



Talent Needs for the Energy and Technology Industry

Final Summary Report

Prepared for the Research Triangle Cleantech Cluster, August 2015

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About RTCC and RTI International



About the Research Triangle Cleantech Cluster (RTCC)

The Research Triangle Regional Partnership (RTRP) formed and manages the RTCC with funding from industry members. RTRP is a public-private partnership that leads economic development strategy for the 16-county Research Triangle Region of North Carolina. RTCC works with diverse members and supporters to brand this region as a global leader in cleantech; create business development opportunities; launch demonstration projects and support technologically productive, future-enabled communities; and bring together the expertise of industry, academia, and government to solve the energy and water challenges of the present and future.



About RTI International

RTI is a nonprofit institute with headquarters in Research Triangle Park, North Carolina, that provides research, development, and technical services to government and commercial clients worldwide. Our mission is to improve the human condition by turning knowledge into practice.

Purpose of the Research

- RTCC sought to better understand the recruitment, retention, and skills development needs of employees in energy- and technology-related companies in the Research Triangle Region of North Carolina.
- Specifically RTCC was eager to gain insights on:
 - In-demand skillsets
 - Hard-to-fill positions
 - Talent recruitment strategies
 - Target markets for recruitment campaigns and marketing collateral in the region
- To help answer these questions, RTI designed and launched a survey of 687 companies to ask them about their talent strengths and needs. This final report summarizes the results of this survey and selected follow-on interviews.

Executive Summary

Executive Summary

- The purpose of this research was to better understand the recruitment, retention, and skills development needs of employees in energy- and technology-related companies in the Research Triangle Region of North Carolina. We surveyed 687 companies and 123 companies responded, yielding an 18% response rate. Survey respondents are diverse. They represent a range of companies in terms of size and the title of the position that each respondent holds within their company.
- Overall the research shows that:
 - Energy- and technology-related industries expect to grow. Eighty-four percent of respondents expect to grow their workforce in the next 2 to 5 years, adding between 1,500 and 3,300 employees
 - . Much of this growth is expected by small to medium-sized companies,* which expect to hire between 1 and 9 employees.
 - Companies identify across multiple lines of core business. Frequent combinations of business lines are:
 - IT and consulting
 - Software/programming and power engineering
 - Renewable energy and power engineering
 - As companies grow, they will continue to integrate new core capabilities into their business. We noted two business lines fueling growth:
 - software/programming, data analytics, and IT
 - energy services, renewable energy, and consulting
 - Understanding the business lines that companies expect to grow into reveals the kinds of skillsets that will be important to improve the employability of students and workers in the Triangle region.

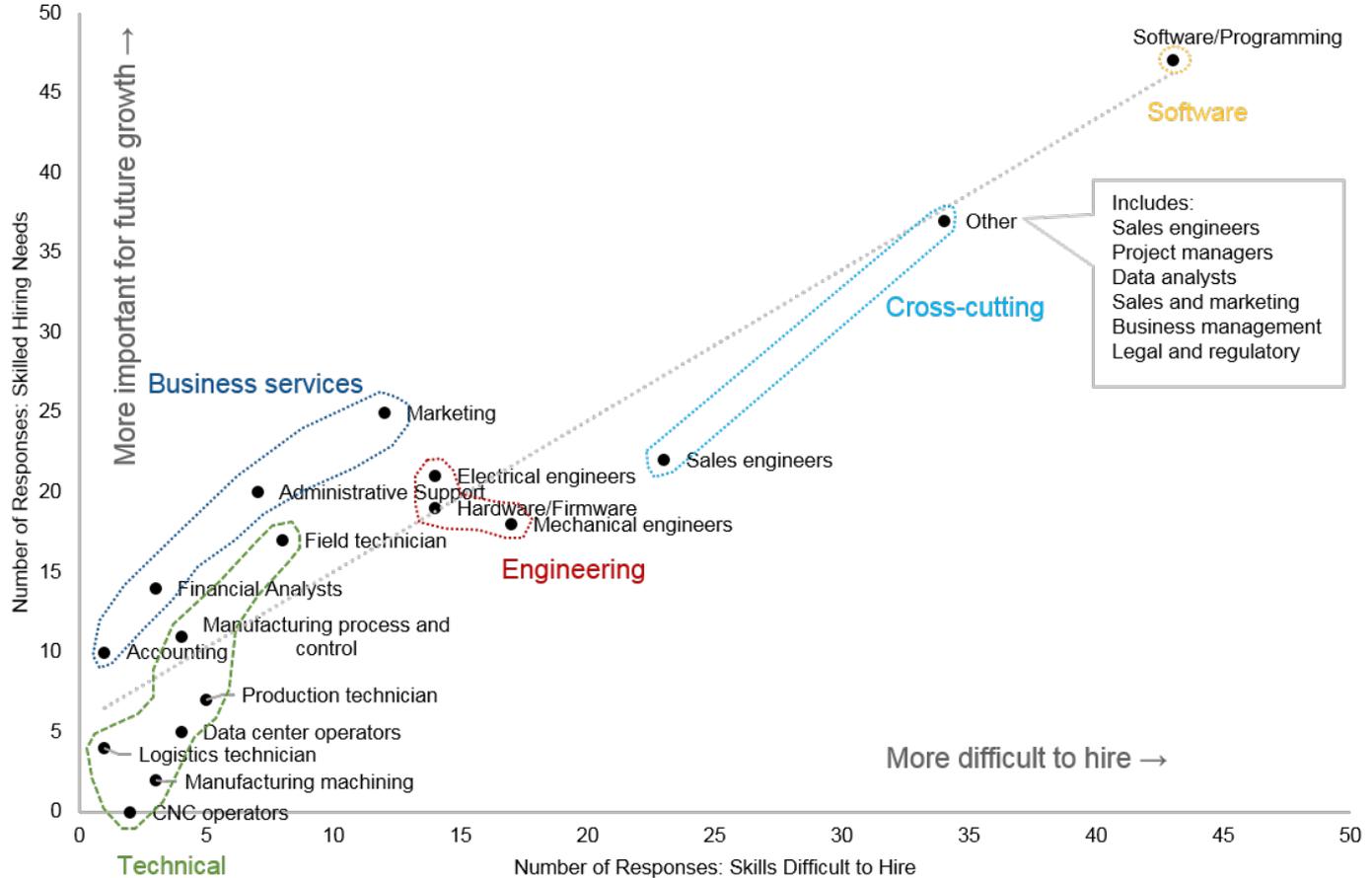
*Small to medium-sized companies are defined as companies with 0-99 employees.

Executive Summary

- As the region seeks to grow the energy and technology industry, it is building on a quality talent base. Companies view the talent pool as strong, a 7.6 on a 1 to 10 scale.
- Yet companies find it difficult to hire mid-level workers with industry experience (65% of respondents).
 - Companies consider their work to be a niche market and thus require highly specific skills that often can only be gained through experience. Niche skills that are difficult to find range from data science, sales engineering, to cybersecurity.
- Companies also struggle to find talent with blended skillsets that integrate technical backgrounds with business, communication, and sales/marketing.
 - Technical skills combined with strong oral, written, and interpersonal communication skills are desired and missing in today's talent pool. Creative and critical thinking, business acumen, ability to work in teams, soft skills (e.g., negotiation, facilitation, ability to develop relationships and work ethic), and cross-disciplinary technical skills (e.g., engineering and energy literacy) are also desired by employers.
- The most common technical skill needed by companies is software/programming. This aligns with companies' projected growth in IT, software, and analytics. Other needed skills include regulatory experts and professionals with an understanding of the future energy industry and markets.

Executive Summary

- This chart shows the skills most important for growth compared with skills that are difficult to hire for.
- Software, cross-cutting skills (e.g., sales engineers, project managers, legal and regulatory), engineering, and business services are in the most demand and are the most difficult to hire for.



Executive Summary

- In terms of retaining talent, small and large companies alike struggle to keep entry-level workers. Large companies have a harder time retaining this cohort (43% of large companies compared with 33% of small companies), but smaller companies have a harder time retaining senior-level talent (19% of small companies compared with 7% of large companies). Seventy-seven percent of companies rely on on-the-job training as a means to train and retain talent.
- Employers wish that science, technology, engineering, and math (STEM) was stressed more in K-16 curriculums. Many companies also emphasized a much greater need for schools, colleges, and universities to rely on real-world applications in their instruction, such as case studies and simulations. Employers wished that team work and communication were stressed more in instruction.
- Regionwide stakeholders such as interest groups and government can be most supportive of the technology and energy industry by providing education and training for workers and opportunities for companies to collaborate on low-risk opportunities and networking between employers and the talent. It would also be helpful to increase companies' exposure to wider markets.
- Findings suggest there are opportunities to strengthen the talent pool for mid-level experienced workers either by improving access between these workers and employers through networks or by improving the readiness and skillsets of more junior-level talent to help fill this gap.
- Cultivating quality talent in software/IT, especially as it can be combined with business, communications, and other technical skills, will be important for fostering future growth in the energy and technology sectors.

Survey and Interview Findings

Overview

Survey and Interview Findings: Overview

In this section of the report, RTI details the survey and interview findings by themes within our research questions. This section relays results in the following subsections:

- **Survey Respondents Profile**
 - Size, headquarters location, position in company, core lines of business
- **Projections of Growth**
 - Employment, target business lines
- **Current Talent Needs**
 - Talent pool today, level of experience, blended experience and niche skills, small business, degrees and certifications, technical skills
- **Challenges in Hiring**
 - Missing skillsets, skills difficult to hire for, other challenges
- **Recruiting and Retaining Talent**
 - Helpful tools, small vs. large companies, factors that help, on-the-job training
- **Supporting the Talent Ecosystem**
 - Curriculum suggestions, ways government and interest can be supportive

Survey and Interview Findings

Survey Respondents Profile

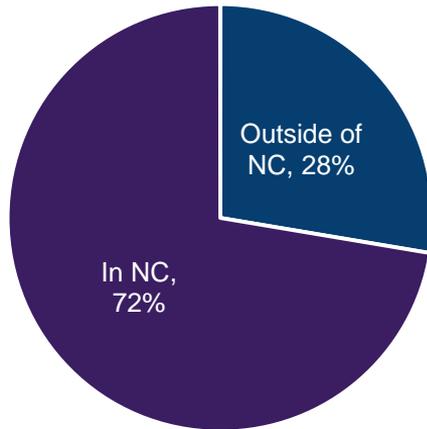
Respondent Profile: Employment Size and HQ Location

RTI reached out to 687 unique local companies. This group represents a mix of small, medium, and large companies with a significant presence in the Research Triangle Region. Of the 687 companies, 123 responded, resulting in an 18% response rate.

Seventy-two percent of survey respondents had headquarters in North Carolina, and those who did not were most frequently large corporations with 1,000 or more employees. The survey results give an overview of a broad range of business types and sizes.

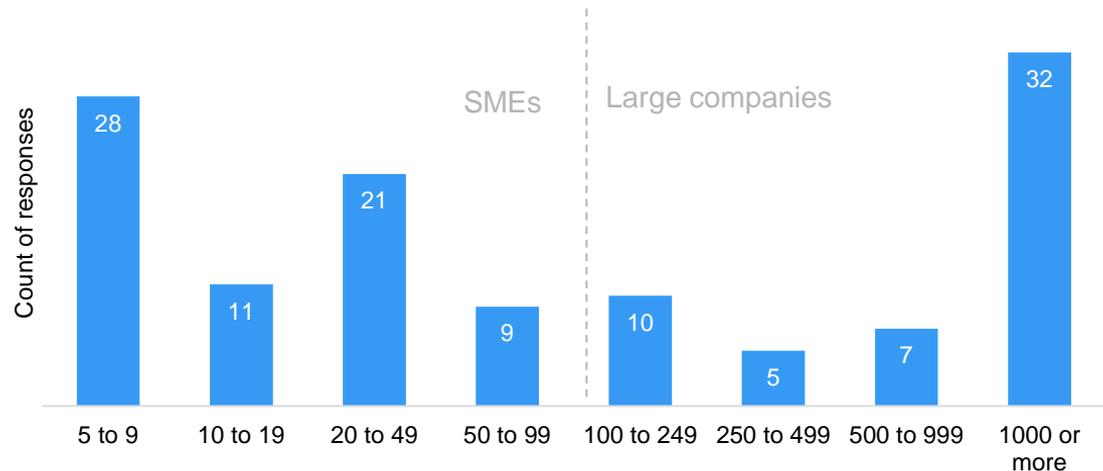
In this analysis, all references to SMEs (small to medium-sized enterprises) are for companies with fewer than 100 employees.

Survey Respondents: HQ Location



Source: RTI Survey Q4

Survey Respondents: Size



Number of total employees

Source: RTI Survey Q2

Survey and Interview Findings

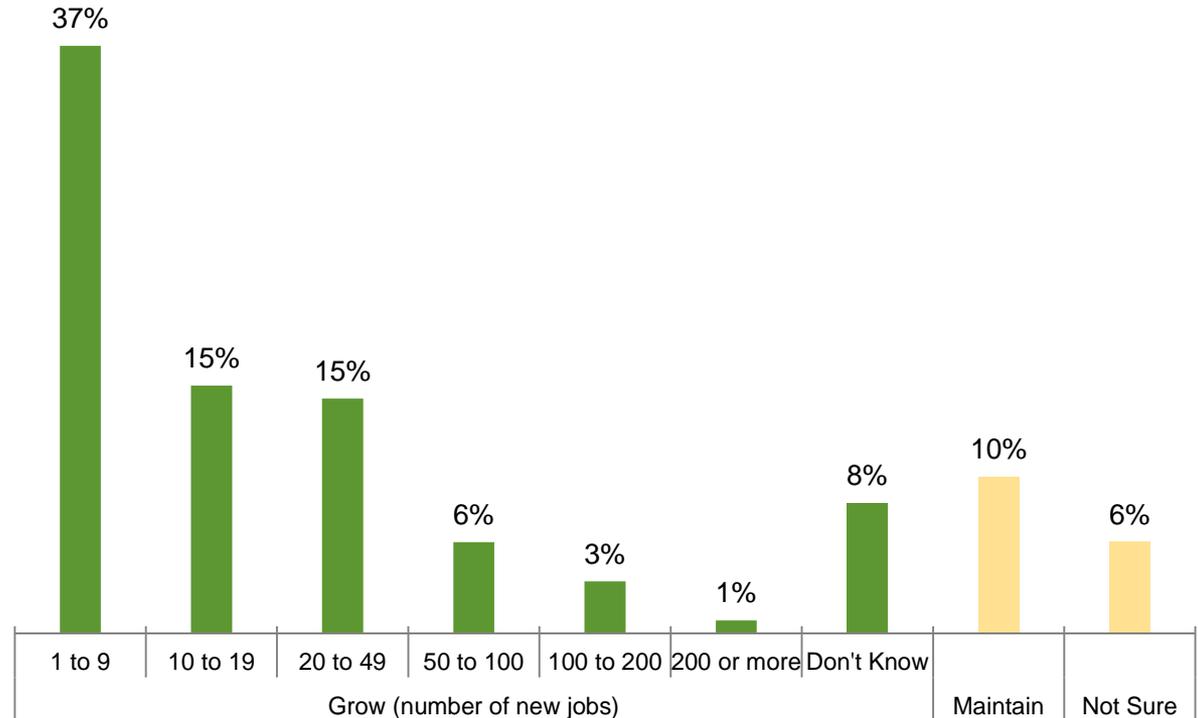
Projections of Growth

Projections of Growth: Employment

- 84% of all businesses surveyed expected to grow their workforce in the next 2 to 5 years.
- Of those expected to grow, the most common were:
 - SMEs looking to hire 1 to 9 new employees
 - Large companies looking to hire 10 to 19 new employees

<i>Expected growth (employees)</i>	SMEs	Large Companies
1 to 9	41	4
10 to 19	7	12
20 to 49	7	11
50 to 100	2	5
100 to 200	1	3
200 or more		1

Do you expect your workforce to grow in the next 2 to 5 years? If so, how many FTE positions do you expect to hire?



Survey and Interview Findings

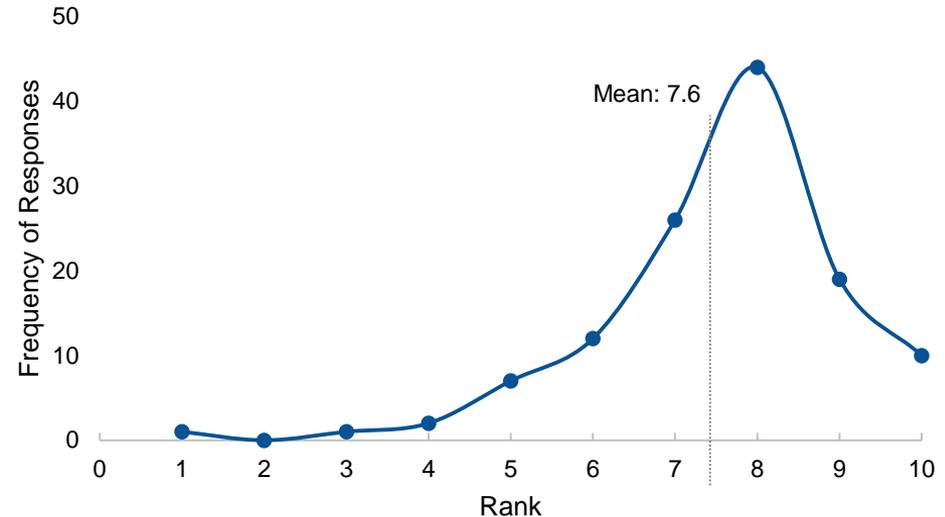
Current Talent Needs

Current Talent Needs: The Talent Pool Today

- Energy and technology companies in the area rank the Research Triangle as having a strong talent pool:
 - On a scale of 1 to 10, they give the area a mean score of 7.6
 - 8 out of 10 was the most frequent response
- Companies cite some of the following reasons for the strong talent pool in the region:
 - Strong universities
 - A diverse set of workers and skills
 - A mix of mid-level workers with experience and entry-level workers who integrate well in the workforce
 - Companies are able to successfully recruit from the region and attract workers from outside North Carolina: Quality of life is an important factor in attracting a skilled workforce.

As companies and organizations like RTCC seek to grow, they are building off a good talent base in the region.

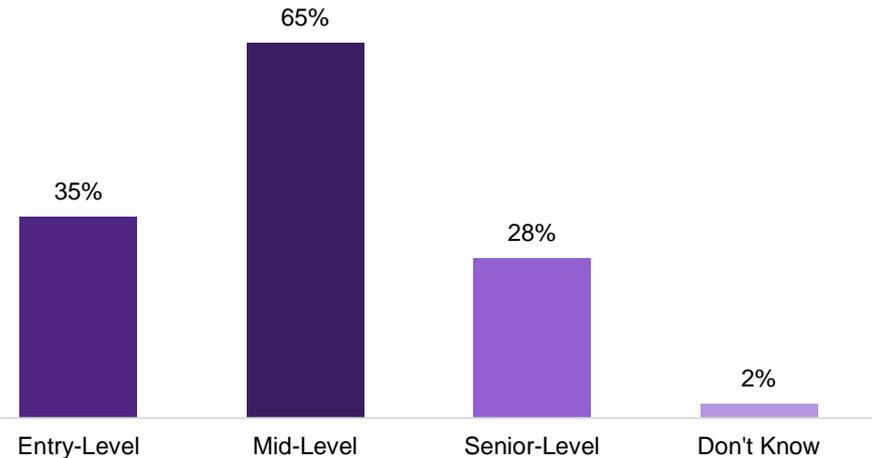
Rank the talent pool from which to hire in the Research Triangle Region as compared to other regions (Scale 1-10)



Current Talent Needs: Level of Experience

- Our research shows that energy and technology companies are most frequently looking to hire mid-level professionals: 65% expected to hire most employees at mid-level positions. These mid-level experienced positions also prove challenging for companies to fill.
- Attractive candidates for energy and technology companies are mid-level professionals with industry knowledge. The nature of the work requires a mix of technical and business skills, which are not necessarily taught at the college level, likely making recent grads less attractive. Senior-level talent is either over qualified, too expensive, or not as flexible in a new working environment.
 - For example, interview and survey respondents expressed a constant need for workers with sales skills and technical experience.
- Comments included:
 - “Many people want to learn about software development or native application development but either have close to no experience or too much experience/seniority. We are looking for that nice middle ground.”
 - “Since we are in a niche market, it is difficult to find the right combination of experience and passion for the mission.”
 - “It has been very hard to find mid/high-level software developers at a reasonable salary.”

At what level do you expect to hire the most employees? (Check all that apply)

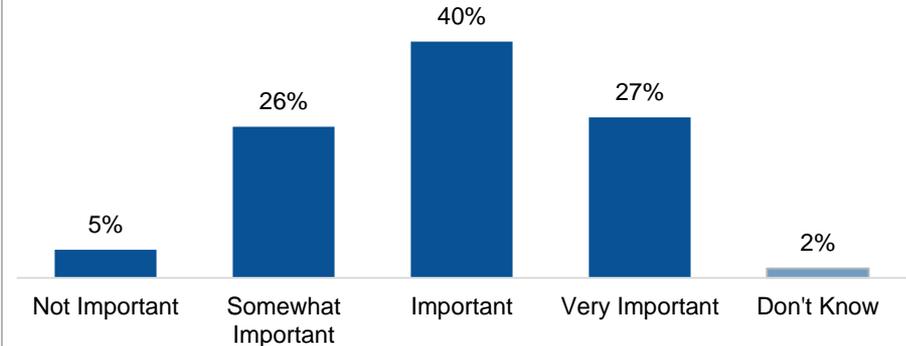


Source: RTI Survey Q7b

Current Talent Needs: Blended Experience and Niche Skills

- Companies are hiring employees with prior industry knowledge: only 5% of respondents said prior knowledge was not important in their hiring.
- It continues to be hard to find a blend of technical and business skills. The need for communication skills and marketing/sales combined with technical knowledge was a constant theme in the survey findings. Respondents expanded on this through comments such as:
 - “It is difficult to find a mix of technical and business natured senior-level resources.”
 - “Senior-level technical writing skills with knowledge of energy industry.”
- Many companies consider their work to be a niche market and require specific skills that are very difficult to find and often can only be gained through experience. Niche skills difficult to hire for include:
 - Cyber security, data science, project management, sales engineering, electrical engineering, Oracle software expertise, substation automation, and protection control engineers
 - Workers with much stronger entrepreneurial instincts and senior executives that can function well in small, growing companies

For non-engineering or non-technical jobs such as marketing or sales, how important is prior knowledge of the industry in hiring?

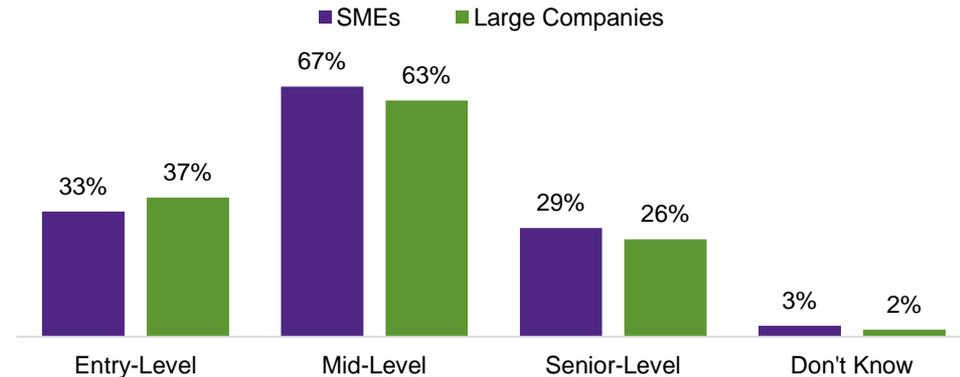


Source: RTI Survey Q8

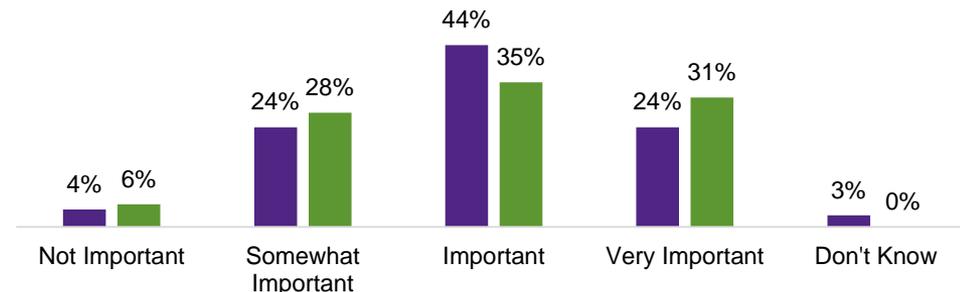
Current Talent Needs: Small Businesses

- Small business hiring needs mirror those of large businesses. They both prefer mid-level employees with experience.
- However, small businesses expressed a unique set of concerns about their talent needs. They:
 - do not have the resources to take on and train entry-level workers.
 - cannot compete with larger companies on salary to attract quality talent. They often rely on work culture, company mission, and benefits to attract quality candidates.
 - find it difficult to hire away from established companies and thus have revenue growth far outpacing employment growth.
- Small businesses are less likely to hire interns. While 85% of large companies reported hiring interns, only 67% of SMEs did. They cited several challenges in hiring interns:
 - Financial constraints
 - Inability to provide adequate mentoring or resources for training
 - Lack of a structure or formal internship program found in larger companies

At what level do you expect to hire the most employees?



For non-engineering or non-technical jobs such as marketing or sales, how important is prior knowledge of the industry in hiring?



Source: RTI Survey Q7b, Q2

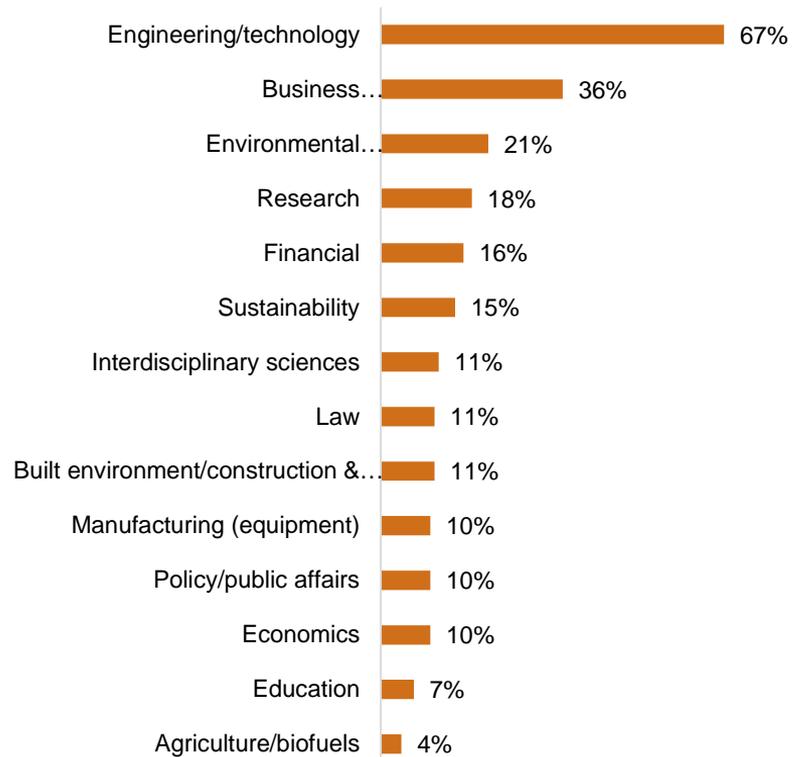
Current Talent Needs: Degrees or Certifications

Overall, companies most frequently prefer workers with engineering and technology degrees (67% of respondents). Business and management degrees come in second at 36%.

Observations:

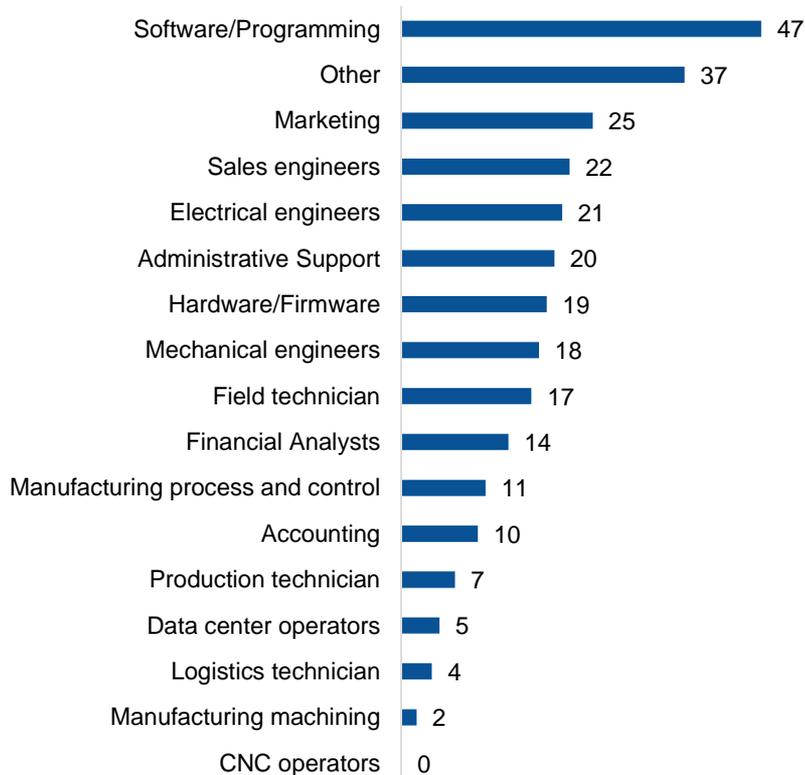
- 25% of survey respondents included BOTH engineering/technology and business/management as preferred or required degrees.
- Among IT/software/analytics companies, 76% preferred engineering and technology degrees.
- Among renewables/energy services/power engineering/utilities companies, 75% preferred engineering/technology degrees. Environmental studies came in second at 34%.

Degrees, majors, and/or certifications that are generally preferred or required as a qualification of hiring:



Skilled Hiring Needs

In what skilled areas do you expect the most hiring needs?



Source: RTI Survey Q7c

Software/programming was the most common skilled hiring need for companies in the energy and technology sectors. It aligns closely with companies' projected growth in IT, software, and analytics.

Common “other” responses include:

- Regulatory and legal experts (7)
- Project managers, construction managers, business managers (6)
- Civil engineers and construction professionals (4)

These responses underscore the need for “sales engineers”: workers with a mix of technical, sales, and management skills who are prepared to work in dynamic, multidimensional jobs.

Needs in marketing, sales, and administrative support are closely related with needs for business development.

Companies also express a particular need for experts in the regulatory and legal area concerning energy and utilities.

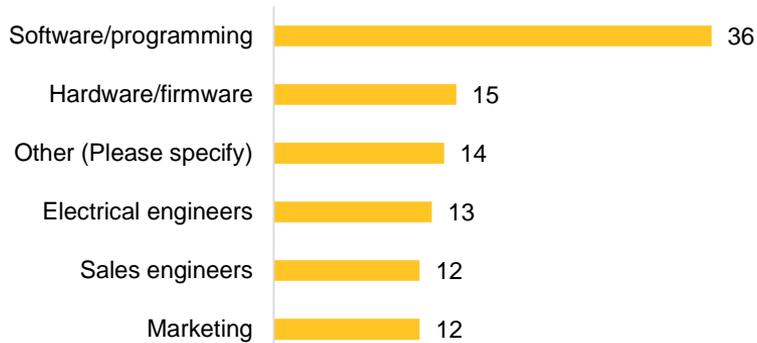
Skilled Hiring Needs by Target Areas for Future Growth

We combined the top industry sectors into two categories: 1. Software, programming, IT, and data analytics and 2. Consulting, energy services, renewable energy. We then show their specific responses about the skill areas with the greatest hiring needs.

Software, Programming, IT, and Data Analytics

The need for skilled talent in this category focuses primarily on software and hardware. Specific skills include Java, database management, analytics, UI, web developers, SQL, and Oracle. Smart grid companies are specifically looking for workers with skills in software and electrical engineering.

Skill Areas with the Greatest Hiring Needs



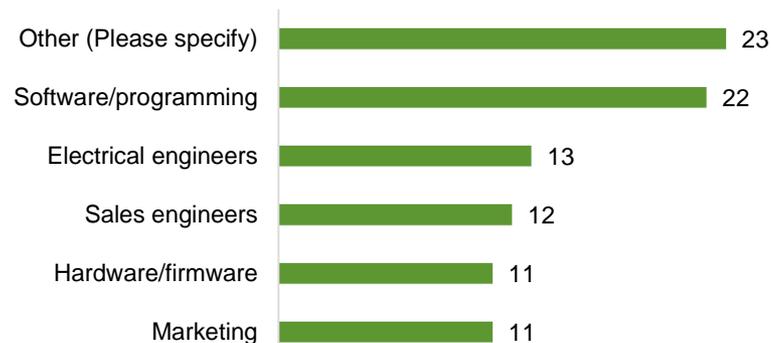
Source: RTI Survey Q7c

Consulting, Energy Services, Renewable Energy

The need for skilled talent in this category does not fall into a single field and is defined by a diversity of “other” responses, including:

- Legal, regulatory, and legislative policy
- Project managers, MBAs, and analysts
- Civil engineers and construction professionals

Skill Areas with the Greatest Hiring Needs



Source: RTI Survey Q7c

Survey and Interview Findings

Challenges in Hiring

Challenges: Skills Difficult to Hire For

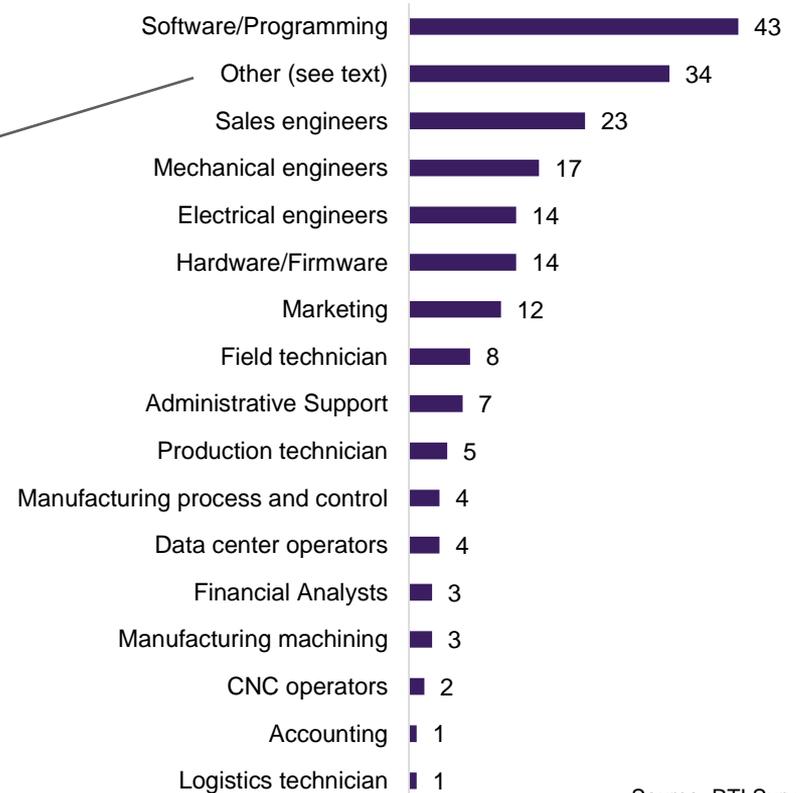
Companies most frequently said that software and programming skills were the most difficult to hire for. They cited an increase in demand for specialized programming, statistics, knowledge in Java, SAS, SQL, and database management.

They frequently cited “other” as a difficult hiring need. Examples included:

- MBAs and JDs with knowledge of the new electricity industry, particularly the regulatory environment
- Chemical engineers and chemists
- Specialized programmers

The most difficult skills to hire for are very similar to the skills that companies are looking to hire for growth. The graph on the slide 36 outlines how market demand for skills compares with the most difficult skills to hire for.

Are there certain skills that your company finds difficult to hire for?



Survey and Interview Findings

Recruiting and Retaining Talent

Retaining Talent: Small vs. Large Companies

Companies have difficulty retaining talent in a competitive labor market.

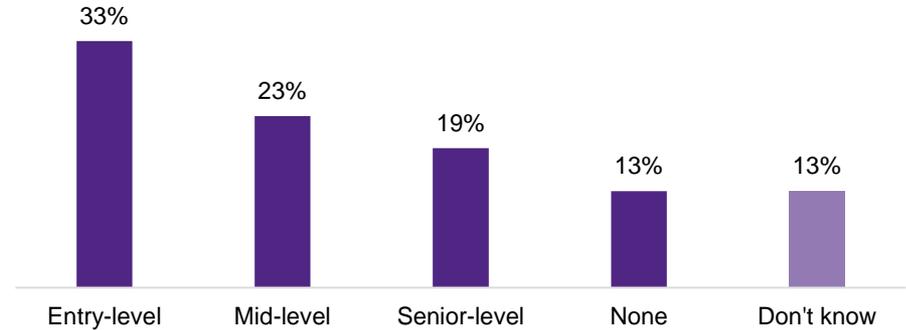
Small to Medium-Sized Companies

- SMEs have more difficulty retaining senior-level talent (19%). Interviewees from SMEs pointed out that they have difficulty competing with the salaries larger companies offer at the senior level.

Large Companies

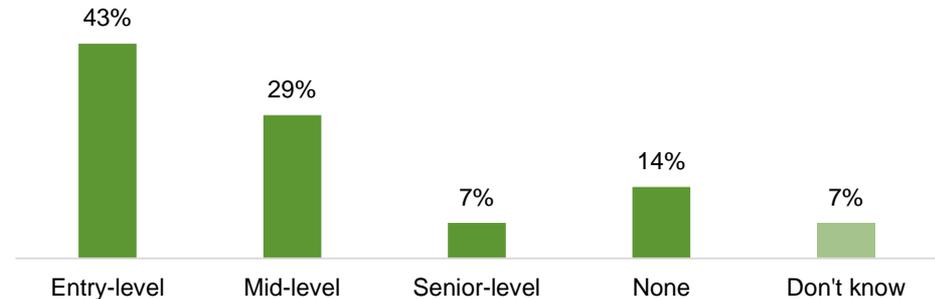
- Large companies have more difficulty retaining entry-level talent (43%). Entry-level workers that go through internal development programs become mid-level workers with skills that are attractive to other companies.
 - “We tend to hire entry-level and give workers good experience, which makes them attractive to outside firms who can offer better salaries. We have to give raises to our workers in order to compete for talent.”

What level of position tends to be difficult to retain talent at your company? (SMEs)



Source: RTI Survey Q31

What level of position tends to be difficult to retain talent at your company? (Lg. Companies)



Source: RTI Survey Q31

Retaining Talent: Factors that Help

Companies' ability to retain talent depends on several factors:

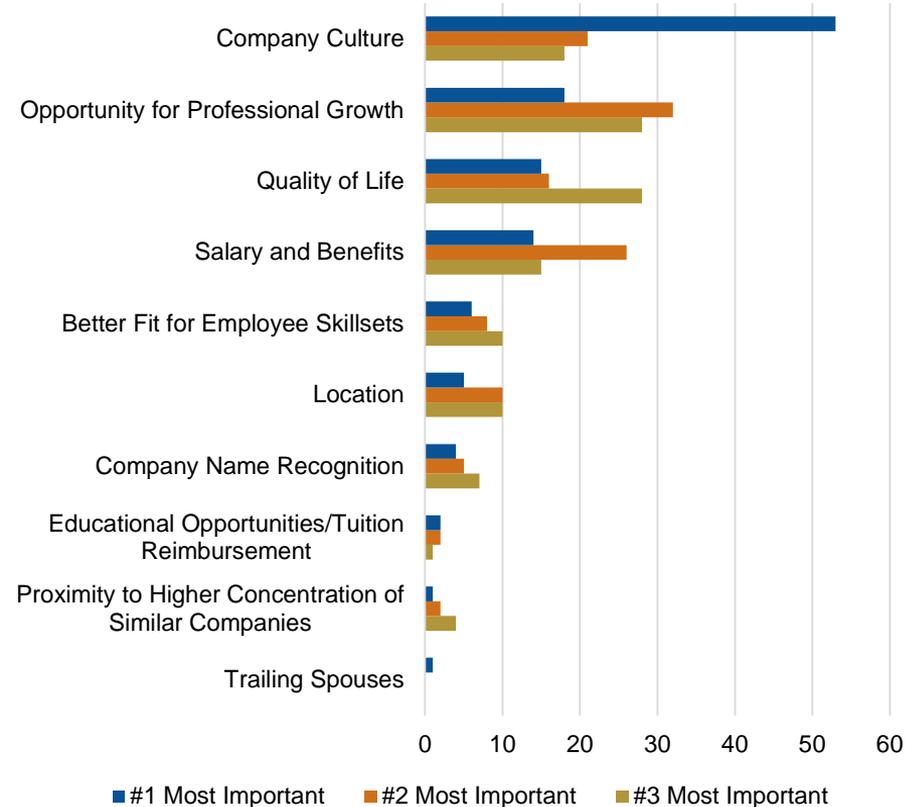
- Survey respondents most frequently cited company culture as the top reason for talent to remain with a company.
- Opportunities for growth, quality of life, and salary and benefits all contributed to retaining talent.
- 77% of companies offered on-the-job training.
- Companies that offered on-the-job training had a harder time retaining talent (see table below)
 - One possible reason is that workers who receive on-the-job training are more likely to be mid-level, and these positions are in high demand (see slide 24).

Does your company offer on-the-job training?		
	Yes	No
Percentage	77%	23%
Difficulty of retaining talent ¹	5.5	4.5

¹ Average of Q18, score of 1-10, with 1 being the easiest and 10 being the hardest

Source: RTI Survey Q18, Q19, Q25

Rank the top three reasons talent stays with your company



Retaining Talent: On-the-Job Training and Skills Development

What kinds of skills or professional development training has been most effective for your company?

77% of survey respondents said that they provided on-the-job training and skills development. Their strategies include:

Modes

- Courses
 - Online training, webinars, tuition reimbursement for degree-based programs and technology certifications
- Technical Symposiums and Conferences
- Mentoring/Apprenticeships
 - Incorporating summer rotations for graduate students
- Informal
 - Lunch and learns, self-study, working in small groups, guest vendor knowledge sharing, personal coaching from team, case studies and lessons learned during and after projects, webinars
- Consulting/Facilitation

Topics

- Project Management
 - Time management, program management, change management
- Team Management
 - Personality assessments, strengths finder, emotional intelligence
- Leadership Skills
- Technical Skills
- Communications
 - Presentations, public speaking
- Soft Skills
 - Build soft skills around technical areas

Survey and Interview Findings

Supporting the Talent Ecosystem

Developing a Curriculum

If you could include or strengthen the kindergarten to higher education curriculum to create stronger paths for students to successfully enter into careers at your company, what would you do?

- **STEM**
 - Strengthen STEM across the board, vocational training that emphasizes technical skill acquisition, make the STEM program more fun, educate children on what the future career market will look like
- **Communication**
 - Reading writing, speaking presentation skills, relationship skills
- **Real World Applications**
 - Practical learnings, simulations, case studies, deemphasize regurgitation, business and or technical skill building classes and scenarios
- **Programming**
 - Computer, software development; data and data structures; data coding
- **Entrepreneurship and Innovation Basics**
 - Expose students to entrepreneurship, its potential and pitfalls; importance of innovative “out of the box” thinking and approaches
- **Teamwork**
 - Project work to get kids to work together to identify a problem, develop a solution, and implement the solution making adjustments on the way
- **Integrated/Interdisciplinary**
 - Multiculturalism, focus on energy (technology, production, and use) combined with analysis and computer control concepts, ability to innovate and collaborate across diverse skillsets, greater emphasis on interdisciplinary writing and engineering
- **Business and Finance**
 - Fundamentals, adopting business perspective, customer empathy

How Government and Interest Groups Can be Supportive

What kind of support would you like to see from organizations from the government sector or private interest groups to help your company with its talent challenges and opportunities?

- **Marketing**
 - Expose companies to wider markets
- **Training**
 - In rural areas for rural workers
 - Emerging technologies
 - Diversity
 - Leadership
 - Academies for coders and digital marketers
- **More proactive in economic development**
 - NC Office of Energy more involved in technology and energy sectors
- **Collaboration**
 - Help companies find better ways to collaborate on opportunities and opportunities for low-risk project-based learning
 - Networking on topical areas (employers and employees)
- **Cost-Effective Ways to Identify Talent**
 - Headhunters are expensive
- **Programs, Grants or Incentives for:**
 - Entrepreneurship, to attract more entrepreneurs to the region
 - Training staff on the cutting-edge technologies and team building
 - Hiring incentives for small companies to bring in skilled staff
- **Lower Taxes**
- **Free Trade**
 - Strengthen understanding of how to export/sell to other countries
- **Education**
 - Student access to high-level technology
 - Expose students to private-sector executives so they can learn about career paths firsthand from industry
 - Ensure high school graduates can read, do math, communicate, follow instructions, and work in teams
 - More support of universities and competitive salaries within universities
 - Any programs at any level that increase the quality of the talent pool
 - High school emphasis on trade, undergraduate emphasis on understanding IT
- **Mass Transit**
 - Airport hub
 - Local/regional transit, light rail