March 2020

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PJM Pipeline

Plumbing Lic. No. 7969 | HVAC Lic. No. 19HC00113011 | MBE Cert. No. 72727-21

New Trenton Biogas Facility Converts Food Waste into Energy

PJM Mechanical Contractors, Inc. is currently finishing up work at **Trenton Biogas**, a new clean energy facility set to go online in early 2020. As the first large-scale anaerobic biodigester facility of its type in New Jersey, Trenton Biogas is paving the way for the Garden State to take another step in the direction of going green. Each year, the facility has the potential to recycle over 110,000 tons of food waste from local homes and businesses that previously would have been destined for landfills. Through Trenton Biogas's anaerobic biodigestion process, the waste is utilized to produce up to **29,000 MWh of renewable energy and 23,000 tons of organic compost per year.**

The project scope involved utilizing and retooling an $83 million sludge treatment facility erected on Duck Island in 1992 that never became operational. Due to the challenging nature of retrofitting existing structures on a project of this scale, a very dynamic work environment was created. PJM's responsibilities included the plumbing and HVAC aspects of the facility, starting with a thorough assessment of existing HVAC equipment and systems to be reused. Also included was installation of new safety fixtures, heating and cooling equipment, and the odorous air ventilation system.

Impressed with our performance on site, the project team **awarded PJM additional work involving rigging and installation of the ammonia stripper system located on the high steel**. Columns, some as large as 35-ft tall by 7-ft wide, were set in structural steel openings 90 ft. above grade with clearances as narrow as 2 inches. Upon setting the columns, PJM was required to utilize a dual-crane operation to make duct connections inaccessible from below, with one crane hoisting the material into place while PJM's crew installed it from a man basket suspended from the second.

Project manager David Robinson took a hands-on approach from the start, thoroughly reviewing documents and identifying, mitigating and overcoming various challenges. "In any project", he stated, "coordination and communication are always the keys to success." PJM and Trenton Biogas project partners were recently **recognized by NJ Alliance for Action's *New Jersey's Leading Infrastructure Projects*** Award Program for representing "a great example of what can be done when organizations work as a team to develop a fantastic project". The program was created to "highlight innovative, pioneering and landmark construction initiatives that greatly impact the state's economy and honor businesses and organizations that work together to ensure the project's success."

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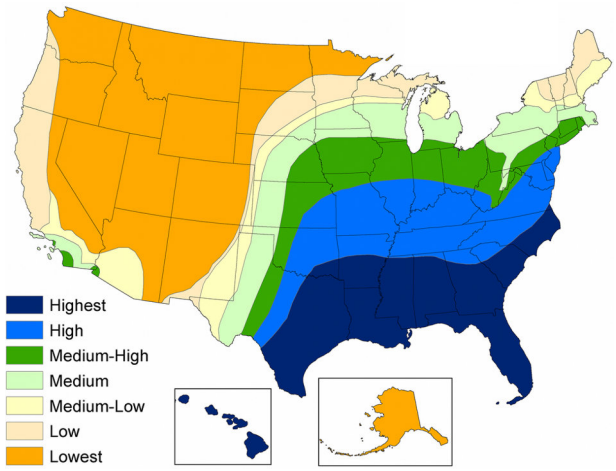
Green NJ: The Benefits of Capturing Condensate

A method of water conservation that has been widely proven to be highly effective is the capture and reuse of condensate from large air-handling units. In addition to the fact that no region of the country is immune from drought, treated potable water costs money, making the collection of thousands, perhaps even millions, of gallons of condensate annually for onsite reuse a smart choice. A Condensate Capture Potential Map published by ASHRAE and the Department of Energy has designated New Jersey's condensate collection potential as high to medium-high.



When humid air passes over AHU cooling coils, condensate forms rapidly and is typically discarded into the sanitary or storm sewer system. In a condensate capturing system, the condensate is directed to a central storage tank or basin and distributed for reuse. Possible uses for the collected water include cooling tower makeup, pre-cooling, irrigation, ornamental fountains and ponds, industrial process makeup, and toilet and urinal flushing.

Routing condensate directly to a cooling tower is typically the best use for reclaimed condensate. Most condensate is clean, essentially-distilled water low in mineral content, and because cooling tower water is always treated no additional treatment is required. Condensate used in applications where water may be aerosolized and inhaled, such as sprinklers and toilet flushing, should be filtered and disinfected to remove the risk of biological contamination, while use in drip irrigation is generally considered safe.

Local climate, type, size and number of buildings and cooling systems, use patterns, and outdoor air requirements should be considered when deciding whether HVAC condensate recovery is a good option. Large laboratory buildings, which require a great deal of outdoor air, are ideal for condensate capture, as are buildings with high-density occupancy. Payback is usually quick, occurring in as little as one year.

PJM Featured in *Construction in Focus* Magazine

PJM was recently featured in the December 2019 issue of *Construction in Focus*, a monthly digital publication with over 112,700 subscribers in the construction industry. The in-depth, four-page spread details PJM's rapid growth since last profiled in the periodical in October 2017, our new status as a certified Minority Business Enterprise (MBE), and our expanded service offerings in arenas that include design/build, refrigeration, dehumidification, and sewer and storm drain inspections, water jetting, and cleaning. Read the full article here.

Service Photo Album

PJM received an urgent call one recent Saturday when a customer found the temperature climbing in a large **environmental room**. Our tech quickly discovered that clogged strainers had shut down the condenser water system, but the city water backup system did not come on as expected because **solenoid valve wires had never been terminated**. City water was flowing within minutes, keeping the room from overheating while strainers were cleared.

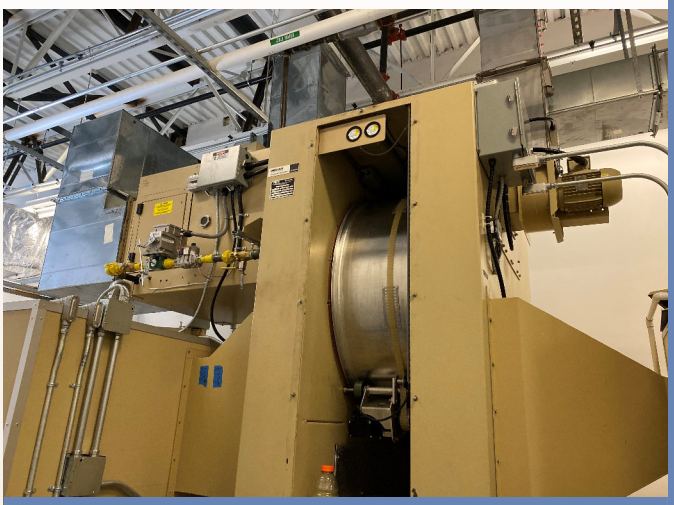
A hospital called PJM to investigate intermittent **vibration and noise in a large exhaust fan**. After running the fan through various speeds, it became evident that the rotating fan shaft was creating **resonant vibrations as it passed through critical speed** at 41 to 43 Hz. We programmed the drive to pass quickly through this band to prevent damage while accurately maintaining negative static pressure.

PJM Employee Profile: Project Manager David Robinson

One of PJM's most valuable assets is our highly talented roster of project managers. Among this group, **David Robinson** stands out due to his impressive blend of knowledge, experience, and ability to execute even the most complex and challenging projects.

David is a graduate of East Carolina University with a B.S. In Economics and has 15+ years in the construction industry, starting with his family's construction business in North Carolina. Since relocating to New Jersey in 2011, he has served as a Project Manager and part of the management team in two prior firms. After joining the PJM team in August 2018 as a project coordinator, his attention to detail, documentation and communication led to a quick rise to the position of Project Manager. Throughout his time at PJM, David has proven his ability to not just understand the client's vision, but also identify the obstacles and requirements to achieve that vision.

In addition to the award-winning Trenton Biogas project featured on page 1, David has run multiple projects for PJM clients including Church & Dwight, DuPont, Bloomberg, and Princeton University. When asked what type of project he finds most enjoyable, he commented that "process and industrial settings are the most interesting due to their individualized nature and specific goals. It's as if I'm watching *How It's Made* on the Discovery Channel except that I get the opportunity to be behind the scenes and part of making those processes possible."



Damaging Effects of VFD Motor Shaft Voltage and How to Prevent It

Shaft voltage is a phenomenon that commonly occurs in electric motors powered by variable frequency drives. The rapidly-switching voltage pulses of VFDs induce high voltages in shafts and bearings that may overcome insulating properties of bearing grease, and the resulting sparks can cause pitting, fluting, frosting, grooving, and cratering that lead to premature failure of the bearings and motor. Bearing damage due to shaft voltage can develop in as little as one week, and failure can occur within a few months. The damage can also extend to the bearings of other connected equipment such as tachometers and gear boxes. Early symptoms of motor shaft voltage are noise, vibration, darkened grease, and overheating. Bearings lose their original shape, sloughing off metal particles that mix with the grease and increase friction.

Shaft voltage only occurs when the motor is energized and rotating, and VFD-induced shaft voltage can be exceedingly brief. Measuring shaft voltage requires a specialized high-bandwidth instrument equipped with a carbon brush probe attachment to contact the rotating shaft. The best way to prevent shaft voltage and extend bearing life is to install a shaft grounding ring that channels current away from the bearings to ground. These devices are easy to install, and the cost is relatively small in comparison to the steep price you'll pay in the event of bearing or motor failure.