**SORBENT AIR CLEANING FOR HVAC LOAD REDUCTION**

**OPPORTUNITY**

How much energy can be saved by bringing in less outside air? 7%

**TECHNOLOGY**

How does sorbent air cleaning for HVAC load reduction work?

**CLEANS INDOOR AIR**

SO LESS OUTSIDE AIR IS REQUIRED TO ACHIEVE GOOD INDOOR AIR QUALITY (IAQ)

Absorbent material selectively removes indoor-generated contaminants and reduces intake of outdoor pollutants.

**M&V**

Where did Measurement and Verification occur?

NATIONAL RENEWABLE ENERGY LABORATORY (NREL) assessed sorbent air cleaning provided by enVerid at multiple commercial and educational buildings in the Eastern and Southern United States.

**RESULTS**

How did sorbent air cleaning for HVAC load reduction perform in M&V?

**IMPROVED IAQ AND HUMIDITY CONTROL WITH LOWER VENTILATION RATES**

6%–37% COOLING SAVINGS DURING PEAK COOLING MONTH

ADD-ON INSTALLATION OUTDOOR DAMPERS MUST BE OPERABLE AND CONTROLLABLE

**DEPLOYMENT**

Where does M&V recommend deploying sorbent air cleaning for HVAC load reduction?

**SITE SPECIFIC**

- Best suited for hot/humid or cold climates where there is higher energy savings potential, especially when existing HVAC equipment is undersized. The energy cost to run the unit can exceed savings in mild climates.
- Best economics for projects that can benefit from reducing heating and cooling capacity requirements. Modeling estimated capacity reductions between 9% and 20%, depending on location.
- Reducing ventilation rates during periods of high outdoor air humidity or pollution may improve IAQ.
- Not recommended where outside air can’t be controlled.

**Modeled Energy Savings Across Climate Zones**

Highest energy savings in climates with extreme hot or cold temperatures.

<table>
<thead>
<tr>
<th>Location</th>
<th>Annual Energy Savings per SF</th>
<th>Peak Demand Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>CLIMATE ZONE</td>
<td>CITY</td>
</tr>
<tr>
<td>1A Miami, FL</td>
<td>3A Atlanta, GA</td>
<td>0.27</td>
</tr>
<tr>
<td>2A Houston, TX</td>
<td>3B Las Vegas, NV</td>
<td>1.89</td>
</tr>
<tr>
<td>3A Atlanta, GA</td>
<td>4A New York, NY</td>
<td>0.99</td>
</tr>
<tr>
<td>3B Las Vegas, NV</td>
<td>5A Chicago, IL</td>
<td>0.72</td>
</tr>
<tr>
<td>4A New York, NY</td>
<td>5A Chicago, IL</td>
<td>0.56</td>
</tr>
<tr>
<td>5A Chicago, IL</td>
<td>AVERAGE MODELED SAVINGS</td>
<td>0.30</td>
</tr>
</tbody>
</table>

**DECREASE IN ENERGY USE INTENSITY (EUI)**

from bringing in less outside air to meet ventilation requirements.1 The air in a building can be replaced between 10 to 20 times a day.2

3Ibid, p.7
4Ibid, p.7
5Ibid, p.38
6Location Annual Energy Savings per SF Peak Demand Reduction CLIMATE ZONE CITY COOLING kBtu/sf/yr HEATING kBtu/sf/yr JULY PEAK SAVINGS % 1A Miami, FL 2A Houston, TX 3A Atlanta, GA 3B Las Vegas, NV 4A New York, NY 5A Chicago, IL AVERAGE MODELED SAVINGS Modeling assumes one air cleaning module for a medium-sized office building (53,800 ft²). Gas is only used for heating ventilation air, space heating is controlled by electric reheat coils.

Absorbent material selectively removes indoor-generated contaminants and reduces intake of outdoor pollutants.

Where does M&V recommend deploying sorbent air cleaning for HVAC load reduction? 7%

**SITE SPECIFIC**

- Best suited for hot/humid or cold climates where there is higher energy savings potential, especially when existing HVAC equipment is undersized. The energy cost to run the unit can exceed savings in mild climates.
- Best economics for projects that can benefit from reducing heating and cooling capacity requirements. Modeling estimated capacity reductions between 9% and 20%, depending on location.
- Reducing ventilation rates during periods of high outdoor air humidity or pollution may improve IAQ.
- Not recommended where outside air can’t be controlled.

Researched by the National Renewable Energy Laboratory (NREL), a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. NREL is operated by the Alliance for Sustainable Energy, LLC.