

State of Washington
Joint Legislative Audit and Review Committee (JLARC)



HVAC/R Licensing and Testing Requirements Study

Report 05-12

September 14, 2005

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JLARC staff, under the direction of the Committee and the Legislative Auditor, conduct performance audits, program evaluations, sunset reviews, and other policy and fiscal studies. These studies assess the efficiency and effectiveness of agency operations, impacts and outcomes of state programs, and levels of compliance with legislative direction and intent. The Committee makes recommendations to improve state government performance and to correct problems it identifies. The Committee also follows up on these recommendations to determine how they have been implemented. JLARC has, in recent years, received national recognition for a number of its major studies.

HVAC LICENSING
AND TESTING
REQUIREMENTS
STUDY

REPORT 05-12

REPORT DIGEST

SEPTEMBER 14, 2005



STATE OF WASHINGTON

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Study Mandate

The 2004 Supplemental Operating Budget directed the Joint Legislative Audit and Review Committee (JLARC) to review the licensing, certification, and testing requirements of HVAC/R (Heating, Ventilation, Air Conditioning, and Refrigeration) contractors and installers. This report: 1) explains what HVAC/R work involves, 2) describes current licensing and certification requirements, and 3) makes comparisons between HVAC/R licensing and certification requirements and professions within Washington and other states.

What Does an HVAC/R Contractor Do?

HVAC/R systems control the temperature and humidity of air in a building. An HVAC/R technician works on equipment such as boilers, heat pumps, air conditioning units, and furnaces. Work might range from taking apart a home unit when a breakdown occurs, identifying the problem and making the necessary repair, to complex, high voltage installation and maintenance of systems in commercial buildings. This involves work in several trades, including sheet metal, plumbing, and electrical work.

What are the Current Certification and Licensing Requirements?

Six Washington cities require licenses for gas and mechanical work, refrigeration, and oil work; however, the state only regulates the electrical work of HVAC/R. Licensing is handled by the Department of Labor & Industries (L&I), who is statutorily charged to license and certify electrical work—with few exceptions—based on the furtherance of safety to life and property.¹ L&I is advised on electrical regulation by the Electrical Board, a 15-member advisory body whose membership is set in statute. Specialty electricians, such as HVAC/R, account for approximately 40 percent of regulated electricians, but are not formally represented on the Board.

A person engaged in the HVAC/R business currently can be required to obtain licensure or certification in four regulatory classifications:

- General or specialty contractor: Provides consumers with a means of financial protection, but does not assure any particular knowledge or skills in a given field;
- Electrical contractor: Required to create a business that employs workers to do electrical work on HVAC/R;
- Electrical administrator: The business must have at least one employee certified as an administrator, who ensures that work is performed in accordance with state law; and
- Journeyman electrician or licensure in one of the two HVAC/R specialties: Individuals who work on the electrical components of HVAC/R must obtain one of these licensures.

Electrical certification and licensing is a fee-supported activity, which means that the electricians and contractors pay for their regulation, not taxpayers. Currently, there are approximately 1,020 Washington-based contractors who perform HVAC/R work. Of this group, 570 perform electrical work on HVAC/R and are licensed as electrical contractors who pay licensing fees to L&I's Electrical Fund.²

¹ RCW 19.28.010.

² This count excludes 65 firms registered as electrical contractors based in other states.

Comparing HVAC/R Certification and Licensing Within Washington and With Other States

In order to evaluate HVAC/R licensing, certification, and testing requirements, JLARC made a series of comparisons and interviewed a range of Washington HVAC/R contractors based on income and location:

- We compared **fees** with other certificates administered by L&I and with other professional certificates in the state. We found that **HVAC/R fees are comparable with other specialty certificates**, as well as with **other professional certificates**.
- We compared the HVAC/R **certification requirements** with other specialty certificates administered by L&I. In the course of doing so, **we found that current certification requirements do not guarantee that a technician has electrical experience** before obtaining a specialty electrical certificate.
- We surveyed Washington HVAC/R contractors on their impression of the scope of work and testing requirements for the state HVAC/R certificate. We found that **most were satisfied with the current scope of work** allowed by the HVAC/R specialty certificate, but that many would **prefer an exam that is focused on more than the electrical work** of their job.
- We looked at other states' regulatory approaches, and found that there are several approaches to HVAC/R certification. Many **certify HVAC/R as a separate trade**; others use an **exam similar to Washingtons**.

Recommendations:

1. Existing certification requirements do not guarantee that an electrical trainee has electrical knowledge or experience. **L&I should provide consumers with assurance that technicians have electrical knowledge and experience before certification.**
2. The methodology for determining training hours is not clear to many contractors, and many HVAC/R firms are not aware of options to reduce required training hours. **L&I should more clearly explain its methodology for determining training requirements, and clarify agency rules to inform HVAC/R technicians of their industry's options to reduce required training hours.**
3. Based on JLARC's survey of contractors, and our review of certification requirements of Washington cities and models of other states, certifying other aspects of HVAC/R work may be an option for the state to consider. **To provide policymakers and industry with a better sense of possible options, L&I should provide fiscal and public safety estimates of scenarios that would certify other aspects of HVAC/R work.**
4. Specialty electricians, such as HVAC/R technicians, represent 40 percent of all certificated electricians in the state and 41 percent of electrical contractors, but are not represented on the Electrical Board. **If the Legislature wishes to more broadly represent regulated entities with knowledge of trade-specific equipment, it should revisit the Board's current composition.**

TABLE OF CONTENTS

CHAPTER ONE: INTRODUCTION TO HVAC/R REGULATION IN WASHINGTON.....	1
WHAT IS HVAC/R?	1
CHANGES IN STATE HVAC/R CERTIFICATION	5
A SECOND OPTION FOR HVAC/R CERTIFICATION	7
CURRENT SCOPE OF WORK.....	7
CHAPTER TWO: COMPARISONS WITHIN WASHINGTON AND WITH OTHER STATES	9
COMPARISON OF SPECIALTY ELECTRICAL CERTIFICATES	10
INPUT FROM WASHINGTON HVAC/R CONTRACTORS AND TECHNICIANS	13
HVAC/R REGULATION IN OTHER STATES	16
CHAPTER 3: FINDINGS AND RECOMMENDATIONS	19
AGENCY RESPONSES.....	24
ACKNOWLEDGEMENTS	24
APPENDIX 1 – SCOPE AND OBJECTIVES	25
APPENDIX 2 – AGENCY RESPONSES.....	27
APPENDIX 3 – LICENSING FEES BY PROFESSION	33

CHAPTER ONE: INTRODUCTION TO HVAC/R REGULATION IN WASHINGTON

In Washington, the state's Department of Labor and Industries (L&I) regulates certain aspects of the HVAC/R (Heating, Ventilation, Air Conditioning and Refrigeration) industry. In 1998, L&I made significant changes to the licensing and certification requirements for HVAC/R contractors and installers.

Many workers in the industry felt that the new state certification requirements were unfair, and voiced their concerns to interested parties, including legislators. In its 2004 Supplemental Operating Budget, the Legislature directed the Joint Legislative Audit and Review Committee (JLARC) to review the licensing, certification, and testing requirements of HVAC/R contractors and installers. This report responds to that request.

The rest of this chapter explains what HVAC/R work involves and describes current licensing, certification, and testing requirements. This chapter also maps out recent changes in state HVAC/R regulation. Chapter 2 compares HVAC/R certification requirements and other professions within Washington and with other states. Chapter 3 concludes with a summary of issues discovered in this analysis and the report's recommendations.

WHAT IS HVAC/R?

HVAC/R, sometimes referred to as climate control, controls the temperature and humidity of the air in a building, and also provides smoke control and fresh air. Employees in the field work on equipment such as boilers, heat pumps, air conditioning units, and furnaces. Working on this equipment involves skills in several trades, including sheet metal, plumbing, and electrical work. Work might range from taking apart a home unit when a breakdown occurs, identifying the problem and making the necessary repair, to complex, high voltage installation and maintenance work of systems in commercial buildings.

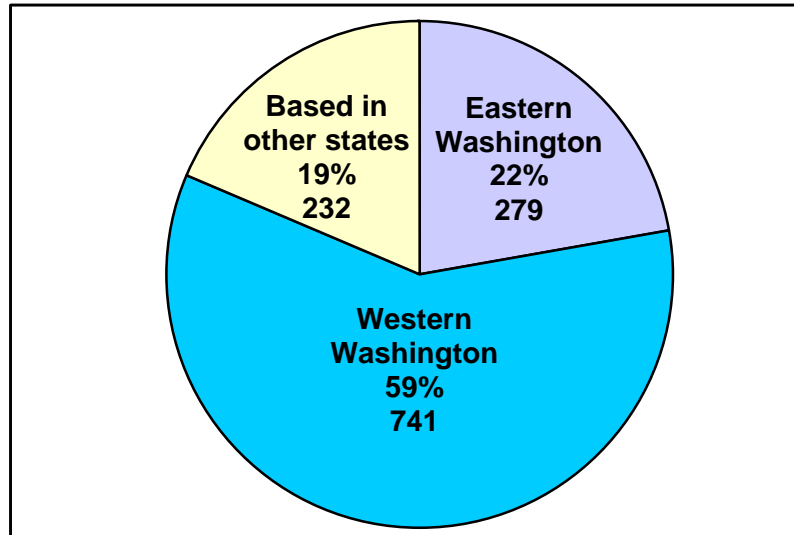
The HVAC/R Industry in Washington

About 1,020 firms in Washington perform some HVAC/R work: 740 firms are located in Western Washington and 280 in Eastern Washington.³ More than 200 firms based in other states are licensed to perform HVAC/R work in Washington (see Figure 1).⁴ These companies employ about 4,200 technicians whom the state certifies to perform electrical work on HVAC/R equipment.

³ Data provided by L&I and the Department of Revenue (DOR). L&I provided data that listed all licensed firms with either an HVAC/R electrical license, or that are registered as general contractors and had specialties that were HVAC/R related.

⁴ These counts exclude firms registered as "General Electrician" or "Limited Energy," although these firms may also perform HVAC/R work. Due to limitations in L&I data, it is not possible to identify which of the firms with these registrations actually perform HVAC/R work. As a result, these figures understate the number of firms whose business includes or exclusively consists of performing HVAC/R work.

Figure 1 – Location of HVAC/R Contractors



Source: JLARC analysis of L&I data.

To better understand the kinds of firms based in Washington, JLARC categorized them into three groups, based on firms' average Gross Business Income from 2000-03:⁵

1. *Small*: less than \$100,000;
2. *Medium*: between \$100,000 and \$750,000; and
3. *Large*: greater than \$750,000, as displayed in Figure 2.

Figure 2 – Firms by Revenue Volume

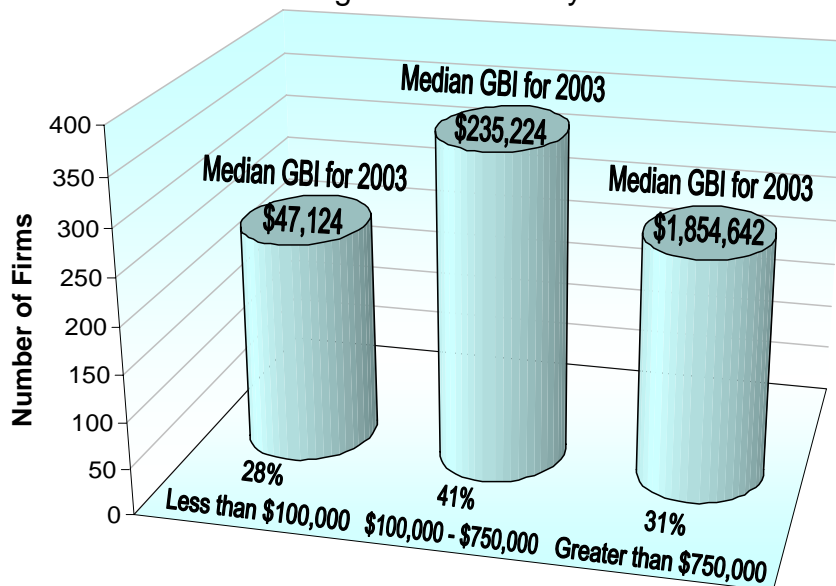


Figure 2 represents 848 firms. It does not include 172 firms with licenses whose data was not available from DOR, or 232 firms licensed in Washington but based in other states.

Source: JLARC analysis of L&I and DOR data.

⁵ GBI represents businesses' income subject to taxes by the Department of Revenue, and includes all gross receipts without deducting for labor costs, taxes, or other business expenses. The division was made to provide three income levels for the purpose of a stratified sample of the industry that was conducted as a part of this study.

CURRENT REGULATORY FRAMEWORK

HVAC/R businesses in Washington are regulated by the state and by some cities. State law requires L&I to certify individuals and license firms performing electrical work, including electrical work performed on HVAC/R equipment. The current regulatory framework is described below.

State Licensing and Certification

The state *licenses* contractors and *certifies* individual employees. Depending on the type of HVAC/R work a firm performs, the state might require license or registration as either a General/Specialty Contractor or Electrical Contractor, or both. In addition, if the HVAC/R firm performs electrical work, it must employ a certified electrical administrator and general electricians or HVAC/R technicians. Figure 3 describes the various licenses and certificates that the state may require for HVAC/R firms and individuals who perform this work.

Figure 3 – State HVAC/R Certificates and Licenses

	Degree of Regulation	Type of Work	Specific Testing	Statutory Requirement for State Regulation	Cost
Contractors	<i>Registration</i> as a general or specialty contractor ⁶	Non-electrical aspects of HVAC/R, such as ductwork	None	Consumer financial protection (payment dispute, workmanship issues, etc.) RCW 18.27.041	<ul style="list-style-type: none"> • Two-Year License: \$106.50 • \$6,000 Surety Bond: \$150-\$750 • \$12,000 Surety Bond: \$175-\$1,500
	<i>Licensure</i> as an electrical contractor	Required for <i>any</i> electrical work on HVAC/R components	None	Consumer financial protection RCW 19.28.041	<ul style="list-style-type: none"> • Two-Year License: \$232.90 • \$4,000 Surety Bond: \$150-\$300
Individual (If the firm is an Electrical Contractor)	<i>Certification</i> as an electrical administrator or master electrician	Any electrical work on HVAC/R components (<i>at least one administrator required</i>)	Test on safety, the state electrical code, and electrical theory	Assures work is performed in accordance with state law RCW 19.28.061	<ul style="list-style-type: none"> • Exam: \$50.00 • Initial Application: \$105.40 • Renewal application (every 3 years): \$133.20 • Continuing Education: \$0 - \$350 annually, free from L&I
	Employees <i>certified</i> as journeymen electricians or certified in one of the two HVAC/R specialties	Any electrical work on HVAC/R components	Test on safety, the state electrical code, electrical theory and the ability to use the National Electric Code and find standards of HVAC/R work	Assures that electrical work is performed safely RCW 19.28.161	<ul style="list-style-type: none"> • Exam: \$75.60 • Initial Application: \$50 • Renewal Application (every 3 years): \$70.20 • Continuing Education: \$0 - \$350 annually, free from L&I

⁶ A contractor can be a person, firm, or corporation. The work of a general contractor, or builder, involves numerous building trades or crafts. A specialty contractor can only perform two unrelated building trades; e.g., air conditioning and sheet metal (RCW 18.27.010).

Licensing and certification for building and construction trades is primarily handled by L&I's Specialty Compliance Services Division, which certifies plumbers and electricians, conducts electrical, elevator, and boiler inspections, and registers construction contractors.

Why is Electrical Work Regulated by L&I?

HVAC/R work involves work in several trades. However, it is only the electrical portion of this work that requires state licensure and certification. This is based on the Legislature's intent that regulation only be at the level necessary "to protect the public interest and to promote economic development through employment."⁷ If the state does regulate a profession, statute directs that regulation is applied at the least restrictive level to protect the public.⁸ There are three levels of assurance that can be applied:⁹

- At the most basic level are *registration* and *licensure*, which require a person or company to apply to be on a roster maintained by an agency or organization. The non-electrical aspects of work require that a contractor *register* with L&I; electrical work requires a contractor to be *licensed* with L&I, the distinction coming from the applicability of two separate chapters of RCW to electrical and non-electrical work.
 - Registration and licensure may carry additional requirements, such as bonding or proof of insurance, but are usually minimal. Licensed electrical contractors and registered contractors are subject to agency enforcement action, such as fines for not buying a permit to do work.
- The next level is *certification*, which requires individuals to meet certain minimum qualifications, such as experience in the field and passing an exam before using a title. Certified professionals are usually subject to agency enforcement action, such as fines for performing improper installations, failure to provide proper supervision of trainees, etc.

Electrical contractors are held to a different licensing standard than some other contractors, such as a sheet metal contractor, and are covered by a different chapter of statute. Statute holds that:

"It is unlawful for any person, firm, partnership, corporation, or other entity to engage in, conduct, or carry on the business of installing or maintaining wires or equipment to convey electric current, or installing or maintaining equipment to be operated by electric current as it pertains to the electrical industry, without having an un-revoked, unsuspended, and unexpired electrical contractor license, issued by the department."¹⁰

This requirement is extended to all individuals working on electrical equipment in Revised Code of Washington 19.28.161. As a result, with limited exceptions, statute requires L&I to license firms and certify individuals performing electrical work, regardless of the voltage or complexity of work performed.¹¹

⁷ RCW 18.118.005.

⁸ RCW 18.118.010.

⁹ RCW 18.118.020.

¹⁰ RCW 19.28.041.

¹¹ RCW 19.28.091 provides exemptions for utility employees, telephone, telegraph, radio, and television wires and equipment, television antenna installations, signal strength amplifiers, and coaxial installations. Additionally, plumbers are allowed to perform electrical work for like-in-kind replacement of household appliances or household utilization equipment that requires limited electric power.

L&I is advised on licensing, certification, and inspection rules for all electrical work by the Electrical Board, a 15-member advisory body with members selected from various sectors of the electrical industry. The Board's membership is set in statute, and its members are appointed by the Governor.¹² The Board's role is to advise the director of L&I on all matters related to standards of electrical installation, inspection procedures, and enforcement. The Board also advises L&I on defining rules and regulations, such as licensing and certification requirements, based on the furtherance of safety to life and property.¹³

Electrical licensing and certification in Washington is a fee-supported activity, which means that electricians and contractors pay for their regulation, not taxpayers. Funds collected for licensing and registration are dedicated to administering the Electrical Program. For the 2005-07 Biennium, the Electrical Program budget was approximately \$27 million, with over 80 percent of these funds coming from electrical permit sales, and the remainder coming from licensing and certification fees, enforcement citations, and other activities.¹⁴ Of the 1,020 Washington-based HVAC/R firms, 570 firms pay for regulation from L&I's Electrical Program; the other 450 firms are registered only as General or Specialty Contractors, which means they either do not perform electrical work on HVAC/R, or are doing so illegally.

Local Government Certification

Six Washington cities require certification for HVAC/R mechanical and gas fitting work in addition to the state electrical certificate. Of these six cities, Seattle and Spokane also require certificates for work with heating oil and air conditioning/refrigeration work.¹⁵ Figure 4 on the following page shows required certificates by municipality. These certificates test competency in other areas of HVAC/R that are also dangerous. For example, a gas furnace could leak and either explode or lead to asphyxiation if installed incorrectly. However, only Pullman and Spokane have a reciprocity agreement for gas-fitting certificates. In other cities, a firm would need to get a separate certificate and pay the associated fee in each city where the firm works. For example, an HVAC/R company that works in both Seattle and Tacoma would have to carry three local knowledge-based certificates in addition to the state specialty electrical certificate if the company performed electrical, gas piping, and air conditioning work.

CHANGES IN STATE HVAC/R CERTIFICATION

Before 1998, most HVAC/R firms and employees did not hold any license or certification beyond that of a general contractor. In 1985, the Electrical Board worked with the HVAC/R industry to create a policy exemption allowing a registered HVAC/R contractor to install a thermostat in a residential home without obtaining an electrical license. This installation involves working on 24-volt wires, which is comparable to working on wiring for speakers, burglar alarms, or fire alarms—all or which require an electrical license.

As HVAC/R equipment and technology evolved, HVAC/R contractors began doing more electrical work. The question of who could legally perform this work was not clear to many contractors. L&I inspectors cited some contractors for exceeding their allowed scope. In 1998,

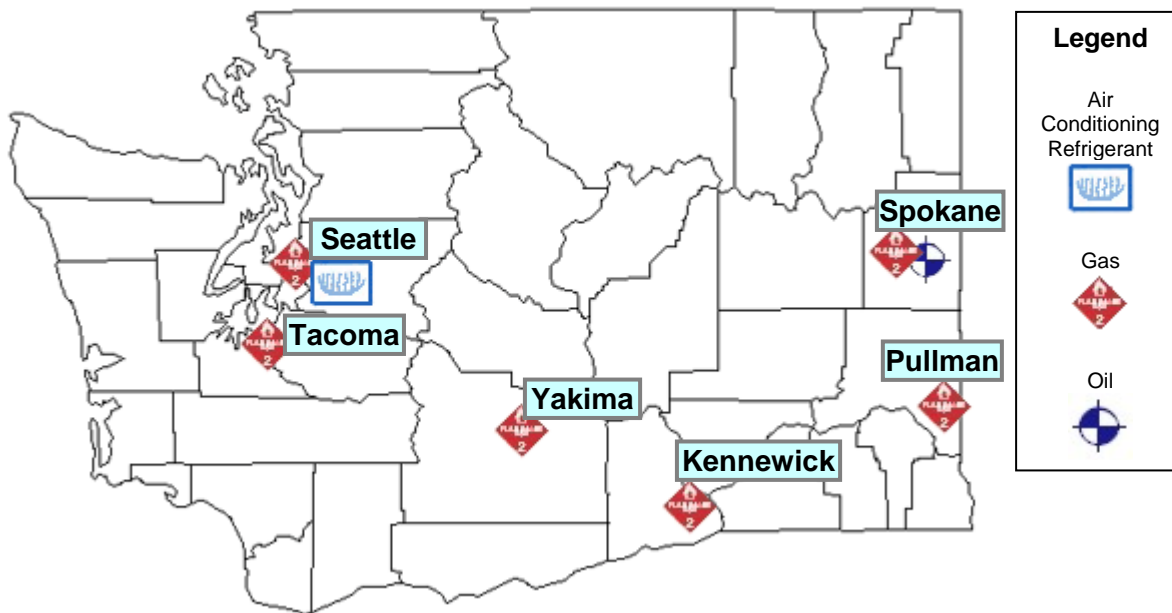
¹² RCW 19.28.311.

¹³ RCW 19.28.010.

¹⁴ To perform electrical work, contractors must purchase a permit for L&I to inspect the work and ensure its safety.

¹⁵ Refrigerant work can involve working with liquids such as ammonia that can lead to short- or long-term health effects.

Figure 4 – Six Cities Require Additional Certificates for HVAC/R



Source: JLARC.

the HVAC/R industry worked with L&I to negotiate an increase in the allowable scope of work in the standing 1985 policy exemption. In the course of these discussions, the Electrical Board and L&I were advised by their Assistant Attorney General that its policy of allowing mechanical contractors to perform low-voltage electrical work was illegal, and could not be expanded or renewed. As a result, the long-standing exemption for HVAC/R contractors was nullified, and L&I began licensing and certifying the electrical elements of HVAC/R work.

L&I Created a Specialty Certificate for HVAC/R Work

After several years of working without licenses or certificate, many in the HVAC/R industry were resistant to the state regulating their trade. To make the regulation of HVAC/R electrical work as applicable to the work as possible, L&I convened several stakeholder meetings and developed an HVAC/R-specific exam for the trade.

To regulate HVAC/R contractors and employees, L&I created a specialty certificate that only covered the electrical work related to HVAC/R equipment, rather than requiring the testing and certification of the much broader General Electrician certificate.¹⁶ Specialty certification has been used with other trades as well. L&I currently administers 15 specialty certificates, each of which is assigned a number along with a title, such as “2-Residential Electrician” or “6A-HVAC/R.”

L&I developed the original HVAC/R specialty certificate, the 6A, with input from the industry. The 6A requires that employees possess experience in the field and pass a test that demonstrates

¹⁶ The Legislature provided L&I with the ability to issue specialty electrical certificates in 1975 to ease certification and testing requirements. Prior to that, the only certification option was a General Electrical certificate, which had a broader scope of work and more training hours than many individuals performing elements of electrical work required.

their ability to use the National Electrical Code (NEC) as it relates to HVAC/R.¹⁷ After the initial certification period when prior work in the field was accepted, applicants needed 4,000 hours of supervised experience before taking the test. The original test and accompanying specialty certificate were fairly broad, allowing technicians to perform residential work, as well as commercial work in buildings not taller than three floors.¹⁸

A Second Option for HVAC/R Certification

In 2003, the HVAC/R industry worked with L&I to clarify the 6A license's scope of work. The industry also requested that L&I create a more limited scope of work appropriate for contractors and technicians who only worked on residential and small-scale commercial buildings.

L&I responded to the request with the HVAC/R-Restricted Technician (6B). The certificate requires fewer hours before licensure—2,000, with the option to take the exam and work unsupervised after 1,000 hours. It also has an exam with fewer questions and a narrower focus that reflects the restricted scope of work.

Whereas the 6A certificate allows a technician to work on a larger industrial unit, such as a rooftop unit in a movie theater or warehouse, the 6B certificate is limited to 250 volt systems. That limitation restricts the technician's work to small commercial jobs, such as an HVAC unit in strip mall, and residential systems. To date, however, there are only two electricians and 26 contractors certified and licensed under this specialty, compared with over 4,200 6A specialty electricians, and 667 6A contractors.¹⁹

Current Scope of Work

The current scope of work for a 6A specialty electrician allows a technician to work on the control wires and sensors that ultimately operate HVAC/R equipment. Technicians are not limited by voltage, phasing, or amperage, and can work on equipment within an HVAC/R unit or replace certain equipment that provides power outside of a unit if the replacement is the same as the existing piece. The 6A certificate does not, however, permit technicians to work on an HVAC/R unit's power supply or on new control wiring in buildings taller than three floors.²⁰

To maintain their certificate, HVAC/R technicians must complete eight hours of education related to the electrical work of HVAC/R each year.²¹ L&I offers these classes for free, and private sector companies also offer courses that are accepted to meet this requirement.

¹⁷ The NEC outlines minimum standards for all types of electrical installations, including HVAC/R, and is the standard by which L&I assures competency for all of the trades regulated by the Electrical Board. L&I held an open period for technicians and contractors from 1999-June 2004, when the agency allowed prior experience in the field to fulfill the experience requirement for the license. L&I also required these individuals to pass the test.

¹⁸ The issue of the three floor limit is one of contention between some in the HVAC/R industry and other electricians, particularly 06-Limited Energy and 01-General Electricians. There is debate concerning why three floors was selected as a cut-off. According to L&I, this was to provide a distinction between residential work and commercial work, where electricians and contractors must address additional safety issues.

¹⁹ Data provided by L&I on 1/14/05.

²⁰ If the work does not pass between floors, a technician can work on buildings of any size (WAC 296-46B-920).

²¹ In each three-year cycle, eight hours of education must cover NEC changes, and four hours on Chapter 19.28 RCW (WAC 296-46B-970).

CHAPTER TWO: COMPARISONS WITHIN WASHINGTON AND WITH OTHER STATES

JLARC's assignment is to evaluate current HVAC/R licensing, certification, and testing requirements. We undertook this evaluation in several different ways:

- We compared **fees** with other certificates administered by L&I and with other professional certificates in the state. We found that HVAC/R **fees are comparable with other specialty certificates**, as well as with **other professional certificates**.
- We compared the HVAC/R **certification requirements** with other specialty certificates administered by L&I. In the course of doing so, **we found that current certification requirements do not guarantee that a technician has electrical experience** before obtaining a specialty electrical certificate.
- We surveyed Washington HVAC/R contractors on their impression of the scope of work and testing requirements for the state HVAC/R certificate. We found that **most were satisfied with the current scope of work** allowed by the HVAC/R specialty certificate, but that many would **prefer an exam focused on more than the electrical work** of their job.
- We looked at other states' regulatory approaches, and found that there are several approaches to HVAC/R certification. Many **certify HVAC/R as a separate trade**; others use an **exam similar to Washingtons**.

Comparing Professional Certificate Fees

L&I charges the same fee for all of the specialty electrical certificates.²² However, two chapters of statute apply to HVAC/R contractors and some of the other electrical certificates, such as 3-Pump and Irrigation and 10-Door and Gate. Therefore, contractors in these professions must be dually registered as both general and electrical contractors if they work on both the mechanical and electrical pieces of their equipment.²³ Firms that only perform electrical work do not need to comply with this requirement. Figure 5 on the following page shows the fees required by these contractors.

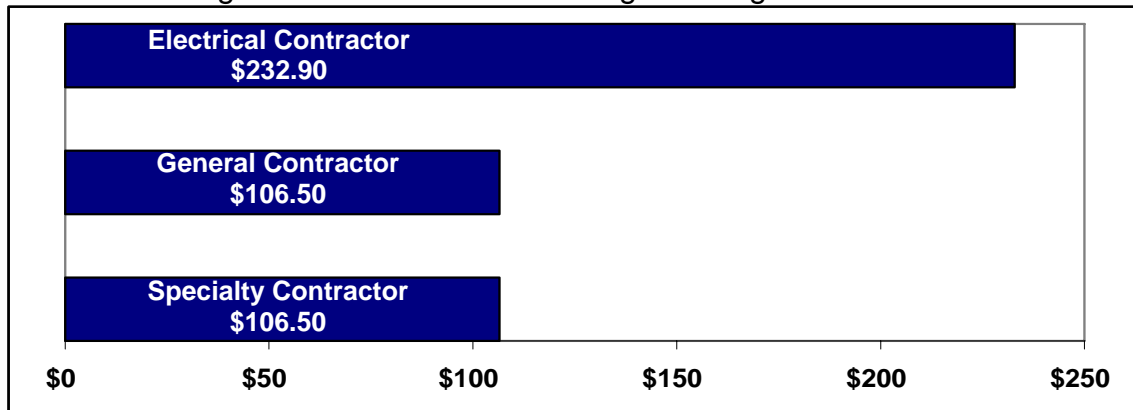
In order to compare the certification fees of HVAC/R to other trades, JLARC considered the associated certification fees of four non-electrical professions. Figure 6 summarizes these fees. This comparison presents the initial cost for a new employee entering the field, and includes fees for examinations, and initial licensure. The final bar represents continuing education fees, which vary widely.²⁴ As Figure 6 shows, HVAC/R certification fees are in line with other professions in the state.

²² See p. 3 for a description of HVAC/R fees.

²³ Consistent with the two chapters of RCW that apply to these trades: Chapters 19.28 and 18.27 RCW.

²⁴ Continuing education fees are for a single year.

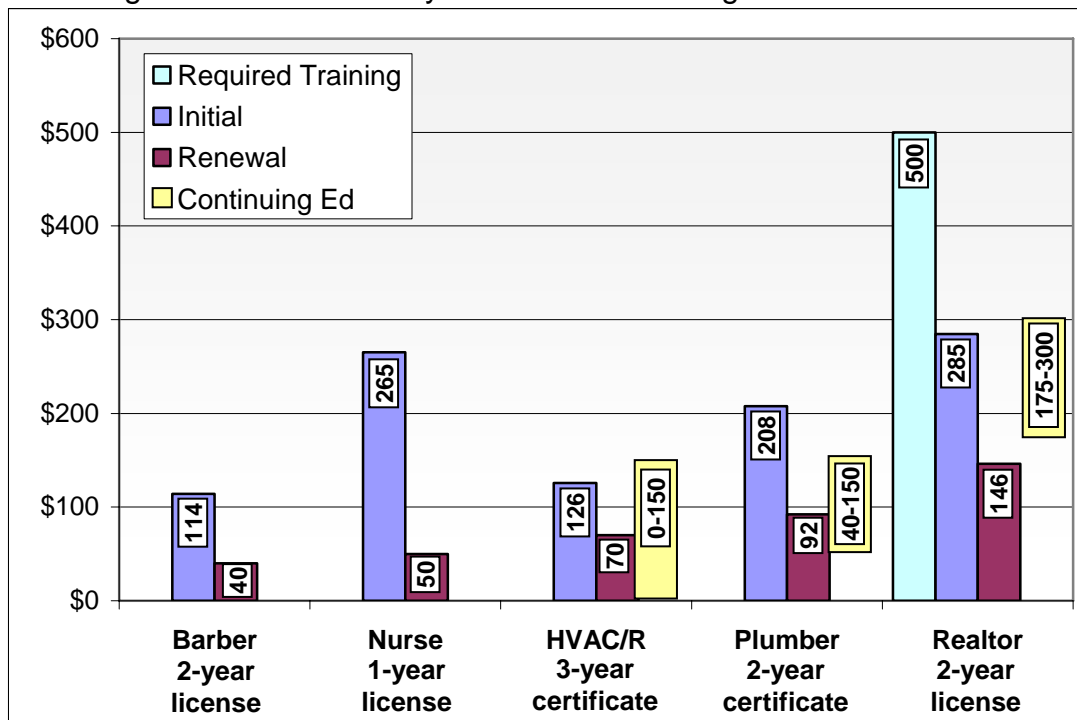
Figure 5 – Contractor Licensing and Registration Fees



Source: L&I.

*Note that firms performing electrical and mechanical work, such as HVAC/R, Pump Installers, and Door and Gate, are covered by **both** chapters of statute and register as **both** electrical and general/specialty contractors.

Figure 6 – Fees Paid By Trades for Licensing and Certification



Source: JLARC.

Comparison of Specialty Electrical Certificates

JLARC compared the training requirements of HVAC/R technicians with four other specialty electrical certificates and the General Electrician certificate, all administered by L&I. Following is a brief description of the specialty certificates:

- *Limited Energy System* (6) can install low voltage circuits in signaling systems, such as fire alarms, security alarms, and HVAC/R low-voltage wiring, including buildings taller than three floors. These electricians can work on numerous systems, and are not limited to work in a single trade.
- *Pump and Irrigation* (3) can work on all electrical components of domestic and irrigation water pumps, pump houses, and circular irrigating systems.
- *Door and Gate* (10) can install and maintain high-voltage electrical equipment for doors and gates, including control push-button doors (to include security and fire doors), electric gates, and windows.
- *Telecommunications* (9) can install telecommunications systems, such as telephone and computer systems, in an office or home. If the firm has a certified administrator, individual employees do not need specialty electrical certificates.

Figure 7 on the following page compares the work each of these certificates allows. Statute directs L&I to issue rules, such as certification requirements, based on the **furtherance of safety to life and property**.²⁵ Figure 7 is organized in descending order based on the potential harm to life and property of the work performed, as well as the extent of electrical work allowed by each certificate. The state recognizes 2,000 hours of training as the equivalent of one year.

When we interviewed HVAC/R contractors for this study, some raised concerns that experience requirements for the 6A certificate were excessive, and not consistent with trades that performed comparable electrical work. Required training hours for the specialty electricians are set in statute, and the allowed scope of work involves negotiation and compromise among trades.

Our analysis of training requirements did not find a clear rationale. For example, Door and Gate and HVAC/R technicians appear to perform electrical work of similar risk. L&I explained that the work of Door and Gate technicians is very similar from job to job, and is usually performed on a single manufacturer's product.

In contrast, HVAC/R systems may be very different at each job site, based on the building design and local climate conditions. While there is a rationale for requiring HVAC/R technicians to have more hours of supervised work experience, it is not clear to many contractors why the required experience is set at *4,000 hours*. According to L&I, it is likely that many contractors are not aware that statute allows the 6A license to require a minimum of 2,000 hours experience; however, some HVAC/R contractors negotiated to leave the specialty at 4,000 hours so their experience could be applied to the experience required for a General Electrician—something that the 2,000 hour specialties cannot do.

Certification criteria do not require actual electrical knowledge or experience.

The *kind* of experience may be a more important factor in certification than the *number of hours* of experience. L&I does not require specific *types* of experience in these required hours. Therefore, it is not possible to determine the *value* of those hours to an apprentice who is learning to perform safe electrical work. L&I counts *all* work performed in the multidisciplinary trades toward completing the required hours for a specialty electrical certificate.

²⁵ Chapter 19.28.010 RCW.

HVAC/R Licensing and Testing Requirements Study

Figure 7 – Electrical Licenses: Scopes of Work and Required Training

Work limited to low voltage equipment specific to trade (installation and repair)	Maintain line voltage equipment (trade-specific)	Install and maintain line voltage equipment (trade-specific)	Install and maintain complex line voltage equipment (trade-specific)	Install and maintain complex line voltage equipment (trade-specific) and run power to equipment	Install life safety low voltage controls in several trades	Install and maintain complex line voltage equipment in any field and run power to equipment
General Electrician (01) 8,000 hours of training required for exam and certification						
NO VOLTAGE LIMITATION						
Limited Energy System (06) 4,000 hours of training required for exam and certification						
LOW VOLTAGE LIMITATION						
Pump and Irrigation (03) 4,000 hours of training required for exam and certification						
NO VOLTAGE LIMITATION						
HVAC/R (06A) 4,000 hours of training required for exam and certification						
NO VOLTAGE LIMITATION						
Door and Gate (10)²⁴ 720 hours required before exam, 2,000 before certification						
LIMITED TO 600 VOLTS						
HVAC/R - Restricted (06B) 1,000 hours required before exam, 2,000 before certification						
LIMITED TO 250 VOLTS						
Telecommunications (09) Can perform work on telecommunications wiring if contractor is licensed						

²⁴ Before passing an exam, an employee must work under supervision at all times (100%). After passing the exam, the employee may work unsupervised. This allowance extends to the Door and Gate license and HVAC/R 6B license.

For example, under current requirements, it would be possible for an apprentice to work for an HVAC/R company for two years and do no electrical work whatsoever, pass the exam for the HVAC/R technician (06A), and begin performing electrical work without electrical training or experience. While most HVAC/R training programs offered by community and technical colleges do include coursework in electricity, the Electrical Board's current experience requirements do not guarantee practical experience performing electrical work in the field.

Another factor that makes assuring knowledge of electrical safety difficult is the current test administered by L&I. The test is specific to HVAC/R electrical work, and measures an applicant's ability to find information in the National Electric Code that relates to code issues a technician is likely to encounter in the course of work. However, it is an open book test that does not measure an individual's electrical knowledge, but instead tests the ability to navigate the NEC. While performing work in compliance with the code is important, an individual with no electrical knowledge whatsoever could pass the test.

While the current requirements do not guarantee electrical experience, changing them to reflect HVAC/R electrical work poses a challenge to L&I. An HVAC/R technician is very unlikely to perform 4,000 hours of electrical work in two years through the course of normal work. In conversations with representatives from other states, we learned that this is a problem they also face. One suggested requiring specific training, as well as specifying practical electrical experience in the field for specialty certificates.

A final issue is that Washington Administrative Code (WAC) entirely exempts some electrical work from certification: e.g., the installation and repair of central vacuums and work on residential garage doors. To receive exemptions, these systems must be powered by Class 2 electrical systems—the same class HVAC/R control wiring uses.²⁶ As a result, an HVAC/R technician installing a thermostat wire in a new house would require a specialty electrical certificate, but the worker on the same site installing a central vacuum system would not. This exemption seems inconsistent with the required certification of other electrical work by L&I.²⁷

Input from Washington HVAC/R Contractors and Technicians

In order to understand the industry's perspective on current certification and testing requirements, JLARC staff contacted a range of firms from all six L&I regions. We chose businesses of varying size, based on their gross business income. Staff contacted 109 firms, over 10 percent of the Washington-based HVAC/R contractors, and spoke with 91 firms (18 refused to participate). We tried to understand the following through our interviews:

1. Does the scope of work allowed by the certificate meet the needs of their customers?

As shown in Figure 8 on the following page, **79 percent of contractors we interviewed are satisfied with the current scope of work allowed through the 6A or 6B certificate.** However, 21 percent feel as though it is too restrictive to meet their customers' needs.

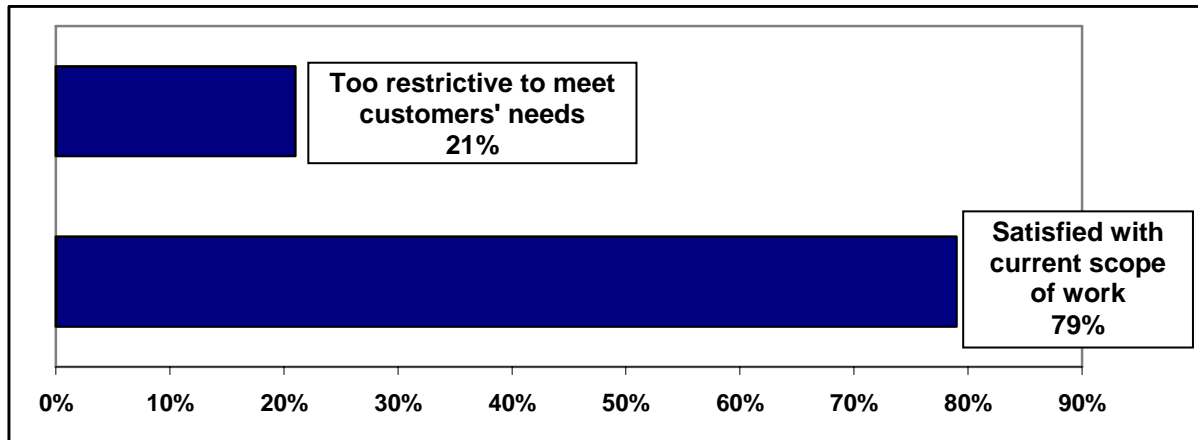
There was some variation among the small, medium, and large firms: 86 percent of the large firms found the certificate scope sufficient, as compared to 79 percent of medium firms, and 73

²⁶ WAC 296-46B-925.

²⁷ WAC 296-46B-925 cites that the electrical failure of these systems do not compromise safety to life and property.

percent of small firms.²⁸ Some noted that they obtained an additional certificate from L&I that allows them to perform maintenance on additional aspects of HVAC/R units not permitted under the 6A certificate. However, this was not very common. According to L&I data, only 3 percent (139 out of 4,200 certified technicians) have found this additional certification necessary.

Figure 8 – Most HVAC/R Contractors Satisfied With Scope of Work Allowed Under Specialty Certificates



Source: JLARC.

2. Have certification requirements changed the type of work firms are doing?

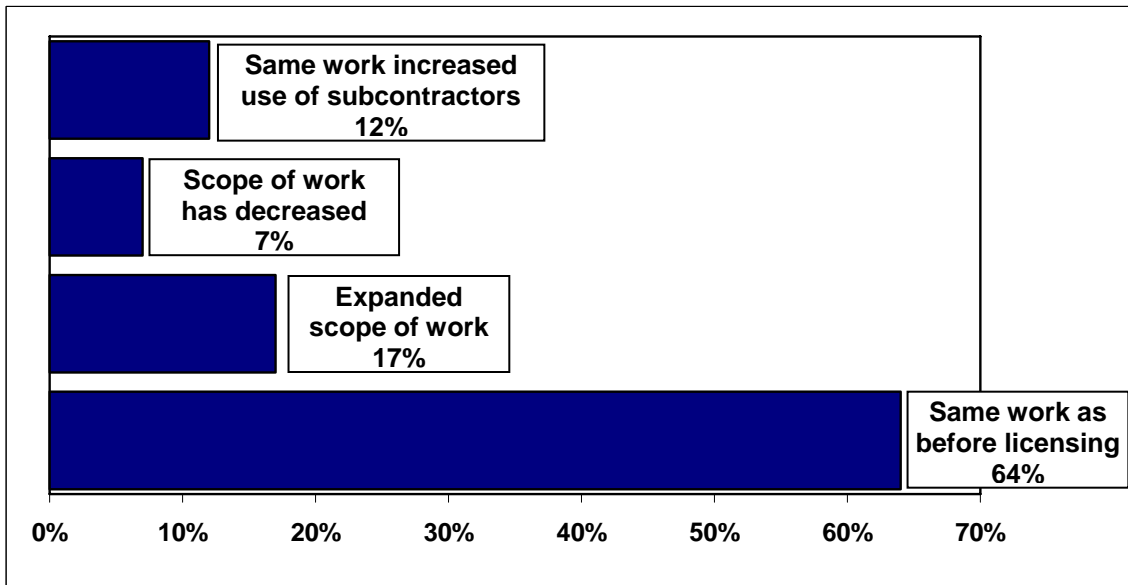
A second question we posed to contractors was whether the state certification requirements affected the work that they were able to do as compared to what they did prior to state certification. Under the policy exemption that was available until 1998, it was not clear to many contractors in the field what work was allowed without a certificate. State certification clearly defined the work HVAC/R technicians could and could not perform.

As shown in Figure 9 on the following page, based on responses from the contractors we interviewed, **certification does not seem to have had a dramatic impact on what types of work firms are performing.** This response was consistent among the small, medium, and large firms we interviewed.

We asked this question of all firms, including those who began operating after 1998. The majority said certification has not affected the type of work they are performing.

²⁸ Small firms: 16 of 22 responded that it was sufficient; medium firms: 27 of 34 responded that it was sufficient; large firms: 19 of 22 responded that it was sufficient.

Figure 9 – Most HVAC/R Contractors Continue To Do the Same Work As Prior to Certification



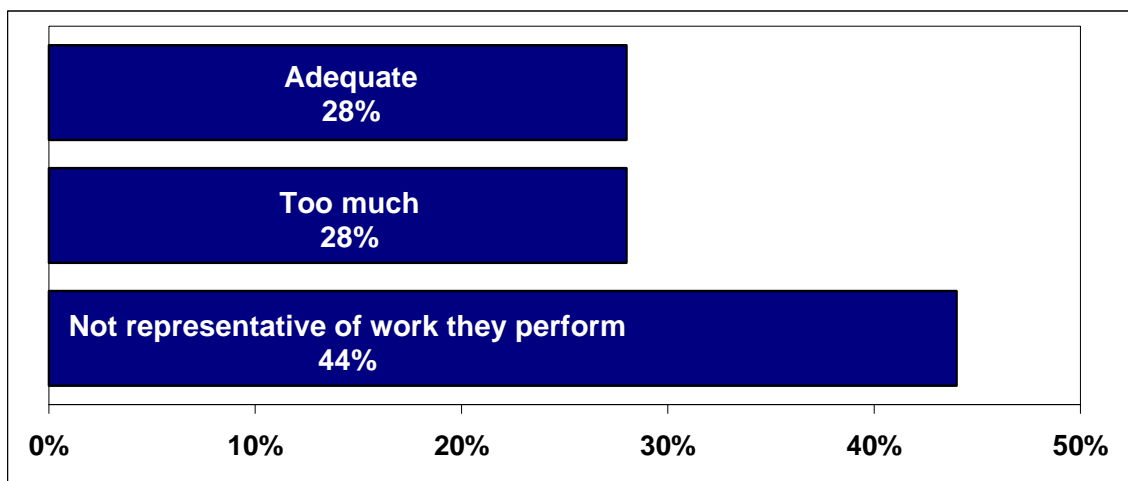
Source: JLARC.

3. What are business perspectives on the current certification and testing requirements?²⁹

To understand the industry’s perspective, JLARC asked contractors for their impression of current certification and testing requirements, as shown in Figure 10, below.

Twenty-eight percent felt that current certification was adequate. Several respondents noted that L&I has worked very hard to obtain input from the HVAC/R industry, and has improved certification for the trade. An equal number responded that there was too much regulation. Of

Figure 10 – Many HVAC/R Contractors Believe Certification Does Not Reflect Their Work



Source: JLARC.

²⁹ JLARC staff successfully interviewed 11 percent (91) of HVAC/R firms with data available (848): Staff were able to reach 109 firms, with 91 participating, and 18 refusing to answer. The participating firms included 28 small, 44 medium, and 37 large. Proportionally, this is very close to the distribution of firms by size that is described in Figure 2 on page 2.

this group, many suggested that the state should not certify or test the low-voltage work of HVAC/R, or that the test was not commensurate with the work they performed.

Over 40 percent of those interviewed think that the **current certification offered by the state does not focus on the work technicians actually perform in the field.** This response was consistent among the small, medium, and large firms JLARC interviewed. Many respondents in that group expressed views similar to a comment submitted by an HVAC/R technician:³⁰

“It is my belief that HVAC 06A licensing is important to keep [Washington] safe. I believe that for this to be done from an HVAC perspective that HVAC testing and continuing education be trade specific. Thus far my experience with the existing system has been less than satisfactory. In speaking with my peers we have discussed becoming more knowledgeable in our trade without trying to learn how a licensed journeyman would wire a 480 volt breaker panel. We do not want to become journeyman electricians. We do want to remain educated, trained HVAC journeyman.”

The technician quoted above and several contractors interviewed in the study support HVAC/R certification, but think it should be certified as a separate trade. Several interviewees described Idaho, which recently created a separate HVAC/R certificate, as a desirable model. This and other states’ certification are discussed in greater detail on pages 17-18. Some suggested that the electrical work they perform is not the most dangerous aspect of their work. **However, L&I is statutorily obligated to license and certify electrical work, while regulation of other aspects of HVAC/R work only require oversight at the level needed to protect the public interest and to promote economic development through employment.**³¹

HVAC/R REGULATION IN OTHER STATES

A final means of evaluating testing and certification requirements involved looking at other states’ regulation of HVAC/R work. JLARC staff studied Washington’s neighboring states, as well as those recommended by staff we interviewed. As Figure 11 on page 18 shows, all of the states we considered handle testing and certification differently. Some states—such as California, Oklahoma, Idaho, and Wisconsin—certify HVAC/R as a separate trade.³² In doing so, testing requirements in these states focus on more than electrical work.

Among the states JLARC surveyed, we found:

- Like Washington, both **Oregon** and **Minnesota’s** exams are based on the ability to use the National Electric Code. Oregon does not require employee certification for HVAC-related electrical work on 1-2 family homes if the contractor is certified.
- In **Oklahoma**, electrical knowledge accounts for approximately 16 percent of the exam. Other areas include heating, air conditioning systems, ventilation, and piping knowledge.

³⁰Comment provided to JLARC, 4/26/05.

³¹ RCW 18.118.005.

³² California only requires the contractor to pass an exam, not individual workers. Wisconsin does not have a state certificate; certification is handled at the municipal level. The state does, however, administer an exam that is accepted in every city that requires an HVAC/R certificate.

- The HVAC/R exam administered by **Wisconsin** is based on the state building and International Mechanical Codes.³³
- In **California's** technical exam of HVAC for contractors, less than 28 percent of the exam is devoted to electrical knowledge. Other areas include system design, fabrication, installation, and maintenance.
- **Idaho** is in the process of developing an HVAC exam. It recently formed a stand-alone HVAC Board, and the new Board is currently writing rules and establishing scope of work and certification requirements.

We also looked to see if other states had counterparts to Washington's Electrical Board. As Figure 11 shows, some of these states have broader contractor or building boards that regulate several trades.

Oklahoma has the Construction Industries Board, whose members include both an Electrical Contractor and Journeyman, Plumbing Contractor and Journeyman, and Mechanical Contractor and Journeyman, a citizen member and local representatives. An HVAC/R technician could obtain a single certificate from the Board and work anywhere in the state. Additionally, an HVAC/R contractor would only need to purchase a single surety bond to legally operate.

Like Washington, Minnesota has Plumbing and Electrical Boards, which each regulate narrower aspects of the construction industry. For some Washington trades, this system proves somewhat inflexible, leaving the certification of non-electrical aspects of their work at either the city level, such as HVAC/R, or through dual certification, such as Pump and Irrigation Installers, who must obtain both a specialty electrical certificate and journeyman plumber certificate to work in the trade.

Another example is Idaho, whose Division of Building Safety regulates several stand-alone boards for trades. The HVAC Board has two local representatives, two HVAC contractors, an HVAC journeyman, and a representative from both the Plumbing and Electrical Boards to ensure that jurisdictional issues between trades are addressed. Again, an employee would need a single certificate, and a contractor would need a single bond to operate. This system is not perfect, however, as a trade such as a Pump Installer, would still require both Electrical and Plumbing certificates, but is easier for HVAC contractors and journeymen to navigate.

Wisconsin does not regulate HVAC/R work at the state level. However, many cities in the state do require certificates to perform this work. To ease certification for companies and employees, the state administers "qualifier exams," which are accepted by all of these cities. Obtaining the qualifier provides workers a centralized means of testing.

³³ The code establishes minimum regulations for building systems using prescriptive- and performance-related provisions.

HVAC/R Licensing and Testing Requirements Study

**Figure 11 – Heating, Ventilation, Air Conditioning, and Refrigeration Certification in Six Other States:
No “Standard” Framework**

	Oversight Authority	State administers a mechanical exam/certificate for HVAC. Certificate allows technicians to perform electrical work within a HVAC system as far as, but not including, the branch circuit connection.	Electrical work of HVAC beyond 1-2 family residential dwelling is handled by an electrical certificate; the exam is based on the National Electrical Code.	An electrical certificate is required to perform any aspect of electrical work related to HVAC/R.	Single statewide certificate for all HVAC-related work, including gas, refrigerant, and electrical work.	State has employee exemptions for low-voltage electrical HVAC work.	Counties and cities require additional certificates and tests (e.g., gas, oil, refrigerant).	State certifies refrigerant work.	Hours required before eligible for exam.
Washington	Electrical Board		✓	✓			✓		4,000
Oregon	Building Code Division: Mechanical Board; Electrical Board if more than 1-2 family home		✓			✓	✓	✓	4,000
California*	Contractors State License Board	✓*				✓*	✓*		8,000
Idaho**	Division of Building Safety: HVAC Board				✓**				8,000 work/ 576 classroom ed
Minnesota	Electricity Board		✓	✓			✓		6,000
Oklahoma	Construction Industries Board	✓							6,000 journeyman/ 8,000 contractor
Wisconsin***	Dept. of Commerce: Safety and Buildings Division	✓***	✓***			✓***	✓***	✓***	4,000

**California only requires a contractor, not an individual employee, to be licensed at the state level. Many cities and counties have stricter certification requirements for HVAC/R and electrical work.*

***Idaho is in the process of developing rules for scope of work and certification and testing requirements. Reported results are not final.*

****In Wisconsin, certification is only handled at the local level. The state offers a "qualifier" exam that is accepted by each of the municipalities that do require certification as proof of competency.*

CHAPTER 3: FINDINGS AND RECOMMENDATIONS

The primary purpose of this report is to provide the Legislature with information about current HVAC/R licensing and certification, and how it compares with requirements of other professions within Washington and with other states. This is covered in Chapters 1 and 2 of this report.

Issue 1: Value of Current Certification Requirements

Existing certification requirements do not guarantee that an electrical trainee has electrical knowledge or experience.

Although L&I specifies required training hours for electrical trainees, it does not require specific *types* of experience in these required hours. The *kind* of experience a trainee gains may be a more important factor in certification than the number of hours of experience. Currently, it is not possible to determine the *value* of those hours to a trainee who is learning to perform safe electrical work. L&I counts *all* work performed in the multidisciplinary trades, such as HVAC/R or Door and Gate, toward completing the required hours for a specialty electrical certificate.

Another factor that makes it difficult to assure a trainee's knowledge of electrical safety is the current test administered by L&I. Although the test is specific to HVAC/R electrical work, and measures an applicant's ability to find information in the National Electric Code (NEC) that relates to code issues a technician is likely to encounter in the course of work, it is an open book test that does not measure an individual's electrical knowledge. Instead, it tests the ability to navigate the NEC. While performing work in compliance with the code is important, an individual with no electrical knowledge whatsoever could pass the test.

For example, under current requirements, it would be possible for a trainee to work for an HVAC/R company for the required 4,000 hours and do no electrical work whatsoever, pass the test for the HVAC/R technician (6A), and begin performing electrical work on HVAC/R systems without electrical training or experience. While most HVAC/R training programs offered by community and technical colleges do include coursework in electricity, the Electrical Board's current experience requirements do not guarantee practical experience performing electrical work in the field.

Recommendation 1

L&I should provide consumers with assurance that technicians have electrical knowledge and experience before certification. This may be achieved by, but is not limited to, changing the existing affidavit of experience to require trainees to perform a minimal level of electrical work, such as minimal hours of electric work or specific tasks, in the course of the required 4,000 hours.

Legislation Required:	None
Fiscal Impact:	Minimal
Completion Date:	L&I should report to the Legislature by December 2005 on its plan to provide this assurance to consumers.

Issue 2: Methodology and Options for Certification Requirements Are Not Clear

The methodology for determining training hours is not clear to many contractors.

Some of the HVAC/R contractors we interviewed for this study raised concerns that the 4,000 hours experience requirement for the 6A certificate is not consistent with trades that perform comparable electrical work. Our analysis of training requirements did not find a clear, transparent methodology, as shown in Figure 7 on page 12. Trades such as Limited Energy System electricians and Pump and Irrigation electricians appear to perform electrical work that is potentially a greater threat to life and property, with the same 4,000 hour training requirement.

L&I was able to provide a rationale, as described on page 11, but noted that some trades' training requirements are set in statute, and the allowed scope of work involves negotiation and compromise between individual trades through the Electrical Board.³⁴ However, based on our interviews with contractors, it is clear that the rationale is not readily understood, and is an issue of concern for many.

Many HVAC/R firms are not aware of options to reduce required training hours.

Many HVAC/R contractors are not aware of options to reduce required training hours. Statute actually allows the minimum training requirements of the 6A certificate to be 2,000 hours, with the option to take the exam and work unsupervised after 720 hours. However, in the rule revision process, HVAC/R representatives worked with L&I to establish the 4,000 hour training requirement. The 4,000 hour requirement allows individuals to apply these hours towards becoming General Electricians (8,000 hour training requirement)—something that is not allowed for the 2,000 hour specialty certificates.

According to L&I, the HVAC/R representatives that participated in these negotiations represented larger firms, whose interests are not necessarily the same as smaller firms, many of which have no intention of becoming or hiring general electricians. Regardless of the firm's size, as described on page 16, many of the HVAC/R technicians we interviewed only want to perform HVAC/R work within the current allowable scope of the 6A license. It is likely that many firms and technicians are not aware of the industry's option granted in statute to reduce required training hours.

Recommendation 2

L&I should more clearly explain its methodology for determining training requirements, and inform HVAC/R technicians of options for the industry to reduce required training hours for the 6A license. This authority is granted in statute, and should be reflected in agency rules to provide contractors with a better understanding of available options, and why training requirements are above the statutory minimum of 2,000 hours.

Legislation Required:	None
Fiscal Impact:	Minimal
Completion Date:	L&I should report to the Legislature by December 2005 on its progress changing agency rules.

³⁴ RCW 19.28.191.

Issue 3: Certifying Other Aspects of HVAC/R Work

L&I should consider certifying other aspects of HVAC/R work.

Washington's focus on only the electrical aspect of HVAC/R work raises the question of whether regulating a portion of the job is in fact protecting the safety of the public. This is not a readily answerable question. However, as discussed in Chapter 1, at least six Washington cities decided to regulate the gas and mechanical work of HVAC/R to further ensure citizen safety, and other states have also opted to regulate more than the electrical work of HVAC/R contractors. For many contractors, complying with local licensing can be difficult—for example, an HVAC/R company that works in both Seattle and Tacoma would have to carry three local knowledge-based certificates in addition to the state specialty electrician certification if the company performed electrical, gas piping, and air conditioning work.

L&I is performing its statutory requirement of regulating electrical work. The agency has worked with the HVAC/R industry to make this regulation as applicable as possible to the work that is done in the field by actively involving stakeholders in defining testing requirements and providing different options for certification. However, based on JLARC's survey of contractors, and our review of certification requirements of Washington cities and models of other states, certifying other aspects of HVAC/R work may be an option for the state to consider.

One option to address this concern is to have a separate HVAC/R certificate. If Washington establishes a comprehensive HVAC/R certificate, the cost for certification and permitting will likely increase for companies who perform this work. Currently, there is a pool of 28,000 certified electricians in the state that contribute to the Electrical Fund. Of that group, only 4,200 are certified as HVAC/R technicians. Consequently, certification, permitting, and inspection fees would be borne by a much smaller pool of firms for a comprehensive HVAC/R certificate. However, there are other options for the state to consider.

Recommendation 3

To provide policymakers and industry with a better sense of the public safety impact and fiscal impacts of possible options, L&I should examine scenarios that would certify other aspects of HVAC/R work. These options include, but are not limited to:

- **Offering a separate, comprehensive HVAC/R certificate(s). This might be achieved through a stand-alone HVAC/R Board.**
- **Administering an HVAC/R certificate(s) through the Electrical Board, or creating a sub-board of the Electrical Board with members of the Board and members from industry, which certifies that a trainee performing both electrical and mechanical work has HVAC/R knowledge and skills in both electrical and non-electrical aspects of work. This approach should recognize that not all HVAC/R technicians perform both electrical and mechanical work.**
- **Offering a model like Wisconsin's, where the state administers an exam that is acceptable to cities that require additional certification for skills beyond the specialty electrical license.**

Legislation Required:	None
Fiscal Impact:	Minimal
Completion Date:	December 2005

Issue 4: Electrical Board Composition

Specialty electricians, such as HVAC/R and Pump and Irrigation, are not represented on the Electrical Board.

In the course of interviewing HVAC/R contractors, some expressed concern that they are not represented on the Electrical Board, the venue where trades’ scopes of work and certification exemptions are discussed. Membership is set in statute, and members are appointed by the Governor.³⁵ Figure 12 outlines the membership and voting authority of Electrical Board members.

Figure 12 – Fourteen Electrical Board Members and Voting Authority

Voting Board Members (Certified By L&I)	Voting Board Members (Not Certified by L&I)	Non-Voting Board Members (Not Certified by L&I)
<ul style="list-style-type: none"> • 3 Electrical Contractors • 3 Electricians • Telecommunications Contractor 	<ul style="list-style-type: none"> • Electrical Utility Representative • Manufacturer/Distributor • General Public Representative • Certified Professional Electrical Engineer • Telecommunications Provider • Telecommunications Worker • Outside Line Electrician 	<ul style="list-style-type: none"> • Local Jurisdiction Representative • L&I's Chief Electrical Inspector

With the exception of telecommunications contractors, a specialty electrician or contractor must compete against a general electrician or contractor for one of the electrician seats on the board.³⁶ While specialty electricians may not have the same electrical knowledge and skills as the general electrician, they may have a broader-based knowledge and understanding of safety issues and electrical work as it relates to this field.

Currently, specialty electricians, such as HVAC/R technicians, represent 40 percent of all certificated electricians in the state and 41 percent of electrical contractors.³⁷ Figures 13 and 14 on the following page show the groups regulated by the Electrical Board and the proportion of each of the specialty electricians. **However, as Figure 12 above shows, only half of voting board members represent groups that are regulated by L&I’s Electrical Program.**

The Legislature may have intended for the Board to have the highest degree of competence related to electricity when it set membership requirements in statute. However, many HVAC/R contractors feel membership doesn’t reflect a thorough understanding of HVAC/R work. One technician explained that general electricians “don’t really understand what HVAC/R technicians do or how they are trained.”³⁸ If the purpose of the Board is enhancing electrical safety with

³⁵ The Board’s composition most recently changed in 2005 as the result of a bill that added an outside line electrician to the Board (HB 1557).

³⁶ The current Board has a Telecommunications contractor who is also licensed as an 06 Limited Energy contractor, and a citizen member who is affiliated with the HVAC/R industry.

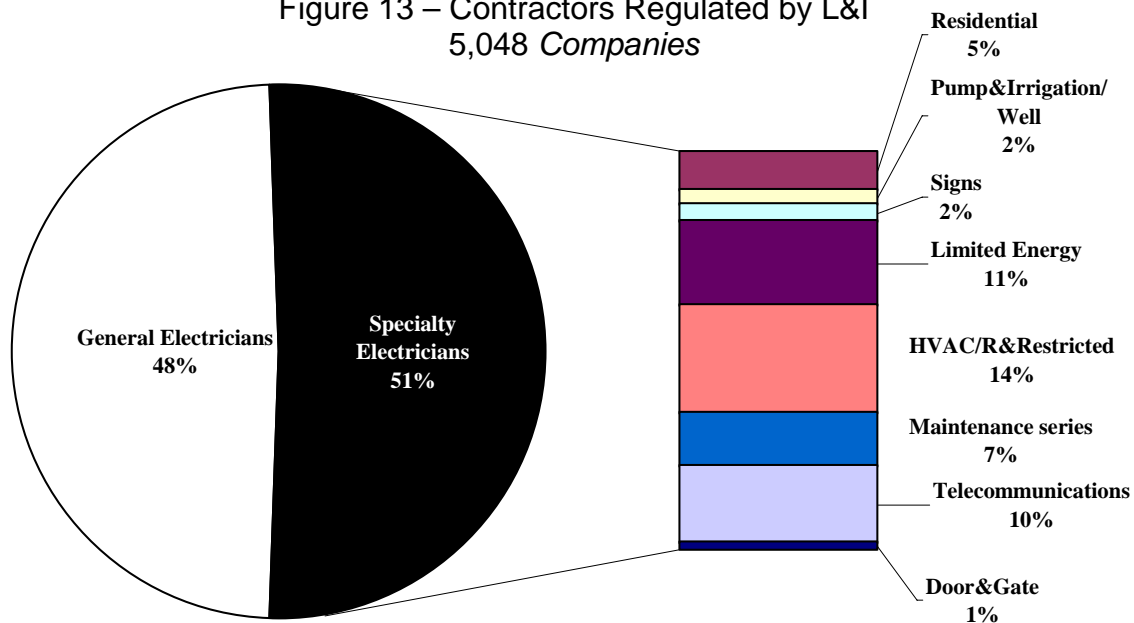
³⁷ This figure excludes telecommunications contractors, who are formally represented.

³⁸ Memo provided to JLARC 3/3/05 from HVAC/R technician.

representation from a broader spectrum of electrical trades, it might be appropriate for the Legislature to reconsider the current membership of the Board.

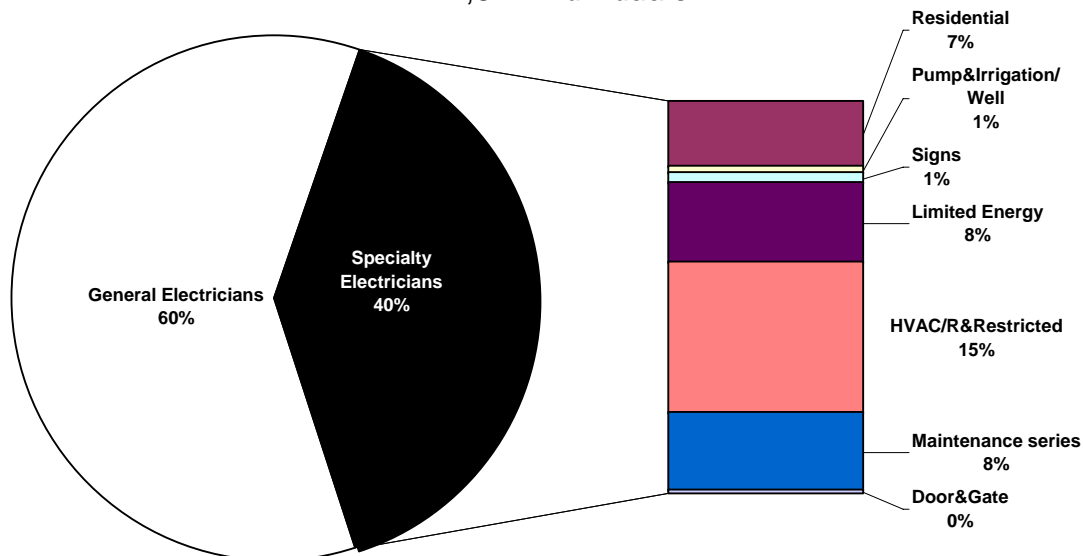
Specialty electricians are, however, represented by another group, the Technical Advisory Committee, which advises the Electrical Board on proposals from the electrical industry. This 47-person committee, which L&I's Chief Electrical Inspector convenes, is not required either by law or agency rule. Membership is based on the proportion that each job category represents of all certified electricians. This provides specialty electricians with an opportunity to voice their concerns about pending rule changes. However, the committee's role is limited to advising the Electrical Board, where specialty electricians are currently not formally represented.

Figure 13 – Contractors Regulated by L&I
5,048 Companies



Source: L&I.

Figure 14 – Electricians Regulated by L&I
27,677 Individuals



Source: L&I.

Recommendation 4

If the Legislature wishes to more broadly represent regulated entities with knowledge of trade-specific equipment, it should revisit the current composition of the Electrical Board.

Legislation Required:	Yes
Fiscal Impact:	None
Completion Date:	N/A

AGENCY RESPONSES

We have shared the report with the Department of Labor and Industries (L&I) and the Office of Financial Management (OFM) and provided them an opportunity to submit written comments. Their written responses are included as Appendix 2.

ACKNOWLEDGEMENTS

We would like to thank the staff in the headquarters and regional offices of the Department of Labor and Industries for their assistance with this project.

Ruta Fanning
Legislative Auditor

On September 14, 2005, this report was approved for distribution by the Joint Legislative Audit and Review Committee.

Representative Ross Hunter
Chair

APPENDIX 1 – SCOPE AND OBJECTIVES

Review of HVAC/R Contractor Licensing and Testing

SCOPE AND OBJECTIVES

JANUARY 2005



STATE OF WASHINGTON
JOINT LEGISLATIVE AUDIT AND
REVIEW COMMITTEE

STUDY TEAM

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THE JLARC STUDY MANDATE

In its 2004 Supplemental Operating Budget, the Legislature included a study of the licensing and testing requirements of HVAC/R (Heating, Ventilation, Air Conditioning and Refrigeration) contractors and installers; the Governor subsequently vetoed the study language. JLARC, however, chose to add the study to its 2003-05 Work Plan. This study will evaluate the current rules related to HVAC/R licensing and testing, and assess whether recommendations or modifications are appropriate.

WHAT DOES AN HVAC/R CONTRACTOR DO?

HVAC/R work includes work on boilers, heat pumps, air conditioning units, and furnaces. This involves sheet metal, ductwork, plumbing, and electrical work. To legally perform this work, HVAC/R workers must obtain an electrical license from the Department of Labor and Industries (L&I). While various cities require gas code, oil burner, and refrigeration tests and licenses, it is only the electrical aspect of HVAC/R technicians' work that is regulated by L&I.

The electrical licenses administered by L&I determine the scope of work that HVAC/R contractors can perform. Currently, L&I offers two HVAC/R specialty licenses: a limited-scope license, intended for technicians who perform residential and small commercial projects; and a second license, which is broader in scope and allows technicians to perform higher voltage installation and repair. However, each of these licenses has limits on the electrical work allowed. For example, an HVAC/R technician can install a thermostat in a resident's home as part of an air conditioning unit installation, but cannot work on the higher voltage power supply of the air conditioning unit.

HVAC/R LICENSING AND REGULATION

Trade licensure is a fee-supported activity, which means that the regulated entities pay for their regulation, not taxpayers. L&I estimates that approximately 1,100 contractors currently perform HVAC/R work in Washington and pay for licensure to the state Electrical Board, a 14-member advisory board within L&I.

A person engaged in the HVAC/R business currently can be required to obtain licensure in four regulatory classifications:³⁹

- General or specialty contractor: Provides consumers with a means of financial protection, but does not assure any particular knowledge or skills in a given field;⁴⁰
- Electrical contractor: Required to create a business that employs workers to do electrical work on HVAC/R;

³⁹ Depending on the scope of work performed, it may be necessary to obtain specialty licensure as a technician and administrator in nonresidential maintenance, as well.

⁴⁰ RCW 18.27

- Electrical administrator: The business must have at least one employee certified as an administrator, who ensures that work is performed in accordance with state law; and
- Journeyman electrician or licensure in one of the two HVAC/R specialties: Individuals who work on the electrical components of HVAC/R must obtain one of these licensures.⁴¹

The work of HVAC/R technicians spans several disciplines and trades, such as plumbing, engineering, and electrical work. However, the electrical work of these technicians is the only aspect of the technical work regulated by the state, which is handled by the Electrical Board. Concerns have been raised about the public safety of HVAC/R work through this regulatory structure.

PROPOSED STUDY SCOPE AND OBJECTIVES

JLARC will conduct a review of HVAC/R licensing and testing requirements. This review will include answers to the following questions:

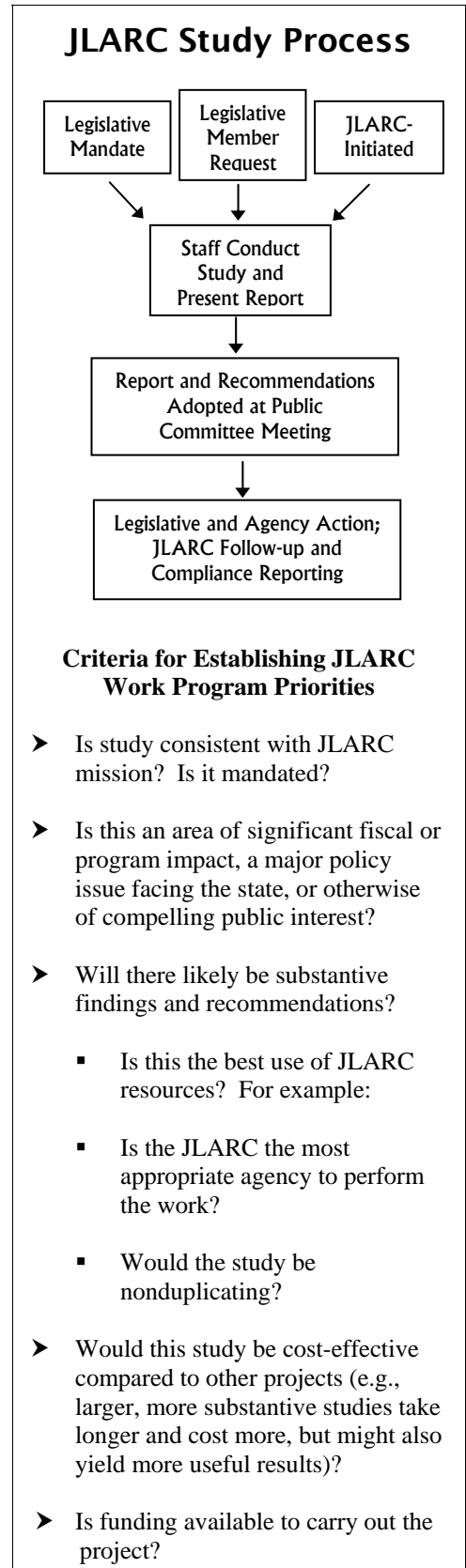
- What are current licensing and testing requirements?
- Are HVAC/R licensing and testing requirements consistent with other specialty licenses administered by the Department of Labor and Industries which span multiple trades?
- Are there ways that the current licensing and testing process can be improved?
- Are licensing and testing fees appropriate for this work?
- Are there other states that might serve as a model for HVAC/R licensing and testing in Washington?

STUDY TIMEFRAME

This study will be completed by June 2005.

JLARC STAFF TO CONTACT FOR THE STUDY

Eric Thomas (360) 786-5298 thomas.eric@leg.wa.gov



⁴¹ RCW 19.28.

APPENDIX 2 – AGENCY RESPONSES

- Department of Labor and Industries
- Office of Financial Management



STATE OF WASHINGTON
DEPARTMENT OF LABOR AND INDUSTRIES
PO Box 44000 • Olympia, Washington 98504-4000

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July 15, 2005

TO: Ann Daley, Interim Legislative Auditor
Joint Legislative Audit and Review Committee

FROM: Gary Weeks, Director *Gary Weeks*

SUBJECT: L&I response to preliminary JLARC report on HVAC/R Licensing

In response to the Joint Legislative Audit and Review Committee's (JLARC) preliminary report on Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC/R), I have attached the department's formal response.

I have asked Ron Fuller, the department's Chief Electrical Inspector, to attend the September 14th meeting.

We look forward to working with you as we work through the recommendations of the report. If you have any comments or questions, please contact me at (360) 902-4203.

Attachment

cc: Peter Bogdanoff, Governor's Executive Policy Advisor
Patrick Woods, Assistant Director
Ron Fuller, Chief Electrical Inspector



Department of Labor & Industries
Response to JLARC audit on HVAC/R

RECOMMENDATION	AGENCY POSITION
<p>Recommendation 1 L&I should provide consumers with assurance that technicians have electrical knowledge and experience before certification. This may be achieved by, but not limited to, changing the existing affidavit of experience to require trainees to perform a minimal level of electrical work, such as minimal hours of electric work or specific tasks, in the course of the required 4,000 hours.</p>	Concur
<p>Recommendation 2 L&I should more clearly explain its methodology for determining training requirements, and inform HVAC/R technicians of options for the industry to reduce required training hours for the 6A license. This authority is granted in statute, and should be reflected in agency rules to provide contractors with a better understanding of available options, and why training requirements are above the statutory minimum of 2,000 hours.</p>	Concur
<p>Recommendation 3 To provide policymakers and industry with a better sense of the public safety impact and fiscal impacts of possible options, L&I should examine scenarios that would certify other aspects of HVAC/R work. These options include, but are not limited to:</p> <ul style="list-style-type: none"> • Offering a separate, comprehensive HVAC/R certificate(s). This might be achieved through a stand-alone HVAC/R Board. • Administering and HVAC/R certificate(s) through the Electrical Board, or creating a sub-board of the Electrical Board with members of the Board and members from industry, which certifies that a trainee performing both electrical and mechanical work has HVAC/R knowledge and skills in both electrical and no-electrical aspects of work. This approach should recognize that not all HVAC/R technicians perform both electrical and mechanical work. • Offering a model like Wisconsin's, where the state administers an exam that is acceptable to cities that require additional certification for skills beyond the specialty electrical license. 	Concur
<p>Recommendation 4 If the Legislature wishes to more broadly represent regulated entities with knowledge of trade-specific equipment, it should revisit the current composition of the Electrical Board.</p>	Concur



STATE OF WASHINGTON
OFFICE OF FINANCIAL MANAGEMENT

Insurance Building, PO Box 43113 • Olympia, Washington 98504-3113 • (360) 902-0555

July 27, 2005

TO: Ann Daley, Interim Legislative Auditor
Joint Legislative Audit and Review Committee

FROM: Victor A. Moore, Director *V.A.M.*

**SUBJECT: REVIEW OF HVAC/R LICENSING AND TESTING
REQUIREMENTS STUDY – PRELIMINARY REPORT**

Thank you for seeking input from the Office of Financial Management on the Joint Legislative Audit and Review Committee's preliminary report noted above. We appreciate the opportunity to respond.

Recommendation	Agency Position	Comments
Recommendation 1	Concur	
Recommendation 2	Concur	
Recommendation 3	Concur	
Recommendation 4	Concur	

We commend your staff for their hard work on this report. If you have any questions, please contact Peter Bogdanoff of the Governor's Executive Policy Staff at (360) 902-0609.

cc: Peter Bogdanoff, Executive Policy Office

APPENDIX 3 – LICENSING FEES BY PROFESSION

- A *barber* must pay \$25 for registration, and \$89 for a practical exam. After that, the fee is \$40 for a two-year license. There are no continuing education requirements.
- A *nurse* must pay the Department of Health a \$65 application fee, and pass a national exam which costs \$200. Each succeeding year requires a \$50 annual renewal fee. There are no continuing education requirements.
- A *realtor* must pay \$146.25 for an initial two-year license and \$138.25 for the examination, and have 60 hours in “real estate fundamentals” (\$300-\$500). Following the initial license, realtors must pay \$146.25 for another two-year license, and have 30 hours of continuing education credit (\$175-\$300).
- A *plumber* pays \$115.30 to take the required exam and a portion of \$92.40 for an initial license, prorated by birth date. Following years require \$92.40 for a two-year license, and eight hours of continuing education (\$40 - \$150) each year.
- An *HVAC/R technician* must pay \$75.60 for an application review and their initial three-year license, as well as a \$50 exam fee. In following years, the fee is \$70.20 for a three-year license, and eight hours of continuing education (\$0 - \$300; L&I offers free training).

Continuing education fees represent estimates, and are based on a JLARC survey of firms that offer these classes, as well as data provided by L&I.

