SUSTAINABLE TIMBER FRAME LIVING

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Timber framing is one of the most sustainable building methodologies around. How sustainable your timber frame is depends on how you select your timber framer, how you specify your timbers and how your enclosure system is designed and installed. It is important that you select a framer that you are comfortable with and who supports your sustainability goals. It is also important that you ask questions throughout the design process to ensure adherence to your goals and a smooth project from start to finish.

So what is sustainable about timber framing? It all starts with the wood.

The Timbers

Wood is a natural, organic, non-toxic material; it is recyclable, biodegradable and waste efficient and it is renewable. These are important for a number of reasons. First, because it is completely natural, renewable, recyclable, biodegradable and waste efficient, the use of wood has very little impact on the environment. Second, because timber does not off gas toxins, it promotes a healthy environment in the home.

Wood is a carbon-neutral material. According to the UK Timber Frame Association, the average tree absorbs approximately one metric ton of CO_2 (carbon dioxide) for each cubic meter of growth and exhales 0.7 metric tons of O_2 (oxygen). The 'C' or carbon, is sequestered/stored in the tree for the life of the tree AND the life of the building it goes into. The carbon that is 'sunk' in the timber equates to about 1.6 pounds of carbon for each board foot of growth. When the timber frame reaches its useful life – in several decades - the wood can be recycled into new products, refashioned into new building material or burned as a substitute for fossil fuels. Calculating your carbon footprint is increasingly important as we all strive to deal with global warming. Ask your timber framer to provide the data for your calculations.

Sourcing new timber from sustainably managed forests has many positive effects on the environment. Specifying that your timber frame be made from wood sourced from certified sources is important. These sources include but not limited to: Forest Stewardship Council (FSC), SFI (Sustainable Forest Initiative), American Tree Farm, Canada's National Standard on Sustainable Forest Management Standard (CAN/CSA Z809) and Program for the Endorsement of

Forest Certification Systems (PEFC).

To varying degrees these third party certification organizations provide an impartial look at the management and sustainable practices in a particular forest. Obtaining certification means that rigorous standards are being followed in the forest; that no clear cutting has occurred and that forests are selectively harvested and replanted. This supports the health and continuity of the forest allowing it to exhibit healthy environments for wildlife and plant life and to preserve the soils and the land. It is also important for our collective carbon footprint. Young trees rapidly metabolize CO2. Selectively harvesting older trees and replanting with young trees makes for a healthy, vigorous forest.

Sourcing timbers from reclaimed or forest/salvaged sources. Reclaimed wood is derived from a variety of sources including: the dismantling of old, unused barns and other farm structures, the dismantling of unused factories and large commercial buildings mostly mills and war time factories and from submerged logs and structures. This wood has a patina that can only be matched with age and can be found in dimensions that are rarely found in today's forests.

Sourcing from standing dead forests creates demand for wood that has been water, disease or bug killed; wood that would otherwise rot in the forest releasing its carbon store to the environment. Harvesting this wood maintains that carbon store and creates open space for reforestation. Asking for visible proof (pictures) of the condition of the trees before using the timbers in a project allows you to see the provenance of the material and makes you feel more connected to the true nature of your frame – who knows, you might even be able to visit your timber as it stands in the forest.

Many timber framers source their materials locally. Making a concerted effort to use local vendors for all materials supports local economies and the overall health of communities. This reduces transportation costs and carbon loads and makes for a thriving, resilient community.

Sustainable Manufacturing

Timber frames are usually crafted and pre-fitted off-site in the shop, minimizing construction site waste and reducing construction time.

Timber framing contains low embodied energy. The energy used to transport, manufacture

and deliver a product, including the energy used for all of its inputs, is the total embodied energy in a product. Converting timbers into a frame takes far fewer greenhouse gases than mainstream alternatives such as stick framing and masonry construction. Depending on the methodology your framer employs to manufacture a frame (hand-cut, CNC machine, hybrid machine/hand manufacture), the total embodied energy runs the gamut of low to almost zero.

Many timber framers use low to no-VOC adhesives, finishes and materials. This has a direct effect on the indoor air quality (IAQ) of your home.

Timber frames are durable and have very long life spans. Choosing timber framing is a choice made for generations.

Highly Efficient Enclosure System

Many timber framers install a highly efficient enclosure system of Structural Insulated Panels (SIPS) or other system around the entire frame. The enclosure system provides a high R-value, vapor retardant and air tight envelope to reduce air infiltration, prevent heat loss and increase durability. This is extremely important to how your house works and can lead to substantial reductions in energy use when compared to traditional construction methodologies. Developing a good, solid, complete plan and having strong communication and partnership between your framer and construction contractor are vital to the success of your home's performance.

Enclosure systems are nearly infinite, some standards are: standard stick frame, double wall stick frame, SIPS, Insulated Concrete Forms (ICF) and in some regions, hay bale. Having shop drawings that include window and door penetrations, mechanical, electrical and plumbing chases and locations and wall layouts enable the entire project to proceed on schedule and without mistakes. Manufacturing and precutting at a factory can further reduce site waste and construction time.

Details should be included in the drawings regarding:

- Installation instructions for windows and doors
- Installation methodology and sealing of other penetrations such as vents and piping
- Rain screen specification and installation instructions that detail materials, fasteners, tapes and sealants, drain gap and lathing and siding installation.

Once the enclosure system is installed it should be tested at least once using a blower door (before drywall and any exterior covering) to ensure that any gaps in the envelope can be identified and sealed before becoming invisible under the finishes.

So what is sustainable about timber framing? Just about everything from the nature of the wood to how the structure is enclosed, by choosing to live the timber frame life, you are pretty sustainable too.

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