EE 17: Use Outdoor Air for Cooling

ANSI/ASHRAE/IESNA Standard 90.1 (2007), as incorporated in Chapter 13 of the New York City Building Code
Proposal developed by the Energy & Ventilation Committee

Summary

Issue:
Buildings can be cooled using outside air when temperatures are sufficiently low. ASHRAE 90.1 does not require this energy-efficient practice in New York City's climate zone.

Recommendation:
Require that new HVAC systems be capable of utilizing outside air for cooling, when temperatures permit.

Proposed Legislation, Rule or Study

Amendments to ANSI/ASHRAE/IESNA 90.1 (2007), as incorporated in Chapter 13 of the New York City Building Code:

1. Amend Table 6.5.1 of Section 6.5.1 as follows:

<table>
<thead>
<tr>
<th>Climate Zones</th>
<th>Cooling Capacity for Which an Economizer is Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a, 1b, 2a, 3a [4a]</td>
<td>No economizer requirement</td>
</tr>
<tr>
<td>4a, 2b, 5a, 6a, 7, 8</td>
<td>&gt;= 135,000 Btu/h</td>
</tr>
<tr>
<td>3b, 3c, 4b, 4c, 5b, 5c, 6b</td>
<td>&gt;= 65,000 Btu/h</td>
</tr>
</tbody>
</table>

Supporting Information

Issue Expanded
It is often necessary to cool the interior of a building even though the outdoor temperature is at or below a comfortable level. This occurs because of internal loads, such as computers and lights that emit heat into the interior of the structure. A simple air conditioning system will simply continue to operate under these circumstances, using electricity to power its compressor. An economizer is a collection of vents and controls that allows the system to substitute cool outdoor air for recirculated indoor air that has been cooled in the air conditioner. Since the economizer relies only on fans and permits the compressor to be shut down (or its use greatly reduced), the use of electric energy is lowered substantially.

The economizer consists of some additional equipment, but is relatively minor in the context of a whole system. The payback period for the additional cost is very short, hence the use of economizers in most applications independent of Code requirements. The reason for adding back this requirement to the Energy Code is simply catch the rare situation whereby a designer may not be informed about the use of this technology. For this reason, we have moved the New York City climate zone (4a) from the group that does not require economizers to the group that require economizers on relatively large systems.

Environmental & Health Benefits
Reduced electric energy use will result in reduced emissions of both Clean Air Act pollutants (particulates, nitrous oxides and sulfur oxides) and carbon dioxide, lowering the carbon footprint.

This proposal was found to have a high, positive environmental impact per building and to impact a small number of buildings. It was thus given an environmental score of 2.

This proposal was found to have no significant positive health impact.
Cost & Savings
As described in the Executive Summary, Bovis Lend Lease prepared cost estimates for each Task Force proposal in the context of well-defined construction projects in specific buildings. Where possible, members of the Technical Committees prepared savings estimates for some of these projects and buildings. These cost and savings estimates are presented in the February 1st draft version of Appendix A. The innate uncertainty in how construction and operation will vary from one building to another, the complexity of the Task Force proposals, and the wide range of applications in which the proposals may be realized mean these figures are truly estimates.

This proposal was estimated to increase first capital costs by 0.01% to 0.02%, depending on building type. It was thus categorized as incurring no to a low capital cost increment. This proposal was also estimated to generate financial savings that will pay for the capital costs in less than three years depending on the building type.

Precedents
Economizers have long been required in New York City, under previous versions of ASHRAE 90.1; this measure will merely adjust the regions for which they are required as described above.

LEED
The use of economizers contributes to energy efficiency and to associated LEED points.

Implementation and Market Availability
There are no known implementation issues for this proposal. Economizers are readily available and in widespread use.