I. ROLL CALL

II. ORAL COMMUNICATIONS
Members of the public are invited to address the Commission on any subject not on the agenda. A reasonable time restriction may be imposed at the discretion of the Chair. State law generally precludes the UAC from discussing or acting upon any topic initially presented during oral communication.

III. APPROVAL OF THE MINUTES
Approval of the Minutes of the Utilities Advisory Commission Meeting held on October 2, 2019

IV. AGENDA REVIEW AND REVISIONS

V. REPORTS FROM COMMISSIONER MEETINGS/EVENTS

VI. GENERAL MANAGER OF UTILITIES REPORT

VII. COMMISSIONER COMMENTS

VIII. UNFINISHED BUSINESS - None

IX. NEW BUSINESS

1. Introductions and Meeting Objectives Discussion
   A. Setting Context and Purpose
   B. Review agenda and meeting objectives

2. Utility Resilience Framework Review Discussion
   A. Review Framework and Balance Probability & Magnitude
   B. Questions and Clarifications

3. What does the Framework mean for Utility Projects Discussion
   A. Assist the City to ensure that the community (e.g., residents, businesses, organizations) can stay in place or return as soon as possible in the event of a disaster or emergency.
      - Establish community resilience hubs that provide residents access to power, water, communications, and other critical supplies.
      - Provide educational materials related to managing utilities when a disaster occurs.
      - Support Emergency Services Volunteer (ESV) program to enhance community knowledge and preparation.
      - Work with City Zoning to determine if codes are supporting resilience and avoid unintended consequences.
   B. Support Community resilience by prioritizing utility services and infrastructure support to critical facilities and retail establishments.
      - Prioritize improvements and updates of utility services to critical facilities such as hospitals, emergency providers, transportation, grocery, etc. to enable effective (and fast) response and recovery.
- Evaluate and establish adequate power and water supplies (could be time specific – 1 week? 24 hours?) for these facilities.
- Ensure that Utility Facilities and Infrastructure can withstand disasters – consider replacement, relocation, and upgrades.

C. **Enhance Utility to ensure its overall resilience.**
   - Develop Workforce Management and Support Plan
   - Build partnerships with community and surrounding businesses to support utility when needed.
   - Explore long-term and temporary housing options for critical city staff.
   - Move to a more integrated planning and development approach across utilities.

4. **Small Group Break Out Discussions**
   A. Review Framework and presented projects, confirm, add or de-emphasize projects based on conversation; Prioritize projects, discuss criteria. *(20 minutes)*

   **B. Report Back to the Group** *(20 minutes)*

5. **Wrap Up and Next Steps**
   **Action**
   Comment Cards, Follow Up Survey

**NEXT SCHEDULED MEETING:** December 6, 2019

**ADDITIONAL INFORMATION** - The materials below are provided for informational purposes, not for action or discussion during UAC Meetings (Govt. Code Section 54954.2(a)(2)).

| Informational Reports | 12-Month Rolling Calendar | Public Letter(s) to the UAC |
Summary Title: Resilience Workshop #2

Title: Resilience Workshop #2: Framework & Priorities

From: City Manager

Lead Department: Utilities

Resilience Workshop #2: Framework & Priorities

✓ Review and Refine the Resilience Framework
✓ Discuss Which Utility Projects Support the Community's Goals
✓ Small Group Discussions on Priorities - We need your input

Objective:

✓ Conduct a Joint UAC and Community Workshop to review the Utility Resilience Framework
✓ Prioritize Future Projects and Efforts to Improve Community Resilience

Preliminary Vision:

Support Palo Alto Community Resilience by;
✓ Advancing the Utility to Become a “Smart” Utility
✓ Assisting the City Prepare, Respond and Support
✓ Rebounding from Manmade and Natural Disasters

Attachments:
- Attachment A: Initial Resilience Vision and Goals
- Attachment B: Presentation
Utilities Advisory Commission
Initial Resilience Vision and Goals

Preliminary Vision
Support Palo Alto Community Resilience by advancing the Utility to become a “Smart” Utility, able to assist the City prepare, respond, support, and rebound from manmade and natural disasters.

Goals

1. Assist the City to ensure that the community (e.g., residents, businesses, organizations) can stay in place or return as soon as possible in the event of a disaster or emergency.
   - Establish community resilience hubs that provide residents access to power, water, communications, and other critical supplies.
   - Provide educational materials related to managing utilities when a disaster occurs.
   - Support Emergency Service Volunteers to enhance community knowledge and preparation. (i.e., CERT program)
   - Work with City Zoning to determine if codes are supporting resilience and avoid unintended consequences.

2. Support Community resilience by prioritizing utility services and infrastructure support to critical facilities and retail establishments.
   - Prioritize improvements and updates of utility services to critical facilities such as hospitals, emergency providers, transportation, grocery, etc. to enable effective (and fast) response and recovery.
   - Evaluate and establish adequate power and water supplies (could be time specific – 1 week? 24 hours?) for these facilities.
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3. Enhance Utility to ensure its overall resilience.
   - Develop Workforce Management and Support Plan
   - Build partnerships with community and surrounding businesses to support utility when needed.
   - Explore long-term and temporary housing options for critical city staff.
   - Move to a more integrated planning and development approach across utilities.
Resilience Workshop #2: Framework & Priorities
11/13/2019
Agenda

- Introduction and Objectives
- Utilities Resilience Framework Review
- What Does the Framework Mean for Utility Projects
  - Goal 1. Stay in Place
  - Goal 2. Prioritize Critical Facilities
  - Goal 3. Enhance Utility’s Resilience
- Small Group Break Out Discussions
- Wrap up and Next Steps
introduce yourself
Meeting Objectives – Solution Orientated

- Review The Utilities Resilience Framework from Workshop #1 – Did we hear you?
- Today we want to expand on the framework to help prioritize future projects and programs that improve community resilience
- We have current and proposed projects to review and an opportunity for you to work in groups and give your feedback on priorities
Utility Resilience Framework Review

- Aug 2018 workshop summary
- Review of draft vision and goals
- Questions
What Do We Mean by Resilience?

- **PREVENTION** – what Utilities is doing to make the electric grid more resilient.
- **RECOVERY** – what Utilities has planned for restoration when the power goes out.
- **SURVIVABILITY** – what are the critical electric services that need to be in place during an emergency.
Workshop #1 Summary: Common Themes

- Develop a roadmap to Smart grid / Smart Utility
- Manage critical utility facilities
- Help support Community Emergency Response Training and neighborhood emergency volunteers
- Develop and manage a technical utility volunteer group (possibly assist with service shut downs)
- Communication about what to do after utility outages e.g. “What to turn on first”
Vision

- Support Palo Alto Community Resilience by advancing the City’s Utilities to become “Smart” Utilities, able to assist the City prepare, respond, support, and rebound from manmade and natural disasters.
Goals

1. Assist the City in ensuring that residents can stay in place or return as soon as possible in the event of a disaster or emergency.

2. Support Community resilience by prioritizing utility services and infrastructure support to critical facilities and retail establishments.

3. Enhance the City’s Utilities to ensure their overall resilience.
What Does the Framework Mean for Utility Projects?
The Risk Assessment: Impact and Probability

- **High Impact, High Probability:** Insure / Mitigate
  - Grid Cyber attack
  - Sea level rise (10-20 yrs)
  - Grid disruption
- **High Impact, Low Probability:** Mitigate / Cancel
  - Earthquake
  - Regional wildfires
- **Low Impact, High Probability:** Plan
  - Urban fires
  - Localized floods
  - Localized utility outages
- **Low Impact, Low Probability:** Manage & Engage
  - Local outages
  - Utilities mains breaks
  - Droughts
  - Extreme weather

**CITY OF PALO ALTO**
What are We Doing for Prevention

- CRITICAL INFRASTRUCTURE REPLACEMENT, MAINTENANCE, & INSPECTIONS
  - Poles, Distribution transformers, Switches, Underground cable, Substation equipment

- VEGETATION MANAGEMENT

- SUBSTATION and CYBER SECURITY
  - Electric, Gas, and Water facilities have video surveillance installed to deter vandalism.
What More Could We Do for Prevention

- DESIGN STANDARDS & CONSTRUCTION GUIDELINES
  - Move overhead lines underground
  - Install barriers or elevate sensitive equipment
  - Relocate electric facilities away from threats

- GRID HARDENING
  - Increase pole size, install more guys for support, replace with steel pole
  - Install tree wire

- INCREASED SECURITY
  - Better lighting, more cameras, perimeter detection system.
What More Could We Do for Prevention Cont.

- **INNOVATIVE TECHNOLOGY**
  - Smart Grid – switches, reclosers, sensors, customer meters
  - Utility Scale Battery Storage
  - Micro-grid
Recovery Strategies In Place

- Utilities emergency/disaster plan
- City-Wide coordination/Office of Emergency Services
- On-call field staff
- Outage Management System
Survivability, What We Have

- **SUBSTATIONS** – station batteries provide power to low voltage electronics for up to 8 hours.
- **COBUG** – (4) natural gas generators at MSC that can provide about 5MW of power.
- **COMMUNICATION TO PUBLIC** – OMS, FACEBOOK, TWITTER, etc.
Other Survivability Strategies

- STRATEGIES FOR UTILITIES (Electric)
  - Battery backup traffic signals
  - Battery backup for communication systems
  - Feeder extensions and more back-ties for switching flexibility to assist with getting power back to hospitals, water treatment plant, water and gas stations, etc.

- STRATEGIES FOR THE COMMUNITY & RESIDENTS
  - Install battery back-up
  - Have an emergency food, clothing, survival gear, and supplies.
  - Have designated shelters
A Key to Our Cost Estimates

😊 Staff time
$ #0,000s
$$ #00,000s
$$# #00,000s
$$# #,000,000s
$$## #0,000,000s
$$### #00,000,000s
$$#### #00,000,000s
Goal 1: Stay in Place

- Assist the City to ensure that the community (e.g., residents, businesses, organizations) can stay in place or return as soon as possible in the event of a disaster or emergency.
# Projects to Support Goal 1

<table>
<thead>
<tr>
<th>Project</th>
<th>Costs</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Outreach</td>
<td>$</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Finalize Outage Restoration Plan and Outage Block Plan</td>
<td>😊</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>Mobile Services</td>
<td>$$</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>Wildfire &amp; Vegetation Management</td>
<td>$</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>Prioritize Communications</td>
<td>$$</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>Building Electrification</td>
<td>$$$</td>
<td>3-10 yrs</td>
</tr>
<tr>
<td>Upgrade City’s backup generators to run independently from grid</td>
<td>$$$</td>
<td>3-10 yrs</td>
</tr>
<tr>
<td>Micro/mini grids</td>
<td>$-$$$$</td>
<td>3-10 yrs</td>
</tr>
<tr>
<td>Expand Recycled Water (distribution and/or potable use)</td>
<td>$$$-$$$$$</td>
<td>Long Term</td>
</tr>
</tbody>
</table>
Outage Blocks Vs. Restoration

- Rolling outages to respond to system capacity shortages
- Restoration priorities for city-wide and longer duration outages
Outage Block - Priority Loads
(short term outages of 2-5 hours)

<table>
<thead>
<tr>
<th>Priority Level</th>
<th>In order of highest priority to least priority facility needing power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority 0</td>
<td>These are exempt from outage blocks (unless the entire city experiences an outage)</td>
</tr>
<tr>
<td></td>
<td>Hospitals</td>
</tr>
<tr>
<td></td>
<td>Police (City Hall)</td>
</tr>
<tr>
<td></td>
<td>Fire stations</td>
</tr>
<tr>
<td></td>
<td>Utility Control Center</td>
</tr>
<tr>
<td>Priority 1</td>
<td>Major cell towers</td>
</tr>
<tr>
<td></td>
<td>Palo Alto Internet Exchange</td>
</tr>
<tr>
<td></td>
<td>Airport (Life Flight fueling, Medivac)</td>
</tr>
<tr>
<td>Priority 2</td>
<td>Medical clinics</td>
</tr>
<tr>
<td></td>
<td>Community Shelters (public schools, Mitchell Park, Lucie Stern)</td>
</tr>
<tr>
<td></td>
<td>Nursing Homes</td>
</tr>
<tr>
<td>Priority 3</td>
<td>Water Pumps (some 12 hr generation)</td>
</tr>
<tr>
<td></td>
<td>Water Quality Plant (processing waste water - has 24+ hr generation)</td>
</tr>
<tr>
<td>Priority 4</td>
<td>Well Pumps</td>
</tr>
<tr>
<td></td>
<td>Grocery, hardware, gas stations (approx. 8)</td>
</tr>
<tr>
<td>Priority 5</td>
<td>Commercial (Stanford Research Park, Charleston Business Park area)</td>
</tr>
<tr>
<td>Priority 6</td>
<td>Retail Districts</td>
</tr>
<tr>
<td></td>
<td>Residential</td>
</tr>
</tbody>
</table>
# Outage Restoration - Priority Loads

(City-wide and long term outages)

<table>
<thead>
<tr>
<th>Priority Level</th>
<th>In order of highest priority to least priority facility needing power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority 1</td>
<td>Hospitals and Cubberley Community Center</td>
</tr>
<tr>
<td></td>
<td>Police (City Hall),</td>
</tr>
<tr>
<td></td>
<td>Fire Stations</td>
</tr>
<tr>
<td></td>
<td>Utility Control Center</td>
</tr>
<tr>
<td></td>
<td>Water Quality Plant (processing waste water - public health)</td>
</tr>
<tr>
<td>Priority 2</td>
<td>Major cell towers</td>
</tr>
<tr>
<td></td>
<td>Palo Alto Internet Exchange</td>
</tr>
<tr>
<td></td>
<td>Airport (Life Flight fueling, Medivac)</td>
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<tr>
<td></td>
<td>Water Pumps</td>
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<td></td>
<td>Community Shelters (public schools, Mitchell Park, Lucie Stern)</td>
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<td>Priority 3</td>
<td>Well Pumps</td>
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<tr>
<td></td>
<td>Medical clinics</td>
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<tr>
<td></td>
<td>Nursing Homes</td>
</tr>
<tr>
<td></td>
<td>Grocery, hardware, gas stations</td>
</tr>
<tr>
<td>Priority 4</td>
<td>Retail Districts</td>
</tr>
<tr>
<td></td>
<td>Residential</td>
</tr>
<tr>
<td>Priority 5</td>
<td>Commercial (Stanford Research Park, Charleston Business Park area)</td>
</tr>
</tbody>
</table>
Mini/Micro Grids

- Utility’s Role
  - Remove roadblocks, allow customers to install storage, micro-grids
  - Absorb grid upgrades required to integrate customer solutions
  - Partner with businesses to create micro-grids to meet community needs
  - Utility owned and operated micro-grids
The Comprehensive Plan and Water Resilience

Karla Dailey
2030 Palo Alto Comprehensive Plan
Major Sections

- Land Use and Community Design
- Transportation
- Natural Environment
  - Long term resiliency for water and energy
- Safety
  - Community Safety, Natural Hazards & Human-caused Threats
  - Description of Utilities Infrastructure and Interconnections
- Community Service and Facilities
- Business and Economics
2030 Palo Alto Comprehensive Plan
Natural Environment Goals and Programs

- Water resources and infrastructure managed to protect public health & safety
  - Study groundwater aquifers
  - Identify groundwater recharge viability
  - Keep groundwater clean
  - Educate residents on risks associated with long-term drought

- Cooperative planning with other agencies
  - Water supply reliability
  - Sea level rise
  - Fire protection services
  - Emergency medical services
  - Emergency response planning
Community aware of risks and prepared for emergencies ("Power" subsection)
- Identify solutions to add power line
- Explore incentives to adopt off-grid technologies
- Continue undergrounding
- Enhance safety of gas pipeline operations
- Provide off-grid and/or backup power for critical City facilities
Water Resilience

• Emergency water supply plan
  – 5 older wells refurbished
  – 3 new well completed

• Northwest County Recycled Water Strategic Plan underway
  – Exploring expanded water reuse
  – Robust study of aquifer and new estimate of sustainable yield

• Regional efforts
  – Expanded regional storage projects
  – Purified water expansion
  – Santa Clara Valley Water District Water Reuse Master Plan
  – Drought-time water transfer agreements
Goal 2: Prioritize Critical Facilities

- Support Community resilience by prioritizing utility services and infrastructure support to critical facilities and retail establishments
### Projects to Support Goal 2

<table>
<thead>
<tr>
<th>Project</th>
<th>Costs</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raise substation equipment</td>
<td>$$-$$$</td>
<td>1-10 yrs</td>
</tr>
<tr>
<td>SCADA server, comm, and security upgrades</td>
<td>$$</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>Physical Security upgrades</td>
<td>$$-$-$</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>Transformer/Breaker upgrades</td>
<td>$$/yr</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>Electric CIP program (Poles, Relays, Wire)</td>
<td>$$$/yr</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Water Gas Waste CIP Program (Pipeline replacement)</td>
<td>$$$/yr</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Seismic upgrades to water tanks</td>
<td>$$$</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>Wildfire Resilience Mitigation Plan</td>
<td>$$$</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>GIS (geographic information systems) improvements</td>
<td>$$</td>
<td>1-5 yrs</td>
</tr>
</tbody>
</table>
More Projects to Support Goal 2

<table>
<thead>
<tr>
<th>Project</th>
<th>Costs</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify a backup UCC location</td>
<td>$$$</td>
<td>3-10 yrs</td>
</tr>
<tr>
<td>Implement Smart Grid Technology</td>
<td>$$$$</td>
<td>3-10 yrs</td>
</tr>
<tr>
<td>Local grid upgrades</td>
<td>$$</td>
<td>3-10 yrs</td>
</tr>
<tr>
<td>Undergrounding</td>
<td>$$</td>
<td>Long Term</td>
</tr>
<tr>
<td>Establish a Second Transmission Connection</td>
<td>$$$$</td>
<td>Long Term</td>
</tr>
<tr>
<td>Move Reservoirs</td>
<td>$$$-$$$$</td>
<td>Long Term</td>
</tr>
</tbody>
</table>
Infrastructure Replacement

- Pipes, wires and equipment
- Prioritize high risk areas, high priority load
  - Liquefaction zones
  - Flood zones
  - Retail vs. residential
  - High impact
Wild Fire Mitigation Plan

- City wide coordination
- Increased vegetation management
- Increased inspections and maintenance
- Training
- Electric system design and operation
  - Reclosers, fuses, tree wire
  - De-energization
  - Rebuild, relocate, underground
On February 17, 2010, a private plane took off from Palo Alto airport.

Due to pilot error, it crashed into power lines, killing all on board.

The power line tower damaged turned out to be the City’s single point of connection to the power grid.

Power was out to Palo Alto for several hours = $millions in economic loss.
Goal 3: Enhance Utilities’ Resilience

- Enhance Utility to ensure its overall resilience
## Projects to Support Goal 3

<table>
<thead>
<tr>
<th>Project</th>
<th>Costs</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get out-of-area contracts in place for emergency work/engineering</td>
<td>$$</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>Employee training for disaster response</td>
<td>😊</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>Enhanced volunteer utility training</td>
<td>$</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>Establish/maintain community and business Partnerships (e.g. temporary emergency worker housing)</td>
<td>$</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>Local workforce development</td>
<td></td>
<td>3-10 yrs</td>
</tr>
<tr>
<td>Adopt integrated planning solutions across utilities</td>
<td></td>
<td>Long Term</td>
</tr>
</tbody>
</table>
Utilities 2018 Strategic Plan: Priority 1: Workforce Tactical Action Plan

- Establish CPAU as an organization where employees are proud to work and recruit other strong performers
- Create a workplace that attracts and retains skilled employees
- Evaluate and consider alternative workforce solutions to achieve organizational business objectives
Community Risks and Hazards
Preparing Our Community. Working Together.

OES Chief Kenneth Dueker, J.D.
Director of Emergency Services

www.cityofpaloalto.org/publicsafety
Group Break Out