

Tiny houses for people with environmental illness



A tiny house is an alternative to a regular house or a camping trailer. It can be affordable and work well for people with chemical and/or electrical sensitivities, but there are some pitfalls.

Keywords: tiny house, healthy house, affordable house, chemical sensitivity, MCS, electrical sensitivity, environmental sensitivity

The tiny house movement

The tiny house movement started among people who wanted a simpler life that wasn't focused on making a lot of money to pay for expensive housing. This centered on the Pacific coast of the United States, where housing costs skyrocketed. The idea was to live in a trailer that was built like a house, but parked in someone's back yard.

Since it is a trailer, the technical requirements are fewer than for a house and it may be possible to park it where zoning forbids a permanent structure.

2 *Tiny Houses*

Some of these tiny houses do not even have a bathroom. This can work when parked in someone's back yard with access to a bathroom in the main house. Some tiny houses use a compact composting toilet to avoid installing a sewage line.

Hookups may simply be a long electrical extension cord and perhaps a garden hose. Some have tiny solar systems and use propane for heating and cooking.

The houses are indeed tiny, with typically about 150 sq. ft. (15 m²) of floor space. A sleeping loft and other clever designs maximize the use of the small space available.

One of the pioneers of the tiny houses built an 84 square foot (8 m²) tiny house out of real wood herself for just \$10,000. She limits her possessions to three hundred items, including socks and eating utensils (Estes, 2009; Williams, 2014).

Though the early tiny houses were mostly built by their owners, now there are several small companies specializing in building them in the United States, Australia and elsewhere.

Tiny houses for the environmentally sensitive

Tiny houses can also be used by people with environmental illnesses, whether it is MCS or EHS. Some were built already in the early 1990s, if not earlier. This author knows several people who live in a tiny house, or did at some point. See the link at the end for some of their stories.

The small space is a challenge for everyone, and there are some extra issues for the chemically sensitive.

Things that are not a problem in the larger airspace of a regular house may stink up a tiny house, such as:

- shoes
- clothes
- grocery items
- cooking odors
- books
- electronics

People with chemical sensitivities often need extra space outside the tiny house to store and outgas things. Extra space may also be needed for storing food items bought in bulk, if they are not readily available locally.

Large plastic crates can be placed under the tiny house or in a garden shed. Some people use large steel trash cans for storage inside their shed.

A shed can also be used for outgassing new items, paper, etc. It can be done using shelving or a "clothesline" suspended from the ceiling.

If you want to build a storage shed, the steel versions become inert much faster than those of plastic or wood products.

Cooking can be a problem in a tiny house as the odors will permeate the house. A range fan may not be enough. Some people cook outside or practice "low impact cooking" (no frying, low heat pot meals, sandwiches).

The limited table space may also require frequently moving materials back and forth, such as for eating a meal and working on projects. This can be an issue for some people.

Tiny houses tend to be poorly insulated to save weight and space. Together with lightweight materials, this means the inside temperature can vary dramatically between day and night unless parked close to an ocean. With the small space, it takes little to heat or cool the air inside, but the system will tend to cycle on and off frequently.

Other problems to consider

Many tiny houses feature a sleeping loft, which is accessed by a steep ladder. This can be a real problem for people with arthritis, fatigue, balance problems or other limitations.

Wheel chair users will have trouble navigating the small spaces, especially the tiny bathroom.

Most tiny houses are raised above the ground, so steps or a ramp may be needed.

A moveable home

A great peace-of-mind feature is that the tiny house can be moved if needed. If a toxic neighbor moves in next door so dryer exhaust and pesticides drift in frequently, the tiny house can be moved to a safer location. If you are parked where zoning doesn't really allow it, you can move if a neighbor calls the zoning department. If major renovations are taking place next door, such as repainting the facade, your house could be parked elsewhere for the duration. It may even be

4 *Tiny Houses*

feasible to move seasonally to a warmer winter location or a cooler summer location – or to escape wood smoke during the winter.



Tiny house made entirely of steel.

A moveable house can be built elsewhere and transported long distances to your site. Then you can hire people specializing in these homes rather than having to find a local builder who will have a lot to learn.

You don't need to own a truck to pull the tiny home. You can rent a truck yourself or hire someone to do the moving.

Once safely parked, the tiny house can be set on blocks and the tires taken off. This both protects the tires against decay from the sun (especially in a sunny climate) and removes their outgassing fumes.

The downside of a moveable tiny house is that a lot of the best/safest materials cannot be used, such as concrete and tile, because of the weight and the cracking during transport. More about this later.

Bathroom

Having your own flushing toilet is probably a necessity. A tiny house with no bathroom will only work if parked near a non-toxic bathroom, and those are very scarce. Even if one is available now, it may be difficult to find another one if having to move again.



All-stainless steel bathroom in an MCS tiny house.

Some tiny houses have a composting toilet to avoid needing a sewage line. The water from the shower and sink is then directed to a graywater system, though

many jurisdictions require a kitchen sink to be connected to a sewage system because of meat bacteria.

We do not recommend using a composting toilet. They are fussy and require a lot more cleaning and maintenance to be odor free. Make sure to thoroughly research the different models and be certain that the maintenance tasks are something you are able and willing to do on an ongoing basis.

Choosing the foundation

The most important decision is which type of foundation to use, as that impacts all other parts of the project, such as:

- cost
- the size and design of the house
- materials that can be used
- which building code to meet
- where the house can legally be placed

There are three basic types of foundations:

- site-built (fixed)
- skids
- trailer (wheeled)

The site-built option

A tiny house can be site-built instead of on a trailer. This removes the weight restrictions, so safe materials like concrete, tile and bricks are useable. It is then also possible to have better insulation and low-EMF features such as in-floor heating (concrete floor).

A site-built tiny house will probably need to conform to the regular building codes, which tend to be more stringent than for trailers (an exception may be to put in a big door and call it a "garage.")

It may not be legal to site-build a tiny house. Some zoning departments specify minimum sizes of houses. Also, zoning may allow only one dwelling per lot.

Call the local planning and zoning department for the rules. It may be possible to apply for a variance if you can demonstrate a special need with a doctor's note.

Building on-site means you'll need to find a local builder who is willing to work with your special needs. This may be difficult.

Building on wheels

The most common option is to build on wheels. Some people have ordered their tiny home from a specialist shop a thousand miles away and had it delivered.

The downside is the restrictions on the weight, which excludes some healthy materials (more about this later).

Building on skids

A third option is to build on skids. This means the house must be transported on a flatbed, which cost a lot more than towing it on wheels.

The benefit of this method is that the tiny house will not need to pass an inspection to be issued a license plate. Some of the earliest tiny houses for people with MCS apparently used this method to avoid any inspections.

Materials

Regular tiny homes are usually built of the same materials used in many regular homes, i.e. wooden studs, glued boards (plywood, OSB, etc.) and fiberglass insulation.

With such a small airspace, the choice of materials for the tiny MCS home must be stringent. It takes very little to stink up a tiny house. At the same time, many of the healthiest materials cannot be used because they are too heavy for a trailer, and they may crack when the house is transported.

This leaves out materials such as bricks, adobe, plaster and most ceramic tiles. Many tiny houses are built of wood, but even genuine wood is not tolerated by many people with severe MCS, and it requires occasional painting.

The walls and ceilings could be covered with gypsum drywall, possibly sealed with aluminum foil. Other options are magnesium boards, cement boards, aluminum plates or steel plates. Raw metal has an odor, so metal plates should have a surface treatment, such as anodizing, galvanizing or a safe paint. Genuine wood planks are tolerable to some.

The standard floor in MCS houses is ceramic tile, which won't work in a moveable house as they are likely to crack when the house is moved, or even when walking on the floor since it will flex a little. An alternative is a hardwood floor, especially

using genuine wooden planks. The typical "hardwood" floors are actually glued laminates, though they may be acceptable after several months of outgassing. Another option is traditional linoleum (most "linoleum" is actually PVC these days), though some people with MCS do not tolerate it.

Some people have a wooden floor which is then covered with an airtight membrane, such as polyethylene plastic or laminated aluminum foil. Porcelain tiles can be placed loosely on top, without any glue or grout (ceramic tiles are not strong enough). Loose tiles must be pulled up at least once a year for cleaning underneath.



The interior of the tiny home shown at the top of this article. It was built around 1990 and has a bathroom in the back. The inside and outside walls are all made of metal (we're not sure whether it is anodized aluminum or porcelain-on-steel).



Interior of a tiny house in Portland, Oregon. It is made of real wood and not toxic plywood, though the owner is not sick with MCS. Courtesy of Tammy CC By 2.0, commons.wikimedia.org).

It is best to choose materials that do not need toxic maintenance, such as paint. Otherwise it may be necessary to move away for several days, or much longer, when maintenance takes place.

Low EMF features

Consider installing outlets for wired internet and telephone near the bed and table. The other end of the cables go to a box on the outside. From there, the tiny house can be connected to wired services, if available, or to wireless antennas ("fixed wireless") which can safely be located away from the house.

The electrical box should be located furthest away from the sleeping area. Also take care in the routing of cables going from the breaker box to major electrical appliances, so they do not run next to where people sit or sleep.



Tiny house built of wooden boards. It was all non-electric and heated by a wood stove. Photo credit: Gary W.

People who are severely electrically sensitive could use a solar 12 volt DC system (no inverter) or no electricity at all. They could then cook with propane (several people with severe MCS have cooked outside for years).

A refrigerator could be placed in a nearby shed, and be either electric or gas (propane). Some people use ice chests.

A propane water heater could be placed in a vented closet (like usually done on commercial travel trailers), or in a shed next to the tiny house. An on-demand tankless water heater is much more prone to frost damage than a tank heater.

Heating and cooling is a large and complicated issue. Some people use a mini-split electric heat pump in their tiny house. Others simply use low-EMF model electric baseboard heaters, a direct-vent propane heater or even a quality wood stove. Hydronic heating with hot water radiators may work too, if the system is not too heavy. In-floor radiant heating is probably too heavy for a trailer.

A few people are able to tolerate a direct-vent propane heater or even a wood stove, but be careful! The ashes and hot metal do stink up a small room.

Holding tanks

Holding tanks for fresh water, gray water and sewage are standard in travel trailers, but not in tiny houses. They cost a lot of money and add a lot of weight. If you don't plan on using the tiny house as a travel trailer in multiple places, then you probably do not need the tanks.



Outlet for sewage water.

If you plan on living at a remote site with no utilities, tanks can be useful, though it may work better to have a larger water tank in a separate shed, with a small solar-powered pressure pump there as well. This setup is more protected against freezing and it may work better with a bigger tank if having water delivered by tanker truck. Placing the pressure pump in the shed omits the EMF issue and greatly cuts down on the noise (these pumps are very noisy).

Weight

When choosing/designing a tiny house on wheels, the weight of the materials is paramount. People have run into trouble where the house was getting to heavy for the trailer that was being built on, so they had to shed some materials and do some of the work after the trailer was towed to the site – i.e. it can't be moved again.

Make sure someone tallies up the total weight of all materials before starting construction, to be sure the underlying trailer can carry it.

Legal issues

There are still unresolved legal issues about tiny houses in some areas. Is it a "mobile home" or a "travel trailer?" If it is on skids and below a certain size is it a pre-fabricated shed?

These issues must be settled before construction starts, so the builder knows what rules apply. They can be quite different and encompass much more than just whether there are tail lights on the tiny house.

If the tiny house is on wheels, it must be inspected and issued a license plate before it can be towed on any public road (otherwise it must be transported on a flat bed). If it is on skids it'll be transported on a flat bed and need no license plate.

If the tiny house is site built, and not moveable, it may have to conform to regular building codes. Some building codes specify a minimum size of a house.

There can be problems finding an insurer that would take on a tiny house and insure it against fire, theft, etc. Make sure whoever transports the house has insurance that covers any damage in transit.

The designation can also be important for where the tiny house can be parked and lived in. Zoning in cities often specifies a single dwelling per lot. That would preclude adding a mobile home, while a travel trailer is usually fine – though ordinances often specifies it cannot be lived in. Breaking such a rule may work well for years if the neighbors do not complain, but someone new may move in one day.

A woman with MCS bought a tiny house made of porcelainized steel and placed it in her back yard as a safe bedroom. But the neighbors chased her out (Associated Press, 2008).

The pioneer, Dee Williams, also had zoning trouble for living in someone's back yard, but she got dispensation since she was a caregiver to her elderly neighbor (Williams, 2014).

Cost

We are familiar with the cost of two tiny homes, built within the last few years. They both cost around \$60,000 (USA). That is much cheaper than a purpose-built MCS house, but you also get a lot less for the money.

First of all, it is a tiny space. The cost per square foot (or square meter) is much higher than for a small house in a lower-cost area. In these two cases, the cost was about \$350 per square foot (\$3300 per square meter).

Secondly, a real house comes with a piece of land and the needed infrastructure, none of which are included with a tiny house. They can cost as much as the tiny house itself.

If you plan on living in someone's back yard, at a trailer park or similar place, then a tiny house makes a lot more financial sense than if you also have to buy land and bring in all utilities.

It can make good financial sense to buy cheap land in a rural area. Even more money can be saved by living in a rural area without electrical service, but you need to know what you are getting into ahead of time.

In the end, you may only be able to raise the money for a tiny home, even though a modest site-built home may be the most cost-effective.

Financing

Financing through a bank is difficult. Banks are generally very conservative and shy away from unusual projects as they can't gauge the risks so well.

If your tiny house is built by a shop that specializes in these things, a bank will be more willing to extend a loan than for anything more unusual. But it can still be difficult to find a bank.

You may have better luck with a private loan through your family.

More information

For other articles about tiny houses and trailers built for people with environmental illnesses, go to: www.eiwellspring.org/temporaryhousing.html.

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