

## Pollution Prevention (P2) Opportunities with HVAC

Heating, ventilation, and air conditioning (HVAC) is an important part of the hospitality industry, both to customer satisfaction and to the environment. HVAC and its supporting infrastructure offers guests and workers the comfort expected in a hotel experience. Proper maintenance and practices with these systems can offer significant cost savings for those implementing them and, at the same time, work towards preventing pollution.

### Efficient Air Conditioners

Energy Star certified heating and cooling units can offer 10 percent less energy usage than other conventional new models and even larger savings with older models.<sup>1</sup> Units are certified using Seasonal Energy Efficiency Ratio (SEER) and Energy Efficiency Ratio (EER), which are used to establish the baseline conditions for an ENERGY STAR certified model.<sup>2</sup> These ratios are found from the cooling/heating output of the unit in relation to the amount of energy provided to it. When looking for a new or replacement conditioner, it is always recommended to look for as high a SEER or EER rating as possible.

#### Room Air Conditioner Sizing

When using an in-room air conditioner an important factor to consider is the size of the room it is placed in. An air conditioner too large or small will not perform to its rated efficiency. Refer to ENERGY STAR's buying guidance<sup>1</sup> on room air conditioners to correctly size your unit.

### Efficient Heating

Many of the same tips for comparing and purchasing an air conditioner can be used for a heating unit, such as SEER and EER values.<sup>2</sup> Modern heating unit types are comparably efficient, so the biggest factor to consider is the age of your current unit.

### Ventilation

Heated or cooled air needs to be pushed by fans through ventilation ducts in order to get to the intended location. ENERGY STAR certified fans can reduce energy usage in this process. Properly insulated ventilation can also reduce the loss of energy while traveling. Ventilation becomes more important the more a building becomes sealed and insulated. Fresh air needs to be brought in and indoor contaminants need to be removed. Making use of pleasant outdoor temperatures can be done through ventilation systems, which can completely negate the need to use an air conditioner. One such system is a whole house fan. This system provides a continuous supply of fresh outdoor air by pulling in air from open windows and expelling it through the roof. A shared space, like the reception area, would be the ideal location to integrate this type of system.<sup>4</sup>

### Preventative Maintenance

Regular preventative maintenance is vital to increasing the lifespan of equipment and allowing for more efficient operation. Monthly maintenance for room air conditioners includes:

- Replacing or cleaning filters (reusable filters recommended)
- Cleaning front cover
- Checking for excess humidity

For central air conditioning, be sure to check air filters as well. A yearly checkup of your heating and cooling units by a well-trained technician is also recommended. The U.S. Department of Energy and ENERGY STAR both provide guidelines<sup>5, 6</sup> for what an annual checkup should include:

- Checking thermostat settings and accuracy
- Tightening electrical connections
- Lubricating moving parts
- Checking the condensate drain
- Checking the controls of the system
- Cleaning evaporator and condenser coils
- Cleaning and adjusting blower components
- Checking central air conditioner's refrigerant level

### Supporting Infrastructure

Supporting an HVAC system with proper insulation and sealing will help save energy by maintaining the heated or cooled air for longer periods. Insulation and sealing also have the extra benefit of helping with noise, pests, dust and humidity control.<sup>7</sup> Air leaks can be large contributors to HVAC inefficiency. Some simple yet effective ways to prevent air leakage are caulking cracks and weather-stripping doors or windows.<sup>8</sup>

#### Windows

Windows make up a large portion of where energy is lost for a building. Around 76 percent of sunlight hitting a window can be expected to become heat. While heating, 30 percent of that energy is lost from the windows.<sup>9</sup> There are many window options to reduce this amount and save on cooling and heating.

Window coverings, such as blinds, curtains and insulated cellular shades can be effective at reducing energy usage when properly used. Insulated cellular shades are the best option, reducing heat loss through windows by 40 percent or more and reducing unwanted solar heat through windows by up to 80 percent.<sup>9</sup>

Reflective films can be applied to existing windows and block out 95-99 percent of UV rays. There are many types of window films to choose from—refer to NFRC ratings for guidance.<sup>10</sup> Exterior options such as awnings, shutters and solar wind screens are also available. An awning can decrease solar heat gain by 65-77 percent while also maintaining visibility outside. Shades, shutters and solar window screens offer similar advantages and disadvantages. The more visibility for these options, the more solar heat gain occurs and vice versa.

### ***Programmable Thermostats and Lighting***

See ADEQ's resource summary on Lighting and Air Conditioning to find more tips on reducing your energy usage.<sup>11</sup>

### ***Roofs***

Cool roofs can help lower energy usage from air conditioners, reduce local air temperatures and preserve roofing materials for a longer period. Cool roofs work by using reflective materials as roofing, or adding a reflective coating to existing roofing tiles.<sup>12</sup> This allows the roof to reflect sunlight instead of absorbing and transferring heat to the building below. A cool roof can be implemented on any roof type. An eye-catching way to implement P2 in the same area is a green roof. Green roofs are roofs that contain a waterproofing membrane, soil and vegetation over a traditional roof. They offer lower energy costs, twice the lifespan, reduction in local air temperature, an increase in biodiversity and better management of storm water runoff. Green roofs are best implemented in flat or shallow-pit roofs.<sup>13</sup>

### **Case Study**

The Bardessono Hotel, a 62 luxury room facility, in Yountville, CA, used many strategies outlined in this resource summary. They were able to implement improved insulation, high efficiency HVAC equipment and window films. This resulted in a 37 percent reduction of energy consumption—almost \$60,000 for a commercial building in Arizona.<sup>14, 15</sup>

### **References**

- <sup>1</sup> [ENERGY STAR. Room Air Conditioner.](#)
- <sup>2</sup> [ENERGY STAR. Air-Source Heat Pumps and Central Air Conditioners Key Product Criteria.](#)
- <sup>3</sup> [ENERGY STAR. Ventilation Fans.](#)
- <sup>4</sup> [U.S. Department of Energy. Cooling with a Whole House Fan.](#)
- <sup>5</sup> [U.S. Department of Energy. Maintaining Your Air Conditioner.](#)
- <sup>6</sup> [ENERGY STAR. Maintenance Checklist.](#)
- <sup>7</sup> [ENERGY STAR. Why Seal and Insulate?](#)
- <sup>8</sup> [U.S. Department of Energy. Air Sealing You Home.](#)
- <sup>9</sup> [U.S. Department of Energy. Energy Efficient Window Attachments.](#)
- <sup>10</sup> [Window Coverings & Attachments. Applied Film.](#)
- <sup>11</sup> [ADEQ. Lighting and Air Conditioning | P2 for the Hospitality Sector.](#)
- <sup>12</sup> [U.S. Department of Energy. Cool Roofs.](#)
- <sup>13</sup> [U.S. General Services Administration. Green Roofs.](#)
- <sup>14</sup> [Journal of Green Building. Green Luxury: A Case Study of Two Green Hotels.](#)
- <sup>15</sup> [U.S. Energy Information Administration. Average Price of Electricity to Ultimate Customers by End-Use Sector.](#)