Increasing Energy Efficiency While Prioritizing Bird Conservation

Overview

Energy efficiency practices and envelope technologies can have significant co-benefits to bird conservation. Organizations and facilities managers can simultaneously meet efficiency goals, increase wellness and comfort, and protect birds through key sustainability actions across building types. Birds are attracted to facilities where they can collide with glass, reflective, or lit surfaces. Every year, one billion birds or more fatally collide with U.S. facilities. Given that 96 million people in the U.S. watch birds, bird fatalities can decrease staff and customer well-being as well as risk poor optics for building owners. Some facility managers and building owners use bird-safe practices that can also increase energy efficiency. These practices are often supported by an increasing number of local ordinances and policies focused on the protection of birds and night skies, as well as sustainability frameworks like LEED that address these issues. Given the co-benefits, federal agencies, state agencies, businesses, elected officials, and non-governmental agencies are intentionally collaborating to encourage energy efficiency, wellness, comfort, bird conservation, and night sky protection.

Opportunities to Increase Energy Efficiency and Bird Conservation

Increasing energy efficiency while reducing bird collisions with facilities is a two-pronged approach. The reduction of lighting is a critical part of minimizing bird attraction and bird accumulation around facilities. It is also crucial to make the building envelope, specifically glass, visible to birds, and many methods simultaneously increase energy efficiency.

- **Building Lighting**

  Energy efficiency, bird safety, and dark skies are increased when indoor and outdoor lighting is used only *when and where needed*. Best practices include:

  - Limiting lighting to necessary times using automatic controls such as timers, dimmers, or motion sensors to turn lights on and off, as needed.
  - Keeping lighting as low to the ground as possible, only illuminating focal areas. Turning off lights that face up into the sky or illuminate the surrounding landscape.
  - Preventing light spill from windows by closing blinds, shades, or curtains at night manually or through automatic controls.
  - Keeping lights as dim as possible.

- **Windows and Building Envelope**

  Bird-safe glazing can maintain or increase energy efficiency relative to specific building designs and local conditions. In heating-dominated climates, bird-safe glazing can have little to no impact on solar heat gain allowing beneficial passive solar strategies to have intended effects. In cooling-dominant climates or buildings with significant amounts of glass, bird-safe glazing can reduce solar heat gain comprehensively or at specific orientations to mitigate peak cooling. Bird-safe glass alerts birds that glass is an obstacle and is not the vegetation reflected in the glass or a safe flight path. Bird collisions can be prevented when the exterior surface of glass is marked in a pattern no more than 2-inches by 2-inches apart. Such patterns have an insignificant effect on solar heat gain and support passive solar heating strategies. Denser bird-safe patterns or solar shading devices mitigate solar heat gain and air conditioning needs. Potential co-benefits can include increased

Shepherd Elementary School in Shepherd, MI uses external window films which reduces bird collisions and light escape while increasing energy efficiency and school safety. Photo: USFWS.

Jacob K Javits Convention Center in New York City uses external ceramic frit to reduce heat loading and bird collisions. Photo: USFWS.

New York Times Building in New York City uses external shading devices to reduce heat loading and bird collisions. Photo: USFWS.

privacy and internal and external glare reduction. Diverse products meet an array of aesthetic and budgetary needs. Bird-safe strategies are listed below:

- External window films with patterned, solid-colored, or frosted effects can be used to retrofit existing glass to reduce energy use and simultaneously provide effective bird collision prevention. To maximize longevity and effectiveness, use products intended for external use on external glass surfaces. These products can also increase security for building occupants, reduce UV light that causes fading of interior finishes, and provide advertising opportunities.
- Etched glass using acid, laser, or other techniques can alert birds to the collision risk, reject heat gain, and disperse interior daylight thereby reducing the need for interior artificial lights.
- Ceramic frit can be applied to glass in patterns with varying effects on transparency but making the glass visible to birds. Effects on solar heat gain vary with pattern density. The Jacob K Javits Convention Center in New York City serves as an excellent example of this mutual benefit and related sustainable business model.
- External solar shading devices can be an important passive design strategy due to the reduction in solar radiation and glare. They also provide opportunities for an array of aesthetics.

- **Infrastructure and Facility Lighting**

  Energy efficiency and bird safety go beyond the building footprint.

  - Parking lot and campus lighting should be minimized using approaches similar to building lighting. Light only when and where needed using timers and down shielding.
  - Communication towers should be lit according to current FAA obstruction lighting recommendations, using only flashing lights at night. Extinguishing or reprogramming non-flashing lights to flash reduces bird collisions by as much as 70% while reducing energy and maintenance costs.

Conclusion

Increasing energy efficiency and other co-benefits can be accomplished while benefiting bird conservation and meeting the demands of the increasing number of local ordinances protecting birds and night skies. Corporations and entities are making the most of these benefits and incorporating them into their business models and public images. Society's standards for and value of bird conservation and dark night skies are increasing, parallelling the interest and need for energy efficiency.

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