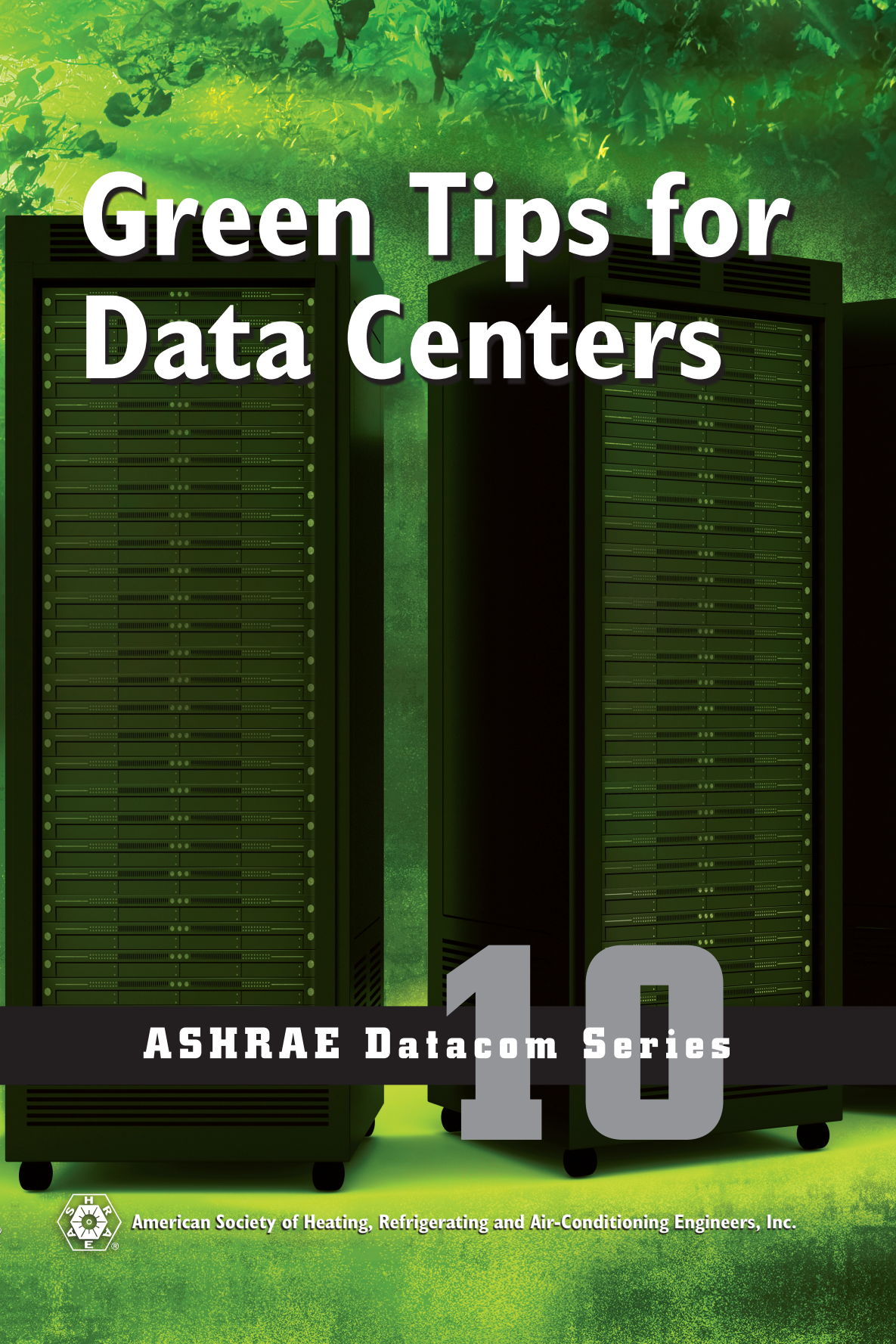

Green Tips for Data Centers
ASHRAE Datacom Series
10
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# Green Tips for Data Centers

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Book 10



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# Preface

The mission-critical nature of computing continues to drive a need for datacom (data processing and telecommunications) facilities to sustain a high level of information technology (IT) equipment dependability and availability. Datacom facility owners and operators have therefore focused their attention on the reliable performance of the power and cooling infrastructures and how to best handle the steadily increasing power density of the IT equipment. However, energy consumption, operating costs, and carbon footprint are becoming increasingly important due in part to increasing concerns regarding global warming and depleting fuel reserves. These issues are magnified in datacom facilities since they represent a large, concentrated use of energy (up to 100 times the power density of an office building) and operate 24 hours a day, 7 days a week (about three times the annual operating hours of a typical office building). The new challenge facing datacom facilities is how to continue to reliably serve mission-critical applications while doing so in the most energy-efficient manner practical.

The goal of this book is to identify techniques for optimizing energy efficiency in existing datacom facilities. Many of the techniques discussed can be implemented through simple operational changes, upgrades, or modifications that require a relatively low investment and that cause little disruption to the existing operations of the IT equipment.

The Green Tips in this book are aimed at datacom facility owners and operators as well as the professional consultants who advise them.

By providing insight into practical techniques that have proven successful at other datacom facilities, this book aims to encourage and give owners and operators the confidence to implement similar techniques in their own facilities.

The techniques in this book are recommendations and do not serve as endorsements for any products or services that may be required to apply any of the tips described. Individual results will vary based on site criteria, preexisting conditions, and operational parameters.

The format of this book was inspired by another ASHRAE publication, *ASHRAE GreenGuide: The Design, Construction, and Operation of Sustainable Buildings*.[1] The datacom Green Tips are presented with an organization similar to the summary sidebars contained in *ASHRAE GreenGuide*.

1. ASHRAE, *ASHRAE GreenGuide: The Design, Construction, and Operation of Sustainable Buildings* (Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, 2006).

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The book is also organized to be consistent with the major sections of the U.S. Department of Energy's data center assessment tool, DC Pro.[2] The sections are: Energy Management, Environmental Conditions, Air Management, Cooling Plant, IT Power Distribution, Lighting, and IT Equipment.

Throughout these Green Tips, abbreviations that are common to the datacom industry are used in a fairly generic manner. For example, CRAC (for *computer room air conditioning*) has been generically used to describe the cooling unit in the datacom space. Please refer to the abbreviations list and glossary for additional information.

Sources for further information are included at the end of each Green Tip as well as in the References section at the end of this book.

2. DOE, DC Pro Software Tool Suite (Washington, DC: U.S. Department of Energy, 2008), www1.eere.energy.gov/industry/datacenters/software.html.