1 : Gaming Challenge

Scenario

- The virtual space shows a typical floor of a modern office building with a mostly open office plan.
- The space provides satisfactory visual comfort from its lighting and daylighting and all systems just meet current energy code requirements.

Action 1

- Your challenge as a user is to improve the energy efficiency of the lighting and daylighting systems as much as possible without:
  - Reducing visual quality or comfort or
  - Increasing the building's energy for its heating, ventilating and air-conditioning (HVAC).
- You are scored on how much energy you save. Your score also increases if you improve visual comfort.
- You may achieve elevated status as you are more successful— e.g., gold, silver, or platinum ratings.
- There are possible variations in this scenario that could involve:
  - Minimizing increases in construction costs while reducing energy use, or
  - Seeking minimum life cycle costs while reducing energy use.

Action 2

- Your challenge is same as in Action 1, but now you are competing with other classmates, or with other eLAD users on the Internet.

2 : Troubleshoot an Installed Non-functioning Daylighting System

Scenario

- The virtual space shows a completed floor of a 100,000 sf addition to a pharmaceutical complex consisting of offices and labs.
- Project was part of a local utility design assistance program.
- Daylighting was a major design objective, and reviews of the completed design concluded that the team did a good design.
- No special commissioning (Cx) or Quality Assurance (QA) efforts were conducted during project specification and construction.

- Upon functional testing at the end of construction the daylighting system was determined to be not working and was not saving any energy at all.

Action

- Compare the completed virtual building with the final design documents, identify what went wrong, and how to fix the problems.

3 : Explore Tenant Improvement for a Low Quality Open Office

Scenario

- The virtual space shows a 12 year old lighting system within an open office with open parabolic fixtures and windows with 40% area of the wall, a solar heat gain coefficient (SHGC) of 0.4 and visible transmittance (VT) of 0.4.
- Partitions are high, surfaces are dark, lighting controls are minimal.
- The owner wants to improve visual comfort, and is willing to consider changes in lighting systems, controls, partitions, interior surfaces, and glare control devices.

Action

- Using the toolkit available with eLAD, explore how to improve visual quality while using a lighting system that uses 25% less annual energy than that required by the local code or project standard. AHSRAE/IESNA standard 90.1-2007 or California Code of Regulations Title 24, Part 6.
- Demonstrate how much improvement in visual comfort has occurred.

4 : Troubleshoot Problems with Construction Documents

Scenario

- The virtual space shows an open office with direct/indirect lighting and daylighting. Both side lighting and top lighting is employed.
- The building delivery phase is 95% completion of construction documents
- Energy and Radiance simulations conducted during design development estimated 50% energy lighting savings from the applicable energy code baseline.
- However, independent review of the construction documents shows that the energy savings will be only 25%.

Action

- Compare the specs as embedded in the virtual space (95% completion of documents) with the equivalent data used in the earlier simulations. *Recommend remedies within the construction documents.

5 : Potential Impact of Lighting Control Retrofit

Scenario

- The virtual space shows an open office floor of a computer center in the data processing offices of a major bank.
- A consultant has estimated that occupancy sensors (to be partially financed by a local utility) will save over 80% of the lighting energy, under the assumption that there is very little long term occupancy within this computer operation.
- Closer examination of the occupancy of the center shows that there are 5 distinct occupancies for this floor, and that 4 of the occupancies involve substantial daytime occupancies.

Action

- Using the toolkit available within eLAD, estimate the potential impact of occupancy sensors for the 5 types of occupancy, and derive an adjusted percent estimated savings from the occupancy sensors.

6 : Explore Impact of Occupancy Sensor Location

Scenario

- The virtual space shows a smallish open office area.
- An occupancy sensor is located near the door.

Action

- You are able to relocate the occupancy sensor to other places in the space.
- Relocate the occupancy sensor to at least 4 new locations in the space and observe the changes in performance and energy use. What can you conclude from this?

7 : Troubleshoot and Resolve Serious Glare Situation

Scenario

- You are being interviewed for a job by a manager in the human resources department of a firm.
- The manager is sitting across a desk from you, and there is a window behind the manager.
- There is so much glare from the window that you can only see a sillouette of the manager and cannot see her facial expression.

Action

- Explore what actions you can take to remedy this situation. You are able to modify:
    - Desk orientation
    - Window shading / blinds
    - Ceiling lighting type, amount, and location
    - Task lighting type, amount and location.
- What can you conclude from this exercise?