



## Optimize energy performance

EA1 | Possible point

### Intent

To establish the minimum level of energy efficiency for the proposed building and systems to reduce environmental and economic impacts associated with excessive energy use.

To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

To establish the minimum level of energy efficiency for the proposed building and systems to reduce environmental and economic impacts associated with excessive energy use.

To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

To establish the minimum level of energy efficiency for the proposed building and systems to reduce environmental and economic impacts associated with excessive energy use.

To achieve levels of energy performance beyond those in the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

To establish the minimum level of energy efficiency for the proposed building and systems to reduce environmental and economic impacts associated with excessive energy use.

To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

To establish the minimum level of operating energy efficiency performance relative to typical buildings of similar type to reduce environmental and economic impacts associated with excessive energy use.

To achieve increasing levels of operating energy performance relative to typical buildings of similar type to reduce environmental and economic impacts associated with excessive energy use.

To establish the minimum level of energy efficiency for the tenant space systems to reduce environmental and economic impacts associated with excessive energy use.

To achieve increasing levels of energy conservation beyond the referenced standard to reduce environmental and economic impacts associated with excessive energy use.

To achieve increasing levels of energy conservation beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

To achieve increasing levels of energy conservation beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

To achieve increasing levels of energy conservation beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

To encourage the design and construction of energy-efficient buildings that reduce air, water, and land pollution and adverse environmental effects from energy production and consumption.

To encourage the design and construction of energy-efficient buildings that reduce air, water, and land pollution and adverse environmental effects from energy production and consumption.

To achieve increasing levels of energy conservation beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

Establish the minimum level of energy efficiency for the proposed building and systems.

Achieve increasing levels of energy performance above the baseline in the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

To establish the minimum level of operating energy efficiency performance for the building and systems.

To achieve an increased level of operating energy efficiency performance relative to typical buildings of similar type to reduce environmental impacts associated with excessive energy use.

Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

Establish the minimum level of energy efficiency for the tenant space systems.

Achieve increasing levels of energy conservation beyond the referenced standard to reduce environmental impacts associated with excessive energy use.

Achieve increasing levels of energy performance above the baseline in the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

Achieve increasing levels of energy conservation beyond the referenced standard to reduce environmental impacts associated with excessive energy use.

Achieve increasing levels of energy conservation beyond the referenced standard to reduce environmental impacts associated with excessive energy use.

Establish the minimum level of energy efficiency for the building and systems.

Establish the minimum level of energy efficiency for the proposed building and systems.

Achieve increasing levels of energy performance above the baseline in the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

Establish the minimum level of energy efficiency for the proposed building and systems.

Achieve increasing levels of energy performance above the baseline in the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

Establish the minimum level of energy efficiency for the base building and systems.

Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

Establish the minimum level of energy efficiency for the base building and systems.

Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

To reduce the environmental and economic harms of excessive energy use by achieving a minimum level of energy efficiency for the building and its systems.

To reduce the environmental and economic harms of excessive energy use by achieving a minimum level of energy efficiency for the building and its systems.

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To reduce the environmental and economic harms of excessive energy use by achieving a minimum level of energy efficiency for the building and its systems.

To reduce the environmental and economic harms of excessive energy use by achieving a minimum level of energy efficiency for the building and its systems.

To encourage the design and construction of energy-efficient buildings that reduce air, water, and land pollution and environmental damage from energy production and consumption.

To reduce the environmental and economic harms associated with excessive energy use by establishing a minimum level of operating energy performance.

To reduce environmental and economic harms associated with excessive energy use by achieving higher levels of operating energy performance.

To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic harms associated with excessive energy use.

To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic harms associated with excessive energy use.

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To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic harms associated with excessive energy use.

To encourage the design and construction of energy-efficient buildings that reduce air, water, and land pollution and adverse environmental effects from energy production and consumption.

## Requirements

### Option 1. Whole building energy simulation

Demonstrate a 10% improvement in the proposed building performance rating for new buildings, or a 5% improvement in the proposed building performance rating for major renovations to existing buildings, compared with the baseline building performance rating.

Calculate the baseline building performance rating according to the building performance rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard<sup>2</sup>.

Appendix G of Standard 90.1-2007 requires that the energy analysis done for the building performance rating method include all energy costs associated with the building project. To achieve points using this credit, the proposed design must meet the following criteria:

- Comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) or USGBC approved equivalent.
- Inclusion of all the energy costs within and associated with the building project.
- Compare against a baseline building that complies with Appendix G of Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) or USGBC approved equivalent. The default process energy cost is 25% of the total energy cost for the baseline building. If the building's process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include documentation substantiating that process energy inputs are appropriate.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment) and other (e.g., waterfall pumps).

Regulated (non-process) energy includes lighting (for the interior, parking garage, surface parking, façade, or building grounds, etc. except as noted above), heating, ventilation and air conditioning (HVAC) (for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), and service water heating for domestic or space heating purposes.

Process loads must be identical for both the baseline building performance rating and the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2007 G2.5) or USGBC approved equivalent to document measures that reduce process loads.

Documentation of process load energy savings must include a list of the assumptions made for both the base and the proposed design, and theoretical or empirical information supporting these assumptions.

Projects in California may use Title 24-2005, Part 6 in place of ANSI/ASHRAE/IESNA Standard 90.1-2007 for Option 1.

## OR

### Option 2. Prescriptive compliance path: ASHRAE Advanced Energy Design Guide

Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide appropriate to the project scope, outlined below. Project teams must comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located. Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

### Option 3. Prescriptive compliance path: Advanced Buildings™ Core Performance™ Guide

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The building must meet the following requirements:

- Less than 100,000 square feet (9,300 square meters).
- Comply with Section 1: Design Process Strategies, and Section 2: Core Performance Requirements.
- Health care, warehouse and laboratory projects are ineligible for this path.

Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

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<sup>1</sup>Project teams wishing to use ASHRAE approved addenda for the purposes of this prerequisite may do so at their discretion. Addenda must be applied consistently across all LEED credits.

<sup>2</sup> Projects outside the U.S. may use an alternative standard to ANSI/ASHRAE/IESNA Standard 90.1-2007 if it is approved by USGBC as an equivalent standard using the process identified in the LEED 2009 Green Building Design and Construction Global ACP Reference Guide Supplement.

Select 1 of the 3 compliance path options described below. Project teams documenting achievement using any of the 3 options are assumed to be in compliance with EA Prerequisite 2: Minimum Energy Performance.

### Option 1. Whole building energy simulation (1-19 points)

Demonstrate a percentage improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard<sup>2</sup>. The minimum energy cost savings percentage for each point threshold is as follows:

New Buildings	Existing Building Renovations	Points
12%	8%	1
14%	10%	2
16%	12%	3
18%	14%	4
20%	16%	5
22%	18%	6
24%	20%	7
26%	22%	8
28%	24%	9
30%	26%	10
32%	28%	11
34%	30%	12
36%	32%	13
38%	34%	14

40%	36%	15
42%	38%	16
44%	40%	17
46%	42%	18
48%	44%	19

Appendix G of Standard 90.1-2007 requires that the energy analysis done for the building performance rating method include all the energy costs associated with the building project. To achieve points under this credit, the proposed design must meet the following criteria:

- Compliance with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2007 (with errata but without addenda) or USGBC approved equivalent.
- Inclusion of all the energy costs within and associated with the building project.
- Comparison against a baseline building that complies with Appendix G of Standard 90.1-2007 (with errata but without addenda) or USGBC approved equivalent. The default process energy cost is 25% of the total energy cost for the baseline building. If the building's process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include documentation substantiating that process energy inputs are appropriate.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment) and other (e.g., waterfall pumps).

Regulated (non-process) energy includes lighting (e.g., for the interior, parking garage, surface parking, façade, or building grounds, etc. except as noted above), heating, ventilating, and air conditioning (HVAC) (e.g., for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), and service water heating for domestic or space heating purposes.

For this credit, process loads must be identical for both the baseline building performance rating and the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2007 G2.5) or USGBC approved equivalent to document measures that reduce process loads. Documentation of process load energy savings must include a list of the assumptions made for both the base and proposed design, and theoretical or empirical information supporting these assumptions.

Projects in California may use Title 24-2005, Part 6 in place of ANSI/ASHRAE/IESNA Standard 90.1-2007 for Option 1.

## OR

### **Option 2. Prescriptive compliance path: ASHRAE Advanced Energy Design Guide (1 point)**

Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide appropriate to the project scope, outlined below. Project teams must comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located. Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

### **Option 3. Prescriptive compliance path: Advanced Buildings™ Core Performance™ Guide (1-3 points)**

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The building must meet the following requirements:

- Less than 100,000 square feet (9,300 square meters).
- Comply with Section 1: Design Process Strategies, and Section 2: Core Performance Requirements.
- Health care, warehouse or laboratory projects are ineligible for this path (for NC & CS Projects).

Points achieved under Option 3 (1 point):

- 1 point is available for all projects (office, school, public assembly, and retail projects) less than 100,000 square feet (9,300 square meters) that comply with Sections 1 and 2 of the Core Performance Guide.
- Up to 2 additional points are available to projects that implement performance strategies listed in Section 3: Enhanced Performance. For every 3 strategies implemented from this section, 1 point is available.

▫ The following strategies are addressed by other aspects of LEED and are not eligible for additional points under EA Credit 1:

- 3.1 — Cool Roofs
- 3.8 — Night Venting
- 3.13 — Additional Commissioning

Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

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<sup>1</sup>Project teams wishing to use ASHRAE approved addenda for the purposes of this prerequisite may do so at their discretion. Addenda must be applied consistently across all LEED credits.

<sup>2</sup> Projects outside the U.S. may use an alternative standard to ANSI/ASHRAE/IESNA Standard 90.1-2007 if it is approved by USGBC as an equivalent standard using the process identified in the LEED 2009 Green Building Design and Construction Global ACP Reference Guide Supplement.

The project must establish an energy performance rating goal for the facility design using EPA's Target Finder rating tool.

#### **Option 1. Whole building energy simulation**

Demonstrate a 10% improvement in the proposed building performance rating for new buildings, or a 5% improvement in the proposed building performance rating for major renovations to existing buildings, compared with the baseline building performance rating.

Calculate the baseline building performance rating according to the building performance rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard<sup>2</sup>.

Appendix G of Standard 90.1-2007 requires that the energy analysis done for the building performance rating method include all energy costs associated with the building project. To achieve points using this credit, the proposed design must meet the following criteria:

- Comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) or USGBC approved equivalent.
- Inclusion of all the energy costs within and associated with the building project.
- Compare against a baseline building that complies with Appendix G of Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) or USGBC approved equivalent. The default process energy cost is 25% of the total energy cost for the baseline building. If the building's process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include documentation substantiating that process energy inputs are appropriate.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment) and other (e.g., waterfall pumps).

Regulated (non-process) energy includes lighting (for the interior, parking garage, surface parking, façade, or building grounds, etc. except as noted above), heating, ventilation and air conditioning (HVAC) (for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), and service water heating for domestic or space heating purposes.

Process loads must be identical for both the baseline building performance rating and the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2007 G2.5) or USGBC approved equivalent to document measures that reduce process loads. Documentation of process load energy savings must include a list of the assumptions made for both the base and the proposed design, and theoretical or empirical information supporting these assumptions.

Projects in California may use Title 24-2005, Part 6 in place of ANSI/ASHRAE/IESNA Standard 90.1-2007 for Option 1.

**OR**

#### **Option 2. Prescriptive compliance path: Advanced Energy Design Guide for K-12 School Buildings**

Comply with all of the prescriptive measures identified in the Advanced Energy Design Guide for K-12 school buildings. Comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located. Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

Projects using Option 2 must be less than 200,000 square feet (18,000 square meters).

### **Option 3. Prescriptive compliance path: Advanced Buildings™ Core Performance™ Guide**

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The building must meet the following requirements:

- Less than 100,000 square feet (9,300 square meters).
- Comply with Section 1: Design Process Strategies, and Section 2: Core Performance Requirements.
- Health care, warehouse and laboratory projects are ineligible for this path.

Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

Select 1 of the 3 compliance path options described below. Project teams documenting achievement using any of the 3 options are assumed to be in compliance with EA Prerequisite 2: Minimum Energy Performance.

### **Option 1. Whole building energy simulation (1-19 points)**

Demonstrate a percentage improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard<sup>2</sup>. The minimum energy cost savings percentage for each point threshold is as follows:

New Buildings	Existing Building Renovations	Points
12%	8%	1
14%	10%	2
16%	12%	3
18%	14%	4
20%	16%	5
22%	18%	6
24%	20%	7
26%	22%	8
28%	24%	9
30%	26%	10
32%	28%	11
34%	30%	12
36%	32%	13
38%	34%	14
40%	36%	15
42%	38%	16
44%	40%	17
46%	42%	18
48%	44%	19

Appendix G of Standard 90.1-2007 requires that the energy analysis done for the building performance rating method include all the energy costs associated with the building project. To achieve points under this credit, the proposed design must meet the following criteria:

- Compliance with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard

90.1-2007 (with errata but without addenda) or USGBC approved equivalent.

- Inclusion of all the energy costs within and associated with the building project.
- Comparison against a baseline building that complies with Appendix G of Standard 90.1-2007 (with errata but without addenda) or USGBC approved equivalent. The default process energy cost is 25% of the total energy cost for the baseline building. If the building's process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include documentation substantiating that process energy inputs are appropriate.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment) and other (e.g., waterfall pumps).

Regulated (non-process) energy includes lighting (e.g., for the interior, parking garage, surface parking, façade, or building grounds, etc. except as noted above), heating, ventilating, and air conditioning (HVAC) (e.g., for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), and service water heating for domestic or space heating purposes.

For this credit, process loads must be identical for both the baseline building performance rating and the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2007 G2.5) or USGBC approved equivalent to document measures that reduce process loads. Documentation of process load energy savings must include a list of the assumptions made for both the base and proposed design, and theoretical or empirical information supporting these assumptions.

Projects in California may use Title 24-2005, Part 6 in place of ANSI/ASHRAE/IESNA Standard 90.1-2007 for Option 1.

## OR

### **Option 2. Prescriptive compliance path: Advanced Energy Design Guide for K-12 School Buildings (1 point)**

Comply with all the prescriptive measures identified in the Advanced Energy Design Guide for K-12 School buildings. Project teams must comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located. Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

- Projects using Option 2 must be less than 200,000 square feet (18,000 square meters).

### **Option 3. Prescriptive compliance path: Advanced Buildings™ Core Performance™ Guide (1-3 points)**

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The building must meet the following requirements:

- Less than 100,000 square feet (9,300 square meters).
- Comply with Section 1: Design Process Strategies, and Section 2: Core Performance Requirements.
- Health care, warehouse or laboratory projects are ineligible for this path (for NC & CS Projects).

Points achieved under Option 3 (1 point):

- 1 point is available for all projects (office, school, public assembly, and retail projects) less than 100,000 square feet (9,300 square meters) that comply with Sections 1 and 2 of the Core Performance Guide.
- Up to 2 additional points are available to projects that implement performance strategies listed in Section 3: Enhanced Performance. For every 3 strategies implemented from this section, 1 point is available.
- The following strategies are addressed by other aspects of LEED and are not eligible for additional points under EA Credit 1:
  - 3.1 — Cool Roofs
  - 3.8 — Night Venting
  - 3.13 — Additional Commissioning

Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

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<sup>1</sup>Project teams wishing to use ASHRAE approved addenda for the purposes of this prerequisite may do so at their discretion. Addenda must be applied consistently across all LEED credits.



<sup>2</sup> Projects outside the U.S. may use an alternative standard to ANSI/ASHRAE/IESNA Standard 90.1-2007 if it is approved by USGBC as an equivalent standard using the process identified in the LEED 2009 Green Building Design and Construction Global ACP Reference Guide Supplement.

Select 1 of the 3 compliance path options described below. Project teams documenting achievement using any of the 3 options are assumed to be in compliance with EA Prerequisite 2: Minimum Energy Performance.

**Option 1. Whole building energy simulation (3-21 points)**

Demonstrate a percentage improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard<sup>2</sup>. The minimum energy cost savings percentage for each point threshold is as follows:

New Buildings	Existing Building Renovations	Points
12%	8%	3
14%	10%	4
16%	12%	5
18%	14%	6
20%	16%	7
22%	18%	8
24%	20%	9
26%	22%	10
28%	24%	11
30%	26%	12
32%	28%	13
34%	30%	14
36%	32%	15
38%	34%	16
40%	36%	17
42%	38%	18
44%	40%	19
46%	42%	20
48%	44%	21

Appendix G of Standard 90.1-2007 requires that the energy analysis done for the building performance rating method include all the energy costs associated with the building project. To achieve points under this credit, the proposed design must meet the following criteria:

- Compliance with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2007 (with errata but without addenda) or USGBC approved equivalent.
- Inclusion of all the energy costs within and associated with the building project.
- Comparison against a baseline building that complies with Appendix G of Standard 90.1-2007 (with errata but without addenda) or USGBC approved equivalent. The default process energy cost is 25% of the total energy cost for the baseline building. If the building's process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include documentation substantiating that process energy inputs are appropriate.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment) and other (e.g., waterfall pumps).

Regulated (non-process) energy includes lighting (e.g., for the interior, parking garage, surface parking, façade, or building grounds, etc. except as noted above), heating, ventilating, and air conditioning (HVAC) (e.g., for space heating, space cooling, fans,

pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), and service water heating for domestic or space heating purposes.

For this credit, process loads must be identical for both the baseline building performance rating and the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2007 G2.5) or USGBC approved equivalent to document measures that reduce process loads. Documentation of process load energy savings must include a list of the assumptions made for both the base and proposed design, and theoretical or empirical information supporting these assumptions.

Projects in California may use Title 24-2005, Part 6 in place of ANSI/ASHRAE/IESNA Standard 90.1-2007 for Option 1.

## **OR**

### **Option 2. Prescriptive compliance path: ASHRAE Advanced Energy Design Guide (1 point)**

Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide appropriate to the project scope, outlined below. Project teams must comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located. Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

### **Option 3. Prescriptive compliance path: Advanced Buildings™ Core Performance™ Guide (1-3 points)**

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The building must meet the following requirements:

- Less than 100,000 square feet (9,300 square meters).
- Comply with Section 1: Design Process Strategies, and Section 2: Core Performance Requirements.
- Health care, warehouse or laboratory projects are ineligible for this path (for NC & CS Projects).

Points achieved under Option 3 (1 point):

- 1 point is available for all projects (office, school, public assembly, and retail projects) less than 100,000 square feet (9,300 square meters) that comply with Sections 1 and 2 of the Core Performance Guide.
- Up to 2 additional points are available to projects that implement performance strategies listed in Section 3: Enhanced Performance. For every 3 strategies implemented from this section, 1 point is available.
- The following strategies are addressed by other aspects of LEED and are not eligible for additional points under EA Credit 1:
  - 3.1 — Cool Roofs
  - 3.8 — Night Venting
  - 3.13 — Additional Commissioning

Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

### **Option 1. Whole building energy simulation**

Demonstrate a 10% improvement in the proposed building performance rating for new buildings, or a 5% improvement in the proposed building performance rating for renovations to existing buildings, compared with the baseline building performance rating. Calculate the baseline building performance rating according to the building performance rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard<sup>2</sup>.

Appendix G of Standard 90.1-2007 requires that the energy analysis done for the building performance rating method include all energy costs associated with the building project. To achieve points using this credit, the proposed design must meet the following criteria:

- Compliance with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4, and 10.4) in Standard 90.1-2007 (with errata but without addenda<sup>1</sup>).
- Inclusion of all the energy costs associated with the building project or USGBC approved equivalent.
- Comparison against a baseline building that complies with Appendix G of Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) or USGBC approved equivalent. There is no default process energy cost.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment), and other (e.g., waterfall pumps).

Regulated (nonprocess) energy includes lighting (for the interior, parking garage, surface parking, façade, building grounds, etc., except as noted above); heating, ventilation, and air-conditioning (HVAC) (for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.); and service water heating (for domestic or space heating purposes).

Process loads shall be identical for both the baseline building performance rating and for the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2007, G2.5) or USGBC approved equivalent to document measures that reduce process loads. Documentation of process load energy savings must include a list of the assumptions made for both the base and the proposed design, and theoretical or empirical information supporting these assumptions.

Many of the industry standard baseline conditions for commercial kitchen equipment and refrigeration have been defined in Tables 1-4 in the Requirements section of EA Credit 1. No additional documentation is necessary to substantiate these predefined baseline systems as industry standard. If USGBC approved equivalent addresses process loads within the standard rather than using an exceptional calculation method, demonstrate how the requirements of Tables 1-4 are being met by the standard.

Projects in California may use Title 24-2005, Part 6, in place of ANSI/ASHRAE/IESNA Standard 90.1-2007 for Option 1.

## OR

### Option 2. Prescriptive compliance path: ASHRAE Advanced Energy Design Guide

Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide for Small Retail Buildings 2006. Project teams must fully comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located. Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

The building must meet the following requirements:

- Less than 20,000 square feet (1,800 square meters).
- Retail occupancy.

### Option 3. Prescriptive compliance path: Advanced Buildings™ Core Performance™ Guide

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The building must meet the following requirements:

- Less than 100,000 square feet (9,300 square meters).
- Comply with Section 1, Design Process Strategies, and Section 2, Core Performance Requirements.
- Projects less than 100,000 square feet (9,300 square meters) must comply with Section 1 and Section 2 of the Core Performance Guide.
- Health care, warehouse, and laboratory projects are ineligible for this option.

Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

Select 1 of the 3 compliance path options described below. Project teams documenting achievement using any of the 3 options are assumed to be in compliance with EA Prerequisite 2: Minimum Energy Performance.

### Option 1. Whole building energy simulation (1-19 points)

Demonstrate a percentage improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard<sup>2</sup>. The minimum energy cost savings percentage for each point threshold is as follows:

New Buildings	Existing Building Renovations	Points
12%	8%	1

14%	10%	2
16%	12%	3
18%	14%	4
20%	16%	5
22%	18%	6
24%	20%	7
26%	22%	8
28%	24%	9
30%	26%	10
32%	28%	11
34%	30%	12
36%	32%	13
38%	34%	14
40%	36%	15
42%	38%	16
44%	40%	17
46%	42%	18
48%	44%	19

All building energy uses associated with the project must be included in the energy simulation model. Improvements to process loads must be documented as described below. Nonprocess energy systems include HVAC (heating, cooling, fans, and pumps), service water heating, and lighting. Process loads for retail may include refrigeration equipment, cooking and food preparation, clothes washing, and other major support appliances. Merchandise for sale that is plugged in and small movable appliances are not candidates for improved energy performance.

Appendix G of Standard 90.1-2007 requires that the energy analysis done for the building performance rating method include all of the energy costs associated with the building project. To achieve points under this credit, the proposed design must meet the following criteria:

- Compliance with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4, and 10.4) in Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) or USGBC approved equivalent.
- Inclusion of all the energy costs within and associated with the building project.
- Comparison against a baseline building that complies with Appendix G of Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) or USGBC approved equivalent. There is no default process energy cost.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment), and other (e.g., waterfall pumps).

Regulated (nonprocess) energy includes lighting (for the interior, parking garage, surface parking, façade, building grounds, etc., except as noted above), heating, ventilating, and air-conditioning (HVAC) (for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, etc.), and service water heating (for domestic or space heating purposes).

For this credit, process loads must be identical both for the baseline building performance rating and for the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2007, G2.5) or USGBC approved equivalent to document measures that reduce process loads.

Documentation of process load energy savings must include a list of the assumptions made for both the base and the proposed design, and theoretical or empirical information supporting these assumptions.

Projects in California may use Title 24–2005, Part 6, in place of ANSI/ASHRAE/IESNA Standard 90.1–2007 for Option 1.

Many of the industry standard baseline conditions for commercial kitchen equipment and refrigeration have been defined in Tables 1–4. No additional documentation is necessary to substantiate these predefined baseline systems as industry standard.

For process loads, provide cutsheets or other documentation demonstrating proposed equipment and budget equipment not covered in Tables 1–4. A clear baseline must be described and documented to compare proposed improvements in process load categories. The baseline and design must be documented in the following ways:

- For appliances and equipment, provide cutsheets of proposed equipment and budget equipment not covered in Tables 1–4 that indicate hourly energy use. Provide a spreadsheet calculation estimating the daily use hours for each piece of equipment listed. Use the total estimated energy use in the energy simulation model as a plug load. Reduced use time (schedule change) is not a category of energy improvement in this credit. ENERGY STAR ratings and evaluations are a valid basis for performing this calculation.
- Spreadsheet calculation may also be utilized for calculation of commercial appliances energy consumption, and input into the Energy Cost Budget (ECB), in lieu of energy simulation modeling as a plug load.
- For display lighting, the space-by-space method of determining allowed lighting power under ANSI/ASHRAE/IESNA Standard 90.1–2007 must be used to determine the appropriate baseline for both the general building space and the display lighting. Installed lighting in the proposed building, including display lighting, is compared with this baseline in the simulation.
- For hard-wired refrigeration loads, the impact of energy performance improvements must be modeled with a simulation program specifically designed to account for refrigeration equipment. For example, eQUEST has a refrigeration module that can be used to simulate performance improvements in refrigeration equipment.

To establish the baseline and design conditions for the energy cost budget, use Tables 1 and 2.

## **OR**

### **Option 2. Prescriptive compliance path: ASHRAE Advanced Energy Design Guide (1 point)**

Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide for Retail Buildings 2006.

Project teams must fully comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located. Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

The building must meet the following requirements:

- Less than 20,000 square feet (1,800 square meters).
- Retail occupancy.

## **AND**

Projects must comply with the prescriptive measures on Tables 1–4 for 90% of total energy consumption for all process equipment.

### **Option 3. Prescriptive compliance path: Advanced Buildings™ Core Performance™ Guide (1-3 points)**

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The building must meet the following requirements:

- Less than 100,000 square feet (9,300 square meters).
- Comply with Section 1, Design Process Strategies, and Section 2, Core Performance Requirements.
- Health care, warehouse, or laboratory projects are ineligible for this path.

Points achieved under Option 3 (1 point):

- 1 point is available for all office, school, public assembly, and retail projects less than 100,000 square feet (9,300 square meters) that comply with Sections 1 and 2 of the Core Performance Guide.
- Up to 2 additional points are available to projects that implement performance strategies listed in Section 3, Enhanced Performance. For every 3 strategies implemented from this section, 1 point is available.
- The following strategies are addressed by other aspects of LEED and are not eligible for additional points under EA Credit 1:
  - 3.1—Cool Roofs
  - 3.8—Night Venting

Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

## AND

Projects must comply with the prescriptive measures in Tables 1–4 for 90% of total energy consumption for all process equipment.

**Table 1. Commercial Kitchen Appliance Prescriptive Measures and Baseline for Energy Cost Budget**

abbreviations:

ES = EPA Energy Star

CEC = California Energy Commission

### Pre-EEM Energy Usage for Energy Modeling Path

appliance type	fuel source	Pre-EEM efficiency	Pre-EEM idle rate	Pre-EEM water use
commercial fryers	elec	75%	1050 W (1)	na
large vat fryers	elec	75%	1350 W	na
steam cooker - batch cooking	elec	26%	200 W/pan	30 gph per compartment (113.56 lph per compartment)
steam cooker - high production/cook to order	elec	26%	330 W/pan	40 gph per compartment (151.42 lph per compartment)
hot food holding cabinets (excluding drawer warmers and heated display)	elec		125 w/ft <sup>3</sup> (4,464.29 w/m <sup>3</sup> )	na
solid door reach-in refrigerators	elec	.1V + 2.04 kWh/day	na	na
solid door reach-in freezers	elec	0.4V + 1.38 kWh/day	na	na
solid door reach-in refrigerator / freezer	elec	0.32AV - 0.8165 kWh/day	na	na
glass door reach-in refrigerators	elec	.12V + 3.34 kWh/day	na	na
ice cream freezer	elec	0.45V + 0.943 kWh/day	na	na
undercounter dish machines - high temp	elec	na	.9 kW	1.98 gpr (7.50 lpr)
undercounter dish machines - low temp	elec	na	0.5 kW	1.95 gpr (7.38 lpr)
door type dishmachine - high temp	elec	na	1.0 kW	1.44 gpr (5.45 lpr)
door type dishmachine - low temp	elec	na	0.6 kW	1.85 gpr (7.00 lpr)
single tank rack conveyor dishmachine - high temp	elec	na	2.0 kW	1.13 gpr (4.16 lpr)
single tank rack conveyor dishmachine - low temp	elec	na	1.6 kW	1.23 gpr (4.66 lpr)
multi-tank rack conveyor dishmachine - high temp	elec	na	2.6 kW	1.1 gpr (4.16 lpr)
multi-tank rack conveyor dishmachine - low temp	elec	na	2.0 kW	0.99 gpr (3.75 lpr)
ice machine (ice making head) IMH H < 450 lb/day (< 204.11 kg/day)	elec	10.26 - 0.0086H kWh/100 lb (46 kg) ice	na	< 030 gal/100 lb ice (<114 L/46 kg ice)
ice machine (ice making head) IMH H > 450 lb/day (> 204.11 kg/day)	elec	6.89 - 0.0011H kWh/100 lb (46 kg) ice	na	< 030 gal/100 lb ice (<114 L/46 kg ice)
ice machine RCU (w/o remote compressor) H < 1000 lb/day (< 453.59 kg/day)	elec	8.85 - .0038H kWh/100lb (46 kg) ice	na	< 030 gal/100 lb ice (<114 L/46 kg ice)
ice machine RCU (w/o remote compressor) H > 1000 lb/day (> 453.59 kg/day)	elec	5.10 kWh/100lb (46 kg) ice	na	< 030 gal/100 lb ice (<114 L/46 kg ice)

ice machine RCU (with remote compressor) H < 934 lb/day (< 423.66 kg/day)	elec	8.85 - 0.0038H kWh/100 lb (46 kg) ice	na	< 030 gal/100 lb ice (<114 L/46 kg ice)
ice machine RCU (with remote compressor) H > 934 lb/day (> 423.66 kg/day)	elec	5.30 kWh/100 lb (46 kg) ice	na	< 030 gal/100 lb ice (<114 L/46 kg ice)
ice machine self contained unit (SCU) H < 175 lb/day (< 79.38 kg/day)	elec	18.0 - 0.0469H kWh/100lb (46 kg) ice	na	< 040 gal/100 lb ice (<152 L/46 kg ice)
ice machine self contained unit (SCU) H > 175 lb/day (≥ 79.38 kg/day)	elec	9.80 kWh/100lb (46 kg) ice	na	< 040 gal/100 lb ice (<152 L/46 kg ice)
ice machine water cooled IMH H < 500 lb/day (< 226.80 kg/day)	elec	7.80 - 0.0055H kWh/100 lb (46 kg) ice	(3)	< 030 gal/100 lb ice (<114 L/46 kg ice)
ice machine water cooled IMH 500 lb/day < H > 1436 (226.80 kg/day < H > 651.36)	elec	5.58 - 0.0011H kWh/100lb (46 kg) ice	(3)	< 030 gal/100 lb ice (<114 L/46 kg ice)
ice machine water cooled IMH H > 1436 lb/day (> 651.36 kg/day)	elec	4.0 kWh/100lb (46 kg) ice	(3)	< 030 gal/100 lb ice (<114 L/46 kg ice)
ice machine water cooled SCU H < 200 lb/day (< 90.72 kg/day)	elec	11.4 - 0.0190H kWh/100lb (46 kg) ice	(4)	< 040 gal/100 lb ice (<152 L/46 kg ice)
ice machine water cooled SCU H > 200 lb/day (>90.72 kg/day)	elec	7.6 kWh/100lb (46 kg) ice	(4)	< 040 gal/100 lb ice (<152 L/46 kg ice)
ice machine once through water cooled	BANNED	BANNED	BANNED	BANNED
griddles (based on 3' model)	elec	65%	420 w/ft2	na
range	elec	70% burner efficiency		
convection ovens (full size)	elec	65%	2.0 kW	na
combination ovens	elec	44%	1.25 kW/pan	< 4.0 gph (15.14 lph) per pan
toaster	elec		1.8 kW (100% duty cycle @ 4 slices per min.) = 1 conveyor	
pre-rinse spray valves (MANDATORY)	na	na	na	1.6 gpm (6 lpm)
kitchen exhaust hood	na	IMC minimum req	na	na
fryers	gas	35%	14000 Btu/h (4.1 kW) (1)	na
large vat fryers	gas	35%	20000 Btu/h (5.86 kW)	
steam cooker - batch cooking	gas	15%	1800 BTU/h/pan (0.53 kW/pan)	30 gph per compartment (113.56 lph)
steam cooker - high production/cook to order	gas	15%	3000 BTU/h/pan (0.88 kW/pan)	40 gph (151.42 lph) per compartment
griddles	gas	32%	3200 BTU/h/ft2 (10.09 kw/m2)	na
convection ovens (full size)	gas	30%	18000 BTU/h (5.27 kW)	na
combination ovens	gas	35%	4700 BTU/h/pan (1.38 kW/pan)	40 gph (151.42 lph)
rack ovens - single	gas	30%	43000 BTU/h (12.59 kW)	na
rack ovens - double	gas	30%	65000 BTU/h (19.03 kW)	na
broiler (underfired)	gas	30%	20,000 BTU/h/ft2 (63.04 kW/m2) peak	na

			input	
range	gas	35% burner efficiency		
conveyor oven (small = < 25 inch (63.5 cm) belt)	gas	20%	45000 BTU/h (13.18 kW)	na
conveyor oven (large = > 25 inch (63.5 cm) belt)	gas	20%	70000 BTU/h (20.50 kW)	na
high efficiency hot water heater	gas	82%		na
instantaneous water heater		82%		
clothes washer	gas	1.72 MEF		8.0 WF

(1) Based on 15 inch (38.10 cm) fryer

(2) AV=Adjusted Volume = (1.63 x freezer volume) + refrigerator volume

(3) Condenser water use = 200 - 0.022H gal/100lb (46 kg) ice

(4) Condenser water use = 191 - 0.0315H gal/100lb (46 kg) ice

Levels for Prescriptive Path			
appliance type	LEED efficiency	LEED idle rate	LEED water use
commercial fryers	80%	1000 W (1)	na
large vat fryers	80%	1250 W	na
steam cooker - batch cooking	50%	135 W/pan	10 gph per compartment (37.85 lph per compartment)
steam cooker - high production/cook to order	50%	275 W/pan	15 gph per pan (57.78 lph per compartment)
hot food holding cabinets (excluding drawer warmers and heated display)		20 w/ft3 (706.46 w/m3)	na
solid door reach-in refrigerators	0.06V + 1.22 kWh/day	na	na
solid door reach-in freezers	0.28V + 0.97 kWh/day	na	na
solid door reach-in refrigerator / freezer	0.27AV - 0.71 kWh/day (2)	na	na
glass door reach-in refrigerators	0.086V + 2.39 kWh/day	na	na
ice cream freezer	0.39V + 0.82 kWh/day	na	na
undercounter dish machines - high temp	na	0.9 kW	1 gpr (3.79 lpr)
undercounter dish machines - low temp	na	0.5 kW	1.7 gpr (6.44 lpr)
door type dishmachine - high temp	na	1.0 kW	0.95 gpr (3.60 lpr)
door type dishmachine - low temp	na	0.6 kW	1.18 gpr (4.47 lpr)
single tank rack conveyor dishmachine - high temp	na	2.0 kW	0.7 gpr (2.65 lpr)
single tank rack conveyor dishmachine - low temp	na	1.6 kW	0.79 gpr (2.99 lpr)
multi-tank rack conveyor dishmachine - high temp	na	2.6 kW	0.54 gpr (2.04 lpr)
multi-tank rack conveyor dishmachine - low temp	na	2.0 kW	0.54 gpr (2.04 lpr)
ice machine (ice making head) IMH H < 450 lb/day (< 204.11 kg/day)	9.23 - 0.0077H kWh/100 lb (46 kg) ice	na	< 25 gal/100 lb (<95 L/ 46 kg) ice
ice machine (ice making head) IMH H > 450 lb/day (> 204.11 kg/day)	6.20 - 0.0010H kWh/100 lb (46 kg) ice	na	25 gal/100 lb (<95 L/ 46 kg) ice
ice machine RCU (w/o remote compressor) H < 1000 lb/day (< 453.59 kg/day)	8.05 - 0.0035H kWh/100lb (46 kg) ice	na	< 25 gal/100 lb (<95 L/ 46 kg) ice
ice machine RCU (w/o remote compressor) H > 1000 lb/day (> 453.59 kg/day)	4.64 kWh/100lb (46 kg) ice	na	< 25 gal/100 lb (<95 L/ 46 kg) ice
ice machine RCU (with remote compressor) H < 934 lb/day (< 423.66 kg/day)	8.05 - 0.0035H kWh/100 lb (46 kg) ice	na	< 25 gal/100 lb (<95 L/ 46 kg) ice
ice machine RCU (with remote compressor) H > 934 lb/day (> 423.66 kg/day)	4.64 kWh/100 lb (46 kg) ice	na	< 25 gal/100 lb (<95 L/ 46 kg) ice



> 934 lb/day (> 423.66 kg/day)	4.82 kWh/100 lb (46 kg) ice	na	(<95 L/ 46 kg) ice
ice machine self contained unit (SCU) H < 175 lb/day (< 79.38 kg/day)	16.7 - 0.0436H kWh/100lb (46 kg) ice	na	< 35 gal/100 lb (133 L/ 46 kg) ice
ice machine self contained unit (SCU) H > 175 lb/day (> 79.38 kg/day)	9.11 kWh/100lb (46 kg) ice	na	< 35 gal/100 lb (133 L/ 46 kg) ice
ice machine water cooled IMH H < 500 lb/day (< 226.80 kg/day)	7.02 - 0.005H kWh/100 lb (46 kg) ice	na	< 25 gal/100 lb (<95 L/ 46 kg) ice
ice machine water cooled IMH 500 lb/day < H > 1436 (226.80 kg/day < H > 651.36)	5.13 - 0.001H kWh/100lb (46 kg) ice	na	< 25 gal/100 lb (<95 L/ 46 kg) ice
ice machine water cooled IMH H > 1436 lb/day (> 651.36 kg/day)	3.7 kWh/100lb (46 kg) ice	na	< 25 gal/100 lb (<95 L/ 46 kg) ice
ice machine water cooled SCU H < 200 lb/day (< 90.72 kg/day)	10.6 - 0.177H kWh/100lb (46 kg) ice	na	< 35 gal/100 lb (133 L/ 46 kg) ice
ice machine water cooled SCU H > 200 lb/day (> 90.72 kg/day)	7.07 kWh/100lb (46 kg) ice	na	< 35 gal/100 lb (133 L/ 46 kg) ice
ice machine once through water cooled	BANNED	BANNED	BANNED
griddles (based on 3' (91.44 cm) model)	70%	350 w/ft2 (3,767.49 w/m2)	na
range	80% burner efficiency		
convection ovens (full size)	70%	1.5 kW	na
combination ovens	60%	0.80 kW/pan	< 3.5 gph per pan (< 13.25 lph per pan)
toaster		3.6 kW (8% duty cycle) = 2 pop-ups	
pre-rinse spray valves (MANDATORY)	na	na	<1.2 gpm (<4.54 lpm)
kitchen exhaust hood	35% reduction in avg cfm	na	na
fryers	50%	9000 BTU/h (2.64 kW) (1)	na
large vat fryers	50%	12000 Btu/h (3.51 kW)	
steam cooker - batch cooking	38%	2100 BTU/h/pan (0.61 kW/pan)	5 gph (18.93 lph) per pan
steam cooker - high production/cook to order	38%	4300 BTU/h/pan (1.26 kW/pan)	5 gph (18.93 lph) per pan
griddles	38%	3000 BTU/h/ft2 (9.46 kW/m2)	na
convection ovens (full size)	43%	13000 Btu/h (3.81 kW)	na
combination ovens	40%	2850 BTU/h/pan (0.83 kW/pan)	15 gph(56.78 lph)
rack ovens - single	50%	29000 BTU/h (8.49 kW)	na
rack ovens - double	50%	35000 BTU/h (10.25 kW)	na
broiler (underfired)	35%	12500 BTU/h/ft2 (39.40 kW/m2) peak input	na
range	40% burner efficiency		
conveyor oven (small = < 25 inch belt)	42%	30000 BTU/h (8.78 kW)	na
conveyor oven (large = > 25 inch belt)	42%	57000 BTU/h (16.69 kW)	na
high efficiency hot water heater	90%		na
instantaneous water heater	90%		
clothes washer	2.00 MEF		6.0 WF

(1) Based on 15 inch (38.10 cm) fryer

(2) AV=Adjusted Volume = (1.63 x freezer volume) + refrigerator volume

(3) Condenser water use = 200 - 0.022H gal/100lb (46 kg) ice

(4) Condenser water use = 191 - 0.0315H gal/100lb (46 kg) ice

Levels for Prescriptive Path			
appliance type	Prescriptive criteria based on:	Energy Star Category	CAIOU = California Investor Owned Utilities (CPUC approved CA incentive program)
commercial fryers	CEE, ES, CAIOU	yes	x
large vat fryers	CAIOU	pending	x
steam cooker - batch cooking	ES		x
steam cooker - high production/cook to order	ES - modified		
hot food holding cabinets (excluding drawer warmers and heated display)	CEE Tier II, CAIOU	yes	x
solid door reach-in refrigerators	CEE Tier II, CAIOU	yes	x
solid door reach-in freezers	CEE Tier II, CAIOU	yes	x
solid door reach-in refrigerator / freezer	ES	yes	x
glass door reach-in refrigerators	CEE Tier II, CAIOU	pending	x
ice cream freezer	ES	yes	x
undercounter dish machines - high temp	ES	yes	x
undercounter dish machines - low temp	ES	yes	x
door type dishmachine - high temp	ES	yes	x
door type dishmachine - low temp	ES	yes	x
single tank rack conveyor dishmachine - high temp	ES	yes	x
single tank rack conveyor dishmachine - low temp	ES	yes	x
multi-tank rack conveyor dishmachine - high temp	ES	yes	x
multi-tank rack conveyor dishmachine - low temp	ES	yes	x
ice machine (ice making head) IMH H < 450 lb/day	CEE Tier II, ES	yes	x
ice machine (ice making head) IMH H > 450 lb/day	CEE Tier II, ES	yes	x
ice machine RCU (w/o remote compressor) H < 1000 lb/day	CEE Tier II, ES	yes	x
ice machine RCU (w/o remote compressor) H > 1000 lb/day	CEE Tier II, ES	yes	x
ice machine RCU (with remote compressor) H < 934 lb/day	CEE Tier II, ES	yes	x
ice machine RCU (with remote compressor) H > 934 lb/day	CEE Tier II, ES	yes	x
ice machine self contained unit (SCU) H < 175 lb/day	CEE Tier II, ES	yes	x
ice machine self contained unit (SCU) H > 175 lb/day	CEE Tier II, ES	yes	x
ice machine water cooled IMH H < 500 lb/day	CEE Tier II		x
ice machine water cooled IMH 500 lb/day < H > 1436	CEE Tier II		x
ice machine water cooled IMH H > 1436 lb/day	CEE Tier II		x
ice machine water cooled SCU H < 200 lb/day	CEE Tier II		x
ice machine water cooled SCU H > 200 lb/day	CEE Tier II		x
ice machine once through water cooled			BANNED
griddles (based on 3' model)	CEE, ES, CAIOU	yes	x
range			
convection ovens (full size)	CAIOU	pending	x
combination ovens	CAIOU	pending	x

toaster			
pre-rinse spray valves (MANDATORY)	epact 2005	na	MANDATORY
kitchen exhaust hood	FSTC recommendation	no	x
fryers	CEE, ES	yes	x
large vat fryers	CAIOU	pending	x
steam cooker - batch cooking	CEE, ES, CAIOU	yes	x
steam cooker - high production/cook to order	ES - modified		
griddles	CAIOU	pending	x
convection ovens (full size)	FSTC recommendation based on anticipated ES level	pending	x
combination ovens	CAIOU	pending	x
rack ovens - single	CAIOU	pending	x
rack ovens - double	CAIOU	pending	x
broiler (underfired)	FSTC recommendation	no	x
range	FSTC recommendation		x
conveyor oven (small = < 25 inch belt)	FSTC recommendation	pending	x
conveyor oven (large = > 25 inch belt)	FSTC recommendation	pending	
high efficiency hot water heater			x
instantaneous water heater			
clothes washer	CAIOU	na	x

(1) Based on 15 inch fryer

(2) AV=Adjusted Volume = (1.63 x freezer volume) + refirgerator volume

(3) Condenser water use = 200 - 0.022H gal/100lb (46 kg) ice

(4) Condenser water use = 191 - 0.0315H gal/100lb (46 kg) ice

**Table 2. Supermarket Refrigeration Prescriptive Measures and Baseline for Energy Cost Budget**

Item	Attribute	Prescriptive Measures	Baseline
Evaporator	Evaporator fan speed control	Variable speed evaporator fan	Constant volume, constant operation
	Evaporator design approach temperature	10°F (-12.2°C)	10°F (-12.2°C)
Condenser	Air cooled condenser fan speed control	Variable Speed Condenser Fan (electronically commutated motors if single phase and less than 1 hp)	Cycling one speed fan
	Air cooled condenser design approach	Floating head pressure, min of 70°F (21.1°C), 5°F (-15°C) drybulb offset	10°F to 15°F (-12.2°C to -9.4°C) depending on suction temperature
	Air cooled condenser fan power	80 Btu/Watt-hr at 10°F (-12.2°C) approach temperature	53 Btu/Watt-hr at 10°F (-12.2°C) approach temperature
	Evaporative condenser fan speed control	Variable speed condenser fan (electronically commutated motors if single phase and less than 1 hp)	Cycling one speed fan
	Evaporative condenser design approach temperature	Floating head pressure, min of 70°F (21.1°C), 9°F (-12.8°C) wetbulb offset	18°F to 25°F (-7.8°C to -3.9°C) based on design wetbulb temperature
	Evaporative condenser fan and pump power	400 Btu/Watt-hr at 100°F (37.8°C) saturated condensing temperature and 70°F (21.1°C) wetbulb temperature	330 Btu/Watt-hr at 100°F (37.8°C) saturated condensing temperature and 70°F (21.1°C) wetbulb temperature
	Suction pressure control	Not addressed	Not addressed
		85°F (29.4°C) minimum	85°F (29.4°C) minimum

Refrigeration System	Condensing temperature control	condensing temperature, fixed setpoint	condensing temperature, fixed setpoint
	Defrost control	No electrical defrost. Hot gas defrost only	Not addressed
Compressor	Compressor capacity modulation	Variable speed drive trim compressor	Slide valves on screw compressors, multiple compressor racks on reciprocating compressor plants

**Table 3. Walk-in Coolers and Freezers Prescriptive Measures and Baseline for Energy Cost Budget**

Item	Attribute	Prescriptive Measures	Baseline
Envelope	Freezer insulation	R-46	R-36
	Cooler insulation	R-36	R-20
	Automatic closer doors	Yes	No
	High efficiency low/no heat reach-in doors	40W/ft (13.12 W/mm) of door frame (low temperature) 17W/ft (5.58 W/mm) of door frame (medium temperature)	40W/ft (13.12 W/mm) of door frame (low temperature) 17W/ft (5.58 W/mm) of door frame (medium temperature)
Evaporator	Evaporator fan motor and control	Shaded pole and split phase motors are prohibited. Use PSC or EMC motors.	Constant speed fan
	Hot gas defrost	Yes, no electrical defrosting	Electric defrost
Condenser	Air cooled condenser fan motor and control	Shaded pole and split phase motors are prohibited. Use PSC or EMC motors. Add condenser fan controllers	Cycling one speed fan
	Air cooled condenser design approach	Floating head pressure controls or ambient sub-cooling	10°F to 15°F (-12.2°C to -9.4°C) dependent on suction temperature
Lighting	Lighting power density (W/sq.ft.) (W/m <sup>2</sup> )	0.6 W/sq.ft. (6.46 W/m <sup>2</sup> )	0.6 W/sq.ft. (6.46 W/m <sup>2</sup> )

Chart based on Final Report on Refrigerated Warehouses PG&E (Pacific Gas & Electric) Codes and standards enhancement initiative, February 2007; Analysis of Standards Options for Walk-In Coolers (Refrigerators) and Freezers PG&E (Pacific Gas & Electric) Codes and standards enhancement initiative prepared by Davis Energy Group Energy Solutions, May 2004; and the ASHRAE Refrigeration Handbook 2004.

Strategies	Prescriptive Measures	Baseline
Make-up air strategies	Dedicated make-up air system	Transfer air through dining area
Exhaust rate control	Demand control package	Constant volume

### Option 1. Whole building energy simulation

Demonstrate a 10% improvement in the proposed building performance rating for new buildings, or a 5% improvement in the proposed building performance rating for major renovations to existing buildings, compared with the baseline building performance rating.

Calculate the baseline building performance rating according to the building performance rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard<sup>2</sup>.

Appendix G of Standard 90.1-2007 requires that the energy analysis done for the building performance rating method include all energy costs associated with the building project. To achieve points using this credit, the proposed design must meet the following criteria:

- Comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) or USGBC approved equivalent.
- Inclusion of all the energy costs within and associated with the building project.
- Compare against a baseline building that complies with Appendix G of Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) or USGBC approved equivalent. The default process energy cost is 25% of the total energy cost for the baseline building. If the building's process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include documentation substantiating that process energy inputs are appropriate.
- Obtain an energy performance rating for estimated energy use of both the baseline and proposed

design from EPA's ENERGY STAR Target Finder design tool and submit the Statement of Energy Design Intent document, generated by Target Finder, as part of the project's design submittal.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment) and other (e.g., waterfall pumps).

Regulated (non-process) energy includes lighting (for the interior, parking garage, surface parking, façade, or building grounds, etc. except as noted above), heating, ventilation and air conditioning (HVAC) (for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), and service water heating for domestic or space heating purposes.

Process loads must be identical for both the baseline building performance rating and the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2007 G2.5) or USGBC approved equivalent to document measures that reduce process loads. Documentation of process load energy savings must include a list of the assumptions made for both the base and the proposed design, and theoretical or empirical information supporting these assumptions.

Projects in California may use Title 24-2005, Part 6 in place of ANSI/ASHRAE/IESNA Standard 90.1-2007 for Option 1.

## **OR**

### **Option 2. Prescriptive compliance path: ASHRAE Advanced Energy Design Guide (AEDG) for Small Hospitals and Healthcare Facilities.**

Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide for Small Hospitals and Healthcare Facilities. The following restrictions apply:

- Buildings must be 90,000 square feet (8,360 square meters) or less.
- Project teams must fully comply with all applicable criteria as established in the AEDG for the climate zone in which the building is located. Projects outside the U.S. may use ANSI/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

### **Option 3. Prescriptive compliance path: prescriptive path for energy improvements in hospitals**

- Buildings must be over 90,000 square feet (8,360 square meters).
- Comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in ASHRAE Standard 90.1-2007
- Incorporate all Energy Efficiency Measures (EEMs) listed below:
  - High Performance Windows and Glazing
  - Thermally broken metal window frames
  - U value at the center of glass < 0.29
  - Solar heat gain coefficient at the center of glass < 0.38
  - U value of the window including framing effects < 0.40
- Lighting Power Density (LPD)
  - Reduce interior LPD a minimum of 10% below IESNA/ASHRAE Standard 90.1 -2007.
  - Reduce exterior lighting power density to 20% below IESNA/ASHRAE 90.1-2007 requirements.
- Lighting Controls
  - Install occupancy sensor lighting controls, at a minimum, in all offices, storage areas and mechanical spaces to achieve the following lighting energy reduction:
    - Offices: 15% during the day
    - Storage: 60% during the day; 30% at night
    - Mechanical Spaces: 50% for 23 hours/day
- The HVAC system serving all areas shall include Variable Air Volume (VAV) air handling units supplied by a central chilled water and boiler plant. In addition, provide zoning controls to maintain pressure relationships as specified in the 2010 FGI Guidelines for Design and Construction of Health Care Facilities. Zoning controls shall be used on both supply air and return/exhaust air systems.
- Reduce fan power a minimum of 10% less than the limit under ASHRAE 90.1-2007.
- Reduce turndown ratio on VAV boxes in accordance with ASHRAE 90.1-2007 Prescriptive Requirement 6.5.2.1.
- Design the heating plant, including boilers and auxiliary equipment, to achieve a minimum system efficiency (BTUH output/ BTUH input) of 90%
- Design hot and chilled water pumps (3 hp [2.24 kW] or greater) with variable speed drives and a minimum part load ratio of 30%.

- For fans and pumps, use only motors that meet National Electrical Manufacturers' Association (NEMA) standards for premium efficiency.
- Chillers shall operate at a maximum of 0.52 kW/ton (0.15 kW/kW) at full load and an Integrated Part Load Value (IPLV) of 0.399 kW/ton (0.11 kW/kW).

#### Whole building energy simulation (1-24 points)

Demonstrate a percentage improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard<sup>2</sup>.

The minimum energy cost savings percentage for each point threshold is as follows:

New Buildings	Existing Building Renovations	Points
12%	8%	1
14%	10%	2
16%	12%	3
18%	14%	5
20%	16%	7
22%	18%	9
24%	20%	11
26%	22%	13
28%	24%	14
30%	26%	15
32%	28%	16
34%	30%	17
36%	32%	18
38%	34%	19
40%	36%	20
42%	38%	21
44%	40%	22
46%	42%	23
48%	44%	24

Appendix G of Standard 90.1-2007 requires that the energy analysis done for the building performance rating method include all the energy costs associated with the building project. To achieve points under this credit, the proposed design must meet the following criteria:

- Compliance with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) or USGBC approved equivalent.
- Inclusion of all the energy costs within and associated with the building project.
- Comparison against a baseline building that complies with Appendix G of Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) or USGBC approved equivalent. The default process energy cost is 25% of the total energy cost for the baseline building. If the building's process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include documentation substantiating that process energy inputs are appropriate.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment) and other (e.g., waterfall pumps).

Regulated (non-process) energy includes lighting (e.g., for the interior, parking garage, surface parking, façade, or building grounds, etc. except as noted above), heating, ventilating, and air conditioning (HVAC) (e.g., for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), and service water heating for domestic or space heating purposes.

For this credit, process loads must be identical for both the baseline building performance rating and the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2007 G2.5) or USGBC approved equivalent to document measures that reduce process loads.

Documentation of process load energy savings must include a list of the assumptions made for both the base and proposed design, and theoretical or empirical information supporting these assumptions.

Projects in California may use Title 24-2005, Part 6 in place of ANSI/ASHRAE/IESNA Standard 90.1-2007 for Option 1.

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<sup>1</sup>Project teams wishing to use ASHRAE approved addenda for the purposes of this prerequisite may do so at their discretion. Addenda must be applied consistently across all LEED credits.

<sup>2</sup> Projects outside the U.S. may use an alternative standard to ANSI/ASHRAE/IESNA Standard 90.1-2007 if it is approved by USGBC as an equivalent standard using the process identified in the LEED 2009 Green Building Design and Construction Global ACP Reference Guide Supplement.

### **Case 1. Projects eligible for Energy Star rating**

For buildings eligible to receive an energy performance rating using the EPA's ENERGY STAR® Portfolio Manager tool, achieve an energy performance rating of at least 69. If the building is eligible for an energy performance rating using Portfolio Manager, Option 1 must be used.

Have energy meters that measure all energy use throughout the performance period of all buildings to be certified. Each building's energy performance must be based on actual metered energy consumption for the LEED project building(s). A full 12 months of continuous measured energy data is required.

Calibrate meters within the manufacturer's recommended interval if the building owner, management organization or tenant owns the meter. Meters owned by third parties (e.g., utilities or governments) are exempt.

### **Case 2. Projects not eligible for Energy Star rating**

For buildings with a primary space type not eligible to receive an energy performance rating using Portfolio Manager, comply with 1 of the following:

#### **Case 1. Projects eligible for Energy Star rating**

For buildings eligible to receive an energy performance rating using the EPA's ENERGY STAR's Portfolio Manager tool, achieve an energy performance rating of at least 71. If the building is eligible for an energy performance rating using Portfolio Manager, Option 1 must be used.

Achieve energy efficiency performance better than the minimum requirements listed above; points are awarded according to the table below.

The minimum energy cost savings percentage for each ENERGY STAR threshold is as follows:

EPA ENERGY STAR Energy Performance Rating	Points
71	1
73	2
74	3
75	4
76	5
77	6
78	7
79	8

80	9
81	10
82	11
83	12
85	13
87	14
89	15
91	16
93	17
95	18

Have energy meters that measure all energy use throughout the performance period of buildings to be certified. Each building's energy performance must be based on actual metered energy consumption for the LEED project. A full 12 months of continuous measured energy data is required.

Calibrate meters within the manufacturer's recommended interval if the building owner, management organization or tenant owns the meter. Meters owned by third parties (e.g., utilities or governments) are exempt.

#### **Case 2. Projects not eligible for Energy Star rating**

For buildings with a primary space type not eligible to receive an energy performance rating using Portfolio Manager, comply with 1 of the following:

Design portions of the building as covered by the tenant's scope of work to comply with ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) and complete the following:

- Compliance with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4, and 10.4) of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>). Projects outside the U.S. may use a USGBC approved equivalent standard<sup>2</sup>.
- Achieve the prescriptive requirements (Sections 5.5 or 5.6, 6.5, 7.5 and 9.5 or 9.6) or performance requirements (Section 11) of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) or USGBC approved equivalent.
- Reduce connected lighting power density 10% below that allowed by ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) or USGBC approved equivalent using either the Space-by-Space Method or by applying the whole building lighting power allowance to the entire tenant space.
- Install ENERGY STAR®-qualified equipment for 50% (by rated power) of ENERGY STAR-eligible equipment installed as part of the tenant's scope of work. This requirement includes appliances, office equipment, electronics, and commercial food service equipment. Equipment that meets the same requirements as ENERGY STAR qualified products but does not bear the ENERGY STAR label is acceptable. Projects outside the U.S. may use a local equivalent to ENERGY STAR. Excluded are heating, ventilating, and air-conditioning (HVAC), lighting, and building envelope products.

Projects in California may use Title 24-2005, Part 6, in place of ANSI/ASHRAE/IESNA Standard 90.1-2007.

Reduce connected lighting power density below that allowed by ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>) using either the space-by-space method or by applying the whole building lighting power allowance to the entire tenant space.

The points earned for reducing lighting power density below the standard are as follows:



Lighting Power Density Reduction below the Standard	Points
15%	1
20%	2
25%	3
30%	4
35%	5

Project teams in California may use Title 24-2005, Part 6 in place of ANSI/ASHRAE/IESNA Standard 90.1-2007.

Design the project to include 1 or more of the following independent strategies:

- Daylight controls for daylit areas: (1 point)  
Install daylight responsive controls in all regularly occupied daylit spaces within 15 feet (4.5 meters) of windows and under skylights. Daylight controls must switch or dim electric lights in response to the presence or absence of daylight illumination in the space.<sup>1</sup>
- Daylight controls for 50% of the lighting load: (1 point)  
Install daylight responsive controls for 50% or more of the connected lighting load and demonstrate that 50% of the connected lighting load is daylight responsive. Daylight controls must switch or dim electric lights in response to the presence or absence of daylight illumination in the space.<sup>2</sup>
- Occupancy sensors: (1 point)  
Install occupancy sensors for 75% of the connected lighting load.

#### Option 1

Implement 1 or both of the following strategies:

- Equipment Efficiency—(5 points)  
Install heating, ventilation and air conditioning (HVAC) systems that comply with the efficiency requirements outlined in the New Building Institute's Advanced Buildings™ Core Performance™ Guide Sections 1.4: Mechanical System Design, 2.9: Mechanical Equipment Efficiency and 3.10: Variable Speed Control.
- Appropriate Zoning and Controls: (5 points)  
Zone tenant fit out of spaces to meet the following requirements:
  - Every solar exposure must have a separate control zone.
  - Interior spaces must be separately zoned.
  - Private offices and special occupancies (conference rooms, kitchens, etc.) must have active controls capable of sensing space use and modulating the HVAC system in response to space demand.

#### OR

#### Option 2

Reduce design energy cost compared with the energy cost budget for regulated energy components described in the requirements of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda<sup>1</sup>). Projects outside the U.S. may use a USGBC approved equivalent standard<sup>2</sup>.

For all ENERGY STAR® eligible equipment and appliances installed as part of the tenant's scope of work, achieve one of the following percentages (by rated power). Equipment that meets the same requirements as ENERGY STAR® qualified products but does not bear the ENERGY STAR® label is acceptable. Projects outside the U.S. may use a local equivalent to ENERGY STAR®.

Percent Installed ENERGY STAR Qualified Equipment of ENERGY STAR Eligible Equipment	Points
70%	1
77%	2
84%	3
90%	4

This requirement applies to appliances, office equipment, electronics, and commercial food service equipment. Excluded are HVAC, lighting, and building envelope products.

The following requirement applies to 90% of the building floor area (rounded up to the next whole building) of all nonresidential buildings, mixed-use buildings, and multiunit residential buildings four stories or more constructed as part of the project or undergoing major renovations as part of the project.

New buildings must demonstrate an average 10% improvement over ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda). Buildings undergoing major renovations must demonstrate an average 5% improvement over ANSI/ASHRAE/IESNA Standard 90.1-2007.

Projects must document building energy efficiency using one or a combination of the following:

- a. ▫ Produce a LEED-compliant energy model following the methodology outlined in the LEED rating system appropriate to each building's scope, including demonstration by a whole building project computer simulation using the building performance rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007. Appendix G requires that the energy analysis done for the building performance rating method include all energy costs associated with the building project. Projects in California may use Title 24-2005, Part 6, in place of ANSI/ASHRAE/IESNA Standard 90.1-2007.
- b. ▫ Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide listed below, appropriate to each building's scope. Comply with all applicable criteria as established in the guide for the climate zone in which the project is located.
  - a. ▫ ASHRAE Advanced Energy Design Guide for Small Office Buildings 2004 (office occupancy buildings less than 20,000 square feet).
  - b. ▫ ASHRAE Advanced Energy Design Guide for Small Retail Buildings 2006 (retail occupancy buildings less than 20,000 square feet).
  - c. ▫ ASHRAE Advanced Energy Design Guide for Small Warehouses and Self-Storage Buildings 2008 (warehouse or self-storage occupancy less than 50,000 square feet).
  - d. ▫ ASHRAE Advanced Energy Design Guide for K-12 School Buildings (K-12 school occupancy less than 200,000 square feet).
- c. ▫ For buildings less than 100,000 square feet, comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute, as follows:
  - a. ▫ Comply with Section 1, Design Process Strategies, and Section 2, Core Performance Requirements, of the Core Performance Guide.
  - b. ▫ Health care, warehouse and laboratory projects are ineligible for this path.

If method (a) is used for all of the floor area evaluated in this prerequisite, the total percentage improvement is calculated as a sum of energy costs for each building compared with a baseline. If any combination of methods (a), (b), and (c) is used, the total percentage improvement is calculated as a weighted average based on building floor area. In determining the weighted average, buildings pursuing (a) will be credited at the percentage value determined by the energy model. Buildings pursuing (b) or (c) will be credited at 12% better than ANSI/ASHRAE/IESNA Standard 90.1-2007 for new buildings and 8% better for existing building renovations.

#### **AND**

For new single-family residential buildings and new multiunit residential buildings three stories or fewer, 90% of the buildings must meet ENERGY STAR or equivalent criteria. Projects may demonstrate compliance with ENERGY STAR criteria through the prescriptive requirements of a Builder Option Package, the Home Energy Rating System (HERS) index, or a combination of the two.

Project teams wishing to use ASHRAE-approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

The following requirement applies to 90% of the building floor area (rounded up to the next whole building) of all nonresidential buildings, mixed-use buildings, and multiunit residential buildings four stories or more constructed as part of the project or undergoing major renovations as part of the project.

New buildings must demonstrate an average 18% (1 point) or 26% (2 points) improvement over ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda). Buildings undergoing major renovations as part of the project must demonstrate an average 14% (1 point) or 22% (2 points) improvement over ANSI/ASHRAE/IESNA Standard 90.1-2007.

Projects must document building energy efficiency using one or a combination of the following:

- Produce a LEED-compliant energy model following the methodology outlined in the LEED rating system appropriate to each building's scope, including demonstration by a whole building project computer simulation using the building performance rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007. Appendix G requires that the energy analysis done for the building performance rating method include all energy costs associated with the building project.

Projects in California may use Title 24–2005, Part 6, in place of ANSI/ASHRAE/IESNA Standard 90.1–2007.

- Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide listed below, appropriate to each building’s scope. Comply with all applicable criteria as established in the guide for the climate zone in which the project is located.
- ASHRAE Advanced Energy Design Guide for Small Office Buildings 2004 (office occupancy buildings less than 20,000 square feet).
- ASHRAE Advanced Energy Design Guide for Small Retail Buildings 2006 (retail occupancy buildings less than 20,000 square feet).
- ASHRAE Advanced Energy Design Guide for Small Warehouses and Self-Storage Buildings 2008 (warehouse or self-storage occupancy less than 50,000 square feet).
- ASHRAE Advanced Energy Design Guide for K-12 School Buildings (K-12 school occupancy less than 200,000 square feet).
- For buildings less than 100,000 square feet, comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute, as follows:
- Comply with Section 1, Design Process Strategies, and Section 2, Core Performance Requirements, of the Core Performance Guide.
- Health care, warehouse and laboratory projects are ineligible for this path.

If method (a) is used for all of the floor area evaluated in this prerequisite, the total percentage improvement is calculated as a sum of energy costs for each building compared with a baseline. If any combination of methods (a), (b), and (c) is used, the total percentage improvement is calculated as a weighted average based on building floor area. In determining the weighted average, buildings pursuing (a) will be credited at the percentage value determined by the energy model. Buildings pursuing (b) or (c) will be credited at 12% better than ANSI/ASHRAE/IESNA Standard 90.1–2007 for new buildings and 8% better for existing building renovations.

#### **AND**

For new single-family residential buildings and new multiunit residential buildings three stories or fewer, 90% of the buildings must achieve a Home Energy Rating System (HERS) index score of at least 75.

Project teams wishing to use ASHRAE-approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

#### **Option 1. Performance compliance path**

Demonstrate a 15% reduction in the heat loss and heat gain of the proposed building envelope compared with the baseline building performance rating per ANSI/ASHRAE/IESNA Standard 90.1–2007 (with errata but without addenda<sup>1</sup>) for the building envelope components such as glazing, insulation, roofing, and slab using a modeling protocol or overall UA (U factor x Area) calculation. Projects outside the U.S. may use a USGBC approved equivalent standard<sup>2</sup>.

#### **OR**

#### **Option 2. Prescriptive compliance path**

Comply with the prescriptive measures for building envelopes of ASHRAE Advanced Energy Design Guide for Small Retail Buildings 2006. The building must meet the following requirements:

- The building in which project is located must be less than 20,000 square feet (1,800 square meters).
- The building must be retail occupancy.
- The project must fully comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located. Projects outside the U.S. may use ASHRAE/ASHRAE/IESNA Standard 90.1-2007 Appendices B and D to determine the appropriate climate zone.

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<sup>1</sup>Project teams wishing to use ASHRAE approved addenda for the purposes of this prerequisite may do so at their discretion. Addenda must be applied consistently across all LEED credits.

<sup>2</sup> Projects outside the U.S. may use an alternative standard to ANSI/ASHRAE/IESNA Standard 90.1-2007 if it is approved by USGBC as an equivalent standard using the process identified in the LEED 2009 Green Building Design and Construction Global ACP Reference Guide Supplement.

Design the building project to comply with both—

- the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) of ASHRAE/IESNA Standard 90.1–2004; and

- the prescriptive requirements (Sections 5.5, 6.5, 7.5 and 9.5) or performance requirements (Section 11) of ASHRAE/IESNA Standard 90.1-2004.

Select one of the four compliance path options described below. Project teams documenting achievement using any of these options are assumed to be in compliance with EA prerequisite 2.

*NOTE: LEED for New Construction projects registered after June 26th, 2007 are required to achieve at least two (2) points under EAc1.*

#### **Option 1 — whole building energy simulation (1-10 points)**

Demonstrate a percentage improvement in the proposed building performance rating compared to the baseline building performance rating per ASHRAE/IESNA Standard 90.1-2004 by a whole building project simulation using the Building Performance Rating Method in Appendix G of the Standard. The minimum energy cost savings percentage for each point threshold is as follows:

New Buildings	Existing Building Renovations	Points
10.5%	3.5%	1
14%	7%	2
17.5%	10.5%	3
21%	14%	4
24.5%	17.5%	5
28%	21%	6
31.5%	24.5%	7
35%	28%	8
38.5%	31.5%	9
42%	35%	10

*\* Note: Only projects registered prior to June 26, 2007 may pursue 1 point under EAc1.*

Appendix G of Standard 90.1-2004 requires that the energy analysis done for the Building Performance Rating Method include ALL of the energy costs within and associated with the building project. To achieve points using this credit, the proposed design—

- must comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2004;
- must include all the energy costs within and associated with the building project; and
- must be compared against a baseline building that complies with Appendix G to Standard 90.1-2004. The default process energy cost is 25% of the total energy cost for the baseline building. For buildings where the process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include supporting documentation substantiating that process energy inputs are appropriate.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment) and other (e.g., waterfall pumps). Regulated (non-process) energy includes lighting (such as for the interior, parking garage, surface parking, façade, or building grounds, except as noted above), HVAC (such as for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), and service water heating for domestic or space heating purposes.

For EA Credit 1, process loads shall be identical for both the baseline building performance rating and for the proposed building performance rating. However, project teams may follow the Exceptional Calculation Method (ASHRAE 90.1-2004 G2.5) to document measures that reduce process loads. Documentation of process load energy savings shall include a list of the assumptions made for both the base and proposed design, and theoretical or empirical information supporting these assumptions.

**OR**

#### **Option 2 — prescriptive compliance path: ASHRAE Advanced Energy Design Guide for Small Office Buildings 2004 (4 Points)**

Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide

for Small Office Buildings 2004. The following restrictions apply:

- Buildings must be under 20,000 square feet.
- Buildings must be office occupancy.
- Project teams must fully comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located. Teams must also provide additional documentation, such as relevant detailed drawings, cut sheets, mechanical/electrical schedules, section of specifications or other documentation to demonstrate compliance with this standard.

## OR

### **Option 3 — prescriptive compliance path: Advanced Buildings™ Core Performance™ Guide (2-5 Points)**

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The following restrictions apply:

- Buildings must be under 100,000 square feet.
- Buildings may NOT be health care, warehouse or laboratory projects.
- Project teams must fully comply with Sections One, Design Process Strategies, and Two, Core Performance Requirements.

Minimum points achieved under Option 3 (2-3 points):

- Three (3) points are available for all office, school, public assembly, and retail projects under 100,000 square feet that comply with Sections One and Two of the Core Performance Guide.
- Two (2) points are available for all other project types under 100,000 square feet (except health care, warehouse, or laboratory projects) that implement the basic requirements of the Core Performance Guide

Additional points available under Option 3 (up to 2 additional points):

Up to two (2) additional points are available to projects that implement performance strategies listed in Section Three, Enhanced Performance. For every three strategies implemented from this section, one point is available.

- Any strategies applicable to the project may be implemented except:
  - 3.1-Cool Roofs
  - 3.8-Night Venting
  - 3.13-Additional Commissioning

These strategies are addressed by different aspects of the LEED program and are not eligible for additional points under EA Credit 1.

## OR

### **Option 4 — prescriptive compliance path: Advanced Buildings Benchmark™ Basic Criteria and Prescriptive Measures (1 Point)**

*Note: projects registered after June 26, 2007 may not use this option*

Comply with the Basic Criteria and Prescriptive Measures of the Advanced Buildings Benchmark™ Version 1.1 with the exception of the following sections: 1.7 Monitoring and Trend-logging, 1.11 Indoor Air Quality, and 1.14 Networked Computer Monitor Control. The following restrictions apply:

- Project teams must fully comply with all applicable criteria as established in Advanced Buildings Benchmark for the climate zone in which the building is located.

Earn at least two points under Energy & Atmosphere Credit 1.

Choose one of the following options:

#### **Option A**

For buildings eligible to receive an EPA rating using ENERGY STAR's Portfolio Manager tool, achieve an energy performance rating of at least 69. If the building is eligible for a rating using Portfolio Manager, Option A must be used.

#### **Option B**

For buildings not eligible to receive an EPA rating using Portfolio Manager, demonstrate energy efficiency at least 19% better than the average for typical buildings of similar type by benchmarking against national average source energy data provided in the Portfolio Manager tool as an alternative to EPA ratings. Follow the detailed instructions in the LEED for Existing Buildings: Operations & Maintenance Reference Guide.

#### **Option C**

For buildings not eligible to receive an EPA rating using Portfolio Manager and also not suited for Option B, use the alternative method described in the LEED for Existing Buildings: Operations & Maintenance Reference Guide.

In addition to Option A, B or C, meet all the requirements below:

- Achieve energy efficiency performance better than the minima listed above; points are awarded according to the tables below.
- Have an energy meter(s) that measures all energy use throughout the performance period of each building to be certified. Each building's energy performance must be based on actual metered energy consumption for both the LEED project building(s) and all comparable buildings used for the benchmark.  
A full 12 months of continuous measured energy data is required.
- Calibrate meters within the manufacturer's recommended interval if the building owner, management organization or tenant owns the meter. Meters owned by third parties (e.g., utilities or governments) are exempt.

**Option A**

[INSERT TABLE HERE]

**Option B and C**

[INSERT TABLE HERE]

Demonstrate the EPA ENERGY STAR energy performance rating that the building has achieved. Utilize ENERGY STAR'S Portfolio Manager tool for building types addressed by ENERGY STAR,

**OR**

For building types not addressed by ENERGY STAR, demonstrate the ENERGY STAR equivalent rating for the building energy use, calculated using the alternate method described in the LEED for Existing Buildings Reference Guide.

*NOTE: LEED for Existing Buildings projects registered after June 26<sup>th</sup>, 2007 are required to achieve at least two (2) points under EAc1.*

ENERGY STAR Rating	LEED for Existing Buildings Points
63*	1
67	2
71	3
75	4
79	5
83	6
87	7
91	8
95	9
99	10

\* Note: Only projects registered prior to June 26, 2007 may pursue 1 point under EAc1.

Design portions of the building as covered by the tenant's scope of work to comply with ASHRAE/IESNA Standard 90.1-2004 or the local energy code, whichever is more stringent.

Reduce connected lighting power density below that allowed by ASHRAE/IESNA Standard 90.1-2004\* using either the Space-by-Space Method or by applying the whole building lighting power allowance to the entire tenant space.

NOTE: All projects registered after June 26<sup>th</sup>, 2007 are required to achieve at least two (2) points under EAc1. LEED for Homes and LEED for Neighborhood Development projects are exempt from this requirement. LEED for Commercial Interiors projects may earn 2 points from achieving any combination of the 4 sub-credits under EAc1.

Option A. Reduce lighting power density to 15% below the standard (1 point)

**OR**

Option B. Reduce lighting power density to 25% below the standard, (2 points)

**OR**

Option C. Reduce lighting power density to 35% below the standard. (3 points)

Reduce connected lighting power density below that allowed by ASHRAE/IESNA Standard

90.1-2004\* using either the Space-by-Space Method or by applying the whole building lighting power allowance to the entire tenant space.

NOTE: All projects registered after June 26th, 2007 are required to achieve at least two (2) points under EAc1. LEED for Homes and LEED for Neighborhood Development projects are exempt from this requirement. LEED for Commercial Interiors projects may earn 2 points from achieving any combination of the 4 sub-credits under EAc1.

Option A. Reduce lighting power density to 15% below the standard (1 point)

**OR**

Option B. Reduce lighting power density to 25% below the standard, (2 points)

**OR**

Option C. Reduce lighting power density to 35% below the standard. (3 points)

NOTE: All projects registered after June 26th, 2007 are required to achieve at least two (2) points under EAc1. LEED for Homes and LEED for Neighborhood Development projects are exempt from this requirement. LEED for Commercial Interiors projects may earn 2 points from achieving any combination of the 4 sub-credits under EAc1.

#### **Option A**

Implement one or both of the following strategies:

- Equipment Efficiency: (1 point)

Install HVAC systems which comply with the efficiency requirements outlined in the New Buildings Institute, Inc.'s publication "Advanced Buildings: Energy Benchmark for High Performance Buildings (E-Benchmark)" prescriptive criteria for mechanical equipment efficiency requirements, sections 2.4 (less ASHRAE standard 55), 2.5, and 2.6.

- Appropriate Zoning and Controls: (1 point)

Zone tenant fit out of spaces to meet the following requirements:

- Every Solar Exposure must have a separate control zone
- Interior spaces must be separately zoned
- Private offices and specialty occupancies (conference rooms, kitchens, etc.) must have active controls capable of sensing space use and modulating HVAC system in response to space demand

#### **Option B**

Reduce design energy cost compared to the energy cost budget for regulated energy components described in the requirements of ASHRAE/IESNA Standard 90.1- 2004.

- Demonstrate that HVAC system component performance criteria used for tenant space are 15% better than a system that is in minimum compliance with ASHRAE/IESNA Standard 90.1-2004. (1 point)

**OR**

- Demonstrate that HVAC system component performance criteria used for tenant space are 30% better than a system that is in minimum compliance with ASHRAE/IESNA Standard 90.1-2004. (2 points)

NOTE: All projects registered after June 26th, 2007 are required to achieve at least two (2) points under EAc1. LEED for Homes and LEED for Neighborhood Development projects are exempt from this requirement. LEED for Commercial Interiors projects may earn 2 points from achieving any combination of the 4 sub-credits under EAc1.

For all ENERGYSTAR® eligible equipment and appliances installed in the project, including appliances, office equipment, electronics, and commercial food service equipment (but excluding HVAC, lighting, and building envelope products):

- 70%, by rated-power, of ENERGY STAR eligible equipment and appliances shall be ENERGY STAR rated (1 point);

**OR**

- 90%, by rated-power, of ENERGY STAR eligible equipment and appliances shall be ENERGY STAR rated (2 points).

Demonstrate that the building has achieved an EPA ENERGY STAR rating of at least 60 utilizing the EPA's Portfolio Manager tool for building types addressed by ENERGY STAR,

**OR**

For building types not addressed by ENERGY STAR, demonstrate that the building has energy performance equivalent to an ENERGY STAR rating of at least 60, as calculated using the alternate method described in the LEED for Existing Buildings Reference Guide.

*NOTE: All LEED for Existing Buildings projects registered after June 26, 2007 must exceed the minimum energy performance requirements outlined in EAp2. See EAc1 for the new requirements.*

Design the building project to comply with both—

- the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) of ASHRAE/IESNA Standard 90.1-2004; and
- the prescriptive requirements (Sections 5.5, 6.5, 7.5 and 9.5) or performance requirements (Section 11) of ASHRAE/IESNA Standard 90.1-2004.

Finally, the project must establish an Energy Performance Rating goal for the facility design using EPA's Target Finder rating tool.

#### **Option 1—Whole building energy simulation**

Demonstrate a percentage improvement in the proposed building performance rating compared to the baseline building performance rating per ASHRAE/IESNA Standard 90.1-2004 by a whole building project simulation using the Building Performance Rating Method in Appendix G of the Standard. The minimum energy cost savings percentage for each point threshold is as follows:

[INSERT TABLE HERE]

Appendix G of Standard 90.1-2004 requires that the energy analysis done for the Building Performance Rating Method include ALL of the energy costs within and associated with the building project. To achieve points using this credit, the proposed design—

- must comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2004;
- must include all the energy costs within and associated with the building project; and
- must be compared against a baseline building that complies with Appendix G to Standard 90.1-2004. The default process energy cost is 25% of the total energy cost for the baseline building. For buildings where the process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include supporting documentation substantiating that process energy inputs are appropriate.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g. lighting integral to medical equipment) and other (e.g. waterfall pumps). Regulated (non-process) energy includes lighting (such as for the interior, parking garage, surface parking, façade, or building grounds, except as noted above), HVAC (such as for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), and service water heating for domestic or space heating purposes.

For EA Credit 1, process loads shall be identical for both the baseline building performance rating and for the proposed building performance rating. However, project teams may follow the Exceptional Calculation Method (ASHRAE 90.1-2004 G2.5) to document measures that reduce process loads. Documentation of process load energy savings shall include a list of the assumptions made for both the base and proposed design, and theoretical or empirical information supporting these assumptions.

**OR**

#### **Option 2—Prescriptive compliance path: Advanced Buildings™ Core Performance™ Guide (2-5 Points)**

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The following restrictions apply:

- The project must be a school under 100,000 square feet.
- Project teams must fully comply with Sections One, Design Process Strategies, and Two, Core Performance Requirements.

Minimum points achieved under Option 3 (2-3 points):

- Three (3) points are available for all school projects under 100,000 square feet that comply with Sections One and Two of the Core Performance Guide.
- Two (2) points are available for all other project types under 100,000 square feet that implement the basic requirements of the Core Performance Guide.

Additional points available under Option 3 (up to 2 additional points):

- Up to two (2) additional points are available to projects that implement performance strategies listed in Section Three, Enhanced Performance. For every three strategies implemented from this section, one point is available.
- Any strategies applicable to the project may be implemented except:



- 3.1-Cool Roofs
- 3.8-Night Venting
- 3.13-Additional Commissioning

These strategies are addressed by different aspects of the LEED program and are not eligible for additional points under EA Credit 1.

Design the building project to comply with both—

- the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) of ASHRAE/IESNA Standard 90.1-2004; and
- the prescriptive requirements (Sections 5.5, 6.5, 7.5 and 9.5) or performance requirements (Section 11) of ASHRAE/IESNA Standard 90.1-2004.
- NOTE: LEED for Core and Shell projects registered after June 26, 2007 must exceed the minimum energy performance requirements of ASHRAE/IESNA Standard 90.1-2004. See EAc1 for the new requirements.

Select one of the four compliance path options described below. Project teams documenting achievement using any of the four options are assumed to be in compliance with EA Prerequisite 2.

*Note: LEED or Core and Shell projects registered after June 26th, 2007 are required to achieve at least two (2) points under EAc1.*

**Option 1 — Whole building energy simulation (1-8 points)**

Demonstrate a percentage improvement in the proposed building performance rating compared to the baseline building performance rating per ASHRAE/IESNA Standard 90.1-2004 by a whole building project simulation using the Building Performance Rating Method in Appendix G of the Standard. The minimum energy cost savings percentage for each point threshold is as follows:

[INSERT TABLE HERE]

Appendix G of Standard 90.1-2004 requires that the energy analysis done for the Building Performance Rating Method include ALL of the energy costs within and associated with the building project. To achieve points using this credit, the proposed design—

- must comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2004;
- must include all the energy costs within and associated with the building project; and
- must be compared against a baseline building that complies with Appendix G to Standard 90.1-2004. The default process energy cost is 25% of the total energy cost for the baseline building. For buildings where the process energy cost is less than 25% of the baseline building energy cost, the LEED submittal must include supporting documentation substantiating that process energy inputs are appropriate.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g. lighting integral to medical equipment) and other (e.g. waterfall pumps). Regulated (non-process) energy includes lighting (such as for the interior, parking garage, surface parking, façade, or building grounds, except as noted above), HVAC (such as for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), and service water heating for domestic or space heating purposes.

For EA Credit 1, process loads shall be identical for both the baseline building performance rating and for the proposed building performance rating. However, project teams may follow the Exceptional Calculation Method (ASHRAE 90.1-2004 G2.5) to document measures that reduce process loads. Documentation of process load energy savings shall include a list of the assumptions made for both the base and proposed design, and theoretical or empirical information supporting these assumptions.

**OR**

**Option 2 — Prescriptive compliance path (3 points possible)**

*Note: LEED for Core and Shell projects registered after June 26th, 2007 are required to achieve at least two (2) points under EAc1*

Comply with the ASHRAE Advanced Energy Design Guide for Small Office Buildings recommendations.

Project teams must fully comply with all applicable criteria as established in the ASHRAE Advanced Energy Design Guide for Small Office Buildings for the climate zone in which

the building is located. It should be noted that this compliance path may only be used for office buildings up to 20,000 sq.ft. Teams must also provide additional documentation, such as relevant detailed drawings, cut sheets, mechanical/electrical schedules, sections of specifications or other documentation to demonstrate compliance with this standard.

Note: the envelope, lighting and HVAC & SWH requirements vary by climate. For each climate there is a table that lists recommended levels for each “system”.

#### **Envelope Performance: (1 point possible)**

Install envelope systems which comply with all the envelope recommendations in the ASHRAE Advanced Energy Design Guide for Small Office Buildings table for the climate zone in which the building is located.

#### **Lighting Systems: (1 additional point possible)**

Install lighting systems which comply with all the lighting recommendations in the ASHRAE Advanced Energy Design Guide for Small Office Buildings table for the climate zone in which the building is located.

All such systems shall be included in systems commissioned under EA P1, Fundamental Building Systems Commissioning.

#### **HVAC and Service Water Heater Systems: (1 additional point possible)**

Install HVAC and Service Water Heating (SWH) systems which comply with all the HVAC & SWH recommendations in the ASHRAE Advanced Energy Design Guide for Small Office Buildings table for the climate zone in which the building is located.

All such systems shall be included in systems commissioned under EA P1, Fundamental Building Systems Commissioning.

#### **OR**

#### **Option 3 — Prescriptive compliance path: Advanced Buildings™ Core Performance™ Guide (2-5 points)**

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute.

- The Core Performance Guide is applicable for buildings under 100,000 square feet.
- The Core Performance Guide is NOT applicable for health care, warehouse or laboratory projects.
- Project teams must fully comply with Sections One, *Design Process Strategies* and Two, *Core Performance Requirements*.

Minimum points achieved under Option 3 (2-3 points):

- 3 points are available for all office, school, public assembly, and retail projects under 100,000 square feet that comply with Sections One and Two of the *Core Performance Guide*.
- 2 points are available for all other project types under 100,000 square feet (except health care, warehouse, or laboratory projects) that implement the basic requirements of the *Core Performance Guide*.

Additional points available under Option 3 (up to 2 additional points):

- Up to 2 additional points are available to projects that implement performance strategies listed in Section Three, *Enhanced Performance*. For every three strategies implemented from this section, one point is available.
- Any strategies applicable to the project may be implemented within this section except:
  - 3.1 - Cool Roofs
  - 3.8 - Night Venting
  - 3.13 - Additional Commissioning

These strategies are addressed by different aspects of the LEED program and are not eligible for additional points under EA credit 1.

#### **Option 4 — Prescriptive compliance path (1 point)**

*Note: Projects registered after June 26th, 2007 may not use this option.*

Comply with the Basic Criteria and Prescriptive Measures of the NBI Advanced Buildings Benchmark™ Version 1.1 with the exception of the following sections: 1.1 Design Certification, 1.2 Construction Certification, 1.3 Operations Certification, 1.4 Energy Code Compliance, 1.7 Monitoring and Trend-logging, 1.11 Indoor Air Quality, 1.13 Refrigeration Equipment Efficiency Requirements, 1.14 Networked Computer Monitor Control, and 2.3 Cool Roofs and EcoRoofs (Zones 1 through 5). The following

restrictions apply:

- Project teams must fully comply with all applicable criteria as established in Advanced Buildings Benchmark for the climate zone in which the building is located.
- Project teams must show compliance with all applicable criteria for all systems that are part of the core and shell work.

Design the building to comply with ASHRAE/IESNA Standard 90.1-1999 (without amendments) or the local energy code, whichever is more stringent.

Reduce design energy cost compared to the energy cost budget for energy systems regulated by ASHRAE/IESNA Standard 90.1-1999 (without amendments), as demonstrated by a whole building simulation using the Energy Cost Budget Method described in Section 11 of the Standard.

[INSERT TABLE HERE]

Regulated energy systems include HVAC (heating, cooling, fans and pumps), service hot water and interior lighting. Non-regulated systems include plug loads, exterior lighting, garage ventilation and elevators (vertical transportation). Two methods may be used to separate energy consumption for regulated systems. The energy consumption for each fuel may be prorated according to the fraction of energy used by regulated and non-regulated energy. Alternatively, separate meters (accounting) may be created in the energy simulation program for regulated and non-regulated energy uses.

If an analysis has been made comparing the proposed design to local energy standards and a defensible equivalency (at minimum) to ASHRAE/IESNA Standard 90.1-1999 has been established, then the comparison against the local code may be used in lieu of the ASHRAE Standard.

Project teams are encouraged to apply for innovation credits if the energy consumption of non-regulated systems is also reduced.

Design to meet building energy efficiency and performance as required by ASHRAE/IESNA 90.1-1999 or the local energy code, whichever is the more stringent.

Reduce design energy cost compared to the energy cost budget for regulated energy components described in the requirements of ASHRAE/IESNA Standard 90.1-1999, as demonstrated by a whole building simulation using the Energy Cost Budget Method described in Section 11:

[INSERT TABLE HERE]

Regulated energy components include HVAC systems, building envelope, service hot water systems, lighting and other regulated systems as defined by ASHRAE.

**Credit 1.1** (2 points) Reduce design energy cost by 20% / 10%.

**Credit 1.2** (4 points) Reduce design energy cost by 30% / 20%.

**Credit 1.3** (6 points) Reduce design energy cost by 40% / 30%.

**Credit 1.4** (8 points) Reduce design energy cost by 50% / 40%.

**Credit 1.5** (10 points) Reduce design energy cost by 60% / 50%.

#### **Option 1. Whole-building energy simulation**

Demonstrate an improvement of 5% for new construction, 3% for major renovations, or 2% for core and shell projects in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to ANSI/ASHRAE/IESNA Standard 90.1-2010, Appendix G, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.), using a simulation model.

Projects must meet the minimum percentage savings before taking credit for renewable energy systems.

The proposed design must meet the following criteria:

- compliance with the mandatory provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.);
- inclusion of all energy consumption and costs within and associated with the building project; and
- comparison against a baseline building that complies with Standard 90.1-2010, Appendix G, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.).

Document the energy modeling input assumptions for unregulated loads. Unregulated loads should be modeled accurately to reflect the actual expected energy consumption of the building.

If unregulated loads are not identical for both the baseline and the proposed building performance rating, and the simulation program cannot accurately model the savings,

follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2010, G2.5). Alternatively, use the COMNET Modeling Guidelines and Procedures to document measures that reduce unregulated loads.

**OR**

**Option 2. Prescriptive compliance: ASHRAE 50% Advanced Energy Design Guide**

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.).

Comply with the HVAC and service water heating requirements, including equipment efficiency, economizers, ventilation, and ducts and dampers, in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone:

- ASHRAE 50% Advanced Energy Design Guide for Small to Medium Office Buildings, for office buildings smaller than 100,000 square feet (9 290 square meters);
- ASHRAE 50% Advanced Energy Design Guide for Medium to Large Box Retail Buildings, for retail buildings with 20,000 to 100,000 square feet (1 860 to 9 290 square meters);
- ASHRAE 50% Advanced Energy Design Guide for K-12 School Buildings; or
- ASHRAE 50% Advanced Energy Design Guide for Large Hospitals.
- • Over 100,000 square feet (9 290 square meters)

For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

**Option 3. Prescriptive compliance: Advanced Buildings™ Core Performance™ Guide**

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or USGBC approved equivalent standard for projects outside the U.S.).

Comply with Section 1: Design Process Strategies, Section 2: Core Performance Requirements, and the following three strategies from Section 3: Enhanced Performance Strategies, as applicable. Where standards conflict, follow the more stringent of the two. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

3.5 Supply Air Temperature Reset (VAV)

3.9 Premium Economizer Performance

3.10 Variable Speed Control

To be eligible for Option 3, the project must be less than 100,000 square feet (9 290 square meters).

Note: Healthcare, Warehouse or Laboratory projects are ineligible for Option 3.

**Option 1. Whole-building energy simulation**

Demonstrate an improvement of 5% for new construction, 3% for major renovations, or 2% for core and shell projects in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to ANSI/ASHRAE/IESNA Standard 90.1-2010, Appendix G, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.), using a simulation model.

Projects must meet the minimum percentage savings before taking credit for renewable energy systems.

The proposed design must meet the following criteria:

- compliance with the mandatory provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.);
- inclusion of all energy consumption and costs within and associated with the building project; and
- comparison against a baseline building that complies with Standard 90.1-2010, Appendix G, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.).

Document the energy modeling input assumptions for unregulated loads. Unregulated loads should be modeled accurately to reflect the actual expected energy consumption of the building.

If unregulated loads are not identical for both the baseline and the proposed building performance rating, and the simulation program cannot accurately model the savings, follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2010, G2.5). Alternatively, use the COMNET Modeling Guidelines and Procedures to document measures that reduce unregulated loads.

For Option 1, Whole-Building Energy Simulation, process loads for retail may include refrigeration equipment, cooking and food preparation, clothes washing, and other major support appliances. Many of the industry standard baseline conditions for commercial kitchen equipment and refrigeration are defined in Appendix 3, Tables 1–4. No additional documentation is necessary to substantiate these predefined baseline systems as industry standard.

## **OR**

### **Option 2. Prescriptive compliance: ASHRAE 50% Advanced Energy Design Guide**

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.).

Comply with the HVAC and service water heating requirements, including equipment efficiency, economizers, ventilation, and ducts and dampers, in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone:

- ASHRAE 50% Advanced Energy Design Guide for Small to Medium Office Buildings, for office buildings smaller than 100,000 square feet (9 290 square meters);
- ASHRAE 50% Advanced Energy Design Guide for Medium to Large Box Retail Buildings, for retail buildings with 20,000 to 100,000 square feet (1 860 to 9 290 square meters);
- ASHRAE 50% Advanced Energy Design Guide for K–12 School Buildings; or
- ASHRAE 50% Advanced Energy Design Guide for Large Hospitals.
- • Over 100,000 square feet (9 290 square meters)

For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1–2010, Appendixes B and D, to determine the appropriate climate zone.

### **Option 3. Prescriptive compliance: Advanced Buildings™ Core Performance™ Guide**

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata (or USGBC approved equivalent standard for projects outside the U.S.).

Comply with Section 1: Design Process Strategies, Section 2: Core Performance Requirements, and the following three strategies from Section 3: Enhanced Performance Strategies, as applicable. Where standards conflict, follow the more stringent of the two. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1–2010, Appendixes B and D, to determine the appropriate climate zone.

3.5 Supply Air Temperature Reset (VAV)  
3.9 Premium Economizer Performance  
3.10 Variable Speed Control

To be eligible for Option 3, the project must be less than 100,000 square feet (9 290 square meters).

Note: Healthcare, Warehouse or Laboratory projects are ineligible for Option 3.

### **Whole-building energy simulation**

Demonstrate a 5% improvement in the proposed performance rating over the baseline performance rating. To determine total energy cost savings, create two models, one for building energy cost and the other for IT equipment energy cost. Calculate the baseline building performance according to ANSI/ASHRAE/IESNA Standard 90.1–2010, Appendix G, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.), using a simulation model for the whole building and data center modeling guidelines.

Determine the power utilization effectiveness (PUE) value of the proposed design.

For this prerequisite, a minimum of 2% of the 5% energy savings must come from building power and cooling infrastructure.

Projects must meet the minimum percentage savings before taking credit for renewable energy systems.

The proposed design must meet the following criteria:

- compliance with the mandatory provisions of ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.);
- inclusion of all energy consumption and costs within and associated with the building project; and
- comparison against a baseline building that complies with ANSI/ASHRAE/IESNA Standard 90.1–2010, Appendix G, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.), and

data center modeling guidelines.

For data centers, regulated energy includes cooling units for computer and data processing rooms, critical power conditioning equipment, critical distribution equipment, heat rejection plants, and mechanical and electrical support rooms.

Include in process loads both the unregulated load and the IT equipment load. The IT load comprises critical systems and electrical power transformation, which may include servers, storage and networking power use, and operations affecting monthly server CPU utilization percentages.

Develop two sets of IT load models using two scenarios, one at the maximum estimated IT load rating and the second at the startup IT rating expected at the time of commissioning.

Document the energy modeling input assumptions for unregulated loads. Unregulated loads should be modeled accurately to reflect the actual expected energy consumption of the building.

If unregulated loads are not identical for both the baseline and the proposed building performance rating, follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2010, G2.5) to document measures that reduce unregulated loads.

#### **Option 1. Tenant-level energy simulation**

Demonstrate a 3% improvement in the proposed performance rating compared with the baseline performance rating for portions of the building within the tenant's scope of work. Calculate the baseline according to ANSI/ASHRAE/IESNA Standard 90.1-2010, Appendix G, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.), using a simulation model for all tenant project energy use.

Projects must meet the minimum percentage savings before application of renewable energy systems.

The proposed design must meet the following criteria:

- compliance with the mandatory provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata, or a USGBC-approved equivalent standard for projects outside the U.S.);
- inclusion of all energy consumption and costs within and associated with the tenant project; and
- comparison against a baseline tenant project that complies with Standard 90.1-2010, Appendix G, with errata but without addenda (or a USGBC-approved equivalent standard outside the U.S.).

Exception: the baseline project envelope must be modeled according to Table G3.1(5) (baseline), Sections a-e, and not Section f.

Document the energy modeling input assumptions for unregulated loads. Unregulated loads should be modeled accurately to reflect the actual expected energy consumption of the tenant project.

If unregulated loads are not identical for both the baseline and the proposed performance ratings, and the simulation program cannot accurately model the savings, follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2010, G2.5). Alternatively, use the COMNET modeling guidelines and procedures to document measures that reduce unregulated loads.

**OR**

#### **Option 2. Prescriptive compliance**

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.).

- Reduce connected lighting power density by 5% below ASHRAE 90.1-2010 using the space-by-space method or by applying the whole-building lighting power allowance to the entire tenant space.
- Install ENERGY STAR appliances, office equipment, electronics, and commercial food service equipment (HVAC, lighting, and building envelope products are excluded) for 50% (by rated-power) of the total ENERGY STAR eligible products in the project. Projects outside the U.S. may use a performance equivalent to ENERGY STAR.

#### **Option 1. Tenant-level energy simulation**

Demonstrate a 3% improvement in the proposed performance rating compared with the baseline performance rating for portions of the building within the tenant's scope of work. Calculate the baseline according to ANSI/ASHRAE/IESNA Standard 90.1-2010, Appendix G, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.), using a simulation model for all tenant project energy use.

Projects must meet the minimum percentage savings before application of renewable

energy systems.

The proposed design must meet the following criteria:

- compliance with the mandatory provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata, or a USGBC-approved equivalent standard for projects outside the U.S.);
- inclusion of all energy consumption and costs within and associated with the tenant project; and
- comparison against a baseline tenant project that complies with Standard 90.1-2010, Appendix G, with errata but without addenda (or a USGBC-approved equivalent standard outside the U.S.).

Exception: the baseline project envelope must be modeled according to Table G3.1(5) (baseline), Sections a–e, and not Section f.

Document the energy modeling input assumptions for unregulated loads. Unregulated loads should be modeled accurately to reflect the actual expected energy consumption of the tenant project.

If unregulated loads are not identical for both the baseline and the proposed performance ratings, and the simulation program cannot accurately model the savings, follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2010, G2.5). Alternatively, use the COMNET modeling guidelines and procedures to document measures that reduce unregulated loads.

For Option 1, Tenant-Level Energy Simulation, process loads for retail may include refrigeration equipment, cooking and food preparation, clothes washing, and other major support appliances. Many of the industry standard baseline conditions for commercial kitchen equipment and refrigeration are defined in Appendix 3, Tables 1–4. No additional documentation is necessary to substantiate these predefined baseline systems as industry standard.

**OR**

#### **Option 2. Prescriptive compliance**

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.).

- Reduce connected lighting power density by 5% below ASHRAE 90.1-2010 using the space-by-space method or by applying the whole-building lighting power allowance to the entire tenant space.
- Install ENERGY STAR appliances, office equipment, electronics, and commercial food service equipment (HVAC, lighting, and building envelope products are excluded) for 50% (by rated-power) of the total ENERGY STAR eligible products in the project. Projects outside the U.S. may use a performance equivalent to ENERGY STAR.

The requirements apply to 90% of the total building floor area (rounded up to the next whole building) of all nonresidential buildings, mixed-use buildings, and multiunit residential buildings four stories or more constructed as part of the project or undergoing major renovations as part of the project. Each counted building must comply with one of the following options.

#### **Option 1. Whole-building energy simulation**

Demonstrate an average improvement of 5% for new buildings, 3% for major building renovations, or 2% for core and shell buildings over ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.) across all buildings pursuing Option 1. Multiple buildings may be grouped into a single energy model, provided (1) the building type (new construction, major renovation, or core and shell) is consistent for all buildings included in the energy model, or (2) an average 5% improvement is demonstrated for the entire energy model. Calculate the baseline building performance according to ANSI/ASHRAE/IESNA Standard 90.1-2010, Appendix G, with errata, using a simulation model.

Buildings must meet the minimum percentage savings before taking credit for renewable energy systems.

Each building's proposed design must meet the following criteria:

- compliance with the mandatory provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.);
- inclusion of all energy consumption and costs within and associated with the building project; and
- comparison against a baseline building that complies with Standard 90.1-2010, Appendix G, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.).

Document the energy modeling input assumptions for unregulated loads. Unregulated loads should be modeled accurately to reflect the actual expected energy consumption of the building.

If unregulated loads are not identical for both the baseline and the proposed building performance rating, follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1-2010, G2.5) or use the COMNET modeling guidelines and procedures to document measures that reduce unregulated loads.

## **OR**

### **Option 2. Prescriptive compliance: ASHRAE 50% Advanced Energy Design Guide**

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.).

Comply with HVAC and service water heating requirements applicable to the each building, including equipment efficiency, economizers, ventilation, and ducts and dampers, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone:

- ASHRAE 50% Advanced Energy Design Guide for Small to Medium Office Buildings, for office buildings smaller than 100,000 square feet (9 290 square meters);
  - ASHRAE 50% Advanced Energy Design Guide for Medium to Large Box Retail Buildings, for retail buildings with 20,000 to 100,000 square feet (1 860 to 9 290 square meters);
  - ASHRAE 50% Advanced Energy Design Guide for K-12 School Buildings; or
  - ASHRAE 50% Advanced Energy Design Guide for Large Hospitals.
- Over 100,000 square feet (9 290 square meters)

For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

### **Option 3. Prescriptive compliance: Advanced Buildings Core Performance Guide**

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or USGBC approved equivalent standard for projects outside the U.S.).

Comply with Section 1: Design Process Strategies, Section 2: Core Performance Requirements, and the following three strategies from Section 3: Enhanced Performance Strategies, as applicable. Where standards conflict, follow the more stringent of the two. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

3.5 Supply Air Temperature Reset (VAV)  
3.9 Premium Economizer Performance  
3.10 Variable Speed Control

To be eligible for Option 3, the project must be less than 100,000 square feet (9 290 square meters).

Note: Healthcare, Warehouse or Laboratory projects are ineligible for Option 3.

## **AND**

For new single-family residential buildings and new multiunit residential buildings three stories or fewer, 90% of the buildings must meet the requirements of LEED for Homes v4 EA Prerequisite: Minimum Energy Performance.

## **Establishment**

Calibrate meters within the manufacturer's recommended interval if the building owner, management organization, or tenant owns the meter. Meters owned by third parties (e.g., utilities or governments) are exempt.

## **Performance**

Meter the building's energy use for a full 12 months of continuous operation and achieve the levels of efficiency set forth in the options below. Each building's energy performance must be based on actual metered energy consumption for both the LEED project building(s) and all comparable buildings used for the benchmark.

### **Case 1. ENERGY STAR Rating**

For buildings eligible to receive an energy performance rating using the Environmental Protection Agency (EPA) ENERGY STAR® Portfolio Manager tool, achieve an energy performance rating of at least 75. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

### **Case 2. Projects not eligible for ENERGY STAR Rating**



Projects not eligible to use EPA's rating system may compare their buildings' energy performance with that of comparable buildings, using national averages or actual buildings, or with the previous performance of the project building.

### **Establishment**

None.

### **Performance**

Demonstrate increased energy efficiency or efficiency improvement beyond EA Prerequisite Minimum Energy Performance as described below. Each building must provide actual metered energy data. A full 12 months of continuous energy data is required.

#### **Case 1. ENERGY STAR Rating (1-20 points)**

For buildings eligible to receive an energy performance rating using the EPA ENERGY STAR's Portfolio Manager tool, points are awarded for ENERGY STAR scores above 75, according to Table 1. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

**Table 1. Points for ENERGY STAR performance ratings**

ENERGY STAR rating	Points
76	3
77	4
78	5
79	6
80	7
81	8
82	9
83	10
84	11
85	12
86	13
87	14
88	15
89	16
90	17
91	18
93	19
95	20

#### **Case 2. Projects not eligible for ENERGY STAR Rating**

Projects not eligible to use EPA's rating system may compare their buildings' energy performance with that of comparable buildings, using national averages or actual buildings, or with the previous performance of the project building.

Establish an energy performance target no later than the schematic design phase. The target must be established as kBtu per square foot-year (kW per square meter-year) of source energy use.

Choose one of the options below.

#### **Option 1. Whole-building energy simulation (1-18 points except Schools and Healthcare, 1-16 points Schools, 1-20 points Healthcare)**

Analyze efficiency measures during the design process and account for the results in design decision making. Use energy simulation of efficiency opportunities, past energy simulation analyses for similar buildings, or published data (e.g., Advanced Energy Design Guides) from analyses for similar buildings.

Analyze efficiency measures, focusing on load reduction and HVAC-related strategies

(passive measures are acceptable) appropriate for the facility. Project potential energy savings and holistic project cost implications related to all affected systems.

Project teams pursuing the Integrative Process credit must complete the basic energy analysis for that credit before conducting the energy simulation.

Follow the criteria in EA Prerequisite Minimum Energy Performance to demonstrate a percentage improvement in the proposed building performance rating compared with the baseline. Points are awarded according to Table 1.

**Table 1. Points for percentage improvement in energy performance**

New Construction	Major Renovation	Core and Shell	Points (except Schools, Healthcare)	Points Healthcare	Points Schools
6%	4%	3%	1	3	1
8%	6%	5%	2	4	2
10%	8%	7%	3	5	3
12%	10%	9%	4	6	4
14%	12%	11%	5	7	5
16%	14%	13%	6	8	6
18%	16%	15%	7	9	7
20%	18%	17%	8	10	8
22%	20%	19%	9	11	9
24%	22%	21%	10	12	10
26%	24%	23%	11	13	11
29%	27%	26%	12	14	12
32%	30%	29%	13	15	13
35%	33%	32%	14	16	14
38%	36%	35%	15	17	15
42%	40%	39%	16	18	16
46%	44%	43%	17	19	-
50%	48%	47%	18	20	-

**OR**

**Option 2. Prescriptive compliance: ASHRAE Advanced Energy Design Guide (1-6 points)**

To be eligible for Option 2, projects must use Option 2 in EA Prerequisite Minimum Energy Performance.

Implement and document compliance with the applicable recommendations and standards in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

**ASHRAE 50% Advanced Energy Design Guide for Small to Medium Office Buildings**

- Building envelope, opaque: roofs, walls, floors, slabs, doors, and continuous air barriers (1 point)
- Building envelope, glazing: vertical fenestration (1 point)
- Interior lighting, including daylighting and interior finishes (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment and controls (1 point)

**ASHRAE 50% Advanced Energy Design Guide for Medium to Large Box Retail Buildings**

- Building envelope, opaque: roofs, walls, floors, slabs, doors, and vestibules (1 point)
- Building envelope, glazing: fenestration - all orientations (1 point)
- Interior lighting, excluding lighting power density for sales floor (1 point)
- Additional interior lighting for sales floor (1 point)

- Exterior lighting (1 point)
- Plug loads, including equipment choices and controls (1 point)

### ASHRAE 50% Advanced Energy Design Guide for K-12 School Buildings

- Building envelope, opaque: roofs, walls, floors, slabs, and doors (1 point)
- Building envelope, glazing: vertical fenestration (1 point)
- Interior lighting, including daylighting and interior finishes (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment choices, controls, and kitchen equipment (1 point)

### ASHRAE 50% Advanced Energy Design Guide for Large Hospitals

- Building envelope, opaque: roofs, walls, floors, slabs, doors, vestibules, and continuous air barriers (1 point)
- Building envelope, glazing: vertical fenestration (1 point)
- Interior lighting, including daylighting (form or nonform driven) and interior finishes (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment choices, controls, and kitchen equipment (1 point)

Establish an energy performance target no later than the schematic design phase. The target must be established as kBtu per square foot-year (kW per square meter-year) of source energy use.

Choose one of the options below.

#### Option 1. Whole-building energy simulation (1-18 points except Schools and Healthcare, 1-16 points Schools, 1-20 points Healthcare)

Analyze efficiency measures during the design process and account for the results in design decision making. Use energy simulation of efficiency opportunities, past energy simulation analyses for similar buildings, or published data (e.g., Advanced Energy Design Guides) from analyses for similar buildings.

Analyze efficiency measures, focusing on load reduction and HVAC-related strategies (passive measures are acceptable) appropriate for the facility. Project potential energy savings and holistic project cost implications related to all affected systems.

Project teams pursuing the Integrative Process credit must complete the basic energy analysis for that credit before conducting the energy simulation.

Follow the criteria in EA Prerequisite Minimum Energy Performance to demonstrate a percentage improvement in the proposed building performance rating compared with the baseline. Points are awarded according to Table 1.

**Table 1. Points for percentage improvement in energy performance**

New Construction	Major Renovation	Core and Shell	Points (except Schools, Healthcare)	Points Healthcare	Points Schools
6%	4%	3%	1	3	1
8%	6%	5%	2	4	2
10%	8%	7%	3	5	3
12%	10%	9%	4	6	4
14%	12%	11%	5	7	5
16%	14%	13%	6	8	6
18%	16%	15%	7	9	7
20%	18%	17%	8	10	8
22%	20%	19%	9	11	9
24%	22%	21%	10	12	10
26%	24%	23%	11	13	11
29%	27%	26%	12	14	12
32%	30%	29%	13	15	13
35%	33%	32%	14	16	14
38%	36%	35%	15	17	15
42%	40%	39%	16	18	16

46%	44%	43%	17	19	-
50%	48%	47%	18	20	-

## OR

### Option 2. Prescriptive compliance: ASHRAE Advanced Energy Design Guide (1-6 points)

To be eligible for Option 2, projects must use Option 2 in EA Prerequisite Minimum Energy Performance.

Implement and document compliance with the applicable recommendations and standards in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

#### ASHRAE 50% Advanced Energy Design Guide for Small to Medium Office Buildings

- Building envelope, opaque: roofs, walls, floors, slabs, doors, and continuous air barriers (1 point)
- Building envelope, glazing: vertical fenestration (1 point)
- Interior lighting, including daylighting and interior finishes (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment and controls (1 point)

#### ASHRAE 50% Advanced Energy Design Guide for Medium to Large Box Retail Buildings

- Building envelope, opaque: roofs, walls, floors, slabs, doors, and vestibules (1 point)
- Building envelope, glazing: fenestration - all orientations (1 point)
- Interior lighting, excluding lighting power density for sales floor (1 point)
- Additional interior lighting for sales floor (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment choices and controls (1 point)

#### ASHRAE 50% Advanced Energy Design Guide for K-12 School Buildings

- Building envelope, opaque: roofs, walls, floors, slabs, and doors (1 point)
- Building envelope, glazing: vertical fenestration (1 point)
- Interior lighting, including daylighting and interior finishes (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment choices, controls, and kitchen equipment (1 point)

#### ASHRAE 50% Advanced Energy Design Guide for Large Hospitals

- Building envelope, opaque: roofs, walls, floors, slabs, doors, vestibules, and continuous air barriers (1 point)
- Building envelope, glazing: vertical fenestration (1 point)
- Interior lighting, including daylighting (form or nonform driven) and interior finishes (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment choices, controls, and kitchen equipment (1 point)

Establish an energy performance target no later than the schematic design phase. The target must be established as kBtu per square foot-year (kW per square meter-year) of source energy use.

Choose one of the options below.

### Option 1. Whole-building energy simulation (1-18 points except Schools and Healthcare, 1-16 points Schools, 1-20 points Healthcare)

Analyze efficiency measures during the design process and account for the results in design decision making. Use energy simulation of efficiency opportunities, past energy simulation analyses for similar buildings, or published data (e.g., Advanced Energy Design Guides) from analyses for similar buildings.

Analyze efficiency measures, focusing on load reduction and HVAC-related strategies (passive measures are acceptable) appropriate for the facility. Project potential energy savings and holistic project cost implications related to all affected systems.

Project teams pursuing the Integrative Process credit must complete the basic energy analysis for that credit before conducting the energy simulation.

Follow the criteria in EA Prerequisite Minimum Energy Performance to demonstrate a

percentage improvement in the proposed building performance rating compared with the baseline. Points are awarded according to Table 1.

**Table 1. Points for percentage improvement in energy performance**

New Construction	Major Renovation	Core and Shell	Points (except Schools, Healthcare)	Points Healthcare	Points Schools
6%	4%	3%	1	3	1
8%	6%	5%	2	4	2
10%	8%	7%	3	5	3
12%	10%	9%	4	6	4
14%	12%	11%	5	7	5
16%	14%	13%	6	8	6
18%	16%	15%	7	9	7
20%	18%	17%	8	10	8
22%	20%	19%	9	11	9
24%	22%	21%	10	12	10
26%	24%	23%	11	13	11
29%	27%	26%	12	14	12
32%	30%	29%	13	15	13
35%	33%	32%	14	16	14
38%	36%	35%	15	17	15
42%	40%	39%	16	18	16
46%	44%	43%	17	19	-
50%	48%	47%	18	20	-

**OR**

**Option 2. Prescriptive compliance: ASHRAE Advanced Energy Design Guide (1-6 points)**

To be eligible for Option 2, projects must use Option 2 in EA Prerequisite Minimum Energy Performance.

Implement and document compliance with the applicable recommendations and standards in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

**ASHRAE 50% Advanced Energy Design Guide for Small to Medium Office Buildings**

- Building envelope, opaque: roofs, walls, floors, slabs, doors, and continuous air barriers (1 point)
- Building envelope, glazing: vertical fenestration (1 point)
- Interior lighting, including daylighting and interior finishes (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment and controls (1 point)

**ASHRAE 50% Advanced Energy Design Guide for Medium to Large Box Retail Buildings**

- Building envelope, opaque: roofs, walls, floors, slabs, doors, and vestibules (1 point)
- Building envelope, glazing: fenestration - all orientations (1 point)
- Interior lighting, excluding lighting power density for sales floor (1 point)
- Additional interior lighting for sales floor (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment choices and controls (1 point)

**ASHRAE 50% Advanced Energy Design Guide for K-12 School Buildings**

- Building envelope, opaque: roofs, walls, floors, slabs, and doors (1 point)
- Building envelope, glazing: vertical fenestration (1 point)

- Interior lighting, including daylighting and interior finishes (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment choices, controls, and kitchen equipment (1 point)

### ASHRAE 50% Advanced Energy Design Guide for Large Hospitals

- Building envelope, opaque: roofs, walls, floors, slabs, doors, vestibules, and continuous air barriers (1 point)
- Building envelope, glazing: vertical fenestration (1 point)
- Interior lighting, including daylighting (form or nonform driven) and interior finishes (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment choices, controls, and kitchen equipment (1 point)

Establish an energy performance target no later than the schematic design phase. The target must be established as kBtu per square foot-year (kW per square meter-year) of source energy use.

Choose one of the options below.

#### Option 1. Whole-building energy simulation (1-18 points except Schools and Healthcare, 1-16 points Schools, 1-20 points Healthcare)

Analyze efficiency measures during the design process and account for the results in design decision making. Use energy simulation of efficiency opportunities, past energy simulation analyses for similar buildings, or published data (e.g., Advanced Energy Design Guides) from analyses for similar buildings.

Analyze efficiency measures, focusing on load reduction and HVAC-related strategies (passive measures are acceptable) appropriate for the facility. Project potential energy savings and holistic project cost implications related to all affected systems.

Project teams pursuing the Integrative Process credit must complete the basic energy analysis for that credit before conducting the energy simulation.

Follow the criteria in EA Prerequisite Minimum Energy Performance to demonstrate a percentage improvement in the proposed building performance rating compared with the baseline. Points are awarded according to Table 1.

**Table 1. Points for percentage improvement in energy performance**

New Construction	Major Renovation	Core and Shell	Points (except Schools, Healthcare)	Points Healthcare	Points Schools
6%	4%	3%	1	3	1
8%	6%	5%	2	4	2
10%	8%	7%	3	5	3
12%	10%	9%	4	6	4
14%	12%	11%	5	7	5
16%	14%	13%	6	8	6
18%	16%	15%	7	9	7
20%	18%	17%	8	10	8
22%	20%	19%	9	11	9
24%	22%	21%	10	12	10
26%	24%	23%	11	13	11
29%	27%	26%	12	14	12
32%	30%	29%	13	15	13
35%	33%	32%	14	16	14
38%	36%	35%	15	17	15
42%	40%	39%	16	18	16
46%	44%	43%	17	19	-
50%	48%	47%	18	20	-

For all process loads, define a clear baseline for comparison with the proposed improvements. The baselines in Appendix 3, Tables 1-4, represent industry standards

and may be used without additional documentation. Calculate the baseline and design as follows:

- Appliances and equipment. For appliances and equipment not covered in Tables 1–4, indicate hourly energy use for proposed and budget equipment, along with estimated daily use hours. Use the total estimated appliance/equipment energy use in the energy simulation model as a plug load. Reduced use time (schedule change) is not a category of energy improvement in this credit. ENERGY STAR ratings and evaluations are a valid basis for performing this calculation.
- Display lighting. For display lighting, use the space-by-space method of determining allowed lighting power under ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.), to determine the appropriate baseline for both the general building space and the display lighting.
- Refrigeration. For hard-wired refrigeration loads, model the effect of energy performance improvements with a simulation program designed to account for refrigeration equipment.

## OR

### **Option 2. Prescriptive compliance: ASHRAE Advanced Energy Design Guide (1–6 points)**

To be eligible for Option 2, projects must use Option 2 in EA Prerequisite Minimum Energy Performance.

Implement and document compliance with the applicable recommendations and standards in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1–2010, Appendixes B and D, to determine the appropriate climate zone.

#### **ASHRAE 50% Advanced Energy Design Guide for Small to Medium Office Buildings**

- Building envelope, opaque: roofs, walls, floors, slabs, doors, and continuous air barriers (1 point)
- Building envelope, glazing: vertical fenestration (1 point)
- Interior lighting, including daylighting and interior finishes (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment and controls (1 point)

#### **ASHRAE 50% Advanced Energy Design Guide for Medium to Large Box Retail Buildings**

- Building envelope, opaque: roofs, walls, floors, slabs, doors, and vestibules (1 point)
- Building envelope, glazing: fenestration - all orientations (1 point)
- Interior lighting, excluding lighting power density for sales floor (1 point)
- Additional interior lighting for sales floor (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment choices and controls (1 point)

#### **ASHRAE 50% Advanced Energy Design Guide for K–12 School Buildings**

- Building envelope, opaque: roofs, walls, floors, slabs, and doors (1 point)
- Building envelope, glazing: vertical fenestration (1 point)
- Interior lighting, including daylighting and interior finishes (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment choices, controls, and kitchen equipment (1 point)

#### **ASHRAE 50% Advanced Energy Design Guide for Large Hospitals**

- Building envelope, opaque: roofs, walls, floors, slabs, doors, vestibules, and continuous air barriers (1 point)
- Building envelope, glazing: vertical fenestration (1 point)
- Interior lighting, including daylighting (form or nonform driven) and interior finishes (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment choices, controls, and kitchen equipment (1 point)

Meet the requirements of Option 2 and comply with the prescriptive measures in Appendix 3, Tables 1–4, for 90% of total energy consumption for all process equipment.

For all process loads, define a clear baseline to compare with proposed improvements. The baselines in Appendix 3, Tables 1–4, represent industry standards and may be used without additional documentation. Calculate the baseline and design as follows:

- Appliances and equipment. For appliances and equipment not covered in Appendix 3, Tables 1–4 indicate hourly energy use for proposed and budget equipment, along with estimated daily use hours. Use the total estimated appliance/equipment energy use in the energy simulation model as a plug load. Reduced use time (schedule change) is not a category of energy improvement in this credit.

ENERGY STAR ratings and evaluations are a valid basis for performing this calculation.

- Display lighting. For display lighting, use the space by space method of determining allowed lighting power under ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.), to determine the appropriate baseline for both the general building space and the display lighting.
- Refrigeration. For hard-wired refrigeration loads, model the effect of energy performance improvements with a simulation program designed to account for refrigeration equipment.

Meet the requirements of Option 2 and comply with the prescriptive measures in Appendix 3, Tables 1-4, for 90% of total energy consumption for all process equipment.

### Whole-Building Energy Simulation

Analyze efficiency measures focused on IT load reduction and HVAC-related strategies (air-side economizers, hot aisle-cold aisle, etc.). Project the potential energy savings and cost implications for all affected systems.

Follow the criteria in EA Prerequisite Minimum Energy Performance to demonstrate a percentage improvement in the proposed performance rating compared with the baseline.

Use energy cost savings from both the building and IT to determine the total percentage reduction.

**Table 1. Points for percentage improvement in energy performance**

New Construction	Major Renovation	Core and Shell	Points (except Schools, Healthcare)	Points Healthcare	Points Schools
6%	4%	3%	1	3	1
8%	6%	5%	2	4	2
10%	8%	7%	3	5	3
12%	10%	9%	4	6	4
14%	12%	11%	5	7	5
16%	14%	13%	6	8	6
18%	16%	15%	7	9	7
20%	18%	17%	8	10	8
22%	20%	19%	9	11	9
24%	22%	21%	10	12	10
26%	24%	23%	11	13	11
29%	27%	26%	12	14	12
32%	30%	29%	13	15	13
35%	33%	32%	14	16	14
38%	36%	35%	15	17	15
42%	40%	39%	16	18	16
46%	44%	43%	17	19	-
50%	48%	47%	18	20	-

Establish an energy performance target no later than the schematic design phase. The target must be established as kBtu per square foot-year (kW per square meter-year) of source energy use.

Choose one of the options below.

### Option 1. Tenant-level energy simulation (1-25 points)

Analyze efficiency measures during the design process and account for the results in design decision-making. Analysis can include energy simulation of efficiency opportunities, energy simulation analyses for similar projects, or published data from energy analyses performed for similar projects (such as AEDGs).

Analyze efficiency measures focused on load reduction and HVAC-related strategies; passive measures are acceptable. Project the potential energy savings and cost implications for all affected systems.



Follow the criteria in EA Prerequisite Minimum Energy Performance to demonstrate a percentage improvement in the proposed tenant project performance rating compared with the baseline.

**Table 1. Points for percentage improvement in energy performance**

Interior construction	Points
4%	4
5%	6
6%	8
7%	10
8%	11
9%	12
10%	13
11%	14
12%	15
13%	16
14%	17
15%	18
16%	19
17%	20
18%	21
20%	22
22%	23
24%	24
28%	25

**OR**

**Option 2. Prescriptive compliance (1-16 points)**

Use any combination of the strategies in any or all of the categories below.

For base building systems that serve the project, as well as any applicable improvements that are part of the project, implement and document compliance with the applicable recommendations and standards (except for measurement and verification) in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone . For projects outside the United States, consult ASHRAE/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

**Building Envelope (2-4 points)**

▫ Building Envelope, Opaque (2 points)

Comply with the recommendations in ASHRAE 50% Advanced Energy Design Guide for all roofs, walls, floors, slabs, doors, vestibules, and continuous air barriers.

▫ Building Envelope, Glazing (2 points)

Comply with the recommendations in ASHRAE 50% Advanced Energy Design Guide for all vertical fenestration.

**HVAC Systems (4 points)**

▫ HVAC Equipment Efficiency (2 points)

For all base building HVAC systems that serve the project, comply with the recommendations in ASHRAE 50% Advanced Energy Design Guide.

▫ HVAC Zoning and Controls (2 points)

For the tenant fit-out of spaces, provide a separate control zone for each solar exposure and interior space. Provide controls capable of sensing space conditions and modulating the HVAC system in response to space demand for all private offices and other enclosed spaces (e.g., conference rooms, classrooms).

## Interior Lighting Power (1-4 points)

### ▫ Lighting Power Density (1-4 points)

Reduce connected lighting power density below that allowed by ASHRAE/IESNA Standard 90.1-2010, either using the space-by-space method or applying the whole-building lighting power allowance to the entire tenant space. Points are awarded according to Table 2.

**Table 2. Points for percentage reduction in lighting power density**

Percentage below standard LPD	Points
10%	1
15%	2
20%	3
25%	4

## Interior Lighting Controls (1-2 points)

### ▫ Daylighting Controls (1 point)

Install daylight-responsive controls in all regularly occupied daylit spaces within 15 feet (4.5 meters) of windows and under skylights for at least 25% of the connected lighting load. Daylight controls must switch or dim electric lights in response to daylight illumination in the space.

### ▫ Occupancy Sensor Lighting Controls (1 point)

Install occupancy sensors for at least 75% of the connected lighting load.

## Equipment and Appliances (1-2 points)

### ▫ ENERGY STAR Equipment and Appliances (1-2 points)

Install ENERGY STAR appliances, office equipment, electronics, and commercial food service equipment (HVAC, lighting, and building envelope products are excluded from this credit) or performance equivalent for projects outside the U.S.. Calculate their percentage of the total (by rated-power) ENERGY STAR-eligible products in the project. Points are awarded according to Table 3.

**Table 3. Points for installing ENERGY STAR equipment and appliances**

Percentage of ENERGY STAR products	Points
70%	1
90%	2

Establish an energy performance target no later than the schematic design phase. The target must be established as kBtu per square foot-year (kW per square meter-year) of source energy use.

Choose one of the options below.

### Option 1. Tenant-level energy simulation (1-25 points)

Analyze efficiency measures during the design process and account for the results in design decision-making. Analysis can include energy simulation of efficiency opportunities, energy simulation analyses for similar projects, or published data from energy analyses performed for similar projects (such as AEDGs).

Analyze efficiency measures focused on load reduction and HVAC-related strategies; passive measures are acceptable. Project the potential energy savings and cost implications for all affected systems.

Follow the criteria in EA Prerequisite Minimum Energy Performance to demonstrate a percentage improvement in the proposed tenant project performance rating compared with the baseline.

**Table 1. Points for percentage improvement in energy performance**

Interior construction	Points
4%	4
5%	6
6%	8
7%	10

8%	11
9%	12
10%	13
11%	14
12%	15
13%	16
14%	17
15%	18
16%	19
17%	20
18%	21
20%	22
22%	23
24%	24
28%	25

For all process loads, define a clear baseline to compare with proposed improvements. The baselines in Appendix 3, Tables 1–4, represent industry standards and may be used without additional documentation. Calculate the baseline and design as follows:

- Appliances and equipment. For appliances and equipment not covered in Appendix 3, Tables 1–4 indicate hourly energy use for proposed and budget equipment, along with estimated daily use hours. Use the total estimated appliance/equipment energy use in the energy simulation model as a plug load. Reduced use time (schedule change) is not a category of energy improvement in this credit. ENERGY STAR ratings and evaluations are a valid basis for performing this calculation.
- Display lighting. For display lighting, use the space by space method of determining allowed lighting power under ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.), to determine the appropriate baseline for both the general building space and the display lighting.
- Refrigeration. For hard-wired refrigeration loads, model the effect of energy performance improvements with a simulation program designed to account for refrigeration equipment.

## OR

### Option 2. Prescriptive compliance (1–16 points)

Use any combination of the strategies in any or all of the categories below.

For base building systems that serve the project, as well as any applicable improvements that are part of the project, implement and document compliance with the applicable recommendations and standards (except for measurement and verification) in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone. For projects outside the United States, consult ASHRAE/ASHRAE/IESNA Standard 90.1–2010, Appendixes B and D, to determine the appropriate climate zone.

#### Building Envelope (2–4 points)

- Building Envelope, Opaque (2 points)

Comply with the recommendations in ASHRAE 50% Advanced Energy Design Guide for all roofs, walls, floors, slabs, doors, vestibules, and continuous air barriers.

- Building Envelope, Glazing (2 points)

Comply with the recommendations in ASHRAE 50% Advanced Energy Design Guide for all vertical fenestration.

#### HVAC Systems (4 points)

- HVAC Equipment Efficiency (2 points)

For all base building HVAC systems that serve the project, comply with the recommendations in ASHRAE 50% Advanced Energy Design Guide.

- HVAC Zoning and Controls (2 points)

For the tenant fit-out of spaces, provide a separate control zone for each solar exposure and interior space. Provide controls capable of sensing space conditions and

modulating the HVAC system in response to space demand for all private offices and other enclosed spaces (e.g., conference rooms, classrooms).

### Interior Lighting Power (1-4 points)

#### ▫ Lighting Power Density (1-4 points)

Reduce connected lighting power density below that allowed by ASHRAE/IESNA Standard 90.1-2010, either using the space-by-space method or applying the whole-building lighting power allowance to the entire tenant space. Points are awarded according to Table 2.

**Table 2. Points for percentage reduction in lighting power density**

Percentage below standard LPD	Points
10%	1
15%	2
20%	3
25%	4

### Interior Lighting Controls (1-2 points)

#### ▫ Daylighting Controls (1 point)

Install daylight-responsive controls in all regularly occupied daylit spaces within 15 feet (4.5 meters) of windows and under skylights for at least 25% of the connected lighting load. Daylight controls must switch or dim electric lights in response to daylight illumination in the space.

#### ▫ Occupancy Sensor Lighting Controls (1 point)

Install occupancy sensors for at least 75% of the connected lighting load.

### Equipment and Appliances (1-2 points)

#### ▫ ENERGY STAR Equipment and Appliances (1-2 points)

Install ENERGY STAR appliances, office equipment, electronics, and commercial food service equipment (HVAC, lighting, and building envelope products are excluded from this credit) or performance equivalent for projects outside the U.S.. Calculate their percentage of the total (by rated-power) ENERGY STAR-eligible products in the project. Points are awarded according to Table 3.

**Table 3. Points for installing ENERGY STAR equipment and appliances**

Percentage of ENERGY STAR products	Points
70%	1
90%	2

Meet the requirements of Option 2 and comply with the prescriptive measures in Appendix 3, Tables 1-4, for 90% of total energy consumption for all process equipment.

The requirements apply to 90% of the total building floor area (rounded up to the next whole building) of all nonresidential buildings, mixed-use buildings, and multiunit residential buildings four stories or more constructed as part of the project or undergoing major renovations as part of the project.

Each counted building must comply with one of the following efficiency options.

#### **Option 1. Whole-building energy simulation (1-2 points)**

New buildings must demonstrate an average percentage improvement of 12% (1 point) or 20% (2 points) over ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata. Buildings undergoing major renovations as part of the project must demonstrate an average percentage improvement of 10% (1 point) or 18% (2 points). Core and shell buildings must demonstrate an average percentage improvement of 11% (1 point) or 15% (2 points). To determine percentage improvement, follow the method outlined in GIB Prerequisite Minimum Building Energy Performance.

**OR**

#### **Option 2. Prescriptive compliance: ASHRAE 50% Advanced Energy Design Guide (2 points)**

To be eligible for Option 2, project must comply with all of requirements of Option 2 in GIB Prerequisite Minimum Building Energy Performance.

**AND**

Comply with the applicable recommendations and standards in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

#### **ASHRAE 50% Advanced Energy Design Guide for Small to Medium Office Buildings**

- Building envelope, opaque: roofs, walls, floors, slabs, doors, and continuous air barriers
- Building envelope, glazing: vertical fenestration
- Interior lighting, including daylighting and interior finishes
- Exterior lighting
- Plug loads, including equipment and controls

#### **ASHRAE 50% Advanced Energy Design Guide for Medium to Large Box Retail Buildings**

- Building envelope, opaque: roofs, walls, floors, slabs, doors, and vestibules
- Building envelope, glazing: fenestration - all orientations
- Interior lighting, excluding lighting power density for sales floor
- Additional interior lighting for sales floor
- Exterior lighting
- Plug loads, including equipment choices and controls

#### **ASHRAE 50% Advanced Energy Design Guide for K-12 School Buildings**

- Building envelope, opaque: roofs, walls, floors, slabs, and doors
- Building envelope, glazing: vertical fenestration
- Interior lighting, including daylighting and interior finishes
- Exterior lighting
- Plug loads, including equipment choices, controls, and kitchen equipment

#### **ASHRAE 50% Advanced Design Guide for Large Hospitals**

- Building envelope, opaque: roofs, walls, floors, slabs, doors, vestibules, and continuous air barriers
- Building envelope, glazing: vertical fenestration
- Interior lighting, including daylighting (form or nonform driven) and interior finishes
- Exterior lighting
- Plug loads, including equipment choices, controls, and kitchen equipment

For new single-family residential buildings and new multiunit residential buildings three stories or fewer, 90% of the buildings must reduce absolute estimated annual energy usage by 20% compared with the LEED index target for each building. Follow the method outlined in LEED v4 for Homes, EA Credit Annual Energy Use.