1 Overview

1.1 Purposes

The COMNET energy efficiency calculation process serves multiple purposes, including the following:

- Establishing eligibility for federal tax deductions per §179D of the Internal Revenue Service code (expired);
- Calculating percent savings for point eligibility related to green building rating systems; and
- Estimating annual energy use for a building in the design phase for the purpose of Design to Earn ENERGY STAR.

COMNET software may be accredited for one or more purposes. Depending on the purpose, the process is somewhat different. Table 1.1-1 [1] summarizes the major differences in calculation procedures for the currently supported purposes. These differences are described in more detail in the sections that follow.

Table 1.1-1: *"Differences in Calculation Procedures by Original Purposes"*

	Tax Deductions	LEED 2.2	LEED 2012	Design to Earn ENERGY STAR
Baseline Standard	ASHRAE Standard 90.1-2001	ASHRAE Standard 90.1-2007	ASHRAE Standard 90.1-2010	CBECS Median Energy Use
Operating Assumptions	Prescribed	Neutral Dependent	Neutral Dependent	Default
Percent Savings Energy Use	Regulated Only	All Energy Use	All Energy Use	Not applicable

1.1.1 Baseline Standards

Both tax deductions and green building rating systems are based on comparing the performance of the proposed design against a code-minimum baseline building; the baseline for federal tax deductions is ASHRAE Standard 90.1-2001 and the baseline for green building ratings is ASHRAE Standard 90.1-2007 or ASHRAE Standard 90.1-2010. The baseline for Design to Earn ENERGY STAR is the median or average energy use for a similar building, in a similar climate, operated in a similar manner. The median is based on energy consumption as reported in the CBECS[1] database. As COMNET is expanded to support additional purposes, additional baselines will be added as necessary.

This manual is consistent with ASHRAE Standard 90.1-2007 and 90.1-2010, but does not include addenda, approved or otherwise. ASHRAE Standard 90.1 is under continuous maintenance. This means that the committee regularly develops, approves and publishes addenda to the standard. At the time of this writing, a number of addenda to Standard 90.1 have been approved and an even greater number is pending. ASHRAE gathers these addenda includes them in the next official publication of the standard.

The modeling rules and procedures in this manual are consistent with the Performance Rating Method (PRM) in Appendix G of relevant version of ASHRAE Standard 90.1

When Standard 90.1 does not establish a baseline, the PRM often gives the rating authority the ability to establish a baseline. In some instances, this COMNET manual establishes a baseline where one does not exist in Standard 90.1, thereby assuming the responsibility of the rating authority. Examples include plug loads and commercial refrigeration. In other instances, the baseline building specification in the PRM was not specific enough and this manual expands on the definition to eliminate ambiguity.[2] The purpose of these elaborations and expansions is to reduce ambiguity and offer credits for energy efficiency measures not addressed by Standard 90.1. It is not the intent of this manual to change the baseline building defined by the PRM or the underlying standards. The COMNET manual is intended to work in series with, not in parallel with the PRM.

1. CBECS is Commercial Building Energy Utilization Survey, which is conducted by the federal Energy Information Agency (EIA) approximately every four years.
2. An example is the supply air temperature reset requirement for baseline building systems 5 through 8.

1.1.2 Modeling Assumptions

When calculating annual energy use, it is necessary to make assumptions about how the proposed building is operated. Operating assumptions

include thermostat settings, number of occupants, receptacle loads, process loads, hot water loads as well as schedules of operation for HVAC systems, lighting systems and other systems. Sometimes these data are known with some certainty and other times (for instance for speculative buildings), it is necessary to make estimates. COMNET provides guidance through defaults for these situations.

1.1.3 Percent Savings

There are differences in how percent savings are calculated, depending on the purpose. ASHRAE Standard 90.1 set a baseline for the energy used for heating, cooling, ventilation, interior lighting and hot water[1]. Since they are regulated by the baseline standard, these components of energy use are referred to in COMNET as the *regulated energy*. There is a multitude of other equipment and systems in a building that use energy, including:

- All the things that are plugged into convenience outlets such as personal computers, printers, coffee machines, refrigerators and desk lamps;
- Commercial refrigeration equipment such as open or closed refrigerated casework, walk-in refrigerators, walk-in freezers, and other equipment common to restaurants, food stores, and convenience stores;
- Transportation systems such as elevators, escalators, and moving walkways;
- Special ventilation systems to remove carbon monoxide from parking garages or fumes from restaurants or laboratories;
- Grills, ovens, fryers, steam trays, and other cooking equipment in restaurants and cafeterias;
- Compressed air systems in manufacturing and warehouse facilities; and
- Other specialized equipment in laboratories, hospitals, and manufacturing plants.

These components of energy use are referred to in this manual as the *non-regulated energy*, because a baseline is not established by ASHRAE Standard 90.1. *Total energy* is the sum of the *regulated energy* and the *non-regulated energy*. When percent savings are calculated for tax deduction purposes, only the *regulated energy* is considered. When percent savings are calculated for green building ratings, the *total energy* is considered. Energy cost is the metric for comparison, per the PRM.

(1.1.3-1)

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(1.1.3-2)

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1. Exterior lighting is also regulated by the Standard, but is typically not included in the performance calculations performed for code compliance purposes.

1.2 Scope

This manual is intended to be used for buildings that are in the planning, design or construction phases. It is also intended to apply to buildings that are within the scope of ASHRAE Standard 90.1.

The long-term goal of this manual is to define modeling rules and procedures for all conceivable design features that may be incorporated in buildings. The authors recognize, however, that this goal cannot be fully achieved due to limitations in the development energy simulation algorithms, and due to the natural lag time between the introduction of an advanced energy efficiency measure or device and the development of algorithms to simulate its performance.

The goal of the manual is to provide methods that are as flexible and accurate as possible. This goal can best be achieved if the manual is a ‘living document,’ changing and growing as increasing amounts of information and better modeling methods become available.

1.3 Audience

This document has been written with several different audiences in mind. These audiences are:

1.3.1 Software Developers

The majority of this document’s content consists of rules which are intended to be implemented by software developers. These requirements include rules for automatically creating the baseline building and for producing standard reports with correct percent savings and/or energy use estimates.

1.3.2 Rating Authorities

The term ‘rating authority’ is used in this manual to represent the organization that is issuing a green building rating or energy label. The term is

also extended to include government organizations that would review and approve claims for tax deductions.

1.3.3 Energy Analysts

When permitted by the rating authority, an energy analyst can manually apply the COMNET modeling rules and procedures to create the baseline buildings and the proposed design and to summarize information into a report for submission to the rating authority.

1.4 Organization

This document is organized in seven chapters and eight appendices, as described below:

Chapter	Description
1. Overview	The purpose, organization, content, and intent of the manual (this chapter).
2. General Modeling Procedures	An overview of the COMNET modeling process, outlining the modeling rules and assumptions that are implemented in the same way for both the standard design and the proposed design, and procedures for determining system types and equipment's sizes.
3. Software Requirements	Requirements for the simulation engines and software shells that are used to make calculations.
4. Content and Format of Standard Reports	The content and organization of the standard reports that need to be produced by qualifying software.
5. Energy Costs and Currency	Data on how energy savings are valued and compared.
6. Building Descriptors Reference	The acceptable range of inputs for the proposed design and a specification for the baseline building.
7. Modeling Tips for Advanced Design Features	Modeling rules and procedures for advanced design features.
Appendix A – Building Descriptors Table	Tabular summary and classification of building descriptors
Appendix B – Modeling Data	Modeling data and assumptions by building type and space use.
Appendix C – Schedules	Default and prescribed schedules of operation.
Appendix D – Construction Materials	Default construction materials library.
Appendix E – Software Tests	Spreadsheets and specifications for software tests.
Appendix F – Energy Costs	Documentation of the methodology used to develop the Chapter 5 energy costs.
Appendix G – XML Schema	The COMNET compliant XML schema specified in Chapter 4 and supported by the COMNET Portal.
Appendix H – Equipment Curves	Spreadsheet that summarizes and graphs the default equipment performance curves referenced in the Modeling Guidelines and Procedures.

Source URL: http://www.comnet.org/mgp/content/overview

Links:
[1] http://www.comnet.org/mgp/content/11-purposes#differences-in-calculation-procedures-by-original-purposes