CINTAR Connection

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Eyes on Pennsylvania becoming the future of AI data processing, a technological hub

Western Pennsylvania has a long history of industrial innovation, more recently shifting towards advanced technologies, driven by its location and higher ed programs.

Cintar's team has witnessed the Western Pennsylvania area shift to increasing its footprint as a technology hub, and it has adapted seamlessly to the requirements of the ever-changing industry. Cintar has developed the expertise and abilities necessary to navigate these types of projects.

Recently two Summits were hosted in Pittsburgh, putting Pittsburgh on the Artificial Intelligence radar to become a technological hub and the future of AI Data processing. In July, the Energy and Innovation Summit was assembled by U.S. Sen. David McCormick and hosted by Carnegie Mellon University. In September, the AI Horizons Summit was held at Bakery Square. Each of the Summits had its own focal point yet both Summits addressed the impact AI technology has on energy demands and infrastructure.

Sen. McCormick chose Pittsburgh for the inaugural Pennsylvania Energy and Innovation Summit to showcase the region's energy resources, leaders in AI research, and skilled workforce. Western Pennsylvania has a long history of industrial innovation, and AI has the potential to revitalize the region and reuse existing infrastructure. Panelists included several experts in energy, tech, and finance with ideas for building and designing the power infrastructure necessary to support the data processing centers required for AI.

The hardware and workload intensity required for artificial intelligence are the driving forces behind why AI data centers consume so much energy. A server rack dedicated to AI search queries can draw up to six times more power than a traditional one. This is expected to increase exponentially by 2030, potentially consuming up to twenty times more energy per server rack. AI "reasoning model" set-ups, those that perform complex problem-solving tasks through logical steps much like a human mind would, require a greater demand for energy due to the longer processing time.

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In August, Google became the first tech giant to publish statistical insights about the demand for energy that AI creates. In the report, Google states that an AI text prompt using their Gemini family of models consumes .24 watt-hours. A television set consumes this amount of energy in about nine seconds. A traditional search query consumes .0003 watt-hours. Google states their .24 Wh figure is a 33x decrease in energy consumption per query over the past year. However,

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AI continues to consume energy thus testing aging technology and cooling strategies

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this number grows substantially when multiplied by billions of text queries, image and video queries, and more advanced computational modeling. Right now, AI consumes approximately 4% of the nation's electricity consumption. It is projected to increase to 12% by 2030 with overall electricity demand increasing by 25% in the same time frame.

The use of AI spans far beyond a search engine query. Healthcare, Financial Services, Manufacturing, Transportation and Logistics, Media, and E-commerce are some of the top industries investing in and utilizing AI. Professionals in these industries incorporate AI into research, data consumption and analysis, optimization, and efficiency amongst industry-specific uses. These uses consume much more energy. As more industries evolve with AI, energy consumption will drastically increase.

Pennsylvania becoming a hub for AI processing and data centers comes with challenges. Challenges include sourcing power, grid connections, extensive electrical design, and expenses. The cost to guarantee electricity in 2024-2025 was $2.2B. The cost to secure power for 2025-26 is nearly $14.7B. The request for more power requires modernizing our grids with larger wires and upgrading technology to provide reliable power distribution.

Energy-efficient cooling solutions are becoming necessary for these massive data centers. Traditionally, data centers have relied on air-based cooling techniques. To offset the increased energy consumption of high-performance computing, some efficient cooling strategies include various liquid cooling techniques, evaporative cooling, hybrid cooling, and waste heat reuse. Advanced facilities are even implementing AI to optimize their own cooling systems' efficiency and waste.

As investors are shifting their attention to Western Pennsylvania and the tristate area as the future of AI, Cintar's power generation and facility services align cohesively with the future. Cintar is poised to assist the growing energy and infrastructure needs. Contact Jay Harris, VP of Operations, at JHarris@Cintar.com.

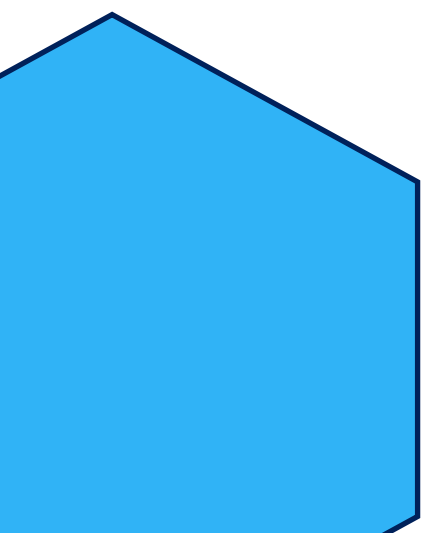
Looking ahead: NEC 2026 changes

As we enter 2026, let's take a look at some of the upcoming changes to the National Electrical Code (NEC 2026). The NEC 2026 has a September 2026 effective date.

The first noticeable change to the NEC 2026 is the structural organization of the code. Some articles are consolidated or rearranged, and there are new articles added. The goal with these changes is to improve the usability of the Code. The overall structure changes from 2023 and now in 2026 are all working towards the overall vision for the NEC 2029. NEC 2026's addition of Annex L offers a look at the 2029 structure as well as outlining the changes during the 2023 and 2026 cycles.

Another NEC 2026 change affects arc flash labeling. These changes are in effort to align closer with NFPA 70E. NEC 2026 expands arc flash labeling to include nearly all commercial and industrial electrical equipment, specifically all non-dwelling distribution equipment. New labeling requirements include system voltage, arc flash boundary, incident energy, PPE rating, and the assessment date.

Additional changes to the NEC 2026 are designed to enhance safety and integrate new technologies. Requirements for Ground Fault Circuit Interrupter (GFCI) protection are broader. Service Disconnect Markings are significantly revised. New provisions include energy management system for electric vehicles.

Cintar's expert electrical team always keeps abreast of the most current Codes. Contact xxxxxxxxxx with questions or a consultation to keep your systems within code and your team safe.

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