Fort Wayne ENGINEERS' Club

Engineers' News **November 2023** **Vol. 86 No. 3**

www.FortWayneEngineersClub.org

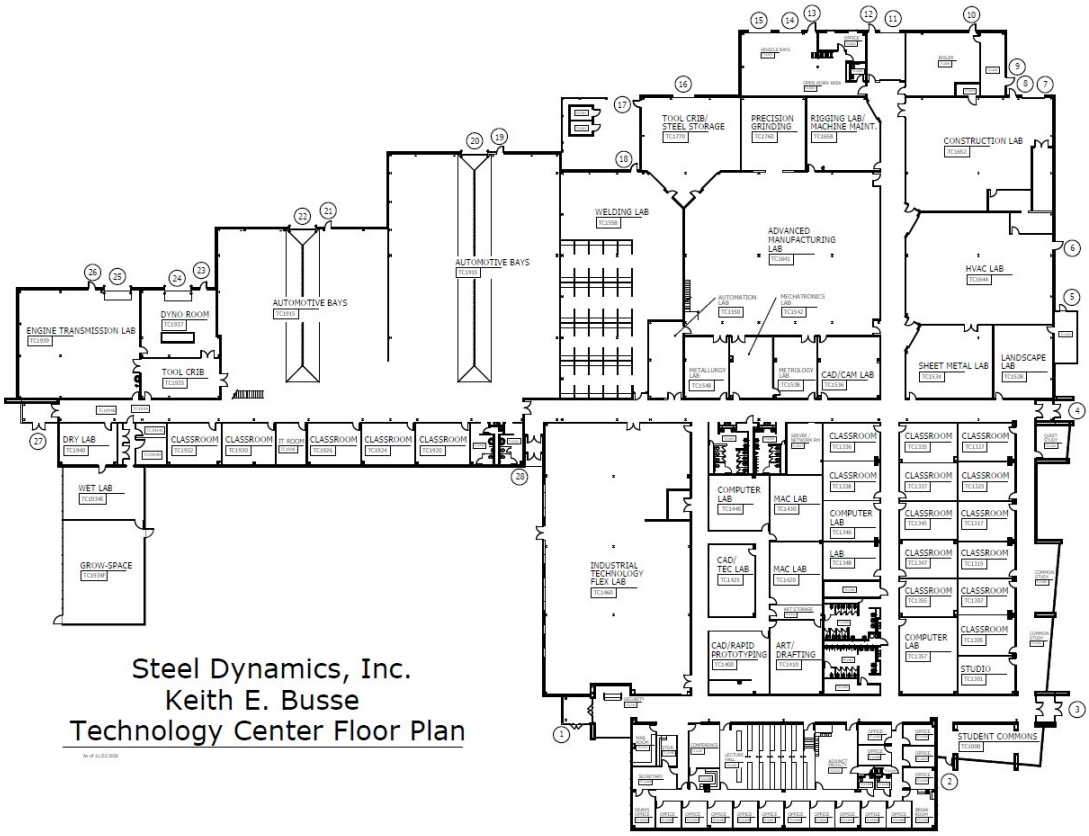
Since the club did two tours in October, there will be no November Tour. However, the club will be hosting a holiday social in December. See details below:

When: Dec. 7, 2023 @ 6:30 p.m.
Where: 14613 Lima Rd, Fort Wayne, IN 46818
Website: https://fortwaynepinball.com/
Details: This is the largest pinball arcade in Indiana! We highly encourage all to attend especially those that wish to have a fun filled night with their children. All ages welcome. Pizza and drinks will be provided.

October Tour Summary

This tour was intended to promote awareness of potential careers for K-12 students and their parents, before they are suddenly expected to make choices (as early as Fifth Grade). Indiana is one of the few States with a single statewide community college system. It efficiently interconnects with multiple employers and universities.

Another reason for the tour was to showcase the quantity, range, and quality of equipment in this facility. It has proven quality of training since opening in 2010. All of it is available to virtually any adult.



To read more, click here.

October Tour Summary

Artificial ponds on the north side of the Maumee River have served various purposes since their creation in the 1970's. Their current purpose is to store "combined" sewage until capacity to treat it is available at the Water Pollution Control Plant (WPCP). Excessive amounts of combined sewage come from areas of the City which date before World War II, where stormwater sewers in the streets also carry sewage from buildings. These originally emptied into the rivers and other drainage, which is now largely prohibited (at least in the Fort Wayne region) by EPA and public demand.

Using Pond #1 (of 3 total) to host floating solar panels is an experiment based on a few successful projects in Europe and the United States. City Utilities (CU) has been methodically but assertively moving towards environmentally-sound energy independence for over a decade. For example, it already saves over $1 million/year from converting fatty waste to methane for fueling conventional generators. (Additional savings come from fees charged for receiving the waste from food processors, restaurant sink traps, and others.)

To read more, click here.

Items of Note

FWEC member Rod Vargo is Chair of the 28 year-old and all-volunteer Utility Advisory Group, which formally advises Fort Wayne City Utilities and often City Council. Your comments are welcome at rodvargo@comcast.net

Volunteer Positions within the Club

Membership and Contact Chair: Open
Northeast Indiana DiscoverE Chair: Open

Vice President:

Club Vice President needed! It's time once again to ask club members to fill this vital spot in the club's leadership roster this year. The Vice President is generally in charge of arranging club tours, though this has traditionally been a team effort so it's not really all that much work. You would be expected to attend the monthly officers meeting (from the end of August until the end of May) and at the end of your one-year term, you would automatically become club president. The typical monthly time involved would be roughly 2 hours (including attending the officers meeting). If you enjoy the club and would like to see it continue to function, please consider volunteering for this spot.

Let us know if you're interested!

Volunteer

General Club Info

Fort Wayne Engineers Club dues are $0. Donations are welcome but strictly voluntary. In recent years, club funds have helped support Discover-E, the Regional Science and Engineering Fair, annual bridge building contests in schools, academic awards, networking events, mentoring, our website, and facilitating free tours.

Please see FortWayneEngineersClub.org, LinkedIn, or Facebook for updates on current Club activities, other news, and past newsletters.

Those participating in activities or hosting tours through FWEC do so strictly at their own risk, including disease exposures. Participation in club events is voluntary, free, nonprofit, and solely for the benefit of participants and the community at large. Anyone with an interest may participate unless restrictions are specified for specific events, such as minimum age or minimum safety attire.

Interested in hosting a tour?

Contact us today!

Host a Tour

Proposed FWEC Roster for FY2023-2024

President: Nathaniel Wisel
Vice President: *Open*
Secretary: Rod Vargo
Treasurer: John Magsam
First-year Board Members: Dave Gordon, Bert Spellman
Second-year Board Member: Ryan Stark, Ed Woodward
Third-year Board Member: Marna Renteria, Mike Magsam
Editor of Engineer News: Nathaniel Wisel
Membership and Contact Chair: Open
Northeast Indiana DiscoverE Chair: Open
Vice President: Open for FY2023-2024

Job posting and resumes listed

The club accepts both job openings from around the area, as well as resumes from those seeking employment. Please submit these to the following email address: Info@FortWayneEngineersClub.org

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Advertise in the Engineers' News

The FWEC provides advertising space within the Engineers' News.
Advertisements are only $10 per issue and limited to ½ page of content.

October Tour Summary (cont'd)

The interior has replicas of typical modern working environments, and ample individual stations for students. We saw pieces, parts, and work stations that had been produced locally by hosts of previous FWEC tours. Cleanliness and proper maintenance were evident throughout. Overall, fifty-six programs of study are formally available in the Center (www.ivytech.edu - select “Fort Wayne” location). Industrial maintenance and trouble shooting are among the available programs.

The “automotive bays” held a range of old and new vehicles including hybrid electric and semi-truck tractor. Various types of driving licenses and endorsements are taught. An Auto Body Center is located elsewhere, near Smith Field which has a separate aircraft airframe and power plant facility almost adjoining Northrup High School.

The full name of this specific building is the Steel Dynamics, Inc., Keith E. Busse Technology Center in deserving recognition of the massive funding provided by Steel Dynamics, among other employers in the Fort Wayne region.

The Busse Center is on the same campus as buildings for hospitality industries and some support services. There is a separate campus on the other side of the Purdue Fort Wayne campus. That Ivy Tech campus supports medical arts studies, support services, and some early education opportunities. (Busloads of students met at the Busse Center on October 6 to learn about programs for Grades “K-14”.) Overall, seven specialized campuses are intended to primarily serve 11 counties in northeast Indiana. But, Ivy tech is expected by the State of Indiana to coordinate specialty programs and residents’ situations as needed statewide.

Many financial arrangements are used at the Center and by Ivy Tech in general. Traditional tuition and fees are common, but courses of study range from certifications to four-year college degrees, and adapt to various continuing education or hobby interests. Employers may hire from that pool and/or provide serious internships. One of the founding reasons for the Center, and its continued funding, is that employers (such as Steel Dynamics) utilize the Center for training employees, sometimes with full pay. Employer reimbursed tuition can also be arranged so that an employee may complete a course before payment is due, and the employer pays Ivy Tech directly.

Speaking as a parent with four children established in careers, and having helped many others, a particularly effective “tool” at Ivy Tech is clearly defined pathways of study from start to finish (typically employment). Unfortunately, that range of career

and financial choices can be intimidating to the uninitiated. That is why adult guidance and a range of childhood experiences can be crucial to a young adult's success. Important steps in High School are taking maximum advantage of Advance Placement course credits (regardless of college intentions) and potentially starting vocational training (often joint programs between a school, Ivy Tech, and perhaps employers). In addition to employers, Ivy Tech itself has agreements with universities. For instance, it is possible to complete three years locally at Ivy before completing a degree with a year at Trine. Assuming GPA and other requirements are met at Ivy, a pre-arranged engineering degree program can start at Ivy and finish at Purdue.

Retirees can usually study tuition-free at Ivy Tech locations. (Materials and books are not free.) Given the current booming job market, Ivy tech is also very interested in hiring adjunct professors or instructors. Overall, even student numbers are static due to a national shortage of available employees. But, employers often need to train new or retain established employees.

Our tour host was Tracy Davis, who may be reached at tdavis457@ivytech.edu as an initial overall contact. Our sincere thanks to her and Ivy Tech for a thoroughly smooth and insightful evening.

October Tour Summary (cont'd)

Consistent successes have recently led to Mayor Henry expanding CU's energy responsibilities to most City of Fort Wayne operations. The expansion is currently in concept and planning stages only, which take time for confirming claims of success elsewhere, figuring out custom designs, and developing contractual arrangements. (Ed.: This floating solar project achieved concept approval in 2013 but installation began in 2023.) SustainFW online provides updates and welcomes public comment.

Shade from floating solar arrays should also suppress algal growth, odor, and water temperatures. An ultrasonic system already provides limited algal suppression. Other measures are used for algae and odor, but both remain problems. Considerable wildlife flourish including fish, but geese are discouraged by extensive riprap shorelines. (Ed.: Disease has not appeared to be a wildlife problem during my multiple visits, and is monitored.)

Individual floats (see photo) are deceptively light and thin grey plastic (HDPE?) rectangular units about 6-8 inches deep. Metal brackets, roughly 6-12 inches high, are bolted to each float and support a mostly-black solar panel roughly 40 x 80 inches. The panel is tilted enough to drain rain or snow melt but resist wind getting underneath or otherwise causing lift. Each combined float and panel assembly (see photo) weighs about 35 pounds. Wiring throughout the installation is conspicuously minimal and thin, and three separate setups provide grounding and power connections.

Flexible tabs on each float are bolted together to form a row of 20 or so panels with enough space between to allow flexing. The tabs also attach a second row of specialized floats which provide a walkway, additional floatation, and lateral stability. Wires transfer power and information to the end of a row where a connection box is located.

Each row of combined panels and walkway are connected to adjacent rows by aluminum arms which can pivot up and down. This creates essentially a floating fabric that is resistant to wind and will pop up out of freezing pond water. The roughly square fabric is finished on all sides with a surround of two walkway floats. The assembly is essentially a floating island which will be moored to piles driven into the pond bottom. Depth of the pond will normally range 3-15 feet. During construction (as in the photo), the “fabric” has been flexible and durable enough to be affixed to shore while water levels change. The banks are roughly 45-degree slopes.

Power flows through the connection boxes to a common control point for the entire 30 acre pond, where inverters will manage this facility rated at 5 megawatts. Each of the roughly 12,000 panels will be individually monitored and are warranteed (and probably bonded) for 20 years at a prorated 90% or better output. If needed, identifying and replacing specific panels will be very easy. The control facility will house a 1 megawatt battery array to buffer variations in solar panel output due to clouds and other transient factors. Based on other installations, rain is expected to keep the panels sufficiently clean most years. Snow will likely melt off in most cases. Bird poop will occur here as anywhere else. The ponds already have a service boat which will certainly be needed. (Ed.: Internal CU meetings suggest the floats are rated for 40 years. End-of-life plans for all components are credible. All said and done, this is an experiment with adequate precedents.)

CU is frankly uncertain as to when financial break-even should occur. The guestimate is 15.5 years. It is credible that this project is one facet of a diversified backup power plan with feasible economics.

The installation will normally be remotely managed from an operations center in the Water Pollution Control Plant, located southward directly across the Maumee River.

For now, CU manages voltages ranging essentially 4,000-36,000 volts which may originate from American Electric Power (AEP), City Utilities's ever-expanding generation, or emergency backups. Sooner than later, CU intends to be self-sufficient if necessary and to continue minimizing consumer bills. (Ed: Bills have trended low long-term relative to peers.)

Especially during major storm events, the most proximal use of power from the solar array will be pump and screen houses, which are located at the corner of this pond (see photo). We also toured those. Two 8' diameter "siphon tubes" are under the river and already transfer excessive combined sewage volumes which reach the WPCP during wet weather, for storage in the ponds. The ponds are at a higher elevation, above most potential floodwater levels.

The Deep Rock Tunnel will, when final details are complete, collect even more sewage volumes from multiple sewer networks (which for now still overflow into the St Marys & Maumee Rivers during wet weather). The Tunnel flows downhill from Foster Park and is designed to overflow most of that combined sewage up a vertical shaft near the WPCP, located on the south side of the Maumee River. From there, that overflow will gravity flow a short distance to the two siphon tubes.

Leading to the pump house, very deep "wells" trap larger debris and serve other functions before reaching pump impellers. SIx pumps are in place with 75 or 330 million gallons per day max capacities. An electric motor the size of an automobile turns each pump, driving water to another well for the screen house.

The screen house excludes debris larger than one-half inch. It has five stations, each with a stoutly built screen roughly the dimensions of a short flat-bed semi-trailer. Multiple rotary brushes scrape debris from the screens into dumpsters.

Screened water flows into and slows down in a channel leading towards pond #1. The slowing water drops most sediment in the channel, which is relatively easy to dredge. Cement risers along the way help break up pieces of ice large enough to damage the channel. If Pond #1 fills, a gate structure regulates gravity flow into pond #2.

But, this is combined sewage waters which must be treated. As capacity at the WPCP permits, the pump house subsequently feeds water back under the river for treatment.

Writing as a 20 year volunteer with City Utilities, I often ponder a financial analysis by EPA from roughly 1993-1995 that Fort Wayne completely remove, remediate (esp. soil), and replace most of its pre-depression buildings, street plans, and infrastructure. The essentially billion-dollar Deep Tunnel basket of projects (versus <ca. 250,000 official residents Citywide) proved unavoidable after the viciously contentious Curdes Avenue Task Force showed inadequate or nonexistent building

foundations precluded replumbing every pre-depression urban building with new sanitary sewers, or (along with other unpleasant factors) even getting a deep trench collection system through downtown. In 2023, our collective courses of actions seem to be financially break-even compared to all "new" after taking into account inflation and other relevant City, corporate, and private work.

Our host, Zachary Schortgen, is a Purdue mechanical engineer hired in 2006, learning electrical engineering on the job since 2006. He is part of the exceptional team which is expanding to serve Citywide sustainable energy goals. We greatly appreciate his after-hours time providing this tour.

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