Building Codes Assessment Tool

ASHRAE Center of Excellence for Building Decarbonization

<Name, Affiliation>

<Workshop Location>
<Workshop Date>

Agenda

- Background
- Building Codes Assessment Tool (BCAT)
- Building Codes Assessment Process
  - Building Code Needs – Why…
  - Building Code Measures – What…
  - Building Policies and Codes – How…
  - Stakeholder Engagement – Who…
- Game Results and Next Steps
- References and Glossary
- Appendix – Building Code Design Elements

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Background

- The **Building Codes Assessment Tool (BCAT)** was developed by the ASHRAE Center of Excellence for Building Decarbonization as part of the Flexible Building Codes Framework project.
- The tool is designed to support **collaborative, multi-stakeholder needs and capabilities assessment workshops** as an initial step in developing and implementing new or enhanced building energy codes and policies aligned with achieving **long-term building sector decarbonization**.
- The tool was primarily developed for use in **emerging economies without mandatory building energy codes** but is flexible enough be used in all national and local jurisdictions to help **update existing building codes and improve building code development and implementation practices**.

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The Challenge

- According to the IEA Net Zero Scenario, **all countries will have to implement national building codes**, along with enabling policies and programs, that rapidly shift the market towards deep energy efficiency, zero carbon emission targets, electrification of heating, renewables integration and demand flexibility.
- **Only 26 percent of countries have adopted mandatory energy codes** at the national level for all building types and **2.4 billion m²** (25.8 billion ft²) of floor space were built last year without meeting any energy-related performance requirements.
- **82 percent** of the population growth is expected through 2030 in countries without mandatory building energy codes.

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ASHRAE Commitment to International Building Codes

"We are **retooling the focus of our existing energy standards** to address embodied and operational carbon in addition to energy efficiency…

…ASHRAE is building on Standard 90.1 to create a **streamlined, flexible building standard framework to help countries in the Global South develop their own consensus-based building codes**, with the target of achieving zero-carbon ready emissions in new buildings by 2030."

Ginger Scoggins, ASHRAE Presidential Member Speaking at COP28 in Dubai, UAE

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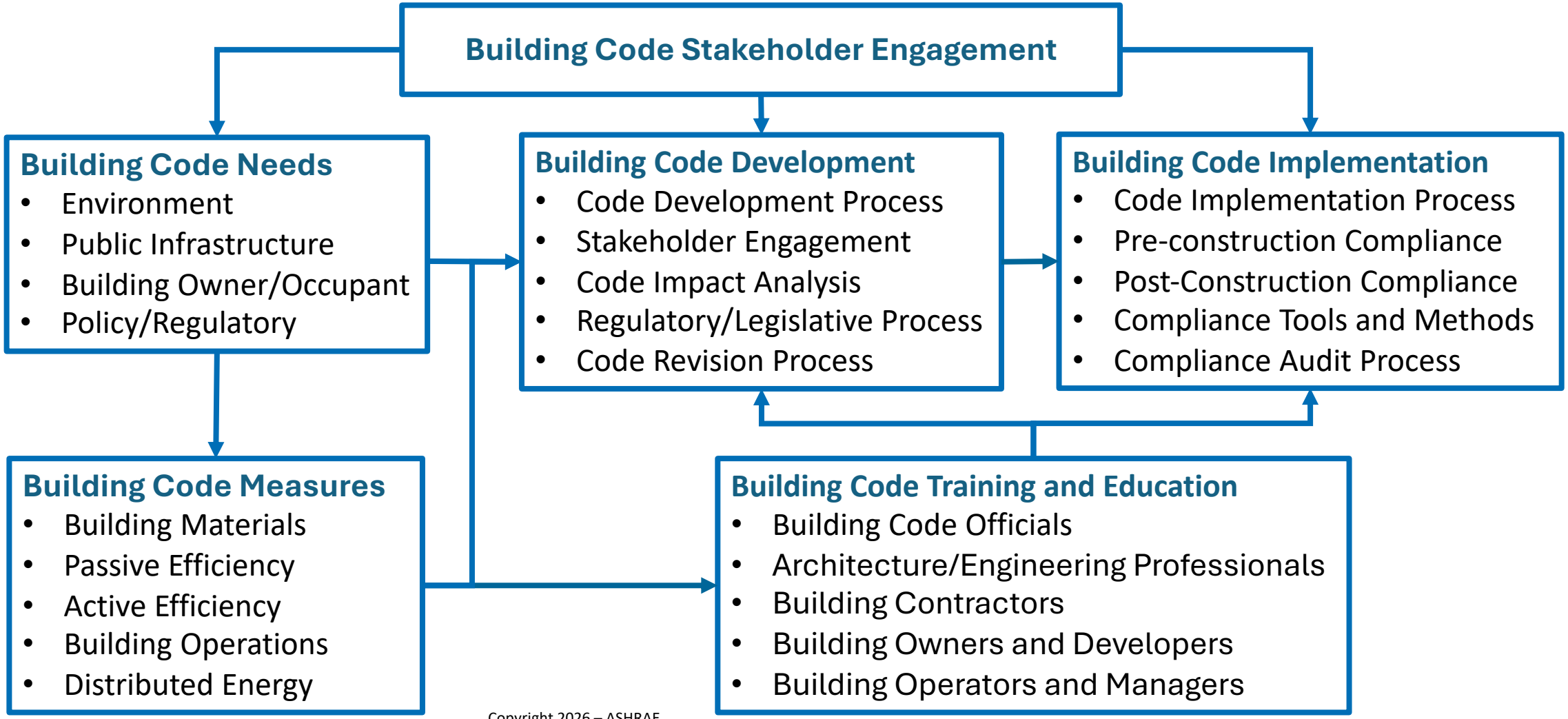
Flexible Building Code Development Framework



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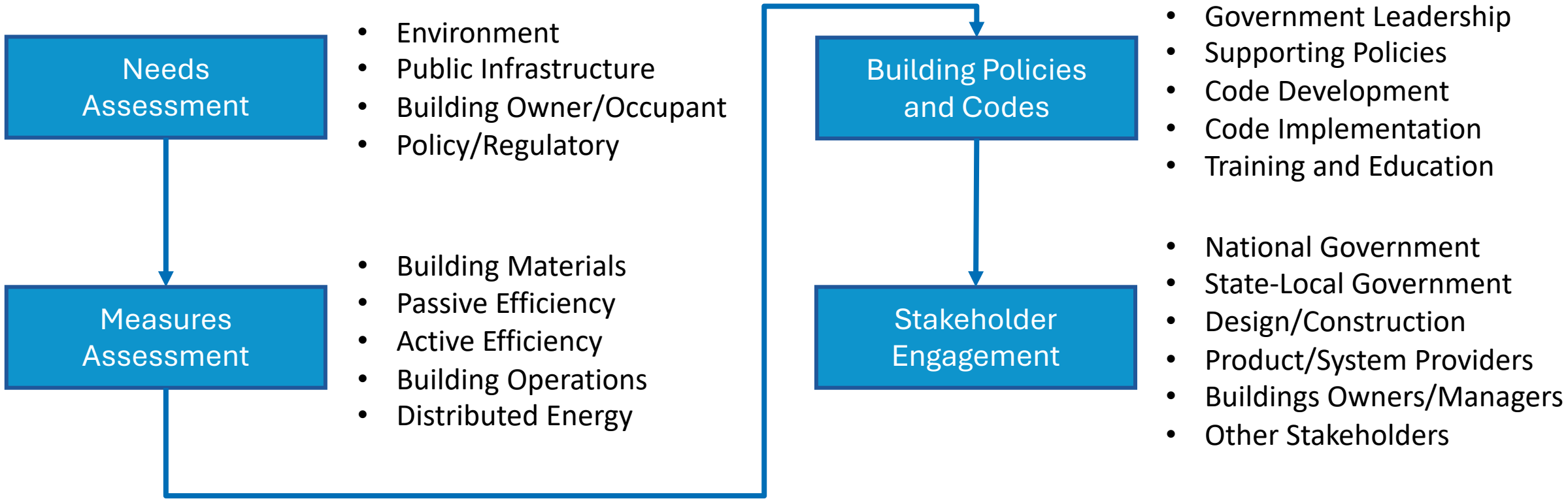
ASHRAE Building Code Assessment Tool (BCAT)



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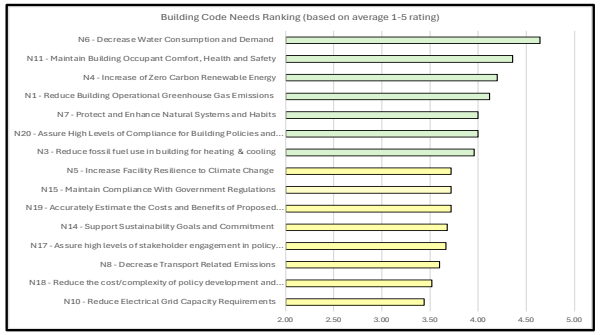
Building Code Assessment Tool and Strategy Game

ASHRAE Building Codes Assessment Tool Needs Assessment - Section One		Step 1 Importance Rating (X) Not at all Important	Somewhat Important	Important	Very Important	Extremely Important	Step 2 Top 7 Priority Selections (X)	Step 3 Group Consensus Matches (X)
Environmental Needs								
N1	Reduce building operational greenhouse gas emissions							
N2	Reduce embodied carbon in building materials and equipment							
N3	Reduce fossil fuel use in buildings for heating							
N4	Increase use of zero carbon renewable energy							
N5	Increase facility resilience to climate change impacts							
Public Infrastructure Needs								
N6	Decrease water consumption and demand							
N7	Protect and enhance natural systems and habitats							
N8	Decrease transportation-related emissions							
N9	Reduce waste from building construction and renovation							
N10	Decrease electrical grid capacity requirements							
Building Owner and Occupant Needs								
N11	Maintain building occupant comfort, health and safety							
N12	Increase building owner and tenant affordability							
N13	Increase building asset value							
N14	Support sustainability goals and commitments							
N15	Maintain compliance with government regulations							
Policy and Regulatory Needs								
N16	Align building policies with public goals and commitments							
N17	Assure high levels of stakeholder engagement in policy development and implementation							
N18	Reduce the cost/complexity of policy development and implementation							
N19	Accurately estimate the costs and benefits of proposed building policies and regulations							
N20	Assure high levels of compliance for building policies and regulations							
	Participant Role: National Government ( ), State/Local Government ( ), Buildings Owners/Managers ( ), Buildings Industry ( ), Research/Academia ( ), International Organizations/Non-Profit ( ), Financial Sector ( )							Total Score

Workshop Rating (1-5 Scale)



Consensus Prioritization

Workshop/Global Priorities (# votes)

International Consensus Results			
Environmental	**Public Infrastructure**	**Owner/Occupant**	**Policy/Regulatory**
N1 - Reduce building operational greenhouse gas emissions	N6 - Decrease water consumption and demand	N11 - Maintain building occupant comfort, health and safety	N16 - Align building policies with public goals and commitments
N2 - Reduce embodied carbon in building materials and equipment	N7 - Protect and enhance natural systems and habitats	N12 - Increase building owner and tenant affordability	N17 - Assure high levels of stakeholder engagement in policy development and implementation
N3 - Reduce fossil fuel use in buildings for heating	N8 - Decrease transportation-related emissions	N13 - Increase building asset value	N18 - Reduce the cost/complexity of policy development and implementation
N4 - Increase use of zero carbon renewable energy	N9 - Reduce waste from building construction and renovation	N14 - Support sustainability goals and commitments	N19 - Accurately estimate the costs and benefits of proposed building policies and regulations
N5 - Increase facility resilience to climate change impacts	N10 - Decrease electrical grid capacity requirements	N15 - Maintain compliance with government regulations	N20 - Assure high levels of compliance for building policies and regulations
Highest Priority	Medium Priority		

Strategy Game

Needs + Measures + Policy/Code Capabilities + Stakeholders

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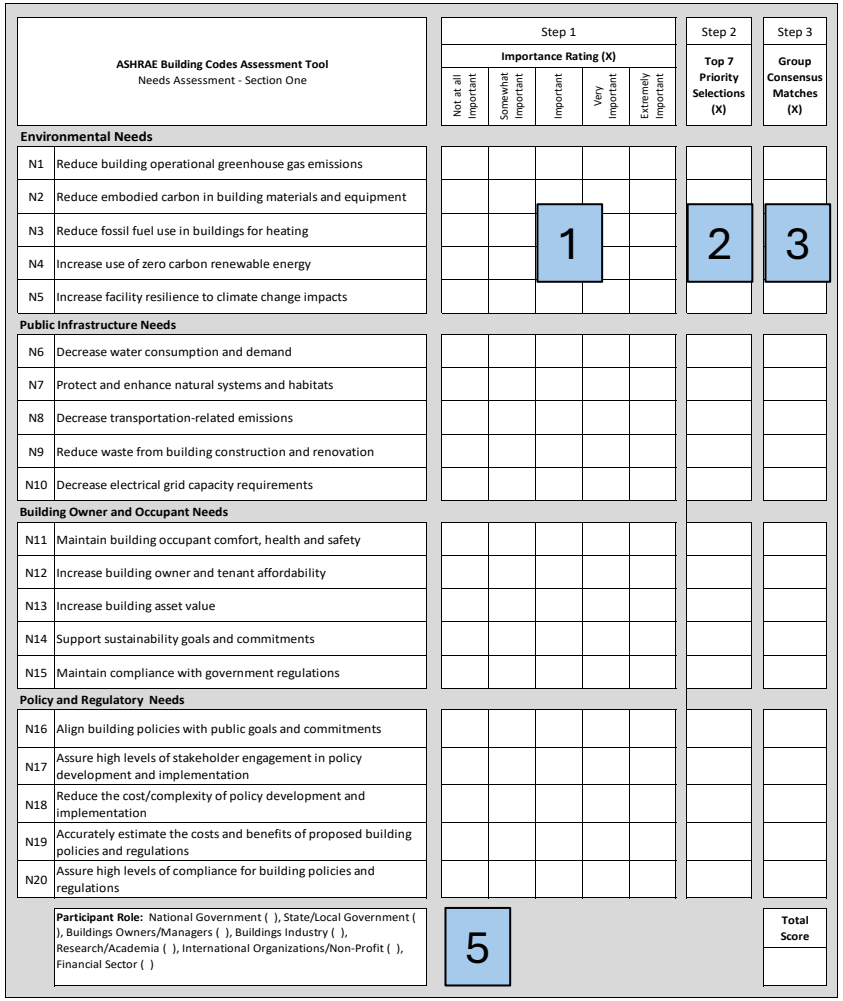
Scoring Sheet Instructions



ASHRAE Building Codes Assessment Tool
Needs Assessment - Section One

		Step 1: Importance Rating (X)					Step 2	Step 3
		Not at all Important	Somewhat Important	Important	Very Important	Extremely Important	Top 7 Priority Selections (X)	Group Consensus Matches (X)
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N3	Reduce fossil fuel use in buildings for heating			1			2	3
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Participant Role: National Government ( ), State/Local Government ( ), Buildings Owners/Managers ( ), Buildings Industry ( ), Research/Academia ( ), International Organizations/Non-Profit ( ), Financial Sector ( )

5

Total Score

4

- Step 1: Rate importance on scoring sheet with an “X”
- Step 2: Select Top Priorities on scoring sheet with an “X”

  Facilitator reveals consensus priorities slide
- Step 3: Mark participant matching priorities with an “X”
- Step 4: Add up total matching priorities
- Step 5: Indicate participant role with an “X”

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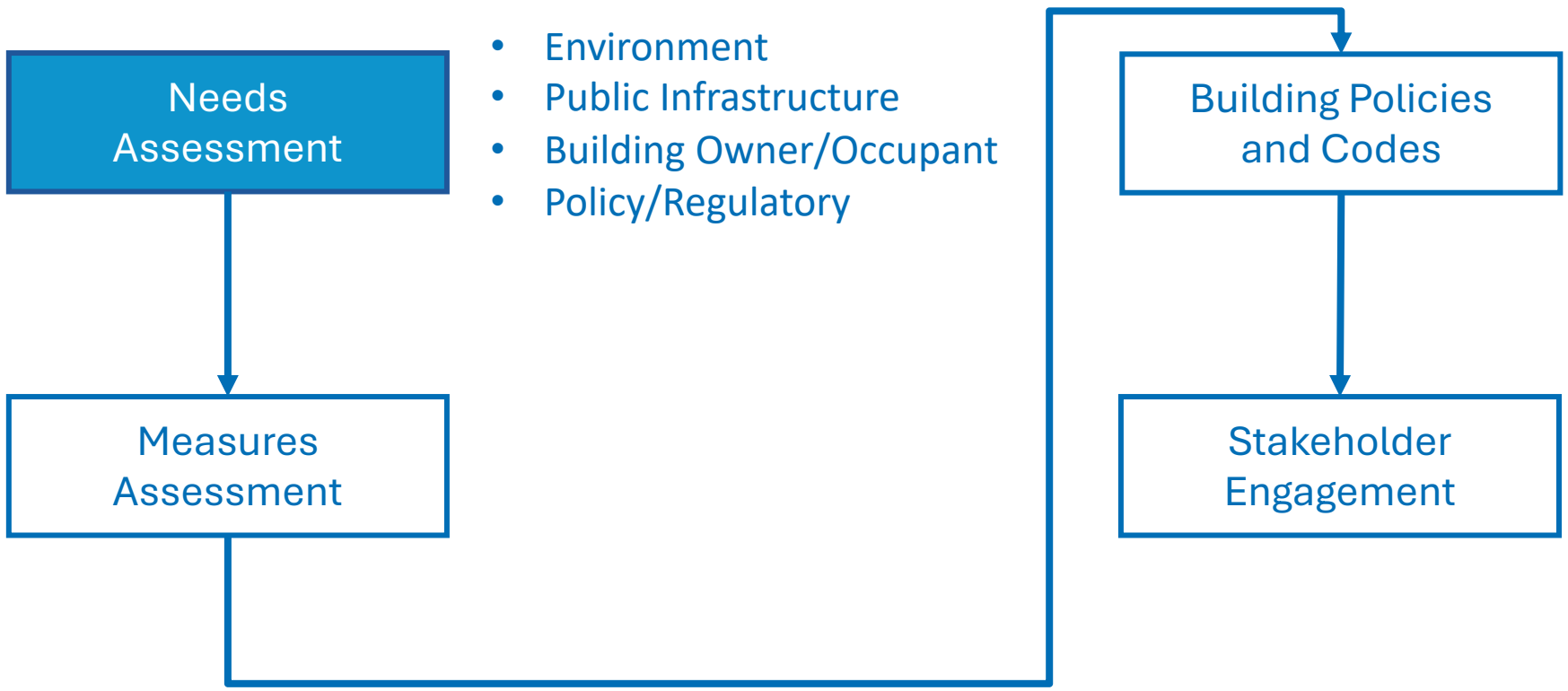
Building Code Needs Assessment – Section One



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Building Code Needs Assessment

Environmental	Public Infrastructure	Owner/Occupant	Policy/Regulatory
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Environmental and Public Infrastructure Needs

N1 - Reduce building operational greenhouse gas emissions

N2 - Reduce embodied carbon in building materials and equipment

N3 - Reduce fossil fuel use in buildings (electrification)

N4 - Increase the use of zero carbon renewable energy

N5 - Increase facility resilience to climate change impacts

N6 - Decrease water consumption and demand

N7 - Protect and enhance natural systems and habitats

N8 - Decrease transportation-related emissions

N9 - Reduce waste from building construction and renovation

N10 - Decrease electrical grid capacity requirements

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Building Owner/Occupant and Policy/Regulatory Needs

N11 - Maintain building occupant comfort, health and safety

N12 - Increase building owner and tenant affordability

N13 - Increase building asset value

N14 - Support sustainability goals and commitments

N15 - Maintain compliance with government regulations

N16 - Align building policies with public goals and commitments

N17 - Assure high levels of stakeholder engagement in policy development/implementation

N18 - Reduce the cost/complexity of policy development and implementation

N19 - Accurately estimate the costs and benefits of proposed building policies and regulations

N20 - Assure high levels of compliance for building policies and regulations

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Building Code Needs Assessment – Consensus Answers

Environmental	Public Infrastructure	Owner/Occupant	Policy/Regulatory
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Highest Priority Medium Priority

Highest Priority

- N1
- N2
- N4
- N5
- N7
- N10
- N11
- N20

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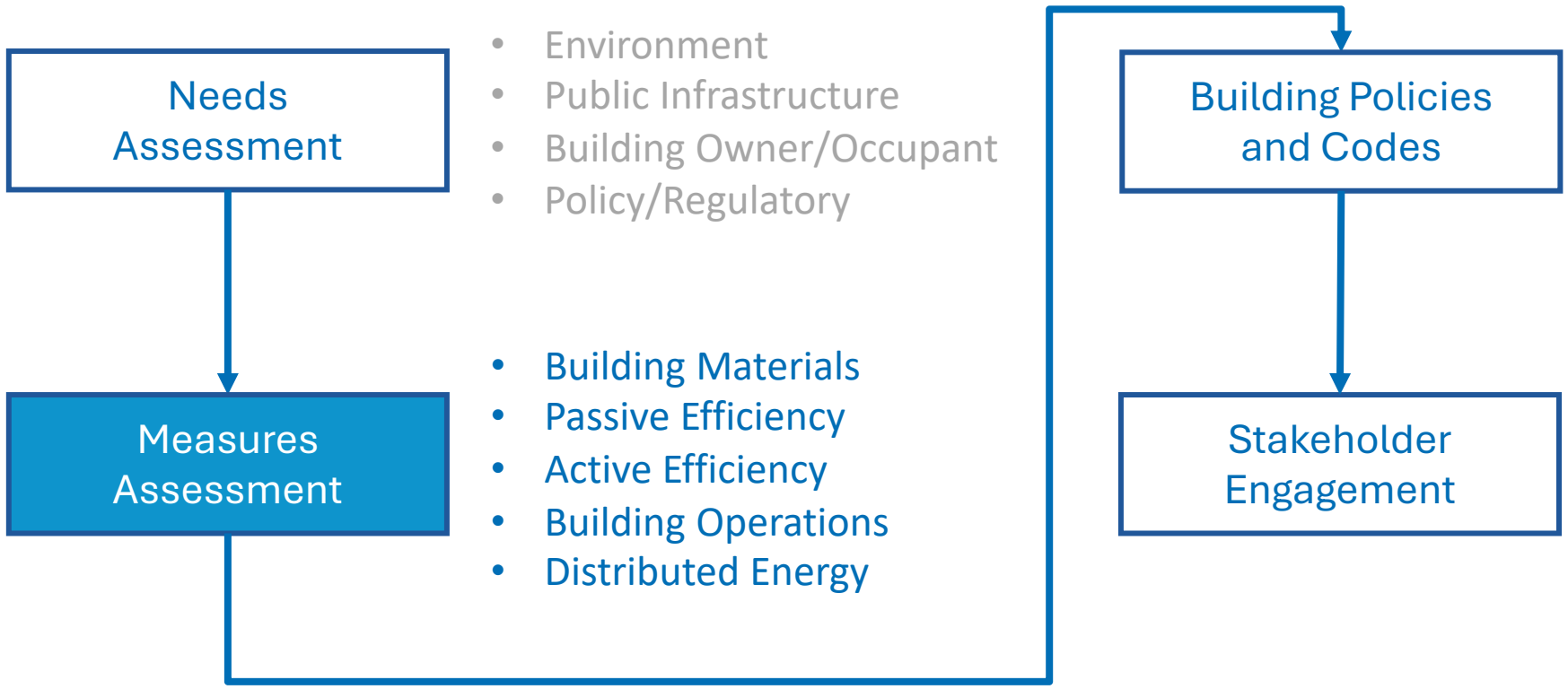
Building Code Measures Assessment – Section Two



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Building Code Measures Assessment

Building Materials	Passive Efficiency	Active Efficiency	Building Operations	Distributed Energy
M1 - Building Material Reuse	M6 - Building Thermal Envelope	M11 - High-Efficiency Space Cooling	M16 - High-Efficiency Lighting	M21 - Energy Metering and Monitoring
M2 - Construction Material Waste Reduction	M7 - Building Fenestration	M12 - High-Efficiency Space and Water Heating	M17 - Lighting Control and Plug-load Management	M22 - On-site Renewable Energy
M3 - Local/Indigeonous Construction Materials	M8 - Building Shading	M13 - Electric Heat Pump Space and Water Heating	M18 - Water Conservation	M23 - Battery Electric Storage
M4 - Low-Carbon Building Materials	M9 - Building Surface Reflectivity	M14 - Thermal Energy Storage and Recovery	M19 - Indoor Air Quality Management	M24 - Managed Electric Vehicle Charging
M5 - Low-GWP Refrigerants	M10 - Natural Ventilation and Thermal Management	M15 - Building Management and Control Systems	M20 - Building Retro-Commissioning	M25 - Demand Flexibility and Resiliency

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Building Materials and Construction Measures

M1 - Building Material Reuse: Reuse of existing construction elements and materials without reprocessing and the repurposing existing building structures for new uses (adaptive reuse).

M2 - Construction Material Waste Reduction: Diverting construction and demolition materials from disposal by using recycled products, practicing source reduction, preserving existing structures, salvaging construction structures, and reusing existing materials.

M3 - Local/Indigenous Construction: Use of local natural materials and in-formal construction practices, often implemented by the non-professional building owners/tenants.

M4 - Low Carbon Building Materials: Materials used in construction with a low carbon footprint in terms of greenhouse gas emissions generated during their manufacturing, transportation, installation, maintenance, and disposal.

M5 - Low GWP Refrigerants: Refrigerants used in HVAC/R equipment with low relative global warming potential, such as natural refrigerants, hydrocarbons, hydrofluoroolefins (HFOs), and some hydrofluorocarbons (HFCs).

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Passive Efficiency Measures

M6 - Building Thermal Envelope - The design and selection of materials for a building's physical barrier between the external environment and internal conditioned space to reduce energy consumption and improve building resiliency.

M7 - Building Fenestration - Proper design, selection, and installation of windows and skylights to minimize heating, cooling, and lighting energy use while improving comfort for occupants.

M8 - Building Shading - The use of natural habitat or artificial devices to control the amount of sunlight entering a building, reducing its cooling requirements, and improving natural lighting quality.

M9 - Building Surface Reflectivity - The ability of a building's surface to reflect sunlight and heat, reducing heat flow from the roof into the occupied space and improving comfort and safety in buildings without air conditioning.

M10 - Natural Ventilation and Thermal Management - The process of using natural forces of wind and thermal buoyancy to deliver fresh air into buildings to improve indoor environmental quality and reduce energy consumption.

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Active Efficiency Measures

M11 - High Efficiency Cooling Equipment – Air and water-cooling systems designed to provide increased user thermal comfort, improved indoor environmental quality, and result in considerable energy, emissions, and operational cost savings.

M12 - High Efficiency Space and Water Heating Equipment – Air and water heating systems designed to provide increased user thermal comfort, improved indoor environmental quality, and result in considerable energy, emissions, and operational cost savings.

M13 - High Efficiency/All-Electric Heating Systems - Replacing fossil-fuel systems for space heating, water heating and cooking with highly efficient, cost-effective electric alternatives that reduce greenhouse gas emissions, while reducing cost and reliability impacts on the grid.

M14 - Thermal Energy Storage and Recovery - Use of hot and cold thermal energy storage and the recovery of waste energy to optimize building heating and cooling performance and cost.

M15 - Building Management and Control Systems - Computer-based systems installed to control and monitor a building's electrical and mechanical systems, such as HVAC, lighting, energy management, fire safety, and security systems.

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Building Operations Measures

M16 - High Efficiency Lighting – Use of high efficiency indoor and outdoor lighting fixtures and bulbs using LED, OLED and other high efficiency/efficacy solid state technologies.

M17 - Lighting Control and Plug-load Management - Strategies and devices for automatic switching and dimming of general indoor and outdoor lighting and the control of plug loads such as computer monitors, task lighting, coffeemakers, and vending machines to reduce energy consumption.

M18 - Water Conservation - Reduction in water resources through the installation of high efficiency fixtures, elimination of leaks, water conserving cooling towers, smart irrigation systems, and other actions throughout the life of a building.

M19 - Indoor Air Quality Management - Designing and operating building systems to provide a comfortable, safe, and healthy environment that reduces common pollutants within buildings.

M20 - Building Retro-commissioning - A systematic process applied to existing buildings that have never been properly commissioned to ensure that their systems can be operated and maintained according to the owner's needs and functional requirements.

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Distributed Energy Resource Measures

M21 - Energy Metering and Monitoring – Real-time electricity and other energy measurement (fossil gas, steam, water) at the building and site level including point of use monitoring for major energy consuming systems and equipment.

M22 - On-site Renewable Energy - Generating renewable energy on-site (solar, wind, hydro, biofuels) where the power is used.

M23 - Battery Electric Storage - Use of electric energy storage technologies to store energy for later use in powering building electrical systems and devices and providing load management services including load shifting, shaping, shedding and backup power.

M24 - Managed Electric Vehicle Charging - An adaptive method of electric vehicle charging to mitigate impacts on the electrical grid and minimize costs by controlling the time and rate of charging using time-of-use electricity pricing or other utility signals.

M25: Demand Flexibility - The capability for demand-side building loads to change their electricity consumption patterns by shaping, shedding, and shifting energy use on a short-term basis based on time-of-use electricity pricing or utility requests.

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Building Code Measures Assessment – Consensus Answers

Building Materials	Passive Efficiency	Active Efficiency	Building Operations	Distributed Energy
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Highest Priority | Medium Priority

Highest Priority

- M6
- M10
- M11
- M12
- M15
- M20

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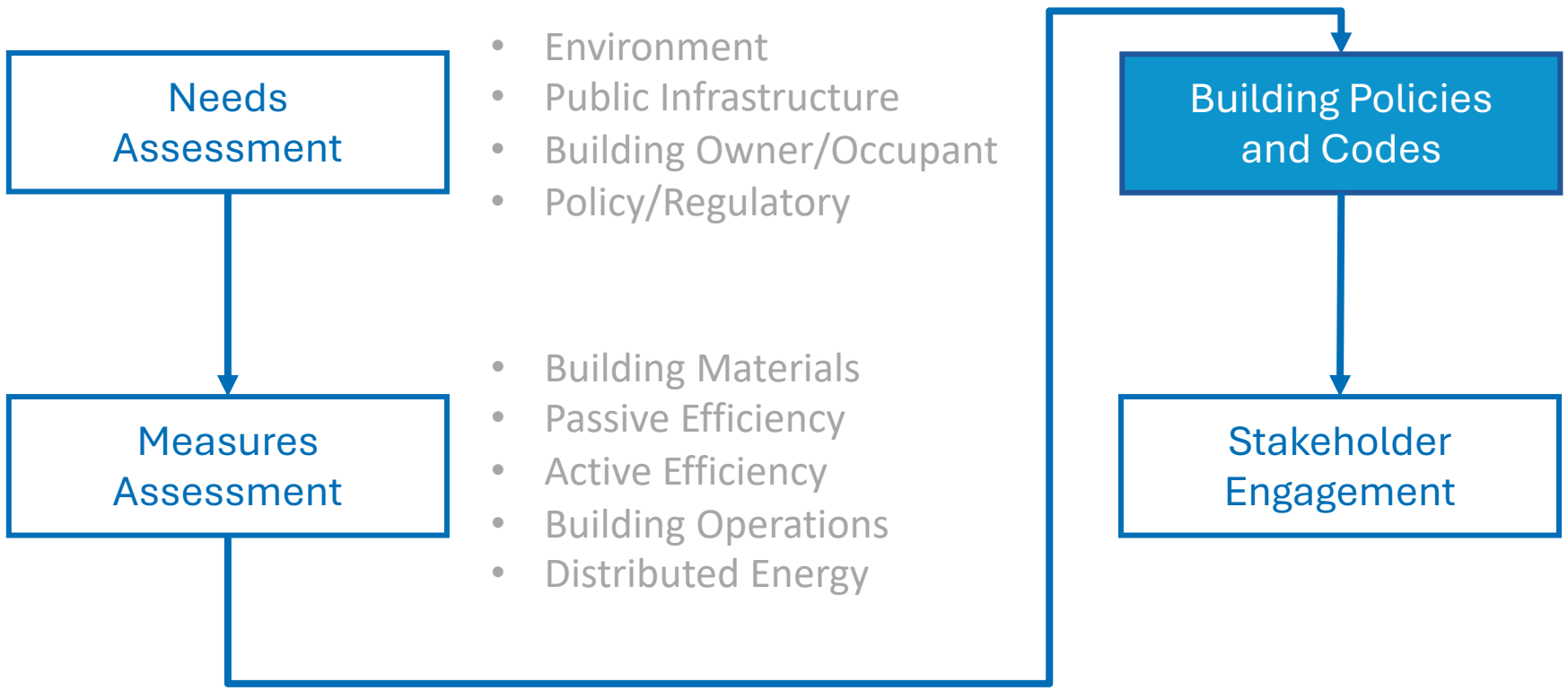
Building Policies and Codes Assessment – Section Three



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Building Policies and Code Capabilities Assessment

Government Leadership	Supporting Policies
P1 - National NDCs and Climate Action Plans	P6 - Building Energy Benchmarking
P2 - State/Local Climate Action Plans	P7 - Building Audits and Retro-commissioning Requirements
P3 - Building Code Enabling Policy and Legislation	P8 - Building Performance Standards
P4 - Government Procurement Policy	P9 - Building Equipment and Appliance Standards
P5 - Government Demonstration Projects	P10 - Government Incentives and Financial Models

Code Development Capabilities	Code Implementation Capabilities	Code Training and Education
C1 - Code Development Process Management	C6 - Code Implementation Process Management	C11 - Building Code Officials
C2 - Stakeholder Engagement Process	C7 - Pre-construction Compliance Process	C12 - Architecture and Engineering Professionals
C3 - Code and Policy Impact Analysis	C8 - Post-construction Compliance Process	C13 - Building Contractors
C4 - Regulatory/Legislative Process Management	C9 - Code Compliance Tools and Methods	C14 - Building Owners and Developers
C5 - Code Revision Process Management	C10 - Code Compliance Audit Process	C15 - Building Operators and Managers

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Government Leadership

P1 - National NDCs/Climate Action Plans: Inclusion of building policies, regulations and codes in updated UNFCCC Nationally Determined Contributions and national building decarbonization roadmaps.

P2 - State/Local Climate Action Plans: Development and publication of climate action plans and roadmaps for building decarbonization and national cooling action plans.

P3 - Building Code Enabling Legislation: Existence of enabling national or municipal legislation for development and enforcement of building regulations and codes.

P4 - Government Procurement Policy: National or local government policies driving the procurement of above-code/high-performance buildings, materials, systems and equipment.

P5 - Government Demonstration Projects: Leadership through example by designing, constructing, retrofitting and operating public buildings at proposed code and above-code, high-performance standards in demonstration and pilot projects.

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Government Policies

P6 - Building Energy Benchmarking: Periodically measuring and reporting building energy performance against similar buildings or industry standards, often including building labeling of a performance level or grade.

P7 - Building Audits and Retro-commissioning: Requirements for commercial buildings to undergo energy audits, retuning, or retro-commissioning to improve energy efficiency and reduce energy consumption, often based on building size, type, and age.

P8 - Building Performance Standards: Policies designed to improve the energy efficiency and environmental impact of existing buildings by setting performance targets for energy use, emissions, or other metrics which become more stringent over time.

P9 – Building Equipment and Appliance Standards: Standards that regulate the energy efficiency and performance of residential and commercial equipment and appliances for heating and cooling systems, lighting, refrigeration, and other applications.

P10 - Government Incentives and Financial Models: financial or other benefits for code, or above code, compliance including interest loans, grants, rebates, tax credits, permitting and code allowances, on-bill payment, pay through savings, and ESCO models

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Building Code Development Capabilities

C1 - Code Development Process Management - Ministries of housing, urban development, energy, and environment oversee the development of building codes, aligning them with national goals, urbanization strategies, and safety regulations.

C2 – Stakeholder Engagement Process – Ministries of housing, urban development, energy, and environment host consultations with government, academia, industry, and civil society and coordinate with standards bodies to ensure technical accuracy.

C3 - Code and Policy Impact Analysis – National agencies and standards bodies, technical experts, universities and research institutes, international organizations and development partners work together to analyze national and local impacts.

C4 - Regulatory/Legislative Process Management - Ministries of housing, urban development, energy, and environment, national standards organizations, legislative bodies and regulatory commissions participate in regulatory/legislative processes.

C5 - Code Revision Process Management – National ministries, standards bodies, technical experts, academia and international partners participate in code revisions.

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Building Code Implementation Capabilities

C6 - Code Implementation Process Management – National ministries oversee the national rollout of codes and coordinate training and compliance monitoring while municipalities conduct plan reviews, issue permits, and inspect buildings for compliance.

C7 - Pre-construction Compliance Process – Municipal building departments review architectural and engineering plans to ensure they meet energy code requirements before issuing building permits and conduct compliance checks.

C8 - Post-construction Compliance Process - Municipal building departments conduct final inspections and review require documentation such as commissioning reports, energy audits, or performance testing before issuing a certificate of occupancy.

C9 - Code Compliance Tools and Methods – Compliance tools and methods include standardized forms, energy modeling tools, or energy performance benchmarks.

C10 - Code Compliance Audit Process - Municipal building departments conduct local audits and may require energy performance certificates or post-occupancy evaluations.

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Building Code Training and Education Capabilities

C11 – Building Code Officials – Training for building code officials, code enforcement officers, building inspectors, building plans examiners, and permit technicians.

C12 - Architecture and Engineering Professionals – Training for architects, designers, structural engineers, mechanical engineers, electrical engineers, environmental engineers, systems engineers, lighting specialists, and commissioning agents.

C13 – Building Contractors – Training for general contractors, electrical contractors, plumbing contractors, technology contractors, HVAC contractors, concrete, framing, and roofing contractors, solar energy contractors, and master systems integrators.

C14 - Building Owners and Developers – Training for private owner/developers, corporate, institutional and government owner/developers, partnerships and REITs.

C15 - Building Operators and Managers – Training for property managers, facilities managers, operations managers, asset managers, energy managers, security managers and space planners.

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Building Policies and Codes – Consensus Answers

Government Leadership	Supporting Policies
P1 - National NDCs and Climate Action Plans	P6 - Building Energy Benchmarking
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Highest Priority Medium Priority

Highest Priority

- P1
- P2
- P3
- C7
- C11
- C14
- C16
- C17

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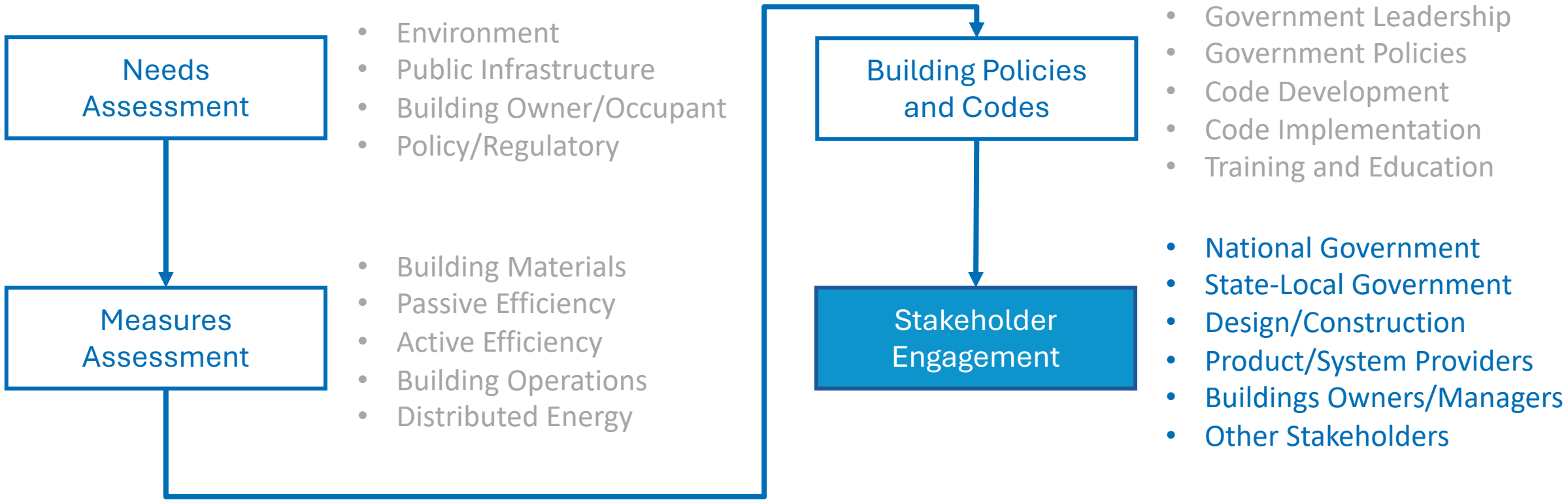
Stakeholder Engagement – Section Four



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Stakeholder Engagement

National Government	State/Local Government	Design and Construction	System/Product Providers	Building Owners and Managers	Other Stakeholders
S1 - Policy Makers and Legislators	S6 - Urban and Infrastructure Planning	S11 - Architects and Designers	S16 - Building Material Providers	S21 - Residential Housing Developers	S26 - Energy and Sustainability Managers
S2 - Government Regulators	S7 - Economic Development	S12 - Green and Sustainable Building Consultants	S17 - Building Interior Systems Providers	S22 - Residential Homeowner and Renter Associations	S27 - Non-Governmental and International Organizations
S3 - Energy, Environment and Natural Resources	S8 - Workforce Development	S13 - Mechanical and Electrical Engineers	S18 - Mechanical and Electrical Systems Providers	S23 - Commercial Real Estate Developers	S28 - Public/Private Financial Institutions
S4 - Housing and Urban Development	S9 - Buildings and Construction Regulations	S14 - Mechanical and Electrical Contractors	S19 - Building Appliance and Equipment Suppliers	S24 - Commercial Building Owners and Managers	S29 - Energy and Water Utilities
S5 - Finance and Administration	S10 - Buildings Regulatory Compliance	S15 - Renewable Energy Contractors	S20 - Renewable Energy Technology Suppliers	S25 - Facility Management and Building Operators	S30 - Research and Academic Institutions

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National, State and Local Government

S1 - Policy Makers

S2 - Government Regulators

S3 - Energy, Environment and Natural Resources

S4 - Housing and Urban Development

S5 - Finance and Administration

S6 - Urban and Infrastructure Planning

S7 - Economic Development

S8 - Workforce Development

S9 - Building and Construction Regulations

S10 - Building Regulatory Compliance and Review

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Design, Construction and System Providers

S11 - Architects and Designers

S12 - Green Building Consultants

S13 - Mechanical and Electrical Engineers

S14 - Mechanical and Electrical Contractors

S15 – Renewable Energy Contractors

S16 - Building Construction Material Providers

S17 - Building Interior Systems and Component Providers

S18 - Mechanical/Electrical/Plumbing Systems Providers

S19 - Building Appliance and Equipment Suppliers

S20 - Renewable Energy Technology Providers

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Building Owners, Managers and Other Stakeholders

S21 - Residential Housing Development

S22 - Residential Homeowner/Renter Associations

S23 - Commercial Real Estate Development

S24 - Commercial Building Owners and Managers

S25 - Facility Management and Building Operators

S26 - Energy and Sustainability Managers

S27 - Non-Governmental and International Organizations

S28 - Financial Institutions

S29 - Energy and Water Utilities

S30 - Research and Academic Institutions

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Building Code Stakeholders – Consensus Answers

National Government	State/Local Government	Design/Construction	System Providers	Building Owners/Managers	Other Stakeholders
S1 - Policy Makers and Legislators	S6 - Urban and Infrastructure Planning	S11 - Architects and Designers	S16 - Building Material Providers	S21 - Residential Housing Developers	S26 - Energy and Sustainability Managers
S2 - Government Regulators	S7 - Economic Development	S12 - Green and Sustainable Building Consultants	S17 - Building Interior Systems Providers	S22 - Residential Homeowner and Renter Associations	S27 - Non-Governmental and International Organizations
S3 - Energy, Environment and Natural Resources	S8 - Workforce Development	S13 - Mechanical and Electrical Engineers	S18 - Mechanical and Electrical Systems Providers	S23 - Commercial Real Estate Developers	S28 - Public/Private Financial Institutions
S4 - Housing and Urban Development	S9 - Buildings and Construction Regulations	S14 - Mechanical and Electrical Contractors	S19 - Building Appliance and Equipment Suppliers	S24 - Commercial Building Owners and Managers	S29 - Energy and Water Utilities
S5 - Finance and Administration	S10 - Buildings Regulatory Compliance	S15 - Renewable Energy Contractors	S20 - Renewable Energy Technology Suppliers	S25 - Facility Management and Building Operators	S30 - Research and Academic Institutions

Highest Priority | Medium Priority

Highest Priority

- S1
- S6
- S9
- S10
- S11
- S12
- S13
- S16
- S25
- S29

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And the winner is...

- Add up the total scores from each of the four sections
  - Section 1 + Section 2 + Section 3 + Section 4 = your total participant score
- Raise your hand when the facilitator mentions your score
  - Counting begins with the maximum possible score of 32 and decreases by one until the participant with the highest score wins the game.
- The winner is the individual(s) whose priorities are the closest match to the consensus priorities from previous global workshops

Important: The global consensus priorities, while interesting as a comparison, may or may not be particularly relevant for your local context. The most relevant data are the consensus results from your workshop and that data should be used to guide future building code development and implementation.

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Next Steps

- Review the key findings from today's workshop
  - What were the consensus priorities for each exercise in today's workshop?
  - Where did today's workshop participants disagree on priorities?
  - Where did today's workshop participants disagree with global consensus priorities?
  - Where are there significant differences in priorities based on participant roles?
- Create a plan for developing, implementing and improving new and existing building energy codes based on information from this workshop
  - Leverage best practices from the code capabilities assessment exercise and technical references to address high priority needs, implement high priority technical measures while engaging with the highest priority stakeholders.
  - An analysis of the workshop data will be provided in the summary report.

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References – International Model Building Codes

- **ANSI/ASHRAE/IES Standard 90.1-2022**, Energy Efficiency Standard for Sites and Buildings Except Low-Rise Residential Buildings
- **ANSI/ASHRAE Standard 90.2-2024**, High-Performance Energy Design of Residential Buildings
- **ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2020**, Standard for the Design of High-Performance Green Buildings
- **ANSI/ASHRAE/IES Standard 100-2024**, Energy and Emissions Building Performance Standard for Existing Buildings
- **ANSI/ASHRAE Standard 228-2023**, Standard Method for Evaluating Zero Net Energy Building Performance
- **International Code Council (ICC),** International Building Code-2024
- **International Code Council (ICC),** International Residential Code-2024

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References

- **Global Alliance for Buildings and Construction (GlobalABC).** (2023). *Global Status Report for Buildings and Construction*. United Nations Environment Programme.
- **GlobalABC.** (2024). *Climate Action Roadmaps for Buildings and Construction: Step-by-Step Guidance*. United Nations Environment Programme.
- **Global Buildings Performance Network (GBPN).** (2023). *Policy Evidence Library*.
- **International Building Quality Centre (IBQC).** (2020). *Good Practice Building Inspector Guidelines for Emerging Economies*.
- **IBQC.** (2021). *Good Practice Guidelines for Low Income Countries*.
- **IBQC.** (2021). *Principles for Good Practice Building Regulation*.
- **International Code Council (ICC).** (2023). *Capacity Building Toolkit: Proposed Deliverables*. Washington, D.C.: International Code Council.
- **ICC.** (2023). *Codes Breakthrough Agenda: Interim Report in Support of the Buildings Breakthrough Priority Action 5*.

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References

- **International Energy Agency (IEA) Energy in Buildings and Communities.** (2021). *Building Energy Codes Compliance Practices*. IEA Energy in Buildings and Communities Programme.
- **IEA.** (2021). *All countries targeted for zero-carbon-ready codes for new buildings by 2030*. IEA Tracking Report.
- **IEA.** (2021). *Buildings: Codes and Standards*. IEA Technical Report.
- **OECD.** (2024). *Global Monitoring of Policies for Decarbonising Buildings: A Multi-level Approach*. OECD Urban Studies, OECD Publishing, Paris.
- **World Bank.** (2023). *Building Green: Main Findings*. Washington, D.C.: World Bank.
- **World Bank.** (2023). *Building Green: Country Profiles*. Washington, D.C.: World Bank.
- **World Bank.** (2023). *Building Code Checklist for Green Buildings*. Washington, D.C.: World Bank.
- **World Bank.** (2023). *Unlocking Efficiency: The Global Landscape of Building Energy Regulations and Their Enforcement*. Washington, D.C.: World Bank Group.
- **World Resources Institute (WRI).** (2023). *Turkiye Building Sector Decarbonization Roadmap*. WRI Ross Center for Sustainable Cities.

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Glossary

- ANSI – American National Standards Institute
- ASHRAE – American Society of Heating, Refrigerating and Air-Conditioning Engineers
- CEBD – Center of Excellence for Building Decarbonization
- COP – Conference of the Parties for country signatories to the UNFCCC
- GBC – Green Building Council
- GFDRR – Global Facility for Disaster Reduction and Recovery - The World Bank
- GWP – Global Warming Potential
- HVAC – Heating, Ventilation and Air-Conditioning
- IEA – International Energy Agency
- IES – International Illuminating Engineering Society
- ICC – International Code Council
- NDCs – Nationally Determined Contributions
- PNNL – Pacific Northwest National Laboratory
- UNFCCC – United Nations Framework Convention on Climate Change
- WorldGBC – World Green Building Council
- WRI – World Resources Institute

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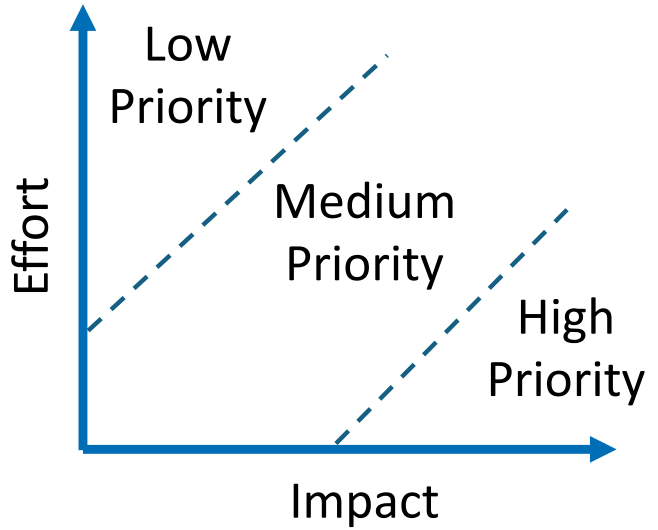
Appendix – Building Code Design Elements

- Building Code Types
  - Prescriptive
  - Performance-based
- Building Code Metrics
  - Energy
  - Carbon Emissions
- Building Code Applicability
  - New Construction
  - Renovation
  - Existing Buildings
- Building Type Coverage
  - Residential
  - Commercial



Note: Incremental incorporation of building code design elements with increasing complexity over time is a best practice for emerging economies.

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Appendix - Building Code Types

E1 - Prescriptive Codes: Specification of minimum or maximum values for individual building components and materials that must be met to ensure compliance without requiring whole-building energy modeling.

E2 - Performance-based Codes: Specification of building performance goals rather than prescribing specific construction methods and materials which allows greater flexibility and innovation but generally requires testing or modeling to prove compliance.

E3 - Outcome-based Codes: Specification of desired building performance outcomes (energy, carbon intensity) rather than prescribing specific construction methods and materials which are measured post-construction to verify compliance.

E4 - Combined Codes: Combination of prescriptive (typically envelope, HVAC/lighting efficiency, and solar heat gain) and energy performance targets while allowing system design trade-offs.

E5 - Voluntary Codes: Compliance is voluntary, and may be encouraged through incentives, for applicable buildings and projects which are not subject to regulatory obligation.

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Appendix - Building Code Metrics

E6 - Energy Use: Annual energy consumption (site or source energy) per unit area based on building type, use and occupancy.

E7 - Energy Demand: Peak electrical demand per unit area and specific time periods based on building type, use and occupancy.

E8 - Operational Carbon: Annual greenhouse gas emissions per unit area during the building's use phase.

E9 - Embodied Carbon: Total greenhouse gas emissions generated during the extraction, manufacturing, and transportation of building materials and during building construction.

E10 - Whole Life Carbon Emissions: Total operational and embodied carbon as well as emissions from building end-of-life demolition, material disposal and recycling.

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Appendix - Building Code Applicability

E11 - New Construction: Code applicability is based on building size, percentage of building floorspace planned for newly constructed space as well as major renovations which involve structural changes or significant system upgrades.

E12 - Major Renovations/Repairs: Structural changes (walls, floors, ceilings), system upgrades (HVAC, insulation, windows, and lighting) and change in use or occupancy often require full compliance with current codes including low-flow fixtures, safe electrical distribution, and modern internet infrastructure.

E13 – Building Use/Occupancy Change: Change in building use or occupancy often require full compliance with current building codes.

E14 – Building Ownership Change: Change in building ownership may require that buildings be brought up to current building codes.

E15 - Existing Buildings: Existing buildings may be required to conform with current building codes after specified periods or through building performance standards.

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Appendix - Building Types

E16 - Small Residential Buildings: Low-rise dwellings, usually one to three stories tall, with limited occupancy (one to two families), often under a certain square footage threshold with separate means of egress and accessory structures like detached garages and sheds.

E17 - Large Residential Buildings: High-rise dwellings, more than three stories tall, which include hotels, motels, apartments, dormitories, small residential care facilities, assisted living or group homes with limited occupants.

E18 - Small/Medium Commercial Buildings: One to two-story buildings including retail stores, small restaurants and cafes, clinics and professional services offices with low occupant load and a limited floor area (5-10,000 square feet)

E19 - Large Commercial Buildings: Buildings over three stories with large floor areas (>10, 000 ft2) including offices, industry, data centers and mixed-use facility with central systems.

E20 - Large Institutional Buildings: Buildings with large floor areas (>10,000 ft2) including hospitals and medical centers, nursing homes and assisted living facilities, correctional facilities, mental health institutions and long-term care facilities which may be public or privately owned.

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Thanks for your participation...

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