Clean Coalition

Making Clean Local Energy Accessible Now

Peninsula Advanced Energy Community (PAEC)

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PAEC Partners

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Peninsula Advanced Energy Community (PAEC) Project Partners

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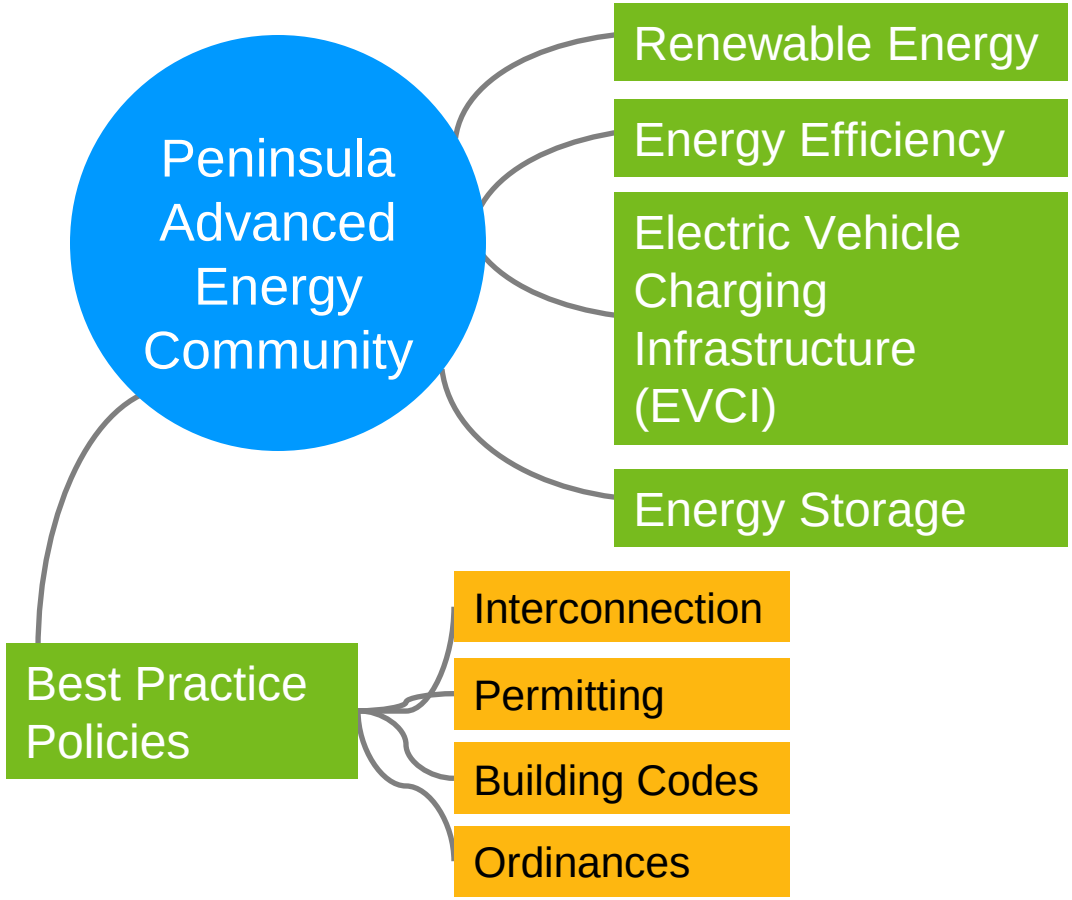
PAEC Technical and Policy Solutions

PAEC Phase 1
Planning and Design



PAEC Phase 2
Deployment of a Model Project

PAEC1 + Solar Emergency Microgrids

- Solar PV
- Energy Storage (Battery backup for critical loads)
- EVCI
- Monitoring, Communications & Control (MC^2)

PAEC Technical Advisory Committee Meeting
Agenda Overview

Clean Coalition

9:00 AM **Welcome & Introductions**

9:10 AM **Expectations for Today**

9:15 AM **Policy Solutions Update:**

- Streamlining of Local Government Planning and Permitting including Energy Storage
- Streamlining the Interconnection of Advanced Energy Communities

9:45 AM **Technical Solutions Update:**

- Solar Siting Survey
- Solar Emergency Microgrid (SEM)
- Electric Vehicle Charging Infrastructure (EVCI) Master Plan

PAEC Technical Advisory Committee Meeting
Agenda Overview

Clean Coalition

10:15 AM **Modeling Overview:**

- Finance and Business Models for Advanced Energy Communities
- Green Lease Language: Landlord-Tenant Collaboration for an Advanced Energy Future

10:45 AM **Showcase Project:**

- Town of Atherton Civic Center Sustainability Features

11:00 AM **PAEC Phase 2 Deployment Project**

11:20 PM **Q&A, Next Steps, and Closing Remarks**

12:00 PM **Adjourn**

Policy Solutions Updates

MENLO SPARK

Peninsula Advanced Energy Communities

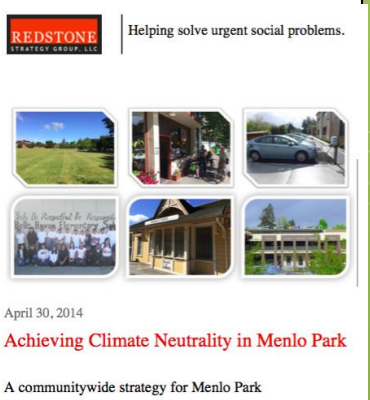
Task 2: Best Clean Energy Practices & Gap Analysis

TAC Meeting
July 25, 2017

Diane Bailey, Menlo Spark

City Clean Energy Measures

- **Clean Energy Categories:**
  - **Renewables (RE),**
  - **Energy Efficiency (EE),**
  - **Zero Net Energy (ZNE)**
  - **Electric Vehicle Charging Infrastructure (EVCI)**
- **General Survey** of Best Practices that have been successful in **U.S. Cities & Abroad**.



Gap Analysis Key Findings

- **Summary of Local Policies**: in Atherton, East Palo Alto, Menlo Park, Redwood City, & San Mateo County (PAEC Corridor)
  - Each area had a measure that stood out as an example & each could benefit from additional improvements on RE, EE, ZNE, and EVCI.
- **Findings**
  - Cities + SMC are more likely to adopt additional clean energy policies with technical and legal assistance developing the measures
    - limited staffing & resources also favors 3rd party approaches
  - Much of the region is comprised of old buildings that would benefit greatly from deep energy retrofits.

Thank You!

MENLO SPARK
Climate Neutral for a Healthy, Prosperous Menlo Park

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Peninsula Advanced Energy Community (PAEC)
Task 2.2: Best Practices Report

Prepared for
California Energy Commission
1516 Ninth St., MS-51
Sacramento, CA 95814

Prepared by
Diane Bailey, Menlo Spark
405 14th Street, Suite 164
Oakland, CA 94612

June 2017

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Climate Neutral for a Healthy, Prosperous Menlo Park

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Peninsula Advanced Energy Community (PAEC)
Task 2.4: Gap Analysis

Prepared for
California Energy Commission
1516 Ninth St., MS-51
Sacramento, CA 95814

Prepared by
Diane Bailey and Clayton Birkes, Menlo Spark
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June 2017

Task 2: Model Ordinances

Potential ordinances eligible for assessment followed the following guidelines:

- No model ordinances currently existed, or were under development.
- Local jurisdictions had expressed interest in benefits or specific ordinances.
- Requirements would push boundaries of AEC for innovation.

The team conducted extensive research into available and verifiable data for each potential ordinance to estimate:

- Cost to install, operate, and maintain the various aspects of the policies, including equipment, design, permitting, etc.
- Current incentive and rebate programs

Task 2: Model Ordinances Analysis

All twelve potential ordinances were compared via the following measures:

Quantitative calculations:

- Energy cost savings
- Payback period
- GHG reduction

Qualitative criteria for societal benefit:

- Minimize fossil fuel use
- Innovation
- Regulatory ease
- Community benefits

Task 2: Model Ordinance Selection

The results prioritized the following ordinances for model language development:

- 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
- Policy 4/5-HP. Ordinance for Zero Carbon Thermal Systems for New Construction

Sovereign Energy Storage
PAEC: Tasks 2 and 3

PREPARED FOR:

Peninsula Advanced Energy Community

7/25/2017

PAEC Tasks 2 and 3 Goals (Energy Storage)

Task 2: Streamlining Local Government Planning and Permitting

- Survey permitting processes for energy storage in California; make policy recommendations and suggestions to implement best practices

Task 3: Finance and Business Models for Advanced Energy Communities

- Create a cost-benefit and value-stream analysis of distributed energy storage systems that could be used for multiple purposes
- Identify and develop innovative financing arrangements for local renewables, energy efficiency, and energy storage

PAEC Task 2 Findings Summary

- Sovereign Storage surveyed the planning and fire departments for San Francisco, Los Angeles, San Mateo, Alameda, Contra Cost, and Santa Clara counties to understand current requirements for energy storage facility permitting
- Sovereign found that most permitting agencies had a streamlined over-the-counter process similar to residential roof-top PV. All agencies required construction plans and fire mitigation information.
- Across developers of distributed energy storage systems, permitting was not the greatest bottleneck – developers found that although they had to work with some permitting agencies to help shape guidelines, they were far more concerned with tariff risk and the ability to finance projects

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Peninsula Advanced Energy Community

Task 4: Streamlining Interconnection

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Task 4.1 Best Practices Report: Interconnection

- *'Best Practices Report: Interconnection for Local, Commercial-Scale, Renewable Energy Projects - Streamlining The Interconnection Of Advanced Energy Solutions To The Grid'*
  - Draft completed on schedule and accepted by CEC
  - Importance of streamlining interconnection
  - Review: Best practices for interconnecting small WDG
    - Information sharing processes
    - Transparent application and review processes
    - Predictable and Reasonable Timelines
    - Queue management
    - Dispute resolution procedures
    - Cost-certainty
    - Cost-sharing for Electrically Related Project
    - Automation and online interconnection portals
  - Model Interconnection Process for small WDG
  - Recommendations not yet implemented
    - Standardized interconnection fee structure
    - Continued automation of the interconnection approval process
    - Combined interconnection applications for distributed energy resources aggregations
    - Timelines for service planning, construction of upgrades, and meter installations
    - Allow for competition in utility upgrades
    - Energy Storage

Task 4.3 Streamlined Interconnection Pilot

- Goal: Replicate the streamlined NEM interconnection review and pricing process for qualified wholesale applicants
- Pilot: Expedited Review & Pre-determined Fixed Interconnection Fee
  - Pending PG&E approval
- Core Pilot Components
  - Eligibility: ICA Qualifying Projects Below 1 MW
  - Guaranteed Fast Track Review
  - Standardized Interconnection Fee
  - Shared Use of Existing Service Lines for Interconnection
- Additional Components (Phase I or II)
  - Automate the Interconnection Approval Process for ICA Compliant Projects
  - Confidentiality of Interconnection Information
  - Explore Enhanced ICA Data & Modeling Access
  - Allow Combined Interconnection Applications for DER Aggregations
  - Upgrades: Utility Ownership (without transfer)
  - Qualified Third Party Upgrade Bid and Construction

Technical Solutions Updates

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PAEC Task 8, Solar Siting Survey and Task 5 Solar Emergency Microgrid Overview

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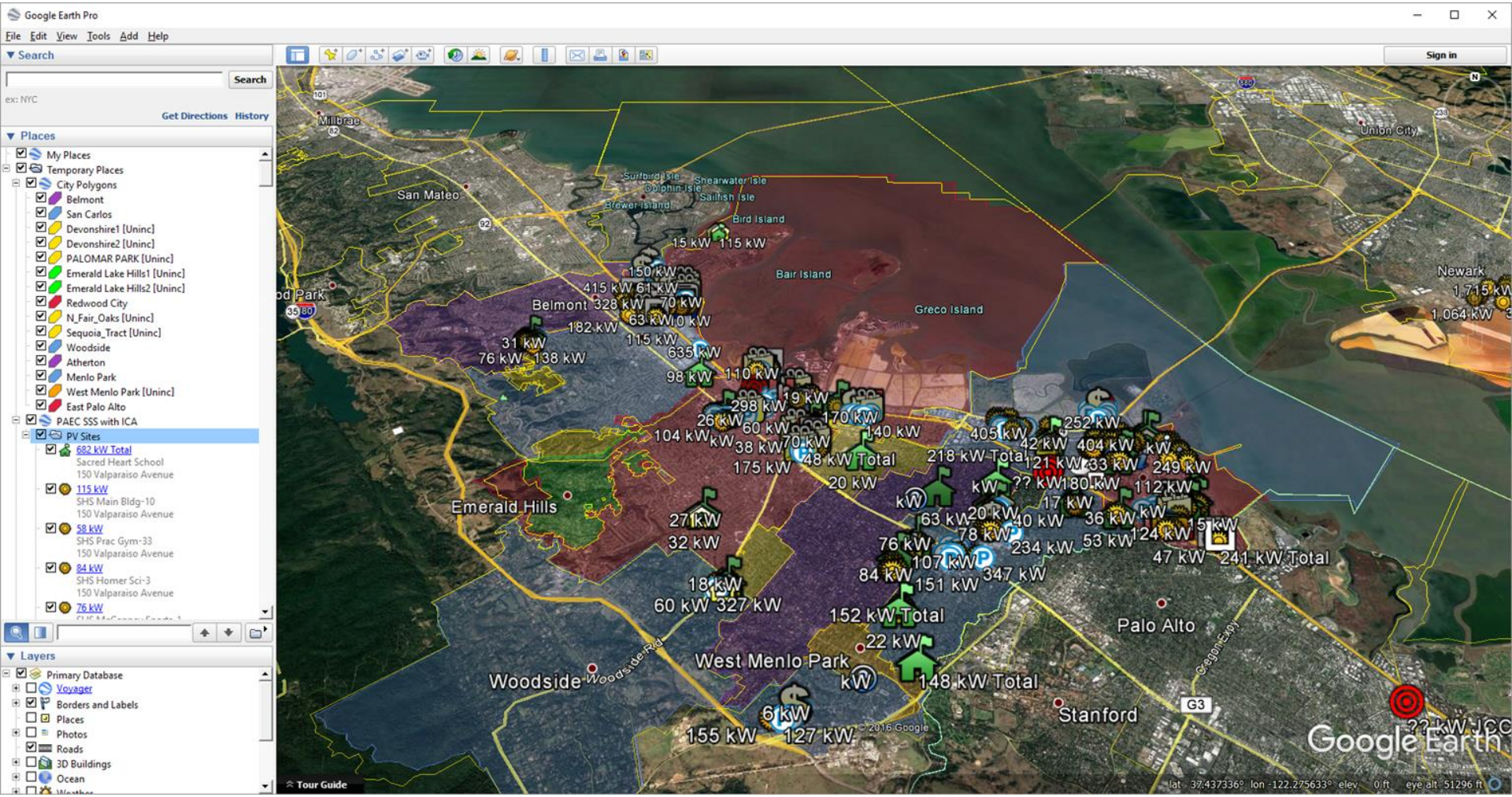
Task 8: Solar Siting Survey Goals and Objectives

- Goals
  - Identify commercial, industrial, and multifamily rooftops and parking lots that have potential for hosting large amounts of PV
  - Provide information in actionable formats
- Objectives
  - Identify structures or aggregations with potential to host about 100 kW AC or more
  - Provide sufficient information to take action on identifying property owners or managers for outreach

Solar Siting Survey Methodology

- Process:
  - Define areas to be surveyed
  - Scan Google-Earth for high value sites with
    - large rooftops
    - aggregations of closely related smaller rooftops
    - parking lots
    - parking garages
  - Limit generation size to about 100 KW AC
- Tools Used for Siting and Delivering the Potential Sites:
  - Survey and coordinates: Google-Earth
  - Database and .kml generation: Excel
  - Addresses and site names: Google-Maps, Bing Maps, MapQuest
  - Alternate display app: Google-Maps

PAEC Survey Overview Display in Google Earth



Survey Example of Detailed Information with ICA

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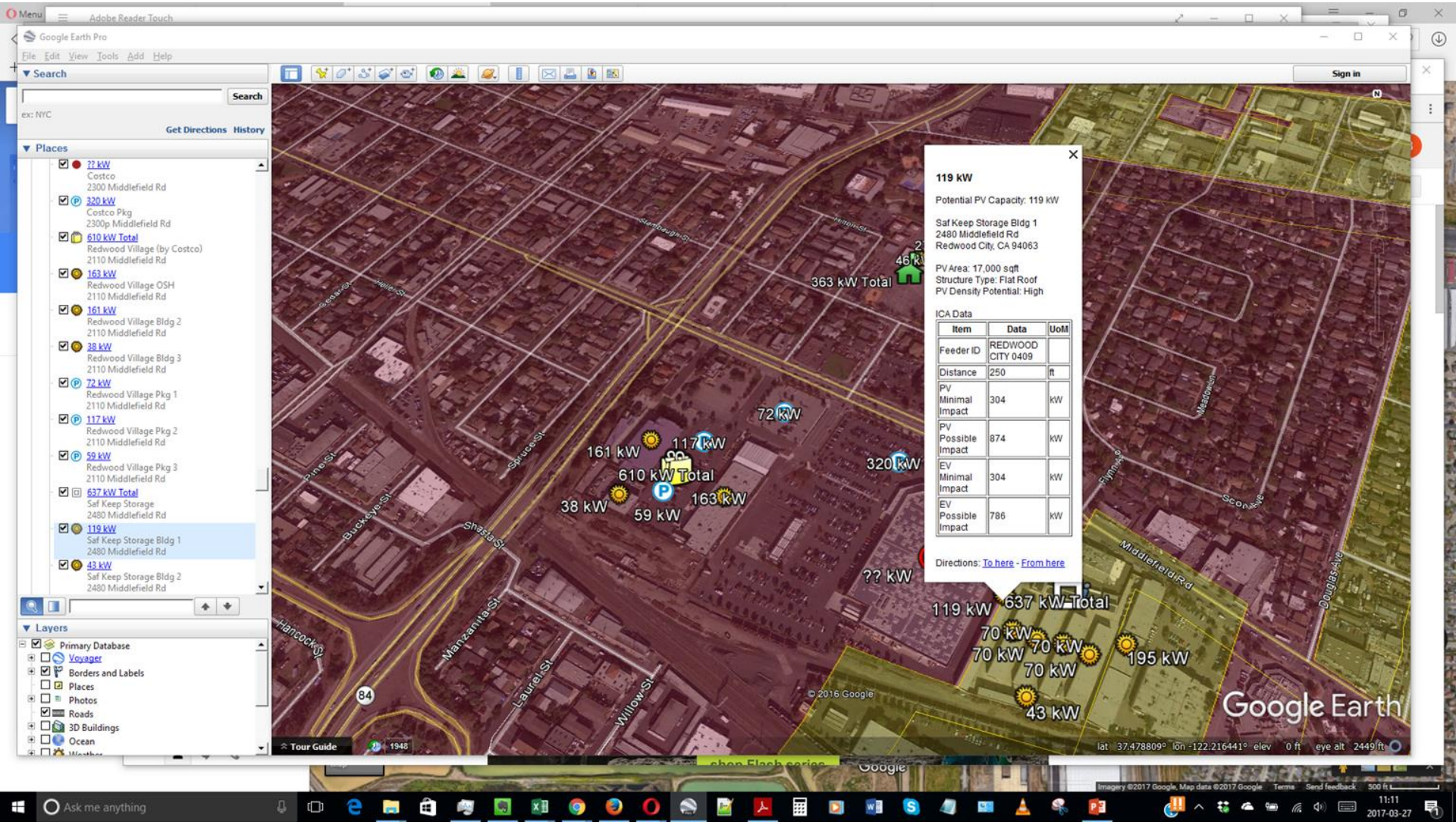


Task 8 SSS Summary

- Key Findings:
  - Over 65 MW of PV potential can be easily found at the 100 kW minimum level.
- Key Takeaways:
  - Parking lots and garages are very under-utilized, comprising over 40% of the total.
- Tie-in to Overall Objectives:
  - The capacity to site PV on commercial, industrial, and civic rooftops is waiting to be utilized.

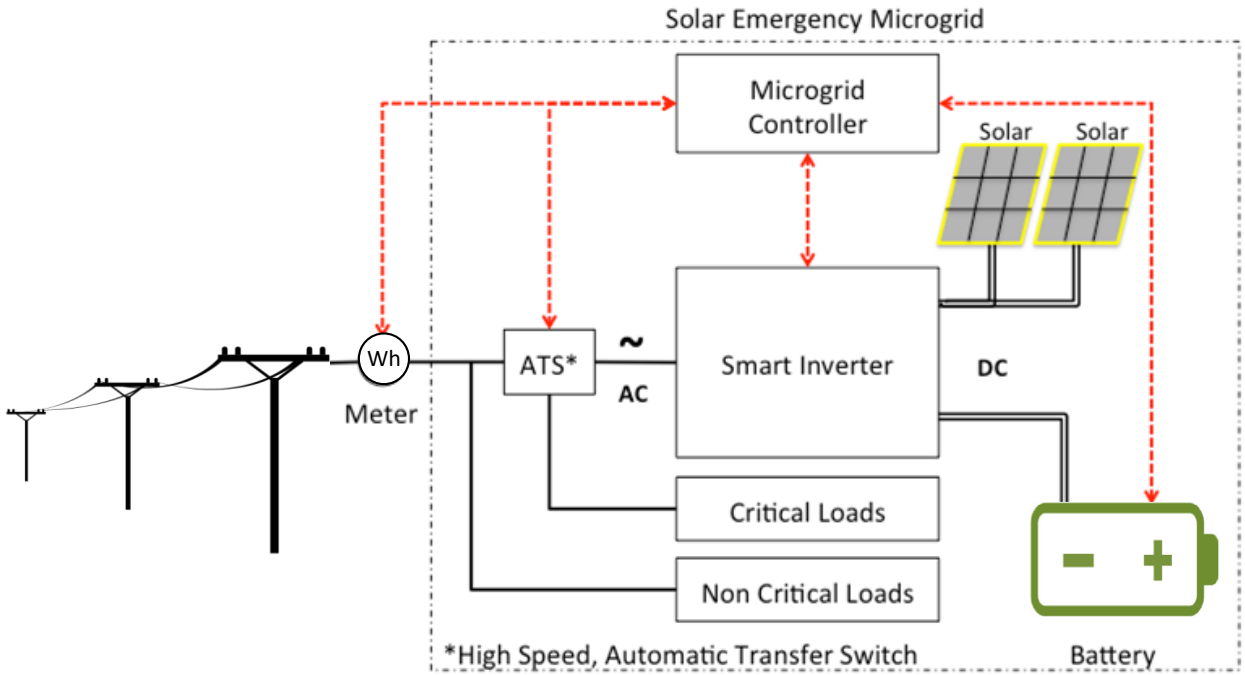
Task 5: Solar Emergency Microgrid Goals and Objectives

- Goals:
  - Identify potential locations that are near to sites or already providing services that would be vital to a community in the event of a regional emergency

- Objectives:
  - Focus on sites with extra attributes:
    - In a CalEnviroScreen top quartile disadvantaged zone
    - Not in FEMA high risk flood zone
  - Ensure there is sufficient room for all microgrid components
  - Find property owners whose goals align with community service

Solar Emergency Microgrid Overview

- A Solar Emergency Microgrid (SEM) has 3 basic components:
  - PV generation, energy storage, and monitoring, communications & control
- A SEM provides indefinite back-up power for critical loads
  - Ideal for police and fire stations, emergency operations centers and shelters, critical communications and water infrastructure, etc.
- A SEM displaces dirty, expensive, non-renewable diesel generators



Potential Sites Under Consideration in RWC, EPA

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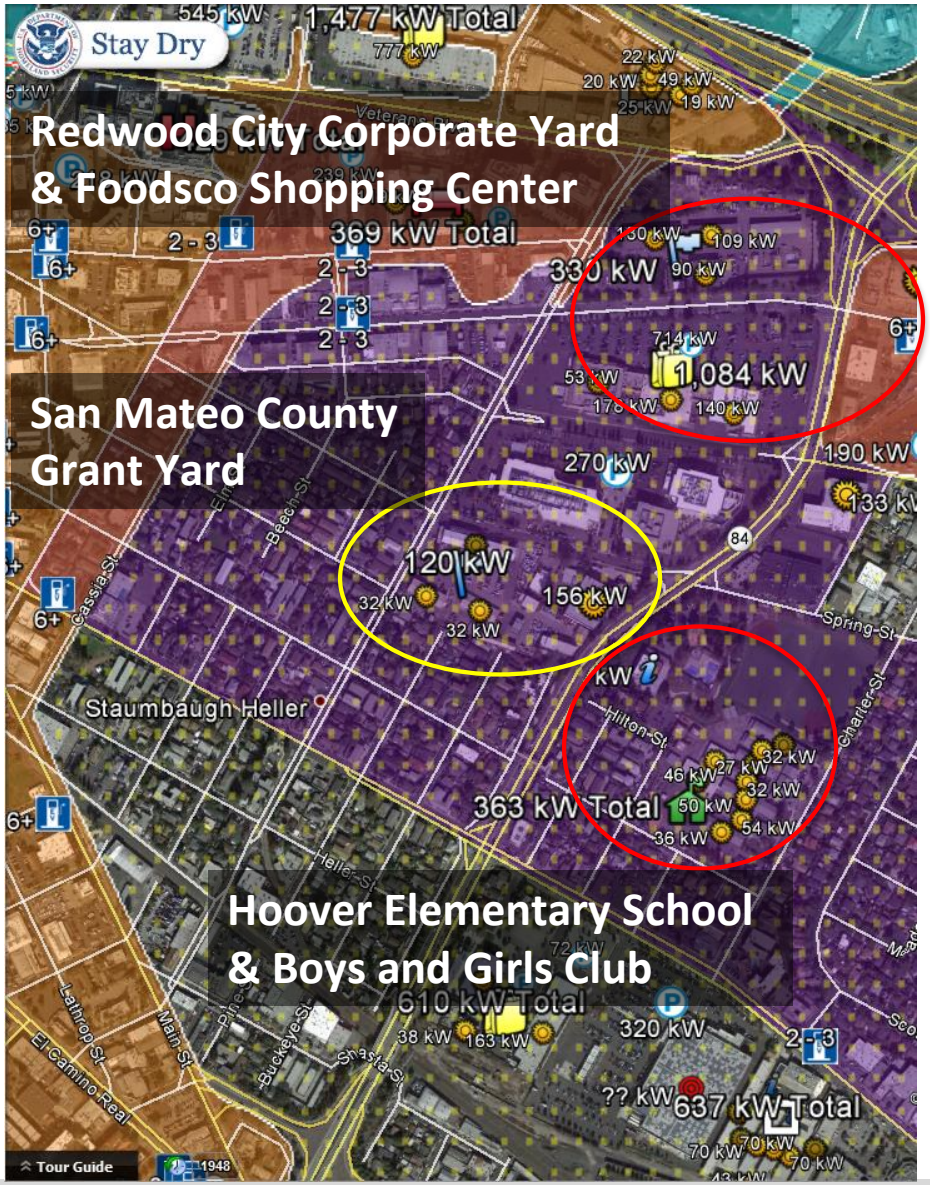

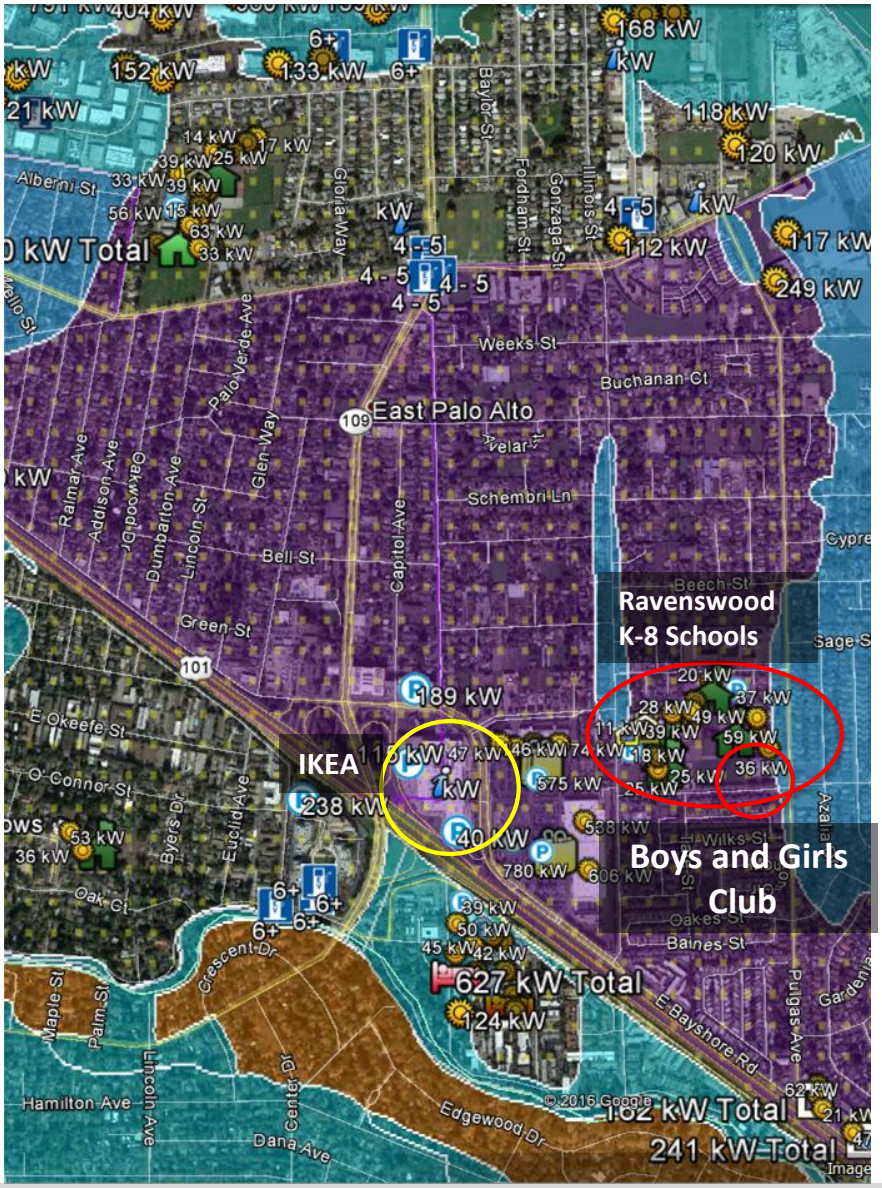

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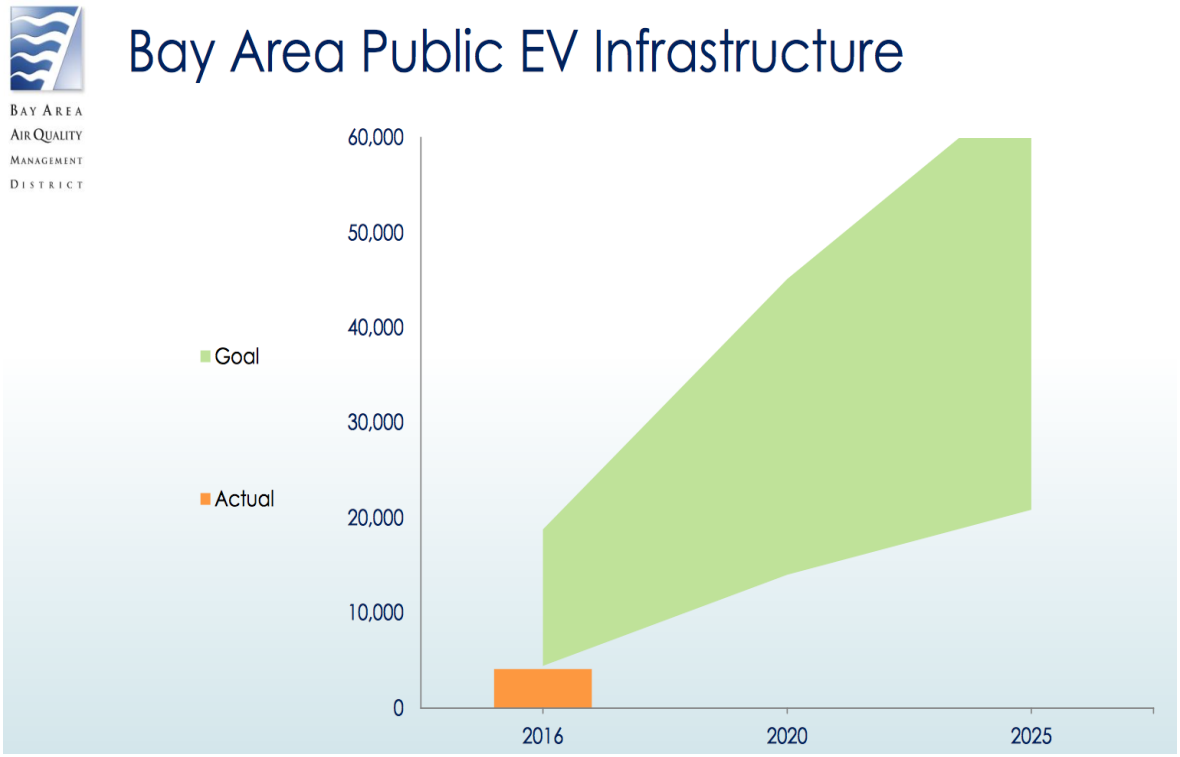
PAEC Task 6: Electric Vehicle Charging Infrastructure Master Plan



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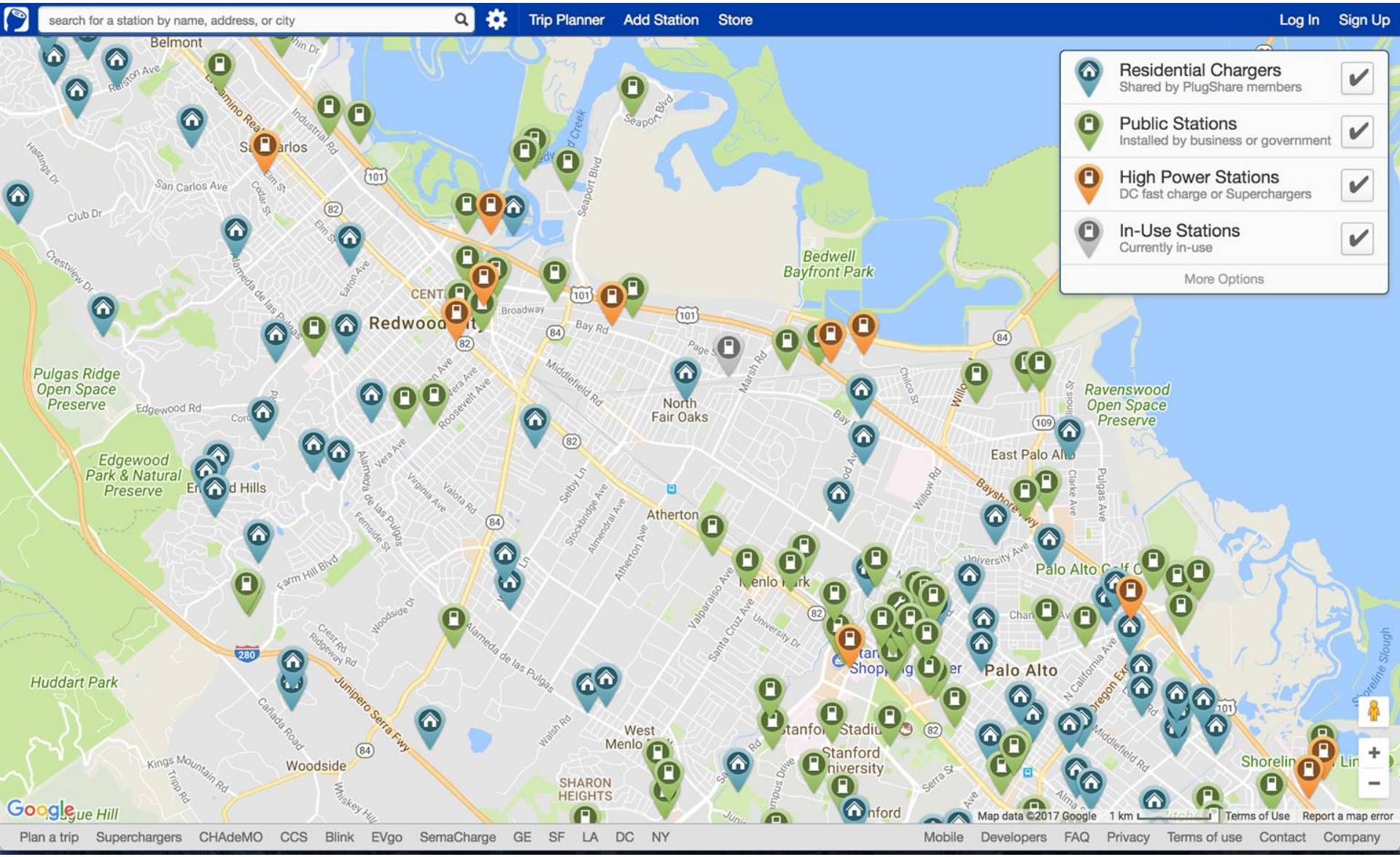
Available EVCI in PAEC Region: Plugshare

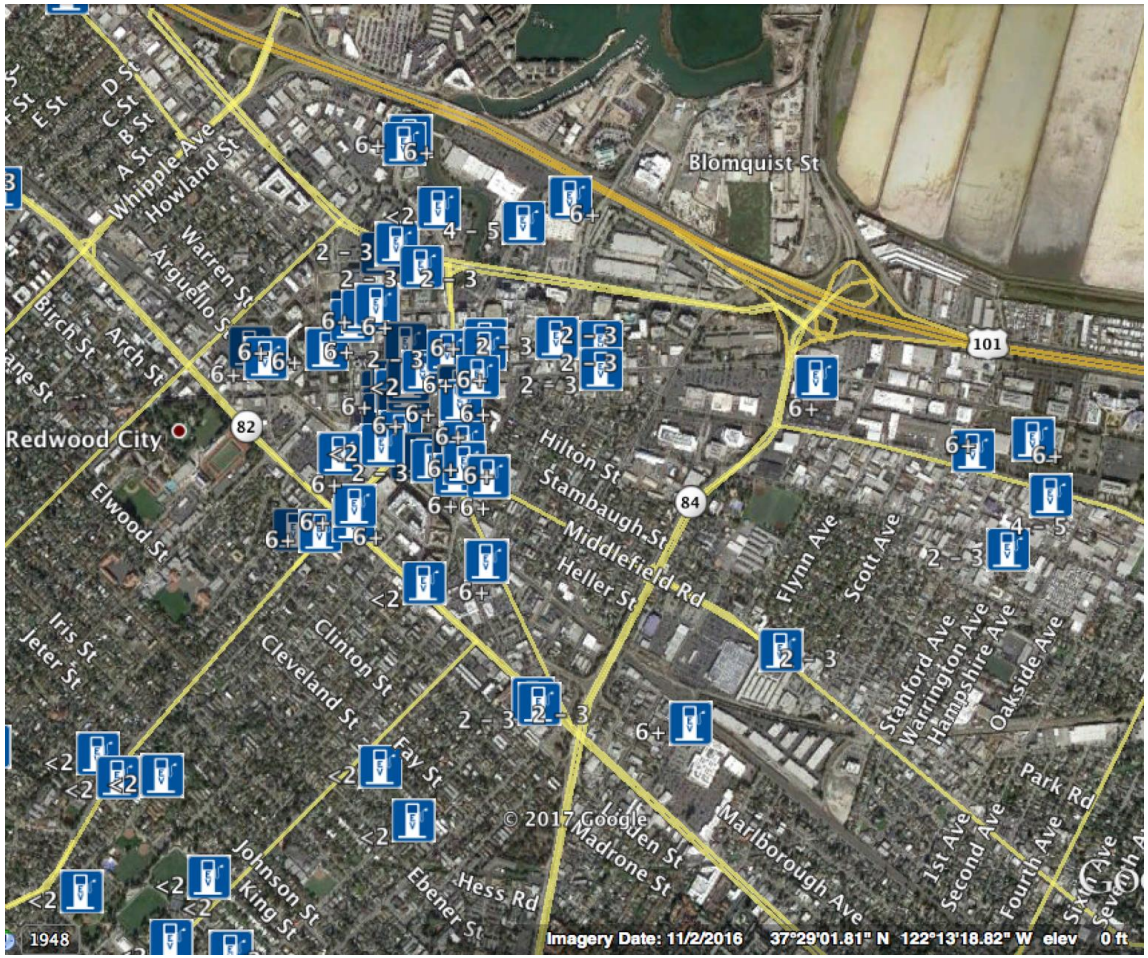


EVCI Master Plan: RWC & Key Components

RWC is the lead site for EVCI Master Plan

Key Components:

- Projected EVCI demand
- Economics and financing plans
- Physical locations of EVCI
- Feeder locations and hosting capacity



City & County: EVCI Support & Guidance

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Issue: Due to onboard communication and billing systems, current intelligent EV chargers cost ~$6,000 capital cost & ~$550/year in networking fees.

Solution Summary:

- Replace existing chargers with simple chargers
- utilize existing parking fee system for billing
- either install simple metering to track electrical use or utilize existing WiFi as the comms system
- relocate or sell existing intelligent charger.

Similar guidance provided to Redwood City, Burlingame and San Mateo County

5-year city savings: $5,000/unit ($2,500; versus $7,500)

Simple Charger

Intelligent Charger

Example, Redwood City, Library Parking Lot

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Currently, EV driver pays $1.5/hr for charging via intelligent charger +$1/hr for parking; two transactions at two different machines ($2.5/hr).

Five year city cost/unit: $7,500

Guidance:

- *Replace intelligent charger with simple charger & kWh meter*
- *Reprogram pay –by-space meter to collect $2.5/ hr for EV charging spots*
- *Modify signage*
- *5 year cost: $2,500*

EVCI Master Plan: Next Steps

- Deep dive to develop the master plan:
  - Finalize locations
  - Determine existing charging equipment and electrical infrastructure
  - Cost and timeline estimates to deploy EVCI
- Follow-up meetings with city staff in August
- Preliminary site plans will include EVCI as part of the Community Microgrid or Solar Emergency Microgrid
  - Redwood City School District
  - Redwood City Corporate Yard
  - San Mateo County Corporate Yard

Questions?

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Modeling Overview

Task 3: AEC Finance and Business Models - Assumptions

Prototypical building characteristics for the following building types (c 1995 vintage) were selected to inform model assumptions:

- Office
- School
- Municipal
- Retail
- Multifamily

The model assumptions provide a professional assessment of likely baseline equipment efficiencies and appropriate higher efficiency upgrades for achieving AECs.

Task 3: AEC Finance and Business Models – BCA

Simple payback was calculated for each building type for the following measures:

- LED interior/exterior
- Building management systems
- Phantom loads
- Window upgrades
- Insulation (wall and roof)
- AC (rooftop heat pump)
- Heating (rooftop heat pump)
- Heat pump hot water
- All EEMs

The analysis found that the most cost-effective measures were generally addressing phantom loads and LED lighting, followed by investments in rooftop heat pumps for air-conditioning. Despite interest to cities for reducing natural gas consumption, due to the low cost of natural gas, the heat pump water heaters result in higher energy costs for water heating.

PAEC Tasks 2 and 3 Goals (Energy Storage)

Task 2: Streamlining Local Government Planning and Permitting

- Survey permitting processes for energy storage in California; make policy recommendations and suggestions to implement best practices

Task 3: Finance and Business Models for Advanced Energy Communities

- Create a cost-benefit and value-stream analysis of distributed energy storage systems that could be used for multiple purposes
- Identify and develop innovative financing arrangements for local renewables, energy efficiency, and energy storage

PAEC Task 3 Findings Summary

- California is currently the only viable market for distributed energy storage with SGIP incentive funding available, DR contracts which allow the use of energy storage, and high demand charges for C&I customers. MA and NY are close behind but still in the developmental stage.
- Today and moving forward the CAISO, ISONE, and NYISO are moving towards integrating distributed resources into the wholesale market. This will incent the development and financing of energy storage by unlocking new wholesale revenue streams
- Sovereign worked with EPRI's public source modeling tool to run multiple scenarios of energy storage systems performing customer-side services, participating in the wholesale market, and doing both – Sovereign determined that projects participating in the wholesale market will be attractive to investors, but it will not be until the 2018 – 2020 time frame that registration and performance requirements will be clearly defined.

Lease Language

Landlord-Tenant Collaboration for an Advanced Energy Future

PAEC TAC Meeting

Sobrato Center

July 25, 2017

OFFICE OF SUSTAINABILITY

COUNTY OF SAN MATEO

Workshop Objectives

- Discuss the possibilities of lease language creating greater synergy between landlords and tenants so that all parties benefit from taking steps towards ZNE
- Receive feedback from property managers, lease attorneys, and negotiators, on current green lease models to inform the CEC on current practices and barriers
- Find opportunities to resolve the split incentive issue
- Use lease language from NRDC and those guiding principles as a baseline for the discussion

OFFICE OF SUSTAINABILITY
COUNTY OF SAN MATEO

Key Takeaways

For successful engagements that support ZNE

- Education of both parties on the value of EE is essential
- Letter of Intent (LOI) is a key first document in process
- Gross Lease Agreements are the preferred model for success
- Financial “argument” for EE or ZNE is simple
  - Landlord interest is bank/property value, tax incentives
  - Tenant interest is reduced rent or energy cost, and footprint

Draft proposed LOI and Lease language is being reviewed.

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COUNTY OF SAN MATEO

PAEC Phase I Showcase Project

Atherton Civic Center

PAEC TECHNICAL ADVISORY COMMITTEE MEETING #1

JUL 25, 2017

WRNS STUDIO

PROJECT GOALS

- REPLACE OLD BUILDINGS BUILT IN 1920'S & TEMP TRAILER OFFICES

- TO REDO THE 5 ACRE SITE TO MAXIMIZE USE AND FUNCTION

- TO PROVIDE MODERN, ENERGY EFFICIENT AND CODE COMPLIANT FACILITIES
- TO BRING ATHERTON TOGETHER AS A COMMUNITY

- TO PROVIDE WELCOMING AND TIMELESS BUILDINGS IN SCALE AND CHARACTER OF ATHERTON

PROJECT INCLUDES

- REMOVE EXISTING LIBRARY – BUILD NEW ONE
- REHAB THE EXISTING TOWN HALL COUNCIL CHAMBERS
- REMOVE EXISTING POLICE AND ADMIN BUILDINGS AND REPLACE WITH NEW MODERN POLICE FACILITIES,
- COUNCIL CHAMBERS, ADMINISTRATION AND COMMUNITY DEVELOPMENT OFFICES
- REALIGN ROADWAYS TO MAXIMIZE FUNCTION OF SPACE AND PROVIDE OPEN GREEN SPACE AREAS
- SOLAR PHOTOVOLTAIC SYSTEM
- ENERGY STORAGE
- SOLAR EMERGENCY MICROGRID (SEM)
- SIX LEVEL 2 ELECTRIC VEHICLE CHARGERS
- ENERGY EFFICIENT AND SUSTAINABLE SYSTEMS THROUGHOUT

Sustainable Water Systems

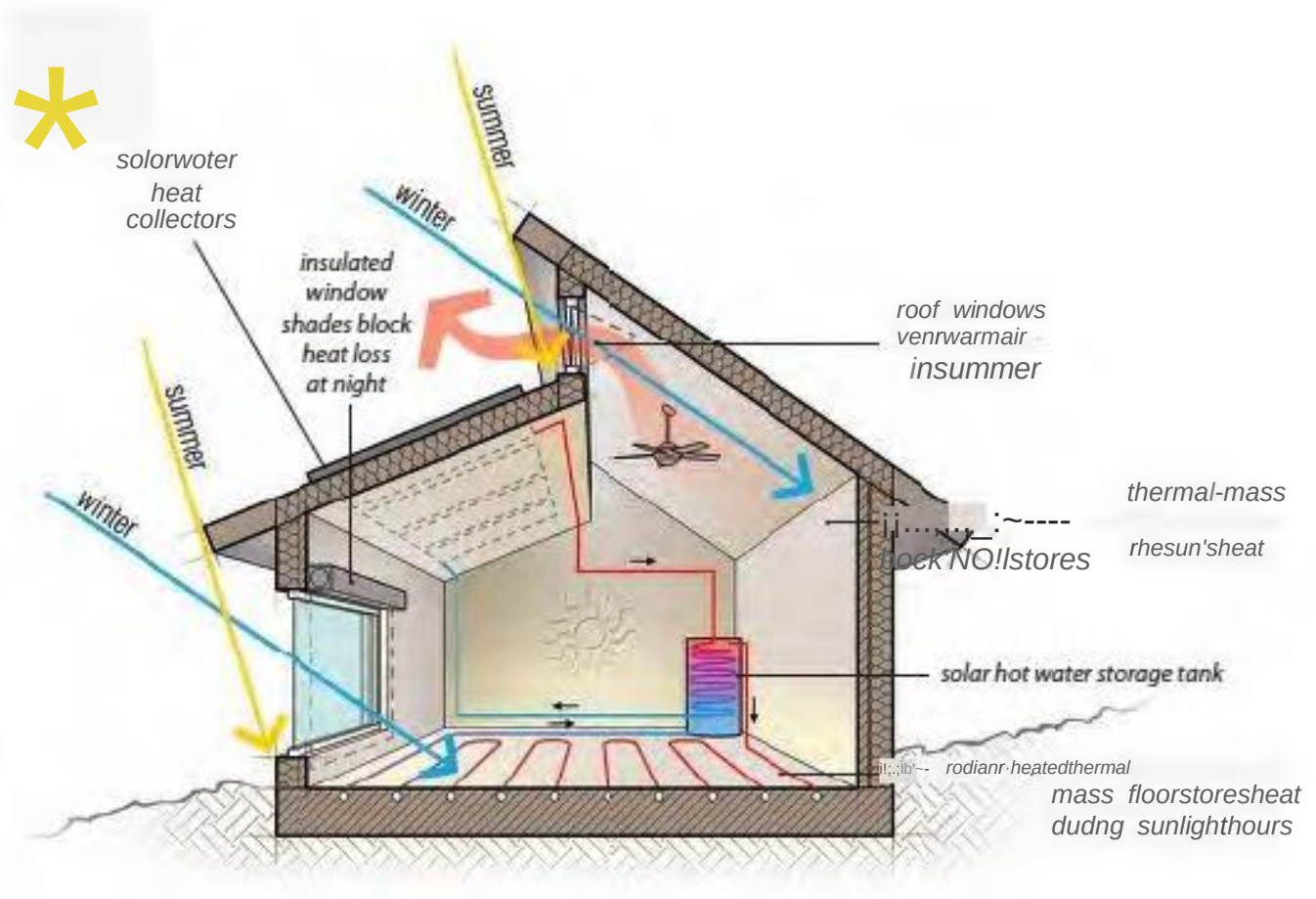
- Reduce: Water Efficiency
- Reuse: Rainwater Harvesting
- Recycle: Graywater to Irrigate Redwoods
- Storm water to Groundwater
- Install new well

simple passive strategies

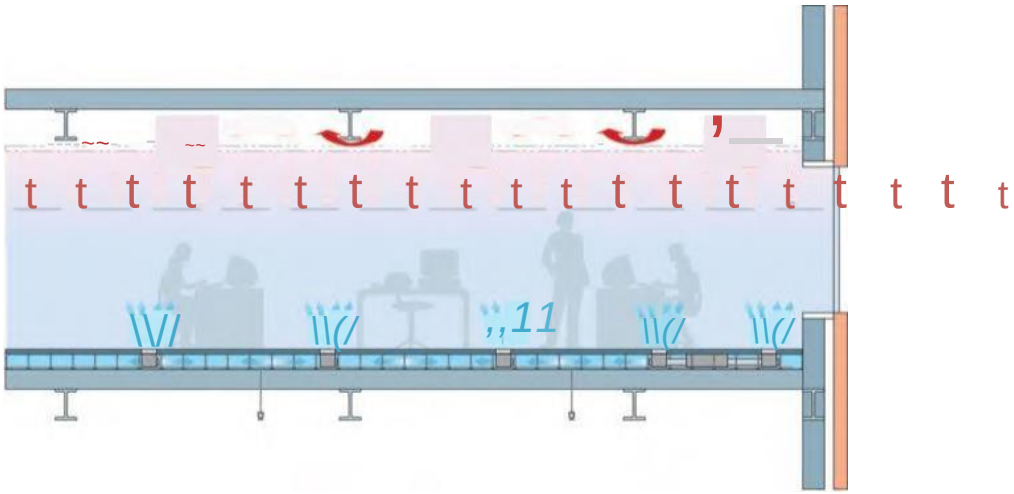
passive solar design
- heating
- cooling/shading

natural ventilation & ceiling fans

radiant solutions displacement ventilation

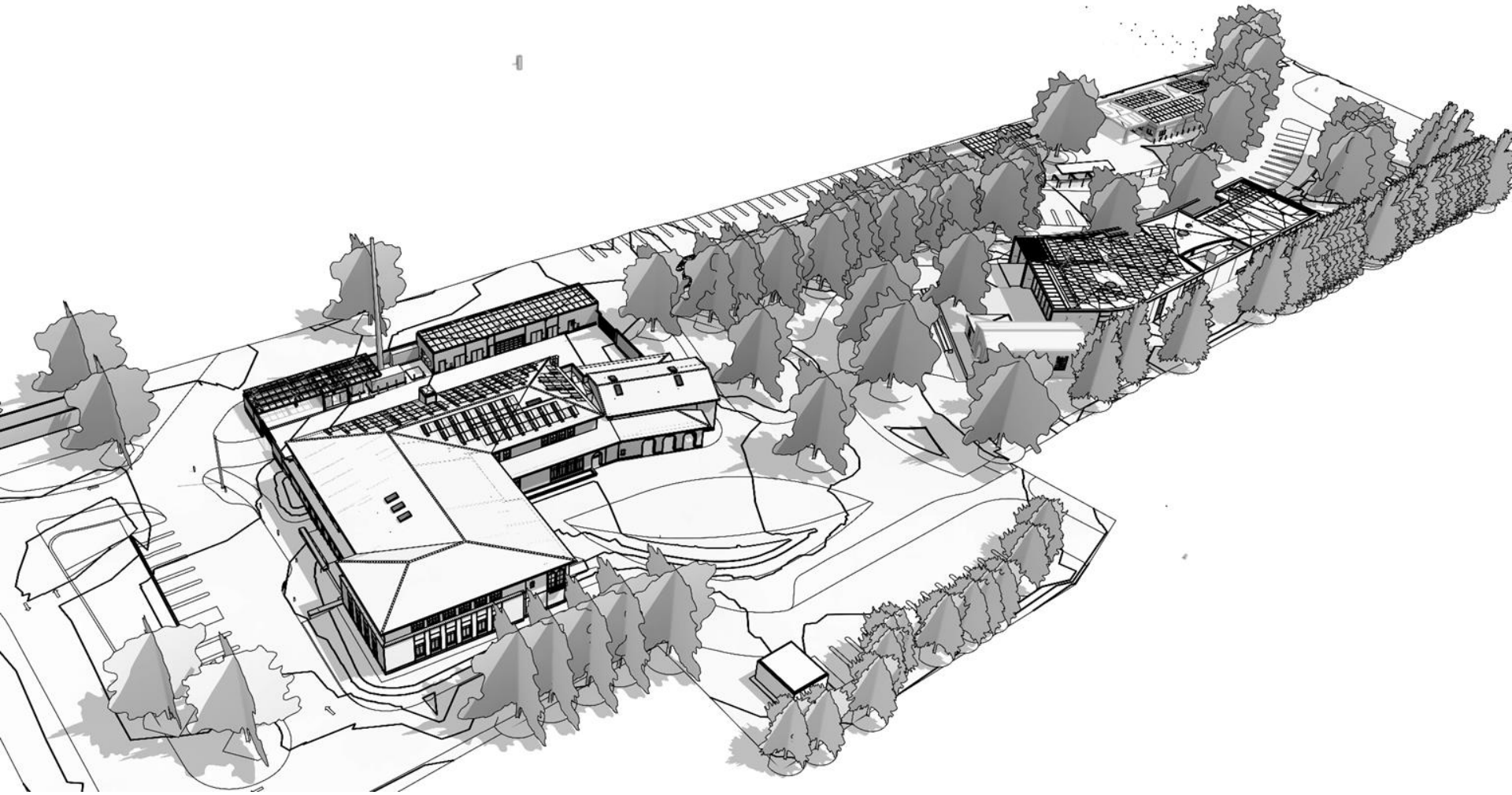


Library – underfloor air distribution



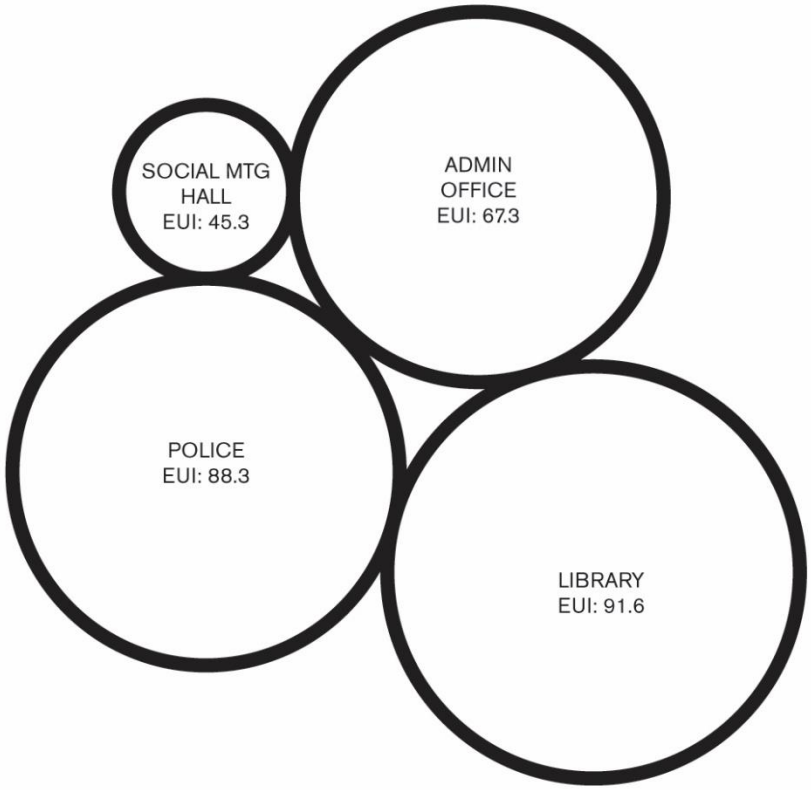
- air provided via cavity under a raised floor
- uses stratification to reduce cooling loads
- increases outside air ventilation and ventilation effectiveness
- reduces sickness by deleting mixing of air within the spaces
- higher thermal comfort
- increased flexibility
- very low noise levels

Site Plan for Solar Photovoltaic Mapping

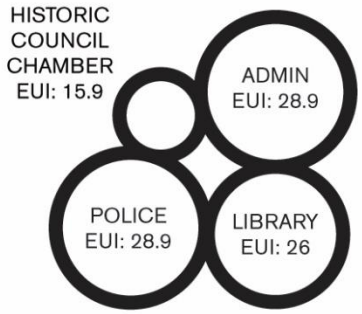


Site Plan of Civic Center with solar PV rooftop installation design

Graphic Representation of Program to Energy Use Mapping

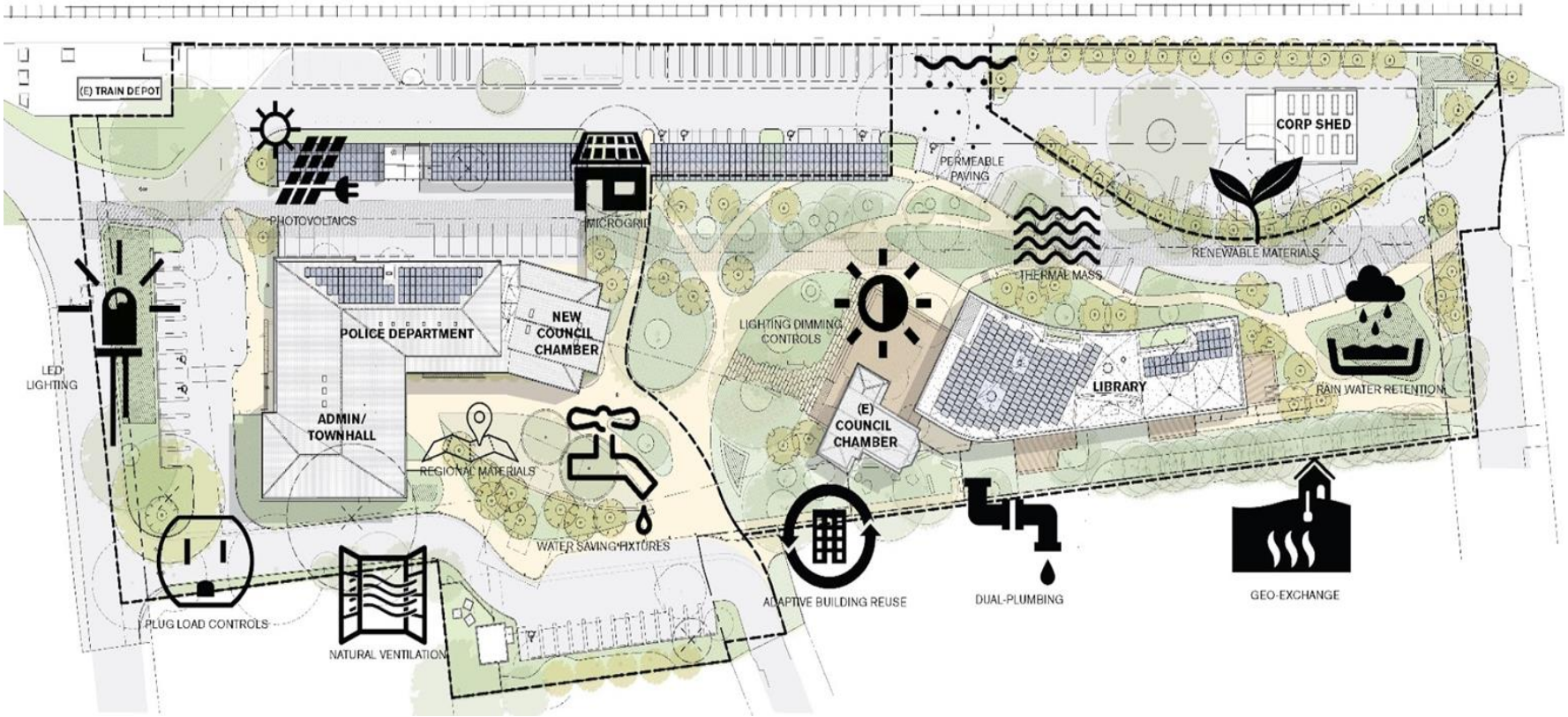


BASELINE EUI



PROPOSED EUI

Site Plan with General Sustainable Strategies



CURRENT PROJECT COST IS ESTIMATED TO BE $36.6M

- NEW LIBRARY AND REHAB EXISTING TOWN HALL CHAMBERS
- WITH SITE WORK IS $14.2M
- NEW CITY HALL WITH SITE WORK IS $22.4M
- FUNDING: DONATIONS, GENERAL FUND, BUILDING FACILITIES, AND LIBRARY FUND

PROJECT SCHEDULE

- 50% CONSTRUCTION DOCUMENTS: JUNE 2017
- PERMITTING AND APPROVAL: SEP 2017 – JAN 2018
- BID DOCUMENTS: JAN 2018
- 100% CONSTRUCTION DOCUMENT: JAN 2018
- BIDDING PHASE: JAN 2018 – MAR 2018
- CONSTRUCTION KICK-OFF: MAR 2018
- PROJECT COMPLETTION: MAY 2020

Wrap Up

Questions & Answers

Next Steps

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