

Energy Conservation in a Commercial Building

Daylight, Fluorescent Lights, Fresh Air, Underfloor HVAC Cut Costs

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A professional office building conserves energy by directing natural light deep inside and using low-energy fluorescent lights, high-efficiency underfloor HVAC and well water,

A new building in Fishkill, NY, is an example of a commercial facility built for:

- Energy conservation
- Low impact on the environment,
- Low water consumption,
- Low operating costs
- Well-being of occupants.

The building owners, Dr. Ken Hansraj, a spinal surgeon, and Marcia D. Griffin-Hansraj, D.O., a specialist in physical medicine and rehabilitation, wanted a building that would:

- Accommodate a facility designed to aid wellness and healing;
- Provide an environment for staff that is healthy and promotes productivity;
- Bring in high degrees of fresh air and natural light.

None of the buildings they researched to lease met their needs. The 37,000 sq. ft building designed for them by Canadian architect Dermot Sweeny, of [Sweeny Sterling Finlayson & Co Architects](#), with civil engineers Michael Gillespie & Associates, is now the LandWorks Professional Center.

Off The Grid

The building dispenses with municipal water and sewage treatment.

- Water comes from an on-site well.
- Rainwater is collected in ponds for use.
- Sewage goes to septic beds.

Daylight Harvesting

The building gains maximum sunlight from a south-facing glass wall.

- External sunshades reduce direct sunlight to eliminate [glare](#).
- Sunlight entering the windows above the sunshades reflects off [light-shelves](#) so that it bounces from the ceiling down into the interior, doubling natural light in the building.
- Electric motors automatically adjust the lightshelf angle to reflect natural light deep into the workspace throughout the day.

Energy-Efficient Fluorescent Lighting

Natural light is supplemented by energy-efficient fluorescent lighting.

- Interior lighting is indirect (i.e., light from fluorescent tubes reflects from a shade beneath them up on to the ceiling and back down to the floor). This diffuses light evenly over the work space.
- Occupancy sensors detect when a person is present or absent at a workstation. Lighting is automatically controlled accordingly.
- Ballasts controlling fluorescent lighting can adjust the voltage to dim the lights. Each occupant can control individual intensity, improving comfort and saving energy.

Energy-Efficient Heating and Cooling

Ventilation air flows via an 18-inch (46-cm) space under a raised floor.

- This reduces the amount of air-conditioning compared to conventional overhead air conditioning. The temperature of the cooled air can be higher than in a conventional building, in which air from ceiling-height ducts mixes with hot air and warms as it is blown down by impellers or fans.
- Underfloor cooled air is drawn up by convection due to the heat of the computers and people in the workspace. Impellers are not needed.
- Heating air flows by convection from under the floor at vents around the perimeter of the building.
- Each occupant can adjust air flow to his or her workstation. This adds to comfort and optimizes heating and cooling energy consumption.
- Occupants can open operable windows for fresh air.

Lowered Operating Costs

- Wiring for power, telephones and computers routes underfloor. This makes it easier to move, add and change workstations and offices.
- The building design minimizes obstructions across the floorplate.
- These characteristics lower the costs of fitting up space for tenants.
- The raised floor reduces costs of installation of systems furniture and of wiring.
- The costs of changes of layouts are greatly reduced.
- Demountable or movable partitions can replace drywall, make it easier to adjust rooms and partitioned areas while eliminating the waste of demolition and rebuilding of drywall.

Environmentally Healthy and Productive

The building minimizes its impact on the environment, conserves energy and water and reduces operating costs in a space design to promote health and productivity. It is off the municipal water and waste treatment grid, uses a high degree of natural light, distributes heating and air conditioning efficiently and has flexibility for change and growth.

It is expected to achieve Silver certification by the [U.S. Green Building Council's](#) LEED (Leadership in Energy-efficient and Environmental Design) system.

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