Appendix E
Implementation Case Studies

Implementation Case Studies

This appendix illustrates adaptation examples that align with a selection of adaptation actions and show how adaptation policies and actions can be effectively implemented.

West Oakland Resilience Hubs

Photo: West Oakland Resilience Hub Planning Meeting https://norcalresilience.org/case-study-west-oakland-resiliency-hub/

Location: West Oakland, CA

The City of Oakland identified three facilities owned and operated by the City that were in need of physical infrastructure upgrades which could serve as climate resilience hubs: West Oakland Senior Center, West Oakland Branch of the Oakland Public Library, and the DeFremery Recreation Center and Park. The facilities were upgraded to offer the following services: cooling, warming, sanitation, communication, transportation, medical area, filtered indoor spaces during forest fires and high air pollution times, and renewable and non-polluting energy sources, including solar energy, and back-up power to run critical operations when the power grid is down. The upgrades involved partnerships between the City, PG&E, and the Bay Area Air Quality Management District. Design phase costs are estimated to be $500,000 and initial known implementation estimates amount to approximately $1.6 million. Funding was provided by a combination of stakeholder financing, funding through California Air Resources Board, and the City of Oaklands Capital Improvement Plan.

Related Action 1.2.1. Establish a Resilience Hub. Formally designate a physical resilience hub, such as the Youth Center or Public Library, and make it available during extreme heat events, poor air quality, severe weather events, and other highly hazardous conditions for use by the community. Provide the following essential resources in the resilience hub(s): health programming and resources, food, refrigeration, charging stations, basic medical supplies, and other emergency supplies. Electrified heating and cooling paired with backup power sources like battery storage provides redundancy and continues services in the event of a power outage. Designate a virtual resilience hub on the City website where residents can access information about the physical resilience hub and resilience efforts.

Berkeley Existing Buildings Electrification Strategy

Location: Berkeley, CA

Photo: Existing Buildings Electrification Strategy https://www.cityofberkeley.info/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/Draft_Berkeley_Existing_Bldg_Electrification_Strategy_20210415.pdf

Berkeley's Existing Buildings Electrification Strategy analyzes the existing building stock of the City, with a focus on low-rise residential, and identifies a pathway for an equitable transition to all-electric buildings. To model electrification costs for Berkeley's existing homes, the project team estimated Berkeley's building stock, using Alameda County Assessor data, to better understand the distribution of building types and existing conditions. The analysis was followed by research into electrification measures and costs and the data was used to model different retrofit packages to identify the most cost-effective options. To ensure Berkeley's pathway to all-electric buildings avoids negative impacts to equity and improves current conditions, the City developed an Equity Framework called Equity Guardrails with stakeholder and community feedback. The Equity Guardrails reflected priorities and concerns of marginalized communities, highlighting the need to protect people against potential unintended consequences of building electrification like gentrification and displacement. The City developed four equity guardrails that each potential policy was assessed against and will be used in the future as new policies are developed. The four equity guardrails are:

- Access to health and safety benefits
- Access to economic benefits
- Maximize ease of installation
- Promote housing affordability & anti-displacement.

Related Action 1.3.4. Conduct a Feasibility Study for Existing Building Electrification and Back-up Power. Perform an electrification feasibility study/existing building analysis in order to understand the potential for, and associated costs of, electrification retrofitting, including heat pumps, along with on-site energy generation and battery storage to provide a more resilient back-up power supply. Establish a plan for reducing or eliminating natural gas from existing buildings, potentially through a reach code, and building resilience to potential electrical grid shutoffs.

Related Action 1.2.2. Limit the Impacts of Climate Change on the Most Vulnerable Populations. Develop a framework to define equity in Carmel-by-the-Sea and develop adaptation approaches that are equitably implemented

2500 R Midtown Development

Photo: Rooftop solar panels at the 2500 R Street Community Development. Sunverge Energy https://cdn.cleanegroup.org/wp-content/uploads/2500R-solar-on-roof-900x675.jpeg

Location: Sacramento, CA

Sacramento Municipal Utility District (SMUD) partnered with Sunverge Energy, and Pacific Housing to create a net zero energy (ZNE) community within a single-family home affordable housing development.[1] The incorporation of solar PV as well as battery storage demonstrates the feasibility of microgrid level projects in using alternative energy while still ensuring power reliability. The project was funding through the US Department of Energy ARRA, Solar SMART program, California SGIP incentives, and private capital leveraging special financial structures that take advantage of Pacific Housing's non-profit status.

Related Action 1.3.2. Initiate a Heat Pump Retrofit Program. Create a program to help fund property owners to convert HVAC units to heat pumps, which provide water heating and space heating in addition to cooling and can improve indoor air quality and community adaptation to extreme heat. Include a microgrid energy storage component to increase power reliability.

Related Action 1.3.4. Conduct a Feasibility Study for Existing Building Electrification and Back-up Power. Perform an electrification feasibility study/existing building analysis in order to understand the potential for, and associated costs of, electrification retrofitting, including heat pumps, along with on-site energy generation and battery storage to provide a more resilient back-up power supply. Establish a plan for reducing or eliminating natural gas from existing buildings, potentially through a reach code, and building resilience to potential electrical grid shutoffs.

[1] California Energy Commission. Microgrid Analysis and Case Studies Report California, North America, and Global Case Studies: Page 19-23. 2018. Available: <https://www.energy.ca.gov/sites/default/files/2021-06/CEC-500-2018-022.pdf>. Accessed February 4, 2022

Marina Dune Preserve Restoration

Location: Marina, CA

Photo: Monterey Peninsula Regional Park District, Marina Dunes Preserve https://www.mprpd.org/marina-dunes-preserve

The Marina Dunes encompass part of the Monterey Bay dune complex spanning Moss Landing to Seaside California. This dune restoration project was a collaborative effort between project partners of the Monterey Peninsula Regional Parks District, Return of the Natives, Burleson Consulting Inc/Terracon, and Native Solutions.[2] Restoration activities included control and eradication of non-native species, sand stabilization, and re-vegetation efforts. Re-vegetation of native species included the collection of site-specific seed, broadcast seeding, hydroseeding, and the out planting of propagated seedlings. Restoration through the eradication of non-natives and re-vegetation of native species increases dune resilience to climate stress.[3] Structural improvement activities included delineation of pathways and fences to protect restoration areas as well as signage to educate the community on dune habitat restoration.

Related Action 2.1.4. Increase Resilience of the North Dunes. Continue to fund maintenance and monitoring at the North Dunes to determine how the changing climate will affect dune habitats. Implement enhancement efforts to improve resilience of the North Dunes.

[2] California Coastal Dune Science Network. Marina Dune Preserve Restoration. 2021. Available: <https://www.resilientcoastlines.com/projects/marina-dune-preserve-restoration>. Accessed February 4, 2022

[3] National Oceanic and Atmospheric Administration (NOAA). Office for Coastal Management. Peer-to-Peer Case Study: Dune Restoration Increases Flood Protection and Access for Community. Available: < https://coast.noaa.gov/digitalcoast/training/cardiff-state-beach.html >. Accessed February 8, 2022.

San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook

Photo: San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook https://nnala.com/san-mateo-county-sustainable-green-streets-and-parking-lots-design-guidebook/

Location: San Mateo County, CA

The county of San Mateo created a guidebook to address green infrastructure and stormwater management.[4] With a specific focus on green streets and parking lots, the San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook was developed with input from the City/County Association of Governments of San Mateo County, the Program's New Development Subcommittee, and the City/County Engineers' Association of San Mateo County. The recommended actions include site layout strategies, stormwater facility strategies, pervious pavements, and urban tree canopy additions.[5] The final chapter of the guidebook is dedicated to implementation considerations. The topics covered include reducing project costs, changing municipal code/policy, and public education and outreach. Additionally, there are four example projects listed to demonstrate feasibility. The main takeaway for implementation was to bundle stormwater management solutions with general street improvements. Funding was sourced by vehicle registration fees collected in San Mateo County for congestion and stormwater management authorized by California Assembly Bill 1546 and California Senate Bill 348.

Related Action 3.1.2. Increase Green Infrastructure. Modify Capital Improvement Program (CIP) project design to consistently evaluate the potential for green infrastructure to be incorporated in CIP projects in the public right-of-way and on public lands. Identify and develop a green infrastructure pilot project that will reduce runoff volume and capture and infiltrate stormwater, based on projected changes in precipitation amounts due to climate change, and incorporates tree and shrub planting to increase carbon sequestration in the city.

Related Action 3.1.3. Reduce Stormwater Runoff. Reduce stormwater runoff through implementation of stormwater diversion and infiltration projects that reduce pollution problems caused by more frequent and intense storms and more extreme flooding events.

Related Action 3.1.4. Earmark Capital Improvement Program (CIP) funding for design, permitting and implementation of storm drain repairs. Include strategies in the 2021 Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) for potential regional funding. Upsize Storm Drain Master Plan (SDMP) improvements, especially when making repairs in the lower reaches of watersheds, to handle larger storms.

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[4] American Society of Landscape Architects. Green Infrastructure and Stormwater Management Case Study. 2009. Available: <https://www.asla.org/uploadedFiles/CMS/Advocacy/Federal_Government_Affairs/Stormwater_Case_Studies/Stormwater%20Case%20081%20San%20Mateo%20County%20Sustainable%20Green%20Streets,%20San%20Mateo,%20CA.pdf>. Accessed February 2, 2022

[5] San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook. Available: <https://www.flowstobay.org/documents/municipalities/sustainable%20streets/San%20Mateo%20Guidebook.pdf>. Accessed February 2, 2022

Pajaro Dunes Geologic Hazards Abatement District

Location: Santa Cruz County, CA

Photo: Pajaro Dunes. https://www.resortsandlodges.com/lodging/usa/california/central-coast/pajaro-dunes-resort.html

The Pajaro Dunes Geologic Hazards Abatement District (GHAD) is one example of an abatement district formed to mitigate sea level rise and storm impacts. The Pajaro Dunes community includes private single-family residences as well as townhouses and condominiums. These residences were built along a narrow strip of land bounded by the Pacific Ocean on the southwest and by the Pajaro River on the northeast and southeast. The development is protected by an approximately 6,000-foot-long seawall constructed of large riprap along the ocean-side of the development and a steel sheet wall along the inland Pajaro River side of the development. The rock revetment has been repeatedly damaged by coastal erosion, occurring during server winter storms.[6] The GHAD is working to fund repairs to the seawall.

Related to funding and financing mechanisms.

[6] Pajaro Dunes Geologic Hazard Abatement District. N.d. 2020 Grading Overview Document. Available: <https://pdghad.org/bg_pdghad.org/reports/>. Accessed February 11, 2022.