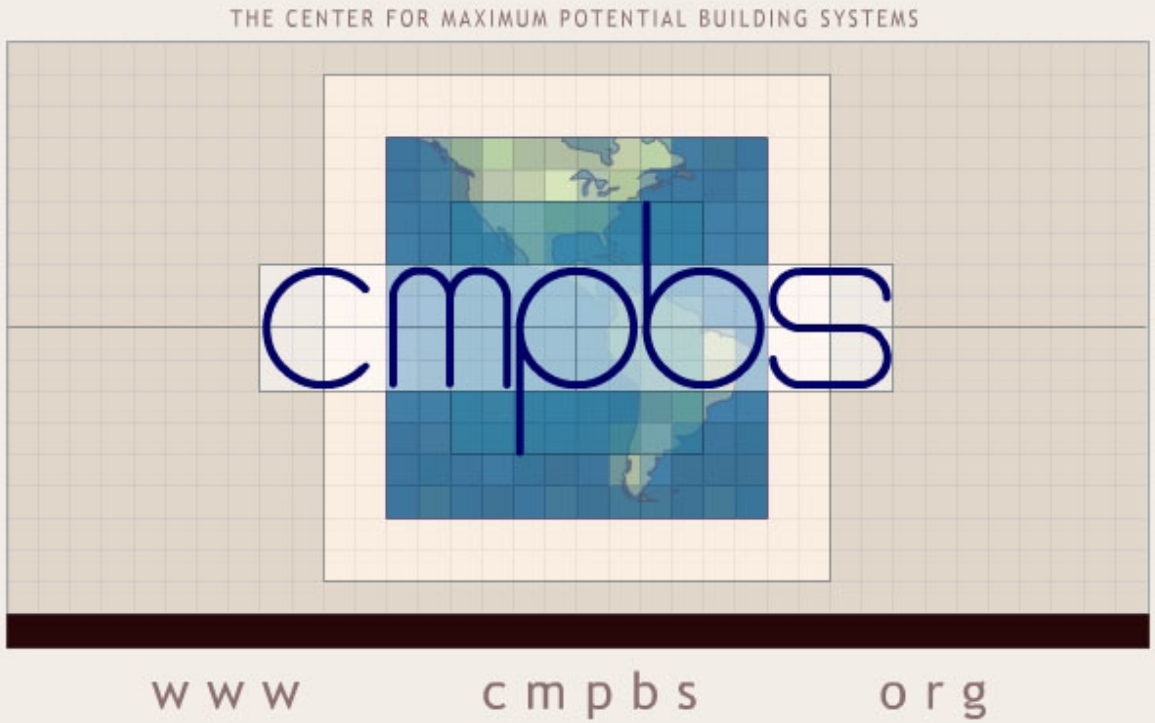


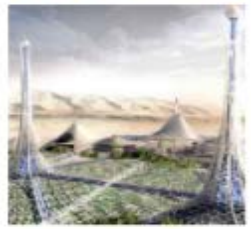
ENERGY WEEK - UT AUSTIN

PLINY FISK III – CO-DIRECTOR
CMPBS

A SUPER ABUNDANT – LOW ENERGY CEMENT FOR OUR FUTURE -
















PRIVATE
(examples)

AIA Research Corp
Stratus Properties
AMD
Catellus

PROTOCOL

PROTOTYPE

PRIVATE

INVESTMENT

PUBLIC

FOUNDATION

PUBLIC
(examples)

City of Austin
State of Texas
General Services Administration
Environmental Protection Agency
Department of Energy
Community Services Administration
Housing and Urban Development
National Renewable Energy Lab

FOUNDATION
Contracts and Advice
(examples)

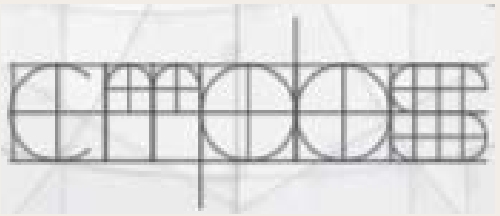
Meadows
Kendeda
Still Water
Gates
MacArthur
Cynthia & George Mitchell

POLICY

"A single industry accounts for around 5% of global carbon dioxide (CO_2) emissions. Concrete is the second most consumed substance on Earth after water."

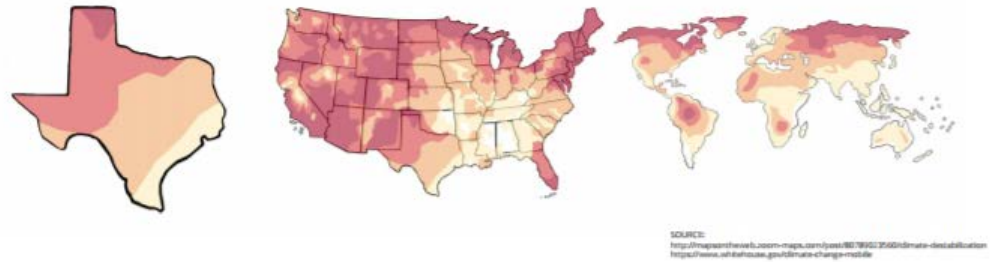
"Cement production is growing by 2.5% annually, and is expected to rise from 2.55 billion tons in 2006 to 3.7-4.4 billion tons by 2050"

- Rubenstein, Madeleine. "Emissions from the Cement Industry" State of the Planet, Columbia University. 2012



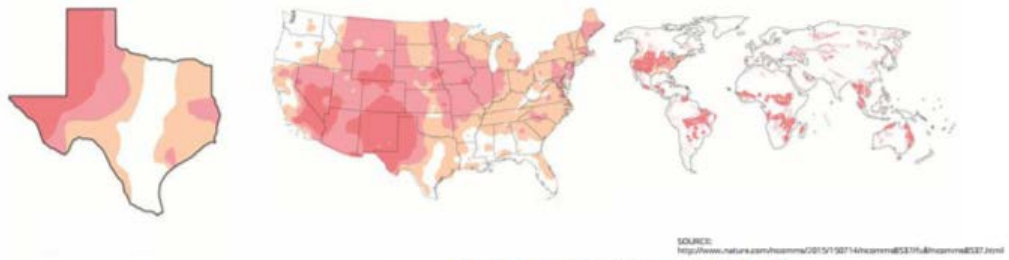
Texas as Canary for Climate Change

TEMPERATURE RISE



CROP DISRUPTION

WILDFIRE



DROUGHT

EXPANSIVE SOILS

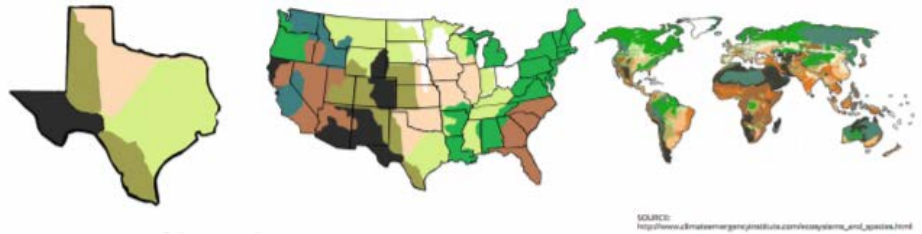
Texas as Canary for Climate Change

FLASH FLOOD

SALINIZATION

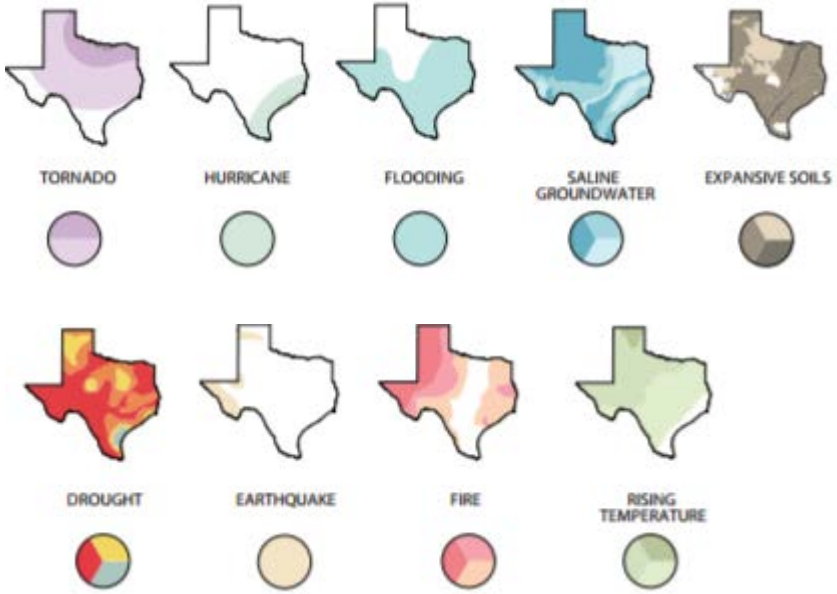
TORNADO

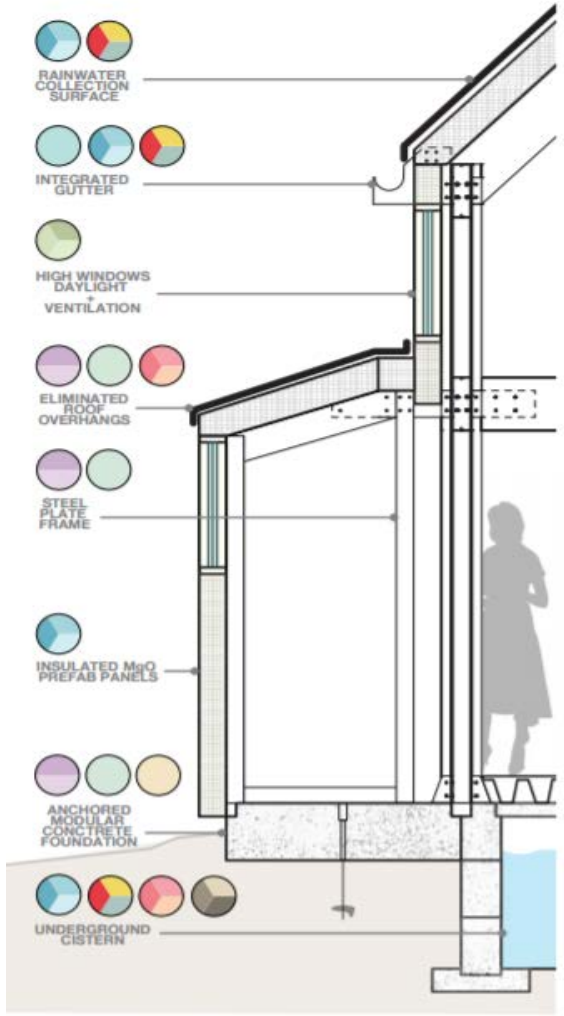
BIODIVERSITY LOSS

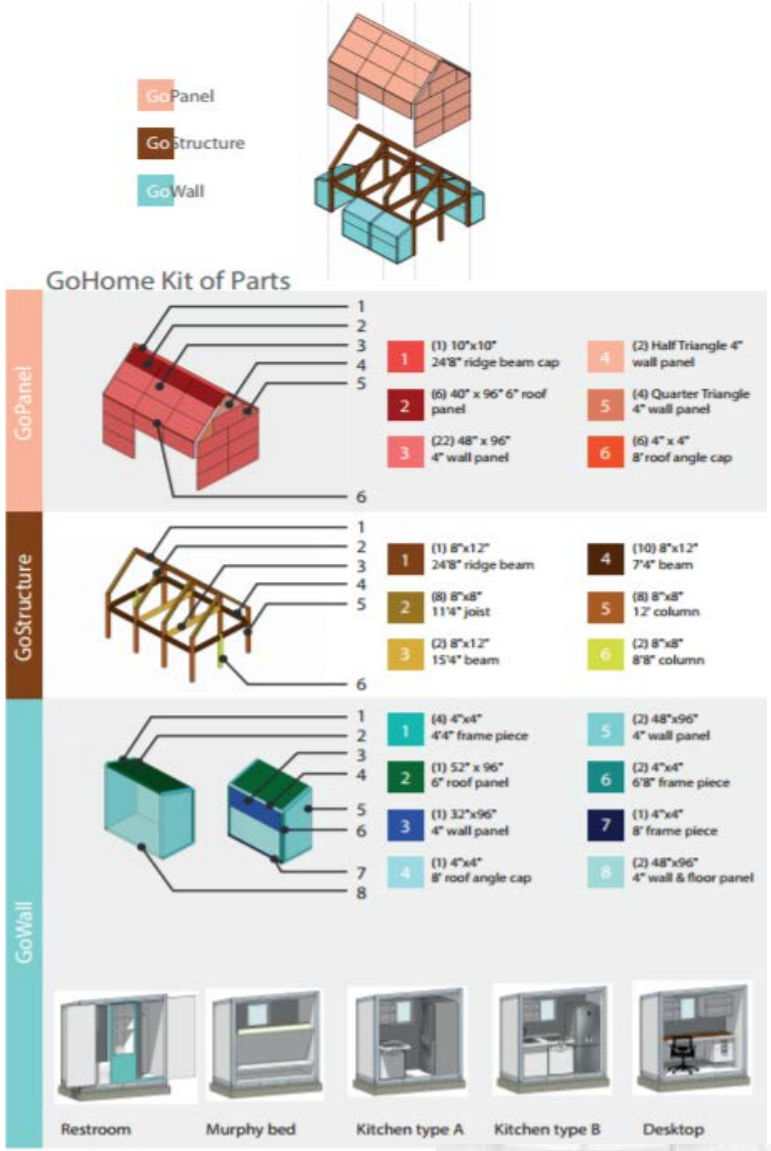


VECTOR DISEASES

goHom™ System







MgO CEMENT

TEXAS IS #1 IN DISASTER & CEMENT PRODUCTION

DISASTER

By State:

	STATE	NUMBER OF DISASTER DECLARED
1	Texas	86
2	California	78
3	Oklahoma	70
4	New York	65
5	Florida	63
6	Louisiana	58
7	Kentucky	55
8	Alabama	55
9	Missouri	53
10	Arkansas	53

1. Texas
2. California
3. Oklahoma
4. New York
5. Florida
6. Louisiana
7. Kentucky

CEMENT PRODUCTION

1. Texas
2. California
3. Missouri
4. Florida
5. Pennsylvania
6. Michigan
7. Alabama

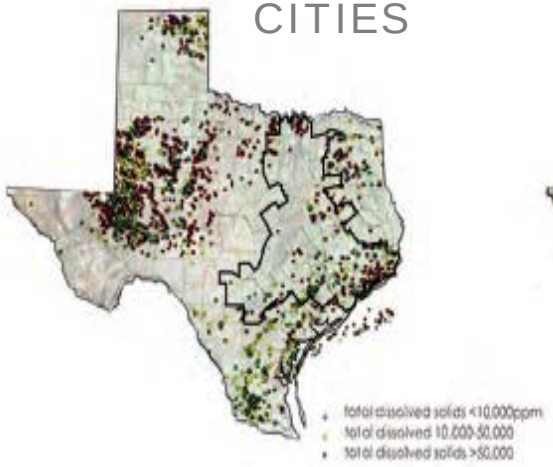
MgO CEMENT

Saline Water Resources in Texas

PETROLEUM INDUSTRY

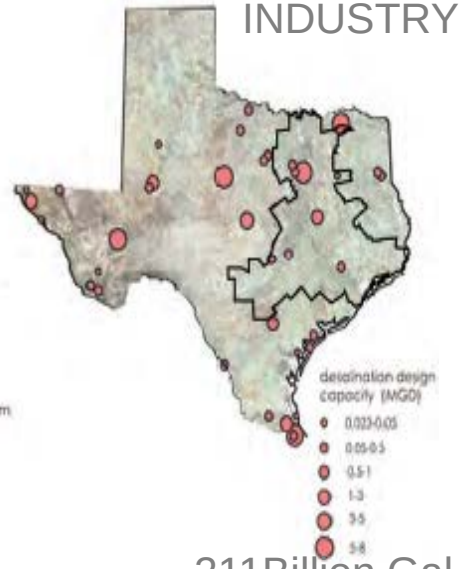
REFINERIES
OIL PLATFORMS
PIPELINES

CITIES



48 Billion gal/yr
Desalinated Water

CHEMICAL INDUSTRY



211Billion Gal
Produced Water

TEXAS possesses **110% MgO cement** compared to portland cement

MgO CEMENT

Availability of Magnesium Oxide - MgO

MATERIALS ON EARTH

47% Oxygen
28% Silicon
8.1% Aluminum
5.0% Iron
3.6% Calcium
2.8% Sodium
2.6% Potassium
2.1% Magnesium
0.8% Others

SEA WATER

55.03% Chloride
30.59% Sodium
7.68% Sulfate
3.68% Magnesium
1.18% Calcium
1.11% Potassium
0.41% Bicarbonate
0.19% Bromide
0.08% Borate
0.04% Strontium
0.003% Fluoride

MgO CEMENT

Historic use of MgO Cement

210 BC
Qin Shi Huangdi's Terracotta Soldiers

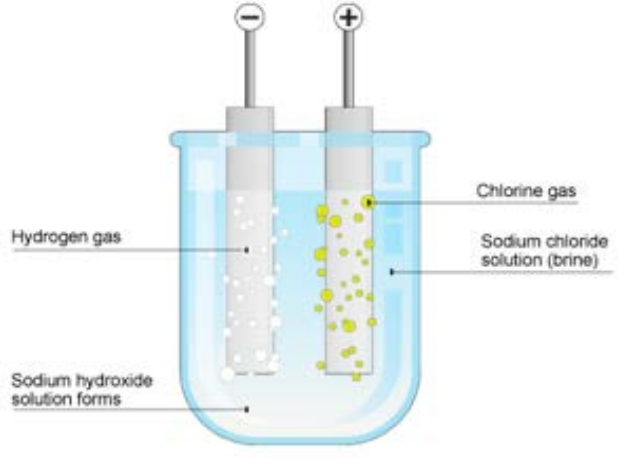
220 BC
Great Wall of China

CEMENT|GALVESTON

Methods of Desalination & MgO Procurement

100 million GPD sea water Desalination plant:

80 MGD Fresh Water
3000 TPD brine for NaOH, HCL & Chlorine
108 TPD Cement
10 MWH Green Power



Salt Pond

High Temp Solar

Waste Heat

Membrane

Electrolysis

Solar Stills

MgO CEMENT

Benefits and Features of MgO Cement

Can be derived from **sea water**

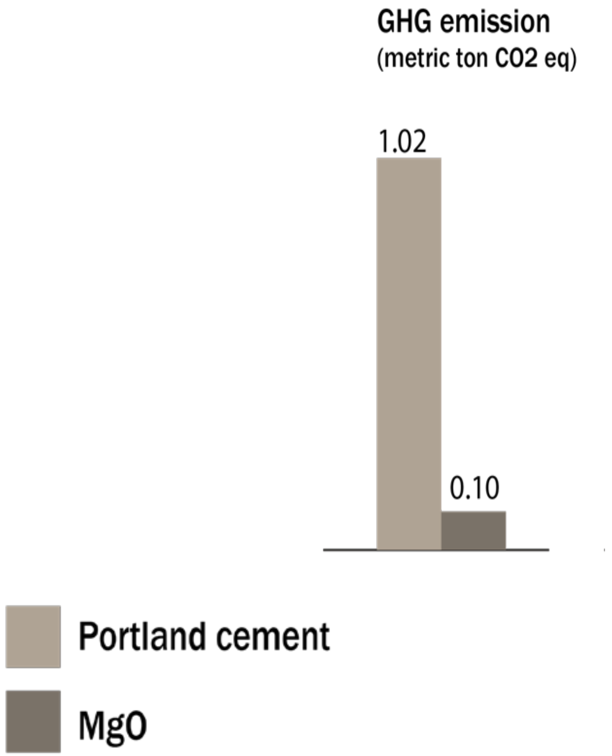
Mixed with **organic materials**, no chemical effect

Can **encapsulate toxins** including heavy metals

Can be **carbon neutral**

MgO CEMENT

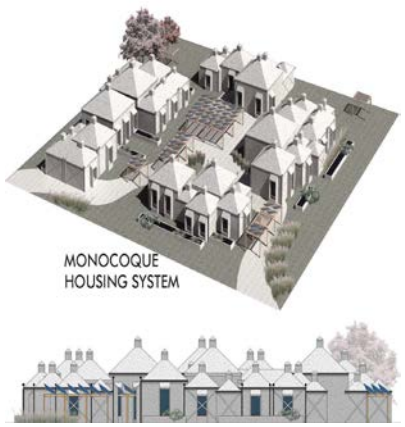
Portland Cement vs. MgO Cement



CO2 EMISSIONS
ENERGY DEMAND
FRESH WATER

MgO CEMENT

Buildings



Taipei 101, Currently the tallest building in the world. All 101 stories use MgO sheeting on the inside and outside of **all** the walls, fireproofing beams and as the subfloor sheathing.

Source George Swanson

MgO Sheeting is the “official” specified construction material of the 2008 World Olympics buildings. A project costing over 160 billion dollars. Over 8 million square feet of MgO Sheeting is installed.

It is now estimated that over 2,000 companies are manufacturing MgO Sheeting worldwide.

Source George Swanson