



The Energy Solutions Industry in Missouri

MISSOURI
PARTNERSHIP®



Energy Solutions Industry in Missouri



Missouri is home to leading developers and producers of batteries for the defense, space, automotive, and consumer industries. Our batteries power NASA's space program, including the current Curiosity mission to Mars. We are one of the top three states for battery production, a leading producer of lead for batteries, and a leading developer of next-generation lithium batteries in the U.S.

You could say that Missouri powers the space program ... and the military ... and the future.

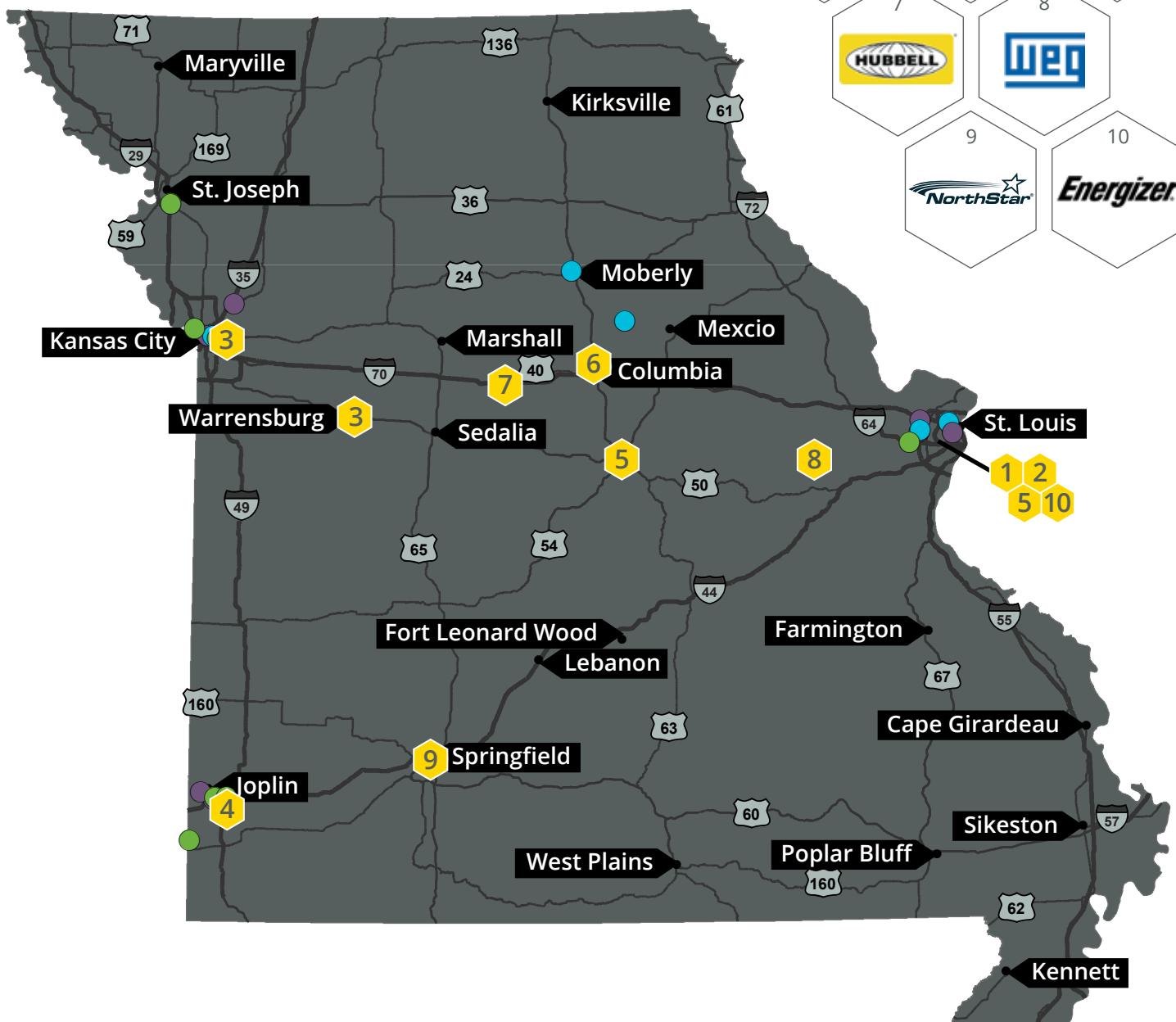
Our next-generation battery manufacturers are taking advantage of our location and extensive logistics infrastructure, making it simple and efficient to ship energy-related products around the world. And Missouri's low cost of energy, combined with competitive cost of living and doing business, positions Missouri as a prime location for manufacturers across the energy sector.

Additionally, Missouri's solar market has grown faster than the national average since 2009 and northwest Missouri is located on the edge of the wind belt making it a stellar location for investing in the wind industry supply chain.

Our energy talent is leading the way in energy storage development, working across the state at research facilities such as the Energy Research and Development Center at Missouri University of Science and Technology (Missouri S&T), the Missouri Center for Advanced Power Systems, the Center for Physical and Power Electronics at the University of Missouri and the Lithium Ion Center of Excellence. And Missouri leads the Midwest for overall employment in energy storage and smart grid jobs according to the Clean Energy Trust.

Missouri Energy Companies

- ◆ Largest energy employers in Missouri
- Energy storage company
- Energy manufacturers
- Supply chain company



Missouri Energy Companies

ENERGY STORAGE DEVELOPERS AND MANUFACTURERS



ENERGY MANUFACTURERS



SUPPLY CHAIN COMPANIES



Recent Projects

Ameren Missouri (statewide) announced its plan to dramatically increase the amount of wind and solar generation to provide cost-effective and sustainable energy for its customers. The company planned to add at least 700 megawatts of wind generation by 2020, representing an investment of approximately \$1 billion, while also adding 100 megawatts of solar generation over the next 10 years, with 50 megawatts expected to come online by 2025.

EaglePicher Technologies (Joplin), a leading producer of batteries and energy devices, expanded with a new 100,000 sq. ft. facility at its headquarters in Joplin, Missouri in 2015. The expansion created 171 new jobs for the region.

Enel S.p.A. (St. Joseph) expanded with a new 300-MW wind farm near St. Joseph, Missouri, in 2017. The expansion represented \$500 million in capital investment, and created 10 new jobs in the region.

Exide Technologies (Kansas City), a global provider of stored electrical-energy solutions for the transportation and industrial markets, expanded with a new \$35 million state-of-the-art manufacturing facility in Kansas City, Missouri, in 2017. The new 180,000 sq. ft. facility represented \$35 million in capital investment and created 50 new jobs in the region.

Johnson Controls (St. Joseph), a global leader in building products and technology, integrated solutions, energy storage and information-based retail solutions, expanded with a new 16,258 sq. ft. facility in St. Joseph, Missouri, in 2017. The expansion represented \$35 million in capital investment, and created 20 new jobs in the region.

Vest Fiber (Moberly), a supplier of small fiberglass products and services to the wind turbine industry, expanded in Moberly, Missouri, in 2016. The expansion created 30 new jobs in the region.

ZAF Energy Systems (Joplin), a developer of next-generation battery technology, expanded with a new production facility in Joplin, Missouri, in 2017. The expansion represented more than \$4 million in capital investment, and created 100 new jobs in the region.



Missouri's Educational Resources

In Missouri, energy innovation is taking place at institutions such as the Energy Research and Development Center at Missouri S&T, the Missouri Center for Advanced Power Systems, the Center for Physical and Power Electronics at the University Missouri, the Lithium Ion Center for Excellence and the Missouri Alternative and Renewable Energy Technology Center.



Alternative energy degree programs

Two-year degree and certificate programs

Crowder College (Neosho) is known for its programs in alternative energy, including an AA and AAS degree in Alternative Energy-Solar, an AS in Pre-Engineering with an Alternative Energy Option, and an AAS in Alternative Energy-Wind. Crowder also offers an Active Solar Technician Certificate and a Wind Energy Technician Certificate.

Several of Crowder's alternative energy programs are offered in cooperation with Missouri S&T in Rolla to give engineering and science students a foundation in solar technologies through applied research.

The Missouri Alternative and Renewable Energy Technology (MARET) Center at Crowder College aims to expand renewable energy throughout the region with education, applied research, and economic development.

Metropolitan Community College (Kansas City) offers a 35 credit hour Photovoltaics Certificate to prepare students for entry-level jobs in PV design, installation and sales. MCC prepares students for the NABCEP Entry Level PV Installer Exam.

MCC also offers a 41 credit hour Energy Efficiency Certificate to prepare students for entry level jobs in a variety of areas, including retrofitting homes for energy efficiency and managing buildings for improved energy conservation and efficiency.

North Central Missouri College (Trenton) offers an AAS and a Certificate in Industrial & Energy Systems Technology.

State Fair Community College (Sedalia) offers an Associate of Applied Science degree in Industrial Technology with an emphasis in Solar Electric as well as a Solar Electric Installation Skills Certificate.

St. Louis Community College offers North American Board of Certified Energy Practitioners (NABCEP) approved solar training courses, from beginner to advanced levels.

Four-year programs

University of Central Missouri (Warrensburg) offers a Bachelor of Science (BS) degree in chemistry with an emphasis in alternative energy.

Southeast Missouri State University (Cape Girardeau) offers a BS in Technology Management with a focus on Sustainable Energy Systems Management.

Engineering/Electronics degree programs

Missouri post-secondary educational institutions granted nearly 5,000 Engineering and Engineering Technology degrees in 2016 (*National Center for Education Statistics*).

Two-year programs

- Brown Mackie College (St. Louis)
- Columbia College
- Crowder College (Neosho)
- DeVry University (Kansas City)
- East Central College (Union)
- Evangel University (Springfield)
- Jefferson College (Hillsboro)
- Lincoln University (Jefferson City)
- Metropolitan Community College (Kansas City)
- Mineral Area College (Park Hills)
- Missouri Southern State University (Joplin)
- Missouri State University (West Plains)
- Missouri Western State University (St. Joseph)
- Moberly Area Community College
- North Central Missouri College (Trenton)
- Ozarks Technical Community College (Springfield)
- Pinnacle Career Institute (Kansas City)
- Ranken Technical College (St. Louis)
- St. Charles Community College
- St. Louis Community College

Southeast Missouri State University (Cape Girardeau)
 State Fair Community College (Sedalia)
 State Technical College of Missouri (Linn)
 Three Rivers College (Poplar Bluff)

Four-year programs:

- DeVry University (Kansas City)
- Lincoln University (Jefferson City)
- Missouri Southern State University (Joplin)
- Missouri State University (Springfield)
- Missouri University of Science and Technology (Rolla)
- Missouri Western State University (St. Joseph)
- Northwest Missouri State University (Maryville)
- Park University (Parkville)
- Ranken Technical College (St. Louis)
- Rockhurst University (Kansas City)
- Saint Louis University
- Southeast Missouri State University (Cape Girardeau)
- University of Central Missouri (Warrensburg)
- University of Missouri (Columbia)
- University of Missouri-Kansas City
- University of Missouri-St. Louis
- Washington University (St. Louis)



Energy Storage Research in Missouri

Energy Storage Research Centers

Center for Physical and Power Electronics at the University of Missouri (Columbia) focuses on high-power electronic devices for defense, life sciences, environmental applications and alternative energy sources and storage. The Center is developing new dielectrics for energy storage that utilizes nanotechnology.

EaglePicher Lithium Ion Center for Excellence (Joplin) opened in 2016 and is focused on battery systems for the aircraft market, the U.S. military, and the field of medicine.

Energy Research and Development Center at Missouri S&T (Rolla) researches electric energy conversion for high impact application in power and energy systems, next generation energy systems, vehicle-to-grid integration, hydrogen fuel cell analysis, and grid stabilization and storage.

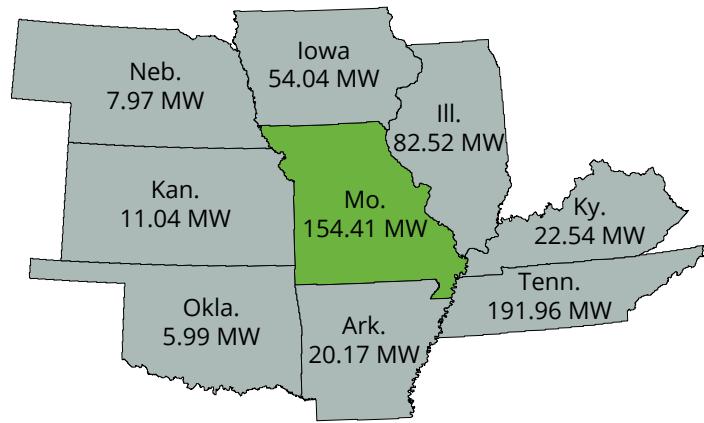
Future Renewable Electric Energy Delivery and Management Systems Center (FREEDM) is a collaborative effort between Missouri S&T and seven other U.S. and European universities to transform the nation's power grid into a distributed system. A major goal is to introduce distributed energy storage devices and distributed grid intelligence such as plug-in hybrid electric vehicles and other devices.

Missouri Center for Advanced Power Systems (MOCAP) is a partnership between Missouri Southern State University, Missouri State University-Springfield, University of Missouri, Missouri S&T, EaglePicher Technologies, the Joplin Area Chamber of Commerce, and the Joseph Newman Innovation Center. MOCAP is devoted to research and development of new battery and advanced power technologies and educating a new high-tech workforce for the future.

Solar Energy and Energy Storage at Washington University in St. Louis aims to become a global knowledge centric consortium that promotes and enables vertically integrated solar energy and energy storage science and technology across organizations.

Solar installations by state

Source: SEIA



Other

Electrical Connection (St. Louis) operates the Midwest's largest resource for training electricians and communication technicians, teaching more than 1,200 IBEW apprentices and journeymen each year. More than 1000 workers are trained in the installation of solar panels and other renewable energy through Electrical Connection's partnership with the International Brotherhood of Electrical Workers Local 1 and the St. Louis chapter of the National Electrical Contractors Association.

The Evergreen Institute's Center for Renewable Energy and Green Building (Gerald) offers high-quality hands-on workshops in solar electricity (photovoltaics), wind energy, solar hot water (solar thermal) systems, and passive solar heating and cooling. The Center also offers workshops in residential energy efficiency, natural building, straw bale building, natural plasters, and green building.

Washington University in St. Louis has the country's only department of Energy, Environmental, and Chemical Engineering.

Occupation Information for the Energy Industry

Code	Occupation title	Missouri employment	Missouri median hourly wage	U.S. median hourly wage
00-0000	All Occupations	2,757,850	\$16.46	\$17.81
13-1199	Business Operations Specialists, All Other	14,710	\$31.49	\$33.19
11 9199	Managers, All Other	5,850	\$45.19	\$50.47
17-0000	Architecture and Engineering Occupations	37,140	\$34.81	\$37.45
17-2041	Chemical Engineers	590	\$45.37	\$47.28
17-2071	Electrical Engineers	3,530	\$45.35	\$45.29
17-2081	Environmental Engineers	950	\$32.18	\$40.81
17-2112	Industrial Engineers	4,600	\$39.10	\$40.53
17-2141	Mechanical Engineers	3,420	\$38.15	\$40.48
17-2199	Engineers, All Other	1,260	\$37.21	\$46.78
17-3011	Architectural and Civil Drafters	2,190	\$22.23	\$24.83
17-3022	Civil Engineering Technicians	1,240	\$22.89	\$24.03
17-3023	Electrical and Electronics Engineering Technicians	1,720	\$31.38	\$29.90
17-3027	Mechanical Engineering Technicians	710	\$20.53	\$26.19
17-3029	Engineering Technicians, Except Drafters, All Other	720	\$27.12	\$29.96
41-4011	Construction and Building Inspectors	1,730	\$24.14	\$28.12
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	7,210	\$31.49	\$30.28
47-2111	Electricians	10,400	\$29.81	\$25.35
47-4099	Construction and Related Workers, All Other	350	\$19.30	\$17.73
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	9,440	\$27.27	\$30.55
49-2092	Electric Motor, Power Tool, and Related Repairers	320	\$17.90	\$19.99
49-9041	Industrial Machinery Mechanics	4,000	\$24.43	\$24.06
49-9043	Maintenance Workers, Machinery	3,250	\$22.36	\$21.42
49-9099	Installation, Maintenance, and Repair Workers, All Other	2,150	\$18.73	\$18.50

Code	Occupation title	Missouri employment	Missouri median hourly wage	U.S. median hourly wage
51-0000	Production Occupations	197,140	\$15.69	\$15.93
51-1011	First-Line Supervisors of Production and Operating Workers	12,690	\$25.78	\$27.78
51-2022	Electrical and Electronic Equipment Assemblers	4,480	\$15.91	\$15.06
51-2041	Structural Metal Fabricators and Fitters	3,150	\$20.57	\$18.14
51-2092	Team Assemblers	23,380	\$16.41	\$14.45
51-2099	Assemblers and Fabricators, All Other	5,000	\$13.30	\$13.73
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	4,570	\$16.85	\$18.21
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	3,100	\$14.83	\$15.56
51-4034	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	610	\$19.09	\$18.50
51-4041	Machinists	6,500	\$19.67	\$20.05
51-4072	Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	3,520	\$12.79	\$14.65
51-4081	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	2,450	\$15.81	\$16.51
51-4111	Tool and Die Makers	1,880	\$26.04	\$24.55
51-4121	Welders, Cutters, Solderers, and Brazers	8,120	\$17.52	\$18.94
51-4193	Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic	810	\$14.73	\$15.04
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	9,340	\$17.32	\$17.68

Source: BLS, May 2016

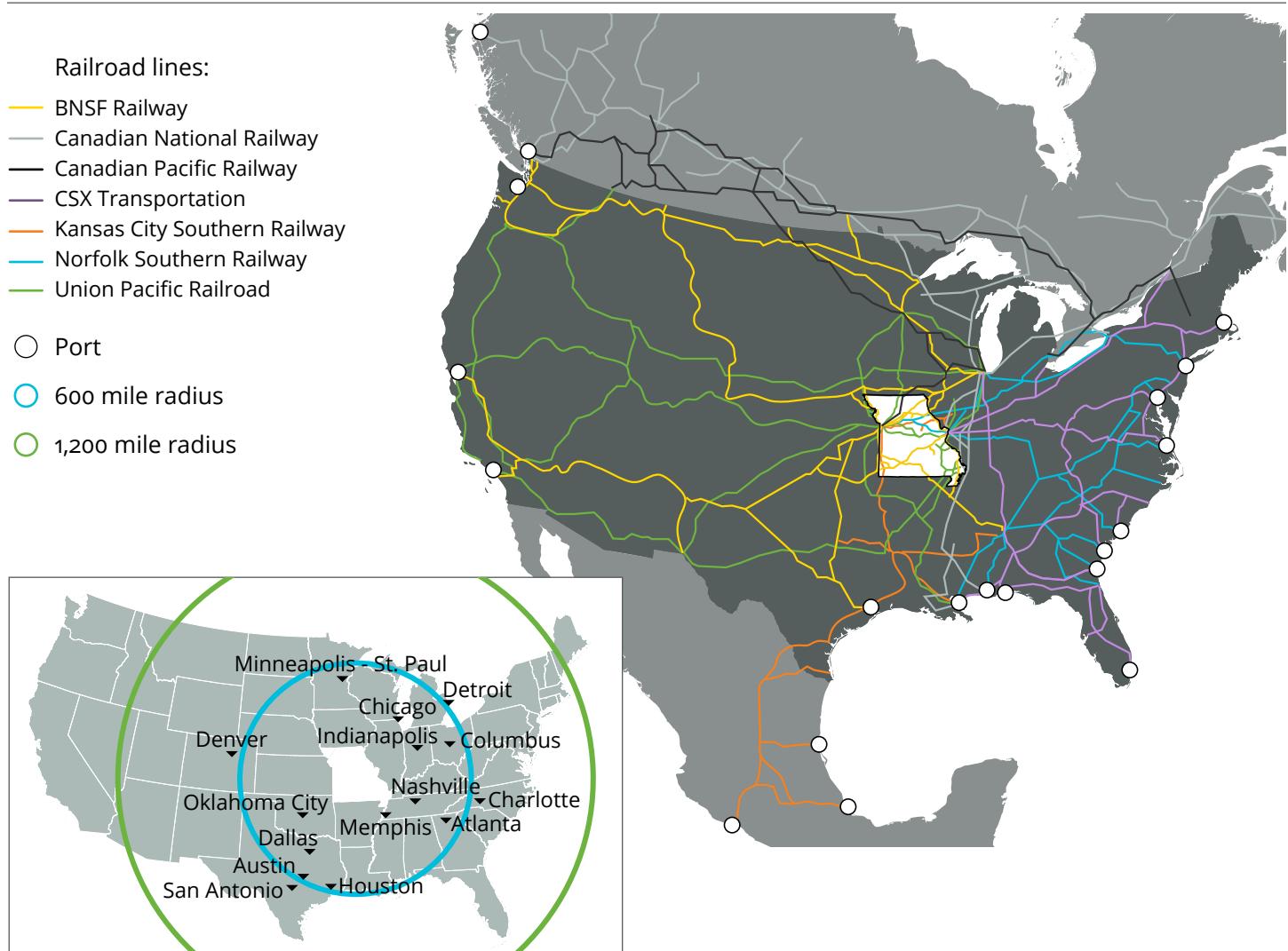
North America's Logistics Center

Missouri knows logistics, and can get your product to the global market quickly and efficiently. We are the nation's rail, river and road crossroads, and a booming epicenter of commerce. We can get your goods anywhere in the world via our international airports, extensive river barge infrastructure, or any of the U.S. Class 1 railroads. Missouri is home to the confluence of the two largest rivers in North America, the Missouri and Mississippi, and is home to the most northern ice free port on the Mississippi with unrestricted access to the Gulf of Mexico.

Missouri's central location allows companies to reach more than 50% of the continental U.S. within one-day's drive, and most of the rest within two. Ninety-six percent of Missouri's population lives within 15 miles of a 4-lane divided highway.

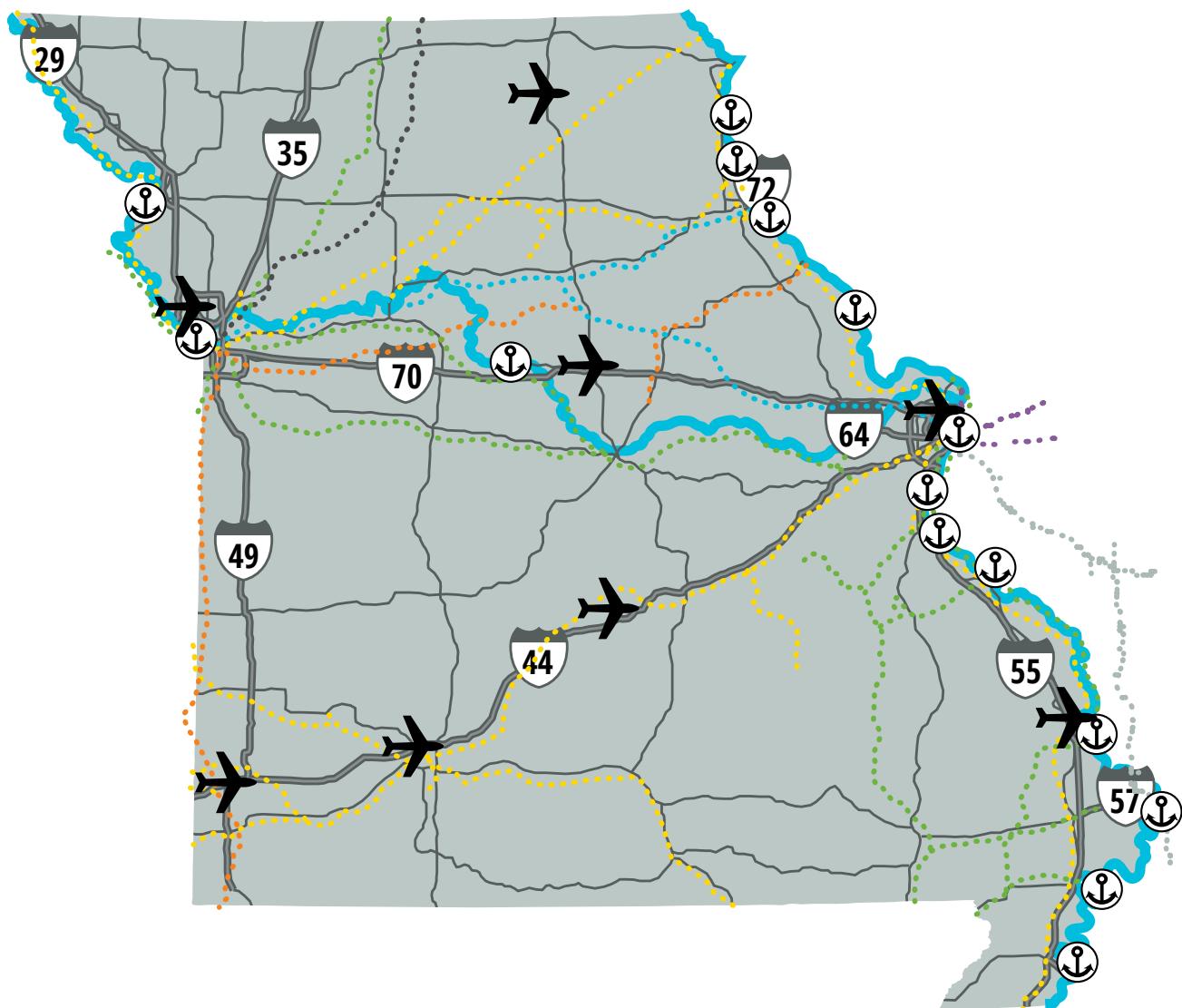
CNBC ranked Missouri's infrastructure 11th best in the U.S. in 2017.

Missouri's central and connected location



Missouri's Transportation Network

- Railroad lines:
- BNSF
 - CN
 - CP
 - CSX
 - KCS
 - NS
 - UP
- Ports
- Airports



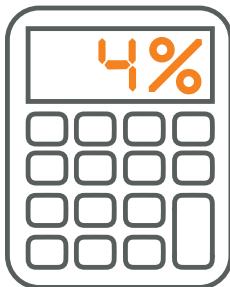
Missouri Reduces Your Risk and Your Costs

Missouri provides you with a solid business foundation, financial and otherwise. In Missouri, taxes and business costs don't eat up all of your company's profits.

Income Tax Allocation

Starting January 1, 2020, Missouri's corporate income tax rate dropped to 4 percent, making us one of the most tax-friendly states in the U.S. Missouri also moved to a single factor, market-based corporate income tax apportionment model based only on sales.

In addition, it is important to note that Missouri has not adopted worldwide or nationwide unitary tax assessment in computing multinational corporate income tax liability.



CORPORATE INCOME TAX RATE OF **4 PERCENT**, THE **2ND** LOWEST IN THE U.S.

Tax Exemptions for Manufacturers

Manufacturers locating in Missouri enjoy numerous tax advantages, including:

- Sales/use tax exemption on machinery and equipment used to establish a new or expand an existing facility
- Property tax exemption for inventories
- State sales tax and local use tax exemption on energy purchases

Certified Sites

Missouri's Certified Sites Program also reduces your risk by ensuring there has already been a comprehensive review of the availability of utilities, site access, environmental concerns, land use conformance, and potential site development costs. Having a site

"certified" reduces the risk associated with development of particular sites by providing up front and consistent information. Additionally, Missouri's 50+ years of a AAA bond rating is representative of our solid financial acumen and stable financial foundations.

Missouri has more than 47 rail served sites of 50+ acres or more and 180 industrial facilities with more than 50,000+ square feet (*LocationOne as of 11/5/2019*).

Workforce Development

Missouri One Start provides businesses with \$42 million of comprehensive pre-employment and customized training solutions to help them ramp up faster during an expansion. Missouri One Start's network of colleges and training facilities have the resources to meet each business's unique needs by delivering tailored pre-employment screening, employment marketing, and job specific training to make businesses more competitive. In addition, Missouri offers free community college through the A+ and Fast Track programs.

Our Services

Missouri is also committed to your growth. Our goal is to reduce your risk and provide first-class support from your initial site search to the day you open for business. Our team is ready to work with you and provide a "concierge service" as you consider where your next expansion will be.

Benefits like our low business and labor costs, reliable and inexpensive energy, aggressive and performance-based incentives, and a statewide commitment to attracting companies and investment, make Missouri a place where your company can come to grow and thrive. Whether it's in six weeks, six months, or six years, we are an expert resource to support you when the time is right to look at Missouri.





Subash Alias, CEO

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Working primarily out of the St. Louis office, Subash is the CEO and focuses on bringing jobs and investment to Missouri.



Cathleen Flournoy, VP, Business Recruitment

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Based in the Kansas City office, and focusing on multiple industry sectors, Cathleen generates, cultivates and closes business attraction opportunities to bring jobs and capital investment to Missouri.



Kylee Garretson, Director, Business Recruitment & Capacity Building

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Kylee actively manages business attraction projects for Missouri, provides support to the full business recruitment team, and manages Missouri's capacity building initiatives in communities across the state. She is based in the Kansas City office.



Deborah Price, VP, Business Recruitment & General Counsel

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Focusing mostly in domestic markets as well as South America and Israel, Deborah is generating, cultivating and closing opportunities with companies across multiple industry sectors. As General Counsel, Deborah serves as the Partnership's senior attorney. She is based in the St. Louis office.



Dennis Pruitt, CEcD, VP, Business Development

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Dennis, who is based in the St. Louis office, works across multiple industry sectors, primarily targeting companies in Europe, Asia, and Canada to bring new jobs and investment into Missouri.



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Missouri Partnership is a public-private economic development organization focused on attracting new jobs and investment to the state and promoting Missouri's business strengths. We work in partnership with the Hawthorn Foundation, the Missouri Department of Economic Development, the State of Missouri, and economic development agencies across the state. • www.missouripartnership.com