Docket Number:	17-EBP-01
Project Title:	Improving Energy Compliance of Central Air-Conditioning and Heat Pump Systems
TN #:	226405
Document Title:	Statewide Online Permitting Platform for Residential HVAC Alterations Recommendations and Cost Estimates (CSE Report, 2-2016)
Description:	N/A
Filer:	Stephen Gunther
Organization:	Center for Sustainable Energy
Submitter Role:	Public
Submission Date:	1/30/2019 11:22:37 AM
Docketed Date:	1/30/2019

January 30, 2019

California Energy Commission
Docket Unit, MS-4
Re: Docket No. 17-EBP-01
1516 Ninth Street
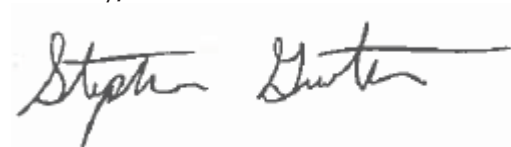Sacramento, CA 95814-5512

Re: Docket No. 17-EBP-01 – Improving Energy Compliance of Central Air Conditioning and Heat Pump Systems

The Center for Sustainable Energy (CSE) appreciates the opportunity to submit additional information to support development of the draft report on improving energy compliance of central air conditioning and heat pump systems. CSE also applauds the California Energy Commission's (Energy Commission) inclusive stakeholder engagement process around development of policies that stand to transform the heating, ventilation, and air conditioning (HVAC) market.

CSE provided comments to Docket No.17-EBP-01 on August 20, 2018 expressing support for, among other things, the establishment of streamlined compliance processes for HVAC systems, particularly processes that leverage web-based technologies. Included below is a report CSE developed for the Energy Commission recommending the development of a statewide online permitting system: *Statewide Online Permitting Platform for Residential HVAC Alterations: Recommendations and Cost Estimates*. The report summarizes several different approaches to online permitting being implemented around the country, from the state of Oregon to California's Imperial Valley. The report outlines rough system specifications and cost estimates to give the Energy Commission insight into the lift necessary to establish a statewide online system. While the report references the GreenNet platform as a potential viable system, CSE wishes to clarify for the record that the report officially recommends implementation of a platform with the specifications described in the report, and not any existing system currently operating in the market. Furthermore, CSE makes several recommendations for additional research and consideration, including investigation into pursuing a competitive bid for software providers and potentially leveraging the Home Energy Rating Systems (HERS) to support development of online permitting. CSE stands by this report as it presents viable examples and important considerations for the Energy Commission, should it pursue a statewide permitting solution.

CSE appreciates the opportunity to comment on these important issues.

Sincerely,

Stephen Gunther
Policy Manager, Distributed Energy Resources
Center for Sustainable Energy®

Statewide Online Permitting Platform for Residential HVAC Alterations: Recommendations and Cost Estimates

February 2016

Prepared for
California Energy Commission

Prepared by
Center for Sustainable Energy

Center for
Sustainable Energy®

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Contents

Background

In October 2013, the Center for Sustainable Energy (CSE) began a project for the California Energy Commission (Energy Commission) to engage with Southern California building departments and contractors to identify best practices for streamlining the permit process for residential HVAC alterations. The resulting report, *Residential HVAC Alterations: A Permit Compliance Overview and Best Practices Guide[1],* outlines four key strategies including development and implementation of a statewide online permitting platform to support HVAC change outs. In addition to the Best Practices Guide, the Energy Commission asked CSE to provide a report presenting recommendations and cost estimates for the implementation of a statewide online permitting platform. This report addresses features of an ideal online permit platform, provides examples of existing platforms, and presents potential statewide implementation approaches.

Introduction

The ability to submit an application online has the potential to reduce significantly the permitting timeline. Online permitting can decrease backlogs at the permit counter and free up time for counter staff to focus on more complex permit applications. Applicants can submit applications from their office or home without driving to the permit counter, eliminating wait-time anxiety and generally decreasing applicant excuses for bypassing the permit process, which center primarily around time and cost. Online permitting also reduces vehicle miles traveled and transportation-related greenhouse gas emissions, potentially bringing value to jurisdictions looking to achieve climate action plan goals.

A statewide, state-subsidized and administered platform would make online permitting feasible for many jurisdictions that do not have the staff time or budget to purchase and implement an online system of their own. It would also encourage consistency across the state, simplify the process for applicants and reduce the administrative burden for contractors working across jurisdictions (see page 7 for an infographic that helps illustrate these benefits). A simpler, consistent online permitting process, coupled with outreach and education to create awareness among noncompliant contractors, will bring more projects to the permit desk. This will in turn allow building departments to track energy savings from more HVAC alterations and increase revenue.

CSE performed a rough calculation to determine the potential for increased revenue among building departments resulting from increased compliance. Our estimates indicate that building departments across the state could earn an additional $1.0M to $4.1M cumulatively per year, associated with a 10 to 40 percent increase in compliance.[2]

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[1] *Residential HVAC Alterations: A Permit Process Overview and Permit Streamlining Best Practices Guide for Building Departments* submitted to the Energy Commission in June 2015, pending publication as of the date of this report.
[2] See Appendix D

Many statewide stakeholders are in support of an online, streamlined, simple, statewide solution to the current HVAC alterations compliance issue. The Western HVAC Performance Alliance (WHPA) Compliance Committee has established development of a "universal smart phone or computer web based system for integrating with permitting systems for mechanical change-outs" as one of its 2015 goals.[3] Similarly, several speakers commented at a July 27, 2015 Energy Commission staff workshop on building energy efficiency standards about the need for widespread online permitting to make compliance easy and uniform across jurisdictions.

A statewide online permitting platform could be the most compelling tool available to the Energy Commission as it works to achieve the goal established in AB 758 and the Strategic Plan to Reduce the Energy Impact of Air Conditioners: an increase in compliance rates from 10 percent to 90 percent by 2020.[4]

Building buy-in and acceptance among building departments will be critical to successfully launch a statewide permitting platform. Building departments will need to be presented with the benefits of adopting a state-backed online tool as well as the existing compliance barriers that it would help overcome. The infographic on the following page, "Streamlining the HVAC Compliance Process with a Statewide Online Permit Platform" presents these barriers in the context of the statewide permit platform solutions.
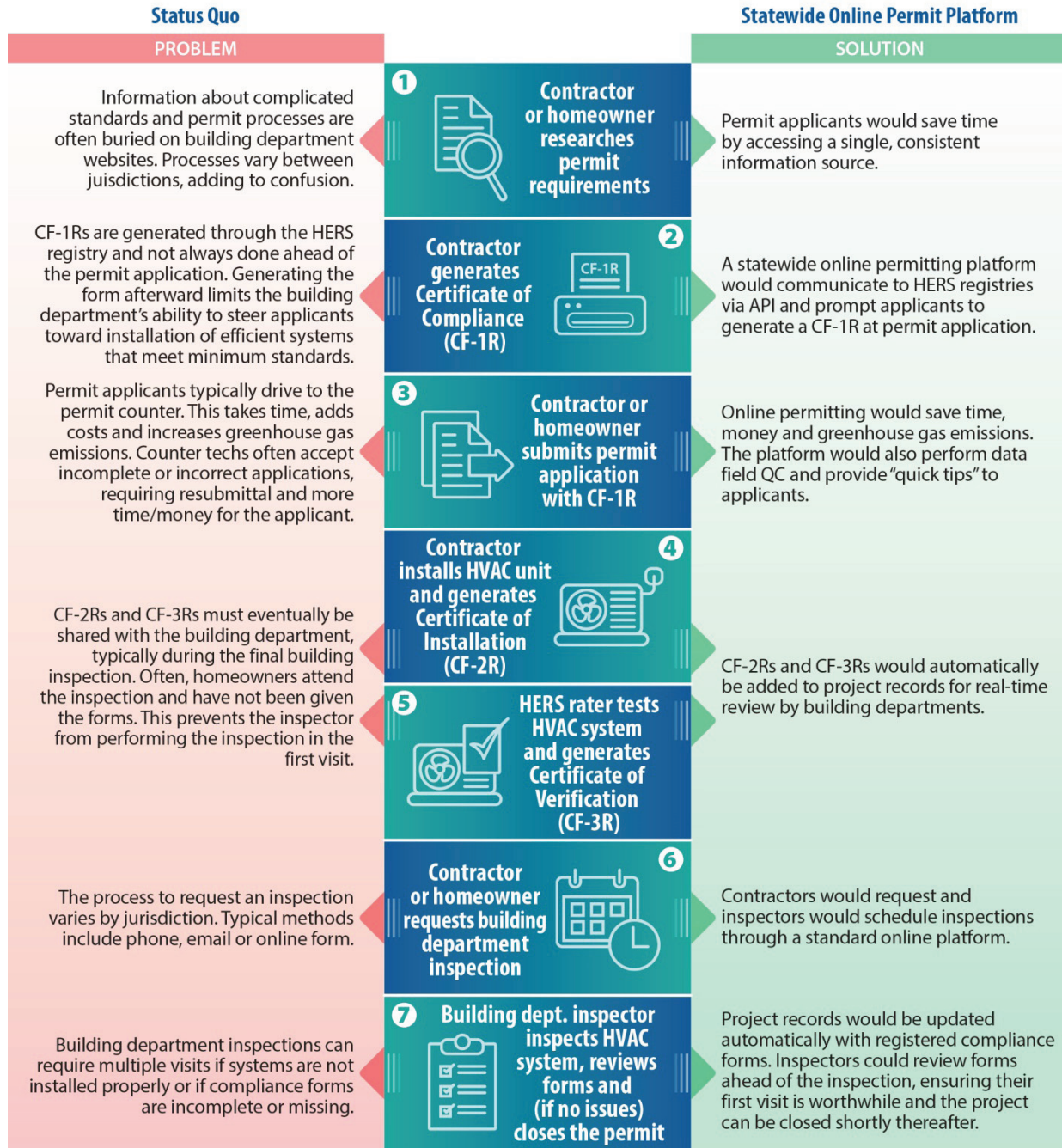
CSE recommends official support and system administration by the Energy Commission; specifically adoption and statewide rollout of a single system, along with onboarding and ongoing support for users – both building departments and contractors. This apporach will communicate to users that the system is a long-term solution to increase compliance, improve consistency and streamline the permit process for all stakeholders and that participation will be worth their while. While market-based solutions are another approach worth considering, competing products from numerous vendors may not signal consistency and longevity to potential system users and such systems will likely struggle to gain a statewide presence.

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[3] http://www.performancealliance.org/Committees/StrategicPlanGoal1Compliance
[4] California Energy Commission, 2008, *Strategic Plan to Reduce the Energy Impact of Air Conditioners*, http://www.energy.ca.gov/2008publications/CEC-400-2008-010/CEC-400-2008-010.PDF.

Streamlining the HVAC Compliance Process
with a Statewide Online Permit Platform

Jurisdictions across the state use a variety of methods to issue permits for residential HVAC alterations. A state-administered online permitting platform would provide consistency and a single point of access for contractors, HERS raters and building departments.

Status Quo		Statewide Online Permit Platform
PROBLEM		**SOLUTION**

① Contractor or homeowner researches permit requirements

Information about complicated standards and permit processes are often buried on building department websites. Processes vary between juisdictions, adding to confusion.

Permit applicants would save time by accessing a single, consistent information source.

② Contractor generates Certificate of Compliance (CF-1R)

CF-1Rs are generated through the HERS registry and not always done ahead of the permit application. Generating the form afterward limits the building department's ability to steer applicants toward installation of efficient systems that meet minimum standards.

A statewide online permitting platform would communicate to HERS registries via API and prompt applicants to generate a CF-1R at permit application.

③ Contractor or homeowner submits permit application with CF-1R

Permit applicants typically drive to the permit counter. This takes time, adds costs and increases greenhouse gas emissions. Counter techs often accept incomplete or incorrect applications, requiring resubmittal and more time/money for the applicant.

Online permitting would save time, money and greenhouse gas emissions. The platform would also perform data field QC and provide "quick tips" to applicants.

④ Contractor installs HVAC unit and generates Certificate of Installation (CF-2R)

CF-2Rs and CF-3Rs must eventually be shared with the building department, typically during the final building inspection. Often, homeowners attend the inspection and have not been given the forms. This prevents the inspector from performing the inspection in the first visit.

⑤ HERS rater tests HVAC system and generates Certificate of Verification (CF-3R)

CF-2Rs and CF-3Rs would automatically be added to project records for real-time review by building departments.

⑥ Contractor or homeowner requests building department inspection

The process to request an inspection varies by jurisdiction. Typical methods include phone, email or online form.

Contractors would request and inspectors would schedule inspections through a standard online platform.

⑦ Building dept. inspector inspects HVAC system, reviews forms and (if no issues) closes the permit

Building department inspections can require multiple visits if systems are not installed properly or if compliance forms are incomplete or missing.

Project records would be updated automatically with registered compliance forms. Inspectors could review forms ahead of the inspection, ensuring their first visit is worthwhile and the project can be closed shortly thereafter.

Minimum Functionality

CSE's exploration of existing online permit platforms and knowledge of California's permit compliance process allowed us to identify ideal features and functionality currently desired by building departments and applicants specifically for permitting HVAC alteration projects. The vision for a statewide permitting platform is to provide a single point of access for all contractors and HERS raters across the state and allow two voluntary pathways of access by building departments: (1) departments could create a login and access permits in the system online or (2) the platform could connect to a department's existing internal permitting software through an Application Program Interface (API). In the latter case, information from the platform would populate a department's existing software like any other project, eliminating the need for staff to learn a new system.

The ideal, statewide, online permitting platform would include the following key features.

1. Remote, unique user login for applicants and building departments
2. Fillable fields with data validation and instructions for applicants
   o Data validation prevents applicants from submitting erroneous data types
   o Built-in instructions provide immediate feedback and "pop-up" tips as applicants hover over specific data fields, serving as an education tool for applicants
3. Automatic generation of CF-1R at time of application
   o CF-1R electronically generated via APIs with HERS provider registries and uploaded to project record
   o HERS FV/DT requirements based on project scope and climate zone
   o Enables building departments to collect Title 24 energy data from applications and forms to more easily inform climate action plan strategies and goals
4. Automatic population of CF-2R and CF-3R into platform for inspector review[5]
   o Permit records updated with CF-2R and CF-3R via APIs with HERS provider registries
   o Building department inspectors can access CF-2R and CF-3R prior to performing inspection
5. Secure transaction of permit fee between applicant and building department
6. No fee charged to building departments
7. Minimal administrative fees charged to the customer (contractor/homeowner) to cover ongoing system maintenance
8. Customizable system that allows building departments to define equipment lists, pricing, permit numbering and other unique requirements
9. Ability to communicate to major existing permit software systems (Accela, SunGuard, etc.) via API, enabling seamless record keeping and minimal to no training for building departments that already have online systems in place
10. Dedicated marketing and outreach campaign to inform building departments and contractors about the system and promote their adoption and regular use

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[5] CSE considers this feature to be critical in helping building departments easily facilitate and increase compliance. Contractors do not always provide these forms in the field and inspectors are not in the habit of visiting HERS provider websites to access the forms before inspections. This feature places the forms in an easily accessible online location that inspectors will regularly visit to schedule inspections. However, implementation of this feature will require buy-in from HERS providers. Without a regulatory mandate requiring HERS providers to cooperate, securing such buy-in may take time. As such, this feature may not be feasible in the first version of a statewide system.

Existing Models

Building departments in California and other states are pursuing online permitting in efforts to modernize their services. According to the Center for Digital Governments, nearly 67% of state governments nationwide use a cloud-based licensing and permitting system. Further, cities and counties report that offering more e-government services are among their top 10 IT priorities for 2015.[6] Below are several examples of local government online permit platforms and tools that facilitate electronic customer interaction and/or increase permitting ease. Each example is discussed in terms of the minimum functionality identified in the section above.

Imperial Valley, California, The GreenNet™ Permitting System
As of winter 2015, four building departments in California's Imperial Valley are piloting an online permit platform (City of Brawley, City of Calexico, City of El Centro and City of Imperial). The GreenNet™ Permitting System,[7] built and operated by Energy Cloud Inc., establishes a standalone platform for online processing of residential HVAC alterations permits among participating jurisdictions. The system is free to building departments; permit applicants pay an administrative fee that covers ongoing maintenance of the system. Energy Cloud Inc. is working independently to recruit building departments and contractors to participate in pilots. They provide ongoing support to building departments to help them customize the platform to their needs and to facilitate timely transfer of collected permit fees.

The GreenNet system provides nearly all of the ideal functionality addressed above except for automatic population of CF-2Rs and CF-3Rs into the platform for inspector review. Currently, only CF-1Rs from the USERA HERS registry are generated at time of application, however other registries could be supported upon cooperation from the remaining HERS providers. Also, while the current pilots do not involve integration between the GreenNet platform and the building department's existing permit tracking software, that functionality is currently possible for Accela. The GreenNet software designers are purportedly working on API interfaces for additional permitting software systems.

State of Oregon, BuildingPermits.Oregon.gov
Since 2009, the State of Oregon Building Codes Division has a contracted with Accela to provide local jurisdictions with access to a full service, online software at essentially no cost. (Some costs are still borne by the jurisdiction, including costs to connect municipal financial systems with Accela). The Accela software allows jurisdictions to establish an online presence to support multiple municipal departments and functions, including public works and building department "e-permitting," if desired. A four percent surcharge on permit fees currently supports ongoing operational costs of the e-permitting system for 36 cities and 21 counties.

Jurisdictions that implement the e-permitting functionality select which permit measures can be made accessible electronically. Licensed professionals can pull permits, make payments, secure work authorizations and schedule inspections online. Based on a conversation with Oregon's statewide permitting office, the state's efforts are a result of 2006 and 2009 legislation primarily driven by contractors to allow over-the-counter, no-plan permit submittals to be secured electronically.

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[6] Government Technology, 2014, The Year in Data, December 1, 2014,http://www.govtech.com/data/2014-The-Year-in-Data.html.
[7] GreenNet Permitting System, www.greennet.com/permitting/tour/

Establishing digital permitting capabilities for local jurisdictions was not driven by low permit compliance rates. As such, the State of Oregon has not tracked resulting impacts to permit compliance.

Relative to the minimum functionalities outlined above, the Oregon system does not present an apples-to-apples comparison. The Oregon system is designed to support general online services for jurisdictions that are otherwise unable to provide them to their residents. While Accela has developed a 'best practices' module that provides many of the HVAC-related functionality outlined above, this module is not provided to Oregon jurisdictions as part of the state-supported, subsidized package. Further, many of the requirements for residential HVAC alterations permits established by Title 24, Part 6 do not apply in Oregon. What the Oregon example does demonstrate is a statewide initiative to make online permitting functions accessible to all jurisdictions and provides consistency for contractors working in multiple jurisdictions.

City of Palo Alto, California, Civic Insight: Expediting permitting and development review to better serve the construction community is one of Palo Alto's priorities. Since 2013, the city has implemented Code for America's Civic Insight application which allows users to locate permits by street address, create a watch list for status tracking and receive email alerts on a desktop or mobile device as soon as a critical point is reached.[8] Civic Insight reduces workflow between departments through real-time notifications and allows inspectors to upload inspection results directly from the field.[9] The city is not yet accepting permit applications online but it is using Accela's software to allow applicants to look up Development Services records and schedule inspections electronically.

Palo Alto's Civic Insight is more of a communication tool than a permit submittal and issuance platform; however, this type of digital innovation implemented by jurisdictions helps to bring basic building department functions into the 21st century that reduce staff time constraints and make customer service more efficient. Features provided by the Civic Insight application, such as real-time uploading of inspection results, may be useful in a residential HVAC alteration project scenario, but the application does not generally meet the minimum functionality outline above.

Aurora, Illinois, Broadcast Real-time Inspection Transparency Emails (BRITE): Using SunGard's Naviline software, Aurora's BRITE Inspection Communication tool provides permit applicants with immediate inspection updates via email. "These additional communication efforts have also leveraged the opportunity to teach our customers how to pass inspections, solicit customer feedback and build stronger relationships between the city and our residents, businesses and customers," stated John Curley, Aurora Building and Permits Division director.[10]

Similar to the Civic Insight platform, communication of real-time inspection results may be useful in a residential HVAC alterations scenario, but the system does not generally meet the minimum functionality outlined above.

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[8] *Government Technology Magazine*, Palo Alto, Calif., Expedites Permit and Inspection Process through Apps, April 14, 2014, http://www.govtech.com/applications/Palo-Alto-Expedites-Permit-and-Inspection-Process-through-Apps.html
[9] City of Palo Alto, California Press Release, Results of Construction Inspections Reported in Real Time via Mobile Technology, October 28, 2013, http://www.cityofpaloalto.org/civicax/filebank/documents/37516.
[10] City of Aurora, Illinois Press Release, BRITE Initiative Recognized by Harvard University, February 18, 2015, https://www.aurora-il.org/detail_news.php?newsDateID=1660.

Platform Development Recommendation

For this report, the Energy Commission asked CSE to recommend an approach to implementation of a statewide, online permitting platform for residential HVAC alterations, as well as to provide cost estimates for the recommended approach. This section presents CSE's attempt to meet the Energy Commissions request.

Rather than invest in developing a new system, CSE believes the Energy Commission's interests in facilitating online residential HVAC alterations permits will be best served by building on the GreenNet platform, a fully functional, California-centric system developed by Energy Cloud Inc. The system incorporates nearly every feature included in our minimum functionality list; the only feature not currently functional is the ability to auto-populate CF-2Rs and 3Rs from HERS registries into the platform. The system is able to generate CF-1Rs from the USERA registry and is equipped to accommodate other registries upon cooperation from providers.

Because the program is already up and running in several jurisdictions in the Imperial Valley, Energy Cloud Inc. has worked through many unforeseen complications and addressed the unique needs of participating building departments, contractors, HERS raters, and USERA, the participating HERS provider. In the City of El Centro, the GreenNet system has enabled the building department to accept credit card payment for permits, and the building department is not paying merchant fees to use this service.[11] Aside from the benefits of online applications, enabling credit card transactions alone makes the compliance process simpler, more cost-effective, and more appealing for contractors. Specifically, the requirement to pay permit fees in-person at the building department adds to the time and staff commitment necessary for contractors. The ability to pay fees online, coupled with online application submittal, would directly address this time constraint and bring building departments into the 21st century.

Another benefit of the GreenNet platform is that it could, with some additional development, facilitate submittal of any no-plan permit. It would not, as currently designed, support permits for larger projects that require plan submittal. However, because the platform is designed to communicate with and complement existing permit software platforms for those jurisdictions that have systems in place, use of the GreenNet platform for residential HVAC alterations and other no-plan permits would not impose additional costs to those jurisdictions other than the minimal staff time necessary to customize application fields and learn how to use GreenNet.

Appendix A includes a list of all current features developed for the GreenNet system, as well as features currently under development. Screen shots depicting both applicant and building department user experiences are included in Appendix B. Appendix C includes recommendation letters from a contractor and a building department currently using the GreenNet system in the Imperial Valley.

Marketing and Outreach

To increase the adoption rate and increase consistency statewide, CSE recommends the Energy Commission work with a third party administrator to implement a statewide roll out of the system. The administrator would perform significant marketing and outreach to inform, engage and recruit

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[11] For additional information on this service contact Energy Cloud Inc., 250 Aventa Campio, Calexico, CA 92231, (858) 829-6909

participants, driving adoption among contractors and building departments. A marketing campaign would include an information distribution effort that engages partners such as the Contractor State License Board (CSLB), the California Building Officials (CALBO), the International Code Council (ICC) California chapters and other forums where contractors, raters and building departments gather information. In addition, a robust marketing campaign would include in-person attendance and presentations by administrator/implementer staff at appropriate meetings and forums such as ICC, CALBO and BIA meetings, as well as city council and board of supervisor meetings.

Additionally, the administrator would facilitate on-boarding of new participants, both contractors and building departments, and provide ongoing support for users on both sides of a virtual permit desk. Further support could be provided by a network of account representatives serving users in specific regions of the state, sharing lessons learned between users in similar regions, facilitating information sharing between existing and prospective users, and assembling recommendations to improve the tool to meet local needs.

Estimated Costs

CSE recommends that the Energy Commission consider acquiring the GreenNet platform at a price reflective of its existing features, and provide startup funding for a third-party administrator to oversee its statewide implementation until per-permit service charge and increased permit volume enable the program to be self-sustaining. Estimated costs for the following services are provided in the table below.

First costs include purchase of a five year license for the GreenNet platform. Additionally, an initial investment would be necessary to support marketing and outreach to building departments and contractors, as well as user onboarding and support. CSE suggests that these activities be performed by a program administrator; building departments would not be responsible for providing marketing or training to contractors in their jurisdiction. The initial administration costs below include staff resources and travel to support recruitment and onboarding of users statewide.

Permit applicants would pay a per-permit service charge to cover the costs of ongoing maintenance of the platform, technical support for users beyond the expertise of the account reps, troubleshooting technical issues and providing support to jurisdiction finance departments. The administrator could also oversee the contract with Energy Cloud Inc. to manage ongoing maintenance and facilitate troubleshooting and technical support for users.

After an introductory period (one to two years), the per-permit service charge could be increased to include ongoing administration costs, including marketing, outreach and user support. This approach creates a sustainable model in which an Energy Commission investment is only necessary upfront and applicant fees sustain system operations and administration. The administrator should take care to limit increases to the per-permit service charge to minimize applicant burden and avoid turning applicants away from the system.

CSE partnered with Energy Cloud Inc. to develop the following cost estimates.

Implementation Category	Approx. Cost
First Cost	
5-year license of existing GreenNet permit platform (including all features listed	$4,000,000

in Appendix A)	
Initial Administration Investment (Annual)	
Marketing and outreach (described above)	$750,000
Onboarding and ongoing user support (described above)	$750,000
Annual Costs	
Support platform adjustments associated with release of new standards	$60,000
Permit Applicant Costs	
Per-permit service charge includes merchant fees and tech support	$29.00
Optional Additional Costs	
Integration with existing major permit software systems (i.e., Accela, SunGuard, etc.) — requires open system and cooperation from existing platform providers	$50,000-$75,000 per system

Areas for Further Exploration

Per the request of the Energy Commission, this report provides the framework, recommendations and estimated costs for a statewide online permitting platform for residential HVAC alterations, and potentially other no-plan permits. CSE recognizes, however, that these costs may be prohibitive and that there are many details beyond the scope of this report that need to be examined and vetted to inform implementation. The following information includes areas for further exploration that the Energy Commission should consider for future research on this topic.

- Determine the viability of purchasing an existing software platform or pursuing a competitive bid process for software providers; explore additional approaches as identified.
- Determine the time, resources and participation necessary for the Energy Commission and HERS Providers to develop, launch and administer this platform and HERS providers.
- Identify security vulnerability concerns, including data protection needs, etc.
- Identify sources of funding to facilitate statewide implementation of a chosen platform.
- Link the statewide permitting platform to the Energy Commission's Online Resource Center.

Conclusion

CSE appreciates the opportunity to provide this recommendation and cost estimate for a statewide, online permit platform for residential HVAC alterations. Based on our research and conversations with building department staff and contractors over the past two years, we believe that adoption of a platform such as the one we described would directly address many compliance barriers and appeal to a wide number of stakeholders on both sides of the permit desk. This solution has the potential to significantly improve compliance for residential HVAC alterations. Specifically, the GreenNet platform is the only platform identified by CSE that is both tailored for California's permit compliance process and tested and proven in the real world.

While the features addressed in this report apply directly to permitting for residential HVAC alterations, an online permit platform with these features could be used to accept and issue permits for most no-plan measures including residential HVAC installations, water heater installations and alterations, and residential and small commercial solar photovoltaic (PV) installations up to 10 kilowatts (kW). Further, a state-supported system would create a framework to support additional compliance features such as serial number tracking.

Appendix A: GreenNet Existing Features

Mechanical Core Features
GreenNet proprietary cloud-based permitting system tailored to California Title 24 Part 6 code.
Web-based access to portal by contractor companies, HERS raters, building departments (BDs), home owners and administrators via unique logins.
Contractors and home owners are able to completely pull permits and pay for them online.
User-specific dashboards summarize all projects and provide real-time status updates.
Can be customized for any jurisdiction within a short period of time; typically 30-60 minutes.
Streamlined-permitting system integrates with the HERS registries' initial CF1R forms.
BDs can view all permitting data and download all PDF forms, including CF1R.
System emails both BD and contractor/customer PDFs of both pending and approved permits.
BD's are paid full permit fees and schedules. No fees are charged to building departments.
Quality control on certain data fields, preventing users from inserting erroneous data types (e.g., cannot input a number when text is desired input)
Quality control on submittal in general – cannot hit "submit" until all fields are completed.
Electronic signature capability.
Works on all major operating systems: Mac, Windows, Linux.
No software to download; works with all major browsers.
Mobile ready; works on smart-phone mobile browsers – iOS and Android
System already "real world" tested in Imperial Valley with BDs for more than a year.
API for integrating with HERS providers
System works with all HERS providers. No choice bias by system.
Statewide license includes unlimited building departments in California.

Building Department Specific Features
BD inspection tracking options include pending/passed/rejected, as well as notes and dates.
Unlimited unique logins for all necessary staff.
All standard project location fields plus climate zone.
BD customization
- Easy editing of their account, equipment, pricing, etc.; no need to call support for changes.   - Able to define eligible equipment and pricing   - Able to price permit issue fee   - Able to enter permit number from their software system or choose multiple numbering options   - Allows for manual approval or automatic with pre-approval and/or permit number   - Permit life can be defined in number of months (e.g., 6 months, 12 months, etc.)   - Can add data field for required contractor city license number   - Can add data field for required parcel number
BD Communications
- Multiple email profiles for notifying multiple staff about system activity, not tied to login accounts   - Customized email communications for Initial permit pulls and approval
BD Finance
Can submit finance and banking information online or via phone

- Paid full fees and not charged merchant fees. (Cheaper for BD than taking credit cards directly.)
- Payment option of net 30 days paid via check
- Payment option of Automatic Funds Transfer/ACH

Contractor Specific Features

Contractor can pull permit online and avoid two separate trips to the BD. (#1 feature for contractors.)

Contractor able to submit complete permit application with registered CF1R compliance form and necessary fees in one transmittal within five minutes.

Contractor able to pay permit fee with a credit card.

Contractor profile saves all basic data including CSLB license, insurance info, city license; no need to reenter for every transaction.

Contractor able to specify their preferred HERS provider and preferred rater.

Contractor able to pick HERS package and pay for both permit & HERS fees in one transaction with participating registries.

Rater Specific Features

Individual HERS raters can have accounts on the system including multiple accounts if they are certified with more than one provider.

HERS rater can have full profile including marketing statement.

Security & Data Center Features

"A" level SSL encryption for data transport (certified by third-party independent lab).

Secure and dedicated servers for the system; no shared hosting environment.

Firewalls NIST certified.

Data center is SAS 70 audited and certified facility located in San Diego, California.

Servers hosted in a facility with true 2N power redundancy (two completely independent power paths).

Servers physically housed in their own controlled cabinet. No other servers allowed. Separate controlling locks.

Data center features bio-metric access, "man-trap" 9 (human access controlled 24 hrs/365 days/year) and Kevlar armored walls in lobby plus bullet proof glass..

Data center in California, but located on geographically stable area as researched through Qwest-commissioned study.

Disaster recovery backup server located in Phoenix Arizona in secure data center with two power grid connections

State Overall Strategic Goals and Needs Features

Energy Commission level login.

Utility login to support complimentary rebate programs.

Additional Core Features Under Development
Verified address lookup integrates with official U.S. Postal Service address system, to reduce/eliminate address issues.
Climate zone auto lookup will auto populate climate zone by ZIP code. Will allow choice only when multiple climate zones/ZIP codes.
"Quick tips" appear when user hovers over certain data fields, addressing FAQs for users (where to find data on forms/reference code sections, etc.).
Credit card pause disables sending charge for 30 seconds to 1 min. after a charge, to avoid duplicate charges.
Email communication with contractor when BD passes inspection.
Contractor able to request inspection through the system from BD (no phone call required).
BD able to confirm inspection request.
Permit violation feature can be used to report non-permitted jobs to the CSLB and/or local BD.
Complaint resolution system.
BD can export .XML data to their external system.
BD can export raw data in .CSV format to their external system.
Allow for escape and other non-standard ASCII characters.
Online video training modules.
Integrate ACE training videos and tools.

Appendix B: GreenNet Screen Shots

I. Applicant screen shots and general process flow

greenNet™ Permitting App

Acme Air

MyPermit Account Page Wiley logged in as wcoyote@greennet.com Logout

All Fields marked with an asterisk (*) are required.

Building Owner Information

First Name:*	Porky
Last Name:*	Pig
Phone:*	760-123-2222
Email:	porkypig@greennet.com
Confirm Email:	porkypig@greennet.com

Project Installation Address

Address:*	123 Brickyard Lane
Address2:	
City:*	Monument Valley
Zipcode:*	90000 State:* CA
Parcel #*	760-123-2222
Climate Zone:*	15

Building Department Information

Building Deptartment: RoadRunner Building Department
Address: Monument Valley CA
Phone: 760-100-0000
Permit duration: 6 months
Dept. Issuance fee prior to Equipment fees: $1.5

Contractor Information

Company Name:	Acme Air	General Liability Insurance Provider:	American Family
Full Name:	Wiley Coyote	General Liability Policy Number:	434534534
CSL#:	CA2343255	Workers Comp Insurance Provider:	Statefund
Address:	250 Avenida Campillo Calexico CA 92231	Workers Comp Policy Number:	100023445
Phone:	858-847-3350	Monument Valley License:	42909

HERS Rater Information

HERS Providership:	U.S. Energy Raters Association
HERS Rater:	Speedy Gonzales Raters
HERS Rater Name:	Speedy Gonzales
Phone:	760-123-1111
Email:	speedy@speedyraters.com
Address:	11111 Raceway Track , Calexico CA
HERS Package Chosen:	HERS 1:30 TPQCP Registry Fee (Includes inspection) $150

Contractor Acct# with Provider: 151 | wcoyote@greennet.com

[Save]

Pull Permit - Screen 2

Contractor, Building Department, HERS Rater Information auto-populates simplifying data entry.

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greenNet™ Permitting App

Acme Air

MyPermit Account Page Wiley logged in as wcoyote@greennet.com Logout

All Fields marked with an asterisk (*) are required. Fields with (^) might be required depending on your choices.

Equipment Information for Building Departments

Specific Equipment:* Package unit ($10.00)/Ea.	Is New System: Yes	Duct Location: ☑ Attic ☐ Crawl Space ☐ Walls
Square feet:* 1000	Circuit Tons:^ 5	☐ Package Unit ☐ Furnace ☐ Indoor Coil Equipment Type* ☐ Condensing Unit ☐ Other
Duct R-Value:^ 8.0	SEER:^ 14	
Condensor Location:* Ground Pad	EER:	
Thermostat type:* Setback Thermostat	^ ☐ AFUE or ☐ HSPF or ⦿ No AFUE or HSPF	

[Add Equipment]

Pull Permit Screen 3

Equipment List is custom based on each Building Department including pricing

Permit Equipment

Equipment	Equip. Tons	Equip. Price	Therm-ostat	Condens. Location	Duct RValue	SqFt.	SEER	EER	AFUE	HSPF	New System	New Ducts	New Ducts > 40 ft.	Duct Location	HERS Req.	Exceptions
Package unit	5	$10.00	SetbackThermostat Set Back	Ground Pad	8	1000	14				Yes	Yes	Yes	Attic	Not Specified	Not Specified

[Proceed to next step]

II. Building Department screen shots

II. Building Department screen shots

Building department dashboard showing approved and pending permits in queue

Building department equipment and pricing customization screen

Appendix C: Letters of Recommendation

LOCKE Air Conditioning
(760) 353-4501

December 17, 2014

To the WHPA Compliance Committee:

We are the owners and operators of a family-owned HVAC installation and services company based in the Imperial Valley region of Southern California. We established our company in 1979.

Our company has always maintained a policy of providing the best services and products to its customers. In order to do so, we have always made it our goal to deliver energy-efficient HVAC system installations and to comply with the legal codes established wherever we operate.

As part of a pilot program in the Imperial Valley area of Southern California, we have been utilizing the greenNet Online Permitting system. This letter is to serve as a letter of support and recommendation of the system.

The online permitting system was very simple to employ into our daily business routine. We liked the fact that we could easily log in over the Internet and not have to install software on our computers. The system also required very little training so that our employees were able to begin utilizing the system quickly and efficiently.

Having an online permitting system has been beneficial to our business's bottom line. Prior to utilizing the online permitting system, we manually had to obtain permits by driving to the local building departments in our area at least twice – once to apply for the permit and next to obtain the physical permit when it was ready. In addition, some of these building departments are many miles away from our office. Waiting for the processing of the permit could also take several days, which delays installations and therefore delays our customer billings.

We continue to utilize the greenNet Online Permitting system and have incorporated into the course of our normal business. This tool is indeed a welcome change to the way things used to be done to ensure compliance through permitting.

The greenNet Online Permitting system has saved our business both time and money and has allowed us to be more efficient in providing excellent service while making our customers and us compliant.

Respectfully yours,

Bobby Locke
President

Locke Air Conditioning & Custom Sheet Metal, Inc. 440 E State Street, El Centro, California 92243

August 13, 2015

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

To Whom it May Concern:

I am writing to recommend the services of Energy Cloud, Inc. We have been using their greenNet Online HVAC Permitting system since its beginning, and we are very happy with the results. Our contractors are pleased with the ability to submit their permit requests from their offices which eliminates the time it takes out of their busy schedule.

We like that we have been able to utilize their online permitting system while still keeping our own permit numbering. Incorporating their system into our permit offering, while keeping our own internal system, has been easy to do.

We normally are not able to accept online payments, but Energy Cloud, Inc. enabled us to be able to take credit cards through their online permitting platform. Energy Cloud was able to work with our Finance Department and come up with a process that worked for all parties and our Building Department does not even get charged merchant fees. We've found Energy Cloud to pay in a timely and accurate manner for all permits pulled though their system.

It has been my experience that any time I have had a question or concern the staff responded in a timely manner, and worked to resolve the issue.

Please feel free to contact our office if you have any questions.

Sincerely,

Patsy Robinson

Patsy Robinson
Permit Center Technician
Community Development Department
Building & Safety / Code Enforcement Division
1275 Main Street, El Centro, CA 92243 (760) 337-4508 Fax (760) 337-2319

Appendix D: Residential Mechanical Alteration Permit Volume and Revenue: Historic and Forecasted

To calculate the potential increase in permit fee revenues, CSE used annual residential HVAC CalCERTS registry data for 2010-2012 as a proxy for permit volume and ran a simple exponential projection to forecast future permit volumes. Because the calculated expected permit volume projections only represent a single HERS registry and there were two others active during 2010-2012, the volume was multiplied by a factor of two. We believe this is an appropriate multiplier to estimate the actual statewide permit volume because CalCERTS is the largest registry.

Permit fees were calculated by taking the average of mechanical permit fees provided by permitting office staff during one-on-one meetings and through CSE's building department survey. Cost information was provided by 20 separate jurisdictions and reflects costs as of 2014. Permit revenues were calculated as the estimated statewide permit volume multiplied by the average mechanical permit fee. The increase in permit fees is calculated by augmenting the current volume by 10, 20, 30 and 40 percent and multiplying by the new volume by average permit fee cost.

Residential Mechanical Alteration Permit Volume and Revenue: Historic and Forecasted (Prepared August 2015)

Permit Volumes based on 2010-2012 HERS Provider Data

Year	2010 (Yr. 1)	2011 (Yr. 2)	2012 (Yr. 3)	Projection (Yr. 4)
Total permits	18,500	35,827	40,138	45,265
Average permits	21.04664391	36.52089704	39.08276534	
Median	7	20	20	
weight	0.2	0.6	0.5	
sumproduct	45,265.20			

Res. Mechanical Alteration Permit Fees Per CSE One-on-One Meetings (2014)	
	$ 120.00
	$ 51.00
	$ -
	$ 86.00
	$ 85.00
	$ 117.00
	$ 69.00
	$ 118.00
	$ 77.00

Permit Fee Projections for Jurisdicitons based on Historic and Projected Permit Volumes

	Current	10%	20%	30%	40%
Statewide Permit Volume	90,530.40	99,583.44	108,636.48	117,689.52	126,742.56
Mechanical Permit Fee Revenues	$ 10,356,089	$ 11,391,698	$ 12,427,307	$ 13,462,916	$ 14,498,525
Revenue Increase	$ -	$ 1,035,609	$ 2,071,218	$ 3,106,827	$ 4,142,436

Res. Mechanical Alteration Permit Fees Per CSE HVAC Survey (2014)	
Del Mar	$ 160.00
Solona Beach	$ 160.00
Encinitas	$ 167.50
Escondido	$ 60.50
Imperial Beach	$ 67.00
Lemon Grove	$ 170.00
Oceanside	$ 174.87
Poway	$ 220.00
San Diego City	$ 64.00
Santee	$ 160.00
Vista	$ 161.00
Average Fees	$114
Median	$118
Standard Deviation	54
Fee Range	$ 5.66 $ 223.12
	low high

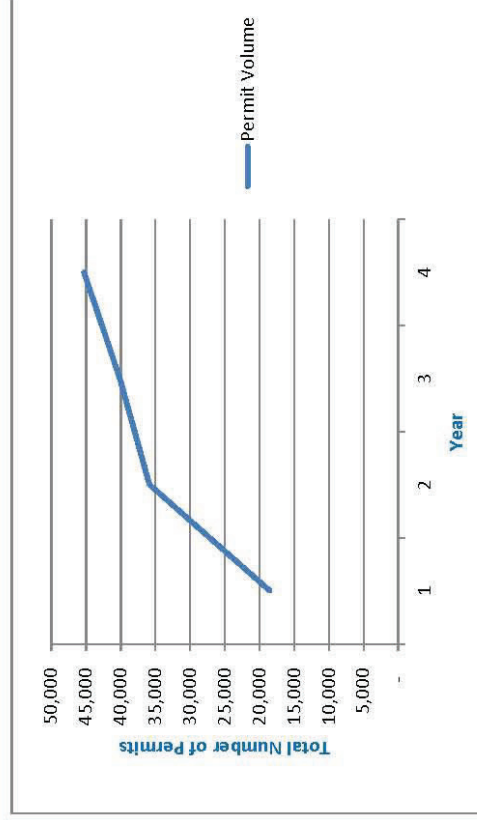Permit Volume — Total Number of Permits vs Year

Notes

1. Using HERS Provider data, calculated weighted average of annual permit totals for residential HVAC alterations between 2010 - 2012 (cells E2, F2 and G2); assuming more recent years are more indicative of current volumes and adding an exponential growth factor to account for the upward trend observed in previous years.

2. Because the sumproduct only represents the volume of permits from a single registry and there are 2-3 others that are active the volume is doubled to account for the additional permit pulled by the other services. This is likely a conservative estimate but the sumproduct does represent volume from the largest registry so we are comfortable with this assertion.

3. Fees are calculated by taking the **average** of actual Mechanical Permit Fees provided by permitting office staff during CSE one-on-one meetings with building departments and from responses to the CSE HVAC survey. Fees reflect costs as of 2014.

4. Increase in Permit Fees is calculated by augmenting the current volume by the percentage outlined in the table and multiplying by the average permit fee cost.

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