Peninsula Advanced Energy Community (PAEC)

Task 2.14: *Final AEC Regulatory and Permitting Recommendations*

Prepared for
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June 2017

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The Clean Coalition is a nonprofit organization whose mission is to accelerate the transition to renewable energy and a modern grid through technical, policy, and project development expertise.

The Clean Coalition drives policy innovation to remove barriers to procurement and interconnection of distributed energy resources (DER)—such as local renewables, advanced inverters, demand response, and energy storage—and we establish market mechanisms that realize the full potential of integrating these solutions. The Clean Coalition also collaborates with utilities and municipalities to create near-term deployment opportunities that prove the technical and financial viability of local renewables and other DER.

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I. Introduction

DNV GL is supporting Clean Coalition to explore combinations of emerging and proven clean-energy technologies and systems that offer the best value in terms of economic, environmental, and technical performance. In this report, DNV GL presents a methodology for prioritizing a set of model ordinances for further development, and associated recommendations for local government interventions in both existing buildings and new construction.

a. Background

The Clean Coalition's Peninsula Advanced Energy Community (PAEC), supported by numerous local governments and PG&E, will accelerate the planning, approval, and deployment of an Advanced Energy Community (AEC) within a diverse community in the southern portion of San Mateo County. The PAEC core region encompasses the cities of Atherton, East Palo Alto, Menlo Park, and Redwood City as well as surrounding unincorporated areas. The PAEC region -largely built-out yet also experiencing enormous commercial and residential growth pressure - is representative of similar regions throughout California, ensuring that the PAEC's success can be replicated statewide. The PAEC project will include the key components necessary to define an AEC: abundant solar electricity, energy storage, and other Distributed Energy Resources (DER,) low or zero net energy (ZNE) buildings, Solar Emergency Microgrids (SEM) for power management and islanding of critical loads during outages, and charging infrastructure to support the rapid growth in electric vehicles.

AEC projects can provide significant energy, environmental, economic, and security benefits, but significant barriers too often impede their planning and deployment. Finding viable sites, securing project financing, and connecting AEC projects to the grid all represent significant challenges. The PAEC project is designed to overcome these barriers and establish a replicable model that can be used by other communities across California and beyond. The results of the PAEC will inform future action by policymakers, municipalities and other governmental agencies, utility executives, and other relevant audiences.

The goals and objectives of this project are to:

- Incentivize and accelerate the planning, approval, financing and deployment of AECs
- Reduce the time, cost, and uncertainty associated with permitting and interconnecting commercial-scale solar and other DER
- Leverage ZNE, efficiency, local renewables, energy storage, and other DER to reduce 25 MW of peak energy across San Mateo County, which will strengthen the grid,
- Reduce use of natural gas, and minimize the need for new energy infrastructure
- Create a model project and project elements that can be replicated throughout California and beyond

To support municipalities to enact new policies related to both new construction and existing buildings, DNV GL assessed how the risks and uncertainties surrounding the design, permitting, and planning of advanced energy communities can be minimized or addressed.

b. Purpose

The overall purpose of this objective is to recommend regulatory changes that PAEC municipalities should adopt to facilitate the planning and deployment of AECs. The PAEC project team previously developed a comprehensive list of potential policies to analyze for energy, economic, and environmental benefits and barriers.

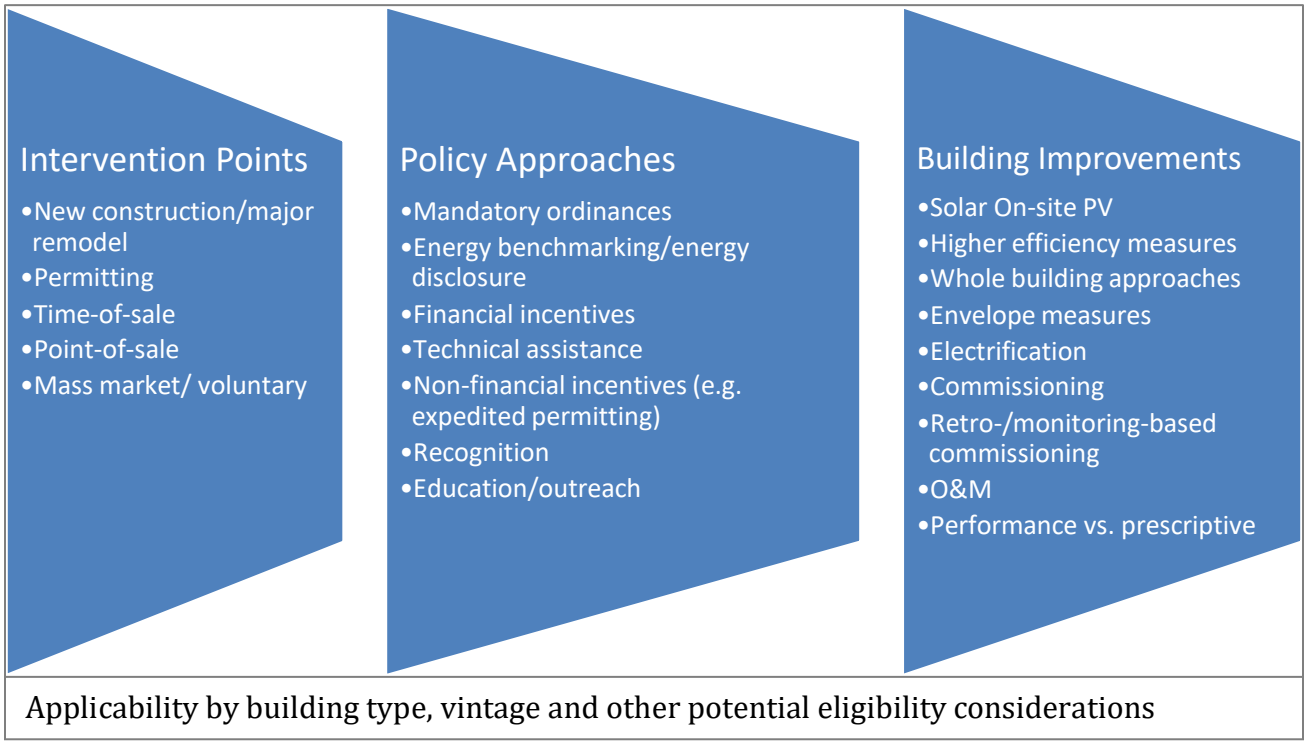
A wide range of policy instruments are available to municipalities to influence community behavior and adoption of new AEC technology at key intervention points related to permitting of new construction, major remodels, as well as in existing buildings. Figure 1 provides a graphical representation for a framework for considering a range of AEC regulatory and policy changes. Regulatory and policy approaches can be organized along three key parameters:

1. Intervention points – opportunities for cities can influence building characteristics in their community

2. Policy approaches – types of policies, programs and initiatives
3. Building improvements – specific building components targeted by city policy

Finally, regulatory approaches may also be tailored based on building type (e.g., residential or commercial), building vintage and other building/project specific considerations (e.g., geographic/neighbourhood considerations).

Figure 1. Framework for considering a range of AEC regulatory and policy changes



The PAEC project examined both mandatory ordinances, as well as the economics associated with voluntary energy upgrades and retrofits of existing buildings. In this report, we examine opportunities for municipal regulatory changes to increase process certainty that supports AEC design and implementation.

II. Mandatory Ordinances

Mandatory ordinances represent the strongest policy approach available to cities and are most applicable to advancing AEC buildings through the city permitting process. A permit is generally required for a wide range of projects such as new construction, additions, remodeling, and repairs to electrical, mechanical, and plumbing systems.

To achieve the desired outcome, a set of eight mandatory ordinances were selected for cost-benefit analysis. To recommend 2-3 policies for further development, the following mandatory ordinances were analyzed, based on quantitative and qualitative criteria:

1. **Policy 1-EV-MF. Electric Vehicle Charging Infrastructure (EVCI) cost-share for existing multi-unit residential buildings**. It is well-known that there are significant barriers for tenants of multi-unit residential buildings to access electric vehicle charging infrastructure for overnight charging, compared with residents of single family homes. Existing state law requires multi-unit residential building owners to allow tenants to install EVCI. The benefit-cost analysis explored the financial and environmental impacts of requiring the building owner to provide a 50% cost-share.
2. **Policy 2-EV-NC. Electric vehicle fast chargers for new retail buildings.** Many cities are exploring reach codes that extend beyond the California Green Building Standards Code to require pre-wiring or full installation of EVCI in new construction. The benefit-cost analysis explored the financial and environmental impacts of requiring electric vehicle fast chargers at retail new construction, to supplement workplace and home charging networks and address "range anxiety" with longer electric vehicle trips.
3. **Policy 3-PV. Solar carports for new commercial buildings.** While some cities are exploring mandatory rooftop solar PV requirements for new construction, parking lots potentially offer cost-effective opportunities for larger distributed solar projects with favorable economics. The benefit-cost analysis explored the financial and environmental impacts of a local requirement for large surface-level parking lots to install solar carports.
4. **Policy 4-HP-MF. Electric heating system installation for new multi-unit residential buildings.** As our electricity mix becomes cleaner and closer to 100% renewable, cities are particularly interested in technologies and initiatives to reduce natural gas consumption in buildings. This benefit-cost analysis explored the financial and environmental impacts of a local requirement for all new multi-unit residential buildings to utilize heat pump technology for space and water heating.
5. **Policy 5-HP-NC. Electric heating system installation for new commercial buildings.** Similar to Policy 4-HP-MF, this benefit cost-analysis explored the financial and environmental impacts of a local requirement to utilize heat pump technology for space and water heating for all new commercial buildings.
6. **Policy 6-EE-MF. Time of sale audit and disclosure for existing multi-unit residential buildings**. In the past few years, cities have struggled to adopt new time-of-sale energy use disclosure requirements for single family residential, due to the opposition of well-organized local realtors. In the effort to support local efforts, this benefit-cost analysis examined the financial and environmental impacts of

requiring an energy audit with energy efficiency recommendations for existing multi-unit residential at time-of-sale.

7. **Policy 7-EE-COMM. Time of sale audit and disclosure for existing commercial buildings.** Existing state law Assembly Bill 802 requires energy use disclosure for existing commercial buildings. This benefit-cost analysis explored a requirement for an energy audit at time-of-sale, with recommendations for energy efficiency upgrades, in addition to the state requirement.
8. **Policy 8-EE-NC. Measurement & verification for new commercial buildings.** Recognizing that the California Building Energy Efficiency Standards focuses on the design of new buildings (and major alterations) with no enforcement beyond certificate of occupancy, some cities are interested in exploring policy approaches to ensure that occupied buildings perform as designed. The benefit-cost analysis explored a city policy that requires measurement and verification of new commercial buildings.

a. Methodology for Assessing Potential for Regulatory Changes

As previously described, the team analyzed each policy across a set of quantitative benefits and costs, summarized below in Table 1.

Table 1: Quantitative benefit-cost analysis results – all policies

Policy #	Total Annual Energy Savings	Annual Profit and/or Cost Savings ($/yr)	Payback (years)	Annual GHG Reduction (MT CO2)
1-EV-MF	630 gallons of gasoline	$ 1,028	2.5	5
2-EV-NC	10,005 gallons of gasoline	$ 5,713	5.7	87
3-PV	143,052 kWh	$ 33,811	7.0	15
4-HP-MF (space heating)	4,920 kWh*	$ (1,159)	No payback	1
4-HP-MF (water heating)	15,010 kWh*	$ (515)	No payback	2
5-HP-NC (space heating)	9,592 kWh*	$ (286)	No payback	1
5-HP-NC (water heating)	4,939 kWh*	$ (167)	No payback	1
6-EE-MF	21,701 kWh*	No cost savings for seller	No payback	2
7-EE-COMM	54,626 kWh*	No cost savings for seller	No payback	6

Policy #	Total Annual Energy Savings	Annual Profit and/or Cost Savings ($/yr)	Payback (years)	Annual GHG Reduction (MT CO2)
8-EE-NC	29,300 kWh*	$ 6,925	15.9	3

*Denotes net energy savings (based on both therms and electricity)

In addition to the quantitative analysis, each policy was also evaluated against a set of qualitative criteria for societal benefit, as shown below in Table 2.

Table 2: Qualitative assessment of benefit-cost criteria – all policies

Policy #	Minimize Fossil Fuel Use	Innovate on tech or deploy	Regulatory Ease	Community Benefits (health, jobs, etc.)
1-EV-MF	high	med	low	low
2-EV-NC	high	high	low	med
3-PV	low	med	high	med
4-HP-MF (space heating)	high	high	low	low
4-HP-MF (water heating)	high	high	low	low
5-HP-NC (space heating)	high	high	low	Low
5-HP-NC (water heating)	high	high	low	Low
6-EE-MF	low	med	med	med
7-EE-COMM	low	med	med	med
8-EE-NC	low	low	med	med

To determine the high, medium or low assessment, the project team considered the following factors associated with each qualitiative criteria:

- **Minimize fossil fuel use.** At the building project scale, what is the relative impact on reducing fossil fuel usage, based on the annual GHG reduction?
- **Innovate on technology or deployment.** To what extent does the policy promote or remove barriers to the deployment of new clean energy technology?
- **Regulatory ease.** From a political and city staff effort perspective, how easy would it be to pass the ordinance through a public process with Council approval?

- **Community benefits** (health, jobs, and infrastructure). To what extent are there multiple co-benefits beyond simply energy, cost, and greenhouse gas emissions savings?

b. Recommendations for Regulatory Changes

In order to recommend regulatory changes for further development, the quantitative and qualitative criteria were scored. Each criteria was weighted for importance and scored via a low, medium, and high scale (1-3 points). The resulting scores prioritized policies for further analysis and development, including permitting considerations.

Each criteria was weighted for importance and scored via a low, medium, and high scale, as detailed below:

- All indicators were weighted equally for the initial analysis (5).
- A negative or no payback was scored low (1), a short payback (<2 years) was scored high (3), and a high payback of (>2 years) was scored medium (2.).
- Annual greenhouse gas emissions of 1 – 4 MT CO_2 was scored low (1), emissions of 5 – 15 MT CO_2 was scored medium (2), and >15 MT CO_2 was scored high (3).
- For fossil fuel use, innovation in technology or deployment, regulatory ease, and community benefits, scores were assigned based on a low (1), medium (2), and high (3) scale.

To results of the scoring exercise were color-coded, as seen below, to indicate high scoring policies. Green indicates a high score, yellow indicates a medum score, and red indicates a low score.

Table 3: Summary of Scoring of Potential Mandatory Ordinances

Policy #	Payback	Payback score	GHG Reduction Score	Fossil Fuel Use Score	Innovation Score	Regulatory Ease Score	Community Benefits Score	OVERALL SCORE
Weighting		5	5	5	5	5	5	
1-EV-MF	1.97	3	2	3	1	1	1	55
2-EV-NC	5.69	2	3	3	3	1	2	70
3-PV	7.01	2	2	1	2	3	2	60

Policy #	Payback	Payback score	GHG Reduction Score	Fossil Fuel Use Score	Innovation Score	Regulatory Ease Score	Community Benefits Score	OVERALL SCORE
Weighting		5	5	5	5	5	5	
4-HP-MF (space heating)	No payback	1	1	3	3	1	1	50
4-HP-MF (water heating)	No payback	1	1	3	3	1	1	50
5-HP-NC (space heating)	No payback	1	1	3	3	1	1	50
5-HP-NC (water heating)	No payback	1	1	3	3	1	1	50
6-EE-MF	No payback	1	1	1	2	2	2	45
7-EE-COMM	No payback	1	2	1	2	2	2	50
8-EE-NC	15.88	2	1	1	1	2	2	45

The highest scoring policies identified for policy language development are:

- Policy 1-EV-MF. Electric Vehicle Charging Station Ordinance for Cost-Share in Leased Buildings.
- Policy 2-EV-NC. Electric Vehicle Fast Charger Ordinance for New Large Retail Buildings.
- Policy 3-PV. Ordinance for Solar Photovoltaic Carports on New Parking

Due to interest from PAEC stakeholders, one additonal policy was included that encompassed Policy 4-HP and Policy 5-HP for zero carbon thermal systems for new construction.

Based on the PAEC Workshop #1 held on May 22, 2017, local government stakeholders reviewed the results of the benefit-cost analysis and provided input on updated model ordinance policy language. For Policy 1-EV-MF, stakeholders were interested in a lower threshold of building owners providing more access to Level 1 chargers. As a result of the

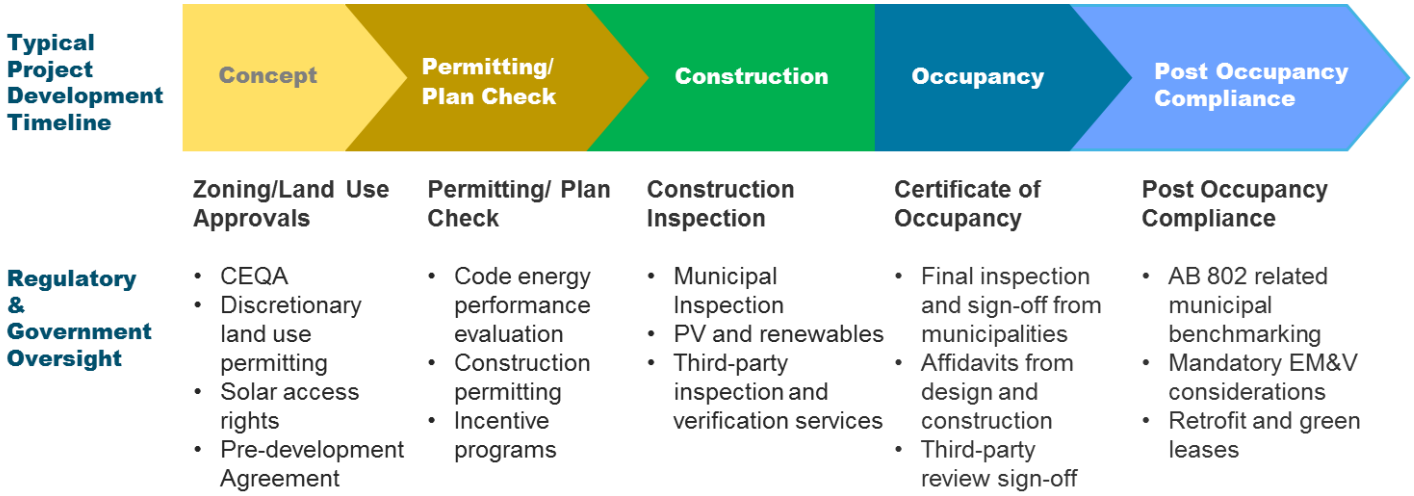
stakeholder outreach, we recommend that cities assess opportunities to require building owners to make Level 1 chargers available to tenants.

To achieve the vision of the Peninsula Advanced Energy Community (PAEC) requires innovation and leadership from our local jurisdictions. For the ordinances considered above, the mandatory ordinances are intertwined with city permitting processes. Below, we explore how to develop a replicable model for permitting considerations that can be used by other communities across California and beyond.

c. Permitting Recommendations

Of the four ordinances selected for further development, three were related to new construction. **Figure** 2 provides an overview of the typical new construction project development timeline and associated regulatory oversight activities by municipalities.

Figure 2: Typical Project Development Timeline and Municipal Oversight



Source: DNV GL

Each city must incorporate new mandatory ordinances into each step of the project development timeline, from entitlement of initial project concept to plan check and issuance of building permits to final inspection and issuance of certificate of occupancy.

AECs require a comprehensive approach to utilizing a range of technologies community-wide including solar electricity, energy storage, and other distributed energy resources (DER,) low or zero net energy (ZNE) buildings, and solar emergency microgrids (SEM), and electric vehicle charging infrastructure. Therefore, municipalities will need to utilize all

policy levers in its "toolbox" for new construction in the implementation of AEC programs. Table 4 identifies a set of process documents needed by municipalities to facilitate the implementation of new mandatory ordinances related to AECs.

Table 4: AEC Project Review Process Documents for Permitting

Type	Examples of AEC Program Documents
Program Outreach Documents	• 1-page AEC program summary • Timeline and workflow diagrams • Informational Bulletins for project teams
Project Applicant Facing Program Documents	• AEC Consistency Checklist for Entitlement Applications • AEC Submission Checklist for Permitting • Detailed Submission Guidelines • Inspection Guidelines and Checklist
Internal City Review Documents	• AEC Entitlement Review Checklist • Design Review Checklist and Protocols • Final Design Review Sign-off Form • Library of Stock Review Comments • Quality Control Process Documents • Internal tracking protocol document

Finally, as part of Task 2, while most of the ordinances addressed new construction, we did include one mandatory ordinance related to existing buildings. The model ordinance Policy 1-EV-MF is designed to promote electric vehicle charging infrastructure installations (with 50% cost-share for tenant requested Level 2 charging and 100% cost-share for Level 1 requests) at existing multi-family housing. In addition to the cost-share requirement, cities can also facilitate these installations through streamlining permitting processes, which are the same as those identified in the Task 2.1 Best Practices Report. These include:

- Clear and regionally consistent forms, directions, and procedure available via the city website, ideally including electronic signatures and/or submittals. In the absence of an online permitting platform, cities should provide fillable PDF applications and compliance documents to decrease in-person wait times at the building department.
- Waiving permitting and plan check fees (up to certain threshold, if desired) for EV charging station installations.
- Developing and implementing plan review and inspection checklists to expedite the review process.

In the development of recommendations related to mandatory ordinances, some concern was raised by PAEC project stakeholders that requiring sizable solar PV carports may exacerbate issues related to the "duck curve" and steeping ramping requirements in the shoulder-periods of the day at certain times of the year. AECs should consider ways to potentially combine solar PV carports with energy storage for electric vehicle charging. More research is needed in this area, and streamlining permitting for both energy storage and electric vehicle charging infrastructure is needed. Furthermore, vehicle-to-grid opportunities related to two-way communication with EV charging infrastructure is being explored and is an important area of research for grid services.

In addition, a significant body of research exists related to streamlining permitting of solar PV systems, culminating in California Assembly Bill 2188 Expedited Solar Permitting Act, which was passed in 2014. AB 2188 required California cities and counties to adopt an ordinance to create a streamlined, expedited permitting process for small residential rooftop solar energy systems by September 30, 2015. Cities and counties were required to:

- Adopt a checklist of all requirements for a system to be eligible for expedited review.
- Approve applications where the jurisdiction determines that the application is complete and meets all prescribed requirements.
- Allow the use of electronic signatures on relevant permitting documents unless a jurisdiction is unable to process them.
- Allow for electronic submittal of the expedited permit documents.
- Adopt a single inspection, subject to certain exceptions, that must be performed in a timely manner.

This approach should be utilized for other AEC projects for existing buildings, including larger solar PV carport systems, as well as combined with energy storage and electric vehicle charging infrastructure. These include:

- Developing a standardized list of required documents, and where possible, an over-the-counter or electronic approval process.
- Expediting permitting for solar photovoltaic carports that generate and/or have the capacity to store a certain percentage of the project's energy needs.
- Waiving permitting and plan check fees (up to a certain amount, if desired) for solar photovoltaic carports and energy storage systems.

III. Conclusion

The success of the Peninsula Advanced Energy Community relies on challenging and informing our communities how to explore and take advantage of new opportunities for innovation in policy and streamlining permitting processes. Based on the research conducted to-date, integrated clean energy technology opportunities are expanding rapidly, and at a much faster rate than policy innovation. Cities need support in engaging its stakeholders to develop the necessary internal checklists and processes to streamline permitting of AEC projects.

This report presents a methodology for prioritizing a set of model ordinances for further development, and associated recommendations for local government interventions in both existing buildings and new construction. The report also recommends steps that PAEC communities should take to update and streamline regulations, ordinances, and other laws and procedures relating to AEC projects, including permit approvals. Streamlining will facilitate the approval of AEC projects and reduce the time, cost, and uncertainty in planning, financing, and deploying them.

Through extensive collaboration with multiple cities, San Mateo County, PG&E, a local fire district, multiple school districts, numerous developers and major property owners, the Clean Coalition's work and leadership in this area will help incentivize and accelerate the planning, approval, financing, and deployment of AEC projects in the PAEC region.

The next steps in the PAEC initiate will include developing a case study documenting actions taken to reduce the time, project costs, and administrative costs to plan and permit an AEC.