Energizing Economic Growth: A Methodology for Assessing National Residential Energy Auditor Readiness

Blake Lajiness, ORISE Fellow at the U.S. Department of Energy
Jenny Wiedower, U.S. Department of Energy
Megan Plog, U.S. Department of Energy
Carly Peltier, AAAS Science Policy Fellowship at the U.S. Department of Energy

ABSTRACT

As the federal government seeks to equitably decarbonize residential buildings, energy auditor readiness is critical to its success. Robust incentives, including tax credits and rebates, are increasing demand for energy audits and require a nationwide network of skilled energy auditors. There is a wide array of credentials and certifications an energy auditor may hold, and with the profession only recently being recognized as an occupation through the Department of Labor, there is currently no nationwide assessment of availability.

This paper explores gaps in market readiness in the absence of reliable nationwide data. Simply counting the number of certified energy auditors does not capture market readiness. Some states have many energy auditors, but their geographic distribution will dictate their readiness to serve rural households or disadvantaged community members experiencing high energy burdens. Therefore, identifying the number of certified energy auditors per geographic region and energy audit wait times are key indicators of readiness. These findings can inform state and federal implementation of new Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA) workforce development programs.

This paper offers a methodology and case studies for states to determine energy auditor readiness. An in-depth literature review and analysis of state energy auditor data were conducted to inform actionable recommendations. The research team found a lack of energy auditor availability, with high energy burden communities least prepared. Moving forward, this paper can serve as a backdrop for a more robust and equitable nationwide assessment of energy auditor readiness.

Introduction

Greening the grid will not suffice to carry the United States to its net-zero by 2050 goal, particularly when considering direct emissions from the residential buildings sector (White House Office of Science and Technology Policy 2023). The U.S. Department of Energy's (DOE) Energy Information Administration (EIA) (2023) reports that the residential sector consumes 21% of total electricity produced in the U.S., and this consumption will become less emissions intensive as more renewables come online. However, residential sector on-site emissions contribute over half of the total sectoral emissions and must be mitigated through energy efficiency and electrification in U.S. homes (EPA 2023). Research by DOE's National Labs suggests improving the envelope of a home can positively affect energy bills when electrification is introduced, particularly in cold climates (Webster et al. 2024, 79-81). Electrifying home

appliances, water heating, and heating, ventilation, and air conditioning (HVAC), contribute to dramatic emissions reductions when replacing existing heating fuels. Energy auditors play a crucial role within the broader energy efficiency workforce as they frequently serve as the initial point of contact for residents embarking on the path toward a more energy-efficient home. Implementing energy efficiency upgrades identified in a home energy audit can save residents on average 5-30 percent on monthly energy bills and contribute to the health and safety of the home (DOE 2022).

Assessing the landscape of energy auditor data availability, we find that there are data provided by credentialling organizations regarding the number of individuals who have undertaken and maintained their credentials, spanning both new construction and existing residential audits. Figure 1 presents the total number of certified energy auditors per one million housing units by state, from highest to lowest (U.S. Census Bureau n.d.). While these data offer a glimpse into the current state-level distribution of auditors, it does not indicate whether the supply of auditors meets, exceeds, or falls short of demand, which is a key indicator of market readiness, as detailed in the following section. Looking at the total number of auditors per number of households in the state of Minnesota, for example, does not provide information on their geographic distribution, a key determinant of energy auditor readiness for equitable distribution of incentives available at the local, utility district, state, and federal level.

Moreover, aggregating data from various credentialing databases only allows us to broadly estimate the total number of energy auditors by state, resulting in low analytical certainty and granularity. The frequency with which these credentialing databases are updated is unknown, and not every organization provides a state-level count of energy auditors. Organizations recognized by DOE as Energy

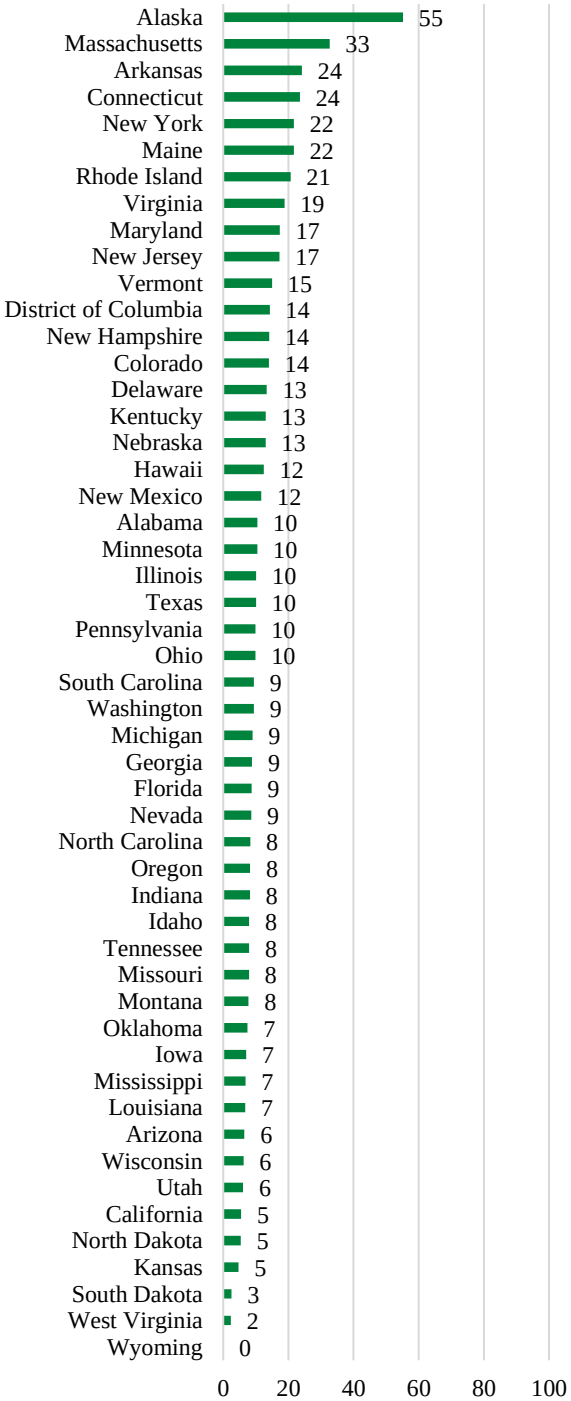

Figure 1. Total energy auditors per one million housing units per state. (Energy auditors from certifications recognized by DOE as Energy Skilled) Housing units from 2020 U.S. Census. *Source*: Building Performance Institute, Association of Energy Engineers, American Society for Heating, Refrigeration, and Air-Conditioning Engineers, DOE Home Energy Score, and Residential Energy Services Network

Skilled that do not maintain a statewide list include Building Science Institute, CHEERS, and CalCERTS. There is also the potential for double-counting individuals who have credentials from more than one program.

The lack of available data on the readiness of the energy auditor labor market presents numerous problems for states and regions, particularly as the funds from the IRA are being disseminated to state energy offices that are standing up new or fortifying existing workforce development programs. Understanding the distribution of energy auditors throughout a state is vital to identifying existing market gaps. For instance, an area with few energy auditors may see longer customer wait times, higher service costs, or other burdens to households. Bothersome roadblocks like these could dissuade or prevent engagement from residents. For instance, residents with limited energy auditor access will find it more difficult to obtain benefits from the IRA, such as the Home Energy Rebate Program ("HOMES"). How quickly a state will apply for HOMES funding from the DOE may depend on if the state has an existing energy efficiency program—with existing energy auditor capacity—through which it can disseminate funding. Ideally, a state will assess its energy auditor readiness before applying for HOMES funding to bolster workforce development, close geographic gaps in energy auditor availability, and shorten customer wait times.

This paper aims to define energy auditor market readiness and estimate the scope and scale of the readiness gap, emphasize best practices, model case studies, and offer a simple methodology for a streamlined approach to assessing readiness for decisionmakers at the state level. Throughout, qualitative findings from stakeholder interviews are infused, such as interviews from conference networking sessions and meetings with energy industry professionals. For concision, this paper focuses on single-family residential buildings because EIA's 2015 Residential Energy Consumption Survey suggests this sector is the largest recipient of energy audits.[1] Further analysis should be conducted for the commercial sector, using this structure as a model. Understanding the readiness of the energy auditor labor market will enable states to make right-sized workforce development investments, create more sustainable energy efficiency programs, and ensure equitable decarbonization of the U.S. residential building stock by 2050.

Defining Energy Auditor Market Readiness

Market readiness is typically referred to as preparing a product or service for commercial sale in the marketplace. How supply and demand interact is the basis for understanding market readiness of a product. Demand is generally driven by consumers, the gap a service or product could fill, and the speed at which the service or product can fill the gap. Factors impacting demand for a product or service include mandates, incentives, perceived value, available capital, consumer education and awareness, as well as competition. Supply is driven by the availability of companies to provide a needed service well, and this can result in a sustainable business model. In the energy audit space, companies provide qualified auditors, equipment, and administrative services. Government policies impact both supply and demand (e.g., requirements for worker qualifications and energy assessments or incentives for training programs and energy audits).

[1] RECS 2020 did not include a question to indicate whether a respondent's home had an energy audit.

This idea can translate to the energy efficiency labor market. As described in the Introduction, demand for energy auditors is poised to spike with the inflow of federal funding. Supply of energy auditors will need to keep pace as demand increases, and communities will need strategies to keep both supply and demand in balance. A goal of these federal programs is to provide businesses and workers with good opportunities in the clean energy economy by lowering cost hurdles for businesses to offer quality energy audit services and incentivizing uptake of energy audits. In an interview with Phil Hull from Community Housing Partners (CHP), a property management company that serves about 55% of Virginia where the current residential building code requires certain services home energy auditors are trained to perform (Va. Code Ann. §R401 (2018), he offers an explanation on how his organization handles supply of energy auditors: "A few years ago, when the state code changed to require energy audit skills, I thought we needed to bring on more staff auditors to perform the expected 1,000 more audits per year. But in actuality, we're at 12 and…we found a way for them to be more efficient." (Training Center Director, pers. comm., February 15, 2024). Qualitative evidence like this is useful when comparing to the quantitative baseline shown in Figure 1 above. Taken together, both can help inform decision making at various governmental levels.

States must be able to assess labor market readiness to inform program design, ensure smooth delivery of program services, and establish a baseline for later program evaluation. An example of a market assessment is the Building Performance Association's (BPA) Workforce Development Needs Assessment for the state of West Virginia (BPA 2022). The West Virginia market assessment considers the existing supply of the energy workforce and the current consumer demand for services, and ultimately explores how supply and demand may shift given BIL and IRA incentives. Demand-side assessments of energy auditors may need to be broken down at the sub-state level because energy audit customers differ in key areas, such as by income level, housing type, motivation, and geographic location. Sub-state assessments of customer type naturally reveal gaps, and this is where states will focus their efforts to boost energy auditor readiness. Significant federal investments will stimulate demand; therefore, the speed at which states address gaps will dictate the scale and success of these investments and impact the degree to which new and disadvantaged businesses and workers reap the benefits. Assessing market readiness, however, can be burdensome to under resourced states, which are often also the states with the most opportunity.

Current Assessment of the Energy Auditor Landscape

Understanding the energy auditor profession is critical to a successful evaluation of market readiness. Auditors have a range of education, experiences, and credentials that support their employment. Energy auditors are responsible for many tasks, from customer engagement to building science technical proficiency. Not only do energy auditors perform in-home diagnostic testing, but they must also analyze the collected data and recommend ways to improve energy use within the home. They must do so while considering customer needs, cost minimization, energy bill impacts, occupant health, safety, comfort, and energy codes.

A typical energy auditor will need, at minimum, a high school diploma to enter the profession, with the expectation that the employee would achieve at least one recognized certification (see Table 1 below). According to the Department of Labor, median wage for

construction and building inspectors–the classification under which energy auditors are placed–is $32.55 hourly or $67,700 annually. This aligns with Phil Hull's experience, who reports the auditors he works with make between $60,000-$70,000 annually across 12 states (Training Center Director, CHP, pers. comm., February 15, 2024).

Career advancement routes require additional education, licenses, certifications, and/or experience, and many residential energy auditors move onto careers in home performance contracting, energy management, and quality control inspecting. Mr. Hull reports that he does not see many electricians or plumbers wanting to pursue energy auditing, but rather HVAC technicians are likely to make the career switch. In a separate interview, Larry Zarker, the president of the Building Performance Institute, agrees with Mr. Hull, "Some of the most successful companies started in HVAC and are now have 'whole house' home performance contractor offerings." Zarker also acknowledges the ease with which commercial energy auditor can be trained to audit residential buildings, but that the reverse would require an engineering background, creating a bottleneck in the commercial space (pers. comm., January 31, 2024).

Various certifications of energy auditors are prevalent in the workforce, likely because of the vehicles through which residential energy audits are performed: by request of an individual customer, offered as part of a utility energy efficiency program, or offered as part of a state's weatherization assistance program (WAP). Structured programs like WAP almost always require energy auditors to hold a credential as a prerequisite for participating in the program. For example, all WAP projects begin with an energy audit performed by a credentialed Home Energy Professional Energy Auditor and then contracted trained crews install the identified energy efficiency and health and safety measures (SCEP n.d.b). With industry-recognized certifications, programs can be assured of the caliber of knowledge held by workers they are hiring, consumers can rest assured these workers have proven their ability to do quality work, and workers can gain access to work streams and cashflows they may not otherwise have been able to access.

Recently, DOE implemented a process to determine qualified certification programs for home energy auditors that taxpayers can hire to claim the Energy Efficient Home Improvement Credit ("Section 25C") for home energy audits, per criteria specified in Internal Revenue Service Notice 2023-59 (2023). The evaluation process for determining which certifications are qualified is based on the industry input included in the National Renewable Energy Laboratory's Single-Family and Multi-Family Energy Auditor Job Task Analyses (JTA) (Head and Kurnik 2018; Owens 2013). DOE recognizes certification programs meeting or exceeding elements of the JTA through its Energy Skilled recognition program for workforce credentials. DOE expands and amends the list of qualified certification programs on a rolling basis, and the list utilized for Section 25C purposes is also utilized for additional BIL and IRA programs.

This compilation of certification programs does not encompass all available energy audit certifications. Nonetheless, given the focus of this paper on the anticipated rise in demand for home energy audits prompted by federal funding programs, DOE's list of Energy Skilled-recognized programs, in Table 1, serves as the primary reference for energy auditors in this paper (U.S. DOE 2023). Notably, DOE's Home Energy Score Assessor program, which provides energy assessments in homes, is not included in Energy Skilled. The Home Energy Score Assessor program, however, requires its participants to hold an industry-recognized credential as a prerequisite, many of which are included below, but several of which are not.

The energy auditor landscape involves many major actors (i.e., federal and state government, program administrators, workforce development partners, trainers, contractors, workers, and consumers), and experiences a lack of consistency in training requirements and

certifications, which helps explain the lack of national data on energy auditors. Most current literature about energy workforce gaps focuses on installation contractors and not on energy auditors. In Table 2 below, the first column lists several major sources for energy efficiency workforce data, while the second column identifies the gaps related to energy auditors.

Table 1. DOE Energy Skilled recognized programs for home energy audits

Organization	**Recognized Program**
American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE)	Building Energy Assessment Professional (BEAP)
Association of Energy Engineers (AEE)	Certified Energy Auditor (CEA)
Building Performance Institute (BPI)	Home Energy Professional (HEP) Energy Auditor Building Analyst Professional (BA-P)
Residential Energy Services Network (RESNET)	Certified Home Energy Rater
Building Science Institute, Ltd. Co.	Energy Code Compliance Specialist ENERGY STAR Verifier Zero Energy Home Verifier
California Home Energy Efficiency Rating Services (CHEERS)	Home Energy Rating System (HERS) Rater
CalCERTS, Inc.	Whole House Home Energy Audit

Table 2. Data gaps from current energy efficiency workforce literature

Resource	**Identified relevant energy auditor gaps**
E4 the Future: Energy Efficiency Jobs in America 2023 (E4 the Future 2023)	Energy auditor employment numbers are aggregated into “other” catch-all categories, making it impossible to glean insights on national energy auditor statistics.
DOE’s U.S. Energy and Employment Jobs Report (USEER) (n.d.c)	While providing a thorough national landscape assessment of energy jobs, the report makes no mention of energy auditors.
Building Performance Association’s Summary of Workforce Development Needs Assessment Findings and Next Steps (BPA n.d.)	BPA has a robust member network of more than 20,000 across the U.S., yet their 2021-member survey on workforce development needs assessment makes no mention of energy auditors.
U.S. Department of Labor’s Bureau of Labor Statistics (BLS) O*Net (2024)	While a Standard Occupational Classification (SOC) for energy auditors exists, data for Wages and Employment Trends is pulled from the dataset for 47-4011 Construction and Building Inspectors and is not specific to energy auditors (O*NET 2024; U.S. BLS 2022)

National Renewable Energy Laboratory's WAP Wage Study & Analysis (Wu et al. 2021)	13 states provided certification data for this study; 37 did not.

Examining the national energy auditor landscape proves challenging due to significant data gaps. For instance, investigating the geographic distribution of energy auditors would require substantial resources, such as extensive stakeholder outreach and data disaggregation. The federal government might face prioritization constraints, while state governments may experience capacity shortages to perform such analyses. National laboratories, non-governmental organizations (NGOs), and private firms may possess greater flexibility to delve deeper into the subject. With access to more comprehensive information, they could make significant strides in understanding the occupation.

Concurrently, we predict there to be a projected spike in demand for residential energy auditors at the state level due to federal stimuli. Many states are standing up new or bolstering existing residential energy efficiency programs in anticipation of federal funding; other states are requiring components of energy audits by adopting stricter residential building codes, such as IECC 2021 (U.S. DOE Building Energy Codes Program 2024). While many organizations, such as utility program implementers, community-based organizations, regional networks, and state-led WAPs, a concern is that supply of energy auditor training may not keep pace with demand, especially in the geographic areas of the U.S. designated "priority".[2]

As states seek opportunities to ramp up energy efficiency workforce development, the challenges they face are many. Such as recruitment, training, and retention as noted by the Oregon Department of Energy's 2022 Biennial Energy Report. At the 2024 National Association for State Energy Officials Policy Outlook Conference, many states echoed this sentiment, adding that there is a clear divide between states with fully-fledged workforce development programs and those starting with little or no energy auditor training programs.

A Shifting Landscape

The passage of the BIL and IRA signaled an upcoming change for both the renewable energy and energy efficiency worlds. To meet the workforce demand created by these laws, there are provisions specifically designed` to recruit, train, and retain a diverse and skilled workforce. This section focuses on how the energy efficiency workforce landscape has changed and where gaps may still exist.

Besides the Energy Efficient Home Improvement Credit (Section 25C), which provides a tax credit of up to $150 for qualified home energy audits, and the Home Energy Rebates Programs discussed earlier, the IRA created new Energy Efficiency and Conservation Block Grants (EECBG) that can be used by states for recruiting, training, and retaining energy auditors to meet states' immediate supply needs and conducting residential and commercial building energy audits (SCEP n.d.a). EECBG's wide range of uses—15 eligible uses—presents a prioritization challenge to states who may have many competing interests in energy efficiency.

[2] Section 40501 of the Bipartisan Infrastructure Law (BIL) of 2021 defines "priority states" as among the 15 states with the highest annual per-capita combined residential and commercial sector energy consumption, or among the 15 states with the highest annual per-capita energy-related carbon dioxide emissions by state, as most recently reported by the EIA (DOE, n.d.).

On the other hand, the options can lead states toward a well-thought-out energy auditor training program with a long-term strategy for growth even after federal funding is expended.

Additionally, the BIL helps states set up a revolving loan fund (RLF) with assistance for energy audits and auditor training. It includes "$250 million to provide capitalization grants to states to establish [RLFs] to provide loans and grants for commercial and residential energy audits, upgrades, and retrofits, among other activities. A state may use up to 25% of the funds to provide grants or technical assistance to eligible recipients for energy audits, upgrades, and retrofits, and up to 10% of the funds for administrative expenses," which can include workforce training, with the remainder to be used on the RLF (DOE n.d.). This stimulus money gives states the ability to supercharge their energy efficiency programs while fostering a sustainable source of funding for future use.

The BIL Energy Auditor Training (EAT) Grant Program, administered by DOE's Office of State and Community Energy Programs (SCEP), offers $40 million to states for direct residential and commercial energy auditor training support (n.d.). The near-term goal of this funding is to meet the immediate demand of the energy efficiency industry, while the long-term goals are geared toward equity, collaboration, and business sustainability. With EAT funding, certified energy auditors will conduct audits to advise residential and commercial building owners on how to reduce energy use, promote energy efficiency, and access energy savings.

The State-based Home Energy Efficiency Contractor Training Grants (also known as TREC) provide $200 million to state energy offices so they can train, test, and certify residential energy efficiency and electrification contractors. States can partner with nonprofit organizations to develop and implement these programs that will prepare contractors and their employees to bring clean energy technologies into homes. Contractors who are trained will be able to install home energy efficiency and electrification technologies and deliver residential energy efficiency and electrification improvements, including projects funded by DOE's Home Energy Rebates Programs, which provide rebates to eligible residents for retrofits and appliance upgrades that reduce energy use (SCEP n.d.a).

Energy efficiency apprenticeship opportunities predate the BIL and IRA but have expanded in their wake. Aspiring energy auditors can participate in registered apprenticeship programs to "earn while they learn" relevant skills, or energy auditors in training may choose to train for and receive the industry-recognized credentials to conduct home audits. According to Apprenticeship USA, "Employers are increasingly utilizing Registered Apprenticeship as a proven solution to recruit, train and retain world-class energy talent. In 2022, there were 14,698 registered apprentices in the energy industry, an 80% increase over the past 9 years" (Apprenticeship USA n.d.a.).

As these new investments are made in developing the energy auditor workforce, there is an important opportunity to ensure that new training, development, and job opportunities are administered equitably. As of 2016, only 18% of workers in the energy efficiency sector were female despite making up 47% of the national workforce, and African American workers make up only ~8% of the energy efficiency workforce (Muro et al. 2019, 25-27). To this end, the Biden Administration's Justice40 (J40) Initiative requires that at least 40 percent of overall benefits of federal investments in covered programs flow to disadvantaged communities that are marginalized, underserved, and overburdened by pollution (The White House 2022). Many

programs that touch the energy efficiency workforce, such as EAT, EECBG, and RLF, are covered programs under J40 (DOE n.d.a). Additionally, DOE programs funded through the BIL or IRA must include a Community Benefits Plan (CBP) (DOE n.d.a). These CBPs ensure that advancing equity is at the center of the funding recipients planning process and that the recipient is prepared to implement funds in alignment with J40.

Assessing Market Readiness: Best Practices and Proposed Methodology

State energy offices and their partners are primed to guide dollars to create a well-balanced energy auditor labor market that can serve each state's entire geography, but the opportunity will be missed if states cannot effectively assess their current situation and projected changes. For instance, the Massachusetts 2023 Clean Energy Workforce Needs Assessment was born out of a Three-Year Energy Efficiency Plan, which was published in 2021 to establish statewide energy efficiency goals. To achieve these goals, a workforce needs assessment was needed to identify gaps in the energy efficiency workforce, such as reduced workforce supply because of increased building technologies and gaps in the training network. A secondary goal of this assessment was to inform key stakeholders, such as utilities and manufacturers, where to direct future investments (BW Research Partnership n.d.). This needs assessment contains many best practices for determining energy auditor readiness that could be applied to other states who choose to follow this model. Other states have conducted similar state workforce needs assessments, according to Xavier Walters at the Building Performance Association (BPA). He reports that "BPA has worked with West Virginia, Maine, Kentucky, Delaware, and Virginia on these projects, but some have not allowed their assessments to be public" (Director of Outreach, BPA, pers. comm., March 5, 2024).

Establishing a baseline is vital for long-term planning and programmatic evaluation at the state level. As federal funding becomes available, states will likely need to show how their workforce programs are having an impact. Comparing the number of energy auditors trained using the BIL funding against the baseline, for example, could show the effectiveness of federal incentives on state economies and the U.S. economy, writ large. Underserved rural communities with currently fewer energy auditors and less access to training networks will be a key metric for states to track to measure the success of their deployment of funds. Another benefit of establishing a baseline is that it could be socialized between regions, states, and even localities to inform future program and policy design. Well-documented successes can also act as justification for future private or public sector investments. The state of Massachusetts offers a baseline of various energy auditor metrics (e.g., wage, typical career pathway, and career satisfaction) that it can use to track changes. As a starting point for assessing energy auditor readiness, states should consider performing a similar baseline needs assessment to that of the state of Massachusetts.

Disaggregated data allows for a deeper and clearer analysis of the results, where available. Despite using some data from the Department of Labor's BLS SOC 13-1199 "Business Operations Specialists, All Other", which lacks in energy auditor-specificity, as pointed out in Table 2, the state of Massachusetts' needs assessment puts energy auditors in their own category. To do this, the Massachusetts' needs assessment includes interviews from over 100 energy auditors across the state, lending to a robust qualitative sample. To conduct such a

comprehensive assessment, Massachusetts contracted help from BW Research Partnership. Collaborating with external entities to gather data, including but not limited to NGOs, consulting firms, utility providers, state-level WAP agencies, and community-based organizations (CBO), is a best practice when it comes to assessing energy auditor market readiness and closing gaps in data availability.

The methodology framework in Figure 2 below outlines four primary steps states should consider when assessing energy auditor market readiness, including critical success factors. The framework is intended to serve as an initial guide for states to build upon. It does not aim to address every aspect of assessing market readiness due to the market's complexity but instead highlights essential areas for achieving success.

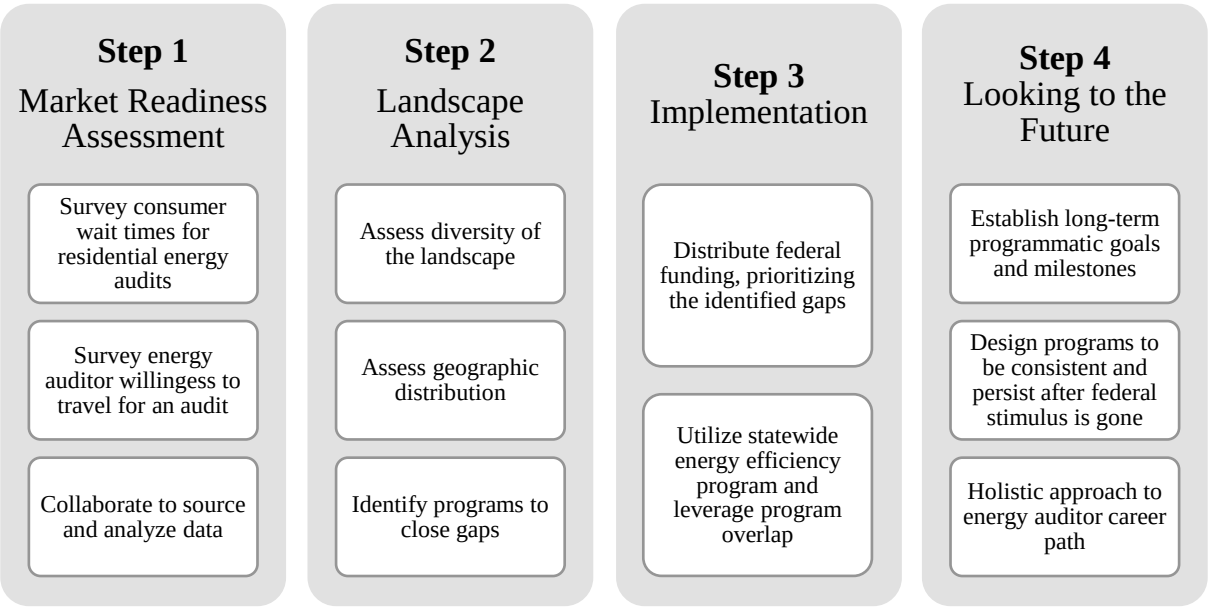

Figure 2. This four-step methodology was carefully curated to emphasize where states should focus their efforts, when seeking to assess the readiness of their energy auditor workforce.

Market Readiness Assessment

When conducting a market readiness assessment of the energy auditor market, states should collect data about consumer wait times and energy auditor travel range. Measuring these data will serve as a useful readiness proxy to states, because they may reveal gaps in distribution of energy auditors. Customer wait time information can be sampled through a survey disseminated in communities across a state (e.g., as an insert to a utility bill and/or when collecting information about an electrical co-op energy efficiency program). Ensuring equitable access to the survey will be crucial for a high confidence interval (i.e., distributing paper copies for customers without internet access). Both perceived—how long a customer would be willing to wait—and actual wait time should be captured in the survey, if possible. Comparing actual wait times reported by customers to estimated service wait times collected from energy auditors, outlined in the following paragraph, will show decisionmakers where customer needs are not being met. Contracting out the surveying would be one practical approach to this task for states facing staffing constraints. To ensure procedural justice and effectively reach priority

communities who may be hesitant to complete a survey funded by a government entity, relationship building with trusted community messengers (e.g., local advocacy organization, CBOs, heads of churches and other community associations) is critical.

In addition to surveying customers, a state market readiness assessment should include the energy auditor perspective. The survey approach provides reasonable estimates and conclusions based on the collection of a few data points from energy auditors. To target geographic concerns, the survey should include questions about an energy auditor's willingness to travel from their home or office to conduct an audit and expected additional costs associated with doing so. Perspectives from new entrants and mid-career professionals may yield interesting and different results, so the sampling should be diverse. With either ZIP code data collected from the survey or credentialling organizations, a state could overlay the concentration and location of auditors with willingness to travel data, giving states an idea of where the labor availability gaps exist and where to target its readiness efforts.

Additional questions could be included on the energy auditor-focused survey, such as entry-level work experience requirements, experience working with various building types, career satisfaction, and additional benefits. The state of Massachusetts conducted a survey of like caliber, producing robust results that are ripe for further analysis to better indicate target areas for—as one example—the state's possible EECBG and/or EAT funding..

Landscape Analysis

Honing energy auditor readiness into three main considerations is the goal of step two of the methodology framework. After reviewing the literature and discovering gaps in comprehensive energy auditor data, we discerned four areas of concern regarding states' energy auditor readiness. First, ensuring the workforce is representative of the communities they work in will help make sure that the communities that have been underserved and overburdened are receiving equitable employment opportunities and benefits of public funding. Second, assessing geographic distribution of energy auditors throughout a given state will inform efforts to achieve reasonable consumer wait times and manageable service fees, while protecting ongoing efforts to decarbonize residential buildings. If states understand specifically where energy auditor supply is lacking relative to demand, they can target a training program to close the gap. Finally, states should identify their programs that are most prepared to close supply gaps as identified in the market readiness assessment. Benefits in program overlap can thus be identified and capitalized upon, with cross-departmental collaboration likely to yield the best results.

With a landscape analysis and market readiness assessment complete, a state will have data on which geographic areas have a deficit, balance, or saturation of energy auditors compared to requests for energy audits. These data should be paired with information about upcoming federal investments and their potential impact on the supply (of workers) and demand (for home energy audits) so that a state can predict where investments should be made to address locations with an imbalance. In some areas, that may mean investing in workforce programming by driving people into energy audit trainings or, in the case of market saturation, driving existing auditors into trainings for in-demand jobs that build on their auditor skillset. In some areas, it may mean augmenting demand for energy audits through sustained incentives, where there is sufficient current or future workforce.

Implementation and Looking to the Future

The final two steps of the methodology consider funding and program implementation as well as actions a state can take to create a sustainable and long-lasting impact on the energy auditor community. This part of the methodology is not the primary focus of this paper, but we want to provide resources and considerations for a state who has completed their readiness assessment and is eager for resources to make progress.

Gaps highlighted by the market readiness assessment and landscape analysis are opportunities for states to strengthen their energy auditor workforce. A state can evaluate whether its existing workforce training programs will be useful to move federal funding through, such as the the BIL Energy Auditor Training program funds. This method of moving funds is a best practice to address reliability, resiliency, and affordability more directly in residential buildings. However, there may be states that are less prepared to implement federal funding, and these states should turn to DOE's Program Design & Customer Experience – Make Design Decisions guide (DOE 2016). This guidebook contains step-by-step instructions for residential energy efficiency program design, tips for success, and additional resources. Additionally, there is a separate guidebook for developing implementation plans that states can use.

As states create and support their programs, considering the shape it will take in the future is critical. This means anticipating supply and demand shifts, maintaining funding forecasts, and developing a robust network to draw information and resources from when needed. There are several elements we suggest states consider for the creation of a sustainable energy efficiency workforce program:

- Establish long-term programmatic goals and intermittent milestones with an eye toward an evaluation process where program achievements can be quantified and benefits to priority communities tracked.
- Continuously reflect on the components for a successful energy auditor market readiness assessment and embed these elements into processes as much as possible on the front end. For example, consider the relevance of comments from stakeholders who have shared interest in data, such as workforce boards, education and training institutions, and utilities.
- Establishing a streamlined application process for distributing competitive funding at the state level for applicants to move through the system efficiently. Creating such an approach may require technical assistance, but a consistent approach is necessary for program evaluation, data collection, and downstream analyses.
- Considering a holistic approach to the energy auditor career pathway will not only stimulate local economic growth, move the U.S. toward its goal of a net-zero economy by 2050, and allow for continued investment in the energy auditor workforce well after federal stimulus is expended, but it will also lend to the sustainability of local businesses created by the trained and certified energy auditors who benefit.

Evaluating programmatic impacts is key for replicating the market readiness process in the future or in other states and to avoid common pitfalls. It is also useful for measuring the impacts of public funds on achieving its stated goals. For example, 40% of the BIL and IRA funds are supposed to flow to disadvantaged communities that are marginalized by

underinvestment and overburdened by pollution (DOE n.d.b). Strict programmatic tracking is needed to quantify the benefits of these funds, but there are paths to avoid burdensome processes. States should consider how best to integrate the J40 initiative into their program design and which metrics to track. One way to track the impact of the BIL EAT funding would be to measure how many newly trained energy auditors are from disadvantaged communities and compare it to the baseline. From analyzing early implementation of EAT funding on disadvantaged communities, states can adjust their approach to align with J40.

Conclusion

Home energy auditors serve a vital role in energy upgrades, but energy auditor data is disparate and incomplete. Federal investments are structured to support states investing in their workforce infrastructure before incentivizing upgrades completed by the workforce. Federal programs are designed to reach priority areas such as disadvantaged communities, rural areas, and places with abundant opportunities for energy savings. As documented in this paper, the investments made today into the energy audit workforce will have an outsized impact on the outcomes of massive new federal programs. Those investments will be best guided when informed by more accurate information about gaps in service coverage. It is crucial to have a process for states to follow when assessing workforce needs that includes the collection of different communities' current conditions, needs, and preferences for accessing energy audit services.

Energy audit data gaps can be addressed by creating a centralized database of energy auditors and their distribution across states. These data gaps may also be addressed at a local, state, or regional level by conducting locally led surveys. A consistent method of collection and storage of data will boost regional coordination. Additionally, a state- or sub-state-level analysis of energy audit resource deficits and surpluses will reveal how to adapt current workforce resources to serve a more representative population and prepare for changes in energy audit demand. Finally, states should share best practices in energy auditor market readiness assessments to help streamline the process and induce cost compression. Energy auditors are at the core of the energy efficiency workforce, as the initial point of contact for many residents seeking improved efficiency. Assessing energy auditor readiness is critical for states to build economic prosperity, lift Americans into the middle class, and reduce residential sector on-site emissions, leading the U.S. down a path toward success in achieving its goal of a net-zero economy by 2050.

References

Apprenticeship USA. n.d. "Energy." Www.apprenticeship.gov. Accessed March 6, 2024. www.apprenticeship.gov/apprenticeship-industries/energy.

———. n.d.a "Energy Auditors." Www.apprenticeship.gov. Accessed March 6, 2024. www.apprenticeship.gov/apprenticeship-occupations/listings?occupationCode=47-4011.01.

BPA (Building Performance Association). 2022. "West Virginia Workforce Development Needs Assessment: Contractor & Coordinator Survey Results." www.building-performance.org/wp-content/uploads/2022/12/WV_Needs_Assessment_Nov_2022_FINAL_REDUCED.pdf.

———. n.d. “Summary of Workforce Development Needs Assessment Findings and next Steps | Resources.” Building Performance Association. Accessed March 6, 2024. www.building-performance.org/education/resources/summary-of-workforce-development-needs-assessment-findings-and-next-steps/.

BW Research Partnership. n.d. “Massachusetts Energy Efficiency Workforce Development Needs Assessment.” Accessed March 6, 2024. www.ma-eeac.org/wp-content/uploads/Massachusetts-Energy-Efficiency-Workforce-Development-FINAL-REPORT-CAREER-PROFILES.pdf.

EIA (Energy Information Administration). 2023. “How Much Energy Is Consumed in U.S. Buildings?” Frequently Asked Questions (FAQs). November 28, 2023. www.eia.gov/tools/faqs/faq.php?id=86.

EPA (Environmental Protection Agency). 2023. “Sources of Greenhouse Gas Emissions.” United States Environmental Protection Agency. October 5, 2023. www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions.

E4 the Future. 2023. “Energy Efficiency Jobs in America 2.2+ Million Americans Work in Energy Efficiency.” www.e4thefuture.org/wp-content/uploads/2023/10/Energy-Efficiency-Jobs-in-America-2023.pdf.

Head, H. and C. Kurnik. 2018. “Single-Family Energy Auditor Job Task Analysis.” National Renewable Energy Laboratory. www.energy.gov/scep/articles/nrel-job-task-analysis-single-family-energy-auditor.

IRS (Internal Revenue Service). 2023. “Guidance on Requirements for Home Energy Audits for Purposes of the Energy Efficient Home Improvement Credit under Section 25C.” August 4, 2023. www.irs.gov/pub/irs-drop/n-23-59.pdf.

Lynham, J. 2018. “4.1 Demand and Supply at Work in Labor Markets.” Pressbooks.oer.hawaii.edu 4.1. www.pressbooks.oer.hawaii.edu/principlesofmicroeconomics/chapter/4-1-demand-and-supply-at-work-in-labor-markets/.

Muro, M., A. Tomer, R. Shivaram, and L. W. Kane. 2019. “Advancing inclusion through clean energy jobs”. Brookings Institute. www.brookings.edu/articles/advancing-inclusion-through-clean-energy-jobs/

O*NET. 2024. “47-4011.01 - Energy Auditors.” Www.onetonline.org. 2024. www.onetonline.org/link/summary/47-4011.01.

Oregon Department of Energy. 2022. “Biennial Energy Report.” www.oregon.gov/energy/Data-and-Reports/Documents/2022-Biennial-Energy-Report.pdf.

Owens, C. 2013. “Multifamily Energy Auditor Job/Task Analysis and Report.” National Renewable Energy Laboratory. www.nrel.gov/docs/fy14osti/60447.pdf.

SCEP (Office of State and Community Energy Programs). n.d. “Energy Auditor Training Grant Program.” Energy.gov. www.energy.gov/scep/energy-auditor-training-grant-program.

———. n.d.a “Energy Efficiency and Conservation Block Grant Program.” Energy.gov. Accessed March 6, 2024. www.energy.gov/scep/energy-efficiency-and-conservation-block-grant-program.

———. n.d.b “Guidelines for Home Energy Professionals Credentials.” Energy.gov. Accessed March 6, 2024. www.energy.gov/scep/guidelines-home-energy-professionals-credentials.

———. n.d.c “State-Based Home Energy Efficiency Contractor Training Grants.” Energy.gov. www.energy.gov/scep/state-based-home-energy-efficiency-contractor-training-grants.
The White House. 2022. “Justice40 Initiative.” The White House. 2022. www.whitehouse.gov/environmentaljustice/justice40/.
U.S. BLS (Bureau of Labor Statistics). 2022. “47-4011 Construction and Building Inspectors.” Occupational Employment and Wage Statistics. May 2022. www.bls.gov/oes/current/oes474011.htm.
U.S. Census Bureau. n.d. “Explore Census Data.” Data.census.gov. Accessed June 3, 2024. www.data.census.gov/table?q=United%20States&t=Housing%20Units&g=010XX00US.
U.S. DOE (Department of Energy). 2016. “Program Design & Customer Experience – Make Design Decisions | Residential Program Guide.” Residential Program Guide. March 28, 2016. rpsc.energy.gov/handbooks/program-design-customer-experience-make-design-decisions#edit-group-description.
———. 2022. “Energy Saver 101 Infographic: Home Energy Audits.” Energy.gov. March 3, 2022. https://www.energy.gov/energysaver/articles/energy-saver-101-infographic-home-energy-audits.
———. 2023. “U.S. Department of Energy Recognized Home Energy Auditor Qualified Certification Programs for the Energy Efficient Home Improvement Credit (Section 25C).” Energy.gov. 2023. www.energy.gov/eere/buildings/us-department-energy-recognized-home-energy-auditor-qualified-certification-programs.
———. n.d. “Bipartisan Infrastructure Law: Energy Efficiency Revolving Loan Fund Capitalization Grant Program.” Accessed March 6, 2024. www.energy.gov/sites/default/files/2023-07/BIL-FAQ-Final.pdf.
———. n.d.a “DOE Justice40 Covered Programs.” Energy.gov. Accessed March 6, 2024. www.energy.gov/justice/doe-justice40-covered-programs.
———. n.d.b “Justice40 Initiative.” Energy.gov. Accessed March 6, 2024. www.energy.gov/justice/justice40-initiative.
———. n.d.c “UNITED STATES ENERGY & EMPLOYMENT REPORT 2023.” Accessed March 6, 2024. www.energy.gov/sites/default/files/2023-06/2023%20USEER%20REPORT-v2.pdf.
U.S. DOE Building Energy Codes Program. 2024. “State Portal | Building Energy Codes Program.” Www.energycodes.gov. March 31, 2024. www.energycodes.gov/state-portal.
Va. Code Ann. §R401 (2018). www.codes.iccsafe.org/content/VECC2018P1/chapter-4-re-residential-energy-efficiency
Webster, B., L. Toffoli, M. Campbell, L. Badger, A. Donovan, D. Lane, K. McGrath, et al. 2024. “Accelerating Residential Building Decarbonization: Market Guidance to Scale Zero-Carbon-Aligned Buildings.” www.advancedbuildingconstruction.org/wp-content/uploads/2024/01/ABC_Industry-Guidance-Report_2023_v5.pdf.
White House Office of Science and Technology Policy. 2023. “National Innovation Pathway of the United States.” www.whitehouse.gov/wp-content/uploads/2023/04/US-National-Innovation-Pathway.pdf.

Wu, K., P. Milson, J. Williams, and A. Schroer. 2021. "Key Takeaways from Weatherization Assistance Program (WAP) Wage Study & Analysis". United States. www.osti.gov/servlets/purl/1823438.