Brief Introduction
  Background
  Research Question

Field and Desk Research
  Video: The Journey (9:00 min)
  The Principles
  The Complementary Ecosystem

Experiments with Reed and Earth
  Walls and Columns
  Framework

Design In Progress
  Injection of A New Urban Strategy
  The City from Tabula Rasa
  Architectural Design
  Focus on Details
  Impressions

Final Thoughts
Discussion
3.2 MILLION PEOPLE WERE DISPLACED WITHIN 2 YEARS WHICH IS 6% OF WORLDWIDE REFUGEES (51.2 M)
MORE THAN 300,000 ARRIVED AUGUST 2014 IN THE CAMPS OF KURDISTAN

[Photograph by EPA]
CAMP OR CITY?
WITHIN TWO YEARS

PHOTOGRAPH BY BUSINESS INSIDER
INTRODUCTION

BACKGROUND
IDENTITY
WHO ARE YOU?
NOT A SINGLE SHELTER IS IDENTICAL
KENYA
OVERALL DESIGN QUESTION

HOW TO REDEFINE KURDISTAN’S CURRENT REFUGEE CAMPS INTO AN OFF-THE-GRID (OTG) CITY USING LOCAL MATERIALS?
HOW TO APPLY SOLAR ENERGY, LOCAL MATERIALS AND RECYCLING METHOD(S) TO MANIFEST A SELF-SUFFICIENT REFUGEE CITY?
UNHCR FAMILY TENT
UNHCR TENT MOD.2
“CARAVAN” SHELTER
CEMENT BLOCKS BLD.

USABLE
FLOOR
AREA
COMPARISON CHART
BASED ON THE THREE CAMPS

- SECURITY
- CLIMATE RESISTANCE
- CAMP LAYOUT
- PRIVACY
- FLEXIBILITY

ARBAT TRANSITIONAL CAMP
ARBAT MAIN CAMP
DARA SHAKRAN CAMP
MY GOAL
PASSIVE SOLAR APPROACH

- Select a material with a high thermal mass
- Face south to gain free heat and optimise the efficiency of the PV cells
- Use indirect light to light during day and moonlight in evening, use vegetation for shading
- Allow air to flow naturally through the composition of the shelter
- Use solar chimney for cooling and heating
- Pre-heat or pre-cool air
- Use venturi roof to remove exhaust air
HOW MUCH PV CELLS IS REQUIRED TO LIT A SEGMENT OF THE CITY?

421 KWHR/YEAR
WITH ONE PV PANEL
(KYOCERA KD180CX)
52.8"X39"X1.4"

3X10W LED BULB = 1X45W
EVERY DAY FROM 6PM-6AM (13 HOURS)
8X8W LED BULB

THE OBJECTIVE:
AVERAGE 25°C
SUMMER & AUTUMN/SPRING

PV CELLS

78°
66°
54°
30°
FIELD AND DESK RESEARCH - WALL
**Step One**

**The Initiation**

**Instructions**

Inject a specific market node in the camp. Add the factories in the no man's land.

**Objective**

Break the current rigid boundaries and stimulate community.
INJECTION OF A NEW URBAN STRATEGY
THE MODEST
FOCUSED TOWARDS THE INSIDE

EXCHANGE
OFFSET OF 1.5M
ARRANGED EVERY 2.5M
REFUELFRESH AIR
DRAIN OUT THE HEAT
NIGHT TIME
DAY TIME
WIND NW
WIND SW

WORKING AREA REQUIRES LIGHT
WINDOW

COOKING AREA REQUIRES LIGHT
WINDOW

VIEW ON GARDEN
WINDOW

4M
4M

WT
DR1
DR2

WHO COMES INSIDE?
WINDOW

DESIGN IN PROGRESS • ARCHITECTURE DESIGN
ARRANGED EVERY 2.5M

REFUEL FRESH AIR
+
DRAIN OUT THE HEAT

EXCHANGE

56 M²

WORKING AREA REQUIRES LIGHT
+
WINDOW

DAY TIME ☀

WIND NW

WIND SW

56 M²

WORKING AREA REQUIRES LIGHT
+
WINDOW

COOKING AREA REQUIRES LIGHT
+
WINDOW

VIEW ON GARDEN
+
WINDOW

WT

DR 1

DR 2

DESIGN IN PROGRESS • ARCHITECTURE DESIGN

37 OF 58
THIS SIDE IS GETTING WARM IN THE SUMMER.

RESPONSE OF SOLAR RADIATION

NO WINDOWS!

WORKING AREA REQUIRES LIGHT

WINDOW

NIGHT TIME

DAY TIME

COOKING AREA REQUIRES LIGHT

WINDOW

50 M²

THE ASSEMBLER

FOCUSED ON UNITY

AREA FOR TOOLS

ZONE

AREA FOR STORAGE

ZONE

AREA FOR DINNER

ZONE

WORKING AREA REQUIRES LIGHT

WINDOW

4-6 M ROAD

DESIGN IN PROGRESS • ARCHITECTURE DESIGN

39 OF 58
THE REAPER
FOCUSED ON PRODUCTION
THE MODEST WEST FACADE
SECTION OF THE ASSEMBLER

A-A

SEWER
AIR FLOW
QUADRUPLE REED LAYER
FASTEN & SLIDE
FRESH AIR
EXHAUST
KITCHEN
WORK/GATHER

13:00
SSW
15:00
18:00
20:00
D01
D02

DESIGN IN PROGRESS • ARCHITECTURE DESIGN
HOW TO MAKE THE REFUGEE CITY REED + EARTH WALL?

- PINPOINT THE REED SUPPORT
- FASTEN REED POLE WITH ROBE
- CONNECT PB
- USE DRLC

HORIZONTAL REED

- 200 MM
- 250 MM
- 300 MM
- 270 MM

MUD LAYER
- OUTDOOR

DRY TIME: 3 DAYS

ADD EARTH

TEMPORARY

PAINT

OF 58 49
HOW TO MAKE THE REFUGEE CITY REED + EARTH WALL?

200 MM

250 MM

PINPOINT THE REED SUPPORT
HORIZONTAL REED

CONNECT PB*

FASTEN REED POLE WITH ROBE

USE DRLC*

OF 58

50 OF 58
HOW TO MAKE THE REFUGEE CITY REED + EARTH WALL?

- Fasten reed pole with robe
- Use DRLC*
- Horizontal reed
- Temporary mud layer
- Outdoor
- Paint

Dimensions:
- 250 MM
- 300 MM
HOW TO MAKE THE REFUGEE CITY REED + EARTH WALL?

300 MM

ADD EARTH
HORIZONTAL REED
TEMPORARY
DRY TIME · 3 DAYS
MUD LAYER
OUTDOOR
+ PAINT

270 MM

ED + EARTH WALL?
**D01 · RENDEZVOUS OF COLUMN VS. ROOF**

- **MUD CLADDING**
- **HORIZONTAL REED BEAM**
- **COMPRESSED REED BLOCK**
- **DOUBLE REED SHEET**

**Dimensions:**
- **100-120 MM**
- **400 MM**
- **66°**
- **110-120 MM**

**Design in Progress · Focus on Details**
D02 · ROOF TOP SUGGESTION

REED TOP ROOF BEAM
FASTEN WITH ROPE
HORIZONTAL BEAM SUPPORT

SOLAR PANEL 1 X 1 M
CONNECT WITH REED & ROPE
FINAL THOUGHT

Develop a **prototype** on site to learn more about the **building method** and **performance**.
THANK YOU FOR YOUR ATTENTION

DISCUSSION TIME