The Fuel of Our Homes – From Building Materials to Content

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Materials used to build a typical American single-family home

- Concrete Foundation
- Rough Framing
  - 2” x 4” Wood wall studs
  - 2” x 6” Wood floor Joists
  - Subfloors
- Roof
  - Structural panels
  - Roof covering
  - Insulation
- External Walls
  - Exterior wall covering
  - Sheathing (insulating)
  - Cavity Insulation
  - Gypsum wall board
- Internal walls
  - 2” x 4” Wood wall studs
  - Gypsum wall board

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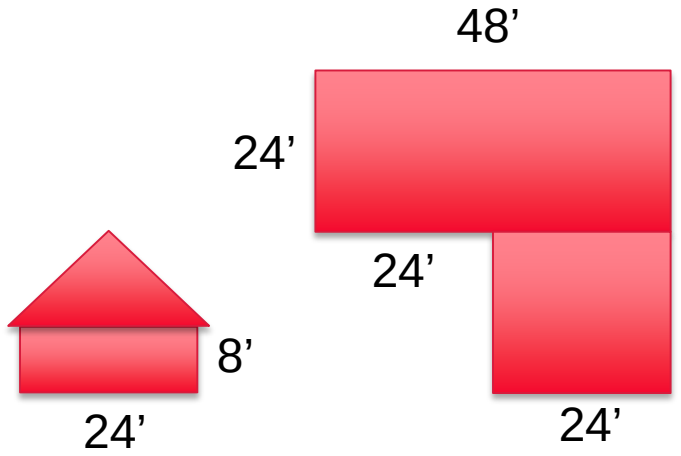
A simple house to use for estimating materials
This is a simplified example!

- Total living area 2,016 sq. ft. = 187 m^2
  - 1st floor 24’ x 48’ = 1,152 sq. ft. = 107 m^2
  - 2nd floor 12’ x (48’ + 24’) = 864 sq. ft. = 80 m^2 (includes space of garage)
- 2 car garage 576 sq. ft. = 54 m^2
  - 24’ x 24’ = 7.3 m x 7.3 m
- Roof pitch 45º
  - 1 ft. eave



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Rough framing

Lumber: A typical 2,000 ft^2 home uses approximately 16,000 board ft. = 38 m^3

400 kg/ m^3 = **15,200 kg**

Subfloors (OSB or Plywood): 2,016 ft^2 = 187m^2 Thickness ¾” = 1.9 cm

Volume = 3.6 m^3

Weight 680 kg/ m^3 = **2,416 kg**

External Wall sheathing Wood

1800 sq. ft. = 167 m^2

OSB or Plywood:

Thickness ½” = 1.27 cm

Volume = 2.1 m^3

Weight 680 kg/m^3 = **1.428 kg**

From Building America Solution Center
https://basc.pnnl.gov/

External Wall Sheathing Foam Board

1800 sq. ft. = 167 m^2

Polystyrene or Polyurethane foam

Thickness 1” =2.54 cm

Volume = 4.2 m^3

Weight 30 kg/m^3 = **126 kg**

External Wall covering

1800 sq. ft. = 167 m^2

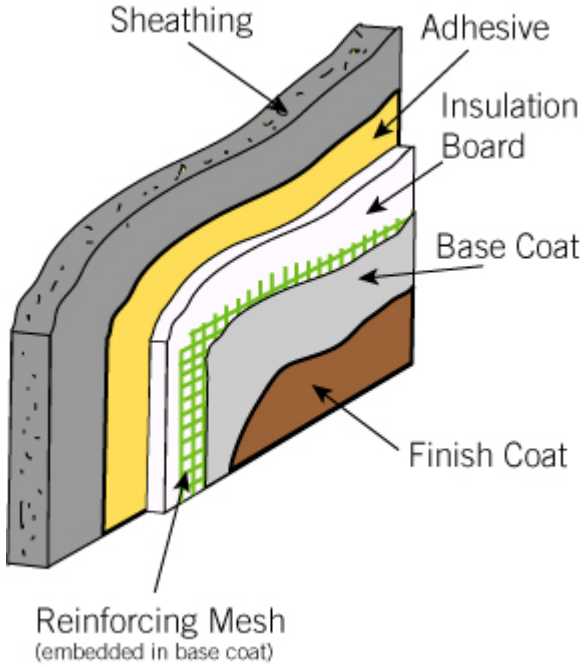
Wood, PVC, Stucco

Wood (1/2”) = **800 kg**

PVC (0.04”) = **300 kg**

Stucco – Traditionally Cement based

Stucco or EIFS (Exterior Insulation and Finishing System)?



Spray on Polyurethane

Cavity Insulation

External walls 1,800 ft^2

Towards attic 1,700 ft^2

Total 3,500 ft^2 = 325m^2

Thickness 4” = 0.1 m

Volume = 33 m^3

Polyurethane

Weight 30 kg/m^3 = **990 kg**

Fiberglass/mineral wool

Weight 30 kg/m^3 = 990 kg

3% = **30 kg organic binder**

Roof

OSB, Plywood, Fiberboard

2600 ft^2 = 242 m^2

Thickness ½” = 1.27 cm

Volume = 3.1 m^3

Weight 680 kg/m^3 = **2,108 kg**

Asphalt shingles

Weight 15 kg/m^2 = **3,630 kg**

Clay tile and metal roofs also an option

Potential fuel from the construction

- Lumber – 15,200 kg
- Plywood/OSB – 5,952 kg
- Wood siding – 800 kg
- Foam sheathing – 126 kg
- Spray on PUR – 990 kg
- Asphalt shingles – 3,630 kg

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Other potential fuels from the building

- Electric and communication cables
- Plastic pipes
- Floor covering
  - Wood, carpet, vinyl, tile
- Wallpaper, paints, varnishes and stains

What we put into our homes

- Upholstered furniture
- Mattresses
- Tables, desks, dressers, cabinets and bookcases
- Electronics
  - TVs, Computers, Tablets, Phones, Sound Systems
- Appliances
- Toys, books, clothes, decorative items

Upholstered furniture

Frame: Wood, steel, fiber board, plastic

Padding: Polyurethane, down, fabric

Covering: Leather, wool, linen, polyester

Weight: 40 – 200 lbs.

18 – 90 kg

Mattresses

Pure foam or Springs and foam.

Foam is made of Polyurethane.

Weight: 40 – 100 lbs.

18 – 45 kg

How much fuel from upholstered furniture in 3-bedroom home

	Number	Weight in lbs.	Weight in kg
King bed	1	100	45
Queen bed	1	80	36
Twin bed	1	40	18
Sofa	1	200	90
chairs	5	40	18
Total		**620**	**279**

Structure Fire

WUI Fire

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Thank you