its global footprint, Huawei has been largely absent from the U.S. since 2012, when a congressional panel warned phone carriers to avoid Huawei. The U.S. government has also taken steps to try to excise Huawei from small and rural wireless networks that still rely on its equipment, and has pressured allies to kick Huawei out of their telecom networks.

“There’s a certain amount of desperation here as the U.S. government tries to figure out what do on 5G,” said Washington lawyer David Hanke, a former GOP congressional aide. Hanke, however, said Barr’s suggestion might be “the least-worst option” for dealing with Huawei, since the alternative would be permanent Chinese domination of the global market for 5G technology.

Huawei has grown in Asia, Europe and Africa, helped by its dramatically lower prices, said Roger Entner, a telecom expert with Recon Analytics. Nokia and Ericsson have lost some market share along the way.

Any acquisition of a majority stake in Ericsson or Nokia by an American company, let alone the U.S. government, would

likely draw close scrutiny by European governments and EU regulators. Some European nations have also suggested setting up regional champions that could compete with U.S. and Chinese giants.

The U.S. has other alternatives. A bipartisan group of senators have proposed a bill to invest \$1 billion in Western alternatives to Huawei and ZTE, another Chinese telecom-equipment maker, by focusing on software. Kudlow also said in a recent interview with the Wall Street Journal that the administration was working with U.S. tech and telecom companies to develop software that could help reduce the need for Huawei’s equipment.

Barr dismissed that approach Feb. 6, calling it “pie in the sky” that could take a decade or more to implement. Telecom experts say it could be ready much sooner.

The FCC declined to comment on Barr’s remarks. Democratic FCC commissioner Jessica Rosenworcel said in a statement that discord over 5G policy showed that the Trump administration doesn’t have a plan to “secure our 5G future.”

Ericsson and Nokia did not immediately respond to requests for comment.



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TECHLINE

Uber Loses \$1.1B Investing in Food Delivery, Driverless Cars

By Cathy Bussewitz | AP Business Writer

NEW YORK (AP) — Uber is still losing money as it expands its food delivery business and develops technology for driverless cars.

But revenue for its rides business nearly tripled in the final three months of last year as the company picked up more passengers around the world. That prompted it to say it will turn a profit earlier than it expected.

The San Francisco-based ride-hailing giant lost \$1.1 billion in the fourth quarter of 2019, about 24 percent more than the same time last year. The loss amounted to 64 cents per share, which was slightly better than what analysts were expecting. Analysts polled by FactSet predicted Uber would lose \$1.18 billion, or 67 cents per share, during the quarter.

Uber brought in \$4.1 billion in revenue, up 37 percent from a year ago. Its revenue grew around the world, although the

biggest gain was in the U.S. and Canada, where it pulled in 41 percent more than last year.

Because of the company's progress in 2019 and its plans this year, Uber expects to turn a profit in the fourth quarter of 2020, CEO Dara Khosrowshahi said in a conference call with investors. That's sooner than the projection during the last earnings call when he said the company would turn a full-year profit in 2021.

Khosrowshahi called 2019 "a transformational year for Uber."

"We recognize that the era of growth at all costs is over," he added.

Uber's Eats business lost \$461 million in the quarter before accounting for interest, taxes, depreciation and amortiza-

tion, down 66 percent from the same time last year as Uber poured money into growing the business in a highly competitive food delivery market.

In January, Uber sold its Eats business in India to Zomato, a popular food app, a move that its executives hope will stem some of the losses. In the U.S., Uber has been focused on improving restaurant selection and has almost 400,000 restaurants on the Eats platform, up 78 percent on a year-on-year basis, Khosrowshahi said.

The fourth quarter was marked by painful disclosures at Uber. In December, it released a long-awaited report, in which its riders reported more than 3,000 sexual assaults during 2018. The same month, it agreed to pay \$4.4 million to end a federal sexual harassment probe about its internal corporate culture. But those announcements did not take a toll on Uber's stock, which has been inching up in recent months. And in a major blow, Uber lost its license to operate in London in November over concerns about impostor drivers and handling of safety.

"We're going to have our day in court," Khosrowshahi said. "We respectfully disagree with (Transport for London's) conclusions." Uber's safety and service have significantly improved over the past few years and "the team is very focused on executing on safety around the world, and the London team is especially focused on it," he said.

Uber also has been dealing with a new California law that



Uber continued to lose cash as it poured money into building its food delivery business and developing technology for driverless cars. The ride-hailing giant lost \$1.1 billion in the fourth quarter of 2019, about 24 percent more than it lost at the same time last year. (AP Photo/Seth Wenig, File)

makes it harder for companies to classify workers as independent contractors instead of employees. The law went into effect in January. Since then, Uber has been making some changes to assert drivers' independence, like allowing drivers to see riders' destinations before they accept a ride. It also changed the cost structure in California so riders now see a price range, instead of a flat rate, before a ride.

"Driver feedback has been positive in terms of the information, the empowerment that I think our driver partners feel," Khosrowshahi said. "Prices have increased more (in California) than they have nationally, so I think from a rider standpoint, the service has become more expensive, but it's very, very early."

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TECHLINE

Digital Transformation Poised to Revolutionize Paints and Coatings Industry

LONDON, U.K. — In 2018, paint and coating manufacturers were putting digital technology to use in only a limited number of digital domains. Since then, the use of digital technology by these coatings companies has accelerated, and today, all leading formulators now have digital initiatives across multiple domains.

A recent analysis by Frost & Sullivan has predicted that new digital business models such as data monetization and coatings-as-a-service will completely transform the way the paints and coatings industry operates in the next 10 years.

“In an industry as highly competitive as paints and coatings, product innovation is an important area of differentiation,” said Brian Balmer, Industry Director, Chemicals, Materials and Nutrition at Frost & Sullivan. “Digital transformation will significantly enhance innovation in this sector, enabling manufacturers to deliver much more than just a tin of paint to customers in the near future.”

Frost & Sullivan’s latest research, Global Digital Transforma-

tion in Paints and Coatings, 2019, tracks the digital transformation of the global paints and coatings industry and seeks to identify future opportunities for further use of this technology. The report also explores the technologies enabling this digital transformation, the current activity among coating formulators and raw material suppliers in the various digital domains, and future scenarios for coatings in an increasingly digital world.

The role of digital leadership, especially chief digital officers (CDO), is poised to explode in 2020, addressing the lack of top-level digital strategy management that remains a challenge for the paints and coatings industry to date. The proper adoption of digital concepts will be disruptive for the industry, and it requires a different way of thinking. With a CDO at the helm, companies can realize their digital transformation goals quickly and effectively.

“The coatings industry is clearly moving away from a model based solely on producing liters of paint. Successful companies in this sector will sell not just paints and coatings, but

also their key attributes, such as protection, color, etc., as a service,” noted Balmer. “In making this transformation, companies will be able to identify new potential customers who could also benefit from the data being generated.”

Companies operating in this sector can also foster growth by:

- Focusing on the digital transformation of one particular domain instead of transforming multiple domains at once.
- Adopting data monetization and coating-as-a-service business models to drive future growth.
- Leveraging one specific digital technology across multiple domains.
- Exploring the application of big data, AI and augmented reality in business operations to identify new business opportunities.

Global Digital Transformation in Paints and Coatings, 2019, is a part of Frost & Sullivan’s Chemicals, Materials & Food Growth Partnership Service program, which helps organizations identify a continuous flow of growth opportunities to succeed in an unpredictable future.

For further information on this analysis, please visit: <http://frost.ly/3yb>



Adoption of big data, AI, and AR will aid coatings companies to uncover new revenue streams and attract new customers, finds new research from Frost & Sullivan.



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NEW PRODUCTS

Neutra-Safe Introduces New Tube-Style Condensate Neutralizers

Neutra-Safe has expanded its line of tube-style condensate neutralizers to include seven models, serving high-efficiency gas-fired appliances up to 2 million BTUH input capacity.

The tube-style condensate neutralizers were designed with the contractor in mind. They feature a clear tube for fast, simple visual inspection of neutralization media without disassembly. Patented, integral unions and O-ring seals are used at each end for a leak-proof seal, as well as ease of installation and service.

The neutralization media, which is a Neutra-Safe proprietary Neutra-pH blend of 99-percent-pure calcite and magnesium oxide, provides the most efficient neutralization possible. It eliminates clumps that can clog traditional neutralizers.

The CN2-220V model specifically can be installed in either horizontal or vertical configurations. This design allows the unit to be used on most residential applications, so service vehicles only need to carry one SKU.



Neutra-Safe has added seven models to its expanded line of tube-style condensate neutralizers, offering high-efficiency gas-fired appliances up to 2 million BTUH capacity.

Pasternack Launches New Class AB High Power Amplifiers With Optional Heatsinks

IRVINE, Calif. — Pasternack, an Infinite Electronics brand and a leading provider of RF, microwave and millimeter wave products, has just launched a new series of high power, Class AB broadband amplifier modules that incorporate GaN, LD-MOS or VDMOS semiconductor technology. The combination of high linearity and efficiency with low distortion over a wide dynamic range make them ideal for a variety of applications including communications systems, military radio, radar, signal jamming, test and measurement and base stations.

Pasternack offers a comprehensive selection of 18 new high power, class AB amplifiers that cover frequency bands from 20 MHz to 18 GHz that feature saturated output power levels ranging from 10 Watts to 200 Watts and power gain up to 53 dB. Designs operate in a 50-Ohm environment and are unconditionally stable. The compact coaxial packages use SMA or N-Type connectors and have integrated D-Sub control connectors for DC bias, enabled with TTL logic control, current sense and temperature sense functions. These rugged assemblies operate over a wide temperature range from -20°C to +60°C and can withstand relative humidity exposure up to 95% maximum. To insure optimum baseplate temperature for highly reliable performance, Pasternack offers 2 new heatsink modules with DC controlled cooling fans that are specifically designed for these power amplifiers.

"The addition of these new high power amplifiers offers our customers more choices to address applications requiring a small form factor, high power, RF amplifier that utilizes leading edge semiconductor technology, with the benefit of high linearity and efficiency, and wide dynamic range over a broad frequency range," said Tim Galla, Product Line Manager at Pasternack.



Pasternack's new Class AB high power amplifiers support popular octave bands ranging from 20 MHz to 18 GHz with P_{sat} levels up to 200W.

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EVENTS

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Here are five reasons you'll want to attend:

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4. You will build a positive, proactive culture of FM leadership.
5. You will look forward to change instead of fearing it.

Facility Fusion is all about focus — on your needs as a facility manager, on your concerns in supporting specific facility types, on your career advancement, and on building your professional network. What you learn and who you meet benefit both you and your employer.

- You'll gain best practices for improving operational efficiency, as well as field-tested strategies for increasing employee productivity through a better work environment.
- You'll stay up to date on industry trends and standards, helping you ensure that your organization is current, compliant and competitive.
- You can tailor a learning agenda applicable to your job responsibilities and existing facility issues.
- Facility tours give you a first-hand look at energy-efficient features, building upgrades and strategic space planning; and you'll benefit from insights shared by FM teams on daily operations.
- The expo saves you hours of independent research on products, services, and suppliers. Fusion exhibitors not only introduce you to their solutions but educate you on how to make those solutions work for you.
- Networking with fellow practitioners, topic experts, and reputable solution providers allows you to compare processes, share ideas and return to work with solid recommendations for improving the workplace.
- Employers who support their FM team's continuing education ensure that their facility is being managed by informed and prepared professionals.

Information and registration at facilityfusion.ifma.org.

CxEnergy 2020 Conference & Exposition

April 6-9 (Expo April 16-17)
Hilton San Diego Bayfront
San Diego, CA

CxEnergy 2020 is the premier conference for building commissioning, energy management, and test & balance professionals. The event includes educational sessions on a wide range of topics relating to commissioning and energy

management of the total building enclosure, an exhibit hall featuring the latest in energy management technologies and certification opportunities for ACG's Certified Commissioning Authority (CxA) and EMA's Energy Management Professional (EMP).

CxEnergy 2020 is the most exhibitor-friendly and cost-effective show in the industry, offering 6 hours of dedicated expo time with no competing educational sessions.

"I have been a CxA since 2008 and an EMP since 2011. CxEnergy is one of the few places that addresses the commissioning side and the energy conservation side. My personal belief is that you have to have both to be successful, especially in existing buildings," said Al LaPera, CxA, EMP, TLC Engineering Solutions.

Attendees are treated to an extensive seminar series that covers topics across test and balance, commissioning, and energy management.

Information and registration at www.CxEnergy.com.

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ASHRAE UPDATE

U.S. DOE Finalizes Rule Clarifying Use of ASHRAE Energy Conservation Standard

ATLANTA — ASHRAE is pleased to announce that the U.S. Department of Energy has issued a final rule, clarifying that DOE must meet its statutory requirements to adopt ASHRAE Commercial Building Energy Efficiency Standard 90.1 energy conservation levels, "except in extraordinary cases where a high evidentiary hurdle has been surmounted." Further, DOE noted in the final rule, "The language of the statute makes clear that Congress intended to establish a high bar for DOE to go beyond the levels in ASHRAE Standard 90.1, an intention clearly reflected by its decision to require a heightened evidentiary standard."

DOE's final rule entitled "Energy Conservation Program for Appliance Standards: Procedures for Use in New or Revised Energy Conservation Standards and Test Procedures for Consumer Products and Commercial/Industrial Equipment," was issued Jan. 15, 2020, and is commonly called the "Process Rule."

The rule provides the procedures by which DOE prescribes energy conservation standards for both consumer products and commercial equipment pursuant to the Energy Policy and Conservation Act. While the statute already directs DOE to adopt energy efficiency levels in ASHRAE 90.1 unless several hurdles are met, the Process Rule clarifies DOE's interpretation of EPCA in acknowledging the statute provides a high bar for going beyond ASHRAE Standard 90.1.

In its final rule, DOE discussed many points ASHRAE made in a letter issued on May 6, 2019, commenting on the proposed rulemaking. DOE also states in its Final Rule that the "statutory scheme, which directs DOE to adopt ASHRAE technical standards and test procedures unless further EPCA provisions command otherwise, comports with the requirements of the National Technology Transfer and Advancement Act of 1995 and OMB Circular A-119."

ASHRAE's standard development process is rigorous, and it is one of only six standards-developing organizations in the U.S. that self-certify that its standards have followed procedures established by the American National Standards Institute (ANSI). ASHRAE has transparent, balanced and robust consensus-based standards setting process, developed through the participation of any and all interested and affected stakeholders. These participants do not need to be ASHRAE members to participate.

ANSI/ASHRAE/IES Standard 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings (referenced as "Standard 90.1") has been a benchmark for commercial building energy codes in the United States and a key basis for codes and standards around the world for more than 35 years. ASHRAE's most recently published Standard 90.1-2019 reflects a process by which ASHRAE received 544 comments from 116 distinct commenters over the course of a three-year period.

All proposed changes to Standard 90.1 are open for public review, which allows interested and materially affected parties to give input into development of the standard and reach consensus, ensuring publication of a document that has been rigorously examined, questioned and defended. ASHRAE's consensus process ensures buy-in and reflects input from energy advocates, building owners, design professionals, utilities, manufacturers, representatives from DOE, and

other materially affected and interested parties. Compared to a building built using ASHRAE Standard 90-1975, a building built to ASHRAE Standard 90.1-2016 will use less than half the energy.

DOE is currently conducting a technical analysis of the latest version of Standard 90.1-2019 to assess its energy efficiency impact on the U.S. built environment. Standing Standard Project Committee 90.1 (SSPC), the committee that has oversees the development of the standard, has served close to 45 years.

The 47 voting members on SSPC 90.1 have broad representation: Of the 19 voting members from the industry interest category, only nine come from the industries that have a material interest in products covered by potential DOE regulation. The remaining industry interest category members represent building envelope material manufacturers (five voting members), and lighting equipment representatives (five voting members).

ASHRAE will continue to improve Standard 90.1 through its continuous maintenance process, and it welcomes involvement in this process.

For more information: ashrae.org/technical-resources/standards-and-guidelines.

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AMERICAN STREET GUIDE

Once-Endangered 1855 Indiana Home is Revived as an Inn

By Dave Bangert | Journal & Courier

ATTICA, Ind. (AP) — Several months ago, Katy Kays was in Attica looking at a property she was thinking about buying, renovating and reselling.

As Kays poked around a house that could have used a handy touch before the general manager of Lafayette’s Achieve Marketing and Consulting tried to flip it, she said she had a visit from James DeGrazia.

“He said, ‘Want something you can really sink your teeth into?’” Kays said. “I knew exactly what he was talking about.”

When she went with DeGrazia to 500 E. Jackson St., where the 4,800-square-foot of the McDonald House had been empty since the early 2000s, Kays said things were rough, inside and out. DeGrazia, as he told the J&C in 2015, had bought the Greek Revival home, built in 1855 by Attica businessman James D. McDonald, at a tax sale in 2013, with hopes that someone would come along with the chops and wherewithal to save it.

“It was bad,” Kays said. “The whole back wall was open in the back. There were raccoons inside. It needed, I don’t know, everything.”

But given a price so low she wouldn’t repeat it and a promise of help when she needed it, Kays said she was in. Other projects were set aside. And she and a crew of five bombed the first phase of a McDonald House restoration that continues to have people slowing down on their way in and out of the Fountain County city on Indiana 28.

As Attica looks to entice HGTV’s Home Town to bring its show — and restoration muscle — to town to look at a downtown that’s listed on Indiana Landmarks’ “10 Most Endangered” list, a restored McDonald House got its big unveiling Jan. 31 and Feb. 1, as it opens as an inn five years after also being listed as one of Indiana’s most endangered structures.

Last week, Kays and Brittany Smith, innkeeper for the newly branded Historic McDonald Airbnb, and others were “but-toning up a few things,” as Kays put it, before guests started to arrive and ahead of the foot traffic of an open house.

“As you can see,” Kays said, “there’s still a lot to do.”

James and Lucinda McDonald built the three-story brick home on a hill where Jackson and Main streets merge, near a park that bears their name. The home sat on an acre and featured eight bedrooms and six fireplaces. A walnut staircase climbs through the middle of the home and up to the roof. Iron balcony rails ran along the second story. The house provided a hilltop view of downtown Attica to the west.

After the McDonalds died, the property passed through several hands during the remainder of the 19th century and through the 20th century.



The Historic McDonald Airbnb is shown, Thursday, Jan. 23, 2020, in Attica, Ind. The Greek Revival home, built in 1855 by Attica businessman James D. McDonald, is reopening as an inn five years after being listed as one of Indiana’s most endangered structures. (Nikos Frazier/Journal & Courier via AP)

Dolly Poston-Zollars spent part of her childhood growing up in the house, which she said her mother used as six apartments as well as a home when the family owned it.

“I used to slide down those bannisters,” Poston-Zollars said. “I can’t wait to see my old bedroom.”

The house stayed in the family until 1997, she said. Fountain County property records show that the McDonald House traded hands several times after that, before DeGrazia bought it.

Being listed on the Indiana Landmarks’ 10 Most Endangered lists in 2014 and 2015, Attica hopes to draw attention to a property that has growing problems, including brickwork that has been destabilized by water gushing from failing gutters.

In 2016, then Mayor Bob Shepherd told the J&C the McDonald House “an integral part of Attica and its history.” DeGrazia told J&C reporter Kevin Cullen that he bought it knowing that he wouldn’t sell it “if they want to demolish it.”

Enter Kays, who says the past five months have been a blur of foundation work, rebuilding a back wall that had given way, tuck pointing the rest of the brick, installing steel beams to shore up floors, replacing 89 window panes, adding insulation and HVAC systems, hanging drywall, painting and cleaning.

“And cleaning and cleaning,” Kays said. “We’re still at it.”

That was just to get the property through phase one, which meant “habitable.” She said work on the next phases will continue on rough spots still evident, even as the inn opens for guests this week.

Kays said McDonald House is ready for Mayor Duane Roderick to cut a ribbon for a grand opening. She booked several rooms around the time her son will graduate from Attica High School in the spring.

“It provides a much-needed spark to the community to see someone from the outside come and join us in our bid to preserve the historic integrity of the town,” Poston-Zollars said. “This, to me, is such a focal point of the entrance to the community when you come in off (Indiana) 28. I think it’s just a huge showpiece when you see this beautiful home that’s been redone rather than coming into town and the first big historic home you see looks like it did. What a blessing.”

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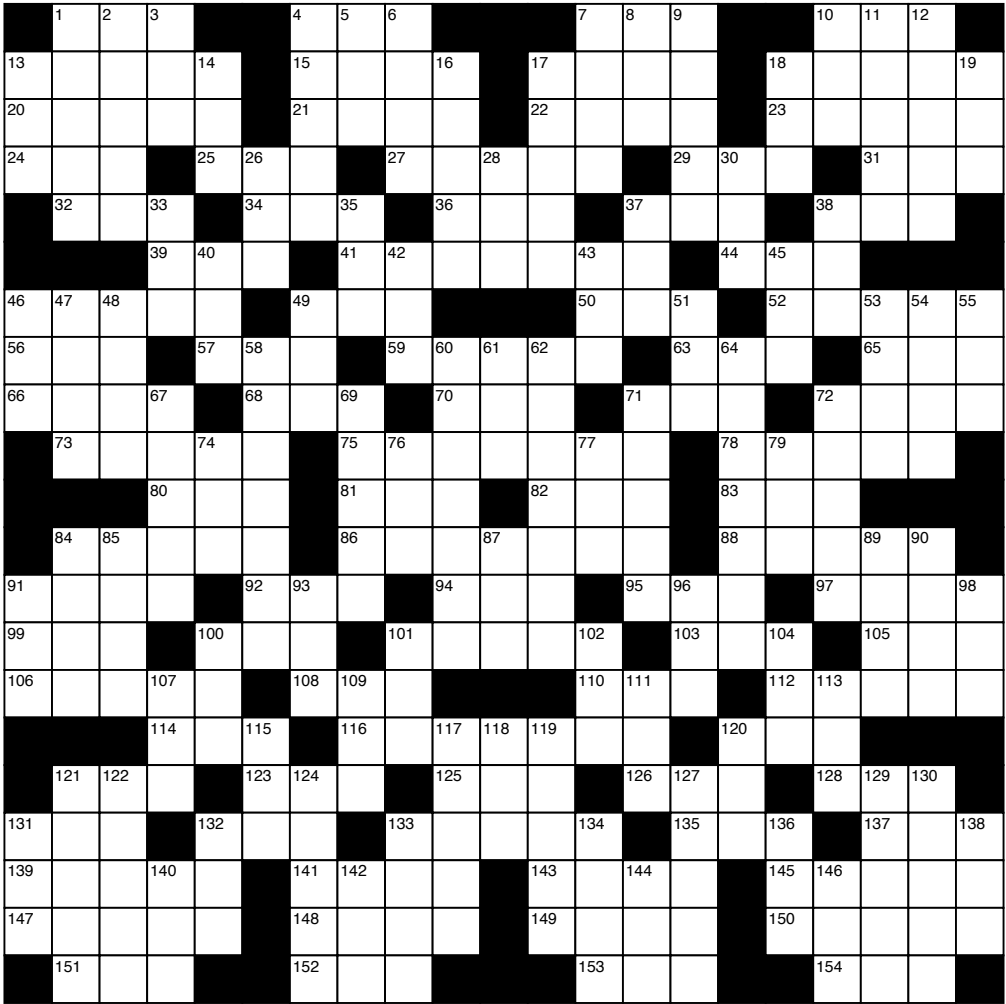
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17 Fleece
18 Fragile
20 Not as insane
21 Object
22 At sea
23 Singer Ronstadt
24 Concealed
25 Gone by
27 Cool
29 Scriptural your
31 Happiness
32 Negative
34 United States
36 Decompose
37 Teensy
38 Skull
39 Inclined
41 Adopts (2 wds.)
44 Roman twelve
46 Bird's flying
apparatuses
49 Harden
50 Communication
Workers of
America (abr.)
52 Rounded part
56 Hoopla
57 Computer
makers



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- 99 Congressional
vote
100 Former USSR's
secret police
101 African nation
103 Snake like fish
105 Before (prefix)
106 Boredom
108 Cry softly
110 Duet
112 Accept
114 Rodent
116 Visits
120 Engage in
espionage
121 Possess
123 Fight
125 Freudian term
126 Slide on snow
128 Bard's before
131 The other half
of Jima
132 Luau dish
133 __ Carta
135 Genius
137 Abdominal
muscles (abbr.)
139 Rhine
141 Supper

- 143 Terminated
145 Large wide scarf
147 Foe
148 Goofs
149 Soybean
150 Bitty
151 African antelope
152 Sere
153 Soggy
154 Wail

DOWN

- 1 Ugly
2 Musical
composition
3 Only
4 Good-by
5 Digital audio
tape
6 Appearance
7 Snug
8 "Raven" author
9 Having wings
10 __ Lanka
11 Musical
instrument
12 Black spider
13 Tree

- 14 Time period
16 Grin
17 Unit of electric
power
18 Travel by air
19 Amateur
26 __ feeling
28 Contender
30 Curse
33 Label
35 Snacked
37 West northwest
38 River (Spanish)
40 Pounds per
square inch
42 Loose gown
worn at mass
43 Frozen water
45 Sick
46 Been
47 Thought
48 Rule
49 Greenwich Mean
Time
51 Expression of
surprise
53 Money institution
54 Capital of Western
Samoa

- 55 Representative
58 Gusty
60 Chef Boyardee
meal
61 Lager
62 Senior level
sports
64 One sent forth
67 Has lots of fins
69 Yellow flower
71 Marsh plant
72 Speaker
74 BB association
76 Morse code
dot
77 Child
79 Her
84 Was looked at
85 Asian nation
87 Weave
89 Misprint
90 Zither
91 Yes
93 Most basic
96 Constellation
98 Gain
100 Killed in action
101 Tons
102 Total

- 104 Drink
107 Vase
109 Rowing tool
111 Ship initials
113 Henna
115 Deuce
117 Small ducks
118 Poached
food
119 Taboos
120 Attack
121 Due
122 Like cloth
124 Pointed at
127 Weight
measurement
129 Racing car
130 Type of wood
131 Wrath
132 Jimmy
133 Christ's mother
134 Avouch
136 Devour
138 Pigpen
140 Flightless bird
142 Be incorrect
144 Look
146 Part of a min.

BOILER ROOM ANNEX

God and the Devil, Pt. 1

Source: www.filevine.com

An engineer dies and reports to the pearly gates. St. Peter checks his dossier and says, "Ah, you're an engineer — you're in the wrong place."

So the engineer reports to the gates of hell and is let in. Pretty soon, the engineer gets dissatisfied with the level of comfort in hell, and starts designing and building improvements. After a while, they've got air conditioning, flush toilets and escalators, and the engineer is becoming a pretty popular guy.

One day, God calls Satan up on the telephone and asks with a sneer, "So, how's it going down there in hell?"

Satan replies, "Hey, things are going great. We've got air conditioning, flush toilets and escalators, and there's no telling what this engineer is going to come up with next."

God replies, "What??? You've got an engineer? That's a mistake — he should never have gotten down there; send him up here."

Satan says, "No way! I like having an engineer on the staff, and I'm keeping him." God says, "Send him back up here or I'll sue."

Satan laughs uproariously and answers, "Yeah right. And just where are *you* going to get a lawyer?"

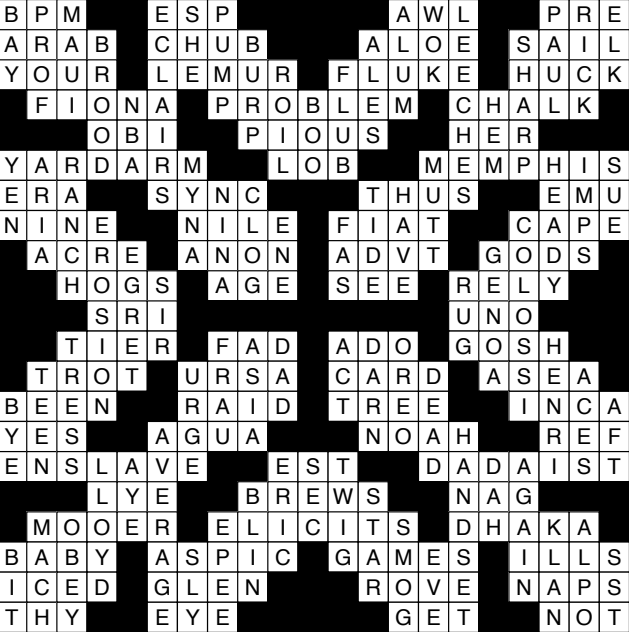
God and the Devil, Pt. 2

Source: www.reddit.com

One day, God thought to ask the Devil how things were going in the fiery inferno of hell. "Everything OK down there?" He said. "Have all the brimstone you need?"

The Devil, looking very pleased with himself, replied, "Actually, things are pretty good — we got an engineer and he installed air conditioning!"

Solution:



FEBRUARY SOLUTION

"Wait a minute," God said, astonished, "you're not supposed to have an engineer!"

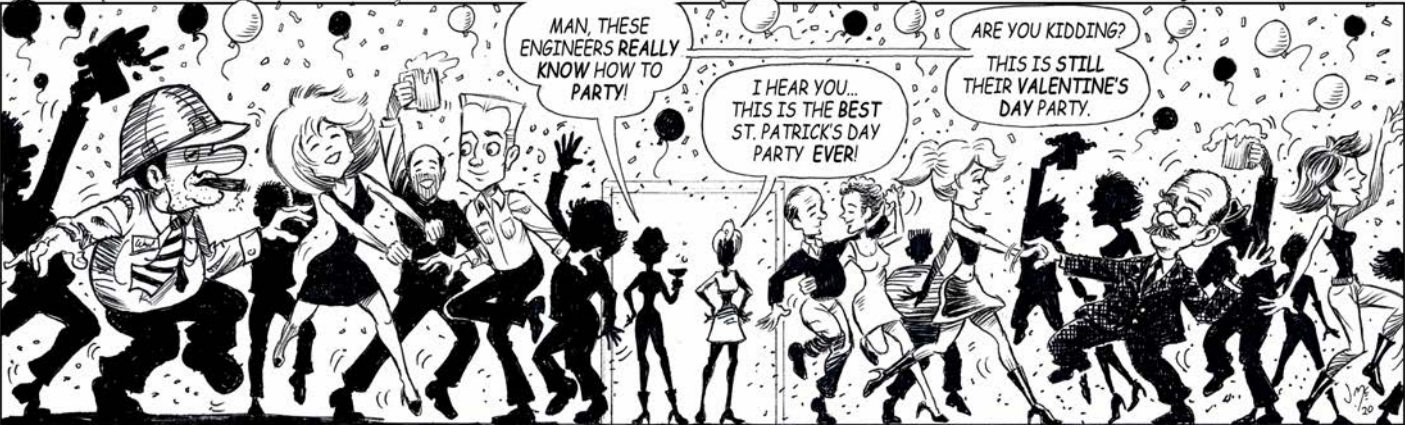
"So sue me," said Satan. "Good luck finding a lawyer!"

Familiar with this smug old line of his adversary's, God told the Devil, "Pfft — so we'll install our own air conditioning in Heaven, and it'll be much more pleasant than *yours*!"

"Ha!" laughed Satan. "And where are *you* going to find a contractor??"

Wrench

by Jim McGreal



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