

## AI Tech Center Hartford, CT

### Project Description:

AI Engineers is in the process of designing a 13 story 260,000 square foot high rise office building in down town Hartford at 3 Constitution Plaza, the site of the former WFSB Broadcast House. This building will reuse an existing building site in the center of the down town area and will be an example of modern building design and engineering technology in the 21st century. This building is intended to achieve a LEED-NC platinum rating.

Mechanical: The single largest energy consumers in most buildings are the mechanical loads related to heating and air conditioning (HVAC). Our review of best HVAC system practices led us to a 100% outside air HVAC design for this building. This approach, while different in design than many conventional HVAC designs, employs system components that have been well established and proven in the industry for decades.

- **Energy Efficient:** This sort of system can use from 20-70% less energy than conventional commercial building HVAC strategies. The use of 100% fresh air supply and exhaust to the building permits smaller duct sizes. A heavy use of energy recovery and evaporative cooling techniques in the supply and return air streams help to significantly reduce the energy requirements. These reductions in construction materials, the size of the HVAC equipment and related emissions combine to reduce the material costs and overall energy footprint of the building.
- **Superior Indoor Environmental Quality:** This 100% fresh air displacement provides superior indoor air quality improving the work environment and helping both occupant comfort and productivity.

### Salient Features

- **High Performance Building Envelope:** The overall resistance to summer heat gain and winter heat loss from the building envelope will exceed the requirements of the building code. This will result in greater occupant comfort and reduced energy consumption.
- **Green Roofing Technology:** This building will have a green roof, using regional plants and shrubs. This will reduce the building heat island effect and building HVAC loads. Recycled water will be used for irrigation.
- **Storm-water and Condensate Recapture:** We will store captured storm-water and cooling coil condensate water in basement vaults. This will be used to irrigate site vegetation and flush water closets. This will reduce the buildings demand for potable water as well as the load on the municipal sewage system.

#### Location

Hartford, CT

#### Owner

AI Engineers, Inc.

#### Duration

2008 onwards

#### Construction Cost

\$45 million est.



Electrical: To achieve the desired LEED Platinum rating for the AI Tech Center, all building systems must be designed to minimize their use of electrical power. Any reduction in electrical power consumption will reduce the costs of the main electrical distribution systems, parasitic heat load on the HVAC system and the carbon footprint of the building.

- **Energy Efficient Lighting Systems:** These systems will be designed to take advantage of the latest proven lighting technologies such as LED and high output fluorescent light sources. The lighting control systems will work with the architectural day lighting/light shelf schemes of this building to maintain a proper lighting environment for occupant productivity and reduced electrical consumption.
- **Photovoltaic Power:** The roof of the AI Tech Center has an open southeast to southwest exposure that has been optimized for the installation of a photovoltaic panel array. This array is designed to provide enough power on a midsummer day to offset the entire building lighting load. This will significantly reduce the need for utility power at the time of highest electrical demand and reduce overall the buildings electrical consumption.
- **Fuel Cell Power:** The AI Tech Center includes a fuel cell power plant in its design. During off peak hours, the fuel cell output will offset the electrical power requirements of the Ice Storage system chiller. During on peak hours the fuel cell output will offset the electrical power requirements of building mechanical systems such as pumps, fans and elevators. The fuel cell heat energy will also power a small absorption chiller. This will significantly reduce the need for utility power at times of highest electrical demand as well as reduce the buildings electrical consumption.

### **Salient Features**

(Continued)

- **Water Efficiency:** Through the use of low flow plumbing fixtures, we will dramatically reduce the demand on potable water compared to other buildings of this size.
- **Non-Chemical Cooling Water Treatment:** A non-chemical cooling water treatment system will reduce the discharge of building chemicals into the municipal sewage system. It will reduce the amount of cooling tower blowdown which will reduce potable water consumption.
- **Ice Storage System Building:** cooling loads will be handled by a combined chiller/ice storage system. This system will use ice created during night time off peak electrical demand hours to provide cooling during the daytime.
- **Absorption Chiller:** A small absorption chiller using the heat energy from the building fuel cell will operate continuously to provide base load building cooling for 24 hour cooling functions as well as during the building seasonal heating/cooling transitions.