The Concord Consortium

ACE Hackathon, April 28-29, Phillips Academy

The Virtual Solar Decathlon

Charles Xie & Corey Schimpf

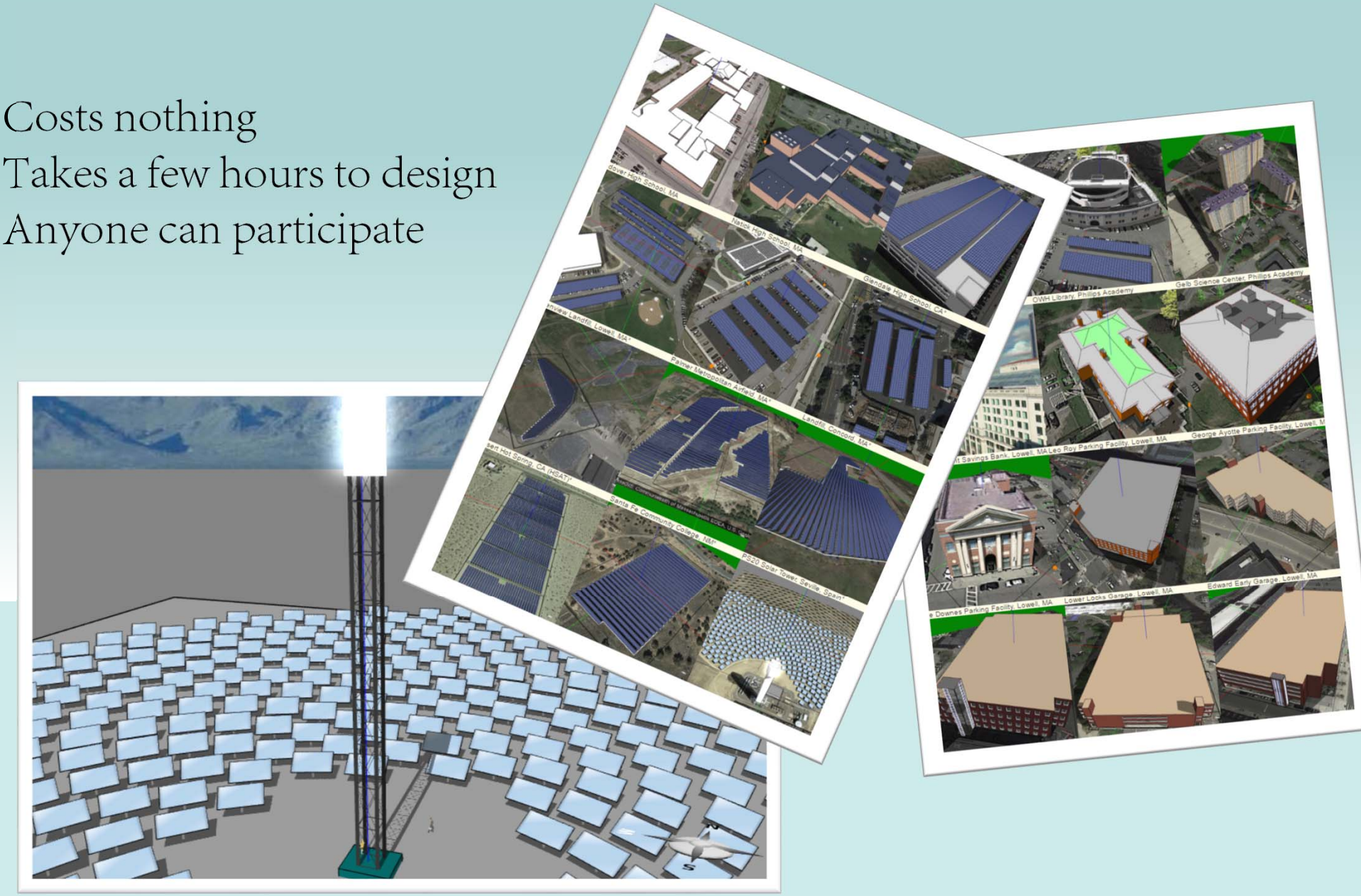
This work is supported by the National Science Foundation (NSF) under grant numbers 1348530 & 1503196. Any opinions, findings, and conclusions or recommendations expressed in this material, however, are those of the authors and do not necessarily reflect the views of the NSF.

U.S. Department of Energy's Solar Decathlon

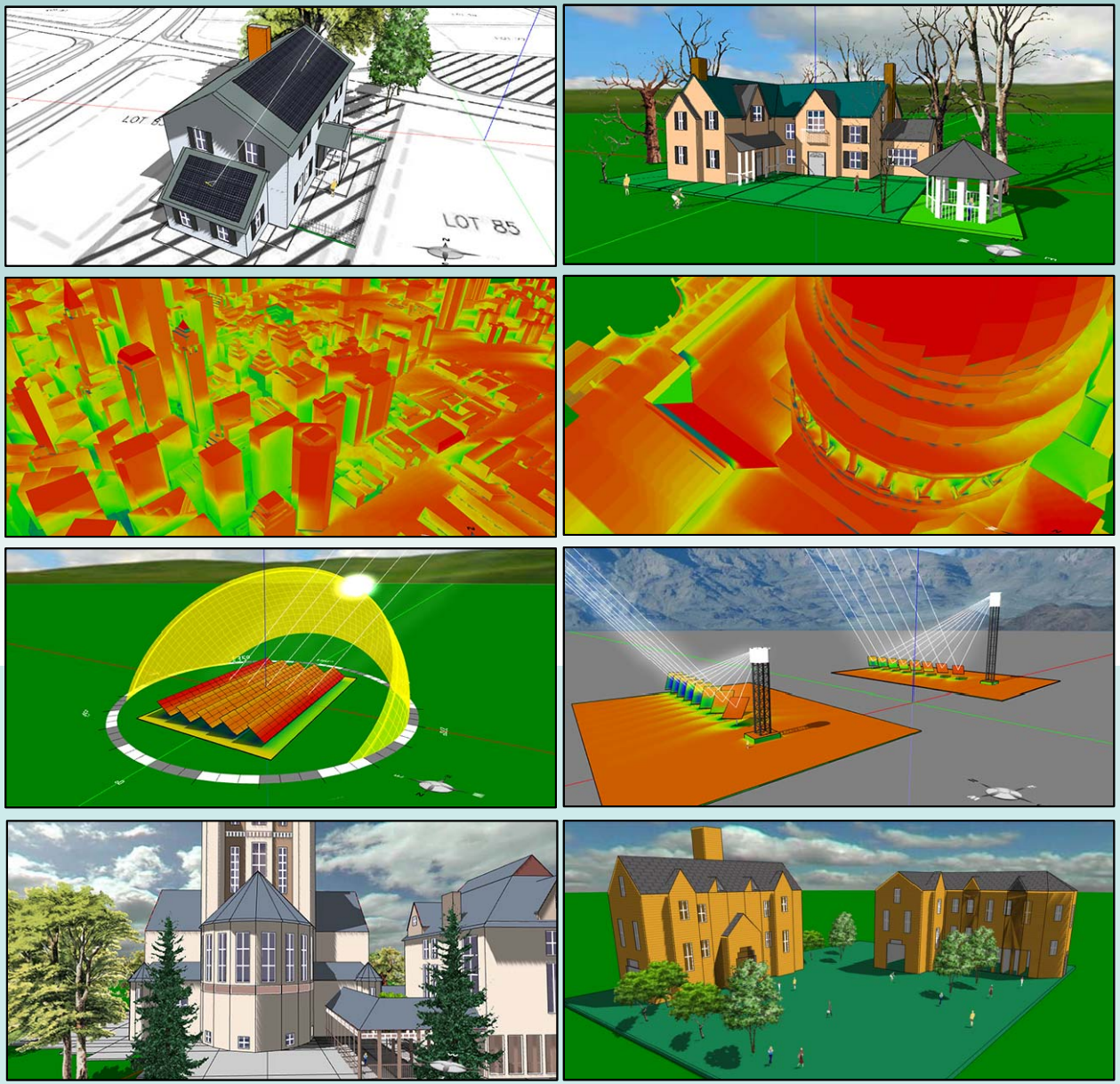
- Costs up to $250,000
- Takes up to a year to design and build
- Only 20 college teams can participate

The Virtual Solar Decathlon

- Costs nothing
- Takes a few hours to design
- Anyone can participate



The Energy3D Playground



Engineering areas:

- Architectural engineering
- Renewable energy
- Urban design
- ....

http://energy3d.concord.org

Modeling Capabilities of Energy3D

Environmental science

- GIS
- Weather data
- Geothermal

Solar energy science

- Photovoltaics
  - Rooftop systems
  - Ground-mounted arrays
  - Solar canopies
  - Solar curtain walls
  - Solar trackers
- Concentrated solar power
  - Power tower
  - Parabolic trough*
  - Fresnel reflector*
- Solar updraft towers*
- Solar water heaters*
- Energy storage*

Building science

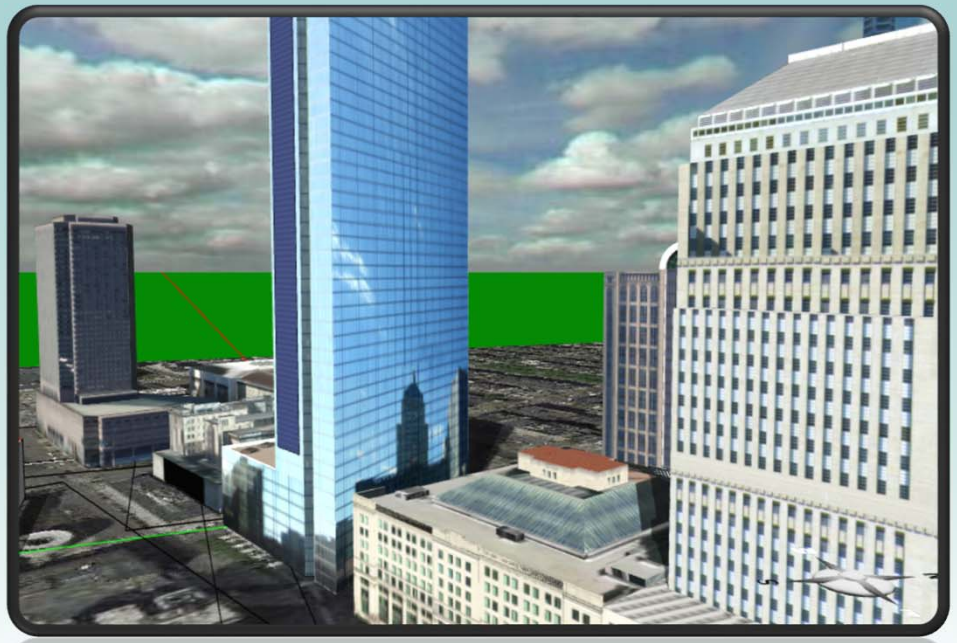
- Building envelope
- Passive solar
- Heat transfer

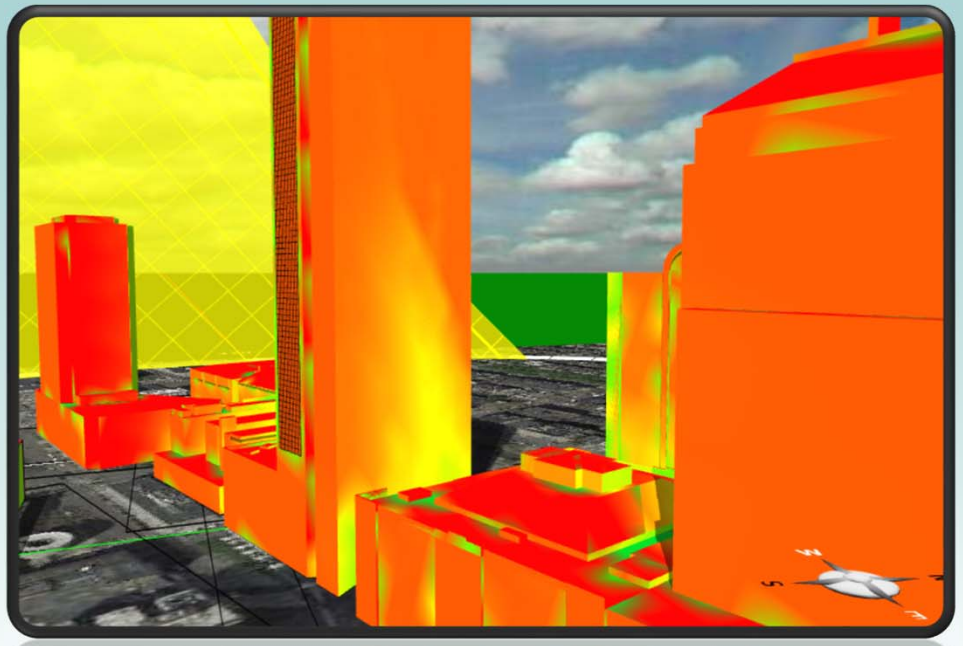
* Under development

Solarize Your World

Google Map 3D
(Boston, MA)

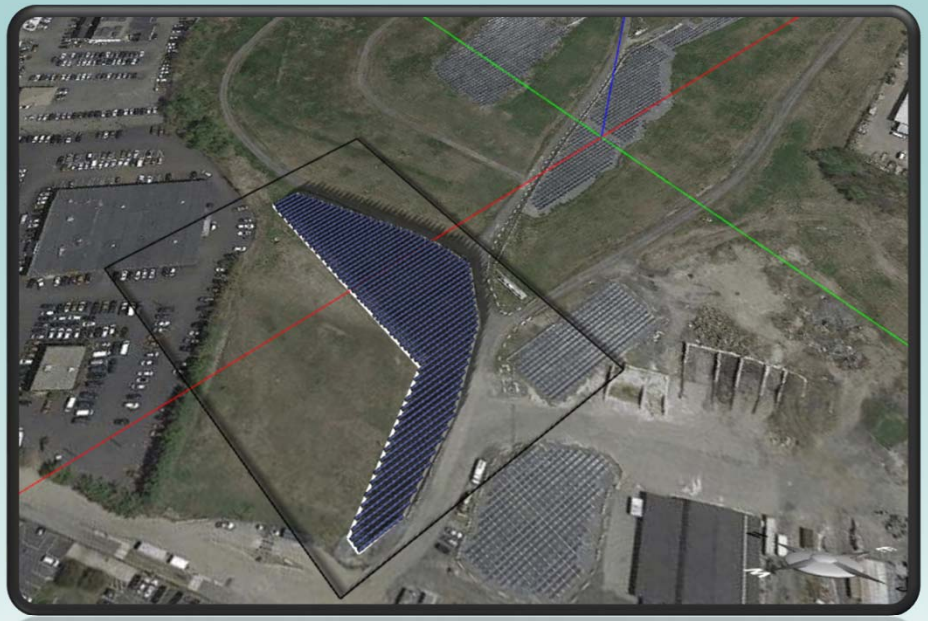
Building-Integrated Photovoltaics

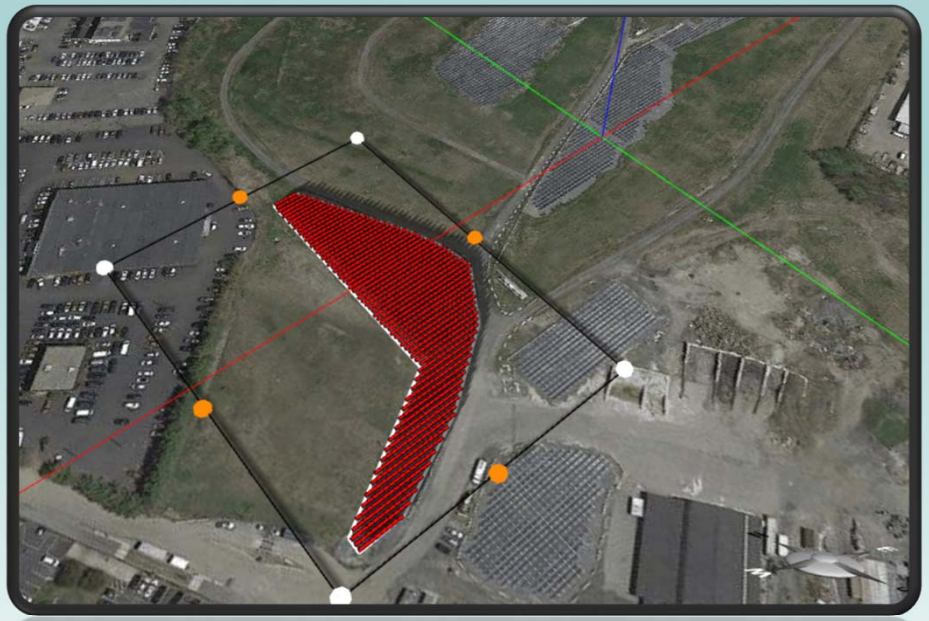




Demo: Energy3D design and simulation
(Copley Square, Boston, MA)

Solar Farms



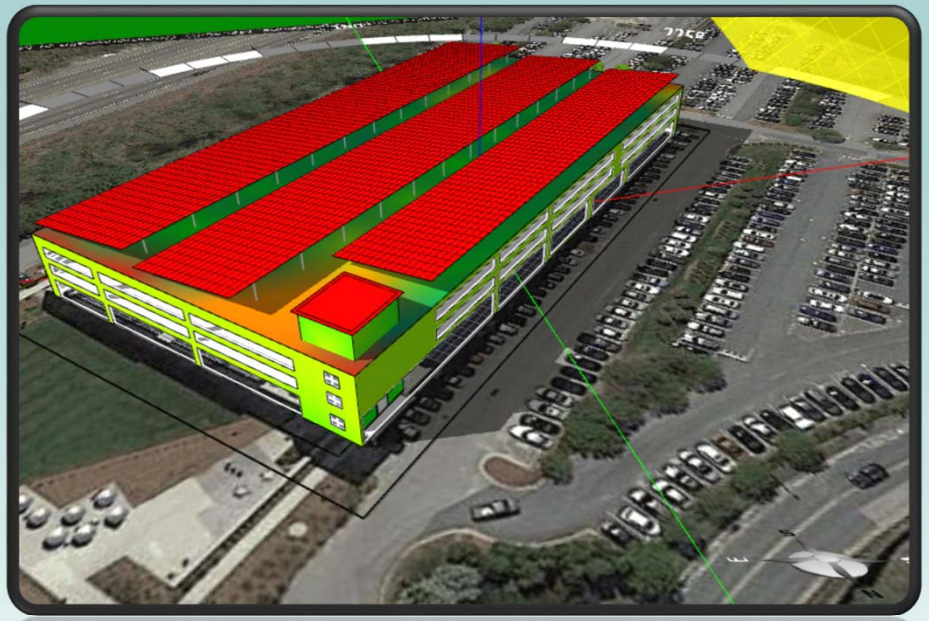


Demo: Energy3D design and simulation
(Glenview Landfill, Lowell, MA)

Solar Canopies

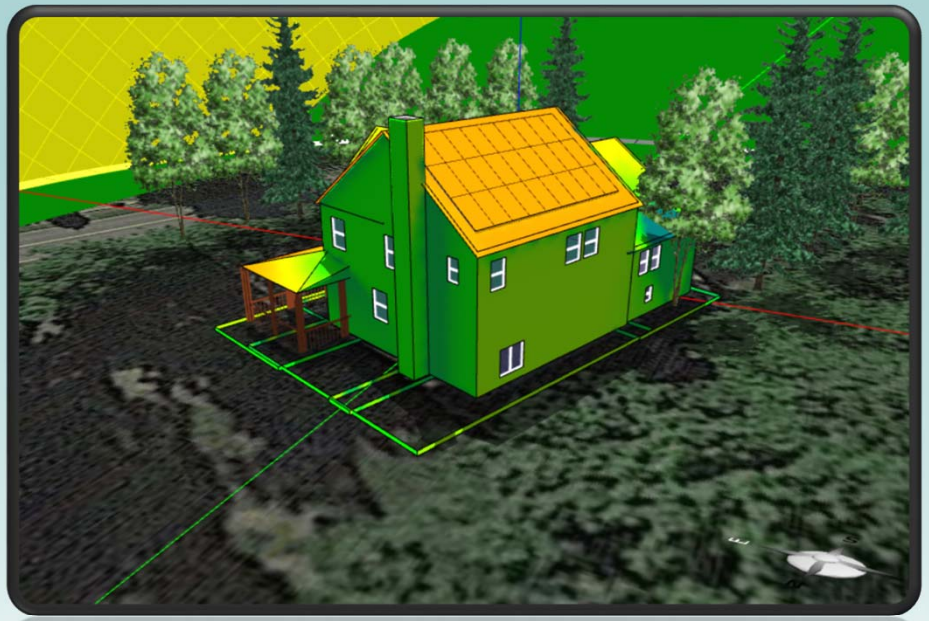
Demo: Energy3D design and simulation
(Andover High School, Andover, MA)

Rooftop Solar Canopies



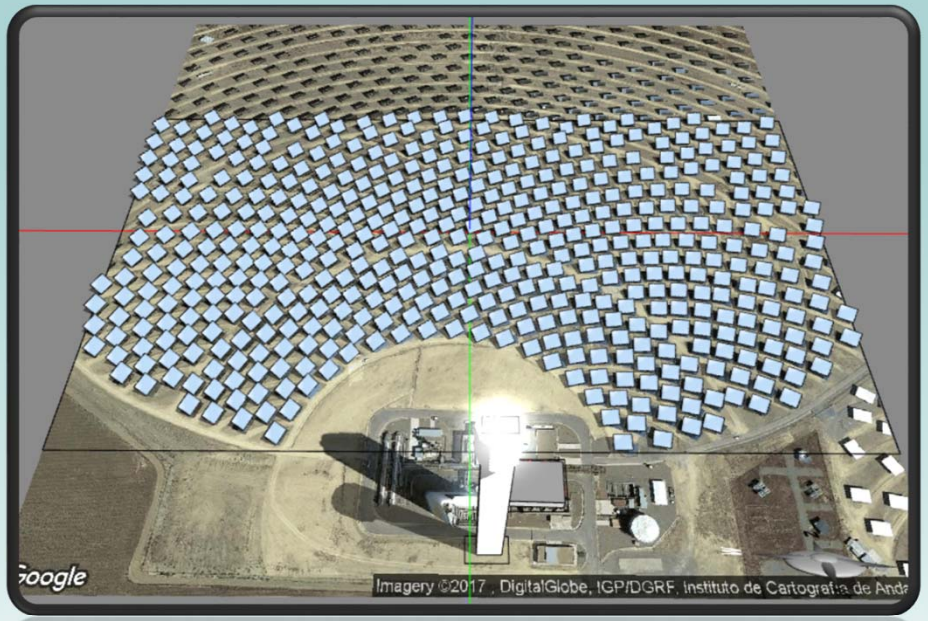
Demo: Energy3D design and simulation
Staple Headquarters, Framingham, MA

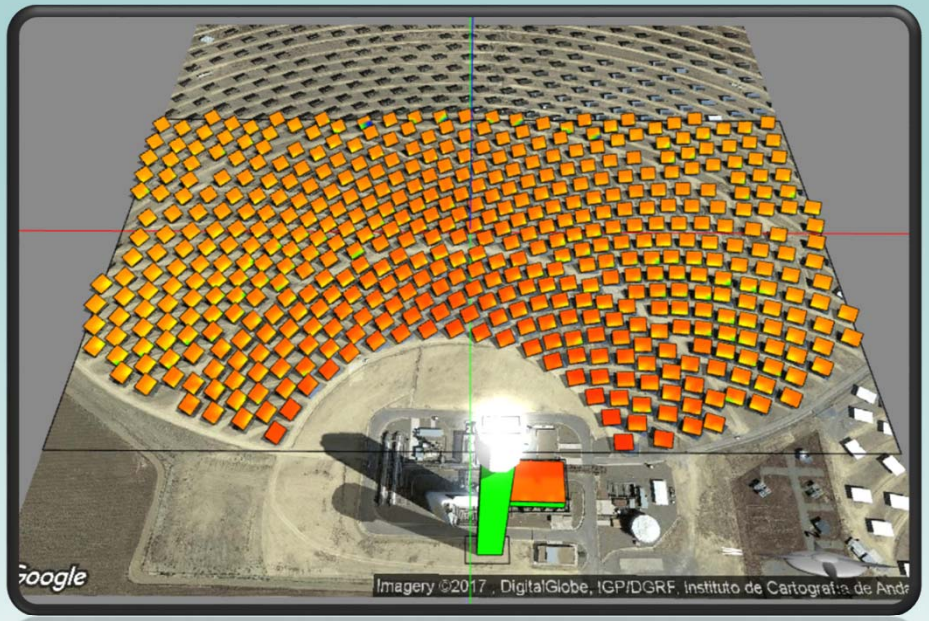
Rooftop Solar Panels



Demo: Energy3D design and simulation
(A house in Sterling, MA)

Solar Power Towers





Demo: Energy3D design and simulation
(PS20 CSP power plant, Seville, Spain)