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## The Self Sufficient Pod

Brenna Merola

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**THE  
SELF SUFFICIENT  
POD**



**AUTHOR:** BRENNA MEROLA  
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SYRACUSE UNIVERSITY SCHOOL OF ARCHITECTURE  
THESIS PREP  
NOVEMBER 12 2015

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# THESIS BOOK PUBLICATION



# CONTENTION

For the past five years civil war has erupted in Syria facilitated by armed conflict causing many Syrians to flee the country. Protests began in 2011 against Syrian President Bashar al-Assad's government. His forces responded with violent crackdowns which continually spiraled into prominent protests and armed rebellion. The US and Russia have been backing different sides of this war escalating the violence in Syria. Waging war between the Alawite government forces, Shia groups, and Sunni rebel groups has been over control of the population. About 7.6 million Syrians have been internationally displaced causing disruption to the immediately surrounding countries. Millions have been subject to poor living conditions and shortages of food and water.

Several international agencies and private entities have sent aid to Syria and its surrounding countries. Since these displaced Syrians have lost their homes, these countries have had to create new accommodations for them. Primary issues have been shelter, food and water. Through analysis of disaster situation case studies such as Hurricane Katrina, Haitian Earthquakes, and Californian Wildfires, the types of infrastructural systems needed for survival can be better understood. This analysis can determine how to integrate systems into an architectural solution to this global issue: temporary housing pods. Ideally, each of these pods can be customized to environmental conditions with the ability to plug into a central system while still generating all of the energy requirements.

Analyzing the issues of these previous disasters will contribute to the testing methods of creating a housing type that will be quickly assembled, transported in mass quantities, and incorporate major necessities such as shelter, water, food, and safety. Not only will this temporary housing system be more efficient, but it will be able to be its own energy source.

Michael McDaniel, EXO Reaction Housing founder, has created a prototype of a disaster housing pod. This pod is an efficient model for maximizing livable space, while still being light weight and easily transportable. The problem with this pod is it lacks the ability to be a self functioning system and only contains one of the major necessities needed for survival.

Shigeru Ban, of Shigeru Ban Architects, has been apart of several disaster relief projects. He has created a series of partition systems that fit within larger structures to better the organization of people setting up a temporary living space. He also has created several temporary relief houses out of paper tubes and recycled materials from the disasters.

Although the previously mentioned disaster relief systems create shelter they are lacking major necessities from an energy perspective. This thesis presents, a typology of temporary relief housing that will be self sustaining and will better address the procedure and process of housing individuals affected by disasters. The proposed pod will be adaptable in order to fit the needs of different types of environmental conditions, while still encompassing the architectural necessities of light, heat, and energy. Each of these pods will have the ability to be self-sustaining as well as connect to an energy source. In order for easy transport these pods will have pre-fabricated parts that can be shipped, efficiently packed and assembled on site. The site location will be in Jordan, who is currently experiencing a mass exodus of refugees due to lack of food and water. Creating an organized camp layout that addresses the issues of resources will encourage refugees to stay. Through harnessing rainwater in the winter months it can be stored and filtered to use as drinking water for the residents.



# NATURAL DISASTER CONDITIONS



REFUGEE CONDITIONS



SYRIAN REFUGEES, TURKEY



REFUGEES, JORDAN



REFUGEES, IRAQ

## CURRENT CONDITIONS

Hurricane Katrina's emergency housing conditions were publicized around the country. The amount of time it took to get proper emergency housing was far too long considering the means available in the US. Most of the evacuees were being housed in the Super Dome, which after a few days was deemed "uninhabitable" by the US Health and Human Services Board (Ferris). Within the Super Dome there was a lack of ventilation in the facilities, no running water and little replenishment of nourishment.

The 2013 Haitian earthquake left devastation through out and already devastated country. Pre- destruction, Haiti is a poverty stricken country with about a 700,000 unit housing shortage and ability to obtain clean water is a rarity. Post- destruction, an additional 105,000 housing units were destroyed. Rental subsidies were granted to those who were eligible but inability to keep up with payments due to unemployment, continued stay until homes were rebuilt did not happen for many displaced.

The Syrian refugee conditions are spiraling towards destruction primarily for the Syrian-bordering host states. Jordan and Lebanon have absorbed the brunt of Syrians fleeing the country. Being countries that struggle on their own, they have to rely "heavily on money from the US and the Gulf to balance its budget" (Phillips, World Today). Jordan has reluctantly begun to build refugee camps but conditions inside are still less than desirable. Refugees have turned to living in previously condemned building that have limited cooking space and unsanitary hygienic facilities. In order to separate space, sheets are hung around an allotted area, creating a loud environment. Turkey's response to the influx of refugees was to build refugee camps immediately. Being a wealthier county, Turkey has more of an ability to create better living conditions. Conditions are still less than desirable but each refugee is allotted 20 Turkish Lira, which most can say is not typical to be receiving any money. Still this is an area that is dealing with social and political unrest due to the different ethnic groups residing in Turkey (Phillips, World Today).







**MAPPING  
DISASTER ZONES,  
REFUGEE LOCATIONS,  
AND CONDITIONS**

# AREAS OF DISASTER OVERLAP

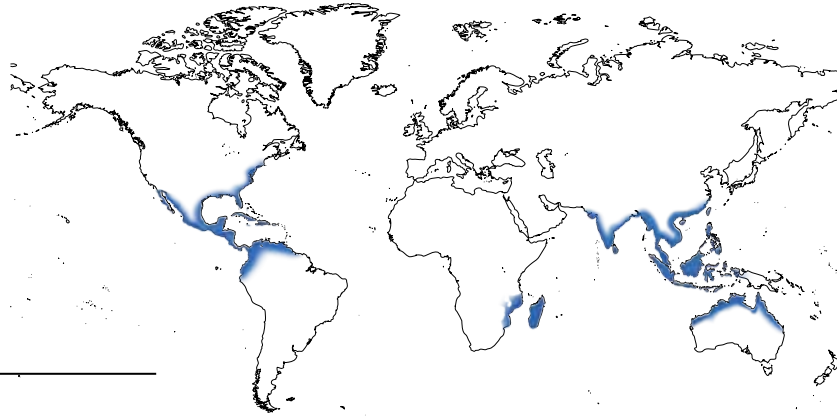


OVERLAPPING ZONES OF DISASTER

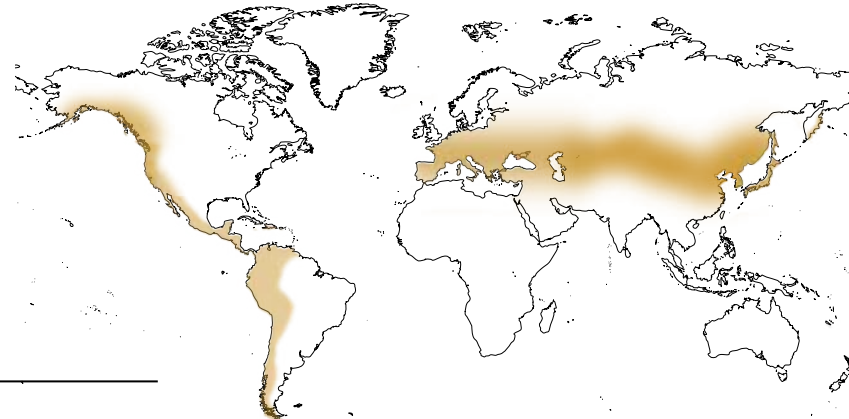
⊖ .1" = 1,000,000 PEOPLE

# DISASTER ZONES

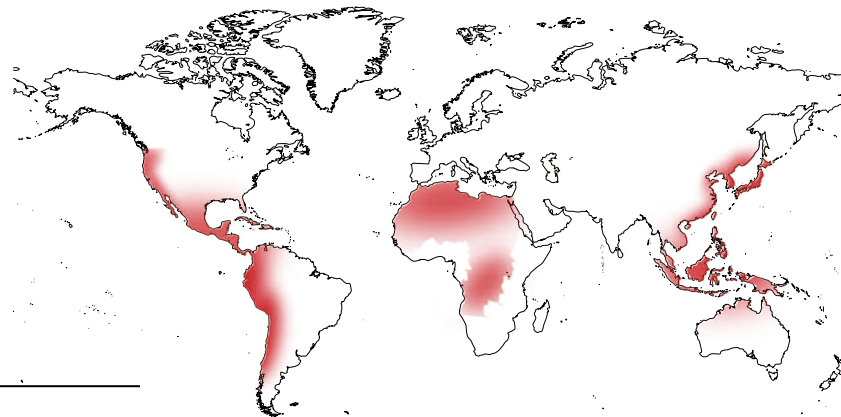
HURRICANE ZONE



EARTHQUAKE ZONE



WILD FIRE ZONE





# AREAS OF DISASTER OVERLAP

## HURRICANE KATRINA



## EARTHQUAKE HAITI



## WILDFIRES CALIFORNIA



+

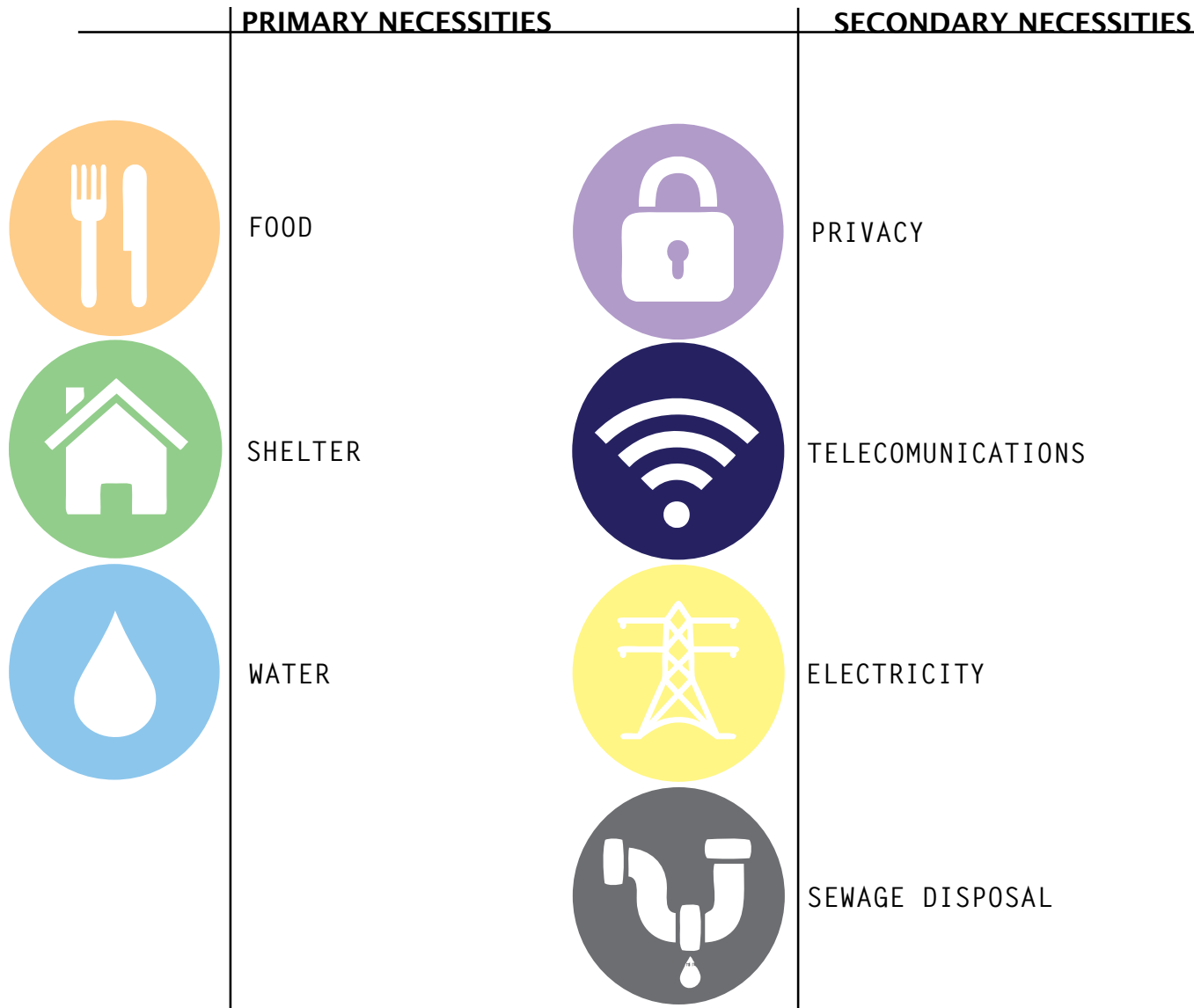
+

Hurricane Katrina displays one of the worst government responses to relief in history. Methods for housing individuals effected by the hurricane reached an all time low and were deemed “uninhabitable” with no where else for these people to go. These people suffered a great deal because they did not have access to the basic necessities.

The Haitian earthquake in 2010 is still effecting individuals today, almost 5 years later. Being one of the poorest countries in the world Haiti has little access to clean water and nutritional meals. After families lose their homes, they have to revert to camps with sheet dividers and tarps tied to sticks for a new home.

Wildfires in California are unfortunately too common of an occurrence. These fires sweep through and leave nothing behind. Many families insurance doesn't cover all of the damages and FEMA can only provide support for a certain time. Not only does disaster housing need to be provided during the wildfires, but it should accomodate individuals while they are rebuilding and recovering their homes.

# SURVIVAL NECESSITIES

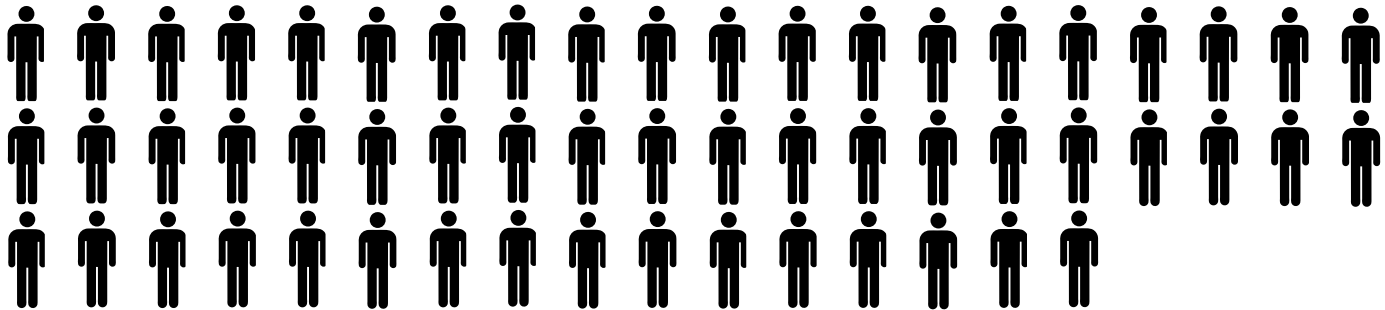


Taking a closer look into specific types of disasters, I analyzed the types of necessities the evacuees were missing. There are four basic necessities in order for the bare minimum survival. These are food, shelter, and water. The secondary necessities are what allow someone to live comfortably. In dire, extreme situations these are not going to be the primary concern but should be when planning to house people for an extended period of time. The next diagram illustrates my analysis of what each situation was unable to provide the evacuees with.

# CASE STUDY DISASTER ISSUES

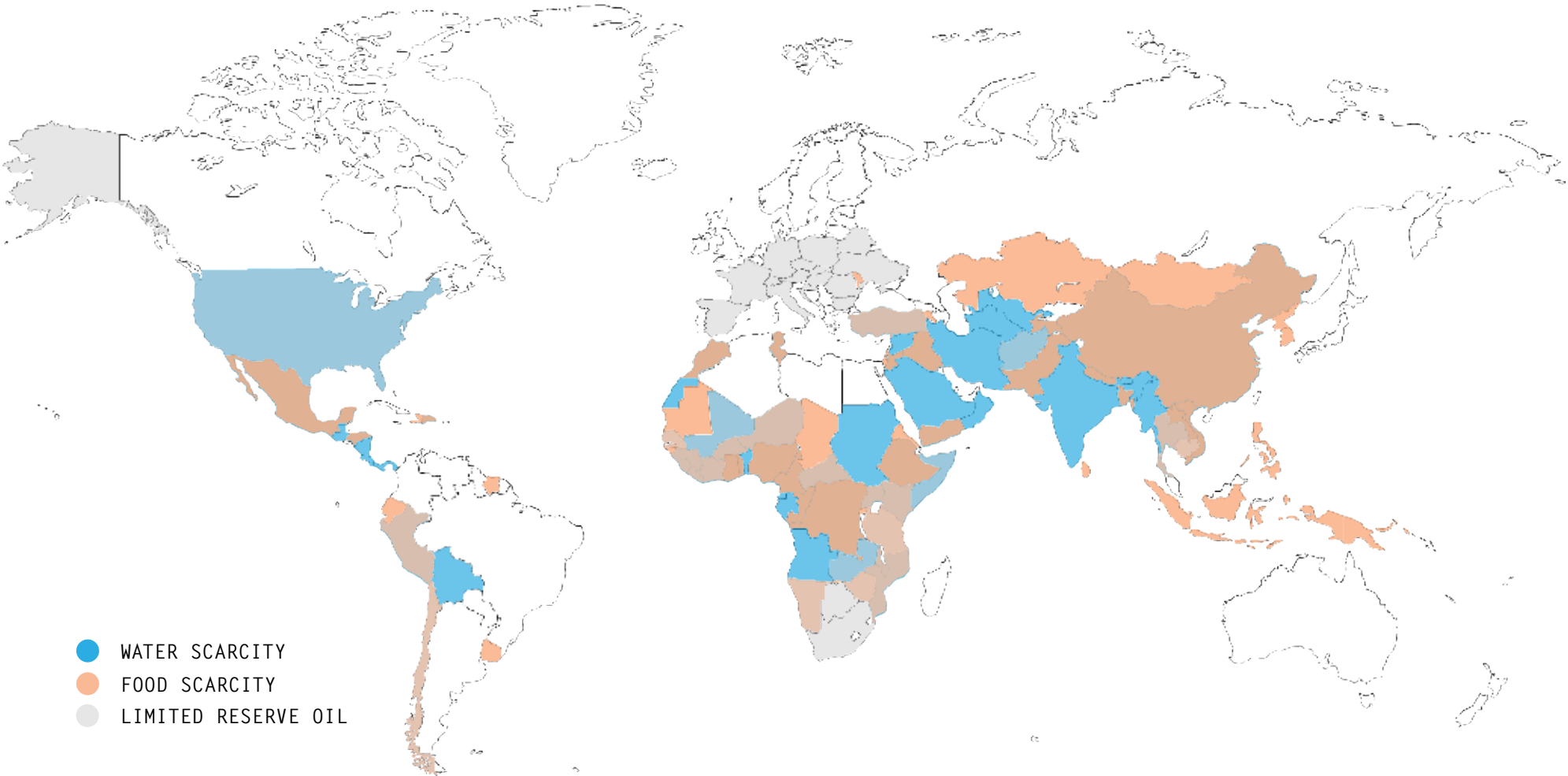


# CASE STUDY DISPLACEMENT

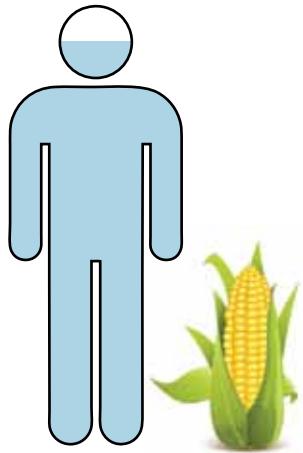


 = 50,000 people

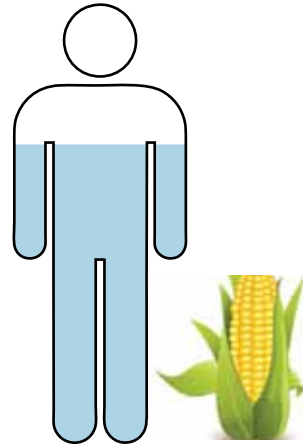
# WORLD RESOURCE SCARCITY



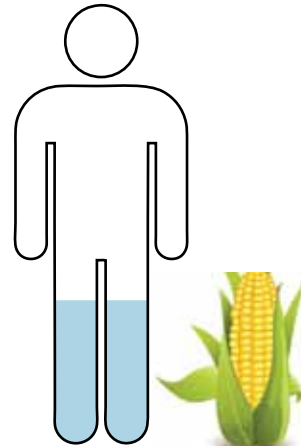
# DISPERSAL OF RESOURCES



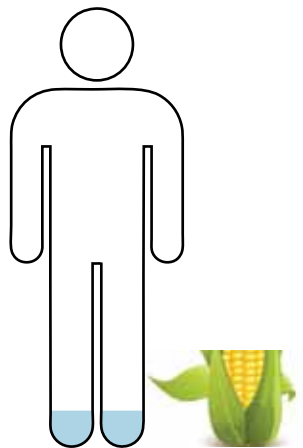
UNITED STATES



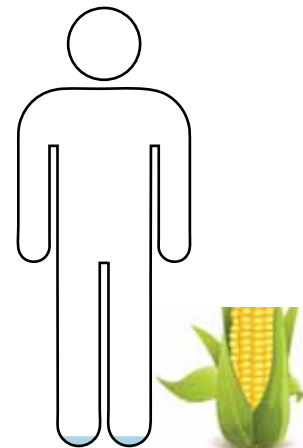
SWITZERLAND



TURKEY



KENYA



JORDAN



= 30 mm of water per person daily



= 10 kcals per person daily

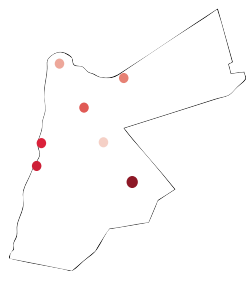
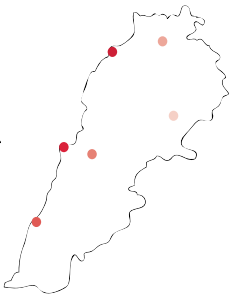
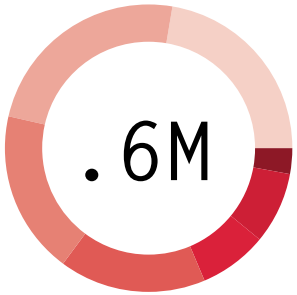
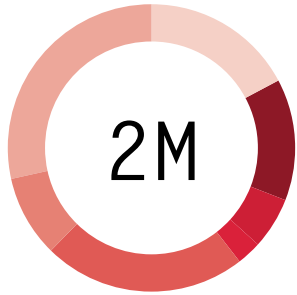
The scarcity of resources is a global problem. Analyzing two of the major necessities for survival the Sub-Saharan region is in clear distress with the largest amount of scarcity in all categories. The water scarce areas were determined by countries under economic water distress. Food scarcity was determined by children under five years old who were under the median weight of the avg. child. Oil scarcity was determined by countries with under ten years left in their reserve supply.

Looking at specific countries taking in refugees, I analyzed how much food and water was allotted per person daily. Jordan, a country taking in refugees close to its population, has the least amount of available water per person. The United States with the most amount of resources is taking in minimal amount of refugees.

# DISPLACEMENT OF SYRIAN REFUGEES



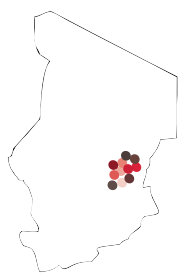
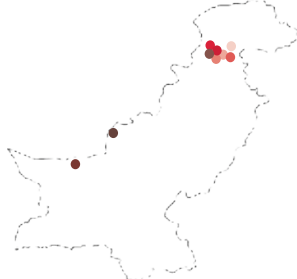
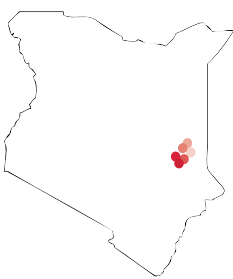
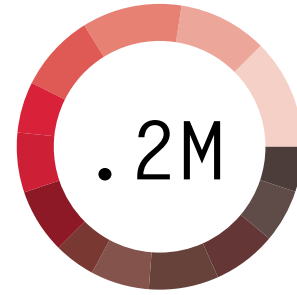
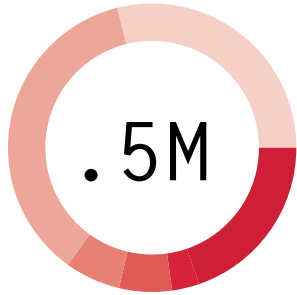
# SYRIAN REFUGEE CAMPS



TURKEY

LEBENON

JORDAN



KENYA

PAKISTAN

CHAD

The most recent statistics account for about 50 million registered refugees in the world. Of that 50 million 4.1 are registered Syrian (Martinez, CNN). Looking into the dispersal of these people, I highlighted which countries were taking refugees in. Each country has allotted a certain amount of their refugee in take population to be a percentage Syrian. These numbers vary drastically by country. For example, the US is only taking in 10,000 within the next fiscal year, while Jordan has taken in two million. This vast dispersal in terms of these two countries is partially due to location and partially due to funding. Within the countries taking in larger amounts of refugees, there have been certain areas dedicated to camps. The right illustration breaks down how many of the refugees are in each camp and where they are located within the country. This illustrates some of the large spread of refugees per country and camp.



# REFUGEE CONDITIONS

Due to the influx of Syrian refugees, some of the surrounding countries are beginning to struggle with providing resources. In countries that already have scarcity issues with food and water, such as Jordan, their supply of these necessities is becoming depleted forcing them to rely on asking for help from wealthier countries such as the U.S.

Other countries are having to turn refugees away from their borders that are bursting at the seams with people trying to push across them. In the most recent news Croatia is allowing refugees into their country but only allowing them to pass through to Hungary or Slovenia. Their borders have been barbed-wired and their military has gone to the extent of using tear gas and water guns to remove people from their borders. Many of these refugees are trying to escape the government injustice but with so many fleeing, it is hard for these smaller, less wealthy countries to absorb as many as millions of refugees.

By creating a pod that is self functioning these refugees would not have any negative impact on the government and the country by using up the little natural resources that they have.





# **PRECEDENT STUDY**

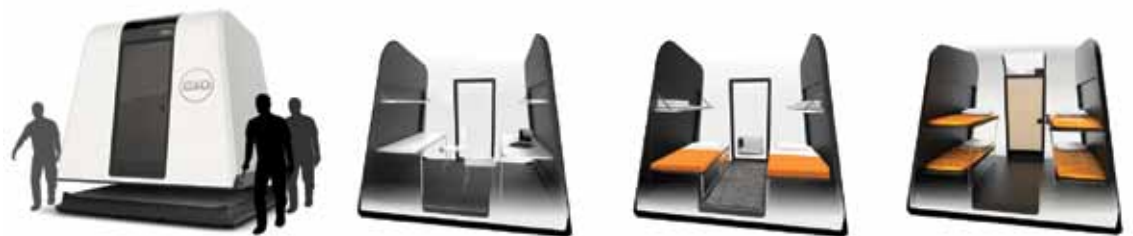
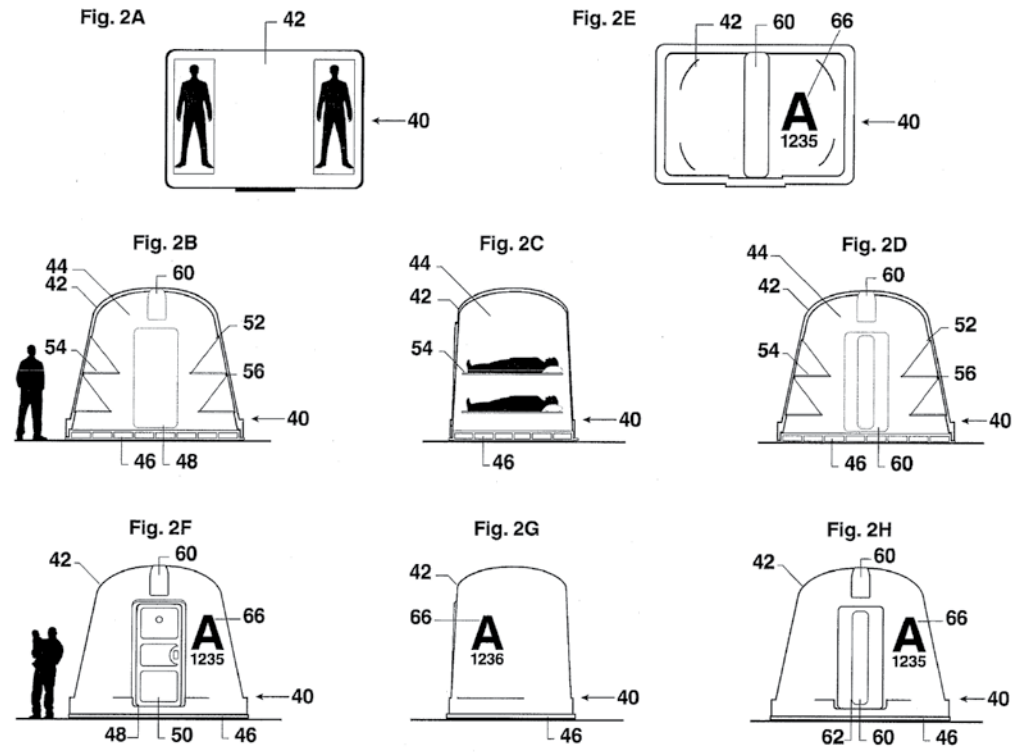
# DISPLACEMENT OF SYRIAN REFUGEES



-   
**Locking Doors**  
NFC/NFCID Digital ID, manual lock
-   
**Lighting**  
Marker LEDs
-   
**Power**  
3 GFCI Outlets
-   
**Ventilation**  
2 Fans w/ carbon air filter
-   
**Dynamic Addressing**  
Emergency LED Display

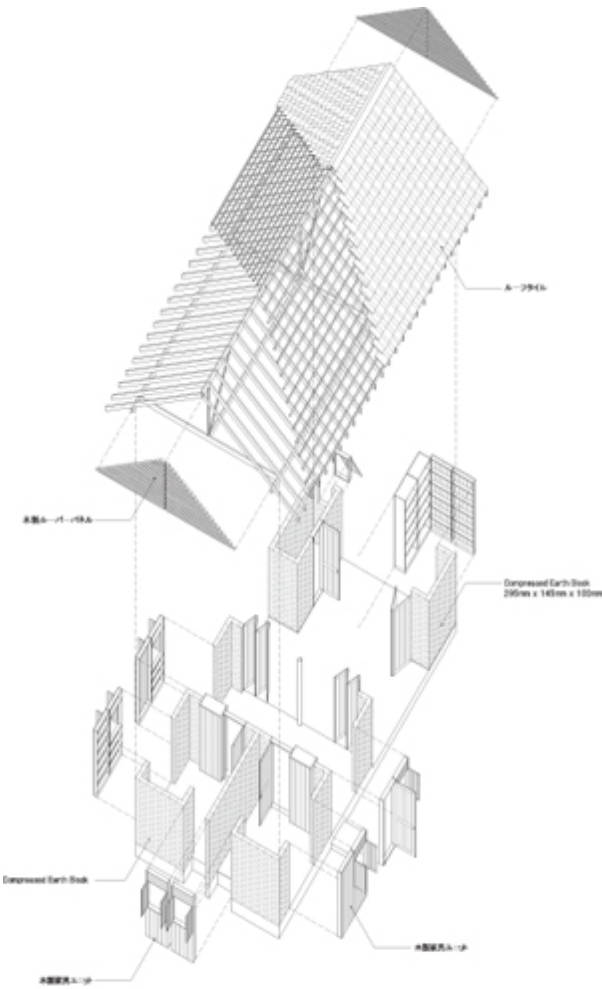
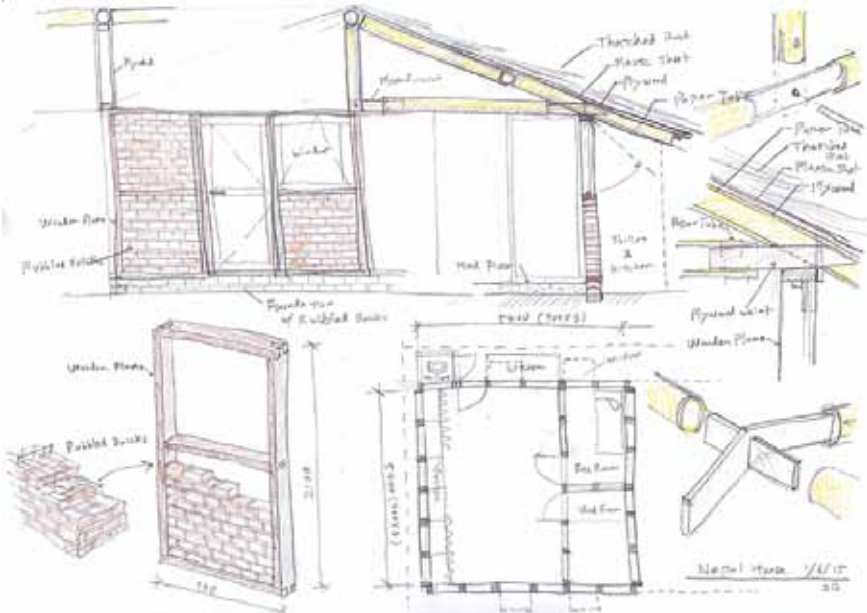


28 MEROLA



\* All images from McDaniels Reaction Housing

# SYRIAN REFUGEE CAMPS



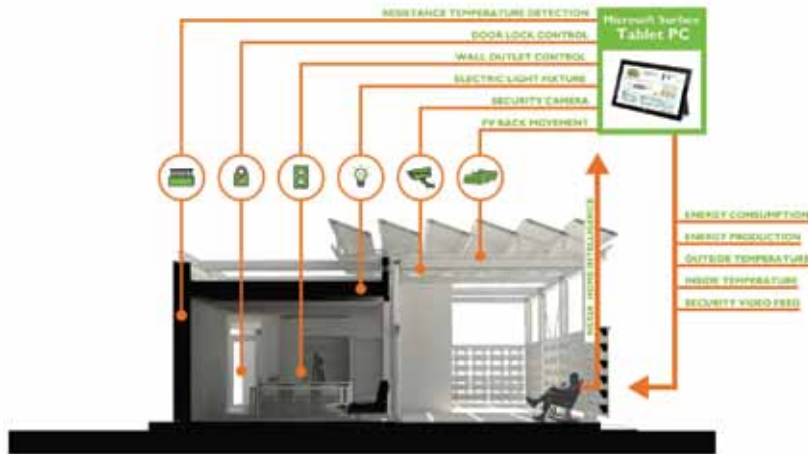
\* All images from Ban Disaster Relief Housing

The Self Sufficient Pod 29

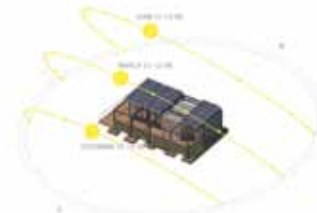
# SOLAR DECATHLON: URBAN EDEN



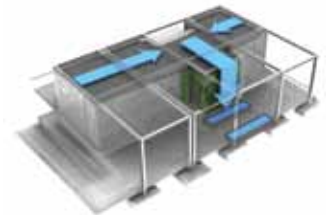
In 2013 UNC Charlotte was a top contender for the solar decathlon. This particular project is known for its building materials, innovative passive and active hybrid cooling system, PV adjustable panels, and responsive technology. The passive and active cooling system is integrated into the concrete exterior south facing walls of the home. Also, the rainwater collection system is of particular interest because the system stores water which is used to water the green wall.



Each of these systems is monitored by a tablet that records the efficiency of the system. The tablet has the ability to determine which systems are being used properly and can suggest how to be more efficient.



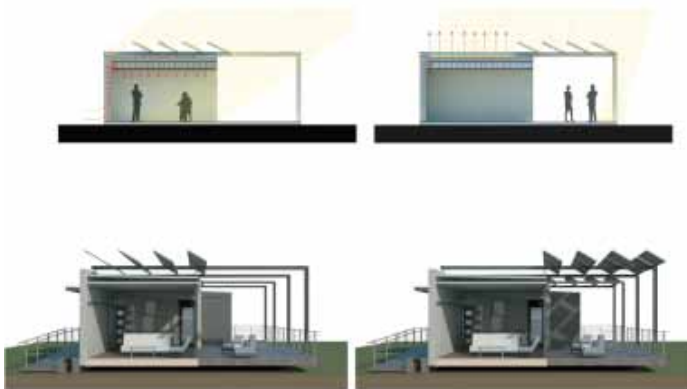
Sun Path Diagram



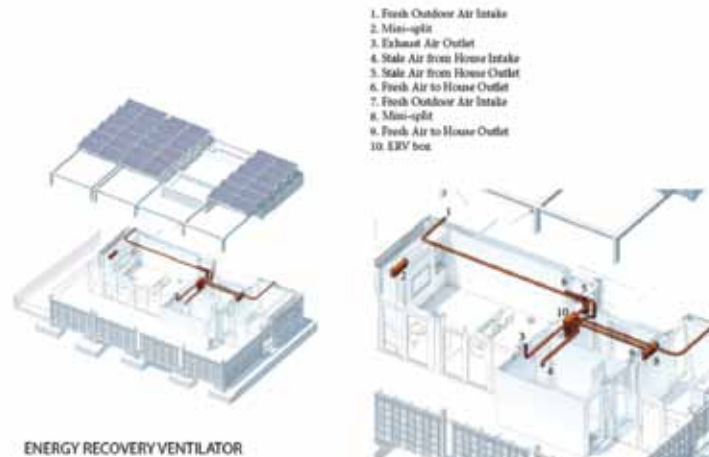
Rainwater Run-off storage



Core of the home



Passive systems dictated by adjustable PV panels

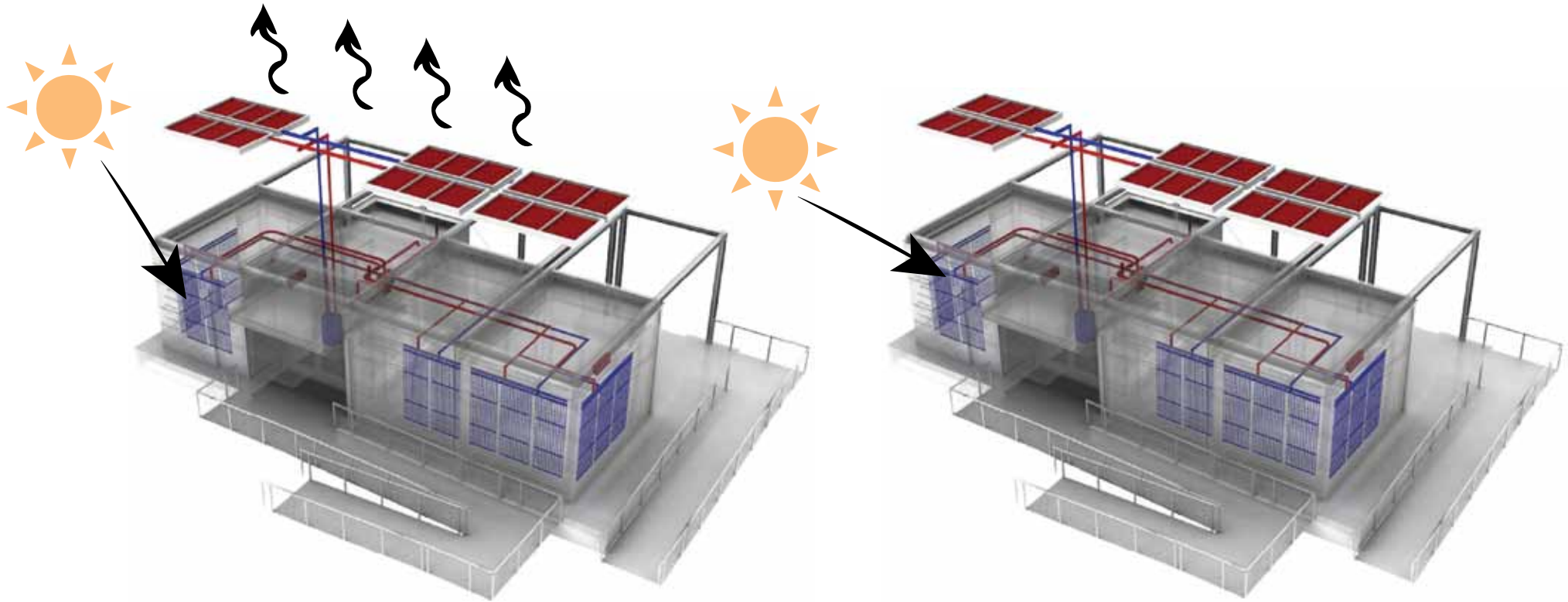


Active HVAC system



Plan of "Wet Wall"

# SOLAR DECATHLON: URBAN EDEN



SUMMER

During the summer months this system removes heat from the home. The water in the coils collects the heat which is then transferred to a heat exchanger and is released.

WINTER

During the winter months this system stores the heat from the sun and releases gives off heat to the home. The water in the coils collects the heat. This is only the passive system. The active strategies for heating are located in the central core for easy access.



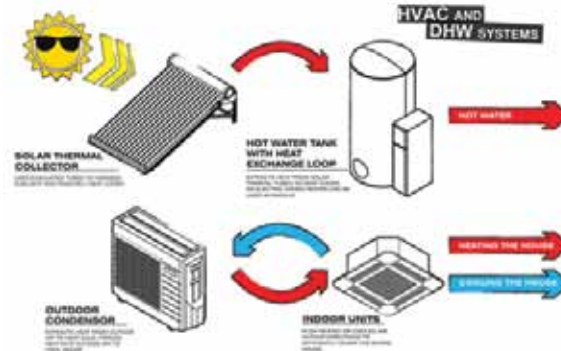
# SOLAR DECATHLON: DALE



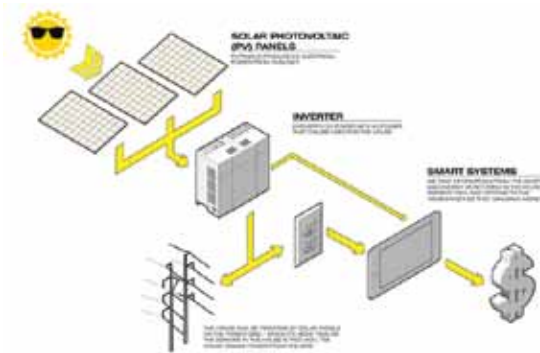
Dale was created in 2013 for the Solar Decathlon. This system is a net-zero railmounted and active dwelling system. Dale sits on top of a sliding rail system that allows each of the interior blocks to slide freely and work independently of each other. The PV panel system and the louvers on the sides allow the exterior to become the interior and vice versa. The purpose of the moving modules is to have the ability to maximize the square footage of the footprint. The most important aspect of this home is the solar panels. This particular system is its ability to work as an independent system.



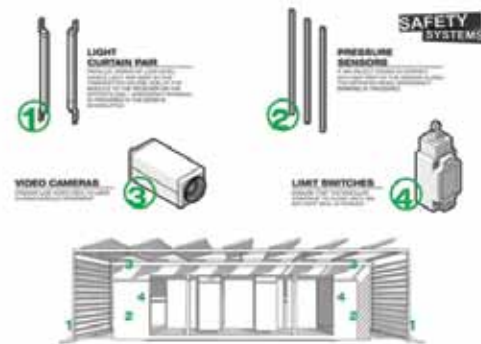
32 MEROLA



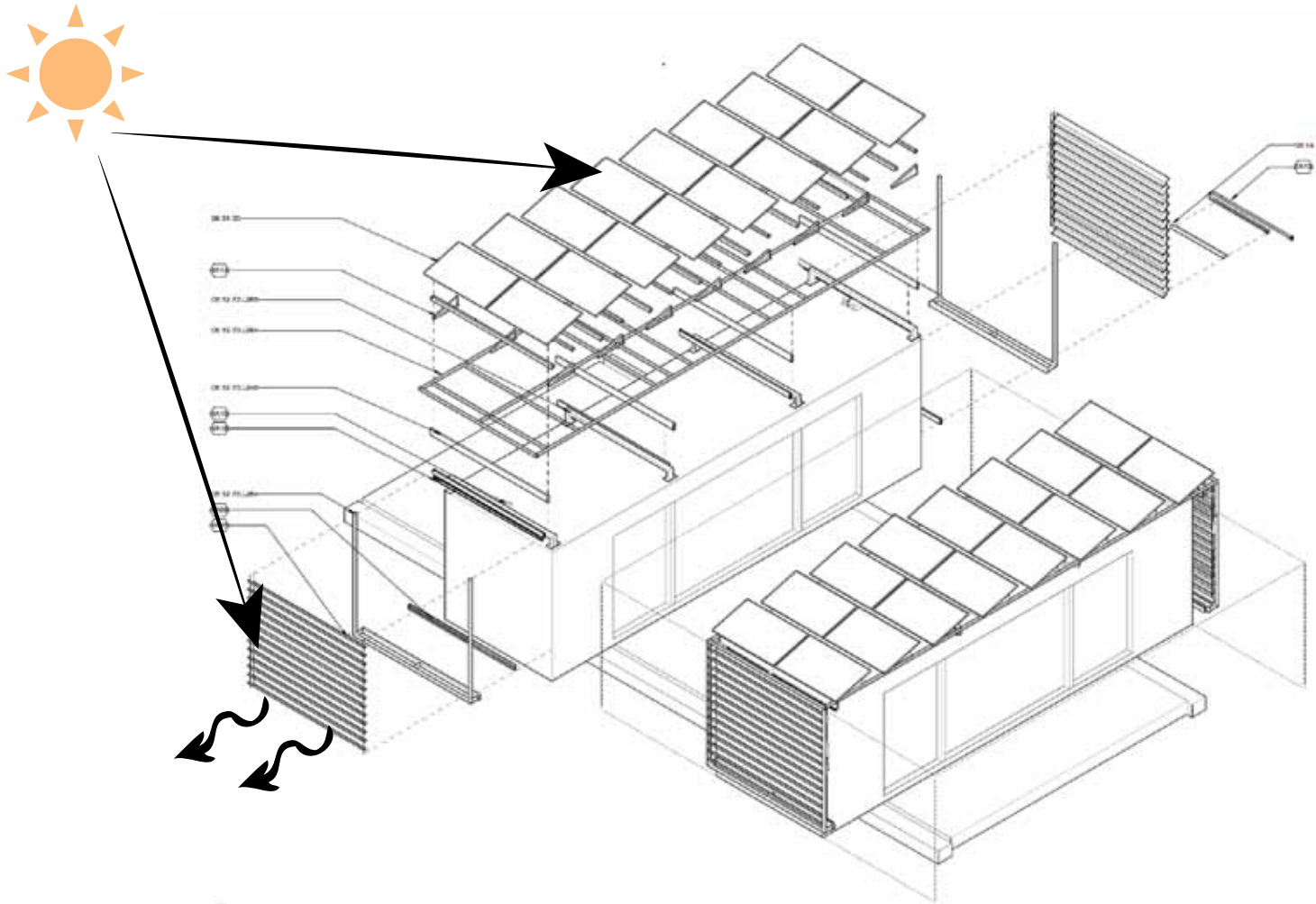
The HVAC system in this home is active and passive. This diagram illustrates the active component of the solar panels as well as the solar collector.



The solar panel system in this home is more complex while at the same time simplified than the typical solar panel system. Due to this complexity the inverter becomes larger because each module has to run independent of the other.



Safety systems are important to the privacy of each of these homes. These systems have to be incorporated into the overall monitoring of the entire home.



The PV panels absorb the solar power and run through the converter which changes the energy from DC power to AC power. The louvers are mechanically operated and can directly adjust to the angle of the sun. During the summer months they can be closed to keep heat out, during the winter months they can be fully opened to allow for sunlight to warm the home.

# POWERWALL: TESLA

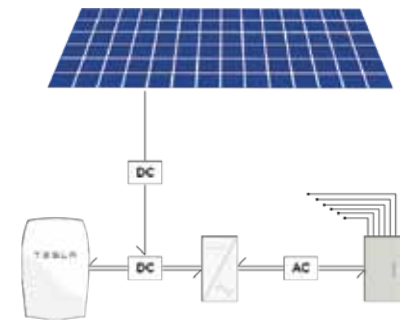


Tesla's Powerwall is a rechargeable lithium-ion battery at a residential level for load shifting, back-up power, and self-consumption of solar power generation. This pack receives commands from a solar inverter, giving consumers the ability to draw from their own reserve. The Powerwall can power a normal home off the grid for 24 hrs a day for 4 months. The cost per unit is \$3500 to \$3000.

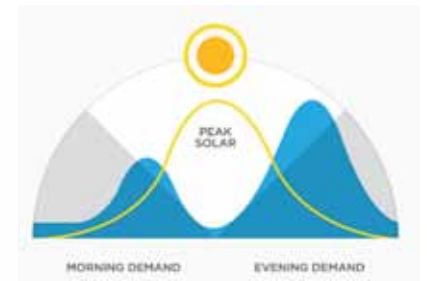
34 MEROLA



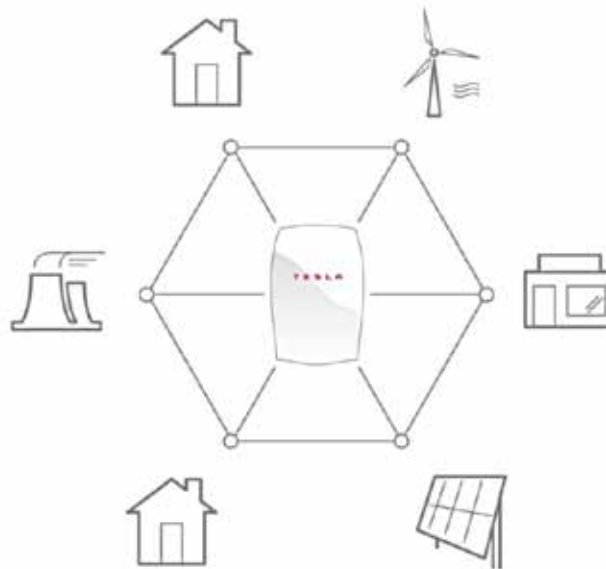
Tesla process to convert DC power to AC power



Power wall unit from grid to home



Daily peak demands for energy

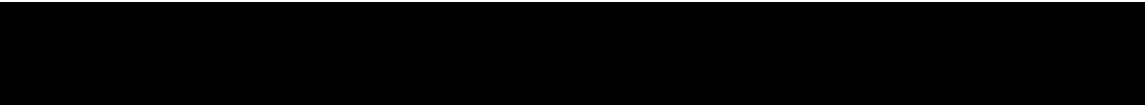


Tesla Powerwall has the ability to harness and give back to each of these programs

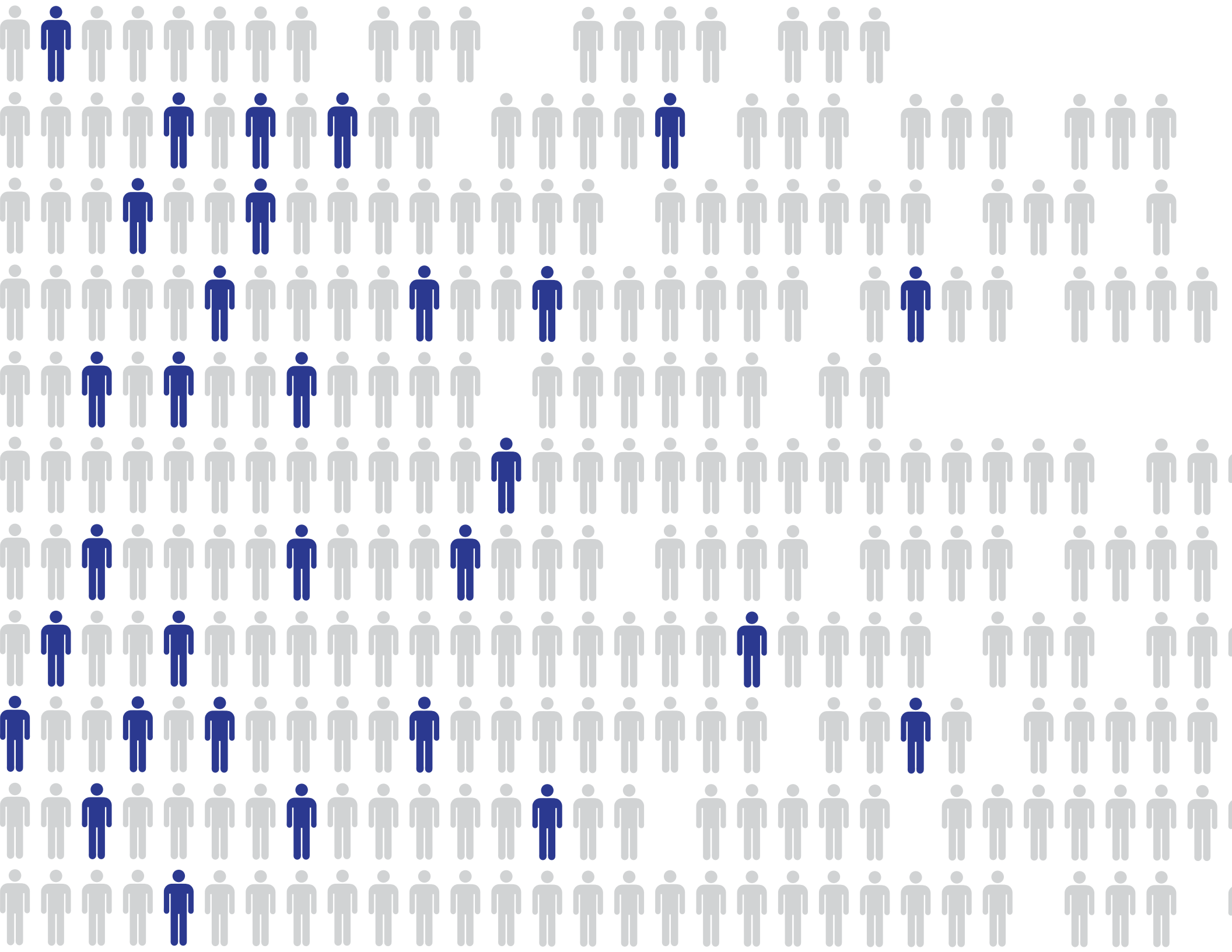


Multiple batteries may be installed together.

Units can be combined for higher energy storage



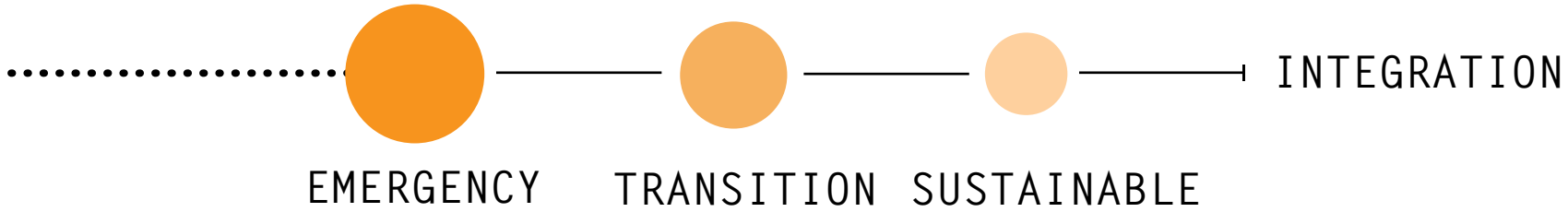
Michael McDaniels Exo has been the main inspiration for my project. His reaction housing has been the closest iteration to creating a shelter that can be distributed world wide and assembled with ease. Ideally, I would like to make the pod its own self-functioning entity. This project will be combining all types of trades in order to integrate all systems that create a self-sufficient home. Shigeru Ban's organization has been an inspiration for helping organize people within existing structures. In many disaster evacuations initially, people move to a larger and safer location. Ban's organizational system, although not ideal, gives people more privacy and a space to call their own. The Solar Decathlon entries have been able to break down different energy systems and integrate them into the architecture of the home. Most of these entries are based on ideal conditions but their understanding of how each of these systems works with one another is what I would like to emulate. These systems are able to keep their homes running independently of an exterior energy source which is the aspect I would like to incorporate into my pod. The Tesla Powerwall is a way to store energy made during the day and re-use during the night when the solar power systems are not absorbing heat. These Powerwalls would have the ability to store the energy created by the solar powered systems and make the pods self functioning entities without drawing from any exterior power sources, thus creating a less strained relationship with the host countries. Since these host countries have to provide all necessities for the refugees, a strained relationship is created between the two. Without the need for complete reliance on the government, it may create a better social relationship between the refugees and their host countries.





# REFUGEE COMMUNITY ANALYSIS

# REFUGEE TRANSITION



The UNHCR outlines a general structure to understanding how camps are planned. It begins with an emergency situation that has to transition into a sustainable solution. The solution then has to be integrated into the fabric of the community.

In order to better understand the conditions inside the refugee camps, I analyzed the general infrastructure of four refugee camps. The camps used for analysis were: Basirma camp in Iraq, Azraq camp in Jordan, Oncunipar camp in Turkey, and Zaatari camp in Turkey. Each of these camps has a different infrastructural organization which changes the dynamics drastically from one another. How the housing is organized around the infrastructure also changes the dynamics of the camp. To break down the infrastructure further, the major buildings were broken down into types of community needs. These maps begin to outline the differences between each camp as well as the benefits and disadvantages of each. The most successful camps have had a central location for all facilities, container shelter, powerlines, and shorter distances to access facilities.

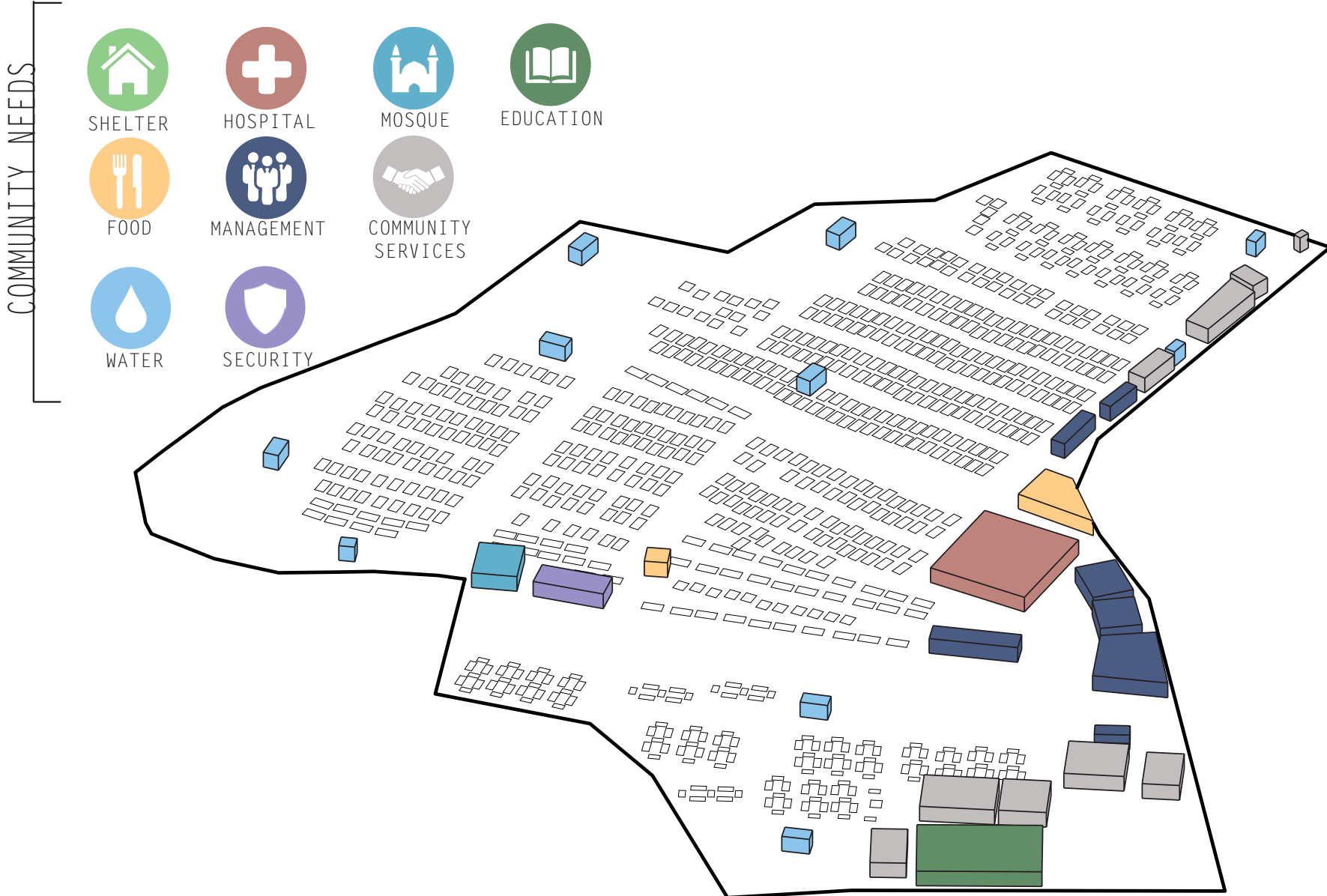


## BASIRMA CAMP, IRAQ: SHELTER LOCATION

This particular camp has been pretty successful based on the criteria mentioned before. All of their facilities are primarily in a central location but the distance of the farthest residents makes it harder for them to easily access facilities. The housing has a semi regular organization within each designated area making it easier to navigate. Larger water facilities make it easier for multiple residents to access.



# BASIRMA CAMP, IRAQ: GENERAL INFRASTRUCTURE



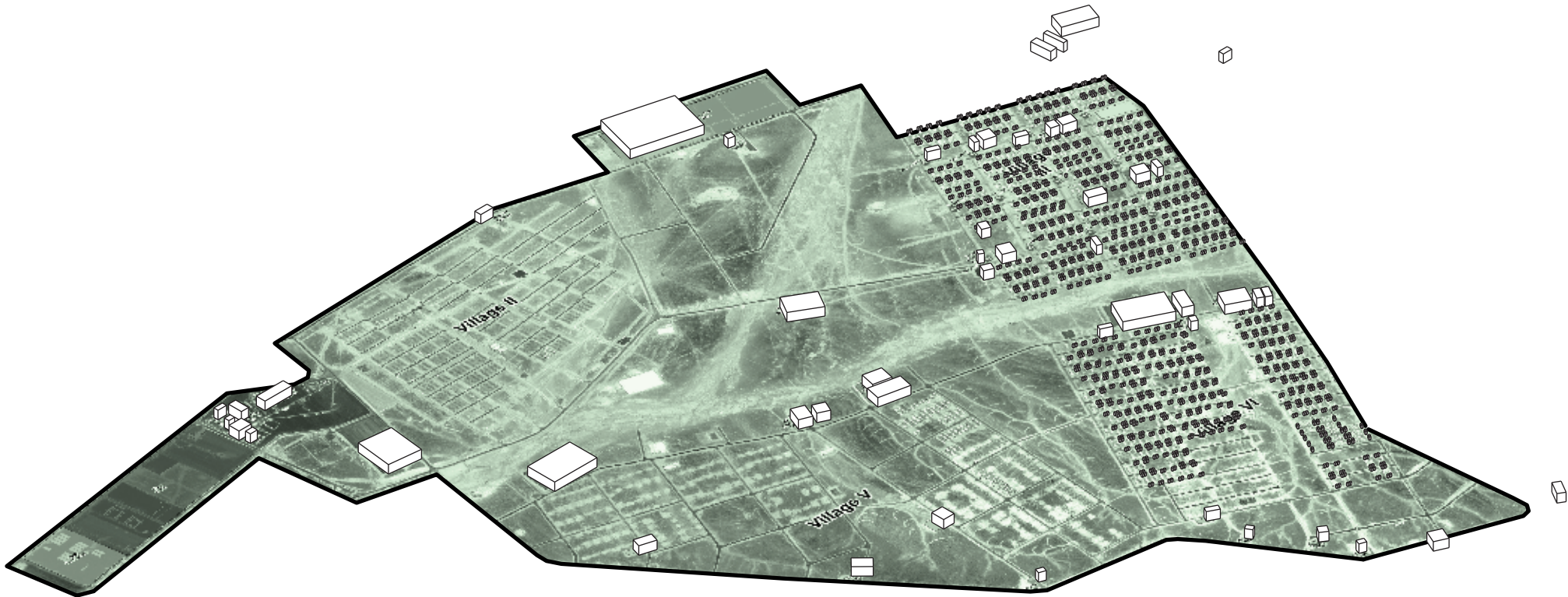
\* REFUGEE GENERAL INFRASTRUCTURE PLAN ADAPTED FROM THE UNHCR

# AZRAQ CAMP, JORDAN: SHELTER LOCATION

The Azraq camp has been less successful in some aspects than others. For example, there are plenty of food and water locations per person in the camp. But the rest of the community needs are too scattered for the scale of the camp and it is less accessible for all members of the camp. The housing has a clear organization making the camp easier to navigate.



HOUSING ORGANIZATION



# AZRAO CAMP, JORDAN: GENERAL INFRASTRUCTURE

COMMUNITY NEEDS



SHELTER



HOSPITAL



MOSQUE



FOOD



MANAGEMENT



COMMUNITY SERVICES



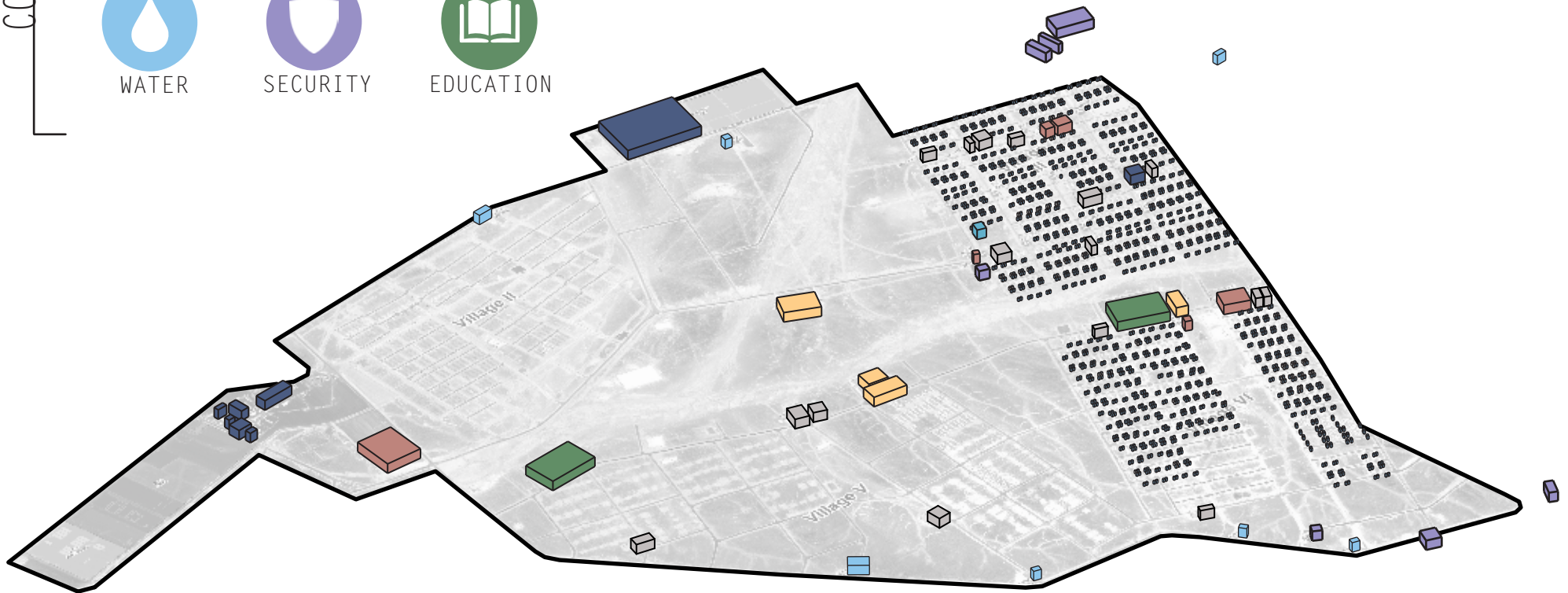
WATER



SECURITY



EDUCATION

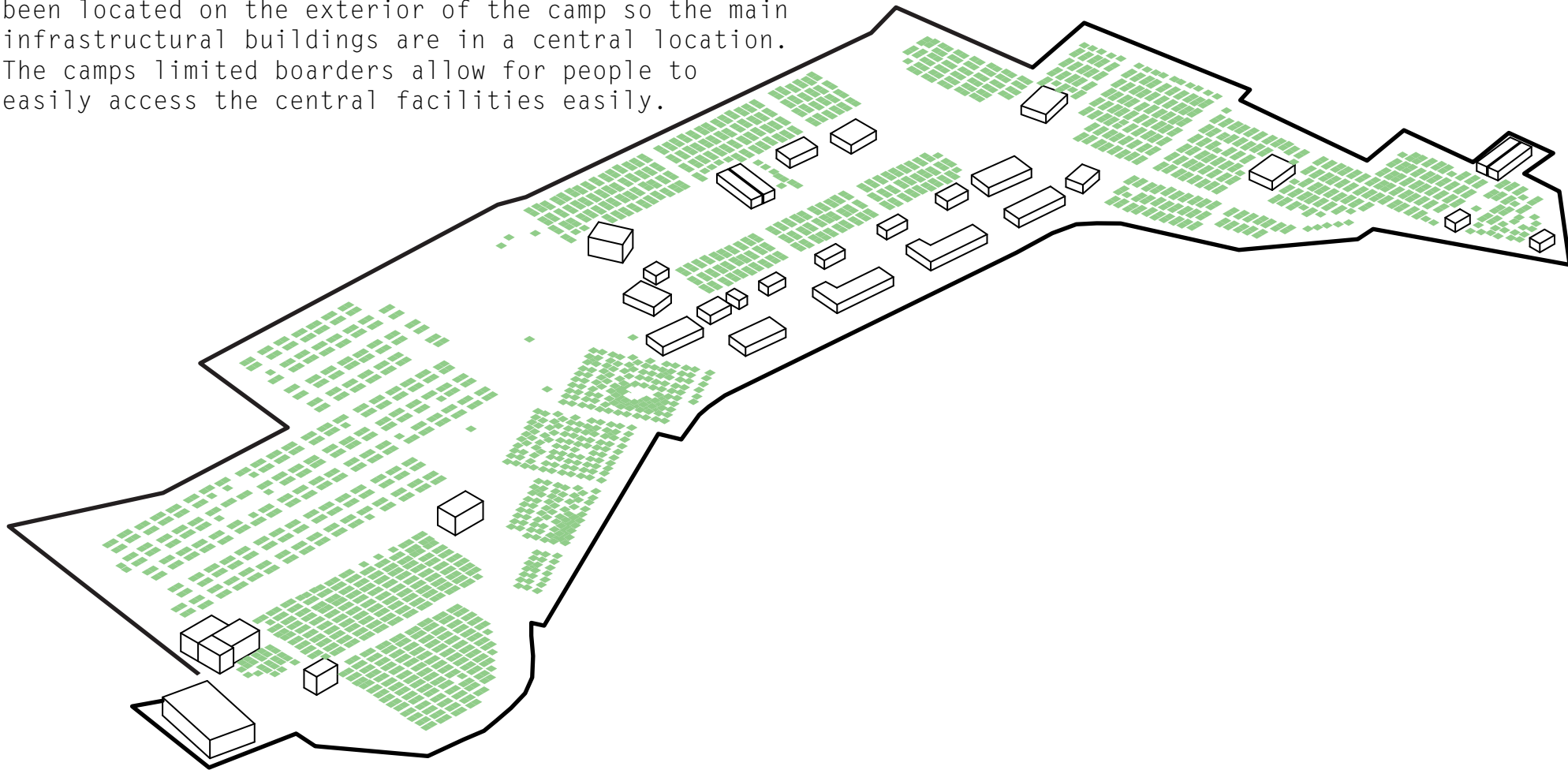


\* REFUGEE GENERAL INFRASTRUCTURE PLAN ADAPTED FROM THE UNICEF

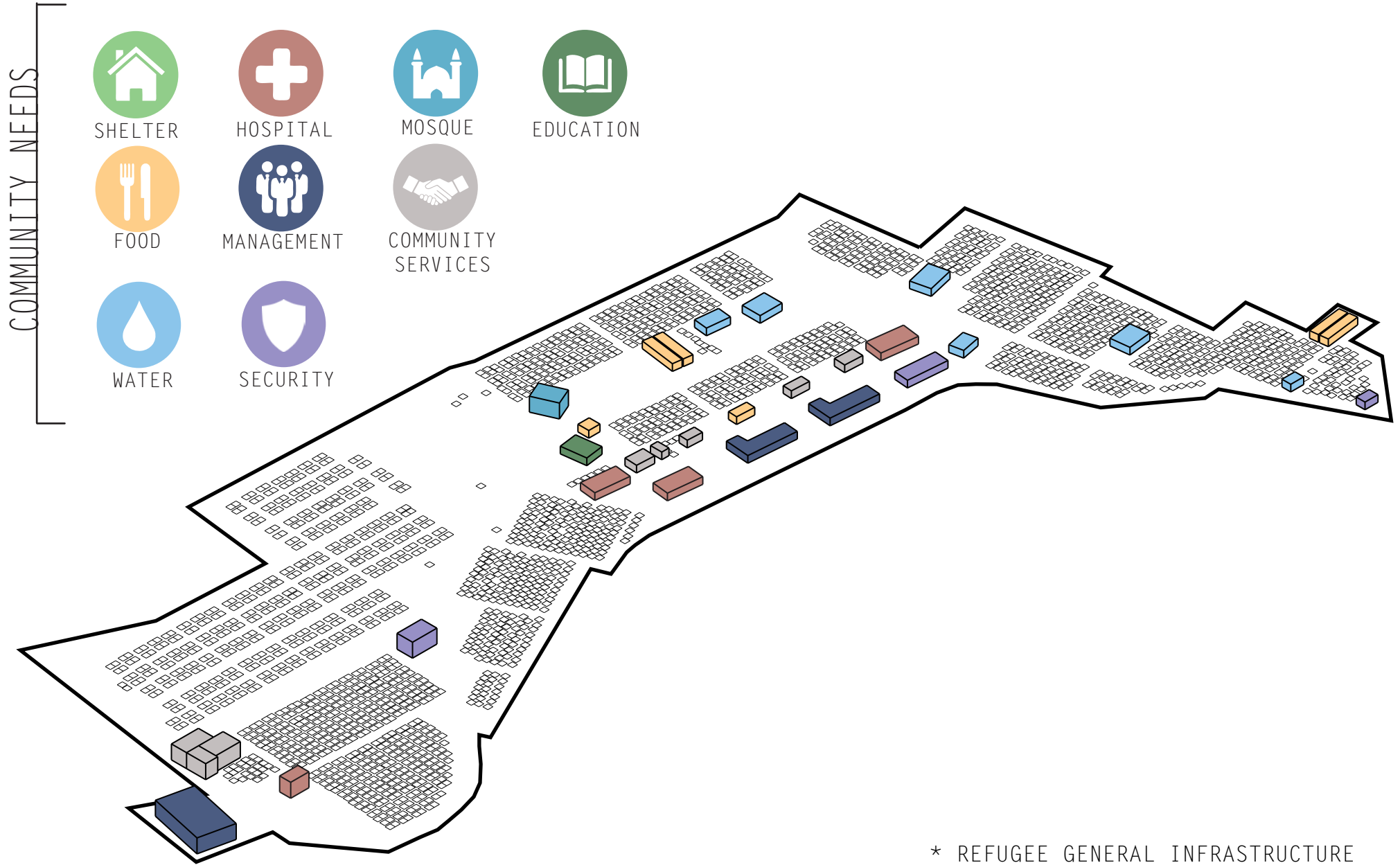
The Self Sufficient Pod 43

## ONCUNIPAR CAMP, TURKEY: SHELTER LOCATION

The Oncunipar is among one of Turkey's best refugee camps. These camps in the Kilis province have been a model of successful refugee camps. They are known for cleanliness, safety and facilities. On the designated paths they use streetlamps as another safety feature. They have added powerlines for what many would consider to be a luxury. Throughout the camp they use container housing instead of tents making a better environment. Most of the housing has been located on the exterior of the camp so the main infrastructural buildings are in a central location. The camps limited borders allow for people to easily access the central facilities easily.



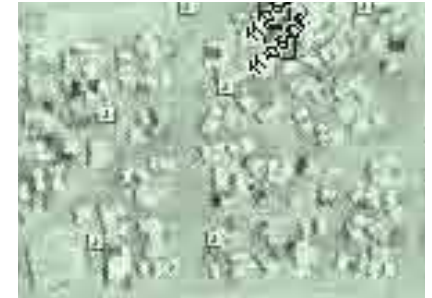
# ONCUNIPAR CAMP, TURKEY: GENERAL INFRASTRUCTURE



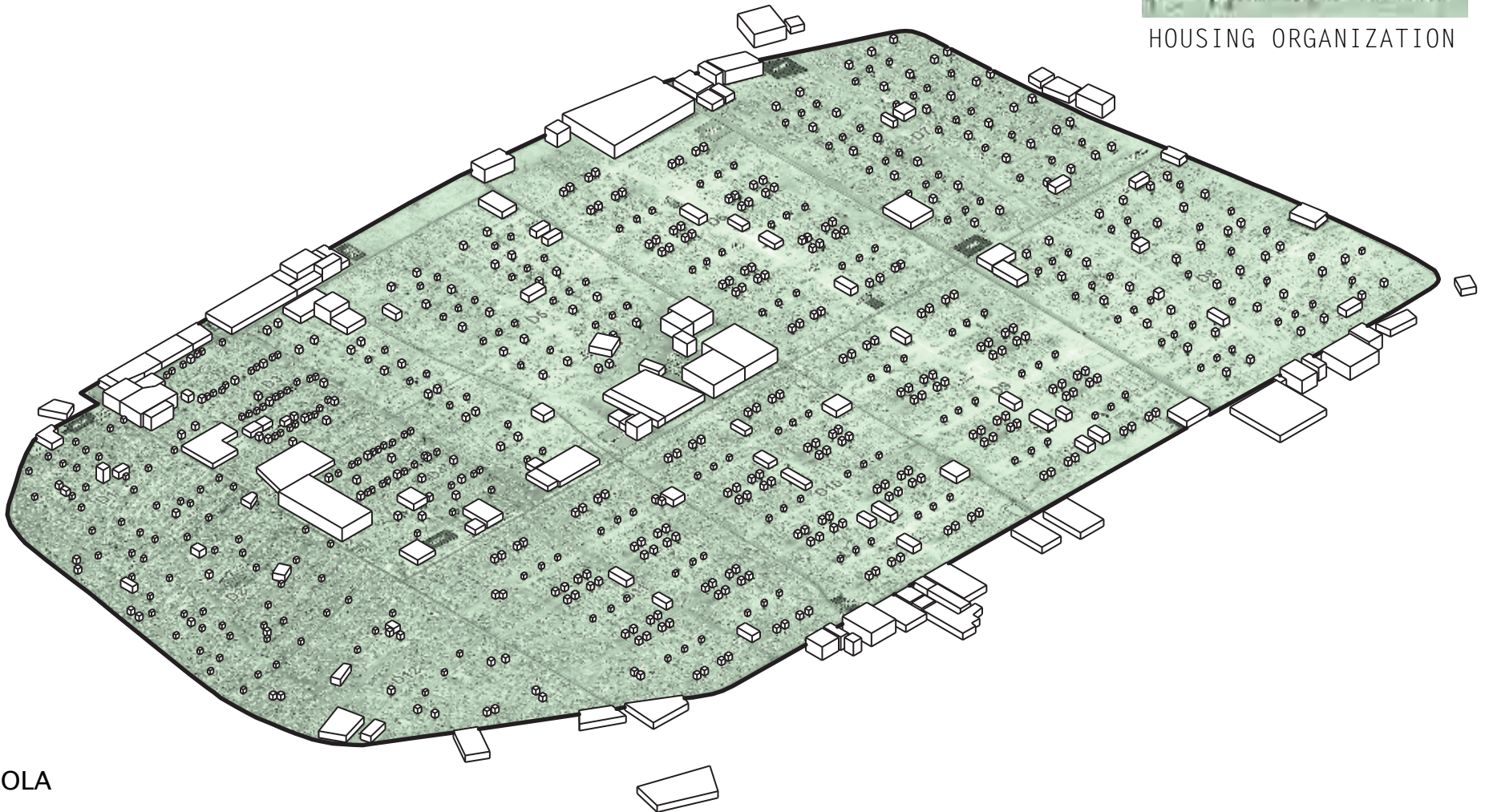
\* REFUGEE GENERAL INFRASTRUCTURE PLAN ADAPTED FROM THE UNITAR

# ZAATARI CAMP, JORDAN: SHELTER LOCATION

Although the Zaatari infrastructural buildings may look organized, this camp actually has several problems. The housing sections are organized by plot but the order of houses do not have a general structure. Most of these homes are tents which need to continue to be replaced by pre-fab structures. Currently the infrastructural buildings are being upgraded to stop insulation and leakage issues. In terms of food and water, there are too many occupants allotted per cooking and water station leaving many incapable of accessing food and water.



HOUSING ORGANIZATION



# ZAATARI CAMP, JORDAN: GENERAL INFRASTRUCTURE

COMMUNITY NEEDS



SHELTER



HOSPITAL



MOSQUE



FOOD



MANAGEMENT



COMMUNITY SERVICES



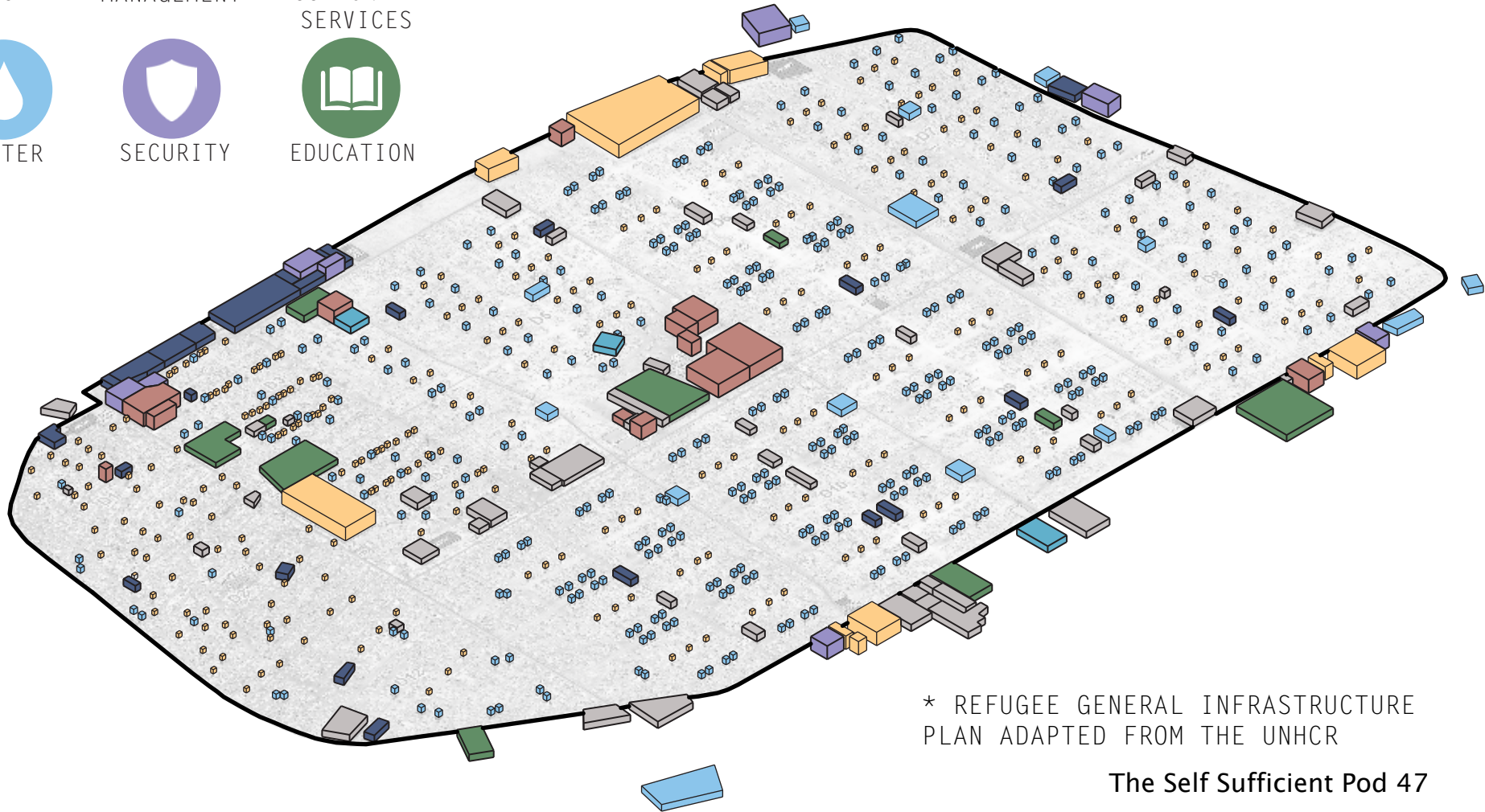
WATER



SECURITY



EDUCATION



\* REFUGEE GENERAL INFRASTRUCTURE PLAN ADAPTED FROM THE UNHCR

The Self Sufficient Pod 47

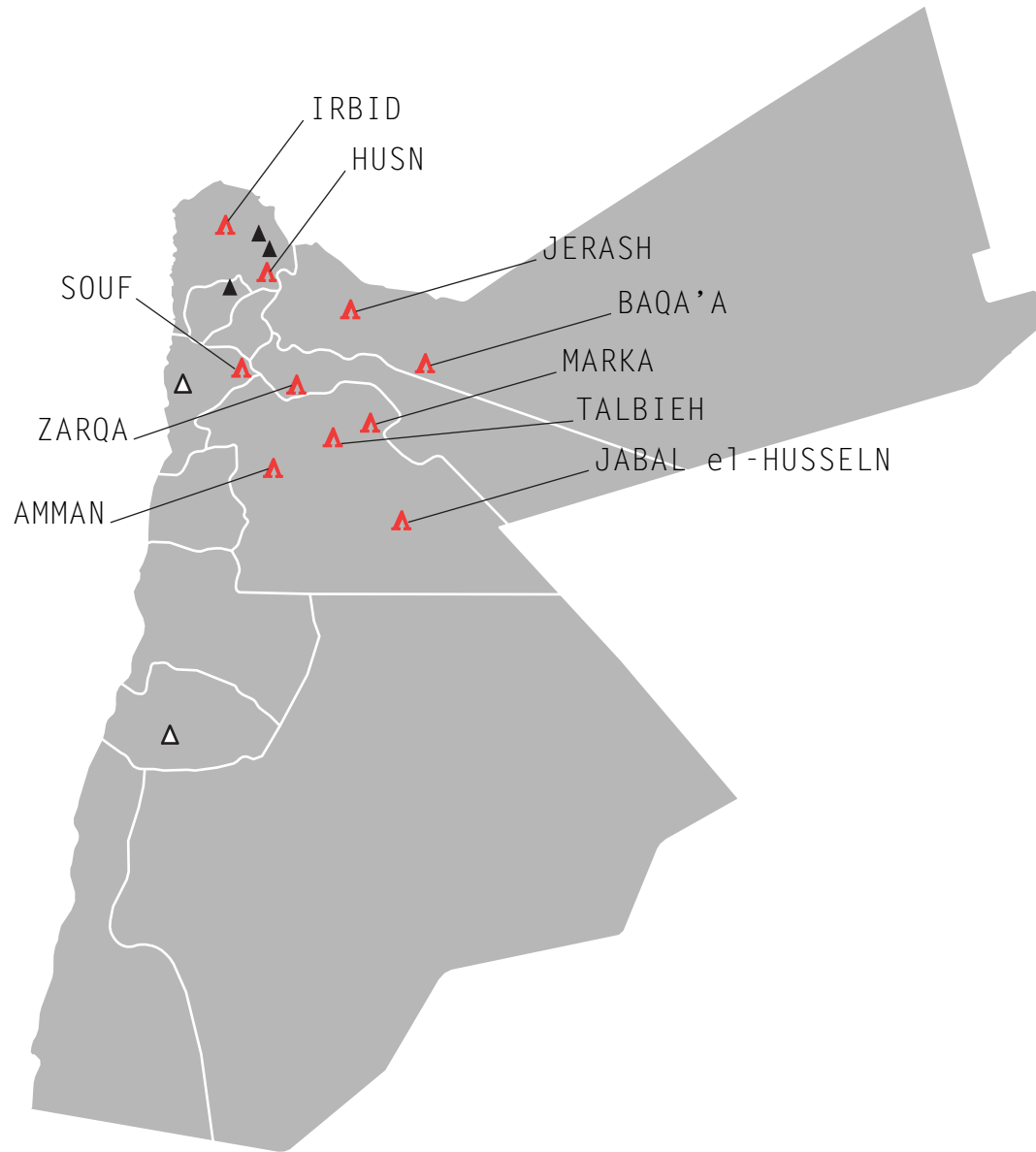


## COUNTRY COST ANALYSIS

REFUGEE CAMP SHELTER COSTS (IN USD)	TARGETED POPULATION (INDIVIDUAL REGISTERED REFUGEES)
EGYPT : \$20,696,598	250,000
IRAQ : \$31,259,101	304,000 OF 400,000
JORDAN : \$81,912,150	810,000 OF 1,500,000
LEBANON : \$86,584,732	920,000 OF 1,013,000

\* FIGURES ADAPTED FROM UNHCR SYRIA REGIONAL BUDGET PLAN OF 2014

# JORDAN REFUGEE CAMP LOCATION



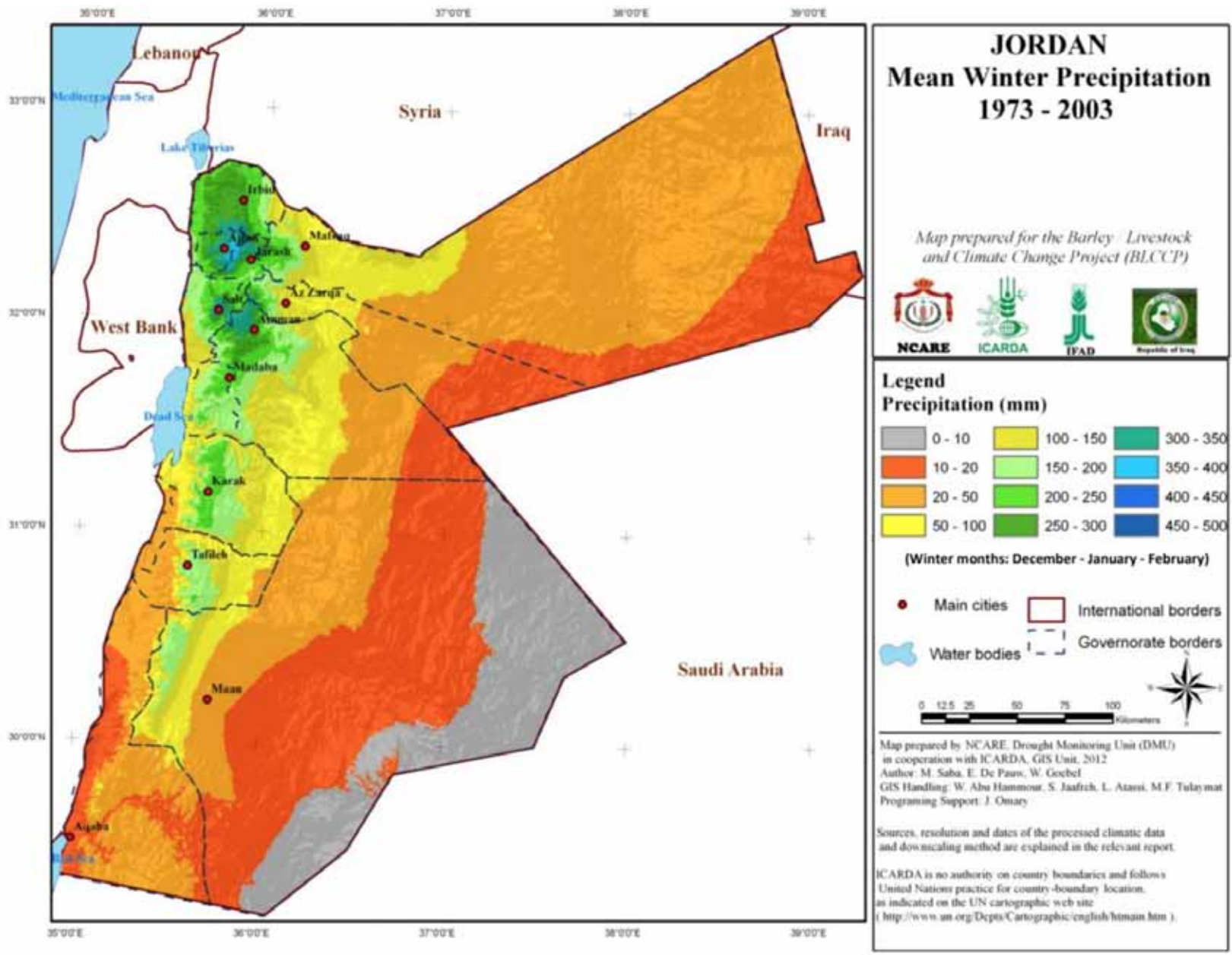
## SETTLEMENT TYPE

- ▲ Refugee Settlement
- △ Dispersed Refugees
- ▲ Refugee Camp

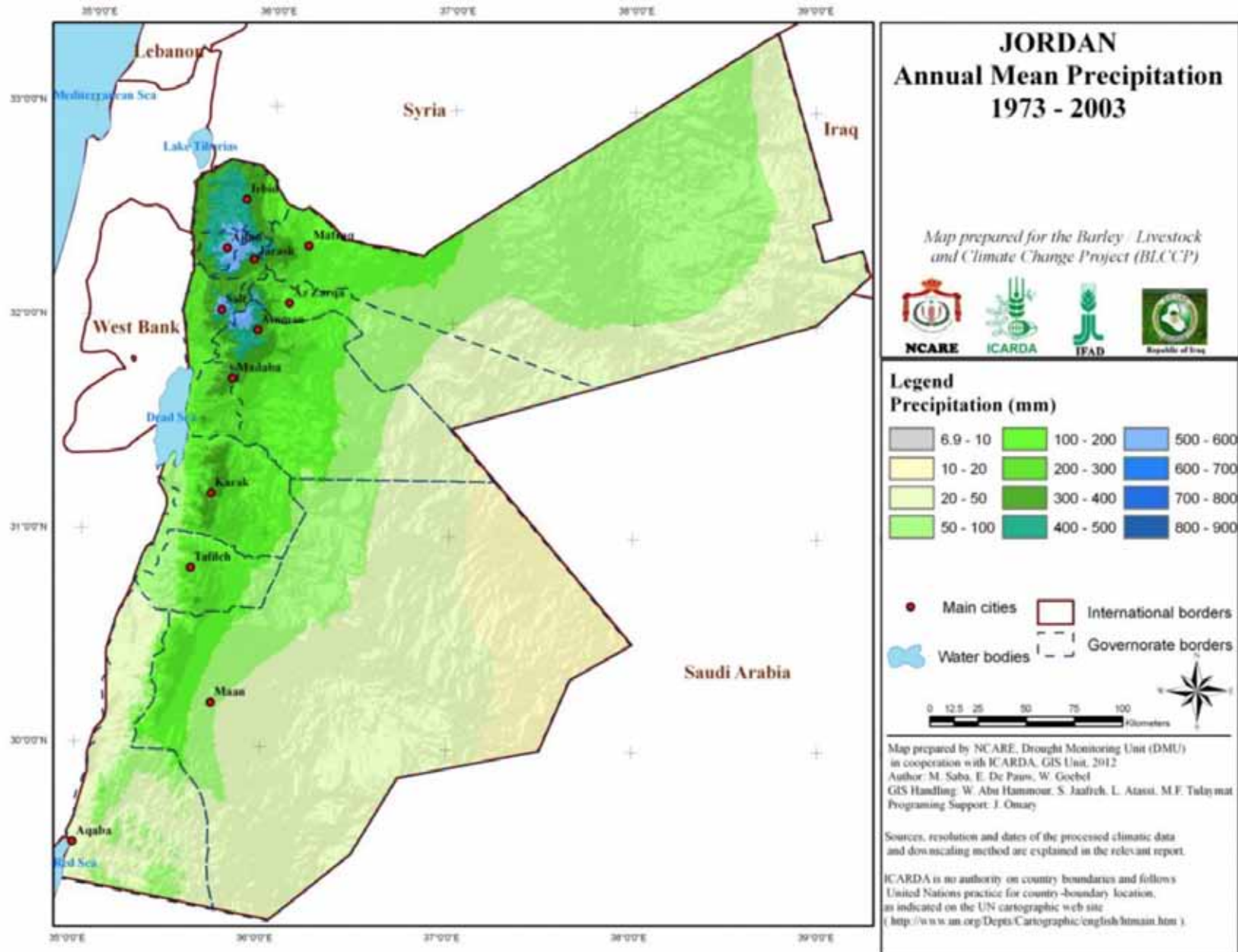
## CAMP POPULATION

IRBID	: 25,000
HUSN	: 22,000
JERASH	: 24,000
BAQA'A	: 104,000
SOUF	: 20,000
ZARQA	: 20,000
MARKA	: 53,000
TALBEIH	: 7,000
AMMAN	: 51,500
JABAL e1-HUSSELN	: 29,000

# WEATHER DATA

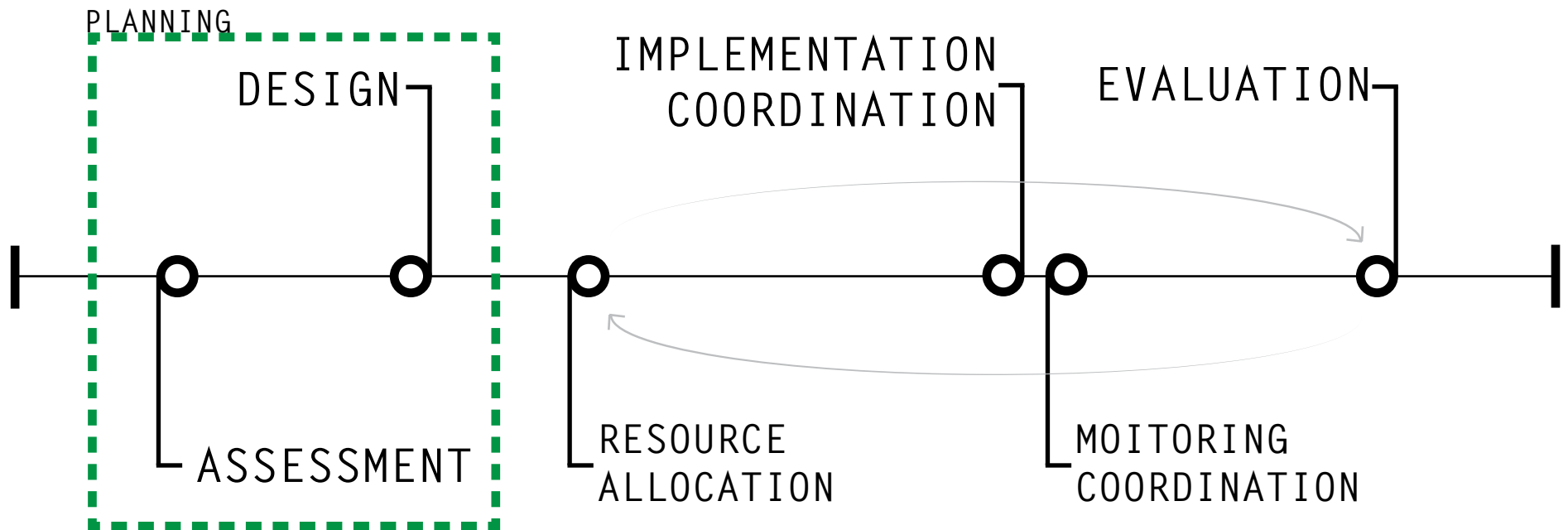


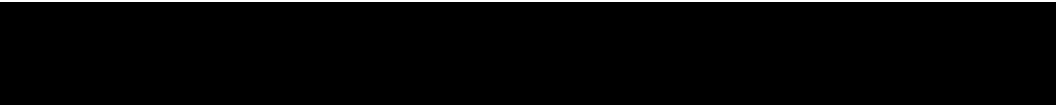
# WEATHER DATA



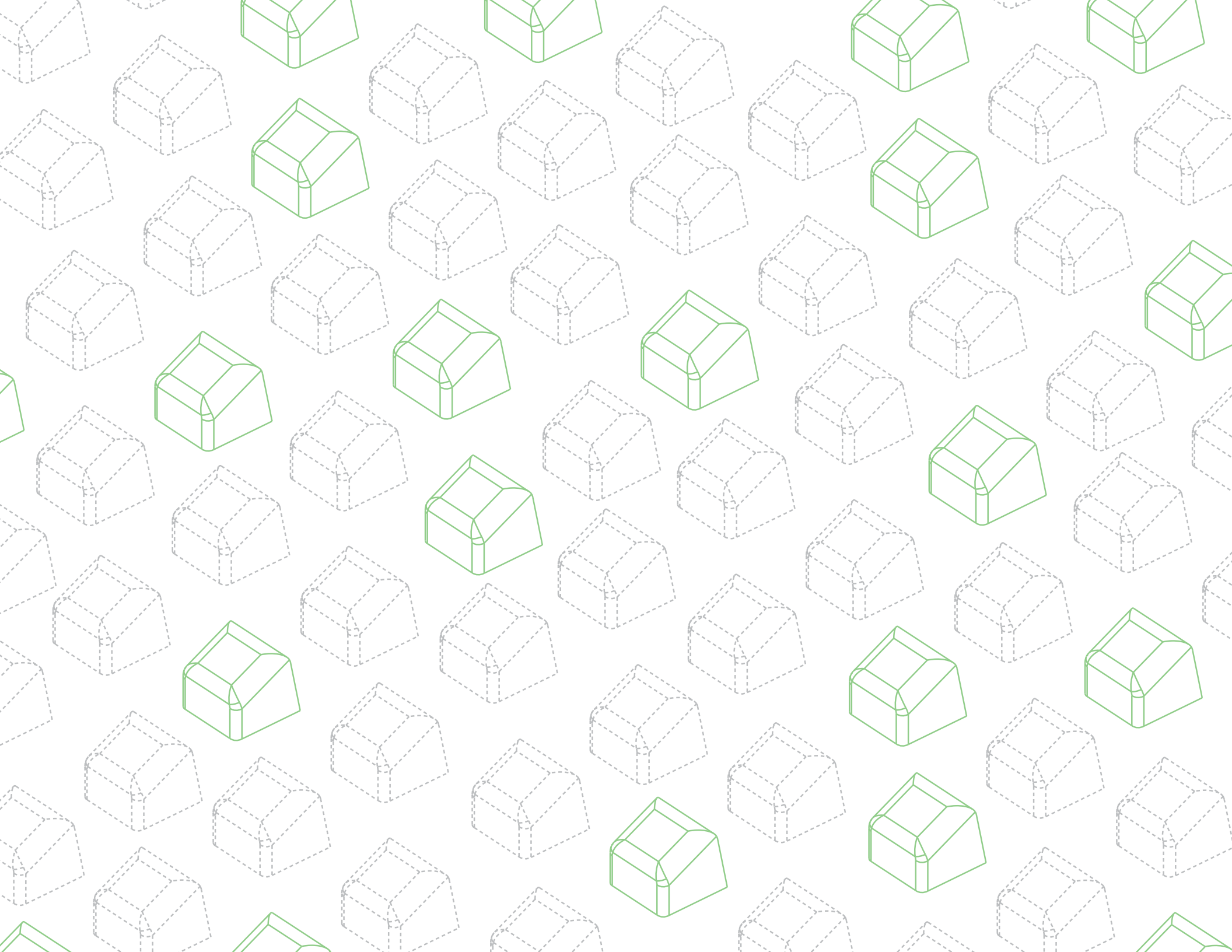
\* PRECIPITATION ADAPTED FROM ICARDA CLIMATE DATABASE

# REFUGEE CAMP PROCESS





The majority of the Jordan refugee camps are located within the same region. This area will be used as my site for the self sufficient pods. Not only will these be individually self sufficient pods but they will also work as their own network and community. The most recent statistics have shown residents of Jordan experiencing shortages of water. Using the weather data maps shows the region does experience about 300-400 mm of rain annually. If this region can create a rain storage system within the camps, it could help reassure the residents that they are able to access some of the main necessities for survival. Ideally, the money that is currently just allotted for shelter can be redirected to other aspects of the camp to better the conditions of these residents. The timeline illustrates the steps that need to be taken in order to begin planning for the camp and how it will be continually re-evaluated for better conditions.

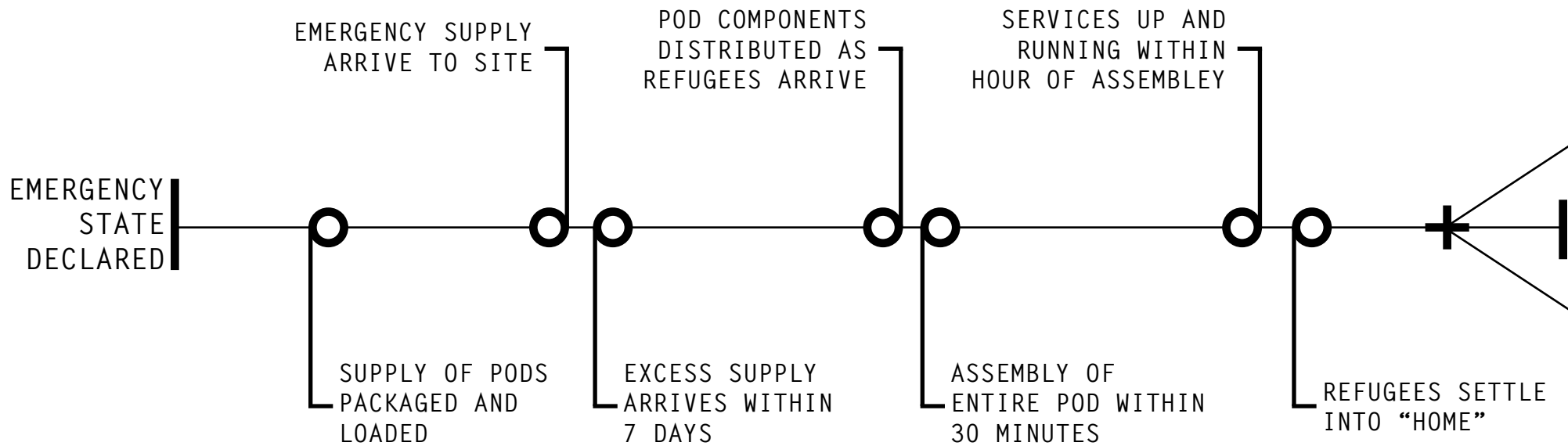




**POD  
DEVELOPMENT**



# ESTIMATED POD TIMELINE





DISSASSEMBLY OF  
COMPONENTS WITHIN  
30 MINUTES

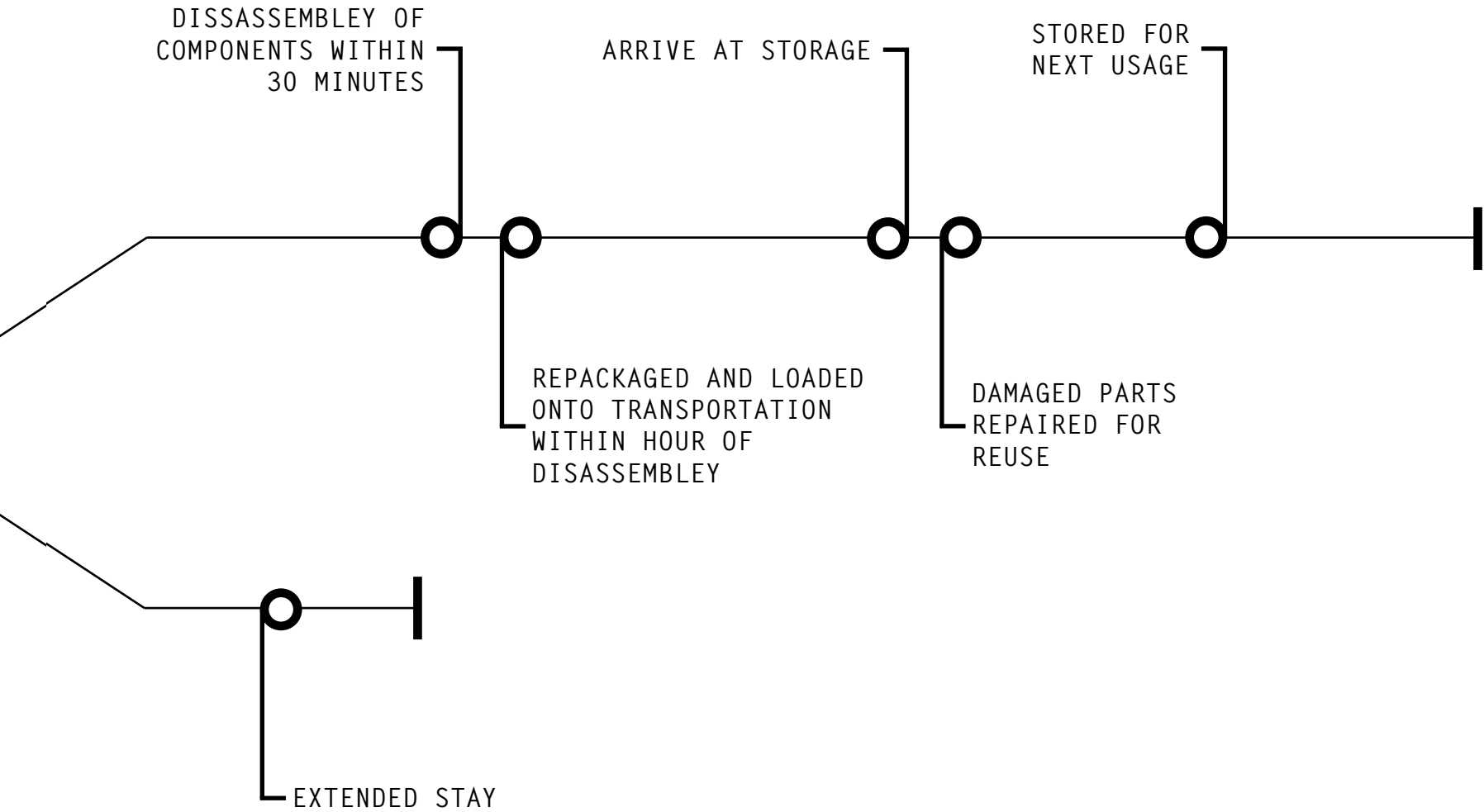
ARRIVE AT STORAGE

STORED FOR  
NEXT USAGE

REPACKAGED AND LOADED  
ONTO TRANSPORTATION  
WITHIN HOUR OF  
DISASSEMBLY

DAMAGED PARTS  
REPAIRED FOR  
REUSE

EXTENDED STAY



# POD ANALYSIS



FOOD

+



WATER

+



SHELTER

+



SAFETY

## COMPONENTS

- EASY ASSEMBLY
- LIGHT ENOUGH TO MOVE
- DURABLE AGAINST ELEMENTS
- CONTAINS NECESSITIES
- USED ON ANY TERRAIN



\*Michel McDaniels, EXO Reaction Housing System

+



NATURAL VENTILATION

+



SOLAR POWER

+



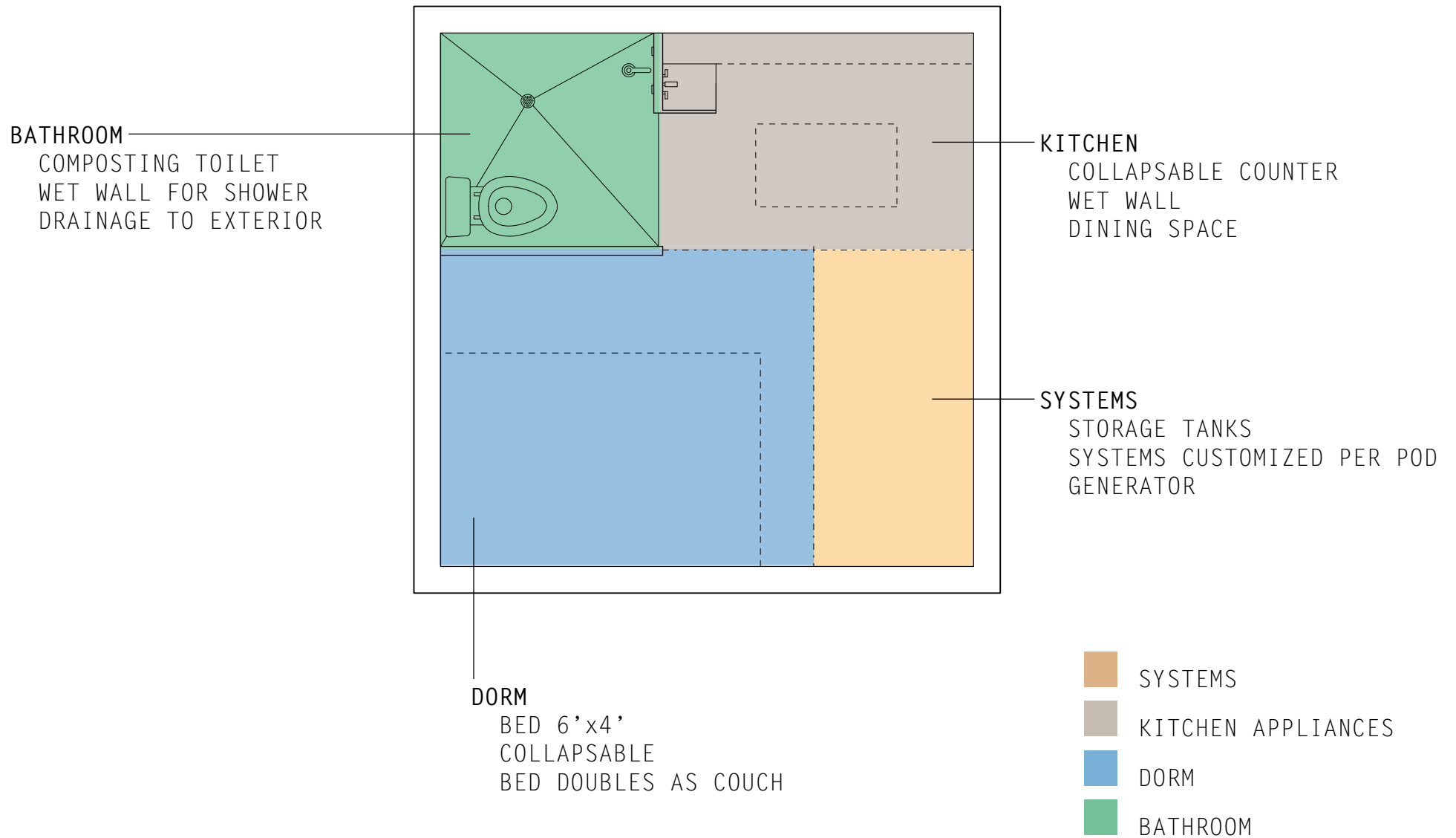
COMPOSTING FACILITIES

+



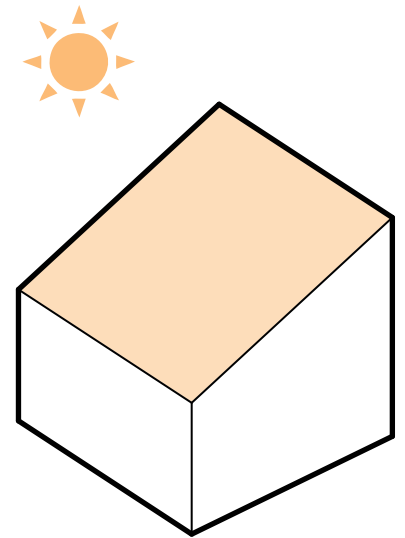
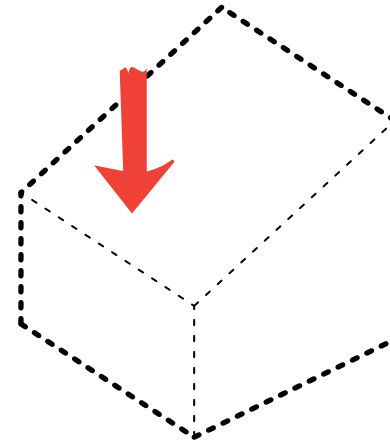
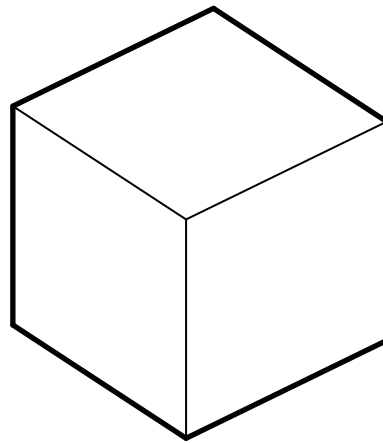
WATER

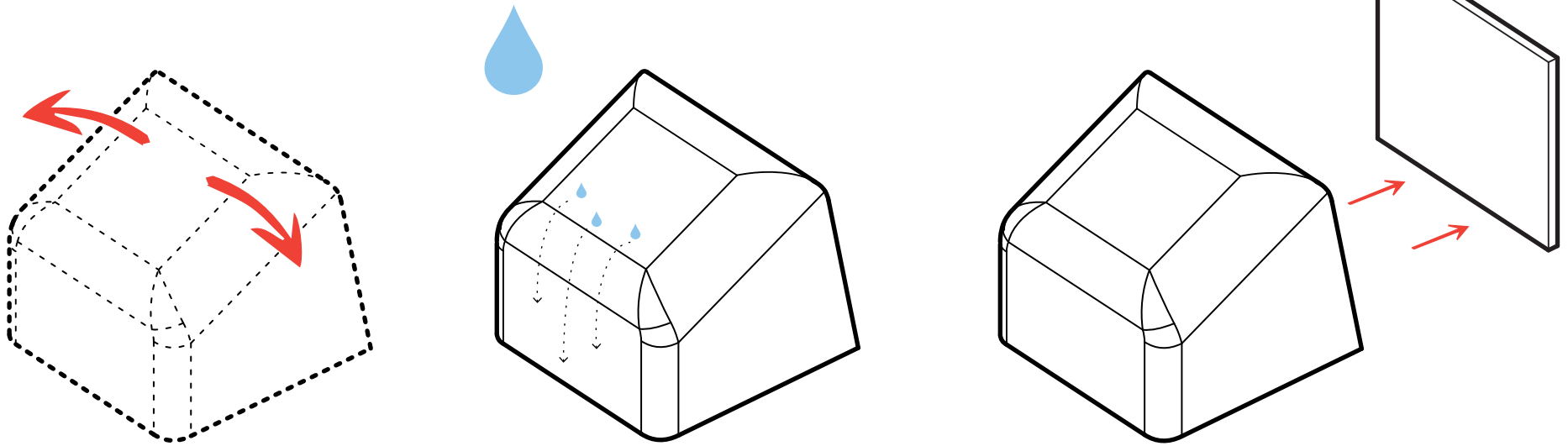
# CONCEPTUAL LAYOUT OF POD INTERIOR



# POD DEVELOPMENT

Adapting the pod from a cube, some important factors are weather. In this region the sun can be harnessed for solar energy. Angling the pod for maximum solar gain is key to obtaining the maximum amount of energy. Since the region these pods will be located in has the ability fo rain collection the pod should include some kind of water harnessing feature. To include systems in the pod, there will be a detachable wall that can be customized per pod depending on the systems needed. This detachable component also allows these pods to be stacked in an efficient way.





# METHODS OF DESIGN



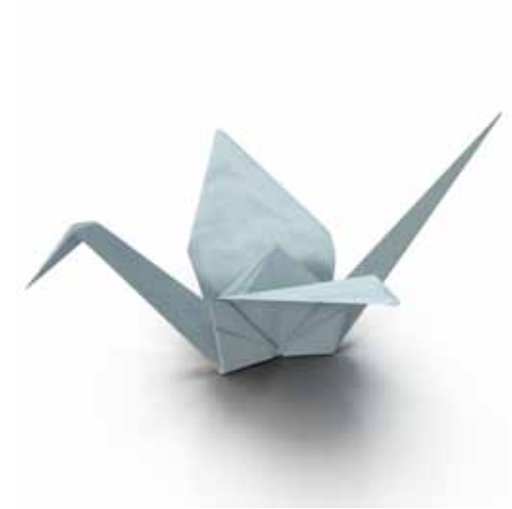
**STACKING**



**FOLDING**

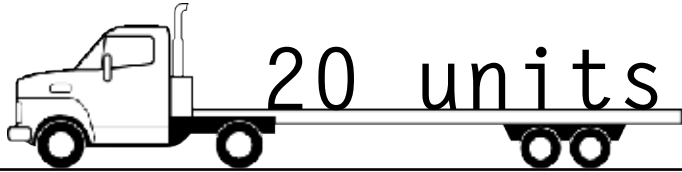


**FRAME**



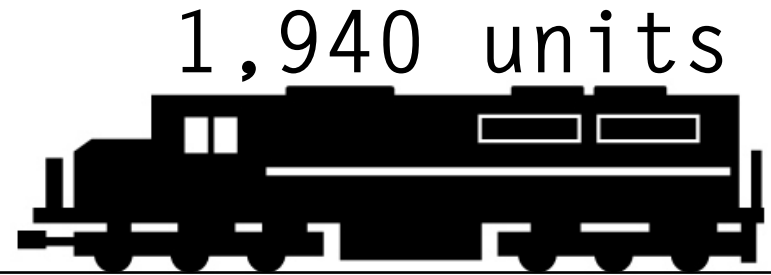
**ORAGAMI**

# METHODS OF TRANSPORTATION



20 units

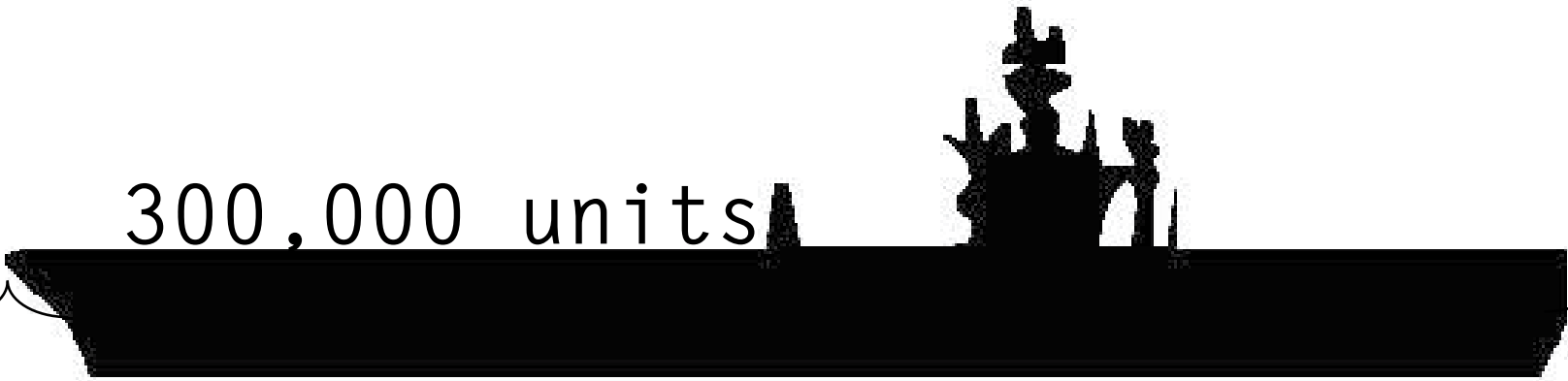
FLATBED TRUCK



1,940 units

1 MILE FREIGHT TRAIN

300,000 units

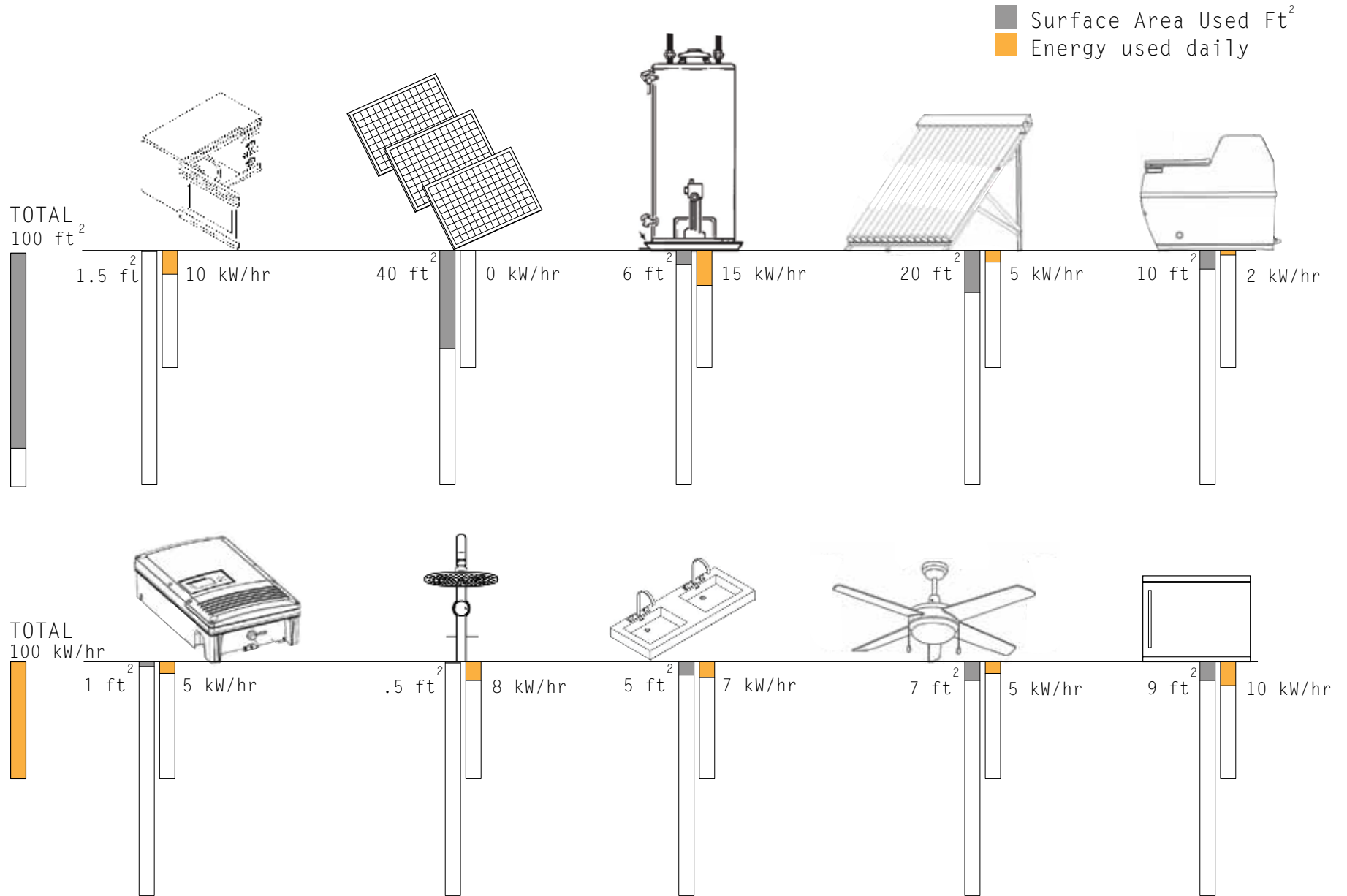


CARGO SHIP

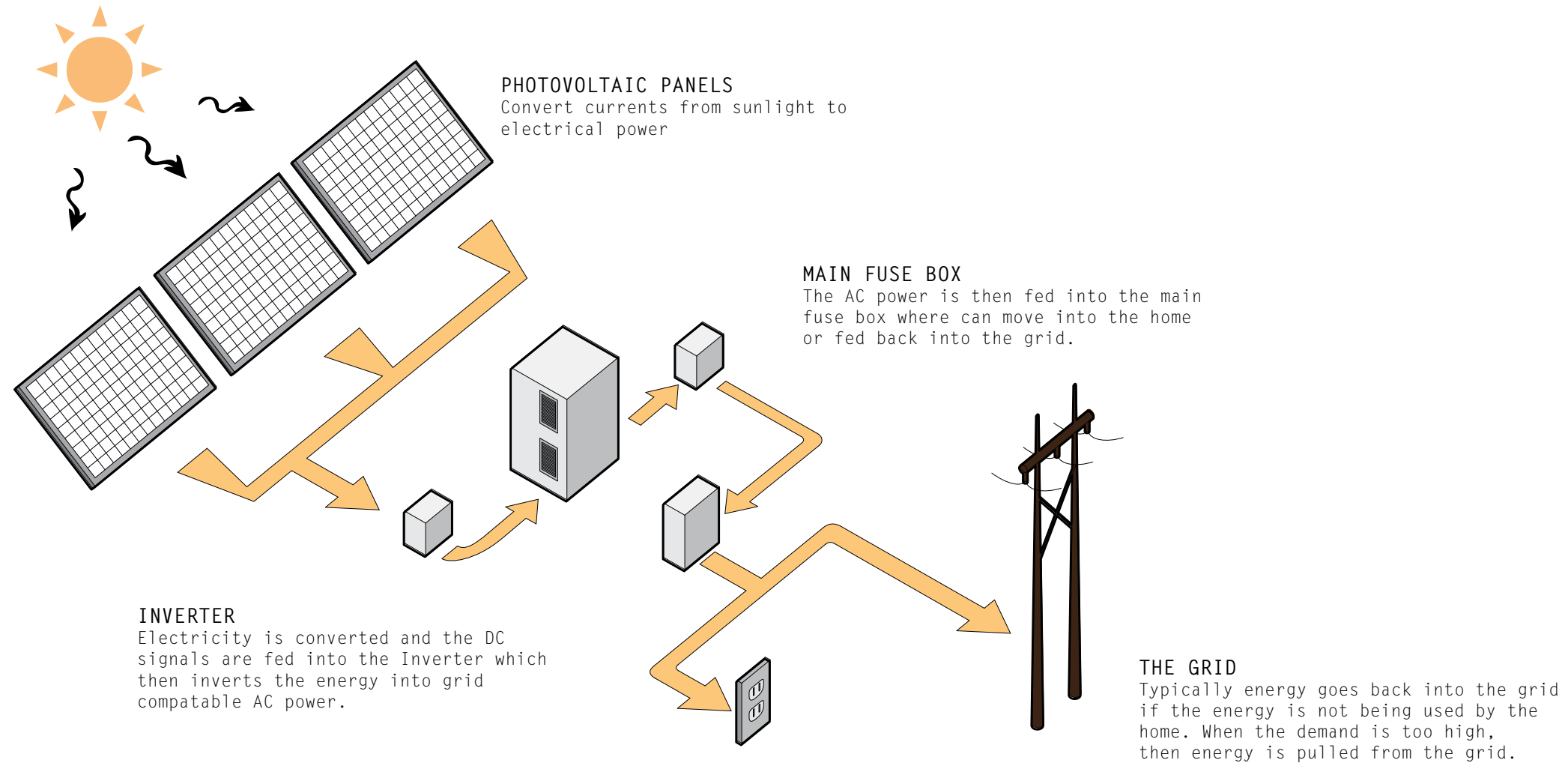
\*Estimates based on Michael McDaniel Reaction Housing



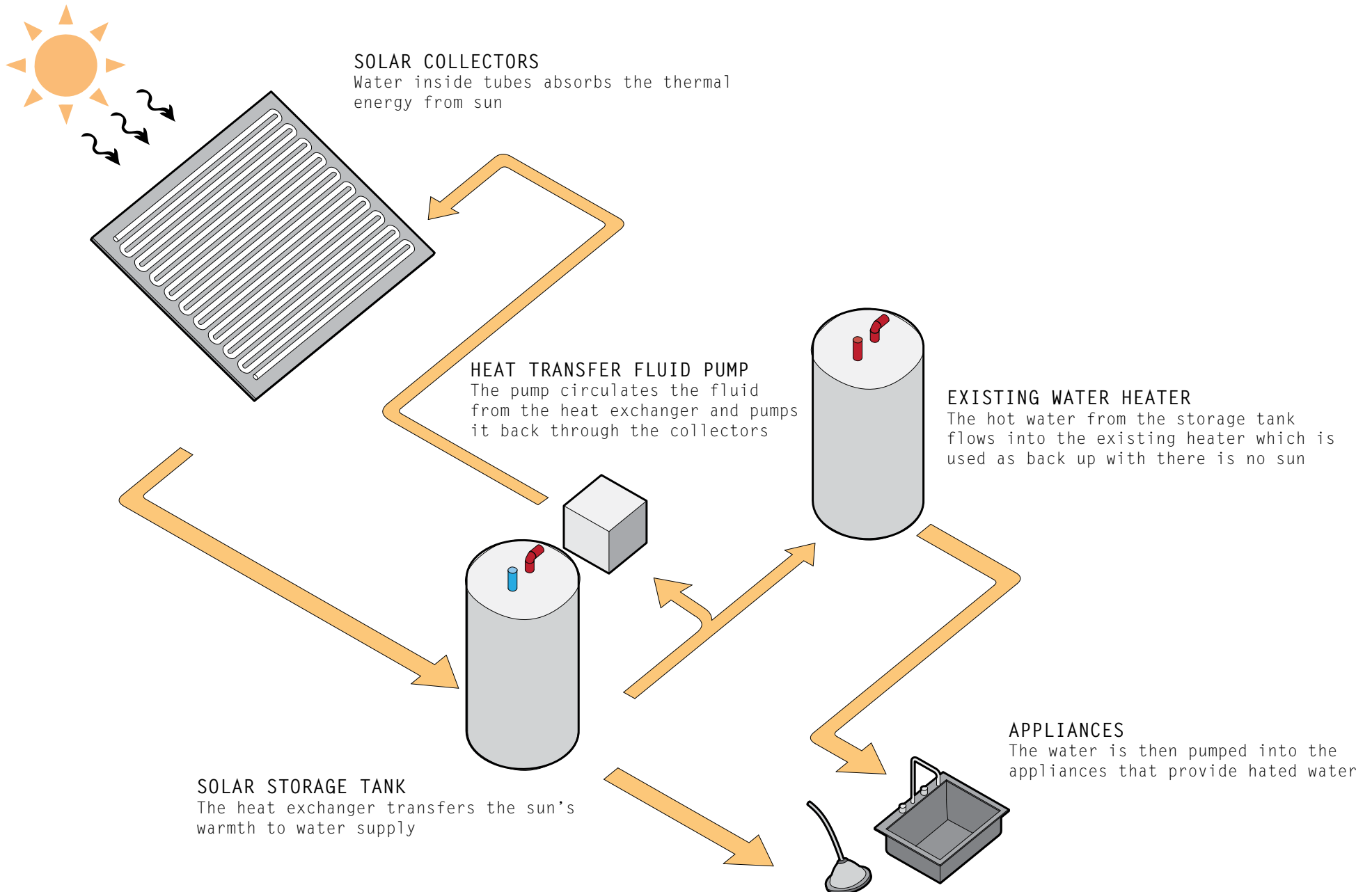
# SYSTEM COMPONENT ENERGY ANALYSIS



# PHOTOVOLTAIC SYSTEMS



# SOLAR COLLECTOR SYSTEM



# TESLA POWERWALL SYSTEM

## PHOTOVOLTAIC PANELS

Panels convert sunlight into electricity that charges Powerwall. Without solar, Powerwall can strategically shift energy consumption.

## INVERTER

The inverter converts direct current electricity from solar panels and Powerwall into the alternating current used by lights, appliances and devices.

## ELECTRICAL PANEL

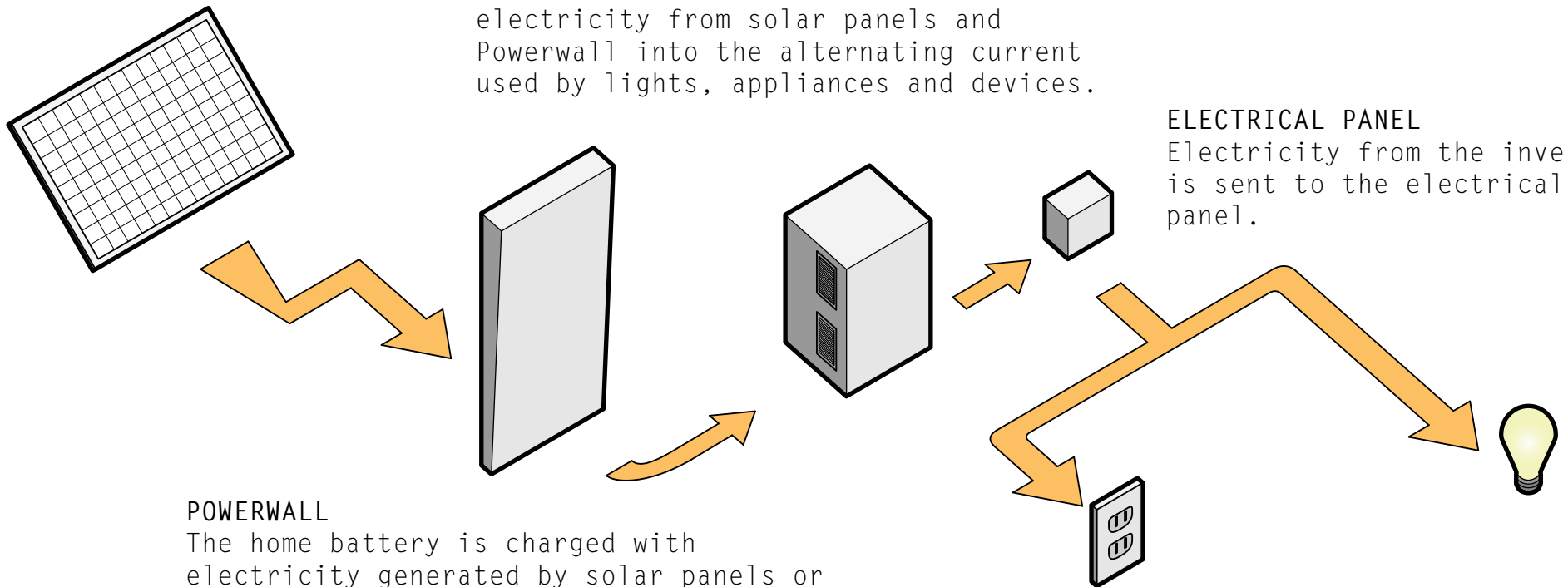
Electricity from the inverter is sent to the electrical panel.

## POWERWALL

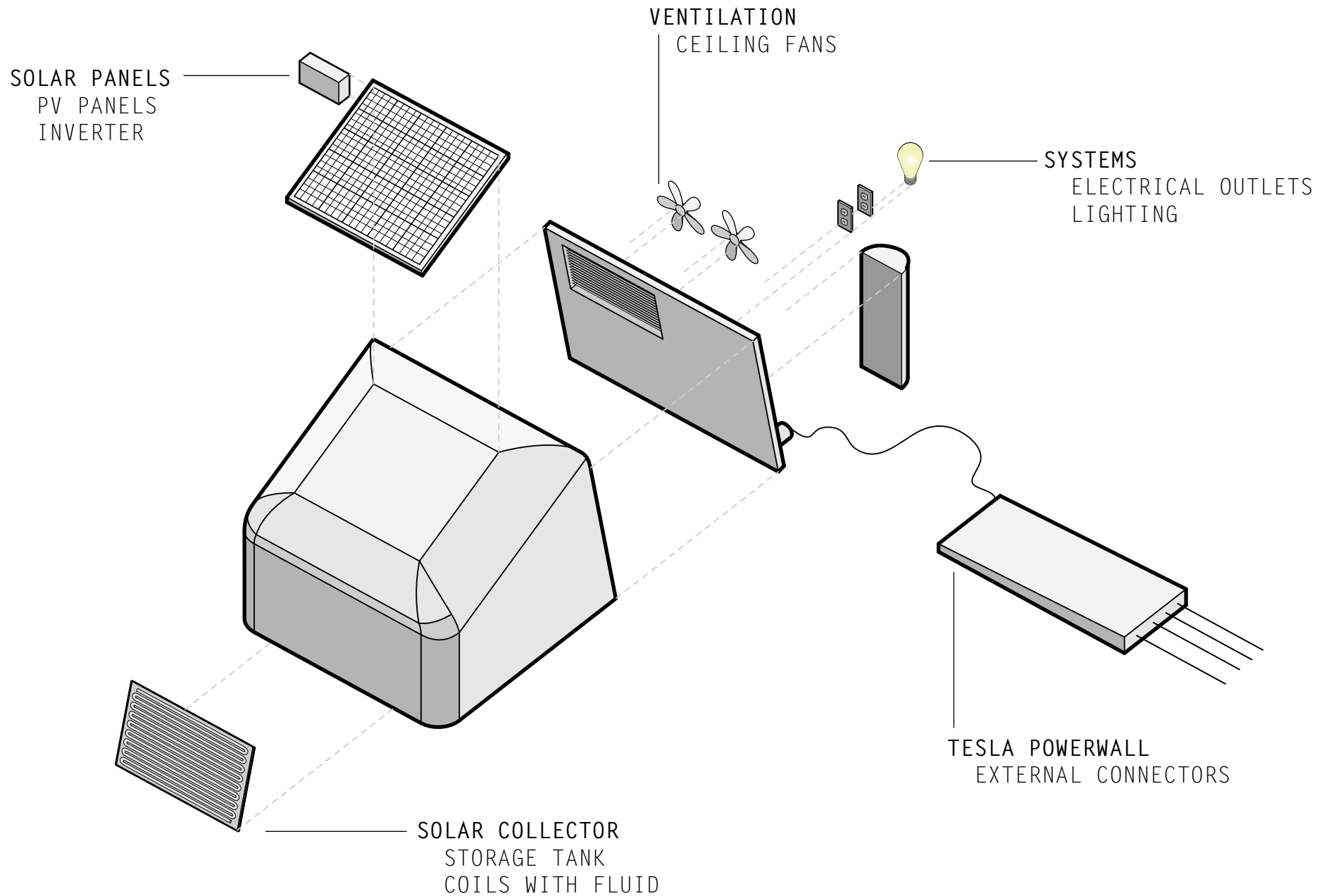
The home battery is charged with electricity generated by solar panels or from the utility grid

## ELECTRICAL UNITS

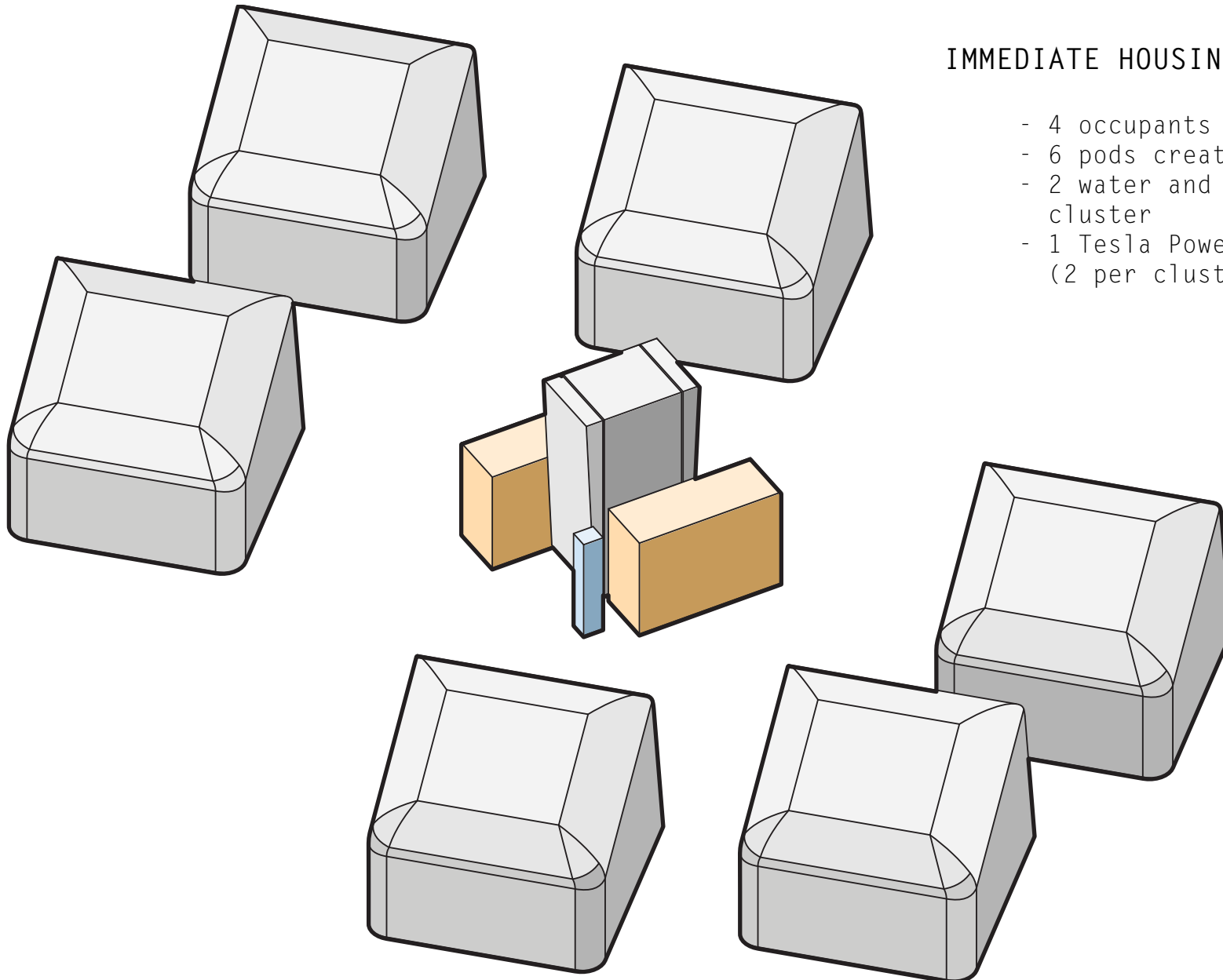
Appliances utilize electricity generated from Powerwall.



# ARRANGEMENT OF COMPONENTS



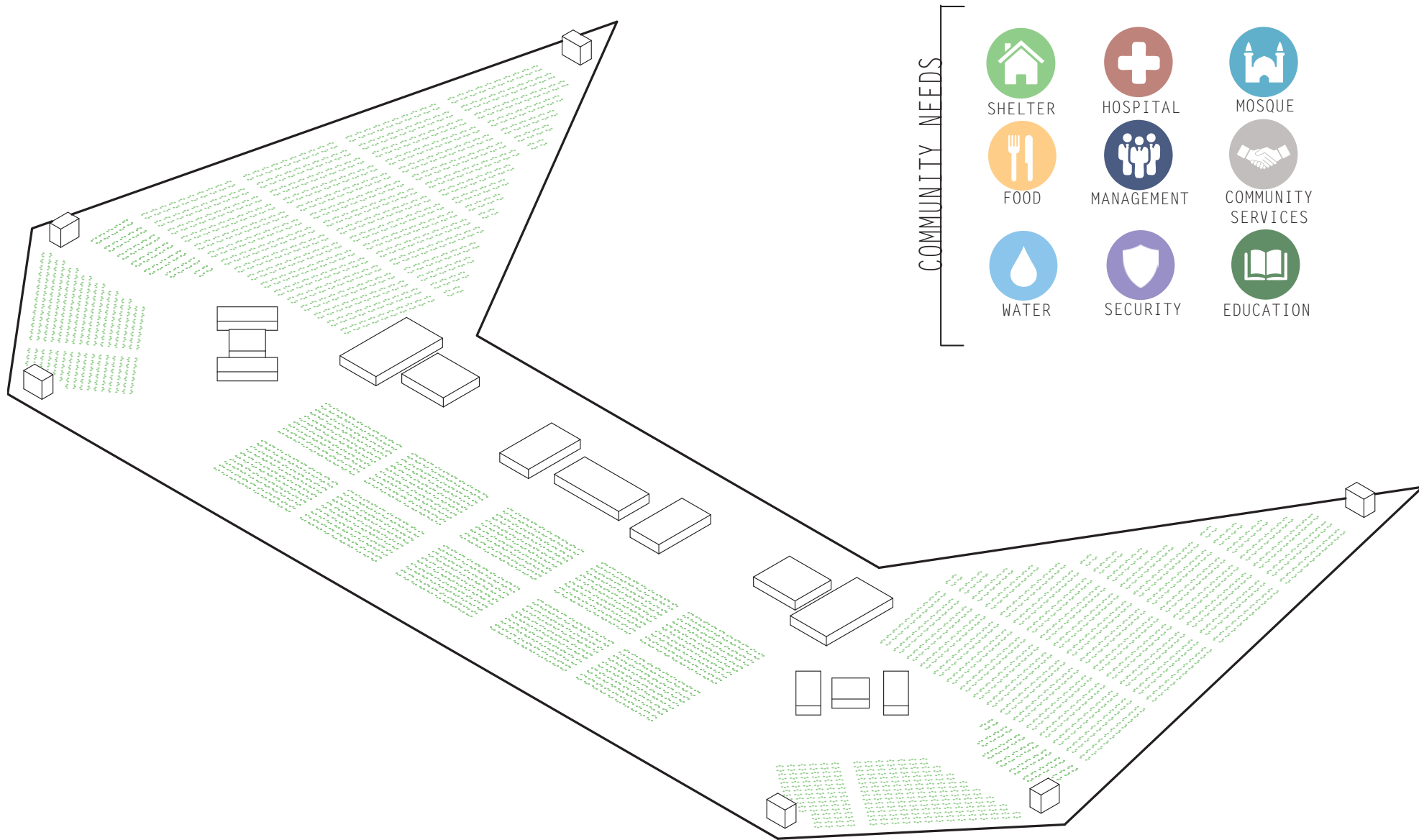
# COMMUNITY SITE PLAN



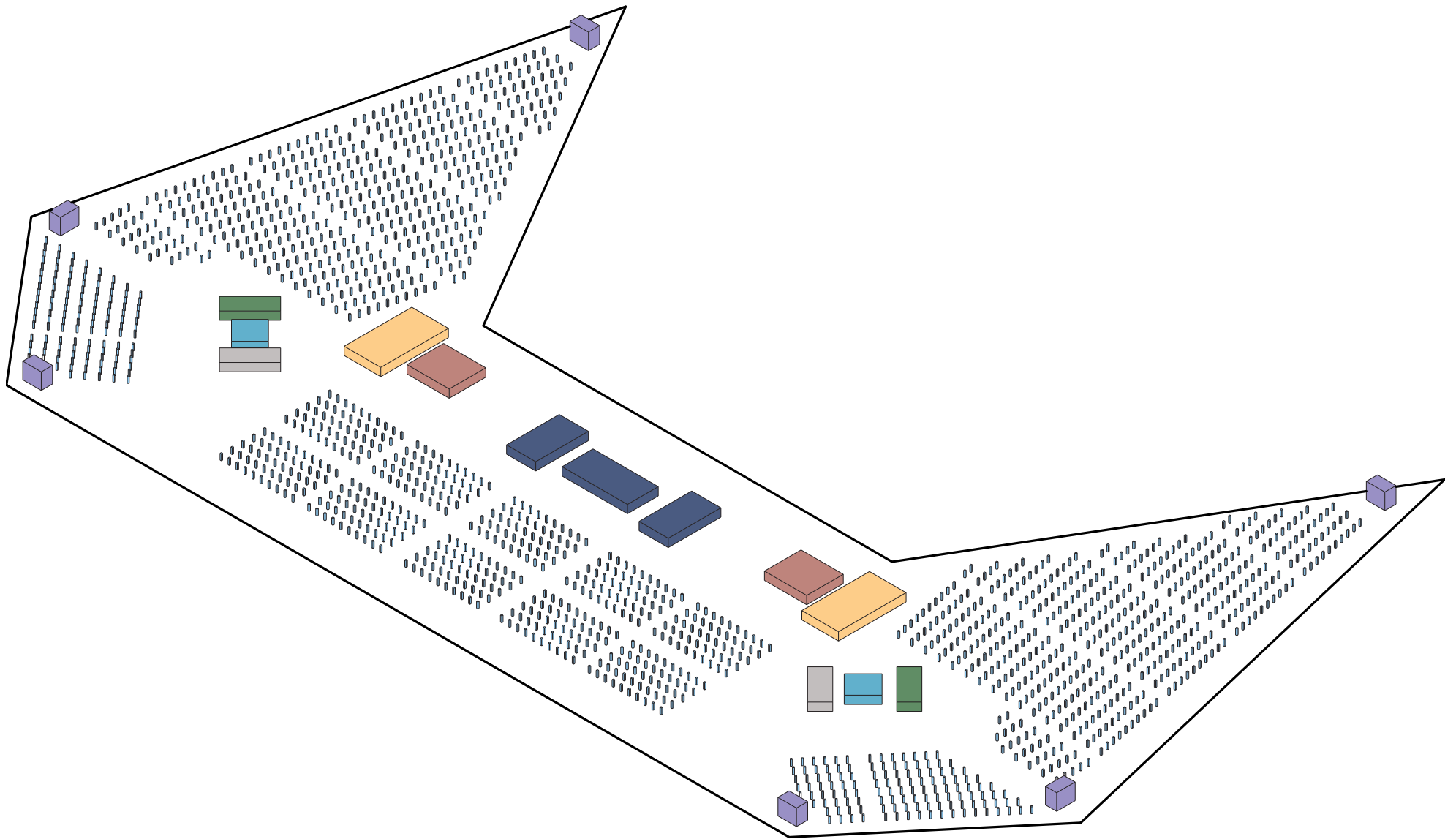
## IMMEDIATE HOUSING GROUP COMPONENTS

- 4 occupants per pod
- 6 pods create a cluster
- 2 water and 2 kitchen stations per cluster
- 1 Tesla Powerwall per 3 units (2 per cluster)

# CONCEPTUAL HOUSING SITE PLAN



# CONCEPTUAL COMMUNITY SITE PLAN





# COMPONENT SYSTEMATIZING

Through the analysis of natural disaster and refugee camp conditions, 4 major necessities and design components outline the ideal conditions within this pod. In addition to these components, efficient systems need to be integrated in order for the pod to be run independently of exterior energy sources. A series of studies of construction methods for this pod will be conducted in order to find the best way to transport and package the pod. The development of this pod will have constraints due to structure in order to have the maximum number of pods transported to a specific site. Energy analysis will be conducted for the specific appliances going into the pod in order to have the most efficient systems. The arrangement of these components and appliances will create a comfortable, energy efficient space for these refugees to be housed in. Creating an easily accessible infrastructure around the pods will create a better temporary living space for the residents. The analysis of current refugee camps illustrates the need for a more centralized infrastructure that is easily accessible for all community members.

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