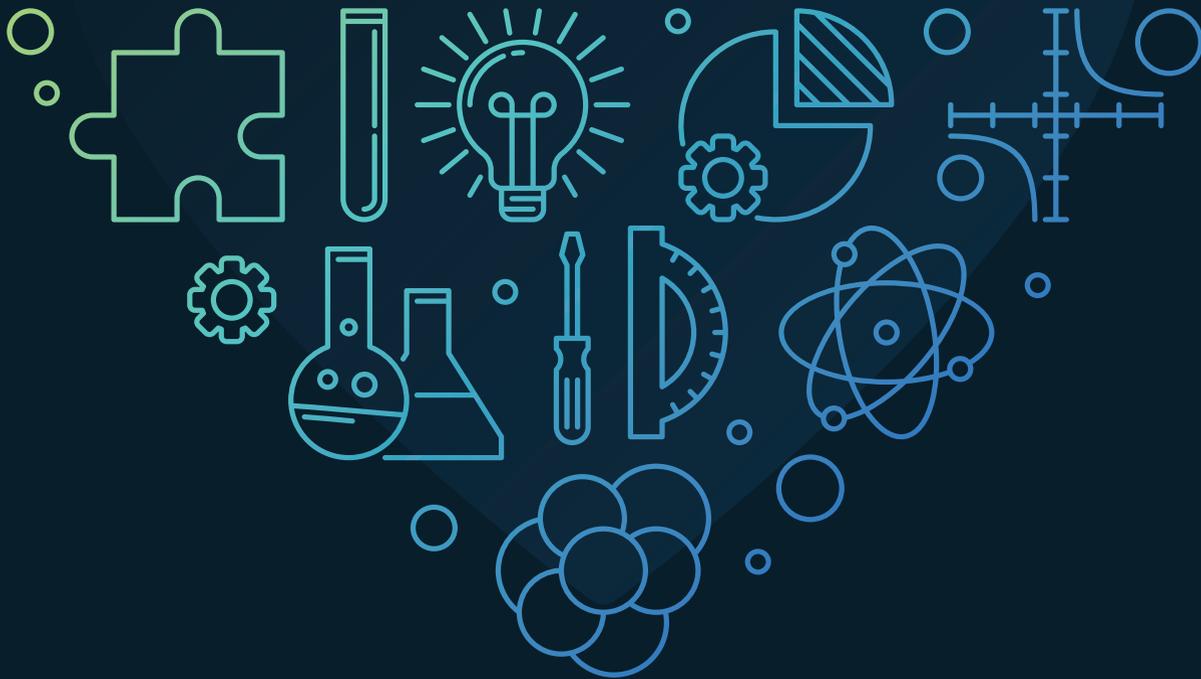


NATIONAL

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GUEST COLUMN

Prioritizing engineering pipeline to Rebuild Illinois

Illinois sits at the center of the nation's infrastructure as a major multimodal nexus for transportation and logistics. With its large freight rail hub and extensive interstate highway network, it is a primary interchange for moving products from the Midwest across the country. Illinois engineers have been at the heart of the rapid modernization of this critical transportation network — designing and building roads, bridges, airport runways, waterways and rail infrastructure that are essential for Illinois' economic success.

The engineering profession contributes \$20.7 billion annually to Illinois' GDP and supports more than 182,000 jobs statewide. ACEC Illinois engineers — working with the Illinois Department of Transportation — have delivered more than 21,300 lane miles of highway, 815 bridges, and 1,100+ safety improvements across the state.

Looking ahead, one of the greatest opportunities for our profession — and the state overall — is strengthening the pipeline of future engineers. The projects that will shape Illinois



KEVIN ARTL

over the next generation will require creative, well-trained problem solvers. That's why now

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NATIONAL ENGINEERS WEEK

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GUEST COLUMN

AI in Engineering: Creating a small carbon footprint to reduce a much larger one

Artificial intelligence has been a game changer in engineering. This includes IMEG, which was an early adopter of AI tools to assist our engineers in delivering sustainable design for long-term, positive environmental outcomes. As a Top 20 Green Design Firm (#17/ENR Magazine) in the U.S., however, we understand using AI comes with a carbon footprint all its own.

AI relies on energy-intensive high-computing data centers that consume vast amounts of electricity to run the computations and large amounts of water to cool the servers. Therefore, every prompt or chat message has a carbon footprint. With 3,000 employees at IMEG, modest individual daily AI usage across the firm adds up to tens of thousands of gallons of water, numerous megawatt-hours of electricity, and several tons of carbon emissions annually.



ADAM MCMILLEN

So the question for us became: Can we deliver highly impactful, sustainable designs resulting in carbon reductions that far outweigh the AI carbon footprint of the design process? The answer is a definitive ‘yes.’

We track our overall AI carbon footprint and have found that leveraging AI in our design work has the potential to save more than 10,000 times the carbon it consumes. We achieve this in two ways.

First, we minimize our carbon footprint by having our proprietary AI tool utilize OpenAI models hosted by Mic-

rosoft — which has pledged to source 100% renewable energy for its data centers by 2030. Compared to the U.S. grid average, this effectively halves the emissions produced by each AI interaction.

The other and more impactful strategy is due to the speed with which AI analyzes our own project data and assists our engineers with repetitive tasks. This enables us to increase our carbon analysis of multiple design options for new buildings from about 100 projects annually to more than 1,000 projects annually — quickly providing a substantially larger number of clients with the design that will best reduce their carbon footprint.

Based on industry carbon data, if AI could be leveraged to guide just 5% reductions across 1,000 projects, IMEG could help these clients collectively avoid about 13,000 tons of CO2 per year in operations and 40,000 to 55,000

tons per year in embodied carbon at construction. This far outweighs the few tons of carbon emissions annually created by IMEG’s use of AI.

While every AEC (Architecture, Engineering & Construction) firm’s AI strategy will differ to some degree, the key to achieving the greatest real value is to ensure they are creating the least amount of carbon emissions possible during design and construction and saving much more in the final product. In this way, engineers, architects, and contractors combined can exponentially reduce the carbon footprint of the entire built environment.

Adam McMillen, PE, LEED AP BD+C, is the director of Sustainability at Quad Cities-based IMEG. He can be reached at Adam.McMillen@imegcorp.com.

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is the time to inspire more students to see engineering as a pathway to meaningful, community-building work. With the right focus on education and outreach, Illinois can continue cultivating the talent needed to design the future.

But we have work to do.

New research from the American Council of Engineering Companies (ACEC) Research Institute estimates that the nation faces an annual shortage of 18,000 engineers. International engi-

neering graduates are also leaving in large numbers. Out of 40,606 international students who earned US engineering degrees, only 3,825 or roughly 9%, received H-1B visas. This translates into delayed projects, increased costs, and potential infrastructure failures. State departments of transportation cannot find enough qualified engineers for federally funded projects and private firms compete fiercely for limited talent.

Attracting engineering talent to Illinois will require policy solutions including reforming H-1B visa policies to

retain U.S.-educated international graduates. In addition, we support legislative initiatives to fund education tax credits, workforce training grants, student loan repayment assistance and increased investment in STEM education to attract more students to the engineering field.

Alongside smart policy solutions, we also believe in old-fashioned recruitment — meeting students in their classrooms, introducing them to engineering careers, and sparking curiosity early through programs like ACEC Illinois’ Explore Engineering initiative.

As we celebrate Engineering Week and all our accomplishments, the task to build and modernize our state’s infrastructure remains challenging. The dependable and futuristic infrastructure network envisioned by the state will have to be built by a skilled engineering workforce. All hands must be on deck to produce and retain the talent to get it done.

Kevin Artl is the president and CEO of the American Council of Engineering Companies of Illinois. He can be reached at kevin@acecil.org.

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