



# State of Tennessee

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# State of Tennessee

## High Performance Building Requirements (HPBr)

*presented by*

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<http://www.tn.gov/finance/OSA/>

and

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# THE STATE IS INTERESTED IN:

Considering any items which may achieve a higher and better use of taxpayer dollars spent on improvements to real property

Items which:

- create greater owner value

**And**

- will lower the State's total cost of ownership through
  - more efficient and effective design, construction and operational processes
  - the realization of higher performing buildings throughout their entire life cycle

# THE STATE'S PORTFOLIO NEEDS TO INCLUDE:

Designed, built or renovated projects which

- Cost very little or no more initially to construct or renovate than the industry's average

**And**

- Are highly energy efficient to operate
- Are able to be well maintained at maintenance costs at rates equal to current private industry standards

# STATE OF TENNESSEE GOALS

The State of TN has goals for more energy efficient buildings, and we have been working diligently for quite a while and in lots of different ways to facilitate achievement of these goals.

The current Sustainable Design Guidelines (SDG) have found limited success statewide and we felt it was time to redefine and elevate the program as the new High Performance Building Requirements (HPBr).

# PRESENTATION OUTLINE

1. Overview of the Tennessee High Performance Building Initiative
2. Development of the Tennessee High Performance Building Requirements (TN HPBr)
3. Major Differences from Sustainable Design Guidelines (SDG)
4. TN HPBr Components
5. TN HPBr Sample Project Walk-Throughs

Part 1

# OVERVIEW OF THE TENNESSEE HIGH PERFORMANCE BUILDING INITIATIVE

# OVERVIEW

## Mission

Develop a framework that promotes the design, construction, and operation of high performance state-owned buildings.

## Objective

The purpose of the TN High Performance Building (HPB) Initiative is to embed a greater economic value within the state building portfolio through reduced operating costs, higher performance, and thus increased sustainability.

Incorporate outcome-based accountability beginning with design and construction and following through to building operations

# OVERVIEW

TN HPBr is a mandatory design, construction and operations tool for all State Building Commission projects

Use in conjunction with Designer and Contractor contracts and other state manuals, standards, and guidelines.

Part 2

# DEVELOPMENT OF THE TENNESSEE HIGH PERFORMANCE BUILDING REQUIREMENTS

# WHY CHANGE THE SDG?

HPBr Builds off the Sustainable Design Guidelines (SDG)

- SDG is LEED-based and new construction oriented

To improve credit alignment with State project scopes of work

- Majority are Capital Maintenance, Renovations and Additions

To increase implementation across all state projects

- Required for all State Building Commission projects

To improve consistency of processes across all Procurement Agencies

# WHY CHANGE THE SDG?

Above average Operating costs in TN State FRF properties

## FY 11/12 FRF (General Government General Office Buildings) Spend Analysis

### Above Industry Standards

Utilities costs	30+%
Repairs and Maintenance costs	63+%

# WHY CHANGE THE SDG?

## Development Process

- An online survey was conducted to assess project experience with SDG
  - The most common critique is that the guidelines do not address the scope for maintenance, renovation and remodeling projects.
- HPB Working Groups
  - Engaged stakeholders within the State Procurement Agencies to develop new credits and revise existing requirements.
  - Participants included UT, TBR, MTSU, TDEC, THEC, STREAM

Part 3

# MAJOR DIFFERENCES IN HPBR FROM SDG

# MAJOR DIFFERENCES BETWEEN HPBr AND SDG

- Project Applicability
- Greater Focus on Cost-Effective, Energy Efficient Design and Performance Monitoring
- Revised Materials and Resources Credits

# PROJECT APPLICABILITY

- The HPBr addresses situations encountered with use of the original SDG where the scope of some building projects were not a good fit for the full application of the sustainability requirements.
- The Project Applicability Tree (within the Owner Project Requirements) defines multiple compliance paths with increasing levels of rigor depending on scope and size of the project.
- Project Applicability to determine the HPBr project path occurs during Pre-Planning or Programming Phase.

# PROJECT APPLICABILITY

## How Does It Affect You?

- It is the Owner's responsibility to use the Project Applicability Tree to identify the HPBr project path best suited for the project.
  - Document in the Owner Project Requirements (OPR ) Project Information Table
  - Document in the Checklist through the 'Applicable to Project' and 'Level' selection
- The OPR informs the Designer and Contractor about project-specific owner requirements:
  - Project Applicability Tree identifies Energy Efficiency credits as Recommended or Required
  - Overview of the commissionable systems
  - HPBr 'Required' credits when applicable to project scope.

# GREATER FOCUS ON COST-EFFECTIVE, ENERGY EFFICIENT DESIGN AND PERFORMANCE MONITORING

- The Commissioning (Cx) requirements have been refined to improve consistency and process delivery across all projects
- Energy Efficient Purchasing Policy
- Energy Modeling and Energy Efficiency credit requirements emphasize a decision-making and goal tracking tool during project design.
- Energy Efficiency in Existing Buildings
- Energy Metering, Monitoring and Reporting
- Life Cycle Cost Analysis to be performed to support project energy efficiency objectives and On-site Renewable Energy goals.

# COMMISSIONING

- The Owner determines the level of Cx for the project
  - Basic Commissioning is performed by Design Engineer of Record
    - Cx requirements are based on project type and the systems impacted.
    - State developed Standards (referenced in the Manual) shall be followed as applicable.
  - Advanced Commissioning is performed by a 3rd Party Commissioning Agent
    - State Commissioning Contract "Attachment 6.6" provides requirements
    - Additional requirements may be added as needed.

# COMMISSIONING

## How Does this Affect You?

- Checklist
  - Removes Credit 1.02-B-1-b: Define Commissioning Scope
  - Revises EE1.1 Basic Commissioning (2 points)
  - Revises EE1.2 Advanced Commissioning (5 points)
- In the OPR, the Owner identifies Basic or Advanced Commissioning or no Commissioning if not applicable to the project scope.

# COMMISSIONING

## How Does this Affect You?

- Basic Commissioning - Design Engineer of Record complies with the applicable state standards listed in the Manual and reviews the OPR with the Owner to align with project objectives.
- Advanced Commissioning – A 3<sup>rd</sup> Party Commissioning Agent performs Cx services in compliance with the State Commissioning Contract “Attachment 6.6” and any specific requirements identified by the Owner.

# COMMISSIONING

## Benefits

- Provides greater assurance to Owner that building systems were installed according to design
- 3<sup>rd</sup> party Commissioning provides independent review of design and installation

# ENERGY EFFICIENT PURCHASING POLICY

- NEW Credit: EE2.1 – Energy Efficient Purchasing Policy
- Purchase and install Energy Star qualified equipment for all eligible equipment types (TCA 12-3-605)

# ENERGY MODELING AND ENERGY EFFICIENCY

- Energy Modeling during Schematic Design was required within SDG for all projects
- In HPBR, energy modeling is required for new construction and existing building projects with >\$3million budget and scope impacting the HVAC system
- Decision making and goal-tracking tool throughout design process
- Iterative process
  - Schematic Design
  - Design Development
  - Construction Documents
- Demonstrate 20% energy cost savings if life-cycle cost effective

# ENERGY MODELING AND ENERGY EFFICIENCY

## How Does this Affect You?

- Checklist changes
  - The revised energy modeling credits (EE3.1, EE3.2 ,EE3.3) replace the following SDG credits
    - 1.02-A-1-d – Building Orientation
    - 1.02-C-2-a – Energy Efficiency of Building Systems: Meet mandatory and prescriptive requirements of ASHRAE Standard 90.1-2007
- In the OPR, the Project Applicability Tree identifies when the Energy Modeling Credits are 'Required' or 'Recommended' based on the project size and complexity.
- The Manual provides detailed Energy Modeling guidance.

# ENERGY MODELING AND ENERGY EFFICIENCY

## EE3.1 Schematic Design Energy Modeling and LCCA (1 point)

- Conducted not later than Schematic Design Phase
- Design assist model to evaluate the following:
  - Load reduction strategies
  - HVAC System Options
  - LCCA results for cost-effectiveness of the HVAC System Options
  - Site- and climate-specific strategies
  - Design considerations: design temperature, operation schedules, peak occupancy, etc.
- Required for New Construction and Renovation / Addition projects >\$3million and impacting HVAC system.
- Report results to the Owner.

# ENERGY MODELING AND ENERGY EFFICIENCY

## EE3.2 Energy Performance and Energy Cost Savings (1 point)

- Design Development Phase Energy Modeling
  - Model the potential benefits of several energy conservation measures
  - Demonstrate energy cost savings of 20% over ASHRAE 90.1-2007 if life cycle cost effective within the project budget.
  - Report results to Owner the results along with a summary of the model inputs and assumptions.
- Construction Document Energy Model
  - Based on 100% CDs
  - Include HVAC and lighting control sequences, equipment capacities and equipment efficiencies.
  - Report results to owner.

# ENERGY MODELING AND ENERGY EFFICIENCY

## EE3.3 Improved Energy Performance and Further Energy Cost Savings (Up to 7 points)

- When a project achieves greater than 20% energy cost savings, additional points will be awarded.
- Higher energy cost savings improves Total Cost of Ownership (TCO)

# ENERGY EFFICIENCY IN EXISTING BUILDINGS

- Four new credits to incentivize energy savings in existing building renovations when energy modeling is not applicable.
  - EE4.1 – Lighting Power Reduction (5 points)
  - EE4.2 – Daylight Harvesting Controls (2 points)
  - EE4.3 – Occupancy sensor-controlled lighting (2 points)
  - EA4.4 – High efficiency HVAC Equipment (2 points)
- The Designer determines credit applicability for project scopes affecting interior lighting and HVAC installation/replacement, respectively.

# ENERGY METERING, MONITORING, AND REPORTING

- Required for projects > \$3 Million
  - Building level metering
- Required for projects >\$20 Million
  - System sub-metering
  - Measurement & Verification Plan
- Otherwise metering “Recommended”

# ENERGY METERING, MONITORING, AND REPORTING

Three new credits replace the SDG Credit 1.02-C-4-a Instrumentation & Measurement

1. EE5.1 Building Level Metering (1 point)
  2. EE5.2 New Construction (3 points)
    - Energy system metering and Measurement & Verification (M&V)
    - Requires energy model calibration to reconcile differences in energy performance
  3. EE5.3 Existing Buildings (3 points)
    - Measures energy savings through either energy model calibration or retro-fit isolation
- The M&V Analyst will develop and implement a M&V Plan
  - M&V Period is at least a continuous 12-month period
  - M&V Analyst will submit a Report at the conclusion of M&V Period.

# ENERGY METERING, MONITORING, AND REPORTING

## EE6.1 Long Term Energy Reporting

- New Credit
- The Owner or project manager shall designate an operations staff member to maintain energy and water consumption in Energy Star Portfolio Manager when the building is in operation.
- Required for New Construction and Renovation / Addition projects >\$3million.
- Recommended Otherwise

# ENERGY METERING, MONITORING, AND REPORTING

## Benefits

- Measures operational energy savings and compares to savings demonstrated in design
- Helps to identify design, construction, and operational issues leading to differences between As-Designed and As-Operated energy savings
- Provides tools to Owner for ongoing performance improvement

# LIFE CYCLE COST ANALYSIS

- Determine the cost-effectiveness of HVAC system options and energy conservation measures (ECMs)
  - EE3.1 Schematic Design Energy Modeling and Life-Cycle Cost Analysis
  - EE3.2 Energy Performance and Energy Cost Savings
- Onsite Renewable Energy Analysis (TCA 4-3-1012)
  - Credit EE7.1 - Investigate Life-Cycle Cost effectiveness of on-site renewable energy

# LIFE CYCLE COST ANALYSIS

- Use free, downloadable BLCC5 software provided by National Institute of Standards and Technology (NIST), or other equivalent methods.
- Use the following parameters:
  - Study Period = 25 years
  - Real Discount Rate = 3% (excluding general inflation)
  - Fuel Cost Escalation Rates = Use most current U.S. DOE projections
  - O&M Costs = include maintenance or replacement costs
  - Salvage (Residual) Value = proportional to remaining effective life at end of study period

# LIFE CYCLE COST ANALYSIS

## Benefits:

- Energy cost savings reduce burden on tax payers and potentially provides more funds for building maintenance and upkeep
- Energy modeling early within design allows project teams to evaluate options quickly and without major design impacts
- Coupling energy efficiency goals with life-cycle cost analysis is a responsible way to achieve higher performing buildings.
- LCCA looks at Total Cost of Ownership issues that would not otherwise be identified (such as maintenance costs, capital renewal, etc.)

# REVISED MATERIALS AND RESOURCES CREDITS

Three new credits added to incentivize use of regional materials and Tennessee produced building products and materials.

- MR3.2 Building materials and products harvested or manufactured in Tennessee (3 points)
- MR3.4 Wood products harvested or manufactured from Tennessee forestlands (3 points)
- MR3.5 Regional materials within 500 mile radius of project site. (1 point)

## Changes to existing credits

- Removed Credit 1.02-D-3-c - Certified Wood
- MR2.1 Construction Waste Management (3 points)
  - Updated point thresholds to 50%, 75% and 95%
- MR3.1 & 3.2 Recycled Content
  - Increased point thresholds to 10% and 20%, respectively

Part 4

# COMPONENTS OF THE HIGH PERFORMANCE BUILDING REQUIREMENTS

# HPBr COMPONENTS

## Manual

### Owner Project Requirements

- Project Applicability Tree
- Cx and HPBr expectations
- Project Information Table

### Checklist

- Checklist/Tracking Form
- Credit Verification Form
- Exemption Form
- One-Time Completion Form
- Materials & Resources Calculator
- Daylight & Views Calculator

# HPBr MANUAL

## How to Use:

- Introduces the HPBr intent, components, and process
- The Manual provides detailed credit requirements and guidance for project teams
- References the standards and protocols that are the basis for credit requirements.
- Use in conjunction with the OPR and the Checklist

# HPBr MANUAL

## Credit Responsibility

- Owner
  - Credit decisions associated with project location, site design, project scope and ongoing operations.
  - Completes the OPR and the initial project Checklist during Programming Phase.
- Designer
  - Tracks design credit criteria and provides updated Checklist to the Owner at the end of each project Phase (Programming, SD, DD, CD, Closeout).
  - Evaluates all HPBr credits for feasibility of implementation in the design.
  - Coordinates design criteria implementation into the design documents.
- Contractor executes credit criteria during construction
  - Records progress of assigned credits
  - Provides required credit documentation.

# HPBr MANUAL

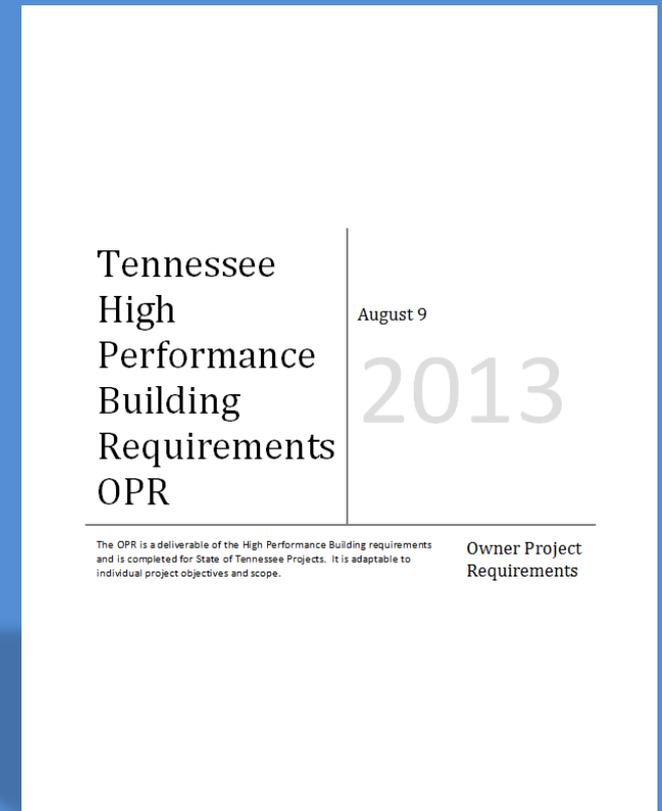
## Credit Categories

- Land Management
- Water Efficiency
- Energy Efficiency
- Materials and Resources
- Indoor Environment Quality
- Innovation in Design and Construction
- Updated from "Tennessee Advancement"

# OWNER PROJECT REQUIREMENTS (OPR)

## Basics

- One of the 3 key documents in the HPBr process (OPR, Checklist, Manual)
- Complete during the Programming Phase or as early as possible
- Outlines the functional requirements and expectations of the building's design and operation
- Project-specific document



# OWNER PROJECT REQUIREMENTS (OPR)

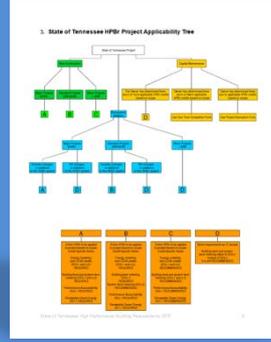
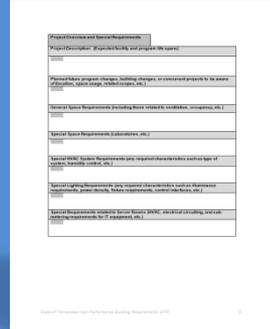
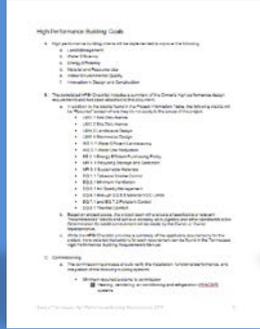
## Roles / Responsibilities

- Initially filled out by Owner or Project Manager
- Updated over the entire project with input from Designer
- The Commissioning Agent (as part of Advanced Cx) will review the design and construction of the building against the requirements set out in the OPR
- Provides a summary to the Project Team on what HPBr credits are expected of them, as well as any other special requirements

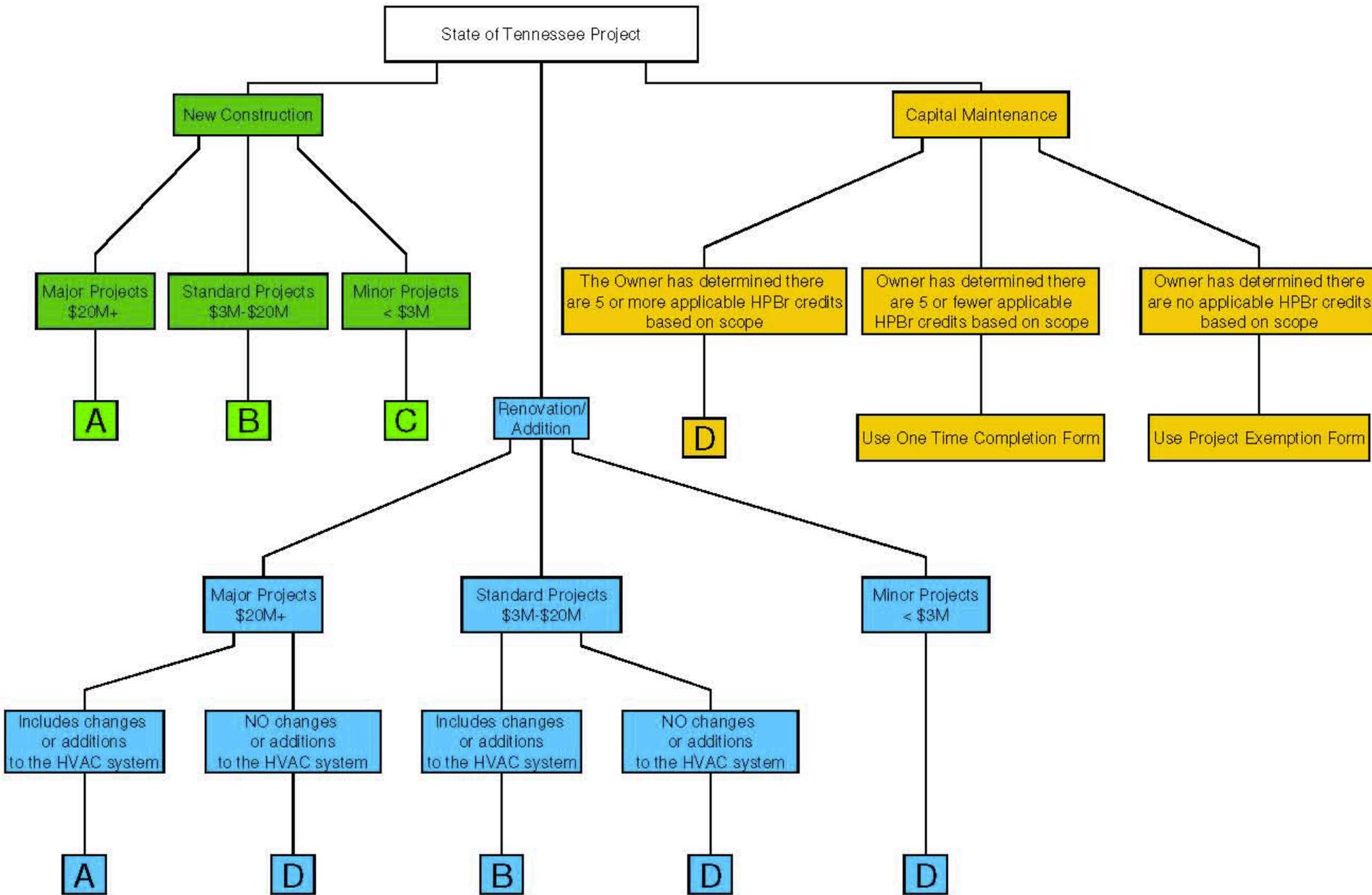
# OWNER PROJECT REQUIREMENTS (OPR)

## Components

- The Project Applicability Tree is used to determine which Energy Efficiency credits will be required for the project, based on size and scope
- The High Performance Building Goals section includes the HPBr credits which are usually Required and a list of systems to be commissioned
- The Building Information Table is completed with information about the type, size, function, and special requirements of the project



# PROJECT APPLICABILITY



# PROJECT APPLICABILITY

## HPBr Project Paths

**A**

Entire HPBr to be applied to project based on scope.  
Credit-Specific Notes:

Energy modeling and LCCA credits (EE3.1 and 3.2)  
**REQUIRED**

Building level and system level metering (EE5.1 and 5.2)  
**REQUIRED**

Long-Term Energy Monitoring EE6.1 **REQUIRED**

Renewable Green Energy EE7.1 **REQUIRED**

**B**

Entire HPBr to be applied to project based on scope.  
Credit-Specific Notes:

Energy modeling and LCCA credits (EE3.1 and 3.2)  
**REQUIRED**

Building level metering (EE5.1)  
**REQUIRED**

System level metering (EE5.2)  
**RECOMMENDED**

Long-Term Energy Monitoring EE6.1 **REQUIRED**

Renewable Green Energy EE7.1 **REQUIRED**

**C**

Entire HPBr to be applied to project based on scope.  
Credit-Specific Notes:

Energy modeling and LCCA credits (EE3.1 and 3.2)  
**RECOMMENDED**

Building level and system level metering (EE5.1 and 5.2)  
**RECOMMENDED**

Long-Term Energy Monitoring EE6.1 **RECOMMENDED**

Renewable Green Energy EE7.1 **RECOMMENDED**

**D**

Same requirements as 'C' except

Building level and system level metering refers to EE5.3 instead of EE5.2  
It is still **RECOMMENDED**

# HPBr CHECKLIST

## Summary

- The Checklist spreadsheet tool has been reworked, but is based on the SDG Checklist format
- Updates include:
  - Credit title, ID, and points
  - Credit Responsibility column
  - Phase-by-phase point target table
  - Phase-by-phase point tracking columns for each credit
  - Credit Verification Form ready to print for each phase
  - Project Exemption Form added
  - One-Time Completion Form added

# High Performance Building Requirements

## CHECKLIST / TRACKING FORM

Phase	Targeted Points
Programmin	
SD	
DD	
CD	
Closeout	

SBC Number:	
Project Name:	
Date:	
Project Type:	
Project Phase:	

Project Team Representatives		Initials
O	- Owner	
C	- Contractor	
ME	- Mechanical Engineer	
EE	- Electrical Engineer	
CE	- Civil Engineer	
A	- Architect	
Other	- Other	

				Programmin	SD	DD	CD	Closeout				
Checklist Total				0	0	0	0	0	0	0	0	
Land Management				LM Total:		0	0	0	0	0	0	
# Points	Credit ID	Applicable to Project?	Description	Level:	Programmin	SD	DD	CD	Closeout	Comment: Describe implementation approach for each pursued credit. If credits are not pursued, provide justification.	Role	Initials
1	LM1.1		<b>Site Selection</b> - Reuse Existing Buildings	Recommended							O	0
1	LM1.2		<b>Site Selection</b> - Show preference for building on developed sites: Preserve farmland/habitat, wetlands, floodplains, public parkland	Recommended							O	0
1	LM1.3		<b>Site Selection</b> - Brownfield Redevelopment - Remediate and Restore contaminated sites when possible	Recommended							O	0
1	LM1.4		<b>Site Selection</b> - Urban Development - Locate building within existing infrastructure	Recommended							O	0
1	LM2.1		<b>Site Disturbance</b> - Sediment and Erosion control during construction	Required							C	0
1	LM2.2		<b>Site Disturbance</b> - Limit site disturbance during construction to minimum development footprint	Required							CE	0
1	LM3.1		<b>Transportation</b> - Plan for access to public transportation	Recommended							O	0
1	LM3.2		<b>Transportation</b> - Provide bicycle storage for 5% of building occupants and shower/changing facilities for 0.5% of FTE occupants	Recommended							CE	0
1	LM3.3		<b>Transportation</b> - Plan site to include preferred parking for carpooling for 5% of all spaces provided	Recommended							CE	0
1	LM3.4		<b>Transportation</b> - Plan site to include preferred parking for low-emitting/fuel efficient vehicles for 5% of all spaces provided	Recommended							CE	0
1	LM4.1		<b>Landscape Design</b> - Maximize vegetated open space	Recommended							Other	0
1	LM4.2		<b>Landscape Design</b> - Native and drought tolerant planting	Required							Other	0
1	LM5.1		<b>Heat Island Reduction</b> - Non roof surface reflectivity and shading	Recommended							CE	0
1	LM5.2		<b>Heat Island Reduction</b> - Reflective roof materials	Recommended							A	0
1	LM6.1		<b>Stormwater Design</b> - Post development discharge rate and volume not to exceed Pre-development rate	Recommended							CE	0
1	LM6.2		<b>Stormwater Design</b> - Reduce discharge rate and volume 25% on previously developed sites.	Recommended							CE	0
1	LM6.3		<b>Stormwater Design</b> - Design to remove 80% Total Suspended solids from the average annual rainfall event. Verify local requirements.	Recommended							CE	0
1	LM6.4		<b>Stormwater Design</b> - Design per TDEC BMP References	Required							CE	0
1	LM7.1		<b>Exterior Site Lighting</b> - Design exterior lighting power to be 20% less than is allowed by ASHRAE 90.1-2007	Recommended							EE	0
1	LM7.2		<b>Exterior Site Lighting</b> - Locate fixtures to minimize illuminance above the horizontal plane	Recommended							EE	0
1	LM7.3		<b>Exterior Site Lighting</b> - Design using "cut-off" and "full cut-off" to eliminate 90 degree directional light.	Recommended							EE	0
1	LM7.4		<b>Exterior Site Lighting</b> - Locate exterior fixtures to minimize light trespass at property lines	Recommended							EE	0
Water Efficiency				WE Total:		0	0	0	0	0	0	0
# Points	Credit ID	Applicable to Project?	Description	Level:	Programmin	SD	DD	CD	Closeout	Comment: Describe implementation approach for each pursued credit. If credits are not pursued, provide justification.	Role	Initials
1	WE1.1		<b>Water Efficient Landscaping.</b> Utilize efficient irrigation technologies and planting measures	Required							ME	0



# HPBr CHECKLIST

## Credit Responsibility

- The Credit responsibilities are more specific (instead of simply D, O, or C)
- Initials for each team member are matched to their corresponding role
- The initials are automatically inserted on the Checklist and Credit Verification Form

Primary Credit Responsibility	
Role	Initials
O	O
O	O
O	O
O	O
C	O
CE	O
O	O
CE	O
CE	O
CE	O
Other	O
Other	O
CE	O
A	O
CE	O
CE	O

Credit Verification Form				Phase:
TN High Performance Building Requirements				Closeout
In accordance with the State Architect's office, a copy of this form must be submitted at the end of each project phase and accompany required Project Closeout documents. Acceptance by the State Project Manager is required upon review of completed Credit Verification Form.				HPBr Points Achieved
				0
Designated Project Team Member	Initials	Team Member Name	Date	
Owner	0	(type name)		
Contractor	0	(type name)		
Mech. Eng.	0	(type name)		
Elec. Eng.	0	(type name)		
Civil Eng.	0	(type name)		
Architect	0	(type name)		
Other	0	(type name)		
<b>Land Management</b>				
# Points	Credit ID	Description	Credit Level	Sign-Off (added from HPBr Checklist)
0	LM1.1	Site Selection - Reuse Existing Buildings	Recommended	N/A
0	LM1.2	Site Selection - Show preference for building on developed sites; Preserve farmland/habitat, wetlands, floodplains, public parkland	Recommended	N/A
0	LM1.3	Site Selection - Brownfield Redevelopment - Remediate and Restore contaminated sites when possible	Recommended	N/A
0	LM1.4	Site Selection - Urban Development - Locate building within existing infrastructure	Recommended	N/A
0	LM2.1	Site Disturbance - Sediment and Erosion control during construction	Required	N/A
0	LM2.2	Site Disturbance - Limit site disturbance during construction to minimum development footprint	Required	N/A
0	LM3.1	Transportation - Plan for access to public transportation	Recommended	N/A
0	LM3.2	Transportation - Provide bicycle storage for 3% of building occupants and shower/changing facilities for 6.3% of FTE occupants	Recommended	N/A
0	LM3.3	Transportation - Plan site to include preferred parking for carpooling for 3% of all occupants	Recommended	N/A

Project Team Representatives		Initials
O	- Owner	
C	- Contractor	
ME	- Mechanical Engineer	
EE	- Electrical Engineer	
CE	- Civil Engineer	
A	- Architect	
Other	- Other	



# HPBr CHECKLIST

## Phase-by-phase point target table

- As the total targeted points change each phase, the project history can be tracked by recording the targets in this table

<b>Phase</b>	<b>Targeted Points</b>
Programming	
SD	
DD	
CD	
Closeout	



# HPBr CHECKLIST

## Phase-by-phase point tracking columns

- As the total targeted points change each phase, the project history can be tracked by recording in each column
- Each credit 's achievement status may be tracked as "yes" "no" or "maybe"
- Each credit has a drop-down selector to choose from 0 to the credit-specific maximum points

Total	Programming			SD			DD			CD			Closeout			Com for ea provid
	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	
	Yes	Ma y be	No	Yes	Ma y be	No	Yes	Ma y be	No	Yes	Ma y be	No	Yes	Ma y be	No	
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# HPBr CHECKLIST

## Credit Verification Tab

- Auto-populates # of Points, Sign-Off initials, Phase, and HPBr Points Achieved at each stage and can be printed.

Credit Verification Form				Phase:	Closeout
TN High Performance Building Requirements					HPBr Points Achieved
In accordance with the State Architect's office, a copy of this form must be submitted at the end of each project phase and accompany required Project Closeout documents. Acceptance by the State Project Manager is required upon review of completed Credit Verification Form.					0
Designated Project Team Member	initials	Team Member Name	Date		
Owner:	0	[type name]			
Contractor:	0	[type name]			
Mech. Eng.:	0	[type name]			
Elec. Eng.:	0	[type name]			
Civil Eng.:	0	[type name]			
Architect:	0	[type name]			
Other:	0	[type name]			
0 Land Management					
# Points	Credit ID	Description	Credit ID	Sign-Off (linked from HPBr Checklist)	
0	LM1.1	Site Selection - Reuse Existing Buildings	Recommended	N/A	
0	LM1.2	Site Selection - Show preference for building on developed sites: Preserve farmland/habitat, wetlands, floodplains, public parkland	Recommended	N/A	
0	LM1.3	Site Selection - Brownfield Redevelopment - Remediate and Restore contaminated sites when possible	Recommended	N/A	
0	LM1.4	Site Selection - Urban Development - Locate building within existing infrastructure	Recommended	N/A	
0	LM2.1	Site Disturbance - Sediment and Erosion control during construction	Required	N/A	
0	LM2.2	Site Disturbance - Limit site disturbance during construction to minimum development footprint	Required	N/A	
0	LM3.1	Transportation - Plan for access to public transportation	Recommended	N/A	
0	LM3.2	Transportation - Provide bicycle storage for 5% of building occupants and shower/changing facilities for 0.5% of FTE occupants	Recommended	N/A	
0	LM3.3	Transportation - Plan site to include preferred parking for carpooling for 5% of all spaces provided	Recommended	N/A	
0	LM3.4	Transportation - Plan site to include preferred parking for low-emitting/fuel efficient vehicles for 5% of all spaces provided	Recommended	N/A	



# HPBr CHECKLIST

## One-Time Completion Form

### TN High Performance Building Requirements

\*\*If a project has 5 (five) or fewer Applicable credits, this form may be filled out, signed, and saved/filed (for future audit) by the Owner or Owner's Representative at the end of the Programming Phase.

No further Credit Verification forms will need to be submitted at the end of each Phase.

Owner's Organization:			
Owner Name:			
Date:			
SBC Number:			
Project Name:			
Project Scope/Description:			
Number of Applicable Credits:			
List Applicable Credits:	1		
	2		
	3		
	4		
	5		
Statement:		<p>After a complete and thorough review of the Tennessee High Performance Building Requirements Manual and Checklist, and in accordance with the Tennessee Code Annotated (TCA), the Owner has determined that there are 5 (five) or fewer Credits which could be deemed applicable to the scope of the examined project.</p> <p>The Project Team hereby commits to incorporating these selected Credits throughout the design and construction process and delivering a final product that is in full compliance with their requirements.</p>	
Owner's Signature:		Date:	
Designer's Signature:		Date:	



# HPBr CHECKLIST

## Project Exemption Form TN High Performance Building Requirements

\*\*If a project claims exemption from the TNHPBr, this form must be filled out, signed, and saved/filed (for future audit) by the Owner or Owner's Representative.

Owner's Organization:			
Owner Name:			
Date:			
SBC Number:			
Project Name:			
Project Scope/Description:			
Statement:	After a complete and thorough review of the Tennessee High Performance Building Requirements Manual and Checklist, and in accordance with the Tennessee Code Annotated (TCA), The Owner has determined that there are 0 (zero) credits which could be deemed applicable to the scope of the examined project.		
Owner's Signature:		Date:	

Part 5

# TN HPBr SAMPLE PROJECT WALK-THROUGHS

# SAMPLE PROJECT WALK-THROUGHS

- Major New Construction project
  - Budget of \$30M, high performing in terms of energy efficiency and sustainability
- Standard Renovation project
  - Budget of \$4M, no changes to HVAC
- Minor Capital Maintenance
  - Fewer than 5 credits apply, One-Time Completion Form utilized