

Utilities

Basic infrastructure offered by the camp

- Water / Showers / Kitchen
- Power / Solar Power
- Camp Bike

Water / Showers / Kitchen

Basic Facilities

Showers

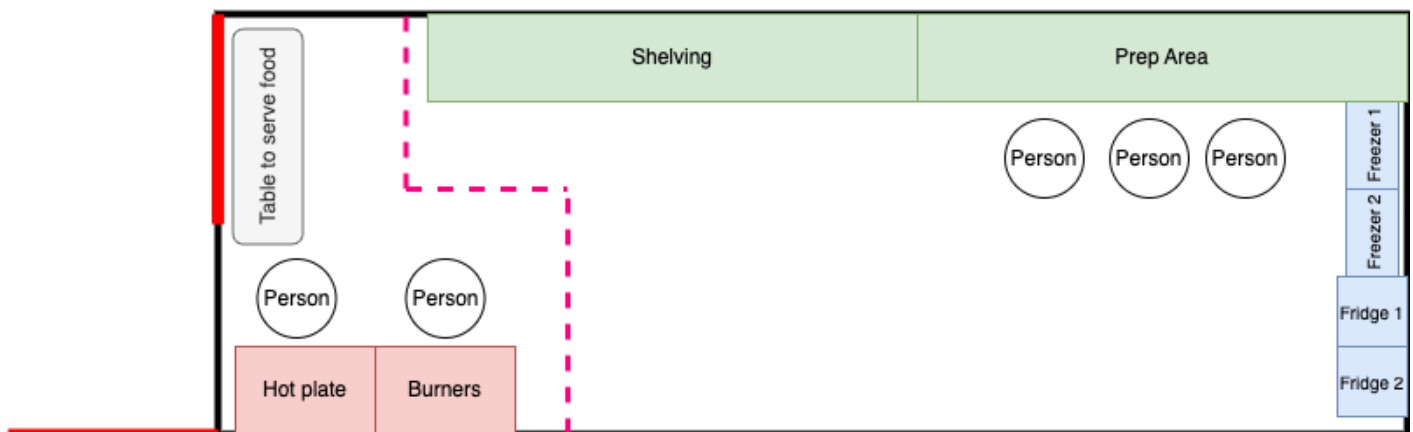
The camp has two wooden showers which worked quite well in previous years. Campers are asked to use biodegradable soaps only, and are also asked to follow a specific shower protocol.

Kitchen

The camp has two sinks, one for washing dishes and one for dispensing water into water jugs (for drinking). Dishes are washed using two sets of spray bottles: One with a vinegar solution, and one with clean water.

Kitchen Container Layout

Proposed camp layout - Work done by Aric Fedida & Neil Tygar:



How we handle water in general

You can survive burning man without power, but you definitely can't survive without water. The welcome staff will reject you at the entrance if you do not have an adequate amount of water with you (which the org sets at 1.5 gallons per day). **To be on the safe side, we go with 2 gallons per camper per day.**

We bring a bunch of 5 gallon jugs of water with us in our camp van when we enter BRC, but that's just backup (self reliance baby!). What we actually do is purchase water from a water vendor. They show up and drop a large 500 gallon water tank at our camp at the beginning of the event, and fill it with drinkable water. We then drop a pump into the container which pumps water to our kitchen, an outside sink for general refill of water bottles, and to our showers.

The Math

For 75 campers camping for 7 days + 2 days build (9 days total), we need this much water:

$$75 \text{ people} \times 2 \text{ gallons} \times 9 \text{ days} = \mathbf{1350 \text{ gallons of water}}$$

A 500 gallon tank will last:

$$500 \text{ gallon} / (75 \text{ people} \times 2 \text{ gal/day}) = \sim \mathbf{3.3 \text{ days}}$$

This means we would need to refill our 500 gallon tank every 3rd ~ 4th day depending on consumption.

Our water vendor

The water vendor supplies the tank and the water, but not the pump. We will need to purchase a pump that can run directly off of DC power (it's more efficient when you don't use transformers).

<https://mecoreno.com/reservations/>

Note: Deadline for reserving water from MECO is August 1st.

BM Resources / Useful links

<https://burningman.org/event/preparation/playa-living/water/>

Gray water disposal

What we did in 2023

Drinking water: Our camp had a water vendor drop a large water tank at the start of the event, which they also filled with potable water. We covered the black tank with a large piece of Aluminet to keep it cool. It worked well.

Gray water: Last year we built an evaporation pond using a large black tarp and some wood as the frame. We also placed 3 tables inside the pond, with pumps pumping gray water onto the tables and the idea was to accelerate the evaporation process. A rough estimate is that the pond helps evaporate roughly half of the gray water, however we did not have a gray water tank and due to the rains and mudpocalypse the entire thing ended up failing, with the remaining un-evaporated gray water mixing with the rain water and escaping the pond...



We we want/plan for 2024

We are considering having permanent tanks for potable water and gray water. The camp does not produce black water and getting rid of gray water is significantly simpler, especially considering our gray water is biodegradable (vinegar and biodegradable soaps being the "worst" molecules in the water).

To ensure microbes and mold do not grow in our gray water tank, we could use any of the following options:

1. **Vinegar:** A natural disinfectant, vinegar can help prevent the growth of bacteria and mold in gray water tanks. It's biodegradable and safe for the environment.
2. **Baking Soda:** This is another natural product that can help maintain pH balance in the water, discouraging microbial growth. It's also harmless to the environment.
3. **Hydrogen Peroxide:** Used in a low concentration, hydrogen peroxide can serve as a mild sanitizer and disinfectant for the water without causing harm to the environment when released.
4. **Citric Acid:** A natural preservative and antibacterial, citric acid can be used to control bacteria and mold growth. It's biodegradable and commonly used in septic treatments.
5. **Eco-friendly Tank Treatments:** There are commercially available tank treatments designed specifically for gray water systems that are biodegradable and non-toxic. These often contain a blend of natural enzymes and beneficial bacteria that break down organic matter and reduce odors without harming the environment.

Power / Solar Power

The promise of Solar Power

When we hear the word "solar," thoughts of "green energy" and even "free energy" often spring to mind. Yet, it's important to recognize that solar power systems can be costly, and the return on investment isn't immediate—especially compared to the low costs of grid-supplied electricity.

At Burning Man, however, the situation is quite different. Here, there is no grid. The predominant sources of power are gasoline-powered generators. Some camps deploy massive, industrial generators that are not only expensive to transport but also consume large quantities of gasoline. Unfortunately, these generators contribute to environmental pollution through noise, odors, and harmful emissions.

In the unique setting of Burning Man, adopting solar energy offers a distinct advantage. Solar power provides a quiet, clean energy source that doesn't emit noise or pollutants. This means it can be set up anywhere, allowing participants to enjoy their music and conversations without interruption. Moreover, solar energy enhances self-reliance—a crucial benefit, particularly in hypothetical apocalyptic scenarios where gasoline might become scarce. Unlike gasoline, sunlight is an ever-abundant, freely available resource.

BMORG Pressure

The BORG is applying gentle pressure on camps to give up their gas based generators in favor of solar power. It is not a hard requirement, and in my opinion we should always have generators as backup (because things can break), but seeing as we already have a solar power system, we might as well continue using it and even slowly expanding it to more reliably cover 24 hours of power for the camp.

How it performed in 2023

Let's just start by saying it's a good thing we had backup generators, for several reasons:

1. We miscalculated our power draw, and due to the radio station we operated, as well as a massive antenna covered in LED lights, we drew more power than originally anticipated.
2. The weather got weird and we had clouds & rain, which resulted in the now famous mudpocalypse.

However during the sunny days of the event it performed fantastically well, and we enjoyed noise-free days (as well as the knowledge and satisfaction of knowing we were getting ample power from the sun!).

During the day, our battery bank was being charged while the panels powered several air conditioning units, a small ice making machine, a charging station for phones & batteries, lights, fans, and god knows what else (and I say this because on various occasions, some people just plugged in their tent A/C's etc.).

Some key facts from 2023:

- The peak output from the panels was 5kW/hr. Theoretical max is about 5.3kW/hr and about 6.5kW/hr with bifacial gain.
- The average daily energy produced was about 27kW/hr. The best days (no dust storms or clouds) were 33-34kW/hr.
- The batteries would last until about 4-5am on days with less than max production.
- Some days we filled the batteries by 11am, and had lots of potential energy not collected.



Seen above is a team of 5 people who spent almost an entire day cumulatively, to build the frame that holds the solar panels, so they can be properly mounted (and not blown away by the winds, which can get pretty strong in BRC).

The finished product:



Existing hardware

The camp currently owns the following hardware:

Item name	Description	Quantity
445W Solar Panels Data Sheet	Canadian Solar High Efficiency 445W Mono Bifacial Solar Panels	12
Solar Panels Mounting Kit	Solar Mount & Racking (Array Tilt = 30deg) Constructed using 1/2" Galvanized Pipe & Fittings	TBD (need to count @ storage)
Solar Inverter User Manual	6kw 48v 120/240vac inverter MPP Solar LVX6048 (mounted to power board with dc and ac distribution panels, Solar disconnect, fuse blocks, battery bus bars, etc)	1

Genmax Generator <u>User Manual</u>	Genmax 6000iED Inverter Generator. This Genmax can supply split phase power directly to the solar Inverter if the batteries run low, and charge up the batteries as well.	1
Honda Generator <u>User Manual</u>	Honda 3000is Generator Power for furnace, fridge, most 13,500 BTU RV AC units, & more. Super quiet & fuel efficient, Electric start, Inverter (stable power for computers), CO-MINDER: advanced carbon monoxide detection system.	2
EVE LF-280K Batteries <u>Vendor Link</u>	EVE 280Ah Prismatic LiFePO4 Cell: This battery is widely used in electric vehicles, electric motorcycles, solar power, energy storage, etc.	12

New hardware requirements for 2024

Mounting kit

Jack is proposing we purchase mounting equipment from this company <https://integrarack.com/>

Their mounting mechanism makes it quick and easy to install solar panels. Their products can be purchased here:

<https://solarpowerdistributors.com/product/ir30-ballasted-ground-mount-racking-system/>

Jack estimates around \$1500 for the full kit.

Extra Batteries

While we do not plan to run a radio station in 2024, I still think we need to expand our battery bank if we want to run 24/7 with not ever needing to start an ICE based generator. I do think we should bring them with us, as an emergency, but ideally we should be able to avoid using them throughout the entire length of the event.

Conclusion: What we need to purchase

To bring the system up to spec, we'll need to purchase the following items/products:

Item name	Description	Quantity

Camp Bike

Intro & Required reading

Black Rock City is vast. While you can explore it on foot—and I strongly recommend dedicating at least one full day to walking, as it offers a unique and immersive experience—the convenience and speed of a bike provide unmatched freedom of movement.

Definitely read this page:

<https://burningman.org/event/preparation/getting-around/bikes/>

Bringing vs. Renting

You have the option to bring your own bike, but many campers choose to rent one from the camp instead. The camp offers a selection of bikes in different conditions for rental. Renting a bike is a convenient option if you prefer to travel light and helps prevent bikes from being abandoned on the playa by those who can't take them back home.



The bike team

The camp's bike lead and a bike team handle our bike, including fixing the bike during the event (and by the way they are awesome!).

