.CAMPER VAN DIY BUILD PLANNING GUIDE.

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Content

1 INTRO

Planning the build of a DIY camper van is a crucial step in the journey of transforming a regular vehicle into a cozy home on wheels. This process involves careful consideration of various factors and elements, and its importance cannot be overstated. Here are several reasons why planning is essential when undertaking such a project:

1. **Budget Management**: Planning allows you to set a realistic budget and stick to it. By outlining the costs of materials, tools, and any professional help you might need, you can avoid overspending and ensure that your DIY camper van project remains financially viable.
2. **Design Customization**: A well-thought-out plan enables you to design your camper van to suit your specific needs and preferences. You can maximize space, include the features you desire, and ensure the layout is both functional and aesthetically pleasing.
3. **Safety**: Safety should be a top priority when converting a van into a camper. Proper planning ensures that you consider safety aspects such as weight & balance, gas systems, electrical wiring, structural integrity, and fire safety measures. This reduces the risk of accidents and ensures a secure living environment.
4. **Efficiency and Functionality**: An organized plan helps optimize the use of space and resources, making the camper van more efficient and functional. You can carefully arrange storage, sleeping quarters, and kitchen facilities to maximize comfort and convenience during your travels.
5. **Legal Compliance**: Many regions have regulations and guidelines governing DIY camper van conversions, particularly in relation to vehicle modifications and safety standards. Planning allows you to research and adhere to these legal requirements, preventing potential legal issues down the road.
6. **Time Management**: Effective planning helps you estimate the time needed for the project accurately. This prevents unnecessary delays and ensures that you can enjoy your camper van sooner rather than later.
7. **Resale Value**: Even if you have no immediate plans to sell your DIY camper van, a well-documented and carefully executed build can significantly increase its resale value. Planning ensures that your modifications are well-maintained and easily explainable to potential buyers.
8. **Personal Satisfaction**: Planning and executing a DIY camper van build can be a rewarding and fulfilling experience. Knowing that you've put thought and effort into every aspect of your home on wheels can enhance your sense of accomplishment and pride in your project.

(Use ideogram of van interior)

In conclusion, planning is an indispensable step when embarking on the journey of building a DIY camper van. It helps you manage your resources, ensure safety and compliance, and create a personalized and efficient living space that suits your needs and lifestyle. Proper planning not only makes the process smoother but also enhances the overall quality and success of your camper van conversion project.

We will look at all of these aspects and more!

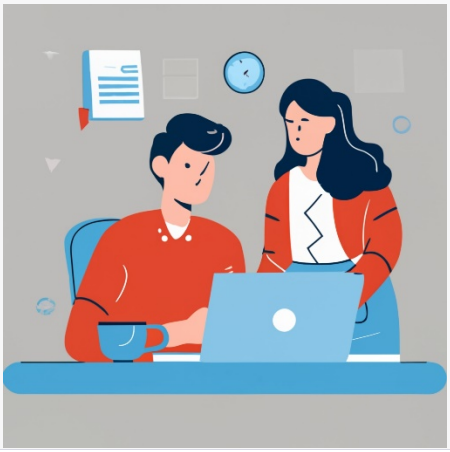
(Use ideogram of Ford Transit exterior view)

Building a camper van as a DIY project is achievable for the average person with the right planning, skills, and determination. It can be a rewarding experience, offering the opportunity to create a customized mobile living space tailored to your needs and preferences. However, it's essential to be prepared for the challenges and uncertainties that may arise during the process and to approach the project with patience and a willingness to learn.

END OF INTRO

2 WARNING

(Use ideogram of Taking Notes)



The information in this video and in the free guide is for educational purposes only. I take no responsibility for the design you will create and build. If unsure, please get professional help.

We have a lot of material to cover. To get the most of this video in the most efficient manner, I recommend that you pause and take notes regularly. It is easier than coming back to search for information at a later time.

Also I included a link in the description below this video for you to download a free PDF transcript of this video. It is yours absolutely free, no strings attached. Pause the video and grab it now. I'll wait.

3 HELPFUL TOOLS TO STAY ORGANIZED

As you research, investigate and make choices, I highly recommend that you write down and organize your notes and ideas. Otherwise the whole project will quickly become overwhelming. You could do it on paper or in a notebook. I personally find that a computer spreadsheet works much better because it allows you to add sub projects in between already planned steps. It also allows you to move ideas or steps around as the project evolves. Adding notes will also be easy. Under the heading Notes I include any idea, tip, website or video link, and potential supplier that can be useful later. Each line of the spreadsheet has a Notes field attached where I write down any of that sort of relevant information. Above all a spreadsheet will go a long way in keeping track of weight added and costs. You can plug those numbers in a column as you progress in the build and total them to get an instant idea of where you are. I have used **MS Excel** with pretty good results for my previous build and for my current build as well. We'll come back to that in more detail later.

Another helpful tool is **Notion.so** It is an online project management tool that you might find helpful to use in place of a spreadsheet or in parallel. The free access is plenty for our purpose. Like a spreadsheet you can total some of your columns to track added weight, cost, etc. The advantage of using Notion over a spreadsheet is that it might be a bit more user friendly and give you a head start.

A 3D design software will also be helpful in designing and visualizing your project. I use **https://sweethome3d.com** which is free. **https://www.vanspace3d.com** is another that you can purchase. These are not essential because in the end a van has complex shapes and you will need to build from actual measurements. As long as you can visualize your ideas, a drawing on paper could work for you.

Once we come to the actual design of our sub floor and furniture, a very useful tool to calculate how many sheets of plywood you will need is **cutlistoptimizer.com** Again the free version should satisfy your need. You plug in all your panels size and it will calculate the best placement on the stock sheets to minimize waste. You will also see how many stock sheets to purchase.

4 THE FIRST STEPS

(See Canva Infographics.)

Here we make our initial choices, preferences, and decisions. Write them down as you go. You will probably think of the different items below in a different order or of several more or less at the same time. Here they are:

1. **Set Your Budget:** Determine how much you're willing to spend on the project. This will guide your choices in terms of the van you buy and the method and materials you use for the conversion.
2. **Choose the Right Van:** Select a van that suits your needs and budget. Consider factors like size, roof height, make, model, age, mileage, and whether you want a new or used van.

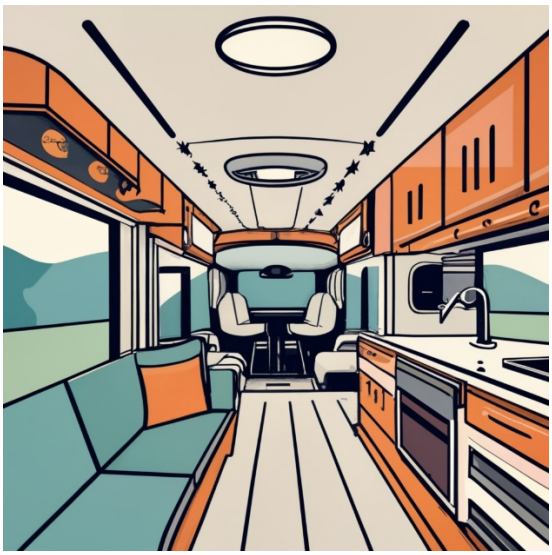
   Currently there are 3 main options for new vans: The Dodge Promaster, the Ford Transit, and the Mercedes Benz Sprinter. Only the Ford Transit and the Mercedes Sprinter offer some form of All Wheel Drive if that is important to you. It is to me because I live in Canada and I choose the Ford Transit, mostly because of a ten times larger dealer network across North America. Your options might be different if you live in Europe or Asia.
3. **Windows and Ventilation:** Where do you want additional windows for natural light and airflow. How big do you want them.
4. **Sleeping Area:** Plan for a comfortable and safe sleeping area. Depending on your design, this could be a fold-down bed, a fixed bed, or a convertible seating area.
5. **Bathroom Facilities:** Decide if you want a bathroom in your camper van. Options include portable toilets, cassette toilets, or even a full wet bath with a shower and toilet. Be aware that the complexity of your build will increase substantially if you want a fixed toilet and/or a shower. You'll need a larger water tank, certainly black and gray water tanks under the van and carefully planned water and moisture control. A leak can be a major disaster in a van. Again we'll talk about that in more detail later. Proper ventilation will also be a concern.
6. **Kitchen Setup:** Create a functional kitchen area with a stove, refrigerator (if desired), sink, and countertop space. Plan for storage of cookware and utensils. Decide if you want to cook with propane, fixed or portable, or with electricity. Will your cooking be done mostly outside or inside or both? Will you cook on propane or an induction plate. There are pros and cons for both, so do your research.
7. **Heating and Cooling:** Consider how you'll regulate temperature in your camper van. Options include diesel heaters, electric heaters, roof vents, and fans.
8. **Furniture and Storage:** Build or install furniture like beds, cabinets, and seating. Ensure they are securely anchored to the van's frame.
9. **Design Your Layout:** Plan the interior layout of your camper van. Consider the number of sleeping spaces, kitchen facilities, storage, seating, and bathroom (if desired). Sketch a floorplan to visualize the arrangement. At this stage it will be crucial to take into account weight and balance. (We'll come back to that later)

   You can do that on a piece of paper or use a computer software like VANSPACE3D.COM

Personally I use the free SWEET HOME 3D. All will require that you learn the software, so there is a learning curve to go through. As nice as these programs can be and so the images generated, I do not think they are indispensable. It is important to make your choices in advance and sketch them on paper but you can easily invest a lot of precious time generating nice 3D images instead of doing actual work. A van is a complex volume to work in and you will have to take all your measurements from the vehicle itself anyway. Do not trust software generated sizes and measurements. Of course the method you choose is up to you.

10. **Insulation:** Do you need to insulate the van to maintain a comfortable interior temperature? That depends where you live and where you intend to travel. Will you live in the van full time or just use it for weekend getaways and short vacation trips? I would recommend some form of insulation because a van can get extremely hot when left parked in the sun, and also extremely cold in winter without insulation. The ceiling is the most important part and I would recommend insulating at least that. We'll come back to that later in more details.
11. **Electrical System:** Do you need an electrical system? If you intend to run a fridge for more than a weekend then I would say Yes. This typically includes a leisure battery, optional solar panels, wiring, fuses and circuit breakers, lighting, and outlets for charging devices.
12. **Plumbing System:** If you plan to have running water, install a plumbing system. This includes a freshwater tank, a greywater tank, a pump, and a sink and maybe a shower.
13. **Safety Features:** Ensure your van is equipped with safety features such as fire extinguishers, carbon monoxide detectors, smoke alarms, and proper ventilation.
14. **Flooring and Wall Coverings:** Choose suitable materials for the flooring and wall coverings. These should be easy to install, clean and maintain.
15. **Exterior Modifications:** Make any necessary exterior modifications, such as roof racks, awnings, and bike mounts, to enhance your van's functionality. If you intend to leave the pavement then a set of all-terrain tires is a very worthwhile investment.
16. **Testing and Inspection:** Before hitting the road, thoroughly test all systems and components. Ensure everything works properly and safely.

5 PLANNING THE ACTUAL BUILD



OK, now that you have done some thinking, taken some notes, and you have a general idea of what you'd like, let's build that spreadsheet or Notion page. And the first thing to do is determine the order of the major building steps. Some people work from the bottom up, floor to ceiling, some from the top down, and some follow a more intuitive and less structured plan. All methods can lead to a happy ending. It just depend on your personality, talents, and inspiration. Personally I favor a top down method. But the reality is that things are not that clear cut. Before you do anything inside the vehicle you will need to have a fairly good idea of all the steps and of the general plan. You cannot insulate and panel the walls without first running the electric cables and maybe plumbing. That means you need to know where you will place your lights, outlets, and switches.

Listing The Main Tasks

Purchase your vehicle

As I said earlier, you will need the vehicle to take actual measurements. Do not build anything until you have the vehicle.

Roof Rack

If you plan to install solar panels or an awning, then building the roof rack is a good place to start your build. Once the rack is in place and the solar panels are mounted you can run the solar cables down into the van, down the wall to your planned electrical compartment. And if you later plan to install an awning then the rack will be ready to accept it.

Also, starting with the roof rack is a way to start building something without really doing anything to the van itself. It will help build up your confidence.

Roof racks can be purchased but they are a significant expense. With some careful planning you can build a nice aluminum rack at a lower cost. There are many resources

available online, blogs and youtube videos that will be helpful. Subscribe to my channel because I will video my roof rack fabrication.

As you can see the spreadsheet list the supplies required to install and wire the solar panels including price and weight.

Then we come to the fabrication of the rack itself. All the supplies are listed with all the necessary information.

So now you get the idea, how the spreadsheet is working. You can pause the video to copy mine if you like it. If you chose to use Notion the headings can be the same. In my opinion Notion makes it easier to move tasks up and down if you change your mind.

Preparation

Here is where you will determine what needs to be done to your van before you can start the build. If it's a used vehicle you might have to remove some previous additions, repair rust, clean, repaint, etc.

Cracks & Leaks

Vans can develop water leaks mostly from the roof panels fairly quickly. They have many factory holes that are normally plugged but can crack and leak. Before you do anything it is recommended to go over all the holes that you will not use and seal them with a quality sealant. Also closely inspect and fix cracks and possible defects in welds between roof panels.

Relocating wire looms

Moving inside, some vehicles will have one or more wiring looms that need to be relocated out of the way.

Locate Important Factory Mounting Points

Now is also a good time to locate the factory provided mounting bolts that can be useful to attach furniture and other heavy items like maybe additional batteries, water tank, etc. Make sure you can still locate these important mounting points after the walls are closed and comes the time to hang your furniture.

If you need extra seat belts, figuring and installing mounting points through the floor should be done now.

Soundproofing

At this point you can apply some form of soundproofing. The large sheet metal panels of a van can rattle and vibrate rather loudly at speed. Soundproofing will improve your driving comfort. Kilmat is often the default product used for that. It is self-adhesive and a small piece in the middle of each panel is all that is needed.

Sub Floor

If you travel in a warm climate, plywood right on the metal floor might be adequate. Otherwise I would recommend laying half inch or one inch wooden or aluminum cross-

members across the floor metal ribs, then placing rigid insulation panels in between the cross-members, covering everything with a vapor barrier if necessary, and finally laying a sub floor of plywood on top, glued or screwed to the cross-members.

DO NOT fill the gaps between the floor ribs with plywood or insulation. The spaces allow air to circulate under the floor. That prevents moisture from accumulating. Also, if you were to have a water leak, at least the water can find its own way down and away. If not, then the sub floor will have no choice but to soak the water. That will create a catastrophe.

Bed

There are several ways to build a bed. It can be fixed across the rear or lengthwise if you have a long wheelbase van, it can be a convertible dinette similar to what you find in many smaller RVs, or it can be some kind of hide-away like a Murphy bed, or lift up bed. There are manufacturers of bed kits for vans but it is likely to be cheaper to build your own.

Ceiling

Like the walls there are many ceiling choices from precut to custom made. Tongue and grove is again a popular choice for the ease of installation since ceilings in vans are usually curved both side to side and also front to back. Check other youtube channels for ideas and inspiration.

Framing

Once the location of your windows, skylights and or ceiling fans is decided you can have a pretty good idea of how you will frame the walls and ceiling, basically much like a house. Wood is the material of choice, generally strips of plywood. Keep weight in mind and avoid using too heavy two by fours. I would recommend using factory holes as much as possible, inserting T nuts or rivet nuts, rather than self-tapping metal screws. By drilling additional holes in the structure of the van you will weaken it. You will also create potential rust spots, and you could also accidentally force a screw into an electrical wire harness, antenna cable, etc.

A note of caution: Before you drill or cut holes anywhere in your van you are well advised to consult the manufacturer's Body & Equipment Mounting Manual. You will find critical information on weight distribution, no drill zones, and much more. You should be able to find a version online. It is tedious reading but it can save you from making a major mistake.

Another point to keep in mind is that glued joints are the strongest. Do not rely only on screws, mostly to secure heavy equipment, and that's basically everything in your van like ceiling, walls, furniture, water tanks, extra batteries, and more. Once you are sure that a task is complete undo the bolts, apply a proper adhesive to the parts to connect,

apply a threadloc compound to the bolt thread and re-assemble. The last thing you want in case of a crash is for your upper cabinets to come off the wall and fly at the back of your head. Enough stuff will come flying and create a very real danger. So again, make use of the factory provided mounting points.

Electrical

Now you need to think of your electrical requirements and define where you need 12V DC (Direct Current) power, as well as AC (Alternating Current – 110V or 220V depending where you live)

Your fridge will probably run off 12V, so will all your LED lights. You probably want to place a few cigarette lighter-type and USB outlets to charge your electronic devices.

If you plan to cook with an induction plate, that will need an AC outlet. Another AC outlet should be near the kitchen countertop for a toaster, water kettle, etc.

At this point you need to decide where you will place your home battery or batteries, inverter, solar charger, etc. These and the fridge can add significant weight to your design. Place them where they will help balance the weight of your water tank for example. Also place all the heavy equipment close to the floor, and on or forward of the rear wheel axle. This will help keep your vehicle balanced and safe.

The main electrical panel is generally installed near the home battery, accessible but out of sight. Anywhere is fine.

Once you decide where things will go, draw it on paper. Link the 12V appliances to the home battery with a red line. Link the 110V AC appliances to the inverter with a black line.

You will probably run these lines in the ceiling and up and down the walls. All the cables will have to be run before you close the walls.

Consider researching your local building codes and regulations. Usually nothing says that you have to follow them but they are in place to prevent accidents and injuries. If you follow your local building code you know that your installation will be as safe as possible. Your state or province will have some kind of Homeowner Electrical Wiring Guide available online. If you are not confident then hire an electrician to do the electrical part for you. We will come back to each section in more detail later. If you are confused now about the electrical wiring that confidence might come later.

Walls

This is when you decide how you will finish the walls. You can get pre-cut plywood panel kits from various van companies. You can purchase plywood and cut it yourself. Be aware that there are no straight surfaces and lines in a van. You will have to make templates with many cuts and bends. Errors can be costly. Many people opt for tongue and groove paneling. It is easier to cut the pieces one by one, and it is also easier to make them follow the curved walls.

Some people finish the walls completely, then they won't need a back to the cabinets. Others prefer to build cabinet boxes, install them, and then finish the walls only in the visible areas. It is really up to you, though I prefer to first finish the walls completely. That way if one day I need to remove a piece of furniture I have a finished wall behind it, not a big hole. It is smart to plan right from the start that one day you might want to do a reno or make changes. It will be easier if each piece is a stand-alone removable piece, rather than a part of a jigsaw puzzle.

Flooring

Again you can apply flooring to the whole van floor and place your furniture on top. Or you can save the flooring and apply it only in the visible areas between the furniture.

The second option makes more sense to me because a bare sub floor is easier to glue wooden pieces to, in order to affix furniture or other items. You will also save weight by not having flooring in the cargo area, in the cabinets, etc. You will also save money since you will need to purchase less square feet of flooring material. This gives you the option to buy better flooring.

If you will go for a laminate floor, placing it between furniture pieces and not under, will allow it to shift a little with the changes in temperature and moisture. Otherwise it might buckle and get damaged. And you will have to first remove your furniture to replace the laminate floor. Again plan for future renos and changes.

Furniture

Here you need to decide how much storage space you need. The options are about the same as in a house, a kitchen cabinet under the sink, maybe overhead cabinets, a wardrobe. As we said before just be cautious of the weight you are adding, mostly if it is up high. Try to keep added weight close to the floor and spread as evenly as possible front to rear and left to right. I would use upper cabinets only if absolutely necessary and only keep light items in them like cloth, dish rags, etc. Keep heavy items like food cans, tools, camera gear, in lower cabinets. In case of a collision they are less likely to become a loose missile.

As far as construction there are many options. Some people use flat-pack pre-made furniture. Ikea is popular. It might not save you as much work as you think though because the walls of your van not being straight, you will have to trim the side panels of the furniture to make them follow the contour of the walls.

If you decide to build the furniture from scratch which is probably the best option, the most common material is plywood. It is stronger, lighter, and looks nicer than particle board or MDF. Choose a cabinet grade plywood from a specialty supplier. It will cost a bit more than from a home hardware store but it will be a better plywood. The large home hardware store carry construction grade plywood which is not suited to make furniture.

You can finish the plywood with a varnish or paint. Another option is to start with a laminated plywood. It will cost more but come pre-finished on both sides in a variety of looks and colors. Once you piece of furniture is cut and assembled it's done. No sanding and no painting.

At the early stage of your build all you really need to decide is where you will want furniture. The rest can come later. Then you can also choose drawer slides, hinges, etc.

If you do not feel confident building furniture, you can find pre-made units from a few van companies but those tend to be quite expensive. You can also get a professional cabinet maker to build it for you. The cost will also be significantly higher. You will also have to make sure that that person understands the necessity for a lightweight but strong design.

As you design your van remember to think about one or more tables to have your meals, work, read, etc. It can be helpful to design a table that can serve more than one function. You can get various types of table mounts that allow you to remove the table and place it somewhere else in your van, others that swivel like the popular Lagun mounts, some where the table slides in a sort of rail then lock, there are folding table legs, and more. Do a search on Amazon and get inspired.

It is commonly said for a good reason that in a van each piece should have 2 or 3 functions. Be creative!

Be careful with kitchen countertops, there are many beautiful options out there. But they are meant to go in a house not a vehicle. Some can be very heavy and are to be avoided for that reason.

Plumbing and Water

There are several ways to build a plumbing system.

First, ask yourself if you need only cold water or hot water as well. A hot water heater will complicate your installation but might be unavoidable if you install a shower. Otherwise it is easy and quick to heat water in a pot for washing yourself or doing dishes. Hot water heaters can run off propane or AC electrical power. Your electrical system must be sized to handle the power demand.

A simple way is to have running water is to have a jug under the sink and a foot pump. No electrical wiring is necessary. This is a good solution for weekend escapes or short camping trips.

A water tank inside the vehicle and electric pump is a common solution. The 3rd option is to place the tank under the vehicle. This will require a more complex installation and drilling through the floor. The tank won't take valuable space inside the van but water could freeze if you use the vehicle in winter.

Water tanks come in vehicle-specific shapes to fit around the rear wheel wells, and in a variety of sizes.

Carry the necessary hoses and adaptors to refill your tank at campgrounds and gas stations.

Fuel pumps require a 12V supply and also come in a variety of output pressure and volume of water. Keep in mind that the higher the output and pressure, the quicker you will drain your water reserve. Plan to have a switch to be able to easily turn the pump on and off. I like to even use the on/off switch to trigger an electronic timer for 5 or 10 minutes. The reason is that it is easy to forget to turn the pump off after using it. If there is a leak in your system, the pump will turn itself on and off in an attempt to maintain pressure in the line and compensate for the leak. If you are away from your vehicle or driving, you might not notice the pump turning on and off. When you finally do it will have pump water that will have inundated your vehicle. Water damage is not something you want to have to deal with. Cheap electronic 12V timers are available on Amazon. Set a delay long enough for a shower if you have a shower or long enough to do dishes. I set mine to 6 minutes. You can always start it again if you need more time.

On the topic of possible leaks, I like to paint the floor under the water tank and under the sink, where the risk of a leak is higher, with a coat of epoxy. If there is a leak the wood won't soak the water and get damaged, giving you a chance to spot the leak and dry the area.

There are several ways to connect your water appliances. You can use flexible food-safe tubing, probably the easiest to run through or along your walls. If you have longer runs then PEX B tubing is another alternative. It is a bit more rigid but still easy enough for a DIY installation. I prefer to run my water lines along the walls behind furniture rather than inside the walls. They are less likely to freeze in the winter and are more accessible in case a repair needs to be made.

Talking about freezing and winter, remember to plan a way to drain your water system at the end of the season or in case you need to make a repair.

If you do not want to carry drinking water separately then I recommend some sort of water filter to make sure that the water you drink is safe.

Somehow you will need to collect the waste water from your sink, shower, etc. This water is called grey water and it cannot be disposed of carelessly on the ground under the vehicle. You can install a grey water tank under your vehicle and empty it at a dump station, or you can simply collect it in a 5-gallon jug under the kitchen sink if you do not have a shower to worry about. That jug can be emptied in a toilet or a dump station in a campground. I recommend using biodegradable soaps and detergents.

If you install a toilet you will also have to think of how to dispose of the waste. That depends on the type of toilet.

Cooking in your van

There are basically 2 ways: with propane or with electricity.

A portable propane camp stove allows you to cook either inside or outside the van and does not require a permanent installation. A fixed propane stove will take counter space whether you use it or not, and it will require a propane tank and some kind of propane tubing to connect the 2. A pressure regulator will also be necessary. It might be safer to have a professional handle that part of your build for you.

Induction cooktops are very popular these days. They do not present the risks we all associate with propane inside a vehicle. They can be fixed or portable to cook outside. The drawback is that they are power-hungry and will be used for a fair amount of time every time you cook. You will need to size your inverter, batteries, and solar system accordingly. That can increase the cost of your build significantly.

Others Items

Consider these items too:

Awning, window covers (insulated or not), bug screens for doors and windows, Shower curtain if you plan an external shower, recovery gear if you plan to go off highway, camping chairs, set of hand tools, etc.

You will need to plan storage for these items.

If you are into outdoor sports plan to store your equipment as well like snowboard, bike, etc.

Do not forget to keep track of the weight you add to your vehicle, and keep in mind your safety driving with these items behind you.

6 CONCLUSION

By now your spreadsheet, or whatever system you are using, should be quite full with all the different categories we have covered, plus all the info you collected researching each one of them as we progressed down the list. As you read, watch videos, you can collect more information and tips in your spreadsheet. You might want to also collect links to videos that will be useful when you come to a specific part of your build. Whatever useful information should be recorded in the order it will be needed. It will save you time later and will help you build a better camper.

Next we will revisit in more detail each block of the build, so stay tuned!