AI Data Centers: Power and Electrical Infrastructure

written by Lauri Moon | August 7, 2025

The infrastructure supporting AI data centers encompasses a diverse array of components, including transformers, switchgear, uninterruptible power supplies (UPS), power distribution units (PDUs), battery banks, backup generators, and sophisticated building automation systems that optimize energy use through the integration of AI and IoT technologies.

The power infrastructure market is expected to grow from $8.86 billion in 2023 to an estimated $17.14 billion by 2029, driven by the expansion of hyperscale and AI-ready data centers. Investment in electrical infrastructure doubled between 2023 and 2024, reflecting the urgency to meet AI's escalating power needs.

The Energy & Manufacturing in Appalachia (EMA) project helps manufactures understand and navigate opportunities in the vast energy supply chains. The EMA team, along with outside experts, have developed supply chain maps for each energy segment or sub-segment to help manufacturers navigate these industry sectors.

The supply chain maps provide introductory overview of the market size, key drivers, supply chain needs, and components for each of the specific segments. Additional resources are provided to learn more about the industry and keep up to date on the latest advancements, opportunities, and potential funding opportunities as well.

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The AI Data Centers: Power & Electrical Infrastructure was drafted by Dr. Deborah Stine. Deb is the Founder of the Science & Technology Policy Academy which provides independent consulting, policy analysis, program evaluation, freelance writing, teaching, and coaching services. Previously, she served in the Obama White House as Executive Director of the President's Council of Advisors on Science and Technology (PCAST) that led to the establishment of the Advanced Manufacturing Partnership and the creation of the Manufacturing USA Institutes.