FIRST LEGO LEAGUE KICKOFF PRESENTATION

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Design Intelligence Scenarios: 2025

- The global population will soar to 8.35 billion people, the majority of whom will live in cities.
- Standard operating procedure will be based on sustainability sciences.
- Construction sites will be dominated by construction robotics.
- The Internet of Things (IoT) will become ubiquitous & will drive change in buildings.
Integrating Three Themes

In Teaching, Practice & Research, the SoA Integrates Around Three Themes to Synthesize Creative Solutions for the Built Environment
“Did management say you could go off the grid?”
Urban design goals typically include the creation of diverse, mixed use, walkable communities, the identification of economic drivers, and improved connectivity.

Ecodistrict planning quantifies system performance, assigns value to ecological processes and promotes social equity in scalar economies.
CASE STUDY MATRIX

FOOD PRODUCTION
- 0.003 acres
- 320 plants
- 0.140 acres
- 1.12 tons
- 0.850 acres
- 40 tons
- 4.000 acres
- 12 tons

STORMWATER MANAGEMENT
- 0.005 acres
- 4 in/h
- 0.036 acres
- 7 in/h
- 0.308 acres
- 7 in/h
- 0.140 acres
- 52,000 gpd

WASTEWATER TREATMENT
- 0.020 acres
- 2,000 gpd
- 0.105 acres
- 30,000 gpd
- 0.140 acres
- 52,000 gpd

ENERGY from WASTE
- 0.060 acres
- 100,000 gpd
- 0.310 acres
- annual waste treatment: 5,000 tons
- annual biogas: 5,860 mmBtu
- 7.900 acres
- 550,000 tons
- 3.000 acres
- annual treatment: 600,000 tons
- biogas/yr: 235,438 mmBtu
Note: This concept plan is not intended to represent specific planned or required development proposals.

1. Vertical Axis Wind Turbines
2. Vegetated Roof
3. Solar Shading
4. Cafe/Living Machine
5. Solar Control at South Facade
6. PV or SHW Panels
7. Rainwater Storage (opt.)
8. District Thermal Loop Connect to Building
9. To Subsurface Irrigation at Landscape Areas
10. District Thermal Loop Connect to Lloyd Center Tower
11. Catalyst Project

Wastewater
Reclaimed Water
Rainwater Collection
COMMERCIAL BANK HQ

TALLEST TOWER IN EUROPE AT 53 STOREYS!

GREEN AGENDA...

4 STOREY GARDENS

VIEWS OUT OF BUILDING OVER FRANKFURT

VIEWS FROM, TO AND THROUGH THE BUILDING

PUBLIC SPACE AT BASE

SOCIAL SPACE SERVES BANK & COMMUNITY
Eco-District Concept – Millvale
Urban Design/Build Studio – Puriflume
PuriFlume, Urban Design/Build Studio, Carnegie Mellon SoA, Pittsburgh, PA, USA on Exhibit at the Hong Kong Bienalle
This year, the team will offer an innovative way of looking at sustainable solar design by creating a “Plug n’ Play” housing product that employs modularity on a variety of scales, allowing the user to configure and re-configure their home as personal or family needs dictate. All mechanical systems are contained within a central Core which allows for the addition of living spaces or “Pods” to be added or exchanged with infinite possibility. A modular in-wall shelving system, combined with standardized wall, ceiling and floor panels allows the inhabitant to customize the interior.

For the competition, we have designed TriPod, an 800 ft² home for two. As the name indicates, this model has three Pods: Kitchen, Bedroom and Live/Work space. Meanwhile, the Core houses all the home’s utilities, including a Bathroom and a laundry closet. Our design also seeks to blend indoor and outdoor spaces, showcasing a Greenscape to the north and a Courtyard to the south.

Solar Decathlon is a US Department of Energy sponsored competition that challenges collegiate teams to design and build a solar-powered house. In October of 2007 each of the twenty teams will bring their entry to Washington D.C. where they will compete in a week-long competition. As a third time entrant, we look forward to pushing the envelope even further with this year’s “Plug n’ Play” modular housing system.
Plug n’ Play

Modularity
Flexibility
Individual Adaptability

CORE

Future Adaptability

Design

The Future of Building
Construction Process
Systems Integration in the MMX at CMU

- Span: 16.20 m (53.15 ft)
- Column spacing: 5.40 m (17.72 ft)
- Floor Plate: 4.80 m x 16.20 m (15.77 ft x 53.15 ft)
- Dimensions of Bay: 5.40 m x 16.20 m (17.72 ft x 53.15 ft)
- No. of Bays per Floor: 8
- Floor tiles: 0.60 m x 0.60 m (2 ft x 2 ft)

The floor plan consists of 8 bays.

Floor-to-Floor Height: 4.65 m (15.25 ft)
Floor-to-Ceiling Height: 3 m (9.84 ft)
Raised Floor Plenum: 1.60 m (5.24 ft)
Total Building Height: 18.66 m (61 ft) above grade (plus roof)
INTRODUCING
THE XKCD PHONE 6, VIII, 10, X, 26, AND 1876
WE DIDN'T START THIS NONCONSECUTIVE VERSION NUMBER WAR, BUT WE WILL NOT loose IT.™®©
the second in a series called HACLab that invites you to take part in the conversation, provide feedback, and experiment with us as we explore the significance of the Hall of Architecture in the 21st century.

#cmoacopypaste
ROBOTIC PLASTERING

In the face of shrinking labor forces robots will function in on and off-site construction
REALITY COMPUTING

Reality Computing is an emerging field of technology concerned with the translation of information between physical and digital environments. Using capture technologies such as photogrammetry or terrestrial/aerial LiDAR scanning, objects in the physical world can be brought into digital workflows for manipulation/analysis via computational and/or modeling softwares. Experiential technologies including virtual/augmented reality and digital fabrication methods such as 3D-printing and CNC-milling can then be used to deliver results back to the physical world. The CULTURAL CONSTRUCTION Studio utilized the August Wilson House as a test-case for developing innovative applications of Reality Computing technologies for enhancing the efficacy of Historic Preservation.
COMPUTE

Using photogrammetry and reality computing software, Autodesk ReMake, 3D meshes of existing artifacts were generated and analyzed digitally to facilitate reproduction. Working over top of true orthographic views of the object allowed for precise geometric delineation and eliminated time and labor required to measure and record every facet of the object via traditional methods.

3D-MESH

Detail image of Colnbrooke capite 3D mesh generated using photogrammetry. The mesh model was analyzed digitally and used to facilitate reconstruction.
MODE 3: PRE-FABRICATION
Programs

- Bachelor of Arts in Architecture
- Bachelor of Architecture
- Minors for SoA Students:
  Architectural Design Fabrication, Architectural History, Architectural Representation & Visualization, Building Science Integrative Design, Arts, and Technology (IDeATe)
- Accelerated Masters Program (AMP)
- Studio–based Masters Programs (3)
  Advanced Architectural Design, Urban Design, M.Arch (F17)
Programs

- **Master of Science Programs (4)**
  - AECM, Building Performance & Diagnostics, Sustainable Design, Computational Design

- **PhD Programs (3)**
  - AECM,
  - Building Performance & Diagnostics,
  - Computational Design
What traits will help make you be successful??

- From Slee (& Google):

  Curiosity,
  Emergent leadership,
  Ownership &
  Humility

  Basic skills are assumed, but not “expertise”