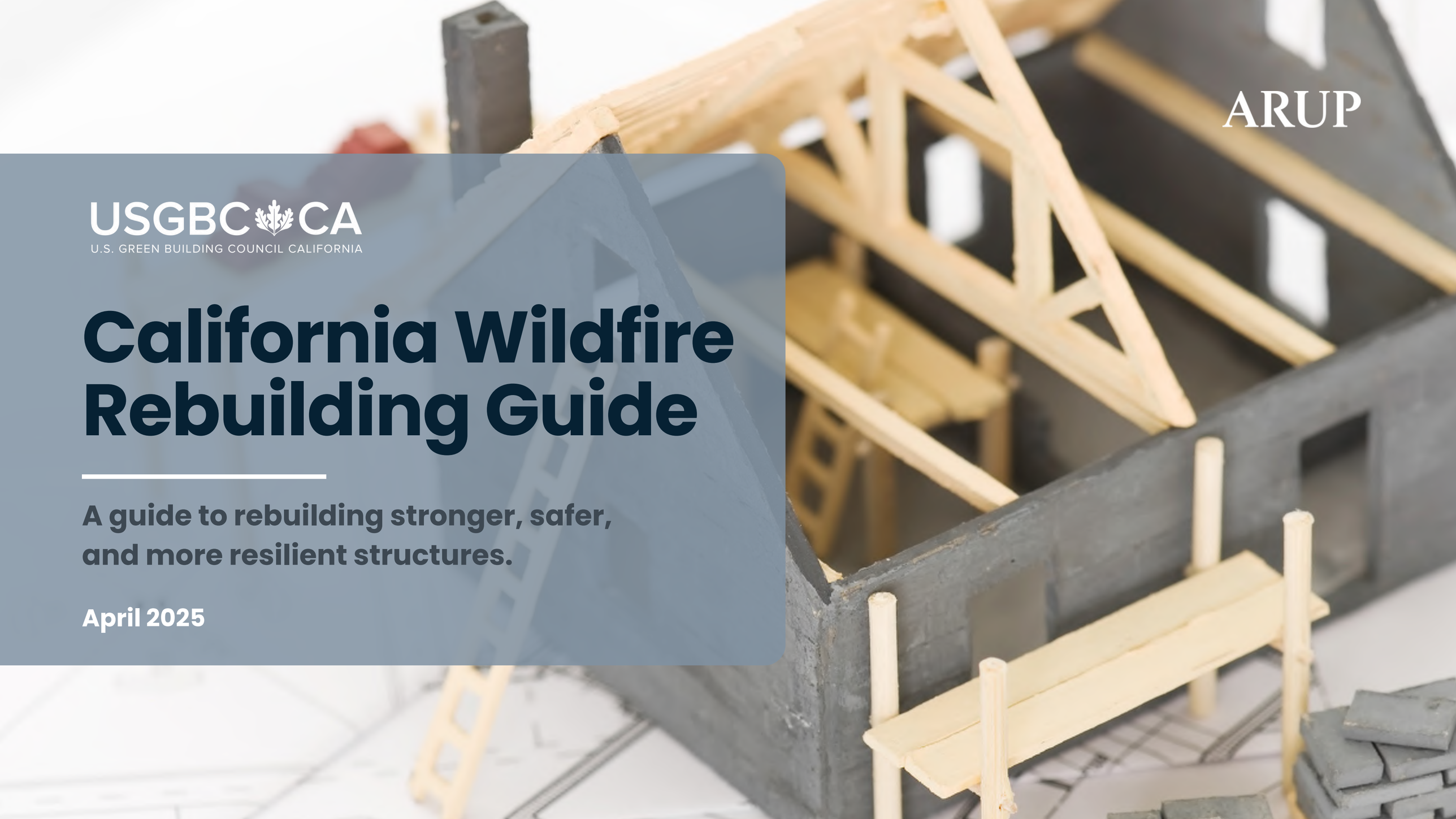


USGBC CA
U.S. GREEN BUILDING COUNCIL CALIFORNIA

ARUP

California Wildfire Rebuilding Guide

A guide to rebuilding stronger, safer, and more resilient structures.

April 2025

Rebuilding for Resilience

A Sustainable and Community-Driven Guide to Wildfire Recovery

In the LA Wildfires of January 2025, we experienced one of the worst climate disasters of our time, as we are seeing these types of wind and drought-driven wildfire incidents increase in size and scale. We will rebuild, and we will move forward, yet the how and the message we send to those who are watching around the world, fearing the next disaster will be in their backyard, is incredibly important.

To that end, our team at USGBC California, with support from Arup, as well as our incredible group of volunteers through our Wildfire Defense Advisory Group, our community of fire, building, and planning experts, has put together this guide as a resource for homeowners looking to make critical decisions on their rebuilding journey, and for professionals who will be needed to support these rebuilding efforts.

This guide focuses on rebuilding in a way that prepares for the multiple hazards, not only wildfire, faced by those of us in California and beyond, highlighting resiliency and sustainability opportunities and co-benefits while making minimizing costs a priority. This is just one piece of our resilient rebuilding support program, which includes **wildfire defense training and certificate programs**, a **Wildfire Defense Toolkit** focused on home hardening, resilient home tours, community assistance workshops, and our professional directory to connect homeowners with vetted professionals.

Building back better does not just refer to the home or business you lost, but encompasses entire communities and the people both within and connected to them. Together, we can build back stronger, more resilient, and be more connected to each other and the environment through thoughtful and holistic building approaches.

This guide provides easy-to-follow steps and choices to consider during your rebuilding process and points to other resources for deeper learning and guidance. Resources are provided for sourcing sustainable materials, energy efficiency, landscape maintenance and stewardship. Please remember that you are not alone and reach out to us if you need additional support or would like to be connected with our community along the way.

Like the world around us, this guide and its application will continue to evolve as additional information and resources become available. For other resources and information, please visit the **Wildfire Defense Rebuilding Support and Recovery Resources page** on our website.

Thank you for your time, interest, and engagement. Together, we can rebuild a more sustainable, resilient, and equitable California for all.

Onward and Upward,

Ben Stapleton
Executive Director, USGBC-CA

Acknowledgements

Thank you to the experts that helped to compile and meticulously review the information in this guide to ensure we are providing accurate and actionable information. We are deeply grateful for your knowledge and contributions to this resource.

Authors

- **Brittany Moffett**, Arup, Senior Resilience Engineer
- **Heather Rosenberg**, Arup, Americas Resilience Impact & Social Equity Leader
- **Mackenzie Roach**, Arup, Senior Fire Protection Consultant

- **Becky Feldman**, USGBC-CA, Chief of Staff
- **Ben Stapleton**, USGBC-CA, Executive Director
- **Elizabeth Christy**, USGBC-CA, Sustainability Program Manager
- **Erik Gonzales-Kramer**, USGBC-CA, Green Building Corps
- **Julie Du Brow**, USGBC-CA, Director of Communications & Partnerships
- **Ling Luo**, USGBC-CA, Marketing & Events Coordinator
- **Priscilla Steele**, USGBC-CA, Senior Marketing Manager
- **Sarah Wolf**, USGBC-CA, Career Coordinator

Contributors

- **Ann Edminster**, Design AVEnues LLC, Zero Energy, Zero Carbon, Green Building Consultant
- **Avideh Haghighi**, ZGF Architects, Associate Principal & Sustainable Design Leader
- **Carl Welty**, The Banning Land Trust, Director of Architecture and Planning
- **Christine Marez**, Cumming, Senior Vice President
- **Clark Stevens**, Resource Conservation District of the Santa Monica Mountains, Executive Officer
- **Deborah Bloome**, ARLA, Senior Policy Director
- **Devon Provo**, ARLA, Senior Policy Manager
- **Gary Lai**, Landscape Architect
- **J. Lopez**, California Wildfire Mitigation Program, Executive Director
- **Jessica Orlando**, AIA Pasadena Foothills, Vice President
- **John Zinner**, Consultant
- **Kathleen Hetrick**, Buro Happold, Associate Principal
- **Lucas Toffoli**, RMI, Principal
- **Lyse Messmer**, LCM, Designer
- **Marc Los Huertos**, Pomona College, Associate Professor, Environmental Analysis
- **Maura Mooney**, RMI, Senior Associate
- **Pauline Allen,** Executive Director, Santa Monica Mountains Fire Safe Council
- **Robert Lempert**, Rand, Director
- **Ron Durbin**, LA County Fire Chief, Forestry Division
- **Roxana Lopez-Truong**, AIA Pasadena Foothills, Project Manager
- **Ted Tiffany**, Building Decarb Coalition, Senior Technical Lead

Arup Reviewers

- **Brian McLaughlin**, Arup, Americas Fire Safety Leader
- **Brianna Leckie,** Arup, Electrical Engineer
- **Erin McConahey**, Arup, Principal, Mechanical Engineering and Whole Life Carbon
- **Frank Schwamborn**, Arup, Senior Energy Engineer
- **Geffen Oren**, Arup, Senior Sustainability Consultant
- **Irene Martin**, Arup, Americas West Façade Engineering Leader
- **James Harrison,** Arup, Senior Electrical Engineer
- **Kelly Perymon**, Arup, Sustainability Consultant
- **Maggie Messerschmidt**, Arup, Senior Resilience Consultant
- **Marie Sullivan,** Arup, Associate, Transportation Planning
- **Martin Howell**, Arup, Energy Skills Leader
- **Rahemeen Ahmed**, Arup, Resilience Analyst
- **Richard Lagesse**, Arup, Associate, Geotechnical Engineering
- **Sean Ahdi**, Arup, Senior Geotechnical Engineer
- **Simon Rees**, Arup, Principal, Structural Engineering
- **Tim Fuller**, Arup, Associate, Façade Engineering
- **Tony Kirby**, Arup, Principal, Civil Engineering
- **Youngbo Shim**, Arup, Sustainability Consultant

Table of Contents

Introduction

Note: This guidance document provides an overview of key concepts and design approaches that may be incorporated into the reconstruction of a home in a burn area. This document is to be used to foster discussion with a registered design professional engaged to prepare a complete design. It is an individual owner's responsibility to ensure that their structure complies with all applicable codes and standards. The authors of this document are not providing building design services, and the use of the guidance found herein does not supplant the professional responsibilities of design and construction professionals engaged on specific topics.

About this Guide

This document is designed to inform homeowners, designers, and contractors as they navigate the challenges of rebuilding single-family homes in the aftermath of the 2025 Los Angeles fires.

What is this guide?

The January 2025 wildfires were not the first time Angelenos lost homes, and it won't be the last. The decision of how - and whether - to rebuild is complex and personal. For those who do decide to rebuild, this guide is intended to make you aware of design concepts that could **enhance the safety of your home and reduce your future risk.**

The aim of this guide is to clarify **resilient**, **sustainable**, and **cost-effective** options, helping you make informed choices during the rebuilding process.

This document is tailored to address the specific challenges faced in Southern California, including recurring droughts, fires, floods, and earthquakes**. "Building back better" involves making strategic design choices at the property level and seizing opportunities to collaborate with your community to enhance overall preparedness.**

Rebuilding offers a pivotal opportunity to set both your property and community up for long-term safety and livability. **Not all upgrades cost more than standard options.** Where the enhancement does come at cost, it's important to consider how choices can be investments. These can pay off over time through benefits like more durable materials, lower operational costs, less risk of water damage, and healthier living environments. Throughout, co-benefits and resources for more green building design guidance are highlighted.

Who is this guide for?

- **Homeowners** working with their neighbors to rebuild their lives and homes with resilience in mind.
- **Designers and Contractors** committed to supporting these homeowners in creating safer, more sustainable living spaces.

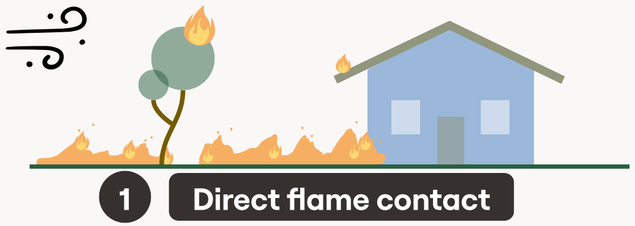
How is it different?

While there is wealth of excellent wildfire guidance available, much of it is geared towards retrofitting existing buildings and focuses solely on wildfires. This resource, drawing from established sources like the California Department of Forestry and Fire Protection (CAL FIRE), National Fire Protection Association (NFPA), and the Insurance Institute for Business & Home Safety (IBHS), sets itself apart in several critical ways:

- **Suburban/Urban Context:** Tailored specifically for suburban and urban settings like Altadena and Pacific Palisades where lot lines are set and sites may be constrained.
- **Rebuild Focus:** Designed for rebuilding rather than retrofitting, offering new insights for existing sites.
- **Multi-Hazard Safety:** Though a primary focus on wildfires, addresses a variety of hazards pertinent to Southern California like earthquakes and heat.
- **Cost Efficiency:** Identifies options that are cost-effective when rebuilding and will reduce long-term maintenance expenses.
- **Sustainability:** Highlights sustainable practices throughout the rebuilding process.
- **Community Scale:** Includes strategies that improve both individual property and community-wide resilience.

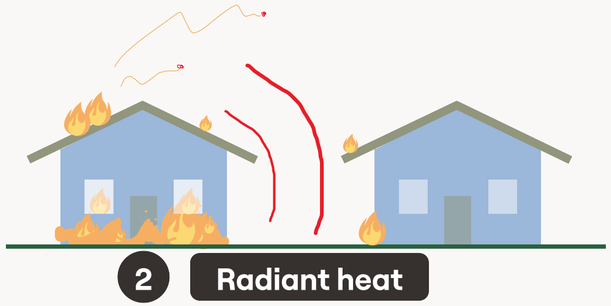
Key Concepts

How do houses catch on fire?



1 Direct flame contact

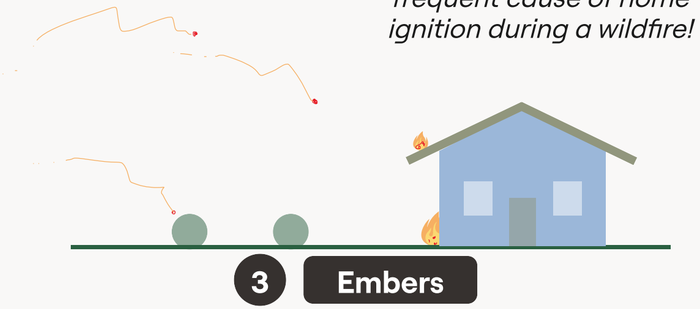
Fire spreads when flames touch materials that can burn (e.g., dry vegetation, wood shingles). Wind, such as the Santa Ana Winds, makes this happen much faster.



2 Radiant heat

There doesn't have to be a flame for materials to catch fire - just heat can do it. Wildfires can reach over 2,000°F. For comparison, wood ignites at 570°F.

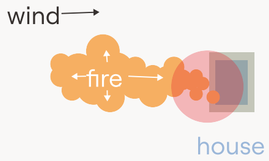
Embers are the most frequent cause of home ignition during a wildfire!

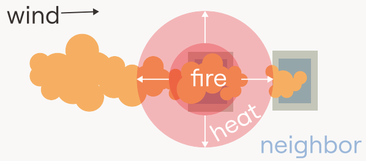


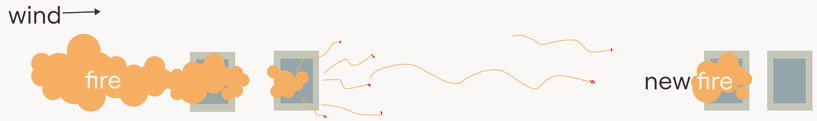
3 Embers

Fires create embers that the wind can blow for long distances. When these embers land on plants, roofs, or walls that can catch fire, they can start new fires far away. That's why this guide will explore many ways to be "ember-resistant."

Bird's eye view:



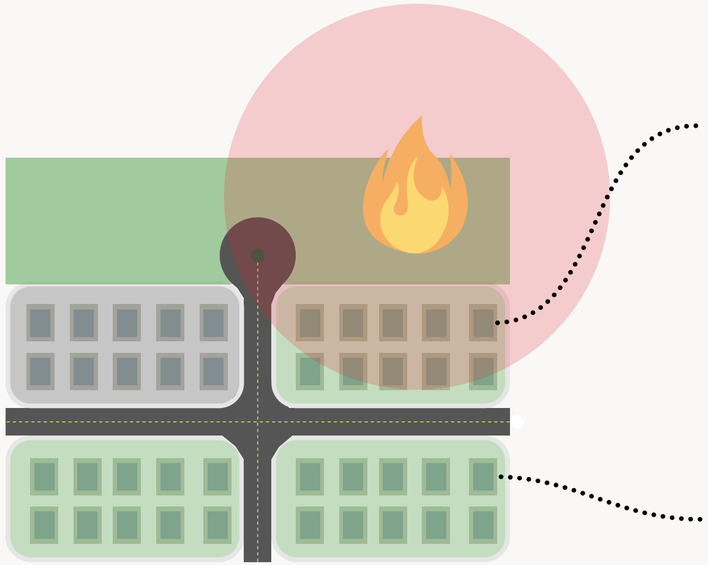




windblown embers
can travel miles, starting new fires, which can then *further* spread any of these 3 ways

Key Concepts

What should my performance goals be when I think about design?



Aerial diagram of neighborhood during an active fire

Fire-ready

What does this mean? **What should we be aiming for?**

In the next fire, if your home is IN an evacuation zone:

1. **Be able to safely and quickly evacuate** meaning you should be able to grab key documents and not be obstructed from physically leaving.
2. **Have a home to return to** because your home and neighborhood were designed and maintained to slow the rate of fire spread, enabling emergency responders to contain the fire quickly.

If outside of an evacuation zone, in addition to 1 and 2 above:

3. **Be able to manage through smoky air conditions,** noting that burn area smoke can travel long distances.
4. **Be able to manage through power outages** like public safety power shut offs (PSPS).
5. **Be ready for a water service disruption**

AND Prepared for other hazards

Wildfires aren't the only danger we need to worry about in Southern California. We need to design homes and neighborhoods to withstand a range of threats, like earthquakes, extreme heat, and flooding. Many of the hazards in California are linked together. For example, drought cycles dry out vegetation, which provides fuel for wildfires. After the fires, bursts of heavy rain can trigger mudslides in the burned areas, where slopes are missing the stabilization provided by roots of healthy plants. **Fortunately, strategies to boost resilience against one hazard often help with others and enhance everyday performance.**

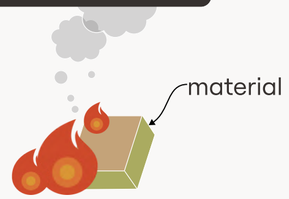
AND High-performing

What is a high-performing, green building? It's all about sustainability and efficiency. These buildings have lower operational costs, lower carbon emissions, and are energy efficient. They use healthy materials and create indoor environments that **not only benefit human health but also support the health of the surrounding ecosystem**. To achieve this, architects and builders often turn to established rating systems and guidelines, such as Passive House, LEED for Homes, and Enterprise Green Communities. These frameworks help ensure that buildings are designed with both people and the planet in mind.

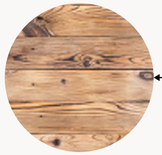
Key Concepts

What do these different material terms mean?

Combustible



Combustible materials can ignite and burn.



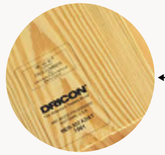
Example: wood

Ignition-resistant

Flame-resistant

Fire-resistant

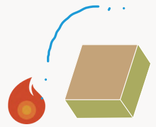
These are similarly-sounding terms that typically mean the fire performance has been tested and meet the requirements for the classification (e.g., fire retardant treated, Class A).



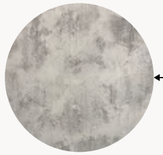
Example: fire-treated wood

Dricon fire retardant treated (FRT) wood. Image source: Tague Lumber / taguelumber.com

Non-combustible



Non-combustible materials, when exposed to fire or heat, will not ignite, burn, or release flammable vapors. A non-combustible material is, by nature, ignition and flame resistant.



Example: concrete

Rated construction assemblies, such as the "1-hour fire-rated wall assembly," consist of tested materials like fire-resistant drywall (Type X gypsum board), studs, and insulation. These components collectively slow the spread of fire, as indicated by the one-hour rating, providing crucial time for firefighting efforts.

For more information on **materials**, please check out FireWise's guide:

FireWise Construction: Site Design & Building Materials

What's good?

How to read this guide

Reducing wildfire damage risk is the core of what's included in this guide.

While response during an event is important, the building and landscape design should focus on making things safe without requiring much effort from you (i.e., **passive design**).

What improves fire performance

Wildfire risk mitigation strategy types:

Passively prevent accumulation of fuel like leaves
e.g., roof geometry

Actively prevent accumulation of fuel
e.g., tree maintenance (requires occupant action)

"Harden" your home's exterior with **non-combustible building materials**
e.g., non-combustible roof covering

Passively prevent landing place for embers
e.g., roof geometry

Passively limit ember entry
e.g., mesh over vents

Actively prevent ember entry
e.g., close windows and doors

Reducing wildfire risk **and what?** There's more to high performance design - these tags help distinguish other benefits to consider in how you build back.

Co-benefits to consider

Savings

Tagged **IF** design choice reduces first costs or operational costs:

- **Material costs** (e.g., equipment, products, availability)
- **Labor costs** (e.g., installation)
- **Operational costs** (e.g., energy use, ongoing maintenance)
- **Durability** (e.g., less susceptible to leaks, equipment with longer life spans, etc.)

Safer

Tagged **IF** design choice will either help protect occupants through or reduce damage from other hazards (direct and indirect) like:

- **Airborne contaminants** (e.g., smoke, dust, fumes, etc.)
- **Earthquakes**
- **High winds**
- **Heat waves**
- **Mudslides**
- **Heavy rain & flooding**
- **Power outages**
- **Utility water disruptions**

Sustainable

Tagged **IF** design choice will simultaneously achieve any of the following:

- **Healthy indoor environments** (e.g., through materials and system choices, protecting your family's health)
- **Energy efficient, high performance buildings**
- **Reduce greenhouse gas (GHG) emissions** (e.g., support solar panels)
- **Low embodied carbon**
- **Support biodiversity and ecological health**
- **Sustainable water use** (i.e., capture, conservation, efficiency, re-use)

Some Things to Consider

Along your Recovery Journey

Rebuilding a home after it has been destroyed by wildfire requires many decision points along the way. This section presents some key questions that people have along the journey.

Some things to consider as you use this guide:

- **Southern California evolved with wildfire**, and wildfires are becoming more frequent and intense. The suggestions in this guide will help you make better decisions about protecting your home, but there is no guarantee that your community won't burn again in the future.
- **Fire is not the only hazard.** Properties located along the coast or on unstable slopes will have additional challenges in the rebuilding process and greater risk in the future of being impacted by other events.
- **Communities are foundational to resilience.** Working with your neighbors can help reduce your risk and pool your resources. More importantly, it can help you retain the things you love most about where you live.
- **Rebuilding takes time.** Even in the best of circumstances, building a home from the ground up takes time. Local agencies are working to remove barriers, but design and construction of new homes is a process. Take the time to consider your priorities and investments and work with your neighbors so that you have a healthy, resilient, and efficient home and community to return to.
- **Small is beautiful.** While market pressures might push you to consider increasing the size of your home, the County has expedited zoning for buildings that are no more than 10% bigger than their original size. See this as an opportunity to keep it the same size or even downsize. Smaller homes take less material to build and less energy to condition. Small ADUs also increase affordable housing options within your community.
- **It will never be the same, but it can be better.** For many people, disasters provide an opportunity to take stock and see what is most important. Thinking about what you need from your home and how you connect to your community can inform your journey of recovery and help you build back better.

CA

FAQs

To Guide Your Way Back Home

Should I go all-electric?

When rebuilding, homeowners face a fundamental decision: re-install natural gas or use this moment to go all-electric? Advancements in electric technology like heat pumps (efficient units that provide both heating and cooling) and induction stoves make the switch easier than ever, and there are many incentives to help support this process, but there are multiple key factors to consider:

- **Weather & Climate:** In warmer climates like California, heat pumps can be more cost-effective, especially when part of an energy-efficient new home. In colder climates, gas furnaces may be more efficient.
- **Local Energy Costs:** Electricity and natural gas prices vary by region, so it's important to compare utility rates, including during peak demand periods.
- **Indoor Air Quality & Health**: Gas appliances produce pollutants that can affect respiratory health. Electric alternatives are better for indoor air quality while reducing risks of asthma and other lung conditions.
- **Environmental Concerns:** If reducing your carbon footprint is a priority, all-electric homes powered by renewable energy are the best option. California's ambitious goal of 100% renewable electricity by 2045 is also a factor to keep in mind.
- **Code Compliance:** California's building codes are increasingly favoring all-electric for energy efficiency and lower emissions. The California Energy Code (Title 24), for instance, requires new single-family homes to be "all-electric ready". Thinking ahead, embracing this trend could help avoid future retrofit costs when selling your home and ensures you're aligned with evolving energy standards.

For more information on going all-electric, check out this easy-to-use guide from Rewiring America:

Electrify Everything in Your Home

FAQs

To Guide Your Way Back Home

Building back a home in your original footprint is the best way to expedite your rebuild, but what exactly does that mean?
Permitting requirements and building rules differ by municipality. Check the official resource for your area for exact guidance. Here are some for the regions impacted by the 2025 LA Wildfires:

- LA County
- LA City
- Pasadena
- Sierra Madre
- Malibu

Note: references linked here are specific to LA County code. Various cities will have different municipal Title Sections.

What is "like-for-like" rebuild, and what does 100% + 10% guidance mean?

"Like-for-like" is a zoning code term set by LA County (defined in Chapter 22.256 - Disaster Recovery). Building owners are permitted to rebuild a like-for-like structure to replace their destroyed home so long as it is the same size, in the same location, and for the same purpose as the previous building. Such structures should be modified to be built to current Building Code (Title 26) and Fire Code (Title 32), and can also have a different internal layout (or be rebuilt smaller than the original structure) but cannot increase the overall floor area, size, or height by more than **+10%** or **+200 sqft** (whichever is greater) of the original building.

To be clear, "like-for-like" is related to planning and zoning approvals - *not* building code compliance. For larger homes, a 10% increase in area could have a notable impact on Building and Fire Code requirements.

Example: At most, your building plan can be the same amount of square feet your home was previously *plus* no more than 10%. If your house was 2000 square feet, you could rebuild it to 2,200 square feet without requiring additional permitting.

Does rebuilding my home all-electric have additional permitting considerations? If I had gas before does this go against the 1-for-1 guidance?

If you had gas before, going all-electric does not conflict with "like-for-like" rebuilding guidelines, primarily because like-for-like focuses on maintaining size, footprint, and height of a home, rather than requiring an identical fuel source.

With Mayor Karen Bass's recent Emergency Executive Order No. 5, the City of Los Angeles is working on streamlining approvals for all-electric rebuilds, and LADWP may offer incentives for electric appliances and upgrades. Homeowners should check with LA Department of Building and Safety and LA Department of Water and Power for the latest permitting guidelines and rebate programs in the coming months.

If transitioning from gas, you may need to upgrade your electrical infrastructure and coordinate with utilities to cap and decommission gas lines. While this requires planning, it may also make you eligible for additional rebates and incentives to offset costs. Be sure to consult with the appropriate agencies and professionals to navigate the process smoothly.

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FAQs

To Guide Your Way Back Home

Can I change the position and/or placement of my home within my property?

Yes, but if you plan to do so, your project may no longer qualify as a “like-for-like” rebuild. Like-for-like rebuilds only allow minor relocations for circumstances like changes in topography (for example, post-disaster mudslides reshaping drainage flows), the original structure’s placement was already nonconforming with current code, or to reduce impacts to biodiversity and local natural resources.

Aside from that, in both the City of Los Angeles and unincorporated areas of Los Angeles County, "like-for-like" rebuilding typically requires reconstructing the home in its original location to qualify for expedited permitting. It's essential to consult with local building and planning departments to understand the specific regulations and obtain necessary approvals before altering the placement of your home during the rebuilding process.

Can I change the layout of my home while keeping the same square footage (+10%)?

Yes, if you plan to keep the same square footage +10%, you are free to change the interior layout of your home without requiring additional planning and zoning permitting approvals (so long as your changes don’t alter the original purpose of the building as described in “like-for-like” rebuild projects).

Can I update the materials on my original plans?

Yes, updating materials in your original plans is generally permissible, and likely a good idea given improvements in materials over the years, so long as they comply with the current Building Code (Title 26), Fire Code (Title 32), and Health and Safety Code requirements. This guide provides a selection of resilient and sustainable materials to help you select the best materials to help you build back better.

All recommendations provided by this guide are compliant with Chapter 7a standards. These standards were developed by the Office of the State Fire Marshall to ensure structures built in wildfire-prone areas are more resilient to fires, and are good practices to adopt regardless of which Severity Zone a home falls under in CalFire maps.

Note that codes are typically updated every three years and the 2025 CBC will be published in July 2025 and become law in January 2026. Therefore, plan submissions after January 1, 2026 will need to follow the updated code.

CA

FAQs

To Guide Your Way Back Home

Can I update the landscaping on my property?

Yes, updating your landscaping is generally allowed, and rebuilding offers a great opportunity to incorporate **drought-tolerant, fire-resistant, and native plants** to improve the resiliency of your property. However, there are a few important considerations:

- Local Regulations & Permits: Some cities and counties have landscaping requirements, especially in fire-prone areas, which may dictate defensible space zones, tree placement, or the types of plants allowed. If you are in a designated Very High Fire Hazard Severity Zone (VHFHSZ), you may need to follow brush clearance and defensible space regulations.

- Water-Efficient Landscaping: The California Department of Water Resources has a statewide ordinance for water-efficient landscapes, which includes restrictions on high-water-use plants and requirements for efficient irrigation systems.

- Rebuilding may also present a good opportunity to look at innovative water reuse, bioswales, and water capture at your home.

Will fire sprinklers be required for fire rebuilds?

Yes, all new homes in California must have fire sprinklers installed, no matter where they are located (according to CRC R313).

What if I want to add solar to my rebuild, but it is not required?

Adding solar to your rebuild is a great investment, even if it's not required. While California's Title 24 energy code mandates solar installations on new residential construction, some rebuilds—especially "like-for-like" projects—may be exempt. However, incorporating solar and potentially even energy storage can reduce long-term energy costs, increase resilience, and qualify you for financial incentives. The California Solar Consumer Protection Guide, created by the California Public Utilities Commission, offers homeowners a step-by-step process for going solar. There are also likely incentives for pursuing solar and storage (e.g., from your utility or regional energy network, depending on your location).

Will codes be waived for rebuilds?

For LA County, "like-for-like" rebuilds do not need to comply with current Zoning Code requirements, but they **will** need to comply with current Building Code (Title 26), Fire Code (Title 32), and Health and Safety Code requirements. When you apply to LA County to rebuild, please check with your land use planner for the most up-to-date information.

For the City of LA, all eligible rebuilding projects are no longer required to follow the all-electric building ordinance (Ordinance No. 187,714), though participants may still opt into the provisions described. There are some state level incentives and LADWP incentives to help support electrification.

Please note that Title 24, (California's Building Standards Code, covering safety, energy efficiency, and sustainability statewide) will be updated by January 1st, 2026. We recommend working with your contractor, who can help you plan your building to appropriate code based on location and timeline.

FAQs

To Guide Your Way Back Home

Can I build and live in an ADU (Accessory Dwelling Unit) on my property while rebuilding my home?

If you are rebuilding in LA County, a new ADU can also be built on a property if a household wants to temporarily occupy it while they wait for a replacement primary dwelling unit to be built on the same property. This will not be considered a temporary structure and will not need to be removed from the property at a future time. LA County will require an application and permits for the new ADU, which will be expedited. The new ADU will need to comply with current Zoning Code and State law requirements.

If you are rebuilding in the City of LA, according to Emergency Executive Order No. 1, passed by Mayor Karen Bass on January 13, 2025, the use of recreational vehicles, tiny homes, modular structures, and mobile homes will be permitted for up to three years, or while an active building permit applies to the property (whichever is longer).

What will trigger additional permitting reviews, and what additions can go through expedited permitting?

Rebuilding projects that deviate from "like-for-like" requirements, such as significant design changes, size increases beyond 10%, or altering the original footprint, may trigger additional reviews. It's advisable to consult with your county's one-stop permit center or your city planning department, your architect or general contractor, to determine the specific requirements for your project.

What is Chapter 7a?

Homes in areas with State-flagged risk for wildfires (High Fire Hazard Zones; these maps were updated in March 2025) must follow extra building codes. In general, this guide applies those requirements outside the High Fire Hazard Zones, given how other areas can benefit. Always consult with your contractor or your local planning department if you have any questions about code requirements.

Additional Resources

For a Deeper Dive

There are many different organizations, coalitions, and municipalities working on resources to support recovery and rebuilding efforts. We are all committed to working together, aligning our efforts, and collaborating whenever possible to provide the best resources available. Where we can not or are not the right organization to provide specific guidance, we will share additional resources. The references below, which will continually be updated, reflect deeper guidance and additional resources on topics we touch on in this guide, as well as resources from local municipalities and utilities.

Disaster resource website for each municipality

- City of Los Angeles Emergency Management Department
- Mayor Karen Bass Emergency Executive Orders
- LA County Recovers
- Malibu Rebuilds

United Policyholders

- A free public resource for insurance questions.

Resources around Wildfire Resilience

- 2022 California Fire Code, Title 24, Part 9
- National Fire Protection Association: Firewise USA
- The Governor's Wildfire and Forest Resilience Task Force 2025 Key Deliverables

Project Recovery

- A report by **Urban Land Institute Los Angeles**, **UCLA Ziman Center**, and **USC Lusk Center**, serving as a resource for policymakers, industry leaders, and communities, offering adaptable strategies for strengthening LA's long-term resilience.

Resources by the American Institute of Architects (AIA)

- AIA Roadmap to Rebuilding and Ask an Architect
- AIA Rebuilding After a Fire - extended guidance

High-Performance and Sustainable Home Certifications

- LEED Homes
- LEED Resources
- Passive House Institute
- Enterprise Green Communities

Placement

Building Placement on Existing Site

Placement

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Building(s)' placement on existing site

Where on my site should the building go?

Place the home **at least 30 ft** from the closest building (best case) ①

IF your neighbor is also rebuilding

Place the home **at least 15 ft** from the property line (plan with neighbor to do the same) ①

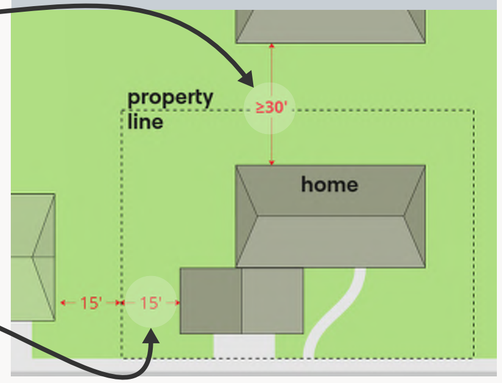
IF NEITHER IS POSSIBLE because of limited space

Make the **abutting exterior wall** more robust against fire spread ②

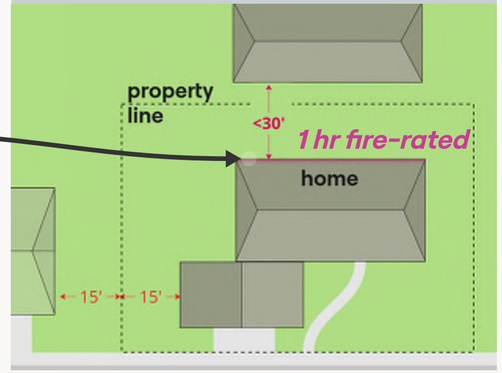
Select a **1-hour fire-resistant wall assembly** and try to avoid placing window(s) where they will be close to a neighboring structure.

A **1-hour fire-resistant wall assembly** is an exterior wall build-up designed to resist direct fire for up to one hour. This helps slow down the fire's spread. It usually includes fire-resistant drywall and insulation. (Non-combustible exterior wall materials are recommended in all cases in a wildfire-prone zone; a 1-hour rating is a step above that.)

Best: at least 30' between structures



Okay: to be closer IF 1-hr fire-rated



Building orientation should also consider solar heat gain, daylight access, and natural ventilation to improve energy efficiency and comfort.

This can help you save money - using passive design principles can lead to needing less heating, cooling, and lighting to keep your home comfortable.

This can also keep your home cooler during power outages that often come with heatwaves.

Passive solar design is a building design approach that maximizes the use of natural sunlight, heat, and airflow to maintain comfortable indoor temperatures without relying on mechanical heating or cooling systems. For more info, check out:

Passive Solar Homes | DOE

Placement

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Detached structures

Do you want a **shed, detached garage, ADU**, or other structure?

Provide at least **30 ft of separation distance** between structures on your property

A shed (e.g., < 64 sqft) can be closer - 15 ft rather than 30 ft.③

OR

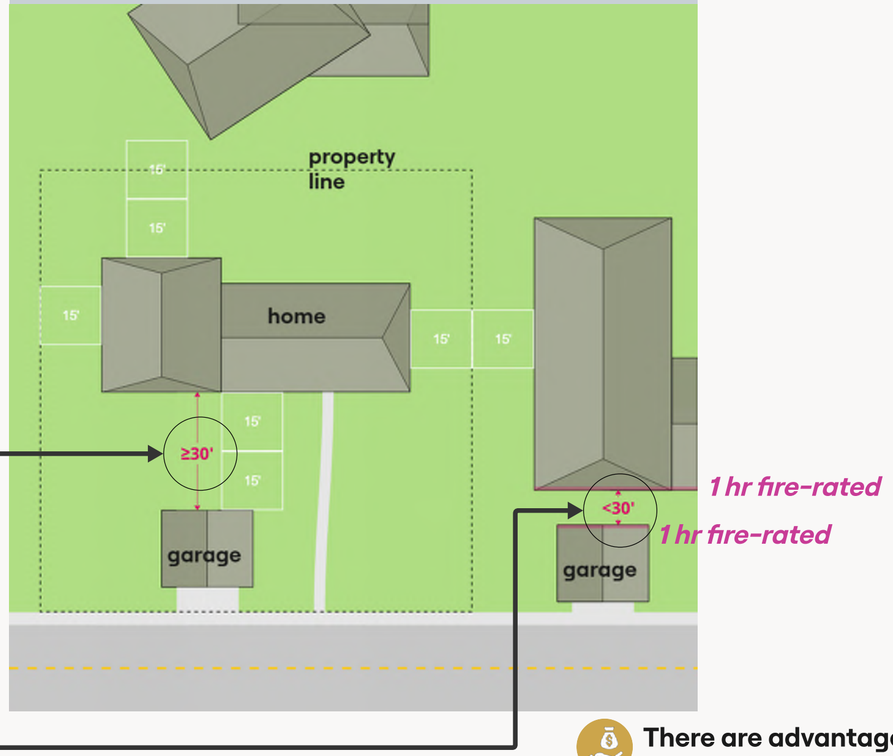
Harden the detached structure ④

Where a buffer distance is not possible, enhance the exterior wall from non-combustible to **1-hour fire resistant.** This helps lower the chance of the detached structure catching fire and endangering your home.

Consider building back an ADU first and then, over time, rebuilding your primary home.

Note: As a baseline, detached garages and ADUs should have **non-combustible exterior walls** and **Class A roofs**. For more information on both of these, refer to the Envelope Chapter.

Best: 30 ft between structures on site



There are advantages to building smaller. It not only creates more space around your buildings but also allows you to use higher quality materials while managing overall costs. Plus, it results in less floor area to condition, saving energy costs.

Placement

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Wildland Urban Interface (WUI)

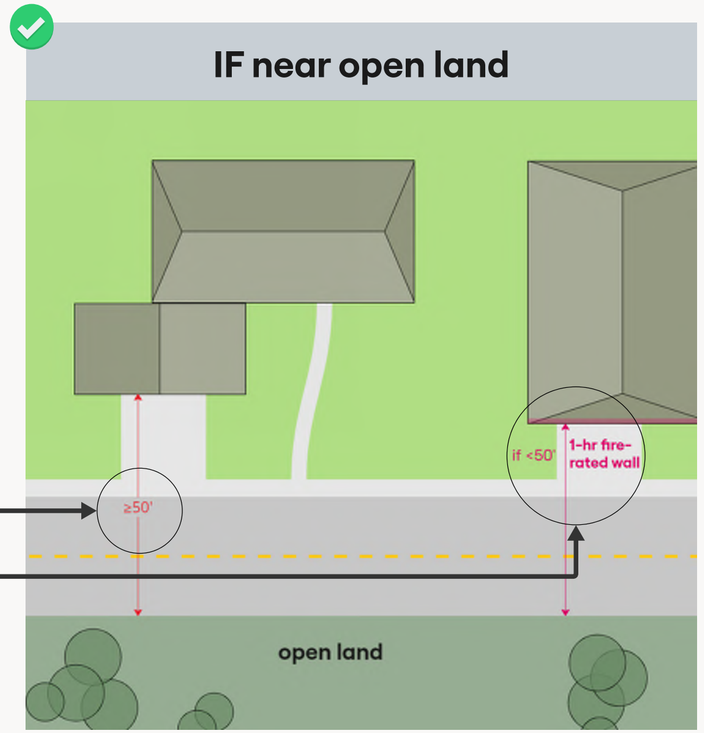
What if my site is **close to open land?**

"Open land" refers to undeveloped land, which could included grasslands and shrubs.

Provide at least **50 ft of separation distance** between any on-site structures and the open land ⑤

IF NOT POSSIBLE

Make wall(s) closest to open-land **1-hr fire-rated** ④



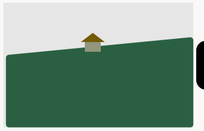
Placement

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

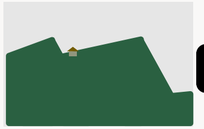
Topographic considerations

Does your **site or neighborhood** have any of the following characteristics?



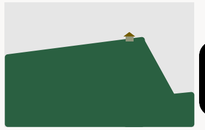
Up on a **slope**?

OR



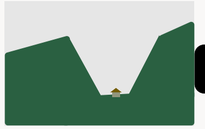
In a **saddle**?

OR



On a **hilltop / ridgetop**?

OR



In a **canyon**?

The steeper the hill, the quicker the fire climbs. Some land shapes can also direct the wind, making the flames spread more quickly.

Your site is at an elevated fire risk, given wind exposure and how flames climb slopes. Limited access routes and narrow curved roads make it more difficult to evacuate and for emergency vehicles to get through. ⑥

Provide increased defensible space distances

Harden your home with additional protection measures (see **Envelope Design** chapter)

Evacuate early

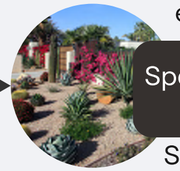
Approaches

Increase vegetation management distances beyond 100 ft

Note: this may require a permit if next to open land.

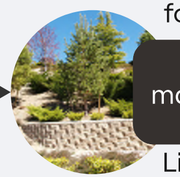
Terraced garden walls

Creating terraces on slopes can also give firefighters easier access points.



Spaced out shrubs with deep root systems

See **Landscaping** section for more information.



If slope is too steep to manage vegetation, provide noncombustible wall(s)

Like a fire resistant retaining wall

On a slope, make sure to manage **stormwater drainage** from the site to prevent soil erosion.

Consider flood risk reduction simultaneously in site grading and drainage design - places like saddles or canyons often have higher flood risks.

Improve drainage simultaneously - Slope stability improvements and landslide prevention efforts are a chance to consider and include drainage in natural hillsides. This helps water flow better, supports plant growth, and reduces dry brush that can catch fire.

Address erosion control by stabilizing the slope (think avoiding mudslides).

See the **Outdoors** chapter for more tips on landscaping, deck, and patio design.

Placement – Notes

1 **Re: at least 30 ft distance between structures and, if neighbor hasn't rebuilt, 15 ft to property line**

FEMA guidance (2023)

To minimize the risk of fire spreading from building to building, it's best to maintain as much space as possible between structures. Ideally, ensure a 30-foot buffer between your proposed design and any neighboring buildings. This is aligned with FEMA's *Marshall Fire Mitigation Assessment Team: Decreasing Risk of Structure-to-Structure Fire Spread in a Wildfire*: "Provide a minimum spacing of 30 feet between structures when possible." If a neighboring property does not yet have a building, a 15-foot clearance from the property line is advisable. If both you and your neighbors maintain a 15-foot buffer, this effectively creates the recommended 30-foot separation to decrease the risk of fire spread.

Marshall Fire MAT: Decreasing Risk of Structure-to-Structure Fire Spread in a Wildfire

2 **Re: 1-hour fire resistance of abutting home wall(s)**

California Residential Code (2022)

For enhanced protection for a wildfire event, FEMA recommends 30ft between structures and 50ft from open land. To protect buildings that are less than the recommended separation distance, we turn to CRC Table R302.1(1) and CBC Table 705.5 that would require a 1 hour fire-resistance rating for increased protection from radiant heat exposure.

3 **Re: reduced buffer (15 ft) around smaller structures like sheds**

NIST research (2023)

The 15 ft recommended distance comes from NIST's research from testing fire performance of sheds: "wooden and steel storage sheds up to 64 square feet (5.9 square meters) in size should be at least 10 or 15 feet (3 or 4.5 meters) away from homes depending on their size."

For Sheds in Wildfire Zones, NIST Researchers Determine How Close Is Too Close to Home | NIST

4 **Re: 1-hour fire resistance of abutting detached structure wall(s) if less than 30 ft from other structures OR less than 50 ft from open land**

This is to follow the same logic charted for the home: if separation is not possible to mitigate radiant heat exposure, then make wall assemblies fire-resistant.

5 **Re: placing ALL structures at least 50 ft from open land IF possible**

FEMA (2023)

This is an application of FEMA's guidance on siting in *Marshall Fire Mitigation Assessment Team: Best Practices for Wildfire Resilient Subdivision Planning*: "Avoid constructing a new development adjacent to an unmanaged open or wildland space where 50 to 100 feet of defensible space cannot be provided on the proposed site." Through rebuilding structures away from that contiguous vegetation where possible, a defensible space can be created.

https://www.fema.gov/sites/default/files/documents/fema_marshall-fire-mat-best-practices-wildfire-resilient-subdivision-planning.pdf

6 **Re: topographic impacts on fire spread**

FEMA (2008)

FEMA's Technical Fact Sheet 3 in *P-737 Home Builder's Guide to Construction in Wildfire Zones* describes how sloped terrain, saddles, ridgetops, hilltops, and canyons accelerate frame spread given how flames ascend quickly and the wind behavior caused by these topographic features.

FEMA's Technical Fact Sheet 3

CA

Envelope Design

Roofs, Screens/Vents, Exterior Walls, Windows

Roofs

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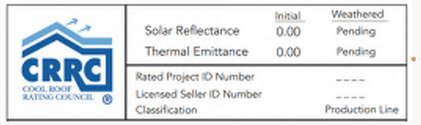
Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Roof material selection

What **materials** should I use for the roof?



Example of cool roof label

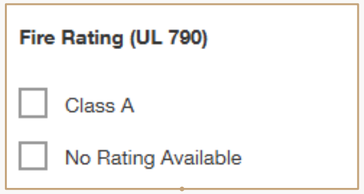
Choose a "cool roof," which reflects more sun and absorbs less heat. Note: for some climate zones, this is a prescriptive requirement (T24 Part 6). ②

- **Cool roofs** reduce energy needed to cool your home, which reduces greenhouse gas emissions.
- **Less energy used means spending less money** on energy each year.

Common Class A roof options

Key action

Choose a **non-combustible roof assembly**



Choosing a Class A-rated roof assembly, which has a non-combustible covering and underlayment, greatly **reduces the risk of fire by making it less likely for windblown embers to ignite it**. This type of roofing is required in Fire Hazard Severity Zones according to building codes, but it is also helpful in other areas.

Class A roof assemblies follow the standards set by UL 790 or ASTM E108. For example, on a major supplier's website, you can find roofing products by selecting "Fire Rating (UL 790): Class A."①

Asphalt shingles

Look for "cool" products - for asphalt, including solar-reflecting granules.

- **Typically lowest cost option** and easiest to install.
- **Renewable energy -** easiest to mount solar panels, no special attachment system needed.

Metal roofing

Select lighter colored metal or paint with a reflective coating.

- **Good performance in strong winds**, long-lasting, and durable. Note: good wind performance is important because high winds can help spread fires - staying on helps protect the roof.
- **Metal does not allow moss growth**, which can cause damage to materials over time.

Clay and concrete tiles ③

Choose lighter color tiles and with a reflective finish. Ensure secure attachment, given this is a heavier material being used in a seismic zone.

- **Lower carbon emissions in manufacturing** (terra cotta/ceramic tiles) compared to metal roofing or asphalt shingles. ④

See additional considerations on the next page

Roofs

Legend Savings Safer Sustainable

Design decisions

Avoid expanded foam (e.g., expanded polystyrene) insulation

Metal drip edge

What improves fire performance

Choose a **non-combustible roof assembly**

INCLUDING

Choose **non-combustible or fire-treated insulation**

AND

Install **non-combustible metal drip edges** and **flashing around penetrations and roof valleys**

Non-combustible and **corrosion-resistant metal drip edges** help protect roofing layers. Flashing around penetrations (like skylights) help divert debris and water (useful during heavy rains to reduce the risk of leaks).

What your options are

Choose insulation with:

- **High performance** (the higher the R-value, the more insulating)
- **Low or no toxic substances** like formaldehyde, isocyanates, and VOCs
- **High recycled content** (e.g., at least 30%)
- **Nearby manufacturing** (shortening the travel distance – i.e., locally sourced) ⑤

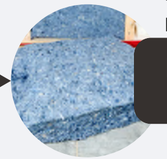
Green insulation options

Fiber glass

Available in rolls (most common, batt) and loose-fill (blown-in, helpful if applying in hard-to-reach area).

Mineral wool

Made from natural rock materials. Also available in rolls and loose-fill.



Fire-treated natural fibers or denim

Made from recycled materials such as cotton, sheep's wool, and straw, but require chemical treatment because not naturally resistant to fire, insects, and moisture.

Co-benefits to consider

A well-insulated roof helps keep your home warm in winter and cool in summer, which reduces the energy needed for heating and cooling.

Less energy used means spending less money on energy each year.

During very hot or cold weather, a roof that is well-insulated helps thermally protect your indoor space, keeping tolerable indoor temperatures for a longer time even if the power goes out.

Better for your health – formaldehyde and isocyanates can be harmful when breathed in, and VOCs can off-gas from building materials like insulation.

Typically most affordable and widely available option.

Lowest carbon emissions in manufacturing and highest percentage of recycled material option. ④

CA

Roofs

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

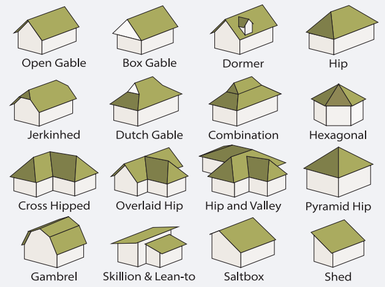
Roof geometry

What **shape** should my roof be?

Choose **simple**

Limit eaves and valleys that can accumulate debris and/or embers

Simple roof geometry options



Skylights

What if I want a **skylight**?

Choose a **fire-resistant** option

Skylights can be a weak point in roofs and allow ember entry. Make sure the design won't accumulate debris (like leaves) and avoid skylights composed of combustible materials like plastic.

Skylight options

Insulated glass skylight with tempered outer pane

And a laminated inner pane for containment in case of breakage.

Fire-rated product

Tested product

Consider where you place features and elements like skylights, gables, and vents when planning for PV, so you don't unintentionally reduce the number of panels you can install.

- **Generally less expensive** to build than more complex roof designs.
- **Reduced water damage risk –** better for drainage, less risk of pooling.
- **Rainwater collection opportunity –** sloped, streamlined surfaces of simple roofs facilitate more direct and efficient rainwater drainage.
- **Renewable energy –** A simple geometry can provide more space for and easier installation of solar panels. Think about the slope direction and sunlight access to boost the energy output of the panels.
- **Skylights can bring more natural light** into the house.
- **Operable skylights can help exhaust rising heat** from inside the home. **BUT, if operable,** provide a non-combustible 1/8" mesh screen or smaller (CBC 708A.2.2) and ensure it can be quickly and easily closed during fire weather so as not to allow in embers.

Roofs

Legend Savings Safer Sustainable

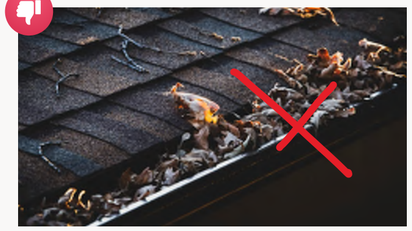
Design decisions	What improves fire performance	What your options are	Co-benefits to consider

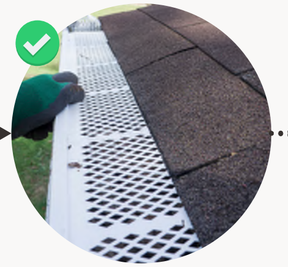
Gutter design

What should I do about **gutters** to improve fire performance?

Add metal **gutter guard**

Install non-combustible guards on your gutters to block debris like leaves from building up.





Metal mesh gutter guard

Note: these will still need to be checked and cleaned regularly. See **Maintenance** section.

- **Reduced maintenance and extended lifespan** - by blocking leaves, twigs, and other debris, gutters need to be cleaned less frequently and last longer.
- **Pest reduction** - the guard also helps prevent insects, small rodents, and other pests from nesting in the gutter system.
- **Less wasted water** for seasonal cleaning, spraying and flushing out gutter debris.

Choose **non-combustible gutter material**

Install non-combustible gutters made of **metal**, instead of vinyl or PVC gutters (which can catch fire).

Aluminum gutter

- **Longer lifespan** - aluminum gutters are more durable and can last twice as long or more as vinyl gutters.
- **Water retention on property** with direct gutter to planter irrigation strategy will help reduce runoff into the street.

Fireplace

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Fireplace

What if I want a **fireplace**?

Choose **electric**, because there's no chimney needed (potential entry point for embers)

Best option: electric

Electric fireplace

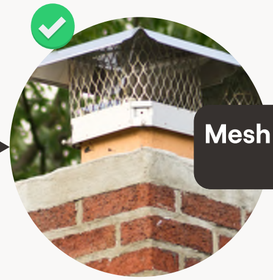
An electric fireplace is a heater that looks and feels like a real fireplace. It uses electricity to create heat with coils and LED lights to make flame effects.

- **Electric fireplaces don't produce smoke, ash, or soot** - which means healthier indoor environments and less pollution leaving your home.
- **No chimney means no heat loss through the chimney -** otherwise chimneys can be where desirable heat is lost or undesirable heat from outside can enter the home.
- **Easier** to clean, don't require fire wood or gas connection.
- **Much safer** given no open flames, smoke, or risk of carbon monoxide poisoning.

IF gas **OR** wood (not preferred)

Add a **spark arrestor screen**

Spark arrestor screens are mesh barriers that stop embers from a fireplace fire from getting out. Adding one here is to have a layer of defense against embers getting in, but note that the mesh isn't as fine as you'd really want for ember resistance.



Mesh between 3/8-inch to 1/2-inch

This mesh is **coarser** than what is used elsewhere to protect against embers (meaning it offers **less protection** against them) to ensure proper ventilation from your fireplace. Close damper during fire weather or after each use to protect against ember entry.

Screens & Vents

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Attic ventilation

What should I consider about **attic ventilation**? ⑥

In all cases, vents should be made of non-combustible materials, facilitate sufficient air flow (make sure airflow is not blocked), and be corrosion resistant.

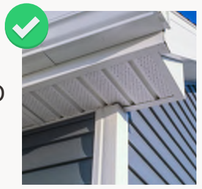
OR

Select **roof intake and exhaust** vents to be flame and ember-resistant

Attach **1/16 to 1/8-inch mesh** to the roof sheathing at the opening as an extra layer of protection.

AND

Design **soffit intake vents** to resist embers and flames



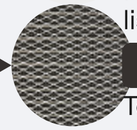
For inlet vents, soffit vents are better at keeping windblown embers out compared to gable end vents.

Select **roof exhaust vents** that are flame and ember-resistant

Intake-only options

California-approved vent

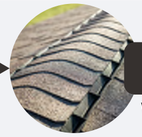
Pick a CA State Fire Marshall-listed product.



WUI vent

Tested to ASTM E2886

Exhaust-only options



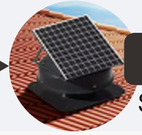
Ridge or off-ridge vents

With mesh 1/8 to 1/16-inch in diameter

Combo options

Turbine vent

Wind-powered



Solar vent

Solar-powered

VEVOR solar roof vent.
Image Source: Lowes / lowes.com

Solar vent drives attic ventilation when the roof heats up in the sun, to lower air-conditioning costs and reduce indoor residual heat.

Screens & Vents

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Wall vents

What about **wall vents**? (6)

i.e., foundation/crawl space vents at the lower section of walls, dryer vents, garage vents, etc.

→ Add an **ember-resistant metal mesh** over vents

Vents help with air flow and moisture control, but they can let in embers if the mesh isn't fine enough (the 1/4-inch standard is meant to keep out rodents).

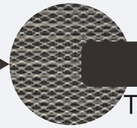
Use materials that resist corrosion and avoid fiberglass or plastic, as they can melt. Adding ember-resistant mesh won't completely remove the risk (so don't store flammable items near vents inside) but will lower the number and size of embers that can get in.

Wall vent mesh options

California-approved vent

Pick a CA State Fire Marshall-listed product.

Vulcan Foundation Vent. Image Source: Vulcan Vents / vulcanvents.com



WUI vent

Tested to ASTM E2886

For California Office of the State Fire Marshal approved building materials list, see:

2022 WUI Listed Products Handbook

AND

→ Keep area in front of and adjacent to vent(s) **clear of vegetation and debris**

See **Outdoors** chapter for more information on the first 5 ft around your home.

AND, IF POSSIBLE

→ Locate vents **away from prevailing wind direction**

To help reduce likelihood of embers being blown into the vents.

It's better for air circulation and quality if vents are not directly in the path of strong winds. Prevailing winds can create higher air pressure and bring in more dust every day.

CA

Exterior Walls

Legend Savings Safer Sustainable

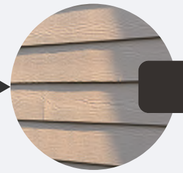
Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Siding

How can the **exterior walls** protect my home?

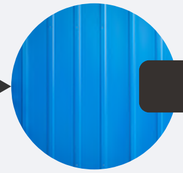
Select **non-combustible wall materials**

Common non-combustible walls



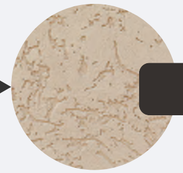
fiber cement siding

- **Low maintenance** - resistant to pests and rot.
- **Robust -** good performance in high winds and heavy rain.



metal siding

- **Recyclable**



three-coat stucco

- **Typically lowest cost option** and widely available in Southern California.

Make sure there is a weep screed (a special metal flashing) at the bottom of the stucco wall. This is critical for letting water escape that will otherwise cause damage.

IF NOT, AT LEAST

What about materials like adobe and strawbale? See **Green Innovations** chapter.

See additional considerations on the next page

Exterior Walls

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Non-combustible material is preferred for its fire performance. Ignition-resistant material and fire-retardant-treated wood need to be labeled for exterior use and meet other building code requirements listed in CBC Section 707A.3.

Choose **non-combustible wall materials**

IF NOT, AT LEAST

Select **ignition-resistant** or **fire-retardant-treated wood** and take other steps to reduce the risk of embers collecting by the exterior walls an igniting a fire ⑦

AND

Choose simple geometry

Limit re-entrant corners and projections that can accumulate debris and/or embers

AND

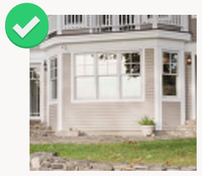
1 **Avoid re-entrant corners** that can collect debris

Simple floorplate (e.g., rectangular)

Corners where debris and embers can collect

Helpful for earthquakes – Simpler building shapes (without inside corners) have more straightforward load paths, reducing chances of structural failure during an earthquake.

2 **Avoid projections** with space below



Bay window built down to the ground

Space below bay window where debris can collect

Avoids creating a space where pests could nest.

Exterior Walls

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Exterior wall insulation

What type of **insulation** should I use?

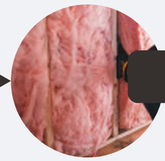
Choose **non-combustible insulation** or **fire-treated insulation** ⑤

Choose insulation with:

- **High performance** (the higher the R-value, the more insulating)
- **Low or no toxic substances** like formaldehyde, isocyanates, and VOCs
- **High recycled content** (e.g., at least 30%)
- **Nearby manufacturing** (shortening the travel distance – i.e., locally sourced)

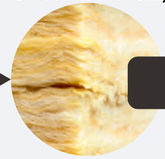
Avoid expanded foam (e.g., expanded polystyrene) insulation

Green insulation options



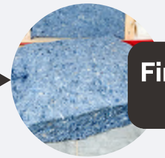
Fiber glass

Available in rolls (most common, batt) and in rigid panels (typically for placement at the outside of the exterior wall).



Mineral wool

Also available in rolls and panels.



Fire-treated natural fibers or denim

Made from recycled materials such as cotton, sheep's wool, hemp wool, or straw, but they require chemical treatment because they are not naturally resistant to fire, insects, and moisture.

- **A well-insulated wall** means less mechanical cooling and heated needed.
- **Less energy used means spending less** money on energy.
- **During very hot or cold weather**, high performing walls will help your home be thermally safe for longer.
- **Improves acoustic performance of exterior walls**, which is useful for privacy, especially when neighbors are close together.
- **Typically most affordable** and widely available.
- **Lowest carbon emissions in manufacturing** and highest percentage of recycled material. ④

Windows

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Glass selection

What kind of **windows** should I get?

There's a risk of windows breaking as a result of direct flame contact or radiant heat from nearby flames. Once broken, there's a clear path for embers and flames to enter the home.

Choose **insulated glass units (IGU)** with a solar control low-e coating

Glass is the most vulnerable part of the window, so you can improve the fire performance by selecting **insulated glass units (IGU)** (at least double-pane) with at least the outer pane being **tempered** (a particular type of heat treatment that strengthens glass). Note: single-pane windows would be virtually impossible for prescriptive energy code compliance anyway.

AND

See additional considerations on the next page

IGU with low-emissivity (low-e) coating

Example of etched label on the corner of tempered glass

High performing glass helps overall building performance (both heating and cooling). The air space and low-e aspect of the coating help insulate the window, slowing heat from entering or leaving. The solar control aspect of the coating helps reflect some of the solar radiation.

Less energy needed, less money spent on energy.

Solar control coatings also help cut down UV damage by blocking some UV rays. This protects things like curtains, carpets, and furniture, making them last longer.

During a heatwave, solar control low-e IGUs help keep indoor temperatures tolerable for longer.

Tempered glass is safer and stronger.

Insulated glass has better acoustic performance too, giving you and your neighbors more privacy.

Windows

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Frame selection

What about the **window frames?**

Select a robust **frame material**

The aim is to create a frame that won't quickly melt when exposed to flames or high heat. This will prevent it from deforming and causing the glass to break or fall out, which could allow fire to spread into the home.

Window frame options

Thermally-broken metal

e.g., aluminum

- **Less conductive frames help lower unwanted heat loss or gain** and **decrease the chance of condensation** (and risk of mold growth).
- **All of these options won't rot or get damaged by termites** (unlike wood).
- **Less prone to damange.**
- **Lasts longer** - less likely to change color or become brittle over time.
- **More sustainable to manufacture** compared to vinyl frames (in terms of chemical hazards during the process)

Fiber cement board

Mix of cement, sand, and cellulose fibers

Reinforced vinyl

Strengthened by metal insert [8]

- **Typically less expensive** than aluminum, steel-framed, or fiber cement board windows.

Envelope – Notes

1 More on Class A roof assemblies

It's important to **make sure that the underlayment meets the manufacturer's specifications** to ensure the entire roof assembly meets the classification (e.g., felt is a typical choice but combustible).

2 More on cool roofs

California Energy Commission
Note to meet the energy code (Title 24), most new single family homes in California are required to have cool roofs (the requirement applies to climate zones 4, 8-16, which roughly translates to non-coastal California). Look for a CRRC cool roof label to check code compliance.
https://www.energy.ca.gov/sites/default/files/2023-08/2022_Res_SF_Cool_Roof_ada.pdf

For more information on **cool roofs,** check out Cool Roof Rating Council's (CRRC) website:

Resources

3 More on barrel tile roofs

If barrel-design tile, block gap at roof edge that could catch embers with a "bird stop" (aka "eave closure"). This is also helpful in preventing nesting of birds, wasps, or other pests. Note that it is not uncommon for bird stopping to be skipped, installed incorrectly, or dislodged by birds, and flat tile roofs don't have the same vulnerability.

"bird stop" aka "eave closure"

4 Re: carbon emissions in manufacturing, what's embodied carbon?

Carbon Leadership Forum (CLF)
As Carbon Leadership Forum clarifies, "embodied carbon refers to the greenhouse gas emissions arising from the manufacturing, transportation, installation, maintenance, and disposal of building and infrastructure materials. Embodied carbon is a significant percentage of global emissions and requires urgent action to address it." Their website has a helpful Embodied Carbon 101.
https://carbonleadershipforum.org/embodied-carbon-101-v2/

5 Re: choosing green insulation

Environmental Protection Agency (2024)
The EPA outlined the following sustainability considerations in choosing insulation:

- "Greater thermal insulation values (R-value)
- Reduction/elimination of toxics (e.g., formaldehyde, isocyanates, some flame retardants) and volatile organic compounds (VOCs)
- Recycled-content
- Low embodied energy & greenhouse gas emissions
- Sustainable material sourcing (e.g., agricultural impacts or other natural resource use)
- End-of-life recycling or disposal options"

Many products have **Health Product Declaration (HPD)** documents, which may be especially helpful if your family is concerned about certain allergens.
Identifying Greener Insulation | US EPA

See Habitable's **guidance on insulation selection** to help find products that are safer for you, fenceline communities, and workers:

Insulation Product Guidance

CA

Envelope – Notes

6 **Re: vent requirements**

CBC Chapter 7A (2022)

The suggestions in this guide for choosing vents match the rules in Chapter 7A of the California Building Code (CBC). Chapter 7A is only necessary for buildings in the Wildland Urban Interface (WUI). However, since fires and embers can travel far, it is recommended that all homes being rebuilt due to fires in the Los Angeles area follow the advice in Chapter 7A. In simple terms: it's not mandatory for everyone, but it can help everyone lower the risk of wildfires.

7 **Re: exterior wall covering guidance**

CBC Chapter 7A (2022)

This guidance is consistent with CBC Section 707A.3: "The exterior wall covering shall comply with one or more of the following requirements, except as permitted for exterior wall assemblies complying with Section 707A.4:

1. Noncombustible material.
2. Ignition-resistant material. The ignition-resistant material shall be labeled for exterior use and shall meet the requirements of Section 704A.2.
3. Fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and shall meet the requirements of Section 2303.2."

8 **Re: vinyl window frames**

IBHS (2021)

IBHS's guidance document *Suburban Wildfire Adaptation Roadmaps* (2021)*:* "While glass has typically been found to be the most vulnerable part of a window, one exception is vinyl frame windows without metal reinforcement, where the vinyl frame can deform prior to the glass failing... Any window whose manufacturer produces an American Architectural Manufacturers Association (AAMA) certified window will have metal reinforcement that mitigates this risk as part of their certification."
https://ibhs.org/wp-content/uploads/member_docs/ibhs-suburban-wildfire-adaptation-roadmaps.pdf

Outdoors

Landscaping, Irrigation, Decks/Patios,
Fences, Driveways/Gates, Maintenance

Landscaping

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Immediate space around building(s)

How should I design the **first 5 ft** around the home? ①

The first 5 ft are a key buffer zone in reducing your vulnerability to fire.

Key action

Keep area **clear of combustible items**

It's common to have combustible items near buildings, such as wooden furniture, propane tanks, garbage, recycling, plastic garden sheds, or lumber. Make sure your design accounts for these items to be placed somewhere else.

Key action

Hardscaping around structures - no vegetation

Setback fire-resistant vegetation at least 5 ft from all structures.

AND, IF more than 5 ft available

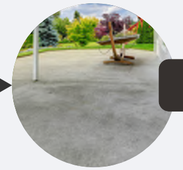
See additional considerations on the next page

Hardscaping options

Gravel

e.g., river rock, decomposed granite

Pervious pavers



Concrete

For all options, **choose light-colored or cool surfaces** to prevent heat gain.

Look for options with **high levels of recycled content**.

Avoid artificial turf. ⑦

Affordable and widely available option.

Lower embodied carbon compared to concrete given less energy-intensive to produce.

Pervious surfaces allow stormwater to infiltrate, supporting irrigation and reducing flooding.

The City of Santa Monica provides a list of approved permeable paving products, check out:

UR_Permeable(1).pdf

Affordable and widely available option.

Helpful on hot days to have light-colored or "cool" surfaces because they reflect heat from the sun instead of absorbing and releasing it.

Recycled content means less waste and more resource conservation.

Landscaping

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Selecting what to plant

And, what about **5 to 30 ft** around the home?

AND how do I plant them?

See spacing guidance on the next page

Key action

Plant **low-flammability vegetation**, spaced widely

WHAT IF I have salvageable trees already in this zone or want to plant trees?

Be careful with tree selection and trim low-hanging branches

DON'T select trees that are high in waxes, oils or resins (think Eucalyptus).

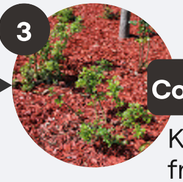
Low-flammability vegetation options

1.  **Fire-smart plants**

AND

2.  **Spaced out shrubs**

AND

3.  **Compost or heavy mulch**

Keep mulch 10 ft or further from structures to be safe.

Work with a **native plant nursery** to select diverse fire adapted species for the right zones and the right spacing.

Choose drought-tolerant plants.

Plan to regularly irrigate and maintain landscapes. Well-hydrated native California plants are the best because they have adapted to handle fire, and their roots stay hydrated.

For a great **resource on plant selection** (including selecting native plants), see defensiblespace.org**:**
Sustainable Defensible Space

Gardens provide habitat, shade, groundwater infiltration and many other benefits.

Mulch helps build soil and retain water.

Native options help support biodiversity and local ecosystem health (e.g., butterflies).

The California Native Plant Society provides an excellent guide for **fire recovery landscaping:**
CNPS Fire Recovery Guide

Certain ground cover can support soil and reduce the risk of erosion.

Lower the chance of wind-blown debris (like flying branches) by keeping trees healthy and well-maintained.

CA

Landscaping

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Deciding where to plant

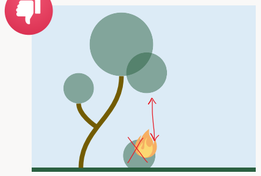
How should I **space** trees and shrubs? ②

Beyond the 5 ft from the home.

In general: design the landscape **for an amount of maintenance effort that is practical** for your household over time.

IF flat site
- **10 ft** between **tree** canopies
- shrubs spaced **2x their height**

IF sloped site
- **30 ft** between **tree** canopies
- shrubs spaced **3x their height**



DON'T create fuel ladders by planting shorter trees or shrubs under taller ones

Refer to LA County's Plant Selection Guidelines for placement do's and don'ts related to fire:

Plant-Selection-Guidelines.pdf

For more information - including balancing benefits and fire safety of shade trees - see CAL FIRE'S guidance:

Fire-Smart Landscaping For Enhanc Wildfire Safety | CAL FIRE

For more helpful images including how to **avoid fuel ladders**, see LA County Fire resource:

Forestry Fuel Modification - Fire Department

Shade trees help reduce ambient temperatures.

Consider hiring one landscape designer to look at your community to help supportively design whole ecosystem.

Irrigation

Legend Savings · Safer · Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Fire-safe and low-water

How should I **irrigate** my outdoor space?

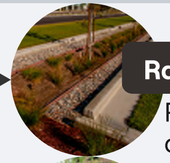
What about sprinklers inside my home? All new homes in California must have fire sprinklers installed (per CRC R313).

In general: landscape irrigation will reduce dried out vegetation and potential fire spread. These are sustainable irrigation options.

Infiltrate stormwater

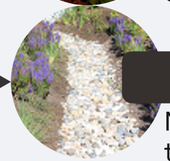
Allowing stormwater to soak into the ground reduces reliance on street drainage systems and can help prevent flooding.

Stormwater infiltration options



Rain gardens & bioswales

Planted depressions that absorb rainwater



Infiltration trenches

Narrow, gravel-filled trenches

Infiltration supports plant health, reduces stormwater runoff, and can contribute to recharging the groundwater supply.

Reducing stormwater runoff can help reduce flood risk at your property and in the neighborhood.

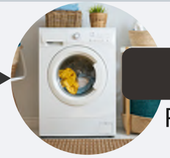
Helps reduce debris flows by increasing groundwater absorption, supporting healthy root systems.

AND

Reuse gray water

Reusing water from sinks, showers, and laundry for watering plants means using less water from the water district.

Gray water example



Clothes washer

Reuse lightly used water

Reduces water bills because less water is needed for irrigation.

Gray water lessens demand on water supply and wastewater systems.

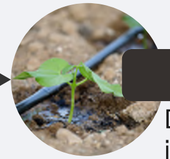
California law allows simple gray water systems from **laundry and shower** direct to underground garden irrigation. see LADWP website

AND

High efficiency irrigation

In selecting an irrigation system, look to reduce evaporative losses to keep your plants healthy with less water.

High efficiency irrigation



Drip irrigation

Drip or sub-surface irrigation helps reduce evaporation

Smart controls

Weather-based on timed

Rain Bird ESP-TM2 irrigation controller. Image source: Rain Bird / rainbird.com

Reduces water bills because less water is needed for irrigation.

Reduces water loss from evaporation and overshoot onto sidewalks and street pavement.

Irrigation

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Water source

What are options for readily available **water storage** to include in design?

Consider leveraging **water storage** when there is a fire alert to hydrate your property at fire notice

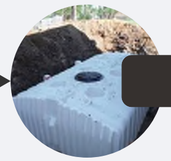
Do not stop evacuating if you receive a notice for your area. If the alert is to be ready for evacuation or a red-flag wind day, **use the water you have stored on-site** to soak your yard and possibly wet your roof.

Remember, this is about **using your stored water** so you don't pull from the larger water supply, which is needed for fighting fires.

Water storage options

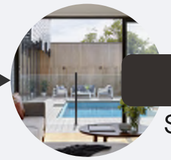
Rain barrel

Rain barrels are simple systems that collect and store rainwater from your roof. Given placement near the building (e.g., first 5 ft), ensure the barrel is not a combustible material.



Buried cistern

Underground storage tank that can be pre-filled with rainwater or municipal water.



Pool

Swimming pool

Many of these will require a hose hook-up to the pool pump or a portable pump to leverage as a fire prevention resource.

Consider: All water storage options come with additional maintenance requirements to ensure water quality and reduce biological- and mosquito-supportive environments.

Can help irrigate your yard day-to-day, not just an emergency resource.

Decks, Porches, Patios

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Outdoor space planning

Do I want a deck, porch, patio, or balcony?

IF YES

Material

What are my **material** options?

The danger with all these options is that falling **embers from above** can land on surfaces and start a fire that could endanger the home. Raised platforms like decks and balconies face an extra threat because **flames from below** can reach them.

AND, **IF** elevated (e.g., deck)

It's tricky to tell these terms apart! A **deck** is an outdoor platform that sticks out from a house, usually raised and not covered. A **balcony** is like a deck but smaller and usually on an upper floor. A **porch** and **patio** are generally at ground level. Porches are usually covered, which is what makes them different.

Choose a **metal structure** with a non-combustible walking surface

For example, aluminum or steel framing

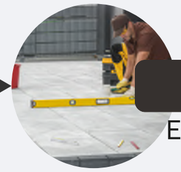
Or, if not elevated (i.e., porch, patio), consider non-combustible materials

For example, concrete, stone or brick

Have an **ember-resistant area below** any decks and balconies

The area below could be enclosed or everything below should be non-combustible (building materials and furnishings) with access for periodic weed management.

Common non-combustible walking surface options

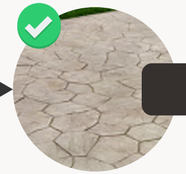


Tile

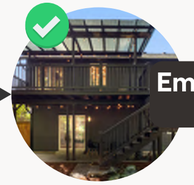
E.g., concrete, ceramic

Metal

In all cases, choose **lighter colors** for your built outdoor spaces to help keep the area cooler and **avoid combustible shade structures.**



Lightweight concrete



Ember-resistant area under deck

Accessible outdoor space can be good for mental health

Note: any **shade structures** should also be non-combustible.

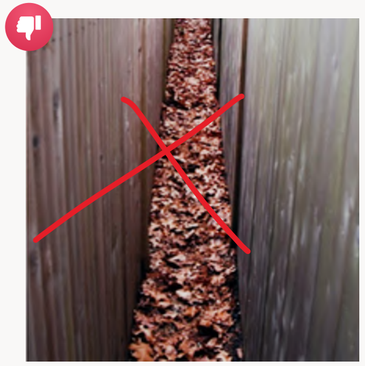
Fences

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Outdoor space planning

Do I want a **fence**?



If your neighbor also has a fence, avoid doubling up — this is an area that can accumulate leaves and other debris.

Choose a **non-combustible material**

OR

At least make any fencing within the first 5 ft of a building **non-combustible**

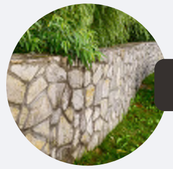
Note: this is less desirable from a fire standpoint. Better to select a non-combustible fence everywhere.

Fire resistant fence connection
Image source: City of Ashland / ashlandoregon.gov.

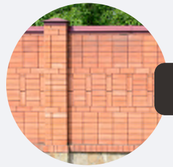
Common non-combustible fence materials

Metal → **Can be recycled**

Concrete



Stone



Brick

Stone + **Brick** → **Lower embodied carbon**

Fiber cement

In all cases, pick **local materials** as much as possible to reduce transportation-related emissions and support the local economy.

Driveways & Gates

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

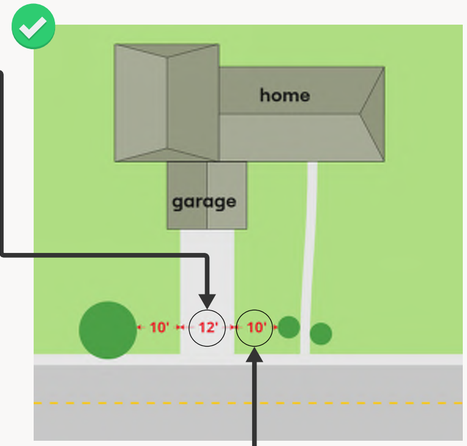
Emergency access

How can I help emergency responders **access my home**?

For material selection, follow recommendations in the **Landscaping** section.

✓ Design driveway with clearance of at least **12 ft in width** and **15 ft in height** ③

To help fire-fighting access.



✓ Create **buffer** around driveways and access roads ④

Don't plant or keep any combustible materials bordering the driveways or access roads.

✓ Make **identifying** your home easy ⑤

Make sure address numbers are easy to see from the street (like size, color contrast, and where they are placed) so emergency responders can find them quickly.

Driveways & Gates

Legend Savings Safer Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Gated homes

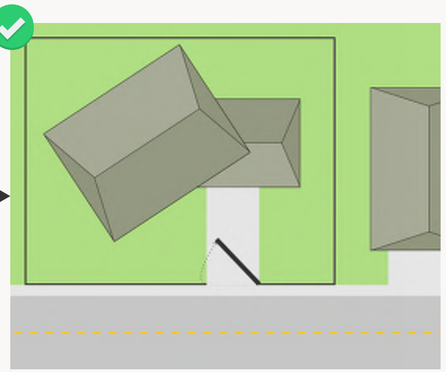
What if I want my **home gated**?

Gated communities

What if my **neighborhood is gated**?

Design gates to **open inward** (toward the property/away from the access road) [6]

This helps prevent the gate from being blocked by debris, such as fallen trees on the street, ensuring clear access for both entering and evacuating the property.



Inward opening gate

Place gates **30 ft** from roadway [6]

This could allow a fire truck to reach the gate without stopping traffic while it waits for the gate to open.

Outdoors – Notes

1. **Re: what to do within first 5 ft around buildings**
CAL FIRE
Aligned with many resources, CAL FIRE suggests: "use hardscape like gravel, pavers, or concrete. No combustible bark or mulch...limit combustible items (like outdoor furniture and planters) on top of decks. Relocate firewood and lumber to Zone 2." Not mentioned in decision tree but worth noting: "Consider relocating boats, RVs, vehicles, and other combustible items outside this zone."
https://www.fire.ca.gov/dspace

2. **Re: vegetation spacing**
CAL FIRE
CAL FIRE describes spacing of trees and shrubs on flat and sloped sites with helpful diagrams.
https://www.fire.ca.gov/dspace

For more information:

For a clear and beautiful guide as you're thinking about your outdoor space, check out Sustainable Defensible Space's **Wildland Urban Interface Wildfire Resilience Homeowner Handbook:**

Defensible_Space_Booklet.pdf

See TreePeople's guide to mulch:

Mulch & Protect & Grow. Report - TreePeople

For **native plant garden inspiration**, see the visual resource from California Native Plant Society:

Calscape | California's Native Plant Gardening Destination

For more on **soil and graywater**, check out TreePeople's research and resources:

Policy & Research - TreePeople

Outdoors – Notes

3 **Re: driveway clearance**

NFPA Firewise

These dimensions are per the Firewise Communities guidance listed on the Los Angeles Fire Department's website: "Make your driveway at least 12 feet wide with a vertical clearance of 15 feet and a slope of less than 5 percent to provide access to emergency vehicles."
https://lafd.org/safety/fire-safety/fire-what-to-do/how-have-firewise-home

4 **Re: buffer around driveways and access roads**

CAL FIRE

"Driveways and access roads: Clearance maintenance: Keep a minimum of 10 feet of vegetation clearance on either side of driveways and access roads."
https://readyforwildfire.org/prepare-for-wildfire/hardening-your-home/

5 **Re: making identifying your address easier for first responders**

IBHS

Per IBHS guidance: "9. Improve fire-fighting capabilities: Provide proper address identification. Choose numbers that are 4 inches on a contrasting background and/or reflective or illuminated. Place address numbers so that they are visible from the street and from both directions of travel."
https://ibhs1.wpenginepowered.com/wp-content/uploads/Wildfire-Ready-Home-Prep-Upgrades.pdf

6 **Re: gates opening**

IBHS

Per IBHS guidance: "Improve fire-fighting capabilities… If the property is gated, gates should open inward and be placed at least 30 feet from the roadway." If an individual property has a very long driveway, it is worth applying the 30 ft setback of the gate from the access road. This is less typical in a more urban/suburban context, so we've linked that recommendation more to gated communities.
https://ibhs1.wpenginepowered.com/wp-content/uploads/Wildfire-Ready-Home-Prep-Upgrades.pdf

7 **Re: avoiding artificial turf**

Although artificial turf can be attractive to reduce water use, it can get very hot in sunny environments (it doesn't cool like natural landscaping), its made from plastic (non-biodegradable), and can lead to chemical run-off.

FAQs:

? **What about back-up power for my garage door so I can evacuate when the power goes out?**

Senate Bill 969

In 2019, a law passed in CA to address exactly this issue. Now, all automatic garage doors sold and installed within the state are required to have a back-up battery.
https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB969

? **You didn't mention sealing around the garage door. Is that important?**

CBC 708A.4 Garage Door Perimeter Gap

Absolutely. Preventing gaps around the garage door to block the entry of embers is even mentioned in Chapter 7A of the California Building Code. We didn't spell it out here because the seal (a.k.a. door sweep) is pretty standard in new garage doors. Note that a well-sealed garage has other benefits like airtightness (helping reduce energy use) and keeping pests out (like mice).

CA

Building Systems

HVAC, Back-up Power, Solar

Building Systems

Legend Savings · Safer · Sustainable

Design decisions	What improves fire performance	What your options are	Co-benefits to consider

Indoor air quality

What should I look for in my new **HVAC**?

Consider taking a neighborhood approach in electrifying and/or equipment purchasing to reduce costs.

See **Community** chapter for more ideas.

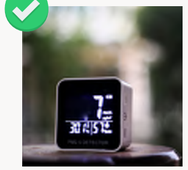
Integrate or add **air filters**

Choose higher performance air filters to integrate into HVAC system and/or have standalone air purifiers.

AND

Consider an indoor or outdoor **air quality monitor**

So you know when to run purifiers or change filters.

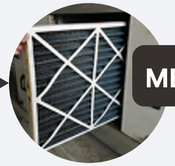


AND

Pick a **heat pump** for 2-for-1 heating and cooling

When you need to keep windows closed on smoky days, heat pumps can help you stay cool if it's hot outside. If it's cold, you can use them without adding pollutants to the indoor air.

Air purification options



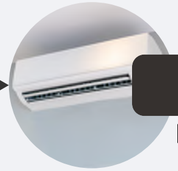
MERV 13 or better air filters

Standalone HEPA air **purifiers**

Heat pump options

Air source heat pump

Image: Cora Wyent



Mini-split heat pump

Ductless heat pump

Wait, what about geothermal heat pumps? See ① for an explanation for why geothermal heat pumps are not listed here.

- **Both help make the indoor air better every day**, even when there are no smoke events, creating a healthier indoor space.
- **Heat pumps are more energy efficient** than traditional gas heating systems because they use heat from the air around them instead of burning gas to create heat.
- **Better for your indoor air quality and better for the environment** to use electricity rather than burn gas in your home (reduced greenhouse gas emissions).
- **Cooling can keep you safe during escalating heat waves.** Heat pumps provide both heating and cooling.
- **Operational consideration: one system to maintain over time** (versus a furnace *and* air conditioner).

Note: By code, your new home must have heat pump connections (T24 Part 6: 150.0(t) requires heat pump space heater ready), so building all-electric is a way to save on gas connections.

Building Systems

Legend Savings · Safer · Sustainable

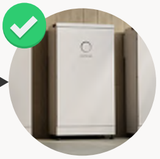
Design decisions	What improves performance	What your options are	Co-benefits to consider

Prepare for Public Safety Power Shutoffs (PSPS)

How can I be **ready for power outages**?

Add a **battery**

Like a panel battery system, so you have power available if the utility power gets disrupted. (By energy code, you need to be battery-ready anyway.)



There are multiple small residential battery systems on the market like Sonnen eco, LG Chem RESU, and Tesla Powerwall. ③

The sonnenEvo, an all-in-one, AC-coupled solar battery storage system.
Image source: sonnen / sonnen.usa.com

AND

Install **solar**

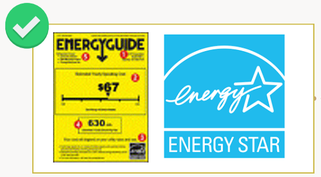
To charge that battery and extend its use. Note that most new homes will be required to add solar to comply with the energy code. ②

Solar panels can be installed on carports, on the ground, or most commonly on roofs due to cost, space use considerations, and best solar access. ④

AND

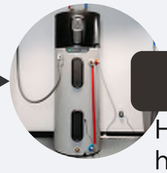
Pair with **efficient, all-electric appliances**

High-performing, energy-efficient buildings reduce the amount of solar and backup power you need (as does a high-performing envelope). In terms of efficiency, at a minimum, choose ENERGY STAR-rated appliances and systems.



Efficient, all-electric appliances

Induction cooking



Water heater

Heat pump or solar water heater

A heat pump water heater by A.O. Smith.
Image source: A.O. Smith / lowes.com

- **Keep food in your fridge/freezer from spoiling** by connecting to back-up power.
- **Keep lights on** (injuries during power outages are common) and/or air conditioning going.
- **Battery and solar** enables you to shift your energy use to times when energy is cheaper.
- **Solar energy is a renewable** energy resource.
- **There's no risk of a gas leak with an all-electric home.** Plus, post-earthquake, it will take time for the gas service to be restored (automatic shut-offs need to be reset at each home by the utility).
- **Efficient appliances save money.**
- **Improves indoor air quality** day-to-day compared to gas combustion alternatives; this can reduce asthma symptoms and asthma development in children.
- **No open flame** - cooking is the number one cause of home fires.
- **Increased heat production efficiency,** up to 3 times, as compared to burning gas.

CA

Building Systems – Notes

1 **Wait, what about geothermal heat pumps?**

Geothermal heat pumps use buried loops to exchange heat and are *very* efficient. However, they are expensive, and in Southern California's mild climate, they would take a long time to pay back. Additionally, there's risk of damage during their long lifespan because of the area's seismic activity. Air source heat pumps (ASHPs) or mini-split systems are likely a better, more cost-effective approach for single family homes in this area.

2 **Re: solar to meet energy code**

California Solar Mandate
As of January 1, 2020, new single family homes are required to add solar (with a few exceptions - like if your property is too shaded for any benefit). EnergySage lays this out in their great overview of the mandate: https://www.energysage.com/blog/an-overview-of-the-california-solar-mandate/

For more information:

Check out Rewiring America's heat pump guidance for homeowners, which includes **rebates, credits,** and a **contractor network**:

Rewiring America

For a well-laid out explanation of how electrified homes are **healthier**, check out the Building Decarbonization Coalition's resource:

switchison.org

3 **Re: back-up battery options**

Note that there are also **smaller portable batteries** - like Goal Zero, Ecoflow, and Jackery - that could be used to power small appliances or to charge devices.

Depending on the power draw of **medical equipment**, a battery can be a safe option. Unlike gas powered generators, batteries don't require to be run at a distance from your home due to pollution, noise, etc.

Also, **vehicle-to-home charging** is an emerging technology to watch. More electric cars are gaining the capability to power homes directly.

4 **Re: adding solar without compromising fire resistance**

Department of Energy
The DOE has recommendations around PV hardening, including choosing a Class A-rated PV modules system and placing inverters and batteries inside fire-resistant containers.
Solar Photovoltaic Hardening for Resilience – Wildfire | Department of Energy

CA

Green Innovation

Natural Materials, Pre-fab Approaches

Natural Materials

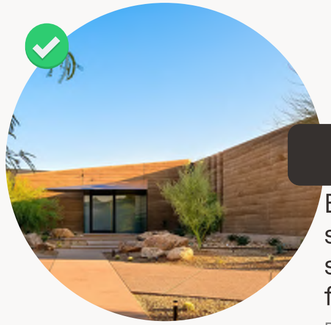
Consider using traditional natural and locally found materials for construction. Rammed Earth and Super Adobe, made from non-combustible materials, and Straw Bale, through being tightly packed and coated in plaster, can achieve a high level of fire resistance.

Co-benefits of all three of these options

- Buildings made from local natural materials like mud and straw have **less embodied carbon** from manufacturing and transportation.
- **Local materials can be cheaper** and more accessible than other materials.
- **Fewer toxic materials**
- **Resistant to moisture, mold, and pests**
- **All offer great insulation** to reduce energy costs (less heating or cooling needed)

Note: These techniques are considered alternatives to standard practice. It may take longer to gain approval from cities, insurers or lenders, and may be difficult to find knowledgeable local contractors who can provide quality design for local conditions.

These materials also may be heavier than modern building materials. Make sure to work with a **structural engineer** to reinforce systems to make them seismically sound.

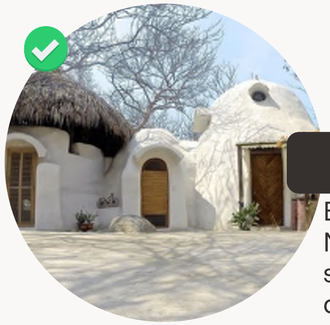


Rammed Earth

Building method using local clay, sand and gravel mixed with stabilizers and cured in formwork to form walls or other components

Dancing Light House in Paradise Valley, Arizona.
Image source: Alexander Vertikoff / dwell.com

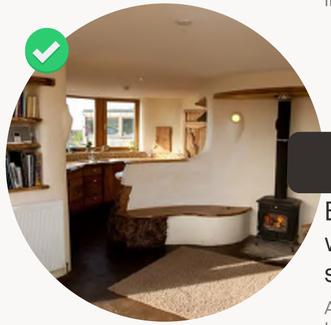
Rammed earth structures are durable. Structures exist that are 1000s of years old.



Super Adobe

Building method developed by Nader Khalili using earth-filled long sand bags and stabilizers coiled and sculpted into structures (1)

A SuperAdobe home at New Ruins permaculture project.
Image source: New Ruins / newruinsbeach.club



Straw Bale

Building method using bales of waste straw to form walls, structural systems or both

A straw bale home in Sligo, Ireland..
Image source: Steve Rogers / smallhouseswoon.com

Straw bale is an excellent insulator, protecting from extreme temperatures and increasing thermal comfort.

Straw bale is rapidly renewable, low embodied carbon, made from agricultural waste and is biodegradable.

Pre-fab

Legend Savings Safer Sustainable

Design decisions	What your options are	Co-benefits to consider

Pre-made Buildings

What if I **don't want to start from scratch?**

Pre-fab buildings or components can speed up construction and lower cost

Everything in this guide about flammability, placement and other attributes applies to these buildings. Steel and concrete are better options than wood - avoid kits that include wood siding, porches or exterior features.

Select models that meet **Passive House** or **LEED Zero standards** and/or that are all electric and high performance.

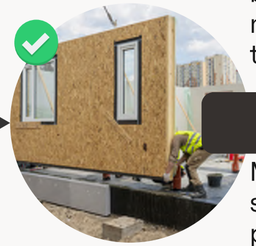
Look for models with **low VOCs** (volatile organize compounds) to protect indoor air quality.

Manufactured homes

Similar to traditional trailer homes but higher quality than in the past. Housing and Urban Development (HUD) federal standards apply that are less stringent than most state codes. These might be set up as a temporary home during construction, as a permanent ADU or as a main house.

Modular homes

Modular homes are built in sections away from the main site and can be arranged in various ways (unlike manufactured homes, which come as one complete unit). They are regulated by states and have stricter rules than manufactured homes. The approach typically allows for more customization.



Modular parts

Modular can also refer to components, such as prefabricated insulated wall panels.

Relevant to all three:

Prefabrication can be cheaper and faster than conventional buildings, potentially allowing a quicker return home in the context of a rebuild.

Off-site manufacturing in a factory setting **produces less waste** and can result in better construction quality (better controlled conditions).

High performance models can save money on energy bills.

Models that are manufactured locally **reduce impacts of transportation and support local jobs.**

Note that mobile homes built before 1976 are at higher risk of fire than conventional homes and should not be reused.

Green Innovation – Notes

1 **Re: history of Super Adobe**

CalEarth
CalEarth's website has a great description of Super Adobe's history and how it works.
SuperAdobe: Powerful Simplicity

For more information:

Check out this book on **Rammed Earth** and **Straw Bale** by Bruce King:

Buildings of Earth and Straw

For another resource on **Straw Bale**, see:

Ecological Building Network – The art and science of building well

For a helpful resource on **Super Adobe**, check out CalEarth:

SuperAdobe: Powerful Simplicity

Community

Resilient Communities, Trauma-informed Approach, Managing Fire Together, Shared Purchasing Power, Shared Energy Resilience

Resilient Communities

Getting started

- Start with your neighbors and people you know. See what they are doing.
- Reach out to local community, social, environmental, or other groups that do work in your area to see how they are organizing and how you can help.
- Reach out to your local jurisdiction to see what programs and efforts are happening in your area.
- Keep a shared contact list of people, organizations and resources.
- Don't assume it's already being done or that it is too late to start! You might just be what your community is waiting for.

Check out Firewise USA for community-scale toolkits.

See if you have a local Fire Safe Council.

Neighbors are key to disaster preparedness and response.

- They are close by and can be the first to arrive and provide assistance in an emergency.
- They know who will need help and who can provide it.

Communities are also key to building back better through recovery. They can:

- Support each other and heal
- Share experiences, stories, and culture
- Amplify each other's voices to demand action
- Create economies of scale
- Manage fire risk
- Build local resources
- Innovate and create

Community organizing can be a source of strength. That doesn't mean it's easy. Working with your community can take work.

The best solutions come from **strong, sustained and intentional commitment to a common vision**, enabled via clear, transparent and equitable frameworks for participation.

There are many guidelines and resources for how to do **equitable engagement**.

Other great **resources** include:

LA County Public Health Emergency Preparedness Response Program

LA City's LA Strong wildfire relief efforts

FEMA's Community Engagement Toolkit for Emergency Managers

Trauma-Informed Approach

Trauma is an event or series of events experienced as harmful or life-threatening that has persistent adverse effects on individual "functioning and mental, physical, social, emotional, or spiritual well-being."

Trauma is **normal** and common after disasters.

Trauma isn't limited to those who were directly impacted – **it can also impact those who respond, support and engage**.

Trauma has a range of symptoms, from anxiety, anger or jumpiness to upset stomach and trouble sleeping. Left untreated it can lead to PTSD. (see Common Reactions After Trauma - PTSD: National Center for PTSD)

Few of the professionals involved with disaster recovery – such as government staff, engineers, architects, contractors and others – receive any training in recognizing or dealing with trauma.

Mental health providers can offer support at both the individual and community level.

Having an **awareness** of trauma can help people make sense of what they are feeling and observing in others.

Community facilitators can help design **trauma-informed approaches to recovery.**

Allowing space for **collective storytelling** and experiences can allow for both individual and collective healing.

Community processes can enable collective visioning and set a foundation for a **more resilient and sustainable recovery.**

For more information **about a trauma-informed approach** check out:

Working with Disaster-Affected Communities to Envision Healthier Futures: A Trauma-Informed Approach to Post-Disaster Recovery Planning - PMC

Managing Fire Together

1 Work together to create **buffer zones and physical fire breaks** around the community.

2 **Help neighbors learn** about and use fire resistant design and construction.

California Wildfire Prevention + Preparation Transdisciplinary Studio course taught by Guillaume Wolf.
Image source: Juan Pasado / artcenter.edu

3 **Work together to actively maintain** vegetation, gutters, roofs and other spaces to limit fuel, such as by having community clearing days and helping those who don't have ability or resources to do it themselves.

Wildfire risk affects not just one property but the whole neighborhood. This means everyone needs to work together to manage it.

For more information about **banding together as a community** to reduce wildfire risk, see:

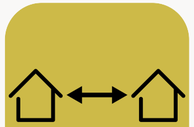
NFPA - Firewise USA®

Shared Purchasing Power

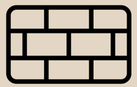
After the fires, many people will be rebuilding at the same time. That puts demand on local supplies and workforces and drives up prices. **Work together to leverage economies of scale** to help reduce overall costs.

Hire architects and contractors together to "mass produce" design and construction.

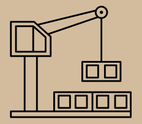
Share designs to streamline local permitting, especially for alternative approaches like rammed earth, super adobe and straw bale.



Maximize spacing between buildings to reduce the risk of building-to-building fire spread.



Purchase materials together, including building materials, fixtures, systems, and finishes.



Work with the same modular housing companies to enable establishment of local manufacturing and local jobs.

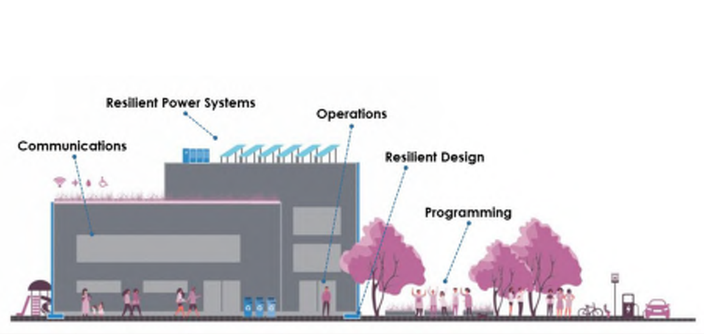
Consider sharing solar and battery installers. This can help you vet options and may lower costs.

Work with local native nurseries to bulk purchase plant material in advance.

Include diverse, fire resistant plants to support local biodiversity.

Shared Energy Resilience

Increases in extreme weather will put pressure on the energy grid. **Community-scale energy approaches can keep carbon emissions low while helping communities keep power when the grid goes down.**



An example of a community resilience hub.
Image source: Department of Energy and Environment / doee.dc.gov/

Community Resilience Hubs are facilities that provide resources to communities during emergencies. They can be equipped with backup power for things like heating and cooling during extreme conditions, device and vehicle charging or refrigeration during power outages.

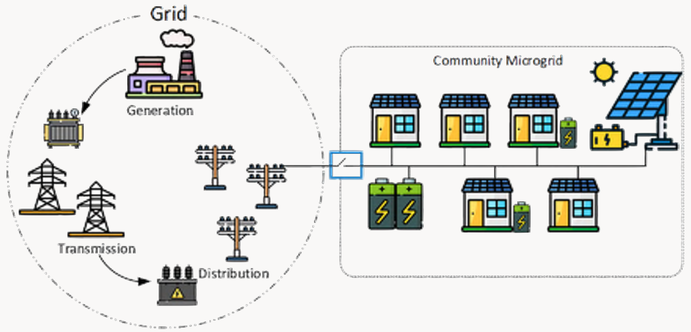
Good candidates are community centers, libraries or local community non-profits.

See resources from Urban Sustainability Directors Network:

Resilience Hubs

Zonal decarbonization refers to neighborhoods that together agree not to use natural gas, limiting the need for the utility to extend or maintain the gas infrastructure. Gas is highly flammable and contributes significantly to climate change.

Communities on the outer edge of gas service can be expensive for utilities to maintain. California SB 1221 requires establishment of zonal decarbonization pilot projects across the state.



A community microgrid.
Image source: RMIT University / communitymicrogrid.net

Community-scale microgrids allow communities to make the most of local clean power resources and disconnect from the grid to maintain power during outages.

They can be paired with local solar and zonal decarbonization approaches to create clean and energy resilient neighborhoods.

Note: These approaches require working closely with the utilities.

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California Wildfire Rebuilding Guide

A guide to rebuilding stronger, safer, and more resilient structures.

April 2025

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Learn more about USGBC-CA's Wildfire Recovery Resources

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