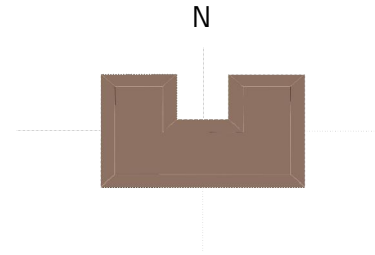


eQUEST SD WIZARD: RULES OF THE GAME

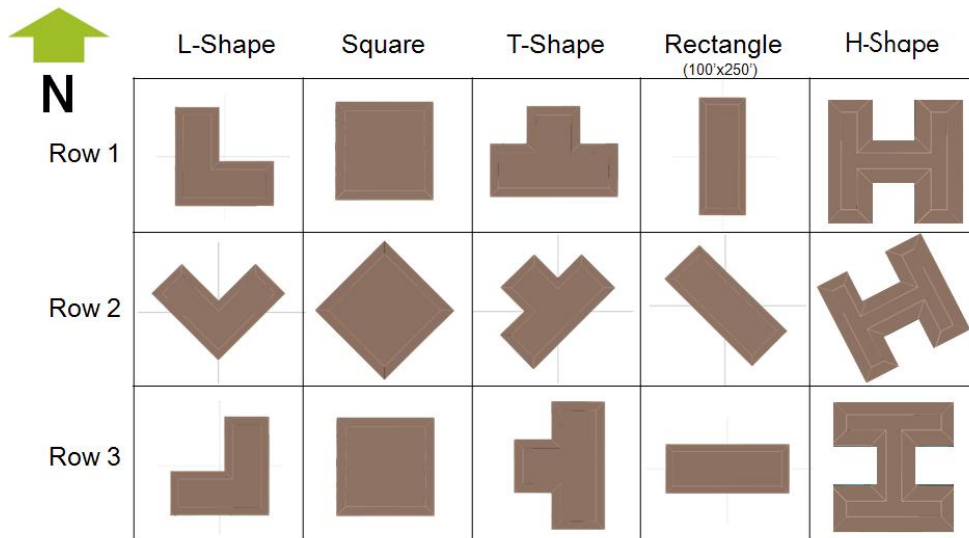
This energy modeling game is divided into 4 quarters. The first 3 quarters are experimental and each provides a different opportunity to test passive energy efficiency measures. In the 4th Quarter, the team starts over with a clean slate and has the opportunity to select any 4 strategies.

The baseline model has been designed to meet the minimum requirements of ASHRAE 90.1, 2007. It is a 50,000 SF, 2-story U-shaped office building located in St Louis, MO. Other attributes are noted in the headlines of the options below for the baseline design.



1. Quarter #1: Massing & Orientation:

- you will be able to choose a different building shape from the 5 options below; each option has the same square footage as the baseline building
- once you have chosen a different building shape, you will be able to select the building orientation and number of floors of the building from 3 options; north, west, or northwest



2. Quarter #2: Envelope Modification (team to select only 2 of the following 5 options):

- Roof Insulation – the baseline design has 4" Polystyrene roof insulation with a R20 value; see chart below for roof insulation modification options:

Base	4" Polystyrene	R20
1.	4" Polyurethane	R24
2.	5" Polyurethane	R30
3.	6" Polyisocyanurate	R42

- Exterior Wall Insulation – the baseline design has 2" exterior board insulation (R 7.5); see chart below for exterior wall insulation modification options:



Base	2" Exterior Insulation	R 7.5
1.	1-1/2" Polyurethane	R9
2.	2" Polyurethane	R12
3.	3" Polyisocyanurate	R21

- c. Window Area – the baseline design has a 40% (gross) window-to-wall ratio as limited by ASHRAE 90.1-2007; see chart below for modification options:

Base	40% Window to Wall Area (53.3% Net)
1.	20% Window to Wall Area (26.7% Net)
2.	60% Window to Wall Area (80% Net)
3.	70% Window to Wall Area (93.3% Net)

- d. Window Glass Type – the baseline glass type is determined by U-value, solar heat gain coefficient, and visible transmittance values (U=0.55, SHGC=0.40, VT=0.40); see chart below for additional window type options:

	Name	U-Value	SHGC	VT
Base	Specified Properties	0.55	0.40	0.40
1.	PPG Solarban 80 (6mm)	0.24	0.23	0.47
2.	Dbl. Pilkinton Low-E (6mm)	0.33	0.66	0.73
3.	Dbl. Viracon Clear (6mm)	0.31	0.40	0.50

- e. Exterior Shading – the baseline building has no exterior shading; the modification option is to provide horizontal overhangs over all windows with an optional depth

3. **Quarter #3: Internal Loads** (team to select only 2 of the following):

- a. Daylight Harvesting – the baseline building has no daylighting strategies implemented; selecting daylighting provides photosensors in the perimeter zones that can dim the lights to 10% capacity when 35 footcandles are detected on the desktop.
- b. Lighting Power Density – ASHRAE 90.1-2007 mandates that the maximum lighting power density for the building be 1.0 watts/ SF; see chart below for modification options:

Base	1.00 watts/ SF
1.	0.95 watts/ SF
2.	0.85 watts/ SF
3.	0.75 watts/ SF

- c. Because there are only two options to choose from in this category, the team may substitute one option from Quarter #2 in conjunction with one option in the Internal Loads category.

4. **Quarter #4: Fresh Start** – In this quarter the slate is wiped clean and each team will select a building massing & orientation plus 4 other energy efficiency measures from any category to compare against the baseline ASHRAE 90.1 model.

The object of the game is to get the Energy Use Intensity (EUI) as low as possible!

