

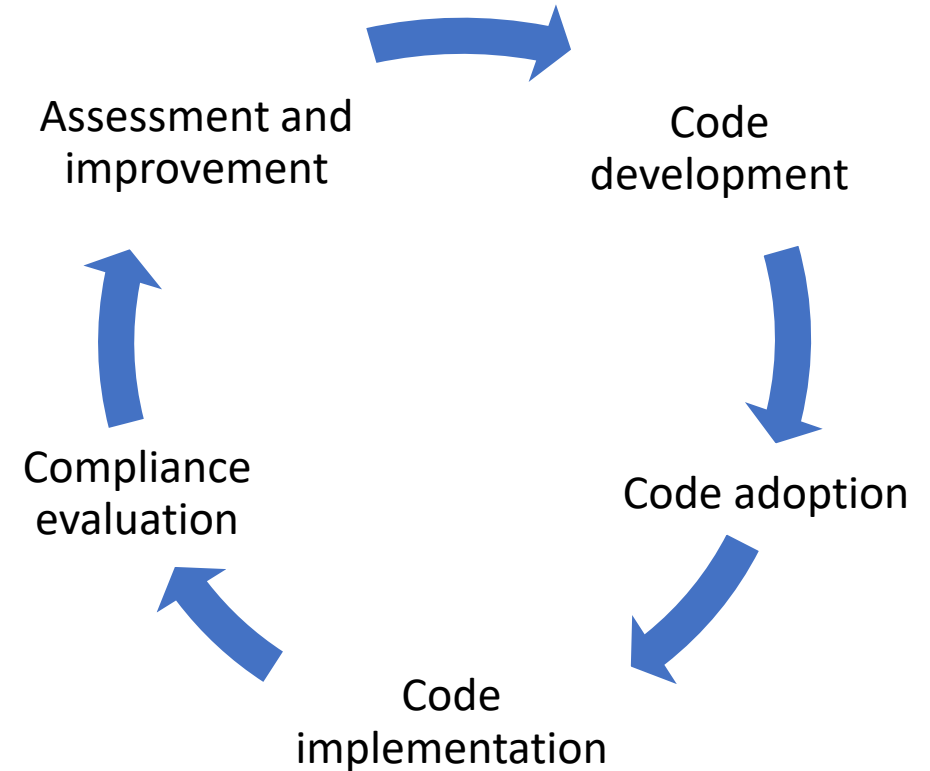
Locking in Energy Savings through Building Codes

CESC Webinar: Locking in Energy Savings through Building Codes

July 10, 2019

MEREDYDD EVANS AND SHA YU, PNNL

- ▶ Introduction: Building energy codes in the Building Efficiency Accelerator (BEA)
- ▶ Playbook for cities:
 - Assess: resources and information, drivers, benefits and potential barriers, and stakeholders
 - Develop: scope, locally-appropriate code, implementation plan, policy, capacity for implementation
 - Implement: energy saving actions, celebrate success with stakeholders
 - Improve: review and evaluate implementation, impacts and potential, analyze evaluation results to assess next steps
- ▶ Conclusions



Stage I: Assess resources and information

Step 1. Collect existing resources and information

- ▶ Many countries have building energy codes, which simplifies process for cities
 - Difficult to develop a city code from scratch
- ▶ Other resources to check:
 - Permit forms and procedures
 - Training materials
 - Software tools
 - Codes toolkits (e.g. http://www.globalchange.umd.edu/wp-content/uploads/2017/04/Building_Energy_Code_Toolkit_042517-final.pdf)
- ▶ This step can be quick, but is also a real time-saver

Introductory Codes Training



COMMERCIAL GREEN BUILDING APPLICATION

Building AP#(s) _____ U&O # _____

PROJECT INFORMATION - Applies only to new construction/additions of 5000gsf or greater (Check all that apply)

New Construction Addition Non-Residential Residential R-2/R-4 Residential R-1 Mixed Use Shell

Size - Gross ft² (gsf): _____ ✪ If under 5000gsf – Not Applicable (If checked, complete only this project information Section)

Project Address: _____ Project Name: _____

APPLICATION INFORMATION – Complete for ALL applicable projects

Project Owner: _____ Address: _____

Phone: _____ Mobile: _____ Email: _____

Primary Contact/Applicant: _____ Address: _____

Phone: _____ Mobile: _____ Email: _____

Registered Design Professional in Responsible Charge (RDPRC): _____

RDPRC Address: _____

Source: Montgomery Co., MD

Step 2. Understand drivers, benefits and potential barriers

- ▶ Benefits of a building energy code:
 - New skilled jobs
 - Cleaner air
 - Improved energy security and resilience

- ▶ Barriers for adopting and implementing building energy codes:
 - Lack of capacity to review building plans and inspect buildings
 - Cost or perceived cost of the energy efficiency measures
 - Perceived risk of changes in construction techniques
 - Lack of understanding of the code

Example: Energy Conservation in Buildings Code 2017 has minimum lighting requirements that are 15% more efficient than the previous code

Step 3. Assess stakeholders to engage

- ▶ Building energy codes involve many stakeholders
 - National and regional offices can help
 - Local stakeholders are key to success (code officials, developers, owners, suppliers, utilities, etc.)
- ▶ Many countries have resources available to help cities and local stakeholders
- ▶ The code should reflect local needs, which makes implementation easier
 - Also important to share information on the code in order to build implementation capacity
- ▶ Additional resource: <https://cleanenergysolutions.org/training/adopting-implementing-building-energy-codes>



Stage II: Develop

Step 4. Define scope of the code

- ▶ Building energy codes are usually adopted as mandatory requirements
 - May start with certain types of buildings, but this also limits savings
- ▶ The main reason for limiting the scope is to build capacity and acceptance over time
- ▶ Clarify timetable for expanding the scope so the market understands the intent, and accepts the code as a mandatory requirement for buildings covered



Step 5. Develop or adapt locally-appropriate code

- ▶ Countries typically develop building energy codes at the national level
 - Very few cities develop codes from scratch
- ▶ When the local government has jurisdiction to adopt the code:
 - Engage local stakeholders to ensure that the provisions meet local needs
 - Seek opportunities to exceed the national code to help devise future standards
 - Identify specific measures that may be hard to implement initially
 - Hold hearings on the code to collect feedback on specific proposals
- ▶ Softening requirements may slow adoption of energy efficiency technologies or approaches



Step 6. Develop implementation plan

- ▶ Implementation plan provides clarity to all stakeholders and demonstrates seriousness of intent
- ▶ Three key questions to ask in developing an implementation plan:
 - What steps are needed to integrate code compliance into the permitting process?
 - Forms, instructions, and guidance
 - Capacity building for code officials and stakeholders
 - Who will conduct plan reviews and inspections?
 - Government officials or private third-parties
 - What kinds of incentives and penalties will help ensure success with compliance?
 - Largest incentive is the permission to build
 - Relaxed zoning requirements

Implementation guidance

Secretaría Distrital
Planeación Bogotá

Protocolo de implementación para el cumplimiento de los porcentajes de ahorro en agua y energía para la ciudad de Bogotá D. C., establecidos en la Resolución 549 de 2015 del Ministerio de Vivienda, Ciudad y Territorio



Step 7. Adopt code

- ▶ Details of adoption process can vary by jurisdiction. Typically determined by overarching construction laws. In many cases, cities adopt the national code to bring it into force.
- ▶ Example of city-level adoption: City Council or Mayor's office:
 - Seeks feedback from knowledgeable agency or technical review committee
 - Releases a public notice of intent with information on the code
 - Interacts with stakeholders and collects feedback
 - Sets an effective date for the new code



Step 8. Building capacity for implementation

- ▶ Capacity building needs to be aligned with the planned implementation framework
 - Consider **near**-term and **long**-term needs
- ▶ Capacity building tips:
 - Assess available resources and identify gaps
 - Prioritize code officials, building designers and construction companies
 - Organize train-the trainer programs for maximum outreach
 - Hold the trainings after the code is finalized but **BEFORE** it enters into force
- ▶ Training and capacity building will take time
 - ...but they are critical to achieving the desired results in energy efficiency

Example: Codes 101 Training in India



Stage III: Implement

Step 9. Implement energy saving actions

- ▶ Two stages of compliance checks
Plan review and **construction inspection**
- ▶ Human capacity
Local code officials or **certified third-parties** under the supervision of local government offices
- ▶ Useful tools
Compliance check software and **checklists**
- ▶ Compliance checks could be viewed as a learning opportunity in the early stages and more punitive in later years.

Plan Review	Construction Inspection
<ul style="list-style-type: none">• Review of construction documents and building plans• Review of products, materials, and equipment specifications• Review product listings• Review of tests and certification reports (if applicable)• Review of supporting calculations	<ul style="list-style-type: none">• Inspection of the building and its systems during construction• Evaluation of materials substituted in the field• Inspection immediately prior to occupancy. <p>(Source: BECP 2010)</p>

Step 10. Celebrate success with stakeholders

- ▶ Communicate with stakeholders and the public on the progress and benefits of building energy codes
- ▶ Make efforts to collect and maintain data on code compliance
- ▶ Other options for sharing success:
 - Publish implementation status report periodically
 - Develop case studies highlighting success stories and innovations
 - Develop building energy efficiency awards recognizing leaders in energy code implementation



Stage IV: Improve

Step 11. Review and evaluate implementation and impacts

- ▶ Compliance evaluation benefits:
 - Ensures the code achieves its intended savings
 - Builds trust and market confidence among stakeholders
 - Instills confidence in the market
 - Identifies potential improvement areas

- ▶ Compliance evaluation options:
 - Reviewing permit database
 - Conducting periodic compliance surveys during construction
 - Leveraging other energy efficiency evaluations
 - Conducting stakeholder surveys

Bogota Example

Bogota has set up a working group to determine how it will assess progress with its code implementation. The group reviewed existing data and is working through possible evaluation approaches. The city has a robust database of newly constructed buildings and building occupancy.

Step 12. Analyze evaluation results to assess next steps

- ▶ Evaluation can help improve local building energy code programs
 - Identify training needs or other ways to improve capacity
 - Highlight where to strengthen compliance

- ▶ Assess options for future code:
 - Provisions that are easily met and can be strengthened
 - Areas where the code may need greater clarity

Conclusions

- ▶ Building energy codes can lock in significant energy savings
- ▶ Important to develop a comprehensive strategy to integrate code development, adoption, implementation, and evaluation
- ▶ Stakeholders are critical to success

