PLANNING, DESIGNING, ENGINEERING FOR A RESILIENT WORLD

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TEXAS as CLIMATE CHANGE CANARY

TEMPERATURE RISE

TCCC
TOWARDS A MAXIMUM POTENTIAL FUTURE

Maximum Potential is a hypothetically perfect state beyond the present. At our Center it is the convergence of 3 conditions: the creation of next generation ecointerventions we call Prototypes; their supportive measured success or failure we call Protocols; and their associated Policies enabling societal acceptance, understanding and improvement over time. It has always been our goal to function with all 3 of these conditions in mind.

Our version of a Potenti-o-meter, similar to an energy meter, identifies the connectivity of these 3 forces, emphasizing their adjacency as powerful enablers that allow us to evolve into a new ecology. The purpose of this virtual invention tool is to create ecointerventions in all 3 areas and to use the Potenti-o-meter as a platform to perform triple duty Serious Commotion.

Because each condition is critical to the other, each contains its own procedural steps; the Prototypes emanate from combinations of regional ingredients that trigger a sequence of how they are formed from the raw resources identified in the maps surrounding the operational cogs of the Potenti-o-meter.

Protocols contain 12 different methods of assessment and discovery, such as our Health lens, that critiques all ecointervention from a human health perspective. Or our planet earth pattern finding lens called Protoscope that helps us identify important Prototype possibilities.

The 7 Policies listed represent how we have worked with others to create the basis for societal acceptance for those combinations of the 3 P’s so far developed. Examples include the Austin Green Builder Program, or the USGBC’s LEED for Healthcare, Health Product Declarations, the AIA’s Environmental Resource Guide, Green Guide for Health Care, National Center for Appropriate Technology and State of Texas Architecture + Engineering Guidelines.
A - E GUIDELINES . STATE OF TEXAS

CMPBS’S ULTIMATE OBJECTIVE BRING WORK TO THE LEVEL OF POLICY
TEXAS as CLIMATE CHANGE CANARY
Tropical Storm Katia, Hurricane Irma and Hurricane Jose in the Tropical Atlantic

Source: NOAA Geostationary Satellite Server

2017 HURRICANE RISKS
## Basis of EPA Projection: Global Redevelopment Costs 2017-2100

**U.S. Billion-dollar Weather and Climate Disasters:**

Data Sources, Trends, Accuracy and Biases

Adam B. Smith  
NOAA National Climatic Data Center, Asheville, North Carolina  
Richard W. Katz  
National Center for Atmospheric Research, Boulder, Colorado

<table>
<thead>
<tr>
<th>Hurricane Affected State</th>
<th>POG estimated insured loss (Commercial, Residential, Auto)</th>
<th>FEMA (PS&amp;D) emergency assistance (PA + IA + BEA)</th>
<th>FEMA individual &amp; community disaster payment (total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>--</td>
<td>--</td>
<td>12.1 (10.0)</td>
</tr>
<tr>
<td>Arkansas</td>
<td>550 (22.0)</td>
<td>35.0</td>
<td>12.5</td>
</tr>
<tr>
<td>Illinois</td>
<td>240 (22.0)</td>
<td>150.0</td>
<td>43.0</td>
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<tr>
<td>Indiana</td>
<td>130 (22.0)</td>
<td>240.0</td>
<td>69.0</td>
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<tr>
<td>Kentucky</td>
<td>530 (22.0)</td>
<td>405.0</td>
<td>110.0</td>
</tr>
<tr>
<td>Louisiana</td>
<td>195 (10.0)</td>
<td>50.0</td>
<td>33.0</td>
</tr>
<tr>
<td>Missouri</td>
<td>700 (22.0)</td>
<td>50.0</td>
<td>110.0</td>
</tr>
<tr>
<td>Ohio</td>
<td>1,250 (22.0)</td>
<td>240.0</td>
<td>43.0</td>
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<tr>
<td>Pennsylvania</td>
<td>750 (22.0)</td>
<td>200.0</td>
<td>40.0</td>
</tr>
<tr>
<td>Texas</td>
<td>6,000 (14.2)</td>
<td>8,000.0</td>
<td>3,140.0</td>
</tr>
</tbody>
</table>

Sub total (1)             | 19,891.9                                                  | 3,787.1                                        |

State aggregate losses to:  
Marine, offshore infrastructure  
Agriculture, forestry  

Sub total (2)             | 2,820.0                                                   |

**TOTAL**                  | -27,500.0                                                 |

*Using Texas Resources insurance coverage report for 2017-2020 hurricanes as a basis.*

- 70% covered for wind damage (27% uninsured) = POG $29.3 billion x (0.70)
- 30% covered for flood damage (61% uninsured) = POG $29.3 billion x (0.30)
- $32.1 trillion in IRMA (2017) = $32.1 trillion x (0.25) = $8.0 trillion in uninsured losses

**Therefore, POG is a lower bound for insured and uninsured hurricane loss estimates.**

**Note:** POG only counts 10% of hurricane losses to FEMA (PS&D) | POG < $29.3 trillion x (0.10) = $2.9 trillion (32.1 trillion).
Belize Population: 387,879 (June 2017)  
For reference, Austin = ~948k people, Dallas = ~1.3 million people, San Antonio = ~1.5 million people according to US Census Bureau  
- Most people live in Belize city, followed by Cayo district.  
- Slightly less than half of the 2010 population was attending formal schools.  
- 55% (estimated 216,473 people) are younger than 25
Adaptation, Resilience, Knowledge
From Mountain to Reef
Lumber, Fiber, Rosen (foam insulation)
Mined MgO (carbon neutral cement)
Fiber, sugar based epoxy
MgO from sea water, recycled plastic

Alternative Material pallet development
PALLET TESTING REQUIREMENTS

test series:

1. side impact test- ASTM D880
2. rotational flat drop test- ASTM D6179
3. random truck vibration- ASTM D4728
4. random air vibration- ASTM D 4728
5. rotational flat drop method 2- ASTM D6179
6. side impact test plus- ASTM D850

must survive up to Assurance Level 1

source: ASTM simulated transport test
POD PALLET - BUILDING SYSTEM - THE SWISS ARMY KNIFE OF SUSTAINABLE DEVELOPMENT

POD PALLET - FOR SERIOUS WORK OR SERIOUS PLAY = SERIOUS COMMOTION
PALLETS MODULE CATEGORIES

- PACKAGING PALLET
- OPEN DRUM PALLET
- FOUNDATION WITH UTILITIES
- CHARCOAL VENTED PALLET
- BALLAST RAFT PALLET
- PV PANEL SHUTTER
- WETLAND PALLET
- COMPOSTING PALLET
- GREEN ROOF PALLET
- VEGETABLE GARDEN PALLET
**UWI CAMPUS AS PROTOTYPE RETROFIT**

**STEP ONE**
- Initial Test & Analysis of Building

1. Resonance sound testing of structure
2. Pressure testing for leakage
3. Infrared analysis of heat/cooling loss
4. Foundation inspection
5. Analysis of HVAC system
6. Model building relative to climate, orientation, insulation, openings to determine potential thermal mass of concrete as energy storage
7. Computer model for water use and potential collection storage

**STEP TWO**
- Remediation

1. Mag fiber cement injection into fissures if required
2. Replace window fenestration as needed
3. Insulate on exterior of mass if warranted
4. Assess possible replacement of system to meet greenhouse gas standards
5. Fit windows with protective silica high impact shutter using treated wood
6. Replace HVAC as needed

**STEP THREE**
- 1st Bay Green Retrofit
- Demonstration & Education

1. Silicated wood cisterns installed for water catchment
2. One cistern retrofitted for pump storage energy system
3. Window protective shutters get retrofitted with pump storage PV panel
4. Cistern set retrofitted with pump storage wind systems
GREEN CAMPUS EVOLVED WITH GREEN INFRASTRUCTURE LANDSCAPE

1. PINE LUMBER WASTE WATER PLANTATION
2. NATIVE FOOD FOREST/MANGROVE WASTE WATER SYSTEM
3. WIND GENERATOR
4. GREEN ROOF STUDENT HANG OUT AREA
5. OUTDOOR INCUBATOR AND CLASSROOMS
6. RAISED BED FLOORS
7. PALLETS USED AS GREEN ROOF/AIR VENTS
8. MOUNT PV ROOF SHADE OVER ROOF TERRACE
9. VENT
10. PALLET FRAMES FOR CISTERN
11. METAL ROOF SUPPORT
12. MgO INSULATION WITH SPRAY SURFACE
13. MgO WALL PANELS
14. SOLAR DRYERS, DISTILLERS, FOOD SPROUTERS, COOKER MODULE
SAFE HOME

- No roof overhang
- Building integrated shade
- Wall at strength of pallets
- Raised for flood
- Ground cabled for wind
- Building integrated PV
- Universal pallet joint system

Spiral Stair
Cistern
Generator
Waste treatment
Growth module

Structural glass
PV panel
sPODS Are Readily Available Across the Globe – Particularly Important When Need Becomes Critical
sPOD’s Modular Components Support Both Building & Infrastructure Construction
4,000 OIL RIGS AVAILABLE
EACH RIG IS 0.00125 SQUARE MILES
TOTAL 5 SQUARE MILES OF NEW REEF
SEMI-SUBMERSIBLE OIL RIGS FOR SALE

REQUESTING A QUOTE

REQUESTING A QUOTE

$1,250,000,000

$26,000,000

$568,000,000
WIND POWER FOR MICRO GRID
ENDANGERED SPECIES ICONS
SILICATED WOOD STRUCTURAL GRID
PALLET OFF-GRID SAFE HOMES
CIRCULATION
SUBMERSIBLE OIL RIG
CONSTRUCTION CRANE
SUBMERSIBLE PLATFORM IN HURRICANE SEASON
HURRICANE VIEWING LOUNGE PROTECTED BY BASALT FABRIC WIND BREAK
TYPICAL PALLET LIVING MODULE WITH BATHROOM / KITCHEN UNITS
SURFACE OF WATER
ACCRETION (CATHODE / HULL)
ACCRETION (ANNODE / ANCHOR)
PV PANELS
PALLET JOINT
HUMAN POWERED ELEVATOR