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Center for Energy Workforce Development

ENERGY WORKFORCE DEMAND

MIDWEST REGION

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INTRODUCTION

This report is designed to exhibit data on the present and future demand for specific energy occupations within the electric and natural gas utility industries for all CEWD regions in the United States. The goal of this report is to provide stakeholders with critical information on energy workforce characteristics, which can be used for planning efforts and as a benchmark for future studies on the region, as well as a comparison against other regions.

The report provides an overview of employment for select energy industries, broken out by CEWD regions, considering historic, current and future circumstances. This is followed by a regional breakdown of employment by occupations typically associated with the Energy sector.

Energy occupations by field were identified by the Center for Energy Workforce Development and EMSI.*

* Please refer to Appendix A for the descriptions of the electric and natural gas utility industries and standard occupation classifications included in this report.

DATA SOURCES

Quarterly Census of Employment and Wages (QCEW); Regional Economic Information System (REIS); Illinois Department of Employment Security, Employment Projections; Indiana Department of Workforce Development; Iowa Workforce Development; Kansas Department of Labor, Labor Market Information Services, Kansas Wage Survey; Michigan Department of Labor and Economic Growth, Bureau of Labor Market Information and Strategic Initiatives; Minnesota Department of Employment and Economic Development; Missouri Department of Economic Development; Ohio Department of Job and Family Services, Labor Market Information Division; Wisconsin Department of Workforce Development, Bureau of Workforce Information.

PREPARED FOR:

The Center for Energy Workforce Development

REGION DEFINITION

Midwest United States: Minnesota, Iowa, Kansas, Missouri, Illinois, Wisconsin, Indiana, Ohio, Michigan

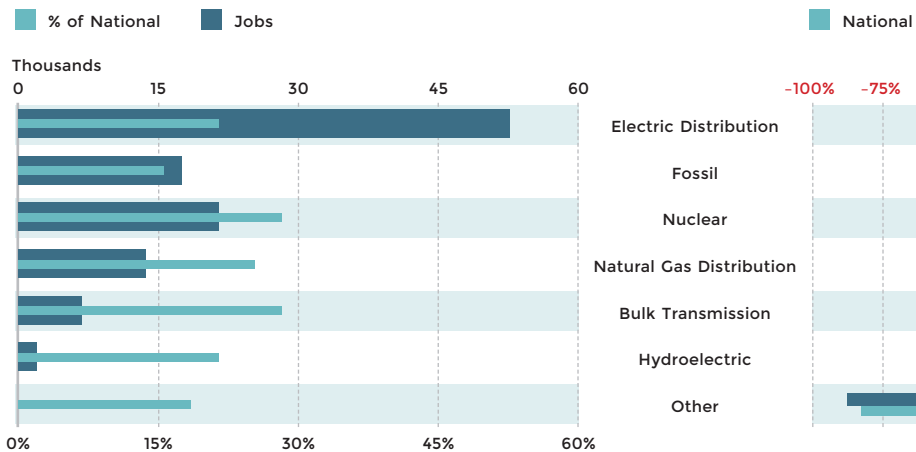
SUMMARY

Midwest Region Energy Workforce overview for Electric and Natural Gas Utilities

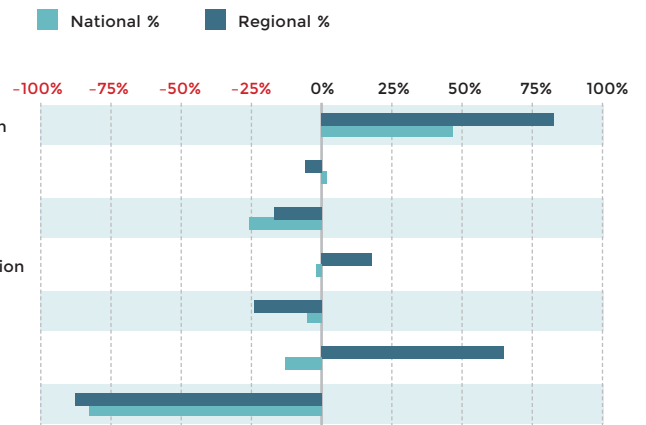
HISTORICAL INDUSTRY OVERVIEW

The following graphs display energy sector jobs in 2012 with their percent of national employment, and the regional and national job change from 2007 to 2012. In 2010, the Quarterly Census of Employment and Wages (QCEW) reclassified much of the employment contained in various electric power generation industries, specifically Fossil, Nuclear and Hydroelectric jobs into the Electric Distribution (NAICS 221122). In some cases this change was dramatic, with hydroelectric losing 300-800% of its jobs to the electric distribution industry. Since our reporting time frame covers this reclassification event, the job numbers reflect the shift accordingly. One must therefore, not overly scrutinize individual industries affected by the reclassification but rather look to the overall energy sector job change total as an indicator of job growth or decline.

Energy Industry Jobs, 2012



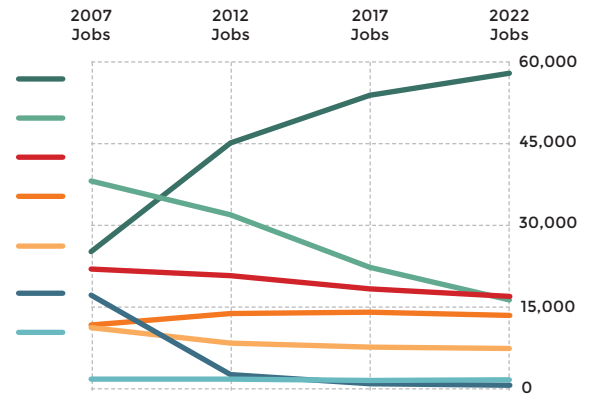
2007-2012 Job Change



Analysis of the energy sector in the Midwest region shows a total of 122,630 jobs for 2012. Between 2007 and 2012 Electric power distribution experienced job growth of 83%. Other electric energy and Nuclear energy had 65% and 18% growth respectively. All other sectors experienced a decline in jobs: Hydroelectric energy -88%, Electric bulk power transmission -24%, Fossil fuel energy -17%, and Natural gas distribution -6%. The table in this section displays both regional and national current employment and historical job change in the industry sectors between 2007 and 2012.

Midwest/National Comparison, Electrical and Natural Gas Utilities, all Jobs by Energy field

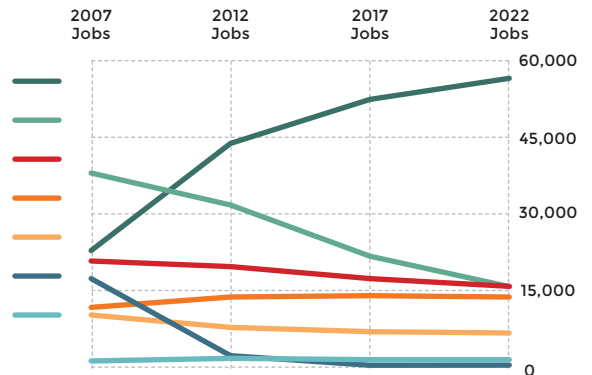
NAICS	Energy Field	2012 Regional Jobs	2007-12 Regional Change	2012 National Jobs	2007-12 National Change
221122	Electric Power Distribution	44,953	20,344	212,714	67,754
221112	Fossil Fuel Electric Power Generation	31,718	-6,455	99,848	-35,438
221210	Natural Gas Distribution	20,363	-1,368	112,326	2,158
221113	Nuclear Electric Power Generation	13,707	2,130	52,338	-682
221121	Electric Bulk Power Transmission and Control	7,879	-2,529	25,033	-1,407
221111	Hydroelectric Power Generation	2,131	-15,230	6,744	-32,344
221119	Other Electric Power Generation	1,880	739	8,938	-1,303
	Total	122,630	-2,369	517,941	-1,262



REGIONAL GOVERNMENT JOBS

CEWD requested EMSI to gather and correlate government jobs data relative to the seven industries currently being review in this report. The following table gives the results of the regional analysis but there are caveats that need to be included here along with the data. The government classifies all occupations into three NAICS codes (or industries): Federal, State and Local. Therefore, no direct correlation can be established between an occupation and a specific functional industry as in the private sector. The staffing patterns used to place government jobs into private industry classifications are based on EMSI’s estimates of staffing patterns of private sector energy producing industries. As such, the data in the table below should not be used to compare industry jobs across the seven private NAICS codes being reviewed elsewhere in this report or against other EMSI official data releases.

NAICS	Title	2002 Jobs	2007 Jobs	2012 Jobs
221122	Electric Power Distribution	23,896	22,319	43,547
221112	Fossil Fuel Electric Power Generation	42,167	37,879	31,453
221210	Natural Gas Distribution	23,201	20,992	19,618
221113	Nuclear Electric Power Generation	6,863	11,574	13,680
221121	Electric Bulk Power Transmission and Control	9,396	10,360	7,827
221111	Hydroelectric Power Generation	25,423	17,242	2,049
221119	Other Electric Power Generation	1,230	908	1,477
	Total	132,176	121,274	119,650



ENERGY FIELD REGIONAL GROWTH PROJECTIONS

Growth projections are designed to portray the future trend of all jobs in the energy sectors in the region. The following table shows the projected employment growth across all seven energy sectors for the CEWD region. The categories include: “2012 Jobs” or the total number of energy workers in 2012; “2012-2017 Growth” or the number of new jobs pro-

jected to be created between 2012 and 2017; “% Growth”; “2012-2017 Annual Job Growth” or the average annual growth over the five year period; “2012-2017 Projected Attrition & Retirements” and “2012-2022 Projected Attrition & Retirements” or the projected annual job turnover/openings for the sector for the respective five or ten year period; and “Median Annual Earnings” or the median average earnings per worker.

Midwest, Electrical and Natural Gas Utilities, all Jobs by Energy field

NAICS	Title	2012 Jobs	2012-17 Growth	2012-17% Growth	2012-17 Average Annual Net Job Change	2012-17 Projected Attrition & Retirement Openings	2012-22 Projected Attrition & Retirement Openings	Median Annual Earnings
221122	Electric Power Distribution	44,953	8,859	16%	1,772	18,616	24,541	\$56,522
221113	Nuclear Electric Power Generation	13,707	510	4%	102	5,676	7,483	\$57,176
221119	Other Electric Power Generation	1,880	-96	-5%	-19	779	1,027	\$51,693
221121	Electric Bulk Power Transmission and Control	7,879	-873	-12%	-175	3,263	4,301	\$57,697
221111	Hydroelectric Power Generation	2,131	-1,722	-420%	-344	882	1,163	\$56,531
221210	Natural Gas Distribution	20,363	-1,946	-11%	-389	8,433	11,116	\$50,081
221112	Fossil Fuel Electric Power Generation	31,718	-9,590	-43%	-1,918	13,135	17,316	\$57,079
	Total	122,630	-4,859	-4%	-972	50,784	66,946	

KEY OCCUPATIONS IN THE MIDWEST REGION

The following table shows the number of workers that were employed in occupations typically associated with the Energy field in 2007, 2012, 2017 and 2022. The columns of data progressively list jobs, job change, and percent change from the previous time period; in five-year increments starting from 2007 and projected forward ten years into the future. The associated projected attritions and retirements occurring over the same 5 to ten year period are listed next.* Finally, “Median Annual Earnings” indicates the average median wages across all occupations in the respective industry.

* Projected attrition and retirements rates for occupations are taken from EMSI’s proprietary dataset.

Midwest Region, Electrical and Natural Gas Utilities, Key Occupation Employment*

SOC Code	Description	2007 Jobs	2007-2012 Change	2007-2012 %Change	2012 Jobs	2017 Jobs	2012-2017 Change	2012-2017 %Change	2022 Jobs	2012-2022 Change	2012-2022 %Change	2012-2017 Projected Attrition & Retirements	2012-2022 Projected Attrition & Retirements	Median Annual Earnings
Lineworkers		19,445	212	1%	19,657	19,464	-193	-1%	19,168	-489	-2%	6,208	8,869	\$64,402
49-1011	First-line supervisors/managers of mechanics, installers, & repairers	3,727	-106	-3%	3,621	3,446	-175	-5%	3,277	-344	-10%	1,144	1,634	\$57,115
49-9051	Electrical power-line installers & repairers	15,718	318	2%	16,036	16,018	-18	-0%	15,891	-145	-1%	5,064	7,235	\$66,050
Plant / Field Operators		11,557	23	0%	11,580	10,942	-638	-6%	10,595	-985	-9%	4,838	6,341	\$67,308
51-8011	Nuclear power reactor operators	1,329	44	3%	1,373	1,407	34	2%	1,425	52	4%	574	752	\$77,700
51-8013	Power plant operators	8,858	37	0%	8,895	8,383	-512	-6%	8,112	-783	-9%	3,716	4,871	\$66,474
51-8092	Gas plant operators	1,370	-58	-4%	1,312	1,152	-160	-12%	1,058	-254	-19%	548	718	\$62,082
Technicians		17,707	-108	-1%	17,599	17,248	-351	-2%	16,934	-665	-4%	6,978	9,487	\$57,036
17-3023	Electrical & Instrumentation Techs., Electrical & electronic engineering technicians	1,815	-41	-2%	1,774	1,673	-101	-6%	1,573	-201	-11%	703	956	\$55,033
19-4051	Nuclear technicians, Nuclear Equipment Operations Technicians Nuclear Monitoring Technicians	790	-13	-2%	777	849	72	9%	882	105	14%	308	419	\$63,897
47-2111	Electricians	1,936	-29	-1%	1,907	1,798	-109	-6%	1,700	-207	-11%	756	1,028	\$54,115
47-2151	Pipelayers	58	-2	-3%	56	50	-6	-11%	47	-9	-16%	22	30	\$36,269
47-2152	Plumbers, pipefitters, & steamfitters	1,401	-60	-4%	1,341	1,219	-122	-9%	1,135	-206	-15%	532	723	\$53,544
47-3015	Helpers, pipelayers, plumbers, pipefitters & steamfitters	8	-1	-13%	7	6	-1	-14%	5	-2	-29%	3	4	\$24,153
49-2095	Electrical & electronics repairers, powerhouse, substation, & relay	3,737	72	2%	3,809	3,929	120	3%	3,992	183	5%	1,510	2,053	\$68,597
49-9012	Control & valve installers & repairers, except mechanical door	3,108	-140	-5%	2,968	2,763	-205	-7%	2,652	-316	-11%	1,177	1,599	\$51,503
49-9041	Industrial machinery mechanics	2,420	153	6%	2,573	2,634	61	2%	2,674	101	4%	1,020	1,387	\$44,971
49-9044	Millwright, Mechanic technician	26	1	4%	27	24	-3	-11%	23	-4	-15%	11	15	\$56,880
51-4041	Machinist	166	2	1%	168	158	-10	-6%	149	-19	-11%	67	91	\$38,873
51-4121	Welders, cutters, solderers, & brazers	479	-12	-3%	467	435	-32	-7%	411	-56	-12%	185	252	\$35,413
51-8012	Power Distributors & Dispatchers	1,763	-38	-2%	1,725	1,710	-15	-1%	1,691	-34	-2%	684	930	\$72,370
Engineers		7,836	-260	-3%	7,576	7,194	-382	-5%	6,848	-728	-10%	2,667	3,540	\$86,423
11-9041	Engineering Managers	1,101	-13	-1%	1,088	1,012	-76	-7%	951	-137	-13%	383	508	\$110,486
17-2041	Chemical Engineer	111	3	3%	114	115	1	1%	113	-1	-1%	40	53	\$86,694
17-2051	Civil Engineers	396	-16	-4%	380	365	-15	-4%	350	-30	-8%	134	178	\$70,108
17-2071	Electrical Engineers, Power Systems Engineer, Energy Transmission Engineers	3,913	-130	-3%	3,783	3,612	-171	-5%	3,464	-319	-8%	1,332	1,768	\$80,427
17-2081	Environmental Engineers	126	-1	-1%	125	120	-5	-4%	115	-10	-8%	44	58	\$77,350
17-2111	Health & Safety engineers, except mining safety engineers & inspectors	98	-7	-7%	91	84	-7	-8%	76	-15	-16%	32	43	\$73,322
17-2141	Mechanical Engineers	441	2	0%	443	404	-39	-9%	385	-58	-13%	156	207	\$77,988
17-2161	Nuclear Engineers	1,650	-98	-6%	1,552	1,482	-70	-5%	1,394	-158	-10%	546	725	\$92,102
Total		56,545	-133	-0%	56,412	54,848	-1,564	-3%	53,545	-2,867	-5%	20,691	28,237	\$65,658

* Job numbers by employment category may not equal total Key Occupation Employment for each region, due to rounding.



STATE-LEVEL OCCUPATION DATA

Standard Occupation Classification (soc) employment data is provided by total number of jobs and projected jobs in the region spanning the years 2006, 2011, 2016 and 2012. Additionally, projected attrition & retirements rates are applied to show the amount of open positions over the next ten years. Employment numbers are reported as of December 2011.

ILLINOIS

SOC Code	Description	2007 Jobs	2007-2012 Change	2007-2012 %Change	2012 Jobs	2017 Jobs	2012-2017 Change	2012-2017 %Change	2022 Jobs	2012-2022 Change	2012-2022 %Change	2012-2017 Projected Attrition & Retirements	2012-2022 Projected Attrition & Retirements	Median Annual Earnings
Lineworkers		2,731	262	10%	2,993	3,059	66	2%	2,836	-157	-5%	945	1,350	\$75,501
49-1011	First-line supervisors/managers of mechanics, installers, & repairers	588	18	3%	606	589	-17	-3%	520	-86	-14%	191	273	\$62,127
49-9051	Electrical power-line installers & repairers	2,143	244	11%	2,387	2,470	83	3%	2,316	-71	-3%	754	1,077	\$78,910
Plant / Field Operators		2,114	78	4%	2,192	2,078	-114	-5%	1,820	-372	-17%	915	1,200	\$70,445
51-8011	Nuclear power reactor operators	182	27	15%	209	222	13	6%	210	1	0%	87	114	\$78,477
51-8013	Power plant operators	1,549	72	5%	1,621	1,568	-53	-3%	1,389	-232	-14%	677	888	\$71,178
51-8092	Gas plant operators	383	-21	-5%	362	288	-74	-20%	221	-141	-39%	151	198	\$62,670
Technicians		2,513	104	4%	2,617	2,699	82	3%	2,491	-126	-5%	1,035	1,410	\$62,229
17-3023	Electrical & Instrumentation Technician, Electrical & electronic engineering technicians	316	15	5%	331	324	-7	-2%	285	-46	-14%	131	178	\$55,442
19-4051	Nuclear technicians, Nuclear Equipment Operations Technicians Nuclear Monitoring Technicians	88	11	13%	99	111	12	12%	107	8	8%	39	53	\$73,052
47-2111	Electricians	393	27	7%	420	409	-11	-3%	365	-55	-13%	166	226	\$67,690
47-2151	Pipelayers	8	-2	-25%	6	6	0	0%	5	-1	-17%	2	3	\$36,019
47-2152	Plumbers, pipefitters, & steamfitters	315	-26	-8%	289	236	-53	-18%	185	-104	-36%	115	156	\$63,271
47-3015	Helpers, pipelayers, plumbers, pipefitters & steamfitters	3	0	0%	3	2	-1	-33%	1	-2	-67%	1	2	\$21,599
49-2095	Electrical & electronics repairers, powerhouse, substation, & relay	548	63	11%	611	693	82	13%	683	72	12%	242	329	\$72,571
49-9012	Control & valve installers & repairers, except mechanical door	166	-42	-25%	124	158	34	27%	156	32	26%	49	67	\$52,083
49-9041	Industrial machinery mechanics	404	41	10%	445	464	19	4%	431	-14	-3%	176	240	\$49,765
49-9044	Millwright, Mechanic technician	3	0	0%	3	3	0	0%	3	0	0%	1	2	\$65,541
51-4041	Machinist	32	4	13%	36	34	-2	-6%	30	-6	-17%	14	19	\$39,766
51-4121	Welders, cutters, solderers, & brazers	79	-1	-1%	78	71	-7	-9%	61	-17	-22%	31	42	\$35,934
51-8012	Power Distributors & Dispatchers	158	14	9%	172	188	16	9%	179	7	4%	68	93	\$74,984
Engineers		1,420	21	1%	1,441	1,404	-37	-3%	1,251	-190	-13%	507	673	\$93,296
11-9041	Engineering Managers	186	8	4%	194	191	-3	-2%	170	-24	-12%	68	91	\$113,135
17-2041	Chemical Engineer	27	1	4%	28	26	-2	-7%	22	-6	-21%	10	13	\$89,128
17-2051	Civil Engineers	89	-3	-3%	86	79	-7	-8%	68	-18	-21%	30	40	\$76,583
17-2071	Electrical Engineers, Power Systems Engineer, Energy Transmission Engineers	556	0	0%	556	565	9	2%	516	-40	-7%	196	260	\$84,082
17-2081	Environmental Engineers	18	2	11%	20	20	0	0%	18	-2	-10%	7	9	\$81,640
17-2111	Health & Safety engineers, except mining safety engineers & inspectors	26	0	0%	26	23	-3	-12%	19	-7	-27%	9	12	\$73,213
17-2141	Mechanical Engineers	85	7	8%	92	89	-3	-3%	80	-12	-13%	32	43	\$80,809
17-2161	Nuclear Engineers	433	6	1%	439	411	-28	-6%	358	-81	-18%	155	205	\$103,967
Total		8,778	465	5%	9,243	9,240	-3	-0%	8,398	-845	-9%	3,402	4,633	\$73,319

INDIANA

SOC Code	Description	2007 Jobs	2007-2012 Change	2007-2012 %Change	2012 Jobs	2017 Jobs	2012-2017 Change	2012-2017 %Change	2022 Jobs	2012-2022 Change	2012-2022 %Change	2012-2017 Projected Attrition & Retirements	2012-2022 Projected Attrition & Retirements	Median Annual Earnings
Lineworkers		2,006	92	5%	2,098	1,986	-112	-5%	1,964	-134	-6%	663	947	\$63,500
49-1011	First-line supervisors/managers of mechanics, installers, & repairers	456	0	0%	456	413	-43	-9%	394	-62	-14%	144	206	\$56,014
49-9051	Electrical power-line installers & repairers	1,550	92	6%	1,642	1,573	-69	-4%	1,570	-72	-4%	519	741	\$65,590
Plant / Field Operators		1,030	16	2%	1,046	963	-83	-8%	945	-101	-10%	437	573	\$69,905
51-8011	Nuclear power reactor operators	158	9	6%	167	160	-7	-4%	160	-7	-4%	70	91	\$74,849
51-8013	Power plant operators	782	10	1%	792	714	-78	-10%	692	-100	-13%	331	434	\$69,514
51-8092	Gas plant operators	90	-3	-3%	87	89	2	2%	93	6	7%	36	48	\$64,376
Technicians		2,535	97	4%	2,632	2,468	-164	-6%	2,432	-200	-8%	1,043	1,419	\$56,754
17-3023	Electrical & Instrumentation Technician, Electrical & electronic engineering technicians	297	9	3%	306	260	-46	-15%	238	-68	-22%	121	165	\$56,660
19-4051	Nuclear technicians, Nuclear Equipment Operations Technicians Nuclear Monitoring Technicians	125	9	7%	134	134	0	0%	136	2	1%	53	72	\$55,316
47-2111	Electricians	212	-2	-1%	210	189	-21	-10%	179	-31	-15%	83	113	\$54,025
47-2151	Pipelayers	5	0	0%	5	5	0	0%	5	0	0%	2	3	\$37,097
47-2152	Plumbers, pipefitters, & steamfitters	157	3	2%	160	159	-1	-1%	162	2	1%	63	86	\$53,771
47-3015	Helpers, pipelayers, plumbers, pipefitters & steamfitters	1	0	0%	1	1	0	0%	1	0	0%	0	1	\$25,632
49-2095	Electrical & electronics repairers, powerhouse, substation, & relay	636	44	7%	680	631	-49	-7%	627	-53	-8%	270	366	\$69,202
49-9012	Control & valve installers & repairers, except mechanical door	536	5	1%	541	500	-41	-8%	486	-55	-10%	214	292	\$46,051
49-9041	Industrial machinery mechanics	306	29	9%	335	335	0	0%	345	10	3%	133	181	\$45,228
49-9044	Millwright, Mechanic technician	4	0	0%	4	4	0	0%	3	-1	-25%	2	2	\$53,373
51-4041	Machinist	14	0	0%	14	13	-1	-7%	13	-1	-7%	6	8	\$37,422
51-4121	Welders, cutters, solderers, & brazers	52	-1	-2%	51	48	-3	-6%	46	-5	-10%	20	27	\$34,179
51-8012	Power Distributors & Dispatchers	190	1	1%	191	189	-2	-1%	191	0	0%	76	103	\$77,272
Engineers		645	-15	-2%	630	583	-47	-7%	563	-67	-11%	222	294	\$81,628
11-9041	Engineering Managers	104	-2	-2%	102	93	-9	-9%	89	-13	-13%	36	48	\$102,327
17-2041	Chemical Engineer	10	1	10%	11	11	0	0%	13	2	18%	4	5	\$83,242
17-2051	Civil Engineers	33	-2	-6%	31	31	0	0%	31	0	0%	11	14	\$67,143
17-2071	Electrical Engineers, Power Systems Engineer, Energy Transmission Engineers	381	-6	-2%	375	340	-35	-9%	324	-51	-14%	132	175	\$79,638
17-2081	Environmental Engineers	18	-1	-6%	17	16	-1	-6%	15	-2	-12%	6	8	\$67,413
17-2111	Health & Safety engineers, except mining safety engineers & inspectors	6	0	0%	6	5	-1	-17%	5	-1	-17%	2	3	\$68,362
17-2141	Mechanical Engineers	44	1	2%	45	41	-4	-9%	40	-5	-11%	16	21	\$71,006
17-2161	Nuclear Engineers	49	-6	-12%	43	46	3	7%	46	3	7%	15	20	\$78,039
Total		6,216	190	3%	6,406	6,000	-406	-6%	5,904	-502	-8%	2,365	3,233	\$63,557

IOWA

SOC Code	Description	2007 Jobs	2007-2012 Change	2007-2012 %Change	2012 Jobs	2017 Jobs	2012-2017 Change	2012-2017 %Change	2022 Jobs	2012-2022 Change	2012-2022 %Change	2012-2017 Projected Attrition & Retirements	2012-2022 Projected Attrition & Retirements	Median Annual Earnings
Lineworkers		1,274	-65	-5%	1,209	1,122	-87	-7%	1,116	-93	-8%	382	545	\$58,669
49-1011	First-line supervisors/managers of mechanics, installers, & repairers	189	-25	-13%	164	138	-26	-16%	128	-36	-22%	52	74	\$54,639
49-9051	Electrical power-line installers & repairers	1,085	-40	-4%	1,045	984	-61	-6%	988	-57	-5%	330	471	\$59,334
Plant / Field Operators		685	-38	-6%	647	562	-85	-13%	543	-104	-16%	271	354	\$59,748
51-8011	Nuclear power reactor operators	67	-5	-7%	62	59	-3	-5%	60	-2	-3%	26	34	\$74,907
51-8013	Power plant operators	565	-39	-7%	526	461	-65	-12%	446	-80	-15%	220	288	\$58,219
51-8092	Gas plant operators	53	6	11%	59	42	-17	-29%	37	-22	-37%	25	32	\$58,885
Technicians		1,094	-54	-5%	1,040	929	-111	-11%	914	-126	-12%	412	561	\$52,963
17-3023	Electrical & Instrumentation Technician, Electrical & electronic engineering technicians	91	-11	-12%	80	72	-8	-10%	69	-11	-14%	32	43	\$47,867
19-4051	Nuclear technicians, Nuclear Equipment Operations Technicians Nuclear Monitoring Technicians	46	-2	-4%	44	43	-1	-2%	45	1	2%	17	24	\$54,913
47-2111	Electricians	122	-13	-11%	109	94	-15	-14%	89	-20	-18%	43	59	\$44,425
47-2151	Pipelayers	4	1	25%	5	2	-3	-60%	2	-3	-60%	2	3	\$37,053
47-2152	Plumbers, pipefitters, & steamfitters	45	-2	-4%	43	32	-11	-26%	28	-15	-35%	17	23	\$43,666
47-3015	Helpers, pipelayers, plumbers, pipefitters & steamfitters	0	0	0%	0	0	0	0%	0	0	0%	0	0	\$27,239
49-2095	Electrical & electronics repairers, powerhouse, substation, & relay	337	-8	-2%	329	318	-11	-3%	326	-3	-1%	130	177	\$67,267
49-9012	Control & valve installers & repairers, except mechanical door	198	-6	-3%	192	154	-38	-20%	142	-50	-26%	76	103	\$46,758
49-9041	Industrial machinery mechanics	150	-2	-1%	148	135	-13	-9%	136	-12	-8%	59	80	\$40,820
49-9044	Millwright, Mechanic technician	3	0	0%	3	2	-1	-33%	2	-1	-33%	1	2	\$44,574
51-4041	Machinist	6	-1	-17%	5	4	-1	-20%	4	-1	-20%	2	3	\$36,456
51-4121	Welders, cutters, solderers, & brazers	25	-1	-4%	24	18	-6	-25%	17	-7	-29%	10	13	\$34,624
51-8012	Power Distributors & Dispatchers	67	-9	-13%	58	55	-3	-5%	54	-4	-7%	23	31	\$64,314
Engineers		379	-47	-12%	332	302	-30	-9%	291	-41	-12%	118	155	\$79,098
11-9041	Engineering Managers	46	-6	-13%	40	36	-4	-10%	34	-6	-15%	14	19	\$105,326
17-2041	Chemical Engineer	5	0	0%	5	4	-1	-20%	4	-1	-20%	2	2	\$83,843
17-2051	Civil Engineers	19	-2	-11%	17	15	-2	-12%	14	-3	-18%	6	8	\$73,990
17-2071	Electrical Engineers, Power Systems Engineer, Energy Transmission Engineers	172	-25	-15%	147	137	-10	-7%	132	-15	-10%	52	69	\$74,075
17-2081	Environmental Engineers	5	0	0%	5	4	-1	-20%	4	-1	-20%	2	2	\$73,091
17-2111	Health & Safety engineers, except mining safety engineers & inspectors	4	0	0%	4	3	-1	-25%	3	-1	-25%	1	2	\$63,455
17-2141	Mechanical Engineers	17	-1	-6%	16	13	-3	-19%	12	-4	-25%	6	7	\$68,430
17-2161	Nuclear Engineers	111	-13	-12%	98	90	-8	-8%	88	-10	-10%	35	46	\$80,049
Total		3,432	-204	-6%	3,228	2,915	-313	-10%	2,864	-364	-11%	1,183	1,615	\$59,148

KANSAS

SOC Code	Description	2007 Jobs	2007-2012 Change	2007-2012 %Change	2012 Jobs	2017 Jobs	2012-2017 Change	2012-2017 %Change	2022 Jobs	2012-2022 Change	2012-2022 %Change	2012-2017 Projected Attrition & Retirements	2012-2022 Projected Attrition & Retirements	Median Annual Earnings
Lineworkers		1,575	182	12%	1,757	1,991	234	13%	2,021	264	15%	555	792	\$57,911
49-1011	First-line supervisors/managers of mechanics, installers, & repairers	285	24	8%	309	339	30	10%	333	24	8%	98	139	\$54,223
49-9051	Electrical power-line installers & repairers	1,290	158	12%	1,448	1,652	204	14%	1,688	240	17%	457	653	\$58,713
Plant / Field Operators		790	107	14%	897	1,031	134	15%	1,052	155	17%	375	491	\$64,260
51-8011	Nuclear power reactor operators	78	12	15%	90	110	20	22%	115	25	28%	38	49	\$75,376
51-8013	Power plant operators	672	95	14%	767	873	106	14%	889	122	16%	320	420	\$63,086
51-8092	Gas plant operators	40	0	0%	40	48	8	20%	48	8	20%	17	22	\$61,099
Technicians		872	68	8%	940	1,089	149	16%	1,100	160	17%	372	508	\$49,942
17-3023	Electrical & Instrumentation Technician, Electrical & electronic engineering technicians	57	5	9%	62	72	10	16%	70	8	13%	25	33	\$61,876
19-4051	Nuclear technicians, Nuclear Equipment Operations Technicians Nuclear Monitoring Technicians	20	0	0%	20	27	7	35%	29	9	45%	8	11	\$56,854
47-2111	Electricians	104	9	9%	113	127	14	12%	125	12	11%	45	61	\$45,942
47-2151	Pipelayers	2	1	50%	3	3	0	0%	3	0	0%	1	2	\$30,220
47-2152	Plumbers, pipefitters, & steamfitters	109	16	15%	125	134	9	7%	133	8	6%	50	67	\$45,048
47-3015	Helpers, pipelayers, plumbers, pipefitters & steamfitters	1	0	0%	1	1	0	0%	1	0	0%	0	1	\$24,293
49-2095	Electrical & electronics repairers, powerhouse, substation, & relay	106	7	7%	113	150	37	33%	157	44	39%	45	61	\$69,638
49-9012	Control & valve installers & repairers, except mechanical door	254	4	2%	258	279	21	8%	273	15	6%	102	139	\$48,256
49-9041	Industrial machinery mechanics	145	23	16%	168	203	35	21%	215	47	28%	67	91	\$40,479
49-9044	Millwright, Mechanic technician	1	0	0%	1	1	0	0%	1	0	0%	0	1	\$55,515
51-4041	Machinist	10	1	10%	11	12	1	9%	12	1	9%	4	6	\$35,263
51-4121	Welders, cutters, solderers, & brazers	32	4	13%	36	39	3	8%	39	3	8%	14	19	\$33,320
51-8012	Power Distributors & Dispatchers	31	-2	-6%	29	41	12	41%	42	13	45%	11	16	\$80,891
Engineers		294	23	8%	317	369	52	16%	366	49	15%	112	147	\$86,811
11-9041	Engineering Managers	36	1	3%	37	43	6	16%	42	5	14%	13	17	\$115,581
17-2041	Chemical Engineer	6	0	0%	6	8	2	33%	9	3	50%	2	3	\$88,754
17-2051	Civil Engineers	18	0	0%	18	21	3	17%	21	3	17%	6	8	\$69,441
17-2071	Electrical Engineers, Power Systems Engineer, Energy Transmission Engineers	154	15	10%	169	196	27	16%	195	26	15%	60	79	\$82,560
17-2081	Environmental Engineers	5	1	20%	6	7	1	17%	7	1	17%	2	3	\$86,986
17-2111	Health & Safety engineers, except mining safety engineers & inspectors	5	0	0%	5	6	1	20%	5	0	0%	2	2	\$63,975
17-2141	Mechanical Engineers	15	1	7%	16	18	2	13%	18	2	13%	6	7	\$69,570
17-2161	Nuclear Engineers	55	5	9%	60	70	10	17%	69	9	15%	21	28	\$91,479
Total		3,531	380	11%	3,911	4,480	569	15%	4,539	628	16%	1,414	1,938	\$59,795

MICHIGAN

SOC Code	Description	2007 Jobs	2007-2012 Change	2007-2012 %Change	2012 Jobs	2017 Jobs	2012-2017 Change	2012-2017 %Change	2022 Jobs	2012-2022 Change	2012-2022 %Change	2012-2017 Projected Attrition & Retirements	2012-2022 Projected Attrition & Retirements	Median Annual Earnings
Lineworkers		2,712	-122	-4%	2,590	2,557	-33	-1%	2,631	41	2%	818	1,168	\$62,983
49-1011	First-line supervisors/managers of mechanics, installers, & repairers	606	-42	-7%	564	539	-25	-4%	535	-29	-5%	178	254	\$55,500
49-9051	Electrical power-line installers & repairers	2,106	-80	-4%	2,026	2,018	-8	-0%	2,096	70	3%	640	914	\$65,065
Plant / Field Operators		2,224	-41	-2%	2,183	1,932	-251	-11%	1,925	-258	-12%	912	1,196	\$65,842
51-8011	Nuclear power reactor operators	201	-2	-1%	199	205	6	3%	220	21	11%	83	109	\$80,472
51-8013	Power plant operators	1,682	1	0%	1,683	1,481	-202	-12%	1,478	-205	-12%	703	922	\$65,125
51-8092	Gas plant operators	341	-40	-12%	301	246	-55	-18%	227	-74	-25%	126	165	\$60,237
Technicians		3,073	-99	-3%	2,974	2,882	-92	-3%	2,922	-52	-2%	1,178	1,604	\$56,346
17-3023	Electrical & Instrumentation Technician, Electrical & electronic engineering technicians	388	-12	-3%	376	361	-15	-4%	355	-21	-6%	149	203	\$54,923
19-4051	Nuclear technicians, Nuclear Equipment Operations Technicians Nuclear Monitoring Technicians	115	3	3%	118	136	18	15%	148	30	25%	47	64	\$65,711
47-2111	Electricians	300	-13	-4%	287	263	-24	-8%	259	-28	-10%	114	155	\$52,560
47-2151	Pipelayers	5	-2	-40%	3	3	0	0%	3	0	0%	1	2	\$26,534
47-2152	Plumbers, pipefitters, & steamfitters	225	-44	-20%	181	146	-35	-19%	135	-46	-25%	72	98	\$50,736
47-3015	Helpers, pipelayers, plumbers, pipefitters & steamfitters	1	-1	-100%	0	0	0	0%	0	0	0%	0	0	\$24,129
49-2095	Electrical & electronics repairers, powerhouse, substation, & relay	705	30	4%	735	771	36	5%	819	84	11%	291	396	\$66,061
49-9012	Control & valve installers & repairers, except mechanical door	576	-63	-11%	513	453	-60	-12%	430	-83	-16%	203	276	\$53,747
49-9041	Industrial machinery mechanics	409	21	5%	430	429	-1	-0%	447	17	4%	170	232	\$45,471
49-9044	Millwright, Mechanic technician	6	0	0%	6	5	-1	-17%	5	-1	-17%	2	3	\$63,835
51-4041	Machinist	33	0	0%	33	30	-3	-9%	29	-4	-12%	13	18	\$40,089
51-4121	Welders, cutters, solderers, & brazers	73	-8	-11%	65	59	-6	-9%	57	-8	-12%	26	35	\$34,485
51-8012	Power Distributors & Dispatchers	237	-10	-4%	227	226	-1	-0%	235	8	4%	90	122	\$66,976
Engineers		1,470	-55	-4%	1,415	1,290	-125	-9%	1,272	-143	-10%	499	662	\$86,084
11-9041	Engineering Managers	255	3	1%	258	229	-29	-11%	219	-39	-15%	91	121	\$109,205
17-2041	Chemical Engineer	17	-1	-6%	16	16	0	0%	16	0	0%	6	7	\$91,915
17-2051	Civil Engineers	62	-6	-10%	56	57	1	2%	57	1	2%	20	26	\$66,089
17-2071	Electrical Engineers, Power Systems Engineer, Energy Transmission Engineers	742	-41	-6%	701	646	-55	-8%	649	-52	-7%	247	328	\$79,296
17-2081	Environmental Engineers	22	-1	-5%	21	20	-1	-5%	20	-1	-5%	7	10	\$78,125
17-2111	Health & Safety engineers, except mining safety engineers & inspectors	14	-2	-14%	12	11	-1	-8%	10	-2	-17%	4	6	\$77,879
17-2141	Mechanical Engineers	123	-4	-3%	119	96	-23	-19%	93	-26	-22%	42	56	\$85,698
17-2161	Nuclear Engineers	235	-3	-1%	232	215	-17	-7%	208	-24	-10%	82	108	\$86,473
Total		9,479	-317	-3%	9,162	8,661	-501	-5%	8,750	-412	-4%	3,407	4,630	\$65,078

MINNESOTA

SOC Code	Description	2007 Jobs	2007-2012 Change	2007-2012 %Change	2012 Jobs	2017 Jobs	2012-2017 Change	2012-2017 %Change	2022 Jobs	2012-2022 Change	2012-2022 %Change	2012-2017 Projected Attrition & Retirements	2012-2022 Projected Attrition & Retirements	Median Annual Earnings
Lineworkers		2,045	193	9%	2,238	2,348	110	5%	2,349	111	5%	707	1,010	\$63,858
49-1011	First-line supervisors/managers of mechanics, installers, & repairers	335	17	5%	352	352	0	0%	340	-12	-3%	111	159	\$60,354
49-9051	Electrical power-line installers & repairers	1,710	176	10%	1,886	1,996	110	6%	2,009	123	7%	596	851	\$64,491
Plant / Field Operators		1,006	78	8%	1,084	1,138	54	5%	1,139	55	5%	453	594	\$73,567
51-8011	Nuclear power reactor operators	137	16	12%	153	165	12	8%	170	17	11%	64	84	\$81,069
51-8013	Power plant operators	743	57	8%	800	844	44	6%	842	42	5%	334	438	\$74,194
51-8092	Gas plant operators	126	5	4%	131	129	-2	-2%	127	-4	-3%	55	72	\$60,632
Technicians		1,478	109	7%	1,587	1,648	61	4%	1,644	57	4%	629	856	\$58,576
17-3023	Electrical & Instrumentation Technician, Electrical & electronic engineering technicians	165	7	4%	172	173	1	1%	167	-5	-3%	68	93	\$54,238
19-4051	Nuclear technicians, Nuclear Equipment Operations Technicians Nuclear Monitoring Technicians	41	2	5%	43	50	7	16%	52	9	21%	17	23	\$61,907
47-2111	Electricians	198	12	6%	210	209	-1	-0%	202	-8	-4%	83	113	\$58,188
47-2151	Pipelayers	5	0	0%	5	5	0	0%	5	0	0%	2	3	\$46,790
47-2152	Plumbers, pipefitters, & steamfitters	123	3	2%	126	122	-4	-3%	118	-8	-6%	50	68	\$57,667
47-3015	Helpers, pipelayers, plumbers, pipefitters & steamfitters	0	0	0%	0	0	0	0%	0	0	0%	0	0	\$29,727
49-2095	Electrical & electronics repairers, powerhouse, substation, & relay	225	22	10%	247	276	29	12%	283	36	15%	98	133	\$71,302
49-9012	Control & valve installers & repairers, except mechanical door	235	7	3%	242	241	-1	-0%	234	-8	-3%	96	130	\$58,635
49-9041	Industrial machinery mechanics	229	35	15%	264	285	21	8%	297	33	13%	105	142	\$46,479
49-9044	Millwright, Mechanic technician	3	0	0%	3	3	0	0%	3	0	0%	1	2	\$60,466
51-4041	Machinist	15	1	7%	16	16	0	0%	16	0	0%	6	9	\$42,716
51-4121	Welders, cutters, solderers, & brazers	48	2	4%	50	50	0	0%	48	-2	-4%	20	27	\$37,936
51-8012	Power Distributors & Dispatchers	191	18	9%	209	218	9	4%	219	10	5%	83	113	\$68,598
Engineers		822	47	6%	869	871	2	0%	845	-24	-3%	306	407	\$88,541
11-9041	Engineering Managers	140	9	6%	149	147	-2	-1%	141	-8	-5%	52	70	\$117,214
17-2041	Chemical Engineer	12	1	8%	13	14	1	8%	14	1	8%	5	6	\$83,970
17-2051	Civil Engineers	35	1	3%	36	37	1	3%	37	1	3%	13	17	\$72,106
17-2071	Electrical Engineers, Power Systems Engineer, Energy Transmission Engineers	485	29	6%	514	514	0	0%	499	-15	-3%	181	240	\$82,907
17-2081	Environmental Engineers	12	0	0%	12	12	0	0%	12	0	0%	4	6	\$77,709
17-2111	Health & Safety engineers, except mining safety engineers & inspectors	8	0	0%	8	8	0	0%	7	-1	-13%	3	4	\$86,065
17-2141	Mechanical Engineers	43	3	7%	46	47	1	2%	46	0	0%	16	21	\$75,639
17-2161	Nuclear Engineers	87	4	5%	91	92	1	1%	89	-2	-2%	32	43	\$89,396
Total		5,351	427	8%	5,778	6,005	227	4%	5,977	199	3%	2,095	2,867	\$67,941

MISSOURI

SOC Code	Description	2007 Jobs	2007-2012 Change	2007-2012 %Change	2012 Jobs	2017 Jobs	2012-2017 Change	2012-2017 %Change	2022 Jobs	2012-2022 Change	2012-2022 %Change	2012-2017 Projected Attrition & Retirements	2012-2022 Projected Attrition & Retirements	Median Annual Earnings
Lineworkers		2,028	44	2%	2,072	2,039	-33	-2%	2,066	-6	-0%	654	935	\$64,994
49-1011	First-line supervisors/managers of mechanics, installers, & repairers	328	-7	-2%	321	310	-11	-3%	308	-13	-4%	101	145	\$52,275
49-9051	Electrical power-line installers & repairers	1,700	51	3%	1,751	1,729	-22	-1%	1,758	7	0%	553	790	\$67,295
Plant / Field Operators		1,012	25	2%	1,037	1,040	3	0%	1,063	26	3%	434	567	\$69,375
51-8011	Nuclear power reactor operators	128	8	6%	136	142	6	4%	148	12	9%	57	74	\$72,107
51-8013	Power plant operators	753	27	4%	780	782	2	0%	798	18	2%	326	427	\$70,616
51-8092	Gas plant operators	131	-10	-8%	121	116	-5	-4%	117	-4	-3%	51	66	\$58,386
Technicians		1,405	-14	-1%	1,391	1,390	-1	-0%	1,424	33	2%	549	748	\$56,507
17-3023	Electrical & Instrumentation Technician, Electrical & electronic engineering technicians	100	-3	-3%	97	96	-1	-1%	96	-1	-1%	38	52	\$56,965
19-4051	Nuclear technicians, Nuclear Equipment Operations Technicians Nuclear Monitoring Technicians	62	5	8%	67	72	5	7%	76	9	13%	27	36	\$62,227
47-2111	Electricians	150	1	1%	151	148	-3	-2%	147	-4	-3%	60	81	\$51,966
47-2151	Pipelayers	11	-1	-9%	10	9	-1	-10%	9	-1	-10%	4	5	\$38,130
47-2152	Plumbers, pipefitters, & steamfitters	184	-20	-11%	164	150	-14	-9%	145	-19	-12%	65	88	\$55,810
47-3015	Helpers, pipelayers, plumbers, pipefitters & steamfitters	1	0	0%	1	1	0	0%	1	0	0%	0	1	\$27,762
49-2095	Electrical & electronics repairers, powerhouse, substation, & relay	223	15	7%	238	252	14	6%	266	28	12%	94	128	\$73,674
49-9012	Control & valve installers & repairers, except mechanical door	278	-22	-8%	256	247	-9	-4%	252	-4	-2%	101	138	\$51,522
49-9041	Industrial machinery mechanics	197	11	6%	208	219	11	5%	234	26	13%	82	112	\$42,284
49-9044	Millwright, Mechanic technician	1	0	0%	1	1	0	0%	1	0	0%	0	1	\$64,106
51-4041	Machinist	11	0	0%	11	11	0	0%	11	0	0%	4	6	\$37,579
51-4121	Welders, cutters, solderers, & brazers	65	-1	-2%	64	61	-3	-5%	60	-4	-6%	25	34	\$34,163
51-8012	Power Distributors & Dispatchers	122	1	1%	123	123	0	0%	126	3	2%	49	66	\$75,504
Engineers		610	-5	-1%	605	597	-8	-1%	597	-8	-1%	213	282	\$87,336
11-9041	Engineering Managers	67	-2	-3%	65	64	-1	-2%	63	-2	-3%	23	30	\$112,900
17-2041	Chemical Engineer	11	0	0%	11	11	0	0%	12	1	9%	4	5	\$87,526
17-2051	Civil Engineers	40	-3	-8%	37	36	-1	-3%	36	-1	-3%	13	17	\$66,686
17-2071	Electrical Engineers, Power Systems Engineer, Energy Transmission Engineers	359	5	1%	364	359	-5	-1%	359	-5	-1%	128	170	\$86,361
17-2081	Environmental Engineers	12	0	0%	12	12	0	0%	12	0	0%	4	6	\$68,515
17-2111	Health & Safety engineers, except mining safety engineers & inspectors	12	-1	-8%	11	10	-1	-9%	10	-1	-9%	4	5	\$74,158
17-2141	Mechanical Engineers	26	-1	-4%	25	24	-1	-4%	24	-1	-4%	9	12	\$75,719
17-2161	Nuclear Engineers	83	-3	-4%	80	81	1	1%	81	1	1%	28	37	\$88,782
Total		5,055	50	1%	5,105	5,066	-39	-1%	5,150	45	1%	1,850	2,532	\$66,219

OHIO

SOC Code	Description	2007 Jobs	2007-2012 Change	2007-2012 %Change	2012 Jobs	2017 Jobs	2012-2017 Change	2012-2017 %Change	2022 Jobs	2012-2022 Change	2012-2022 %Change	2012-2017 Projected Attrition & Retirements	2012-2022 Projected Attrition & Retirements	Median Annual Earnings
Lineworkers		3,144	-347	-11%	2,797	2,616	-181	-6%	2,453	-344	-12%	883	1,262	\$59,962
49-1011	First-line supervisors/managers of mechanics, installers, & repairers	567	-75	-13%	492	456	-36	-7%	423	-69	-14%	155	222	\$56,442
49-9051	Electrical power-line installers & repairers	2,577	-272	-11%	2,305	2,160	-145	-6%	2,030	-275	-12%	728	1,040	\$60,721
Plant / Field Operators		1,884	-163	-9%	1,721	1,469	-252	-15%	1,370	-351	-20%	718	943	\$64,938
51-8011	Nuclear power reactor operators	232	-26	-11%	206	199	-7	-3%	192	-14	-7%	86	113	\$78,296
51-8013	Power plant operators	1,521	-146	-10%	1,375	1,131	-244	-18%	1,038	-337	-25%	574	753	\$63,482
51-8092	Gas plant operators	131	9	7%	140	139	-1	-1%	140	0	0%	58	77	\$59,571
Technicians		3,341	-237	-7%	3,104	2,951	-153	-5%	2,821	-283	-9%	1,230	1,673	\$56,484
17-3023	Electrical & Instrumentation Technician, Electrical & electronic engineering technicians	249	-42	-17%	207	189	-18	-9%	172	-35	-17%	82	112	\$54,692
19-4051	Nuclear technicians, Nuclear Equipment Operations Technicians Nuclear Monitoring Technicians	229	-28	-12%	201	222	21	10%	232	31	15%	80	108	\$66,364
47-2111	Electricians	300	-38	-13%	262	231	-31	-12%	209	-53	-20%	104	141	\$46,375
47-2151	Pipelayers	15	3	20%	18	16	-2	-11%	15	-3	-17%	7	10	\$35,097
47-2152	Plumbers, pipefitters, & steamfitters	173	18	10%	191	188	-3	-2%	182	-9	-5%	76	103	\$44,148
47-3015	Helpers, pipelayers, plumbers, pipefitters & steamfitters	1	0	0%	1	1	0	0%	1	0	0%	0	1	\$23,696
49-2095	Electrical & electronics repairers, powerhouse, substation, & relay	756	-65	-9%	691	664	-27	-4%	641	-50	-7%	274	372	\$63,211
49-9012	Control & valve installers & repairers, except mechanical door	564	-18	-3%	546	494	-52	-10%	460	-86	-16%	216	294	\$52,042
49-9041	Industrial machinery mechanics	361	-8	-2%	353	351	-2	-1%	349	-4	-1%	140	190	\$43,122
49-9044	Millwright, Mechanic technician	4	-1	-25%	3	3	0	0%	2	-1	-33%	1	2	\$52,624
51-4041	Machinist	28	-2	-7%	26	23	-3	-12%	21	-5	-19%	10	14	\$37,705
51-4121	Welders, cutters, solderers, & brazers	64	-4	-6%	60	56	-4	-7%	52	-8	-13%	24	32	\$35,189
51-8012	Power Distributors & Dispatchers	597	-52	-9%	545	513	-32	-6%	485	-60	-11%	216	294	\$71,261
Engineers		1,443	-193	-13%	1,250	1,159	-91	-7%	1,077	-173	-14%	440	585	\$84,582
11-9041	Engineering Managers	176	-23	-13%	153	135	-18	-12%	121	-32	-21%	54	72	\$111,698
17-2041	Chemical Engineer	18	2	11%	20	19	-1	-5%	19	-1	-5%	7	9	\$85,571
17-2051	Civil Engineers	60	-3	-5%	57	55	-2	-4%	53	-4	-7%	20	27	\$68,698
17-2071	Electrical Engineers, Power Systems Engineer, Energy Transmission Engineers	659	-95	-14%	564	516	-48	-9%	472	-92	-16%	199	264	\$77,193
17-2081	Environmental Engineers	18	-3	-17%	15	15	0	0%	14	-1	-7%	5	7	\$83,138
17-2111	Health & Safety engineers, except mining safety engineers & inspectors	15	-1	-7%	14	12	-2	-14%	11	-3	-21%	5	7	\$75,544
17-2141	Mechanical Engineers	56	-4	-7%	52	49	-3	-6%	45	-7	-13%	18	24	\$71,166
17-2161	Nuclear Engineers	441	-66	-15%	375	358	-17	-5%	342	-33	-9%	132	175	\$89,167
Total		9,812	-940	-10%	8,872	8,195	-677	-8%	7,721	-1,151	-13%	3,271	4,463	\$63,179

WISCONSIN

SOC Code	Description	2007 Jobs	2007-2012 Change	2007-2012 %Change	2012 Jobs	2017 Jobs	2012-2017 Change	2012-2017 %Change	2022 Jobs	2012-2022 Change	2012-2022 %Change	2012-2017 Projected Attrition & Retirements	2012-2022 Projected Attrition & Retirements	Median Annual Earnings
Lineworkers		1,929	-27	-1%	1,902	1,747	-155	-8%	1,730	-172	-9%	600	858	\$66,888
49-1011	First-line supervisors/managers of mechanics, installers, & repairers	373	-17	-5%	356	311	-45	-13%	295	-61	-17%	112	161	\$58,920
49-9051	Electrical power-line installers & repairers	1,556	-10	-1%	1,546	1,436	-110	-7%	1,435	-111	-7%	488	697	\$68,690
Plant / Field Operators		813	-39	-5%	774	727	-47	-6%	738	-36	-5%	324	424	\$63,248
51-8011	Nuclear power reactor operators	146	5	3%	151	145	-6	-4%	150	-1	-1%	63	83	\$79,673
51-8013	Power plant operators	591	-39	-7%	552	528	-24	-4%	540	-12	-2%	231	302	\$56,181
51-8092	Gas plant operators	76	-5	-7%	71	54	-17	-24%	48	-23	-32%	30	39	\$82,264
Technicians		1,395	-79	-6%	1,316	1,193	-123	-9%	1,185	-131	-10%	520	709	\$58,234
17-3023	Electrical & Instrumentation Technician, Electrical & electronic engineering technicians	152	-8	-5%	144	126	-18	-13%	121	-23	-16%	57	78	\$52,938
19-4051	Nuclear technicians, Nuclear Equipment Operations Technicians Nuclear Monitoring Technicians	63	-12	-19%	51	54	3	6%	57	6	12%	20	27	\$60,075
47-2111	Electricians	158	-13	-8%	145	129	-16	-11%	125	-20	-14%	57	78	\$49,833
47-2151	Pipelayers	2	-1	-50%	1	1	0	0%	1	0	0%	0	1	\$38,290
47-2152	Plumbers, pipefitters, & steamfitters	70	-7	-10%	63	52	-11	-17%	46	-17	-27%	25	34	\$59,949
47-3015	Helpers, pipelayers, plumbers, pipefitters & steamfitters	0	0	0%	0	0	0	0%	0	0	0%	0	0	\$23,873
49-2095	Electrical & electronics repairers, powerhouse, substation, & relay	201	-37	-18%	164	175	11	7%	190	26	16%	65	88	\$77,293
49-9012	Control & valve installers & repairers, except mechanical door	301	-4	-1%	297	236	-61	-21%	219	-78	-26%	118	160	\$55,162
49-9041	Industrial machinery mechanics	218	5	2%	223	213	-10	-4%	220	-3	-1%	88	120	\$46,100
49-9044	Millwright, Mechanic technician	2	0	0%	2	1	-1	-50%	2	0	0%	1	1	\$49,774
51-4041	Machinist	17	0	0%	17	15	-2	-12%	14	-3	-18%	7	9	\$38,569
51-4121	Welders, cutters, solderers, & brazers	41	-2	-5%	39	33	-6	-15%	31	-8	-21%	15	21	\$37,760
51-8012	Power Distributors & Dispatchers	170	0	0%	170	158	-12	-7%	159	-11	-6%	67	92	\$78,915
Engineers		751	-37	-5%	714	620	-94	-13%	585	-129	-18%	251	334	\$81,729
11-9041	Engineering Managers	91	-1	-1%	90	76	-14	-16%	71	-19	-21%	32	42	\$101,967
17-2041	Chemical Engineer	6	-2	-33%	4	5	1	25%	4	0	0%	1	2	\$73,840
17-2051	Civil Engineers	40	0	0%	40	34	-6	-15%	33	-7	-18%	14	19	\$69,091
17-2071	Electrical Engineers, Power Systems Engineer, Energy Transmission Engineers	405	-12	-3%	393	339	-54	-14%	319	-74	-19%	138	184	\$75,537
17-2081	Environmental Engineers	16	0	0%	16	14	-2	-13%	13	-3	-19%	6	7	\$76,232
17-2111	Health & Safety engineers, except mining safety engineers & inspectors	7	-1	-14%	6	5	-1	-17%	5	-1	-17%	2	3	\$62,920
17-2141	Mechanical Engineers	32	0	0%	32	28	-4	-13%	27	-5	-16%	11	15	\$68,276
17-2161	Nuclear Engineers	154	-21	-14%	133	119	-14	-11%	113	-20	-15%	47	62	\$94,492
Total		4,888	-182	-4%	4,706	4,287	-419	-9%	4,238	-468	-10%	1,695	2,325	\$66,121

ABOUT THIS REPORT

This report was produced in collaboration between the Center for Energy Workforce Development (CEWD) and Economic Modeling Specialists, Inc. (EMSI).

REGION DEFINITIONS

Northwest	West	Midwest	Mid-Atlantic	South	Southeast	Northeast
Alaska	California	Minnesota	Virginia	Arkansas	Mississippi	Maine
Idaho	Nevada	Iowa	West Virginia	Louisiana	Tennessee	New Hampshire
Montana	Hawaii	Kansas	Pennsylvania	Oklahoma	Kentucky	Vermont
Oregon	Arizona	Missouri	Delaware	Texas	Alabama	Massachusetts
Washington	New Mexico	Illinois	Maryland		Georgia	Rhode Island
Wyoming		Wisconsin	Washington DC		Florida	Connecticut
Utah		Indiana			South Carolina	New York
Colorado		Ohio			North Carolina	New Jersey
South Dakota		Michigan				
North Dakota						
Nebraska						

ABOUT CEWD

Formed in March 2006, the Center for Energy Workforce Development (CEWD) is a non-profit consortium of electric, natural gas, and nuclear utilities and their associations—Edison Electric Institute, American Gas Association, Nuclear Energy Institute, and National Rural Electric Cooperative Association. CEWD was formed to help utilities work together to develop solutions to the coming workforce shortage in the utility industry. It is the first partnership between utilities, their associations, contractors and unions to focus on the need to build a skilled workforce pipeline that will meet future industry needs. Our mission is to build the alliances, processes, and tools to develop tomorrow’s energy workforce. For more information about CEWD, visit us at www.cewd.org, or call us at 202.638.5802.

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Economic Modeling Specialists International (EMSI), a CareerBuilder company, is a leading provider of economic impact studies, labor market data, data-driven reports, and custom

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EMSI's understands that a skilled, well-prepared workforce drives economic prosperity. The successful development of that workforce requires the right training, recruiting, hiring, and planning. These activities are largely dependent on our ability to process data that illuminates many facets of employment and human capital so that we can make better decisions. EMSI is here to provide that data. For more information about EMSI, visit us at www.economicmodeling.com, or call us toll-free at 866.999.3674.

APPENDIX A

Industry & Occupation Definitions

NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM

Industry descriptions are taken from the North American Industry Classification System (NAICS) website.* The NAICS codes listed below are those requested by CEWD for this report.

Electric Distribution (NAICS 221122)—This U.S. industry comprises electric power establishments primarily engaged in either (1) operating electric power distribution systems (i.e., consisting of lines, poles, meters, and wiring) or (2) operating as electric power brokers or agents that arrange the sale of electricity via power distribution systems operated by others.

Fossil Fuel Energy (NAICS 221112)—This U.S. industry comprises establishments primarily engaged in operating fossil fuel powered electric power generation facilities. These facilities use fossil fuels, such as coal, oil, or gas, in internal combustion or combustion turbine conventional steam process to produce electric energy. The electric energy produced in these establishments is provided to electric power transmission systems or to electric power distribution systems.

Nuclear Energy (NAICS 221113)—This U.S. industry comprises establishments primarily engaged in operating nuclear electric power generation facilities. These facilities use nuclear power to produce electric energy. The electric energy produced in these establishments is provided to electric power transmission systems or to electric power distribution systems.

Natural Gas (NAICS 221210)—This industry comprises: (1) establishments primarily engaged in operating gas distribution systems (e.g., mains, meters); (2) establishments known as gas marketers that buy gas from the well and sell it to a distribution system; (3) establishments known as gas brokers or agents that arrange the sale of gas over gas distribution systems operated by others; and (4) establishments primarily engaged in transmitting and distributing gas to final consumers.

Electric Bulk Transmission (NAICS 221121)—This U.S. industry comprises establishments primarily engaged in operating electric power transmission systems and/or controlling (i.e., regulatory voltage) the transmission of electricity from the generating source to distribution centers or other electric utilities. The transmission system includes lines and transformer stations.

Hydroelectric Energy (NAICS 221111)—This U.S. industry comprises establishments primarily engaged in operating hydroelectric power generation facilities. These facilities use water power to drive a turbine and produce electric energy. The electric energy produced

* U.S. Census Bureau, "North American Industry Classification System (NAICS)." <http://www.census.gov/eos/www/naics/> (accessed April 26, 2012).

in these establishments is provided to electric power transmission systems or to electric power distribution systems.

Other Electric Energy (NAICS 221119)—This U.S. industry comprises establishments primarily engaged in operating electric power Generation facilities (except hydroelectric, fossil fuel, nuclear). These facilities convert other forms of energy, such as solar, wind, or tidal power, into electrical energy. The electric energy produced in these establishments is provided to electric power transmission systems or to electric power distribution systems.

STANDARD OCCUPATION CLASSIFICATIONS

Standard Occupation Classification (SOC) employment codes are taken from the U.S. Department of Labor, Bureau of Labor Statistics.* The SOCs listed below are those requested by CEWD for this report.

LINWORKERS:

49-1011 First-Line Supervisors of Mechanics, Installers, and Repairers—Directly supervise and coordinate the activities of mechanics, installers, and repairers. Excludes team or work leaders.

49-9051 Electrical Power-Line Installers and Repairers—Install or repair cables or wires used in electrical power or distribution systems. May erect poles and light or heavy-duty transmission towers. Excludes “Electrical and Electronics Repairers, Powerhouse, Substation, and Relay” (49-2095).

PLANT/FIELD OPERATORS:

51-8011 Nuclear Power Reactor Operators—Operate or control nuclear reactors. Move control rods, start and stop equipment, monitor and adjust controls, and record data in logs. Implement emergency procedures when needed. May respond to abnormalities, determine cause, and recommend corrective action.

51-8013 Power Plant Operators—Control, operate, or maintain machinery to generate electric power. Includes auxiliary equipment operators. Excludes “Nuclear Power Reactor Operators” (51-8011).

51-8092 Gas Plant Operators—Distribute or process gas for utility companies and others by controlling compressors to maintain specified pressures on main pipelines.

TECHNICIANS:

17-3023 Electrical and Electronics Engineering Technicians—Apply electrical and electronic theory and related knowledge, usually under the direction of engineering staff, to design, build, repair, calibrate, and modify electrical components, circuitry, controls, and machinery for subsequent evaluation and use by engineering staff in making engineering

* U.S. Department of Labor, Bureau of Labor Statistics, http://www.bls.gov/soc/major_groups.htm (accessed April 26, 2012).

design decisions. Excludes “Broadcast Technicians” (27-4012).

19-4051 Nuclear Technicians—Assist nuclear physicists, nuclear engineers, or other scientists in laboratory or production activities. May operate, maintain, or provide quality control for nuclear testing and research equipment. May monitor radiation.

47-2111 Electricians—Install, maintain, and repair electrical wiring, equipment, and fixtures. Ensure that work is in accordance with relevant codes. May install or service street lights, intercom systems, or electrical control systems. Excludes “Security and Fire Alarm Systems Installers” (49-2098).

47-2151 Pipelayers—Lay pipe for storm or sanitation sewers, drains, and water mains. Perform any combination of the following tasks: grade trenches or culverts, position pipe, or seal joints. Excludes “Welders, Cutters, Solderers, and Brazers” (51-4121).

47-2152 Plumbers, Pipefitters, and Steamfitters—Assemble, install, alter, and repair pipelines or pipe systems that carry water, steam, air, or other liquids or gases. May install heating and cooling equipment and mechanical control systems. Includes sprinklerfitters.

47-3015 Helpers - Pipelayers, Plumbers, Pipefitters, and Steamfitters—Help plumbers, pipefitters, steamfitters, or pipelayers by performing duties requiring less skill. Duties include using, supplying or holding materials or tools, and cleaning work area and equipment. Construction laborers who do not primarily assist plumbers, pipefitters, steamfitters, or pipelayers are classified under “Construction Laborers” (47-2061). Apprentice workers are classified with the appropriate skilled construction trade occupation (47-2011 through 47-2231).

49-2095 Electrical and Electronics Repairers, Powerhouse, Substation, and Relay—Inspect, test, repair, or maintain electrical equipment in generating stations, substations, and in-service relays.

49-9012 Control and Valve Installers and Repairers, Except Mechanical Door—Install, repair, and maintain mechanical regulating and controlling devices, such as electric meters, gas regulators, thermostats, safety and flow valves, and other mechanical governors.

49-9041 Industrial Machinery Mechanics—Repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems. Excludes “Millwrights” (49-9044), “Mobile Heavy Equipment Mechanics, Except Engines” (49-3042), and “Maintenance Workers, Machinery” (49-9043).

49-9044 Millwrights—Install, dismantle, or move machinery and heavy equipment according to layout plans, blueprints, or other drawings.

51-4041 Machinists—Set up and operate a variety of machine tools to produce precision parts and instruments. Includes precision instrument makers who fabricate, modify, or repair mechanical instruments. May also fabricate and modify parts to make or repair machine tools or maintain industrial machines, applying knowledge of mechanics, mathematics, metal properties, layout, and machining procedures.

51-4121 Welders, Cutters, Solderers, and Brazers—Use hand-welding, flame-cutting, hand

soldering, or brazing equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.

51-8012 Power Distributors and Dispatchers—Coordinate, regulate, or distribute electricity or steam.

ENGINEERS:

11-9041 Architectural and Engineering Managers—Plan, direct, or coordinate activities in such fields as architecture and engineering or research and development in these fields. Excludes “Natural Sciences Managers” (11-9121).

17-2041 Chemical Engineers—Design chemical plant equipment and devise processes for manufacturing chemicals and products, such as gasoline, synthetic rubber, plastics, detergents, cement, paper, and pulp, by applying principles and technology of chemistry, physics, and engineering.

17-2051 Civil Engineers—Perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures, and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, and water and sewage systems. Includes architectural, structural, traffic, ocean, and geo-technical engineers. Excludes “Hydrologists” (19-2043).

17-2071 Electrical Engineers—Research, design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use. Excludes “Computer Hardware Engineers” (17-2061).

17-2081 Environmental Engineers—Research, design, plan, or perform engineering duties in the prevention, control, and remediation of environmental hazards using various engineering disciplines. Work may include waste treatment, site remediation, or pollution control technology.

17-2111 Health and Safety Engineers, Except Mining Safety Engineers and Inspectors—Promote worksite or product safety by applying knowledge of industrial processes, mechanics, chemistry, psychology, and industrial health and safety laws. Includes industrial product safety engineers.

17-2141 Mechanical Engineers—Perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance, and repair of equipment such as centralized heat, gas, water, and steam systems.

17-2161 Nuclear Engineers—Conduct research on nuclear engineering projects or apply principles and theory of nuclear science to problems concerned with release, control, and use of nuclear energy and nuclear waste disposal.

