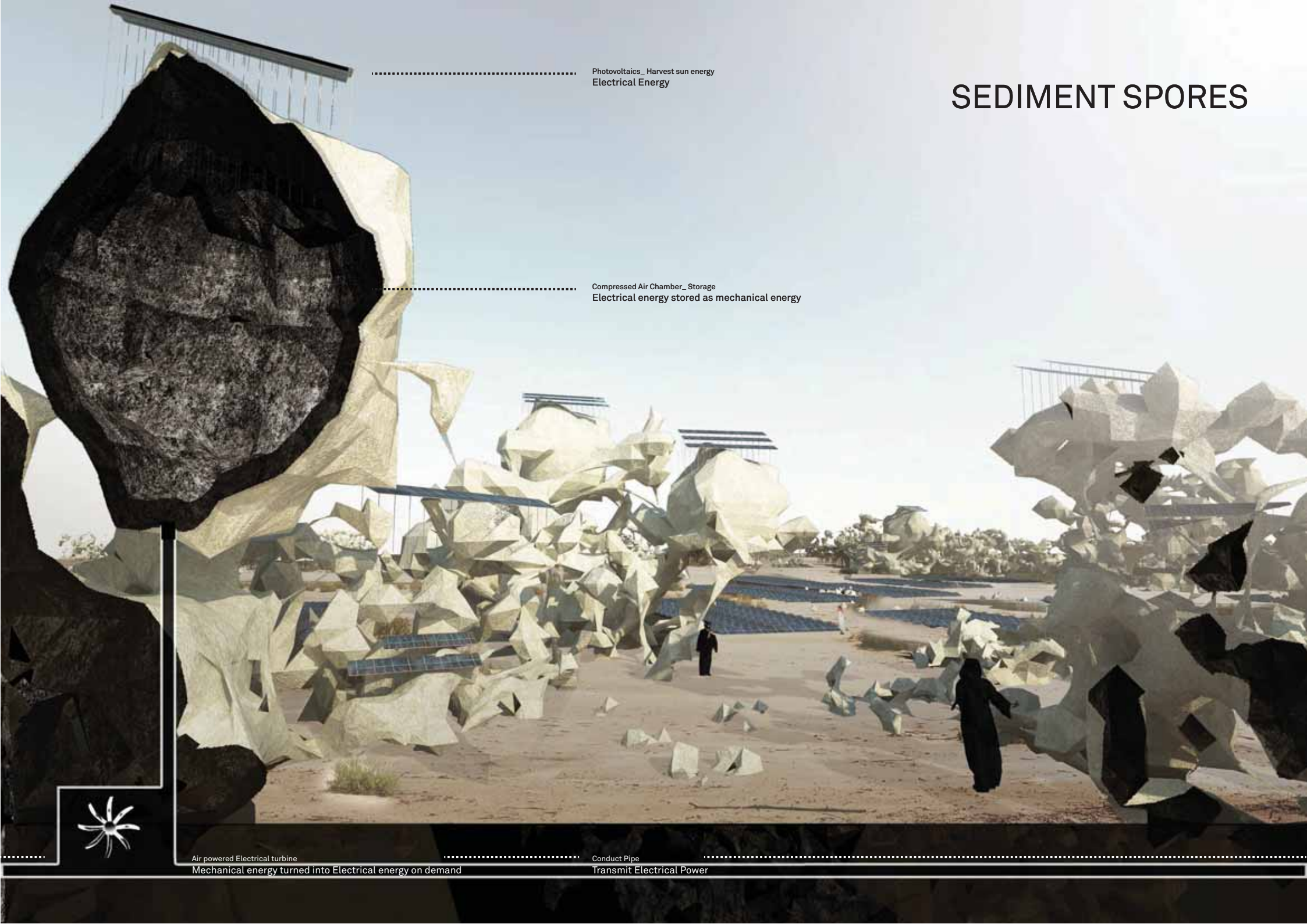
SEDIMENT SPORES



Photovoltaics_ Harvest sun energy
Electrical Energy

Compressed Air Chamber_ Storage
Electrical energy stored as mechanical energy

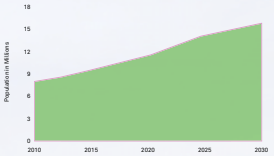
Air powered Electrical turbine
Mechanical energy turned into Electrical energy on demand

Conduct Pipe
Transmit Electrical Power

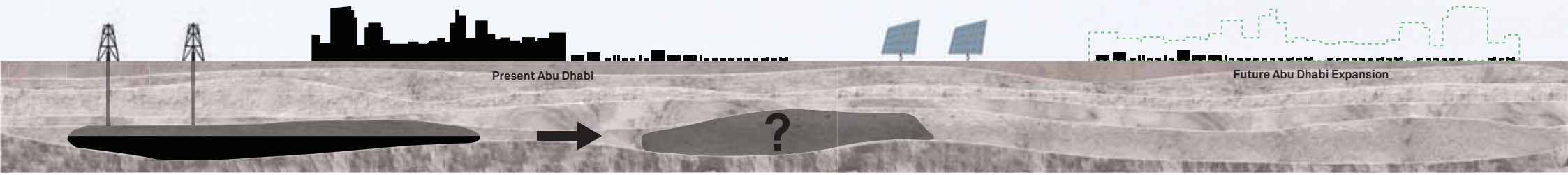
SEDIMENT SPORES

According to Georges Bataille entropy is, by definition, excess energy; an overproduction. The current world is heavily investing in renewable energy due to new laws, potential carbon taxes, etc., in which energy technological efficiencies will grow exponentially coinciding with Moore's Law. If people are unable to control this growing energy production, the future will face the same problem we do today, excess energy we call waste and therefore the ability to store energy efficiently is more critical than producing energy itself.
Interestingly enough, Abu Dhabi finds itself at the center of this polemic being one of the worlds largest oil suppliers. This mass amount of stored energy has created a rapidly growing city and population that has produced excess tertiary space in its sprawl development. However, these spaces will eventually densify but it is uncertain the future energy that will facilitate such growth knowing that oil wells will inevitably run out. Many nations have been investing in their underground salt mines to store energy in the highly efficient form of compressed air. Why could not Abu Dhabi do the same with their oil wells, augmenting space devoid of its original use?
The project puts in place a similar initiative by using devoid city space and excess materials and matter from city growth to create an energy storage and production land art piece on Site 3. Architecture is another word for system in which entropy is its structural blindness. In this context, waste is a repressed condition of architecture in which the project creates new material structures with waste by looking at systems of nature.
The interest of entropy, waste and excess was derived from the context of the site as well as past land artists such as Robert Smithson and conceptual artist Marcel Duchamp. The project addresses the "structural blindness", as Smithson puts it, of waste in the building process. By using waste as a instrument and a sand calcifying bacteria that feeds on urea, as an architecture, the proposal intends to challenge viewers perception of how space in a rapidly growing city is created and understood. This is not to battle entropy but on the contrary, to embrace it showing its repressed potentials in an urban context.

Site 3 was selected for this very reason. It is itself, a leftover space that is blocked from view by foliage. Such places are only noticed, or not noticed, once created. That is to say, we only see the dust once it has settled. The site is situated between 3 freeways near the airport and seemed to have the least value of the three sites thus proving the most potential.
The forms of the land art piece are derived from the behaviors of its constructors. By creating a program that mimics a sand calcifying bacteria *(Bacillus pasteurii)* behaviors we are able create emergent forms out of adjacent excavated building sand brought on site. When the city grows, the land art piece grows as well. Placing molds within the piles of sand and adding the bacteria, the forms created by bacteria are shown at multiples scales relating to the human and microbe alike. This complex and organic patterning allows for multiple spatial features and habitats allowing for public viewing as well as solar energy harvesting and storage for thousands of homes.



UAE Population Growth

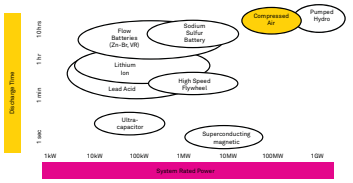


'READY MADE' STORED ENERGY = OIL

DRY OIL WELL = CHALLENGE FOR ENERGY CREATION

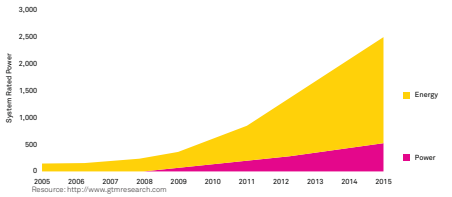
NEW ENERGY GENERATION = CHALLENGE TO CREATE NEW ENERGY STORAGE

COMPRESSED AIR: FUTURE OF ENERGY STORAGE



Resource: http://www.gtmresearch.com

Potential Energy Storage System Comparison



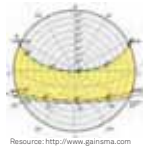
Resource: http://www.gtmresearch.com

Production of Grid Scale Energy Storage

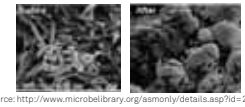
CITY EXPANSION

City Growth = Excavated Building Soil

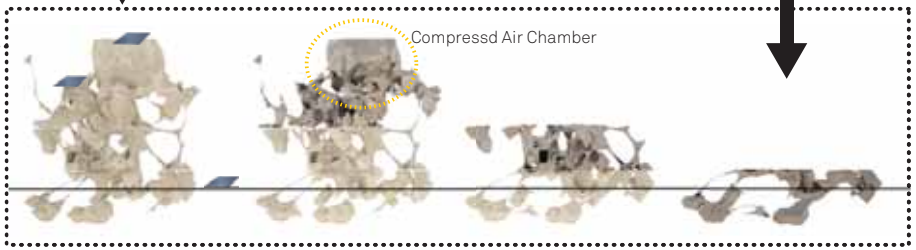
Energy Photovoltaics


Resource: http://www.gainsma.com

Sun Chart


Resource: http://www.microbelibrary.org/asmonly/details.asp?id=2851&Lang

CALCIFICATION *(Bacteria Bacillus pasteurii)*



ENTROPY REINTERPRETED = ENERGY PRODUCTION AND STORAGE SANDSTONE LANDART

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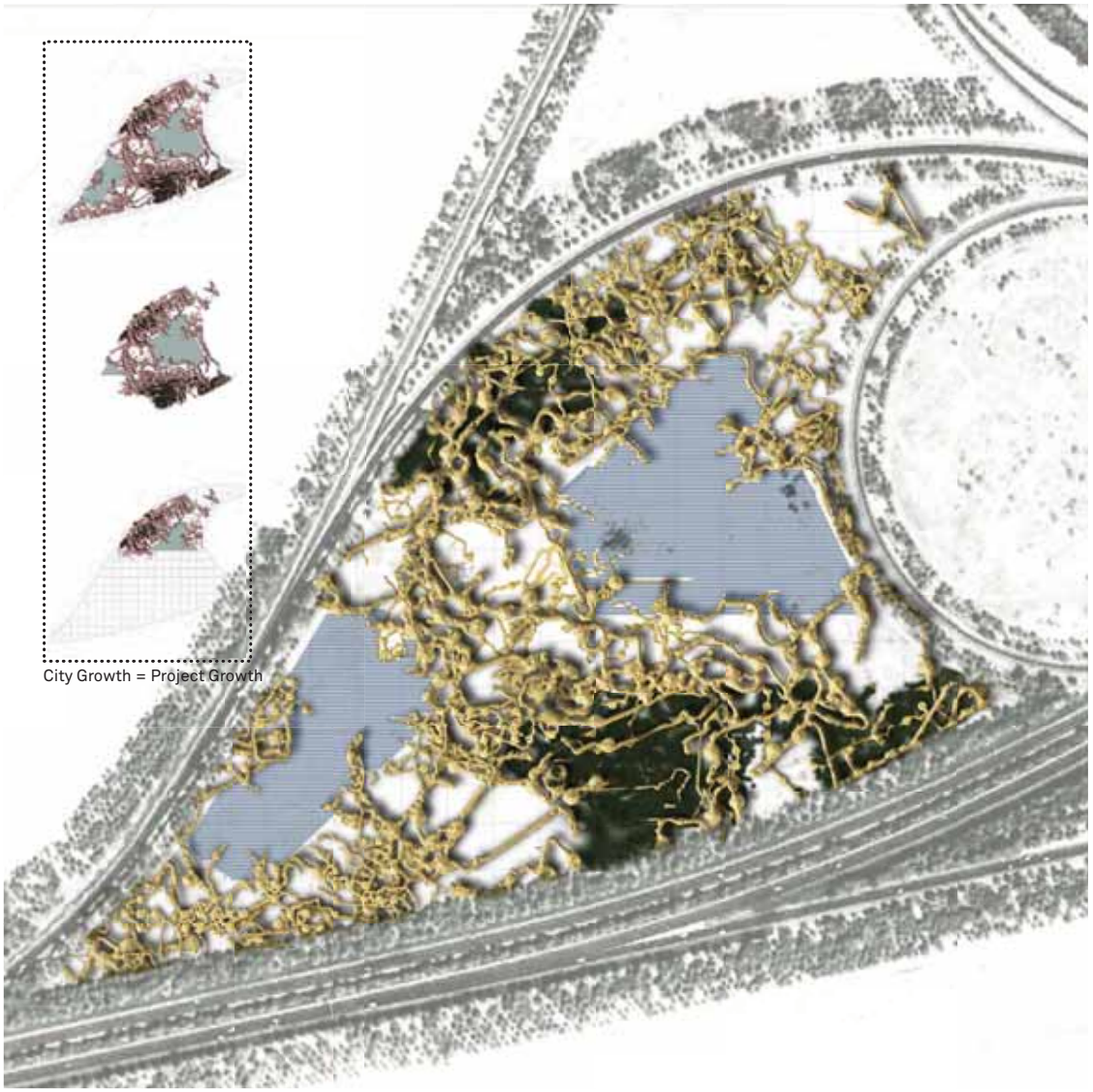
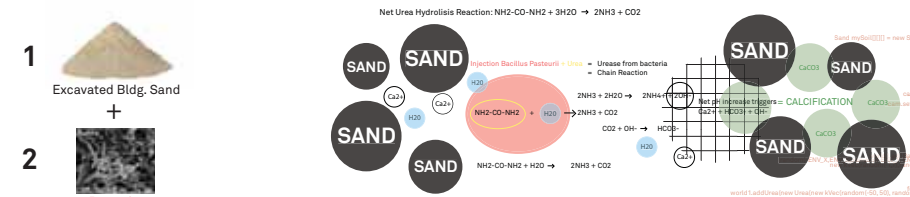


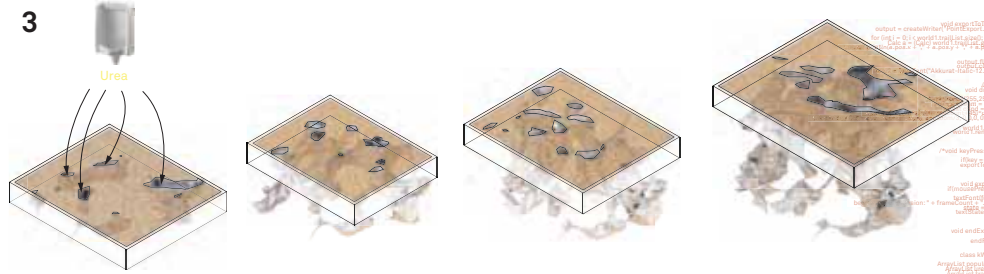
City Growth = Project Growth

Plan

SAND CALCIFICATION PROCESSES

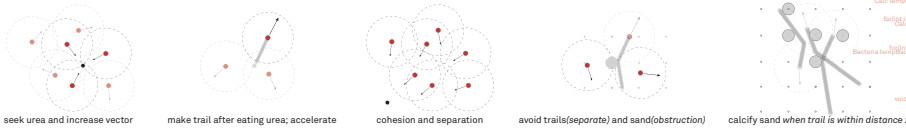


Chemical Reaction of Calcifying Sand Bacteria



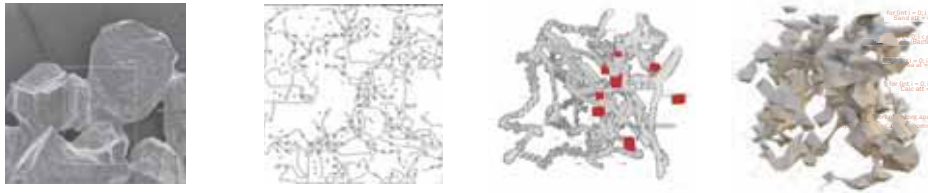
Sandstone Form Mold and Framing Construction Sequence

CREATIVE GEOMETRIC AUGMENTATION



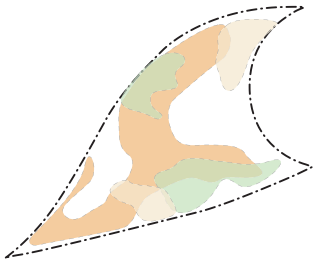
seek urea and increase vector | make trail after eating urea; accelerate | cohesion and separation | avoid trails*(separate)* and sand*(obstruction)* | calcify sand *when trail is within distance x*

Scripted Bacteria Behaviors



Calcified Forms Between Sand Particles | Java Script 2D | Java Script 3D **SCALE 1 : 0.001** | Resulting 3D Model **SCALE 1 : 100**

Scripted Geometry of Microscopic Bacteria



Indigenous Plants.....45,500 m²
Desert.....3,500m³
Calcified Sand Forms.....128,000m³

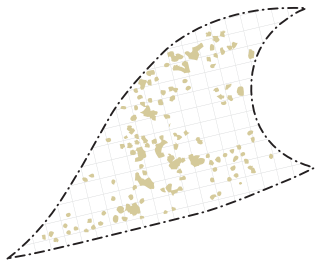
TOTAL.....177,000m³

Total Site Area.....238,000m³

177,000/238,000 =

74% of site as potential habitats

Habitat



Number of Chambers.....100
Total Volume of Chambers.....22,000m³
Air Compression.....30 atm

PRESSURE x VOLUME = **ENERGY**

30 atm x 22,000m³ = **66,874,500,000 joules**

1 MW = **1,000,000 joule/s**

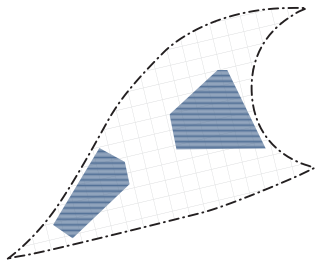
66,874,500,000 Joules/1,000,000 = 66,874 MW/sec

Maximum Storage Capacity

66,874MW/2.2MW =

35 days of energy storage at 2.2MW per day

Compressed Air Chambers



Surface Area of Photovoltaics.....76,990 m²
Energy Produced by 1m².....72 W

72watts x 76,000 =**5.4 MW**
(1 MW = 1,000,000 W)

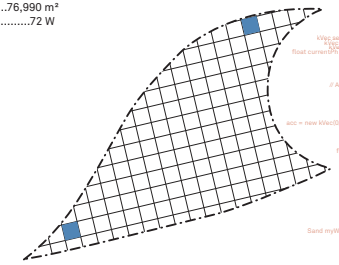
Capacity Factor of 40% = 2.2MW

1 MW Powers 1000 homes

2.2 x 1000 =

2,200 homes annually

Photovoltaics



Conduit Piping and Transformer

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