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ENERGY AUDITS AND IMPROVEMENTS

FOR COMMERCIAL BUILDINGS

WILEY

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[Figure 13.7 Efficient ceiling fans can use as much as 80 percent less electricity as older, inefficient fans.](#)

[Figure 13.8 Refrigerator.](#)

[Figure 13.9 Ice maker with insufficient clearance in a hotel corridor.](#)

[Figure 13.10 Hotel refrigerator in enclosed cabinet.](#)

[Figure 13.11 GE Monitor Top refrigerator, c. 1937.](#)

[Figure 13.12 Unutilized refrigerators should be unplugged or removed.](#)

[Figure 13.13 Vending machines can be replaced with high-efficiency machines, use motion sensors for lights, or use motion sensors or timers for refrigeration.](#)

[Figure 13.14 Gas-fired clothes dryers.](#)

[Figure 13.15 Energy use of coin-operated laundry machines can be estimated based on usage from coin receipts.](#)

[Figure 13.16 Conveyor toaster.](#)

[Figure 13.17 Kettles are more efficient than stovetop water boiling, and efficient kettles allow setting the water temperature.](#)

Chapter 14: Gas Loads (Other than Heating and Domestic Hot Water)

[Figure 14.1 Standing pilot on a commercial stove burner.](#)

Chapter 15: Advanced Energy Improvements

[Figure 15.1 Solar thermal components.](#)

[Figure 15.2 Grid-tied photovoltaic system.](#)

[Figure 15.3 Photovoltaic installation.](#)

Chapter 16: Estimating Savings

[Figure 16.1 Boiler improvement energy savings can be estimated either in isolation or interactively with other improvements.](#)

[Figure 16.2 Photovoltaic energy analysis is frequently performed without hourly electricity use profiles. Models that account for hourly electricity use profiles more accurately predict what will be saved on-site.](#)

[Figure 16.3 Writing out units, and making sure units are consistent, reduces the risk of calculation mistakes.](#)

[Figure 16.4 Variable-frequency drive.](#)

[Figure 16.5 Heat pump.](#)

[Figure 16.6 Spreadsheets can be used for integrated energy models. However, they can grow complex and require rigorous checking to avoid mistakes.](#)

Chapter 17: Financial Aspects of Energy Improvements

[Figure 17.1 To estimate energy cost savings from energy savings, we need to calculate the incremental cost of energy, in other words, the energy rate at which the last \(incremental\) unit of energy is purchased.](#)

[Figure 17.2 Energy improvements should be justified by all their benefits, and not just as a financial](#)

investment. They are investments in our buildings, health, safety, comfort, and the environment.

Figure 17.3 Removed light fixtures in buildings where the lighting is already efficient may be re-used elsewhere.

Chapter 18: Reporting

Figure 18.1 A whole-building photograph is a nice touch, on the cover of energy audit reports.

Figure 18.2 Use photographs to document important deficiencies, not only to justify an improvement, but to clarify where the improvement must be applied.

Figure 18.3 Improvement descriptions in energy audits must contain information to allow effective energy improvements: location and quantity, efficiency, features that impact energy use, and test requirements.

Figure 18.4 Prioritizing energy recommendations is a fundamental purpose of energy audits.

Chapter 19: Sector-Specific Needs and Improvements

Figure 19.1 24/7 lighting of common areas in multifamily buildings presents an opportunity for significant energy savings.

Figure 19.2 Condominium ownership presents challenges to energy improvements, as individual owner preferences provide less economy of scale.

Figure 19.3 Common-area lighting presents energy conservation opportunities in hotels.

Figure 19.4 Thermal zone control in the hospitality sector allows energy savings when rooms are not occupied.