

# A HOME

# ADDITION



# WITHOUT SUBTRACTING SAVINGS

[www.sgvenergywise.org](http://www.sgvenergywise.org)

## What is an ADDITION?

*Is an addition the best thing for my home?*



*An addition is when you add new square footage of living (conditioned) space to your home.*

*For this handout, we will be looking at additions which are less than 300 square feet.\**

## Before planning your addition...

Room additions are usually not a first option due to cost and complexity. First, try things like reorganizing your home or even repurposing a room that is of little use. Repurposing is as simple as swapping out furniture and as extensive as a remodel.

### **Consider a remodel rather than an addition.**

You may ask yourself, "If I'm already going to do construction with a remodel, why not just build an addition?" It's important to know the difference.

Remodels deal with what is already there, without the need for new foundation or roof. Systems like electrical and A/C may not need to be altered. Building an addition can be like building a new home, new from foundation to roof and everything in between.

Also keep in mind the responsible use of resources. The combustion of fossil fuels to generate electricity is the #1 source of CO<sub>2</sub> emissions in the nation, 65% of which is construction-related.



Consider reconfiguring your home before adding to it.

\* For larger additions, more Energy Code requirements are involved.

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## *Building an ADDITION*

*How and where do I begin?*

When adding to your home, getting the right-sized addition is more important than having energy efficiency as your main goal to help you save money. Keep in mind you need a permit AND you must meet Energy Code minimum standards.

### **Possible Limitations**



Check with City Planning to define how much you can add. It would be based on the location, size of your home, and the size of your lot.

Check with the Building Department for energy, building, and fire department requirements specific to your area.

### **Professional Services**



If you get the “go ahead” from the city the next step is finding your team.

Cities may require the plans to be stamped and signed by design professionals. The services of an architectural designer, an energy consultant, and/or a structural engineer may be required. It is very important to find the ones you trust and who have good communication because “it’s a process.”

- The right team helps, define the right shape, location, orientation, style, and energy efficient features for your addition. They will help make the new and existing parts of the house correlate in a functional, efficient and cohesive way.

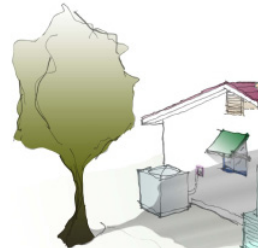
# A HOME ADDITION WITHOUT SUBTRACTING SAVINGS

*Get things right the first time around  
Choose what is best for your addition*

## Look at your home's SITE

For energy savings, first consider your home from the outside. Surprisingly, a well oriented and landscaped addition uses less energy by design. Avoid severe sun exposure and unnecessary heat gain throughout your addition.

- Give your home addition the best orientation by locating longer walls facing north and south.
- Limit hardscape near the addition (concrete and other impermeable materials) to reduce the "heat island" effect.
- Add trees to shade your home and outdoors.

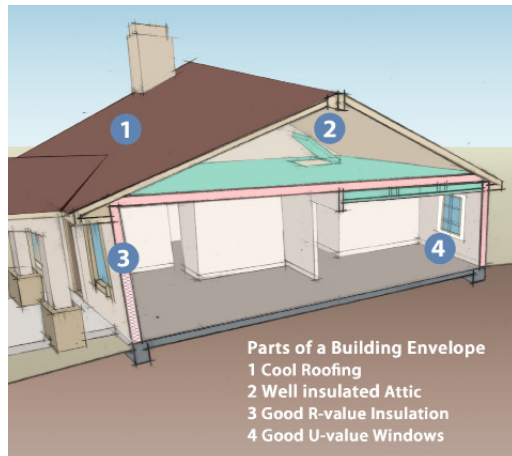


Use trees to shade your addition.

## Building Envelope

Moving our focus from the site to the home, use your home addition to regulate exposure to elements like sun, rain, and even noise.

The "building envelope" is another way of saying the shell or skin of the home. The parts that make up the envelope are the parts that keep undesired elements out and desired elements (like conditioned air) in. A good building envelope uses less energy by preventing energy loss. The following pages discuss the parts of the building envelope to consider when designing your addition.



Parts of a Building Envelope  
1 Cool Roofing  
2 Well insulated Attic  
3 Good R-value Insulation  
4 Good U-value Windows

# A HOME ADDITION

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*The important parts that make up the whole  
Of Your New Addition*

### Roof

The roof is your first line of defense to energy gain or loss to your home. Roofs get hot because they absorb the sun's energy so it is best to select a roof that reflects sunlight and doesn't store heat, known as "cool roof". California Energy Code recommends a "cool roof" but it is not required. Matching your home may limit choices but you will be surprised by the various "cool roof" products available.

#### Minimum Required by Energy Code:

- A Radiant Barrier is required to be installed below roof deck and gable ends. Roof sheathing for roof decks can be ordered with radiant barriers. It looks like aluminum foil on one side of the plywood decking.
- When adding roof insulation, a minimum of 1 ½" air gap must be provided from the radiant barrier to the top of the insulation for air to flow.



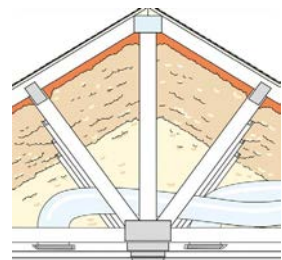
For more energy saving details, please see the handout **Cool Roof**.

### Attic

If attic insulation is placed under the roof sheathing, the attic is part of the conditioned space and A/C ducts operate more efficiently.

#### Minimum Required by Energy Code:

- Attic temperatures can reach 120 degrees, and the insulation at the ceiling joist becomes completely saturated with heat. Therefore: **Install R-30 insulation.**
- Airflow through the attic is critical in reducing heat buildup, requiring **inlet and outlet vents**. The number and size of these vents must be calculated.
- Seal all cracks: ceiling-to-wall and floor-to-wall joints.



Attic with insulation under roof sheathing increases duct efficiency.

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*The important parts that make up the whole  
Of Your New Addition*



Walls are filled with insulation designed to keep cool air in and heat out. The measurement of how well they do this is called R-value.

## Insulation

R-13 is required for 2x4 wood framing at 16" or 24" on center but we recommend an additional rigid insulation of R-5 continuous over the plywood sheathing for a total of R-18 insulation to increase the energy performance of your addition.

### Minimum Required by Energy Code:

- R-13 insulation minimum for 2x4 walls.
- R-19 insulation minimum for 2x6 walls.



For more energy saving details, please see the handout **Insulate**.



Just like walls, windows are designed to keep cool air in and heat out. The measurement of how well they do this is called U-factor.

## Windows

### Minimum Required by Energy Code:

- U-factor (Window Insulation Factor) of  $\leq 0.32$ , but remember lower is better.
- SHGC (Solar Heat Gain Coefficient)  $\leq 0.25$
- Maximum glazing area of new windows is 75 square feet.



For more energy saving details, please see the handout **Window**.

## Use the Sun

- **Daylighting** - Use sunlight to light the house by installing solar tubes and/or skylights.
- **Solar power** - If you have more than 250 square feet of roof area that faces south, west or east, consider renewable energy in the form of roof top solar panels.



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## *The important parts that make up the whole Of Your New Addition*

### Electricity

New electric wiring will be added to provide power and lighting to the addition. The existing wiring may need upgrading to cope with the power need of the new ADDITION.

#### Minimum Required by Energy Code:

- @ Bedrooms: Must be high efficacy lighting and must be controlled by vacancy sensor or a dimmer.
- @ Bathrooms: Must have at least one high efficacy luminaire and all must be controlled by vacancy sensors

NOTE: High efficacy luminaires (LED or Compact Fluorescent lights) must switch separately from low efficacy luminaires.



For more energy saving details, please see the handout **Electricity**.

### HVAC

**First**, about ducts: If you are extending less than 40 feet of ducts, no additional permit is required. If more than 40 feet, you must register with a HERS Provider Data Registry.

**Second**, if you are adding a new A/C system for your addition, select a high-efficiency A/C system that best meets your needs, and will help you keep your new addition cool with low energy bills.

- Get the right HVAC size. The size of your addition plays a very important part on the size selection of your HVAC.
- Have your HVAC contractor install and sign certificates of installation as required by Energy Code.

#### Minimum Required by Energy Code:

- Minimum SEER=14 is required



For more energy saving details, please see the handout **HVAC**.

# A HOME ADDITION

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## *The steps you need to follow*

*REPLACE, or ADD to your current system*

### What should YOU do when adding square footage to your home?



- Evaluate how much square footage you have and how much you plan to add.
- Assemble the right design team to design and prepare construction plans.
- Select the right **contractor** – one who is licensed and bonded.
- Submit **Certificates, Application** and **Plans** as a part of getting a permit from your local Building Department.
- Schedule **inspections** with your local building inspector to review paperwork including **certificates** and **work completed**. Inspections may include pre-inspection, tests, and final inspection.

### Things to consider

- Is your house historic? If so, some limitations and/or restrictions may apply.
- Do you live in a community with a HOA (Homeowner's Association)? Check for approval process and acceptable installation location or any other restrictions.

*Please make sure to review minimum requirements throughout this handout. For more details, please refer to accompanying handouts.*





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## Building Department Checklist

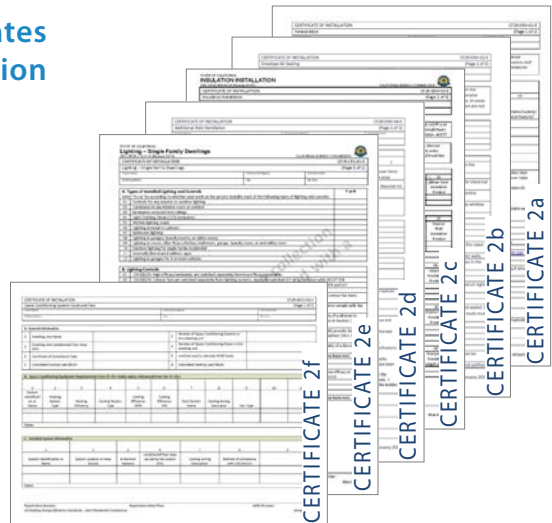
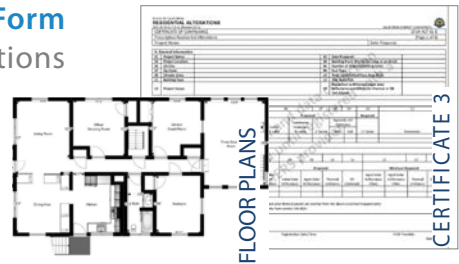
*Plans, Permit, and Inspection*

3. Complete **Certificate of Compliance Form CEC-CF1R-ALT-01-E: Residential Alterations for Lighting/Electrical Conformance.**
4. Construction Plans & Photos.

### For CLOSEOUT

TO COMPLETE THE PROJECT:

1. Schedule inspections with the City.
2. Complete ALL applicable **Certificates of Installation and Field Verification forms** such as:
  - a. **Form CF2R-ENV-01-E** for Windows.
  - b. **Form CF2R-ENV-02-E** for Envelope Air Sealing.
  - c. **Form CF2R-ENV-03-E** for Insulation Installation.
  - d. **Form CF2R-ENV-04-E** for Roofing.
  - e. **Form CF2R-LGT-01-E** for Lighting.
  - f. **Form CF2R-MECH-01-H** for Ductwork.



*Visit your local Building and Planning Department for very helpful information including specific requirements for permit submittal and approvals. Design approval submittal may be required.*

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Check out other improvement ideas...

**Electricity**

**Shade**

**Insulate**

**Windows**

**Cool Roof**

**Air Conditioning**

**Kitchen**



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