Stakeholder Charrette Report

Charrette #6: Workforce | June 16, 2021

Char-rette: a meeting in which all stakeholders in a project attempt to resolve conflicts and map solutions

Background

Decarbonizing the way we heat and cool our buildings is essential to a stable climate and a zero-emissions future.

HEET[1], a non-profit climate solutions incubator, has designed a method for gas utilities to deliver renewable, non-emitting and non-combusting heating and cooling. This technology, known as networked geothermal[2], consists of pipes filled with water that are installed in the street and connected to ground source heat pumps in buildings. The system can be installed and operated by existing gas utilities, providing a way forward for a transition off natural gas and for states and municipalities to meet emission reduction mandates.

Increasingly, utilities and energy advocates across the U.S. and internationally are considering networked geothermal as a viable electrification pathway, business model and alternative to fossil fuels. In Massachusetts, six networked geothermal demonstration projects have been approved for installation and are moving forward.

Each of HEET's charrettes is an ongoing effort to work together across diverse perspectives and backgrounds, generate ideas and anticipate barriers. In this way, we can move towards a just energy transition—one with clean, safe and accessible energy, low customer bills and good jobs—as rapidly, wisely and justly as possible.

Executive Summary

At HEET's Workforce Charrette, participants from both organized labor and the gas industry discussed the scope of work needed to build networked geothermal systems as a replacement for natural gas, along with opportunities for job creation and career advancement.

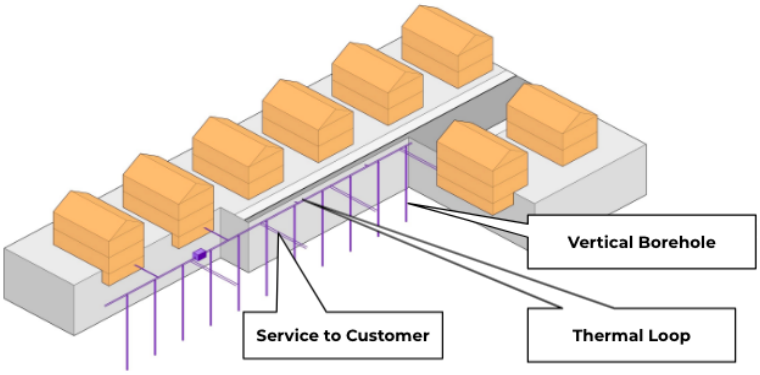
[1] HEET, Home Energy Efficiency Team, is a Massachusetts-based non-profit dedicated to cutting carbon emissions now by driving systems change.
[2] Networked geothermal is also commonly referred to as thermal energy networks. In the past, it has been called the GeoMicroDistrict or GeoGrid.

The 50 stakeholders present included utility executives, regulators, labor and workforce representatives, community organizations, advocates, geothermal designers and installers and heat pump installers and manufacturers.

HEET deeply thanks all participants for their input. This report will be shared with participants and other stakeholders, including utilities and state regulators.[3] *HEET also thanks E4theFuture and other funders for their support of HEET's charrettes.*

Introduction

HEET's Co-Executive Director, Zeyneb Magavi, opened the charrette by describing networked ground source heat pumps and their basic implementation.



Currently, gas utilities are planning multiple networked geothermal demonstration projects in Massachusetts. There are additional projects being planned in New York and Connecticut.

Magavi explained that we are at the very beginning of a gas-to-geo transition. Workforce will be key to making this transition successful. Based on the gas pipe replacement in Merrimack Valley after gas explosions occurred there[4], where 46 miles were replaced in six weeks, HEET estimates that replacing all mains and services in the entire gas system in Massachusetts would take around 4,500 gas workers over 52 years. This doesn't include retrofitting buildings or drilling the boreholes.

This charrette aimed to emphasize the importance of workforce, create connections, share knowledge and shape a path forward to transform our energy system in a way that will also positively transform and provide opportunities for our workforce.

Presenters

- **Steve Bryant**, Former President of Columbia Gas of Massachusetts

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[4] See page 3 for more information on the Merrimack Valley gas disaster.

- **Jason Taylor**, Air-Sealing Specialist and Instructor at Green Jobs Academy, Byggmeister Associates
- **Nikhil Satyala,** Associate Professor and Chair of Engineering Technology at Benjamin Franklin Institute of Technology
- **Gregory King**, Managing Director, TSK Energy Solutions, LLC
- **Temi Olonilua,** Lead Fellow at Advanced Energy Group (AEG) and Engineer at Consolidated Edison

Steve Bryant

Steve Bryant was the President of Columbia Gas at the time of the Merrimack Valley gas disaster in 2018, where excessive pressure in gas lines caused explosions and fires in Lawrence, Andover and North Andover. The event resulted in a $56 million settlement, with $4 million dedicated to a networked geothermal installation to be built in the Merrimack Valley.

Bryant described lessons related to workforce learned during the restoration efforts:

> Repair and restoration of the gas distribution service to thousands of customers was a monumental undertaking that required a significant amount of labor. Columbia Gas, now dissolved, said it would need 1,300 workers to replace 48 miles of pipes over two months.
>
> The scale and intensity of repair efforts following the gas disaster offers a good comparison to the effort that would be required to replace our gas distribution system with networked geothermal. The work is labor intensive, with many different skills and trades involved. A great deal of planning is also required. For example, the electrical capacity of homes may need to be assessed and upgraded. Trade specialists, including electricians, plumbers, insulation specialists and sheet metal workers, would all need to be involved in this work. Excavation specialists would be needed to connect homes to the central loop of ambient temperature water.
>
> The demonstration projects in Massachusetts will be critical to gaining a better understanding of workforce needs and to aid with planning and best decisions for the future.

Jason Taylor

Jason Taylor has been training green job workers for the last 12 years at the Green Jobs Academy, the ABCD Weatherization Lab in Mattapan and at Roxbury Community College. He has written air-sealing curricula for community colleges, Massachusetts Association for Community Action and HEET. Taylor spoke about job opportunities available in weatherization:

> There is a high demand and even a backlog of weatherization work, so many good-paying jobs are currently available. People taking these green jobs after completing training have reported having more disposable income. While a high school diploma is typically required, jobs are available even for those who did not excel in school. Job training is also available. The work is physical, involving tasks like installing insulation in attics, so applicants do need to be in good shape. Former athletes or military would be well suited to the work, but everyone is encouraged to get involved.

Nikhil Satyala

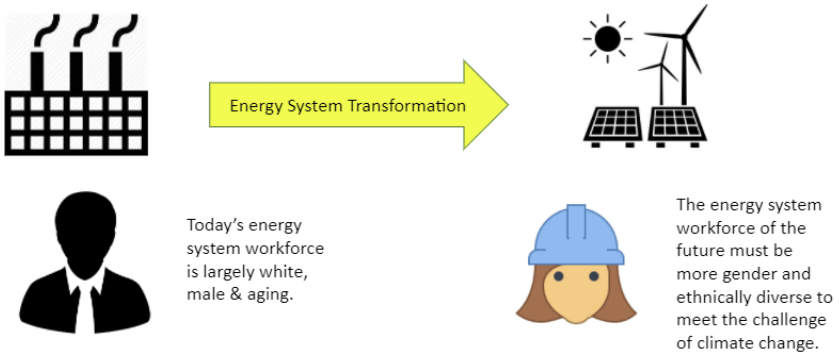
Nikhil Satyala is Associate Professor and Chair of Engineering Technology at Benjamin Franklin Institute of Technology. He shared his thoughts on the time needed to ramp up training programs and the importance of in-community recruitment.

> A pipeline of potential students for training programs should be developed starting in high school. Benjamin Franklin Institute of Technology (BFIT), for example, provides opportunities for students to get involved with renewable energy and industry programs early on. BFIT has the ability to develop short term courses with certifications to prepare students, as well as offer more concentrated programs with a two-year curriculum. Another pathway for students to get involved earlier in their career is internships or scholarships. Getting industry input and support is essential to making students successful.

Gregory King

Gregory King is Managing Director at TSK Energy Solutions, LLC. King described how decarbonizing our energy systems requires reimagining career advancement opportunities.

> The energy system workforce of the future must be more gender and ethnically diverse to meet the challenge of climate change. In order to become less costly, more resilient and less harmful to the environment, energy generation, distribution and consumption must become more intelligent. We need smarter buildings and a smarter grid, which requires technical expertise in computer science



> and electrical and mechanical engineering. The energy worker of the future will experience a new ecosystem that combines many different disciplines.
>
> The following approaches could help increase the size and diversity of the clean energy workforce:
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> - Use awareness campaigns to intentionally seek out women and minorities for training and careers in energy efficiency.
> - Partner with communities to support outreach, recruitment and other services.
> - Destigmatize completing vocational or technical education versus high school education.
> - Deconstruct the white-male dominated career pathways associated with “white collar” vs “blue collar” careers. Transition to “no collar” designations.

Temi Olonilua

Temi Olonilua is a lead fellow at Advanced Energy Group (AEG) and serves as an engineer with Consolidated Edison in New York. She will soon be moving to Boston to attend Harvard Business School. Olonilua shared her thoughts on workforce:

> Olonilua had the experience at Con Edison of supervising an all-male crew, an experience she reported was both enjoyable and challenging, as it could be hard at times to find people to relate to. As we look to the future, Olonilua shared the importance of taking a more inclusive approach, especially given that newer generations will expect diversity. Workers must also be prepared to adapt because the energy industry is changing rapidly. There is a strong need to continue to learn and leverage technology to do these jobs better. Olonilua emphasized that leaders in the utility space must think about the future of work and consider workers’ well-being by finding ways to combat anxiety, build competence and encourage innovation.

Discussion and Attendee Comments

After speakers presented, charrette attendees discussed their vision for the future green workforce. HEET asked: what adjectives describe a job you would invest in, want to keep and be proud of? Top ranked adjectives and phrases included: respect, ethical behavior, collaboration, money and improving community.

Next, HEET assigned participants to five working groups for a collaborative workforce mapping exercise. Each group was asked to envision 2050 as the ideal situation where networked geothermal systems are built and climate change has been solved. What would this ideal networked geothermal clean energy workforce look like?

Visioning 2050: Stakeholder Responses

- The public has a high level of awareness about energy systems and the clean energy field.
- Thermal resources within any planned community are interconnected, working as one to share energy with other infrastructure.
- Broad-based training is available to everyone, with qualified programs and certifications.
- The workforce has a deeper bench of skills that facilitates people moving in and out of occupations as the needs arise and allows people to be equipped for future work with requisite training requirements.
- Full employment and attractive jobs are available.
- Workweek is less than 30 hours/week or 4 days/week, or there is flexible time commitment with benefits.
- Profits are shared across the community.
- Discussions about the energy future start in elementary and middle school.

Next, each group was asked to consider workforce needs in 2030 and 2040 that would lead to success in 2050.

Workforce needs for 2040: Stakeholder Responses

- Policies support investment in women and minority-owned businesses.
- Workers have a stake in clean energy companies.
- There is an established network of training institutions that support clean energy jobs.
- Relationships and collaboration between management and workers is improved.
- New jobs with good salaries are readily available.
- Energy work is destigmatized, particularly weatherization work.
- There is a high demand for trained workers.
- Lines are blurred between blue and white collar jobs.
- The work week is less than 35 hours/week.
- Workers have expanded access to child/eldercare.
- Dangerous work is mostly automated.

Workforce Needs for 2030: Stakeholder Responses

- Green jobs are broadly advertised, including how to access them and what skills are needed.
- Partnerships are created with underrepresented communities.
- Clean energy apprenticeships are widely available.
- Vocational-technical education and STEM is expanded to include climate training.
- Stronger STEM training is the norm, including for women and minorities.
- Training and certifications are enhanced in current jobs so that workers can smoothly transition to the jobs needed in 2030-2050.
- Many stories are published of a diverse, respected workforce and of how people want work to change.
- Public transportation and micro transportation options are expanded.
- Local training facilities are improved.
- Living wages become a goal for all.
- Childcare and eldercare are expanded and salaries raised.

Other Stakeholder Recommendations and Comments:

- Building codes need to evolve. Building codes drive training requirements, but currently lag by three years for adoption and have a 10 year technology lag.
- Legislation is needed to allow unions, trade schools, community colleges to train for needed jobs. New job titles and descriptions are also needed.
- Transition of skills will require a public relations campaign to implement changes as quickly as needed.
- Utilities involvement will be essential to support the transition of gas jobs to electrical systems jobs.
- Unions will need to adapt. A key issue is monetizing training.
- Reduce barriers to entering networked geothermal job markets.

Additional Information:

HEET slide deck

For more information about HEET and its work on networked geothermal:

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