

A NIGHT AT THE  
ENERGY MODELING  
IMPROV



STARRING:  
THE eQUEST  
SD WIZARD

# WHO WE ARE



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# THE GAME

## QUARTER #1

MASSING &  
ORIENTATION

## QUARTER #2

BUILDING  
ENVELOPE

## QUARTER #3

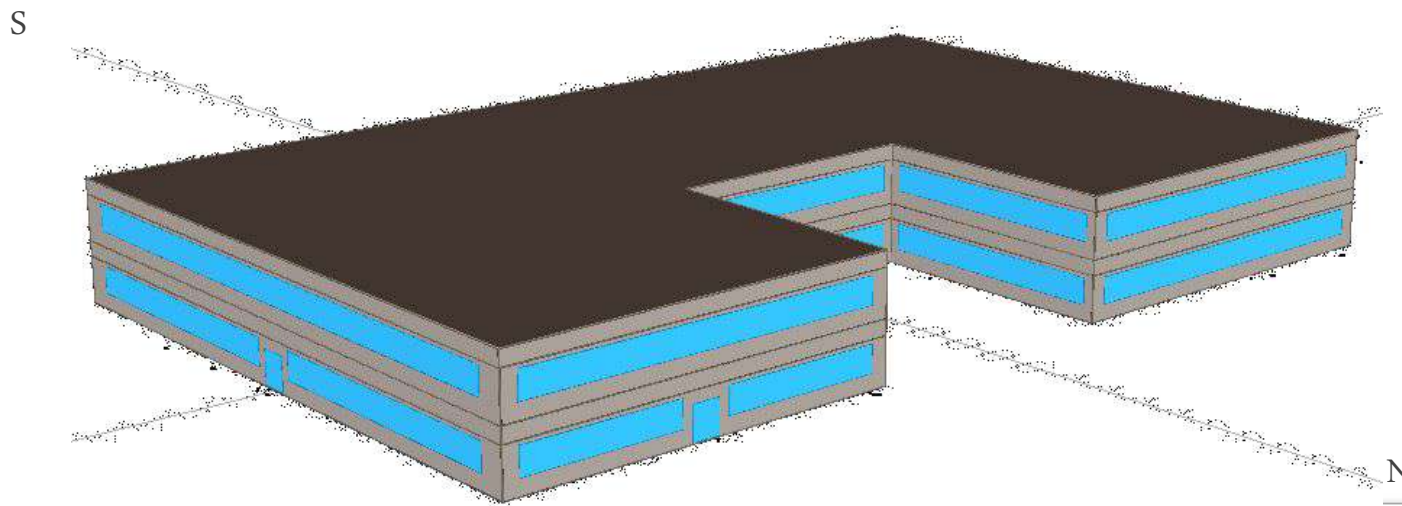
INTERNAL LOADS

## QUARTER #4

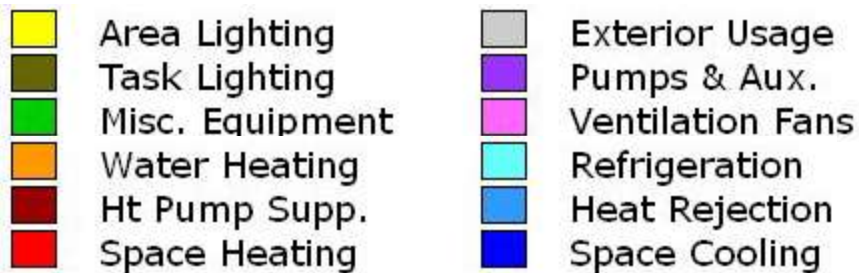
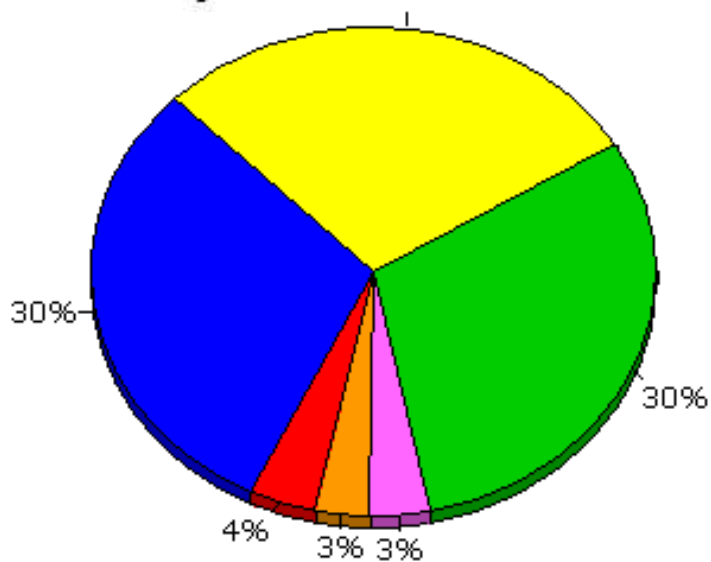
FRESH  
START



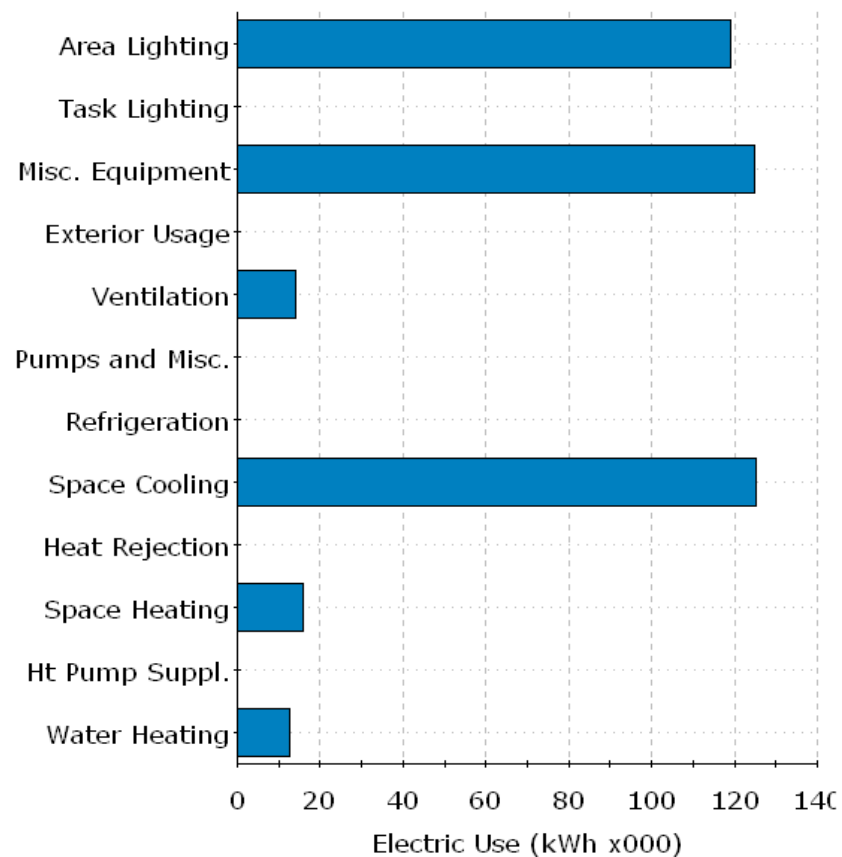
# THE BASELINE (Compliant with ASHRAE 90.1, 2007)



## Electricity



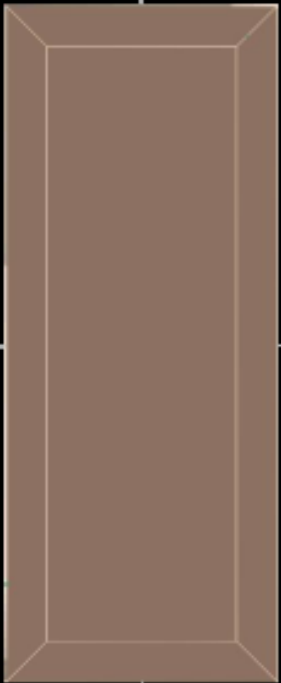
## Electric Use by Enduse



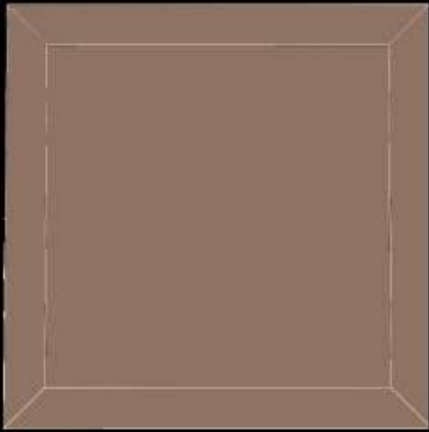
# MASSING & ORIENTATION

# QUARTER #1

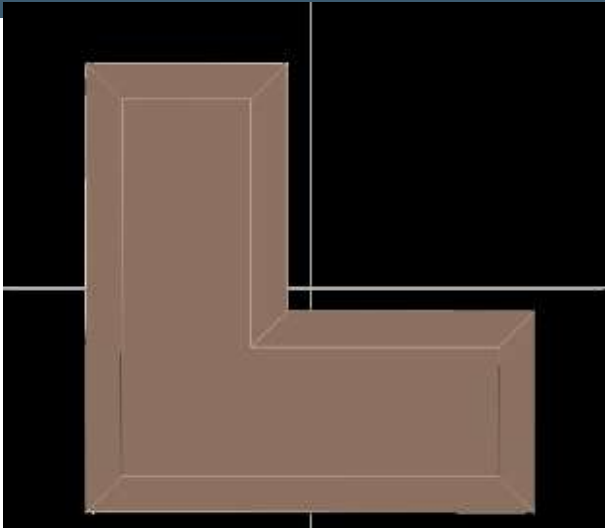
SELECT A NEW BUILDING SHAPE:



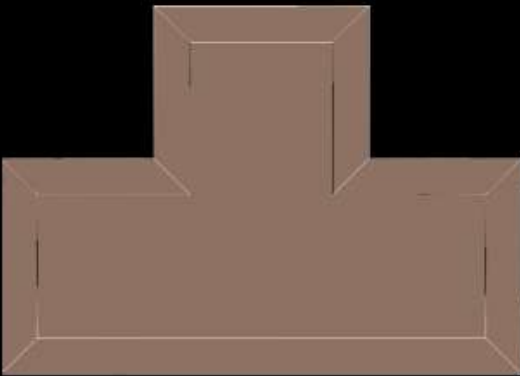
Rectangle



Square



L Shape



T Shape



H-Shape



# MASSING & ORIENTATION

## QUARTER #1

SELECT A NEW BUILDING SHAPE:



N

L-Shape

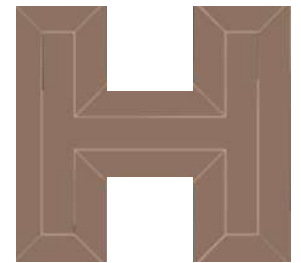
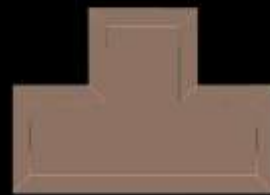
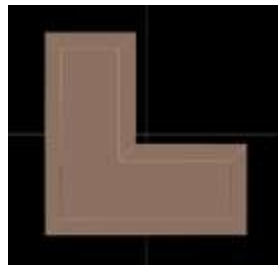
Square

T-Shape

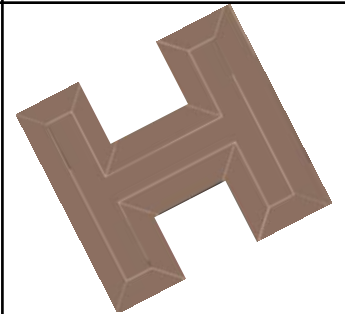
Rectangle  
(100'x250')

H-Shape

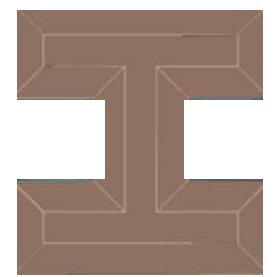
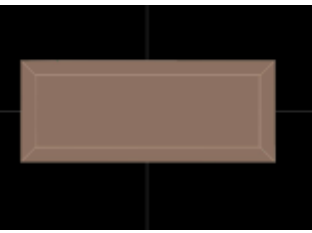
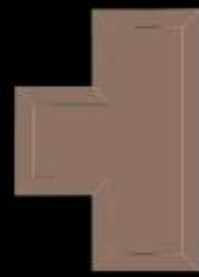
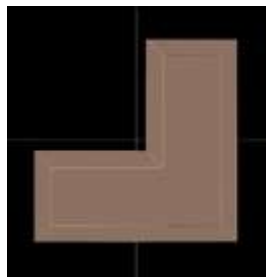
Row 1



Row 2



Row 3



SELECT **2** OF THE FOLLOWING ENVELOPE MODIFICATIONS:

1. ROOF INSULATION
2. EXTERIOR WALL INSULATION
3. WINDOW AREA
4. WINDOW GLASS TYPE
5. WINDOW EXTERIOR SHADING



## QUARTER #2: Envelope Modification ( select only 2 of the following 5 options ):

- a. **Roof Insulation** – the baseline design has 4” Polystyrene roof insulation with an 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

- b. **Exterior Wall Insulation** – the baseline design has no exterior board insulation (R13 batt insulation), see chart below for exterior wall insulation modification options:

Base	No Exterior Insulation	0
1	1” Polystyrene	R4
2	2” Polyurethane	R12
3	3” Polyisocyanurate	R21

- c. **Window Area**– the baseline design is limited to a 40% (gross) window-to-wall ratio as dictated 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	75% Window-to-Wall Area (100% Net)

- d. **Window Glass Type** - the baseline glass type is determined by U-Value, solar heat gain coefficient, and visible transmittance values (U=0.75, SHGC=0.25, VT=0.40); see chart below for additional window type options:

	Name	U-Value	SHGC	VT
<b>Base</b>	<b>Specified Properties</b>	<b>0.75</b>	<b>0.25</b>	<b>0.40</b>
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 and will be 3 feet deep

SELECT **2** OF THE FOLLOWING INTERNAL LOAD MODIFICATIONS:

1. DAYLIGHT HARVESTING
2. LIGHTING POWER DENSITY

OR

**1** INTERNAL LOAD AND **1** BUILDING ENVELOPE MODIFICATION:

1. ROOF INSULATION
2. EXTERIOR WALL INSULATION
3. WINDOW AREA
4. GLASS TYPE
5. EXTERIOR WINDOW SHADING



## QUARTER #3: Internal Load Modification ( 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 30 footcandles are detected on the desktop
- b. **Lighting Power Density** – ASHRAE 90.1 mandates that the maximum lighting power density for the building be 1.0 watts per square foot; see chart below for modification options:

Base	1.0 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

## MASSING & ORIENTATION

### BUILDING SHAPE & ORIENTATION

SELECT **4** OF THE OPTIONS LISTED BELOW:

## BUILDING ENVELOPE

ROOF INSULATION

WINDOW GLASS TYPE

EXTERIOR WALL INSULATION

WINDOW EXTERIOR SHADING

WINDOW AREA

## INTERNAL LOADS

DAYLIGHT  
HARVESTING

LIGHTING POWER DENSITY



# eQUEST

[www.doe2.com](http://www.doe2.com)

**Weather Files:**

[www.doe2.com-/download/weather/](http://www.doe2.com-/download/weather/)

THE END



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