



City of Palo Alto

Utilities Advisory Commission Staff Report

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Summary Title: Permit Processes for Various Energy Technologies

Title: Discussion of City of Palo Alto Permitting Processes for Various Energy Technologies

From: City Manager

Lead Department: Utilities

Recommendation

This item is for Utilities Advisory Commission (UAC) information and discussion. No action is requested.

Executive Summary

The City periodically receives feedback about issues with permitting processes. Feedback and customer-reported challenges include issues such as delays in project approval, and procedures or requirements that differ from neighboring jurisdictions. To address these issues and improve the City's processes, staff contracted with the consulting firm TRC Engineers (TRC) in the fall of 2020 to assess the current permitting and inspection processes specifically for residential electrification projects as well as for EV charging equipment at residential and nonresidential sites. The TRC study also provided recommendations to streamline the permitting process for these projects.

This report outlines the findings of the TRC study and recommendations for improvement (Attachment A), and staff's preliminary response and work plan (Attachment B).

Background

City of Palo Alto is committed to facilitating the adoption of technologies by residents and businesses that align with the City's sustainability and climate goals. Examples of such technologies include photovoltaic (PV) rooftop solar systems, electric vehicle (EV) charging equipment, energy storage systems, and efficient electric heat pump alternatives to replace gas appliances for water and space heating. Building owners who are planning to install these types of equipment need to obtain the requisite building permit to ensure the safe and reliable operation of the equipment as well as compliance with relevant building codes. A customer-friendly permitting and inspection experience is important in facilitating the adoption of these energy technologies.

The permitting process begins and ends with the Development Services branch of the Planning and Development Services Department. This branch coordinates with other departments that may need to be part of the permit review process. These other departments and divisions include the Utilities Department, Planning, Fire Department, and the Public Works Urban Forestry Division. The type of project, plus other factors such as the size of the proposed system, dictate the permit review process. If an error is found during the permit review process, the customer will be asked to make the correction and resubmit the permit application prior to resuming the review process.

The TRC study was conducted concurrently with a similar effort led by Silicon Valley Clean Energy (SVCE) for its 13 member cities in Santa Clara County. The Palo Alto TRC study was completed in February 2021, while the SVCE study, which is focused primarily on building electrification permitting, is expected to be completed in March of 2021.

Discussion

Overview of Permitting Process

New construction, building alterations, and replacement of mechanical equipment or permanently installed appliances in Palo Alto require a building permit and inspection to ensure that the work is done safely and meets all relevant codes, ordinances, and standards. Licensed contractors can apply online for “instant permits” for minor projects such as furnace and boiler replacements, gas tank water heater replacements, re-roofing, and residential window retrofit. All other types of projects require a permit application submitted to the Development Center. Prior to the pandemic, these applications had to be submitted in person. The Online Permitting Service portal was launched in April 2020 for customers to submit permit applications online.

Depending on the complexity of the project, it will be assigned as one of three permit types: (1) over the counter, (2) express, and (3) regular. Once the submittal is determined to be complete, the expected turnaround time for issuing the permit is same day for over-the-counter projects, 14 calendar days for express projects, and 30 calendar days for regular projects. This review process may involve multiple departments for specific project types.

For example, a proposed residential photo voltaic (PV) system that exceeds 10 kW will require review by Utilities and Fire, while a proposed commercial electric vehicle (EV) charging station will require review by Utilities, Fire, and Planning. If the permit application is incomplete or does not comply with the relevant regulations and standards, then the customer will be notified to make corrections and resubmit the application. After resubmittal, there will be a further review period of 7 calendar days for express projects and 14 calendar days for regular projects. Construction and installation work may commence only after the permit is issued.

Upon completing construction/installation work, the project applicant will need to schedule an inspection to verify that the work is consistent with the documentation. Depending on the

project, there may be separate inspections by a building inspector and Utilities staff. If the work is not consistent with the documentation or does not comply with relevant codes and standards, the customer will be asked to make corrections. Once all the necessary inspections are passed, the project is considered complete.

Note that the utility interconnection process in Palo Alto differs from nearby jurisdictions. In Palo Alto, the Utilities Department's review of these technologies is done as part of the building permit review process. In other jurisdictions, separate applications must be submitted to the municipal Building Division and to Pacific Gas and Electric (PG&E).

Chapter 3 of the TRC Study provides a more detailed overview of the permit processes for various energy technologies and a summary of how permit processes differ for each technology. Chapter 4 goes into the details of the permit processes for different technologies.

TRC Study Results

TRC reviewed publicly available data and resources on Palo Alto's permitting and inspection processes, interviewed City staff in Development Services and Utilities departments, and interviewed industry stakeholders working in Palo Alto.

Since it was simultaneously studying 13 other jurisdictions in Santa Clara County, TRC could make comparisons between jurisdictions' permit processes, albeit based on anecdotal evidence gathered in interviews.¹ Section 3.3 gives a comparison of Palo Alto's consultant's findings. TRC found a number of Palo Alto-specific requirements. Palo Alto specific requirements include requiring a dedicated AC disconnect for PV systems,) or grounding requirements for PV systems that differ from neighboring jurisdictions. Also, TRC said that the inspection process for PV systems, EV charging equipment, and Energy Storage Systems (ESS) is more rigorous in Palo Alto than neighboring jurisdictions (for example, in Palo Alto, torque tests are required for all connections). Contractors surveyed by TRC reported PV inspections in the City often require more than one visit, which is contrary to the state mandate of a single inspection for small residential PV system. TRC also noted more stringent regulatory requirements in Palo Alto, such as Urban Forestry requirements when trenching near protected trees.

TRC found that Palo Alto's over the counter permitting timelines (which apply to virtually all residential solar systems without batteries) were consistent with other agencies, but the City generally has longer timelines than neighboring cities for permits requiring plan review. Permit fees were comparable. Contractors interviewed reported that stated review timelines are often not met. Given that many electrification projects require Utility review, the permit review process for these projects will likely take longer than other cities. If the information required for Utility review is not provided, then the review process is further delayed. On the other hand, one interviewee said that for panel upgrades, the process was significantly better in Palo Alto

¹ As noted in the TRC study, Section 3.3, "Note that distinctions reported by contractor interviewees were not independently verified, and that even though contractors may not have encountered certain requirements in other jurisdictions they may still be required by code."

than in PG&E territory due to the fact the building permit review and interconnection review could take place within the same agency.

TRC noted that while the City provides extensive resources to customers on permit guidelines and checklists on City websites, these information sources are not well organized or easily accessible. As an example, information and requirements for PV applications are split between Development Services and Utilities website, rather than being accessible from one location.

Development Services, Utilities, & Fire Next Steps

Chapter 5 of the TRC Study presents several findings based on TRCs study and Chapter 6 presents recommendations on how to improve Palo Alto's electrification permitting and inspection processes. Staff has written responses to TRC's recommendations and listed action items for further follow-up in Attachment B.

Near-term actions include developing review timelines that prioritize these projects above others and coordinating inspections among partner departments. These two actions alone will create faster turnaround time for applicants, and ultimately help the City achieve its climate goals more quickly. Further, as in the case with the inspections, these steps ensure adherence with state law. Other actions, as evidenced in Attachment B, will require more time to implement.

Timeline

Attachment B includes actions to be taken in the short term, medium term, and long-term time frames. Staff will return to the UAC in four months with an update.

Resource Impact

Work on some of the short-term recommendations has proceeded using only existing resources, but some of the longer-term action items may require additional resources. Staff will develop budget proposals if needed.

Policy Implications

Streamlining the permitting process for PV system, residential battery storage, home electrification projects, supports the City's S/CAP goals to electrify existing buildings, as well as various Policies and Programs in the Comprehensive Plan, including:

- Natural Environment Goal N-7 ("A clean, efficiency energy supply that makes use of cost-effective renewable resources"), particularly Policy N-7.2 ("Advance the development of a "smart" energy grid, a diverse energy resource portfolio, and technologically advanced public utilities as a key part of a smart and connected city.") and Program N7.2.1 ("Promote the adoption of cost-effective, renewable energy technologies from diverse renewable fuel sources by all customers.")
- Business and Economics Program B5.1.1 ("Improve coordination of the City's environmental review, permitting, and inspection processes.")

Stakeholder Engagement

As part of data gathering for the TRC study, the consultant conducted interviews with contractors with experience working in Palo Alto and the surround region. Collectively, these contractors have installation experience with PV systems, EV charging equipment, battery storage system, and heat pump equipment. Additional outreach to customers and contractors will be needed as staff proceeds with its permit streamlining work plan.

Environmental Review

This informational report is not a project for the purposes of the California Environmental Quality Act, as a government organizational or administrative activity that will not result in direct or indirect physical changes in the environment (14 CCR Section 15378(b)(5)).

Attachments:

- Attachment A: TRC Study
- Attachment B: Staff Responses and Work Plan



February 12, 2021



PALO ALTO ELECTRIFICATION PERMIT STREAMLINING STUDY

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Table of Contents

1	EXECUTIVE SUMMARY.....	1
2	INTRODUCTION	5
2.1	About Palo Alto	5
2.2	About the Electrification Permit Streamlining Study.....	6
2.3	Data Collection and Analysis Process.....	6
2.4	Assessment Evaluation Criteria.....	7
3	PERMIT AND INSPECTION PROCESS OVERVIEW	9
3.1	Permit Trends.....	13
3.2	Baseline Assessment Evaluation Rubric	14
3.3	Comparison to Neighboring Jurisdictions	15
3.3.1	<i>Process</i>	<i>15</i>
3.3.2	<i>Timelines</i>	<i>16</i>
3.3.3	<i>Pricing</i>	<i>16</i>
4	APPLICATION REVIEW AND INSPECTION PROCESS BY PROJECT TYPE.....	17
4.1	Appliance and Equipment Retrofits	17
4.2	Solar Photovoltaic (PV)	18
4.3	Energy Storage System (ESS)	18
4.4	Combined PV and ESS.....	19
4.5	Electric Vehicle (EV) Charging	19
4.6	Electrical Service Panel Upgrade	20
5	ANALYSIS AND FINDINGS.....	21
6	STREAMLINING RECOMMENDATIONS.....	23
6.1	Immediate Priorities.....	25
6.1.1	<i>Adhere to stated plan review and corrections timelines.....</i>	<i>25</i>
6.1.2	<i>Comply with state-mandated single inspection for PV, reduce burden of electrical inspections.....</i>	<i>25</i>
6.1.3	<i>Evaluate Palo Alto-specific requirements, and eliminate requirements that exceed code or ordinance requirements.....</i>	<i>26</i>
6.1.4	<i>Improve coordination between Development Services and Utilities.....</i>	<i>26</i>
6.1.5	<i>Explore opportunities to customize and simplify online submittal and review processes.....</i>	<i>26</i>
6.1.6	<i>Consider opportunities for appointment-based one-on-one phone or web meetings for challenging projects.....</i>	<i>27</i>

6.1.7	<i>Improve communications with customers and contractors</i>	27
6.2	Medium-term Priorities	28
6.2.1	<i>Develop written plan check procedures for electrification project types</i>	28
6.2.2	<i>Actively track all electrification project types</i>	28
6.2.3	<i>Track common application and inspection errors to support</i>	28
6.2.4	<i>Develop dedicated electrification permit applications or application procedures</i>	29
6.2.5	<i>Adopt all state-mandated expedited review requirements</i>	29
6.3	Long-term Priorities	29
6.3.1	<i>Evaluate permit fee structures to provide fee-parity</i>	29
6.3.2	<i>Pursue regional coordination of review and inspection procedures</i>	30

Table of Figures

Figure 7: Streamlining Recommendations Summary 3

Figure 1: Technologies to be Investigated..... 6

Figure 2: Assessment Criteria Description..... 8

Figure 3: Palo Alto Permit and Inspection Process 11

Figure 4: Typical permit review process for electrification technologies and selected natural
gas incumbents 12

Figure 5: Palo Alto Permit Trends 13

Figure 6: Palo Alto Baseline Assessment Rubric **Error! Bookmark not defined.**

Figure 7: Streamlining Recommendations Summary 23

1 Executive Summary

The City of Palo Alto (City) has contracted TRC to conduct the Electrification Permit Streamlining Study. This study assesses and analyzes permitting and inspection process in Palo Alto for measures that support building electrification, including electric appliances and equipment (in place of natural gas), electric vehicle (EV) charging equipment, solar photovoltaic (PV), and ESS or “energy storage systems” (ESS), to identify key opportunities and barriers with the permitting processes related to electrification technology and inform permit process streamlining efforts. In addition, the study provides recommendations for streamlining permitting and inspection processes for electrification measures in Palo Alto.

To collect and compile the information presented in this Baseline Assessment report, TRC conducted three primary data collection activities: review and collection of publicly available data and resources on permitting and inspection processes, interviews with City staff in Planning & Development Services and Utilities departments, and interviews with industry stakeholders working in Palo Alto.

Building on the results of these data collection efforts, TRC identified the following key findings of successes and challenges in the permitting and inspection process for electrification technologies in Palo Alto:

- ◆ **The COVID-19 pandemic has disrupted typical Development Services workflows, resulting in longer permit application timelines** – As a result of the COVID-19 pandemic, Development Services staff have transitioned to an entirely online system, working remotely, and handling an increased permit activity workload with reduced staff resources. Removing face-to-face counter hours inevitably slows the review process for some permit types, and limits opportunities for collaboration and problem solving with customers, within the department, and with other departments such as Utilities. Palo Alto’s stated plan review timelines in general are longer than those for other jurisdictions in the region, and contractors reported that stated review timelines are often not met.
- ◆ **Online permit application process poses challenges for customers and City staff** – Contractors frequently noted that onerous file formatting requirements in the Online Permitting Services portal (OPS) were an added burden and source of delay for permit applications. Although Development Services no longer requires applicants to include bookmarking in their PDF plan sets, Development Services staff are now reviewing online permit applications internally for proper file formats and have launched a pilot program to make corrections internally without involving the applicant, only adding to staff workload. Staff is monitoring the volume to see if internal corrections are sustainable or if additional resources are needed. One Development Services interviewee noted that because the OPS is provided by a third-party, it is not customized to meet the City’s needs. This interviewee also noted that the department is working with the system administrator to increase functionality and customization of the system. While several contractor interviewees did note the onerous formatting requirements, one contractor reported that Palo Alto’s online system was relatively user friendly compared to other jurisdictions in the area.
- ◆ **Development Services staff lack clear guidance on plan review for new electrification technologies** – One Development Services interviewee noted that there is a learning curve with many electrification measures, with technologies that are advancing and changing quickly. They noted that the department is working to ensure all processes are carried out consistently, and

while the goal is to have documented processes for all application types, they have not had the opportunity to develop fully standardized procedures yet.

- ◆ **Permit applications frequently lack required information or documentation for Utility review –** Requirements for Utility review on permit applications can add complications in the plan review process, and delay the overall process if documentation is incomplete, as noted by the Utilities interviewees. Utilities interviewees also noted that they are not engaged early enough in the permit application process, and that the Utility liaison in the Development Services office is rarely utilized to review application materials at the pre-application stage. However, some information required for Utility review may not always be available at the time of building permit application, such as specification and details for PV systems (especially in the case of new construction), resulting in incomplete submissions. One contractor interviewee also reported that the panel upgrade process in Palo Alto is a significant improvement over the process in jurisdictions within PG&E territory.
- ◆ **Excessive inspection practices, and non-compliance with state PV inspection mandates –** Contractor interviewees consistently reported that inspections for residential PV, EV charging, and ESS were excessively detailed and onerous compared to other jurisdictions, including requirements such as torquing all connections. Because of those detailed inspection procedures, contractors also reported that the electrical inspector often splits inspections for PV systems into two separate visits (not counting re-inspection for correcting errors), contrary to the state mandates requiring a single inspection for small residential PV systems. One Development Services interviewee acknowledged that the inspectors are very thorough in enforcing the letter of the code, and reported that it was rarely possible for them to complete a PV inspection in one visit. In addition, one contractor interviewee noted that the prescriptive inspection checklists for PV or ESS systems may not adequately address the characteristics of projects that are combining multiple systems, or are not adaptable to differing conditions on site. For example, one contractor described a scenario with a combined PV and ESS system, resulting in three power sources including the Utility source, but the inspection checklist requires a label for a dual power source.
- ◆ **Requirements unique to Palo Alto result in challenges and delays –** Development Services, Utilities, and contractor interviewees all mentioned that Palo Alto has unique requirements for certain electrification projects that neighboring jurisdictions do not have. The example that came up most often was the requirement for a dedicated power disconnect for residential PV and ESS systems. Both Development Services and Utilities interviewees reported the AC disconnect requirement is a common source of error in both permit applications and installations.
- ◆ **Customer-facing resources are not well organized or easily accessible –** The City provides extensive resources, guidelines, and checklists to support permit applications and inspections, but some of the Utilities interviewees speculated that the extensive information may actually be too much for customers to effectively take in. For example, the PV checklist outlines extensive details on system requirements and installation guidelines in combination with permit application requirements, which may make finding specific details more difficult. The organization of these documents on the City website may make this information difficult to find. One Utilities interview also noted that information and requirements for some processes, like PV applications, are split between Development Services and Utilities websites, rather than having everything in one unified location.

Building on the findings outlined above, TRC has identified the streamlining recommendations outlined below. These recommendations respond directly to the challenges identified in the previous section, and present opportunities to further streamline processes for electrification technologies overall.

Figure 1 summarizes the recommendations in relation to the challenges identified in the previous section, with section number references for detailed descriptions of each recommendation, below.

Figure 1: Streamlining Recommendations Summary

Challenge Identified (see section 5)	Streamlining Recommendations
<p>The COVID-19 pandemic has disrupted typical Development Services workflows, resulting in longer permit application timelines</p>	<p>Immediate priorities:</p> <p>(6.1.1) Adhere to stated plan review and corrections timelines by identifying efficiencies in the process or providing additional resources required to meet stated timelines</p> <p>(6.1.6) Consider opportunities for appointment-based one-on-one phone or web meetings for challenging projects</p>
<p>Online permit application process poses challenges for customers and City staff</p>	<p>Immediate priorities:</p> <p>(6.1.5) Explore opportunities to customize and simplify online submittal and review processes such as limiting formatting requirements and integrating submittal checklists</p>
<p>Development Services staff lack clear guidance on plan review for new electrification technologies</p>	<p>Medium-term priorities:</p> <p>(6.2.1) Develop written plan review procedures for all electrification project types, including strategies for common combined project types (e.g. combined PV and ESS)</p>
<p>Permit applications frequently lack required information or documentation for Utility review</p>	<p>Immediate priorities:</p> <p>(6.1.4) Improve coordination between Development Services and Utilities, including fully engaging the Utility liaison to ensure application materials are complete, and integrating Utility checklists on Development Services website and OPS.</p>
<p>Excessive inspection practices, and non-compliance with state PV inspection mandates</p>	<p>Immediate priorities:</p> <p>(6.1.2) Comply with state-mandated single inspection for PV systems, and reduce the burden of electrical inspections by limiting the scope of the inspection to what is accessible at the time of inspection, and sampling</p> <p>Medium-term priorities:</p> <p>(6.2.5) Adopt all state-mandated expedited review requirements</p>

Challenge Identified (see section 5)	Streamlining Recommendations
<p>Requirements unique to Palo Alto result in challenges and delays</p>	<p>Immediate priorities:</p> <p>(6.1.3) Evaluate Palo Alto-specific requirements (see section 3.2), and eliminate requirements that exceed code or ordinance requirements</p> <p>Long-term priorities:</p> <p>(6.3.2) Pursue regional coordination of review and inspection procedures to provide greater consistency for customers, and reduce application errors.</p>
<p>Customer-facing resources are not well organized or easily accessible</p>	<p>Immediate priorities:</p> <p>(6.1.7) Improve communications with customers and contractors by consolidating information documents in a more accessible location and including all Utility requirements with Development Services documentation</p>

2 Introduction

The City of Palo Alto (City) has contracted TRC to conduct the Electrification Permit Streamlining Study. This study assesses and analyzes permitting and inspection process in Palo Alto for measures that support building electrification, including electric appliances and equipment (in place of natural gas, electric vehicle (EV) charging equipment, solar photovoltaic (PV), and ESS or “energy storage systems” (ESS), to identify key opportunities and barriers with the permitting processes related to electrification technology and inform permit process streamlining efforts. In addition, the study provides recommendations for streamlining permitting and inspection processes for electrification measures in Palo Alto.

2.1 About Palo Alto

The City is a charter city located in the San Francisco Bay Area of Northern California. The City provides electricity, natural gas, water, wastewater collection, fiber optics and other utility services to customers within its boundaries through its Utilities department (CPAU). CPAU is the only municipal utility in California that operates publicly owned services in all of the above areas. CPAU serves over 29,000 utility customers, with around 15,000 single family customers, 10,000 multifamily customers, and 4,000 nonresidential customers.

City of Palo Alto has long established its leadership in sustainability, with the adoption of the City’s first climate action plan in 2007. In April 2016, City Council unanimously approved an ambitious goal of reducing the community’s GHG emissions by 80% from the 1990 levels by 2030 (“80x30”) for the City’s Sustainability and Climate Action Plan (S/CAP). This goal takes into account the head start provided by the City’s Carbon Neutral Plan, that requires carbon neutrality for the electric supply portfolio since 2013. As of 2018, the community’s GHG emissions are 36% below 1990 levels. To meet the 80x30 goal, the City will need to aggressively pursue GHG reductions in the transportation and building sectors, by: (i) reducing total vehicle miles travelled by encouraging alternative modes of transport, (ii) increasing the share of EV vehicles among residents, commuters and visitors, and (iii) reducing the direct use of natural gas in buildings by electrifying gas appliances for space heating, water heating, cooking, clothes drying, etc.

In December 2019, City Council approved a building reach code ordinance that mandates all-electric design for all low-rise residential new construction projects, and electrification-ready requirements for mixed-fuel design for non-residential projects.

To encourage the use of EVs, the City currently offers EV charger rebates to workplaces. CPAU also provides technical assistance to multifamily sites and non-profit organizations to install EV chargers. The California Clean Fuel Rewards Program, partially funded by CPAU and other agencies, launched in November 2020 and provides a \$1500 rebate for new EV purchases at participating dealerships.

To encourage building electrification, CPAU currently offers a rebate of up to \$1500 for the replacement of a gas water heater with a heat pump water heater. CPAU plans to expand rebate offers to support building electrification among residential and nonresidential customers.

2.2 About the Electrification Permit Streamlining Study

The Electrification Permit Streamlining Study analyzes current permitting and inspection processes for all-electric technologies and appliances in Palo Alto. The study examines permitting processes related to electric appliances and equipment (in place of natural gas), PV systems, and ESS at the residential level, as well as EV charging at the residential and commercial levels. The results of the study outline Palo Alto’s current permitting and inspection processes, and provide recommendations and best practices for streamlining those processes.

At the outset of the study, the City and TRC identified the relevant technologies to be investigated through this study, as outlined in Figure 2 below.

Figure 2: Technologies to be Investigated

<ul style="list-style-type: none"> ◆ All-electric appliances: <ul style="list-style-type: none"> ◆ Electric heat pump water heaters ◆ Electric heating ventilation & air conditioning ◆ Induction cooktops ◆ Electric dryers (resistance and heat pump) ◆ Self-generation and energy storage: <ul style="list-style-type: none"> ◆ Solar + battery storage ◆ Solar only retrofit (residential + commercial) ◆ Solar thermal (for domestic hot water and pool heating) ◆ Whole-home battery storage ◆ Storage-only retrofit 	<ul style="list-style-type: none"> ◆ Electric vehicle charging infrastructure <ul style="list-style-type: none"> ◆ Level 1 and 2 charging at residences ◆ Level 1, 2, and 3 charging at nonresidential ◆ Electric infrastructure <ul style="list-style-type: none"> ◆ Electrical panel upgrade, including relocation of residential electric panel (benchmark against other electric utility providers in the region) (200amp, 400amp) ◆ Interconnection process (benchmark against other electric utility providers in the region)
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2.3 Data Collection and Analysis Process

To collect and compile the information presented in this report, TRC conducted three primary data collection activities:

- ◆ Data collection of publicly available processes and documentation – TRC collected information on permitting and inspection processes, as well as documentation and resources posted on the City website. TRC also compiled information on permitting and inspection processes provided directly from City staff.

- ◆ Interviews with City staff – TRC conducted interviews with staff from the Planning & Development Services department and the Utilities department, as follows:
 - Planning & Development Services interviews – three interviews total: one Project Coordinator, one Contract Building Plan Checker, one Building Inspector
 - Utilities interviews – one group interview of four utility engineering staff
- ◆ Interviews with industry stakeholders – TRC interviewed a total of five industry stakeholders with experience working in Palo Alto and the surrounding region, in three interviews. Industry interviewees shared experiences with a variety of electrification technologies including equipment and appliance retrofits, solar PV installation, EV charging, and battery storage (ESS).

In addition, where relevant, this report incorporates findings from a parallel study of electrification permitting and inspection processes TRC is conducting on behalf of the Silicon Valley Clean Energy Authority (SVCE).

2.4 Assessment Evaluation Criteria

The Baseline Assessment documents electrification permit trends, as well as permitting processes, pricing, and timelines, and how those factors differ between electric technologies and relevant natural gas counterparts.

To provide an additional level of evaluation of current permitting and inspection practices, TRC established a set of four key assessment questions, as outlined in Figure 3, below.

Figure 3: Assessment Criteria Description

Assessment Questions	Why it's important
<p>Does the agency provide expedited review or processing for electrification measures?</p>	<p>Expedited review or processing is one way permitting agencies can help to encourage adoption of new technologies. In addition, state laws, as described later, already require expedited processing for PV and EV charging projects, establishing a model process for other electrification measures.</p>
<p>Does the agency provide information, checklists, guidelines, or other resources for electrification permit processes?</p>	<p>Permitting resources, such as submittal guidelines or system requirements can help ensure that customers submit all the necessary documentation, in the appropriate formats, as part of their permit application, thus reducing or eliminating the need for revisions or corrections, and streamlining the overall process.</p>
<p>Does the agency have specialized permit applications for electrification measures, or an indicator as part of standard permit application forms?</p>	<p>Electrification measures require different plan check and inspection processes than standard like-for-like replacements, because of additional electrical requirements and/or different performance characteristics. Having a method for clearly indicating electrification measures (e.g. HPWH vs standard water heater replacement) can help customers better understand submittal requirements, and help Building Department staff recognize the plan check and inspection processes required.</p>
<p>Does the agency track electrification permit trends?</p>	<p>Tracking permit trends helps identify electrification adoption in an agency's jurisdiction, which in turn can help identify priority areas for developing dedicated plan check or inspection process and can help identify areas where additional support may be needed to encourage greater adoption.</p>

These assessment questions were evaluated against five key permitting categories that support the most prevalent electrification measures: appliance electrification retrofits (e.g., heat pump water heaters and heat pump HVAC), new receptacles or electrical circuits to support new electrical loads, electric service panel upgrades, PV, ESS, and EV charging.

Results of these evaluation criteria for Palo Alto are shown below in section 3.3.

These criteria also guided the data collection and analysis and inform the assessment findings presented in this document.

3 Permit and Inspection Process Overview

New construction, building alterations, and replacement of mechanical equipment or permanently installed appliances will require a building permit and inspection. For the purposes of this report, all of the electrification processes outlined in Figure 2 will require some form of permit, unless it is a plug-in appliance with an existing electrical connection available in the appropriate location. Cities and counties issue permits and conduct inspections to ensure that construction work is done safely and meets all relevant codes, ordinances and standards.

Palo Alto has four types of permit application and review processes. For certain minor project types, including furnace replacements in the same location, natural gas tank water heater replacements, residential window retrofits, and re-roofing, among others, licensed contractors can apply for **Instant (Online Web Based)** permits, which they receive and print online without plan review. Prior to the pandemic these were the only permits available online. None of the electrification measures subject to this study are currently eligible for Instant permits.

All other projects types, including all of the electrification project types in this study, will require some form of plan review. Due to the pandemic, all permit applications requiring plan review are processed through City’s Online Permitting Services (OPS) portal. The first step in the permit application process is the Pre-Application phase, where applicants upload all application and project documents and Project Coordinators (see description below) review documents for completeness. Project Coordinators review Pre-Application submittals within five business days and applicants will receive email requests to provide any additional or missing information. If all application materials are complete, Project Coordinators will inform applicants and route application materials to one of three plan check timelines:

- ◆ **Over the counter:** prior to the pandemic-related work-from-home conditions, these permit types would be reviewed in-person at the counter at the Development Center, and if everything in the application and documentation was correct, permits would be issued at that time. Today, “over the counter” permits submitted through the OPS and are typically reviewed within two to three days. Per state requirements, small residential PV systems (up to 10 kW), and residential EV charging installations up to 40 amps receive over the counter review. If application materials require corrections or revisions, applicants are notified via email. Resubmittal review for over the counter applications are typically processed within one day.
- ◆ **Express:** projects that require more thorough plan check may be routed for “express” review, for completion within 14 calendar days once the submittal is determined to be complete. Larger residential PV systems (over 10 kW), residential EV charging installations over 40 amps, and nonresidential EV charging installations and nonresidential PV systems typically receive express review. If application materials require corrections or revisions, applicants are notified via email. Once the applicant completes the resubmittal, the project is routed for a 7 calendar day review.
- ◆ **Regular:** larger or more complex projects will be routed for regular plan review, for completion within 30 calendar days once the submittal is determined to be complete. These projects may include large renovations or additions, projects combining multiple systems (such as large PV, ESS, and EV charging), or projects that may require review from additional departments such as Utilities, Planning, or Fire (see for review requirements by project type). If application materials require corrections or revisions, applicants are notified via email. Once the applicant completes the resubmittal, the project is routed for a 14 calendar day review.

Palo Alto’s Planning & Development Services department has three key staff roles in the permit and inspection process:

1. **Project Coordinators** take in permit applications, review documents in the Pre-Application phase to assess the completeness of the submittal, determine the type of project and permit application and the associated plan check schedule (per the options described above), and route the application through the overall process. If applications are incomplete, Project Coordinators will ask the customer to make corrections. When the project has been approved, the Project Coordinators assess and collect the permit fees and issues the approved plans.
2. **Plan Checkers and Plan Check Engineers** review permit applications and project documents once the Project Coordinators determine the submittals to be complete to confirm compliance with relevant codes, ordinances, and standards. If the project, as described in the documents, does not comply with the relevant regulations and standards, the Plan Checkers will ask the customer to make corrections. If the project complies, the Plan Checker will approve the permit for issuance.
3. **Inspectors** review the actual work after the permit is issued. Inspectors confirm that the work was completed as stated in the permit applications and project documents, and that the work complies with relevant codes, ordinances and standards. If the work is not consistent with the documentation, or does not comply, the inspector will ask the customer to make corrections. Once all the necessary inspections are passed, the project is considered complete.

Because Palo Alto has its own municipal utility, some electrification projects will also require utility review as part of the plan check process, e.g. new solar PV systems, service panel upgrades, and large EV charging or ESS installations. In jurisdictions that are part of investor-owned utility territories, such as PG&E, the utility coordination is largely separate from building permit and inspection process.

Depending on the scope of the project, permit applications may also require review from other City departments, such as Planning or Fire.

Figure 4, below, illustrates and overall journey map of permit and inspection process in Palo Alto.

PALO ALTO PERMIT AND INSPECTION PROCESS

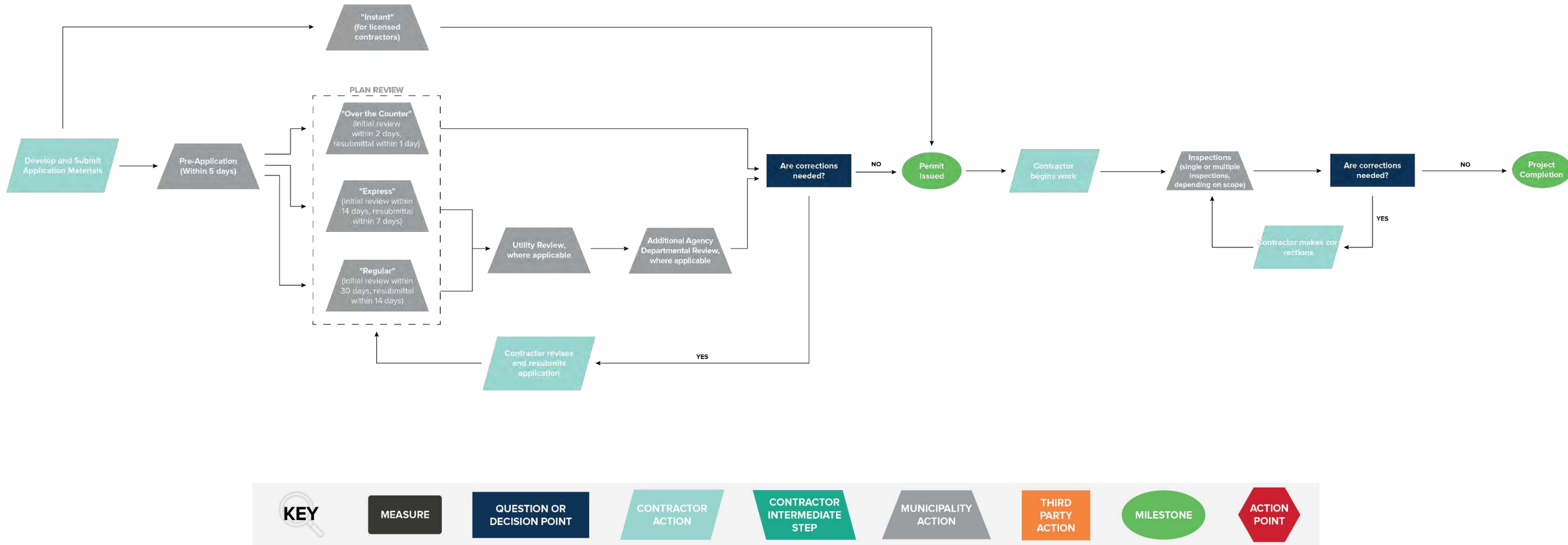


Figure 4: Palo Alto Permit and Inspection Process

Figure 5, below, outlines the typical permit review process for the electrification technologies assessed in this study. Note that all PV projects, regardless of size, require a separate utility interconnection agreement.

Figure 5: Typical permit review process for electrification technologies and selected natural gas incumbents

Permit Type	Plan Review Type	Utility Review?	Planning Review?	Fire Review?
New electrical outlet or circuit (to support new electrical appliance / equipment)	Over the counter			
Heat pump water heater	Over the counter			
Heat pump HVAC	Express		If exterior equipment	
Residential PV <10 kW	Over the counter	Y		
Residential PV >10 kW	Express (If a supplemental review is required, it will take up to additional 20 days. Beyond the supplemental review, additional time and fee will be required.)	Y		Y
ESS Interior	Express	Y		HazMat review req'd
ESS Exterior	Express	Y	Y	HazMat review req'd
Residential EV charging <40 amps (50 amps breaker)	Over the counter	Y		
Residential EV charging >40 amps (50 amps breaker)	Regular	Y	Y	Y
Commercial EV charging	Regular	Y	Y	Y
ESS + PV <10 kW	Express	Y		HazMat review req'd
Combined PV, ESS, and/or EV charging	Regular	Y		
Electrical service panel upgrade – up to 200 amps, within 10 feet of original location	Over the counter			
Electrical service panel upgrade – over 200 amps, and/or relocated more than 10 feet from original location	Express	Y		

3.1 Permit Trends

Figure 6 shows selected permit trends in Palo Alto for 2018, 2019, and 2020. With the exception of solar PV and EV charging, Palo Alto is not actively tracking permit applications for electrification or electrification-supporting (e.g., service panel upgrades or upgraded electrical circuits) technologies. Note that with the exception of EV charging, all tracked categories in Figure 6 saw increases in permit applications in 2020, despite the impacts of the COVID-19 pandemic.

Figure 6: Palo Alto Permit Trends

Permit Type	2018	2019	2020	Is this data tracked?
Solar PV	100	99	115	Yes
EV Charging	148	124	70	Yes
ESS				No
Water Heater Replacement (all types)	86	75	93	Yes
Heat Pump Water Heater				No
Furnace Replacement (all types)	24	33	51	Yes
Heat Pump Space Heating				No
Electric Service Panel Upgrade				No
New electrical circuit(s)				No

3.2 Baseline Assessment Evaluation Rubric

Figure 7, below, illustrates the evaluation rubric for Palo Alto based on the criteria outlined above in section 2.4.

Figure 7: Palo Alto Baseline Assessment Rubric

Assessment Question	Appliance Electrification Retrofits	New Receptacle / Circuit	Service Panel Upgrade	Solar PV	EV Charging	ESS
Expedited review or processing?				✓	✓	
Checklists, guidelines, or other resources?			✓	✓	✓	✓
Dedicated selection option on permit application form?		✓	✓	✓	✓	
Tracking electrification permit trends?				✓	✓	

3.3 Comparison to Neighboring Jurisdictions

In addition to the overall assessment of Palo Alto permitting and inspection processes, TRC has collected the summary details outlined below comparing Palo Alto processes to neighboring jurisdictions. This comparison is based on findings from a parallel study for Silicon Valley Clean Energy’s (SVCE) thirteen member agencies and their permitting and inspection processes, as well as feedback from contractor interviewees working across jurisdictions in the Bay Area. Note that distinctions reported by contractor interviewees were not independently verified, and that even though contractors may not have encountered certain requirements in other jurisdictions they may still be required by code.

3.3.1 Process

Overall, typical processes are relatively consistent between jurisdictions, based on feedback from building officials. However, because Palo Alto has its own utility, any coordination with utility review happens within the building permit application process, as opposed to SVCE agencies where any coordination with PG&E is separate from the building permit process.

Both contractors and City interviewees did report that Palo Alto has some specific requirements and processes that go beyond typical practice in other jurisdictions. These Palo Alto-specific requirements and practices are outlined as follows:

1. Project or system requirements above and beyond neighboring jurisdictions:
 - a. Dedicated AC disconnect for PV systems, not required in other jurisdictions
 - b. Dedicated disconnect for each powerwall/battery, whereas other jurisdictions may only require one for the whole system
 - c. Separate shutoffs for PV and ESS in projects with both PV and ESS system
 - d. PV systems require second ground rod in the system, six feet apart, not required in other jurisdictions
 - e. Commercial EVSE disconnects
2. Application or inspection procedures that differ from neighboring jurisdictions
 - a. Document formatting requirements for plan sets submitted through OPS
 - b. Utility applications for projects like PV required at the same time as the building permit, when details of the PV system, such as size and specifications may not yet be finalized
 - c. PV, EV charging, and ESS inspections more rigorous than neighboring jurisdictions, including torque testing all connections, per reports from contractor interviewees
 - d. Inspection checklists are longer than other jurisdictions, including requirements for a placard on the main service panel diagramming where all the shutoffs are located (the interviewee noted that this may be a requirement in the code, but has not encountered this issue elsewhere)
 - e. Structural requirements for EV charging equipment pads, not required in other jurisdictions, as reported by one contractor interviewee
3. Other process differences:
 - a. Project Coordinator role and “pre-application” phase are unique to Palo Alto

- b. Planning review for mechanical equipment placement / noise ordinance (not entirely unique to Palo Alto, but not required in all jurisdictions)
- c. Urban Forestry requirements for any application requiring trenching near protected trees

3.3.2 Timelines

The online review process has delayed review timelines in almost all jurisdictions. Palo Alto’s “Over the Counter” timelines are relatively consistent with neighboring agencies. However, full plan review timelines (both “Express” and regular) are generally longer than neighboring jurisdictions (SVCE jurisdictions quoted plan review timelines between one day and 20 days, depending on the jurisdiction and project scope).

Given that Palo Alto operates its own utility, the permitting process for electrification projects that involves utility interconnection (e.g. new PV system or service panel upgrade) will cover the requirements for both the building permit and utility interconnection. In other SVCE jurisdictions, the project applicant will need to separately coordinate with PG&E on the utility interconnection agreement or panel upgrade while undergoing the building permit process. Depending on PG&E availability, the jurisdiction, and the scope of the project, this additional coordination can add several weeks to the overall process.

3.3.3 Pricing

Permit fee structures in Palo Alto are based on a cost recovery model, and fees are largely in line with neighboring jurisdictions. Palo Alto complies with all state mandated caps on permit fees for PV systems.

4 Application Review and Inspection Process by Project Type

Palo Alto uses an online permit submittal system called the Online Permitting Services (OPS) through a Citizen Access Portal for all permit applications. The OPS system has specific submittal guidelines and formatting requirements for permit applications that customers must follow. The Development Services website provides extensive resources in written and video form to guide customers through the application submittal process.

The City also provides extensive resources such as submittal guidelines and application checklists to help customers develop successful permit application submittals, especially for PV, EV charging, and ESS.

Because CPAU is part of the City, Utility review for electrification projects is integrated into the permit application and inspection process.

Any time a permit application triggers Utility review (see details in the following sections), the Development Services Project Coordinator will route the Utilities Service application, signed Interconnection Agreement, and PV/ESS load sheet to Utility Engineering Review. A dedicated Utilities staff is available to assist the Project Coordinator to ensure the completeness of the submittals. As with the permit application process, Project Coordinators confirm the completeness of the submittals for engineering review.

Though integrated Development Services and Utility review can provide a more seamless experience for customers—as interviewees reported is the case with service panel upgrades—it can also cause complication if the required Utility documentation is not complete or not included as part of the permit application. Utility interviewees noted that although the City provides submittal guidelines and checklists, applicants are not always submitting complete information (even when the customer indicates that everything is complete on the checklist), and that Project Coordinators may not notice when Utility submissions are incomplete. A Utility liaison is available in Development Services to review applications at the pre-application phase to ensure submittals are complete, but that Project Coordinators may not be fully utilizing the liaison when reviewing submittals.

Utility interviewees also reported that including Utility review as part of the permit application process can create complication on larger projects where final details for electrification systems have not been finalized, such as PV or ESS for new construction or large renovations.

The following sections provide additional details on the permit and inspection processes for typical electrification measures.

4.1 Appliance and Equipment Retrofits

For appliance and equipment retrofits, such as heat pump water heating (HPWH) or electric HVAC systems, there are additional permit review and inspection procedures when compared to a standard like-for-like replacement. For example, whereas a typical gas water heater replacement would be eligible for an instant online permit, a heat pump water heater installation requires a plan review to confirm that the water heater location meets the operational specifications for the equipment, minimum energy efficiency standards and to review any new electrical supply and venting to the

location. Inspections for these types of installations will need to confirm that all gas lines are properly capped, and that all the new electrical supply is properly installed and safe.

Similarly, any other type of new electrical equipment with an exterior condensing unit, such as a heat pump HVAC system or HPWH, would require submitting a site plan indicating the location of the condensing unit and may require Planning review for property setback and noise ordinance requirements.

4.2 Solar Photovoltaic (PV)

New stand-alone residential rooftop solar PV systems up to 10 kW in size are reviewed “over the counter”, in compliance with state mandates for expedited PV permitting under AB 2188 and AB 1414. Systems larger than 10 kW, or any system combined with ESS and/or EV charging are scheduled for longer plan review periods depending on the scope of the project. Large PV systems > 10 kW (including existing and proposed), and PV systems in combination with storage, or EV charging > 40 amp also require Utility review (see section 3), as well as Planning and Fire review.

Plan review for PV systems includes confirming proper electrical connections and disconnects, minimum fire access setbacks from the edge of the roof, structural anchorage for wind and seismic loads, waterproofing details, three-line electrical diagram of all the components sizes and types, dimensions, equipment and electrode grounding systems, proper equipment labeling, means for rapid shutdown and a review of load calculations to confirm adequate service panel capacity. Inspections will also confirm all electrical connections and disconnects, confirm structural connections and adequate protection from damage to the equipment. Submittal Guidelines for Photovoltaic Residential Standard Submittal are available on building permit website in the Residential Forms section.¹

PV systems regardless of size are required to submit the PV/ESS load sheet and an owner-signed Interconnection Agreement form to the Utilities division if submitted on or after Jan 1, 2018.

Utility review for PV systems includes the signed interconnection agreement, which provides detailed information about the proposed PV system and legal right for the City to disconnect that system in case of emergency, interference or hazard. Utility review also includes confirming electrical system requirements, such as the required AC disconnect. Utility interviewees indicated that this AC disconnect requirement is a common error in applications, and they noted that most jurisdictions in PG&E territory do not have the same requirements for dedicated disconnect for PV systems.

4.3 Energy Storage System (ESS)

Battery storage systems or Energy Storage Systems (ESS) require plan review and also require Utility and Fire reviews in addition to building, depending on the type and size of the system. Plan reviews and inspections review the electrical configuration and confirm the power disconnect, confirm proper locations and clearances for equipment placement, ensure adequate protection from damage, especially in garage locations, and confirm compatibility of all electrical components in the system. For larger or

¹ https://www.cityofpaloalto.org/gov/depts/ds/building/building_permits.asp
<https://cityofpaloalto.org/civicax/filebank/documents/63929>

multiple ESS units that exceed the certain threshold quantities depending on the type of battery, as listed in the California Fire Code and in the City’s ESS Checklist, these are required to be reviewed and inspected for hazardous materials requirements by the Fire Department. Indoor residential ESS shall require minimum working clearances, proper ventilation, protection from physical damage if located in a vulnerable location, such as a garage, and smoke alarms and fire sprinklers. ESS units cannot be installed within habitable residential spaces.

Outdoor ESS installations require a minimum 5-ft separation from property lines, public ways, other buildings, combustible materials and minimum working clearances.

Fire department requirements for ESS installations with capacities exceeding California Fire Code thresholds in Table 608.1 require hazardous material review.

Utilities review requires a minimum of one AC disconnect for the PV/ESS that is within 10 feet and visible from the main service panel in addition to a completed PV/ESS Load Sheet.

Submittal guidelines for Energy Storage Systems can be found on the Development Service website.²

4.4 Combined PV and ESS

When PV systems are combined with ESS system installations, all of the PV and ESS requirements apply with additional requirements. These combined systems are reviewed by the building, utilities and fire departments for compliance. The additional requirements include the method and location of rapid shutdown for the ESS and a point of interconnection between the ESS and other power production sources. Electrical load calculations for conductor sizing, overcurrent protection ratings, open circuit voltage calculations and new service panel sizes are reviewed. A three-line electrical diagram showing method of interconnection, grounding and bonding of the ESS and PV are required for review.

For existing PV systems with a new or retrofit ESS system requires that the conductor sizing, type and interconnections must be reviewed for the revised configuration.

4.5 Electric Vehicle (EV) Charging

Stand-alone Residential Level 2 EV charging up to 40 amps is reviewed “over the counter”, in compliance with state mandates for expedited permitting by AB 1236 (Gov. Code Section 65850.7). Residential EV charging over 40 amps are scheduled for “express” plan check, including a Utility review. Plan reviews and inspections review the electrical configuration, confirm proper locations and clearances for equipment placement, ensure adequate protection from damage, and confirm compatibility of all electrical components in the system and that the existing service panel is adequately sized. Submittal Guidelines are available on building permit website in the Residential Forms section.³

Stand-alone Commercial Level 2 and Level 3 EV charging applications are also typically routed to “express” plan check. Commercial installations over 40 amps continuous or 50 amps breaker require a more thorough plan check process including Utility, Fire, and sometimes Planning review. Plan check for commercial EV charging reviews applications for accessibility requirements for disabled access and

² <https://cityofpaloalto.org/civicax/filebank/documents/65944>

³ https://www.cityofpaloalto.org/gov/depts/ds/building/building_permits.asp
<https://www.cityofpaloalto.org/civicax/filebank/documents/37623>

building design criteria in addition to the standard electrical and safety requirements. The City’s Green Building Ordinance also requires additional charging stations at nonresidential and hotel sites beyond the minimum state requirements in the California Building Code for new construction, which has caused some confusion with applicants.

Submittal Guidelines for Commercial EV charging are available on building permit website in the Commercial Forms section.⁴

As noted above, utility review for EV charging is only required for systems over 40 amps or overcurrent protection breaker is over 50 amps. Utility review includes electrical system configuration and requirements, location, clearances, and protection from damage.

4.6 Electrical Service Panel Upgrade

In most cases, contractors are aware of whether a home has sufficient panel capacity for the planned measures or if a panel upgrade is required. In some cases, the customer may request a service panel upgrade to support current or future electrification measures described above.

The review process for panel upgrades depends on the panel size and location. Permits for 200 amp panels within 10 feet of the original location are reviewed “over the counter” and typically issued the same day. For these permits, Utilities works with applicant after permits have been issued to ensure their compliance with CPAU’s rules and standards. Permits for 200 amp panels more than 10 feet from the original location, and 400 amp panels require “express” review, and applicants must include a site plan as part of the application.

Utility interviewees reported that utility service panel upgrades are required for about one-third of the projects they review, including major renovations and new homes. They also reported that the process for panel upgrade applications and meter release inspections is a very strong link between Utilities and Development Services. The documentation and process are clear, consistent, and understood by all parties involved.

As noted above, 200 amp panels more than 10 feet from the original location, and any 400 amp panels require Utility review. Utility review for service panel upgrades includes both electrical system and load calculation review, as well as any infrastructure support requirements such as providing upgraded conduit or upgrading utility transformers. For 400 amp panels, Utilities also requires NEC load calculation for approval.

Panel upgrade in the original location doesn’t necessary mean that it meets current Utilities standard. Any electrical panels located directly above gas meters or too close to an openable window are required to be relocated. Customers are responsible for the cost of any new or upgraded conduit to support the increased panel size. Costs vary depending on whether supply is overhead or underground, as well as the length of any buried cable required. Upgrades to 400 amp service panel require full load calculations and engineering review to confirm utility transformer capacity. If the increased load from the upgraded panel exceeds the transformer capacity, the customer is also responsible for the labor cost of upgrading the utility transformer.

⁴ https://www.cityofpaloalto.org/gov/depts/ds/building/building_permits.asp
<https://www.cityofpaloalto.org/civicax/filebank/documents/37622>

5 Analysis and Findings

Based on interviews with Development Services and Utilities staff, as well as contractors working in Palo Alto, and a review of documentation on the City website, TRC has identified the following key findings of successes and challenges in the permitting and inspection process for electrification technologies in Palo Alto:

- ◆ **The COVID-19 pandemic has disrupted typical Development Services workflows, resulting in longer permit application timelines** – As a result of the COVID-19 pandemic, Development Services staff have transitioned to an entirely online system, working remotely, and handling an increased permit activity workload with reduced staff resources. Removing face-to-face counter hours inevitably slows the review process for some permit types, and limits opportunities for collaboration and problem solving with customers, within the department, and with other departments such as Utilities. Palo Alto’s stated plan review timelines in general are longer than those for other jurisdictions in the region, and contractors reported that stated review timelines are often not met.
- ◆ **Online permit application process poses challenges for customers and City staff** – Contractors frequently noted that onerous file formatting requirements in the OPS were an added burden and source of delay for permit applications. Although Development Services no longer requires applicants to include bookmarking in their PDF plan sets, Development Services staff are now reviewing online permit applications internally for proper file formats and have launched a piloting program to make corrections internally without involving the applicant, only adding to staff workload. Staff is monitoring the volume to see if internal corrections are sustainable or if additional resources are needed. One Development Services interviewee noted that because the OPS is provided by a third-party, it is not customized to meet the City’s needs. This interviewee also noted that the department is working with the system administrator to increase functionality and customization of the system. While several contractor interviewees did note the onerous formatting requirements, one contractor reported that Palo Alto’s online system was relatively user friendly compared to other jurisdictions in the area.
- ◆ **Development Services staff lack clear guidance on plan review for new electrification technologies** – One Development Services interviewee noted that there is a learning curve with many electrification measures, with technologies that are advancing and changing quickly. They noted that the department is working to ensure all processes are carried out consistently, and while the goal is to have documented processes for all application types, they have not had to opportunity to develop fully standardized procedures yet.
- ◆ **Permit applications frequently lack required information or documentation for Utility review** – Requirements for Utility review on permit applications can add complications in the plan review process, and delay the overall process if documentation is incomplete, as noted by the Utilities interviewees. Utilities interviewees also noted that they are not engaged early enough in the permit application process, and that the Utility liaison in the Development Services office is rarely utilized as they should be to review application materials at the pre-application stage. However, some information required for Utility review may not always be available at the time of building permit application, such as specific details of PV systems, resulting in incomplete submissions. One contractor interviewee also reported that the panel upgrade process in Palo Alto is a significant improvement over the process in jurisdictions within PG&E territory.

- ◆ **Excessive inspection practices, and non-compliance with state PV inspection mandates** – Contractor interviewees consistently reported that inspections for residential PV, EV charging, and ESS were excessively detailed and onerous compared to other jurisdictions, including requirements such as torquing all connections. Because of those detailed inspection procedures, contractors also reported that the electrical inspector often splits inspections for PV systems into two separate visits (not counting re-inspection for correcting errors), contrary to the state mandates requiring a single inspection for small residential PV systems. One Development Services interviewee acknowledged that the inspectors are very thorough in enforcing the letter of the code, and reported that it was rarely possible for them to complete a PV inspection in one visit. In addition, one contractor interviewee noted that the prescriptive inspection checklists for PV or ESS systems may not adequately address the characteristics of projects that are combining multiple systems, or are not adaptable to differing conditions on site. For example, one contractor described a scenario with a combined PV and ESS system, resulting in three power sources including the Utility source, but the inspection checklist requires a label for a dual power source.
- ◆ **Requirements unique to Palo Alto result in challenges and delays** – Development Services, Utilities, and contractor interviewees all mentioned that Palo Alto has unique requirements for certain electrification projects that neighboring jurisdictions do not have. The example that came up most often was the requirement for a dedicated power disconnect for residential PV and ESS systems. The current Commercial EVSE Submittal Guideline also requires the site plan to show location of a EVSE disconnect; it is unclear this requirement is applicable for all commercial EVSE. Both Development Services and Utilities interviewees reported the AC disconnect requirement is a common source of error in both permit applications and installations.
- ◆ **Customer-facing resources are not well organized or easily accessible** – The City provides extensive resources, guidelines, and checklists to support permit applications and inspections, but some of the Utilities interviewees speculated that the extensive information may actually be too much for customers to effectively take in. For example, the PV checklist outlines extensive details on system requirements and installation guidelines in combination with permit application requirements, which may make finding specific details more difficult. The organization of these documents on the City website may make this information difficult to find. One Utilities interview also noted that information and requirements for some processes, like PV applications, are split between Development Services and Utilities websites, rather than having everything in one unified location.

6 Streamlining Recommendations

Building on the findings outlined above, TRC has identified the streamlining recommendations outlined below. These recommendations respond directly to the challenges identified in the previous section, and present opportunities to further streamline processes for electrification technologies overall.

The recommendations outlined below emphasize clear and effective communication both with customers and between City departments, and on setting legible and achievable expectations for the City and permit applicants.

The opportunities presented here acknowledge the City’s mandate to enforce adopted codes, regulations and ordinances and should not be construed as an effort to limit or reduce that enforcement. Many of the recommendations will also require additional resources, whether in staff time or funding, to achieve the desired outcome.

Finally, these recommendations also recognize the responsibility of permit applicants to provide complete and accurate application materials, and to comply with all relevant codes and regulations. The recommendations outlined here are not a reduction or limitation to the applicant’s responsibilities.

Recommendations below are organized into three categories:

- ◆ **Immediate priorities** that directly respond to the challenges outlined above, and present the greatest potential for resolving those challenges
- ◆ **Medium-term priorities** focused on improving processes more broadly, and that require greater investment of time and resources
- ◆ **Long-term priorities** addressing structural issues that require support from other City bodies or regional coordination

Figure 8 summarizes the recommendations in relation to the challenges identified in the previous section, with section number references for detailed descriptions of each recommendation, below.

Figure 8: Streamlining Recommendations Summary

Challenge Identified (see section 5)	Streamlining Recommendations
<p>The COVID-19 pandemic has disrupted typical Development Services workflows, resulting in longer permit application timelines</p>	<p>Immediate priorities:</p> <p>(6.1.1) Adhere to stated plan review and corrections timelines by identifying efficiencies in the process or providing additional resources required to meet stated timelines</p> <p>(6.1.6) Consider opportunities for appointment-based one-on-one phone or web meetings for challenging projects</p>

Challenge Identified (see section 5)	Streamlining Recommendations
Online permit application process poses challenges for customers and City staff	<p>Immediate priorities:</p> <p>(6.1.5) Explore opportunities to customize and simplify online submittal and review processes such as limiting formatting requirements and integrating submittal checklists</p>
Development Services staff lack clear guidance on plan review for new electrification technologies	<p>Medium-term priorities:</p> <p>(6.2.1) Develop written plan review procedures for all electrification project types, including strategies for common combined project types (e.g. combined PV and ESS)</p>
Permit applications frequently lack required information or documentation for Utility review	<p>Immediate priorities:</p> <p>(6.1.4) Improve coordination between Development Services and Utilities, including fully engaging the Utility liaison to ensure application materials are complete, and integrating Utility checklists on Development Services website and OPS.</p>
Excessive inspection practices, and non-compliance with state PV inspection mandates	<p>Immediate priorities:</p> <p>(6.1.2) Comply with state-mandated single inspection for PV systems, and reduce the burden of electrical inspections by limiting the scope of the inspection to what is accessible at the time of inspection, and sampling</p> <p>Medium-term priorities:</p> <p>(6.2.5) Adopt all state-mandated expedited review requirements</p>
Requirements unique to Palo Alto result in challenges and delays	<p>Immediate priorities:</p> <p>(6.1.3) Evaluate Palo Alto-specific requirements (see section 3.2), and eliminate requirements that exceed code or ordinance requirements</p> <p>Long-term priorities:</p> <p>(6.3.2) Pursue regional coordination of review and inspection procedures to provide greater consistency for customers, and reduce application errors.</p>
Customer-facing resources are not well organized or easily accessible	<p>Immediate priorities:</p> <p>(6.1.7) Improve communications with customers and contractors by consolidating information documents in a more accessible location and including all Utility requirements with Development Services documentation</p>

6.1 Immediate Priorities

6.1.1 Adhere to stated plan review and corrections timelines

Perhaps the highest priority for Development Services should be adherence to stated plan review and corrections review timelines in order to better meet customer expectations. Development Services should evaluate current plan review procedures, especially for PV, EV charging, and ESS projects (and combinations of those systems), to identify potential efficiencies or opportunities to reduce timeframes. Other potential opportunities to address timeframe challenges include:

- ◆ Change stated review timelines to business days, rather than calendar days, so that deadlines do not fall on non-working days.
- ◆ Set specific timeframes and deadlines for each reviewer or review department (e.g., Utilities, Fire, etc.) for each application. This may be an improvement that can be supported with updates to the OPS (see section 6.1.5).
- ◆ Explore opportunities for multiple parties to review applications concurrently, rather than sequentially, especially on application types that require multiple departments to review. This is another area that could be enabled through improvements to the OPS (6.1.5).

Because corrections were also frequently cited as a source of permit application delay, Development Services should work to provide all required corrections in a single notice whenever possible, and adhere to stated corrections review timelines employing the strategies outlined above.

Even after implementing the strategies listed above, due to the increased workload from online review process, staff shortages due to the pandemic, and increased permit activity during the pandemic, Development Services may still require more staff resources to meet stated plan review timelines.

If more staff resources are not available, Development Services could consider extending review timelines to set customer expectations more accurately.

(Note that the recommendation to accelerate or prioritize review for certain project types was considered, but was determined not to be a viable strategy because prioritizing some permit types only creates further delay for other non-priority project types, and does not address the root causes of the delays.)

6.1.2 Comply with state-mandated single inspection for PV, reduce burden of electrical inspections

As noted above, contractors consistently reported that inspections for residential PV, EV charging, and ESS were excessively detailed and onerous, and that PV inspections often required more than one visit, contrary to the state mandates requiring a single inspection. Development Services should work to comply with state-mandated inspection requirements, and limit the overall burden of electrical inspections, potentially including the following strategies:

- ◆ Provide clear instruction to inspection staff that PV-only inspections must be completed in one visit. Work with those staff as needed to develop a one-time inspection process that still meets the rigor that inspection staff feel requires a multiple inspection process.
- ◆ Limit scope of inspections to what is visible and/or accessible at the time of inspection,

- ◆ Test a sample of connections, rather than every connection.
- ◆ Develop or modify inspection protocols that are adaptable to systems combining PV, EV charging, and/or ESS, and avoid overly prescriptive requirements that may contradict actual conditions (as in the scenario described in section 5, above, where the inspection checklist required a label for “dual power sources” but the installed system had three power sources: utility, PV, and battery).

Because some customers noted that scheduling inspections by phone is a time-consuming process, Development Services should more actively encourage customers to use the online inspection scheduling tool. Potential strategies include providing notifications or reminders in the OPS at the time of application, or with a pre-recorded message about the online scheduling option that can play when customers are waiting on hold on the phone scheduling line.

6.1.3 Evaluate Palo Alto-specific requirements, and eliminate requirements that exceed code or ordinance requirements

Development Services, Utilities, and any other relevant City departments should evaluate any application and installation requirements for electrification projects that are unique to Palo Alto (as outlined in section 3.3), and especially requirements such as the dedicated AC disconnect and additional ground rod for PV projects, to determine whether these requirements are necessary.

Any requirements that are not directly supported by the building code, electrical code, local ordinance, or state law should be eliminated. Permit submittal checklists and inspection checklists should be updated to reflect such changes.

6.1.4 Improve coordination between Development Services and Utilities

Development Services and Utilities should work closely to address challenges and communication issues related to applications that require Utility review. Development Services Project Coordinators should fully utilize the Utility liaison at the Pre-Application stage on all applications that require Utility review to ensure that all necessary documentation is available, and/or to identify any additional documentation or information applicants need to provide.

Utilities and Development Services should work together to develop a work flow that enables more effective collaboration at the early stages of permit applications. This may be another opportunity to leverage improvements to OPS, such as automatically routing relevant electrification projects to the Utility liaison, in addition to the Project Coordinator, for review at the Pre-Application stage.

Development Services should also integrate any Utility checklists for permit applications into the Development Services website, and into the OPS platform.

6.1.5 Explore opportunities to customize and simplify online submittal and review processes

Development Services should work closely with the OPS vendor to implement updates and revisions to the online system to increase ease of use, and to provide more actionable information for applicants to avoid errors and missing information in applications. Potential strategies include:

- ◆ Evaluate the usefulness of plan set formatting and bookmarking requirements. Although Development Services no longer requires applicants to include bookmarking in their PDF plan sets, Development Services staff are now reviewing online permit applications internally for proper file formats and have launched a pilot program to make corrections internally without involving the applicant, only adding to staff workload. Staff is monitoring the volume to see if internal corrections are sustainable or if additional resources are needed. Development Services should eliminate any document formatting or bookmarking requirements that do not measurably increase the efficiency of the plan review process. If formatting requirements are deemed necessary, Development Services will need additional staff resources to complete formatting revisions without sacrificing overall plan review timelines.
- ◆ Integrate permit application forms within the OPS system so that applicants do not have to complete and upload permit applications as a separate supporting document.
- ◆ Integrate submittal checklists or project guidelines within OPS portal. Explore the potential for providing dynamic checklists that automatically update based on type of permit application. Consider options to generate an error message or prevent applicants from submitting the application until all checklist items are confirmed, or require separate specific document uploads for each checklist item, where applicable. Include any relevant utility checklists in the OPS to ensure all necessary utility information is provided.
- ◆ Wherever possible eliminate requirements for applicants to enter duplicate information. Contractors reported that the current system requires users to input basic information such as project address or contact information when resubmitting corrections or adding documents to existing applications. Wherever possible, auto-populate any relevant and available project information (project address, contact information, project details, etc.) for all subsequent user interactions with OPS.
- ◆ Establish timeframes, deadlines, and/or automated reminders for each reviewer for each application within OPS to help keep applications on schedule.
- ◆ Allow multiple reviewers or departments to review concurrently within OPS, rather than sequentially, to help keep applications on schedule.

6.1.6 Consider opportunities for appointment-based one-on-one phone or web meetings for challenging projects

The inability to meet face-to-face has significantly disrupted the typical relationship between plan reviewers and permit applicants. To help improve communications beyond what is possible over e-mail, Development Services should consider implementing an appointment-based one-on-one phone or web meeting process for challenging projects so that plan reviewers and applicants can discuss challenges and potential solutions directly and more quickly.

6.1.7 Improve communications with customers and contractors

To reduce application and installation errors, and to set customer expectations more appropriately, build on existing documentation to provide additional reference documentation, and improve the organization of existing guidelines and checklists. Potential strategies include:

- ◆ Consolidate customer-facing documents in a more accessible location and format. Consider organizing all project checklists or submittal guidelines under a dedicated “Application Checklists and Guidelines” heading.
- ◆ Work with Utilities to ensure that all checklists and guidelines for Utility review requirements are posted on the Development Services website, and accessible at the initial permit application stage.
- ◆ Pursue opportunities to integrate checklists into the OPS system, as noted above.
- ◆ Consider opportunities to provide abbreviated or more topic-focused reference documents. For example, a one-page PV application checklist detailing submittal requirements may be more relevant to an experience PV installer than details on system requirements.
- ◆ Consider opportunities to provide homeowner-facing reference documentation, explaining electrification processes and potential roadblocks, especially pertaining to the potential need for service panel upgrades and the associated unexpected costs that can entail.

6.2 Medium-term Priorities

6.2.1 Develop written plan check procedures for electrification project types

To address unfamiliarity with newer technologies, and to ensure that all plan reviewers are evaluating applications consistently, Development Services should develop written plan review procedures and protocols for any electrification measures that do not already have established processes. This is especially relevant for ESS applications, and applications that combine PV, EV charging, and/or ESS. In addition, Development Services and Utilities should proactively collaborate in anticipation of emerging electrification technologies to develop written plan review and inspection procedures and protocols for technologies such as Vehicle-to-Home (V2H) and Vehicle-to-Grid (V2G), as well as other technologies as they emerge.

6.2.2 Actively track all electrification project types

To help inform priorities and strategies for streamlining electrification permitting and inspection processes, Development Services should begin actively tracking all common electrification permit applications (see Figure 2). Having data on permit application trends will give the City insights into technology adoption trend, as well as the knowledge needed to adapt permitting and inspection processes to better meet customer needs and prioritize strategies on the highest demand measures.

6.2.3 Track common application and inspection errors to support

Understanding where customers are most commonly making mistakes in permit applications and during installation inspections can help agencies develop guidance on how to avoid those errors in the future. As with the permit tracking above, having data on common application and inspection errors will give Development Services and Utilities the knowledge needed to prioritize efforts for developing support documentation to address those errors and better meet customer needs.

6.2.4 Develop dedicated electrification permit applications or application procedures

Development Services should develop specific standardized application materials, or dedicated line items on standard application forms, for common electrification measures, especially in cases such as heat pump water heaters that combine previously unrelated permit processes (in this case, water heater replacement, and new electrical receptacle/circuit). Developing these specific application processes will help customers provide the necessary information in the permit application and will help staff accelerate the plan review process by more clearly indicating what the permit application is for and how the application should be routed for review. Having the ability to indicate specific electrification measures on the application form will also support the recommendations above for actively tracking electrification permit types and common errors.

6.2.5 Adopt all state-mandated expedited review requirements

The State of California has legislated specific mandates for expedited review and preferential pricing on certain electrification measures. These include expedited permit and inspection processes for residential PV systems less than 10 kW (AB 2188, Gov. Code 65850.5), limits on permit fees for residential PV systems (AB 1414, Gov. Code Section 66015), and expedited permit and inspection processes for residential EV charging (AB 1236, Gov. Code Section 65850.7).

Palo Alto has adopted standard practices that meet the spirit of these requirements, though there are some areas where the city has not fully complied. Specifically:

- ◆ According to the [analysis](#) by the Governor’s Office of Business and Economic Development, Palo Alto has an EV permit checklist, but has not yet met the other requirements of AB 1236, including limiting plan review to administrative approval of health and safety requirements only, ensuring that EV charging applications are not subject to any homeowner association review or approval, and providing all corrections in one complete deficiency notice. Note that AB 1236 instructs local jurisdictions to pass an ordinance guaranteeing these provisions, which would require coordination with City Council.
- ◆ As noted above, AB 2188 limits residential PV projects to a single inspection, though Palo Alto often requires multiple inspection visits for PV projects.

The mandates for expedited processes for PV and EV charging allow for flexibility by requiring each permitting agency to develop a submission requirement checklist, and only mandating expedited processing for the applications that meet all items on the agency’s checklist. As such, agencies can ensure that the expedited processing fits their internal processes and does not compromise their ability to confirm compliance with building and safety standards.

6.3 Long-term Priorities

6.3.1 Evaluate permit fee structures to provide fee-parity

As a strategy to encourage broader adoption of electrification measures, Palo Alto could review permit and inspection fees to identify opportunities to establish parity in fees between electrification and natural gas incumbents, or even provide reduced fee structures for electrification measures. Additional

fees related to electrical service and potential service panel upgrade costs result in higher permit fees for electrification measures, especially appliance and equipment retrofits, compared to natural gas incumbents. This effort could also be employed as part of the development of dedicated permit application materials.

However, because Palo Alto bases permit fees on a cost recovery model, where fees are determined based on the cost to the jurisdiction for reviewing applications or conducting inspections, any effort to reduce existing permit fees would require some form of subsidy, either through other permit fees or another source of funding. One potential option to address this would be through increased permit fees for natural gas measures, justified based on the greenhouse gas impacts of natural gas appliances, and the City's emissions reductions goals.

Other examples of approaches for streamlining permit fees include the following:

- ◆ Santa Clara County's combined mechanical-electrical-plumbing permit application charges a flat rate for up to three items (for example, a water heater replacement and the supporting electrical work in the case of a heat pump water heater).
- ◆ In Mountain View permit fees for PV systems are ostensibly based on a percentage of the project value, but the city caps the assessed value of residential PV projects at \$1,000 to keep permit fees low and encourage adoption.

6.3.2 Pursue regional coordination of review and inspection procedures

The most common concern from permitting agency customers is the variation in application processes and requirements for electrification technologies across jurisdictions. For the many contractors who work across multiple jurisdictions, learning new application procedures for each agency is a time-consuming and costly process. This is especially true for Palo Alto, where certain project requirements differ from most other jurisdictions in the region. To address and minimize these variations, and in addition to evaluating current Palo Alto-specific requirements (see section 6.1.3), Palo Alto could explore opportunities to work with neighboring jurisdictions and/or collaborate on a regional scale to align permit application processes and plan review and inspection procedures, where feasible and with the understanding that each jurisdiction will have unique requirements for permit and inspection processes.

However, this is not something individual jurisdictions could pursue on their own, and would require extensive coordination with neighboring permitting agencies, as well as other entities. Due to the level of collaboration and coordination required, agencies could look to third-party entities, such as community choice energy agencies, utilities, regional government collaborations, or professional organizations to support and coordinate this effort.

This attachment describes the City’s work plan for streamlining permitting related to various energy technologies. The table in Section 1, below, lists recommendations from the *Palo Alto Permit Streamlining Study* by TRC, as well as staff’s response to the recommendations and planned action items.

Section 1: Staff Response to TRC Recommendations and Work Plan

Item	TRC Recommendation	Staff Response	Action Items
Immediate Priorities			
6.1.1	Adhere to stated plan review and corrections timelines by identifying efficiencies in the process or providing additional resources required to meet stated timelines	<p>Staff is taking steps to ensure given timelines are met.</p> <p>Staff has also begun to review processes to explore ways to reduce wait times and provide a better customer experience.</p>	<ul style="list-style-type: none"> • Consider adding additional plan review staff. • Explore direct appointments with applicants. • Set Residential PV, EVCS, ESS and other electrification projects as priorities, with shorter review timelines. • Clearly identify and relay total response timeline to the customers. • Department managers to measure and monitor all aspects of the review process.
6.1.2	Comply with state-mandated single inspection for PV, reduce burden of electrical inspections	Building Inspection only allows one inspection at the completion of residential stand-alone PV roof mounted systems under 10kW. If the inspection does not pass then reinspections are required. Staff is also working to have one single inspection that coordinates across building, fire, and utility inspectors on this type of project.	<ul style="list-style-type: none"> • Inspection managers from Building, Utilities and Fire are working to coordinate inspection requests to reduce contractor wait time.

Item	TRC Recommendation	Staff Response	Action Items
6.1.3	Evaluate Palo Alto-specific requirements, and eliminate requirements that exceed code or ordinance requirements	Various departments will work to clarify requirements for AC disconnects and identify ways multiple disconnects end up being required. Staff will also review for other inspection requirements that may not be adopted.	<ul style="list-style-type: none"> • Establish inter-departmental team to review requirements and compare to ordinance and code requirements. • Develop clear checklists that bring requirements into one location for ease of customer use.
6.1.4	Improve coordination between Development Services and Utilities	Development Services has already begun the process to collaborate more closely with the Electric Utilities Department representative at the Development Center.	<ul style="list-style-type: none"> • Project Coordinators shall have Utilities Representative check for completeness of all PV/ESS and EVCS for Utilities.
6.1.5	Explore opportunities to customize and simplify online submittal and review processes	Staff plans to roll out a new online appointment system to assist customers with online submittal and review in real time to improve service and reduce delays.	<ul style="list-style-type: none"> • The Utilities Department is to explore options to reduce the number of required forms (for example, PV/ESS load sheet) • Staff will work on creating a submittal checklist that can be utilized at application intake for the PV/EVCS/ESS projects.
6.1.6	Consider opportunities for appointment-based one-on-one phone or web meetings for challenging projects	Staff in the process of creating the opportunity for customers to book virtual appointments to assist with submittal and over the counter review.	<ul style="list-style-type: none"> • Create messaging on website to direct customers on how to book an appointment • Set up trial run appointment time slots in Outlook to assist customers. • Explore options for appointment booking software.
6.1.7	Improve communications with customers and contractors	Staff agrees and will work with departments to improve communication.	<ul style="list-style-type: none"> • Reach out more frequently via phone rather than relying solely on email communication

Item	TRC Recommendation	Staff Response	Action Items
Medium-Term Priorities			
6.2.1	Develop written plan check procedures for electrification project types	Staff sees benefits to creating a plan review checklist for each type of review.	<ul style="list-style-type: none"> • Each department to develop a plan review checklist for each type of electrification project. • Train staff to use checklist as a baseline document to conduct the review.
6.2.2	Actively track all electrification project types	Project Coordinators to take a more active role on tracking the progress of the electrification projects to make sure we meet our establish review due dates.	<ul style="list-style-type: none"> • Strategize on an approach with Development Services Permit Manager. • Task project coordinators to track and monitor projects.
6.2.3	Track common application and inspection errors to support	Work with reviewing departments to review typical plan review errors and engage inspection staff to identify comment in field inspection corrections.	<ul style="list-style-type: none"> • Publish on the City's website common plan check application corrections and inspection corrections.
6.2.4	Develop dedicated electrification permit applications or application procedures	Staff will take this recommendation under consideration. The ideal approach would be to integrate the required information into the initial OPS application intake screens.	<ul style="list-style-type: none"> • Staff to determine the requirements to automate the OPS application in-take platform. • Management to determine if this approach is feasible.
6.2.5	Adopt all state-mandated expedited review requirements	Residential PV under 10KW Adopted by City in 2015 under PAMC 16.63. Staff will review other possible state-mandated expedited requirements.	<ul style="list-style-type: none"> • Management to research all current state mandates related to electrification projects and identify any short falls. • If short falls are identified, staff will strategize a compliance path.
Long-Term Priorities			

Item	TRC Recommendation	Staff Response	Action Items
6.3.1	Evaluate permit fee structures to provide fee-parity	Costs for permitting will be reviewed during the current fee study. Fees will not exceed state mandated limits. Planning & Development services is designed to be cost-recovery model.	<ul style="list-style-type: none"> • Identify lost revenue in current fee study effort.
6.3.2	Pursue regional coordination of review and inspection procedures	Staff will take this recommendation under consideration, but it may require additional resources.	<ul style="list-style-type: none"> • To be determined