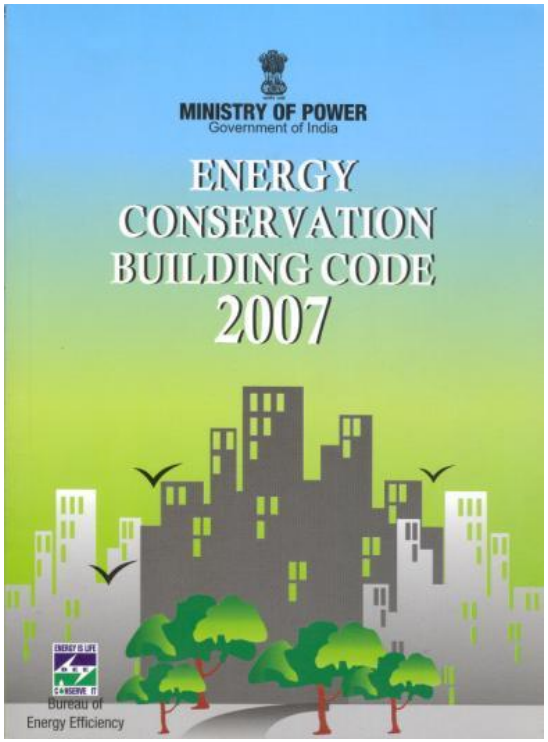
Energy Conservation Building Code

Regional Experiences – Gujarat, Maharashtra, Madhya Pradesh

2nd Region; Workshop on ECBC Implementation in States

March 16, 2017, Ahmedabad

Energy Conservation Building Code, India



ECBC set minimum energy efficiency standards for design and construction

It encourage energy efficient design or retrofit of buildings

It does not constrain the building function, comfort, health, or the productivity of the occupants

Has appropriate regard for economic considerations

Energy Conservation Building Code, India

Adoption

– Mandatory requirement is to be adopted at SDA or by the ULB or by an agency such as the state PWD. ECBC compliance is included in building bye-laws.

Implementation

– Architects and engineers design the building to meet ECBC requirements
– Contractors construct and commission the building to meet ECBC Requirements

Enforcement

– The process of checking ECBC requirements in a building
– Happens at design stage to get construction permit, and after construction
to get occupancy certificate

Energy Conservation Building Code, India

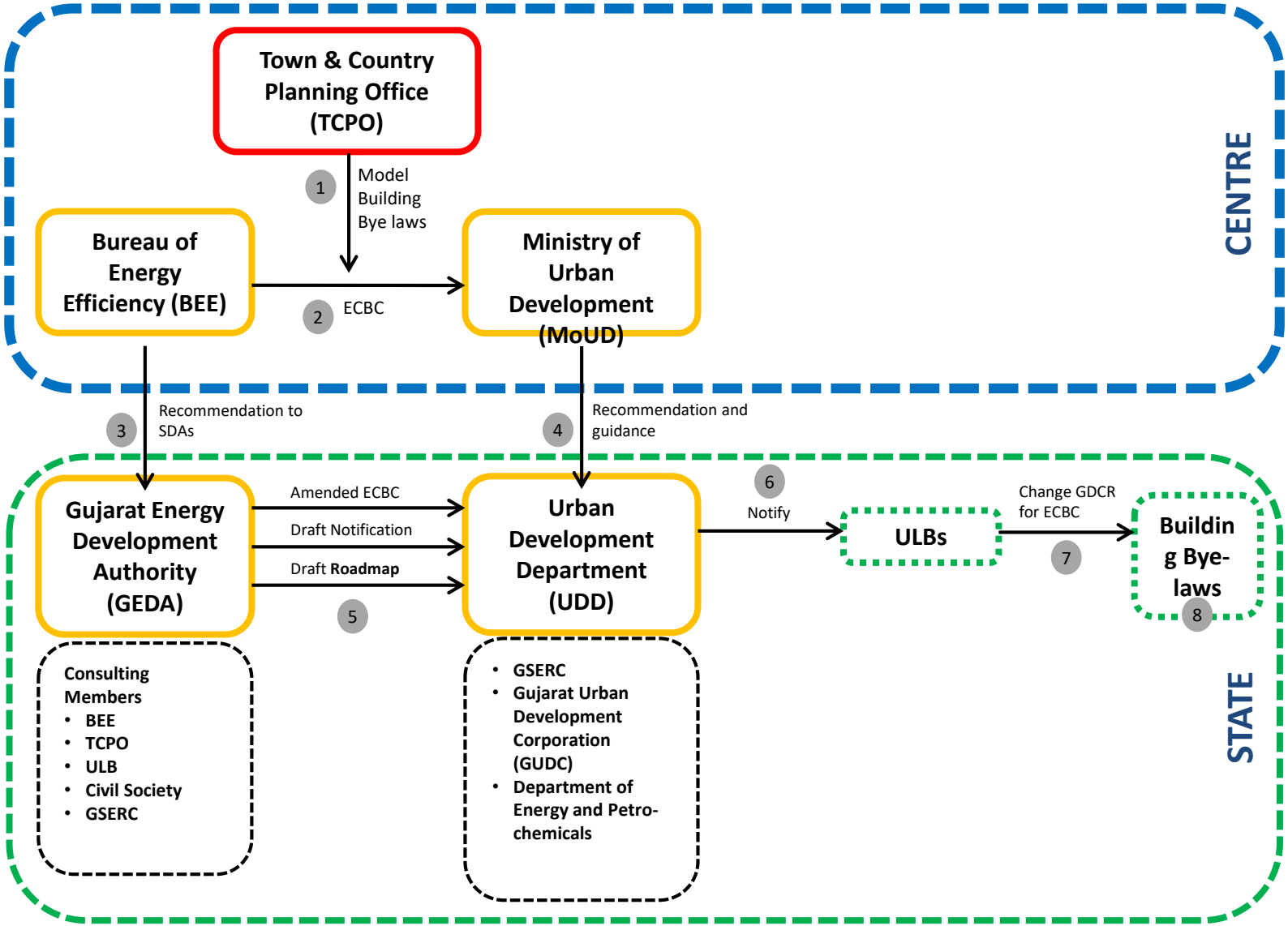
Code Enforcement Overview

Step 1 must be a compliance check before construction that gives a permit to construct based on drawings and Documentation

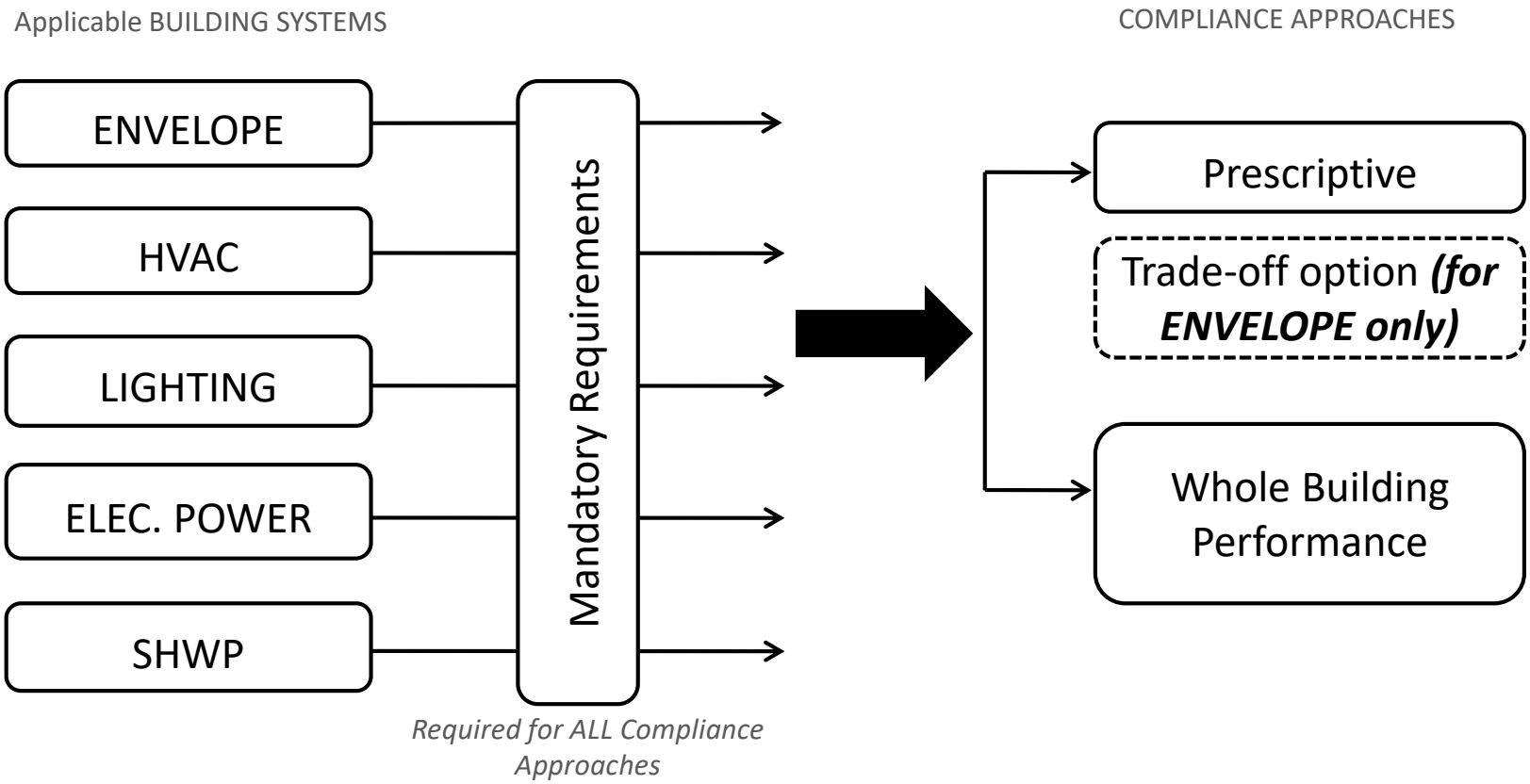
Step 2 must be a compliance check with on-site inspection that ensures that the building as an asset is code compliant

Step 3 may be an optional ongoing check for compliance based on building Energy Performance Index

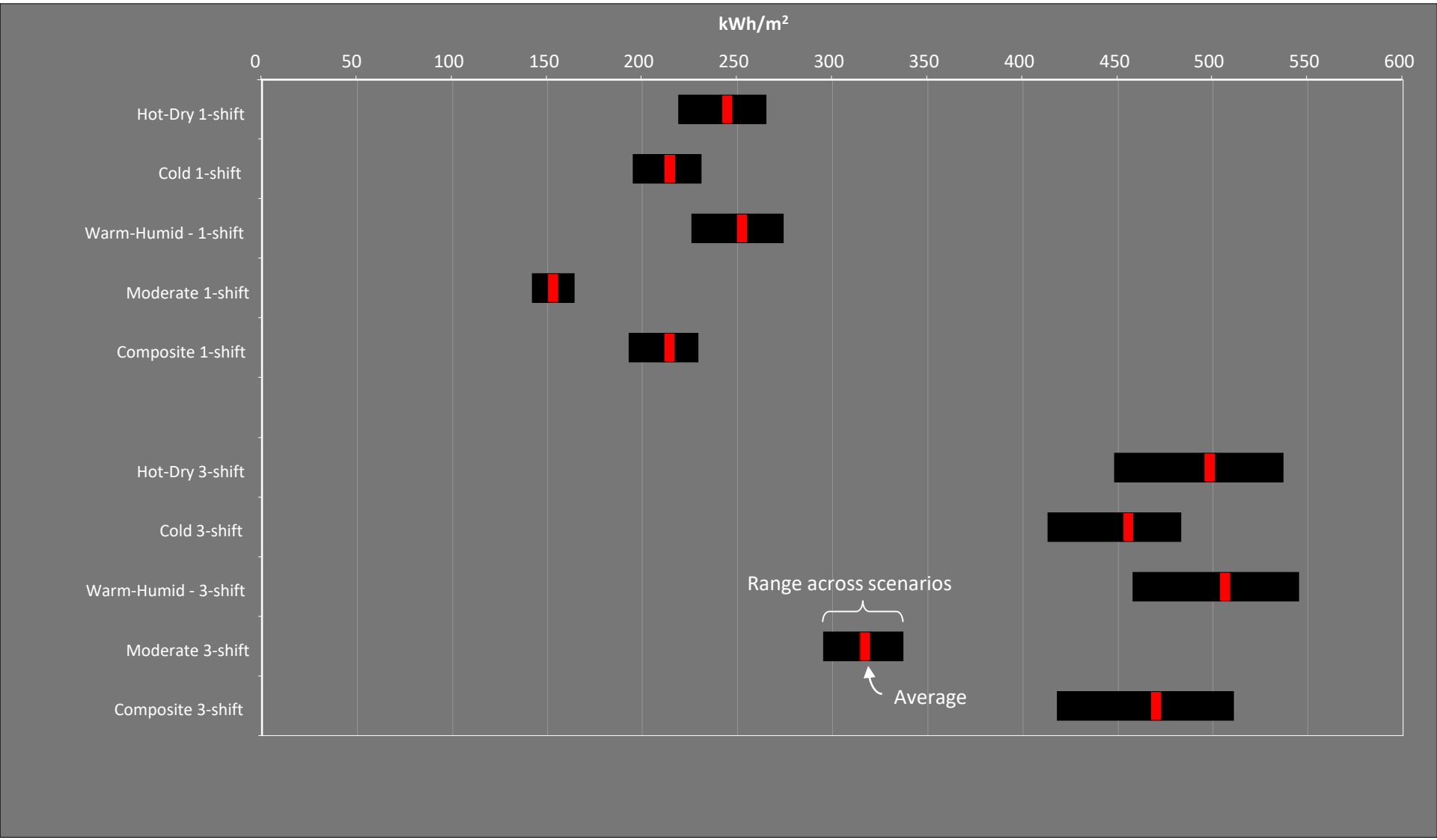
ECBC Notification Process



Compliance Approaches

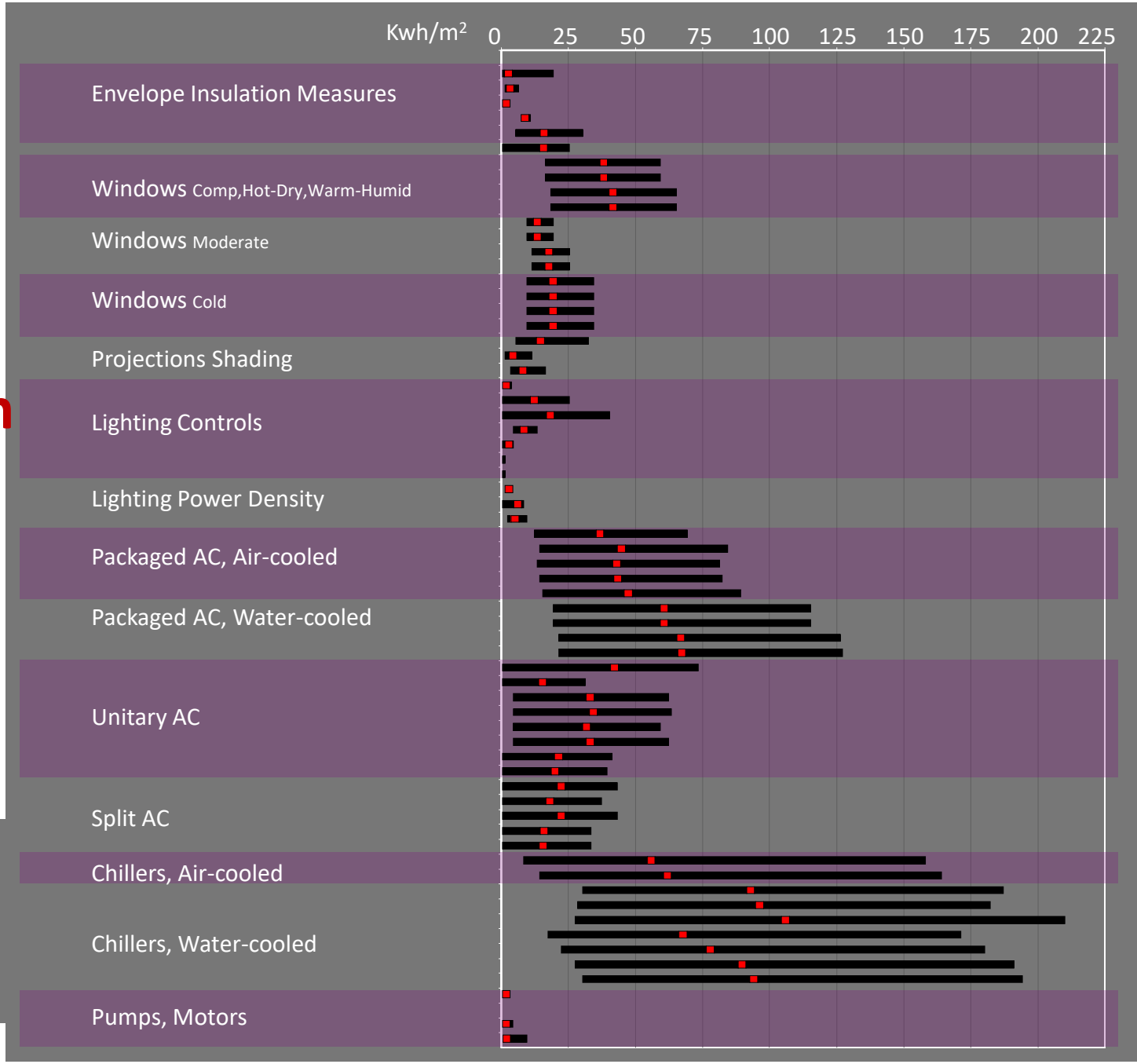


Energy Performance Index of Buildings



Source: TWG-CEPT Study

Savings Summary Of Various Energy Conservation Measures



Savings compared to BAU

Range across scenarios

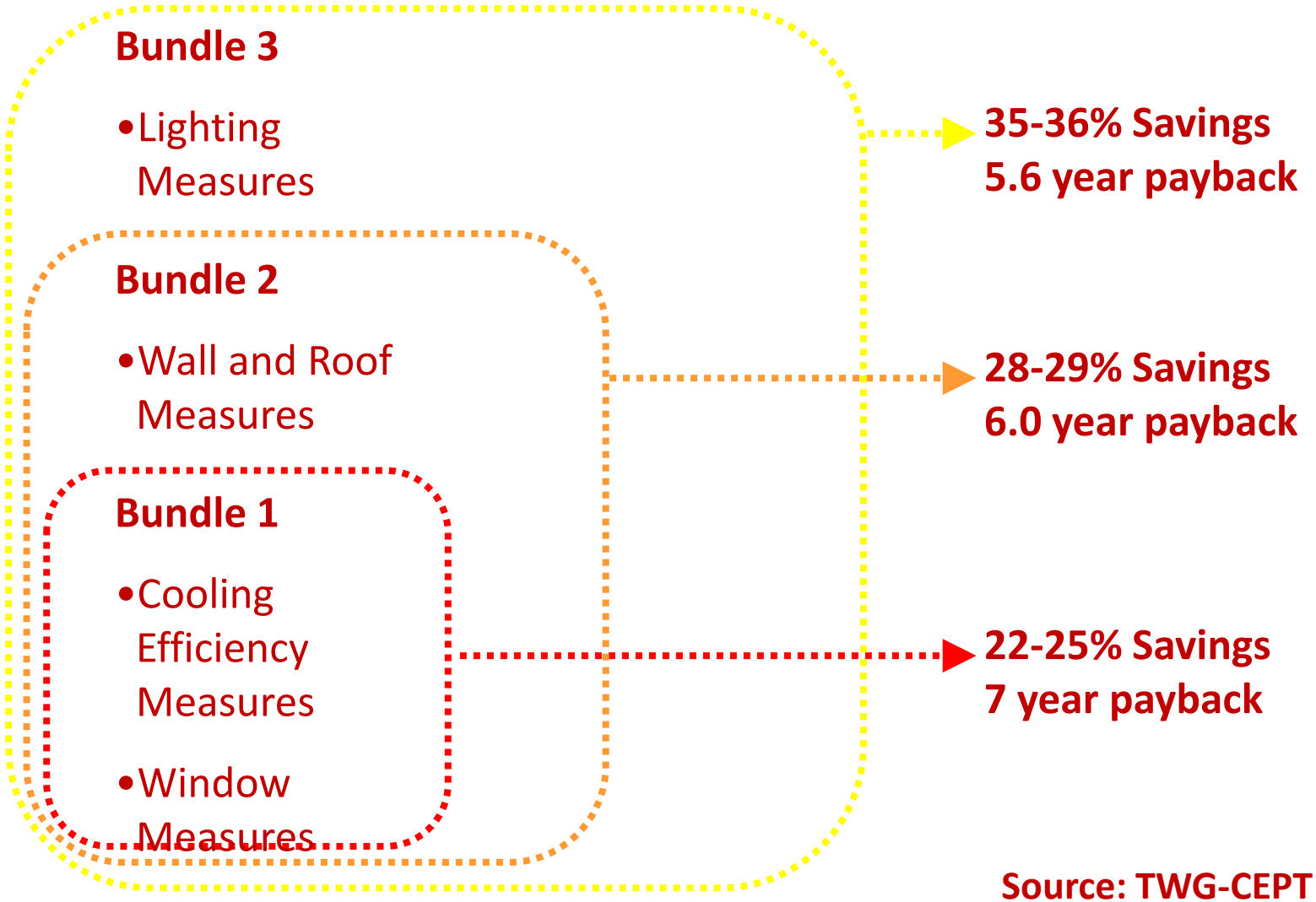
Source: TWG-CEPT Study

Implementation and Enforcement Approach 1 : Energy Saving

- The most promising measures for each climate zone in terms of annual energy savings are included in the first Bundle.
- Thus, ECMs with high energy savings are in Bundle 1, followed by moderate energy savings in Bundle 2 and those with lower energy savings in Bundle 3.
- This ensures that high energy savings are realized even when the first step- Stepped Bundle 1 is implemented.

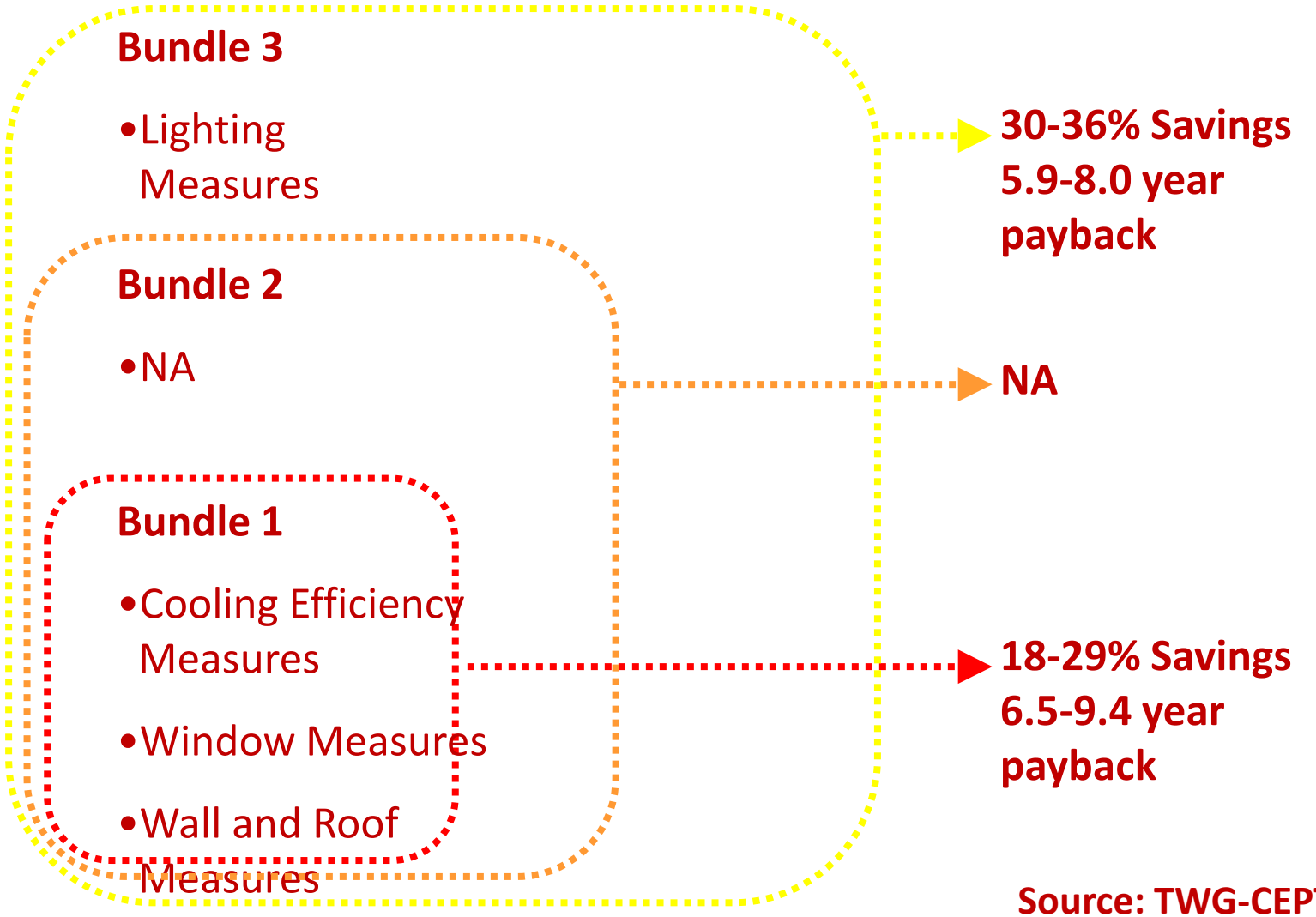
Source: TWG-CEPT Study

Approach 1 Hot-Dry and Warm-Humid Climates



Source: TWG-CEPT Study

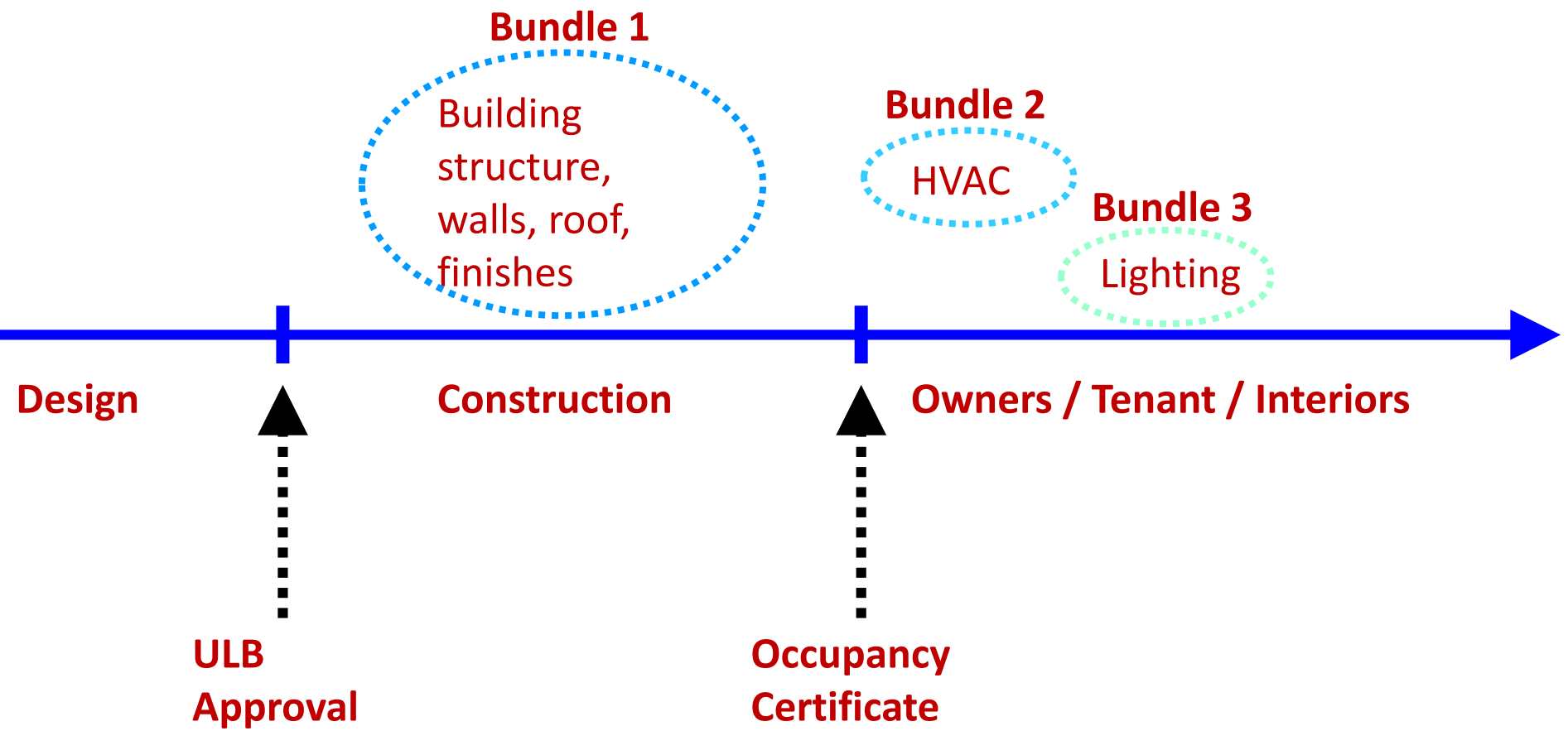
Approach 1 Cold, Moderate and Composite Climates



Source: TWG-CEPT Study

Construction and Permitting Process

For majority developer projects



Source: TWG-CEPT Study

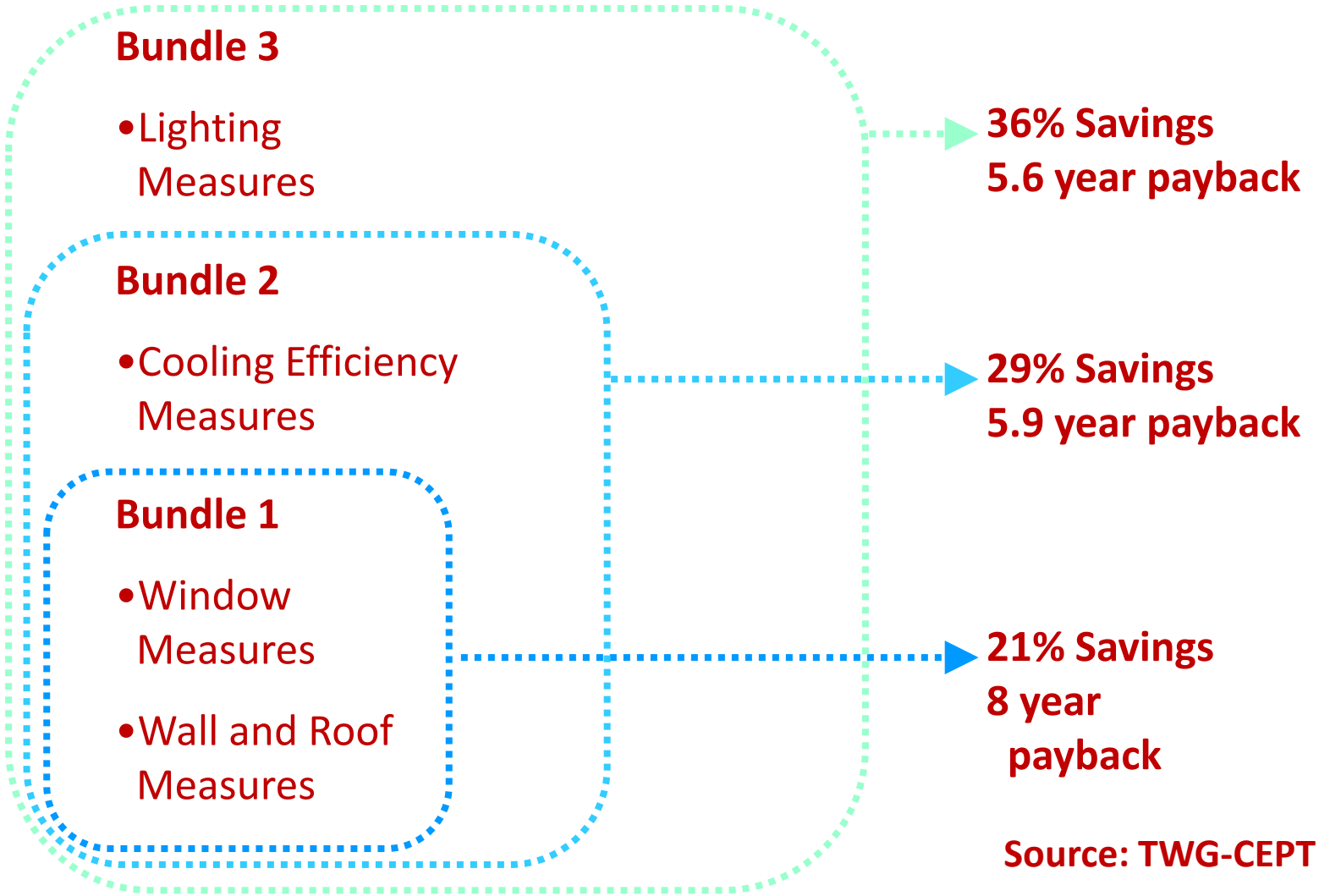
Implementation and Enforcement Approach 2 : Ease of implementation

Bundles area arranged with ECBC requirements that align with the current building permitting process

- Bundle 1 contains measures that can be checked when the building shell is completed and ready for approval given the current construction approval process of most ULBs.
- Bundle 2 contains measures that could be implemented by the developer/owner with labeling programs as the mode of enforcement.
- Bundle 3 contains measures that are difficult to enforce with labeling programs or with the current ULB approval process, and may require an independent Third Party Agency.

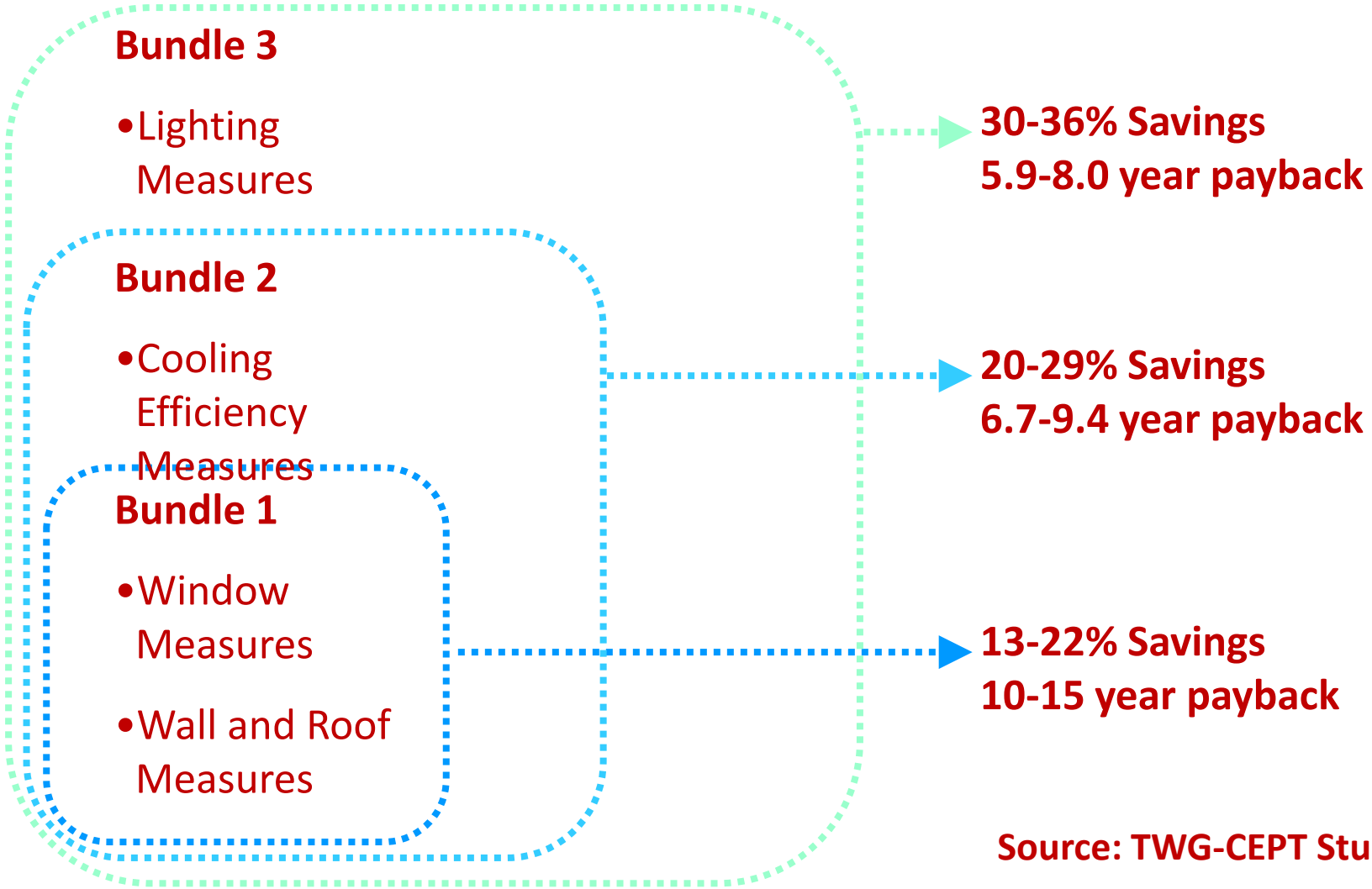
Source: TWG-CEPT Study

Approach 2 Hot-Dry and Warm-Humid Climates



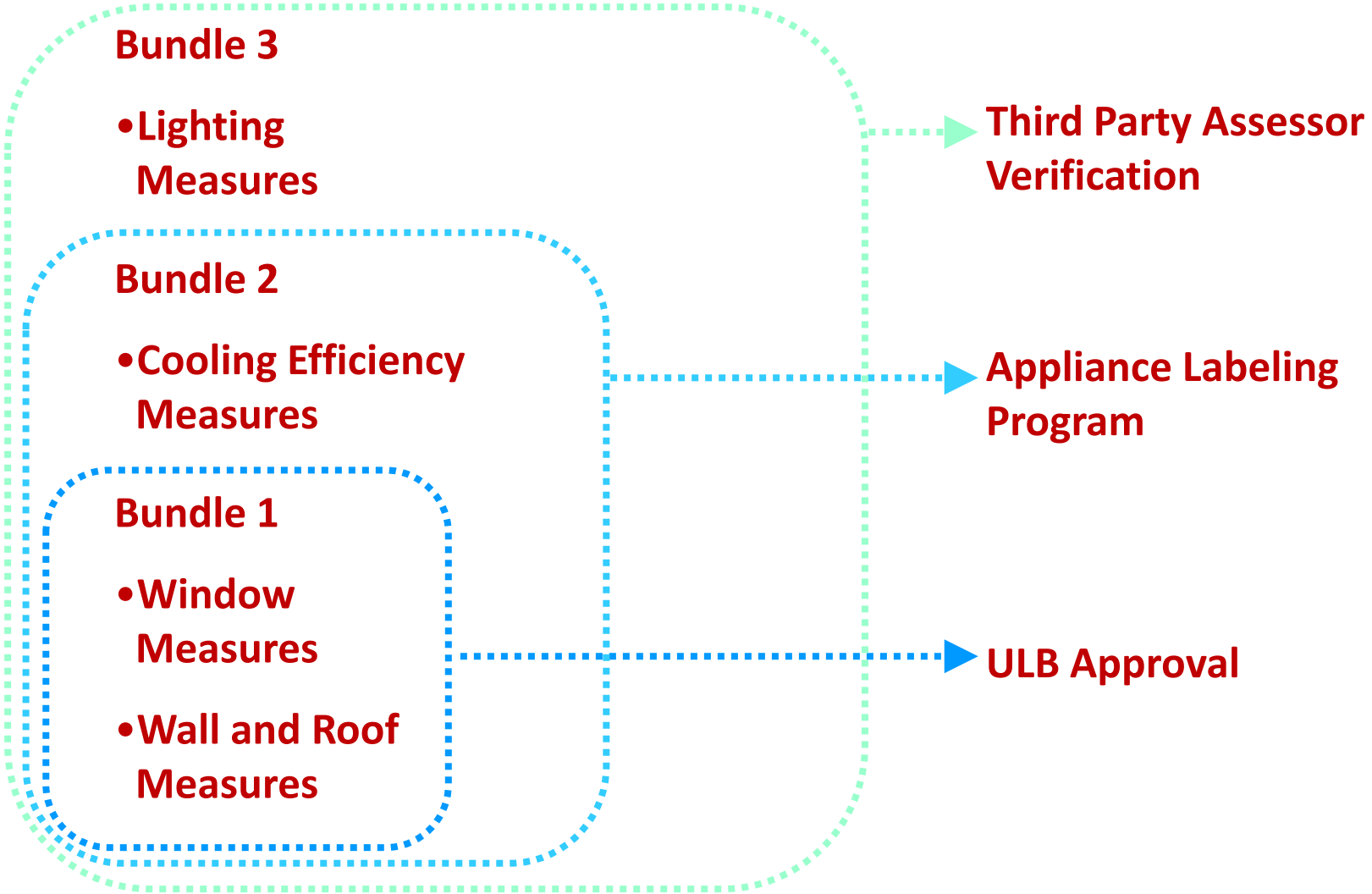
Source: TWG-CEPT Study

Approach 2 Cold, Composite and Moderate Climate



Source: TWG-CEPT Study

Approach 2

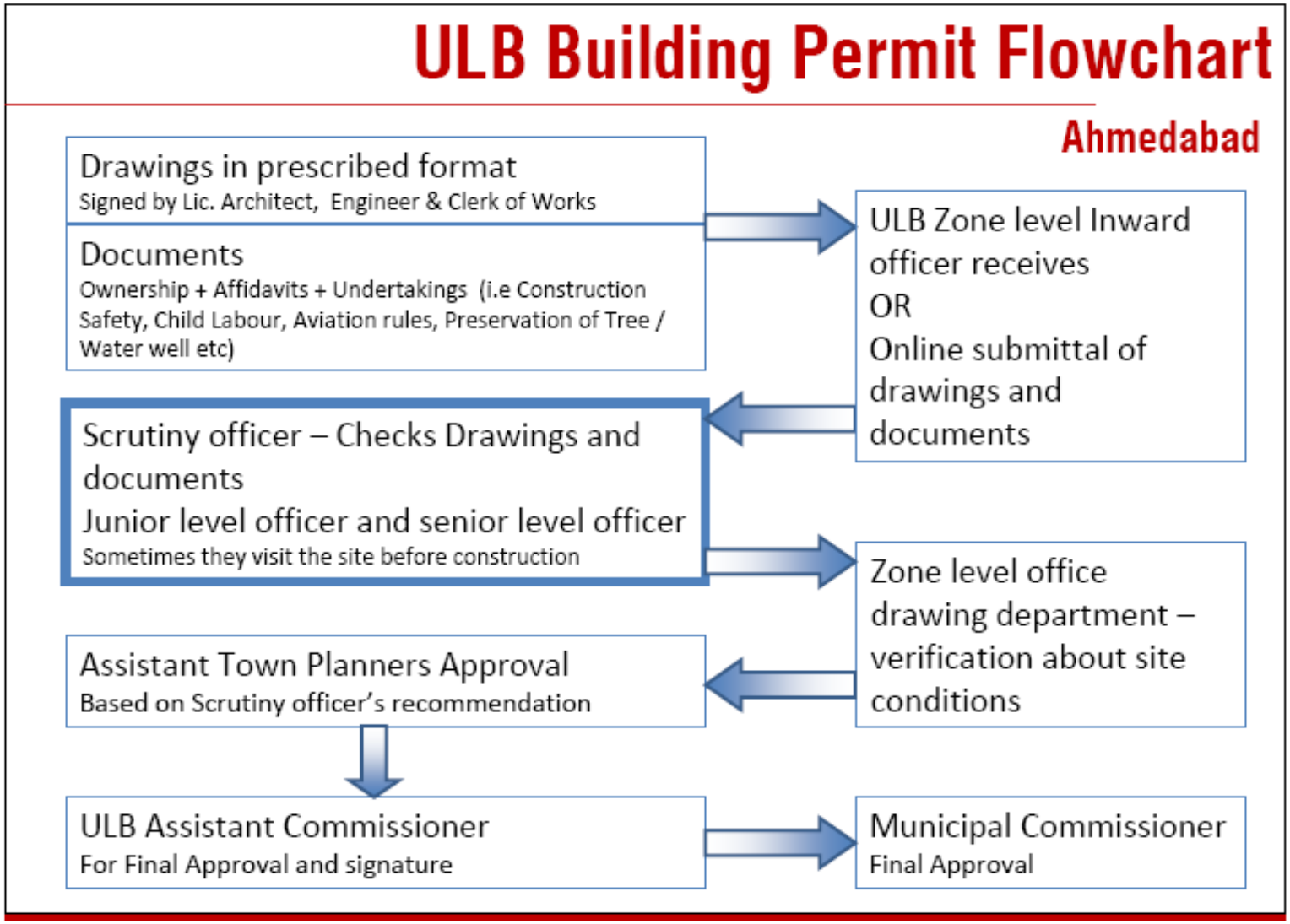


Source: TWG-CEPT Study

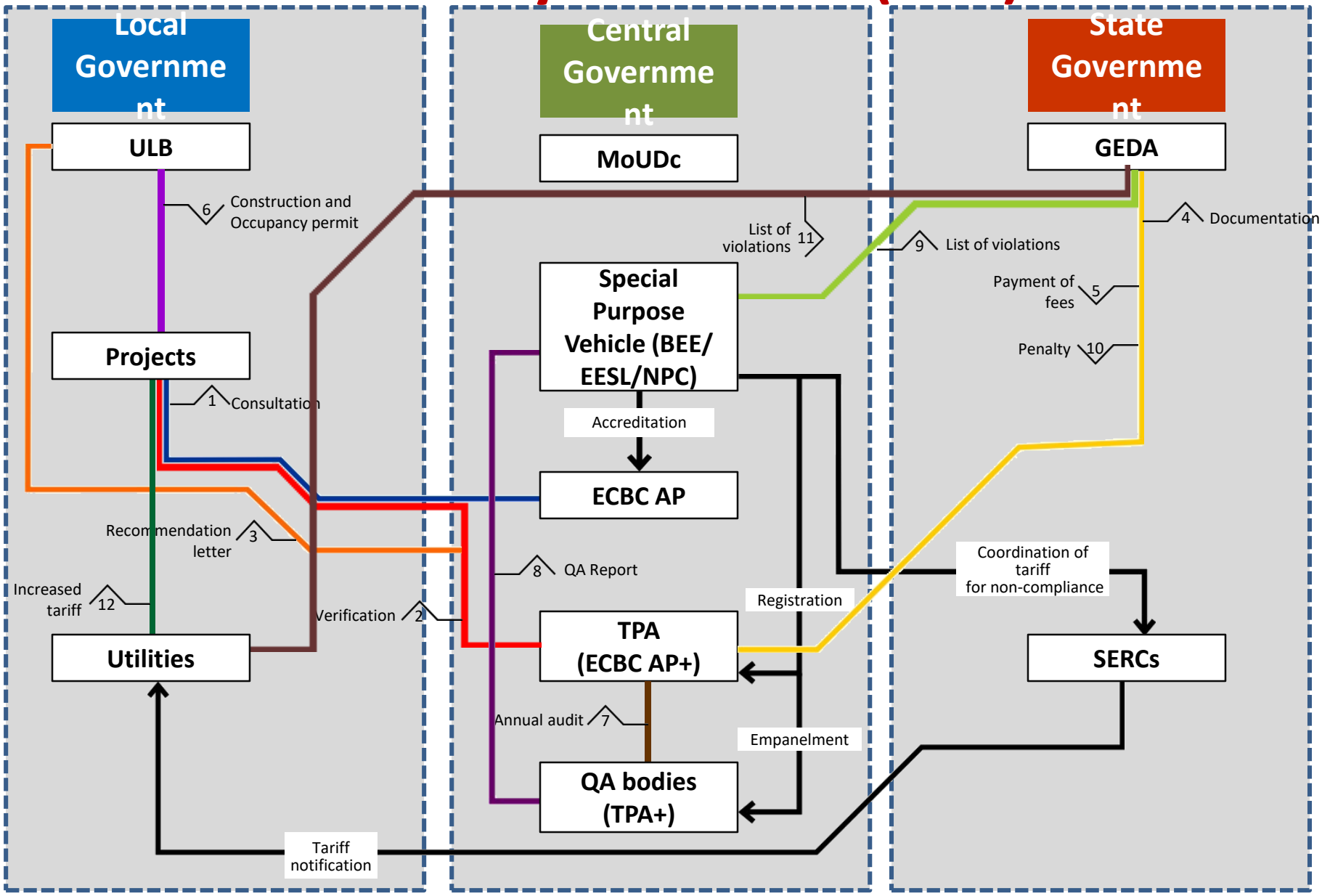
Enforcement Models

- **Urban Local Body (ULB) Model**
- **Third Party Assessment (TPA) Model**
- **ECBC Expert Committee (EEC) model**

Energy Conservation Building Code, India



Third Party Assessors (TPA)



Energy Conservation Building Code: TPA

Increasingly popular mode of code enforcement.

• Allows easier scale up and scale down of capacity to handle growth

• Once instituted, it can include Rating Authorities

Challenges

– Requires a certification and qualification for TPAs

• **Examples of Success**

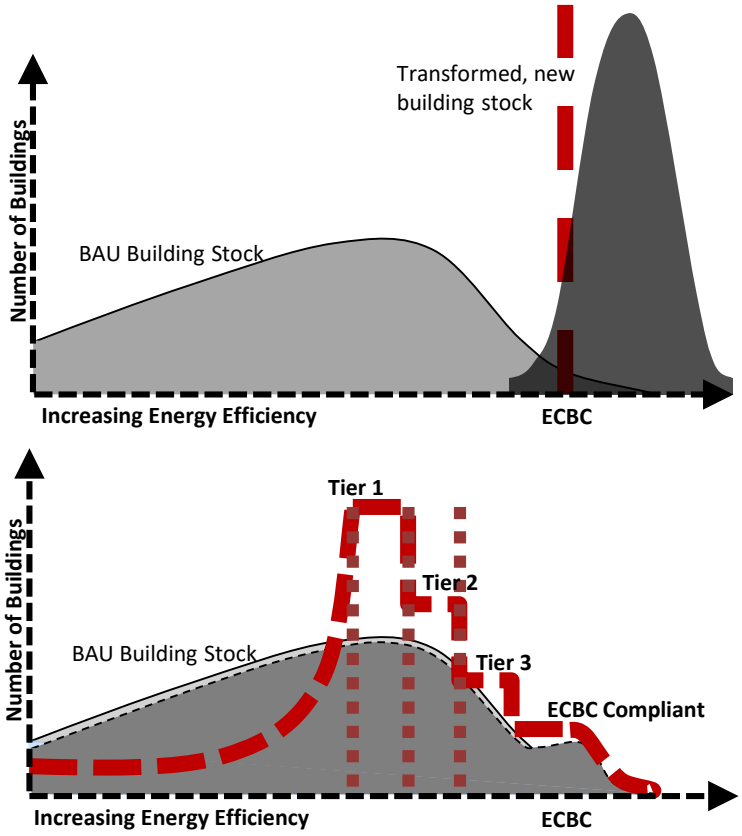
– Adopted in China with good success, 80% compliance reported.

– In response to issues about municipal-led regulatory enforcement, governments in Canada have used TPAs.

– Over 90% of the US State of Pennsylvania's 2,562 municipalities have enforced the code locally, using employees or via Certified TPAs

– Rating systems with TPAs used in Australia (NABERS), USA (HERS)

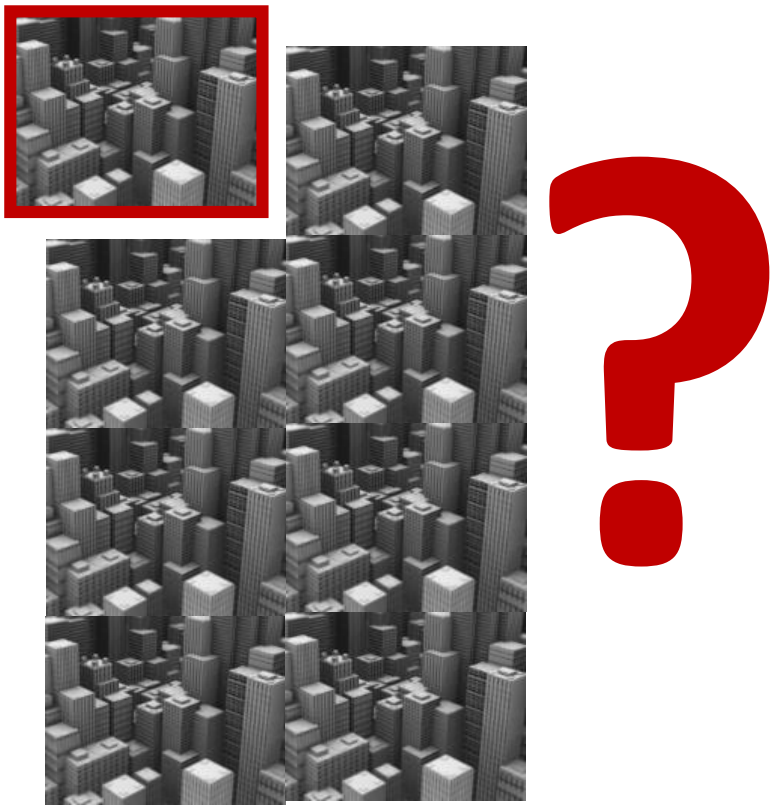
ECBC: Implementation Challenges and Approach



- **Urban Local Bodies to enforce**
  - Scope up to building construction
  - No control over operation of building
  - Limited Capacity
- **Tiered approach of implementation**
  - ULB focused –
    - Construction permit
    - Occupancy permit
  - State Designated Agency
    - Third party assessment
    - Utility managed assessment process

Energy Saved by Each Measure of Building

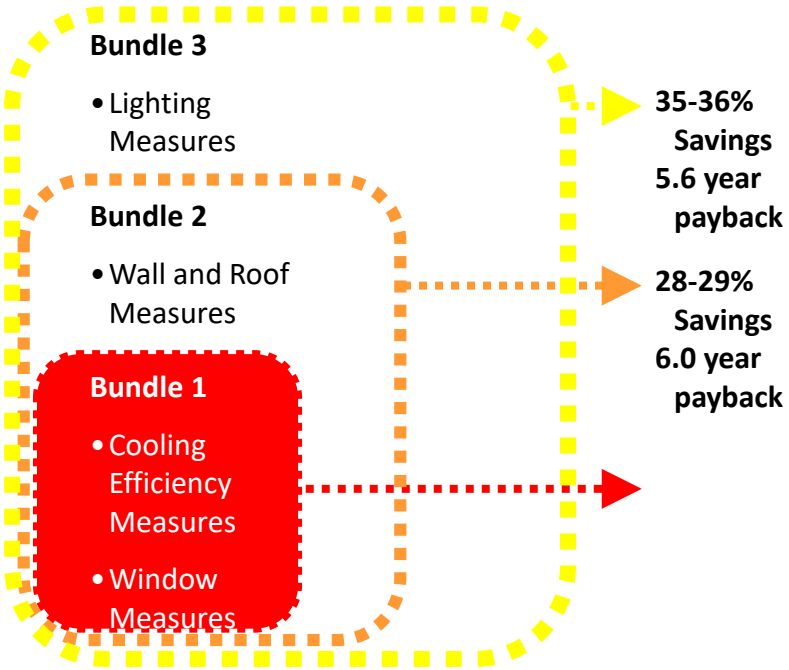
Challenge: Estimation of energy savings at city level



- **How much energy can be saved**
  - Envelop and / or building systems
  - At city or At State level
- **Should code be expanded to / for**
  - Smaller commercial buildings
  - Large residential buildings
- **Prioritise enforcement**
- **Readiness and benefits to industry**
  - Manufacturing
  - Service Industry

Prediction of future energy scenario

Extending work to potential retrofits and Emissions



- **1 KWh/m2-year efficiency in the total existing floor space at Ahmedabad can result in City level cost savings: INR 79.8 crores**

  - *Avoided CO_2 emission and avoided installed capacity*

  - *Triple bottom line Energy, Environment, Equity*

THANK YOU

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Backup Slide

Third Party Assessors (TPA)