Massachusetts Division of Fisheries and Wildlife Headquarters in Westborough

Background

The Massachusetts Division of Fisheries and Wildlife (DFW) is responsible for the conservation - including restoration, protection and management - of fish and wildlife resources for the benefit and enjoyment of the public. The Cronin Building, our Field Headquarters, is where MassWildlife biologists, environmental review, information & education, and some administrative staff are located.

The building is heated and cooled by geothermal energy in combination with unique design and mechanical systems and solar panels that generate more power than the building uses. The building's interior floors and trim were completed in sustainably harvested wood from trees grown on open space set aside for the Division. The building's design facilitates the Division's operations, including research labs, open space preservation and endangered species protection.

Key features of the Cronin Building (opened to employees in August 2014)

RENEWABLE ENERGY SOURCES

Geothermal

In the basement of the building is a small room (1/4 the space needed for oil and gas furnace system) with three geothermal pumps that bring up heated water (110°) from 20 wells 400-feet deep. The geothermal energy is used specifically for heating and cooling of the building. The wells are located under the parking lot. The room feels somewhat cool, because there are no furnaces combusting oil or natural gas. The room is also fairly quiet (except when one of the pumps turns on), allowing a tour guide to easily talk to groups. While the three pumps could be used at the same time, only one is needed to adequately heat/cool the building. The three pumps are thus used alternately to extend the life of the pumps and to provide a back up in case one of the pumps fails.

Solar panels There are 90 solar panels on the roof of the building that generate more electricity than the building uses, thus they are giving more energy back to the grid than they use (The Mass DWF Headquarters building is better than zero net energy- it's a negative net energy user).

INTEGRATIVE DESIGN
The building was designed to be highly energy efficient to reduce the demand for energy.

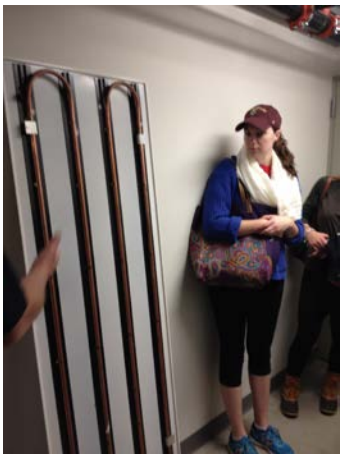
Building shell
The roof is made out of a Sarnafil PVC membrane. There is 9 inches of insulation under the roof. The shell insulates the building so well that in February during a period of temperatures of 20°F when the power went out for 3 days over a weekend, the building only lost 3° of heat.

Windows and Skylights
Three-layer windows with argon gas that have high R values (resistance to conductive heat loss). Large side windows allow for excellent daylighting in conference rooms. Large skylights on the ceiling of the building bring in natural lighting in the atrium.

The bright circle window is one of the many skylights that bring in abundance daylight and make the interior of the building pleasantly lit.

Radiative Heating/Cooling

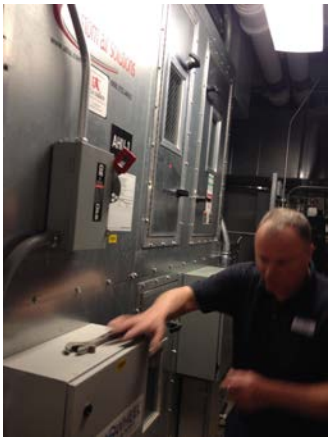
Floor and ceiling panels use radiative heating and cooling with copper coils that bring cooled or heated water through the building. Fans help to circulate the heat from the ceiling to the floor.



This is the underside of a ceiling panel showing the copper coils

Ventilation System

In a building that is as airtight as the Cronin, it's important to have good air circulation and ventilation. The ventilation system uses 100% air brought in from outside year round. In addition to making the air feel fresh, it is also more energy efficient. The ventilator retains heat and moisture from exchanged air in winter, but dehumidifies incoming air in summer. It transfers energy from the air being exhausted from inside to the air being drawn in from outside. The system they use is made by Custom Air Solutions.



Variable Speed Motors

Motors modulate rotations based on the energy demand, so motors are not working when the energy service is not needed.

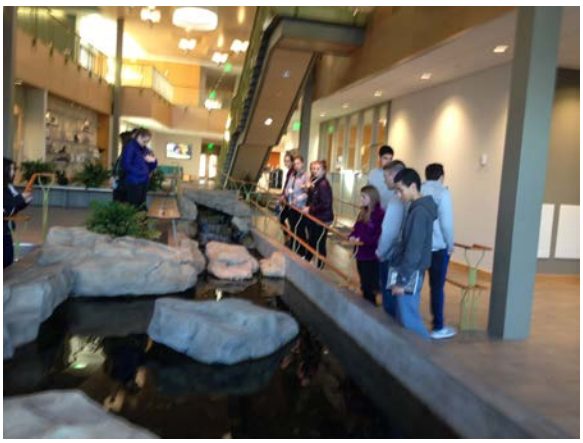
Environmental Sensors

On the ceilings are daylight sensors. When daylight is insufficient to light the room the lights will go on, however only if the room is occupied.

There are also carbon dioxide sensors that trigger increased ventilation when CO^2 levels go up. In addition to maintaining healthy air quality, this helps to keep people alert during meetings (i.e., improved productivity).

Trout Pond and Plants in the Atrium

The trout pond houses approximately 15 individuals of three of the state's trout species, rainbow, brown, and the tiger trout. In addition to being an educational display for visitors, the trout pond, with moving water, provides a peaceful ambience for employees.



Conservation Land: Adjacent to the headquarters building are 600 acres of conservation land including forest and wetlands for wildlife preservation and hunting. There are walking trails for the public.

*Report created after a field trip on November 18 and 20, 2015, by a class at Boston College on Climate Change taught by Tara Pisani Gareau.