Iowa State Board
of Education

Executive Summary

September 14, 2017

Agenda Item: Iowa Sector Partnerships

Iowa Goal(s): Goal 2: All PK-12 students will achieve at a high level.

Goal 3: Individuals will pursue postsecondary education in order to drive economic success

State Board Role/Authority: This presentation is designed to provide information only as the State Board provides leadership and advocacy for the education system in Iowa.

Presenter(s): Barbara Burrows, Chief Bureau of Community Colleges

Joe Collins, Education Program Consultant Bureau of Community Colleges

Attachment(s): Four

Recommendation: It is recommended that the State Board hear and discuss this information.

Background: Sector partnerships are an effective, collective impact strategy for aligning education, workforce development, and community services and developing career pathways to address industry-identified labor market needs. The Inventory of Sector Partnerships in Iowa report provides an overview of the current status of partnership development.
The collection of regional sector partnerships in Iowa are similar to a singular business entity in need of the leadership, support, and guidance from the visionary members of the industry-led Sector Partnership Leadership Council (SPLC). Relying on expertise and leveraging personal and professional relationships within given organizations, industries, and communities, the SPLC shall primarily provide the following four types of support for the development, growth, and sustainability of regional sector partnerships in Iowa.

1) **EQUIP**
   (Shared vision and goals)
   Develop and implement a unified set of standards, policies, metrics, training materials, and other resources to guide sector partnerships across the state.

2) **EMPOWER**
   (Training & capacity)
   Identify and assist with the technical and financial resources necessary to empower sector partnerships across the state towards the successful attainment of their short, mid, and long-term goals.

3) **PROMOTE**
   (Awareness and outreach)
   Increase awareness and cultivate excitement about sector partnership work across the state through various outreach initiatives by way of personal and professional networking channels.

4) **CHAMPION**
   (Legislation and policy advocacy)
   Shape, implement, and advocate for changes in public policy designed to accelerate the growth and enhance the effectiveness of regional sector partnerships.


**Sector Partnership Relational Model**

Although inclusive and robust, sector partnerships are only one aspect of the larger strategy surrounding workforce, economic, and community development. The state of Iowa drafted and approved a *Unified State Plan* in 2016, based on the guidelines and recommendations outlined in the Workforce Innovation and Opportunity Act (WIOA) of 2014. The plan created in Iowa is similar to how other states are approaching workforce issues, yet it is also unique in many ways. The chart below is meant to assist Iowa’s interrelated groups with their role in this larger statewide strategy. Local sector partnership teams should utilize this general illustration to build a customized relational model for their unique community representation and needs. A key aspect to the success of these initiatives is strong, clear, and consistent communication between the interrelated groups.

**Definitions/Roles:**

**State Workforce Development Board (SWDB)**

- Statewide board with duties that include, but are not limited to, assisting the Governor in the development and continuous improvement of the workforce development system in Iowa, including the development and expansion of strategies for meeting the needs of employers, workers, and jobseekers, particularly through industry or sector partnerships related to in-demand industry sectors and occupations.
Local Workforce Development Boards (LWDB)

- Local groups created to lead efforts to engage with a diverse range of employers and with entities in the region involved to develop and implement proven and promising strategies for meeting the employment and skill needs of workers and employers (such as the establishment of industry and sector partnerships), that provide the skilled workforce needed by employers in the region, and that expand employment and career advancement opportunities for workforce development system participants in in-demand industry sectors or occupations. Sometimes referred to as a Regional Workforce Development Board (RWDB).

Local Sector Partnership Standing Committee (LSPSC)

- An optional specialized standing committee of each LWDB that represents and focuses specifically on issues relating to sector partnerships within each region. Members will also facilitate information and updates relating to the SWDB and LWDB back to their respective regional sector partnership groups. Consistent interaction and collaboration between LSPSC’s across the state is also recommended.

Sector Partnership Leadership Council (SPLC)

- A public/private entity that provides leadership and guidance on issues related to sector partnerships in Iowa. Relying on expertise and leveraging professional relationships within given organizations, industries, and communities, the SPLC supports the development, growth, and sustainability of regional sector partnerships across the state. The SPLC serves in a formal advisory role to the SWDB on matters related to sector partnerships. Convened and supported by the Iowa Department of Education.

Local Sector Partnership

- Consortium led by local Business and industry members who meet to collectively resolve shared workforce issues. Reinforced by a wide array of local support partners, including but not limited to, workforce development, education, economic development, public sector, and community-based organizations. The Iowa Department of Education is leading efforts to connect and assist the approximately 60 groups currently in operation across the state.
Inventory of Sector Partnerships in Iowa
June 2017
# Table of Contents

Project Background and Methodology ............................................................................. 2  
Sector Partnership Background ...................................................................................... 3  
Geography, Industry & Occupations .............................................................................. 4  
History and Structure ....................................................................................................... 6  
Partnership Engagement .................................................................................................... 8  
Current Work and Projects .............................................................................................. 9  
Accomplishments and Areas for Improvement ............................................................... 10  
Success ............................................................................................................................... 11  
Resources and Opportunities Needed ............................................................................ 12  
Key Takeaways .................................................................................................................. 13  
Sector Partnership Contacts .......................................................................................... 15
PROJECT BACKGROUND AND METHODOLOGY

Project Objective

In support of Iowa Central Community College, Iowa Workforce Development, and the Iowa Department of Education Community College Division (IDOE), the University of Northern Iowa’s researchiQ (a collaboration between Strategic Marketing Services and Institute for Decision Making) conducted quantitative and qualitative primary research, along with supplementary secondary market research, to develop an inventory of sector partnerships across the state of Iowa. A sector partnership is defined as “a workforce collaborative that organizes key stakeholders and targeted industry partners into a sustainable working group focused on the long-term workforce needs of a targeted industry cluster” (Sector Partnership & Career Pathway Advisory Council Overview and Survey Findings, December 2015).

Project Methodology

In order to achieve the stated objective, researchiQ first conducted secondary research to identify sector partnerships in Iowa (above and beyond those identified by IDOE), including collaborative entities driven by Iowa’s 15 community colleges, as well as nonprofits, educators, and other community partners. researchiQ worked in conjunction with IDOE team members to develop a set of in-depth interview questions designed to collect information that supports the overall project objective.

In-depth interviews were conducted with approximately 60 sector partnerships by employing an approach of in-person, telephone, and e-mail interviews, with a preference of in-person interviews conducted whenever possible. The primary lines of questioning assessed the following data sets for each sector partnership (where available):

- Industry/sector of focus
- Geographic area of focus
- Length of existence/History/Structure
- Membership list
- Partnership engagement
- Current work, projects, task groups, subcommittees
- Accomplishments/success stories and set-backs/areas for improvement
- List of needs, hopes, desires, or requests

Interviews Conducted

- In-Person: 60.0%
- Email: 23.3%
- Telephone: 10.0%
- Other: 6.7%
## Sector Partnership Background

### Definitions

**Sector Partnership** – a workforce collaborative that organizes key stakeholders and targeted industry partners into a sustainable working group that focuses on the long-term workforce needs of a targeted industry cluster.

**Convener** – a credible entity in a position to identify regional economic and labor needs and convene industry and support partners to develop strategies which address the identified regional needs.

**Facilitator** – a neutral, credible, and trained entity tasked with ensuring the ongoing operation and sustainability of a sector partnership.

**Chair or Lead Partner** – Industry partner designated as chair or lead partner.

### Status

- **3.3%** In the process of being formed
- **18.3%** Currently running
- **78.3%** On hiatus or break in service

### Convener

<table>
<thead>
<tr>
<th>Sector</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community College</td>
<td>67.8%</td>
</tr>
<tr>
<td>Economic Development Organizations</td>
<td>20.3%</td>
</tr>
<tr>
<td>Workforce Development Organizations</td>
<td>10.2%</td>
</tr>
<tr>
<td>Industry Partner</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

### Facilitator

- **61.0%** Yes, designated & trained facilitator
- **20.3%** Yes, interim facilitator
- **18.6%** No

### Chair or Lead Partner

- **42.4%** Yes, designated chair or lead partner
- **5.1%** No, but has engaged an industry partner to chair or lead
- **52.5%** No
**Geography, Industry & Occupations**

### Sector Partnership Convener Locations by Industry

*The map indicates the location of each sector partnership convener by industry, with pie charts indicating multiple sector partnerships in the location.*

### Industry Area of Focus

<table>
<thead>
<tr>
<th>Industry Area of Focus</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, Food and Natural Resources</td>
<td>20.0%</td>
</tr>
<tr>
<td>Architecture and Construction</td>
<td>16.7%</td>
</tr>
<tr>
<td>Business Management and Administration</td>
<td>11.7%</td>
</tr>
<tr>
<td>Finance</td>
<td>13.3%</td>
</tr>
<tr>
<td>Health Science</td>
<td>28.3%</td>
</tr>
<tr>
<td>Information Technology</td>
<td>31.7%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>40.0%</td>
</tr>
<tr>
<td>STEM</td>
<td>21.7%</td>
</tr>
<tr>
<td>Transportation, Distribution, and Logistics</td>
<td>20.0%</td>
</tr>
<tr>
<td>Other</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

*The top industry of focus for sector partnerships in Iowa is Manufacturing (40.0%), followed by Information Technology (30.0%) and Health Science (28.3%). The other industry mentioned is Education.*

N=60
**Geography, Industry & Occupations**

**Focus on Career Cluster**

- N=59
- 15.3% Yes
- 6.8% No, but we plan to add
- 78.0% No, don’t see a need

**Top 5 Career Cluster Categories**

1. Manufacturing (15)
2. Healthcare (9)
3. Technology (9)
4. Transportation & Logistics (7)
5. Construction (4)

The map indicates the number of sector partnerships serving each county, including six counties outside of Iowa.

**Geographic Area of Focus**

- 73.7% Regional
- 14.0% County
- 10.5% City
- 1.8% Statewide

**Note:** Benton County has the highest number of sector partnerships, as both Hawkeye Community College and Kirkwood Community College cover this county. In addition, the Iowa Energy Workforce Consortium covers all 99 counties in Iowa.

**Affiliations**

95.0% Affiliated with secondary / postsecondary organizations

54.2% Affiliated with local school districts

77.2% Affiliated or plan to affiliate with industry associations, trade organizations, or unions
**History and Structure**

The majority (62.1%) of sector partnerships in Iowa were established in 2015 or later.

### Active and Engaged Industry Partners

- **1 to 5**
  - 10.2%
- **6 to 10**
  - 30.6%
- **11 to 15**
  - 24.5%
- **16 or more**
  - 34.7%

### Active and Engaged Support Partners

- No support partners
  - 6.1%
- **1 to 4**
  - 36.7%
- **5 to 9**
  - 34.7%
- **10 or more**
  - 22.4%

### Year Established

- **2009** (2)
- **2010** (2)
- **2011** (3)
- **2012** (2)
- **2013** (1)
- **2014** (11)
- **2015** (17)
- **2016** (8)
- **2017** (11)

### Subcommittees

- **10.0%**
- **30.0%**
- **60.0%**

### Top Areas of Focus

1. Based on goals/objectives
2. Training
3. Education
4. Marketing
5. Programming
6. Awareness of Careers
7. Recruitment/Networking
8. Apprenticeships & Internships
9. Building the pipeline

### Marketing

- **23.6%**
  - Have a website, and 60.0% plan to in the future
- **8.8%**
  - Have branded materials or a logo, and 49.1% plan to in the future
**History and Structure**

**Maturity Level**

**Planning**
A convener is determining whether the partnership really makes sense for their community, considering or preparing for actions needed to launch a partnership, and working to identify partners who would be involved.

**Emerging**
The sector partnership has at least an interim facilitator, has engaged at least one private sector champion to help drive the launch and implementation, includes support partners from workforce development, education, economic development, etc., and is engaged in networking with mature sector partnerships.

**Mature**
The sector partnership has a clear neutral facilitator, is led by industry, has broad industry engagement, includes critical and engaged support partners, operates in a true labor market region, operates under a shared, long-term strategic plan, has developed at least one effective, employer-validated career pathway, has clear, identified priorities, and has common agreed-upon dashboard of success indicators.

**Formalized Contract or Structure**
- Charter (4)
- Memorandum of understanding (3)
- By-laws (2)

**Additional Written or Unwritten Guidelines**
- Meeting length and time (11)
- Large business to support partner ratio (10)
- Mission statement (4)
- Participation and attendance (4)
- Serve on committee (3)
- Leadership terms (3)
- Member expectations (3)
### Partnership Engagement

#### Meeting Frequency

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twice a Year</td>
<td>11.7%</td>
</tr>
<tr>
<td>Quarterly</td>
<td>35.0%</td>
</tr>
<tr>
<td>Quarterly or Every Other Month</td>
<td>18.3%</td>
</tr>
<tr>
<td>Every Other Month</td>
<td>6.7%</td>
</tr>
<tr>
<td>Monthly</td>
<td>23.3%</td>
</tr>
<tr>
<td>To Be Determined</td>
<td>5.0%</td>
</tr>
</tbody>
</table>

The majority (60.0%) of sector partnerships prefer to meet quarterly or every other month.

#### Meeting Location

<table>
<thead>
<tr>
<th>Location</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community College Facility</td>
<td>32.2%</td>
</tr>
<tr>
<td>Rotate Locations</td>
<td>30.5%</td>
</tr>
<tr>
<td>To Be Determined</td>
<td>16.9%</td>
</tr>
<tr>
<td>Economic Development Facility</td>
<td>8.5%</td>
</tr>
<tr>
<td>City Facility</td>
<td>6.8%</td>
</tr>
<tr>
<td>Other</td>
<td>5.1%</td>
</tr>
</tbody>
</table>

#### Agenda

- Current Developments & Program Updates (54.2%)
- Workforce Issues (27.1%)
- Goal Progress (23.7%)
- Training Needs (22.0%)
- Employer Needs (20.3%)
- Subcommittee Work Time (20.3%)
- Still Developing Agenda (18.6%)
- Marketing (15.3%)
- Guest Speaker (13.6%)
- Career Exposure in Area Schools (10.2%)
- Upcoming Events (8.5%)
- Curriculum Development (6.8%)
- Best Practices & Success Stories (6.8%)

#### Preferences

- 100% Prefer in-person meetings.
- 5.0% Also prefer conference calls and Skype for meetings.

Operate according to a shared, long-term strategic plan. In the process of developing a strategic plan.

Prefer in-person meetings. Also prefer conference calls and Skype for meetings.
CURRENT WORK AND PROJECTS

Short-term Goals
- Career Awareness in Schools (32.4%)
- Continuing to Develop Goals (29.7%)
- Workforce Training and Skill Development (29.7%)
- Develop Career Pathway (16.2%)
- Marketing Campaign / Website / Video Promotion (16.2%)
- Work-Based Learning Opportunities (10.8%)

61.7% have short-term goals

Mid-term Goals
- Career Awareness in Schools (33.3%)
- Marketing (25.0%)
- Work-Based Learning Opportunities (25.0%)
- New Programming (25.0%)
- Social Media / Website (16.7%)
- Workforce Training (16.7%)

20.0% have mid-term goals

Long-term Goals
- Develop Strong Pipeline (59.5%)
- Career Awareness in Schools (38.1%)
- Developing Curriculum (26.2%)
- Develop Strategic Plan and Goals (19.0%)
- Work-Based Learning Opportunities (16.7%)
- Change Industry Perception (11.9%)

70.0% have long-term goals

Developed and Validated Career Pathways

- Yes, at least one (38.3%)
- No, but in the process (16.7%)
- No, but would like to (11.7%)
- No, not been developed (33.3%)

A **career pathway** consists of structured course sequences which organize rigorous and high-quality education, training, and other services related to a targeted industry cluster to meet the education and skill needs of the region and state, and the particular needs of an individual, all in the context of workforce preparation.

Manufacturing (27.3%)
Healthcare (24.2%)
To Be Determined (18.1%)
Transportation & Logistics (9.1%)
Information Technology (6.1%)
Agriculture & Energy (6.1%)
Construction (6.1%)
Financial Services (3.0%)
Areas Working Well

1. Programming (37.2%)
2. Collaboration (32.6%)
3. Actionable Goals (30.2%)
4. High School Engagement (18.6%)
5. Strong Industry Leadership (16.3%)
6. Participation & Engagement (14.0%)
7. Subcommittees (9.3%)
8. Sharing Information & Success Stories (9.3%)
9. Other - Career Pathway, Trained Facilitator, & Membership Increasing (7.0%)

“Getting the group together and talking about programs has worked well so far. A CDL program was established as a result of the sector partnership, with 150 people successfully completing the program.”

“All educational institutions are participating in this sector board, which has been valuable to develop curriculum and improve relationships with area employers.”

Areas That Need Improvement

1. Participation & Engagement (69.0%)
2. Understanding the Value of Sector Partnerships (11.9%)
3. Industry Taking Leadership (9.5%)
4. Diversity in Careers (7.1%)
5. Focus on Goals (7.1%)
6. Finding the Right People to Be Involved (7.1%)
7. Scheduling (7.1%)

“Consistent involvement from employers – I don’t feel most employers are engaged to participate and lead.”

“Actual goal setting and formal strategic planning could use improvement.”

“There is so much diversity in health care, and the group is looking to find commonalities and be accommodating to differing needs of the industry partners.”

“Engagement is high and the business partners own the work. There is excitement and many leaders are willing to step up and are open to new ideas.”

Factors Attributing to These Areas

Understanding business needs and being flexible are the top factors that attribute to the areas working well. Multiple respondents also cited participation and engagement or strong leadership as factors.

The top factors driving the areas that need improvement include businesses having limited time, a large number of groups that have similar goals, struggles in rural communities to bring businesses together, and weak industry leadership.
**SUCCESS**

### Definition of Success

<table>
<thead>
<tr>
<th>Goals</th>
<th>Workforce Needs</th>
<th>New Group</th>
<th>Awareness</th>
<th>Pipeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accomplishing goals is the top definition of success, mentioned by 44.1% of sector partnerships.</td>
<td>Meeting skilled workforce needs (23.7%).</td>
<td>18.6% are still new groups and are developing their definitions of success.</td>
<td>Building career awareness in high schools is considered a sign of success by 15.3%.</td>
<td>13.6% believe success comes with building a strong pipeline of skilled employees.</td>
</tr>
</tbody>
</table>


### Training

- Training the workforce with an increase in employment within the industry (13.6%).

### Participation

- Participation and engagement of industry partners (8.5%).

### Impact

- Having a positive impact on the industry (6.8%).

### Collaboration

- Building a larger network and collaborating with industry partners (6.8%).

### Career Pathway

- Developing a career pathway (5.1%).

20 percent of sector partnerships have established common, measurable indicators of success. Some examples include benchmarks, enrollment in programs, number of projects launched, number of tours, and number of goals accomplished.

Success indicators are most often updated yearly, or sometimes twice a year or more frequently depending on the project. Several sector partnerships do not update their success indicators or plan to in the future.

A total of 21 sector partnerships would be interested in receiving assistance to develop success indicators, and 15 others would be interested in knowing what other groups are doing, but believe the success indicators still need to be developed based on member needs.
RESOURCES AND OPPORTUNITIES NEEDED

1. **Funding**
   - Maintaining funding for areas of support would help sector partnerships to continue accomplishing goals, including funds for marketing, equipment, initiatives, technology, staff, trained facilitator and meals at meetings.

2. **Participation**
   - Increased participation and engagement by industry partners is needed. Ideas would be welcomed on topics to discuss or guest speakers to bring in to make meetings more engaging.

3. **Marketing**
   - Assistance with marketing campaigns and brochure development, as well as marketing funds for job opportunities and promotion of sector board successes statewide would be beneficial.

4. **Value**
   - Training provided to industry partners on the value of sector partnerships would help them understand the purpose. Assistance at the state level in promoting the value of sector partnerships would also be appreciated.

5. **Collaboration**
   - Many sector partnerships would see value in collaboration with similar industry sector boards, comparable to the monthly calls that already occur to connect manufacturing sector partnerships throughout the state.

6. **Rules & Regulations**
   - Several sector partnerships emphasized the need for increased work-based learning regulations. Sector partnerships are also concerned state-level rules will be mandated upon them in the future that will negatively impact their local efforts.

7. **State Level Resources**
   - State-level resources such as a one-page summary about sector partnerships would be helpful. Federal grant proposals would also help to leverage funds to move ahead. Creating structure and funding available at the state level would help sector partnerships keep moving forward.

8. **Facilitator Training**
   - Sector partnerships would like to have assistance with finding a neutral, outside facilitator and have facilitator training headed by the state.

9. **State Technical Assistance**
   - Assistance from the state would be appreciated in facilitation or convening of meetings, development of success indicators, and conducting strategic planning.

10. **CTE Advisory Boards**
    - It would be helpful for CTE advisory boards to be a part of the sector boards to allow further collaboration between school districts and industry partners.

---

29. **Sector partnerships are lacking representation from business/industry or support partners. The majority of these are new groups that are still recruiting participants. Others would like to see more school districts, rural companies, and smaller industry partners represented.**

---

Produced by researchiQ, June 2017
**KEY TAKEAWAYS**

**Sector Partnership Background**

- The majority of sector partnerships were convened by community colleges (67.8%) or economic development organizations (20.3%). Most groups have a designated or trained facilitator (61.0%), while less than half have a designated chair or lead partner (42.0%). Over three-fourths of sector partnerships are currently running, and another nearly 18.3% are in the process of being formed.

**Geography and Industry**

- The top industries of focus for sector partnerships in Iowa are Manufacturing (40.0%), followed by Information Technology (30.0%) and Health Sciences (28.3%). The majority of sector partnerships (78.0%) focus on career clusters, with the top career cluster categories being Manufacturing, Healthcare, Technology, Transportation & Logistics, and Construction.
- Nearly all (95.0%) sector partnerships are affiliated with secondary/postsecondary organizations, and 77.2% are affiliated or plan to affiliate with industry associations, trade organizations, or unions.

**History and Structure**

- Most sector partnerships in Iowa (62.1%) were established in 2015 or later. Over half (59.2%) have 11 or more active and engaged industry partners, and just under three-fourths have 1 to 9 active and engaged support partners.
- Only 20.3% of sector partnerships have websites, and some of these are through the general community college website. Some asked if they were going to be required to create one, and asked who would maintain it. Some suggested a statewide website for all sector partnerships.
- Several sector partnerships plan to implement a formal contract or MOU, but only 15.3% currently have done this. Just over half have written or unwritten rules.

**Partnership Engagement**

- The majority (60.0%) of sector partnerships prefer to meet quarterly or every other month. The top categories placed on the agenda include current developments and program updates, workforce issues, goal progress, training or employer needs, and subcommittee work time. All groups prefer to meet in person, and just under a third of the groups rotate meeting locations.

**Current Work and Projects**

- Half of the sector partnerships have developed and validated career pathways or are in the process of doing so. The top categories are Manufacturing, Healthcare, and Transportation & Logistics.
- Developing a strong pipeline, building career awareness in schools, and workforce training and skill development are top priority goals identified by Iowa sector partnerships.

**Accomplishments and Areas for Improvement**

- Sector partnerships report that some of the areas that work well for them include implemented programming, collaboration between industry and support partners, creating actionable goals, and engaging with area secondary and postsecondary organizations. Understanding business needs and being flexible are the top factors that attribute to these areas working well.
The most often cited area in need of improvement was the challenge of keeping the board engaged. Related to this was the issue of participation and attendance at meetings. Also mentioned was the need for assistance with goal setting, strategic planning, and helping industry partners to understand the value of sector partnerships. The top factors driving needed improvements include businesses having limited time, a large number of groups that have similar goals, struggles in rural communities to bring businesses together, and weak industry leadership.

Success

Sector partnerships define success as accomplishing goals, meeting skilled workforce needs, building career awareness in high schools, building a strong pipeline of skilled employees, training the workforce with an increase in employment within the industry, participation and engagement of industry partners, having a positive impact on the industry, building a larger network and collaboration, and developing career pathways.

12 of the sector partnerships have established common, measurable indicators of success, 21 would be interested in receiving assistance to develop indicators, and 15 others would be interested in knowing what other groups are doing, but believe the success indicators still need to be developed based on member needs.

Resources and Opportunities Needed

Many suggestions were mentioned when sector partnerships were asked what resources or opportunities are needed:

1. **Funding:** Funding for externships, meals at meetings, marketing, equipment and initiatives, and more permanent staff would be great. Maintaining funding for areas of support would help the groups to continue accomplishing goals. In addition, groups would appreciate funding to invest in trained facilitators, without the attachments (paperwork, etc.) that usually go with funding.

2. **Participation:** Increased participation and engagement by industry partners, as well as ideas on who to bring to meetings to make them more engaging would be welcomed.

3. **Marketing:** Sector boards request marketing for job shadows and internships and help promoting sector board successes statewide.

4. **Value:** Training provided to industry partners on the value of sector partnerships would help them understand the purpose and importance of the work.

5. **Collaboration:** Statewide perspectives are helpful to hear experiences of other partnerships, similar to the monthly calls that already occur to connect manufacturing sector partnerships throughout the state.

6. **Rules & Regulations:** Several groups emphasized the need for increased work-based learning regulations. Sector partnerships are also concerned state-level rules will be mandated upon them in the future that will negatively impact their local efforts.

7. **State Level Resources:** Resources from the state such as marketing materials or one-pagers about sector partnerships would be helpful. Groups would also appreciate federal grant proposals initiated at the state level to leverage funds for Iowa sector partnerships.

8. **Facilitator Training:** Groups would like assistance in obtaining neutral, outside facilitators and having training made available to them from the state.

9. **State Technical Assistance:** Sector partnerships would appreciate assistance from the state with facilitation or convening meetings, as well as development of success indicators and strategic planning.

10. **CTE Advisory Boards:** It would be helpful for IDOE to look at allowing CTE advisory boards to be a part of the sector board.
Agriculture & Energy

Agriculture Sector Partnership
Convener: Iowa Lakes Community College
Jolene Rogers
19 S 7th St.
Estherville, IA 51334
jrogers@iowalakes.edu
712-362-0431
Facilitator: Jolene Rogers
Iowa Lakes Community College
jrogers@iowalakes.edu
712-362-0431

Agriculture Sector Partnership
Convener: Iowa Valley Community College
Jacque Goodman and Sandy Supianowski
3702 S Center Street
Marshalltown, IA 50158
Jacque.goodman@iavalley.edu
641-844-5640

Organic and Natural Food
Convener: Iowa City Area Development Group
Tom Banta
136 S. Dubuque St.
Iowa City, IA 52245
tbanta@icadgroup.com
319-354-3939
Facilitator: Iowa City Area Development Group team member TBD

Iowa Energy Workforce Consortium
Convener: Center for Energy Workforce Development
Beth Brit
beth@cewd.org

Energy Sector Board
Convener: Iowa Lakes Community College
Jolene Rogers
19 S. 7th St.
Estherville, IA 51334
jrogers@iowalakes.edu
712-362-0431
Facilitator: Jolene Rogers
Iowa Lakes Community College
jrogers@iowalakes.edu
712-362-0431

Business Services

Central Iowa Careers in Financial Services
Convener: Central Iowa Works
Pat Steele
1111 9th St.
Des Moines, IA 50314
pat@centraliowaworks.org
515-243-2130
Facilitator: Pat Steele
Central Iowa Works
pat@centraliowaworks.org
515-243-2130

Financial Service Industry Sector Board
Convener: Kirkwood Community College
Kim Becicka
6301 Kirkwood Blvd. SW
Cedar Rapids, IA 52404
Kim.becicka@kirkwood.edu
319-398-5525
Facilitator: Judy Stoffel
Kirkwood Community College
Judy.stoffel@kirkwood.edu
319-398-5503

Community Board

Cresco Community Board
Convener: Northeast Iowa Community College
Wendy Mihm-Herold
1625 Hwy 150 South
Calmar, IA 52132
Mihm-herold@nicc.edu
563-562-3263 x221
Facilitator: Wendy Mihm-Herold
Northeast Iowa Community College
Mihm-herold@nicc.edu
563-562-3263

Manchester Community Board
Convener: Northeast Iowa Community College
Wendy Mihm-Herold
1625 Hwy 150 South
Calmar, IA 52132
Mihm-herold@nicc.edu
563-562-3263 x221
Facilitator: Wendy Mihm-Herold or Connie Behnken
Northeast Iowa Community College
Mihm-herold@nicc.edu
563-562-3263

Clayton County Community Board
Convener: Northeast Iowa Community College
Wendy Mihm-Herold
1625 Hwy 150 South
Calmar, IA 52132
Mihm-herold@nicc.edu
563-562-3263 x221
Facilitator: Wendy Mihm-Herold
Northeast Iowa Community College
Mihm-herold@nicc.edu
563-562-3263

Waukon Community Board
Convener: Northeast Iowa Community College
Wendy Mihm-Herold
1625 Hwy 150 South
Calmar, IA 52132
Mihm-herold@nicc.edu
563-562-3263 x221
Facilitator: Wendy Mihm-Herold or Mary Jo Goodman
Northeast Iowa Community College
Farmers & Merchants Savings Bank
Mihm-herold@nicc.edu
563-562-3263

New Hampton Community Board
Convener: Northeast Iowa Community College
Wendy Mihm-Herold
1625 Hwy 150 South
Calmar, IA 52132
Mihm-herold@nicc.edu
563-562-3263 x221
Facilitator: Wendy Mihm-Herold or Teresa Weber
Northeast Iowa Community College
ATEK
Mihm-herold@nicc.edu
563-562-3263

Oelwein Community Board
Convener: Northeast Iowa Community College
Wendy Mihm-Herold
1625 Hwy 150 South
Calmar, IA 52132
Mihm-herold@nicc.edu
563-562-3263 x221
Facilitator: Wendy Mihm-Herold
Northeast Iowa Community College
Mihm-herold@nicc.edu
563-562-3263
Construction

Construction Sector Partnership
Convenor: Iowa Valley Community College
Jacque Goodman & Sandy Supianoski
3702 S Center Street
Marshalltown, IA 50158
Jacque.goodman@iavalley.edu
641-844-5640

Central Iowa Careers in Construction
Convenor: Central Iowa Works
Pat Steele
1111 9th Street
Des Moines, IA 50314
pat@centraliowaworks.org
515-243-2130
Facilitator: Pat Steele
Central Iowa Works
515-243-2130

Healthcare Technology
Convenor: Iowa City Area Development Group
Tom Banta
136 S. Dubuque St.
Iowa City, IA 52245
tbanta@iavalley.edu
319-354-3939
Facilitator: Member TBD
Iowa City Area Development Group

Healthcare Sector Partnership
Convenor: Iowa Valley Community College
Jacque Goodman & Sandy Supianoski
3702 S Center St.
Marshalltown, IA 50158
Sandy.Supianoski@iavalley.edu
641-844-5780
Facilitator: Shalimar Mazetis
Iowa Western Community College
shmazetis@iwcc.edu
712-325-3352

Allied Health Sector Board
Convenor: Northern Iowa Community College
Robert Allbee
1160 E. 6th St.
Sioux City, IA 51101
Robertallbee1160@gmail.com

Healthcare Industry Sector Board
Convenor: Kirkwood Community College
Kim Becicka
6301 Kirkwood Blvd. SW
Cedar Rapids, IA 52404
kim.becicka@kirkwood.edu
319-398-5525
Facilitator: Judy Stoffel
Kirkwood Community College
Judy.stoffel@kirkwood.edu
319-398-5503

Information Technology

Information Technology Sector Board
Convenor: Eastern Iowa Community College
Ellen Kabat Lensch
306 West River Dr.
Davenport, Iowa 52801
ekabatlenesch@eicc.edu
563-336-3304
Facilitator: Bob Allbee
EICC (Retired)
Robertallbee1160@gmail.com

Central Iowa Careers in Healthcare
Convenor: Central Iowa Works
1111 9th St.
Des Moines, IA 50314
Facilitator: Pat Steele
Central Iowa Works
515-243-2130

Healthcare Sector Partnership
Convenor: Central Iowa Works
1111 9th St.
Des Moines, IA 50314
Facilitator: Pat Steele
Central Iowa Works
515-243-2130

Healthcare Technology
Convenor: Iowa City Area Development Group
Tom Banta
136 S. Dubuque St.
Iowa City, IA 52245
tbanta@iavalley.edu
319-354-3939
Facilitator: Member TBD
Iowa City Area Development Group

Healthcare Sector Partnership
Convenor: Iowa Valley Community College
Jacque Goodman & Sandy Supianoski
3702 S Center St.
Marshalltown, IA 50158
Sandy.Supianoski@iavalley.edu
641-844-5780
Facilitator: Shalimar Mazetis
Iowa Western Community College
shmazetis@iwcc.edu
712-325-3352

Allied Health Sector Board
Convenor: Northern Iowa Community College
Robert Allbee
1160 E. 6th St.
Sioux City, IA 51101
Robertallbee1160@gmail.com

Healthcare Industry Sector Board
Convenor: Kirkwood Community College
Kim Becicka
6301 Kirkwood Blvd. SW
Cedar Rapids, IA 52404
kim.becicka@kirkwood.edu
319-398-5525
Facilitator: Judy Stoffel
Kirkwood Community College
Judy.stoffel@kirkwood.edu
319-398-5503

Information Technology

Information Technology Sector Board
Convenor: Eastern Iowa Community College
Ellen Kabat Lensch
306 West River Dr.
Davenport, Iowa 52801
ekabatlenesch@eicc.edu
563-336-3304
Facilitator: Bob Allbee
EICC (Retired)
Robertallbee1160@gmail.com
**Information Technology Sector Board**
Convener: Northeast Iowa Community College
- Wendy Mihm-Herold
  1625 Hwy 150 South
  Calmar, IA 52132
  Mihm-heroldw@nicc.edu
  563-562-3263 x221
Facilitator: Kristin Dietzel
Greater Dubuque Development Corporation
kristind@greaterdubuque.org
563-557-9049

**IT Industry Partnership**
Convener: Des Moines Area Community College
- Karen Stiles & Bill Workman
  2006 South Ankeny Blvd.
  Ankeny, IA 50023
  kastiles@dmacacc.edu
  515-964-6484
Facilitator: Karen Stiles and Bill Workman
DMACC
kastiles@dmacacc.edu
515-964-6484

**Augmented/Virtual Reality**
Convener: Iowa City Area Development Group
- Tom Banta
  136 S. Dubuque St.
  Iowa City, IA 52245
  tbanta@icagroup.com
  319-354-3939
Facilitator: Member TBD
Iowa City Area Development Group

**Manufacturing**

**Advanced Manufacturing Sector Partnership**
Convener: Hawkeye Community College
- Darcia Krouse & Pam Wright
  3420 University Ave.
  Waterloo, IA 50613
  Darcia.krouse@hawkeyecommunitycollege.edu
  319-296-2329 x3009

**Advanced Manufacturing Sector Board**
Convener: Kirkwood Community College
- Kim Becicka
  6301 Kirkwood Blvd. SW
  Cedar Rapids, IA 52404
  km.beicicka@kirkwood.edu
  319-398-5525
Facilitator: Greg Mulherin
Newell Machine
gmulherin@newellmachine.com
319-393-1610

**Information Technology Industry Sector Board**
Convener: Kirkwood Community College – Continuing Education
- Kim Becicka
  6301 Kirkwood Blvd. SW
  Cedar Rapids, IA 52404
  km.beicicka@kirkwood.edu
  319-398-5525
Facilitator: Gary Vogt
Kirkwood Community College
gary.vogt@kirkwood.edu
319-398-4485

**Wearable Technology**
Convener: Iowa City Area Development Group
- Tom Banta
  136 S. Dubuque St.
  Iowa City, IA 52245
  tbanta@icagroup.com
  319-354-3939
Facilitator: Member TDC
Iowa City Area Development Group

**Information Technology Sector Partnership**
Convener: Transitioning to Hawkeye Community College
- Keri Kono
  3420 University Ave.
  Waterloo, IA 50613
  keri.kono@iwd.iowa.gov
  319-291-2705 x350

**Advanced Manufacturing Sector Partnership**
Convener: Eastern Iowa Community College
- Ellen Kabat Lensch
  306 West River Dr.
  Davenport, IA 52801
  ekabatlensch@eicc.edu
  563-336-3304
Facilitator: Bob Allbee
EICC (Retired)
Robertallbee1160@gmail.com

**Fairfield Manufacturing Association**
Convener: Fairfield Economic Development
- Joshua Laraby
  605 S. 23rd St. Ste 102
  Fairfield, IA 52556
  reachjoshualaraby@gmail.com
  920-309-0126

**Manufacturing Education Partnership**
Convener: Iowa Lakes Corridor Development Corp., Spencer High School, Iowa Lakes Community College
- Kiley Miller
  520 2nd Ave., East, Ste. 2
  Spencer, IA 51301
  kmiller@lakescorridor.com
  712-264-3474
Facilitator: Scott Rettey
Spencer High School
srettey@spencerschools.org
712-363-0454

**Advanced Manufacturing Sector Board**
Convener: Indian Hills Community College & IowaWORKS
- Jennifer Erdmann
  15260 Truman St.
  Ottumwa, IA 52501
  Jennifer.erdmann@iwid.iowa.gov
  641-684-5401
Facilitator: Rich Kennedy
IowaWORKS/Indian Hills Community College
Richard.kennedy@iwid.iowa.gov
641-684-5401
Central Iowa Careers in Advanced Manufacturing
Convener: Central Iowa Works
1111 9th St.
Des Moines, IA 50314
Facilitator: Pat Steele
Central Iowa Works
pat@centraliowaworks.org
515-243-2130

Manufacturing Sector Board
Convener: Iowa Lakes Corridor – Transitioning to Iowa Lakes Community College
Jolene Rogers
19 S 7th St.
Estherville, IA 51334
jrogers@iowalakes.edu
712-362-0431
Facilitator: Jolene Rogers
Iowa Lakes Community College
jrogers@iowalakes.edu
712-362-0431

Northwest Iowa Metals Manufacturing Sector Board
Convener: Rosenboom
Lary Rosenboom
PO Box 280
Sheldon, IA 51201
712-324-4854
Facilitator: Bob Henningsen
Smart Solutions
bhenningsen@smartsolutionsgroup.net
515-238-2697

Manufacturing Sector Partnership
Convener: Southeast Regional Planning Commission
Mike Norris
211 N. Gear Ave. Ste 100
West Burlington, IA 52655
mnorris@seirpc.com
319-753-4310

Southwest Iowa Advanced Manufacturing Sector Board
Convener: Iowa Western Community College
Mark Stanley
2700 College Road
Council Bluffs, IA 51503
mstanley@iwcc.edu
712-325-3408
Facilitator: Starlyn Issacson
Iowa Western Community College
sissaacon@iwcc.edu
712-325-3705

Advanced Manufacturing Sector Partnership
Convener: Iowa Valley Community College District
Jacque Goodman & Sandy Supianoski
3702 S Center St.
Marshalltown, IA 50158
Jacque.goodman@iavalley.edu
641-844-5640

Advanced Manufacturing Sector Partnership
Convener: Ames Economic Development Commission
Brenda Dryer
304 Main St.
Ames, IA 50010
Brenda@ameschamber.com
515-232-2310
Facilitator: Brenda Dryer
Ames Economic Development Comm.
Brenda@ameschamber.com
515-232-2310

Advanced Manufacturing
Convener: North Iowa Area Community College
Heather Wright and others
500 College Drive
Mason City, IA 50401
Heather.wright@niacc.edu
641-422-4312
Facilitator: Sue Gibbons
SS Gibbons Services
Sagibbons@dmacc.edu
515-491-4495

Industry Technology Advisory Board
Convener: Clarke County Development Corp.
William Trickey
PO Box 265
Osceola, IA 50213
wmtrickey@clarkecountyiowa.com
641-414-1884

Transportation & Logistics
Transportation/Logistics Sector Board
Convener: Eastern Iowa Community College
Ellen Kabat Lensch
306 West River Drive
Davenport, IA 52801
ekabatlensch@eicc.edu
563-336-3304
Facilitator: Bob Allbee
EICC (Retired)
Robertallbee1160@gmail.com

Automated Vehicles
Convener: Iowa City Area Development Group
Ellen Kabat Lensch
136 S. Dubuque St.
Iowa City, IA 52245
tbanka@icadgroup.com
319-354-3939
Facilitator: Member TBD
Iowa City Area Development Group

Transportation CDL Sector Board
Convener: Northeast Iowa Community College
Wendy Mihm-Herold
1625 Hwy 150 South
Calmar, IA 52132
Mihm-heroldw@nicc.edu
563-562-3263 x221
Facilitator: Wendy Mihm-Herold
Northeast Iowa Community College
Mihm-heroldw@nicc.edu
563-562-3263

Transportation & Logistics Sector Board
Convener: Kirkwood Community College
Amy Lasack
6301 Kirkwood Blvd. SW
Cedar Rapids, IA 52404
Amy.lasack@kirkwood.edu
319-398-5435
Facilitator: Chris Kula
Kirkwood Community College
Chirs.kula@kirkwood.edu
319-398-7130

Central Iowa Careers in Transportation, Distribution & Logistics
Convener: Central Iowa Works
1111 9th St.
Des Moines, IA 50314

Other
Education Assessment & Technology
Convener: Iowa City Area Development Group
Tom Banta
136 S. Dubuque St.
Iowa City, IA 52245
Tbanta@icadgroup.com
319-354-3939
Facilitator: Member TBD
Iowa City Area Development Group

Produced by researchIQ, June 2017
Inventory of Sector Partnerships in Iowa

June 2017

Prepared by Strategic Marketing Services and Institute for Decision Making at The University of Northern Iowa
OPPORTUNITIES IN ENERGY
IOWA CAREER PATHWAYS
**BACKGROUND:**
Iowa's Energy industry forms the backbone of communities across the state. Every time you turn on a light switch or cook on the stove you are connecting to an exciting field that employs tens of thousands of Iowans. Energy companies in electric, natural gas, oil and renewable energy technologies represent a range of growth careers, and a home for all kinds of people. The following tool contains Energy career pathways information that shows career opportunities for every type of person, no matter what your interests or skills. You will probably see yourself represented in a few different families. We hope that you will explore and research jobs that sound interesting to you, and consider joining an industry that is part of the fabric of your community.

**METHODOLOGY:**
The information in this document was collected by the Council for Adult and Experiential Learning (CAEL) and paid for by a grant from the Iowa Department of Education. In addition to quantitative research, CAEL conducted focus groups with Energy businesses in partnership with the Iowa Energy Workforce Consortium. Jobs descriptions and skills represent what employers in your community are looking for, and education and wage levels are based on labor market intelligence in the state of Iowa. Please note that all information has been averaged to help guide the reader in evaluating which jobs are of interest.

Using this information, the occupations for Iowa's Energy sector were grouped into three levels based on the credentials/experience they required, and their potential pay:

1. **Entry Level:** These positions are the best entry points into a sector for an individual with little experience or education as they typically require only a HS diploma (occasionally a certification or minimal vocational training) and little to no prior related work experience.
2. **Mid-Level:** While these positions pay more than those at the entry level, they also involve more skilled work, requiring greater education—anywhere from vocational training (or certifications) to a 4-year bachelor’s degree—and some level of related work experience.
3. **Senior Level:** These positions are typically high-level management positions and require significant education (typically a 4-year bachelor’s or graduate degree) and extensive experience in the industry.

This information was also used to map out connections and paths between individual occupations within and across occupational families. For each occupation, any paths to other occupations are either one of two types:

1. **Lateral** (→) meaning an individual can transfer into that occupation without significant extra education or experience. Often the average salaries are similar.
2. **Vertical** (↑) meaning an individual will need additional education or industry-related work experience to move up. This typically involves an increase in average salary.
WHAT’S INSIDE:
The information in the Pathways is broken down into two parts:

1. **Occupational Family Pathway Map**: shows the connections and pathways between occupations within each occupational family and provides basic information on each occupation.

2. **Sector Occupation Detail**: shows detailed information for each occupation in the occupational family. This information is laid out like the example below:

   - **Occupation Title**: OPERATIONS ENGINEER [SENIOR-LEVEL]
   - **Occupation Description**: Utilize engineering principles to ensure that the plant is operating efficiently by analyzing plant data, developing reports, designing continuous improvement projects, and assisting with plant operations. Provide operating procedures and line orders to ensure safe, reliable, and secure plant operations. Utilize power flow software to analyze the impact that equipment outages and contingencies have on the system.
   - **Skills & Knowledge**:
     - 1. Systems analysis and operation
     - 2. Organization and planning skills
     - 3. Project management
     - 4. Excellent oral and written communication
     - 5. Budgeting and scheduling
   - **Average salary range for occupation**: $85k - $95k
   - **Additional certifications or licenses the occupation may require**: Professional Engineer License
   - **Conditions workers in this occupation may be expected to deal with regularly**: Highs, Extreme Temperatures, Outdoors, Travel, Night Work/Odd Hours/On-Call
   - **Color coded**: Red for electric, Yellow for gas, Green for renewable, White for neutral
   - **Occupations an individual can move to next in a different family**: Cross-Sector Pathways:  
     - Civil Engineer
     - Project Manager
   - **Conditions workers in this occupation may be expected to deal with regularly**: Heights, Night Work/Odd Hours/On-Call
   - **Education, experience, and credentials required for occupation**: Bachelor's Degree or Master's Degree

USING THE PATHWAYS:
The information in these pathways is not intended to provide an exhaustive or highly detailed picture of each occupational family, or a comprehensive list of every occupation an industry employer might hire. Rather, it is intended to provide the job-seeker or transitioning worker with a high-level view of common positions within each family, as well as potential opportunities for movement within and across family. Our hope is that they can then use this information as a starting point for further exploring specific occupational family and occupations of interest in order to make more informed decisions around their future career.
# TRANSMISSION AND DISTRIBUTION

## METER READER/TECHNICIAN  [ENTRY-LEVEL]

- **Education:** HS
- **Work Experience:** 0-2
- **Salary:** $40k - $50k
- **Work Conditions:** ☁️ ☀️

Read and record data collected from utility meters. May travel to and monitor meters in-person, recording unusual meter conditions, ensuring authorized use, delivering notices to customers, or repairing meter equipment. May monitor meters remotely. Uses specialized measurement and recording equipment.

**Skills & Knowledge:**
1. Data entry
2. Computer skills
3. Attention to detail
4. Physical endurance
5. Customer service

**Cross-Family Pathways:**
- General Laborer
- Customer Service Representative
- Energy Advisor

## HEAVY EQUIPMENT/CRANE OPERATOR  [ENTRY-LEVEL]

- **Education:** HS
- **Work Experience:** 2+
- **Salary:** $50k - $60k
- **Work Conditions:** CDL, NCCER or NCCO certification

Safely operate heavy construction and maintenance equipment such as line and aerial lift trucks, cranes, bulldozers, and backhoes. Use equipment under direction of Crew Leader to assist in installation, alteration, addition, and repair of electrical systems and facilities.

**Skills & Knowledge:**
1. Heavy equipment and vehicle operation
2. Physical dexterity
3. Oral and written communication
4. Teamwork
5. Safety processes and procedures

**Cross-Family Pathways:**
- Heavy Equipment/Crane Operator

## GAS TRANSMISSION & DISTRIBUTION TECHNICIAN  [ENTRY-LEVEL]

- **Education:** HS
- **Work Experience:** 0-2
- **Salary:** $50k - $60k
- **Work Conditions:** Commercial Driver’s License (CDL)

Performs all types of work (except welding) in connection with construction, operations, and maintenance of gas facilities and lines; installs automatic controls used to regulate and monitor systems, responds to gas leaks; connects and disconnects gas equipment and appliances; turns gas services on and off.

**Skills & Knowledge:**
1. Physical strength and dexterity
2. Natural gas knowledge
3. Repair and maintenance
4. Equipment monitoring
5. Problem solving

**Cross-Family Pathways:**
- Transmission and Distribution
- Plant Operations
- Engineering and Systems Design
- Customer Service and Sales

---

Developed by the Council for Experiential Learning (CAEL) in partnership with the Iowa Dept. of Education, Iowa Workforce Development and Iowa Energy Workforce Consortium. | July 2017
### Relay Technician [Mid-Level]

- **Education:** AP
- **Work Experience:** 3-5
- **Salary:** $70k - $80k

Assist in the installation, maintenance, programming and functional testing of protective relays/control circuits, revenue metering and ancillary equipment. Inspect and test equipment and circuits to identify problems using special diagrams that show wiring as well as testing devices. Open and close switches to isolate defective relays, then perform adjustments or repairs. Disconnect and replace equipment that manages voltage on high voltage power lines. Maintain and update installation, inspection, and maintenance records.

**Skills & Knowledge:**
1. Electrical components and systems knowledge
2. Schematic diagram reading
3. Problem solving
4. Troubleshooting
5. Multitasking

**Cross-Family Pathways:**
- Instrumentation and Control Technician

### Lineworker [Mid-Level]

- **Education:** V/AP
- **Work Experience:** 3-5
- **Salary:** $70k - $80k

Install and repair cables, wires and other equipment on electrical poles and transmission towers. Climb poles or use truck-mounted buckets to reach equipment using appropriate safety equipment. Identify defective devices such as fuses, switches, and wires. Inspect and test power lines and other equipment using special reading and testing devices. Lay underground cables.

**Skills & Knowledge:**
1. Electrical components and systems knowledge
2. Safety practices/procedures
3. Physical strength, dexterity, and endurance
4. Effective oral communication
5. Critical thinking and problem solving

### Substation Mechanic [Mid-Level]

- **Education:** V/AP
- **Work Experience:** 3-5
- **Salary:** $70k - $80k
- **Commercial Driver’s License (CDL)**

Perform routine operations and maintenance of electrical and mechanical equipment and systems at electrical substations. Serve as an expert on how a substation works and its equipment. Read electrical diagrams and troubleshoot malfunctioning electrical systems. Disassemble mechanical equipment and replace malfunctioning parts.

**Skills & Knowledge:**
1. Mechanical knowledge and reasoning
2. Maintenance and repair knowledge
3. Blueprint/diagram reading
4. Physical strength and dexterity
5. Teamwork

---

Developed by the Council for Experiential Learning (CAEL) in partnership with the Iowa Dept. of Education, Iowa Workforce Development and Iowa Energy Workforce Consortium. | July 2017
# TRANSMISSION AND DISTRIBUTION

## ELECTRIC TRANSMISSION & DISTRIBUTION TECHNICIAN [MID-LEVEL]

- **Education:** V/AP
- **Work Experience:** 3-5
- **Salary:** $60k - $70k

Performs routine installation and maintenance operations at electrical substations. Inspect and test electrical equipment to identify problems using special wiring diagrams and testing devices. Disconnect and replace equipment that manages voltage on high voltage power lines.

**Skills & Knowledge:**
1. Electrical components and systems knowledge
2. Schematic diagram reading
3. Maintenance and repair
4. Effective oral and written communication
5. Physical dexterity

**Cross-Family Pathways:**
- Quality Assurance

## WELDER/FABRICATOR [MID-LEVEL]

- **Education:** V/AP
- **Work Experience:** 3-5
- **Salary:** $75k - $85k
- **Welding Certification (e.g. AWS)**

Use hand welding or flame-cutting equipment to join metal segments in connection with maintenance, repair, installation, and removal of transmission and distribution equipment or structures. Lay out, position, and secure parts prior to assembly. Monitor the fitting, burning, and welding processes to avoid overheating and warping, shrinking, distortion, and expansion of material.

**Skills & Knowledge:**
1. Welding skills and equipment
2. Physical dexterity
3. Attention to detail
4. Organization skills
5. Troubleshooting

**Cross-Family Pathways:**
- Quality Assurance

## PIPEFITTER/PIPELAYER/FUSER [MID-LEVEL]

- **Education:** V
- **Work Experience:** 2+
- **Salary:** $70k - $80k
- **CDL, OQ certification**

Lay pipe for steam or gas mains for renewable natural gas. Follow the directions of others or written instructions to lay out pipe routes. Cut pipes to required size. Position pipes to prepare them for welding or sealing. Connect pipe pieces and joints using welding equipment or other sealing techniques. Find pipes in need of repair or replacing using special magnetic or radio indicators. Work safely and use appropriate safety equipment.

**Skills & Knowledge:**
1. Plumbing/pipefitting knowledge
2. Attention to detail
3. Good oral communication
4. Basic math
5. Physical strength

Developed by the Council for Experiential Learning (CAEL) in partnership with the Iowa Dept. of Education, Iowa Workforce Development and Iowa Energy Workforce Consortium. | July 2017
# TRANSMISSION AND DISTRIBUTION

## CORROSION TECHNICIAN  [MID-LEVEL]

<table>
<thead>
<tr>
<th>Education: V</th>
<th>Work Experience: 3-5</th>
<th>Salary: $775k - $85k</th>
</tr>
</thead>
</table>

Install, maintain, and operate cathodic protection systems on gas mains, looking for corrosion. Takes part in installing and removing gas meters and regulators and valves as required, taking tests of pressures and odor levels, investigating and repairing leaks, operating and maintaining tools and equipment. Observes system and plant gauges and charts and makes adjustments to equipment as required.

**Skills & Knowledge:**
1. Inspection and investigation
2. Repair and maintenance
3. Physical dexterity
4. Troubleshooting
5. Attention to detail

## CREW LEADER/FRONT LINE SUPERVISOR  [MID-LEVEL]

<table>
<thead>
<tr>
<th>Education: V/AP-AS</th>
<th>Work Experience: 5+</th>
<th>Salary: $80k - $90k</th>
</tr>
</thead>
</table>

Determine schedules and work activities of crew members/staff. Review job performance and provide feedback, as necessary. Ensure that all work is performed correctly and in a safe manner. Train personnel in the correct procedures to complete assigned tasks. Communicate effectively with others including crew members, bosses, and management.

**Skills & Knowledge:**
1. Leadership and supervisory skills
2. Instruction and mentorship
3. Effective oral and written communication
4. Problem solving
5. Scheduling and personnel management

**Cross-Family Pathways:**
- Project Manager

## SYSTEMS PROTECTION ENGINEER  [SENIOR-LEVEL]

<table>
<thead>
<tr>
<th>Education: B (Engineering or related field)</th>
<th>Work Experience: 0-2</th>
<th>Salary: $75k - $85k</th>
</tr>
</thead>
</table>

Assist in supervising/training other technicians in maintaining and improving electric transmission facilities. Analyze, monitor, and improve electrical protection and control systems for transmission, generation, and distribution equipment to ensure security, safety, reliability, and integrity. Minimize the probability of system outages and preserve the delivery of electrical energy to customers. Assists in preparing protective relay equipment specifications and settings coordination.

**Skills & Knowledge:**
1. Electrical components and systems knowledge
2. Complex problem solving
3. Project management
4. Effective oral and written communication
5. Budgeting and scheduling

**Cross-Family Pathways:**
- Electrical/Power Systems Engineer
- Generation/Plant Engineer
- Quality Assurance

---

**Work Conditions**
- Installation and Maintenance
- Administration and Management
- Customer Service and Sales
- Transmission and Distribution
- Plant Operations
- Engineering and Systems Design

---

Developed by the Council for Experiential Learning (CAEL) in partnership with the Iowa Dept. of Education, Iowa Workforce Development and Iowa Energy Workforce Consortium. | July 2017
### GAS TRANSMISSION & DISTRIBUTION ENGINEER  [SENIOR-LEVEL]

**Education:** B (Engineering or related field)

**Work Experience:** 0-2

**Salary:** $75k - $85k

**Work Conditions:** OQ Certification

- Assist in supervising/training other technicians in maintaining and improving natural gas distribution facilities. Perform engineering evaluation of gas transmission system assets. Responsible for balancing the gas supply and demand. Control, dispatch and monitor operation of all company transmission lines, designated distribution points and remotely controlled gas systems. Direct activities of crews during emergency and planned shutdowns of feeder lines or remotely controlled systems.

**Skills & Knowledge:**
1. Natural gas knowledge
2. Complex problem solving
3. Project management
4. Effective oral and written communication
5. Budgeting and scheduling

**Cross-Family Pathways:**
- Mechanical Engineer
- Civil Engineer
- Generation/Plant Engineer
- Quality Assurance

### SENIOR MANAGER  [SENIOR-LEVEL]

**Education:** B (Business Administration, Management or related field)

**Work Experience:** 6-8

**Salary:** $90k - $100k

- Schedule and oversee work of electrical and/or gas operations. Review crew member performance and provide feedback. Prepare and manage budgets. Report to management.

**Skills & Knowledge:**
1. Leadership/supervisory skills
2. Budgeting and scheduling
3. Personnel management
4. Financial management and cost control
5. Effective oral and written communication

**Cross-Family Pathways:**
- General Operations Manager
PLANT OPERATIONS

ENTRY-LEVEL

- ASSISTANT OPERATOR (HS, 0-2 years) - $60-70K
- BOILER OPERATOR (HS, 3-5 years) - $70-80K
- FUEL/MATERIALS HANDLER (HS, 3-5 years) - $70-80K

MID-LEVEL

- INSTRUMENTATION AND CONTROL TECHNICIAN (V/AP, 3-5 years) - $70-80K
- GENERATION TECHNICIAN (V/AP, 3-5 years) - $75-85K
- PLANT OPERATOR (V/AP, 3-5 years) - $70-80K

SENIOR-LEVEL

- LABORATORY TECHNICIAN (AS, 3-5 years) - $60-70K
- ENVIRONMENTAL SPECIALIST (B, 3-5 years) - $75-85K
- OPERATIONS ENGINEER (B, 3-5 years) - $85-95K
- PLANT MANAGER/SUPERVISOR (B, 6-8 years) - $90-100K

- GENERATION/PLANT ENGINEER (B, 3-5 years) - $90-100K

Legend:
- HS: High School Diploma/GED
- V: Vocational Training
- AP: Apprenticeship
- AS: Associate Degree
- B: Bachelor’s Degree
- M: Master’s Degree
- Years of Experience
# Plant Operations

## Assistant Operator [Entry-Level]

- **Education:** HS
- **Work Experience:** 0-2
- **Salary:** $60k - $70k

Aid Operators in operation of plant equipment by providing tools and technical assistance; performing assigned maintenance and cleaning; and assisting with inspections. Report equipment conditions to Operators. Receive training and progressively learn to perform the duties of an Operator.

**Skills & Knowledge:**
1. Problem solving and mechanical reasoning
2. Attention to detail
3. Physical dexterity
4. Oral and written communication
5. Basic math

**Cross-Family Pathways:**
- Maintenance and Repair Technician

## Fuel/Materials Handler [Entry-Level]

- **Education:** HS
- **Work Experience:** 3-5
- **Salary:** $70k - $80k
- **Forklift Operator certification**

Handle fuel and materials necessary for energy generation or manufacturing. Operate loaders and forklifts to unload fuel from trucks or train cars and transport to yard or boiler. Responsible for safe handling and transport practices as well as quality monitoring. Inspect and monitor related equipment.

**Skills & Knowledge:**
1. Equipment/forklift operation
2. Physical strength/dexterity
3. Attention to detail
4. Safety practices and procedures
5. Effective oral communication

**Cross-Family Pathways:**
- Heavy Equipment/Crane Operator

## Boiler Operator [Entry-Level]

- **Education:** HS
- **Work Experience:** 3-5
- **Salary:** $70k - $80k

Operate and maintain boiler and steam generation systems to ensure efficiency. Monitor temperatures, pressures, and flow rates on all systems and ensures production goals. Inspect and repair boiler and steam fixtures/equipment. Test, analyze, and record chemical content in steam and water systems, providing treatment according to guidelines.

**Skills & Knowledge:**
1. Equipment operation
2. Safety practices and procedures
3. Effective oral communication
4. Physical dexterity/strength
5. Troubleshooting

**Cross-Family Pathways:**
- Maintenance and Repair Technician
INSTRUMENTATION AND CONTROL TECHNICIAN  [MID-LEVEL]

Education: V/AP  Work Experience: 3-5  Salary: $70k - $80k

Diagnose mechanical and electrical problems and perform preventive and corrective maintenance of all plant instrumentation, as well as tuning, configuration and repair of all control systems. Responsibilities include maintenance of temperature, pressure, flow and level instruments and control loops.

Skills & Knowledge:
1. Electrical/mechanical knowledge
2. Repair and maintenance knowledge
3. PLC programming
4. Troubleshooting
5. Blueprint/diagram reading

Cross-Family Pathways:
- Relay Technician

---

GENERATION TECHNICIAN  [MID-LEVEL]

Education: V/AP  Work Experience: 3-5  Salary: $75k - $85k

Responsible for the operation of plant equipment and performing routine maintenance. Responsible for the safe and efficient repair, maintenance and cleaning of all equipment. Inspect equipment including motors and belts, fluid levels and filters. Do corrective maintenance checkups on machines, mechanical equipment, and buildings.

Skills & Knowledge:
1. Mechanical knowledge and reasoning
2. Operating and monitoring equipment
3. Blueprint/diagram reading
4. Troubleshooting
5. Physical dexterity

Cross-Family Pathways:
- Electrician
- Relay Technician
- Engineering Technician + AS

---

PLANT OPERATOR  [MID-LEVEL]

Education: V/AP  Work Experience: 3-5  Salary: $70k - $80k

Operate and control the equipment that generates energy from a variety of sources including renewables. Work safely and use appropriate safety equipment. Use special testing tools to test generation machinery. Do preventative maintenance checkups on generation equipment and repair, if necessary. Adjust the control on the generation equipment as power usage changes.

Skills & Knowledge:
1. Effective oral and written communication
2. Problem solving
3. Systems analysis and failure mitigation
4. Computer skills
5. Multitasking
### Laboratory Technician [Mid-Level]

- **Education:** AS (Chemistry or related field)
- **Work Experience:** 3-5
- **Salary:** $60k - $70k
- **Certified Laboratory Technician**

Conduct chemical experiments, tests and analyses in support of fuel production and generation. Operate and maintain laboratory equipment. Assist in developing and conducting programs of sampling and analysis to maintain quality standards among plant systems (including boilers, cooling, etc.). Conduct or assist in air and water quality testing and assessments, environmental monitoring and protection activities, and development of and compliance with standards.

### Generation/Plant Engineer [Senior-Level]

- **Education:** B (Engineering)
- **Work Experience:** 3-5
- **Salary:** $90k - $100k
- **Professional Engineer License**

Provide engineering analysis of plant equipment and systems in order to increase generation efficiency and ensure plant runs at maximum performance. Troubleshoot process problems and considers cost factors. Purchase fuel and arrange transport of fuel to plant. Help ensure compliance with environmental, health, and safety requirements. Manage Generation Technicians, determining work schedules and activities.

### Operations Engineer [Senior-Level]

- **Education:** B (Engineering or related field)
- **Work Experience:** 3-5
- **Salary:** $85k - $95k
- **Professional Engineer License**

Utilize engineering principles to ensure that the plant is operating efficiently by analyzing plant data, developing reports, designing continuous improvement projects, and assisting with plant operations. Provide operating procedures and line orders to ensure safe, reliable, and secure plant operations. Utilize power flow software to analyze the impact that equipment outages and contingencies have on the system.

---

**Skills & Knowledge:**

1. Strong chemistry and biology knowledge
2. Laboratory equipment use and calibration
3. Experimental testing and research
4. Effective written communication skills
5. Troubleshooting

**Cross-Family Pathways:**

- Mechanical Engineer
- Technical Sales Representative
- Maintenance Manager

---

**Skills & Knowledge:**

1. Mechanical knowledge and reasoning
2. Advanced systems analysis
3. Safety processes/procedures
4. Effective oral and written communication
5. Personnel management

**Cross-Family Pathways:**

- Civil Engineer
- Project Manager

---

**Skills & Knowledge:**

1. Systems analysis and operation
2. Organization and planning skills
3. Project management
4. Excellent oral and written communication
5. Budgeting and scheduling

**Cross-Family Pathways:**

- Civil Engineer
- Project Manager

---

**Skills & Knowledge:**

1. Strong chemistry and biology knowledge
2. Laboratory equipment use and calibration
3. Experimental testing and research
4. Effective written communication skills
5. Troubleshooting

---

**Skills & Knowledge:**

1. Mechanical knowledge and reasoning
2. Advanced systems analysis
3. Safety processes/procedures
4. Effective oral and written communication
5. Personnel management

---

**Skills & Knowledge:**

1. Systems analysis and operation
2. Organization and planning skills
3. Project management
4. Excellent oral and written communication
5. Budgeting and scheduling

---
**ENVIRONMENTAL SPECIALIST  [SENIOR-LEVEL]**

- **Education:** B (Chemistry or related field)
- **Work Experience:** 3-5
- **Salary:** $75k - $85k

Provides technical support and participates in solving complex operating problems related to plant chemistry. Coordinates research and analysis activities according to applicable regulations, safety, manufacturing processes or other considerations. Reviews research and testing, and interprets results of laboratory activities to ensure that quality standards, efficiency and schedules are met. Manages Laboratory Technician staff, evaluating performance and coordinating budget/staff resources.

- **Skills & Knowledge:**
  1. Expertise in chemistry and biology
  2. Experimental research design
  3. Laboratory management
  4. Budgeting and scheduling
  5. Complex problem solving

- **Cross-Family Pathways:**
  - Chemical Engineer
  - Quality Assurance

**PLANT MANAGER/SUPERVISOR  [SENIOR-LEVEL]**

- **Education:** B (Business Administration, Engineering, or related field)
- **Work Experience:** 6-8
- **Salary:** $90k - $100k

Direct the efforts of all plant personnel to meet all established safety, quality, performance, generation, and delivery requirements. This includes directing and initiating cost savings efforts and quality programs, development of budgets, and meeting stated financial objectives. Inspect records and log book entries to determine the efficiency in which the plant is operating. Determine schedules and work activities of team members. Communicate and coordinate with other management personnel in other areas of company.

- **Skills & Knowledge:**
  1. Leadership and supervisory skills
  2. Financial management and cost control
  3. Project management
  4. Report preparation
  5. Personnel management

- **Cross-Family Pathways:**
  - Senior Manager
  - Supervising Engineer
  - General Operations Manager

---

Developed by the Council for Experiential Learning (CAEL) in partnership with the Iowa Dept. of Education, Iowa Workforce Development and Iowa Energy Workforce Consortium. | July 2017
 entries-level mid-level senior-level

supervising engineer
- B
- 6-8
- $90-100K

environmental/compliance engineer
- B
- 3-5
- $75-85K

electrical/power systems engineer
- B
- 0-2
- $75-85K

chemical engineer
- B
- 3-5
- $80-90K

mechanical engineer
- B
- 2+
- $75-85K

civil engineer
- B
- 2+
- $75-85K

nuclear engineer
- B
- 3-5
- $85-95K

engineering technician
- AS
- 0-2
- $65-75K

electrical/powers systems engineer
- B
- 0-2
- $75-85K

wind energy engineer
- B
- 0-2
- $75-85K

solar design engineer
- B
- 2+
- $75-85K

environmental/compliance engineer
- B
- 3-5
- $75-85K

engineering and systems design

h s High School Diploma/GED
v Vocational Training
a p Apprenticeship
a s Associate Degree
b Bachelor’s Degree
m Master’s Degree
x Years of Experience
# Engineering and Systems Design

## Engineering Technician [Entry-Level]

**Education:** AS (Engineering Technology or related field)  
**Work Experience:** 0-2  
**Salary:** $65k - $75k  
**Skills & Knowledge:**  
1. Significant math and science  
2. Blueprint and diagram reading/design  
3. Problem solving  
4. Teamwork  
5. CAD software  
**Cross-Family Pathways:**  
- Gas Transmission & Distribution Engineer  
- Systems Protection Engineer  
- Generation/Plant Engineer  
- Operations Engineer

Work with engineers in applying engineering standards and practices in planning generation and distribution systems. Their work is more narrowly focused and application-oriented than that of the scientists and engineers they assist. This can involve preparing project documentation and files, preparing requests for materials, providing technical support, and preparing technical reports.

## Electrical/Power Systems Engineer [Mid-Level]

**Education:** B (Engineering Technology or related field)  
**Work Experience:** 0-2  
**Salary:** $75k - $85k  
**Skills & Knowledge:**  
1. Electrical design and diagramming  
2. Troubleshooting  
3. Systems analysis  
4. Complex problem solving  
5. Strong math and science

Apply electrical theory to engineering projects involving the design and operation of power systems. Perform calculations to determine how electrical systems should be built. Use computer assisted engineering and design software and equipment to perform engineering tasks. Design relay and control panel layouts and prepare purchase specifications for devices.

## Mechanical Engineer [Mid-Level]

**Education:** B (Mechanical Engineering or related field)  
**Work Experience:** 2+  
**Salary:** $75k - $85k  
**Skills & Knowledge:**  
1. Mechanical knowledge  
2. Blueprint and diagram reading/design  
3. Strong math and science  
4. Complex problem solving  
5. Good written communication  
**Cross-Family Pathways:**  
- Generation/Plant Engineer  
- Technical Sales Representative

Use knowledge of machines and mechanical engineering to oversee the design, installation, operation, and maintenance of equipment systems. This work can include: discovering why equipment fails and making repair recommendations to the maintenance crew; establishing technical requirements for the modification of equipment; and overseeing the installation of new equipment.

---

**Developed by the Council for Experiential Learning (CAEL) in partnership with the Iowa Dept. of Education, Iowa Workforce Development and Iowa Energy Workforce Consortium. | July 2017**
### Environmental/Compliance Engineer [Mid-Level]

- **Education:** B (Engineering or related field)
- **Work Experience:** 3-5 years
- **Salary:** $75k - $85k
- **Work Conditions:**
- **Cross-Family Pathways:**
  - Health and Safety Manager
  - Regulatory Affairs Manager/Analyst

Using tools and principles from a variety of engineering disciplines, establish practices to prevent, control, and/or remediate environmental, health and safety hazards in operations. Inspect equipment to evaluate and ensure compliance with environmental regulations. Provide environmental engineering assistance to Regulatory Analysts/Managers. Monitor progress of environmental improvement programs.

**Skills & Knowledge:**
1. Knowledge of safety procedures and environmental regulations
2. Monitoring processes and materials
3. Judgement and decision making
4. Complex problem solving
5. Effective oral and written communication

### Civil Engineer [Mid-Level]

- **Education:** B (Engineering or related field)
- **Work Experience:** 2+ years
- **Salary:** $75k - $85k

Perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures and facilities such as pipeline and power plants. Direct or participate in surveying to lay out installations and guide construction. Inspect project sites to check on progress and make sure workers are following design specifications and safety standards.

**Skills & Knowledge:**
1. Systems planning and design
2. Strong math and science
3. Organizational and planning skills
4. Complex problem solving
5. Effective oral and written communication

### Wind Energy Engineer [Mid-Level]

- **Education:** B (Engineering or related field)
- **Work Experience:** 0-2 years
- **Salary:** $75k - $85k

Responsible for managing and analyzing wind assessment resources; designing and validating wind farm layouts; determining optimal meteorological tower locations and configurations; creating monthly reports using onsite and reference stations’ recorded wind data; and performing wind farm energy production assessments, site suitability analysis, and wind turbine power performance tests.

**Skills & Knowledge:**
1. Knowledge of wind power and aerodynamics
2. Knowledge of electrical systems
3. Systems planning and design
4. Complex problem solving
5. Effective oral and written communication

**Cross-Family Pathways:**
- Quality Assurance
### SOLAR DESIGN ENGINEER [MID-LEVEL]

**Education:** B (Electrical Engineering or related field)  
**Work Experience:** 2+  
**Salary:** $75k - $85k

Design large photovoltaic or solar thermal systems. Develop the specifications and integration requirements that allow solar power to safely, effectively and efficiently flow into the power grid. Create electrical three-line diagrams for solar power systems using computer-aided design software; Run computer simulations of solar PV generation to optimize efficiency and system performance. Provide technical direction or support to field teams during installation, start-up, testing, system commissioning, and performance monitoring.

**Skills & Knowledge:**
1. Solar and electrical systems knowledge
2. Systems design and evaluation
3. Construction management
4. Complex problem solving
5. Effective oral and written communication

### CHEMICAL ENGINEER [MID-LEVEL]

**Education:** B (Chemical Engineering or related field)  
**Work Experience:** 0-2  
**Salary:** $80k - 90k

Provide technical and engineering support related including the development of processes to separate components of liquids or gases, or generate electrical currents using controlled chemical reactions. Develop safety procedures to be used by workers who will be near on-going chemical reactions. Conduct research to develop new and improved chemical processes related to energy generation and transmission.

**Skills & Knowledge:**
1. Strong chemistry, physics, and math knowledge
2. Systems analysis and planning
3. Complex problem solving
4. Troubleshooting
5. Effective oral and written communication

### NUCLEAR ENGINEER [MID-LEVEL]

**Education:** B (Nuclear Engineering or related field)  
**Work Experience:** 3-5  
**Salary:** $85k - $95k

Design and oversee the construction and operation of nuclear reactors and power plants. Monitor activity in a nuclear facility to ensure safety rules and laws are followed. Perform experiments that provide information about how to use and dispose of nuclear material.

**Skills & Knowledge:**
1. Knowledge of nuclear energy and reactions
2. Systems analysis and planning
3. Complex problem solving
4. Benchmarking and safety standards
5. Judgement and decision making

**Cross-Family Pathways:**
- Quality Assurance
Design large photovoltaic or solar thermal systems. Develop the specifications and integration requirements that allow solar power to safely, effectively and efficiently flow into the power grid. Create electrical three-line diagrams for solar power systems using computer-aided design software; Run computer simulations of solar PV generation to optimize efficiency and system performance. Provide technical direction or support to field teams during installation, start-up, testing, system commissioning, and performance monitoring.

Skills & Knowledge:
1. Solar and electrical systems knowledge
2. Systems design and evaluation
3. Construction management
4. Complex problem solving
5. Effective oral and written communication

Cross-Family Pathways:
- Plant Operations Manager/Supervisor
- Senior Manager

Education:
- B-M (Engineering or related field)

Work Experience:
- 6-8

Salary:
- $90k - $100k

Additional Education
- High School Diploma/GED
- Vocational Training
- Apprenticeship
- Associate Degree
- Bachelor's Degree
- Master's Degree

Additional Work Experience
- Vertical Pathway
- Lateral Pathway
- Additional Work Experience
- Additional Education

Years of Experience or Certification
- (#)

Work Conditions
- Installation and Maintenance
- Administration and Management
- Customer Service and Sales
- Engineering and Systems Design
- Plant Operations
- Transmission and Distribution
INSTALLATION AND MAINTENANCE (FLEET AND FACILITY)

- **MAINTENANCE MANAGER**
  - High School Diploma/GED
  - Apprenticeship
  - Years of Experience: 6-8
  - Salary: $80-90K

- **CONSTRUCTION/INSTALLATION MANAGER**
  - Bachelor’s Degree
  - Years of Experience: 6-8
  - Salary: $75-85K

- **WELDER/FABRICATOR**
  - Vocational Training
  - Apprenticeship
  - Years of Experience: 3-5
  - Salary: $60-70K

- **MAINTENANCE AND REPAIR TECHNICIAN**
  - High School Diploma/GED
  - Apprenticeship
  - Years of Experience: 3-5
  - Salary: $65-75K

- **WIND TURBINE TECHNICIAN**
  - Vocational Training
  - Apprenticeship
  - Years of Experience: 3-5
  - Salary: $60-70K

- **ELECTRICIAN**
  - Vocational Training
  - Apprenticeship
  - Years of Experience: 3-5
  - Salary: $60-70K

- **HEAVY EQUIPMENT/CRANE OPERATOR**
  - High School Diploma/GED
  - Years of Experience: 2+)
  - Salary: $50-60K

- **GENERAL LABORER**
  - High School Diploma/GED
  - Years of Experience: 0-2
  - Salary: $40-50K

- **AUTOMOTIVE MAINTENANCE TECHNICIAN**
  - High School Diploma/GED
  - Years of Experience: 3-5
  - Salary: $45-55K

- **SOLAR PV INSTALLER/TECHNICIAN**
  - High School Diploma/GED
  - Vocational Training
  - Apprenticeship
  - Years of Experience: 0-2
  - Salary: $45-55K

Additional notes:
- HS: High School Diploma/GED
- V: Vocational Training
- AP: Apprenticeship
- AS: Associate Degree
- B: Bachelor’s Degree
- M: Master’s Degree
- Years of Experience

## General Laborer [Entry-Level]

**Education:** High School Diploma/GED  
**Work Experience:** 0-2  
**Salary:** $40k - $50k

Manually move stock, materials, and supplies. Engage in basic construction tasks. Perform basic cleaning and maintenance.

**Skills & Knowledge:**
1. Physical strength and dexterity  
2. Equipment operation  
3. Teamwork  
4. Oral communication  
5. Attention to detail

**Cross-Family Pathways:**  
- Heavy Equipment/Crane Operator

## Heavy Equipment/Crane Operator [Entry-Level]

**Education:** High School Diploma/GED  
**Work Experience:** 2+  
**Salary:** $50k - $60k  
**Licensure or Certification:** CDL, NCCER or NCCO certification

Safely operate heavy construction and maintenance equipment such as line and aerial lift trucks, cranes, bulldozers, and digger derricks. Use equipment under direction of Construction/Maintenance Manager to assist in installation, alteration, addition, and repair of electrical systems and facilities.

**Skills & Knowledge:**
1. Heavy equipment and vehicle operation  
2. Physical dexterity  
3. Oral and written communication  
4. Teamwork  
5. Safety processes and procedures

**Cross-Family Pathways:**  
- Heavy Equipment/Crane Operator  
- Substation Mechanic

## Automotive Maintenance Technician [Entry-Level]

**Education:** High School Diploma/GED  
**Work Experience:** 3-5  
**Salary:** $45k - $55k  
**Licensure or Certification:** CDL, Automotive Service Excellence (ASE)

Maintain and repair line and aerial lift trucks, cranes, bulldozers and other similar vehicles. Inspect, clean, adjust, remove or install automotive parts including work on all hydraulic systems and component parts. Perform road tests on vehicles, as directed. Observe all safety rules and practices.

**Skills & Knowledge:**
1. Mechanical/hydraulic knowledge  
2. Troubleshooting  
3. Physical dexterity  
4. Heavy equipment and vehicle operation  
5. Teamwork

**Cross-Family Pathways:**  
- Substation Mechanic

---

**Additional Education**  
- High School Diploma/GED  
- Vocational Training  
- Apprenticeship  
- Associate Degree  
- Bachelor’s Degree  
- Master’s Degree

**Additional Work Experience**  
- Vertical Pathway  
- Lateral Pathway  
- Years of Experience  
- Licensure or Certification  
- Vertical Pathway  
- Additional Work Experience  
- Additional Education  
- Vertical Pathway  
- Additional Education

**Work Conditions**  
- Heights  
- Extreme Temperatures  
- Outdoors  
- Travel  
- Shift Work/Odd Hours/On-Call  
- Transmission and Distribution  
- Plant Operations  
- Engineering and Systems Design  
- Customer Service and Sales

---

*Developed by the Council for Experiential Learning (CAEL) in partnership with the Iowa Dept. of Education, Iowa Workforce Development and Iowa Energy Workforce Consortium. July 2017*
### SOLAR PV INSTALLER/TECHNICIAN [ENTRY-LEVEL]

- **Education:** HS-V
- **Work Experience:** 0-2
- **Salary:** $45k - $55k
- **Cross-Family Pathways:**
  - Electric Transmission & Distribution Technician
  - Solar Design Engineer

#### Skills & Knowledge:
1. Customer service
2. Photovoltaic/electrical knowledge
3. Oral and written communication
4. Computer skills
5. Physical strength and dexterity

#### Work Conditions
- Electrician certification

Install, monitor, diagnose, optimize and repair photovoltaic systems. Design and prepare system layouts based on specific site characteristics. Drive to multiple sites to install, inspect, evaluate, test, clean, calibrate, and maintain solar module systems, mounting hardware, inverters, and related equipment. The work may entail electrical troubleshooting, diagnostics and repair.

### MAINTENANCE AND REPAIR TECHNICIAN [MID-LEVEL]

- **Education:** V/AP
- **Work Experience:** 3-5
- **Salary:** $65k - $75k
- **Cross-Family Pathways:**
  - Substation Mechanic

#### Skills & Knowledge:
1. Physical strength and dexterity
2. Teamwork
3. Oral communication
4. Equipment operation
5. Attention to detail

#### Work Conditions
- Substation Mechanic

Ensure machines, equipment, and buildings remain in good condition and proper working order. Inspect motors, belts, fluid levels, filters and other mechanical elements. Take apart machines and repair/replace parts using hand or power tools. Use large machines like hoists and cranes. Use repair manuals to determine and fix problems. Keep track of work.

### WELDER/FABRICATOR [MID-LEVEL]

- **Education:** V/AP
- **Work Experience:** 3-5
- **Salary:** $60k - $70k
- **Cross-Family Pathways:**
  - Welder/Fabricator
  - Pipefitter/Piplayer/Fuser

#### Skills & Knowledge:
1. Welding skills and equipment
2. Physical dexterity
3. Attention to detail
4. Organization skills
5. Troubleshooting

#### Work Conditions
- Welding Certification (e.g. AWS)

Use hand welding or flame-cutting equipment to join metal segments in connection with maintenance, repair, installation, and removal of mechanical equipment/structures. Lay out, position, and secure parts prior to assembly. Monitor the fitting, burning, and welding processes to avoid overheating and warping, shrinking, distortion, and expansion of material.

---

Developed by the Council for Experiential Learning (CAEL) in partnership with the Iowa Dept. of Education, Iowa Workforce Development and Iowa Energy Workforce Consortium. | July 2017
WIND TURBINE TECHNICIAN  [MID-LEVEL]

Installation, maintenance, troubleshooting, and repairs on wind turbines and other associated equipment. Must understand the mechanics, including both electrical and maintenance of hydraulics, of all wind turbine components. Replaces mechanical and electrical components, understands schematics and uses appropriate diagnostic tools.

Skills & Knowledge:
1. Mechanical/hydraulic knowledge
2. Safety procedures
3. Physical dexterity and endurance
4. Troubleshooting
5. Effective verbal communication

Cross-Family Pathways:
- Lineworker
- Generation Technician
- Wind Energy Engineer

Education: V/AP
Work Experience: 3-5
Salary: $60k - $70k

ELECTRICIAN  [MID-LEVEL]

Install, maintain and repair electrical wiring, equipment and fixtures for energy facilities (e.g. batteries, meters, protective grounds, etc.). Ensure that work complies with electrical and building codes. May hold a wide variety of jobs depending on where they work and whether they work for a small or large contractor/company.

Skills & Knowledge:
1. Electrical systems and components
2. Good oral and written communication
3. Troubleshooting
4. Problem solving
5. Attention to detail

Cross-Family Pathways:
- Electric Transmission & Distribution Technician
- Relay Technician
- Instrumentation and Control Technician
- Generation Technician

Education: V/AP
Work Experience: 3-5
Salary: $60k - $70k

CONSTRUCTION/INSTALLATION MANAGER  [SENIOR-LEVEL]

Responsible for providing oversight to the management of construction activities for various plant and (electric and gas) transmission/distribution projects including: verifying contract and technical requirements are being met by contractors, coordinating all on site activities; assuring that materials are available when needed to complete work; and assuring that safe work practices are being utilized. Provides direction to construction crews and other responsible personnel as required to complete projects safely, on time, on budget and as required by contract documents.

Skills & Knowledge:
1. Project management
2. Budgeting and scheduling
3. Contract management
4. Occupational Health and Safety
5. Excellent oral and written communication

Cross-Family Pathways:
- Senior Manager
- Project Manager

Education: B (Construction Management or related field)
Work Experience: 6-8
Salary: $75k - $85k

Additional Work Experience
Additional Education
Licensure or Certification
Years of Experience

# HS  High School Diploma/GED
# V  Vocational Training
# AP  Apprenticeship
# AS  Associate Degree
# B  Bachelor’s Degree
# M  Master’s Degree
# H  Heights
# ET  Extreme Temperatures
# O  Outdoors
# T  Travel
# SW  Shift Work/Odd Hours/On-Call
# Vertical Pathway
# Lateral Pathway
# Additional Work Experience
# Additional Education
#(#)  Years of Experience

- Transmission and Distribution
- Plant Operations
- Engineering and Systems Design
- Installation and Maintenance
- Administration and Management
- Customer Service and Sales

Developed by the Council for Experiential Learning (CAEL) in partnership with the Iowa Dept. of Education, Iowa Workforce Development and Iowa Energy Workforce Consortium.  |  July 2017
**MAINTENANCE MANAGER  [SENIOR-LEVEL]**

Determine schedules and work activities of maintenance team members. Discuss with team members how well they are doing on the job and provide feedback, as necessary. Check work areas and examine tools and equipment to see if there are any unsafe conditions. Communicate effectively with others including team members, bosses, and management.

**Skills & Knowledge:**
1. Resource management
2. Maintenance and repair expertise
3. Leadership/supervisory skills
4. Project management
5. Excellent oral and written communication

**Education:** B (Engineering, Construction Management, or related field)

**Work Experience:** 6-8

**Salary:** $80k - $90k

**Project Management Professional (PMP)**

**Cross-Family Pathways:**
- Senior Manager
- Plant Manager/Supervisor
- Project Manager
**ADMINISTRATION AND MANAGEMENT**

**DISPATCHER** [ENTRY-LEVEL]

- **Education:** HS
- **Work Experience:** 0-2
- **Salary:** $50k - $60k

Dispatch electric/gas services and transmission/distribution personnel, receive customer trouble and service tickets or calls, call employees for emergency work or notification purposes, coordinate field response, and monitor the overall distribution grid as well as employee locations/statuses.

**Skills & Knowledge:**
1. Computer skills
2. Effective oral and written communication
3. Customer service
4. Data entry
5. Multi-tasking

**Cross-Family Pathways:**
- Assistant Operator

**SECURITY OFFICER** [ENTRY-LEVEL]

- **Education:** HS
- **Work Experience:** 2+
- **Salary:** $55k - $65k
- **Work Conditions:** First Aid/CPR, Firearm license

Patrol, inspect, and monitor property to protect against fire, theft, vandalism, terrorism, and illegal activity. Protects company investments, enforces laws on the property, deters criminal activity and other problems. Utilize radio and telephone communications to call for assistance from police, fire or emergency medical services as the situation dictates. Write comprehensive reports outlining observations and activities during assigned shift.

**Skills & Knowledge:**
1. Surveillance and systems monitoring
2. Security operations
3. Effective oral and written communication
4. Judgement and decision making
5. Law enforcement or criminal justice knowledge

**BUYER** [MID-LEVEL]

- **Education:** B (Business Administration or related field)
- **Work Experience:** 2+
- **Salary:** $70k - $80k
- **Work Conditions:** Certified Professional in Supply Management

Act as an agent for the company to source and procure materials, equipment and services necessary for operation. Prepare and initiate requests for proposals and analyzes price quotations from suppliers. Prioritize requisitions to ensure equipment, material and services are obtained in a timely fashion with an emphasis on quality, cost and availability. Work with internal customers to review material and service requirements for projects and develop a procurement strategy to meet those needs. Negotiate and prepares contracts.

**Skills & Knowledge:**
1. Procurement and purchasing
2. Contract management
3. Negotiation skills
4. Excellent oral and written communication
5. Enterprise Resource Planning

**NOTE:** Following are only a few of the administrative occupations present within the energy industry. Positions in accounting, human resources, marketing, and other areas play essential roles in the industry and offer excellent opportunities to individuals with these skill sets.
# ADMINISTRATION AND MANAGEMENT

## BUSINESS/FINANCIAL ANALYST  
**MID-LEVEL**

- **Education:** B (Business Administration, Finance, or related field)
- **Work Experience:** 3-5
- **Salary:** $70k - $80k

Gather financial documentation for energy projects and develops and initiates pricing strategies to recover all revenue requirements. Develop terms and conditions for all rates, including bundled gas and electric rates, unbundled electric delivery service rates, transition charges and related tariffs.

### Skills & Knowledge:
1. Accounting and budgeting
2. Data analysis and assessment
3. Analytical and critical thinking
4. Strategic thinking and planning
5. Computer skills

### Cross-Family Pathways:
- Market Analyst

---

## QUALITY ASSURANCE  
**MID-LEVEL**

- **Education:** B (Engineering or related field)
- **Work Experience:** 3-5
- **Salary:** $70k - $80k

Perform quality assurance (QA) audits and quality control (QC) tests and inspections on all work. Adhere to all safety and quality policies. Conduct routine and non-routine analyses of materials, processes, equipment and components. Write technical reports or documentation such as testing protocols, and trend analyses. Monitor operations and equipment to ensure conformance to specifications and make process adjustments.

### Skills & Knowledge:
1. Critical thinking
2. Judgement and decision making
3. Effective oral and written communication
4. High attention to detail
5. Statistics and data analysis

## HEALTH AND SAFETY MANAGER  
**MID-LEVEL**

- **Education:** B (Occupational Safety and Health Technology or related field)
- **Work Experience:** 5+
- **Salary:** $80k - $90k
- **Certified Safety Professional, First Aid/CPR**

Responsible for designing and overseeing programs that help ensure a safe working environment. Additionally, responsible for assisting with analyzing, troubleshooting, and resolving potential problems with plant and site operations relating to health and safety. The Health & Safety Manager must be able to effectively work in a team environment.

### Skills & Knowledge:
1. Occupational health and safety knowledge
2. Legal compliance
3. Effective oral and written communication
4. Teamwork/collaboration
5. Inspection and investigation

### Cross-Family Pathways:
- Environmental/Compliance Engineer

---

Developed by the Council for Experiential Learning (CAEL) in partnership with the Iowa Dept. of Education, Iowa Workforce Development and Iowa Energy Workforce Consortium. | July 2017
# REGULATORY AFFAIRS MANAGER/ANALYST [MID-LEVEL]

- **Education:** B (Engineering, Business Administration, or related field)
- **Work Experience:** 5+
- **Salary:** $85k - $95k

Responsible for the oversight and management of compliance systems. First point of contact for all regulatory and quality related deliverables, assisting in preparing for third party and government audits. Responsible for the collection, review, and reporting of key performance indicator data associated with their work in these areas.

**Skills & Knowledge:**
1. Regulatory affairs knowledge
2. Excellent oral and written communication
3. Relationship-building
4. Process improvement
5. High attention to detail

# PROJECT MANAGER [MID-LEVEL]

- **Education:** B (Business Administration or related)
- **Work Experience:** 6-8
- **Salary:** $80k - $90k
- **Project Management Professional (PMP)**

In coordination with field leadership, coordinates activities of the project to ensure project progresses on schedule and within prescribed budget. Review project proposals or plans to fully understand the scope of the work and contract to determine time frame, funding limitations, procedures for accomplishing project, staffing requirements, and allotment of available resources to various phases of project. Manage project staffing and resources in keeping with project plan/contract.

**Skills & Knowledge:**
1. Project management
2. Budgeting and scheduling
3. Computer skills
4. Effective oral and written communication
5. Teamwork/collaboration

**Cross-Family Pathways:**
- Construction/Installation Manager
- Senior Manager

# GENERAL OPERATIONS MANAGER [SENIOR-LEVEL]

- **Education:** B-M (Business Administration, Engineering, or related field)
- **Work Experience:** 9+
- **Salary:** $100k+

Responsible for managing a single unit, different sectors, or multiple units of an energy company or organization. Plan, direct and coordinate the work of the organization; administer and coordinate the development and execution of the capital improvement projects budget; participate in the development of master plans for organizing and financing capital improvement projects.

**Skills & Knowledge:**
1. Operations management
2. Strategic planning
3. Financial management and budgeting
4. Leadership and supervisory skills
5. Excellent oral and written communication

---

- HS High School Diploma/GED
- V Vocational Training
- AP Apprenticeship
- AS Associate Degree
- B Bachelor’s Degree
- M Master’s Degree
- H Heights
- ET Extreme Temperatures
- O Outdoors
- T Travel
- SW Shift Work/Odd Hours/On-Call
- Vertical Pathway
- Lateral Pathway
- Additional Work Experience
- Additional Education
- Years of Experience or Certification
- Transmission and Distribution
- Plant Operations
- Engineering and Systems Design
- Installation and Maintenance
- Administration and Management
- Customer Service and Sales

Developed by the Council for Experiential Learning (CAEL) in partnership with the Iowa Dept. of Education, Iowa Workforce Development and Iowa Energy Workforce Consortium. | July 2017
ENTRY-LEVEL

CUSTOMER SERVICE AND SALES

- **Customer Service Representative**
  - HS
  - 0-2
  - $30-40K

MID-LEVEL

- **Technical Sales Representative**
  - B
  - 3-5
  - $70-80K

- **Energy Advisor**
  - AS
  - 3-5
  - $55-65K

- **Market Analyst**
  - B
  - 2+
  - $75-85K

SENIOR-LEVEL

- **Sales/Account Manager**
  - B
  - 5+
  - $80-90K

Legend:
- HS: High School Diploma/GED
- V: Vocational Training
- AP: Apprenticeship
- AS: Associate Degree
- B: Bachelor’s Degree
- M: Master’s Degree
- (X): Years of Experience

- Customer Service and Sales
### Customer Service Representative [Entry-Level]

- **Education:** HS
- **Work Experience:** 0-2
- **Salary:** $30k - $40k

Communicate directly with customers and respond to a variety of customer needs and requests, taking resources, constraints, and organizational values into account when seeking resolution. Must coordinate with other company employees (especially Dispatchers) to find relevant information and take necessary action.

**Skills & Knowledge:**
1. Customer service and contact
2. Computer skills
3. Effective oral and written communication
4. Problem solving
5. Multi-tasking

**Cross-Family Pathways:**
- Dispatcher

### Energy Advisor [Mid-Level]

- **Education:** AS
- **Work Experience:** 3-5
- **Salary:** $55k - $65k

Responsible for providing expert advice and coordination services directly to homeowners, landlords, building owners and other utility customers including recommending specific modifications to electric and/or gas systems; inform prospective customers of services and energy-saving measures. May combine office and field work.

**Skills & Knowledge:**
1. Energy efficiency and conservation knowledge
2. Effective oral and written communication
3. Teamwork/collaboration
4. Computer skills
5. Customer service

### Technical Sales Representative [Mid-Level]

- **Education:** B (Engineering, Business Administration, or related field)
- **Work Experience:** 3-5
- **Salary:** $70k - $80k

Develop and foster relationships with current and future retail, commercial, and industrial customers. Sell products, services, and resources in alignment with company’s growth plan and strategic goals. Develop strategies to increase sales and distribution. Provide technical expertise and consulting as needed.

**Skills & Knowledge:**
1. Strong sales and negotiation skills
2. Client management
3. Technical knowledge and support
4. Multi-tasking
5. Effective oral/written communication

**Cross-Family Pathways:**
- Buyer
### MARKET ANALYST [MID-LEVEL]

**Education:** B (Business Administration, Economics, or Engineering)  
**Work Experience:** 2+  
**Salary:** $75k - $85k  

Perform energy market data analysis in support of energy market activities such as gas trading, trade capture operations, fuel cost hedging, outages/scheduled maintenance, fuel forecasting, and demand forecasting. Monitor market data to be aware of changing market conditions. Perform after-the-fact review and variance analysis to identify additional market, cost saving, and forecasting improvement opportunities. Assist in preparing clear, audience-appropriate written explanations of forecast components, market conditions, operational issues and variance analysis.

**Skills & Knowledge:**  
1. Market analysis and forecasting  
2. Market research  
3. Data analysis  
4. Problem solving  
5. Effective oral/written communication

**Cross-Family Pathways:**  
- Business/Financial Analyst

### SALES/ACCOUNT MANAGER [SENIOR-LEVEL]

**Education:** B (Business Administration or related field)  
**Work Experience:** 5+  
**Salary:** $80k - $90k

Serve as a liaison to key commercial accounts and strategic stakeholders providing recommendations and coordinating all energy-related service. Establish and maintain personalized external and internal relationships to support account issues, provide technical assistance and ensure that customer needs are met.

**Skills & Knowledge:**  
1. Strong sales and negotiation skills  
2. Account management  
3. Technical knowledge and support  
4. Strong relationship-building  
5. Excellent oral/written communication

**Cross-Family Pathways:**  
- General Operations Manager

---

**Additional Education**  
- Bachelor’s Degree  
- Associate Degree  
- Apprenticeship  
- Vocational Training  
- High School Diploma/GED

**Lateral Pathway**  
- Plant Operations
- Engineering and Systems Design

**Vertical Pathway**  
- Installation and Maintenance
- Administration and Management

**Additional Work Experience**  
- Outdoors
- Travel
- Tall Work/Shift Work/Odd Hours/On-Call

**Years of Experience or Certification**  
- Installation and Maintenance
- Administration and Management
- Customer Service and Sales

---

Developed by the Council for Experiential Learning (CAEL) in partnership with the Iowa Dept. of Education, Iowa Workforce Development and Iowa Energy Workforce Consortium. | July 2017