RenewAire® Energy Recovery Ventilation

ERV Case Study
St. Croix Casino

Casino Installs Energy-Efficient ERVs to Improve IAQ in a Smoky Environment

AT A GLANCE

OVERVIEW:

- Project: St. Croix Casino
- Location: Turtle Lake, WI
- Industry: Gaming and Hospitality
- RenewAire ERVs installed:
  - HE Series Rooftop ERVs

RESULTS:

- Enhanced indoor air quality
- Improved experience for guests
- Increased revenue from customer retention and longer stays
- Healthier conditions for staff, leading to reduced absenteeism and turnover
- Energy savings of 65,000 btu/hr (heating) and 2 tons (cooling)
- 58°F mixed air temperature across coils with -25°F outside air
- For casino applications, optimal air quality is best achieved with CO2 or VOC sensor controls

PROJECT OVERVIEW

- Provide a clean, healthy indoor air for guests in a smoky environment
- Improve health and productivity of employees through increased ventilation
- Find a cost-effective ventilation strategy for a cold, northern climate

A SMOKY CHALLENGE

St. Croix Casino in Turtle Lake, WI needed a simple and cost-effective ventilation solution for improving their indoor air quality (IAQ). The resort features a 100,000-sq. ft. casino, 160-room hotel and three restaurants, with smoking permitted throughout the casino. The solution would have to control tobacco smoke migration, provide a comfortable atmosphere for guests, and protect casino workers from long-term exposure to second-hand smoke—all while maintaining a cost-effective ventilation strategy in a cold, northern climate.

To understand the scale of this challenge, it is important to look at the typical air quality in similar gaming environments. Studies have shown that casinos that allow smoking can have particulate matter (PM) levels five times higher than outdoor air quality standards, primarily due to smoke accumulation. Before a smoking ban in Illinois, casinos had air pollution levels over 400 PMs in gaming areas (considered hazardous by the EPA), compared to 15 PMs after the smoking ban. Long-term exposure to high levels of PMs can cause health problems like heart disease, lung cancer, stroke, diabetes, and asthma.

In addition, air quality can deteriorate at casinos due to volatile organic compounds (VOCs) from cleaning products and restaurant kitchens. These airborne particles can cause eye, nose and throat irritation, headaches, nausea, plus damage to the liver and kidneys. One of the most effective ways to improve these conditions is diluting and removing these particles through ventilation and filtration.

IMPROVING IAQ

In addition to health risks, deficient IAQ can impact a casino's bottom line. Breathing unhealthy air can cause guests to have an unpleasant experience and leave the casino early, or choose a different gaming location. Poor IAQ also poses health concerns for employees, causing fatigue and lower productivity, absenteeism, and higher turnover rates.

To improve IAQ, air filtration is essential for removing particulates, but it is often insufficient on its own. A robust strategy utilizes increased ventilation and air disinfection to dilute and remove the particles that standard filters might miss.

According to ASHRAE 62.1-2022 standards, casinos have a minimum ventilation rate of 7.5 CFM per person, and 0.18 CFM per sq. ft. Using IMC standards and best practices, casinos that permit smoking are advised to have 20–30 air changes per hour. Due to this high rate of air changes, it's important to be as energy efficient as possible to keep ventilation costs low.

RenewAire ERVs ideal for casinos:

HE3XRT

LE6XIN

CA4XRT

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AN ENERGY-EFFICIENT SOLUTION

In addition to air quality challenges, the Turtle Lake location required a solution that could perform reliably in extreme winter conditions without skyrocketing operational costs. RenewAire's energy recovery ventilators (ERVs) provided St. Croix with an energy-efficient solution for ventilating and improving the resort's air quality. The ERVs actively dilute airborne particles and environmental tobacco smoke by continually bringing in fresh, outdoor air while exhausting the stale, polluted indoor air.

RenewAire ERVs are designed to work across a wide range of climates, including the frigid winters of northern Wisconsin. ERVs and dedicated outdoor air systems (DOAS) recycle energy by reusing the otherwise-wasted energy and humidity from exhaust air to temper incoming outdoor air. RenewAire's energy recovery process helps lower the demand on heating and cooling, allowing facilities to downsize their HVAC equipment and save up to 70% on ventilation energy costs.

The project's engineering team opted for RenewAire HE Series ERVs, which connected directly to the resort's packaged rooftop air handling units. The ERVs helped the mixed air temperature across coils reach 58°F while the incoming winter air was at -25°F, leading to heating savings of 65,000 BTU/hr. The new ventilation strategy allows St. Croix to clear the smoke and improve IAQ without freezing guests or raising energy costs.

RenewAire HE Series ERV at St. Croix Casino

THE WINNING RESULTS

The ability to maintain these ideal indoor conditions sustainably has yielded measurable business benefits. The installation of RenewAire ERVs provided St. Croix Casino with an efficient and cost-effective solution for improving ventilation and indoor air quality. Through the use of ERVs, the casino has successfully reduced its energy consumption, minimized its environmental impact, and created a healthier and more comfortable environment for guests and staff.

This noticeable improvement in IAQ led to increased revenue from guests staying longer at the casino and more frequent return visits. In addition, the healthier working conditions helped improve employee productivity and reduced staff absenteeism and turnover.

RenewAire ERVs helps **the casino's mixed air temperature reach 58°F while the incoming winter air drops as low as -25°F**, greatly reducing the demand for heating and **leading to a savings of 65,000 BTU/hr.**

For over 40 years, RenewAire® has been a pioneer in improving human health, cognitive function, productivity and wellbeing by enhancing indoor air quality via energy recovery ventilation technologies. This is accomplished energy-efficiently, cost-effectively and sustainably with fifth generation static plate enthalpy core energy recovery ventilators and dedicated outdoor air systems. For more information, visit www.renewaire.com, email: ramarketing@renewaire.com or call (800) 627-4499.