Third Party Assessor Framework

Final Report for Phase 1

April 12, 2012

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for

Shakti Sustainable Energy Foundation

Prepared by:

The Weidt Group and CEPT University

An initiative supported by

SHAKTI
SUSTAINABLE ENERGY
FOUNDATION

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Introduction

The Energy Conservation Building Code (ECBC), developed by Bureau of Energy Efficiency (BEE) under the Ministry of Power provides minimum requirements for energy-efficient design and construction of buildings. When ECBC is adopted, compliance with these requirements shall be a significant challenge for the construction industry as well as the agencies that shall enforce it. To deliberate on the ECBC compliance-check process, Shakti Sustainable Energy Foundation (Shakti) organized a day-long workshop with stakeholders from government agencies, utilities, developers, architects, engineers, product manufacturers and other consultants. The CEPT University and The Weidt Group facilitated this workshop.

One of the modes identified for ECBC enforcement or checking for compliance was the use of Third Party Assessors (TPA), who are independent of the design and construction team, and also not part of the Urban Local Body (ULB). In the proposed model, a TPA is retained to check for compliance with ECBC and submit a report to the ULB or the utility for provisional compliance approval. Permissions are given in two stages- once before construction begins, when the utility provides temporary power to the construction site and second after completion of construction, prior to occupancy. The TPA may provide the on-site inspection to ensure ECBC asset compliance when construction is ongoing as well as when it is completed. Ongoing compliance checks may occur during occupancy. Shakti has retained The Weidt Group (TWG) and CEPT University to conduct Phase 1 background research and to develop an operational model for the TPAs. The activities include:

- Review the TPA model used by China, GRIHA/ADaARSH (India), IGBC (India), GBCI (USA), Chartered Accountants (India), Company Secretaries (India), and code compliance by local government agencies (USA) and summarize the findings.
- Review the Chartered Accountant and Property Assessment TPA model in India and summarize the findings.
- Develop a *draft framework* for the TPA model to work in a hybrid ULB compliance check process and a potential utility compliance check process with DSM funds. Develop a draft Statement of Work for the TPA to outline their responsibilities, methods for checks, work schedule and their expected deliverables. Propose draft selection criteria for qualifying/recognizing/accreditation of the TPAs at a firm level and at a personnel level. Propose a review process to assess the performance of the TPAs.
- Discuss the draft Statement of Work with potential firms or building energy professionals who could act as TPAs to get understanding about the range of their fees or charges.
- Hold a joint workshop with Ministry of Urban Development, BEE, one or two ULBs, SDA, a utility company and a supportive State Electricity Regulatory Commission to review the *draft framework* for issues related to the compliance process and staging, required personnel job profiles and qualifications at the ULB and utility, the methods for provisional compliance based on building design, asset compliance based on building construction, and performance compliance based on ongoing building operation. The draft framework also proposed funding mechanism to sustain TPA activity and a method for assuring quality and consistency in the TPA work.

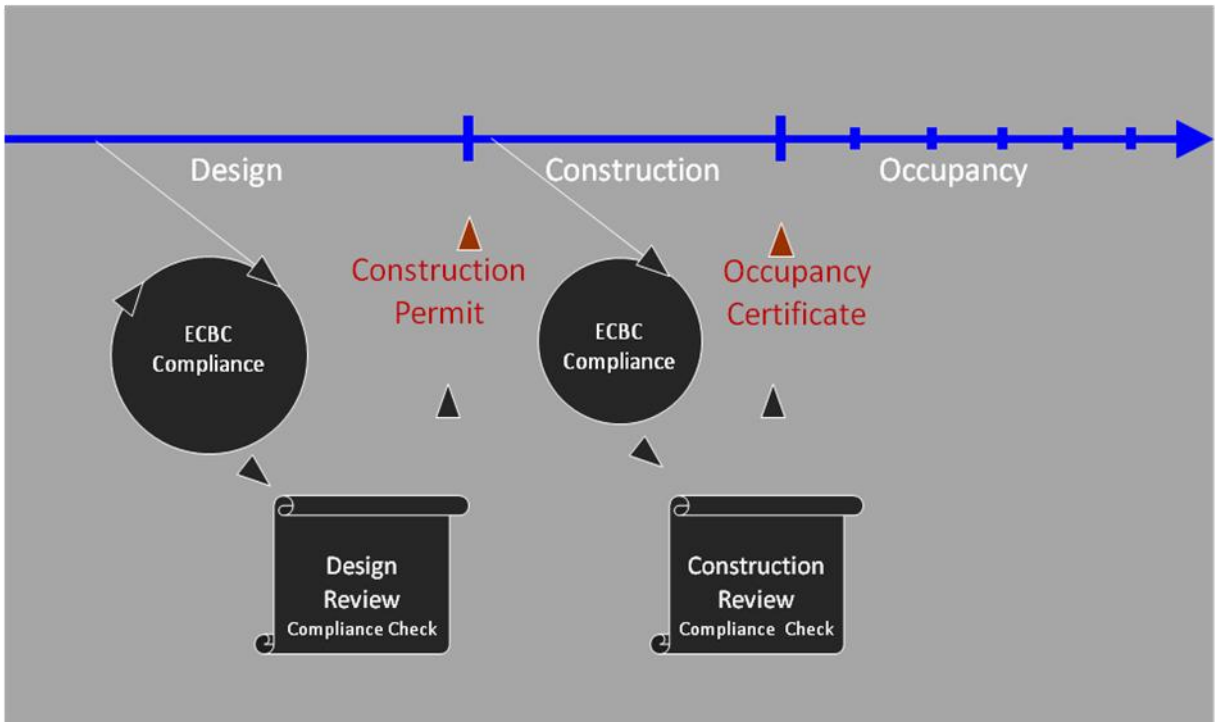
TWG and CEPT proposed an operating model for the TPA work and presented it in a workshop held in New Delhi on February 27, 2012. This document summarizes the project team's proposal for the TPA operating model framework and the discussion and findings from the workshop. Participants in the workshop are listed below:

- Shakti – Seema Paul, Smita Chandiwala, Alpana Jain, Kerry Harwin
- BEE – Sanjay Seth, Girja Shankar
- Gujarat Energy Development Agency – Rajendra Pandya
- Regulatory Assistance Project – Mahesh Patankar
- Schneider Electric (USAID-ECO-III Project) – Satish Kumar
- UMC – Meghna Malhotra

- CEPT – Rajan Rawal, Yash Shukla, Sanyogita Manu
- TWG – Prasad Vaidya, Alecia Ward

Background

Figure 1. Compliance Check Schedule for Building Project



Currently, the process of compliance with building codes is done through compliance with the local bye-laws. The project design team led by the architect, submits a set of documents to the ULB for approval. The ULB reviews the drawings and other supporting documents that have been submitted and verifies that bye-laws and building codes are being complied with. The ULB then gives permission to the building owner to commence with the construction. During various stages and towards the end of the construction process, the ULB inspects the construction on site and verifies that the building has been built to comply with the bye-laws. The ULB then gives the building owner an Occupancy Certificate. The Occupancy Certificate allows building owner to avail power and water supply and use the building. When the requirements of ECBC are included in the bye-laws, this process of approvals can become complex[1]. In this context we see the following barriers to the enforcement of ECBC Requirements through ULBs:

- Reviewing a building design in documents or on site requires understanding of civil, mechanical and electrical issues. Typically, ULB staff has understanding of civil issues only. The requirements for civil items for ECBC also need a basic understanding of building physics and thermodynamics.
- Checking for both the prescriptive and performance paths of ECBC requires a significant capacity building effort to educate and train the ULB personnel in each location. This level of training and capacity building for over 600 ULB's in India can be inefficient, especially if a ULB jurisdiction is likely to have very few new buildings that fall within the purview of ECBC.
- Within a ULB personnel are transferred to other departments that do not deal with building permits and bye-law enforcement. Thus even after capacity building at ULB is accomplished, such transfer of trained ULB personal will reduce the benefit of the capacity building.

1 Given the bye-law enforcement process, ECBC enforcement is likely to happen primarily through the ULB. Facilitation or assistance to the ULB may need to come from the State Designated Authority or another agency.

Third Party Assessors as independent agents outside the ULB offer specific advantages:

- The capacity building will be done by the private sector, and within the private sector.
- The private sector allows easier scale up and scale down of capacity to handle growth as needed.
- Private sector expertise is not tied to geographical location. Thus a TPA living in one geographical region can easily provide ECBC compliance checking services in a different location. ULB personnel cannot do that easily.
- Quality and consistency of services offered by the private sector can be regulated. Thus quality and consistency of the compliance checking will be easier to control, maintain and improve over time when it is done by a TPA.

Research Summary

The Weidt Group and CEPT University reviewed a number of third party operating models.

1. Chartered Accountants (CA) in India
2. Company Secretaries (CS) in India
3. Property Assessors (Valuers) in India
4. IGBC/ LEED in India
5. GRIHA/ADaRSH in India
6. LEED/GBCI for all Rating Systems except LEED for Homes in the USA
7. LEED/GBCI for Homes in the USA
8. EPA ENERGY STAR in the USA
9. Code Compliance with TPAs in various Jurisdictions in the USA (Fairfax County, VA; Dayton, OH; Pittsburgh, PA; Washington, DC)
10. Code Compliance through use of Design Professional Accountability/Self-Certification in the USA (Wisconsin & Arizona)
11. Code Compliance in China

For each of the above the ten aspects listed below were researched and documented (TWG CEPT 2012). The research findings are included in a separate report in the Appendix.

1. Roles
2. Appointment methods
3. Fee structure
4. Process of review or audit
5. Standards followed
6. Complaint resolution
7. Qualifications
8. Credentialing
9. Education and training
10. Quality assurance

Summary of Research Findings and Framework Principles

The background research informed the development of principles under which TWG and CEPT have proposed the TPA framework described in this document and discussed at the February 27, 2012 workshop. The detailed research report and the workshop presentation slides are included in the Appendix.

To assist the ULB and streamline the work process

- Integrate the operation model with existing checkpoints in the building permit process
- Maximize the capacity building outside the ULB, and minimize need of capacity building within the ULB
- Minimize the management burden on the ULBs

To ensure consistency and to maximize geographical flexibility, keep the standards of service, qualification, accreditation, and quality assurance upstream at the national level.

Ensure that there is no conflict of interest for the TPA by

- Removing conflict of interest between TPA and project team
- Removing conflict of interest between TPA and the QA bodies[2]

Ensure Quality Control and Quality Assurance

- Quality Control: Provide two sets of educated eyes for each project. An ECBC accredited professional, as part of the design team would assist the team with compliance and facilitate any discussions related to ECBC with the TPA or other authorities. The TPA would provide the review.
- Quality Assurance: Provide for after-the-fact review of TPA's work through a randomized audit or checking process, and provide penalties for poor quality of work.

Use existing funding sources that can be earmarked for ECBC compliance checks so that immediate implementation in Phase 1 of the TPA model can be readily done.

2 QA Bodies will review the work of the TPA to ensure quality and consistency over time and across geographical regions.

Proposed Framework & Workshop Notes

TWG and CEPT developed an operating model for the TPAs to provide services for compliance review for ECBC requirements. A summary of the research findings **of various TPA models from India, the US and China** and the proposed operating model were presented. This section includes the framework that was presented in the workshop and a summary of the discussion and participants' comments. Workshop presentation slides are included in the Appendix.

General Workshop Comments: Fire safety certification may be an additional relevant model to add to the research. There was some debate by workshop participants as to whether it is third party enforced. Several participants suggested that fire safety is not a TPA example. CEPT and TWG agreed to investigate this option more thoroughly to assess whether lessons learned might be informative for the proposed TPA model. There was discussion among the participants related to overall ECBC enforcement and the implication or need for buildings of a certain size to be recognized as Designated Consumers.

TPA Scope of Work[3]

The TPA shall review the drawings, specifications, Compliance Forms in Appendix G of ECBC User Guide or alternative compliance forms endorsed by BEE to ensure that the energy conservation measures (ECM) are reflected in the project Design Documents. If ECMs that are required to meet ECBC are excluded or incompletely documented, the TPA shall notify the ECBC Accredited Professional on the design team and request additional information to ensure that ECBC requirements are met. If the design team has not used the ECOnirman WBP Tool for compliance, the TPA shall use the ECOnirman WBP Tool to generate the EPI for the proposed building. The TPA shall complete and sign a Letter of Recommendation for Approval. The TPA shall send the letter with the Checklist attached to the ULB notifying them of the findings.

Any building project can choose to comply with ECBC using the Prescriptive or the Performance approach. As ECBC is adopted at the state levels, the prescriptive requirements may be amended at the state level based on climate and context. Such modifications shall be endorsed by BEE. The Tiered Approach to ECBC compliance (TWG CEPT 2011, Rawal 2012), is an example approach for amendment to ECBC. TPAs shall be required to provide compliance checks for ECBC and its state-level or local adaptations. Each project shall be completed with the following deliverables as documentation of the TPA's work.

- Design Review
  - Checklist of compliance check items, duly completed after the Design Document Review
  - Comments and request for additional information provided to the design team
  - Letter of Recommendation for Approval at Design stage with the final Checklist attached
- Construction Review
  - Checklist of compliance check items, duly completed after the Document Review
  - Comments and request for additional information provided to the design team
  - Site inspection documentation with labeled photographs, on-site report and material supplier cut sheets
  - Letter of Recommendation for Approval with the final Checklist attached

Workshop Comments: There was general agreement among the participants about the TPA scope of work presented.

3 The scope of work for the TPA is discussed in detail in a separate document titled TPA Scope of Work (TWG CEPT 2012). See Appendix.

Institutional Set Up and Administrative Roles

At the national level, Bureau of Energy Efficiency (BEE) under the Ministry of Power and the Ministry of Urban Development are the government entities involved. TPAs, ECBC Accredited Professionals and QA Bodies will also provide services across the country without being tied to any local or state jurisdiction. BEE list TPAs as registered personnel who are qualified to carry out the ECBC compliance checks. BEE also selects the QA bodies.

State Electricity Regulatory Commissions (SERC), Urban Development Departments (UDD), and State Designated Agencies (SDA) are the government entities involved at the state level. SDAs play the administrative role at the state level, pay the TPAs for their work and maintain a database of the buildings that attempted to comply and later complied with ECBC.

The utility company, ULB, and the project team are involved at the local jurisdictional level. The ULB approves the building permits. The utility provides temporary and permanent meter connections for the building construction and occupancy respectively.

Workshop Comments: The role of utilities in ECBC enforcement was discussed. Participants discussed the issue that utilities do not have jurisdiction to enforce efficiency. The group concluded that the role of utilities in ECBC enforcement needs further development and discussion with ULBs and utilities.
The participants from the government agencies discussed the need to increase the involvement of the ULBs in this conversation. There needs to be further discussion and exploration with the ULBs on how/whether/when enforcement or a possible penalty might be arrived at for failure to comply with the code. Code enforcement at the moment of occupancy versus ongoing conformance with code throughout occupancy was also discussed. Upon conclusion of the discussion, the government representatives agreed that code compliance in the design phase and at the moment of occupancy are most appropriately handled by the TPA and ULB whereas ongoing performance of the building during occupancy may be appropriately handled by the utility with some coordination with SDAs and SERCs.
BEE participants agreed that BEE would be the authority credentialing TPAs and ECBC Accredited Professionals. BEE would list qualified TPAs on their website and work towards having enough TPAs in the country to meet the anticipated demand.

Project related roles

The ECBC Accredited Professional (AP) works with project team to assist with meeting ECBC requirements. The TPA conducts document review and construction review and gives recommendation to ULB that the design or the construction meets the applicable ECBC requirements. In addition to the ECBC compliance, the ULB coordinates or checks for compliance with all other bye-laws and gives the stamp of approval for the project. QA bodies conduct annual random audits to review TPA's work for quality and consistency. BEE maintains list of TPAs who are qualified to provide TPA services on projects.

Workshop Comments: There was general agreement among the participants about the project related roles presented.

Qualifications and accreditation

TPAs and ECBC APs shall be registered persons and not firms. ECBC Accredited Professionals will have minimum qualifications and will have passed exam. A TPA shall be a building professional (architect or engineer) and an ECBC Accredited Professional in good standing. In addition, a TPA shall have a minimum experience on three building projects with design review and on-site inspection for energy efficiency. QA bodies shall be selected organizations that have experienced TPAs to conduct QA activities on their staff.

Workshop Comments: There was general agreement among the participants about the qualifications and accreditation proposed.

Appointment methods

TPAs qualified to carry out the work shall be registered by BEE and listed on BEE's website. The Design Team shall select the TPA to work on their project. TPA shall declare no conflict of interest for each project they review. QA bodies shall be appointed by BEE with due process for qualification and selection.

Workshop Comments: There was general agreement among the participants about the appointment methods proposed.

Fees

TPA fees will be fixed based on project size and complexity. TPAs will be paid by SDAs. QA bodies will be paid similarly. QA bodies will be paid by BEE.

Workshop Comments: The group discussed fees and payments and participants were interested in more details on how LEED and GRIHA reviewers were paid. There was discussion about having the TPAs paid by the ULBs at the local level rather than by the SDAs as proposed; this relates to the concern that the ULBs needed to have some stake in the process of ECBC enforcement. In general, the participants concluded that TPAs could be paid by the SDAs, and that some additional discussion with a few ULBs was needed to confirm this model.

Funding sources

TPA work will be funded out of state level energy conservation funds. QA work will be paid out of national funds.

Workshop Comments: The group discussed possible funding sources to pay for the TPA services. Four models for funding were discussed: 1) utility or ratepayer funded model; 2) a central government funding model; 3) a state and local government model; and 4) a free-standing funding model where project developers pay for the TPA's services. The general consensus of the group was that a) the developer payment of TPA was a conflict of interest and was not desirable; and b) sufficient existing funding is in place flowing from central government to states and local jurisdictions (BEE to SDAs for ECBC compliance or state established energy conservation fund) to handle the initial demand for TPA services. The group also agreed that in the long run, a different financing model such as rate-payer funding may be possible and desirable.

Compliance-checking process

Compliance checks will be done at design and construction stages. ECBC AP will assist project team to meet compliance requirements and prepare compliance reports. TPA will check for compliance and request additional clarifications from project team. During construction stage, TPA will visit site to verify compliance with the code. TPA will give Letter of Recommendation when satisfied about compliance on a project. ULB will use TPAs letter with along with proof of compliance with other bye-law requirements as the basis for issuing approvals.

Workshop Comments: There was general agreement among the participants about the compliance checking process proposed.

Quality assurance

All annual work of a TPA is assigned to a QA body. Each QA body shall consistently determine number of projects to audit based on statistical significance, and shall identify the projects to be reviewed. Documentation of the identified projects will be reviewed by the QA bodies. QA bodies may also visit the building for site inspection. A QA report is prepared for each TPA that lists all TPA's projects, the projects that were reviewed, projects in violation of compliance along with the level of violation. The QA Body will provide a Summary of Violations to BEE and to SDA involved in the TPA's projects.

Workshop Comments: There was general agreement among the participants about the QA methods proposed.

Penalties and resolution

TPA is fined for each violation by the SDA. Repeat violations result in the BEE cancellation the TPA's qualification to provide services. Projects in violation are penalized with higher tariff[4], unless rectified.

Workshop Comments: The group discussed penalties on the TPAs for recommending non-compliant buildings for ULB approval as well as after-the-fact penalty payable by the developer for building a non-compliant project. Some additional penalties ideas were proposed 1) assessing a flat rate fine on the project developer for non-compliance that could be levied through property taxes 2) adjusting the tariff rate on a project property that was determined to be non-compliant. The group concluded that a TPA could only determine ECBC compliance for the building as an asset based on a set of standard operating conditions[5]. The group also concluded that the model of fine on the developer for building a non-compliant building needed further discussion and exploration with other stakeholders.

4 CEPT and TWG will explore other forms of penalties to the building owner in Phase 2 of the work.

5 The group agreed that once the building was in operation, code compliance check for the building as an asset would need to be done separately from any ongoing performance evaluation of the building. Calculating the building EPI based on its ongoing utility bills would not be a correct basis for assessing the efficiency of the building asset. The performance of the building asset would need to be evaluated under standard operating conditions.

Figure 2. Institutional Setup Diagram as presented in the workshop

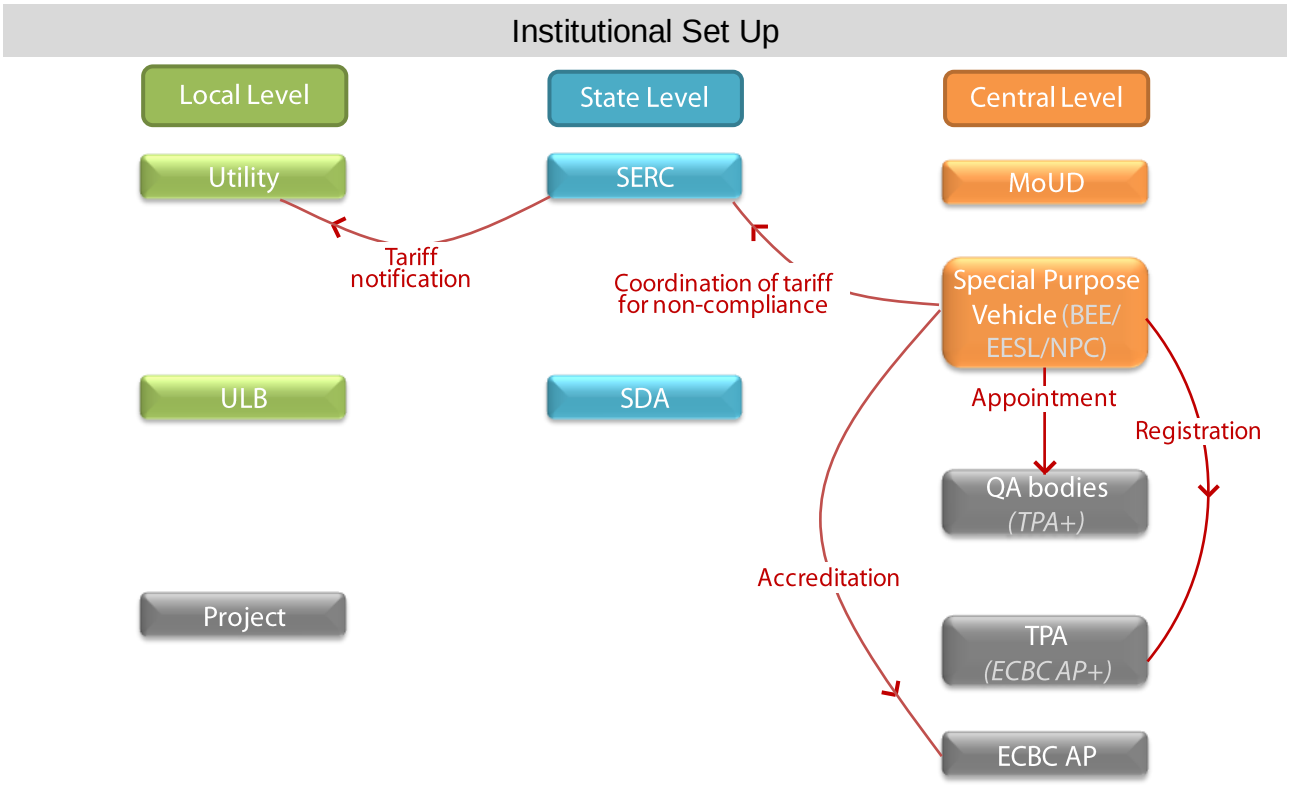


Figure 3. Process of Work for Each Building as presented in the workshop

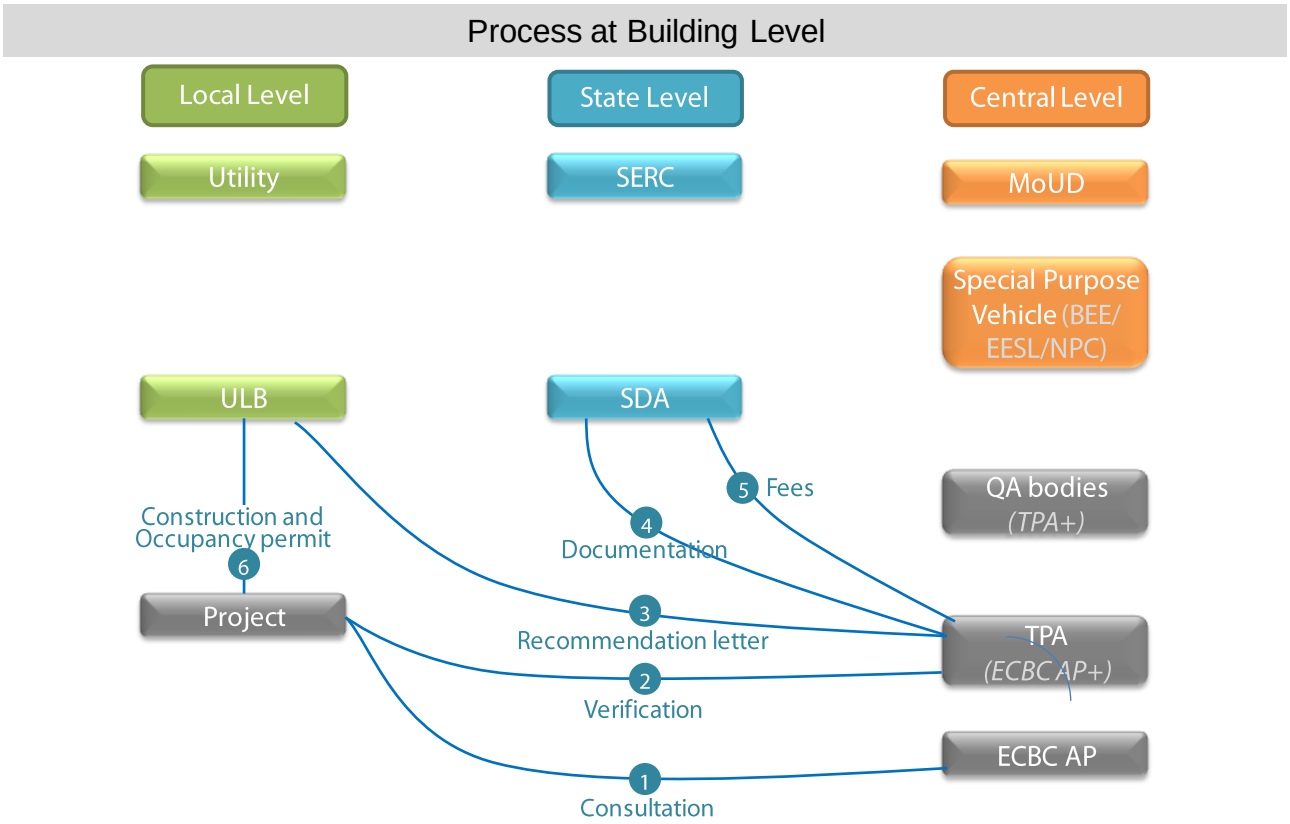
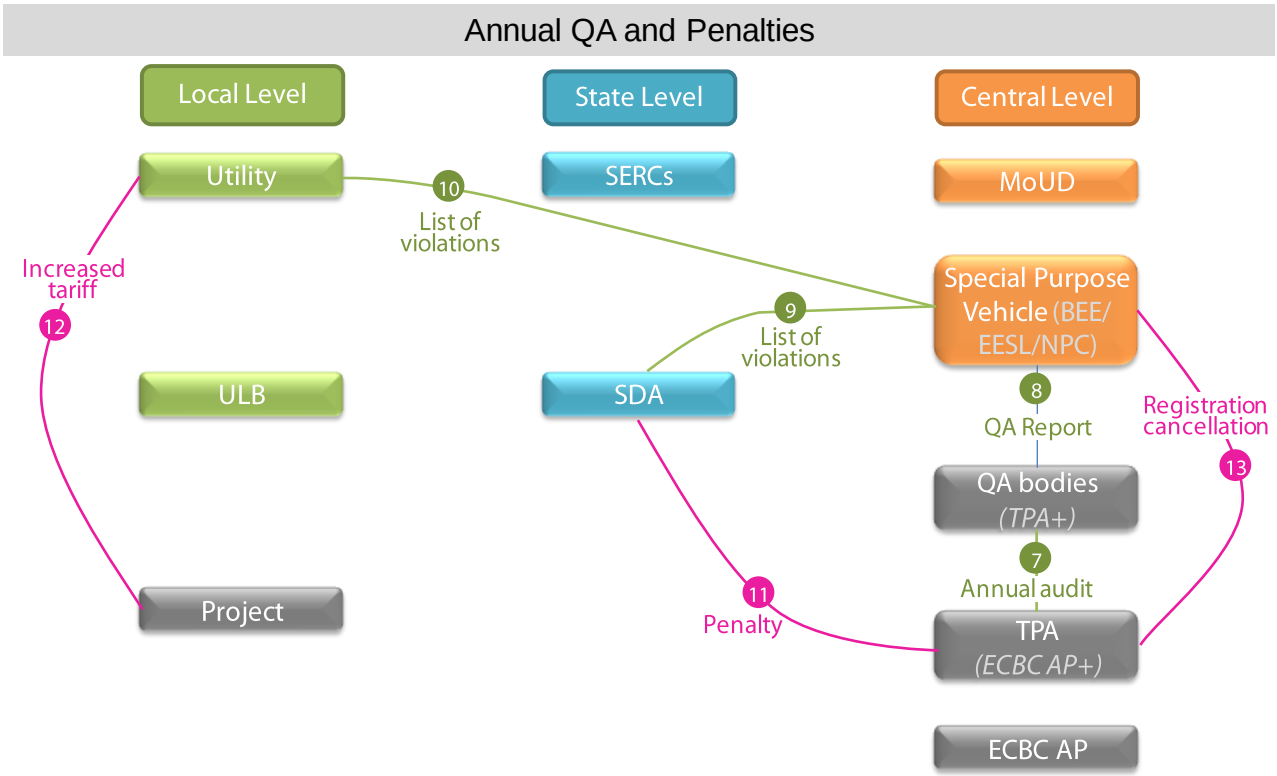


Figure 4. Annual QA Process and Penalties as presented in the workshop



Next Steps – Proposed Phase II Activities

Given the feedback from workshop participants and the need to establish a strong TPA model for ECBC compliance in the immediate future, the group determined that these next steps would be appropriate.

Socialization with State and Local Governments

- Develop alternative relationship and funding diagrams based on discussions from the workshop.
- Conduct meetings with ULBs and SDAs to review the proposed operating model, the rules, penalties and incentives, and the alternative relationship and funding diagrams.

ECBC Accredited Professional

- Detail the qualifications of ECBC Accredited Professional (AP) and examination and accreditation methodology.

Third Party Agency

- Further detail the Statement of Work for the TPA to further outline their responsibilities, methods for checks, work schedule and their expected deliverables including draft selection criteria for qualifying and registering the TPAs.

QA Bodies

- Detail the Statement of Work for the QA Bodies to further outline their responsibilities, methods for checks, work schedule and their expected deliverables including draft selection criteria for the QA Bodies.

Socialization of the Framework

- Conduct a *stakeholder workshop/webinar* that includes building developers, designers, ULBs, utilities and potential providers to review and discuss the proposed framework for the TPA model.

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Appendix

1. **Third Party Assessor Research Summary**
2. **Third Party Assessor Scope of Work**
3. **Presentation Slides from Workshop dated February 27, 2012**

Third Party Assessor Research Summary

February 25, 2012

for

Shakti Sustainable Energy Foundation

Prepared by

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Introduction

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One of the modes identified for ECBC enforcement or checking for compliance was the use of Third Party Assessors (TPA), who are independent of the design and construction team, and also not part of the ULB. In the proposed model, a TPA is retained to certify design documents and submit a report to the ULB and/or the utility for provisional compliance approval. Permissions are given before construction begins and before the utility provides temporary power to the construction site. The TPA may provide the on-site inspection to ensure ECBC asset compliance when construction is complete. Ongoing compliance checks may occur during occupancy. Shakti has retained The Weidt Group and CEPT University to conduct Phase 1 background research and to develop an operational model for the TPAs. The activities include

- Review the TPA model used by China, GRIHA/ADaARSH (India), GBC (India), GBCI (USA), Chartered Accountants (India), Company Secretaries (India), and code compliance by local government agencies (USA) and summarize the findings.
- Review the Chartered Accountant and Property Assessment TPA model in India and summarize the findings.
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- Discuss the draft Statement of Work with potential firms or building energy professionals who could act as TPAs to get understanding about the range of their fees or charges.
- Hold a joint workshop with Ministry of Urban Development, BEE, one or two ULBs, a utility company and a supportive State Electricity Regulatory Commission to review the *draft framework* for issues related to the compliance process and staging, required personnel job profiles and qualifications at the ULB and utility, the methods for provisional compliance based on building design, asset compliance based on building construction, and performance compliance based on ongoing building operation.

This document summarizes the findings of the research on how TPAs have been used in the following cases:

1. Chartered Accountants (CA) in India
2. Company Secretaries (CS) in India
3. Property Assessors (Valuers) in India
4. IGBC/ LEED in India
5. GRIHA / ADaRSH in India
6. LEED/GBCI for all Rating Systems except LEED for Homes in the USA
7. LEED/ GBCI for Homes in the USA
8. EPA ENERGY STAR in the USA
9. Code Compliance with TPAs in various Jurisdictions in the USA (Fairfax County, VA; Dayton, OH; Pittsburgh, PA; Washington, DC)
10. Code Compliance through use of Design Professional Accountability/Self-Certification in the USA (Wisconsin & Arizona)
11. Code Compliance in China

Research Methodology

Literature research included but was not limited to

- Building Codes Assistance Project's (BCAP) survey for code compliance
- World Bank Report on codes in developing countries
- GBCI Website
- Building Green: Environmental Building News
- Alliance to Save Energy (ASE)
- Building Codes Assistance Project (BCAP)
- Department of Energy (DOE)
- Pacific Northwest National Laboratory (PNNL)
- Institute for Market Transformation (IMT)
- Indian Green Building Council Website
- GRIHA Website
- The institute of Chartered Accountants of India Website
- The institute of Company Secretaries of India Website

Interviews included but were not limited to

- Institute for Market Transformation (IMT); Washington DC, USA
- Alliance to Save Energy (ASE); Washington DC, USA
- Building Codes Assistance Project (BCAP); Washington DC, USA
- Interview with GBCI (USGBC's certification agency), USA
- Interview and email exchanges with a US energy codes experts
- Correspondence with John Hogan, City of Seattle, USA
- Correspondence with Ken Nittler and Ross DePaolo of Westlab
- E-mail correspondence with Ankoor Sanghvi, Architect, India
- E-mail correspondence with Priyanka Kochhar, ADaRSH
- Interview with Nikita Jhaveri, Chartered Account, India
- Interview with Arvind Gaudana, Chartered Account, India
- Interview with Shui Bin, American Council for an Energy-efficient Economy

The research questions investigated were

- What are roles for the various entities such as the TPAs, Reviewers, Inspectors etc?
- What are the appointment methods for a third party reviewer?
- What is the fee structure?
- What is the process of review?
- What are the standards of review?
- How is complaint resolution done?
- What are the qualifications?
- What are the education and training requirements?
- What is the method for credentialing and maintenance of credentials?
- What is the process for Quality Assurance?
- What are the penalties, if any, for non-performance?

Research Findings

Research findings for the various areas where TPAs have been used in India, China and USA are all structured under ten subheadings.

Chartered Accountants (CA) in India

(1) Roles:
   a. CA conducts help prepare account books and conducts financial audits for individuals or companies
   b. CA also assists in filing income tax return for individuals or companies

(2) Appointment methods:
   a. Tax-paying Individual or company can employ or contract with CA for services
   b. Public, private firms or government, public institutes also use panel of CAs (re-selected every 1 or 3 years) for services through empanelment process.

(3) Fee Structure:
   a. Professional fees have been precribed by Institute of Chartered Accountants of India (ICAI) which is a professional governing body responsible for code of conduct and fair practices.
   b. Fees paid by the clients may vary based on industry practice which may not be fully accordance with ICAI norms.

(4) Auditing process:
   a. Individual person with less than designated income does not require a financial audit. Individual person or companies with more than designated income will ask for services from CA in submitting income tax forms and file return. The audit on income tax return is performed by income tax office.
   b. After crossing certain threshold of turnover, an individual, organization or company's income tax return (as stipulated by law) needs to be audited first by internal auditor; this internal auditor can be employee of company or can be hired on professional basis. Internal auditor must be qualified as well as licensed CA. Selection of internal auditors lies with individual, organization or company.
   c. Certain large organization stipulated by Government of India need to comply norms by conducting statutory audits. Statutory audits can be carried out by a qualified licensed CA. These statutory auditors can be selected by party . These statutory auditors verify the audit conducted by internal auditors.
   d. The central agency (ICAI) also has a peer-review panel that regularly reviews information reported by companies.

(5) Auditing Standards:
   a. Audits methodology has been outlined in standards formulated by ICAI
      i. Recommends use of standards set by National Advisory Committee on Accounting Standards (NACAS)
      ii. Recommends use of other technical standards such as Standards on internal audit (SIAA), Corporate affairs standards (CAS) and Generally Accepted Accounting Principles (GAAP)
   b. Internal Audits:
      i. All the financial details are reviewed by internal (or company employed / hired) CA.
   c. Statutory Audits:

i. All the details (bills etc) are reviewed by the ICAI certified auditor.
ii. The auditor can use knowledge of standards and professional judgment to determine what level of audit has to be performed.

(6) Complaint Resolution:
   a. ICAI's disciplinary committee has quasi-judicial status and can take disciplinary action against the members who violates code of ethics.
   b. When found guilty, ICAI can temporarily or permanently revoke licenses and can impose financial penalty as well.
   c. Disciplinary action by ICAI is separate from judicial system so chartered accounts can also be challenged in the court for negligence of duty or professional misconduct.

(7) Qualification:
   a. Apart from minimum enrolment requirements, chartered accountants also need to pass ICAI examinations and conduct three years of practical training (article ship). License is given to individual and not company. Statutory auditors can be firms.

(8) Education and Training:
   a. Chartered accountants also need to get practice of certificate (POC) to start their own professional practice.

(9) Credentialing:
   a. Continuing Professional Education (CPE) credits are required every three years.

(10) Quality Assurance:
   a. Peer-review High-level audit is performed to ensure that all the necessary audit steps have been performed (such as balance sheets have been properly maintained). While this may not be a direct check on the CA, it will indirectly review the work of a CA. Peer reviews get conducted randomly, and ICAI publishes the list of organizations which will undergo peer review in typical financial year. This is a cyclic process, every firm's peer review happens once in 5-6 years. Peer review's objective is to ascertain accounting standards and is not an audit over external auditor.

Company Secretaries (CS) in India

(1) Roles:
   a. Company Secretary ensures board procedures are followed and regularly reviewed as per existing laws.
   b. Company Secretary advises board of directors of private or public companies on to its duties as well as powers provided under various laws, rules and regulations.
   c. Company Secretary certifies annual return of companies reported to stock exchanges.

(2) Appointment methods:
   a. Individual or company can employ or contract with CS for services

(3) Fee Structure:
   a. Fees paid by the clients may vary based on competition and local expectations.

(4) Auditing process:
   a. Certain firms (per norms in law) are required to appoint qualified person as company secretary for corporate governance.
   b. The central agency (ICSI) has a quality review board to ensure that the good quality services are being provided to the clients. The quality review board can ask for information from

members (in form of survey or project information) or conduct off-site and on-site review as it feels appropriate.

(5) Standards:
    a. Secretarial standards have been written by ICSI for company secretaries.
(6) Complaint Resolution:
    a. The central agency (ICSI) supervises the members on professional ethics and code of conduct. The Council of the Institute determines that the code has been violated and also determines appropriate actions to be taken in the event of violations of the code.
(7) Qualification:
    a. Apart from minimum enrollment requirements, company secretaries also need to pass ICSI examinations and conduct stipulated trainings on various skills.
(8) Education and Training:
    a. Company secretary also need to get practice of certificate (POC) from ICSI to start professional practice.
(9) Credentialing:
    a. The company secretary has to maintain their membership of ICSI and periodically renew POC certificate.
(10) Quality Assurance:
    a. The central agency (ICSI) has a peer-review process to ensure that the technical standards are being following by practicing units. Minimum one peer-review in five years should be conducted on every practicing unit. The cost of peer-review is determined by central agency (ICSI) and will be paid by practicing units.

Property Assessors (Valuers) in India

(1) Roles:
    a. Valuers assess and certify financial value of building, plant and machinery for a project.
(2) Appointment methods:
    a. Individual or company can employ or contract with a Valuer for services.
(3) Fee Structure:
    a. Fees paid by the clients may vary based on competition and local expectations.
    b. Several professional Valuer organizations exist that have defined recommended fee structure for their members.
(4) Valuation process:
    a. Individual or company contacts registered Valuer for services.
    b. Register Valuer visits site to gather information about the building, plan and machinery.
    c. Based on professional knowledge and experience, the Valuer determines financial value of the site and provides a certificate indicating the assessed value.
    d. Several Valuers keep another person to gather the site information and then uses the gathered information to determine financial value.
(5) Standards:
    a. Several books have been written on the valuation process as well as recommended methods but no formal standards have been defined for the Valuer to use.
    b. Several professional Valuer organizations exist that have defined their own recommended practices for members.
(6) Complaint Resolution:

a. No formal process has been developed for complaint resolution. Typically, nation's judicial system is used during conflicts.
b. Several professional Valuer organizations exist that have defined their own code of conduct for members.

(7) Qualification:
a. The professional Valuer organizations have defined a minimum education or experience requirements to register as a Valuer.

(8) Education and Training:
a. There are no formal training or education requirements for Valuer except for the minimum qualification and experience requirements mentioned in previous section.

(9) Credentialing:
a. Valuer needs to maintain his membership in associated professional Valuer associations.

(10) Quality Assurance:
a. Certain large organization or banks, based on their own policy, may verify the estimates developed by a Valuer with another reputed Valuer.

IGBC/ LEED in India

(1) Roles:
a. Green rating system is designed by IGBC to help design and build Green buildings in India.
b. IGBC Accredited Professional (AP) assists the design and construction team to comply with the IGBC requirements and document them before the project is submitted for LEED review.
c. External Reviewers review the project information submitted to IGBC. Reviewers are appointed by IGBC on basis of experience and knowledge of the field

(2) Appointment methods:
a. Project team can employ or contract IGBC AP (accredited professionals) for services. It is necessary to have an IGBC AP as part of design team for any LEED certification aspirant project.
b. IGBC appoints External Reviewers to review a project submitted to IGBC.

(3) Fee Structure:
a. Fees paid to IGBC AP (by the clients) may vary based on industry practice, competition and local expectations. There are no guidelines by IGBC or any such organization on fees paid to IGBC AP.
b. Fees paid to IGBC for rating evaluation is based on fixed scale (determined by IGBC).
c. Fees paid to External Reviewer by IGBC are based on fixed scale (determined by IGBC).

(4) Process:
a. The project team registers the project to IGBC for rating evaluations.
b. A consultation meeting is scheduled between the project team and IGBC to discus rating evaluation process which is similar to an orientation workshop for design team.
c. Project team hires IGBC AP to help document project for IGBC rating as per IGBC norms. IGBC AP also helps project team to comply with IGBC norms other than documentation.
d. Project team submits the documentation to IGBC for evaluation.
e. First review:
i. IGBC internal team verifies completeness of documents submitted for evaluation.
ii. External reviewer reviews the technical aspects of documentation.

iii. Field Audit (Only in certain cases) will be conducted to review the specifics (not intended as a policing exercise).
iv. Review results are sent back to the project team along with "in principle" allocated credits.

f. Project team with help of IGBC AP review the queries/comments submitted by IGBC (along with external reviewer comments) and rectify/correct/modify as per project performance.
g. The documentation with answer on queries and comments will be submitted to IGBC for second review.
h. After successful / satisfactory second review, the project will be awarded appropriate certification level (platinum, gold, silver, certified).
i. The documentation submission and other communication with IGBC occurs through email and hence it is difficult to track progress of the project until communication is received from IGBC.

(5) Standards:
   a. IGBC green homes rating system and evaluation standards have been written by IGBC
   b. Documentation can be obtained on CD or in softcopy format.

(6) Complaint Resolution:
   a. No formal process has been designed for complaint resolution. Generally, the person with complaints can approach CII-GBC, which administers IGBC rating, to complain.
   b. No code of conduct has been formally written for the involved parties.

(7) Qualification:
   a. IGBC has minimum education or experience requirement to participate in the exam.

(8) Education and Training:
   a. IGBC AP: Voluntary trainings are provided by IGBC
      i. 2 day elementary workshop
      ii. 2 day advanced workshop
   b. External Reviewer: Basic orientation and evaluation training is provided to external reviewers (by IGBC)

(9) Credentialing:
   a. IGBC AP: IGBC AP has to pass online-exam to be an IGBC AP. The online exam, administered by Pro-matrix, is conducted periodically at regional centers.
   b. External Reviewer: Reviewers are appointed by IGBC on basis of experience and knowledge of the field

(10) Quality Assurance:
   a. Random internal evaluations (by IGBC committee) are performed on external evaluators to ensure quality of evaluations.

GRIHA / ADaRSH in India

(1) Roles:
   a. Green rating system designed by TERI and adopted by MoNRE to help design and build Green buildings in India. GRIHA is administered by ADaRSH, a society. ADaRSH consults with the design and construction team to assist the project to meet GRIHA requirements.
   b. External experts review the GRIHA submittals for projects. Reviewers are appointed by GRIHA on basis of experience and knowledge of the field

(2) Appointment methods:

a. Project team can employ or contract GRIHA trainers or evaluators for services (optionally project team can submit documents on their own without GRIHA professional).

(3) Fee Structure:
   a. Fees paid to GRIHA professional (by the clients) may vary based on competition and local expectations.
   b. Fees paid to ADARSH for rating evaluation is based on fixed scale (determined by ADARSH).
   c. Fees paid by ADARSH for review of projects to external reviewer is based on fixed scale (determined by ADARSH).

(4) Auditing process:
   a. The project team registers the project to ADARSH for rating evaluations.
   b. A consultation meeting is scheduled between the project team and ADARSH to discuss rating evaluation process.
   c. Project team hires GRIHA trainers or evaluators to evaluate building performance on rating system and for preparation of supporting documentation.
   d. Project team submits the documentation to ADARSH for evaluation.
   e. First review:
      i. ADARSH verifies that all the necessary documents have been submitted for evaluation.
      ii. External expert (evaluator or trainer) reviews the technical aspects of documentation.
      iii. Field Audit will be conducted to review the specifics (not intended as a policing exercise).
      iv. Review results are sent back to the project team along with "in principle" allocated credits.
   f. Project team with the help of ADARSH trainer or evaluator reviews the queries/comments submitted by ADARSH (along with external expert comments)
   g. The documentation with answer on queries and comments will be submitted to ADARSH for second review.
   h. After second review, the project will be awarded appropriate certification level.
   i. The documentation submission and other communication with ADARSH occur on website and hence it is easy to track the progress of the project.

(5) Standards:
   a. GRIHA rating system and evaluation standards have been written by TERI and MoNRE.
   b. The standards and documents can be obtained from the GRIHA website.

(6) Complaint Resolution:
   a. No formal process has been designed for complaint resolution.
   b. No code of conduct has been formally written for the involved parties.

(7) Qualification:
   a. ADARSH has minimum education or experience requirement to participate in the exam.

(8) Education and Training:
   a. GRIHA trainers and evaluators:
      i. GRIHA trainers and evaluators need to attend GRIHA training by TERI or other reputed institutes. GRIHA trainers and evaluators also need to pass the exam taken at the end of the workshop. Based on the performance of the exam, the trainer and evaluator certifications will be awarded to the participants.

ii. GRIHA trainer can provide GRIHA training to future aspirants.
iii. GRIHA evaluator can assist with project execution and help with the documentation for GRIHA certification

(9) Credentialing:
   a. GRIHA evaluator and trainer certification will be awarded based on the performance of the GRIHA exam.
   b. External experts for project review:
      i. Reviewers are appointed by ADARSH on basis of experience and knowledge of the field.
      ii. Basic orientation and evaluation training is provided to external experts (by ADARSH).

(10) Quality Assurance:
   a. Random internal evaluations (by ADARSH) are performed on external experts to ensure quality of evaluations.

LEED/GBCI for all Rating Systems except LEED for Homes in the USA

Source: BuildingGreen.com

(1) Roles:
   a. Certification Bodies (CB) check the LEED submittals provided by the design/project teams.
   b. One CB is responsible the checking of all requirements on one project. CBs only check the documentation provided; they do not conduct on-site inspection.
   c. CBs manage the process, but for technical reviews of LEED applications, they, in turn, contract with GBCI-approved assessors. Initially, these assessors were many of the same people who had reviewed LEED applications under contract to USGBC. GBCI's internal staff has been required to step in to the process to maintain consistency in the application of the standard.
   d. LEED applications are submitted through USGBC's LEED Online software intended to better serve both LEED users and the certifiers.

(2) Appointment methods:
   a. The GBCI has ongoing contracts with CBs. A CB is appointed to manage the entire checking process on a project.
   b. The GBCI provides approved assessors for specific technical review but has no contractual relationship with them.

(3) Fee Structure:
   a. Fees to the CBs are paid by the GBCI.
   b. Project teams pay fees to the GBCI for certification review.

(4) Process:
   a. Project team submits the project for LEED review on LEED Online. As part of the submission, the project team pays the Certification Fee to GBCI.
   b. GBCI notifies the project team that they have received the project for review.
   c. GBCI assigns the project to a CB. The CB may additionally request a GBCI-approved Assessor for specific technical items to be reviewed. The CB is typically given about 30-days to conduct the review.
   d. The CB conducts the review and sends comments and requests for additional information to the project team. GBCI conveys these to the project team.
   e. The project team responds to the comments and provide additional information as requested. The project team is given 25 days to respond.
   f. GBCI then opens the project for additional review. The CB completes the review within 30 days and marks LEED credits and prerequisites as Earned or Denied, and prepares a review report that documents the review comments.
   g. GBCI notifies the project team of the results.
   h. The project team gets 25 days to accept the result of ruling. Appeals are done with additional fees.
   i. GBCI uses a different reviewer or CB to assess the merits of the Appeal. After the appeal review has been done, the GBCI notifies the project team of the result.

(5) Standards:
   a. The GBCI has changed the standard of review over time based on customer comments and with a view provide consistency and integrity to the meaning of LEED Certification.
      i. Reviews are done to meet the standards of ISO Guide 65.

ii. Technical standards for the review are based on the LEED Rating System requirements, the Reference Guides, and Credit Interpretations published by the USGBC.

(6) Complaint Resolution:
   a. GBCI uses the Appeal method to resolve complaints.
   b. All project appeals are carried out by a reviewer that is different from the one who originally reviewed the project.
   c. Final discretion of ruling lies with the GBCI.

(7) Qualification:
   a. Solicitations to CBs and assessors have been public. The process continues to evolve as GBCI strives for consistency, quality and customer satisfaction.
   b. GBCI has also done postings for qualified assessors that specifically work on the energy aspects.
   c. GBCI looks for experience and practical application which they believe is critical to have beyond education and technical knowledge.
   d. The basic qualification is a LEED Accredited Professional.

(8) Education and Training
   a. USGBC worked with GBCI to train a cadre of "certification bodies," firms that are registered through ISO to certify products and services, on how LEED certification works.
   b. GBCI has put in place a certification program. After certification, the assessor is required to have 400 hrs of actual review work under guidance of a mentor, before they are assigned to a project.
   c. It takes 9 months to 1 year for training of an assessor.

(9) Credentialing
   a. Credentials are maintained by working on projects or getting continuing education and training for 400 hours in a year.

(10) Quality assurance
   a. Each individual review team has an internal protocol for managing quality and QA/QC guide for all reviews. GBCI requires every review team to comply with ISO Guide 65.
   b. GBCI staff holds regular conference calls with reviewers for technical discussions. The body of knowledge is evolving quickly. They have made a significant commitment to sharing information.
   c. GBCI's LEED Online tool provides standard forms for the project teams and for the assessors to check with. Review comments are provided in a standard format. Assessors are provided checklists, acceptable range of values, and standard cross-checking calculations that helps them to review the energy credits consistently.
   d. GBCI's staff or expert assessors provide additional assistance or QA to the assessors.
   e. Each project review goes through vetting and quality control checks before it is returned to the customer.
   f. Quality assurance is a post review assessment. Randomized for a level of statistical significance.

LEED/ GBCI for Homes in the USA

(1) Roles:

a. **LEED for Homes Providers** are local and regional organizations chosen by the USGBC to provide certification service to projects in their local and regional markets. All LEED for Homes projects registered must be verified by a LEED for Homes Green Rater certificate holder or LEED for Homes Green Rater in Training undergoing the required mentorship. Providers have three primary roles: 1) Marketing LEED to builders; 2) Providing green home rating support services to builders; and 3) Training, coordinating and overseeing Green raters.
b. **Green Raters** provide the required onsite verification services on a project. Green Raters assemble the Project Submittal Package and submit it for certification review. Green Raters may work closely with the individual project teams to assist the design and construction professionals in meeting their sustainability goals.
c. **Energy Raters** provide energy performance testing. Many Green Raters are also qualified Energy Raters and can provide both the onsite verification and performance testing services.

(2) Appointment methods:
a. The USGBC selects Providers with an Request For Qualifications and the Providers are in contract with the USGBC
b. The Green Raters and Energy Raters are selected by and in contract with the Providers. They may also be part of the in-house staff of the Provider.

(3) Fee Structure:
a. Registration fees are payable to the USGBC. The fee schedule is published by the USGBC.
b. Fees for certification review are payable to the Provider and are negotiated by the builder with the Provider.

(4) Process:
a. Project team contacts a LEED for Homes Provider to join the program.
b. The provider may offer orientation and up-front technical assistance to the builders.
c. The builder and the project are registered with USGBC.
d. The Provider or Green Rater will assist the project team by doing a preliminary rating. This includes performance testing of a typical example of the builder's home design, completion of preliminary checklist, preliminary LEED score estimate.
e. Depending on the preliminary score, the project team may modify the design and construction.
f. The Green Rater under the supervision and management of the Provider conducts on-site performance tests and visual inspections of measures.
g. The Green Rater scores the home based on the actual construction.
h. The Green Rater completes the project documentation package which includes the completed and signed checklist and forms. The Green Rater submits the package to the Provider for review and approval.
i. The Provider reviews the documentation and if it is satisfactory, notifies the project team then USGBC. USGBC then sends out the official notification and the certificate.

(5) Standards:
a. Reviews are done to meet the standards of ISO Guide 65
b. Technical standards for the review are based on the LEED Rating System requirements published by the USGBC.
c. Energy rating testing standards are provided by RESNET. RESNET Qualified ENERGYSMART Contractors and Builders are committed to providing quality and

professional service to their customers and the public. This Code of Ethics sets forth principles and rules of conduct.

(6) Complaint Resolution:
   a. Information related to complaint resolution for the LEED for Homes program was not available.
   b. RESNET has a formal online complaint resolution process.

(7) Qualification:
   a. A Provider is selected by the USGBC based on their ability to:
      i. Recruit and register projects for LEED for Homes
      ii. Manage, coordinate and provide oversight a team of Green Raters
      iii. Certification of LEED homes
      iv. Provide Quality Assurance for the certifications
      v. Coordination with the USGBC and local USGBC chapters.
   b. A Green Rater must
      i. Meet the minimum Eligibility Qualifications.
      ii. Complete two part training. Part 1 is a self guided online learning of approximately five hours and part 2 is a 2-day workshop.
      iii. Pass the LEED for Homes Green Rater exam, administered by the Green Building Certification Institute (GBCI).
      iv. Complete the required components of LEED for Homes Green Rater Mentorship within 24 months of passing exam.
   c. An Energy Rater must
      i. Successfully complete training by a RESNET accredited rater training organization. The training is conducted in accordance with a syllabus developed by RESNET.
      ii. Pass the RESNET Test.

(8) Education and Training
   a. For a Green Rater, the education requirements include a High-school diploma and 3 years experience in the field of residential construction. Other education requirements include and understanding of the LEED for Homes Rating System, understanding of green building strategies in the each credit category, knowledge of building science basics.
   b. The Green Rater training is in two parts. Part 1 is a self guided online learning of approximately five hours and part 2 is a 2-day workshop.
   c. A Green Rater candidate must pass the LEED for Homes Green Rater exam. Once candidates have passed the Green Rater exam, they have two years to complete a mentorship with a current LEED for Homes Green Rater and Provider Quality Assurance Designee (QAD).

(9) Credentialing
   a. Credential information specifically for the LEED for Home Program was not available.
   b. RESNET license holders must maintain a RESNET membership in good standing

(10) Quality assurance
   a. The level of rigor and consistency of the LEED for Homes Rating is assured through 3 sequential QA Processes.
      i. Third Party Verification Process: The Provider serves as the second set of eyes in the certification process for every LEED Home.
      ii. Auditing of Raters by Provider: The Provider is responsible for hiring, training, and having in place a quality assurance protocol for all of its Raters. This protocol

includes 10% paper review for each Rater, and 1% in-field re-rating for each Rater conducted by a third party on an annual basis.

iii. Auditing of Raters by USGBC: The Provider must maintain records for each rater, including training and ratings completed, home builder or buyer complaints, project files, and results of QA checking. USGBC will spot-check these records for each Rater on an annual basis.

EPA ENERGY STAR in the USA

(1) Roles:
   a. ENERGY STAR standards designed by EPA to help build high performance buildings in US
   b. RESNET Certified Rater inspects and tests the home for compliance.
   c. Provider is a business entity that ensures the quality of Raters work and gives the Energy Star Rating.

(2) Appointment methods:
   a. Individual or builder can employ or contract with RESNET Certified Rater or Provider for services.
   b. Raters align themselves with Providers so that homes inspected by them will be given the Energy Start rating by that Provider.

(3) Fee Structure:
   a. Fees paid by the developer may vary based on competition and local expectations
   b. Most providers take annual fee or per home fees from Raters

(4) Process:
   a. Builder registers as a partner on ENERGY STAR website
   b. Builder or owner contacts certified Rater to determine appropriate energy–efficient home Features
   c. The rater studies the plans of the home and determines the "projected rating" of the home
   d. The rater goes in the field and verifies all the construction points in the mandatory checklists have been met. If necessary, Raters generates correction needed list that will need to be corrected by builders.
   e. The rater and builders work with HVAC contractor to ensure all the necessary checklists have been completed during design and installation of HVAC system
   f. Once the home is built, Rater performs diagnostic infiltration and duct leakage testing along with visual inspections.
   g. Rater collects all the documentation from builders and raters and uses the information from field inspection and testing to generate "actual rating" of the home
   h. Rater verifies that the home meets ENERGY STAR guidelines and issues ENERGY STAR label
   i. Periodically, provider submits the information to ENERGY STAR for tracking of total ENERGY STAR homes built in the country

(5) Standards:
   a. Technical standards for homes have been written by technical committee of RESNET (Residential Network)

(6) Complaint Resolution:
   a. RESNET standard provides code of conduct and professional ethics documents to providers and raters.

b. RESNET committee determines that the code has been violated and determines appropriate actions to be taken in the event of violations of the code.

(7) Qualification:
   a. RESNET has minimum education or experience requirement to participate in the exam.

(8) Education and Training:
   a. RESNET Certified Providers:
      i. Need to meet minimum qualification requirements
      ii. Need to pass online Provider examination conducted by RESNET
      iii. Need to obtain professional insurance for practice
   b. RESNET Certified Raters:
      i. Need to meet minimum qualification requirements
      ii. Need to pass online rater examination conducted by RESNET
      iii. Need to get a provider who can certify Rater's work
         1. Need to complete three ratings under a provider
         2. Many providers have probation period where they track performance of the Raters more closely

(1) Credentialing:
   a. Rater and Provider need to maintain continuing RESNET exams and education requirements. Rater and Provider also need to maintain EPA partner exams and education requirements.
   b. Rater and Provider also need to obtain professional liability insurance to practice in the field.

(2) Quality Assurance:
   a. Many utilities provide financial incentives for building ENERGY STAR homes. These utilities ask Raters/Builders to submit appropriate documents and conduct their own QA to ensure the incentives are properly assigned.
   b. Provider supervises performance of the Rater and ensures that the work quality will be maintained. Providers are mandated (by RESNET) to field-test certain percentage of Rater homes. Providers are also required to check software rating on certain percentage of Rater homes.

Code Compliance in Various Jurisdictions in the USA (Fairfax County, VA; Dayton, OH; Pittsburgh, PA; Washington, DC)

The summary below is for the process and framework in several US jurisdictions whose TPA programs fall into three categories: Project TPA selected by the builder/developer, project TPA selected by the jurisdiction (local government), and Auditor selected by the jurisdiction.

(1) Roles:
   a. Third Party Reviewers (TPR) are retained by builders and developers to determine substantial compliance with local building energy codes prior to submission to and approval by local building department. The role of the TPR in this case is to check construction documents and provide feedback to the builder/developer and to certify that the construction drawings and various building components are in substantial compliance with the energy code.
   b. There are examples where a local jurisdiction contracts with the TPR rather than allowing the builder/developer to select the TPR.

c. In addition, the local jurisdiction may elect to retain an additional independent Auditor to review the submission of TPRs who have been selected by either the builder/developer or the jurisdiction. The jurisdiction determines the final completeness and issues the permit after reviewing the TPRs certification of design documents.
d. In the case of Pittsburgh, the local jurisdiction permitting agency (Bureau of Building Inspection – BBI) performs site inspections and scheduled inspections, without exception. In other cases, on-site inspection and/or verification that construction is in substantial compliance with certified and approved CDs, is conducted by either the the local jurisdiction or by the jurisdiction's contracted TPR.
e. Despite the differences in the third party system on a jurisdiction by jurisdiction basis, the local jurisdiction ensures that a pool of qualified TPRs is available. The jurisdiction sets out clear standards of eligibility, sets regular intervals by which those standards can be met and maintained, and enforces violations of those standards.

(2) Appointment Methods:
a. TPRs are typically retained by the builder or developer.
b. In the case where a local jurisdiction chooses to contract the TPR, a competitive selection process is typically used. These may include soliciting Requests for Proposals or vendors may be selected from a pre-qualified list of eligible providers. In some cases, TPRs for life, health and safety (L/H/S) issues branch out their businesses to provide similar services for energy code compliance.

(3) Fee Structure:
a. Average costs fall around $560 to retain a TPRs for the duration of a project. This cost was arrived at using IMT's assumption that TPR document reviews take an average of 8 hours at an average cost of $70 per hour.
b. The costs for TPRs are paid by the builder/developer in addition to permitting fees charged by the local building department.
c. An advantage to a builder/developer is that plans that have been reviewed by a TPR are often expedited through the permitting process, saving time and money. Although these savings have not yet been quantified in a study, they can be real indirect cost-savings.

(4) Process:
a. In all three models, this process is substantially held to:
    i. A package of construction documents (CDs) are submitted to the TPR for review. These may include:
        1. Mechanical
        2. Electrical
        3. Plumbing
        4. Energy
    ii. CDs are reviewed and certified by the TPR, or if they are found to be non-compliant, returned to the builder/developer for additional modification
    iii. Once CDs are certified by the TPR, they are submitted to the local jurisdiction's permitting agency by either the TPR or the builder/developer.
    iv. Often, as a result of securing a TPR, the project is expedited for review by the local jurisdiction (the Auditor), thus fast-tracking the project through the permitting process
    v. When CDs are approved by the TPR, the local jurisdiction does a final review and issues permits.

vi. Neither the builder-selected TPR nor the Auditor can be involved in the design process, to avoid any conflicts of interest

b. A separate and independent Auditor may also be retained by the local building department as an independent check on the system and to ensure that a conflict of interest is avoided. This TPA audit role is often outsourced to reduce the costs to the local jurisdiction while ensuring a qualified review of the TPA's work.

(5) Standards:

a. Often the local jurisdiction will provide a manual or written documentation which establishes the application and approval process, minimum qualifications as well as the duties and responsibilities of the TPR and the Auditor.
b. The local jurisdiction or the independent Auditor provides the framework of a quality assurance process.
c. The local jurisdiction or the jurisdiction's Auditor will provide on-site inspection and verification that construction is in substantial compliance with TPR certified CDs.
d. When TPR approved plans are found to be invalid by a significant margin, a meeting between code officials and the TPR is held to discuss the differences.
e. If a TPR consistently certifies CDs that are found to be substantially non-compliant, they are at risk of having their TPR status revoked.

(6) Complaint Resolution:

a. Certification of a TPR may be revoked under certain circumstances, like: consistently recommending non-compliant plans, failure to follow program guidelines, or failing to maintain minimum certifications and on-going education.
b. Often, before certification is revoked, the jurisdiction may issue warnings or put a TPR on probation.
c. Typically an appeals process for seeking redress is available.

(7) Qualifications:

a. TPRs and Auditors typically hold valid and current licenses as professional engineers or architects maintain certifications and participate in required training and continuing education which may vary by jurisdiction. Examples or additional local compliance training may include specialties in: elevators, structural/non-structural, mechanical, plumbing, electrical, life/health/safety (L/H/S), or a green compliance review.
b. An initial, minimum certification is be issued by a national body like the International Code Council (ICC) or ASHRAE.
a. TPR and Auditors must meet mandatory requirements and qualifications.

(8) Education and Training:

a. Local jurisdictions require TPRs and auditors to hold valid licenses.
b. Certification and training to acquire and continuing ongoing education to maintain credentials from national and state-wide professional associations is mandated by most jurisdictions.
c. Often local training for compliance with the local building code manual/guidelines is offered and TPRs/Auditors are expected to participate to keep current on local guidelines. In VA, 2% of permitting fees goes toward continuing education and training.

(9) Credentialing:

a. In jurisdictions where there is a state certification for code officials or an industry requirement to practice, the TPRs and Auditors must acquire and maintain all such credentials.

b. In most cases, the TPR is required to submit an application to serve as a TPR, maintain updated credentials and eligibility in the local jurisdiction's system, and notify the local jurisdiction if anything changes.
c. In some cases, TPRs are required to keep proof of additional liability insurance for the services provided.

(10) Quality Assurance:
a. Local jurisdictions are responsible for creating a process to evaluate and approve TPRs and creating a quality assurance or audit process. The local jurisdiction sometimes chooses to retain the services of an independent Auditor to review the work of TPRs.

Code Compliance through use of Design Professional Accountability/Self-Certification in the USA (Wisconsin & Arizona)

This model recognizes that access to limited resources require local jurisdictions to rely upon the most highly trained and appropriate individuals to ensure that projects are built to comply with both their design drawings and the appropriate building code – for energy as well as other structural, life, health and safety measures. The assumption is that securing a design professional license is a matter of public safety and code enforcement (of all flavors) merely makes them accountable.

(1) Roles:
a. Licensed design professionals are required to complete a "statement of compliance" or certify that final construction of the building is in compliance with designed and approved plans and with building codes, standards and ordinances.
b. In Arizona and other jurisdictions, design professionals are required to certify the design documents and may conduct a "commissioning" or "mini-commissioning" of the code measures. In Arizona, the designers are involved only in the design process, not in the construction process.
c. In Wisconsin, in addition to being involved in the design process, architects/engineers/design professionals are required to be intimately involved in the construction process to certify the design documents and that construction is in compliance. This ensures pull-through of design intent into final construction. For this requirement to be binding, local jurisdictions are required to pass or uphold a state code that requires a "compliance statement."
d. In Wisconsin, there are state-wide plan reviewers, who review the statement of compliance. These state-wide plan reviewers are supported by nearly 200 local municipal code officials. Together they ensure compliance on the part of the licensed design professionals. In this model, one can think of the state-wide plan reviewers as (Auditors) of the Plan Review process.

(2) Appointment Methods:
a. By virtue of being licensed design professionals, engineers and architects, the community of professionals effectively-self appoints or is mandated to the role of accountability.

(3) Fee Structure:
a. Design professionals are compensated for their services by the developer/owner.
b. Design fees are paid in addition to any permitting fees or other costs of doing business.

(4) Process:
a. Construction must be supervised by a state-registered architect or engineer.

b. Alternatively, installation of HVAC and lighting may be supervised by a state-registered designer.
c. Supervision of construction is structured as a "professional service" and can consist of between 2-4 hours per week; this supervision is independent of the contractor's responsibility to oversee construction.
d. All construction that retains a licensed design professional is required to comply.
    i. Multiple statements of compliance may be submitted to comply with codes in addition to energy codes, including:
        1. Lighting
        2. Mechanical
        3. Building

(5) Standards:
a. Quality assurance mechanisms are in place in jurisdictions, such as randomized inspections completed by the permitting agency or a state-wide designated Auditor. These are used to assess the performance of design professionals.
b. If a design professional fails to meet the standards of conduct by improperly or falsely certifying design documents, the consequences may include suspension or revocation of licenses.

(6) Complaint Resolution:
a. Most jurisdictions have a formal appeals process for design professionals whose licenses have been revoked or who find themselves on suspension.

(7) Qualifications:
a. Design professionals must be registered in their state for a minimum period of time period of time before they can self-certify. In Arizona, that minimum is 3 years.
b. Design professionals are required to participate in mandatory training and continuing education by the local jurisdiction to inform design professionals of their responsibilities and the consequences of non-compliance.

(8) Credentialing:
a. Architects, engineers and designers are required to be licensed
b. Only licensed design professionals, the architect or the PE are legally allowed to stamp construction document. And it is the use of the ' stamp', granted by each state's own licensure boards that make the Architect and/or PE legally liable for their design for the life of every building.
c. Design professionals must be in good standing with the state, with their state-wide and national association, and have completed all local jurisdictional training in addition to maintaining their professional credentials and certifications for eligibility.

(9) Education and Training:
a. Additional information about specific education and training for design professionals separate from their professional credentials was not available at the time of this draft.

(10) Quality Assurance:
a. Quality Assurance in the design professional self-certification example often comes in the form of Commissioning during construction as mandated by jurisdictions and potentially after occupancy. In Wisconsin, the statue specifies that *commissioning* is to be done on a periodic basis, the *registered design professional* in responsible charge shall provide a schedule of periodic *commissioning* with the submittal documents that shall be reviewed and *approved* by the *code official*.

It is worth noting that the City of Austin, TX and the City of Seattle, WA have strong code compliance programs in place.

In the case of the City of Austin, third party code compliance is administered and overseen by a staff person in the Green Building Program at Austin Energy, a municipal utility. This staff member is entirely responsible for certifying, registering and overseeing the work of all third-party contractors who conduct residential energy performance testing. While the program is entirely residential and the Energy Star/HERS/BPI model has been covered elsewhere, it is worth mentioning for a variety of reasons.

First and foremost, it appears to be remarkably successful with 45 registered third party performance testers. The administrator overseeing third party work has a strong understanding of the skills and capabilities of the third party testers. And costs and savings from the program appear to be favorable. In fact, third party testing has gained popularity among the home builders who were previous skeptics because of the ability of performance testing to document the failures of sub-contractors to deliver on contracted work.

In the case of the City of Seattle, WA, the model is not third party. Rather, it is an example of a strong and competent employee of the City of Seattle Department of Planning and Development and five additional staff diligently pursuing code compliance documentation.

Code Compliance in China

(1) Roles:
   a. The ministry of Housing, and Rural and Urban Development (MOHURD) is responsible agency for adopting codes and for overseeing code implementation throughout the nation.
   b. Chinese Academy of Building Research (CABR) provides technical support to MOHURD for drafting and enforcing energy codes.
   c. Local construction departments are responsible for local enforcement of building codes and for issuing building permits. The role of this organization is very similar to the role of Urban Local Body (ULB) in India.
   d. Local quality supervision stations are responsible for review and approval of building documents and for supervision of building construction process.
   e. Testing laboratories verify that the specific building components comply with the building energy code.
   f. Developer guides the entire building design and construction process and is responsible for project funding as well.
   g. Architects design building as per national codes and developer requirements.
   h. Design verification companies certify that the building design (by Architect) complies with building energy codes.
   i. Construction companies are responsible for constructing building as per approved building design.
   j. Construction supervision companies are responsible for supervision of construction quality and standards maintained by construction companies.

(2) Appointment Methods:
   a. Developer hires architect, design-verification Company, Construction Company and Construction Supervision Company. Bidding process for the selection of these companies as well as certification/qualification of these companies at the time of the project is verified by quality supervision stations.
   b. MOHURD, CABR and local administrative departments are government entities. Testing laboratories and quality supervision stations are semi-governmental agencies supported by local administrative departments.

(3) Fee Structure:
   a. Developer pays permit fees as well as service fees (to participate in bidding process) to construction administrative department.
   b. Developer directly pays fees to architect, design-verification Company, Construction Company and Construction Supervision Company.
   c. Building design companies usually charge fees based on estimated capital cost while design-verification companies and construction companies usually charge fees based on construction square footage. Government regulates fees provided to construction inspection companies.

(4) Process:
   a. Developer takes permission from construction administration department for land use.
   b. Developer sets up bidding process for project team (Architect, Design Verification Company, Construction Company, and Construction Supervision Company) and then awards contract to qualified participants.

c. Quality supervision and testing station reviews the bidding documents and verifies qualification of awarded project team. Based on recommendation of quality supervision and testing stations, construction administration department gives permission to start the design process.
d. Architect on the project designs the building that meets applicable building codes. The design verification company verifies that the designed building complies with applicable codes.
e. The quality supervision and testing station reviews the design documents and provides recommendations to construction administration department. Based on the recommendations, the construction administration gives permission to proceed with the construction.
f. Construction Company starts construction work after demonstrating detailed construction plan as well as compliance with the required quality standards.
g. The construction supervision company supervises the quality of construction work throughout the construction process. The quality supervision and testing station also conducts inspections on construction quality.
h. Once the construction is complete, the quality supervision and testing station provides completion report approving that all the necessary code requirements are satisfied by the building. Based on the completion report, construction administration department issues the occupancy permit.

(5) Standards:
a. The national government has acceptable code that elaborates the testing and evaluation methodology for energy-efficient building construction.

(6) Complaint Resolution:
a. The quality supervision and testing station and construction administration departments have authority to stop the design or construction process and require the necessary changes.
b. The Construction Supervision Company has authority to stop the construction and require the necessary changes.

(7) Qualifications:
a. MOHURD has minimum eligibility criteria to apply for third party certification:

Title Exams for Certificates

Key Stakeholders	Title Exams for Certificate by Employee	
	Employees	**Title Exams for Certificates**
Building design companies, building research entities	Building designers	Registered architect, certified structural engineer, certified electrical engineer, certified equipment engineer, quality inspector, geotechnical engineer, interior designers, certified cost engineer, cost engineer, etc.
Drawing inspection companies	Drawing inspectors	
Construction companies	Construction managers	Constructor, certified cost engineer, cost engineer, construction workers, technician,
	Construction workers	

Construction inspection companies	Construction inspectors	security engineer, quality inspector, etc.
Testing companies or labs	Testing engineers	Certified testing engineer
Quality supervision stations	Quality supervisors	Supervision engineer

Source: Shui et al. (2011)

(8) Education and Training:
   a. Local jurisdictions require that the third parties obtain certifications from MOHURD for practice.

(9) Credentialing:
   a. The third parties must maintain their certifications with MOHURD and avoid violations.

(10) Quality Assurance:
   a. MOHURD conducts annual inspections in various cities to check energy code enforcement in the country. MOHURD rates inspected city based on performance and also asks non-compliant projects to make required changes.
   b. Certain provincial governments conduct additional inspections for compliance checks.
   c. The rules of energy conservation in civil building specifies financials penalties for violations of compliance
   d. Certain provincial governments conduct additional inspections for compliance checks.
   e. In case of violations of energy code, financial penalties can be imposed on developer, project as well as third parties. In case of repeated violations, the third party license can be suspended or revoked. MOHURD also maintains a list of certified third parties on the website that also lists their code violations.

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Third Party Assessor

Scope of Work

February 29, 2012
7603.0003

for

Shakti Sustainable Energy Foundation

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Introduction

The Energy Conservation Building Code (ECBC), developed by BEE under the Ministry of Power provides minimum requirements for energy-efficient design and construction of buildings. When ECBC becomes mandatory, compliance with these requirements shall be a significant challenge for the construction industry as well as the agencies that shall enforce it. To deliberate on the ECBC compliance check process, Shakti Sustainable Energy Foundation (Shakti) organized a day-long workshop with stakeholders from government agencies, utilities, developers, architects, engineers, product manufacturers and other consultants. The CEPT University, Ahmedabad and The Weidt Group facilitated this workshop.

One of the modes identified for ECBC enforcement or checking for compliance was the use of Third Party Assessors (TPA), who are independent of the design and construction team, and also not part of the ULB. In the proposed model, a TPA is retained to certify design documents and submit a report to the ULB and/or the utility for provisional compliance approval. Permissions are given before construction begins and before the utility provides temporary power to the construction site. The TPA may provide the on-site inspection to ensure ECBC asset compliance when construction is complete. Ongoing compliance checks may occur during occupancy. Shakti has retained The Weidt Group and CEPT University to conduct Phase 1 background research and to develop an operational model for the TPAs. The activities include

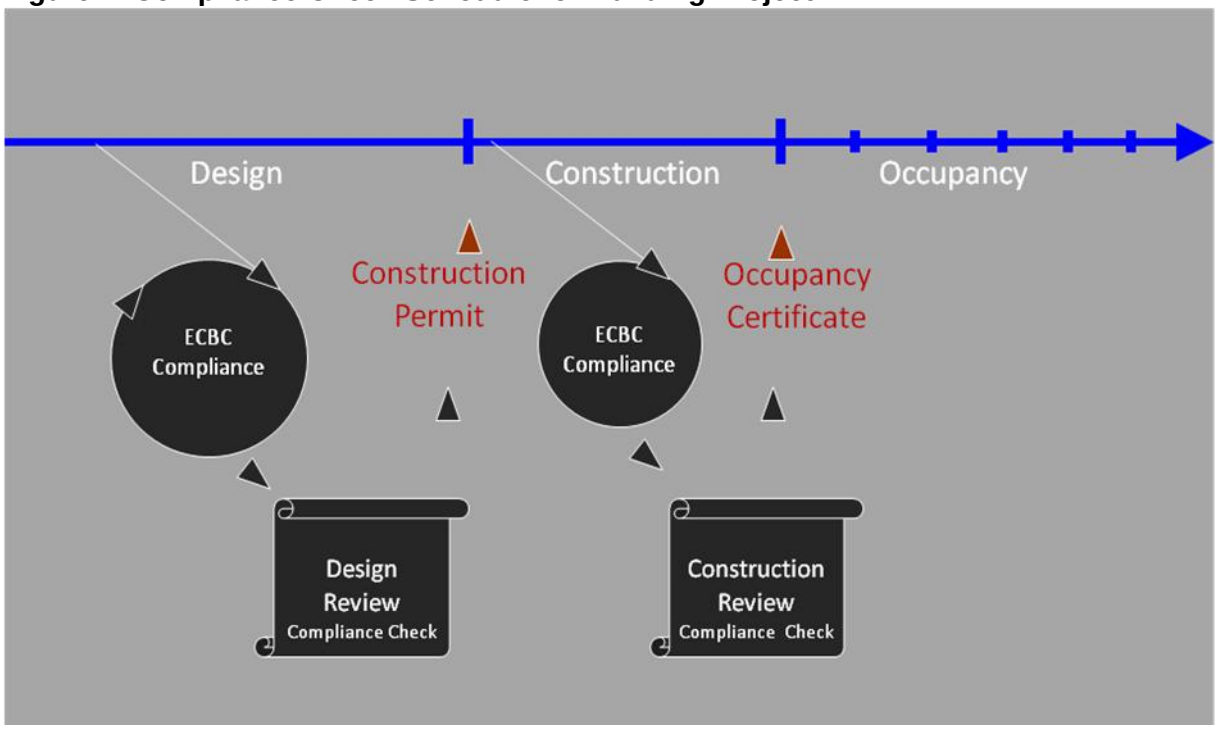
- Review the TPA model used by China, GRIHA/ADaARSH (India), GBC (India), GBCI (USA), Chartered Accountants (India), Company Secretaries (India), and code compliance by local government agencies (USA) and summarize the findings.
- Review the Chartered Accountant and Property Assessment TPA model in India and summarize the findings.
- Develop a *draft framework* for the TPA model to work in a hybrid ULB compliance check process and a potential utility compliance check process with DSM funds. Develop a draft Statement of Work for the TPA to outline their responsibilities, methods for checks, work schedule and their expected deliverables. Propose draft selection criteria for qualifying /recognizing / accreditation of the TPAs at a firm level and at a personnel level. Propose a review process to assess the performance of the TPAs.
- Discuss the draft Statement of Work with potential firms or building energy professionals who could act as TPAs to get understanding about the range of their fees or charges.
- Hold a joint workshop with Ministry of Urban Development, BEE, one or two ULBs, a utility company and a supportive State Electricity Regulatory Commission to review the *draft framework* for issues related to the compliance process and staging, required personnel job profiles and qualifications at the ULB and utility, the methods for provisional compliance based on building design, asset compliance based on building construction, and performance compliance based on ongoing building operation.

This document summarizes the project team's proposal for the scope of work for the TPA, outlines responsibilities, methods for checks, work schedule and the expected deliverables. It includes an outline of the selection criteria for qualifying /recognizing / accreditation of the TPAs, and a proposed review process to assess the performance of the TPAs.

Scope of Work

The TPA shall review each building in two stages to determine ECBC compliance. The first stage is a Document Review and the second stage is Construction Review.

Figure 1. Compliance Check Schedule for Building Project



Design Review

The intent of this stage is to assess compliance with ECBC requirements based on design drawings, specification and forms provided by the design team.

The TPA shall review the drawings, specifications, and Compliance Forms in Appendix G of ECBC User Guide (subsequently referred to here as Design Documents) to ensure that the energy conservation measures (ECM) are appropriately reflected in the project Design Documents. If ECMs that are required to meet ECBC are excluded or incompletely documented, the TPA shall notify the ECBC Accredited Professional on the design team and request additional information to ensure that ECBC requirements are met. If the design team has not used the ECOnirman WBP Tool for compliance, the TPA shall use the ECOnirman WBP Tool to generate an EPI for the proposed building. The TPA shall complete and sign a Letter of Recommendation for Approval. The TPA shall send the letter with the Checklist attached to the ULB notifying them of the findings.

Any building project can choose to comply with ECBC using the Prescriptive or the Performance approach. As ECBC is adopted at the state levels, the prescriptive requirements may be modified at the state level based on climate and context; such modifications shall be endorsed by BEE. The Tiered Approach to ECBC Compliance (TWG CEPT 2011, Rawal 2012), is an example approach for adaptation of ECBC. TPAs shall provide compliance checks for ECBC and any of its BEE-endorsed state-level of local adaptations.

Detailed Compliance-Check Steps:

A. Check for Prescriptive Compliance Method:
   - Review the ECBC Compliance Forms submitted by the design team. TPA shall refer to Appendix G of ECBC User Guide for standard compliance forms and checklists.
   - Review the Mandatory Requirements declarations provided by the design team and check documents for proof where applicable.
   - Identify ECMs to be checked that are applicable to the building in the ECBC checklists. Refer to Appendix G of ECBC User Guide for the checklists. Determine the applicable ECMs based on climate zone, day-use or 24-hour operation building use type.
   - Review documents and check all ECMs applicable to the building. This activity may include:
     - Reviewing floor area, window area, wall area and roof area calculations for the building.
     - Reviewing HVAC component tables for air-handling equipment, refrigeration equipment, condensing equipment, and air-flow summaries.
     - Reviewing tables showing lighting equipment schedules.
     - Reviewing insulation quantities in walls and roof, and the construction assemblies
     - Reviewing SHGC, VLT, and U-factor for window assemblies.
     - Reviewing lighting power density calculations in the Design Documents.
     - Reviewing proposed lighting controls.
     - Reviewing HVAC equipment efficiencies and control equipment.
     - Reviewing motor efficiencies and controls.
   - Fill out the checklist and provide comments when the proposed building does not meet the ECBC requirements or if the design documents provide inadequate information.
   - Use the ECOnirman WBP Tool to report the EPI for the proposed building.
   - Complete and sign a Letter of Recommendation for Approval.
   - Send the Letter of Recommendation for Approval with the Checklist attached to the design team and the ULB.

B. Check for Whole Building Compliance Method
   - Review the ECBC Compliance Forms submitted by the design team. TPA shall refer to Appendix G of ECBC User Guide for standard compliance forms and checklists.
   - Based on the Compliance Forms, identify the ECM's to be checked.
   - Prepare a checklist of ECMs to be reviewed for the project.
   - Review the Mandatory Requirements declaration provided by the design team and check documents for proof where applicable.
   - Review documents and check all ECMs applicable to the building. This activity may include:
     - Unless ECOnirman WBP is being used, the TPA shall also confirm that the protocol in Appendix B has been followed. Conversely the TPA may construct a similar model in ECOnirman WBP and compare the EPI with that reported by the design team; if the variance is too large, TPA shall check the modeling protocol used by the design team.
     - Reviewing floor area, window area, wall area and roof area calculations for the building.
     - Reviewing HVAC component tables for air-handling equipment, refrigeration equipment, condensing equipment, air-flow summaries.
     - Reviewing tables showing lighting equipment schedules.
     - Reviewing insulation quantities in walls and roof, and the construction assemblies
     - Reviewing SHGC, VLT, and U-factor for window assemblies.
     - Reviewing lighting power density calculations in the Design Documents.
     - Reviewing proposed lighting controls.

    - Reviewing HVAC equipment efficiencies and control equipment.
    - Reviewing motor efficiencies and controls.
- Fill out the checklist and provide comments when the proposed building does not meet the ECBC requirements or if the design documents are missing information.
- Use the ECOnirman WBP Tool to generate an EPI number for the building.
- Complete and sign a Letter of Recommendation for Approval.
- Send the Letter of Recommendation for Approval with the Checklist attached to the design team and the ULB.

Construction Review

The intent of this stage is to assess compliance with ECBC requirements based on the installation in the building.

The TPA shall review the Compliance Forms submitted by the design team and inspect the building to ensure that the energy conservation measures (ECM) are reflected in the construction of the building and the installation of its systems. If ECMs that are required to meet ECBC are excluded or not installed, the TPA shall notify the design team and request additional information to ensure that ECBC requirements are met. If the design team has not used the ECOnirman WBP Tool for compliance, the TPA shall use the ECOnirman WBP Tool to generate an EPI number for the building. The TPA shall complete and sign a Letter of Recommendation for Approval. The TPA shall send the letter with the Checklist attached to the ULB notifying them of the findings.

Detailed Compliance Check Steps:

1. Check for Prescriptive Compliance Method:
    - Review the ECBC Compliance Forms submitted by the design team and compare them with the Checklist filled out by the TPA during the Document Review stage.
    - Review the Mandatory Requirements declaration provided by the design team and check installation as applicable.
    - Identify ECMs to be checked and revise the checklist used for on-site inspection.
    - Inspect the building on-site and check for all ECMs applicable to the building. This activity may include:
        - Review of final construction documents for floor area, window area, wall area and roof area calculations, HVAC component tables for air-handling equipment, refrigeration equipment, condensing equipment, air-flow summaries, tables showing lighting equipment schedules, and tables showing motor schedules.
        - Reviewing insulation quantities in walls and roof, and the construction assemblies.
        - Reviewing of manufacturer or contract documents for SHGC, VLT, and U-factor for window assemblies.
        - Inspecting lighting equipment like lamps, ballasts, to confirm fixture wattage.
        - Inspecting required lighting controls such as manual switching of perimeter daylighting circuits, automated occupancy based control, photo sensor controls, and automated timer based controls.
        - Reviewing HVAC equipment efficiencies and control equipment.
        - Reviewing motor efficiencies and controls.
    - Fill out the checklist and provide comments when the proposed building does not meet the ECBC requirements.
    - Use the ECOnirman WBP Tool to generate an EPI number for the building.
    - Complete and sign a Letter of Recommendation for Approval with the Checklist attached.
    - Send the Letter of Recommendation for Approval to the design team and the ULB.

2. Check for Whole Building Compliance Method
    - Review the ECBC Compliance Forms submitted by the design team and compare it with the Checklist filled out by the TPA during the Document Review stage.
    - Identify ECMs to be checked and revise the checklist used for On-site Inspection.
    - Review the Mandatory Requirements declaration provided by the design team and check installation as applicable.
    - Inspect the building on-site and check for all ECMs applicable to the building. This activity may include:
        - Unless ECOnirman WBP is being used, the TPA shall confirm that the protocol in Appendix B has been followed. Conversely the TPA can construct a “similar”

model in ECOnirman WBP and see if it complies; if the variance is too large, they shall check the protocol.
    - Review of final construction documents for floor area, window area, wall area and roof area calculations, HVAC component tables for air-handling equipment, refrigeration equipment, condensing equipment, air-flow summaries, tables showing lighting equipment schedules, tables showing motor schedules.
    - Reviewing insulation quantities in walls and roof, and the construction assemblies
    - Reviewing of manufacturer or contract documents for SHGC, VLT, and U-factor for window assemblies.
    - Inspecting lighting equipment like lamps and ballasts to confirm fixture wattage.
    - Inspecting required lighting controls such as manual switching of perimeter daylighting circuits, automated occupancy based control, photo sensor controls, and automated timer based controls.
    - Reviewing HVAC equipment efficiencies and control equipment.
    - Reviewing motor efficiencies and controls.

- Fill out the checklist and provide comments when the proposed building does not meet the ECBC requirements or if the design documents are missing information.
- Use the ECOnirman WBP Tool to generate an EPI number for the building.
- Complete and sign a Letter of Recommendation for Approval.
- Send the Letter of Recommendation for Approval with the Checklist attached to the design team and the ULB.

Deliverables

Each project shall be completed with the following deliverables as documentation of the TPA's work.

- Design Review
    - Checklist of compliance check items, duly completed after the Document Review
    - Comments and request for additional information provided to the design team
    - Letter of Recommendation for Approval with the final Checklist attached
    - EPI for the building as determined by ECOnirman WBP tool
- Construction Review
    - Checklist of compliance check items, duly completed after the Document Review
    - Comments and request for additional information provided to the design team
    - Site inspection documentation with labeled photographs.
    - Letter of Recommendation for Approval with the final Checklist attached
    - EPI for the building as determined by ECOnirman WBP tool

Selection Criteria and Performance Review Process

Qualifications for TPA

- TPAs shall be registered persons and not firms.
- A TPA shall be a building professional (architect of engineer) who shall have passed an exam and be an ECBC Accredited Professional in good standing.
- In addition, a TPA shall have a minimum experience on 3 building projects with drawing review and on-site inspection for energy efficiency.

Selection and Appointment of a TPA

- TPAs qualified to carry out the work shall be registered by BEE and listed on BEE's website.
- The Design Team shall select the TPA to work on their project.
- TPA shall declare no conflict of interest for each project they review.

Performance Review

Performance review of the TPAs shall be done through a Quality Assurance (QA) process.

- QA bodies shall be appointed by BEE with due process for qualification and selection.
- QA bodies shall be selected organizations that have experienced TPAs to conduct QA activities on their staff.
- All annual work of a TPA shall be assigned to a QA body for performance review.
- QA body shall determine number of projects to audit based on statistical significance, and shall identify the projects.
- QA body shall prepare a report for each TPA. The report shall list the TPA's projects, projects in violation of compliance, and level of violation.
- Summary of violations shall be provided to BEE and each SDA involved in the TPA's projects.

References

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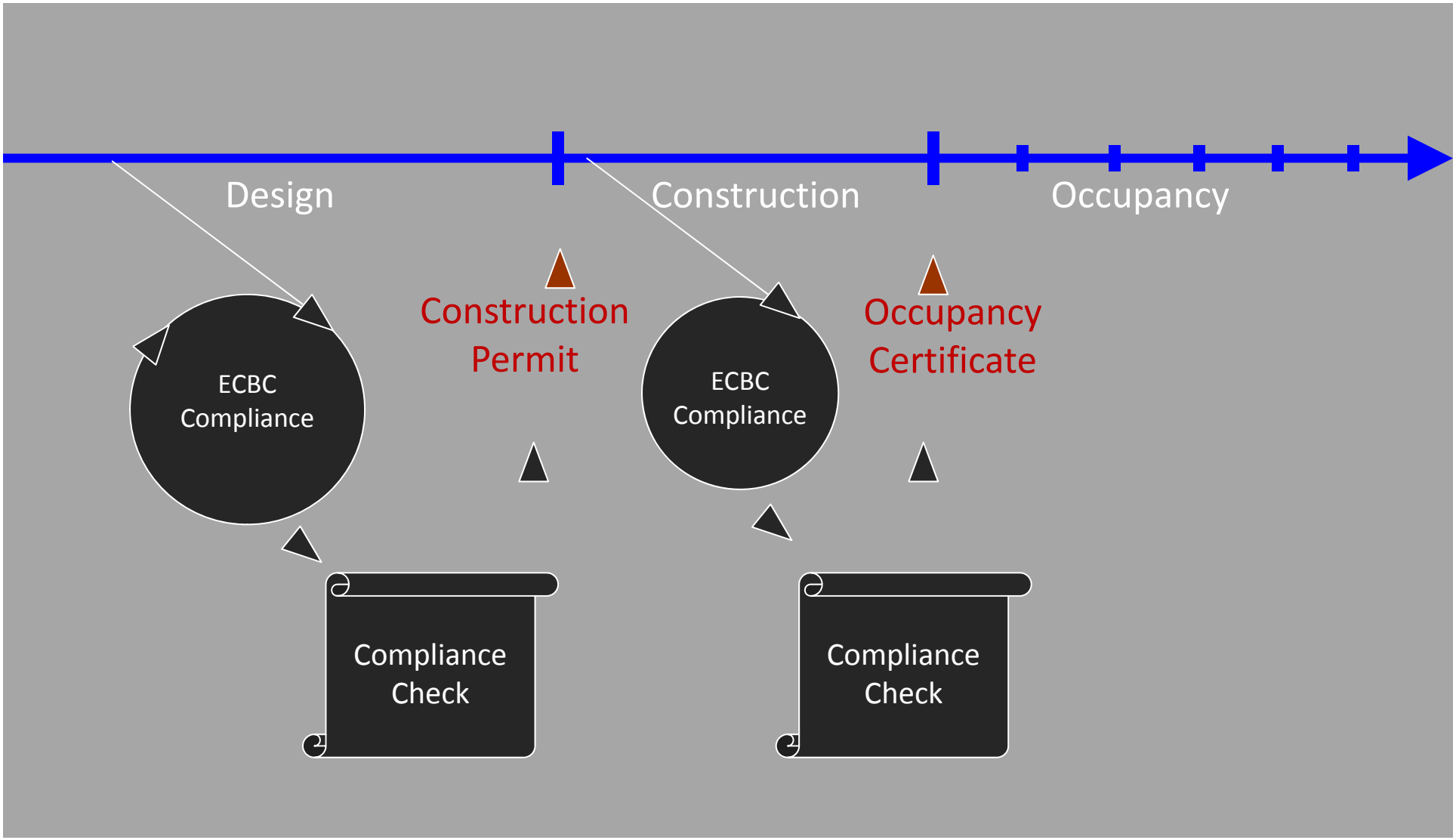
Third Party Assessor for ECBC Enforcement Framework

Workshop on Third Party Assessor Framework: Monday 27th February 2012, New Delhi

Agenda

- Introductions
- Problem Statement
- Research Summary
- Proposed Framework
- Proposed Operating Model
- Discussion

Process for Compliance



Problem Statement

Barriers to Enforcement of ECBC Requirements through ULBs

- Requires understanding of civil, mechanical and electrical issues
- Requires understanding of ECBC
- Capacity building for this at each ULB can be inefficient
  - E.g. Ahmedabad is projected to have min. 10 bldg/Yr

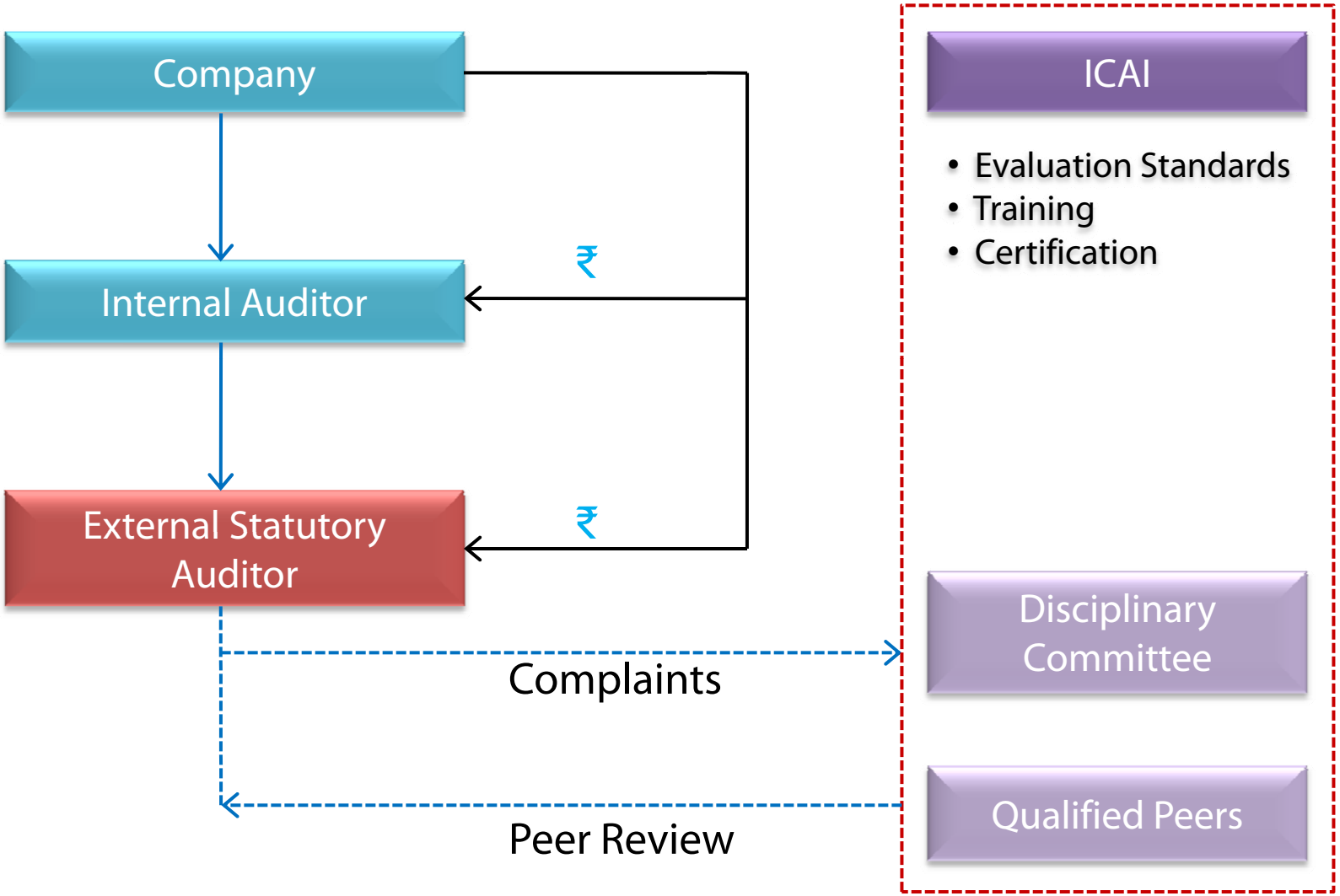
Third Party Assessors as independent agencies offer advantages

- Capacity building will be done by the private sector
- Allows easier scale up and scale down of capacity to handle growth
- Expertise is not tied to geographical location
- Quality and consistency is easier to control and maintain

Research Summary

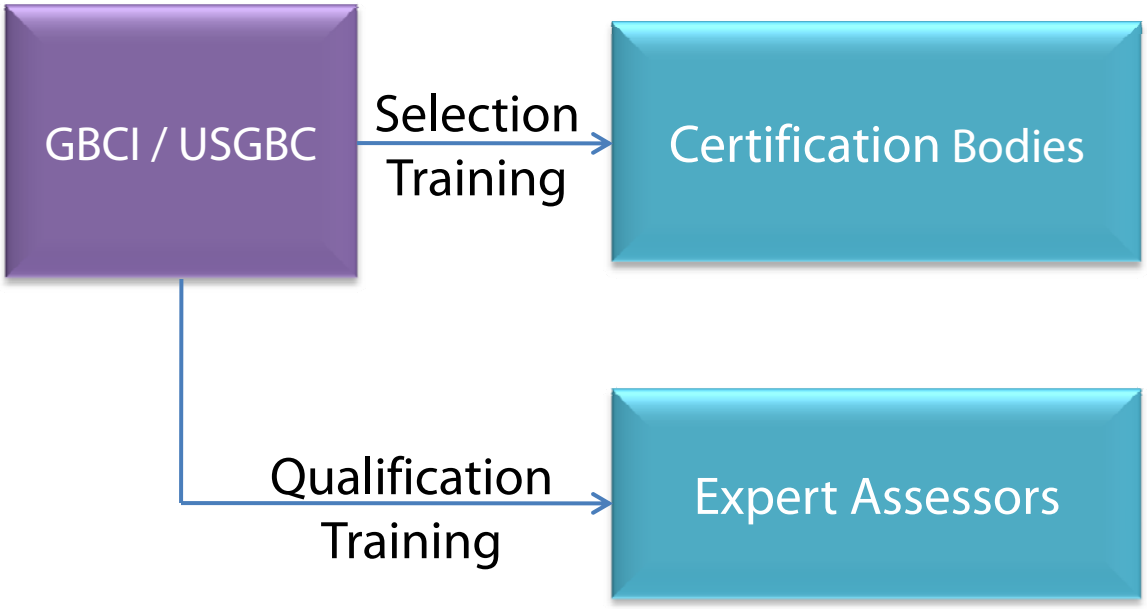
- Third Party Operating Models Reviewed
  - India
    - Chartered Accountants
    - Company Secretaries
    - Property Assessors (valuers)
    - IGBC/ LEED
    - GRIHA / ADaRSH
  - USA
    - LEED/GBCI for all Rating Systems except LEED for Homes
    - LEED/ GBCI for Homes
    - EPA ENERGY STAR
    - Code Compliance in Fairfax County, VA
    - Code Compliance in Dayton, OH
    - Code Compliance in Pittsburgh, PA
    - Code Compliance in Washington, DC
    - Code Compliance through use of Design Professional Accountability/Self-Certification (Wisconsin & Arizona)
  - China
    - Code Compliance for Public Buildings

Chartered Accountant

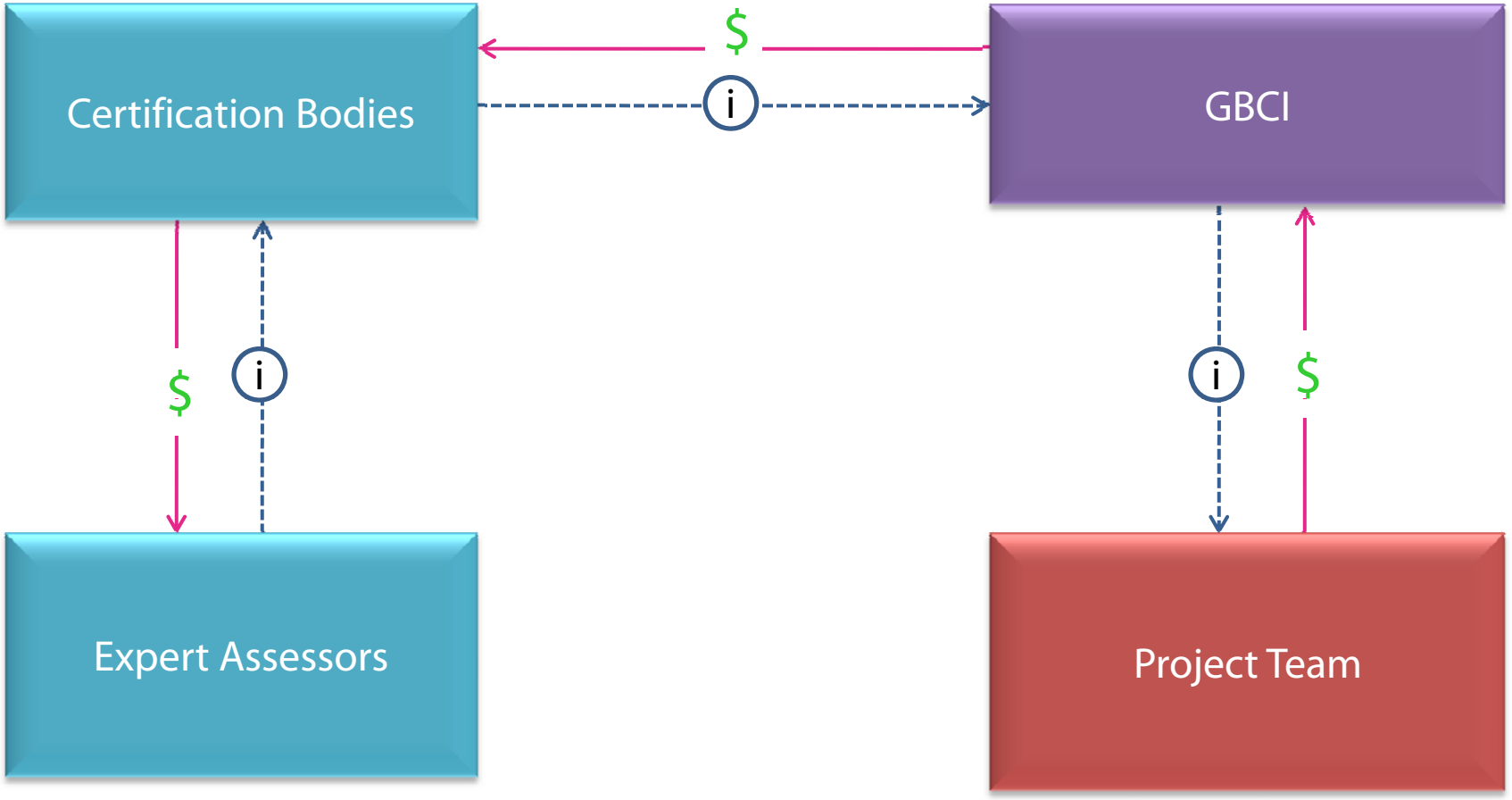


LEED Projects - USA

SELECTION QUALIFICATION



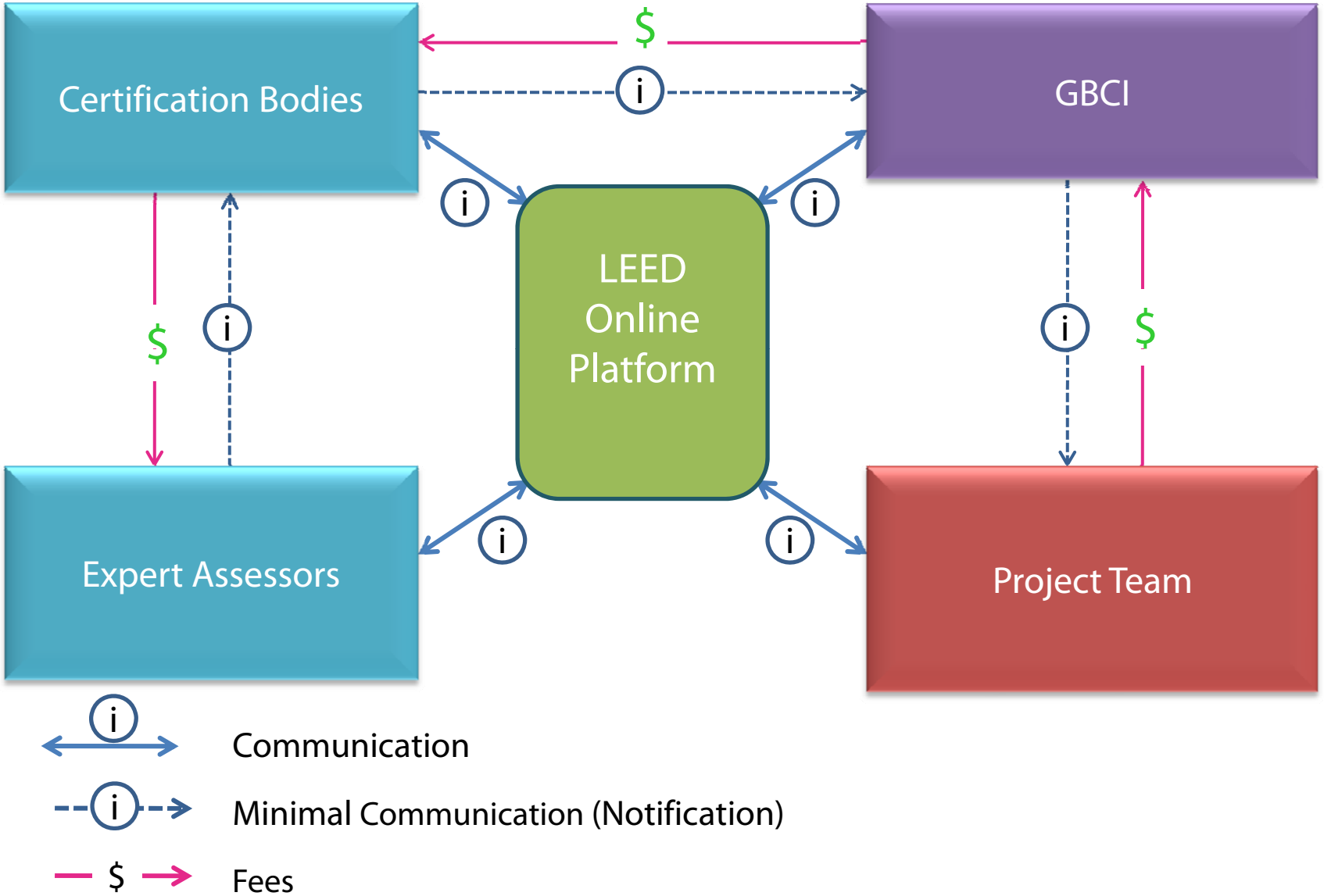
LEED Projects - USA



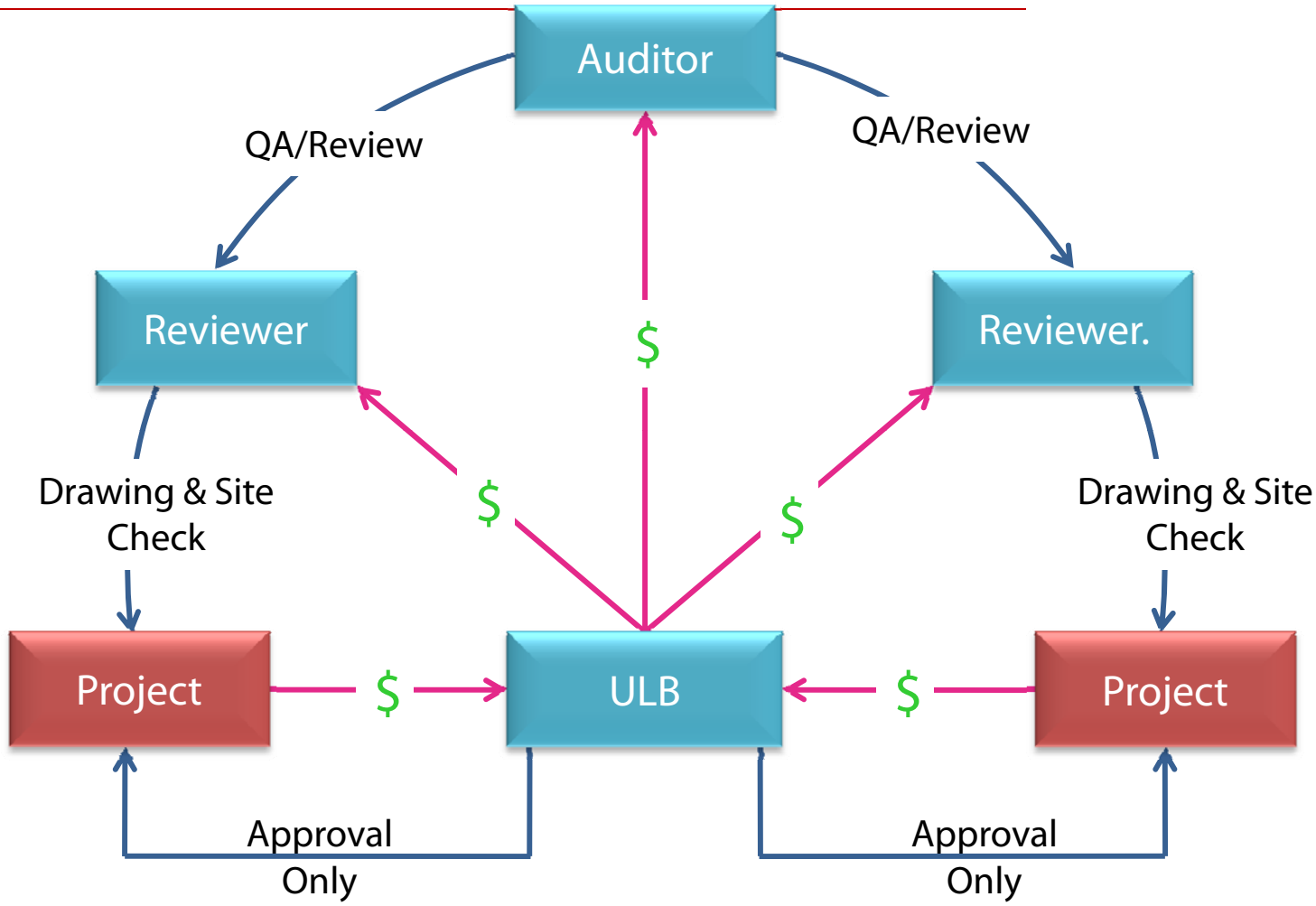
i Minimal Communication (Notification)

$ Fees

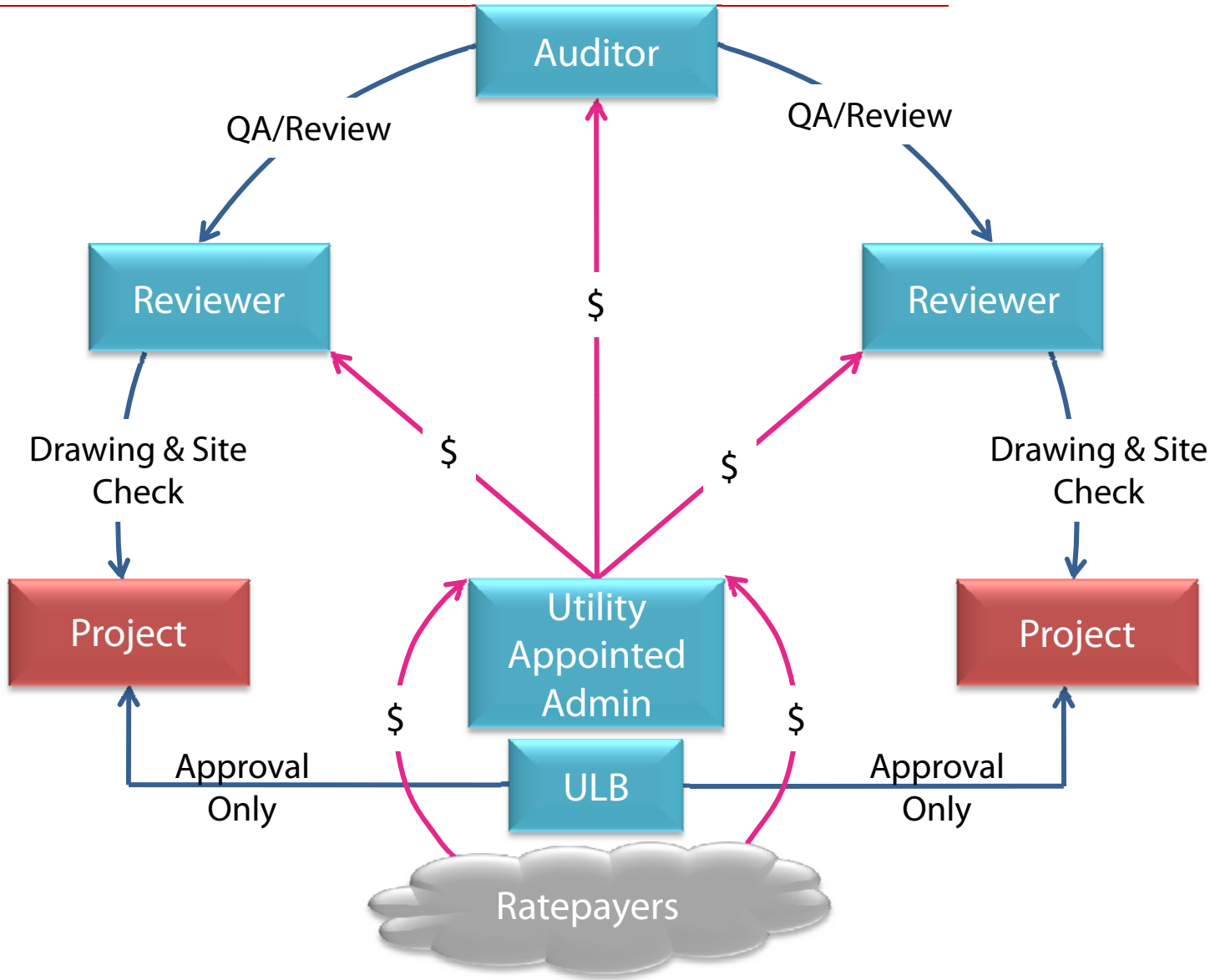
LEED Projects - USA



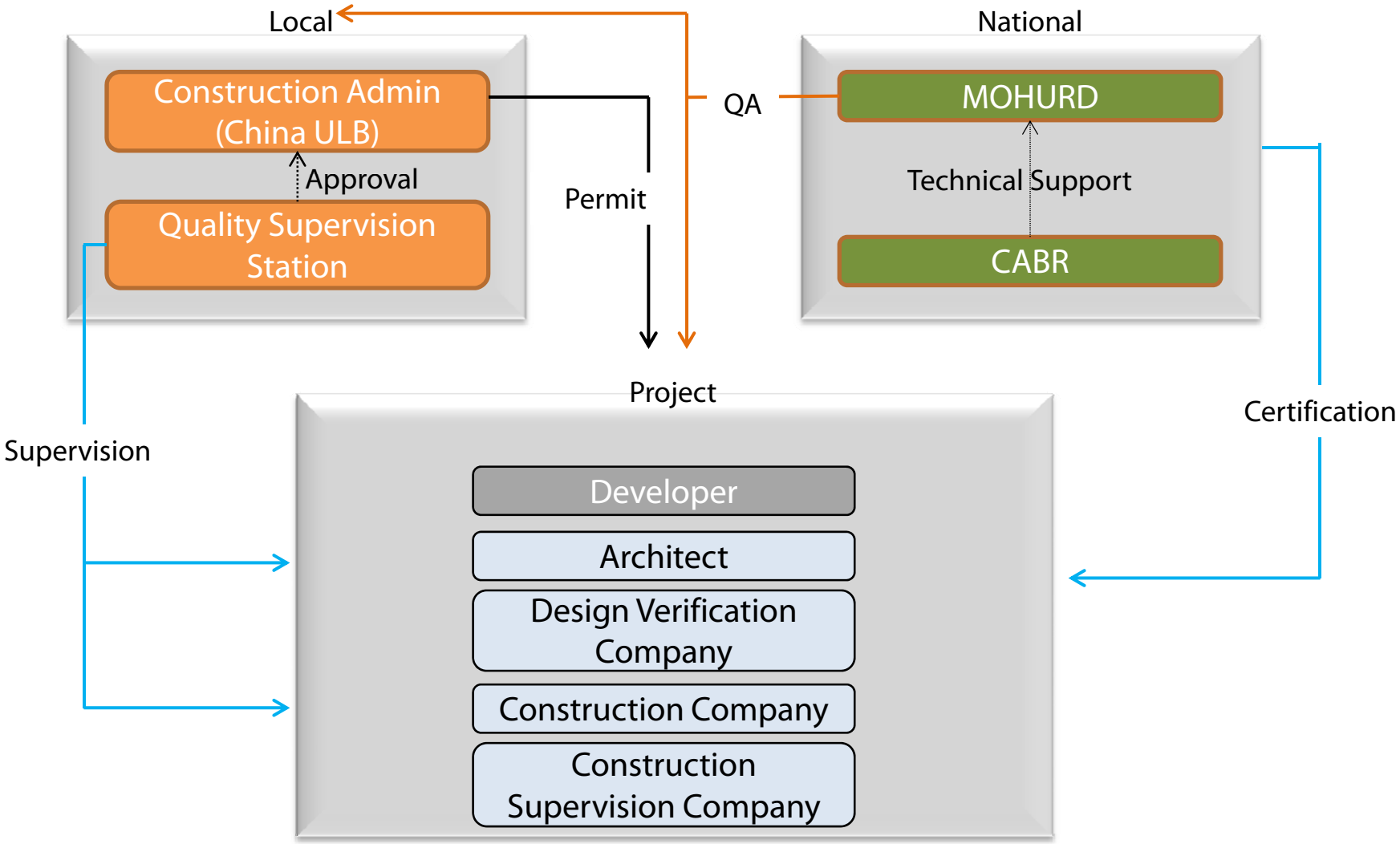
Code Compliance - USA



Residential Compliance – Austix TX, USA



Code Compliance – China



Framework Principles

- For ULB
  - Integrate the operation model with existing checkpoints in the building permit process
  - Maximize the capacity building outside the ULB, minimize need at ULB
  - Minimize management burden on the ULBs
- Standards, accreditation and quality assurance done upstream at the national level
- Conflict of Interest
  - Remove conflict of interest between TPA and project team
  - Remove conflict of interest between TPA and QA body
- Review
  - Provide 2 sets of educated eyes for each project
  - Provide for QA
- Use existing funding sources that can earmarked for ECBC compliance checks in Implementation Phase 1
- Enforcement after occupancy certificate done through utilities

Entities


Local Level
State Level
Central Level
Utility
FOR SERCs
MoUD
Special Purpose Vehicle (BEE/ EESL/NPC)
ULB
SDA
QA bodies (TPA+)
Project
TPA (ECBC AP+)
ECBC AP

Proposed Framework

- Project related roles
  - ECBC Accredited Professional works with project team to assist with meeting ECBC requirements
  - TPA conducts design check and site inspections and gives recommendation to ULB
  - ULB gives stamp of approval for the project
  - QA bodies conduct annual random audits for statistical significance
  - SPV (BEE or EESL) maintains list of TPAs
- Qualifications and accreditation
  - ECBC Accredited Professionals will have minimum qualifications and will have passed Exam
  - TPAs are ECBC Accredited Professionals with additional skills or experience with verification
  - QA bodies are selected organizations who have experienced TPAs to conduct QA activities

Proposed Framework

- Appointment methods
  - TPAs and ECBC professionals are selected by the project team
  - TPAs have to declare no conflict of interest for each project reviewed
- Fees
  - TPA fees will be fixed based on project size and complexity. TPAs will be paid by SDAs
  - QA bodies will be paid similarly. QA bodies will be paid by National Level Agency
- Funding sources
  - TPA work will be funded out of state level energy conservation funds
  - QA work will be paid out of national funds

Proposed Framework

- Compliance-checking process
  - Compliance checks will be done for design and construction
  - ECBC AP will assist project team to meet compliance requirements and prepare compliance reports
  - TPA will check for compliance and request additional clarifications from project team
  - TPA will give letter of recommendation when statisfied about compliance on a project
  - ULB will use TPAs letter with other bye-law requirements as the basis for issuing approvals.

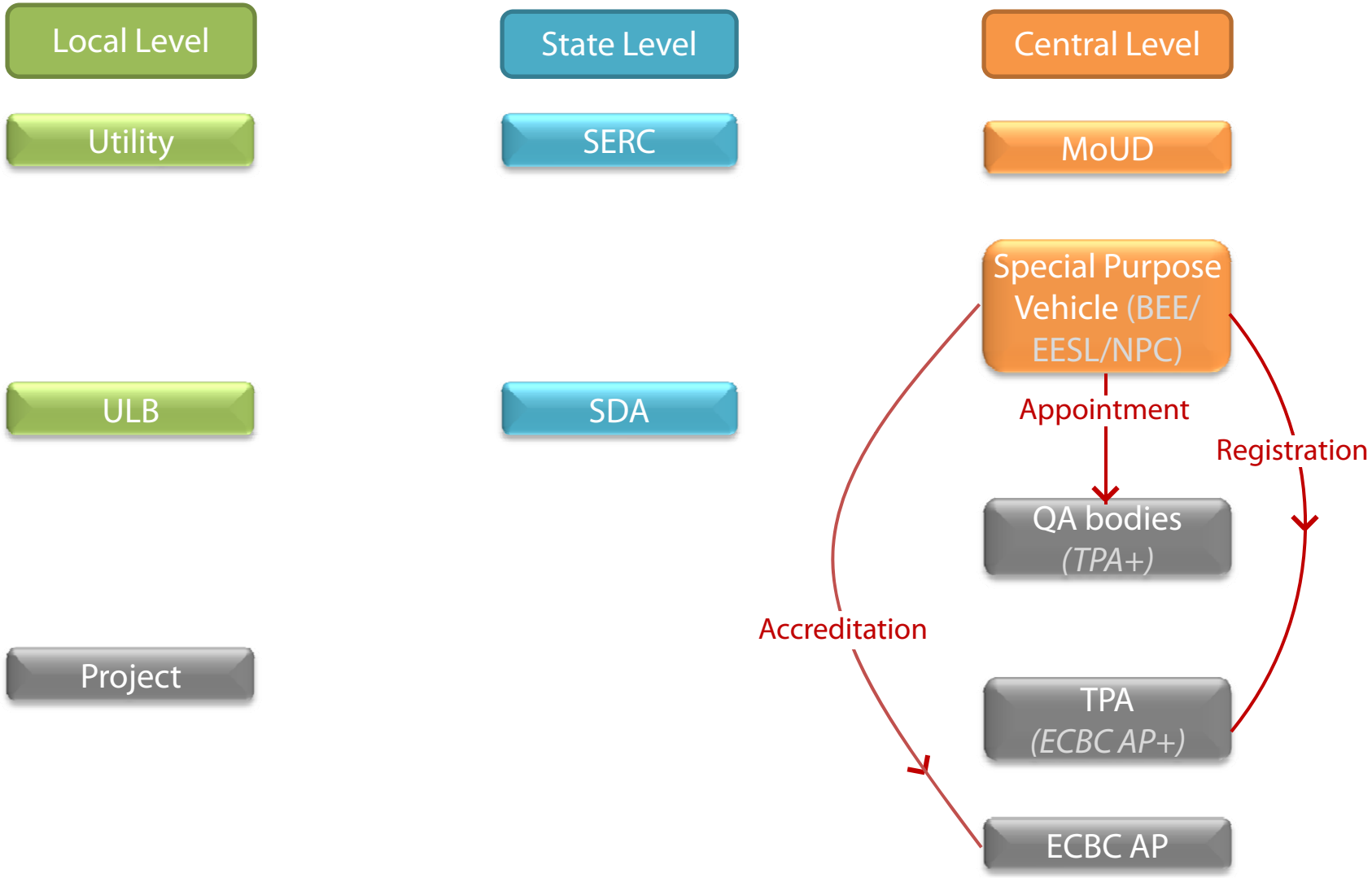
Proposed Framework

- Quality assurance
  - QA bodies are appointed by SPV with due process
  - All annual work of a TPA is assigned to a QA body
  - QA body determines number of projects to audit, and identifies projects
  - QA report is prepared for each TPA that lists TPA's projects, projects in violation of compliance, and level of violation
  - Summary of violations is provided to SPV and each SDA involved
- Penalties and resolution
  - TPA is fined for each violation by the SDA
  - Repeat violations result in cancellation of TPA status
  - Projects in violation are penalized with higher tariff unless rectified

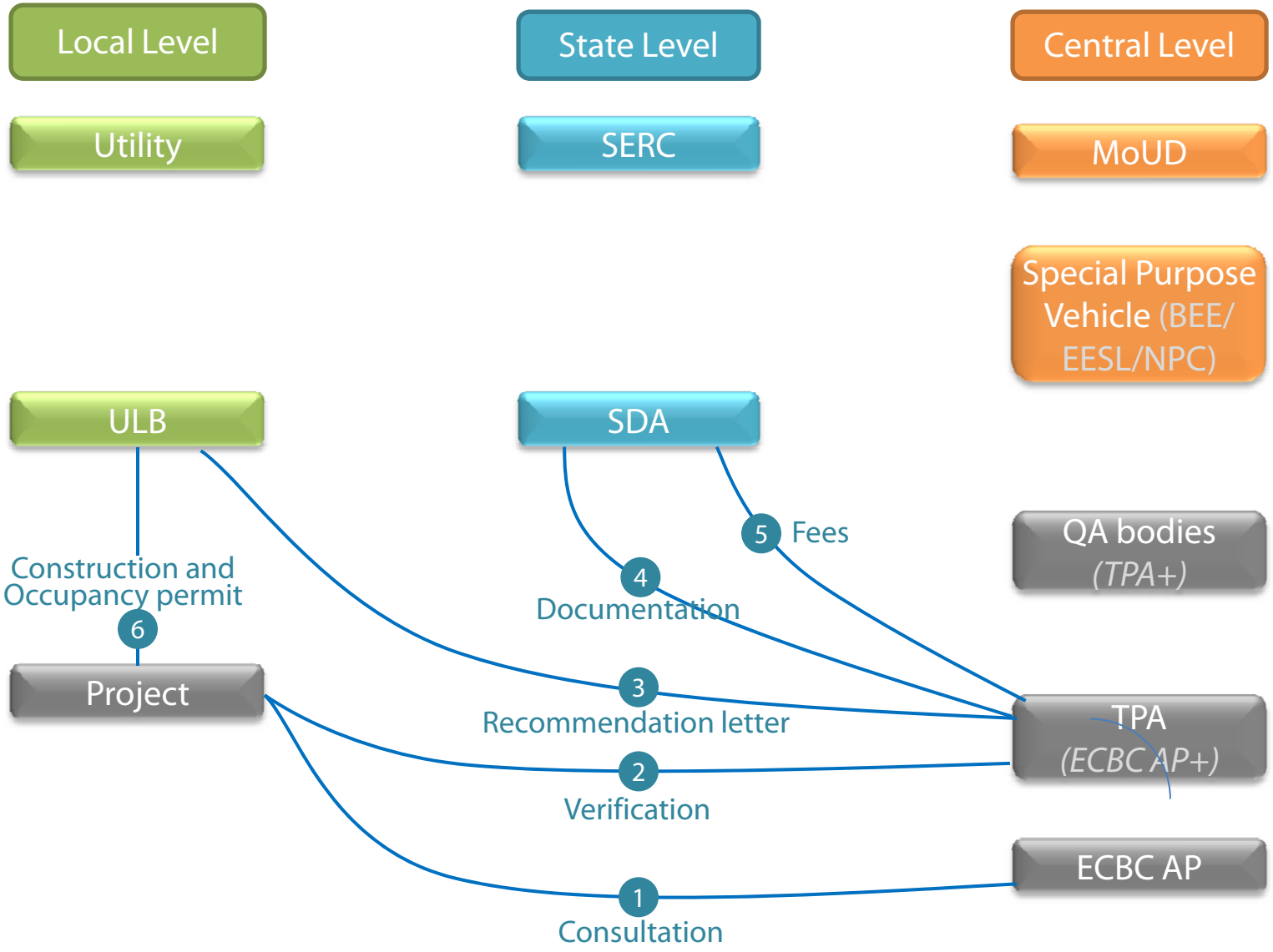
Proposed Operating Model

- One-time Institutional set up
- Process on Building Project
- Annual QA and Penalties

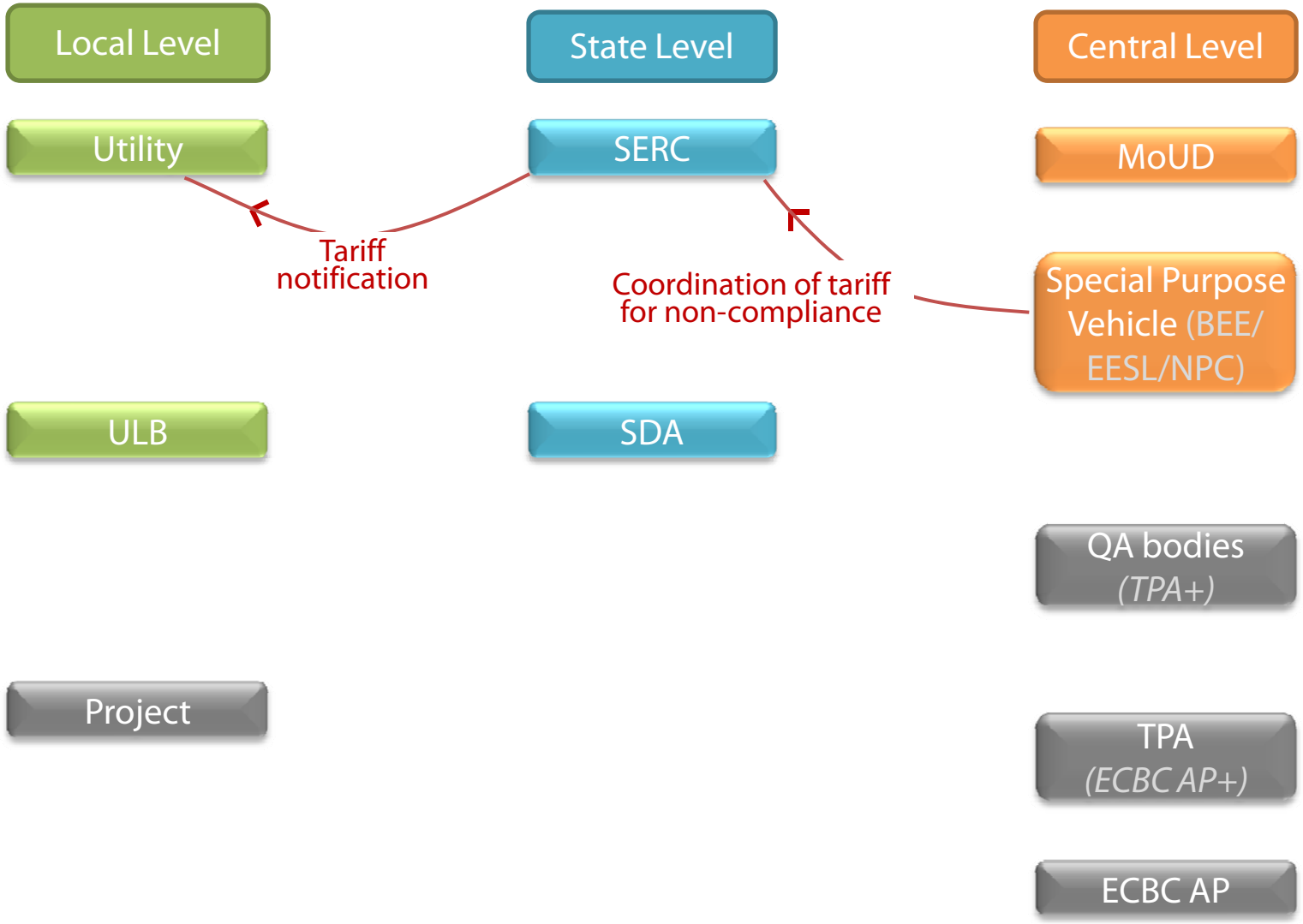
Institutional Set Up



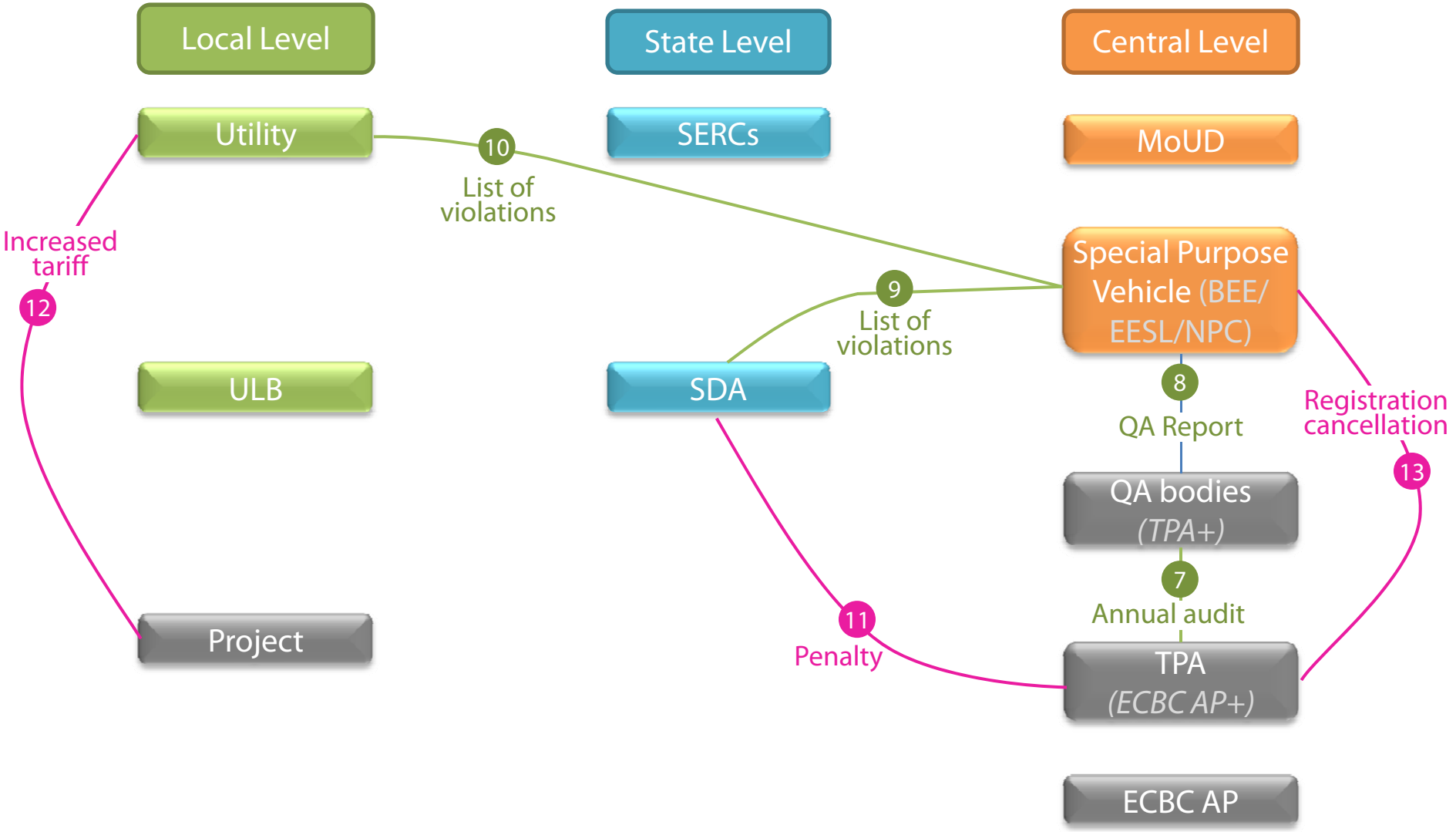
Process at Building Level



Institutional Set Up



Annual QA and Penalties



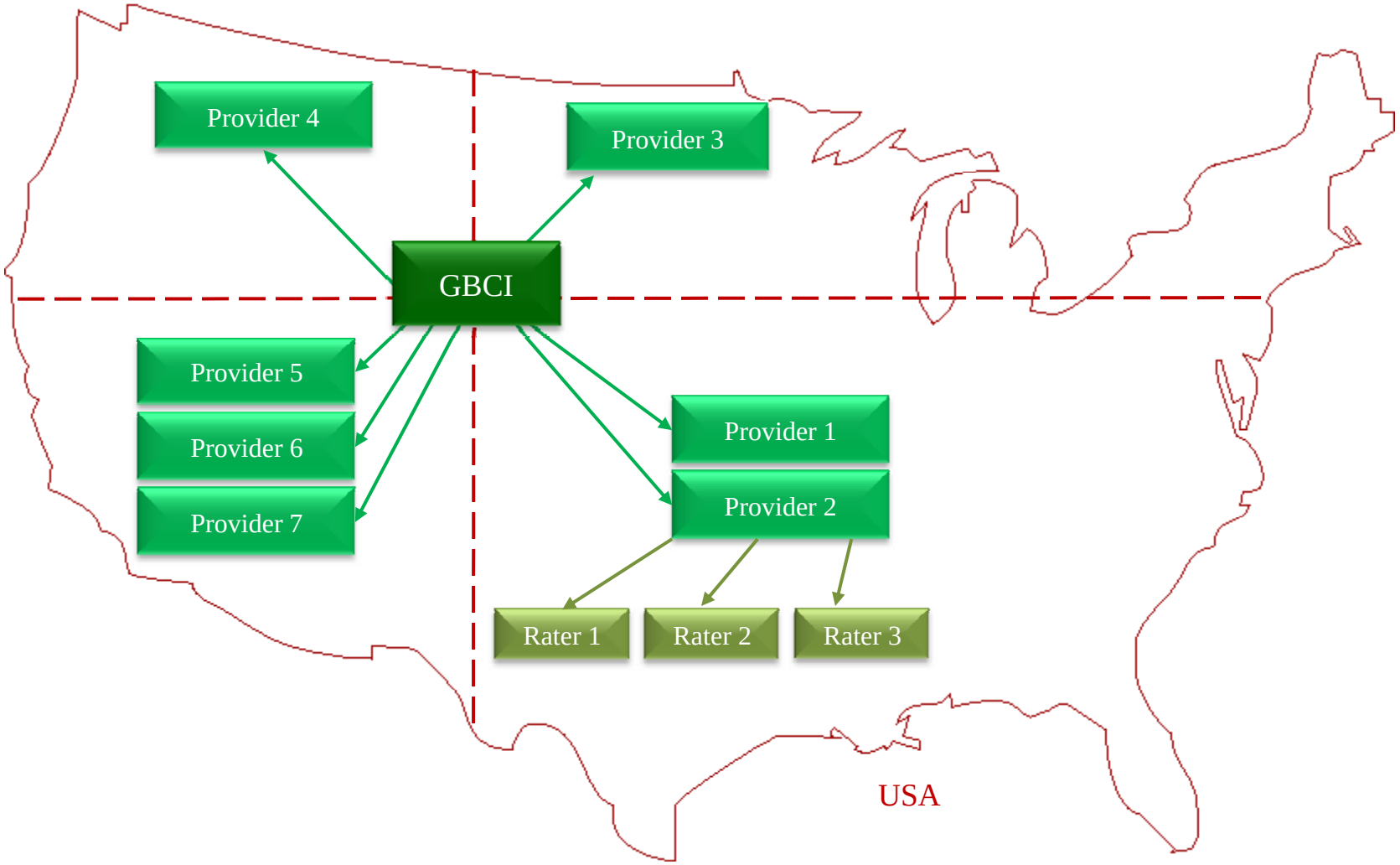
Next Steps

- Detail out the framework
- List of stakeholders to be consulted for preparation of detailed framework
  - CREDAI
  - CII
  - NICMAR
  - Indian Building Congress
  - Council of Architecture
  - ICLEI/ UMC/ASCI

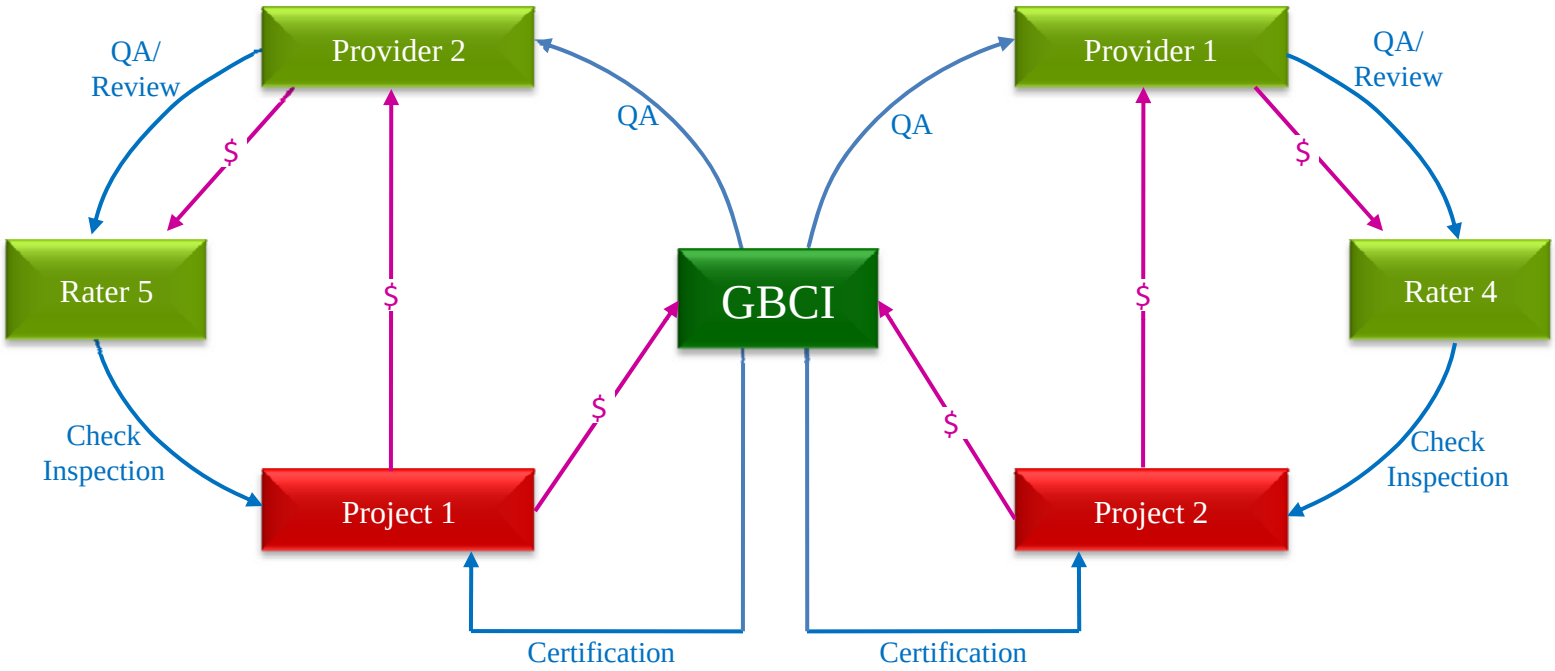
Appendix

Funding Options

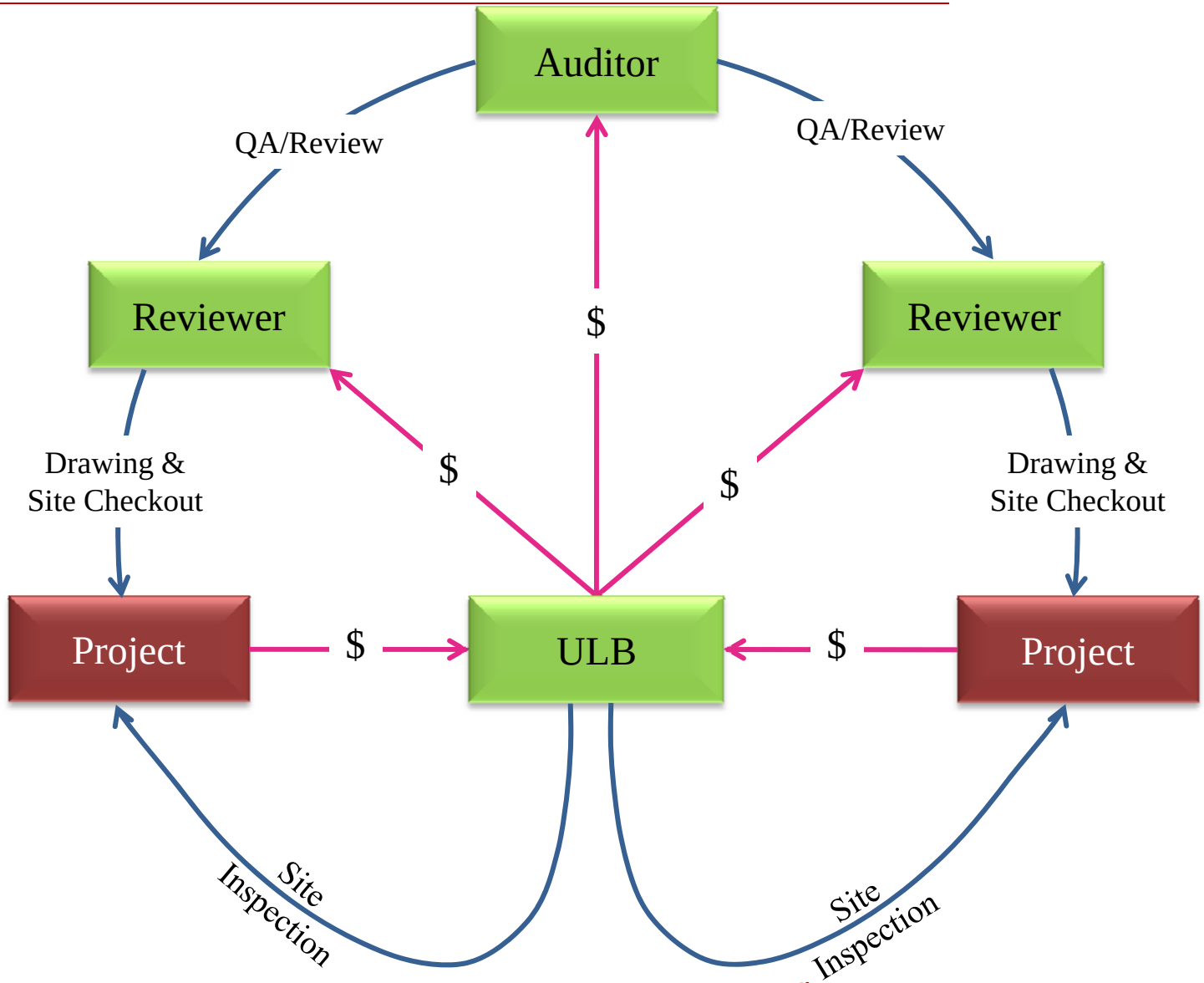
LEED for Homes - USA



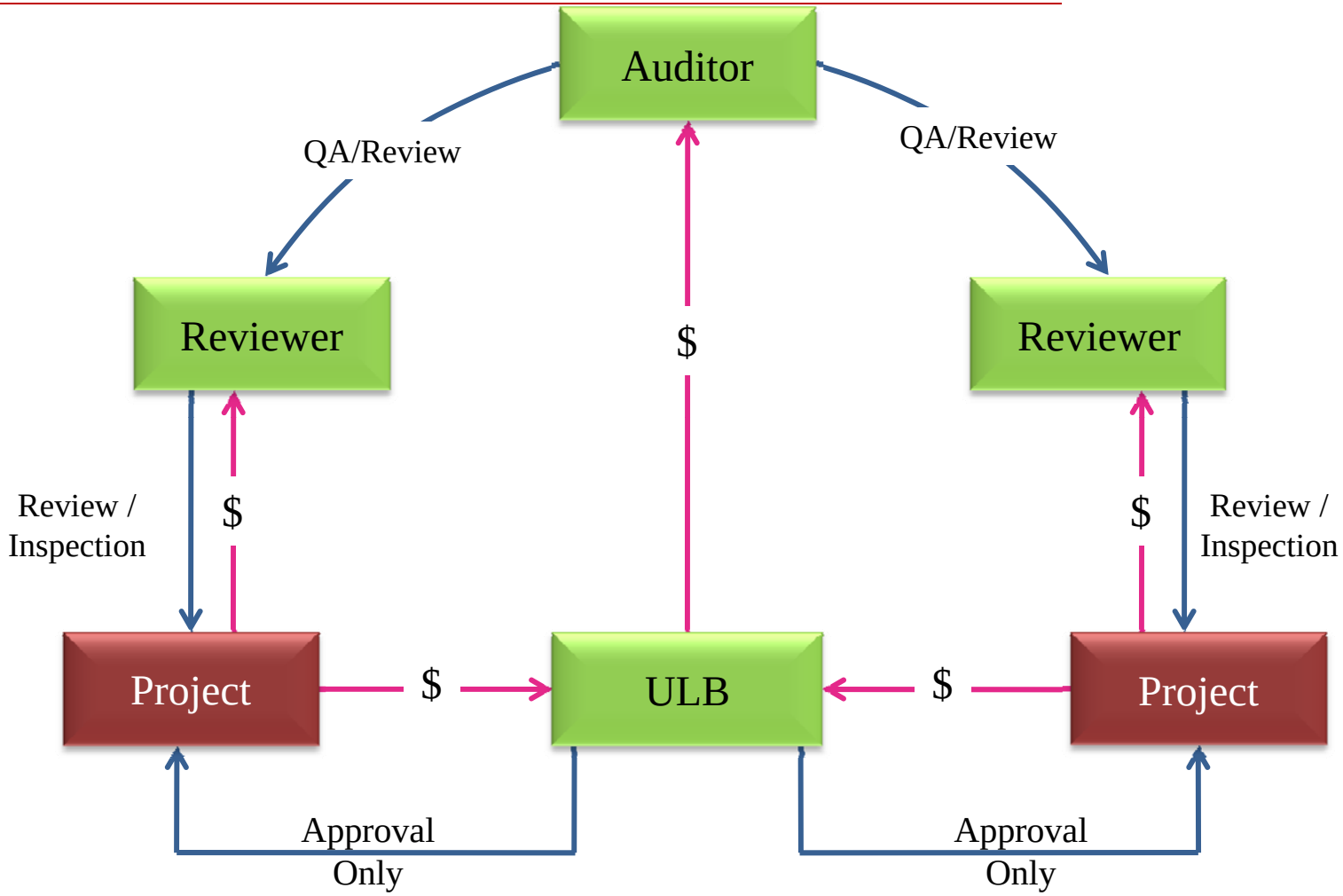
LEED for Homes - USA



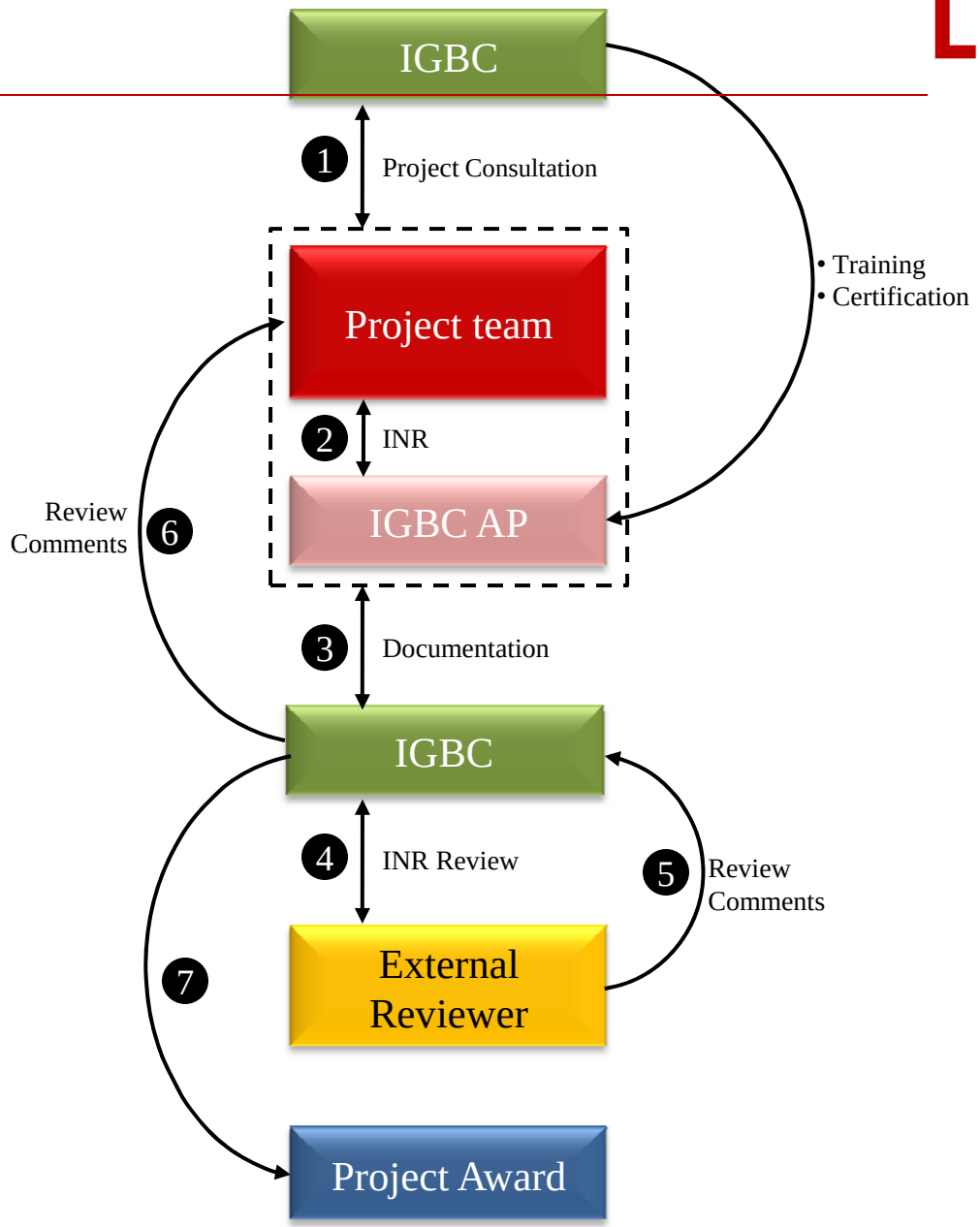
USA Code Compliance



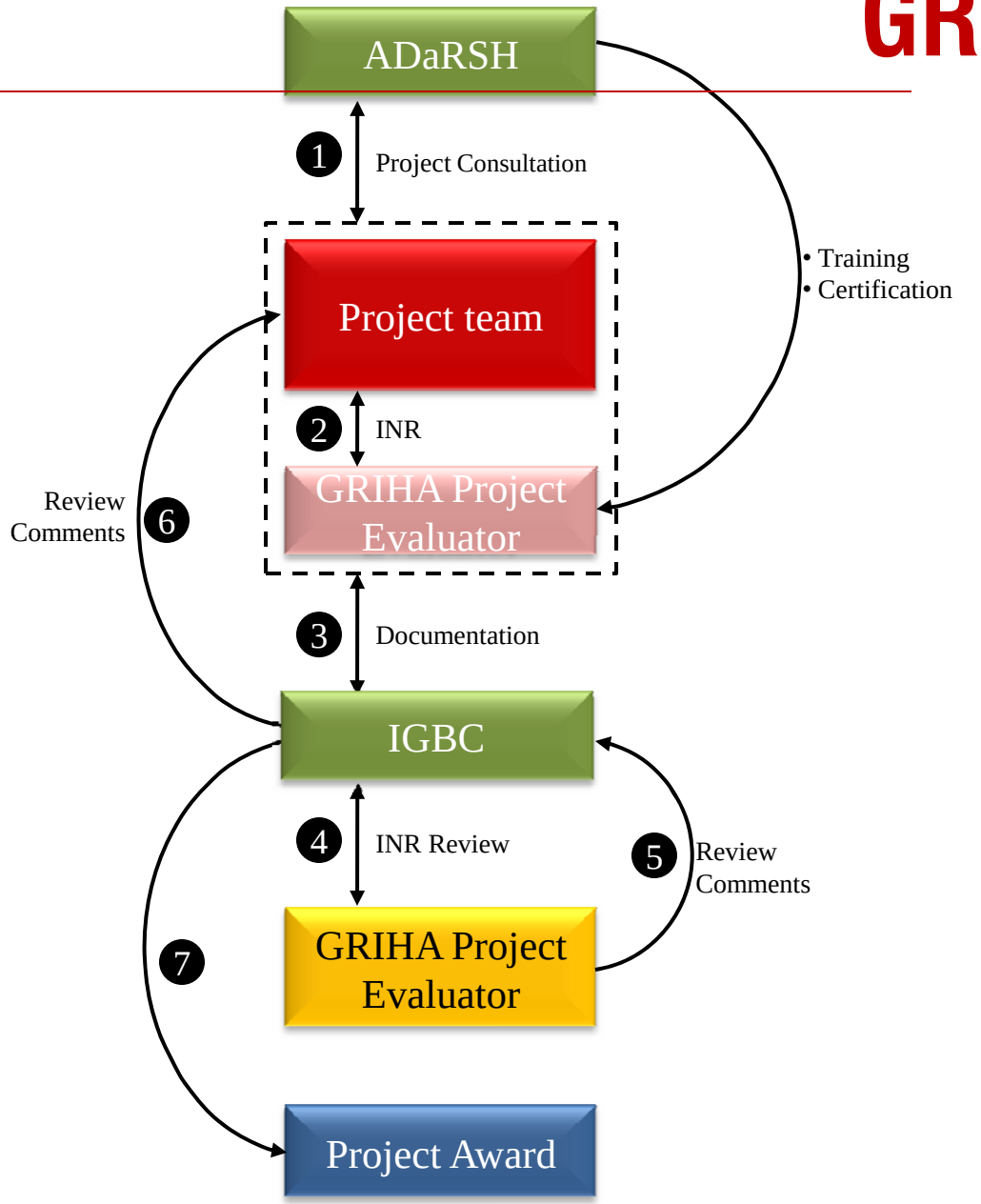
USA Code Compliance



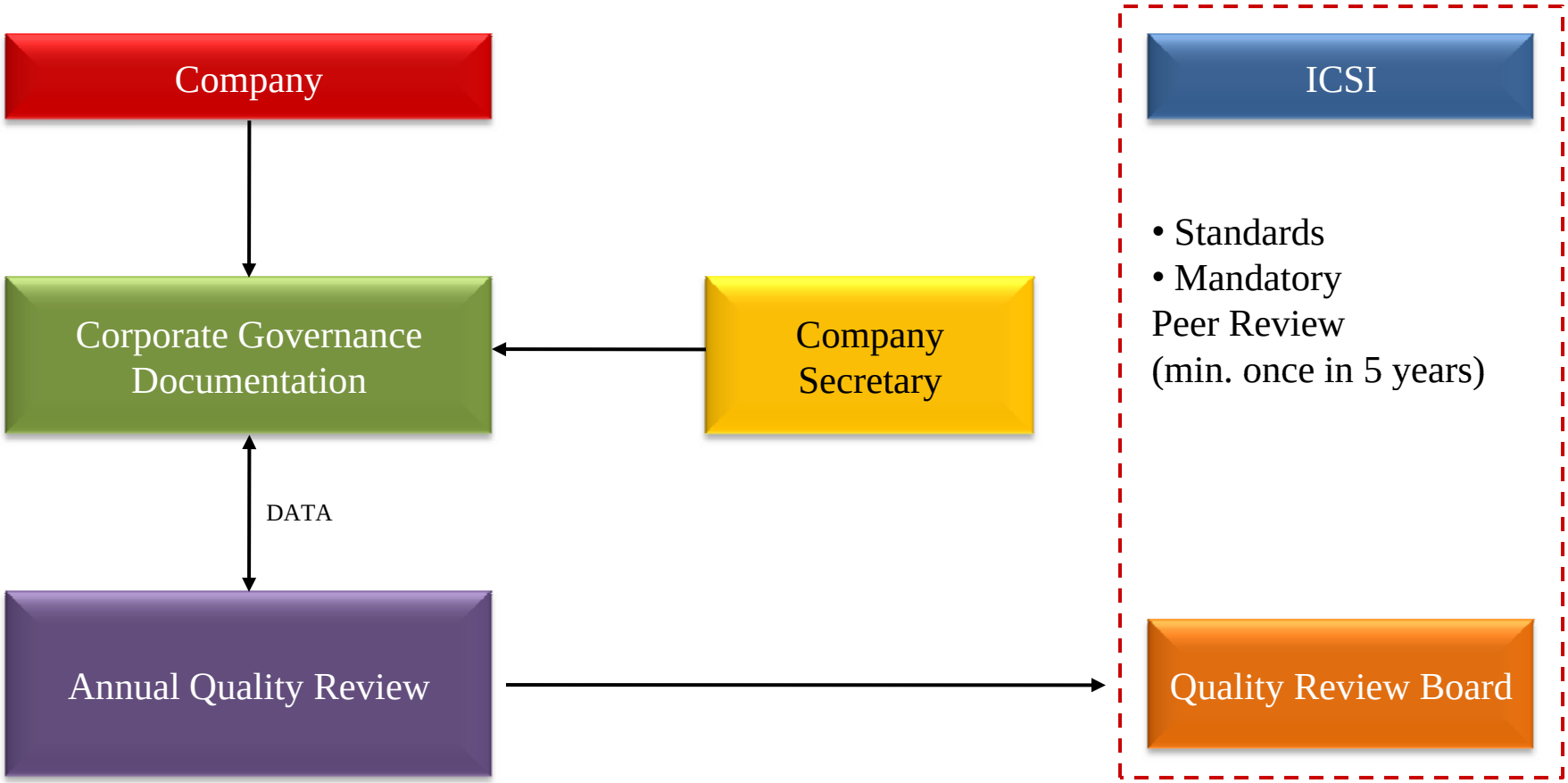
LEED - India


IGBC
1
Project Consultation
Project team
2
INR
IGBC AP
• Training
• Certification
Review
Comments
6
3
Documentation
IGBC
4
INR Review
5
Review
Comments
7
External
Reviewer
Project Award

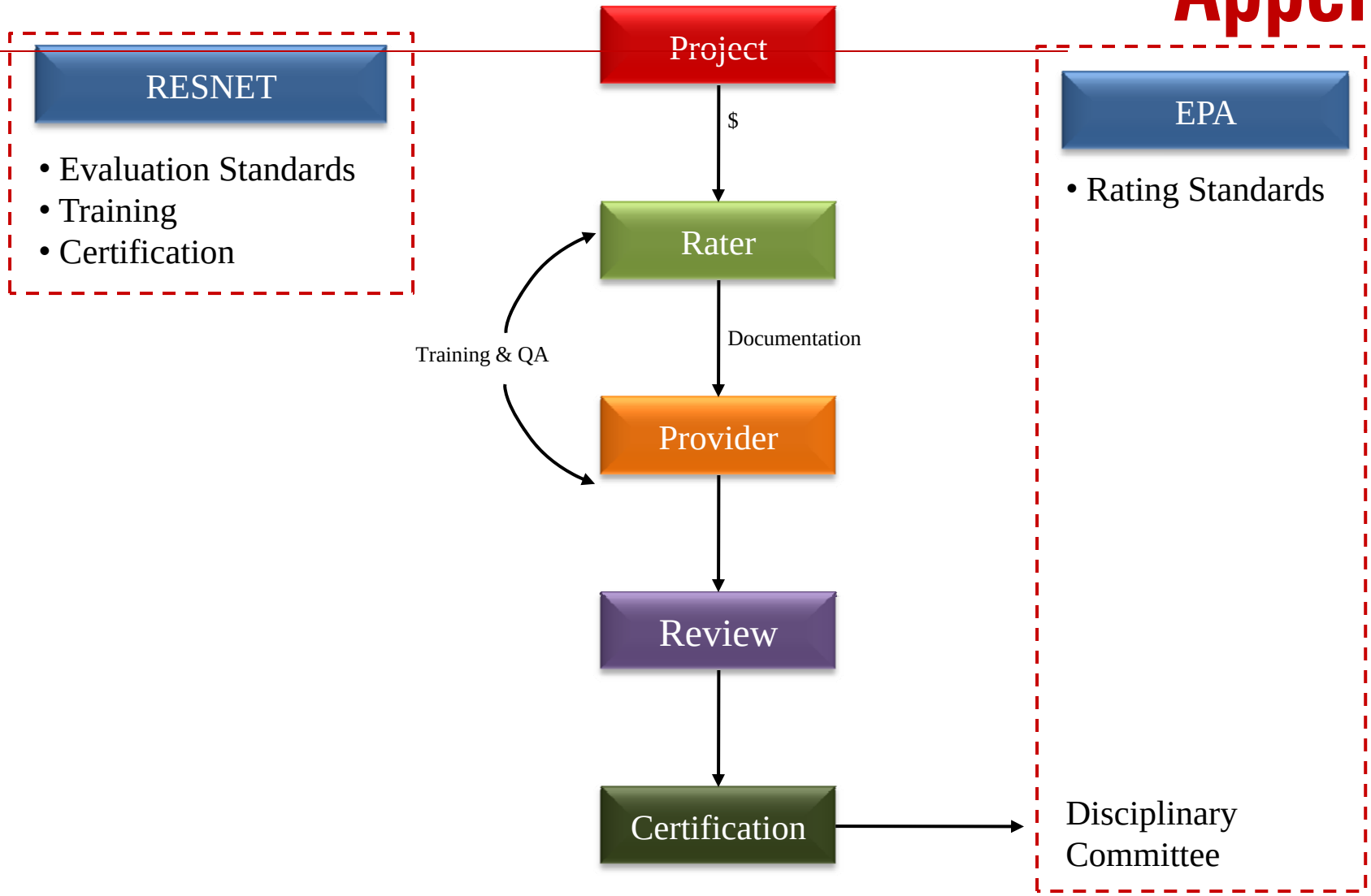
GRIHA - India


ADaRSH
1
Project Consultation
Project team
2
INR
GRIHA Project Evaluator
• Training
• Certification
Review Comments
6
3
Documentation
IGBC
4
INR Review
5
Review Comments
GRIHA Project Evaluator
7
Project Award

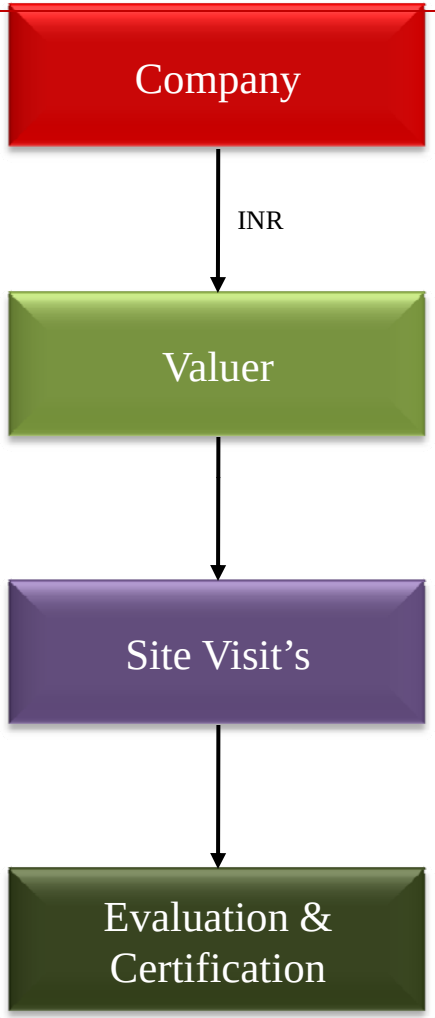
Appendix


Company
Corporate Governance Documentation
Company Secretary
DATA
Annual Quality Review
ICSI
• Standards
• Mandatory
Peer Review
(min. once in 5 years)
Quality Review Board

Appendix


RESNET
• Evaluation Standards
• Training
• Certification
Project
$
Rater
Documentation
Training & QA
Provider
Review
Certification
EPA
• Rating Standards
Disciplinary Committee

Company Secretary - India



Professional Valuer Organization

- Code of Conduct
- Standard Practices