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Equipment Registration

Additional submitted attachment is included below.

EQUIPMENT REGISTRATION

A Plan for Standards Compliance and Enforcement of HVAC Alterations

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Follow-up to Equipment Number Registration Docket No. 12-EBP-1 TN 71535

In Response To:
Improving Energy Compliance of Central Air-Conditioning and Heat Pump Systems
- SB 1414 Compliance Plan

For Consideration In:
Notice of Lead Commissioner Workshop on the Promotion of
Regulatory Compliance in the installation of Central Air Conditioning

Referenced Primary Document by Same Author:
Equipment Number Registration (ENR)
Docket No. 12-EBP-1
TN No. 71535
July 08 2013

Presented To:
California Energy Commission
Dockets Office, MS-4
Re: Docket No. 17-EBP-01
1516 Ninth Street
Sacramento, CA 95814-5512
docket@energy.ca.gov

Prepared By:
Roy Eads, CEA
7212 Tavira Court
Elk Grove, CA 95757
760.641.2447
Eads.Roy@gmail.com

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Overview

This document serves as a follow-up to the prior document *Equipment Number Registration* by the same author, Roy Eads, Docket No. 12-EBP-1, TN No. 71535 submitted on 08 July 2013. That document is attached hereto.

The docketed document can be located on the following CEC website link:
http://www.energy.ca.gov/ab758/documents/2013-06_workshops/comments/

Or by use of the direct link:
Roy Eads Report regarding Standards Compliance and Enforcement 2013-07-08 TN-71535.pdf

This follow-up document reiterates and summarizes the negative issues and concerns involved with non-permitted non-compliant HVAC changeouts. The aim is to dramatically transform the negative impact of non-compliant installations into positive end results, which serve to benefit our industry, consumers, the environment, and the State of California.

Equipment Registration offers a potentially viable solution to achieve up to 100% compliance by utilizing a statewide database registry that is simple to design, requires minimal effort to operate and maintain, and provides the least amount of cost and expense to all participants, including the state.

Introduction

California's Long Term Energy Efficiency Strategic Plan, dated September 2008, "sets forth a roadmap for energy efficiency through the year 2020 and beyond.[1]" On page 2, the report goes on to say,

> …with a growing population, increasing demand for energy, and the pressing need to reduce greenhouse gas (GHG) emissions in a rapid and low-cost manner, there has never been a more important time for energy efficiency in California.[1]

The California Energy Commission (CEC) has been the constant driving force behind meeting energy efficiency goals, and has carried the torch relentlessly, along with the collaborative support of the CPUC, the regulated utilities, and hundreds of individuals and stakeholders statewide. These efforts have guided the state to the stunning energy efficiency success that we witness today. However, the work is not complete, and we now find ourselves at yet another critical turning point – taking the next needed step to dramatically and rapidly eradicate non-compliant HVAC installations, with the intent to further increase the performance and energy efficiency of one of our home's most energy-consuming appliances, the residential HVAC system.

For well over ten years, the CEC and all involved stakeholders have entered into deep discussion and have diligently engaged in numerous studies to develop potential strategies to best improve the energy efficiency of residential HVAC alterations within the State of California. The end reports may contain slight variances in detail, but whichever report is referenced, it appears that there is overwhelming agreement that an alarmingly substantial number of HVAC alterations are performed without regard to the requirements of the law, that they commonly falter to industry best practices, and that these non-compliant HVAC installations have a much greater potential to result in substandard system performance and subsequent increased energy use.

[1] CPUC. *California's Long Term Energy Efficiency Strategic Plan.* September 2008. Pages 1-2. Web. 29 July 2018. <http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=5305>

Undisputed Topics Regarding Non-Compliance

The following topics have been identified and discussed throughout the lengthy discovery process and generally remain undisputed. This is not a complete list, but it highlights many major points of concern:

- **Rampant Non-compliance Exists**: Regardless of a consensus of the actual number of non-permitted and non-compliant HVAC changeouts, these non-compliant installations far outnumber the compliant installations;
- **Illegal Work Practices Cannot be Tolerated**: Any non-permitted and non-compliant work is considered illegal and should not be tolerated by current law;
- **Third-Party Inspections Required by Law**: Building inspections for Health & Safety, and the required HERS verifications of HVAC installations, are non-negotiable under current law. Identification of poor system performance and improper installation is extremely difficult to detect, and to subsequently rectify, without qualified third-party support;
- **Lack of Enforcement**: Adequate enforcement of non-permitted work by the authorities having jurisdiction has proven to be unachievable with the current strategies, available resources, budgets, and allotted workforce;
- **Lack of Negative Consequences:** Installers are more likely to perform non-compliant work when the odds of getting caught are considered slim-to-none, and the penalties are affordable;
- **Non-Compliant HVAC Changeouts Have Greater Potential to Underperform:** Without fear of the long arm of the law, installers are more likely to cut corners by taking the easiest, quickest, or cheapest installation path; they are more likely to ignore rules and bypass industry standards with substandard materials and workmanship.
- **Proper System Performance is Paramount:** A well designed and properly installed HVAC system is a fundamental goal in meeting energy efficiency goals.
- **Non-compliant Work May Pose Health & Safety Concerns:** Permitted work must comply with codes that address health and safety. Non- permitted work is more likely to have installation and structural deficiencies which pose a public health and safety hazard for workers and homeowners, including Carbon Monoxide (CO) risks.

- **Non-compliant Work Provides Unfair Competitive Advantage:** Reputable HVAC Contractors are at a competitive disadvantage and are more likely to join the ranks of the illegal installers, which exacerbates the problems.
- **Decreased Comfort is Not Desirable**: Poor HVAC system performance robs the consumer of the deserved comfort that he/she is entitled to.
- **Excessive Energy Use Is Common**: A poor performing HVAC system uses considerably more energy than a highly efficient system;
- **Increased Demand on Our Electrical Grid:** The goal is to minimize the overall demand on an already strained electrical grid, but poor HVAC system performance results in the opposite effect and a negative impact;
- **Increased Peak Demand:** The CEC states, "Failure to ensure quality at the time of cooling system installations results in a 20 to 30 percent increase in the peak energy needed by systems**."**[2]
- **Negative Environmental Impact**: Additional energy use resulting from poor HVAC performance adds an element of environmental concern that is unacceptable by current standards and negatively impacts the state's energy goals;
- **Federal Regulations Currently Require Equipment Number Record Retention**: The Regional Standards Enforcement Procedures, July 14, 2016, applies to manufacturers, private labelers, distributors, contractors and dealers with respect to central air conditioners subject to regional standards. The regulation requires record retention of the manufacturer name, model number, serial number, and location of installation.[3]
- **HERS Providers Currently Require Equipment Number Reporting:** The CEC-approved HERS registry requires, in most instances, reporting of the design, type, and characteristics of HVAC systems, including equipment manufacturer name, model number, serial number, and location of installation.[4]

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[2] State of California. CEC. *CA|Energy Efficiency Strategic Plan, January 2011 Update*. 55. Web. 6 July 2013. <http://www.energy.ca.gov/ab758/documents/CAEnergyEfficiencyStrategicPlan_Jan2011.pdf>

[3] U.S Gov. Government Publishing Office (GPO). *Regional Standards Enforcement Procedures*. Web. 31 July 2018. Electronic Code of Federal Regulations. <https://www.ecfr.gov/cgi-bin/text-idx?SID=753d31511c08185672832085207406 22&mc=true&node=sg10.3.429_1134.sg0&rgn=div7>

[4] CEC. *CF2R-MCH-01-E*. Web. 31 July 2018. < http://www.energy.ca.gov/2015publications/CEC-400-2015-032/appendices/forms/CF2R/2016-CF2R-MCH-01a-SpaceConditioningSystem-Performance.pdf

Benefits of Equipment Registration

Detail and further discussion of potential benefits are found in the attached primary document.

- **Allows for after hours and weekend jobs to be permitted at a convenient time**
- **Minimal Time and Effort Required of Users of the Database Registry**
- **Secured Access -** Privacy Issues, Confidential Business Information, and Identity concerns can be controlled to restrict access and mimic existing business practices
- **Aids in the Federal Record Retention Regulations**
- **Can be Integrated with Existing HERS Registries**
- **Increases Required HERS Verifications –** as triggered from the building permit process and documents system performance as related to HERS verifications
- **Transparent to Homeowners –** requires no additional effort from the homeowner, unless the homeowner is acting as the installing contractor
- **Reduced Peak Demand for Electricity**
- **Long-term Energy Savings**
- **Longer Life Span of HVAC Equipment**
- **Improved System Performance Can Potentially Be Achieved**
- **Positive Job Creation**
- **Reduced Anxiety for Homeowners**
- **Reduced Liability and Risks for Homeowners, Contractors, and Insurance Providers**
- **Improved Health & Safety**
- **Improved Comfort In Homes**
- **A Level Playing Field for Competitive Bids by Installation Contractors**
- **Increased Building Permit Volume –** and increased permit revenue with little or no additional costs to Building Departments to monitor enforcement of non-permitted work
- **Easily Enforceable –** provides inherent means for queries to the Database Registry by designated enforcement personnel
- **Fines may serve as operational costs**

Alternate Solutions

Many worthy solutions have been presented. Some are capable of a major transformation, but to be considered they must meet time and cost constraints to be viable; they must be capable of rapid implementation at the lowest cost possible and provide dramatic results in the shortest available time frame.

- **Increased Training and Education is Needed, but Not Enough**

  Contractors do not need to be trained on the requirement of building permits. Training and education for installation are basic elements that cannot be ignored. Installing contractors and their employees must be knowledgeable and competent. Therefore, training and education should remain as an ongoing element of meeting compliance. However, it cannot provide the needed improvement in compliance as a sole alternative. It does not have the ability to meet the urgent demand of time restraints and the compelling motivation for installers to comply.

  - **Equipment Registration can lead to higher compliance and act as a motivational tool to drive installers towards higher performance standards.**

- **Online Permitting is Needed, but Not Enough**

  A uniform statewide online permitting system is needed to streamline the compliance process and make it readily accessible, cost effective, and thus more desirable to installing contractors. However, this alone is not enough to compel contractors to comply. An online permitting system will benefit all participants, regardless of which approach is taken to improve compliance.

  - **Equipment Registration is highly complemented by the use of a statewide online permitting system.**

- **Incentives Do Not Have Longevity and Cannot be Sustained**

  Incentives create a huge and unbearable financial burden, are unpredictable, and do not have longevity for lasting results. It seems morally wrong to bribe an installer or consumer with an incentive to not break the law. When incentives dry up, compliance drops. This plan will not meet the needed time restraints.

  - **Equipment Registration can potentially lead to a higher rate of compliance at a comparatively low cost to the state and other participants.**

- **Rapid Market Transformation Through Consumer Education Is Not Feasible**
  Developing a mindset that compliance is a benefit to all parties, or a perception of value, is not an option due to the massive cost, organization, and time that is needed to fulfill such an endeavor. The uncertainty of executing such a plan remains, and it is coupled with a potentially high cost and extended time restraints that do not mix well with the targeted expectations.
    - **Equipment Registration can effectively lead to higher awareness of performance and the related benefits as a powerful side effect.**

The Most Feasible Solution

Only one proposed solution that meets the demands of a viable method to improve compliance remains – Equipment Registration. This proposal most effectively addresses all issues and concerns. It offers potentially more success at the least cost in comparison, and in the shortest amount of time needed to meet both the state's short term and long term energy efficiency goals.

Equipment Registration is the only viable solution at this point that has the teeth to improve compliance with the intensity and speed of execution that is needed to address non-compliance with successful results. When designed properly to satisfactorily address plausible objections, it requires little effort on the part of each participant and offers fairness with a small investment that can potentially provide large rewards in the effort to meet our energy goals.

The proposed Equipment Registration solution, previously referred to as Serial Number Tracking (SNT), has been widely analyzed, discussed, and has attracted the most support of any of the alternate solutions, as is witnessed by the speaker comments from the prior June 2018 SB 1414 Compliance Plan workshops.[5] Although there is scattered opposition, primarily from the manufacturing sector, when the details are exposed there is overwhelming support for the fundamentals of such a system.

[5] State of California. CEC. *Staff Workshop on the Promotion of Regulatory Compliance in the Installation of Central Air Conditioning and Heat Pump Systems.* Web. 30 July 2018. < https://www.energy.ca.gov/title24/enforcement/sb1414_documents/>

At this point in the process, or at any other point, the Equipment Number approach appears to be the only potentially viable solution due to the following highlights:

- ✓ **Low cost to execute** in respect to other solutions.
- ✓ **Low cost to all participants** to implement and integrate into their business model.
- ✓ **Minimal time investment** required of participants during business operations.
- ✓ **Simple to follow –** Requires little training or experience to navigate
- ✓ **Follows the path of the law -** It establishes the fundamentals of law-abiding communities and statewide industries.
- ✓ **Does not require costly incentives** to persuade contractors to abide with current law.
- ✓ **Can be rapidly implemented** in relatively short time frame as compared to alternatives.
- ✓ **Computer Programming is Minimal -** The required database system is fundamentally simple and does not require labor intensive programming and complex algorithms.
- ✓ **Can integrate batch dumps from existing computer systems** - Manufacturers, distributors, HERS registries, etc. can utilize existing technology.
- ✓ **Can Be Used by Participants as a Tool to Meet Their Federal Regulations Obligations** May be able to double as the inventory control needed for Federal record retention
- ✓ **Federal Precedence Has Been Set**
  - o In July of 2016, the Federal Regulations have set forth records retention provisions. These provisions explain the responsibilities of manufacturers, private labelers, distributors, contractors and dealers with respect to central air conditioners subject to regional standards. Records retention required includes: The manufacturer name, model number, serial number, location of installation (including street address, city, state, and zip code), date of installation, and party from whom the unit was purchased (including person's name, full address, and phone number).
    Details can be found at:
    - o *Enforcement of Regional Standards for Central Air Conditioners Final Rule, Section H.* Records Retention and Requests, U.S. Department of Energy, Federal Register Vol. 81, No. 135, July 14, 2016, http://www.ecfr.gov/cgi-bin/text-idx?SID=753d31511c0818567283208520740622&mc=true&node=sg10.3.429_1134.sg0&rgn=div7– identifies in Section H records required by DOE for

manufacturers, distributors and contractors to retain for all installations of specific residential air conditioners in the Southwest effective August 14, 2016.

- ✓ **HERS Registry Precedence Set**
  - The HERS registry currently requires Equipment Registration documentation
  - Installing Contractors have been required to record the make, model, and serial numbers of installed equipment for many years.
  - HERS Raters have been collecting and verifying this data for years.
  - The process is dependent on a building permit being issued, so unpermitted work is the broken link. Equipment Registration closes the gap.

Objections Addressed – Docketed Comments Respectfully Discussed

1. *Should the CEC should direct its efforts toward improving the current inefficient, time consuming permitting process rather than implementing additional regulations?*

   ❖ The current permitting system has room for needed improvement. A simplified and uniform statewide online permitting system has the potential to increase compliance and build contractor acceptance. However, an efficient permitting system alone does not have the power of persuasion for contractors to voluntarily follow the requirements of the law. In combination with Equipment Registration, a redesigned online permitting system will relieve a certain portion of the contractor's source of frustration and annoyance and make the permitting process more acceptable.

2. *Will adding additional a tracking system on top of the existing permitting requirements only add complexity to the process and worsen the very problem it is intending to solve?*

   ❖ No. The primary concern is to prevent non-permitting. The next step is to develop a system that can deliver results in the most effective, simplistic, and cost-effective manner. A simplified permit system alone does not have the teeth to compete with the benefits gained by the installer's non-permitted activities, especially when the contractor has no fear of enforcement and can easily weigh the minimal risk against the much larger monetary return. The task in hand is to provide deterrence that makes compliance an easier path than non-compliance. Equipment registration is the driving force to motivate the contractor to abide by the law and avoid fines, which many

contractors blatantly ignore due to a lack of enforcement. An additional tracking system is intended to enhance the compliance process and remove the cloud of deception. This process is viewed as a viable asset, rather than an additional burden.

3. *What part of the true cost of a new database registry, which includes initial investment, operation, and maintenance costs, will be charged to the stakeholders, and will the cost be passed on to manufacturers, distributors, contractors, and consumers?*

❖ A cost of implementation cannot be addressed until there is a decision to move forward with a study of feasibility and potential costs for development, operation, and maintenance. The time frame must allow for the urgency of meeting the state's energy goals and be implemented rapidly. This process has already been defined and is ready to implement. All stakeholders should be invited to provide a description of needs and capabilities. From this information, a specific proposed design can be assessed. Due to the anticipated relative simplicity of the database registry, the costs are assumed to be reasonable and fair. After an estimated development cost is established, the burden of payment should also be analyzed. The costs to participants should be kept to a minimum to avoid a financial burden on any entity. Every program carries with it a cost, but that is not to say that there is no value associated with it.

4. *Will costs be passed onto consumers as a result of Imposing additional regulatory compliance costs onto industry stakeholders?*

❖ Every attempt should be made to keep costs at a no-cost or very low-cost levels. A most simplistic design of the Equipment Registration database is important, and it must require very little effort on each participant's part, thus reducing the risk of high costs. Utilizing existing technology, such as computer software, scanning devices, and other available inventory controls, time and expense should be kept at a minimal level. The database registry has the potential to compliment an existing inventory system and provide internal reports for private business analysis and inventory control. Security and privacy concerns have been addressed, since the information required is very limited and is not transferrable to parties that are not involved with an equipment sale.

5. *How onerous is the data reporting, considering the complex structural chain involving Manufacturers, Distributors, Contractors, and Homeowners?*

   ❖ The process is surprisingly simple. The Equipment Registration database registry requires minimal informational input. The equipment component is first entered at the manufacturers level, which would involve any qualified component that is intended to be sold in California. If a piece of equipment were erroneously registered and later shipped out-of-state, that component can simply be marked as an out-of-state installation. The process involves a simple check on a predetermined list of equipment that is in that participant's possession. This task could be done manually, or utilizing computerized batches as determined by the registry's capabilities. These are issues that can be resolved in the discovery and feasibility study and the design process.

   ❖ At each level of distribution, the selling party merely indicates who the equipment was sent to, and the receiving party merely acknowledges possession of the equipment. This is done with a simple check mark on a pre-populated list. The proprietary information is limited to your immediate buyer and your immediate supplier. It is the transfer of possession that is tracked. This is information that is currently recorded and saved in the normal course of day-to-day business by all businesses and is non-invasive.

6. *Will manufacturers and distributors be required to divulge who or where their product is installed?*

   ❖ No. Manufacturers and distributors are not required to keep any information that they would not normally have kept. The registry merely tracks possession of equipment by noting the transfer of possession. Collecting information pertaining to the installing contractor, the homeowner, the HERS rater, the building permit, the location of the installation, nor any other personal or business-related information of this sort is not required of a manufacturer or distributor and should be discouraged. Visibility of the registry is strictly limited to your company's list of equipment, and it designates whether the equipment is either in your possession or has been transferred to another party. The data sharing ends there. You are restricted from seeing any other party's data and list of equipment that did not originate from you. This dramatically

limits the amount of information needed for input and the time and resources needed to input it.

7. *If the vast number of consumers are not currently complying with permitting regulations, will they be willing or required to divulge their personal information, such as names, addresses, and contact info?*

   ❖ Homeowners are not required to divulge any of their personal information that is not required under our current system. However, with Equipment Registration, they will be required to take out a permit as required by law. When taking out a local building permit or hiring a HERS rater, homeowners are currently required to divulge their address and contact information, or they can allow their installing contractor to act on their behalf. There is no change from the current process. The database is only designed to track the equipment as it moves from hand-to-hand and to verify that the installation has eventually been permitted and HERS verified. The verification of the final permitting process is documented by the HERS rater with one easy step upon verification of the install. No special trip to the house is required. No further action is needed. This is already being done, but only when a contractor takes out a permit as required by law. Unpermitted work circumvents the law.

8. *Will the CEC secure the mass data that is collected?*

   ❖ Yes. Securing personal data is performed through the software capabilities of the registry, as is currently done with personal banking accounts, HERS registries, email accounts, the Social Security Administration, the DMV, etc. Each participant follows a simple one-time registration process and obtains a unique login and password. Assurance must be given by the CEC that the collected information will not be disseminated without respect to the law. This has been addressed within all departments of government and does not appear to be an obstacle. However, this is part of the discovery and feasibility process.

9. *Does the CEC truly understand the scope of such a proposed registration system?*

- ❖ The CEC has a track record of success and is considered by many to be the national and global leader of building energy efficiency. Confidence is well-earned. A cost and feasibility study performed by competent professionals is advised prior to making a lasting commitment. The topic of Serial Number Tracking, or Equipment Registration as it is now known, has been thoroughly studied and discussed in detail for over a decade. RFP-16-403 set forth a process to vet this proposal and bring it to the next level for potential analysis and/or implementation. The CEC has demonstrated this ability to perform since it's inception during the 1970's and continues to exceed expectations while leading the nation in building energy efficiency program guidance.

10. *How will this system impact the Building Departments?*

- ❖ Building departments do not interact with the registry. If an install in their jurisdiction is discovered to be non-permitted, or the permit is not closed out properly, the building department can be notified for enforcement of the permit through normal channels.
- ❖ The volume of mechanical permits is expected to rise, as will permitting revenue.

END

EQUIPMENT NUMBER REGISTRATION (ENR)

A Plan for Standards Compliance and Enforcement of HVAC Alterations

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In Response To:
Comprehensive Energy Efficiency Program for Existing Buildings
- Draft Action Plan Staff Workshop

For Consideration In:
The Final Action Plan

Presented To:
California Energy Commission
Dockets Office, MS-4
Re: Docket No. 12-EBP-1
1516 Ninth Street
Sacramento, CA 95814-5512
docket@energy.ca.gov

Prepared By:
Roy Eads, CEPE
1st Choice HERS Rating
68811 Risueno Road
Cathedral City, CA 92234
760.641.2447
Eads.Roy@gmail.com

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Overview

Within the details of the AB 758 Action Plan, titled *CA| Draft Action Plan for the Comprehensive Energy Efficiency Program for Existing Buildings, June 2013* (The Plan), the California Energy Commission (CEC) acknowledges the failure of the statewide system by which building permits for residential HVAC alterations are regulated and subsequently enforced:

> The State of California requires contractors to obtain building permits as a condition of their license, and local laws designed to protect consumers also require contractors to obtain permits. Unfortunately, these legal requirements are not always met. For example, an estimated 90 percent of all residential central heating, ventilation, and air-conditioning (HVAC) replacements are being done without a permit, making it difficult for enforcement agencies to oversee and confirm compliance with the standards.[1]

The Plan indicates that, as a direct result of the prevailing lack of enforcement and non-compliance in residential HVAC alterations, a tremendous amount of peak demand has been added to our electrical generation needs, subsequently causing a major negative impact by sabotaging California's long term energy efficiency strategic goals. Although the ultimate goal is to achieve meaningful energy savings within existing buildings, important environmental issues, such as greenhouse gas (GHG) emission reduction goals and The Global Warming Solutions Act of 2006 (AB 32), are also at risk.

A 2008 CEC report, cited within the Plan, estimates annual savings of 130 megawatts that could be attained with 90% permitting of residential HVAC replacements and proper installation.[2] Furthermore, in the recent AB 758 Workshop held in Fresno on June 25, 2013, the CEC reiterated the expectation of tremendous California peak electricity demand reduction by

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[1] CEC. *CA Draft Action Plan for the Comprehensive Energy Efficiency Program for Existing Buildings*. June 2013. CEC-400-2013-006-D. p.23.

[2] Michael Messenger. *Strategic Plan to Reduce the Energy Impact of Air Conditioners*, California Energy Commission, Sacramento, 2008, CEC-400-2008-010, p. 7-8, <http://www.energy.ca.gov/2008publications/CEC-400-2008-010/CEC-400-2008-010.PDF>.

means of 90% HVAC replacement permitting.[3] Thus, the creation of a plan to eradicate the dilemma of non-compliance and lack of enforcement is of utmost importance and can potentially have an immediate positive impact, which can no longer be ignored.

The CEC is clearly aware of this surmounting issue and has entertained suggestions addressing a viable solution to this problem. One such proposition, as previously mentioned in the California Energy Commission Staff Report*, Comprehensive Energy Efficiency Program for Existing Buildings - Scoping Report,* August 2012, has alluded to a plan of Serial Number Tracking[4]:

> Many contractors and homeowners who are doing single-component alterations bypass the permit process. A recent survey, conducted through the Western HVAC Performance Alliance that assessed the risk of contractors not pulling a permit for residential HVAC change-outs, revealed that there is a relatively low expectation of consequences, and the fines associated with the violation are not high enough to motivate a contractor to obtain a permit. This market condition has created an "underground economy" that encourages noncompliance, ultimately undermining the Energy Commission's goal of achieving 90 percent compliance with the Standards. (129)
>
> Another more aggressive option would be to track HVAC equipment serial numbers from the manufacturer or distribution points to actual permit addresses. This could be accomplished by a cooperative effort of equipment manufacturers, distributors, and enforcement agencies developing the process and database to track and monitor the equipment. (130)

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[3] State of California. CEC. *Draft Action Plan Comprehensive Energy Efficiency Program for Existing Buildings Public Workshop. 25 June, 2013*. Fresno. Slide 54. Web. 6 July 2013. <http://www.energy.ca.gov/ab758/documents/2013-06_workshops/presentations/2013-06-25_AB758_Workshop_Fresno.pdf >.

[4] State of California. CEC. *California Energy Commission Staff Report, Comprehensive Energy Efficiency Program for Existing Buildings - Scoping Report, August 2012* (CEC-400-2012-015). 129-130. Web. 7 July 2013. < http://www.energy.ca.gov/2012publications/CEC-400-2012-015/CEC-400-2012-015.pdf>.

For lack of a specific plan that details the Serial Number Tracking option, this paper supports the suggestion, offers additional detail, provides argument in favor of a tracking plan, debunks potential opposing complaints, and lays the groundwork for implementing such a plan. The original concept of Serial Number Tracking has been renamed to Equipment Number Registration (ENR), which appears to be more indicative of the process because it involves the registration of: the participants involved, the manufactured HVAC equipment, and the transfer of ownership from origination by the manufacturer to the final installed location. Ultimately, the building permit and HERS compliance testing are easily verified through this registration process and the ease of use is surprisingly simple as the trail of ownership advances.

Therefore, as a grave result of blatant non-compliance practices in HVAC alterations, it is evident that immediate action must be taken to mitigate the negative impact on California's long term energy plan. Since the lifespan of HVAC equipment is measured in years-- even decades-- every substandard alteration results in a tremendous loss of energy efficiency potential-- a loss that will not be recoverable for decades to come. Furthermore, improper and/or poor HVAC installations pose potential public health and safety issues, increasing environmental concerns, financial loss, and diminished comfort at home, all of which are virtual economic costs that we cannot afford. Current enforcement policy is clearly unacceptable, and further delay would merely fuel the practice of non-compliance. Considering the dire consequences, non-action is not a credible solution-- we must act now. There has been no record of denial, seemingly placing all parties in agreement that this problem does exist. The ENR plan offers a viable solution, one that not only requires, but provides a path of rapid action. However, regardless of the direction taken, rapid action is only feasible with the full support and guidance of the CEC.

Equipment Number Registration (ENR)

The proposed Equipment Number Registration (ENR) database system may be used as a tool to verify that HVAC installations-- those that add or replace major HVAC components such as: condensing units, evaporative coils, indoor/outdoor coils, air handlers, and furnaces-- meet compliance with the current Building Energy Efficiency Standards and follow proper building permit requirements as mandated in the California Code of Regulations, Title 24.

The ENR process requires each HVAC participant-- manufacturers, distributors, installers, and HERS raters-- to participate in a simple registration process that tracks the transfer of possession of any qualified HVAC equipment, manufactured or sold in the State of California, from the originating manufacturer to the final installed location. In doing so, the building permit process and HERS testing measures are seamlessly verified, ensuring that the equipment installed meets compliance. The following steps illustrate the simplicity of the process:

Step 1 - Register: Each participant performs a onetime online registration at the ENR registry (minimal info is required):

I. Type of Organization: Manufacturer, Distributor, Installer, or HERS Rater
II. Name/Address/Contact Info
III. Responsible Person
IV. User created User ID and Password

Step 2 - Manufacturer Adds Equipment to the Database: A onetime entry of each item (minimal info is required):

I. Type of Equipment (from a drop-down list)
II. Trade/Brand Name
III. Model #
IV. Serial #
V. Date of Manufacture

Equipment is automatically marked as "active" and remains on the manufacturer's active list until transferred to another participant, at which time, the equipment is then automatically marked as "inactive" and moves to the manufacturer's inactive list. Any item on an active list indicates that there is possession of that item; any item on an inactive list indicates that possession of that item has been transferred to another party, such as in the sale to a distributor or installer.

Step 3 - Transfer: To transfer an item to any participant, the transferor must:

I. Enter an ID # of the transferee or select from a drop-down list
II. Place a check mark on each active item to transfer
III. Click [TRANSFER]

Step 4 - Acknowledge a Transfer: The party receiving the transferred equipment is electronically notified upon login and must acknowledge the transfer:

I. Click [ACKNOWLEDGE TRANSFER]

Step 5 - Install: The installer enters minimal information:

I. Place a check mark on each active item to install
II. Identify the local jurisdiction (from a drop-down list)
III. Building Permit #
IV. Date Permit Issued
V. Install Date
VI. Job Address
VII. Select HERS Rater (from a drop-down list)
VIII. Click [TRANSFER]

Step 6 - HERS Rater: Upon completion of HERS compliance testing, the rater must:

I. Place a check mark for: Pass -or- Fail
II. If FAIL: Follow-up and retest until passed
III. If PASS: Click [SUBMIT]

Input Errors: Equipment numbers are input only once, a feature that protects against input or typographical errors. The same is true for other repeatable data, such as company names and IDs for transfers-- drop-down lists and auto-fill fields are used to avoid input errors and maintain accuracy and consistency throughout the system.

Duplication: The software is programmed to avoid duplicate serial number entries.

Bar Code Scan Technology/Downloads: This technology exists, and is currently used by most manufacturers, as evidenced by the presence of bar code labels on equipment. Equipment numbers are currently being utilized by manufacturers for inventory control and warranty issues. This technology may be integrated in the ENR database process to minimize data input and to ensure a higher degree of accuracy.

Security/Personal Information: Security issues are addressed with user ID and password protection. To protect personal information, each individual company shall only have access to transactions originated from that company's active or inactive lists. Information available is limited to the equipment numbers and identification of the party who transferred equipment to you, or identification of the party that you transferred equipment to. Job location information is only accessible by the installer and HERS rater.

Summary: ENR provides a low-cost method of monitoring the trail of equipment, from manufacture to installation, to ensure that compliance is met. The process is simple and easy to navigate, and the time required for each participant is very minimal-- measured in seconds for each item registered. Consequently, the cost to implement is also expected to be minimal in nature. With the addition of a statewide online permitting system, building permits can easily be monitored and verified. With a target of 100% compliance, the CEC goals of energy efficiency can be superseded with higher expectations and increased results.

ENR Enforcement

Manufacturers, both in-state and out-of-state, must be diligent with the system, and must be monitored periodically for ENR compliance, as the process begins with them. Shipping, or smuggling, of non-registered equipment into the state shall carry the deterrence of criminal charges and fines. Manufacturers shall be encouraged to voluntarily report ENR violations when discovered, as in warranty-related issues involving non-registered equipment.

Distributors are easily monitored through the ENR transfer system, which requires minimal action. A properly automated ENR system permits the transfer of equipment with a few clicks of the mouse. Auditing is easily performed by verifying equipment inventory from the distributor's active list, and meeting compliance easily outweighs the cost of substantial fines.

Installers play a crucial role in the building permit and compliance process. Registration of the building permit and designation of a HERS rater are the primary concerns. Inactive equipment is automatically monitored by permit closures and HERS verification.

Expired permits and length of time on an active list are indicators of non-compliance. Unpermitted installations can easily be enforced by auditing the installer's ENR active list for possession of equipment which the installer has acknowledged. Any equipment on an active list should be in possession of that responsible party. Stolen equipment requires an official police report for confirmation. A strong fine, per item, shall be imposed for missing equipment that is listed as active on the ENR database.

HERS raters are required to do very little in regards to ENR. A rater's job is performed in the normal course of business, and ENR requirements are merely a couple clicks of the mouse for verification. However, the volume of HERS rating jobs would increase dramatically with 100% permitting-- potentially nine-fold-- based on the fact that up to 90% of the HVAC alterations are performed without a permit, and therefore, without HERS compliance testing.

Local Building Departments, although not relieved of enforcement duty, are fully assisted by the ENR enforcement system and reap the benefits. Non-compliance enforcement is a service which is not aggressively pursued by most departments, primarily due to budget concerns. Therefore, success of the ENR system may offer increased cash flow to the local jurisdictions with very little participation required.

Fines and penalties are used to ward off non-compliance; the offending fine should be of a substantial amount to be deemed unaffordable, such as $1,000 per item. A typical HVAC replacement involves three items. Repeat offenses shall cause an increase in the amount of the fine, and shall pose potential disciplinary sanctions from the California State License Board, such as increased fines and possible suspension of the license, for performing contractual work without a building permit and failing to comply with Title 24 regulations.

Auditing at the distributor or installer level is easily performed utilizing the ENR database. Audit lists are easily generated online to provide the company name for the equipment in possession and the holding location. Verification of possession is performed at the specified location and appropriately marked on the database. Bar code scanning is encouraged. Auditing for permit compliance and HERS testing is performed with database queries and does not require field verification, except in the event of a computer generated inconsistency.

Auditing personnel may be on the state level, and/or services may be subcontracted to local HERS raters for a preset fee. Minimal training is required to participate and the auditing aspect is an additional source of job creation. Funding for auditing costs is likely to come from collection of imposed fines for violations.

ENR: Potential Benefits Through Compliance

1. **Long-term energy savings**:
    a) ENR inherently promotes compliance with the Energy Efficiency Standards and local building codes. Equipment installations that are in compliance are expected to offer increased performance and higher energy efficiency. It is common practice for installers to have two sets of standards, one for permitted work, and one for non-permitted work. If the installer knows that there will be no inspection, one can expect the quality of workmanship to decline, resulting in underperformance and increased energy use;
    b) Higher quality installations equate to lower peak demand through energy efficiency savings. The CEC states, "Failure to ensure quality at the time of cooling system installations results in a 20 to 30 percent increase in the peak energy needed by systems."[5]
2. **Longer life span of HVAC equipment:**
    a) Equipment Sizing: The Standards require HVAC load calculations for proper sizing. This procedure is rarely used with unpermitted work and most systems installed are oversized. Proper equipment sizing minimizes short-cycling that is common to oversized systems. Short-cycling causes the system to cycle on and off more frequently, which translates to increased wear and decreased equipment life;
    b) Duct Leakage: Sealed ducts are more efficient because they deliver more conditioned air into the living space. Leaking ducts require the system to run longer to deliver the same amount of conditioned air. The longer the system is required to run, the shorter the life of the equipment. Average duct leakage of

[5] State of California. CEC. *CA|Energy Efficiency Strategic Plan, January 2011 Update*. 55. Web. 6 July 2013. <http://www.energy.ca.gov/ab758/documents/CAEnergyEfficiencyStrategicPlan_Jan2011.pdf>

existing systems is 25-30% by CEC reports.[6] The Standards call for 6% if new, and 15% if existing;

c) Refrigerant Charge: Proper charge extends equipment life through improved performance. Over charge causes the compressor to run at higher pressures and shortens the life. Under charge of refrigerant results in poor performance and longer run times;

d) Airflow Testing: Compliance testing assures that minimum standards are met. Low airflow causes longer run times and a decrease in comfort;

e) Building Code Violations: Improper installation practices can cause maintenance issues, such as limited access, and operational issues, which result in maintenance concerns and poor performance. Unpermitted work is less likely to comply.

3. **Positive job creation**:

a) Local building departments may experience a potential nine-fold increase in HVAC permit fees collected, supporting additional inspectors in the field;

b) State level jobs are created by ENR-- agency personnel, auditors, and trainers-- aided by support from non-compliance fines;

c) Local job growth may arise from an anticipated increase in ancillary business need: office supplies, travel expenses, gasoline, tools, software support, communications, etc.;

d) HERS rater job creation is expected from a potential nine-fold increase in compliance testing. Job growth is a rather simple process to meet through established HERS training organizations, providing the demand is present;

e) An increased work load is expected from existing HERS raters, since most existing HERS raters are under employed and capable of higher workloads.

4. **Reduced anxiety for Homeowners:**

a) Opposition to permitting is higher when there is a less-costly alternative, such as non-compliance. Preventing non-compliance relieves the pressure.

[6] State of California. CEC. *HVAC: Overview: Duct Problems: Airflow and Leakage*. Building Media Inc., 2008. Video. Web. 7 July 2013. < http://www.energyvideos.com/ crs_MM.php?S=1&L=20&C=205&M1=441&M2=791&VT=A&VID=cec_hvac_overview.wmv.

b) There is less confusion and reduced emotional pressure when compliance is the norm. The current decision making process pits "following the law" with "breaking the law" and creates tension;

c) Increased comfort in the home due to better performing systems;

d) Bid comparison is simpler when all contractors include compliance costs.

5. **Reduced liability and risk:**

a) Non-permitted work with substandard practices have a higher tendency towards failure and increased risk of litigation;

b) Non-permitted work can cause a denial of homeowner's insurance coverage in the event of an insurable loss, such as: furnace related fires, electrical fires, water damage and resultant mold contamination, and structural failure due to faulty installs.

6. **Improved health and safety:**

a) Carbon Monoxide (CO) poisoning can cause illness and death when systems are not properly vented. Permitted work is more likely to pass inspection;

b) CO alarms are required when work is permitted, potentially saving lives. Unpermitted work commonly ignores this important safety requirement;

c) Permitted work requires locking service valve caps. This building code was put into place after witnessing the hazards of potential death, usually by teenagers who have been found fatally "huffing refrigerant" from systems without locking caps.[7, 8] Non-permitted work is not likely complying with this code requirement and placing human life at stake;

d) Permitted work must comply with codes that address health and safety. Non-permitted work is more likely to have installation and structural deficiencies which pose a public health and safety hazard for workers and homeowners.

e) Access and clearances to equipment is important. Improper access causes hazards, such as: electrical hazards caused by improper work clearances, falling dangers, and injuries;

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[7] Dallof, Sara. KSL.com. *'Freon huffing' on the rise, posing danger to teens*. July 2011. Web. 7 July 2013. < http://www.ksl.com/?nid=148&sid=16266745>.

[8] Valenzuela, Beatriz E. The Sun. *Hesperia girl's death prompts Freon huffing awareness*. March 2013. Web. 7 July 2013. < http://www.sbsun.com/ci_22759146/hesperia-girls-death-prompts-freon-huffing-awareness>.

f) Indoor air quality is improved when systems are installed properly and duct leakage is kept to a minimum. Asthma, allergies, and other breathing disorders are best addressed with proper air distribution, filtration, and sealing, all of which help avoid inadvertent contaminants to be drawn in from unwanted areas such as attics, crawlspaces, garages, and outdoors;

g) Non-compliance is far more detrimental to public health and safety.

7. **A level playing field for competitive bids by installation contractors**:

   a) 10% permitting means that 90% of the HVAC installation bids do not include the cost of permits and compliance. With so many contractors bidding for HVAC work without building permits or HERS rating, legitimate contractors are competitively pressured to non-comply, exacerbating the problem and putting themselves, the company, and the homeowner at further risk;

   b) Enforcement of the Standards and local building code levels the playing field and the homeowner can then make a reasoned decision based on true costs, comparing apples to apples.

Frequently Asked Questions:

1. **Will this be too costly to implement by the State?**

   The cost of implementing ENR should first be compared to the cost of non-action:

   - What is the cost of a failing long term strategic plan?
   - What is the cost of irreparable environmental damage?
   - What is the cost to the economy for additional peak energy production?
   - What is the cost to home values when unpermitted work is performed?
   - What is the cost of death from CO poisoning or refrigerant huffing?
   - What is the cost of medical needs due to poor indoor air quality?
   - What is the cost of underperforming equipment?
   - What is the cost of shortened equipment life?
   - What is the cost of the denial of an insurance claim for a furnace fire?

   The cost to implement the ENR plan is pale in comparison to non-action. Although there are costs to be incurred, there are also benefits to implementation that provide a certain balance to the scale. However, the main costs are in the details which remain to

be worked out. Considering the simplicity of the plan, requiring a relatively small support team, costs should include:

- Organizational/star-up costs
- Legal fees
- Notification
- Hard costs for offices/infrastructure
- Software development and maintenance
- Support personnel
- Field agents/auditors
- Accounting

2. **What are the privacy and security concerns?**

   Personal information and business privacy is protected. Each registered user can only view his/her active and inactive lists, which is common to any business practice that the registered user is currently performing. No personal information is available to another user except for the basic contact information of the registered user that equipment was transferred to or from. This is a typical vendor-client relationship.

3. **Is the process time consuming or cost prohibitive to distributors and small business?**

   No. Each registered user has minimal input requirements, typically measured in seconds per item. Technology exists for bar-code scanning, computer downloading of data, or blue-tooth compatibility for large orders. Manual input, if desired, is minimal. Equipment numbers are only input by the manufacturer. Other users primarily use a check mark on the list of active equipment to transfer to another user. Installers are required to obtain a building permit and meet compliance-- as is the current requirement by law. No fines or penalties will be levied if the requirements are met.

4. **What about record keeping?**

   All records are kept online by the CEC on a secured server. Equipment inventory lists, whether active or inactive, can be printed, if desired. Normal shipping documents currently in use by a company will provide backup for transfers/sales, if needed.

5. **What about input errors or typos?**

   One time entry of numbers by the manufacturer prevents input errors by other participants. Minimal manual input is required. Drop down lists are used to minimize input whenever possible. The transferee is required to acknowledge the transfer online

with one click. If an error occurs, the transferor will be notified and required to correct the transfer to the intended party.

6. **Is there a competitive disadvantage for California-based distributors?**

   No. Any distributor supplying specified HVAC components to California will have the same requirements, whether in-state or out-of-state. Potentially fewer warranty claims are expected when equipment is installed to meet compliance, inspected by the local building department, and HERS compliance verified.

7. **Will this plan get the State closer to Title 24 Compliance?**

   Yes. The registration process requires the contractor to designate the permit number and HERS rater before the equipment can be closed off his/her active list. Auditing can be performed in-house by the CEC to confirm permitting and HERS compliance has been met by monitoring the active and inactive list controls. Field auditors perform a simple verification of active equipment in possession.

8. **Is the process nearly impossible?**

   No, it is quite the contrary. The ENR process is simple and cost-effective for both the State and the participants. Implementation of the program will augment the success of California's long term strategic goals. Failure to implement ENR will leave California on the same path of failure in the HVAC installation arena that we are on today, and it will take years to catch up. This is not acceptable and must be changed. The alternatives are too dire to ignore.

Compliance and Enforcement Issues

Failing to take out a permit is the obvious point of discussion. However, obtaining a building permit is only the first step in the compliance process. From that effort, controls are triggered that are intended to safeguard public health and safety, impose quasi-quality controls, and assure compliance with the energy standards as monitored by the HERS rating system. Although expectations are high, there are barriers, roadblocks, and loopholes that circumvent the credibility of the process and fuel the non-compliance argument. The reasoning behind this process is complex, but ENR provides a simple solution in conjunction with statewide modifications to the permitting process. The following is a list of major concerns:

1. **Non-Compliance**: Failing to obtain a permit is the prime concern. Unfortunately, the consequences of non-compliance are not considered a viable threat due to lack of enforcement. Local building departments generally focus on enforcement of permitted projects; un-permitted work is secondary and is typically acted upon by chance rather than intent. In other words, there does not appear to be a solidified effort among local enforcement agencies to take a proactive approach toward non-permitted work enforcement. Therefore, the risk to the contractor is greatly diminished and further non-compliance is encouraged. ENR will relieve the building department's burden of enforcement by promoting compliance and focusing on enforcement of permitted work. ENR addresses this issue directly to minimize abuse.

2. **Permit Costs**: The process for obtaining and closing out a permit can be cost prohibitive in the eyes of the homeowner and/or contractor. Many cities have exorbitant fees which need to be addressed, as high fees encourage non-compliance. Additionally, HERS compliance testing adds to the cost dramatically. ENR suggests a potential nine-fold increase in HVAC alterations permitting, and the resultant supply and demand economics is likely to have a positive effect on both permit fees and HERS pricing. ENR addresses this issue indirectly with a redesign of the permitting process.

3. **Time Intensive**: The process for obtaining and closing out a permit is time intensive. This typically involves a trip to city hall and an undetermined wait time to obtain the permit. The contractor generally considers this as "lost time" and becomes aggravated. Forms vary from city to city and increase the confusion. The final inspection requires a wait time of up to a half day when building departments only offer morning or afternoon appointments and refuse to commit to a narrow time frame. The initial permit process could be greatly enhanced with an online permit service for HVAC change outs-- avoiding the trip to city hall altogether-- and offering narrower time windows for final inspections. ENR addresses this issue indirectly with a redesign of the permitting process.

4. **Expiration Loopholes**: A building permit generally has a life of 180 days. After expiration, many building departments delay immediate action and may or may not notify expired permit holders by mail. Many departments operate on a marginal budget and lack personnel for proper follow-up and enforcement. The loophole that a contractor may use is as follows: Take out a permit (technically "compliant"), finish the work, do not have the HERS testing performed, and do not call for a final inspection. Then the contractor sits on the permit until forced to act, which could be never. This is a profitable scenario in the eyes of the contractor and a reasonable gamble whether or not he/she is caught. ENR addresses this issue directly to minimize abuse.

5. **HERS testing loopholes**: Failing to close a permit, as mentioned above, bypasses the HERS compliance testing. Many times, the cost for HERS testing is included in the overall cost of the project. If the contractor stops the process prior to testing, he will likely pocket the estimated costs, unbeknownst to the homeowner, and profit from non-compliance. This stall technique is also used when a HERS test fails.

   Another scheme to circumvent a failed HERS test is to create a duplicate project on the HERS provider's registry, hire another HERS rater, and hope for more favorable results.[9] Each of these techniques negatively impacts the homeowner, the HERS rater, and the overall success of California's energy goals. ENR addresses this issue directly to minimize abuse.

6. **Quality of Workmanship**: It is human nature to have two sets of standards: (1) a high work standard when inspection of the work is anticipated; and (2) a lower work standard when the worker knows that the work will not be inspected. Therefore, compliance and enforcement encourages higher quality workmanship. ENR addresses this issue directly to minimize abuse.

[9] Addresses are easily duplicated with insignificant spelling changes, punctuation, or adding content. Simple controls for duplicates can be implemented on the HERS provider registry by adding an Assessor's Parcel Number (APN) and quantifying the number of systems at each location.

7. **Lack of knowledge, or oversight, on the building inspector's part:** It is important that building department personnel are properly trained in approval of Title 24 requirements, including HERS field verification and diagnostic testing. If a building inspector does not understand the requirements, the permit may be closed out without proper compliance. HVAC alteration compliance is relatively simple to the trained observer, but confusing to the layman. A check list of inspection needs for each project would be beneficial to meeting compliance. This list could be used by both the installer, the inspector, and the building department staff to clarify code requirements and reference the appropriate code section. The ENR process assures a confirmation from the HERS rater that the installed system has complied, regardless of the building department final inspection, serving as a check point for quality control. ENR addresses this issue directly to minimize abuse.

Redesigning the HVAC Alterations Building Permit Process

ENR is designed to make the HVAC alteration permit process unavoidable, striving for 100% compliance. However, to gain favor and avoid added aggravation, it is imperative that the permit process be user friendly, affordable, and easy to implement. A multi-faceted approach can be taken to streamline the permit process from the initial permit application to the final inspection. The objective is to encourage compliance with a cost-effective, time-savings approach with minimal sacrifice from each participant involved; the local jurisdiction, contractor, homeowner, HERS rater, and ENR auditor. These goals can be achieved through a uniform, statewide online permit process.

Permit System Operation: The proposed system involves a CEC developed software program that is publicly accessible online by contractors, homeowners, local jurisdictions, and ENR staff with 24/7 availability. Local jurisdictions have access to customize the screen page with logos, contact information, local specifics, pricing, etc. A uniform, statewide one-page permit application is completed online, permitting fees are paid online to the local jurisdiction, and the user prints out the appropriate permit and job card documents. CF-1R-ALT-HVAC forms are

registered with the HERS provider, as is currently done, and the permit form is easily accessed online by the local jurisdiction for confirmation and a paperless trail.

The processing time should be minimal-- a matter of a couple of minutes as compared to the time it takes to drive to city hall, fill out the papers, wait in line, and drive back. The process can be completed without the need for transportation, and performed by lower paid employees rather than owners or company supervisors.

Final inspections are requested online, the local jurisdiction processes the request online, and an inspection date and time is provided online. It is imperative that the inspection is given the narrowest window possible to avoid wasted time by waiting participants. Inspectors record inspection comments online and communication is established. Electronic signatures are used for job card sign-off, and printed copies are available, if desired.

HERS compliance testing is currently registered online and the building inspector has access for verification of HERS compliance documents. This process is currently in effect and requires no modification. However, most building departments still rely on a paper trail as a result of old habits. Paperless trails should be encouraged to streamline the process and reduce costs of printing, copying, filing and delivery; this is all accessible to the HERS rater, contractor, homeowner, and building department.

Program Development Costs: If each individual jurisdiction develops a personalized online permitting system, the statewide cost is tremendous. There are 58 counties and 478 cities in California.[10] In comparison to the cost of 558 individual systems, one statewide system made available to all municipalities has enormous economic benefits. A modest maintenance fee from each permit fee can fund development and operational costs, while providing improved service and convenience to all users.

[10] Fulton, William, and Paul Shigley. *Guide to California Planning, Third Edition*. Point Arena: Solana Press Books, 2005. Print. 66.

HVAC Alterations Permit Fees: Permit fees play a major role in the decision process when deciding to take the compliance path or performing HVAC installs illegally. Throughout the state, fees vary dramatically. Many jurisdictions offer affordable fees, but others have what appears to be an exorbitant fee structure. It is to the benefit of all parties to make compliance affordable. A fair fee schedule may be developed from the following guidelines:

1. Compute an equitable amount of desk time required for in-house processing
2. Compute an equitable amount of time required for travel to inspection site
3. Compute an equitable amount of time required to perform the field inspection
4. Compute the average drive distance from city hall to the city limits and multiply by the Federal mileage allowance of $ 0.555 per mile

With the new streamlined system, there are reductions in desk time, phone time, filing/archive time, scanning, shredding, printing, scheduling, routing, and processing the calls for final inspections. The total fees should cover the operating expenses to process the online permit, perform the field inspection, and cover software maintenance fees. As a result, permit fees can be dramatically reduced.

Exorbitant fees are counter-productive to the compliance cause and encourage non-compliance. With a potential nine-fold increase in permitting activity, plus use of a streamlined online system, jurisdictions should be capable of increasing cash flow while maintaining lower permit fees, which are made possible with the automated system. Jurisdictions need to be committed to the plan and highly encouraged to reduce the existing fee schedule.

HVAC Inspection Check List: Many contractors and inspectors struggle with code requirements. Due to the growing complexity of both energy standards and building code, a computer generated inspection check list, specific to HVAC installation, can be beneficial for both inspectors and installers. The software program can easily provide this service at the time of online application. The list will provide the basic requirements of a successful installation, as well as code references. Use of the check list assists all parties with speedy and accurate compliance. A mock sampling of basic check list items may include:

INSPECTION CHECKLIST

☐	Have load calcs been performed for proper equipment sizing?	§150(h), §151(b)
☐	Equipment meets minimum efficiency standards?	§111 and §112
☐	Suction line insulation = 0.75" min.?	§150(j)2
☐	Insulation in outdoors location is protected from weather/UV	§150(m)9
☐	Temperature Measurement Access Holes (TMAH) present?	RA3.2
☐	Proper clearance from walls, obstructions?	xxxxxx
☐	Proper attic access clearance?	xxxxxx
☐	Set-back thermostat installed?	§151(f)9
☐	Duct insulation of R-8?	xxxxxx
☐	Proper duct installation - mastic, draw bands, UL181 tape?	xxxxxx
☐	Locking refrigerant line service valve caps?	2010 CMC 1106.3.1
☐	Correct fuse/breaker sizes?	xxxxxx
☐	HERS compliance?	

Note: This is not an exhaustive list and is intended for illustration purposes only.

Statewide Online Permit Process Benefits:

1. **Contractor and/or Homeowner**:
   a) Payroll savings: no travel time required to the local city hall and back;
   b) Payroll savings: no wasted time waiting in lines;
   c) Payroll savings: lower paid office staff capable of completing an online process;
   d) Permits can be taken out 24/7: eliminates being tied to the limited building department operating hours, which are closed on weekends, holidays, after hours, and other furlough days;
   e) Uniform statewide application form: forms are no longer jurisdiction-specific provides uniformity and ease for contractors who work in multiple jurisdictions;
   f) Easy credit card payment available online; walk-in payments optional;
   g) Permanent database records;
   h) Searchable database available for permit servicing and research;

i) Printing of job cards, permits: cost savings for jurisdiction; convenient for contractor/homeowner;
j) Request for final inspections online: cost and time savings for jurisdictions who currently process voice mail messages/phone calls and convert to paper; convenient for contractor/homeowner;
k) Final inspection scheduling: cost and time savings for jurisdictions and ease of use by contractor/homeowner;
l) Excellent means of communication between jurisdiction and contractor, such as in the event of an inspection failure, the inspector can leave documented detailed instructions and/or comments;
m) Inspection results can be seen online immediately;
n) Auditing of compliance by ENR auditors is simple;
o) Security issues can be addressed with programming.

2. <u>Local Jurisdiction</u>:

a) Each jurisdiction is capable of modifying an introduction screen to personalize city information, logo, pricing, special requirements, instructions, etc.;
b) The basic permit input, form, and program remains uniform statewide;
c) Uniformity between jurisdictions is important for users and minimizes the fielding of questions and concerns that the local jurisdiction must answer repeatedly, which saves time;
d) Low cost of computer programming as a result of the cost of one statewide program: operating costs can be distributed between all statewide jurisdictions;
e) Payroll savings: less counter time and phone time required with more efficient processing;
f) Banking expense savings: online credit card transactions are performed faster than manually processing checks; credit costs can be built into the fee structure;
g) Printing cost savings: contractor/homeowner prints out forms;
h) Online digital records: reduces filing/archive and storage expenses;
i) Searchable database: reduces time spent searching compared to manual files;
j) Database backup performed by CEC;
k) Request for inspections: faster processing time;

l) Scheduling for inspections: faster processing time;

m) In-field handheld computers for inspectors available for live data input, commenting, scheduling, and communications;

n) Increased cash flow: as a direct result of increased permit participation and reduced processing costs;

o) Inspection/processing costs are covered by permit fees;

p) Follow-up letters for expired permits and enforcement can be processed by ENR auditing, which saves time and money.

3. <u>ENR Auditor and HERS Rater</u>:

a) ENR auditors can easily access HVAC alterations permits for compliance auditing, as needed;

b) HERS raters are less likely to use the permitting system unless asked to perform ENR audits.

THE ENR PARTICIPANTS

Manufacturer	Distributor	Installer	HERS Rater
•In-State •Out-of-State	•Warehouse •Wholesaler •Retailer	•HVAC Contractor •General Contractor •Homeowner	•Performs Field Verification & Diagnostic Testing

PARTICIPANT REGISTRATION INPUT PROCESS

BUSINESS TYPE SELECT ONE
- MANUFACTURER
- DISTRIBUTOR
- INSTALLER
- HERS RATER

NAME & ADDRESS
- COMPANY NAME & ADDRESS
- CONTACT INFO
- WAREHOUSE ADDRESS

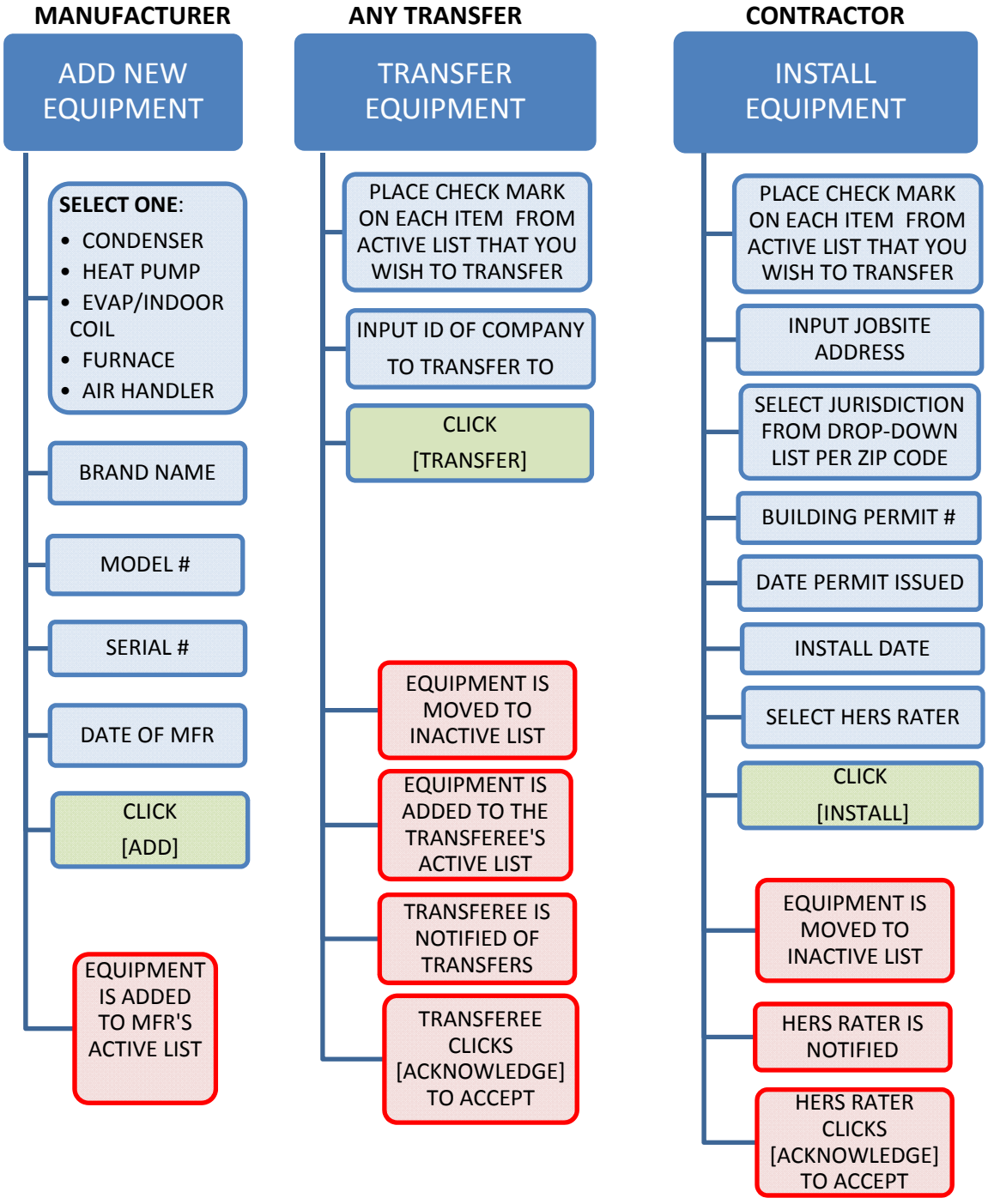
RESPONSIBLE PERSON
- NAME
- CONTACT INFO

LOG IN INFO
- CREATE USER ID
- CREATE PASSWORD

DATA SCREENS AVAILABLE AFTER SECURE LOGIN

ACTIVE LIST	INACTIVE LIST	PERSONAL PROFILE	Manufacturers Only
•List ofall HVAC equipment in your possession	•List of all equipment that has been transferred to others •No longer in your possession	•Contains your contact info, password info, settings •Edit this list as needed	•Add equipment to the ENR Database

DATA INPUT FLOW CHART



HERS RATER - FINAL DATA INPUT