

**A ULI VIRTUAL ADVISORY SERVICES PANEL
EXECUTIVE SUMMARY REPORT**

**SONOMA COUNTY,
CALIFORNIA**

Wildfire, Energy, and
Economic Resilience

April 14–21, 2021



About the Urban Land Institute

THE URBAN LAND INSTITUTE is a global, member-driven organization comprising more than 45,000 real estate and urban development professionals dedicated to advancing the Institute's mission of shaping the future of the built environment for transformative impact in communities worldwide.

ULI's interdisciplinary membership represents all aspects of the industry, including developers, property owners, investors, architects, urban planners, public officials, real estate brokers, appraisers, attorneys, engineers, financiers, and

academics. Established in 1936, the Institute has a presence in the Americas, Europe, and the Asia Pacific region, with members in 80 countries.

More information is available at uli.org. Follow ULI on [Twitter](#), [Facebook](#), [LinkedIn](#), and [Instagram](#).

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About the Urban Resilience Program

ULI'S URBAN RESILIENCE PROGRAM

provides ULI members, the public, and communities across the United States with information on how to be more resilient in the face of climate change and other environmental vulnerabilities. The program

seeks to provide technical assistance, advance knowledge, and catalyze the adoption of transformative practices for real estate and land use policy, building from the knowledge of ULI members.

About ULI San Francisco

ULI SAN FRANCISCO is the San Francisco Bay Area's preeminent global organization focused on creating and sustaining thriving communities through wise land use, development, and redevelopment decisions. We bring together a dedicated multidisciplinary community of professionals that deliver market-based, innovative solutions that can be implemented in the Bay Area and beyond.

As integrators, we share real-world knowledge and best practices, and offer a wide range of in-depth educational programming and resources for members of the organization and the broader Bay Area community.

About ULI Advisory Services

The goal of the **ULI ADVISORY SERVICES** program is to bring the finest expertise in the real estate field to bear on complex land use planning and development projects, programs, and policies. Since 1947, this program has assembled well over 700 ULI-member teams to help sponsors find creative, practical solutions for issues such as downtown redevelopment, land management strategies, evaluation of development potential, growth management, community revitalization, brownfield redevelopment, military base reuse, provision of low-cost and affordable housing, and asset management strategies, among other matters. A wide variety of public, private, and nonprofit organizations have contracted for ULI's advisory services.

Each panel team is composed of highly qualified professionals who volunteer their time to ULI. They are chosen for their knowledge of the panel topic and are screened to ensure their objectivity. ULI's interdisciplinary panel teams provide a holistic look at development problems. A respected ULI member who has previous panel experience chairs each panel.

The agenda for a virtual Advisory Services panel (vASP) offering is tailored to meet a sponsor's needs. For a virtual panel, ULI members are briefed by the sponsor, engage with stakeholders through in-depth interviews, deliberate on their recommendations, and make a final presentation of those recommendations. A written executive summary report is prepared as a final deliverable.

Because the sponsoring entities are responsible for significant preparation before the panel's visit, including sending extensive briefing materials to each member and arranging for the panel to meet with key local community members and stakeholders in the project under consideration, participants in ULI's vASP assignments are able to make accurate assessments of a sponsor's issues and to provide recommendations in a compressed amount of time.

A major strength of the program is ULI's unique ability to draw on the knowledge and expertise of its members, including land developers and owners, public officials, academics, representatives of financial institutions, and others. In

fulfillment of the mission of the Urban Land Institute, this vASP executive summary report is intended to provide objective advice that will promote the responsible use of land to enhance the environment.

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Urban Land Institute
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The panel would also like to thank the more than 60 community leaders, city and county staff, and residents and business owners who shared their perspectives, experiences, and insights with the panel.



Wildfires burning in Sonoma County.

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ULI San Francisco Member Steering Committee Perspective

Shortly after the 2017 Tubbs Fire, ULI members who live in the region asked the same question many others in Sonoma County asked: “What can we do to help, and what should we be learning from this once-in-a-generation experience?”

Twelve months later, the Camp Fire proved this was not just a once-in-a-generation experience. Two more years and two fire seasons later brought to light the increasing challenges facing our county emanating from the complex intersection of land use, energy supply, and macro-resilience issues. Ultimately, we had to wonder about the sustainability of Sonoma County’s idyllic quality of life and its economic future.

Local ULI members enlisted the assistance of ULI San Francisco, one of the global nonprofit’s largest member-driven chapters. Desiring to see what we could learn and how we could assist, we embarked on organizing a ULI Advisory Services panel (ASP). The ASP is one of ULI’s signature offerings to communities around the globe. With over 80 years of experience, the ASP has focused ULI’s considerable member knowledge on complex land use, placemaking, economic development, and sustainable community challenges. With support from

the Kresge Foundation, the process required finding a local sponsor with the technical knowledge and capacity to help organize the five-day process and coordinate the 100-plus stakeholders who would inform the panel and help shape the specific questions that form the heart of the panel’s work.

This task was made even more challenging when the coronavirus pandemic made the five-day in-person workshop no longer possible, and the first scheduled event was canceled. Fast-forward 12 months, ULI and the world had quickly pivoted to conducting business online. So in April 2021, the Sonoma County ASP was held—more than four-and-a-half years after our initial inquiry of “how can we help?”

The five-day process brings together a wide range of experts who focus on the questions provided by the sponsor, as well as questions the panel feels need to be addressed but may not have been asked. More important, the process gives an experienced and national team of experts the opportunity to learn from regions facing unique challenges, while offering ideas, solutions, and best practices that have worked in other settings.

We are thankful to the Regional Climate Protection Authority and the entire Sponsor Team for engaging ULI in this complex issue, and we look forward to working with you and your partners to implement and carry forward the recommendations made by the esteemed panel of experts.

Jim Heid, FASLA
Founder, UrbanGreen & CRAFT
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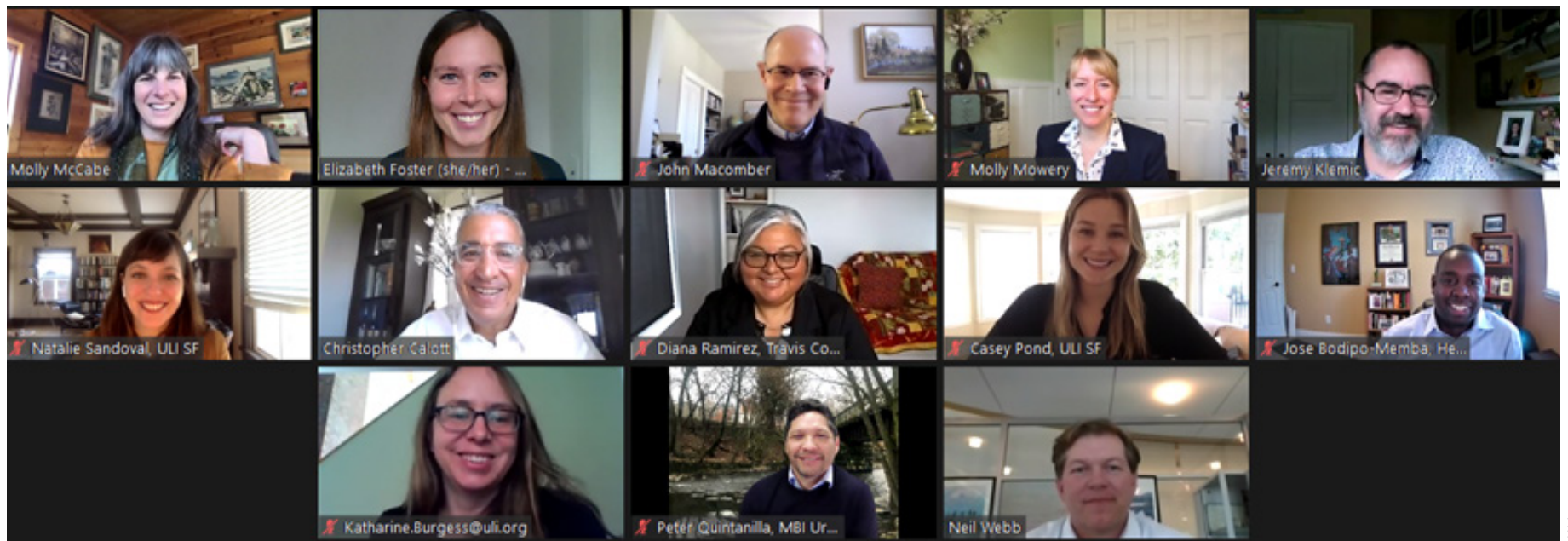
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Summary

Sonoma County experienced devastating wildfires in 2017, 2019, and 2020 and was on high alert in 2018 because of high-risk conditions and nearby catastrophic fires that contributed to poor local air quality. The compounding challenges of wildfires and the coronavirus pandemic in 2020 and 2021 led to a public health emergency and extraordinary economic disruption, taxing local governments, community members, and businesses.

Although emergency fire practices had been greatly improved since the 2017 wildfire season in response to the existing dangers, County of Sonoma and the City of Santa Rosa recognized that housing and land use strategies would be integral to scaling up further wildfire preparedness and recovery efforts. The Sonoma County Regional Climate Protection Authority (RCPA), a coordination agency for the entities involved in climate protection through the



The Advisory Services Panel convened virtually over the course of six days to engage with stakeholders from across Sonoma to develop a thorough understanding of recent wildfires in the region.

county, worked with the County of Sonoma and the City of Santa Rosa to invite ULI to convene a virtual Advisory Services panel (vASP) to provide strategic guidance about how to improve the community's immediate and long-term resilience to potential future wildfire and de-energization events. The vASP sought to provide high-level advice on future planning, development, and infrastructure strategy that could enhance regional resilience and protect communities in the face of future fire events.

During its six-day virtual engagement, the ULI panel engaged with stakeholders from across Sonoma County to develop a thorough understanding of the recent wildfires as well as the impacts of those events on residents, housing stock, governance structures, and the economy. The resulting recommendations acknowledge the immediate and potential future risks, the significant recovery progress to date, and other community objectives such as decarbonization, addressing the housing affordability crisis, and achieving equitable outcomes in all RCPA and municipal initiatives.

The recommendations are intended to be high level, with implementation strategies developed locally to align with local capacity and resources. Many of the recommendations address the overall theme of learning to live with fire and of preparing communities, people, and the built environment for future fire seasons. Unfortunately, these

What We Heard

"The best solutions might be regional, not local."

Trauma

"Disaster is a new constant state of being in Sonoma County."

"We've gotten a lot better at responding to disasters because we have been in them. But I don't think we have gotten used to this new state of being, of being constantly in disaster and recovery mode."

Capacity/Leadership

"We have no more capacity and no one is organizing us."

"The power of the region is not being harvested."

Housing

"Housing policy is climate policy."

"The density that people are afraid of already exists."

Grid Resilience

"PSPS has not proven to really be mitigation."

Equity

"The lost wages for the working-class community in Sonoma County, which is majority Latino/Latinx and families with young kids, created economic instability on a level that no one was prepared for."

Essence

"We need to meet each community where it is at."

"We are a confederation of cities, hamlets, and unincorporated areas, each with a unique character, its own feel, and its own way of life."

"Disasters really emphasize how much people need each other and need to rely on each other, especially in small communities."

events are likely to continue to become even more damaging because of the impacts of climate change and other factors.

The panel's approach, as articulated and detailed through the recommendations in this report, comprises the following elements:

- **Resilience:** The panel's goal is that its recommendations help Sonoma County come back stronger from the challenges it has faced—not to return to the way things were. Although many perspectives exist, the panel used climate resilience specifically as its frame to consider how the study area can be more prepared for the effects of climate change, including wildfires, increased drought, extreme heat, and other impacts. Climate resilience also offers many direct connections with economic and social resilience, which are critical to community well-being.
- **Equity:** The panel worked from PolicyLink's definition of equity, which is "a just and fair inclusion into a society in which all can participate, prosper, and reach their full potential." (PolicyLink is a national research and action institute dedicated to advancing economic and social equity.) In its recommendations, the panel considered that wildfires are disproportionately affecting historically marginalized and

otherwise disadvantaged communities, considering age, socioeconomic status, race, immigration status, language spoken, technology access, private vehicular access, and other factors. Historically marginalized groups are most likely to be impacted by climate change, given both the likelihood of damages and the cost of bouncing back from a disruption such as a damaged home or interrupted job. Enhancing resilience requires embedded social and racial equity considerations throughout an analysis.

- **Community essence:** The panel was inspired by the opportunity to get to know Sonoma County and the unique character of its many different communities. In planning for enhanced resilience and future development, it is critical to respect, maintain, and celebrate this community essence. The panel heard from stakeholders that the area is "a confederation of cities, hamlets, and unincorporated areas." The panel observed both that many stakeholders feel a strong attachment to their communities and that the existence of many different places to visit and experience is integral to the county's considerable tourism economy and high quality of life.

The Sponsor Team

A coalition of government entities hosted the Sonoma County Advisory Services panel. Led by the RCPA, the coalition also included leadership from the County of Sonoma, the City of Santa Rosa, the Renewal Enterprise District, and Sonoma Clean Power. A full list of individuals who participated can be found in the "Acknowledgments" section of this report. Throughout this report, this group of Advisory Services panel hosts is referred to as the "Sponsor Team." The panel's recommendations include actions that may be led by one or all of the entities that hosted the panel, and further analysis or technical assistance may be required locally to determine roles and responsibilities for specific recommendations, especially if carried out in collaboration.

A key theme for the panel was the call to action for the Sponsor Team to come together as "One Sonoma" to more effectively coordinate and scale investments in wildfire resilience. "One Sonoma" may take the form of a new alliance, investment vehicle, or other entity formally joining the Sponsor Team in its efforts to enhance wildfire resilience and improve collaboration and transparency. One immediate follow-up effort from the Advisory Services panel, which is detailed further in the recommendations of this report, may be designing this "One Sonoma" vehicle and determining the optimal governance, funding, and collaboration structure.

Guide to the Panel's Recommendations

All property in Sonoma County faces some level of wildfire risk. The panel's recommendations focus on changing policy to reflect this and better protect communities, residents, and businesses from the considerable risk of damages and human harm. This represents a step change from the current approach, which primarily focuses on wildfire resilience for outlying locations currently designated as wildland–urban interface (WUI). Alongside that change, the panel identified a number of methods to help the Sponsor Team meet its infill and attainable housing goals, reduce the impact of Public Safety Power Shutoff (PSPS) de-energizations, and more effectively begin to leverage its powerful position as a coordinated region. Delivering attainable housing stands concomitant with wildfire resilience as one of the key challenges facing the county, and the solutions to both enhancing wildfire resilience and housing access are often intertwined.

The panel delivered 40 recommendations in the categories of land use for wildfire resilience, housing, and governance and encourages county leadership to identify the potential for alignment between the recommendations and RCPA's Strategic Plan 2025. The full details of and rationale behind the recommendations follow in the respective sections of this report. Following is a list of every recommendation and its location in the report for easy reference:

Page	Recommendation
Land Use to Enhance Wildfire Resilience	
19	Hire one consultant team to deliver a coordinated General Plan, which includes regional data sharing and community drill downs, and consider how the General Plan can incorporate wildfire resilience measures.
	Create a singular, aggregated vegetation and fire severity zone map for the county.
20	Re-envision the WUI as any area within the county that can be subject to direct flames or embers caused by wildfires, and establish a minimum countywide wildfire construction standard for all residential development (new and existing).
	Ensure the allocation of dedicated funds to home-hardening programs.
	Formalize training programs for industry professionals and residents on wildfire-resilient home design and hardening.
21	Make decisions that align with Community Wildfire Protection Plans.
	Evaluate a policy position on building new housing stock in high-risk areas.
	Evaluate potential mechanisms for transfer of development rights (TDR)/land buyouts.
23	Establish wildfire buffer zones and protective corridors.
24	Mitigate wildfire risk by increasing trail network around urban growth areas.
25	Promote prescribed burning, mechanical thinning, and reintroduction of fire-tolerant species.
26	Expand urban forest management strategies.
	Study existing and proposed California precedents of community wildfire preparedness programs and wildfire-resilient development.
Energy and Economic Resilience	
28	Leverage community assets (assessment).
29	Existing energy infrastructure assets should not be replaced in-kind if it ultimately impairs energy transition ambitions.
	Establish a regional partnership structure to improve communication.
	Identify equitable regional wildfire prioritization metrics.
	Increase community energy education.
30	Develop an inclusive regional energy resilience strategy.

Page	Recommendation
31	Solidify regional resilience consortium. Innovative energy storage.
32	Deploy regional energy resilience/sustainable communities mapping.
33	Evaluate emerging technologies for energy independence and wildfire resilience.
Housing, Development, and Urban Planning Recommendations	
37	Develop a single “menu” to guide by-right entitlements. Continue to develop infill typologies that align with local architectural context and heritage, and allow up to seven stories for contextual residential development in Santa Rosa and Petaluma downtown cores.
38	Ensure the building department is prepared to approve modular construction in each jurisdiction. Leverage historic state and federal tax credits for adaptive use. Increase neighborhood density with place-appropriate missing middle infill.
39	Reduce or eliminate parking requirements in downtown core. Reevaluate street standards for walkability and pedestrian safety and to incorporate climate resilience strategies.
40	Track emerging state funding. Eliminate annual housing limits.
41	Evaluate options for expanded renters’ rights partnerships and programs. Evaluate the potential for and feasibility of employer subsidized housing. Explore a county housing bond to increase housing and potentially support home hardening.
Equitable Governance and Making the Business Case	
42	Establish mutual aid and interlocal agreements, including pre-position contracts. Fund and partner with regional groups to increase their capacity.
44	Enhance communication and transparency of funding decisions with new data-sharing resources. Apply for funding regionally to become more competitive.
49	Adopt, develop, and implement the panel’s economic resilience model to make cost/benefit analysis–driven investments.

RCPA Strategic Plan 2025

1. FOCUS

Focus initiatives on regional decarbonization, carbon sequestration, and resilience to directly reduce greenhouse gases and improve quality of life.

Objective Leverage RCPA’s regional role to accelerate climate action in focused areas.

Outcome Members and partners prioritize and implement local climate actions that generate tangible, regional impact.

S1.1 Establish solution sets for local governments that cascade positive climate impacts regionally.

Develop strategies to support regional decarbonization, sequestration, and resilience and collaboratively identify partners and local government roles.

Consider menu of strategies and associated impact based on 2030 GHG reduction goals and present to members and partners for input.

Establish regional climate action work plan templates to address locally relevant priorities.

S1.2 Pursue high impact regional-scale grants and funding to enable local government climate action implementation.

Identify and pursue grant opportunities for other funding sources for each action.

2. ENGAGE

Engage and support local governments to meet Sonoma County’s climate and resilience goals.

Objective Directly assist local government members to address a range of climate and resilience needs.

Outcome Greater participation and capacity of local government members to direct and implement local climate action.

S2.1 Streamline information sharing between local government agencies and partners.

Work with members and partners to identify effective communication and data sharing tools and develop a schedule for ongoing communications and information sharing.

Establish a members portal, with contributions from partners, to share best practices, resources, and data.

Share locally relevant state and regional information on specific priorities.

S2.2 Increase capacity for local members to participate in climate action.

Survey members and partners regarding their needs and interests.

Create an option in local contribution agreements to include assistance in the development of climate action plans.

As part of baseline membership, offer training and skills related to climate action.

S2.3 Convene local government members to reduce duplication of efforts.

Establish, convene and facilitate quarterly meetings between local government members and RCPA.

Work with city managers and county manager agency.

Develop member commitment to data sharing and resource sharing.

3. SUSTAIN

Ensure RCPA grows revenues to achieve operational sustainability within the next 5 years and is able to expand services to fulfill its mission.

Objective Increase the capacity of RCPA to provide additional benefits to members and partners through focused growth.

Outcome Members and partners are supported and empowered to meet Sonoma County’s ambitious climate goals.

S3.1 Position RCPA as a regional leader in climate action with clear roles and measurable goals.

Develop messaging and communications materials to highlight RCPA’s value proposition to members, partners, and decision-makers.

Present RCPA progress to member’s decision-making bodies on an annual basis.

Expand RCPA’s staff to support expanded programs and services.

S3.2 Diversify and grow revenue sources through the development of operational grants, innovative fee for service programs, trainings, resources, and strategic partnerships.

Secure funding to implement strategic plan.

Work with members and partners to establish increase in local contributions consistent with desired RCPA capacity.

Establish and implement a 3 to 5 year fund and revenue development plan.

Develop a suite of fee for service programs for local governments to enable RCPA to secure sustained focused funding for specific projects.

The Sponsor Steering Committee and RCPA are encouraged to review the recommendations contained herein with the goals of RCPA 2025 Strategic Plan to look for areas of alignment, amplification, and efficiency of execution.

Panel Recommendations and Where They Can Provide the Greatest Benefit

Recommendation	Santa Rosa	Settled towns	Rural residential	Industrial	Agricultural and open space
House hardening	X	X	X		
Vegetation management and clearing	X	X	X		X
Asset Management: power line refreshing			X		X
Land buyout, TDR		X	X		
First responders – equip and train	X	X	X	X	
Housing funding, RED, other CDFIs	X				
Remove generators			X		
Public transit	X				
Parks and recreation	X	X	X		
Water treatment and conservation	X	X	X	X	X
Turgid areas, ember suppression	X	X			X
Increase local energy independence:					
• Microgrids and hydrogen	X	X		X	
• Innovation and manufacturing	X	X		X	
• Green jobs	X	X		X	

Source: ULI panel.

Panel recommendations can be considered as part of a coherent and coordinated spending plan that can help the county grow together, with cumulative benefits that build upon each other and have an even greater impact.

The Panel's Assignment

The purpose of this vASP was to assess land use, development, and local energy grid strategies in relation to community preparedness and wildfire and economic resilience in unincorporated Sonoma County and the City of Santa Rosa. While the threat of wildfires is affecting energy grid reliability, the County of Sonoma and its nine incorporated jurisdictions are striving to meet state and local climate mitigation and housing goals.



FLICKR, HARMINDER DHESI

The Glass Fire in September 2020 contributed to the destruction of over 5,000 acres in Anadel State Park in Sonoma County.

RCPA and the Sponsor Steering Committee asked the ULI panelists to consider the following scope questions:

Land Use and Development for Wildfire Resilience

- What land use and development strategies and policies can Sonoma County use to equitably address current wildfire risks and set the foundation to meet the predicted increased lengths of fire season and power shutoffs?

Energy and Economic Resilience

- How can Sonoma County increase the resilience and reliability of its energy supply as it transitions from fossil fuels to renewable electricity and prepares for the impact of extreme winds, heat, power shutoffs, and wildfires?

Equitable Governance, Partnerships, and Funding

- How can we ensure that land use, development, and infrastructure investment decisions are transparent and support equity? What examples of other communities' engagement, coordination, and decision-making can we learn from and apply?

- Recognizing that energy and wildfire risks often span jurisdictional and organizational boundaries, what best practices in governance and funding can Sonoma County implement to ensure a coordinated, effective response to these risks? How can the County of Sonoma General Plan support this effort in tandem with updates to the individual General Plans of the county's incorporated cities, specifically the City of Santa Rosa?
- What can we do now and in the next few years to (a) establish new and sustainable revenue sources to dedicate to this grid and wildfire resilience work and (b) leverage new revenue sources for maximum impact?



Cities can experience elevated smoke pollution levels for weeks following a wildfire, with air quality index readings reaching dangerous heights.

FLICKR, BLM

The Study Area's Existing Conditions

Sonoma County is one of nine counties in the San Francisco Bay Area. The county has long strived to balance growth and development with its residents' desire to preserve the natural environment and rural character. Growth patterns in the larger Bay Area region have strongly influenced the land use and development patterns in Sonoma County. At the time of the panel in April 2021, the County of Sonoma was beginning a countywide, multiyear process to update its General Plan.

Santa Rosa is the county seat of Sonoma County and the largest city between San Francisco and Eugene, Oregon. Since its incorporation in 1868, with an area of about one square mile and population of 900 residents, Santa Rosa has evolved into the commercial, financial, medical, and industrial center of the North Bay.

Before 2017, major wildfire damage last occurred in Sonoma County during the 1964 Hanly and Nunns Canyon fires. However, as the county's fire prevention website says in introducing its Community Wildfire Protection Plan (CWPP), "this abruptly changed in 2017 when the Sonoma Complex fires forever changed our county."



Sonoma County, California.

SONOMA COUNTY RESILIENCE ADVISORY PANEL BRIEFING BOOK

Recent wildfires have caused tremendous damage to life, infrastructure, and property in Sonoma County, foreshadowing the future wildfire risks predicted to occur because of the influence of climate change. The October 2017 Sonoma Complex wildfires caused more than \$9.4 billion in damages and killed 44 people. These wildfires burned over 110,000 acres and destroyed 6,997 structures. After the 2017 wildfires, Sonoma County residents and agencies undertook a significant recovery effort that focused on rebuilding to meet critical housing needs and improving emergency notification and response procedures.

In fall 2019, PG&E began de-energizing the grid through widespread power shutoffs to decrease the risk of wildfires during peak fire danger events. Unfortunately, these efforts were not enough to prevent the ignition of the Kincade Fire on October 23, 2019. This wildfire burned 77,758 acres and destroyed 374 structures, including the loss of 174 homes. Almost 200,000 Sonoma County residents were under mandatory evacuation orders during the Kincade Fire.

Wildfires broke out in Sonoma County again in 2020 with the Walbridge and Meyers fires in August and the Glass Fire in September. The Walbridge Fire burned 55,000 acres and the Meyers Fire burned 2,360 acres. Combined, 159 residential structures were destroyed by these fires. The Glass Fire burned 67,484 acres destroying 1,555

structures in Sonoma and Napa counties. In Sonoma County, roughly half the total area burned, and 329 homes were destroyed. During the 2020 wildfires, Sonoma County experienced elevated smoke pollution for weeks, including two weeks with air quality index readings ranging from unhealthy to hazardous, which impacted almost the entire Bay Area region.

Finally, the frequency and magnitude of wildfires and Public Safety Power Shutoff events are negatively affecting Sonoma county’s economy. The county and its cities are investing more of their limited budgets, staff time, energy, and focus on emergency management and response; key industries such as tourism are experiencing declines in consumer demand; and some residents and businesses have chosen to leave Sonoma County because of the stress of multiple disasters, resulting in a loss of local talent and tax revenues.

Impact of Recent Fires in Sonoma County

Fires	Year	Acres	Homes	Fatalities
Sonoma Complex (Tubbs/Nunn)	2017	110,000	6,997	44
Kincade	2019	77,758	174	
Glass/Walbridge/Meyers	2020	124,844	488	
	Totals	312,602	7,659	44

Source: Regional Climate Protection Authority.

Existing Challenges

A central theme of all stakeholder interviews was the trauma and difficulties of living with repeated, catastrophic events. Many interviewees, from local government leaders to residents, emphasized that they have been living in “response mode” since 2017. The repeated fire events, the prolonged recovery periods including air quality impacts, and the need to prepare for future events have become an exhausting additional layer over the many other stresses of the pandemic and associated economic fallout.

The panel also heard and observed that many governing entities at the county and in Santa Rosa now primarily focus on response to events, rather than having the capacity to lead in a more proactive manner. As a result, the power of the region to act and advocate for itself as a collective is not being harvested, and no clear leader or “champion” has emerged with the capacity, interest, and trust to do so.

An equity challenge is the economic instability created by the wildfires and PSPS. These regular shutoffs have become extremely disruptive to businesses and households across the region. In addition to complicating emergency response and decreasing quality of life, the PSPS strategy has not been wholly effective at preventing wildfires from igniting and causing damage in the county.

The panel also heard and observed that many governing entities at the county and in Santa Rosa now primarily focus on response to events, rather than having the capacity to lead in a more proactive manner. As a result, the power of the region to act and advocate for itself as a collective is not being harvested, and no clear leader or “champion” has emerged with the capacity, interest, and trust to do so.

These fires have had a major impact on lower-income residents who are most likely to live in homes without wildfire preparedness design measures, and who are least likely to have the resources needed for repairs, temporary housing, and other recovery costs. These community members are also the least likely to have flexibility from their workplaces to take time off, telework, or otherwise shift routines during a time of disruption. As one stakeholder said, “The lost wages for the working-class community in Sonoma County, which is majority Latino/Latinx and families with young kids, created economic instability on a level that no one was prepared for.” Many of the low-income community members in Sonoma are also living in temporary or group housing and experiencing crowding. The panel heard that some residents—especially those with lower incomes—are living in crowded conditions to make ends meet. One stakeholder interviewee remarked that “the density that people are afraid of already exists . . . but without giving people the dignity of their own home.” Overall, the housing situation is untenable, is growing even more unequal, and increases the risk from extreme events.

Like many communities in California, the county is also experiencing significant housing challenges with a high and increasing cost of homeownership and rent as well as pushback from some stakeholders to



GIBSON OUTDOOR PHOTO; SHUTTERSTOCK

Smoke from the Santa Rosa Walbridge Fire in 2020 that burned 55,000 acres.

build new housing. The high costs in the Bay Area, as well as the increasing ability to work remotely given changing corporate expectations after COVID, have meant that Sonoma is continuing to see more and more interest in development, which has spurred on an already competitive housing market. However, a plethora of barriers stymie the building of new housing, especially affordable or attainable housing. These barriers can include the following:

- land costs;
- zoning codes;
- time for entitlements;
- the California Environmental Quality Act;
- neighborhood opposition;
- labor shortages, current construction costs, and materials supply chain;
- limited and very competitive state low-income housing tax credit funds and federal funding sources; and
- downstream rent projection that reduces return on investment.

All these constraints exist independent of the concerns about potential damages or recovery from future wildfire events. The challenges of wildfire events compound most of the preceding challenges, given the human harm, disruption, physical damages, and resource loss occurring on account of wildfire events. In short, destructive wildfire

events have also increased the difficulty of adding new housing to meet market demand as well as to achieve Santa Rosa's Regional Housing Needs Allocation (RHNA), which the Association of Bay Area Governments set at 4,685 units (as of May 2021 in its *Draft RHNA Plan: San Francisco Bay Area, 2023–2031*). Moreover, efforts to add much-needed housing units aligning with RHNA goals are orchestrated at the city level, rather than on a more coordinated basis considering challenges, opportunities, and wildfire resilience concerns at the county level.

Existing Strengths

Sonoma County's unique character, location in the Bay Area, and commitment to enhancing resilience are some of the many strengths shared by stakeholders. The panel noted the significant policy innovation already underway in the county, especially with regard to sustainability and disaster recovery.

Many stakeholders noted how much the county's emergency response efforts had

In short, destructive wildfire events have also increased the difficulty of adding new housing to meet market demand.

improved between 2017 and 2019, in addition to the community's strength coming together after the sudden trauma of 2017. "Disasters really emphasize how much people need each other and need to rely on each other, especially in small communities," noted one interviewee. The panel also noted the speed of rebuilding and the community spirit engendered during the county's efforts after the 2017 Tubbs Fire, including in neighborhoods such as Coffey Park and Larkfield.

One of Sonoma County's greatest strengths is its potential power to deliver results if it acts as a coordinated region. The uniqueness of the county's many cities, towns, and hamlets adds to the study area's overall appeal, but these are not isolated communities and they should not act as such.

The panel believes that the county's many communities could have greater success and experience efficiencies if they participated in synchronized processes and sought more opportunities to coordinate, scale efforts, and seek joint funding and implementation opportunities.

Part of the county's strength is that it remains—despite traumatic wildfire events and future risk—a desirable place to live given its beautiful landscapes, unique towns, and convenient location in the greater Bay Area. Interest in the county is likely to only continue to grow given that the coronavirus pandemic increased the

ability for some office-based employees to work remotely, with some Bay Area tech workers receiving unprecedented flexibility to choose where to live. This trend is likely to benefit the county in terms of economic development by helping to stabilize the population even if some permanent displacement occurs from the recent wildfires. Although no comprehensive data existed at the time of the panel, anecdotal reports indicated Bay Area employees were relocating to the North Bay, including to Sonoma County, during 2020 and early 2021. While this trend offers an important economic development opportunity, it will also exacerbate the county's housing affordability challenges if additional demand is not met by supply.

Sonoma County also has ambitious transit goals. Enhancing transit offerings is critical to regional connectivity and achieving greenhouse gas emissions reductions targets, and is likely to facilitate interest in relocation to Sonoma County from other parts of the Bay Area. Golden Gate Transit runs from Santa Rosa to San Francisco, and Sonoma County Transit runs throughout Sonoma County. The county offers a bus system partially funded by sales taxes. The SMART (Sonoma–Marin Area Rail Transit) train is one recent transit investment that links the county directly with the ferry terminal in Larkspur. Another of the community's strengths is its highly knowledgeable governance and nonprofit staff, including

The panel believes that the county's many communities could have greater success and experience efficiencies if they participated in synchronized processes and sought more opportunities to coordinate, scale efforts, and seek joint funding and implementation opportunities.

at RCPA, who are already focused and leading on wildfire mitigation and housing attainability through infill and affordable development. In many instances, the panel observed the Sponsor Team and stakeholders from the county and city "already know what you need to do."

The recommendations included in this report are intended to help officials return to proactive implementation after several years of emergency response, to scale up existing efforts, and to involve and promote the work of other champions in the process.

Land Use to Enhance Wildfire Resilience

To frame the recommendations about wildfire resilience and land use, the panel broadly considered three types of land use in Sonoma County: rural, suburban, and urban. All these development typologies could form part of the wildland–urban interface, depending on the conditions which exist within each land use type. However, the mitigation methods and tools relevant for each differ. For example, natural lands would have different mitigation approaches than developed downtown areas. Key background to consider for this analysis includes the following:

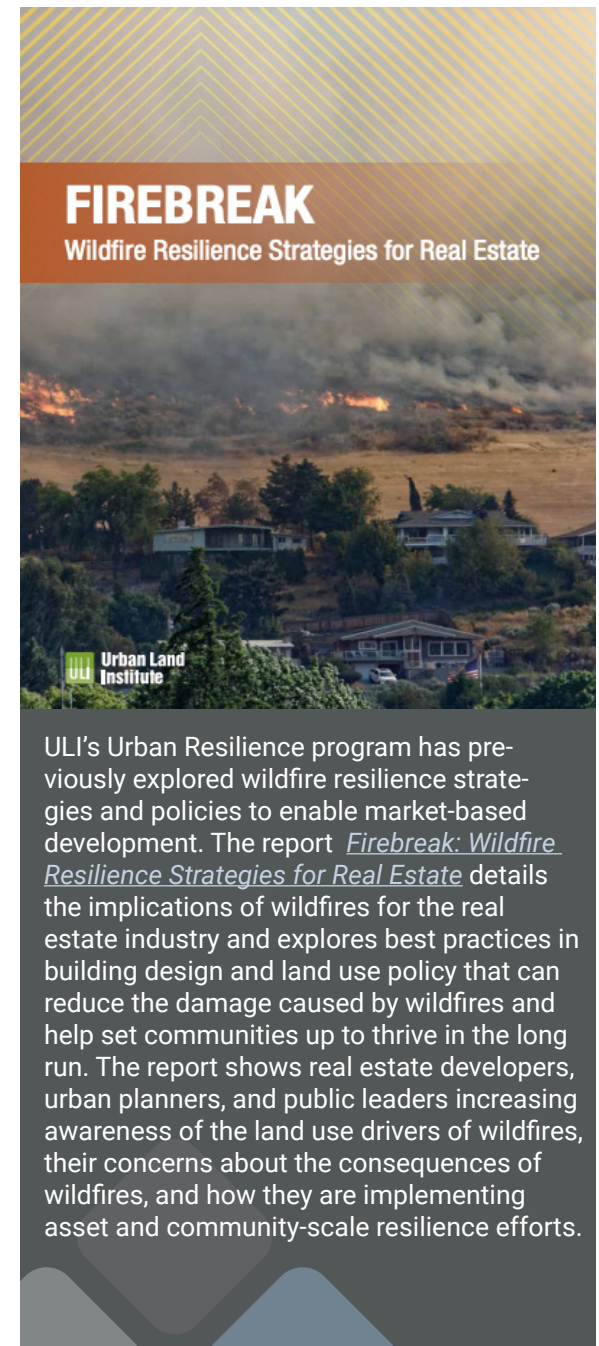
- The WUI is a set of conditions describing places where enough fuel is available that wildfires can take place and sustain themselves. This is a critical land type to consider because wildfires can ignite in and/or travel quickly into the WUI. Firefighting is also typically difficult in the WUI, and the physical property damage and economic costs in these geographic areas are often extreme.
- Surrounding natural lands can contribute to wildfire resilience if managed to prevent the rapid spread of very intense wildfires, and urban areas can be pro-

tected by strategic land management that prevents fire intrusion and building construction that decreases the chances that far-flying embers will ignite structures.

- Developed areas, including the urban downtowns, are also susceptible to wildfires, as was evidenced in 2017. Developed areas also present an opportunity to provide new and more resilient housing through infill and increased density.

One of the panel’s key recommendations is to use the current approach to development in the WUI to better conceptualize risk across the entire county.

The term “wildland–urban interface” first emerged in the early 1970s when physicist C.P. Butler at the Stanford Research Institute used the term to describe a situation related to urban development and wildfires (cited in Mowery, et al. 2019). “In its simplest terms,” he said, “the fire interface is any point where the fuel feeding a wildfire changes from natural (wildland) fuel to man-made [or human-made] (urban) fuel. For this to happen, wildland fire must be close enough for its flying brands or flames to contact the flammable parts of the structure.”



ULI’s Urban Resilience program has previously explored wildfire resilience strategies and policies to enable market-based development. The report [*Firebreak: Wildfire Resilience Strategies for Real Estate*](#) details the implications of wildfires for the real estate industry and explores best practices in building design and land use policy that can reduce the damage caused by wildfires and help set communities up to thrive in the long run. The report shows real estate developers, urban planners, and public leaders increasing awareness of the land use drivers of wildfires, their concerns about the consequences of wildfires, and how they are implementing asset and community-scale resilience efforts.

Today, land use planners and wildfire experts still think about the WUI in similar terms as *any* developed area where conditions affecting the combustibility of both natural and cultivated vegetation (wildland fuels) and structures or infrastructure (built fuels) allow for the ignition and spread of fire through the combined fuels. These WUI conditions include the location of structures, type and quantity of nearby vegetation, and topographical features. Currently about one-third of the housing in Sonoma County is in the WUI, according to the Community Wildfire Protection Plan from Permit Sonoma. This housing falls into different development typologies, meaning that different mitigation methods may be most effective to enhance wildfire resilience.

Because the WUI does not refer to only one geographic location that is affected by wildfire, the panel urges the Sponsor Team to use the term WUI to help conceptualize the overall risk faced in the county and region. This framing approach should support the Sponsor Team and Sonoma community to acknowledge the extent of risk faced and develop policy approaches to address this risk in both the WUI and in related land uses.

In addition to considering the WUI, the panel believes it is important to acknowledge the general past approach of forest management in the last century, which has in part created today's conditions for more extreme

wildfires. Native, old-growth forests were essentially “fire resistant” with adaptations that allowed them to survive, and in some cases thrive, under a regular cycle of low-level wildfires.

However, in 1935, the U.S. Forest Service enacted the “10 a.m.” policy, so named because it aimed to suppress every fire that started by the morning of the day following the reporting of the blaze (Smith 2017). This policy so successfully suppressed fires that it allowed unprecedented amounts of vegetative fuel to accumulate. The large amounts of accumulated fuel in natural lands like those present in Sonoma County that surround its town centers are a factor in the relatively recent occurrence of “mega-fires”—fires that move more quickly, over more area, for longer durations, and cause more damage than fires in the historical record. Other forest management conditions have also contributed to increased fuel buildup, such as beetle scourge and sudden oak death, further contributing to wildfire vulnerability.

Further, climate change is making the conditions for destructive fires more likely to occur. The panel also heard from many stakeholders about concern regarding extended drought, increased temperature, dry fuels, and other conditions that are making wildfires deadlier. California has recently experienced longer periods of low humidity and high temperatures, which

It is this new normal of increased wildfire risk, as well Sonoma County's location in a historically fire-prone but also fire-adapted natural environment, which the panel is seeking to help mitigate.

increase vulnerability to wildfires. The average fire season in California has increased by 78 days over the last 40 years, as the panel Briefing Book noted (page 8). California also experienced six of its largest-ever fires in 2020.

It is this new normal of increased wildfire risk, as well Sonoma County's location in a historically fire-prone but also fire-adapted natural environment, which the panel is seeking to help mitigate.

In addition to adopting strategies to reduce risk in the most fire-prone parts of the county, the panel recommends the elaboration of more policy tools to shift future development toward lower-risk areas over the long run. With the following recommendations, the panel hopes to help the community manage the immediate risks of decreased well-being from potential wildfires and insufficient housing as well as the long-term economic risks of repetitive catastrophic burn-rebuild cycles.

Policy Tools in High- and Very-High-Risk Wildfire-Prone Areas

As the County of Sonoma moves into its General Plan process, the county should look to use policy tools that would both better protect existing development and enable the shifting of development patterns toward lower-risk areas over the long run. The recommendations below offer some strategies to begin this process and may be appropriate to scope out during the General Plan process.

Regional Vision and Data Sharing

Recommendation: Hire one consultant team to deliver a coordinated General Plan, which includes regional data sharing and community drill downs, and consider how the General Plan can incorporate wildfire resilience measures. Currently, Sonoma County's 2008 General Plan is undergoing a countywide, multiyear update process. The revised General Plan Update was in the early public outreach and scoping steps in 2020 when COVID struck and temporarily halted the update process. Using this reflection period, the County of Sonoma can build on the existing circulation and transit element to include enhanced intercounty coordination on transportation and housing targets. Stakeholders involved in the panel noted that much of the general planning for the county's communities is happening independently. Moreover, some cities and towns

in the county, especially those with smaller staff or those overwhelmed by recent disaster events, are already outsourcing their general planning efforts. Sharing data and coordinating resources to complete the General Plan would allow the region to have a more coordinated, effective approach to wildfire risk reduction, increase capacity for planning staff—especially in the smaller towns, and deliver cost savings at a county-wide level. The General Plan also presents an opportunity for the county to use wildfire resilience as a lens for future planning and to advance some of the panel's recommendations for future development.

Recommendation: Create a singular, aggregated vegetation and fire severity zone map for the county. There is a considerable body of local fire science knowledge, including research led by Pepperwood Preserve and others. There are also an increasing number of private and nonprofit providers offering wildfire-related data for free, or for relatively affordable rates, to private homeowners.

However, the data for the different relevant factors (vegetation, land use, population growth, fire risk, etc.) is documented in many different maps, often held and updated by different entities. *A single map or online data set, designed to be accessible and understandable by local residents, would improve data access for community members, would enable individuals to take more targeted prevention measures, and could help create more buy-in for various healthy intact forestry and wildfire mitigation programs.*

As part of the same effort, the panel recommends including information on the aggregated map that would be critical to firefighters during a response. Especially for out-of-town or new firefighters, clearly marking access roads, fire hydrants, other water sources, and other factors would be useful. Some of this information may already be part of the forthcoming countywide Community Wildfire Protection Plan update. Within that process, creating a user-friendly portal or public website for this data and the overall CWPP should be a key priority.



Environmental education classes offered at Pepperwood Preserve provide the public with valuable resource management and conservation information.

Wildfire Resilience through Land Use and Building Strategy

Recommendation: Re-envision the WUI as any area within the county that can be subject to direct flames or embers caused by wildfires, and establish a minimum county-wide wildfire construction standard for all residential development (new and existing).

Structures not built to WUI standards are at elevated risk, especially to embers that can travel over a mile ahead of a wildfire, and if a wildfire does affect nonresilient structures, that may allow wildfire to spread more easily to other developed areas. Requiring a basic minimum standard of protection would not change the fact that there are and will continue to be different levels of hazard across the county, but the minimum standard will help decrease both individual and community risk. *In short, all new development in the county, whether within or outside the WUI, should comply with the more stringent building codes and include hardening measures.*

Currently, structures categorized as located in the WUI must comply with higher-resilience building codes that require features proven to be effective, such as maintenance of defensible space, specifically sized screening over vents to prevent ember intrusion, and noncombustible building materials. However, those requirements apply to only about a third of the overall development

within the county under the Sonoma CWPP (page 9), and as county residents have experienced—most notably in 2017 with the Tubbs Fire causing significant damage to the Coffey Park neighborhood and retail areas around the 101 freeway—wildfires can travel into more urban neighborhoods that are not currently classified as WUI. There may be some concern about insurance or market impacts from implementing WUI standards on all sites across the county; however, the panel advises that ensuring all building adheres to a higher standard will better protect people, properties, businesses, and the local economy in the case of ongoing fire risk.

Recommendation: Ensure the allocation of dedicated funds to a home-hardening programs. Existing properties constructed before modern wildfire resilience standards are at increased risk of sustaining damages. These properties are also more likely than new, wildfire-resilient development to perpetuate the spread of flames and embers through the community; the panel believes it is essential for the safety of all—those who live in older housing and those who live adjacent to it—to ensure that these structures are hardened against wildfire damage. The panel also recognizes that home hardening and other retrofit or renovation efforts can present a financial burden to some residents, and local governments should create strategies and mechanisms to make hardening achievable for all.

The panel recommends dedicating any funds raised through a potential county-wide Housing Bond (see recommendation on page 41) be coupled with programs for hardening retrofits. There is currently a countywide home-hardening program under development that aligns with current fire mitigation science. It is critical that this program is designed and implemented to be politically fair and address all housing constituents. The panel recommends evaluating the potential synergies between wildfire home hardening and sustainability upgrades that would contribute to the Sponsor Team's climate mitigation goals.

The Sponsor Team should also consider what incentives could drive increased uptake of home hardening, and how efforts could align with other sustainability outcomes, such as the transition to renewable energy. The county should consider investing in programs to work with local contractors, hardware stores, landscapers, and other small businesses to improve understanding of fire-resistant properties and available resources.

Recommendation: Formalize training programs for industry professionals and residents on wildfire-resilient home design and hardening. As alluded to above, the panel heard from multiple stakeholders that some industry professionals, including developers and builders, have not received enough basic information or training on

home-hardening strategies. Together with a new funding allocation for home hardening, the panel recommends creating a formal training program, or potentially even a certification or rating system, to warranty best practices for future building in high- and very high-risk areas. Alternatively, the Sponsor Team can partner with local organizations that specialize in wildfire safety to develop and deliver these trainings. These trainings are also likely to be of interest beyond Sonoma, including the multicounty regional area and even constituencies outside California.

Recommendation: Make decisions that align with Community Wildfire Protection Plans. The panel recommends that communities in Sonoma County continue to prioritize updating and maintaining CWPPs and using them as risk-based guidance for residential construction and retrofits. This will help increase defensible space (and therefore reduce wildfire risk) on a county-wide level. Local partner organizations, such as Fire Safe Sonoma and Citizens Organized to Prepare for Emergencies (COPE), have critical roles to play in the engagement and delivery of these plans. Fire Safe Sonoma is a 501(c)(3) nonprofit whose mission is to increase awareness of wildfire issues in Sonoma County and help local residents and firefighting agencies achieve improved wildfire safety. Fire Safe Sonoma acts as a liaison between local communities and agencies, actively seeks grant funding for

wildfire-related projects, and manages grant programs. The mission of COPE is to help residents, families, and visitors prepare for, respond to, and recover from emergencies. COPE fosters community preparedness in coordination with public safety agencies, nonprofits, and nongovernmental agencies.

Recommendation: Evaluate a policy position on building new housing stock in high-risk areas. If worst-case scenario predictions about climate change and future wildfire risks are correct, there could potentially be unacceptable levels of life-safety risk and unsustainable repetitive losses in high- and very-high-risk fire zones. Six of California's largest-ever fires ignited in 2020 (Grad 2020), indicating that the state may be moving into a very difficult and damaging new normal. Although most of the housing stock in Sonoma County is already constructed, and 28 percent is in high or very high wildfire-risk zones, an opportunity exists to avoid significantly increasing the risk to people and property by considering directing new development to lower-risk areas (DiStefano 2018). Enhancing wildfire resilience is a two-sided coin and will require both better protection of existing development and decisions to direct future development to sites that will face less risk from future fires.

The panel recommends the Sponsor Team get ahead of this potential challenge by gathering information, understanding how insurers are responding to wildfire risk

zones, and conducting inclusive community engagement and policy deliberations now. Then, if the county makes the decision to curtail development because of continued damages and risks to home and infrastructure, the community is ready with a thoughtful and equitably developed policy to address it, in line with the way the county addressed flooding in its 2016 Hazard Mitigation Plan. This process of developing a policy position on new development in high- and very-high-risk fire zones should begin with a survey of relevant maps and lands. The county may consider developing a strategy for this discussion within the parameters of the General Plan update process.

Recommendation: Evaluate potential mechanisms for transfer of development rights (TDR)/land buyouts. As part of long-term resilience planning, the panel recommends the city and the county adopt some sort of mechanism like TDR that would allow community-elected officials to mitigate the risk to people and existing property in high- and very-high-risk fire zones giving priority to areas that have experienced repeated losses or threats. A TDR policy should also enable the county to deliver higher-density housing in safer locations and contribute to meeting the region's significant housing demand. Given that every new structure added in the WUI presents additional future risk, TDR could be a key way to reduce future risk and redirect development while maintaining development opportunity.



EXPLORING TRANSFER OF DEVELOPMENT RIGHTS AS A POSSIBLE CLIMATE ADAPTATION STRATEGY

Urban Land Institute Resilience Panel Focus Group with Miami-Dade County



Transfer of Development Rights

Transfer of development rights (TDR) presents one promising option for directing development out of harm's way and facilitating climate adaptation. However, developing strategies for sending and receiving sites, and designing a policy compatible with market realities, present challenges, with solutions likely to significantly differ depending on state policy and market conditions. To explore opportunities to use TDR to enhance coastal resilience in south Florida, ULI's Urban Resilience program teamed up with ULI Southeast Florida and Caribbean to host a focus group, *Exploring Transfer of Development Rights (TDR) as a Possible Climate Adaptation Strategy in South Florida*. TDR offers the opportunity for an optional, incentive-based program to permit landowners to sell the development rights from their land to any interested party to increase density at a given location. The findings from south Florida may present some parallels to developing a TDR policy for wildfire resilience.

high and very high wildfire-risk zones. The panel also appreciates the importance of continued land management and maintenance. These homesteads and natural and agricultural areas preserve the rural, rustic character of the county and are important to protect. However, these areas are generally at high wildfire risk with limited resources to protect themselves. The panel strongly encourages the Sponsor Team to continue to pursue and expand its existing infill strategies because of these complexities. Like the considerations for a new policy position on new building in high- and very-high-risk zones, conducting community engagement and policy discussions about how the community will both direct development to sites at reduced risk and address existing risk will support more equitable and actionable outcomes in the long run.

At this point, it is unclear what entity would manage a potential TDR program and what specific land use changes the potential TDR program would support. The panel recommends further study of which areas could be suitable as receiving areas, what level of density could be achieved, and what market interventions would be needed for development to be viable. A next step after this panel may be an additional community-wide exercise, such as a ULI technical assistance panel, which studies market conditions, needed housing targets, and density ambitions and then proposes strategies to design locally specific TDR policy.

Ideally, a TDR strategy can bolster other infill strategies that are already in play and redirect development in the county to more fire-safe locations.

A TDR program is defined as a market tool that can be used to achieve land preservation by allowing a landowner to sever unused development rights (the "sender" or the "sending site") in exchange for compensation from another landowner who wants additional development rights for another parcel

(the "receiver" or the "receiving site"). Most traditionally used for agricultural and historic preservation, participation in TDR programs may be either mandatory or voluntary. TDR as a climate adaptation strategy is a relatively new concept that has most often been considered by coastal communities at risk from multiple types of flooding (see sidebar).

The panel recognizes the equity, financial, and political complexities of significantly reducing risk to existing development in

Healthy Forestry and Landscape Practices to Promote Resilience

The panel encourages the Sponsor Team to prioritize land stewardship that will support healthy intact forests that are more reflective of the native, fire-resistant landscapes that existed before the federal “10 a.m.” fire suppression policy.

Recommendation: Establish wildfire buffer zones and protective corridors. Fire, as a natural system, does not stay within political borders. Recognizing this, the panel encourages the Sponsor Team to co-create with other local entities, including adjacent counties, wildfire buffer zones where fuels can be managed to reduce wildfire threat to adjacent land uses. Many stakeholder entities also spoke about how informal buffer zones (including some agricultural lands and vineyards) offered critical protection during recent fires, without which the damage could have been far more significant.

The panel envisions these buffer zones as strategically located areas that consist of irrigated orchards or crops, where water sources are sustainable or already in place (meaning that irrigated land should not be expanded in drought-prone areas where the water may be used for other purposes). Other landscapes—such as thinned forests—can be managed in a way that helps slow or stop the advance of wildfires into developed areas. Creating these buffer zones is also an opportunity to put grazing

Case Study: Resilient Land Use Scenarios in Santa Rosa

A recent report published by Next 10, [*Rebuilding for a Resilient Recovery: Planning in California’s Wildland Urban Interface*](#), details case study analyses of three different resilient land use scenarios. The Santa Rosa scenarios revealed better ways to adapt to wildfire risk than continuing to rebuild in the same places following a fire (UC Berkeley Center for Community Innovation 2021). Scenarios suggested that managed retreat and resilience nodes could offer better wildfire protection for residents—while simultaneously meeting climate and housing goals.

- **(Re)Building as Usual:** This scenario assumes all homes damaged in the 2017 Tubbs Fire are rebuilt, with 250 of them adding accessory dwelling units (ADUs). In this scenario, the same number of families—potentially more—continue to live in wildfire-prone areas.
- **Managed Retreat:** This scenario assumes most WUI residents relocate to the western portion of Santa Rosa where the wildfire risk is lower. As cited in the Next 10 report, 70 percent of homeowners whose properties were destroyed in the Tubbs Fire would participate in a federally funded voluntary buyout program, which would take significant time and resources but offer increased safety for residents longer term. This scenario also assumes the building of new housing in western Santa Rosa that meets the need for single-family and low-rise multifamily units to combat the affordability crisis and increase the “missing middle” housing. “Missing middle” housing refers to multi-unit buildings such as duplexes and fourplexes that are small enough to be integrated within primarily single-family neighborhoods. This building typology was common prior to World War II but fell out of popularity as low-density, single-family suburbs expanded in the 1950s” (UC Berkeley 2021).
- **Resilience Nodes:** This scenario would reduce risk for residents voluntarily electing to relocate from existing vulnerable homes in the WUI into dense, walkable neighborhoods with protective green buffers to reduce future fire susceptibility. This scenario also involves buyouts for Tubbs Fire survivors, with 80 percent of those in the WUI moving to the resilient nodes and 20 percent rebuilding their homes in their original locations.

animals such as sheep, goats, cows, beavers, and birds to work to help maintain these types of fuel breaks. The creation and maintenance of regional fuel breaks is also an opportunity for engagement and cooperation among the public, private, and nonprofit sectors. The incorporation of farm animals could also potentially contribute to tourism or community branding initiatives. Future buffer zones could not only offer important protection for communities in the county but also contribute to building from local sense of place and achieving quality-of-life goals.

Recommendation: Mitigate wildfire risk by increasing trail network around urban growth areas. As noted previously, wildfire mitigation measures can contribute to Sonoma County's recreation opportunities, tourism potential, and quality of life. Alongside efforts to expand and formalize wildfire protective corridors, the panel recommends extending existing pedestrian and bicycle trails into a continuous loop around Santa Rosa as well as the other developed areas in Sonoma County.

The primary purpose of this enhanced trail network would be to reduce wildfire risk by interrupting fuel continuity, allowing more intensive management practices that reduce the amount and type of fuels and can increase response or access. The trail system should include strategically managed vegetation and perhaps irrigated

Regional Precedent: Recreational District with Goat Grazing

Goats and other animals grazing on open space can serve as a natural firebreak in vulnerable, fire-prone areas. In Park City, Utah, the Basin Recreation District recently unveiled plans to bring goats into the Snyderville Basin. The Basin Recreation District contains over 2,000 acres of open space and 170 miles of trails for recreation. The purpose of introducing grazing is twofold: the goats' vegetation consumption manages weeds and mitigates potentially combustible fuel. The goats are expected to consume two acres of shrubs, weeds, tall grasses, and invasive plants in the meadows of Willow Creek, which is a dedicated fire egress area (Basin Recreation 2020).

Examples of using goats to establish natural firebreaks already exist. During a 2019 Ventura County fire that cost the Ronald Reagan Presidential Library and Museum more than \$500,000 in damages ("Easy Fire" 2019), firefighters on the scene of the fire credited the more than 350 goats that graze there with significant prevention of damage. Because they grazed the library grounds' perimeter, they prevented fuels from engulfing the library and museum in its entirety ("Goats Return" 2021).



During a 2019 Ventura County fire, goats grazing were cited by firefighters as a primary reason for limiting catastrophic damages to the Ronald Reagan Presidential Library and Museum.

Goats also offer a strong opportunity for fire prevention in hazardous areas that cannot be easily reached by landscaping crews. Locally, the Sonoma County Regional Parks Department has been using grazing sheep and goats for several years for both fire prevention and to eliminate non-native, invasive plants that can choke out flowers and native grasses (Benfell 2018). This initiative builds upon the longstanding work of Regional Parks to use cattle grazing as a land management tool at a handful of its properties (Parker 2020).

FLICKR, MELINDA YOUNG STUART

Historic Precedent: A Regional Firebreak

California used to be traversed by the world's biggest firebreak, a nearly 800-mile line cut into the Sierra Nevada from Mount Shasta to Bakersfield. This dirt road firebreak, the Ponderosa Way, was a labor-intensive and costly project built in three years by the Civilian Conservation Corps in the 1930s during the Great Depression with the goal of protecting valuable timber from wildfire. The cleared path—free of trees, brush, debris, and ground cover—not only had the potential to serve as a firebreak but also as an emergency access or evacuation route for residents and communities in danger.

Left unmaintained and neglected nearly from the beginning, the Ponderosa Way never lived up to its purpose and has since been reclaimed by nature, with only small portions remaining intact. With county, state, and federal officials disagreeing over who bore the responsibility and expense of maintenance, and others unsure of its actual effectiveness in fire protection or emergency response, the largest firebreak in U.S. history was abandoned (Gafni 2020).



The panel recommends creating buffer zones as an opportunity for grazing animals such as cows to maintain firebreaks, while also offering a connection to nature for bicyclists or pedestrians on nearby trails.

nearby vegetation in sections where it is possible to align with natural water features or low-fire-risk agricultural land. In effect, the trail system would create a buffer around developed areas, thereby scaling up the idea of defensible space around homes to defensible space around the entire developed areas. In accordance with the sidebar example, the panel suggests evaluating the expanded use of grazing animals (a “fire protection brigade”) to help maintain the trail buffer. These grazing animals could also contribute some small business or tourism development potential.

Recommendation: Promote prescribed burning, mechanical thinning, and reintroduction of fire-tolerant species. Essential thinning of tree stands, prescribed burning when conditions allow, and prioritizing restoration of fire-adapted species will encourage stronger, more fire-resistant growth. The panel recommends first increasing these activities in areas most likely to be affected by wildfires based on knowledge of historical and predicted fire direction as well as along emergency access and evacuation routes. Note that prescribed burning, thinning, and reintroduction of desired species

can happen independently or as part of creating and maintaining regional firebreaks and protective corridors.

The goal of these types of vegetative fuel treatments is not to reduce the amount of fire but the severity of it. Low-severity fires that are close to the ground, slow moving, and burn at relatively low temperatures help remove (and eventually prevent the buildup of) dangerous fuel that allows wildfires to travel quickly, generate lots of far-flying embers, and burn at catastrophic temperatures. Further, low-severity fires help regenerate and spread some fire-adapted species that are ecologically critical to maintaining a healthier, less risky forest structure.

Recommendation: Expand urban forest management strategies. In addition to increasing healthy intact forests that surround developed areas, the panel encourages the Sponsor Team to develop an Urban Forestry Plan and/or expand similar provisions in the County Municipal Code and/or General Plan update. The goal of this effort is not only to confirm that the urban forestry strategy reduces wildfire risk but also to proactively mitigate the urban heat island effect, which can be a potentially negative outcome of increased infill development. Providing shade and plantings that reduce the urban heat island effect that are appropriate for California’s drought conditions and do not increase wildfire risk will require careful consideration. This recommenda-

tion aligns with the current work of Permit Sonoma to review and update the county’s Comprehensive Tree Ordinance.

Recommendation: Study existing and proposed California precedents of community wildfire preparedness programs and wildfire-resilient development. Many examples of wildfire-resilient development and community engagement exist in California, and the panel urges the Sponsor Team to consider incorporating some of these best practices to help the County of Sonoma and the City of Santa Rosa expand their wildfire preparedness efforts. Some examples include [Rancho Mission Viejo](#) (notable for community defensible space, home hardening) and the Santa Monica Mountains Conservancy (notable for postfire communication, outreach, rebuilding, and plant establishment and the creation of a trail management plan).

In particular, the panel strongly encourages the Sponsor Team to examine the work of multisector entities such as the Mariposa County Fire Advisory Committee (MCFAC) in Mariposa County, California. MCFAC is an effective multistakeholder group formed in 2019 that makes fire resilience recommendations, providing input and feedback on activities such as its recent CWPP update.

A Change in Liability for Prescribed Burns?

California Senate Bill 332 (Dodd) would grant the new California State-Certified Prescribed-Fire (CaRx) Burn Bosses (CalFire 2020) a different liability standard (gross negligence rather than simple). This would make it much easier for qualified individuals to use prescribed burning on private land, helping to significantly reduce excess fuels and decrease the risk of catastrophic wildfires. The Burn Boss program was established in 2018 to develop curriculum and continuing education requirements to support a state-wide training and certification program for these prescribed-fire techniques.

This new legislation about prescribed-burning liability has the potential to encourage more burns by removing the risks associated with conducting prescribed-burn operations for vegetation management and wildfire prevention purposes. Despite the advantages of prescribed fire for an ecosystem, many private land managers avoid using it because of fear of liability for damages that may result from an escaped fire (Dodd Fact Sheet).

Five states—Florida, Georgia, Michigan, Nevada, and South Carolina—have adopted gross negligence standards for prescribed burns, and research shows that those states are seeing significantly more private burning (Dodd Fact Sheet).

Energy and Economic Resilience

The panel focused on the process of assessment, planning, and execution in considering the scope question, “How can Sonoma County increase the resilience and reliability of its energy supply as it transitions from fossil fuels to renewable electricity and prepare for the impact of extreme events?” With the following recommendations, the panel hopes to help the Sponsor Team meet its goals of equitably addressing the current and potential future impacts of PSPS events, strengthening the region’s economy, and preparing for a successful transition to a decarbonized system.

Energy system threats, especially from extreme natural events like wildfires, are increasing. Climate change will cause rising temperatures and drier conditions that will increase the risk of wildfires when utility infrastructure encounters foliage, particularly during high-wind conditions. Utilities continue to advance their ability to assess this risk through real-time weather forecasting, cameras, asset inspections, and grid intelligence. Utilities are hardening infrastructure to reduce the risk of failure and, in turn, reducing the risk of wildfire.

Managing resilient electric service is a continuous challenge of matching the supply of available energy resources to the demand of end users in real time. The ability to transmit

power from distant resources allows a high degree of resource flexibility, but in today’s environment of climate threats it also exposes those assets to risks from wildfire and other natural threats. During high-wind conditions, utilities shut off power to customers in some areas to reduce the risk of wildfire until the extreme weather has subsided. Given that these “public safety power shutoff” events are extremely disruptive to society, utilities are investing in solutions to lessen their impact, including the development of microgrids—or installing sectionalizing switches on circuits and advanced technologies to reduce fire risk—allowing these circuits to continue to stay energized. As utilities and communities isolate portions of the grid during these conditions, it becomes increasingly important to locate energy resources closer to the end user community to adequately balance and manage the supply of energy to the demand.

In California, the state wildfire commission noted that existing models of capital to fund utility wildfire risk prevention in the state are insufficient in light of the changing climate. As credit ratings deteriorate, utility borrowing costs increase, making funds available for essential safety improvements difficult to obtain.

In this context, a process-based approach to resilience is critical. The panel recommends a

framework of constantly assessing vulnerabilities and reacting to them in real time, identifying the most impactful strategies in the context of wildfire events, and clearly defining the structures in place to help centralize and coordinate the work of existing and potential leaders to maximize effective implementation and economics of scale. The following chart describes the specific processes that the panel considered in its energy assurance and resilience recommendations:



The panel approached energy resilience and assurance from a process-based perspective, recognizing that threats to utilities and community vulnerability are constantly evolving.

Mitigating the health, equity, and economic impacts of PSPS events is a near-term priority. The panel also recommends immediately beginning to set up and deepen working partnerships for long-term success.

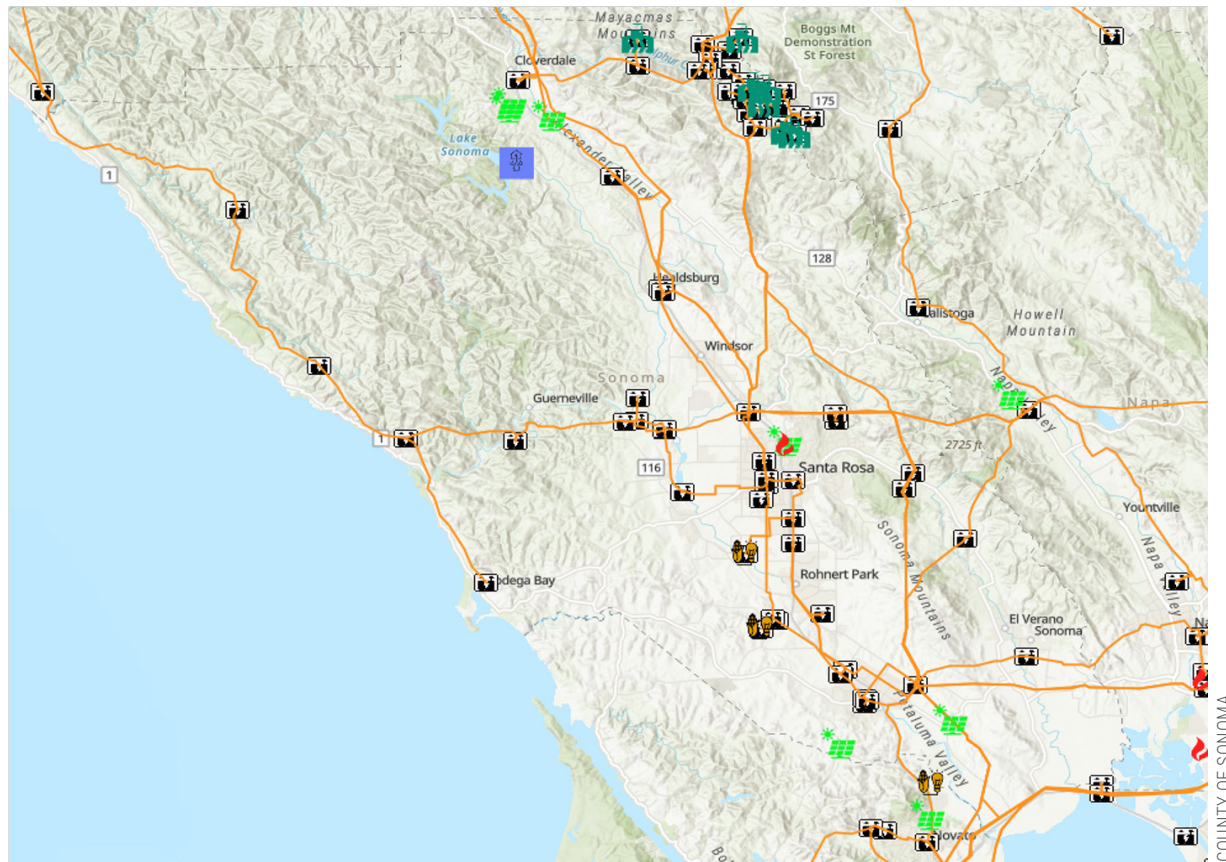
In examining the county's current energy infrastructure, the panel noticed that a lot of power is being brought in from remote locations on existing infrastructure that is

both at risk from wildfire damage and—if not maintained—has the potential to ignite wildfires, as seen throughout California. Sonoma County is not a net energy producer, which means it must import electricity from other locations to service the needs of the community.

Over the long term, the panel recommends that the community generate more power

resources closer to the people using the energy. Compartmentalizing and section- alizing grids on a smaller, more local scale using microgrids or similar technologies will also support individual and regional energy resilience.

Recommendation (short term): Leverage community assets (assessment). Assess and identify the critical energy assets across



Sonoma County infrastructure map.

Geysers as an Energy Resource

Geysers are a great energy resource to Sonoma County. However, the relative distance of this geothermal energy source from the primary population centers where energy is consumed, presents challenges and risks. The energy must be transmitted over elevated ridgelines that have been more susceptible to fire risk and therefore are turned off during wildfire threat, thus leaving Sonoma County without a very valuable energy asset.

Sonoma County that could support the county during PSPS events. Substations, solar facilities, and energy storage and backup power systems will all play a part in the ability to separate from larger systems' assets and sustain the needs of the community. It is also valuable to understand which facilities and operations in the community have the flexibility to either curtail or eliminate their demand during times of limited energy resource availability.

Recommendation (short to long term): Existing energy infrastructure assets should not be replaced in-kind if it ultimately impairs energy transition ambitions.

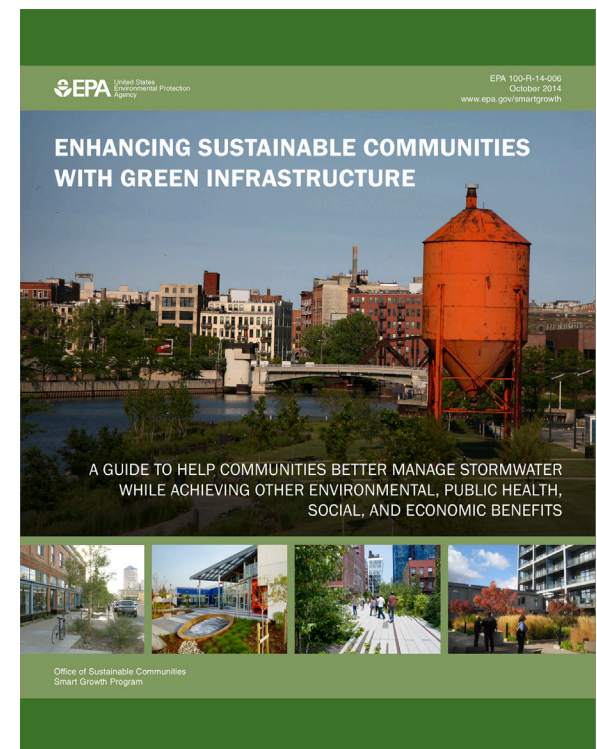
The goal with all energy infrastructure decisions is to be future-focused and flexible and not to rebuild if doing so impairs the Sponsor Team's energy transition ambitions. Thinking independently about how to choose between the various resilient options will help the community meet the challenges and opportunities associated with, for example, the transition to electric transportation.

Recommendation (short term): Establish a regional partnership structure to improve communication. This group should include agency, technical, community, and business stakeholders as well as PG&E, which has a major role in this process but has little public trust among county residents. Currently, individuals as well as county and city utility and public health decision-makers have very little lead time to prepare for PSPS events. Estab-

lish a preliminary working group to share information more quickly and consistently about upcoming PSPS events and to more effectively share after-action observations and recommendations. This working group should also develop a more robust communication plan for PSPS events so that Sonoma County residents have more information and time to prepare for de-energizations.

Recommendation (short term): Identify equitable regional wildfire prioritization metrics. Low-income communities and many historically marginalized communities including communities of color are most at risk from the impacts of climate change. Housing instability, lack of funds to manage an emergency event, and lack of personal vehicular transportation are all factors that compound the effects of already devastating fire events. Considering the cascading impacts of wildfires and other disaster events is critical as the Sponsor Team looks to develop metrics for how investments in energy and economic resilience enhance equity. The Sponsor Team may look to municipalities that have led equity-centered resilience plans for ideas, such as the cities of Oakland and Providence, Rhode Island.

Recommendation: Increase community energy education. In the immediate term, incorporate and communicate existing energy resilience programs. Although not as apparent, retrofitting for efficiency in commercial and residential sectors



The EPA's publication, Enhancing Sustainable Communities with Green Infrastructure, is a good resource for cities seeking to expand and enhance future environmental, health, social, and economic outcomes.

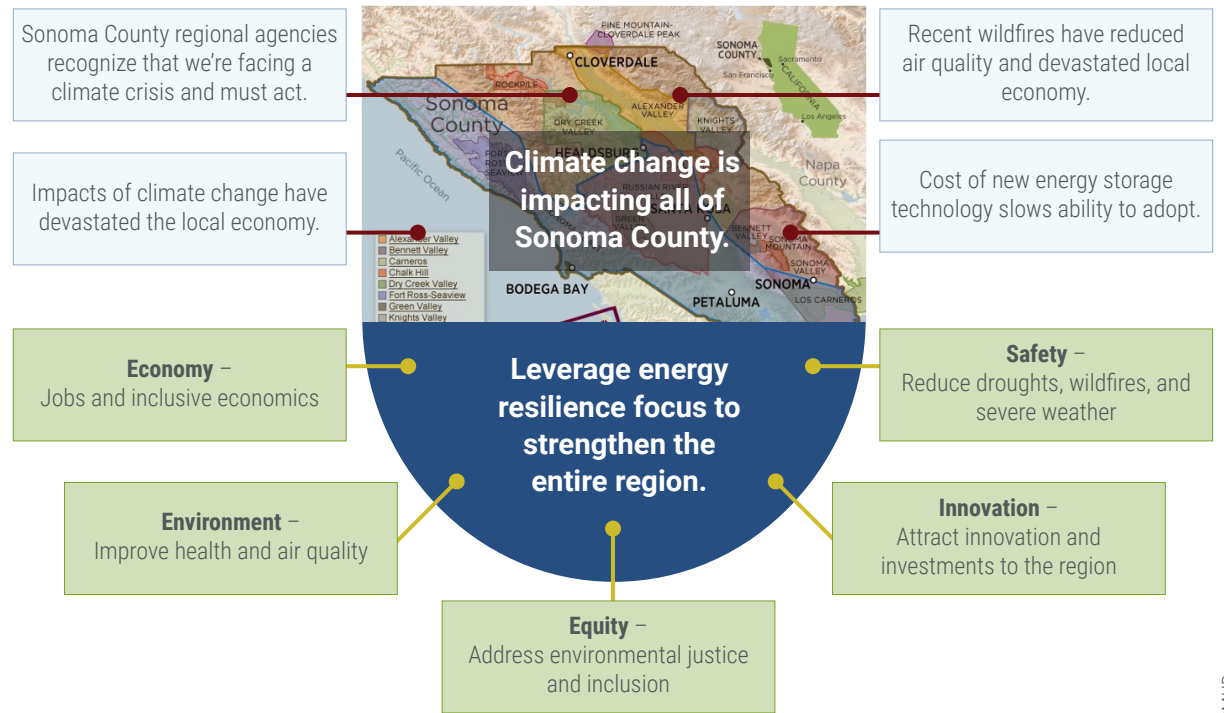
lowers the requirements for energy resources across the system and thus limits dependency on distant generation and transmission assets. It is important to show how the culmination of many smaller actions can contribute greatly to an overall plan. The panel especially commends many of the sustainability and equity-focused programs of Sonoma Clean Power, including its self-generation incentive

program, low-income energy assistance program, and financial incentives for all-electric rebuilds. At the time of the panel, about \$17,500 was available to individual homeowners who were rebuilding homes destroyed by wildfires to be all-electric. The panel recommends expanding education programs to ensure that all eligible county community members can take advantage of current assistance and incentive programs.

The Sponsor Team should also ensure that communities have information about the what and the why of the energy transition, in part to respond to stakeholder feedback expressing concern about the potential wildfire risk increase from electrification. Education should be delivered in multilingual and multimode formats. Consider partnering with existing grassroots organizations who are trusted sources of information. The panel recommends also using these education sessions/efforts as opportunities for dialogue and to evaluate the community's priorities. The resulting energy strategies and decision-making should reflect the community's hierarchy of needs.

Recommendation (medium term): Develop an inclusive regional energy resilience strategy. Climate change is affecting the entire county, leading to reduced air quality and significant economic impacts. However, the cost of new technologies, including backup power and energy storage, slows the ability for the entire community to adopt

Why Regional Energy Resilience



these strategies now. Energy infrastructure planning should support decisions that do not widen economic stratification or decrease access to technical solutions or both. A regional energy resilience strategy can be part of a “One Sonoma” approach to apply for more federal funding to provide equitable access to emerging technologies.

The panel recommends that the Sponsor Team make energy resilience decisions to support the county's many demographic and cultural groups (*i.e.*, do not only consider

geography). Consider how energy infrastructure decisions can create a more inclusive economy with green jobs, can improve environmental conditions—especially for underserved populations, and can create new centers of economic growth that address environmental injustices.

From a technical perspective, this inclusive regional strategy can align the many stakeholders working on electric infrastructure and related systems. A regional strategy will ensure that transportation and grid network

Considerations for Energy Infrastructure Decision-Making

Resilient energy infrastructure requires significant upfront investment, and goals for mitigation and adaptation can at times clash or lead to tradeoffs. The following considerations can help frame investment in future energy infrastructure and build the business case for scaling up investment:

- What is the age of our infrastructure and how should we view replacement and retirements?
- Are we maintaining, monitoring, and coordinating programs from vegetation management to physical assets?
- Can we sectionalize the grid and build greater intelligence locally to manage and isolate, i.e., microgrids?
- How can we view energy independence as a community?
- Are there opportunities to rethink solar and storage for local benefits and independence?
- What other emerging technologies can we evaluate?
- What can individual residences and properties do to lessen the need for large-scale infrastructure and investment? Consider retrofits, codes, and standards.
- Can electrification and transportation create future benefits for our community?

improvements are planned and implemented in a coordinated manner, so the two systems support each other. Further, the strategy should clearly outline regional strategies for vegetation management, undergrounding of utility lines, and securing funding.

Recommendation (medium term): Solidify regional resilience consortium. Building from the initial working group, formalize and make permanent a regional resilience consortium to continue to mitigate the impact of PSPS events and engage a multistakeholder group in infrastructure decision-making. The consortium should begin, if not already doing so, to consolidate regional energy resilience data and to consider the previously identified equity metrics (language, income, demographic, age, health risk, geographic metrics, etc.) in infrastructure decisions.

Recommendation: Innovative energy storage. Energy storage is a rapidly evolving solution with numerous dimensions and potential benefits. Storage solutions can be centralized near utility distribution system assets, which can then be used to support needs across large geographies, or they can be localized and applied to specific needs of individual facilities. Although the current characterization of storage often revolves around lithium-ion battery solutions, a great deal of research is advancing around alternative electro-chemistries that can offer benefits such as longer duration, extended asset life, and greater efficiency.

It is important to understand the current state of technology and positioning of the solution relative to the needs where it is deployed. The electrification of transportation from mass transit to individual electric vehicles will also have a profound impact on energy systems in the coming decades, creating challenges, but also benefits, as technology, interoperability, and business models evolve. Incorporating the transition from fossil fuels to electric vehicles will be one of the most critical components to planning and phasing of energy storage and its role for Sonoma County in the future.

At the same time, electrical storage is but one avenue to store energy. Thermal storage offers another approach to solving energy needs and resiliency. This is apparent when one considers that a large portion of energy for commercial, institutional, and residential facilities is applied toward conditioning (heating and/or cooling) space. Thermal storage applications are garnering more attention throughout the globe as a means to time-shift energy needs and provide for a longer-duration storage at a lower capital cost compared to electrical storage.

Yet another avenue exists in the evolution of converting abundant supplies of renewable energy to green hydrogen. This too represents a rapidly advancing component to the overall energy supply chain. With high energy density and the opportunity to be directed into transportation or utility networks, hydrogen will

play a vital part of the balance of solutions in the coming years.

Recommendation: Deploy regional energy resilience/sustainable communities mapping. It has been proven repeatedly that the more we understand the consuming behavior of energy users, the better positioned we are to find solutions to meet challenges. Creating

a topology of energy use for communities will allow the county to understand these needs and curate solutions for deployment. Unfortunately, “one magical technology” cannot be deployed to solve needs universally across the county. However, with greater understanding of the use patterns of consumers, solutions can be introduced that are incremental and purposeful in their

“In many ways, the most important kilowatt of energy is the one we don’t have to produce, manage, and ultimately consume.”

– Neil Webb, ULI Advisory Services panelist

benefits. Most important, one cannot look at introducing all solutions from the energy supply perspective but should also include efficiency retrofits that lower fundamental requirements for energy. “In many ways, the most important kilowatt of energy is the one we don’t have to produce, manage, and ultimately consume,” noted ULI panelist Neil Webb.

To be sustainable, a community must be resilient to disasters. This includes the ability to prepare for, withstand, and rebound from wildfire occurrences. Although the resources outlining necessary steps to reduce vulnerability and the data indicating which communities are most susceptible are available, they are rarely found in a cohesive, easy to understand format. Without this, understanding policies, practices, funding sources, and opportunities for action are hard to achieve for government, private businesses, and especially the general community.

Sustainable Communities Resource Priorities Map

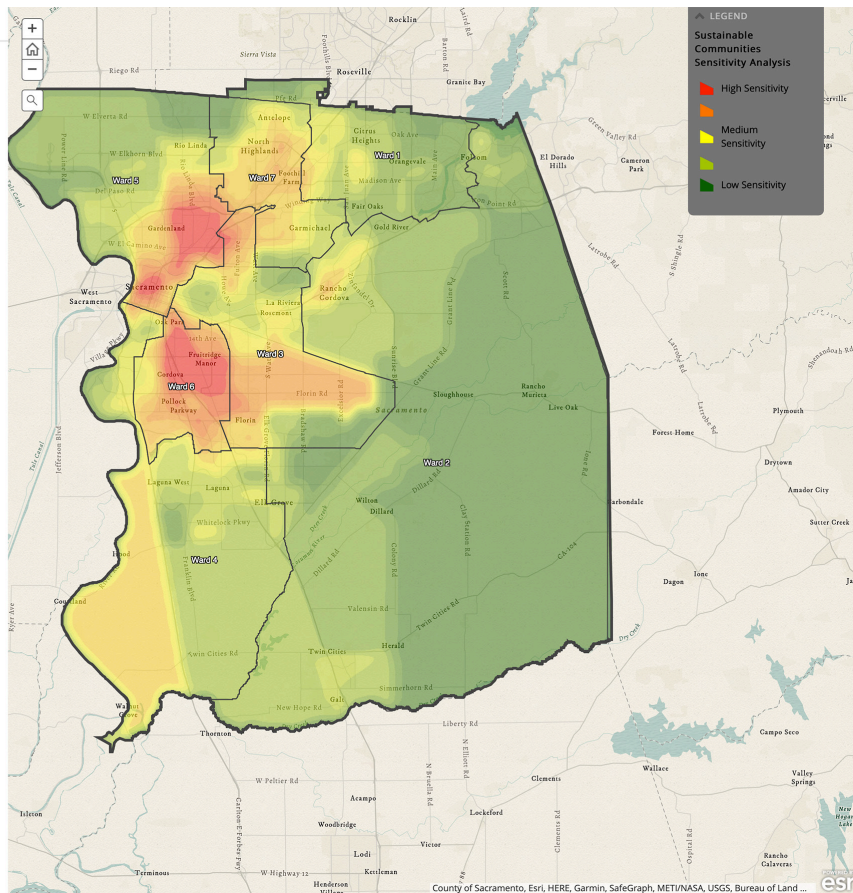


Strengthening our neighborhoods. Together.

In order to deploy comprehensive resources for our communities most in need, we must align our region’s investments toward the goal of creating and supporting healthy, vibrant and economically sustainable neighborhoods.

This interactive map helps analyze current data to indicate the local areas most likely to be underserved or in distress by lack of community development, income, housing, employment opportunities, transportation, medical treatment, nutrition, education and clean environment.

Scroll down through each section to reveal a different view of the map. On the left is an explanation of the nature of the vulnerability being examined and the criteria used for identifying the communities at greatest risk. You can then click on various places on the map to reveal more details of each highlighted area.



A single map—or a relatively simplistic series of maps—is needed that speaks to the dedication of resources before, during, and after wildfire events. The benefit of such mapping includes reduction of property and economic loss, minimization of social disruption, shorter recovery time frames, and peace of mind for community members to reinvest and rebuild their communities. A variety of examples are available for mapping a sustainable community through the aggregation of various data sets. One example is the sustainable community resources priority map created by the Sacramento Municipal Utility District.

Wildfire-related applicable data sets for Sonoma and Santa Rosa (existing and under production) are numerous and distributed by various sources (including but not limited

to Cal Fire, Sonoma Resource Conservation District, Pepperwood Foundation, Permit Sonoma, Conservation Lands Network, i-tree, and local fire departments and COPEs). It is essential that the assessment, ranking, and application of data for mapping be community-centric and include input from stakeholders and partners to adequately address their needs and concerns. The investment to create wildfire-specific maps will result in better-informed community members and more accessible and successful implementation of wildfire action plans. Ultimately, this will lead to an increased protection of property and critical infrastructure, and instill a sense of safety and security through the preparedness and involvement of community members.

Recommendation: Evaluate emerging technologies for energy independence and wildfire resilience. A great many emerging technologies exist, including new equipment to help mitigate risks and to generate electricity. Relevant technologies under development include new renewable concepts, storage technology, and hydrogen when it becomes commercially available. Monitoring these developments and taking advantage of them will require a considerable amount of flexibility in Sonoma’s energy strategy.

Housing, Development, and Urban Planning

Housing is Sonoma County’s “social infrastructure,” enabling a high quality of life, economic resilience, and improved equity outcomes. Rather than framing housing as a social service, the panel advises that the Sponsor Team consider housing as an economic development strategy that benefits the entire community. Meeting the community’s housing needs and creating more affordable and attainable housing are critical goals that are made only more complex and difficult to execute by the losses from recent fires and the need to make future development more resilient and prepared for future fires.

Rather than framing housing as a social service, the panel advises that the Sponsor Team consider housing as an economic development strategy that benefits the entire community.



BUREBANK HOUSING, JOHN A KATZ

Clustered development patterns creating denser, more compact housing options with shared amenity spaces such as courtyards can provide a more wildfire-resistant form of homebuilding.

The panel recommends that the Sponsor Team pursue all avenues to facilitate the delivery of infill housing. These efforts both have the potential to enhance wildfire resilience by reducing new development in more vulnerable areas and can achieve other objectives related to sustainability and quality of life. The County of Sonoma and the City of Santa Rosa have already advanced several initiatives to encourage infill. These efforts offer critical progress but need to be further scaled up because they are not sufficient to meet the region's need for housing.

The panel is aware of and supports several Sonoma County housing initiatives that have already begun to address barriers to critical replacement and new housing production. Permit Sonoma's commitment to its Streamlining Tools for Ease of Permitting (STEP) program should be modeled by all ministerial housing agencies in the county. The Renewal Enterprise District (RED), a partnership between the City of Santa Rosa and the County of Sonoma, is also appropriately focused on supporting key infill housing projects in the right locations, which in concert with recent planning policies should locate more new housing near transit. Like many places in the Bay Area region, the county is experiencing a severe housing crisis, not only in income-restricted affordable units but also in workforce housing, which is necessary to attract and retain essential service workers in this community.

The city and county recognized that launching new infill, mid-to-high-density, transit-oriented housing projects would require pooled financial resources to address funding gaps. RED is pairing private financing with public funds to accelerate production of infill, mid-to-high-density transit-oriented housing development, shortening development timelines, and rapidly meeting climate, equity, disaster, and smart growth housing goals. And to develop at scale, they needed to streamline the

process. Several strategies and solutions to incentivize infill development are listed on RED's website (renewalenterprisedistrict.org/faq) that outline their efforts and could be a good resource for others.

In downtown areas, the panel recommends focusing on increasing density with transit-oriented, mixed-use developments and affordable housing. Working with all the local transit providers (Santa Rosa, Petaluma, Sonoma County) may



There are numerous benefits to integrating infill housing into downtown core parking lots and surrounding neighborhoods. Infill housing provides crucial social infrastructure, preservation of open space, and increased equity and vibrancy in a community.

support efforts to identify transit-oriented development (TOD) locations and routes aligned with future infrastructure investments. Adding density in these areas is a critical wildfire resilience strategy because it gives residents more options to live in lower-risk areas. Increasing downtown housing options also provides a viable alternative to continued development in the wildland–urban interface, which can be dangerous and leads to extreme fire protection and rebuilding expenses for both the public and private sectors. Sonoma County’s urban growth boundaries support the concept of infill and transit-oriented housing and help create a sense of place, which supports a high quality of life for residents and the county’s tourist economy. The urban growth boundaries also support increased wildfire resilience by encouraging development in lower-risk, easier to protect zones while helping maintain valuable open space that can be managed to reduce wildfire risk.

Further, concentrating development within the existing urban growth boundaries can potentially help the Sponsor Team achieve their affordability and sustainability objectives. Infill development has the potential to enable an extraordinary amount of much-needed housing to meet the market demand and to help improve homeownership and rental affordability. Increasing a community’s new-build housing stock creates opportunities for older, existing housing

stock to naturally become more “affordable” housing, commonly referred to as naturally occurring affordable housing (also known as NOAH).

Infill development can also enhance the sense of place and mitigate greenhouse gas emissions if planned to be walkable, bikeable, and aligned with public transportation. The safety created by this downtown vibrancy encourages community cohesion—a key component of social resilience—and the consumer spending and housing for employees critical to Sonoma’s businesses.

The county currently has a significant opportunity to increase transit-oriented offerings given the recent addition of the SMART train. This opportunity is reflected in Santa Rosa’s updated Downtown Station Area Specific Plan, which encourages and permits more housing than the original plan. The SMART train may be of particular interest to commuters whose jobs are primarily remote, with semi-regular travel into San Francisco required. However, increased interest from the remote-worker demographic presents challenges given the already tight housing market in Sonoma County before proliferation of remote work during the COVID pandemic. Pursuing TOD in the county also presents challenges from a wildfire preparedness perspective, given that evacuations primarily occur by car.

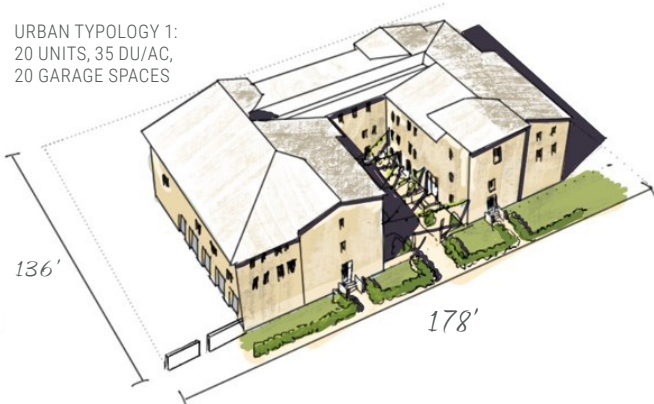
In all areas—both in Santa Rosa and throughout the county—the panel

The Case for Infill Development

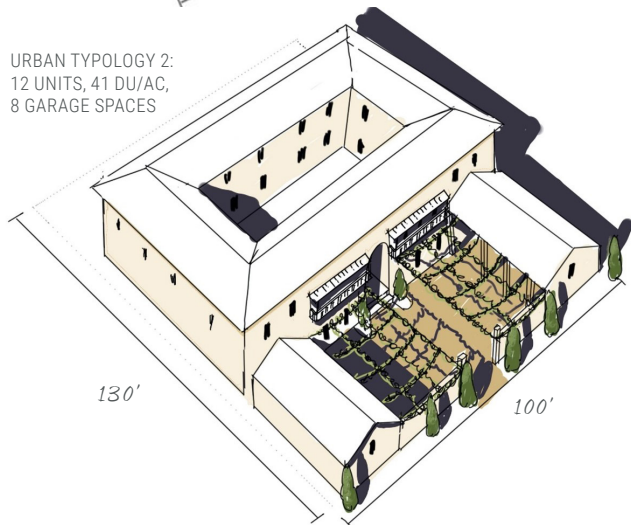
- The right place to preserve open space
- Can meet extraordinary housing demands
- Creates more vibrant communities
- Vital support for business economies
- Fundamentally addresses issues of equity
- Housing is social infrastructure
- Supports wildfire resilience strategy

strongly recommends that the design of higher-density new development reflect the essence and uniqueness of the region. In alignment with the panel’s recommendations, Santa Rosa is currently working on a Missing Middle Housing initiative to allow by-right housing in walkable neighborhoods. Context-sensitive infill development can include “traditional” infill opportunities like duplexes, fourplexes, bungalows, and cottage court homes, as well as sensitively designed higher-density five-over-one models specific to Sonoma County. These building types may include step-backs for the upper floors, which reduces the overall form and building

URBAN TYPOLOGY 1:
20 UNITS, 35 DU/AC,
20 GARAGE SPACES



URBAN TYPOLOGY 2:
12 UNITS, 41 DU/AC,
8 GARAGE SPACES



HAMLET TYPOLOGY:
1 UNIT, 10 DU/AC,
1 GARAGE SPACE



PETER QUINTANILLA

massing to align with existing architectural character. Developing appropriate housing types, as well as incorporating water-smart landscape strategies, which reflect regional character, can in some cases reduce NIMBYism by incorporating the architectural styles and contexts that residents relate to and value.

Prioritizing infill offers significant opportunities for enhanced wildfire resilience, as well as increasing economic development and meeting regional housing needs. Any policies encouraging increased density must also incorporate strategies to develop new affordable housing, retain existing affordable housing, or both, to avoid displacement. While increasing the supply of housing should improve accessibility, additional policy levers are required given the significant interest in Sonoma and the level of resources in the Bay Area and nearby Silicon Valley.

Santa Rosa Downtown and Other Growth Boundary Neighborhoods

Delivering attainable housing in California is currently extremely challenging because of high land values, existing regulations, and other complicating factors such as water and wastewater infrastructure. However, delivering more housing must remain a priority for the county alongside mitigating future wildfire risk. The following recommendations explore how communities in Sonoma

County could encourage infill and higher-density development, which could both better meet demand and reduce the development footprint in the most at-risk areas.

Recommendation: Develop a single “menu” to guide by-right entitlements.

Several initiatives are underway dedicated to up-zoning and promoting density and development with a TOD/walkable urban focus in the Santa Rosa downtown core. The panel recommends that these plans be developed as robustly as possible in downtown Santa Rosa, and similar density measures should be considered in Petaluma as well. Contextual gentler-density measures in the form of “missing middle” typologies should be adopted for smaller towns and communities throughout the county, like Sonoma, Healdsburg, Sebastopol, Guerneville, Windsor, Rohnert Park, and Cotati. Alongside these efforts, the panel recommends the Sponsor Team coordinate all the various city and county General, Specific, and Area Plans to develop a clear “menu” that developers can rely on to plan their projects and receive by-right entitlements. This setup would provide the certainty that developers rely on and would encourage developers to meet planning objectives.

Recommendation: Continue to develop infill typologies that align with local architectural context and heritage, and allow up to seven stories for contextual residential development in Santa Rosa and Petaluma

Different housing typologies show the potential for more dwelling units per acre depending on the design and local policy regulations.

downtown cores. Future infill development, especially in urban and community cores, presents a key opportunity to increase density and produce much-needed housing units. A variety of housing types and styles can build on the architectural heritage in Sonoma County while accommodating larger numbers of units. The panel's highest recommended density for downtown core development is seven stories in Santa Rosa and Petaluma. This increase would accommodate the most cost-efficient construction, including five levels of Type III (brick-and-joist) over two levels of Type I (concrete-and-steel) construction. This construction and building type achieves maximum densities, without tripping over to high-rise costs and codes, and area developers and contractors are now comfortable building in this range.

Recommendation: Ensure the building department is prepared to approve modular construction in each jurisdiction. Related to the preceding recommendation, residential construction of up to seven stories may be accomplished with modular construction assemblies. Modular construction may also become more competitive in the near future, which could reduce housing costs by around 20 percent. Modular construction can contribute to enhancing housing affordability and the speed of housing construction and may provide an effective rebuilding or recovery strategy after future wildfire events.

Recommendation: Leverage historic state and federal tax credits for adaptive use.

Opportunities to receive significant funding through state and federal tax credit programs are extraordinarily underused resources, and Santa Rosa and other historic downtown cores in Sonoma County may present ample opportunities. Adaptive use of worthy downtown structures not only enhances community image and character, but it can also add real contributions in the number of housing units produced. Adaptive use projects are especially conducive for live/work lofts, artists' studios, housing, and a mix of other vibrant uses. Live/work lofts especially are a highly appropriate type of "missing middle" housing to encourage in the downtown core.

Recommendation: Increase neighborhood density with place-appropriate missing middle infill. In neighborhood blocks outside the downtown core but within the Urban Growth Boundary, density can be effectively increased through missing middle infill housing products, such as courtyard apartments, townhouses, multiplexes, duplexes, triplexes, and fourplexes. This has been encouraged in other municipalities by eliminating single-family zoning and allowing three and up to six units on these lots. Santa Rosa could easily allow three units per lot with little visual impact while tripling densities. In alignment with this panel recommendation, the City of Santa Rosa is already working on a Missing Middle Housing

ADU Policy Best Practices

ULI's Building Healthy Places team reviewed ADU policy in several cities to understand which regulatory changes have been most impactful in promoting equitable ADU development. While there is significant variation in how different cities regulate ADUs, it is clear that a streamlined, cost-effective process and flexible code requirements encourage more people to build ADUs. Key policy consistencies across cities with larger volumes of ADUs include the following:

- Allow ADUs on all lots where residential uses are permitted.
- Allow attached ADUs (basement, attic, or other carve-out unit and as additions) and detached ADUs (coach houses and cottages).
- Do not require off-street parking for the ADU.
- Do not require the property owner to live on site.
- Allow flexibility in terms of size, height, and placement of ADUs on the lot.
- Minimize permit and other development fees.
- Offer financial assistance programs for middle- and lower-income property owners.

(ULI Chicago 2020)

Initiative (<https://srcity.org/3495/Missing-Middle-Housing>) to amend or create policies, standards, and fees to accommodate by-right construction, replacement, or conversion of standard single-family homes and remodels to produce missing middle infill housing. In addition, Sonoma County's recent policy change on accessory dwelling units in 2020 should be commended. ADUs offer an effective strategy for implementing missing middle housing and maximizing use of existing housing sites.

Recommendation: Reduce or eliminate parking requirements in downtown core.

Parking requirements are often costly and can greatly impact development, ultimately contributing to the housing attainability crisis. Some say that “parking drives development,” yet this is one barrier to development which should be reduced throughout Sonoma County. Human-powered transportation (walking, bicycling, ride-sharing services, micro-mobility choices, etc.) in downtown areas is growing, and more walkable, transit-oriented downtowns are more vibrant and linked to healthier outcomes. Many Bay Area jurisdictions are lessening or eliminating parking requirements altogether in their downtown cores, leaving it to the market and the developer to get the number of parking spaces right.

The panel recommends considering actions to help reduce or eliminate parking requirements in the downtown core, including the following:

- Eliminate parking requirements for new multifamily residential developments in downtown core districts, allowing developers to assess the market's need to provide parking spaces. The panel commends Santa Rosa's action to eliminate parking in its Downtown Station Area Specific Plan, and the panel recommends that other communities consider this as a tool as well.
- Allow “reservoir parking” arrangements where parking may occur in structures off site, possibly sharing underused municipal garages already in place, and providing additional revenue streams.
- Explore design types that reduce parking count and streamline parking needs, such as creating a “center block” strategy in which an association of all landowners on a block jointly manages and uses a central parking facility, opening up other potential sites for infill and higher-value uses.
- Wrap all new parking garages with active commercial spaces.
- Improve public transit options to lessen car and parking dependency.

Recommendation: Reevaluate street standards for walkability and pedestrian safety and to incorporate climate resilience strategies. Currently the right-of-way in some of the rebuilding areas is 30 feet, curb to curb, or more. Even with sufficient

Research Report

Parking Policy Innovations in the United States

Explore a growing collection of policies from cities across the United States in an interactive report featuring a fact sheet library and searchable database

May 12, 2021 | Americas



Parking Policy Innovations in the United States

In recent years, cities across the United States have adopted a range of parking policy reforms to manage the existing parking supply, reduce traffic, cut pollution, and bolster city finances. Reforms include eliminating minimum parking requirements for development projects, enabling developments and businesses to share parking facilities, and using technology solutions to efficiently manage the supply of on-street parking.

This interactive report allows users to access information on policies from cities across the United States. A searchable, filterable database includes a range of recent policy examples that represent significant shifts from the status quo depending on the local context (ULI 2021).

space for emergency vehicular access, the panel noted that this size right-of-way is unusual for downtown areas and is not conducive to an attractive and safe pedestrian environment. The considerable space dedicated to the street might also be counterproductive to Santa Rosa's climate and quality-of-life goals. As examples, asphalt is an impervious, dark surface that will contribute to higher local temperatures (i.e., the urban heat island effect), and wider travel lanes are associated with increased risks for pedestrians because of higher vehicle speeds.

The panel recommends evaluating the existing street standards to determine the optimum road width and replacing any "extra" space with uses that maximize sustainability and safety benefits with amenities like mature (drought-tolerant and fire-resistant) trees or rain gardens.

Recommendation: Track emerging state funding. The governor recently approved state housing funds and homeless housing funds. The City of Santa Rosa may qualify for some of these funds. The panel also recommends that the county and all local jurisdictions in Sonoma County start or continue to track SB35 projects and other newly emerging legislation, which are state sanctioned for fast-track approval.

Additional Strategies to Increase Housing Affordability and Access

Housing affordability is a challenge throughout California and is particularly acute in Sonoma County. The need for housing is even more extreme given both the destruction of housing by the 2017 and 2020 fires and recent relocation trends during the COVID pandemic. Creating strategies to deliver affordable and attainable housing must remain a top priority for all regional decision-makers.

Recommendation: Eliminate annual housing limits. The panel was surprised to learn of annual housing limits in certain communities in the county, which have been ruled illegal when they inhibit fulfillment of Regional Housing Needs Allocations. The panel strongly recommends that all housing limits be quickly eliminated to ensure compliance with RHNA and to participate in a coordinated countywide infill development strategy that helps reduce wildfire risk to people and property. The panel believes these areas can absorb a proportionally significant number of new housing units (possibly increasing some densities four- to five-fold) without affecting their character. In particular, bungalow court apartments and single-family cottage compounds can achieve reasonable densities in infill configurations in existing blocks that provide not only rental but also for-sale ownership opportunities, which reinforces the equities of a mixed-income community.

RHNA Standards

The Regional Housing Needs Allocation (RHNA), established in 1969 by the State of California, requires that local governments plan for the housing needs of California residents of all income levels. From low-income to market-rate housing, the state assigns an allocation of new housing that each region must provide, and each region then assigns a percentage share of the housing need to the local governments. The mandate is implemented through each local government's General Plan Housing Element and through the RHNA process and is updated every eight years.

The most recent allocation for unincorporated Sonoma County, for the eight-year period starting 2023 and ending in 2031, is 5,250 new housing units, up from the current allocation of 515 units, which has not yet been met.

This proposed 919 percent increase in housing units for Sonoma County is further complicated by the geographies identified in the allocation, which include areas beyond the county's voter-approved Urban Growth Boundary, areas in floodplains, and areas at high risk for wildfires.

The allocation process concludes at the end of 2021 and is open for appeals until that time. The local jurisdictions then have until January 2023 to submit local Housing Element plans, detailing how the allocation targets will be met (Bailey 2021).

Recommendation: Evaluate options for expanded renters' rights partnerships and programs. The panel applauds the Sponsor Team's focus on equitable housing outcomes. In addition to increasing the number of available units, the panel recommends that local governments evaluate options for expanded renters' rights partnerships and programs. Several nonprofit groups, such as the North Bay Organizing Project, advocate for affordable and fair housing practices, primarily aimed at underrepresented populations and migrant workers. One possibility is to formalize or expand partnerships with these organizations. The Sponsor Team can also look to regional groups in the Bay Area advocating for tenants' rights, such as Community Legal Services in East Palo Alto.

Recommendation: Evaluate the potential for and feasibility of employer subsidized housing. The panel heard from business and political stakeholders that local employers are concerned about being able to retain the workforce in the county. The panel recommends working with a multidisciplinary stakeholder group to evaluate how the business community could and would be willing to contribute to new housing units. The panel recognizes that the success of any employer subsidized housing program would rely on ensuring not only the provision of attainable housing but also a structure that ensured an equitable balance of power between employers and employees.

Recommendation: Explore a county housing bond to increase housing and potentially support home hardening. The panel recommends passing a housing bond that is dedicated to (a) providing gap financing to make affordable housing projects more competitive for state low-income housing tax credit awards and (b) funding the aforementioned home-hardening program for houses in areas at high and very high risk from wildfires. Both programs would directly support the Sponsor Team's housing and equity goals, producing new affordable housing for workers and protecting valued existing assets. The effectiveness of countless similar initiatives from business improvement districts to municipal housing trust funds demonstrate how mission-driven public assessments can be effective at first shining a light on a critical community problem or need and then leveraging initial steps to address these needs.

Equitable Governance and Making the Business Case

A key theme of panel interviews and discussion was the stress and emotional impact of recent fires and of the shortage of scaled, coordinated efforts to address future risk. The following recommendations, focused on equitable governance and the business case, are intended to help decision-makers on the Sponsor Team implement their existing plans and move from reactive emergency management back to more proactive prevention and equitable recovery.

The panel recognizes and applauds the many plans and planning efforts already underway that demonstrate all the stakeholders' understanding of the resilience issues facing communities in Sonoma County. Similarly, the Sponsor Team's sense of urgency in addressing wildfire, energy, and economic risk is appropriate to the challenges. The panel encourages the Sponsor Team to maintain its sense of urgency and focus so that the community can be better prepared for the next and future wildfire seasons. A key next step will involve better coordinating across governmental entities in Sonoma and scaling efforts to address the extent of risk faced from wildfires and related challenges such as PSPS events.

“By aligning your planning, funding, and actions, a regional consortium’s total impact will often exceed the sum of its parts.”

— Diana A. Ramirez, ULI Advisory Services panelist

To achieve their goals, it is imperative that the Sponsor Team prioritize cooperation between the county and its cities and towns, among Sonoma County's public, private, and nonprofit sectors, and between the county and its neighboring jurisdictions. Trust-building, information-sharing, and transparency should be key focus areas so that stakeholders feel knowledgeable and confident about how local governments are making decisions and allocating funding. The panel's interviews determined that trust-building, information-sharing, and true collaboration all need improvement. A necessary next step beyond this could be to build genuine partnerships and scaled-up planning efforts, including seeking opportunities from joint funding sources.

Recommendation: Establish mutual aid and interlocal agreements, including pre-position contracts. Formalizing these agreements will help all stakeholders understand the overall response/recovery apparatus while allowing them to deliver on their organization's specialty. The mutual aid agreements detail each party's role in emergency preparedness, response, and recovery as well as the commitment from each party to fund its share and to seek federal reimbursement for specific costs.

The pre-positioning of contracts with non-profits and local business partners will allow governmental funding to be dispersed in a timely manner. Pre-positioning contracts can also support more equitable distribution of funds because there is time between fire seasons to evaluate the partnerships and ensure a broad and diverse set of agreements.

Recommendation: Fund and partner with regional groups to increase their capacity. On-the-ground groups know what the communities' needs and challenges are, have often already identified priority projects, and are well set up to execute efficiently and with community input. COPE and Fire Safe Sonoma are two critical

regional groups with the sole purpose of addressing climate and wildfire risk, respectively, and both organizations have built up impressive locally organized ecosystems to enhance community preparedness. Several other community-based organizations also provide information and services to Sonoma's Latinx community, and these organizations would greatly benefit from additional resources, support, and partnership with local governments.

Notably, COPE is a potentially critical partnership for the Sponsor Team because this organization has essential local knowledge on wildfire resilience and relationships and has built strong community support during the fire seasons of recent years. COPE can help the Sponsor Team increase turgid/irrigated areas on a building-by-building basis by encouraging homeowners and property managers to maintain defensible space, especially during wildfire season and/or high-risk conditions. When property owners are successfully engaged in the creation and maintenance of turgid areas, this lowers not only the risk that embers will ignite individual landscaping and structures but also the risk that embers and flames will spread throughout the community.

The Sponsor Team should identify opportunities to productively partner with and allocate resources to these groups to make

Examples of Pre-Positioned Contracts

Expediting the Recovery Process with Indefinite Quantity Contracts

In 2019, the Texas General Land Office recommended that indefinite quantity contracts (IQCs) be established and reviewed before each hurricane season. According to an op-ed piece written by Texas Land Commissioner George P. Bush in the *Houston Business Journal*, "IQCs are reviewed and awarded like other contracts but put on hold and activated when needed for activities such as debris removal and infrastructure repair. These pre-positioned contacts should be reevaluated each year in preparation for hurricane season to ensure continued viability."

Expediting Procurement for Disaster Preparedness

The Houston-Galveston Area Council cooperative purchasing program, known as H-GAC-Buy, recently approved a pre-positioned three-year emergency management contract with the firm CDR Maguire Emergency Management. This allows the contractor to respond quickly to requests for mitigation, preparedness, response, and recovery services in the region.

"The HGACBuy is a cooperative purchasing program that pre-approves contractors to provide services so the procurement process can be expedited when services are required."

"Having pre-positioned contracts in place will give you peace of mind in the event of a disaster. You will know your contractors and what skills and services they can bring to the table, as well as how quickly they will arrive to augment your staff where needed and assist your community's recovery. Use of advance contracting prior to a disaster ensures that sufficient time is available for proper procurement requirements to be met. This is especially important since procurement is one of the top Office of Inspector General (OIG) justifications for de-obligation at audit and/or disaster close-out. Proper procurement can literally save you millions" (Doyle 2020).

inroads advancing wildfire resilience both across the region and at the individual household scale. Currently, the potential positive impact of these groups is limited by their very small budgets. The panel recommends increasing investment in these community groups and using the funding opportunity to establish metrics for success and accountability.

Recommendation: Enhance communication and transparency of funding decisions with new data-sharing resources. Stakeholders reported confusion and lack of knowledge about county and city funding decisions. The panel observed that funding information is available on relevant government websites, and it is accessible to those with industry knowledge and the time to search for the information; however the information is not necessarily centralized or accessible in a manner that makes it easy to digest and process. Stakeholders interviewed also occasionally speculated about access to or understanding of what PG&E funding had been allocated to in the context of the county's wider wildfire resilience efforts. Many felt that more transparency is needed about how these funds are used and how this spending aligns with broader wildfire resilience efforts.

According to many local stakeholders, the current format for communicating funding decisions and progress is not approachable

or quickly accessible for most community members. The panel recommends creating a simplified system to show what money has been spent, what money is left, and the reasons why it has not all been spent to date. The Sponsor Team can also increase their communication—especially storytelling—regarding funding decisions and impact so that stakeholder levels of knowledge and trust increase.

Recommendation: Apply for funding regionally to become more competitive. Sonoma County and the communities within it are eligible for hundreds of millions of dollars in disaster response and recovery aid. Although initially that sounds like a lot, the funding is not enough in comparison to the magnitude of the many expenses facing the community, especially in the face of increasing wildfire risk caused by the impacts of climate change.

To make the most of the available funding and to bridge the gap with new funding, the panel recommends creating countywide alignment in identifying and allocating new funding sources. Together, the county and its cities can likely obtain more federal, state, and private funding than the jurisdictions could individually. The Sponsor Team should also leverage this regional coordination to underscore the sense of urgency and importance of the work the Sponsor Team is already conducting and is applying to continue or enhance with additional resources.

It is also critical that the county and cities take advantage of opportunities for other regional engagement, especially on housing policy and housing access.

Sample Table for Sources of Funding That Should Be Kept and Updated

Tool	Source of Funding	Capacity	Authorization	Political Dimension	Additional Observations
SB1, the Road Repair and Accountability Act	State Road Maintenance and Rehabilitation Account	\$XX million for FYXX; funding amount determined by state funding apportionment formula	County Board of Supervisors adoption of list of proposed projects by resolution	County must comply with accountability and transparency provisions	Can fund core road maintenance, rehabilitation, and critical safety needs on road system and purchase and upgrade of heavy equipment
American Rescue Plan	Local Fiscal Recovery Fund	Est. \$XX million for the County of Sonoma; \$XX million for City of Santa Rosa; \$XX million for City of Petaluma; \$XX million for City of Healdsburg; \$XX million for City of Sebastopol, etc.	U.S. Treasury Department or state allocation	Staff time	Uses should be considered transparently to help address overlapping impacts of wildfires and COVID public health emergency
PG&E Settlement	PG&E	Sonoma entities received \$XX million on month/day/year	Boards of the various entities approve the allocation of funds	Focus is on funding projects identified in the Recovery and Resiliency Framework	Agriculture and Open Space District will facilitate allocating funds for near-term community projects totaling \$XX million
BRIC (Building Resilient Infrastructure and Communities)	Grant	\$XX million grant request submitted. Project selection occurs in summer 20XX.	FEMA	Regional cooperation and participation	Grant application submitted; funding focus is away from reactive disaster spending and toward research-supported, proactive investment in community resilience
Moon shots*	Grant	TBD	Various	Staff time and likely matching funds	State and federal funds, usually one time
American Jobs Act	Federal Infrastructure Funding	If passed, will provide \$X+trillion for high-speed broadband, a renewed electric grid; build, preserve, and retrofit X+ million homes and commercial buildings; incentivize the purchase of electric vehicles; build infrastructure resilient to floods, fires, storms, and other threats	Congressional vote	Staff time and planning to apply for and spend funds for greatest impact	TBD

*Moon shots: public or private grants that may exist but will require some exploration into their availability.

Making the Business Case

Successfully dealing with the wildfire threat is critical to Sonoma County's quality of life and to its continuing economic vitality. As the impacts of climate change lead to increasingly frequent and damaging fires, significant additional human harm and economic consequences could occur. Coordinated preparation and response are both crucial, and this takes adequate funding. Evaluating the business case for investment in resilience can be complicated, given the many unknowns about when a fire will occur, what geographic area may be affected, what prevention and response might be in place, and the extent of the possible damages.

To begin to address this complex question, the panel created a cost/benefit model to illustrate a range of economic and quality-of-life outcomes for Sonoma County. The objective is to provide forecasts of different scenarios for discussion, based on the logical impact of various starting assumptions. Citizens and leaders can consider the individual inputs piece by piece and then see how the aggregate unfolds as a sum of the parts. This is a common way to help groups articulate and blend the differing preconceptions and varying

objectives of the many participants in a process like this. This can then be woven into a common narrative that leads to coordinated and high-impact action.

This preliminary model is a *conceptual illustration*. The key assumptions are detailed here. (These are broad-brush ranges that should be made more precise in future iterations.) The analysis focuses on comparing the input and outcomes from two scenarios:

- "Business as Usual," with minimum investment in resilience; and
- "Excellent Resilience," with increased upfront investment in preparedness. The Excellent Resilience scenario assumes that many parties in Sonoma invest in resilience as a "coalition" ("One Sonoma") with a common plan to aggregate funds and make investments in a unified project pipeline, ranked by benefit/cost criteria, and aiming at the overall goals of the coalition.

The analysis strives to consider in the big picture: "What do we all want?" This includes avoidance of fire loss, of course, but also preservation of natural beauty, an organized development path, job creation with matching housing creation, and the economic vitality that leads to a healthy local economy and higher revenues for cities and towns—and in

turn to more resilience investing by them. The key assumptions start from known current data such as acreage of open space, number of jobs, number of houses, and size of municipal budgets. Different growth rates are modeled, including historic trends for Business as Usual and different growth rates for Excellent Resilience.

Citizens should then look at this model more deeply and discuss both the individual growth rate assumptions and the implicit relationship between growth rates of different categories (for example, housing and jobs). Calculations are based on a discounted cash flow over 30 years, using a discount rate of 5 percent, to report a net

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Rates of growth	Minimal resilience	Excellent resilience
Jobs	-1.0%	1.9%
Multi-industry economy (GRP)	1.0%	2.0%
Municipal revenues	0.5%	3.0%
Housing high-income-unit growth rate	1.0%	2.0%
Housing mid-income-unit growth rate	1.3%	2.4%
Housing low-income-unit growth rate	0.8%	4.0%
Home price appreciation	5.0%	12.0%
Open space	-5.0%	0.5%
Disaster response and recovery	5.0%	-1.0%
Rebuild costs (all sources)	5.0%	-10.0%
Collective investment in resil/prevent	5.0%	0.0%
Annual fire insurance premium (if avail)	5.0%	0.0%
Baseline resil/prevent spend (annual)	25.0%	100.0%
Using starting figures that approximate conditions today, how do these two paths compare?		

Calculations are based on a discounted cash flow with a net present value (NPV) of 5 percent.

present value for each scenario. These numbers for each scenario are easy to compare. *Remember that this model was developed in a short time with limited information, and it can surely be made more useful with the input of local experts.*

Each scenario (which can be thought of as two different development paths/economic futures) is based at core on different growth rates. The model includes hard-to-quantify factors such as the value of peace of mind, open space, a multi-industry economy, and improved ecosystem services like clean water. The model calculates the benefits of those attributes given the threats of wildfire, drought, and river flooding.

Adopting this model—or a similar one—will help the Sonoma community avoid future costs and begin to tackle the tough questions of who pays for disaster preparedness and recovery as well as how to ensure that the financial benefits of resilience are realized and shared equitably. Using this model will also help identify opportunities to better attract large-scale investment with increased leverage to coordinate and jointly seek funding as “One Sonoma.”

Making the business case for planned programs can be a key part of Sonoma’s implementation strategy. A preliminary cost/benefit analysis conducted by the panel shows that a holistic focus on resilience (consider-

“Building affordable housing builds resilience in the community.”

– John Macomber, ULI Advisory Services panelist

ing upfront costs, avoided costs, and myriad benefits) has the largest payoff and aligns with current housing affordability, energy independence, and wildfire mitigation efforts already underway. Impact assessment is also key, including metrics related to equitable outcomes and health, which is already underway given the recently created Sonoma County Office of Equity and the work of the Department of Human Services.

In considering the business case, the panel recommends that the Sponsor Team keep in mind that economic resilience is fundamentally linked to housing. It is imperative to keep critical service provider capacity in the community by building housing (for ownership and rentals) that is attainable for residents with a mix of incomes. The upfront expense of subsidizing or incentivizing this housing growth will pay off in the long run with higher municipal taxes and fees from a stable or growing population.

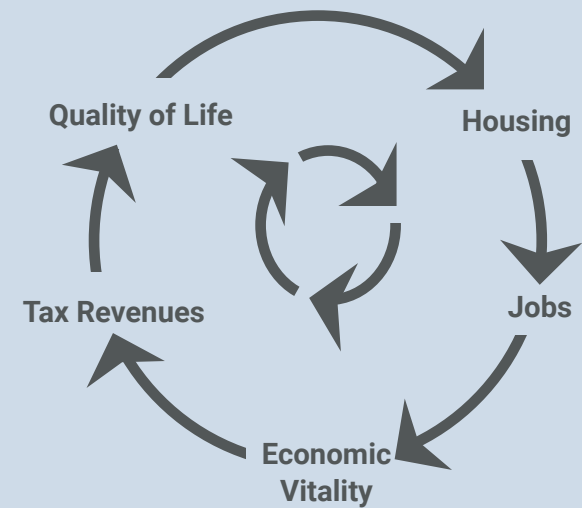
Model Learning 1: Without substantial upfront investment in resilience and preparedness, the cost of response and recovery will continue to escalate. However, a collective resilience and prevention investment can significantly reduce losses and mitigate rebuilding costs. On average, county spending is already \$2 billion to \$3 billion a year on recovery and rebuilding (leveling out the \$10 billion in recovery/rebuilding costs from 2017). This loss estimate does not include lost paychecks and business sales. The assumptions in the model indicate that without intervention these costs will rise over the next 30 years. Making a collective investment in resilience and prevention reduces rebuilding costs to about \$1.5 billion annually—much lower over time in the Excellent Resilience scenario than in the Business as Usual scenario.

Model Learning 2: Substantial indirect costs can be saved (or revenues can be enhanced). Most of the historic loss calculations cover only “direct costs,” such as hospital bills or rebuilding of destroyed homes. There are also indirect costs like lost jobs, lost business revenue, collective trauma over fire worries, people giving up and moving away, and the mismatch of spending on rebuilding existing homes (which does not

add value) and building new homes (which does add value).

Model Learning 3: Disaster resilience investment increases green space, while minimal resilience investment leads to loss of open space. Without coordinated investment, the county’s green space could decline precipitously because of continued development pressure that encroaches on today’s agricultural and forested lands, even considering existing urban growth boundaries. Such a land use pattern, with more people and infrastructure in higher-risk wildland–urban interface areas, would also continue to increase wildfire risk, damages, and rebuilding costs. In contrast, the amount of green space in the county could increase with coordinated resilience and housing investment that boosts density in urban centers and hamlets, while protecting surrounding natural lands. Under this scenario, a host of co-benefits also follow. These include reduced wildfire risk, increased housing, improved ecosystem services, and a growing local economy.

Model Learning 4: Upfront investment in preparedness and resilience leads to a self-reinforcing, positive economic cycle. Today, the county’s municipal budget is about \$1.9 billion with a gross regional product (GRP) of \$27 billion. The tremendous and recurring expenses for the catastrophes and



rebuilding, as well as the high and increasing cost of housing, have the potential to create a downward spiral that would challenge these levels. In this potential spiral, people leave the county, which reduces municipal revenues and GRP, which further reduces the funding available for resilience, creating more negative outcomes. However, investments in resilience that include better fire prevention and increased provision of housing, encourage job growth, improve peace of mind, and avoid catastrophe will lead to a more positive, self-reinforcing economic cycle. With upfront investments encouraging residents to remain in or others to move to the county, municipal revenue—through increased taxes and fee receipts—and GRP both have the potential to more than double,

not to forget the provision of more housing and preservation of open space (and diminution of fire losses). The detailed spreadsheet that was created during the panel is linked under sources at the end of the report. This could be a useful resource to build upon and update with more refined numbers. Please note that the model used \$1.7 billion as the base municipal budget during the panel, which the graphics show in this report. This can be adjusted in the linked model.

Model Learning 5: Housing, jobs, fire prevention and resilience, and a vibrant, multi-industry economy are related.

Job growth in Sonoma County has been essentially flat for decades, according to the Employment Development Department of the State of California. In the Business as Usual/minimal investment scenario, the model assumes that this static rate of job growth persists along with a very slow rate of housing development. However, with increased resilience investment, the number of midlevel jobs and quantity of attainable housing units would grow together. In particular, fewer jobs and homes would be lost to fire in the Excellent Resilience scenario. The county has the potential to build a multi-industry, more diversified economy if sufficient and attainable housing is available to support a variety of workers who earn various incomes.

Model Learning 6: This plan has an attractive return on investment for many existing and new actors. Operating as “One Sonoma” with planned, ambitious funding applications would likely raise more money than smaller, individual asks and would create the possibility of pursuing cumulative benefits from projects that would build on each other. Further, implementing the many wildfire, energy, and economic resilience strategies that this panel has recommended would help the county and its cities grow together and increase equitable outcomes.

Recommendation: Adopt, develop, and implement the panel’s economic resilience model to make cost/benefit analysis–driven investments. The cost/benefit analysis created by the panel illustrates the choices that the Sonoma community has and reflects that it has myriad ways to accomplish its resilience goals. Further, the cost/benefit analysis provides a decision-making tool to support the “One Sonoma” approach to collaboration, funding, and prioritization.

To further develop the model, the panel recommends that the Sponsor Team begin by identifying a champion to lead this project. This champion could be a partner organization, an agency or department in county government, or a new coalition of county,

city, and partner entities. This champion, possibly with a small team, will then need to improve the accuracy of the baseline numbers and growth rates used by the panel in the pilot model included here and tune the spreadsheet and model. Then, the panel recommends that a multistakeholder “One Sonoma” coalition use the improved model to create and work to achieve an ambitious funding target from blended sources of funds. The cost/benefit analysis will demonstrate the urgency of the funding ask. Further, the panel recommends leveraging the model to develop a plan to use the blended source of funds driven by a cost/benefit project plan.

Determining a structure for a “One Sonoma” coalition could be a first post-panel partnership opportunity for the County of Sonoma, the City of Santa Rosa, and their partners. This could be a new independent vehicle, or a pilot project led by a county department or agency. “One Sonoma” could also be a vehicle to engage on general land use planning, regional housing group coordination, and federal funding applications.

Climate Resilience: Investment and Avoided Future Cost Worksheet

Which scenario? Select ->

Excellent resilience

Projection		2020 Baseline	2022	2023	2024	2025	2026	2027	2028	2029	2030		2050	As % 2022
Jobs		250,000	254,750	259,590	264,522	269,548	274,670	279,889	285,206	290,625	296,147		431,510	173%
Year-on-year growth, jobs			4,750	4,840	4,932	5,026	5,121	5,219	5,318	5,419	5,522		8,046	
Housing – high-income units in place		40,000	40,800	41,616	42,448	43,297	44,163	45,046	45,947	46,866	47,804		71,034	178%
Housing mid-income units in place		150,000	153,525	157,133	160,825	164,605	168,473	172,432	176,484	180,632	184,877		294,197	196%
Housing low-income units in place		25,000	26,000	26,520	27,050	27,591	28,143	28,706	29,280	29,866	30,463		45,267	181%
Total		215,000	220,325	225,269	230,324	235,494	240,780	246,185	251,712	257,364	263,143		410,498	191%
Year-on-year growth, housing units			5,325	4,944	5,055	5,169	5,286	5,405	5,527	5,652	5,779		9,035	
Residential fire ins per \$100,000 in value		\$3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000		\$3,000	100%
Open space (acres, all uses)		122,000	122,610	123,223	123,839	124,458	125,081	125,706	126,335	126,966	127,601		140,986	116%
Home price & assessment appreciation		\$535,000	599,200	671,104	751,636	841,833	942,853	1,055,995	1,182,715	1,324,640	1,483,597		14,311,213	2675%
Money in millions, per annum:														
Disaster response and recovery		(\$100)	(\$99)	(\$98)	(\$97)	(\$96)	(\$95)	(\$94)	(\$93)	(\$92)	(\$91)		(\$75)	75%
Rebuild costs (all sources)(5 yr avg)		(\$1,000)	(\$900)	(\$810)	(\$729)	(\$656)	(\$590)	(\$531)	(\$478)	(\$430)	(\$387)		(\$47)	5%
Collective investment in resil and prev		(\$100)	(\$102)	(\$104)	(\$106)	(\$108)	(\$110)	(\$113)	(\$115)	(\$117)	(\$120)		(\$178)	178%
Total (million)		(\$1,200)	(\$1,101)	(\$1,012)	(\$932)	(\$860)	(\$796)	(\$738)	(\$686)	(\$640)	(\$598)		(\$299)	25%
Multi industry economy (GRP)		\$27,000	\$27,540	\$28,091	\$28,653	\$29,226	\$29,810	\$30,406	\$31,015	\$31,635	\$32,267		\$47,948	178%
Municipal revenues		\$1,900	\$1,957	\$2,016	\$2,076	\$2,138	\$2,203	\$2,269	\$2,337	\$2,407	\$2,479		\$4,477	236%
Total (million)		\$28,900	\$29,497	\$30,107	\$30,729	\$31,364	\$32,013	\$32,675	\$33,351	\$34,042	\$34,747		\$52,425	
Present value (million)	5%		\$563,772											
Present val of DRR costs (million)	5%	discount rate	(\$1,350)											
Present val of rebuild costs (million)	5%		(\$5,931)											
Present val of Resil and Prev (million)	5%		(\$1,933)											
			(\$9,215)											

Note: The detailed spreadsheet created during the ULI panel is linked in the Sources section at the end of this report under “Macomber, John.” This could be a useful resource to build upon and update with more refined numbers.

Conclusion

The fire seasons ahead will continue to present significant danger to Sonoma County and its various communities. While the county has done an excellent job improving preparedness measures, ongoing stress has led to disaster fatigue and exhaustion among the community and its public servants. In hosting this panel, many of the county's leaders articulated a goal to move from reactive to prepared and resilient, meaning that communities should be ready to withstand disruptive events and bounce forward.



RYANSLIMAKPHOTO, ADOBE STOCK

To tackle such a challenging task, it is critical that the many stakeholders in the county—from the County of Sonoma, the City of Santa Rosa, and RCPA—come together as “One Sonoma,” a coalition ready to scale infrastructure and funding solutions to wildfire risk. “One Sonoma” should include not only all the political actors, but also the many community-based organizations that have shown significant commitment to supporting Sonoma County neighbors in times of need. It will take a coalition to address some of the more ambitious infrastructure and land use solutions to reduce wildfire risk. These solutions will be more successful on a regional scale, given that fires do not respect municipal boundaries. Implementing science-based approaches to reducing risk at scale will also be critical to enhancing wildfire resilience for existing buildings and should consider risk across the entire county, not only in areas designated as the WUI.

Although new climate and infrastructure policies will be crucial to advancing resilience in Sonoma County, they are not the only solution. It’s important to remember, “housing policy” is also “climate policy.” Accelerated housing demand, combined with the challenges to building in urban cores, has resulted in a dual problem of insufficient new construction and development in areas most at risk from fires. Local stakeholders will need to take a hard look at current and future development patterns and strategize about how to better deliver infill and reduce risk to existing homes. Given that historically marginalized and low-income communities are most at risk from disruption and harm in climate events, housing policy must also consider how to enhance equity and reduce risk to all.

Many of the panel’s proposals will require input and policy action from multiple entities. Working together, collaborating across jurisdictions, and understanding how one another’s respective efforts support one another will be key to advancing resilience in the face of fire seasons that are becoming increasingly dangerous and damaging on account of the impacts of climate change. While these challenges facing Sonoma County may seem insurmountable, local communities can tackle them by acting together in a strategic and thoughtful manner that looks to the past for proven strategies and looks to the future for inspiration and vision.

“One Sonoma”

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About the Panel

Molly McCabe Panel Chair Bigfork, Montana

McCabe describes herself as a scout, mapmaker, and bridge builder. She is the CEO and founder of HaydenTanner, a strategic real estate advisory and development firm focused on accelerating impact investment and sustainability in the built environment. She founded HaydenTanner after spending many years with large financial institutions in commercial real estate finance, capital markets, and development. She has spent her career cultivating practical solutions and strategies to accelerate the emergence of resilient buildings and vibrant, sustainable cities.

Former chair of the ULI Responsible Property Investment Council, McCabe was on the faculty for the National League of Cities/Rose Center for Public Leadership and Land Use. She is cofounder and on the board of the Lotus Campaign, a nonprofit working to alleviate homelessness, as well as sitting on the board of the Freshwater Trust. She holds a BS in managerial economics from the University of California at Davis and an MBA in finance from the University of San Francisco. Originally from San Francisco, she now lives in Montana with her family and a host of pets.

The quote that lives over her desk says, “The only death you die is the death you die every day by not living. Dream big and dare to fail.”—Norman Vaughn, Alaska, age 93.

Jose Bodipo-Memba Sacramento, California

Bodipo-Memba is the director of sustainable communities for the Sacramento Municipal Utility District (SMUD). He is the program manager for SMUD’s Long Range Asset Management Plan and the environmental compliance coordinator for the 5,000-acre Solano Wind Project in Rio Vista, California. Bodipo-Memba has spent over 18 years managing development projects associated with the California Environmental Quality Act and National Environmental Policy Act.

Bodipo-Memba’s development projects have covered a range of technical areas, including greenfield specific plan development, infill development, school and facilities planning, site feasibility analysis, wind energy, and infrastructure improvement. Some of his more notable projects include the Sacramento Railyards Specific Plan Environmental Impact Report (EIR), the Lincoln High School Complex (San Diego) EIR, the San Diego State Medical Health

Center project, the Country Club Estates Specific Plan EIR, and the California Lottery Headquarters Plan. With direct project experience throughout California, he has shown the versatility needed to address the variety of environmental and planning issues cities face.

Bodipo-Memba is active in the community, serving on the Sacramento Planning and Design Commission, the Center for Fathers and Families Board of Directors, chair of ULI Sacramento, and a member of the ULI National PDIC. He was a 2010 recipient of the Sacramento Business Journal 40 under 40 award, the 2012 Drexel University Oxholm Award for Community Leadership, and the 2015 Drexel University 40 under 40 Distinguished Alumni award.

Bodipo-Memba holds a BA in history from the University of California at Berkeley and an MBA from Drexel University.

Christopher Calott

Oakland, California

A member of the American Institute of Architects, Calott is an award-winning architect, urban designer, academic, and real estate developer. He is the inaugural Lalanne Chair in Real Estate Development, Architecture & Urbanism at the University of California, Berkeley, and the founding faculty director of a new Master of Real Estate Development + Design Program, which he launched in 2018. Before Berkeley, Calott was the director of the Master of Sustainable Real Estate Development Program at Tulane University, where he developed a curriculum in “regenerative development,” working in post-Katrina New Orleans, and throughout the United States.

In addition, Calott has pursued significant research in the areas of urbanism, affordable housing, informal settlements, and sustainability through community-based projects and published investigations tied to teaching appointments at numerous universities throughout the United States, Mexico, and Latin America. Calott’s practice-based research investigates the role that private-sector real estate development plays in creating more equitable and resilient communities through his professional work in the Bay Area. Focused on the redevelopment of disinvested urban communities, he is currently working as a design and development consultant on a large housing redevelopment project and

the creation of a new town center, employing innovative financing and urban design strategies.

Formerly, Calott was a founding principal of CALOTT + GIFFORD Architecture / Urban Design and founding partner of the real estate development firm INFILL SOLUTIONS: Innovative Urban Design and Development, based in Albuquerque and Santa Fe, New Mexico. For over 15 years his two firms worked together to create innovative mixed-use housing, dense infill developments, adaptive use, and vibrant public spaces, working principally in cities throughout the Southwest. Using regional urban building typologies in strikingly modern forms, Calott’s work also engaged nonprofit affordable housing and publicly financed urban design projects, often working with urban and rural Native American populations and traditional Hispanic communities throughout the region. Practicing architecture and real estate development as a “form of urbanism,” his projects have been recognized with over 65 local, state, national, and international design awards.

Calott holds a BA, Honors, in urban theory and design from Brown University. He received a Certificate in Architecture from the Institute for Architecture and Urban Studies in New York and his Master of Architecture degree from Princeton University. Calott was awarded a Loeb Fellowship at Harvard University’s Graduate School of Design in 2011–2012.

Jeremy Klemic

Los Angeles, California

Klemic is an associate principal at SWA Los Angeles with close to 20 years of experience as a landscape architect in Southern California.

At SWA, Klemic led the City of Thousand Oaks Urban Forestry Master Plan, which updated the city’s design standards for street trees, roadway medians, and general planting palettes toward today’s climate conditions. Immediately following the success of the plan, the City of Thousand Oaks has contracted SWA to implement the recommendations on four pilot projects as “proof of concept” for the principles of drought tolerance and community-approved design for roadway medians. Similarly, for the California State University Long Beach’s 320-acre campus, SWA is updating its landscapes toward a more water-efficient and drought-tolerant palette to adhere to the campus’s renewed standards of sustainability—both from the environmental and financial points of view. Klemic’s construction experience, attention to detail, and scheduling expertise help ensure that complex public projects are brought to fruition.

Klemic is a member of the American Society of Landscape Architects and is a graduate of the University of California San Diego Urban Studies and Planning program and UCLA’s Extension Landscape Architecture Program.

John Macomber

Boston, Massachusetts

Macomber is a senior lecturer in the Finance unit at Harvard Business School. His professional background includes leadership of real estate, construction, and information technology businesses. His teaching and research combine infrastructure finance (including public/private partnerships), investing in resilience (notably in the face of sea rise in some areas and drought in others), economic development, and the impact of new technologies in this realm. His most recent book is *Healthy Buildings: How Indoor Spaces Drive Performance and Productivity* (Harvard University Press, 2020). His most recent *Harvard Business Review* article looks at the long-term public health impacts of the electricity grid crisis in Texas, flooding in Florida, and wildfires in California.

The faculty chair of the HBS Africa Research Center, Macomber is also engaged in the Business and Environment Initiative and Social Enterprise Initiatives at HBS. He teaches finance, real estate, urbanization, and entrepreneurship courses in the elective curriculum and in Executive Education.

Macomber is the former chairman and CEO of the George B.H. Macomber Company, a large regional general contractor. He remains a principal in several real estate partnerships. He serves or has served on the boards of Young Presidents Organization International, Boston Private Bank, Beth Israel Lahey Health, and the WGBH Educational Foundation as well as ULI Boston/New England.

Molly Mowery

Denver, Colorado

Mowery, AICP, serves as the executive director of the Community Wildfire Planning Center, a 501(c)(3) nonprofit whose mission is to support community wildfire risk reduction. She also is founder of Wildfire Planning International, a land use and wildfire mitigation planning consulting firm that provides services to communities across North America.

Throughout her career, Mowery has successfully launched and managed national wildfire programs, including the Fire Adapted Communities in partnership with the U.S. Forest Service and the Community Planning Assistance for Wildfire program. She has also designed and delivered national trainings to educate land use planners and fire professionals, including the first Wildland–Urban Interface Planning curriculum for the U.S. Fire Administration.

Mowery is a certified planner and member of the American Planning Association (APA), she serves on the Sustainable Development Code Advisory Council, and is lead author of the APA Planning Advisory Service Report 594: *Planning the Wildland-Urban Interface*. She holds a BA from Naropa University and a master in city planning degree from the Massachusetts Institute of Technology.

Peter Quintanilla

Pittsburgh, Pennsylvania

Quintanilla brings more than 18 years of experience to his role, where he leads the Urban Design Studio (UDS) team in Pennsylvania as part of a collaborative process across Michael Baker’s practice groups to deliver complex and holistic urban design solutions for clients. With increased urbanization across the United States, city residents are looking for communities designed to offer sustainable, healthy, and vibrant places to live, work, and play. Michael Baker’s UDS—a distinct division of the Planning and Architecture Practice—has compiled a team of specialized talents to meet these needs.

Before joining Michael Baker, Quintanilla led numerous projects throughout the world using the charrette methodology. This process brings together local government officials, landowners, and residents with project designers and engineers to create a complete design that responds to the needs of the community while creating the largest buy-in from government agencies. He most recently worked as a senior associate urban designer at PlaceWorks, where he master planned greenfield, urban regeneration, and infill projects. Quintanilla also served in numerous roles for the Prince’s Foundation, where he led charrettes and projects in the Galapagos, China, and England. He has extensive experience in leading charrettes, master planning, urban design, architectural design, watercolors, hand drawings, AutoCAD, and Photoshop.

Quintanilla is a member of the Congress for the New Urbanism, ULI, and the New Urbanism Film Festival. He earned both his BS in chemistry and a master of architecture from the University of Miami (Florida).

Diana A. Ramirez

Austin, Texas

Ramirez is director of the Economic Development & Strategic Investments (EDSI) office at Travis County. She oversees a small, nimble team of 11 and uses external expertise to extend its impact. In addition, her team partners with the public, nonprofit, and private sectors, leveraging public resources to bring private capital to the table.

Her team leads the following efforts: redevelops underused county properties (Expo Center, Palm School); developed and implements the first countywide Comprehensive Economic Development strategy that centers economic equity, inclusion, sustainability, and resilience; develops campus and facility master plans; issues conduit debt for affordable housing, health facilities, and other community and economic development projects; constructs affordable housing projects as general partner and/or general contractor; negotiates and manages economic development performance agreements; invests county funds and hospital district funds (under contract) in accor-

dance with the Texas Public Funds Investment Act; and negotiates and funds public improvement districts.

Under the current COVID-19 pandemic and national response crisis, Ramirez is co-leading the effort to ensure the county draws down the maximum federal and state funding to provide response, relief, and recovery programs. Her team created and implemented a new small business assistance grant program, TCTX Thrive, using CARES Act funding. She did this concurrently with leading negotiations with Tesla to site its new \$1.1 billion Gigafactory, Giga Texas, in unincorporated Travis County.

Ramirez earned her bachelor's degree in psychology from the University of Texas at Austin and a master's in public affairs from the Princeton University School of Public and International Affairs. She is a member of the Government Finance Officers Association (GFOA) and GFOA of Texas and is a Certified Government Finance Officer. She is a member of GFOA's national Capital Planning & Economic Development Committee. She has also earned the National Development Council's Economic Development Finance Professional certificate. Ramirez is a member of the ULI Austin's P3 Local Member Council and Advisory Board and represents the Travis County Judge on Capital City Innovation's board as ex officio board member.

Neil Webb

Syracuse, New York

Webb has been working in the energy industry for over 28 years. His experience spans the evolution of energy markets from the vertically integrated holding companies of the early 1990s to today's deregulated marketplace. During this transformation, Webb has been engaged by utilities, independent system operators, and energy supply companies to assist in strategic and operational functions of both the wholesale and retail energy markets.

Recently, Webb's work has been focused at the retail level assisting entities with critical decisions involving energy from the procurement of electricity, natural gas, and oil to the planning and management of renewable energy credits. He has been heavily involved on energy assurance and resiliency issues including microgrids and innovative platforms to advance the integration of energy storage and distributed generation.

Webb has a bachelor's in industrial engineering from Clarkson University and an MBA from the University of Rochester's Simon School.



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