

## **4 DESIGN OBJECTIVES AND REQUIREMENTS**

Many factors go into the design of a mechanical system. Before choosing the correct system, a designer must first know what are the owner's and occupant's needs. In the McKinstry Oregon Headquarters, it is a combination of sustainability, comfort, and economy.

### **4.1 SUSTAINABILITY**

First and foremost, McKinstry wanted to make sure their new building received LEED Certification. According to McKinstry designers, LEED has become the industry standard. Achieving certification is seen no longer as a perk, but a necessity. At the beginning of design, McKinstry looked into several sustainable solutions. One of which was on-site wind energy or solar energy. The designers also wanted to save water by harvesting rainwater. This grey water would supply all of the toilets and urinals in the building. The mechanical system is an open loop ground source heat pump. In a metaphorical way, the open loop system, like the roots of a tree, gets its energy from the earth. This can provide substantial savings on energy. Finally, being a mechanical company, they find an aesthetic to their work and chose to leave the ductwork exposed throughout the building.

### **4.2 COMFORT**

Tenants' comfort was very important from the beginning of design. A comfortable employee is a more productive employee, so the designers wanted to make sure every effort was taken to maintain a comfortable environment inside the building. On the mechanical side, indoor temperatures were set to very comfortable temperatures (70°F in the winter and 74°F in the summer). Some buildings in the Portland area would actually raise their summer set point to as high as 80°F to save energy.

Windows in the room were placed higher on the walls to decrease direct sunlight onto the work plane. The building also includes a full kitchen with stove and hood system, showers for those who bike to work, and a weight room. All of this creates a welcome atmosphere to employees and encourages employees to spend time together on breaks.

### **4.3 ECONOMY**

Finally, just as in virtually any project, hard dollars step in and dictate which ideas are feasible and which ideas are pipe dreams. Throughout the project, total costs dwindled from about \$20 million to \$15 million. Several ideas such as solar and wind power were scrapped (the wind power had a 30+ year payback). Rainwater harvesting was reduced from supplying all the toilet grey water to being a supplemental system. As with any building, the greatest challenge is to produce an aesthetic, functional building on a budget.