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GEORGIAN BUILDING CODES ASSESSMENT

FINAL

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DATA

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I would like to thank the following EPI's local team members for their invaluable work and contribution to the progress and success of this mission.

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ABSTRACT

Georgia is making a progress in reforms and developments. This posture contributed to the posting in the most recent report from World Bank Doing Business for 2011, ranking Georgia 12 out of 183 global economies in ease of doing business, and ranked 7 in dealing with construction permits.

The U.S. government has been in full support of these reforms and developments for a stronger Georgia, politically and economically. This support substantiated by various USAID projects to reinforce, strengthen, and institutionalize the progress for sustainable growth and development in Georgia.

The USAID Economic Prosperity Initiative project has conducted assessment on many business sectors in Georgia, including the construction sector, which is the subject matter in this report. Government of Georgia has already made significant progress in simplifying and streamlining administrative procedures for issuing construction permit and CO and adopted administrative part of construction legislation that meets international standards and best practices. However, Georgia still lacks construction technical standards. Therefore, EPI project initiated new scope of work, **Assessment of Building Codes, Standards, and Regulations in Georgia**, to address this very important issue. The focus of this report is to evaluate current Georgian building codes and standards and compare it to recognized international codes, make recommendations based on findings to bring Georgian construction industry to international level. The intent of this reform is to attract investors, discover local construction materials, boost market development, and build skills in planning, design, construction, and operation, which will contribute to job creation and prosperity.

ABBREVIATIONS

ICC	International Code Council
IBC	International Building Codes
GOG	Government of Georgia
EPI	Economic Prosperity Initiative
SNIP	Russian Abbreviation of Soviet Construction Norm and Rules
USAID	United States Agency for International Development
WBDB	World Bank Doing Business
NGO	Nongovernmental Organizations
MEP	Mechanical, Electrical, and Plumbing
CO	Certificate of Occupancy
MOU	Memorandum of Understanding
MoESD	Ministry of Economy and Sustainable Development
IGCC	International Green Construction Codes
OSHA	Occupational Safety and Health Administration
NFPA	National Fire Protection Association

CONTENTS

I. EXECUTIVE SUMMARY

In recent years, USAID has supported comprehensive construction industry reform focusing on simplifying and streamlining construction permits and certificates of occupancy, and adoption of technical standards for construction based on internationally recognized codes and standards. While the permit process has been dramatically simplified, Georgia still lacks construction technical standards.

Consequently, in June 2011, USAID EPI project undertook to develop an **Assessment of Building Codes, Standards, and Regulations in Georgia** to address this very important issue. The local expert team, identified earlier in this report, is working with the international expert to accelerate the achievement of the goal to update Georgia's building codes based on internationally recognized codes.

Georgia's construction industry need further reform to meet international standards. The adoption of unified and streamlined building codes will help strengthen the construction business sector; open market development for new and local construction materials; introduce new construction means and methods; and build skills in planning, design, construction, and operations in Georgia. This will contribute to Georgia's financial system, job creation, and economic prosperity.

This project analyzes Georgian construction codes, comparing it to internationally recognized codes, such as ICC, identify gaps, and makes recommendations based on Georgian's locale. The project is on a fast-track, starting June 2011 and to be completed in September 2011. For this type of project, the approach should be based on solid principles to be able to conduct the study that has a credibility that deserves. Below are the principles that were established to start this project:

Sustainability. Make solid assessment with examination of the current status from the field and feedback from the stakeholders, and propose concrete recommendations that will sustain the effort and take Georgia's building industry to the highest level possible.

- Transparency. Engage all the stakeholders and empower them to take on this reform. In addition, inform the public and invite their input on the process of codes' development, implementation, and maintenance.
- Collaboration. Work closely with stakeholders and government agencies to meet and exceed expectations in delivering a complete product within schedule.
- Education. Inform public and private stakeholders and educators through one-on-one communication, public meetings, workshops, and website.

EPI's local team developed a list of stakeholders from the construction industry and government agencies for project intervention. Face-to-face interviews were conducted with government agencies, ministries, professional associations, architectural and engineering firms, developers, universities, and other nongovernmental organizations. Public meetings and workshops were conducted to communicate the intent of the project. Based on the feedback, assessment of the current building codes' condition was made focusing on:

- Immediate needs for building codes related to safety: structural, fire protection, accessibility, and seismic issues

- Necessity for codes related to MEP
- Sustainability: environmental, water, and energy conservation
- Value added: local construction materials, market development, and job creation
- The construction sector's need for transformation, and the aspiration of the professionals in this sector and GOG to reform and modernize the building codes
- Integrate the new codes into the education of the new generation of Georgian's engineers, architects, landscape architects, interior designers, and contractors

Although the scope of this mission was specific to the assessment of the current Georgian building codes and standards, throughout the investigation, other related issues were noted. This report will address these issues as well.

FINDINGS

Below are the results from the assessment of the current building codes and standards in Georgia. Georgian building codes are obsolete. The feedback was unanimous from all the interviewed stakeholders and the local expert team working on this subject matter. Here are specific findings:

❖ Building Codes

- Georgian building codes have not been updated for over a decade.
- Inconsistency in building codes and standards exist; a mix of Soviet Union, American, British, German, and other European standards are used.
- Current Georgian building codes are mainly based on Soviet Construction Norms and Rules (referred to in this report by its Russian language abbreviation: SNIP).
- No MEP, fire safety, and accessibility codes exist.
- Designers, architects, and engineers use any codes they desire.
- No licensing is required to practice design, engineering, and construction.
- Contractors are at loss. They often build using inconsistent design and sometimes they build based on owner's direction in materials and means and methods selection.
- Lack of unified and consistent standards, such as standards for concrete, steel, and other building materials, as well as for soil testing, equipment performance, and interior finishes.

❖ Code Compliance and Enforcement

Having a mix of codes is cumbersome for the designers, and it is horrendous for municipality who issues building permit and conducts inspection to issue CO. The findings here reinforced the urgency to complete this project. These findings are based on the current practices at Tbilisi municipality, which will be a model used

elsewhere in the country. Below are the two departments within Tbilisi municipality responsible for issuing building permit and CO.

- **Architecture/Building Permit Office.** In Georgia, the constructions are divided into five classes based on the complexity of the construction. Architecture office is responsible for review construction permit applications and issue building permits for construction class two to four. Class five is the most complex, such as power plants, dams, etc. This level of construction is under the MoESD.

- The structural drawings and specification review is subcontracted to independent/expert reviewer and his/her report is used to grant the permit.

- Simplified and streamlined administrative procedures are in place for permit processing, including “One Stop Shop” for permitting.

- Building permit is issued based on compliance with structural design review only.

- No MEP, safety, accessibility, and fire protection review is performed, and there are no requirements to be included in the drawings and specification for permitting.

- Not all the construction and renovation projects apply for permit.

- Review and permitting staff are architects. There are no MEP engineers.

- No licensing is required to design and sign and seal construction documents.

- Lack of tools, training, and new technology to design and maintain as-builts or the final building record documents that include all the changes made during the construction.

➢ **Construction/Inspection Office.** One of this office’s responsibilities is conducting inspections for all renovations and constructions up to class four and issue CO.

- Inspection for all construction and renovation projects up to class four supposed to be conducted and CO issued by this office.

- CO for class five projects is issued based on independent expert’s inspection report.

- CO is granted with minimum inspection and in some cases without inspection.

- Inspection staff is mostly architects. No MEP and fire safety engineers are on staff.

- Office staff is not enough to conduct all the permitted inspections. They are primarily busy responding to nonpermitted construction.

- No contractor licensing is required for contractors to build.

- Lack of quality control in construction is due to codes deficiencies.
- Lack of knowledge and training in construction means, methods, inspections, and construction project management.
- Unable to control compliance and enforcement due to variety of codes in practice.

❖ Other Findings

- Insufficient zoning code.
- Ineffective planning office due to its physical disconnect from municipality and zoning department.
- No infrastructure standards for building roads and highways, bridges, tunnels, and utilities. No management system exists to facilitate decisions to prioritize construction and maintenance of the road network.
- No green building standards, despite the fact that the majority of the firms, organizations, and individuals interviewed, know about green buildings and sustainable development.
- Lack of education and training programs related to building codes and standards, construction, and infrastructure at vocational schools, colleges, and universities.
- No programs and guidelines for operation and maintenance to sustain buildings and infrastructure`s intended performance.

RECOMMENDATIONS

❖ Building Codes

Development and adoption of a unified, internationally recognized set of building codes are essential. One of the recommendations is to purchase **2009 International Codes** suite both electronic and hard copy(s) with commentary. Due to the urgency and needs to develop Georgian building codes, this report includes some of the recommendations that are already underway and some are completed before this final report was delivered. Intermediate reports were delivered during the earlier visits to get some of the recommendations underway.

2009 International Codes are recommended as a framework to develop Georgian building codes. Starting phase one with 2009 IBC is the most logical approach because IBC addresses all buildings except detached one and two family dwellings and townhouses not more than three stories in height. This comprehensive code features time-tested safety concepts, structural, and fire and life safety provisions covering means of egress, interior finish requirements, comprehensive roof provisions, seismic engineering provisions, innovative construction technology, occupancy classifications, and the latest industry standards in material design. The approach is to prioritize adoption, review, and translation based on the most immediate needs of Georgia. Phase two is addressing the other 2009 International Codes, including structural, mechanical, plumbing, energy, existing buildings,

property maintenance, gas and fuel, sewage treatment, NFPA 70 and NFPA 13, and the standards to meet these codes requirements.

➢ Phase I _ start with IBC 2009

- EPI's local team to review and translate IBC 2009 Chapters 2_15, 31, 34, and 35 to Georgian by August 30, 2011, and complete the approval process, including public comments period by the middle of November 2011 and submit to the ministries' review and legislative approval.

- EPI's local team to review and translate IBC 2009 Chapters 16, 17, and 18 to Georgian by the end of November 2011 and follow the same ministries' review and legislative approval process.

- EPI's local team to complete translation of IBC 2009 Chapters 19-26 by the end of February 2012 and follow the same ministries' review and legislative approval process.

- Integrate residential codes for one and two story dwellings into this code as an appendix. After Georgian codes are well established, it is highly recommended that Georgia develop an independent residential code.

- EPI's team to identify standards referenced in the IBC 2009 code and register them in English as national standards following the adoption of IBC. The identified standards to be translated to Georgian in the next phase of this project.

- Adopt NFPA 70 and NFPA 13 as part of the Georgian building codes for electrical and fire protection. NFPA 70 and NFPA13 are referenced in IBC 2009. They must be translated to Georgian and included in the Georgian building code suite. Assemble a committee per each listed NFPA and follow the process set for code adoption.

- Develop basic green building standards based on the Georgia's locale, and encourage the use of green standards on a voluntary basis. Sustainable standards are becoming common practices around the world. This will position Georgia as a leader in sustainability in the region.

- Form committees for each discipline and involve them in the codes and standards review process.

- If needed, engage short-term local experts in the final review of codes that the EPI local team does not have expertise in, such as MEP, energy, and fire protection before publishing for ministries' review and approval.

➢ Phase II _ complete the remaining relevant codes in ICC 2009 suite

- EPI's local team is to complete the translation to Georgian, public review, and government approval of all the other relevant codes and standards in the 2009 International Code suite by August 2014, including structural, mechanical, plumbing, energy, existing buildings, property maintenance, gas and fuel, sewage treatment, and NFPA 70 and NFPA 13.

- This phase's translation is to start by the end of the first quarter of 2012. The translation of above codes shall be based on priority, and it is recommended as follows: structural, plumbing, NFPA 70, NFPA 13, mechanical, sewage treatment, energy, fuel and gas, existing buildings, and property maintenance.

- EPI's local team is to review the standards included in these codes, including:

    - UL – Underwriters Laboratories, Inc.
    - TMC – The Masonry Society
    - PCI – Precast Prestressed Concrete Institute
    - NCMA – National Concrete Masonry Association
    - ISO – International Standards Organization
    - ASTM – American Society for Testing Materials
    - ASME – American Society of Mechanical Engineers
    - ASCE – American Society of Civil Engineers
    - SEI – Structural Engineering Institute
    - ANSI – American National Standards Institute
    - ACI – American Concrete Institute

- EPI's local team and the code review committees are to determine what is relevant to Georgia and translate the code to Georgian or identify and utilize other compatible standards that satisfy the code's requirements. The standards translation to be completed in conjunction with the code that the standards are associated with.

- Develop Georgian green building standards as a supplement to Georgian building codes.

- Governmental/public property and projects to implement green building standards on a mandatory base to lead the way to sustainable Georgia.

- Implementation of green building standards for private projects should be voluntary and GOG to provide incentive to private sector for implementing green building standards.

❖ Establish a website

The website will serve as a permanent location for this project and for the future Georgian Building Codes. The website will allow posting of information and progress, as well as establish a communication avenue with the public for feedback.

- This website's permanent address to be at the MoESD or at the EPI's website.

- The final codes must be maintained and updated as needed, typically every three years. All updates must follow the acceptable procedure for code updates,

including public comment period for input and the process to be transparent and to be posted on this site.

- The website will serve as a hub for information on Georgian Building Codes and Standards for Georgia and people around the world who are interested in Georgian construction industry to view the codes development process, the final product, and may communicate feedback.
- Post the sustainability and greening features of the Georgian building standards on this site.
- Identify individual(s) who will maintain the website, answer public comments, and post future updates.

❖ Establish committees

- Set up a committee for each code and the standards associated with it, and one for sustainable/green development. It is recommended committees, with maximum of five members in each committee, to review and provide feedback on each code and its relevant standards.
- List each committee's function, duties, and responsibilities and post them on this website.
- Identify and post committee members' qualifications and selection process.
- Select committee member by application. MoESD and EPI to review the applicants and select the best qualified based on set qualifications.

❖ Codes Compliance and Enforcement

Building codes are not effective without compliance and enforcement. Although Tbilisi municipality has made a fantastic progress in its administrative permitting process, including electronic permit application and creating a great approach of "One Stop Shop" below are proposed recommendations to further enhance the technical process.

- Combine the architectural and inspection office within the municipality and reorganize by adding a new department named "Codes Enforcement Office" or "Building Safety Division"; select qualified individuals from each department to form the Code Enforcement Office, this means that each department will continue performing its other current duties and responsibilities in addition to permitting and inspection. In case of lack of available qualified individual to perform the construction documents reviews and inspection, add qualified individual to the staff. This office/division will be responsible for the public safety through enforcement of codes governing construction. The staff will review plans, issue building permits, and perform inspections to ensure code compliance related to aspects of life safety, structural integrity, handicap accessibility, and electrical, plumbing, fuel gas, heating, and air conditioning systems. Based on the current practices and organization of Tbilisi municipality, this office/division will bring efficiency, consistency, cooperation and open communications, and integration to maintain a safe and economically stable service and community.

- This is the most sustainable and cost-effective approach, based on the integrated team approach. All the services and expertise under one roof.

- Code Enforcement Office's team must include architects, MEP engineers, fire safety engineer, structural engineers, and landscape architects. Each team member will review and inspect in his/her area of expertise. This will create efficiency, consistency, and technical credibility for the construction sector and the municipalities in Georgia.

- The Code Enforcement Office shall issue permit, review construction documents, inspect, and issue CO.

- Establish new permit, review, and inspection fee based on the new services. Fee calculation is established based on the construction type, occupancy type, area in square feet, and project scope. See City of Chicago permit fee calculator.

  https://ipiweb.cityofchicago.org/DynamicPortal/Forms/FeeCalculator.aspx

  Also, see Rock Hill, South Carolina, permit fee calculation method at

  http://www.ci.rock-hill.sc.us/userfiles/file/documents/PAC_HOW_TO_CALCULATE_BUILDING_PERMIT_FEES_COMMERCIAL.pdf

- Review the established administrative process for construction permit of "Silent is Consent" based on the new and possibly high volume applications when the new codes are implemented and enforced. With the new Georgian building codes and the new proposed approach for compliance and enforcement, the permit application may increase. Review if the "Silence is Consent" still will be applicable.

❖ Training and Development

With the introduction of the new codes and standards, training of the municipalities and other government employees is vital to ensure compliance and enforcement.

- Provide training on introduction to ICC codes and how they are used as a framework to establish Georgian Building Codes. This training can be open to all the stakeholders, public and private. An abbreviated version was delivered in July 2011.

- Offer training on each code to municipalities and other government employees involved in design, renovation, operation, construction, and inspection of any type of building. This training must be completed when the codes are released for implementation.

- EPI's local team and the subject matter experts who serve as code and standards development committee members to provide training to municipalities and Georgian construction sector on newly adopted codes.

- EPI's local team and the subject matter experts to acquire credentials from a recognized body, in this case ICC, to become trainers for code development

and implementation in Georgia and the region. This may require online or in-person training.

- Introduce training on sustainable development, design, construction, and operation to be delivered by qualified and accredited professional(s) in this area.

- Plan on providing government employees continued education training on building codes annually.

- Once the municipality's "Code Enforcement Office" become proficient, it can offer training to other municipalities and public entities.

- Construction management training must be offered to the government employees who are involved in construction projects.

- Provide training to government employees on project management, construction and contract administration, including construction document review, estimating, scheduling, and payment review.

- Integrate Georgian codes' development, compliance, and enforcement into university curriculum. First start with workshops and training. EPI's team can play a vital role in curriculum development. Also, EPI can contribute to accelerate this process and coordinate establishing collaborations between Georgian universities and other universities around the world.

- Introduce sustainable design, construction, and operation to university students and faculties. Start with workshops and training, and establish partnerships between universities who have programs with degrees in sustainability to sustain Georgia's development with environmental, water, and energy conservation.

❖ Environmental Assessment and Impact

Georgia is a wealthy land with beautiful physical features, historical treasures, and a stunning landscape. During booming development, it is easy to neglect these features and contribute to irreversible environmental change, which is exactly what the developed countries are facing; they are awakening to the global warming and natural disasters that the human action contributed to. In case of Georgia, the facts are known about "dos" and "don'ts" for environmental conservation. The tools and knowledge are available to minimize the impact. Georgia can still be developed to be a modern country and preserve its natural beauty.

It has been proven that buildings contribute to the environmental degradation and CO2 emission more than industry and transportation. For example buildings in the United States consume 40% energy, 73% electricity, 14% potable water, and 39% CO2 emission. It is apparent that the building environment in Georgia has impact on natural resources and environment. Reforming the building codes will have a profound impact on the development and construction in Georgia. This project has the most important environmental attributions to Georgia, including:

- Introducing new and internationally recognized codes such as 2009 International Code is a step to the right direction to establish sustainable

design and construction for Georgia's current and future development. The adoption of the new codes will establish a baseline for Georgia's new development and construction.

- This project has already contributed and it will further contribute to the sustainability and green buildings education and awareness in Georgia. In July 2011, two workshops were delivered on introduction to building codes and introduction to green buildings and development.
- Compliance with the codes and enforcing them will contribute to sustainable design, construction, and operation practices compared to the current practices.
- With new code implementation, a baseline for energy and water conservation can be established, and green practices can be added to maximize building performance.
- Building-related CO2 emission can be calculated and reported, and strategies can be developed to further optimize building performance and decrease building's CO2 footprint. This will ultimately contribute to Georgia's CO2 footprint.
- With the code implementation, sustainable site, water efficiency, and energy conservation practices will be followed that are far better and more advanced than what Georgia is using as building codes.
- The new codes will establish the buildings' minimum energy performance and will introduce new building type material, including envelope insulation and efficient glazing. This will contribute to the discovering and using of local material in construction, which will contribute to local economy that is big part of sustainability.
- Storm water management, flood plains, and light pollution baseline will be established with new code implementation.
- With the baselines established, optimized building performance will follow when integrating new approaches and practices for heat island effect, hazardous material handling, transportation, open space management, water and energy conservation, and local and healthy material are used in construction.

❖Other Recommendations

- **Professional licensing;** establish board of professional regulations for architects, engineering, contractors, and sub-contractor licensing. This board can be under the MoESD. Establish a commission made of professionals.
- **Establish ICC chapter** in Tbilisi in support of the new codes.
- **Zoning codes;** Georgia is in much need for updated and improved zoning codes.
- **Infrastructure standards;** establish infrastructure standards for highways, roadways, streets, bridges, tunnels, and utilities that are consistent with the new building codes.
- **Sustainable/green buildings;** Construction industry stakeholders in Georgia are aware of green building movement and are in support of it. Based on

interviews of stakeholders and their current interest in green buildings, it is recommended to develop Georgian green building standards and made available for use on voluntary basis. Green building standards and sustainable development will further enhance Georgia image on the global platform.

- **Construction safety** and work place safety needs attention and enforcement, especially with the new reform in the construction industry. OSHA standards can be used as a framework to develop construction and work place safety standards for Georgia.

II. APPENDICES

A. BACKGROUND

B. METHODOLOGY

C. FINDINGS

D. RECOMMENDATIONS

E. ADDITIONAL INFORMATION

A. BACKGROUND

Since 2005, Georgia has been making great strides in its reform and development, which contributed to the raving report from WBDB, ranking Georgia's construction permit in the top ten in 2011.

Georgia's ranking in Doing Business 2011

Rank	Doing Business 2011
Ease of Doing Business	12
Starting a Business	8
Dealing with Construction Permits	7
Registering Property	2

USAID has been supporting GOG in reforming the business sector, including the construction. A few other studies have been conducted on the Georgian construction sector, including construction laws and regulations and building codes. From earlier studies and reports, ICC 2006 was recommended, and some work was performed toward its adoption; GOG and ICC signed an MOU to collaborate on improving building codes in Georgia; several chapters of 2006 IBC were registered as a national standard in Georgia. However, no further progress was made. The registered chapters were not implemented and enforced, and there was no widespread awareness about the effort. The construction industry in Georgia is at a point to position itself globally and ready to adopt solid, unified, internationally recognized and consistent codes and standards and to develop a fresh and modern Georgian building codes.

Codes are the foundation upon which great communities are built. They are the frameworks that regulate where and what type of development may occur. Codes guide everything from permissible land uses, to building densities and efficiency, locations, and setbacks, to street widths and parking requirements. When prepared well, codes make it easier for a country/community to implement its vision. Codes must line up with the country/community's vision and goals and are the best vehicles to achieve the desired development. Therefore, adopting unified and consistent codes are essential to keep up with the rapid development in Georgia, and developing Georgian building codes is the step to the right direction to further enhance the reform of the construction sector.

This document's findings and recommendations are based on review of previous studies and reports on this issue and are also derived from face-to-face interviews with governmental and nongovernmental stakeholders.

During the interviews, other compelling development and construction issues not related to the scope of this project were uncovered and have been addressed in this report. The report focuses on Georgian current building codes and the potential for future advancement that will support Georgia's construction industry and its rapid development.

The report identifies the status of building codes, their implementation, and enforcement in Georgia and then compares it to internationally accepted building codes, identifies the gaps, and makes recommendations.

B. METHODOLOGY

Georgian building codes' assessment project is on a fast-track and it is must be completed in four months. It is clear; time is of the essence to meet the tight schedule. As soon as the team was established, the team started strategizing via conference calls and scheduling tasks, interviews, and plan for every step to meet the schedule.

The team's approaches was to get to root of the issue, study and understand the background, identify public and private stakeholders and decision makers, conduct intense face-to-face interviews, identify public and private champions in different areas of expertise in the construction industry, and develop a long-term alliances and partnerships to develop a sustainable Georgian building codes.

Early on, the guiding principles were established for the project to deliver a product that is a collective result of everyone's hard work. Since the project is on a fast-track, an aggressive schedule was established to complete this task between June 2011 and September 2011. The guiding principles include:

- Sustainability: Make solid assessment with examination of the current status on the field, and feedback from the stakeholders, and propose concrete recommendations that will sustain the effort and elevate the Georgian building codes to the highest level possible.
- Transparency: Involve all the stakeholders and empower them to take on this reform. In addition, inform the public and invite their input to the process and make them part of solution in the product development, implementation, and maintenance.
- Collaboration: Work closely with the local team, stakeholders, and government agencies to meet and exceed expectations in delivering a complete product within schedule.

A long list of champions and stakeholders from the construction industry was compiled by EPI's local team for project intervention. One-on-one interviews were conducted with government agencies, ministries, professional associations, architectural firms, engineering firms, developers, universities, and other NGOs. Public meeting and workshops were held to communicate the message. Based on the feedback, assessment of the current building codes' situation made focusing on:

- Immediate need for building codes related to safety: structural, fire protection, accessibility, and seismic
- Need for codes related to MEP.
- Sustainability codes for environmental, water, and energy conservation
- Value added: local construction materials, create jobs, and market development

❖ Information Collection

This is a very important step in the process. Assessment was based on research and findings. The information collection included the following methods:

- Earlier available reports generated on the subject matter by other international experts and local expert team

- Published and online data
- Government statistical information
- Face-to-face meetings with architects, engineers, and contractor's firms, developers, government entities, universities, NGOs, and other organizations
- Extensive knowledge and experience of the local team

EPI scheduled meetings with all the stakeholders. These meetings provided opportunity not only to collect pertinent information, but also to meet prospective partner firms and organizations (public, private, and NGOs) and engage them in discussion of EPI's approaches and objectives of this project. The meetings provided tremendous brainstorming opportunities. The participants enthusiastically embraced the strategic opportunities and possibilities for partnership and become champions to advance the construction sector in Georgia.

❖ Local EPI Team

The EPI's local team members identified earlier in this report are critical to the completion of this task. They have profound understanding of the subject matter in Georgia, have worked with the other two prior international experts, well rooted in the community, know all the stakeholders, have translated some IBC 2006 Chapter 2-6 to Georgian, and are currently working on translation and adoption of IBC 2009 codes to Georgian. The collaboration of this team with the international expert is critical to deliver a comprehensive product. This team will review the IBC 2009 codes and the other 2009 relevant codes and standards, translate it, and be an active part of the review process and during public comment meetings.

❖ Local Stakeholders

Local stakeholders are community leaders and members, public and private, who have a stake in the construction industry in Georgia, and have been working in this sector for decades. Individual interviews were conducted with each entity/individual to learn more about the state of the policies, rules, codes, implementation, and enforcement on a daily basis in their practice. Vital information was gathered from their personal experiences and grievance with current codes and practices. At the end of the interviews, it seemed that all have one objective, how and when building codes reform will be completed, implemented, and enforced. What role they can play to expedite it and be part of the historic change. In addition, each entity volunteered their efforts and staff to participate in the process. Below is a list of the stakeholders that were interviewed:

- Office of the Prime Minister
- Ministry of Economic and Sustainability Development of Georgia
- Tbilisi City Municipality, Construction Supervision Department and Architectural Department
- Union of Architects of Georgia
- Architectural firms
- Engineering firms
- Construction Association
- Georgian Employers' Association
- GIZ
- USAID NATELI project
- Universities

The discussion with the stakeholders started with specific questions, such as:

- What is status of the building codes in Georgia?
- How is your industry affected by the current codes?
- What would you like to see in the new codes?
- What impact will the unified codes system have on the construction industry in Georgia?
- How this change may affect cost of construction?
- What does it take to identify and introduce new local regional construction material to the market?
- What impact will the new codes have on the design and construction skills of professionals and workers?
- Are you ready for new unified building codes?

It was refreshing to find that the responses were unanimous in support of this initiative. Everyone felt that this is a task that is long overdue for Georgia, and how this codes reform will positively affect them personally and professionally, the construction industry as a whole, and will benefit the country. This feedback made this project even more exciting and unique. With a positive attitude like that, the ambitious goal of this project is within reach.

C. FINDINGS

During face-to-face interviews and discussions with the stakeholders, the message was clear and consistent from all, that “Unified building codes is much needed in Georgia”. For simplicity, findings are separated into sections related to the building codes and codes enforcement. Other findings that are related to construction but were not part of the scope of this project are also included.

❖ Building Codes

In 2008, GOG signed an MOU with ICC and purchased IBC 2006. Chapters 2-6 of IBC were translated to Georgian language and registered as the national standards. The remaining IBC chapters were registered as standards in English, but were to be reviewed and modified to adapt to Georgia’s locale, and then to be translated to Georgian language. The interviewed stakeholders were not aware of this change to the codes status, and evidently, the codes requirements are not implemented in design and review for permitting, or in construction and inspection for issuing CO.

Georgia’s current building codes are outdated. They are a mix of Soviet Union, American, British, German, and other European standards. The most recent are the seismic codes that were last updated in 2009, but they were mainly based on 1980’s version and they need substantial revision. SNIPs are the most widely used codes in Georgia. But even SNIPs have not been updated for a decade. Although SNIP structural and seismic codes are used, but there are no MEP, fire protection, existing buildings, energy conservation, and accessibility codes. Lack of knowledge; awareness; and importance of building safety, design, construction, material use, energy efficiency, water efficiency, and operation and maintenance are contributing to poor quality, inefficient, and unsustainable Georgian building stock. Therefore, new and modern building codes are urgently needed.

❖ Code Compliance and Enforcement

Tbilisi municipality is responsible for construction permit and CO issuance for two to four classes of buildings (which represent the majority of constructions) as are other municipalities, with Tbilisi municipality being used as a model for reform. The municipality has done a superb job in streamlining and simplifying the administrative process of construction permit application. But, there is a room for improvement in the technical aspect. The municipality has two main departments responsible for this process:

- **The Architectural/Permitting office** which is in charge of the permit application review process, including review of the drawings and specifications up to Level 4 buildings. It is not clear what in the construction documents are reviewed since they do not require MEP, life safety, fire protection, and accessibility for permit review. Structural drawings and specifications are required for permitting, but these are sub-contracted to independent external experts for review, and based on the report from the independent expert, construction permit is issued. This office has about 60 employees, mainly architects. There are no engineers on staff; therefore, MEP and fire safety reviews are not conducted. But, in their defense, each project submitted for permitting and review is designed differently, and they cannot provide in-house expertise for mixed unenforceable codes used. Tbilisi municipality’s “One Stop Shop” for permit application and processing made it easy for public to apply for construction permit. Everything related to

application is converted to electronic application and notification with posted schedule of permit processing, fees, and feedback. The municipalities have seen increase in number of permit application. Municipalities can achieve the same success in the technical process if there are unified enforceable building codes in Georgia. Close to 65% of construction permit applications in Tbilisi are residential and 35% are commercial, and most of the residential permits are for high-rise buildings. The staff in this office is in need for immediate training on the new building codes and the construction administration. Beside the "One Stop Shop", the municipality's "silence means consent" approach may fire back when unified codes are implemented and the number of permits increased and the staff cannot review and issue permits on proposed schedule. This aspect of the permit application needs to be reviewed and assessed based on the new building codes.

Level 5 building permits are reviewed and inspected by independent external experts. This level of buildings is under the umbrella of MoESD.

- **The Construction/Inspection office** is also within the Tbilisi municipality. This office is responsible for inspection of all construction and renovation projects up to Level 4 buildings in addition to their other municipality functions. The feedback from stakeholders interviews was that inspections are rarely conducted and COs are still issued. The inspection office explained their dilemma and challenge they face in inspection and all is related to building codes deficiencies. For the projects that they can inspect, they face a real challenge during construction where the material quality and construction means and methods are compromised. The owner often interferes and directs the contractor to construct the building in a manner that pleases him/her. This contributes to poor quality and problematic and unsustainable buildings. However, they do not have any other option to interfere since there are no unified enforceable codes. This office's biggest challenges are lack of knowledge of the mix of codes used, use of modern technology, means and methods of construction, poor quality of construction document, and lack of material availability. The issues related to quality are being related to the banking system because the interest is greater than 19%. Therefore, buildings are built with inexpensive material, poor construction methods, and use of unskilled workers for first cost saving. This office is in much need for training in project management in addition to codes training.

- During interview with Georgia's Employer Association, they indicated that they can deliver OSHA inspection and training. But, it appears that none of the stakeholders in the construction industry was aware of this service in Georgia. Due to lack of regulations in this area and professionals and skilled workers in the construction industry in Georgia, foreign investors do not use professionals and workers from Georgia to build their projects. When foreign developers build in Georgia, they bring their own design and construction team.

❖ Other Findings

During interviews and meetings with the stakeholders, other issues related to construction surfaced; it is necessary to include them in this report for future action. These issues are as important as the building codes when it comes to construction sector.

- **Zoning codes**. Although the zoning codes were not reviewed within this mission, from feedback of other professionals in this area and EPI's local team, the current codes are insufficient and need to be updated to meet the vision and goals of the GOG in its approach to open Georgia for business and investment. Zoning codes are the foundation for establishing communities, developments, and cites. Modern zoning codes are essential for Georgia. Currently, a zoning office is within the MoESD; it is not clear what is its function and how it is integrated with the planning and municipalities.

- **Planning.** Tbilisi municipality does not have a planner on staff to collaborate with the zoning official and the building officials. Modern planning guidelines are essential to follow and communicate effectively with the zoning officials and municipalities to convey the message to the developers and investors.

  Infrastructure Standards. Infrastructure standards are the arteries that connect buildings, communities, and cities. They take the most abuse from all type of traffics. From feedback from stakeholders, it appears there are no infrastructure guidelines or pavement management system or standards to construct or maintain highways, roadways, tunnels, and utilities. Again, this is an essential part of development where buildings, communities, as well as economic activity are hugely impacted.

- **Green Building Standards.** Green building has been the buzzwords for the past decade, and every continent, countries, cities, and communities are looking at ways to improve efficiency, minimize their activities' impact on the environment, decrease their carbon footprint, and conserve water, energy, and the environment. Georgia is no different from other developed and developing countries that are taking the path toward holistic sustainability. As the building codes are developed, this is the perfect timing to ingrate sustainability and its best practices into the Georgian modern building codes. It only makes sense to do it now to protect Georgia's natural beauty and at the same time save and conserve water and energy. Georgia generates about 88% of its power from hydrogenation. At this point, Georgia is already ahead of the curve in renewable resources generation. By integrating sustainability and greening into building codes, it will contribute immensely to its market development and the independence and prosperity that GOG is pursuing.

- **Higher Education and Vocational schools**. Educating the new generation and arming them with the knowledge and tools are the key to brighter and sustainable future. Integrating construction and building codes in education is essential to approach the reform from grassroots. Higher education can be used as a sustainable vehicle to reform, and teach building codes, sustainable design, construction, and operations through curriculum. During visit and interview at Georgia Technical University, it appeared that the academia is open to integrate modern codes into the education process and its curriculum, and it appears that some faculty and students are already initiating these efforts. Therefore, weaving the rapid changes and development into education, Georgia will soon produce domestic graduates who are knowledgeable about Georgia's new codes and will be ready to implement, where they become experts in the region, where their skills and knowledge will be needed and exported to other surrounding countries.

D. RECOMMENDATIONS

❖ Building Codes

Unified, internationally recognized building codes are crucial to use as a framework to review and follow to establish Georgian Building Codes. IBC 2006 has been recommended by prior international experts who did assessment for the Georgian construction sector. Although some preliminary work was done on IBC 2006, starting ahead of the curve for a country like Georgia fits its vision and mission in advancement and to rise to the global platform. Therefore, adopting the whole 2009 International Codes suite as a framework to develop Georgian building codes is highly recommended.

It is recommended to purchase 2009 International Codes suite, both electronic and hard copy with commentary to be able to find explanation and interpretation to the codes during translation to Georgian. The EPI's local team has been instrumental to this mission with proposed tight schedule for this task.

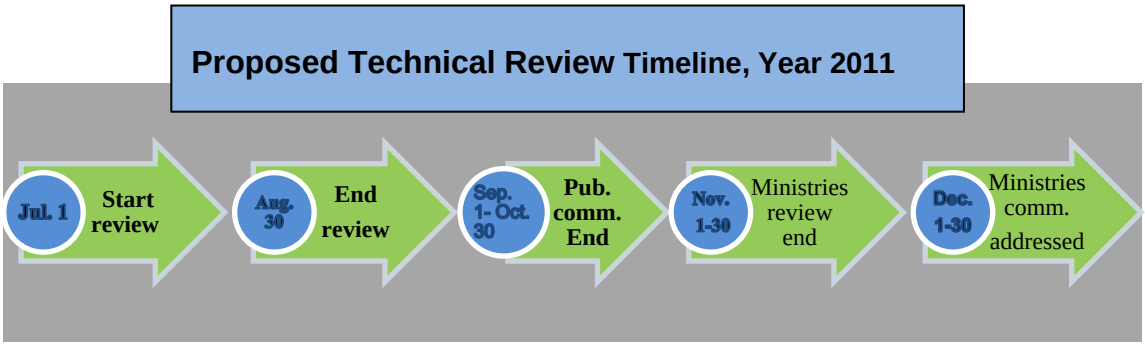
- The recommendation is to undertake this massive task in two phases that are prioritized based on the immediate needs to building codes and standards. 2009 International Codes and References suite is being used as a framework to establish Georgian building codes. After conducting assessment and to expedite introducing new building codes, it was determined that codes' development and their release will be in phases. IBC was the logical code to begin this process to provide the basic code to govern construction related to aspects of life safety, structural integrity, handicap accessibility, and electrical, plumbing, fuel gas, heating, and air conditioning systems. Other 2009 International Codes will be in the second phase of Georgian building codes development, including structural, mechanical, plumbing, energy, existing buildings, property maintenance, gas and fuel, sewage treatment, and NFPA 70 and NFPA 13. The standards associated with each code to be reviewed by the EPI's team and the codes committees and translate to Georgian all the relevant standards, including:

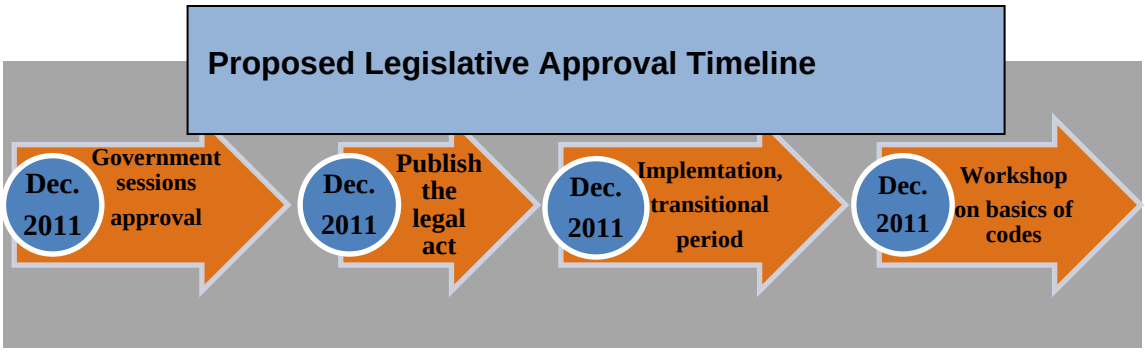
    - UL
    - TMC
    - PCI
    - NCMA
    - ISO
    - ASTM
    - ASME
    - ASCE
    - SEI
    - ANSI
    - ACI

- **Phase I, start with IBC 2009** _ Local EPI's team to review and translate IBC 2009 Chapters 2-15, 31, 34, and 35 to Georgian by August 30, 2011, and to complete public comments period, ministries' reviews, and legislative approval by end of November 2011. For each phase of codes review, translation, and adoption, there will be timelines associated with the process.

  Technical review period. Where the codes are reviewed by the EPI's local team, the committees, the external expert in the areas which EPI's local team does not have expertise in, public comment period, ministries review period, and period to address ministries comments.

  Legislative approval period. Where the completed codes will go through the governmental legislative sessions for legal approval, then publishing the legal act, and implementation of the codes.



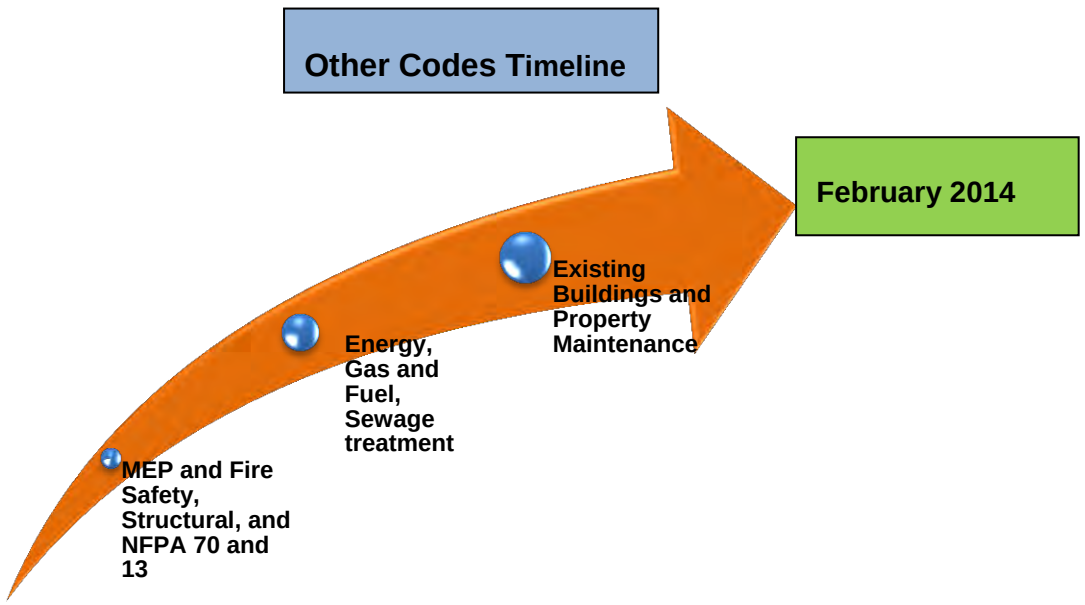


- Integrate residential codes for one and two story dwellings into this code as an appendix. Developing residential codes if not for Tbilisi, then for the rest of the country.
- EPI's local team to review and translate IBC 2009 Chapters 16, 17, and 18 by November 2011.
- EPI's local team to complete translating IBC 2009 Chapters 19-26 by February 2012.
- Since ICC does not have electrical and fire safety codes, adopt/translate NFPA 70 and NFPA 13 to Georgian and integrate into Georgian building codes.

- EPI's local team to review the standards in each chapter on the IBC and identify what is relevant to Georgia. Translate to Georgian to use as a supplement with each chapter.
- Form committees per each discipline and involve them in the codes review process.
- Engage a local expert in codes that the EPI local team does not have expertise in, such as MEP, energy, and fire protection to review the final codes before publishing it for ministries' review and approval.

➢ **Phase II, complete the remaining relevant codes in ICC 2009 suite**

- EPI's local team to complete translation of all the other relevant codes in the ICC 2009 suite to Georgian by end of August 2014, including structural, mechanical, plumbing, energy, existing buildings, property maintenance, gas and fuel, sewage treatment, and NFPA 70 and NFPA 13 to fully address the electrical and fire sprinklers.



- EPI's local team to review the standards included in the codes and identifies what is relevant to Georgia. Translate to Georgian, this is important supplement to the codes and must be used, or use other compatible standards that satisfy the codes requirement.

❖ **Establish a website** that will house this project to post information, progress, and establish communication with the pubic for feedback. This is one of the critical tools that must be available for communication, transparency, and progress reporting. It is recommended that this website to be with the MoESD or USAID EPI. This site will be the permanent location for the codes after completion. The final codes must be maintained and updated as needed, every three years, and this site

will be the vehicle to provide the most updated information on Georgian building codes. This website will be the destination for individuals seeking latest information on Georgian building codes and construction laws and regulations, zoning, and infrastructure standards.

As the website is established, identify individual(s) who will maintain the website, answer public comments, and maintain future updates. The website must be active by end of September 2011.

- **Establish committees** with maximum five members in each committee to review and provide feedback on each code. The following codes committees are recommended to be established as the code development progresses and per each scheduled IBC chapter completion:
  - Mechanical
  - Architecture and Fire Safety
  - Fuel and Gas
  - Electrical
  - Sewage Treatment
  - Plumbing
  - Structural
  - Energy
  - Existing Buildings and Property Maintenance

Committee members' appointment will be by application. MoESD and EPI will review the applications and select the best fit applicants for each committee.

Set up a page on the website for committees and post guidelines for committee application, duties, and selection process.

Minimum qualification for committee member applicants:

- Must be a specialist in the area of the committee that he/she is applying for
- Must have five years of experience in the subject matter
- Must have designed, reviewed, and/or inspected a minimum of three projects in the past five years
- Must be committed and dedicate time to the committee's activities
- Georgian and English speaking applicants are preferred

Duties of committee members:

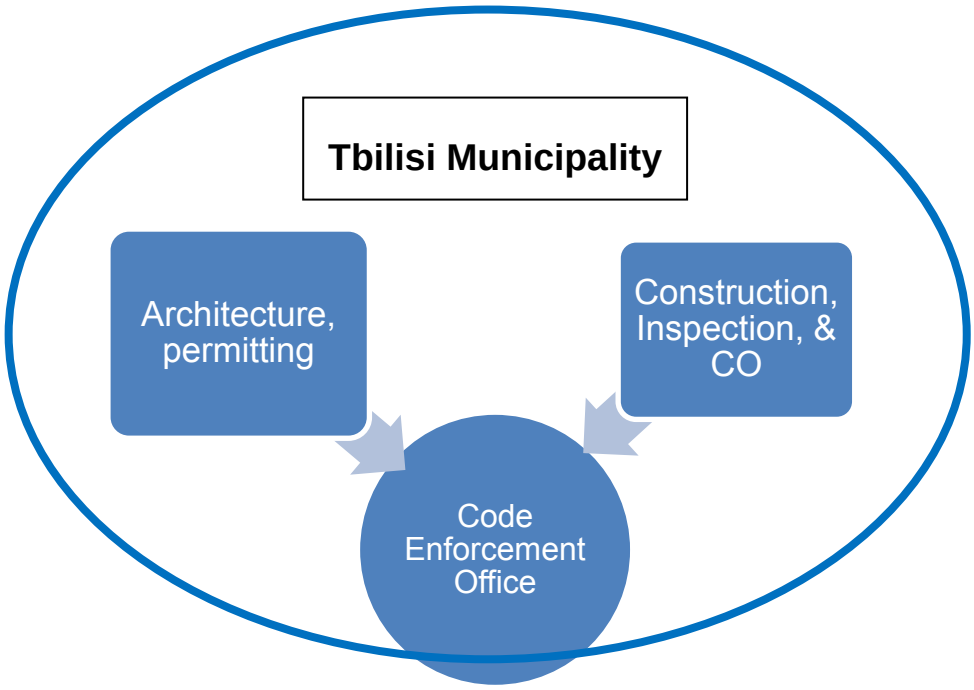
- Review the ICC codes in his/her area of expertise, for example mechanical codes.

- Provide a list of comments on the codes, what codes aspect fit Georgian locale? What does and what does not?
- Propose what is currently working in Georgia to be integrated into the new Georgian building codes.
- Be open to debate with other committee members.
- Be willing to speak in public regarding the new building codes.

❖ **Code Compliance and Enforcement.** Building codes are not effective without compliance and enforcement. Although Tbilisi municipality has made a fantastic progress in their administrative permitting process, including electronic permit application, and creating an efficient approach of "One Stop Shop", other recommendations are proposed here to further enhance their technical process. This can be accomplished:

➢ Through reorganizing architectural and inspection office into one department named "Codes Enforcement Office". This will be in addition to their other departments. Within this office, there is a team of professionals, including architects, MEP engineers, life and fire safety, structural engineers, and landscape architects. Each team member will review and inspect in his/her area of expertise. This team will review the permit application, including the drawings and specification, and they will be conducting inspections of the same projects that they reviewed.

This will create efficiency, consistency, and technical credibility for the construction sector and the municipalities.



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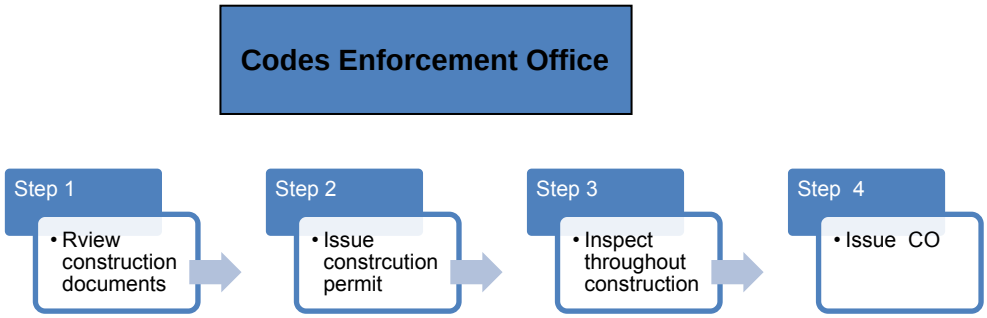
The Codes Enforcement Office can review permit applications, construction documents, issue permit, inspect construction, and issue CO. With the new organization, establish new permit, review, and inspection fee based on the new service.



❖ Training and Development.

With the introduction of the new codes, training of the government employees is vital to ensure compliance and enforcement. Provide training on introduction to ICC codes and how they are used as a framework to establish Georgian Building Codes. This training can be open to all the stakeholders, public and private. Abbreviated version was delivered in July 2011.

Training must be provided on each code to municipalities and other government employees involved in design, renovation, operation, construction, and inspection of any type of building. This training must be completed by the first quarter of 2012. As an incentive, this can be offered to committee members. In order to sustain the knowledge, provide government employees continued education on building codes annually. Once the municipality's "Code Enforcement Office" become proficient, they can offer training to other entities, both public and private, to generate revenue.

Construction management training must be offered to the government employees who are involved in construction project

❖ Other Recommendations

- **Professional licensing**. The quality of services will improve with the licensing the professionals in the construction industry in Georgia. Establish board of professional regulations for architects, engineering, contractors, and sub-contractor licensing.

- **Establish ICC chapter**. In Tbilisi, the chapter must be a not-for-profit organization, can function as a hub for information on building codes, update, and add new codes based on Georgia's needs. To make codes effective in Georgia, the codes must be adopted by the government if it is local or national level. Most likely, in Georgia, it will work better for implementation if it is nationally adopted. If a successful chapter is established, the chapter can offer training, conduct an ongoing review of the codes, and update based on the changes in the construction sector in Georgia.

- **Zoning codes**. During fieldwork and interviews, it was noted that Georgia is in need to updated and improved zoning codes. Since zoning codes is not

part of this project scope of work, it is recommended that Georgia's zoning codes be reviewed and updated. Building codes will not be effective without a solid zoning code. Develop guidelines and standards for each zoning that can be used in marketing.

- **Infrastructure standards.** During the research and interviews with stakeholder and professionals, it was noted that there are no infrastructure standards for highways, roadways, bridges, tunnels, and utilities. It is highly recommended these standards be developed and implemented. These infrastructures are the arteries that connect buildings, and they must be in place to for ultimate sustainable developments, communities, and cities.

- **Sustainable/green buildings.** During initial interviews with all the stakeholders, a question related to green buildings was posed, and it seems that majority of the stakeholders already know about green building and are well aware and in support of environmental, energy, and water conservation. It is highly recommended to develop Georgian Green Building standards and make it as a supplement to Georgian building codes.

E. ADDITIONAL INFORMATION

- **References**
  - Business Enabling Environment Reports Component
  - International Code Council, http://www.iccsafe.org
  - United States Green Building Council, http://www.usgbc.org
  - National Fire Protection Association, http://www.nfpa.org/catalog/
  - Florida Board of Professional Regulations, http://www.myfloridalicense.com/dbpr/
- **Presentations delivered for building codes introduction and sustainable building design in the following pages:**
  - Introduction to Building Codes
  - Introduction to Green Buildings
  - Code Compliance and Enforcement

Building Codes

Sustainable Building Codes For Georgia

Bahar Armaghani, LEED AP BD+C **, LEED Faculty**

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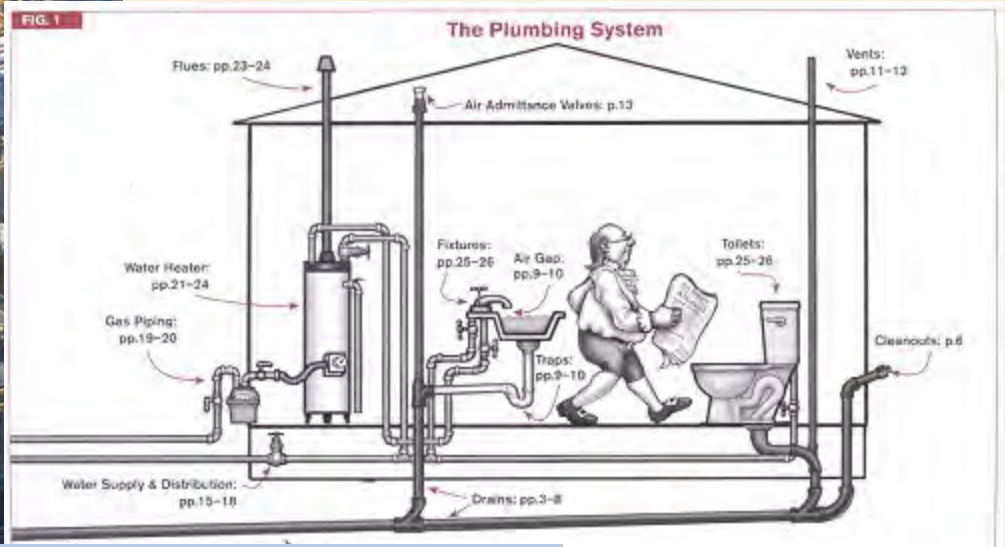
USAID | GEORGIA
FROM THE AMERICAN PEOPLE

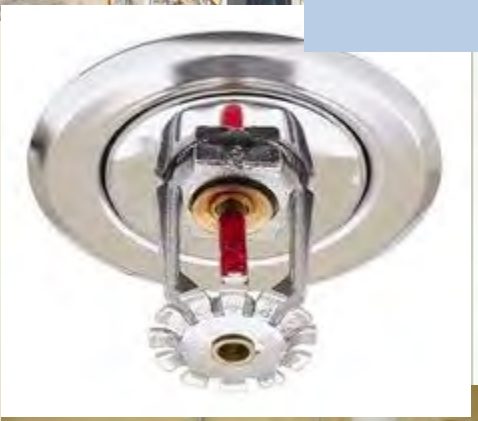
EPI Economic Prosperity Initiative

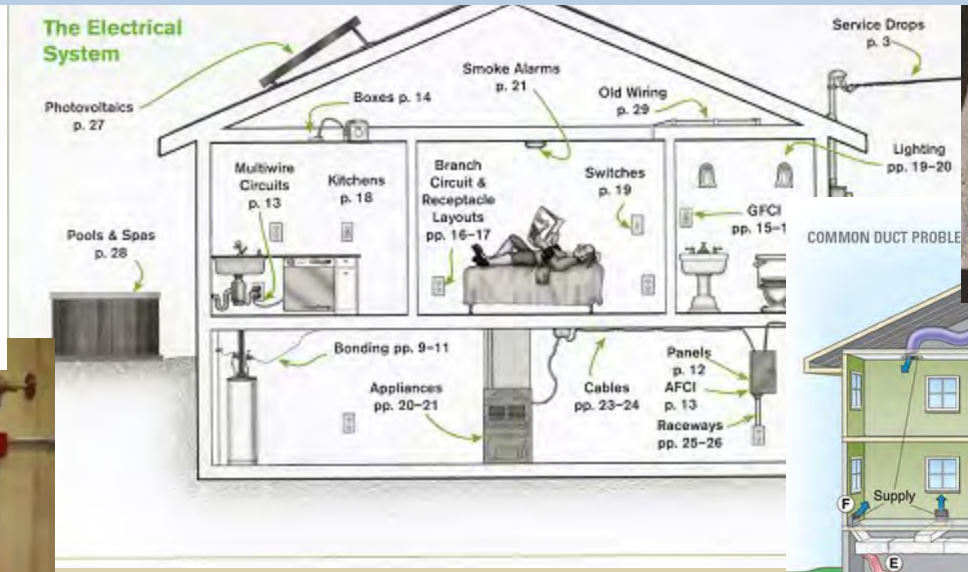
Topics

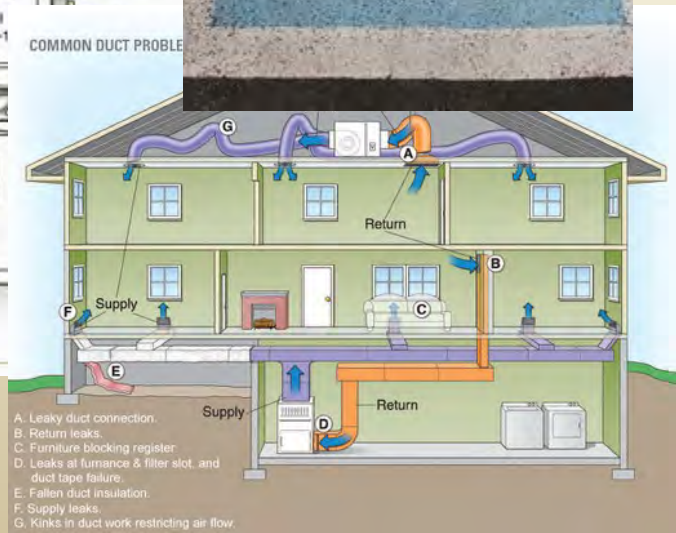
- About Building Codes
- Model Codes
- International Code Council (ICC)
- Q & A



Building Codes address?







Code of Hammurabi

- One of the first written codes of law in record history dating to ca. 1700 BC

Code on diorite stele

Code on clay tablet

WHAT IS A BUILDING CODE?

- Practically, it is the government's official statement on building safety.
- Technically, it is a ***minimum safety*** standards arranged in a systematic manner (codified) for easy reference. It embraces all aspects of building construction, fire, structural, plumbing, electrical, and mechanical.

Smart building codes and well designed architecture can make huge life-or-death difference

Chile's Earthquake
8.8 Richter scale, 700 people died

Haiti earthquake

7.0 Richter scale, 250,000 people died

Why Have a Building Code?

Codes protect public health, safety and welfare

- Building codes provide protection from tragedy caused by fire, structural collapse and general deterioration in our homes, schools, stores and manufacturing facilities.

- Safe buildings are achieved through proper design and construction practices and a code administration program that ensures compliance. Home and business owners have a substantial investment that is protected through complete code enforcement.

Codes keep construction costs down

- The International Codes provide uniformity in the construction industry. This uniformity permits building and materials manufacturers to do business on a larger scale — statewide, regionally, nationally or internationally. Larger scale allows cost savings to be passed on to the consumer.

Why Have a Building Code?

Codes provide consistent minimum standards in construction

- Codes establish predictable and consistent minimum standards, that are applied to the quality and durability of construction materials, a practical balance between reasonable safety, and cost to protect life and property. The term “minimum requirements” means that construction meets the criteria of being both practical and adequate for protecting the life, safety and welfare of the public.

- Inspection during construction is the only way to independently verify that code compliance has been achieved. An average of 10 inspections are conducted to homes, offices or factories to verify conformity to minimum standards. Codes keep construction costs down

- The International Codes provide uniformity in the construction industry. This uniformity permits building and materials manufacturers to do business on a larger scale — statewide, regionally, nationally or internationally. Larger scale allows cost savings to be passed on to the consumer.

Why Have a Building Code?

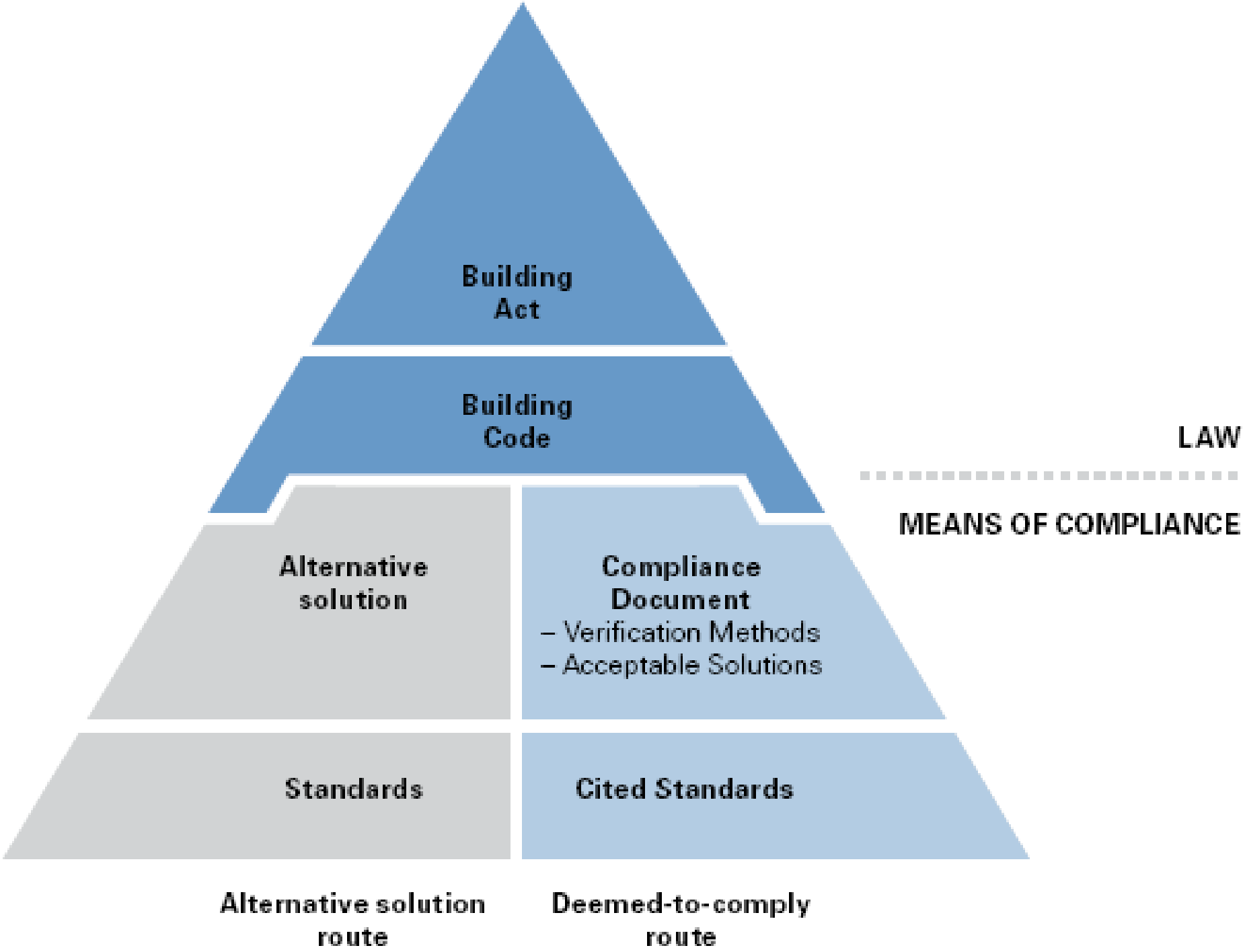
Codes contribute to the well-being of the community

- The preservation of life and safety, as well as the maintenance of property values over time, are a direct result of the application and enforcement of model building codes.

- The conservation of energy contributes to intelligent use of resources and provides the consumer with cost savings.

What is a Model Code?

- A building code that is developed and maintained by an organization independent of the jurisdiction responsible for enacting the building code.
  - No force of law – must be adopted by jurisdiction.
  - Avoids “Reinventing the Wheel” in each state.
  - Involves nationwide experts to reflect diverse views and state of the art.
  - Utilizes consensus development process
    - Open
    - Transparent
    - Balance of Interest
    - appropriate Process


Building Act
Building Code
LAW
MEANS OF COMPLIANCE
Alternative solution
Compliance Document
– Verification Methods
– Acceptable Solutions
Standards
Cited Standards
Alternative solution route
Deemed-to-comply route

Current Status Evaluation

Assessment

International Code Council

ICC

Eurocodes

SNIP

Recommendation

ICC INTERNATIONAL CODE COUNCIL®

People Helping People Build a Safer World™

Current Status (cont.)

- Face to face interviews with the private and public stakeholders
- Update to 2009 ICC codes
- Establish a web site for public viewing and feedback
- Form committees from local and regional stakeholder, public and private
- Time line to complete 19 months effective July 1, 2011

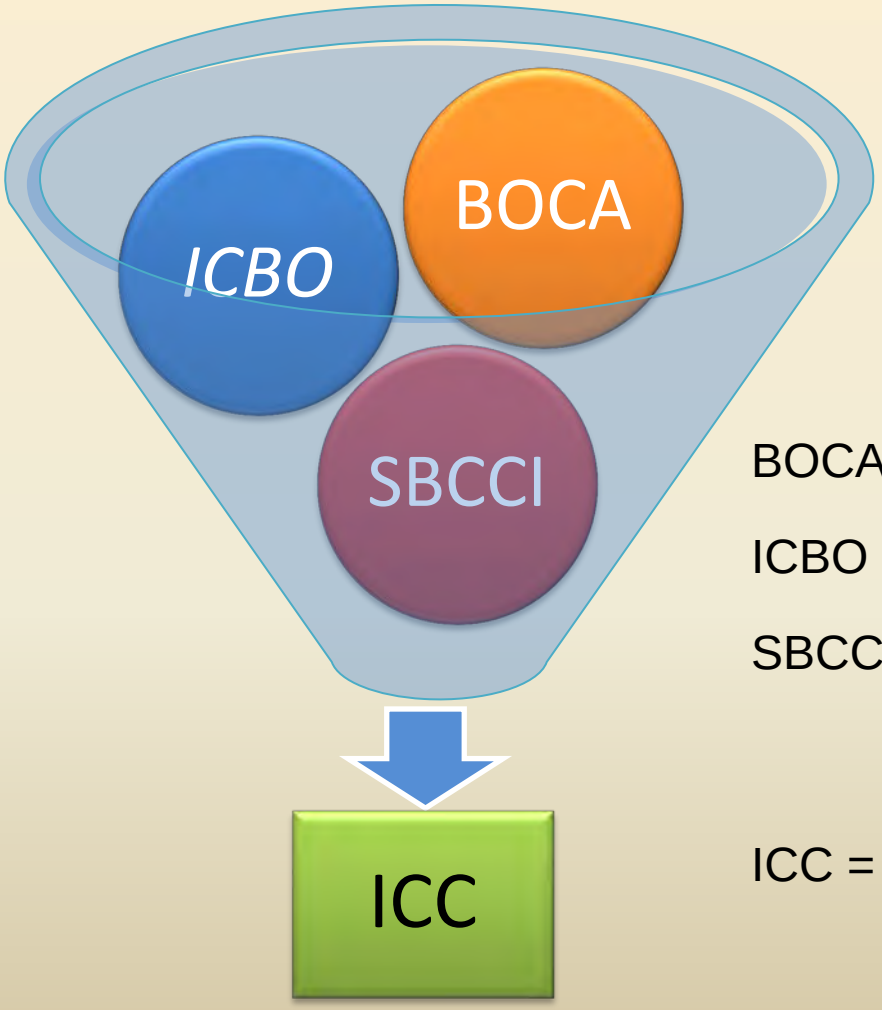
What is ICC and Why ICC?

ICC VISION:
To protect the health, safety and welfare of people by creating better buildings and safer communities

Not-for-profit Member-Driven Association

- 50,000 members
- 350+ chapters
- 300+ staff

ICC - BUILT ON A SOLID FOUNDATION



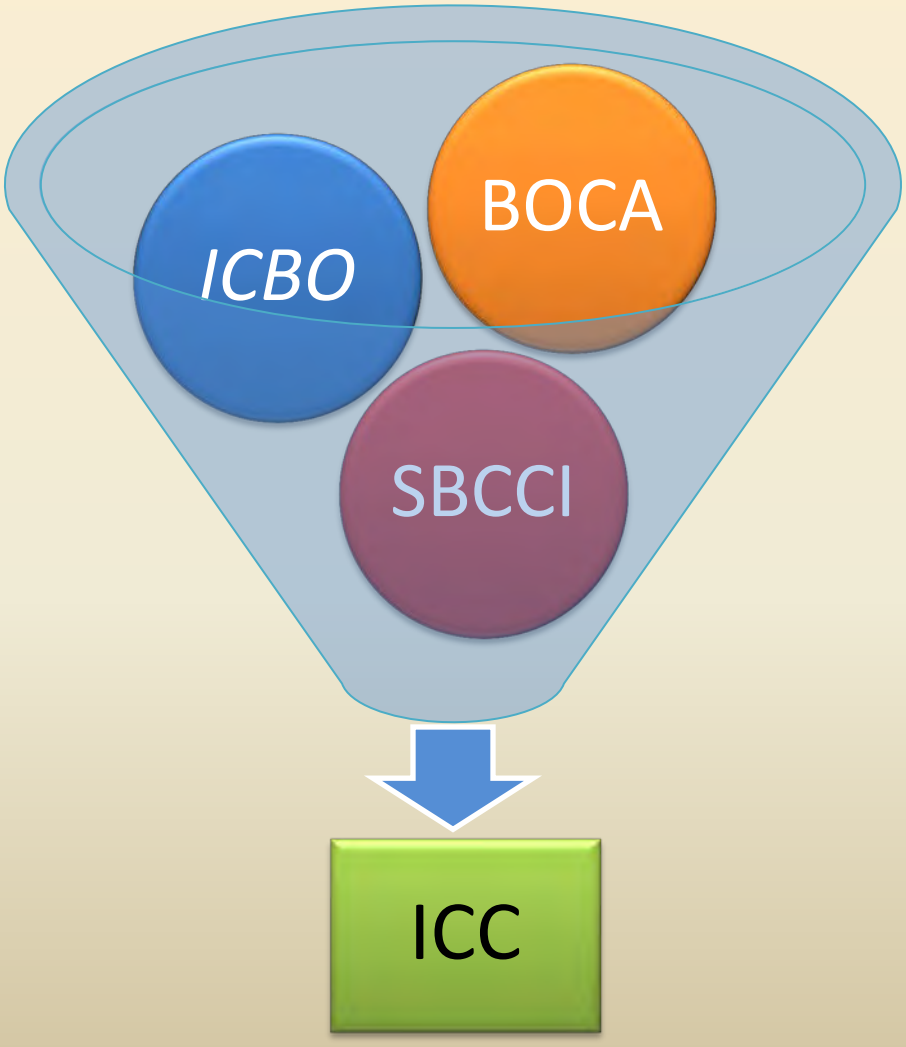
BOCA = Building Officials and Code Administrators International
East Coast & Midwest

ICBO = International Conference of Building Officials
West Coast

SBCCI = Southern Building Code Congress International
Southeast

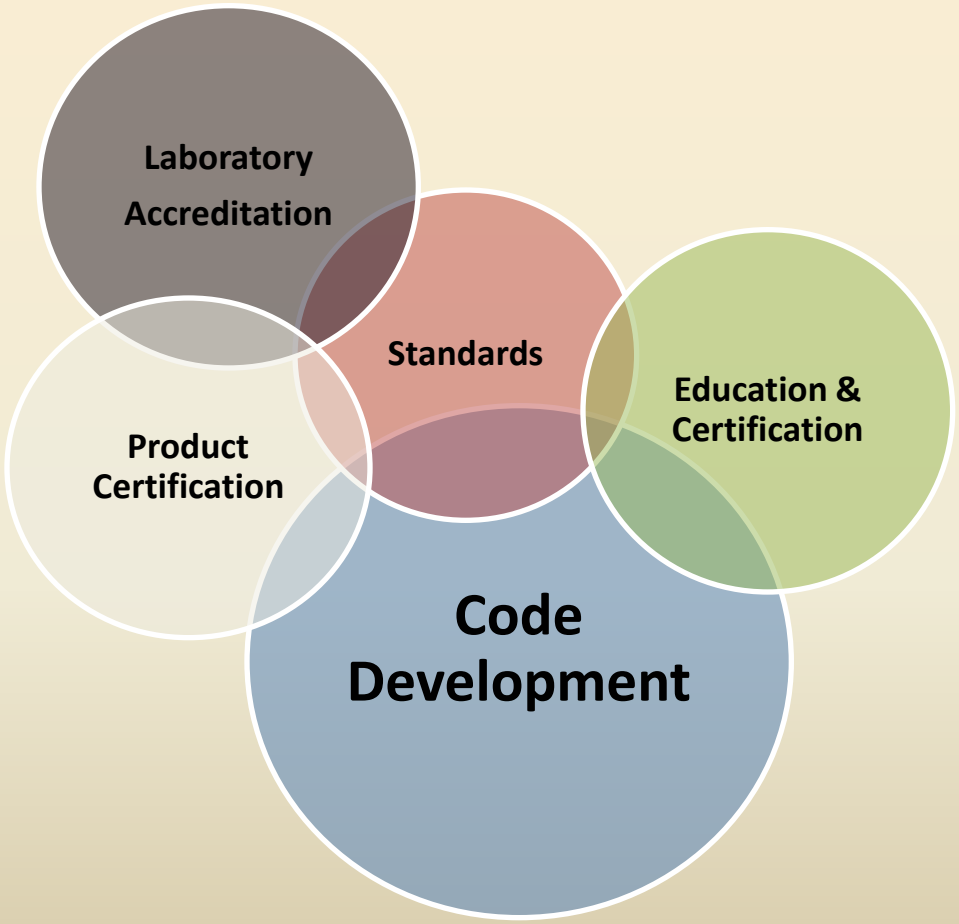
ICC = International Code Council

ICC - BUILT ON A SOLID FOUNDATION



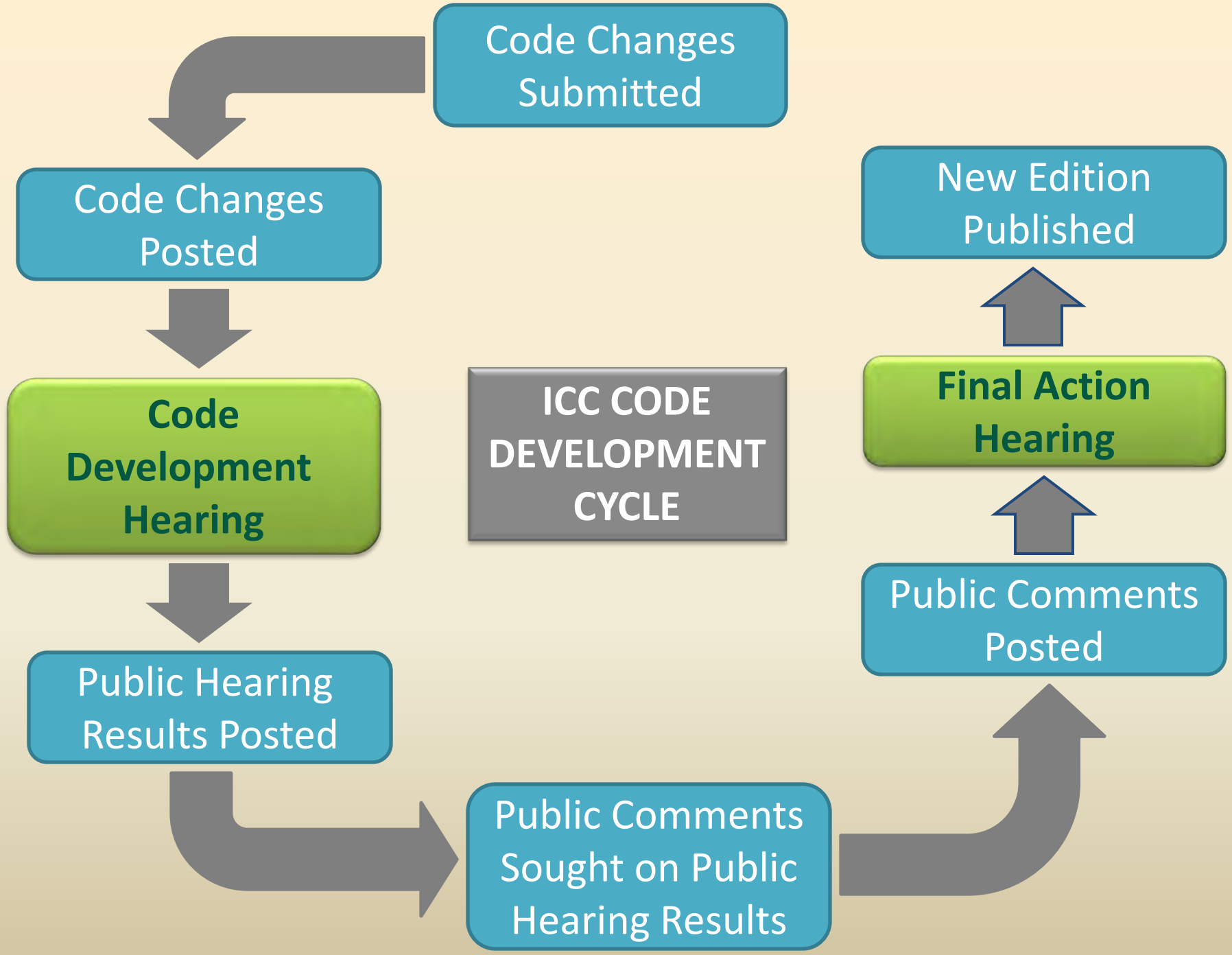
- Two centuries of collective experience
- A history of support for public safety
- Widespread recognition and reliance throughout the U.S. and the world.

ICC's Products and Activities

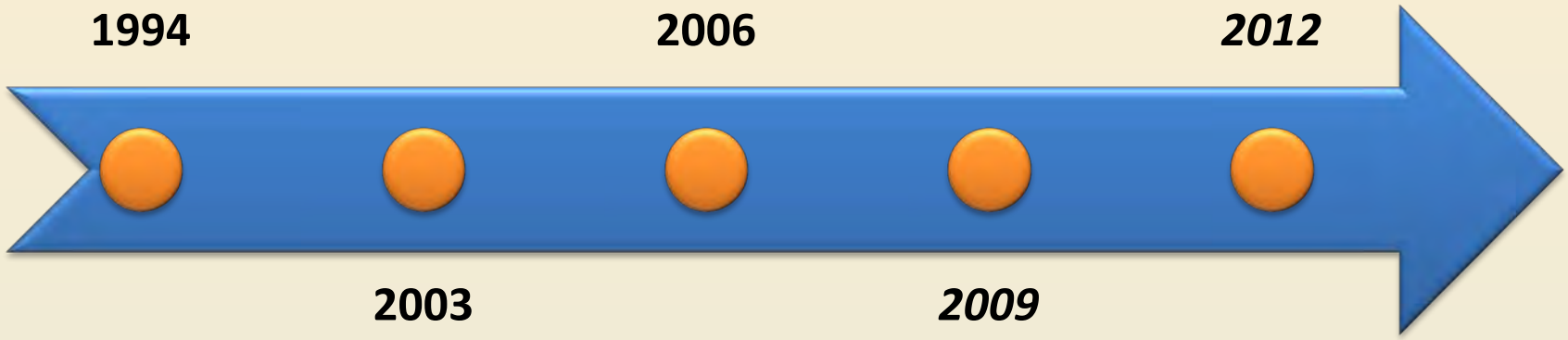


ICC's Family of Building Codes

- International Building Code (IBC)
- International Residential Code (IRC)
- International Fire Code (IFC)
- International Energy Conservation Code (IECC)
- International Plumbing Code (IPC)
- International Private Sewage Disposal Code (IPSDC)
- International Mechanical Code (IMC)
- International Fuel Gas Code (IFGC)
- International Wildland-Urban Interface Code (IWUIC)
- International Existing Building Code (IEBC)
- International Property Maintenance Code (IPMC)
- International Zoning Code (IZC)
- International Green Construction Code (IGCC)

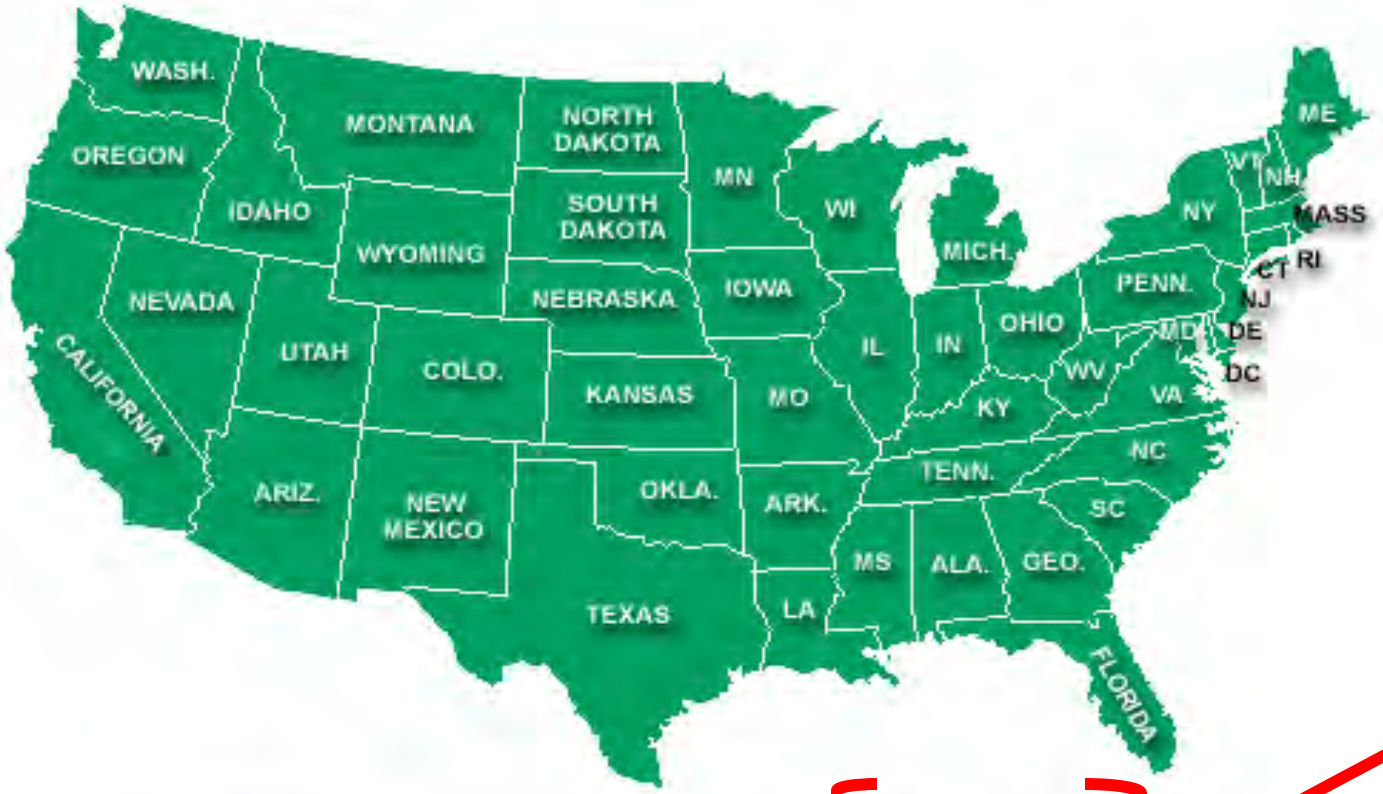

Code Changes Submitted
Code Changes Posted
Code Development Hearing
Public Hearing Results Posted
Public Comments Sought on Public Hearing Results
Public Comments Posted
Final Action Hearing
New Edition Published
ICC CODE DEVELOPMENT CYCLE

International Code Council Timeline



ICC Chapters and Board/Staff Liaison Map

Select a state for a list of current ICC Chapters and ICC Board/Staff Liaisons. Click links below map for Alaska, Hawaii and International information.



Alaska
Hawaii

International

Australia
Canada
Kenya
New Zealand

Local Amendments

- Virtually all governmental entities that adopt a model code amend the document.
- State or local code committees for the jurisdiction review the model code with respect to:
  - Specific local conditions and needs
  - Local building practices
  - Local materials available
  - Union rules and requirements
  - Political considerations

New Addition

International Green Construction Code

International Green Construction Code

Cooperative effort launched in 2009 to develop a code overlay for commercial applications.

- Best chance of true enforcement and widespread adoption.
- Covers energy, water efficiency, materials, emissions, IEQ, site preservation, etc.

First version released in March, 2010 and currently open for public comment.

Why Now?

YOU HAVE the POWER™

Questions

Thank you

USAID | GEORGIA
FROM THE AMERICAN PEOPLE

EPI Economic Prosperity Initiative

Green Buildings

July 8, 2011

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Agenda

- International Green Construction Code
- Green building rating systems
- What is sustainability?
- Green Buildings Basics and Best Practices
- Does Green Building cost more?
- LEED Resources
- Your role in building green

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ICC INTERNATIONAL CODE COUNCIL®
People Helping People Build a Safer World™

IgCC
SAFE & SUSTAINABLE BY THE BOOK

International Green Construction Code

International Green Construction Code

Cooperative effort launched in 2009 to develop a code overlay for commercial applications.

- Best chance of true enforcement and widespread adoption.
- Covers energy, water efficiency, materials, emissions, IEQ, site preservation, etc.

First version released in March, 2010 and currently open for public comment.

Green Building Rating Systems

- Leadership in Energy and Environmental Design (LEED), USA
- Building Research Establishment Environmental Assessment Method (BREEAM), UK
- Green Guide for Health Care (GGHC), USA
- Energy Star Program, USA

What is Sustainable Development/Building?

"Development/building that meets the needs of the present without compromising the ability of future generations to meet their own needs."

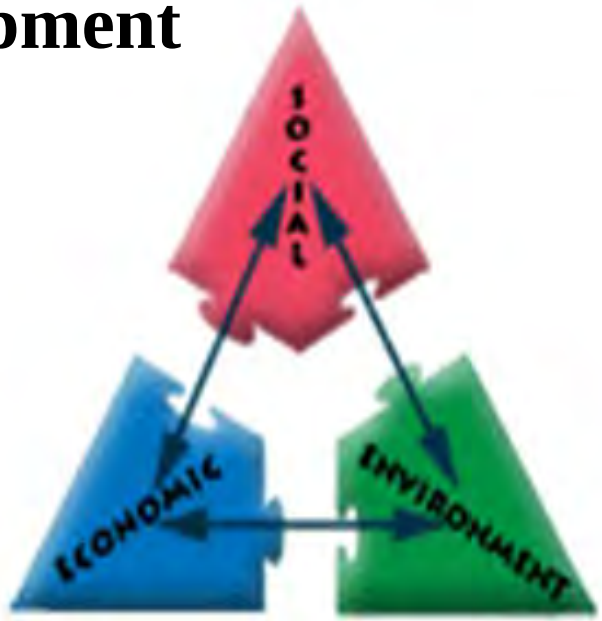
World Commission on Environment and Development

What is Sustainability?

"Sustainability, like quality, doesn't cost; it pays……. In all my business experience, I have never seen a more powerful differentiator in the marketplace."

Ray Anderson, founder and CEO of Interface, Inc.

Sustainable Development



Services	Equity	Biodiversity
Household Needs	Participation	Natural Resources
Industrial Growth	Empowerment	Carrying Capacity
Agricultural Growth	Social Mobility	Ecosystem Integrity
Efficient Use of Labor	Cultural Preservation	Clean Air and Water

World bank

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What are green buildings?

Visitor center in Kentucky

"The diamond" in Dubai

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Why Build Green?

Impacts of U.S. Buildings on Resources

40% primary energy use*

72% electricity consumption*

39% CO_2 emissions**

13.6% potable water consumption*

* Environmental Information Administration (2005). EIA Annual Energy Review
** Energy Information Administration (2005). Emissions of Greenhouse Gases in the United States

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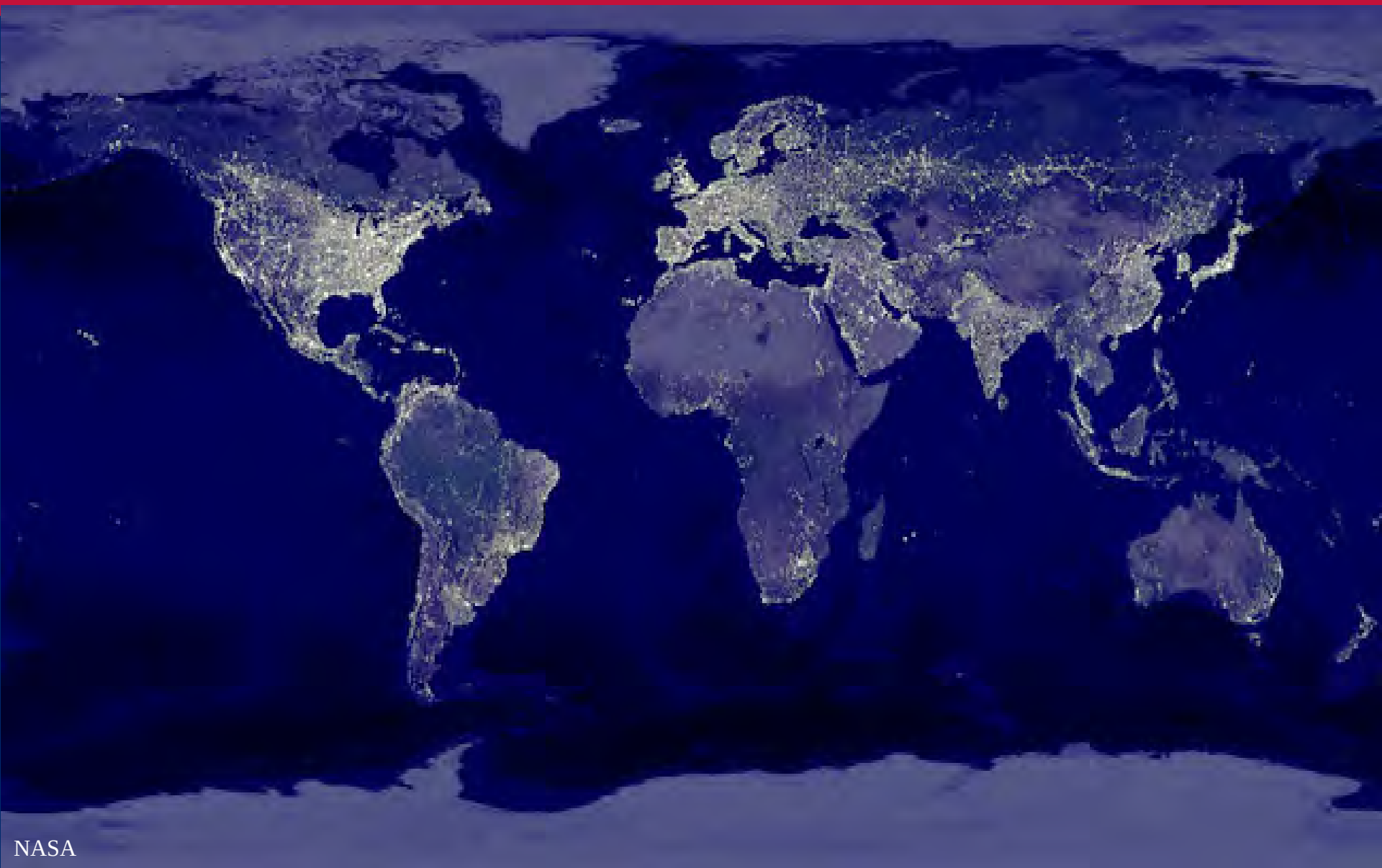

NASA

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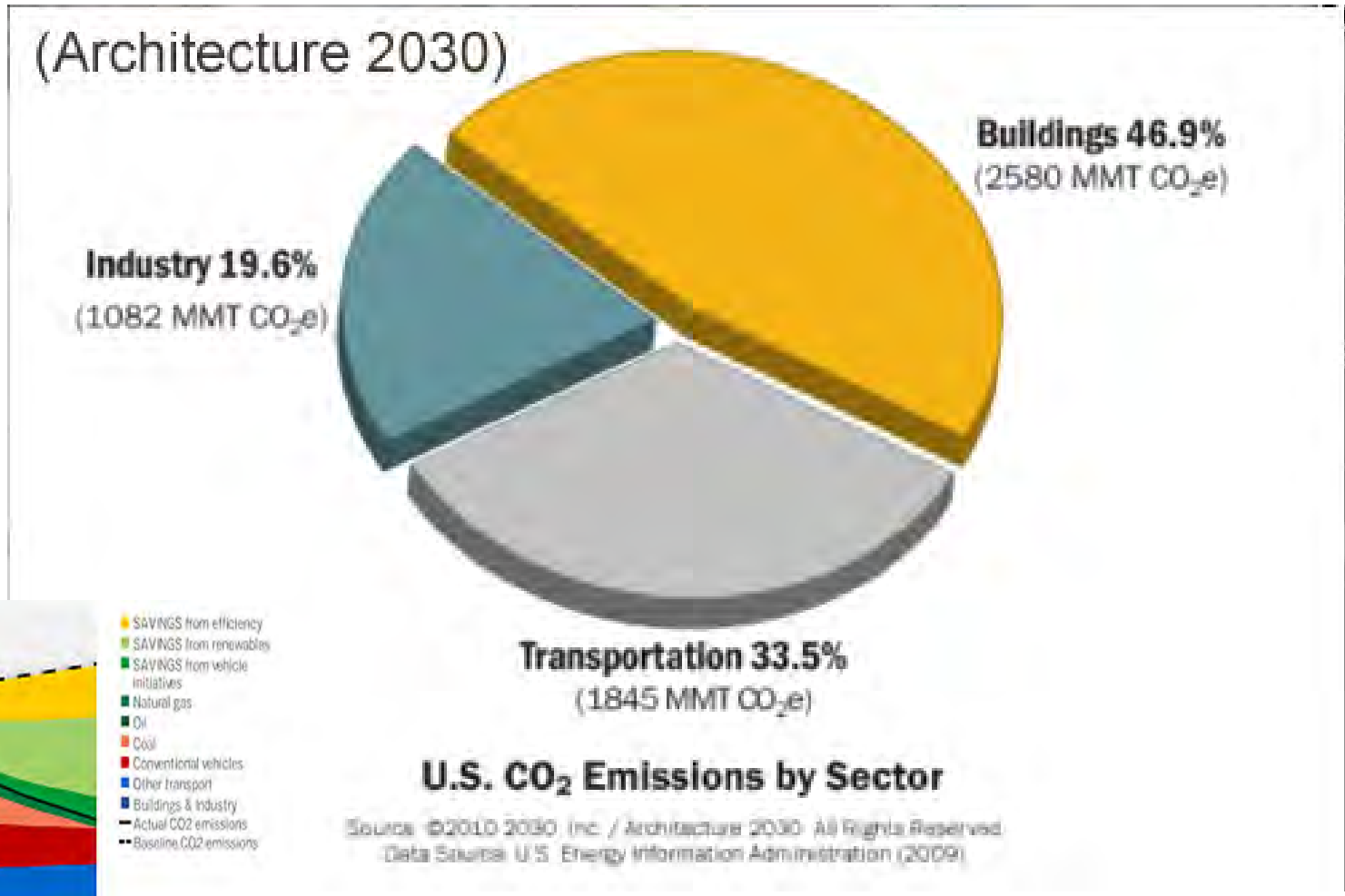
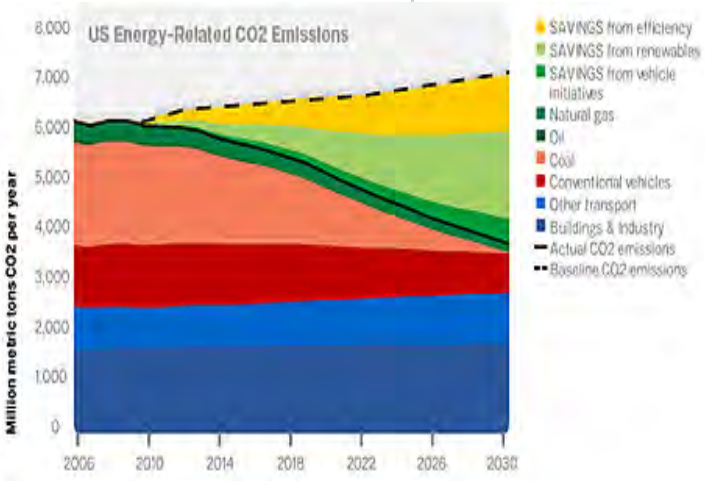
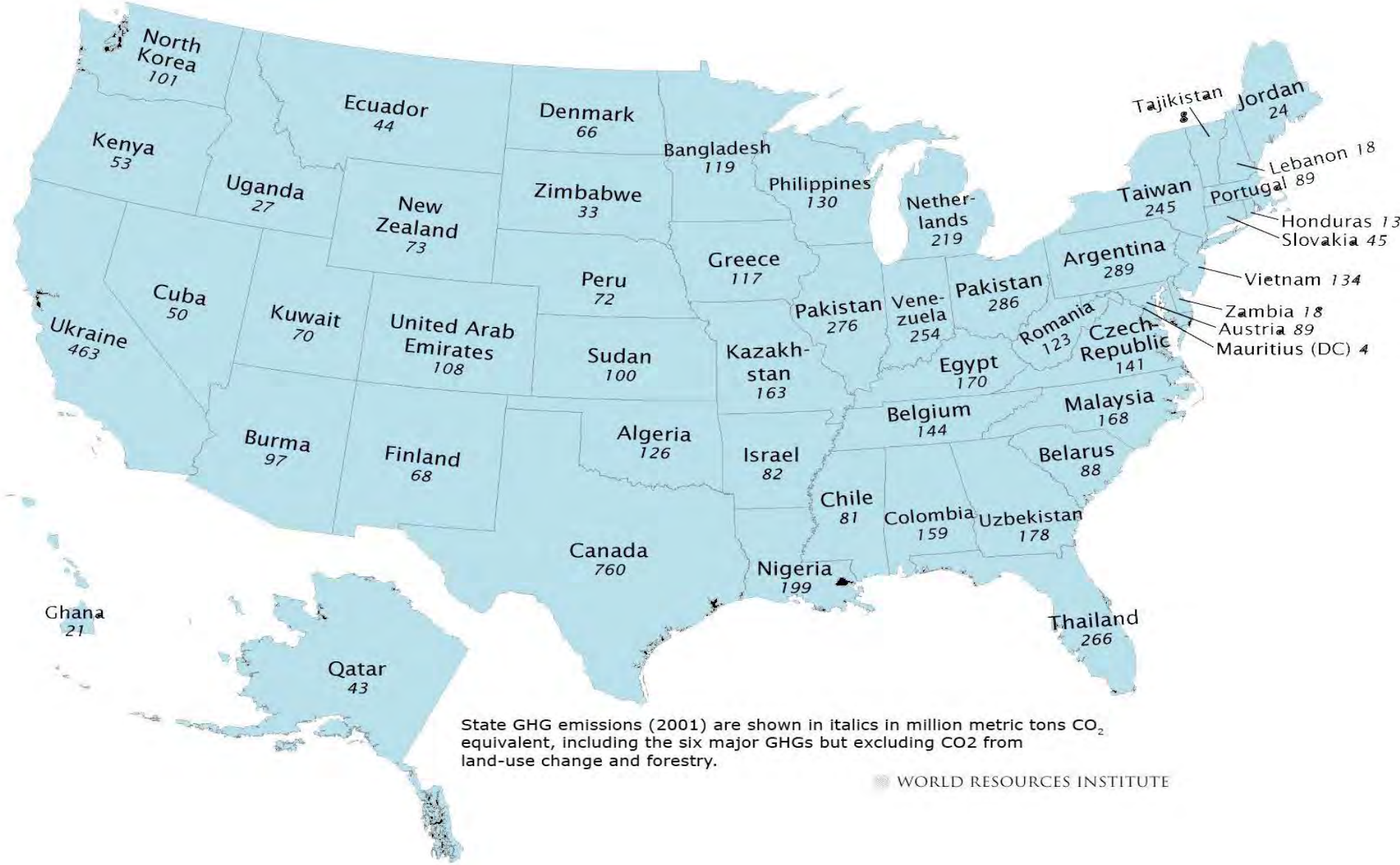

(Architecture 2030)
Buildings 46.9%
(2580 MMT CO_2e)
Industry 19.6%
(1082 MMT CO_2e)
Transportation 33.5%
(1845 MMT CO_2e)
U.S. CO_2 Emissions by Sector
Source ©2010 2030 Inc. / Architecture 2030 All Rights Reserved
Data Source U.S. Energy Information Administration (2009)


US Energy-Related CO2 Emissions
Million metric tons CO2 per year
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2006
2010
2014
2018
2022
2026
2030
SAVINGS from efficiency
SAVINGS from renewables
SAVINGS from vehicle initiatives
Natural gas
Oil
Coal
Conventional vehicles
Other transport
Buildings & Industry
Actual CO2 emissions
Baseline CO2 emissions



State GHG emissions (2001) are shown in italics in million metric tons CO_2 equivalent, including the six major GHGs but excluding CO2 from land-use change and forestry.

WORLD RESOURCES INSTITUTE

Think about it

Do you know Georgia's CO2 footprint?
Do you know your carbon footprint?

http://www.epa.gov/climatechange/emissions/ind_calculator.html

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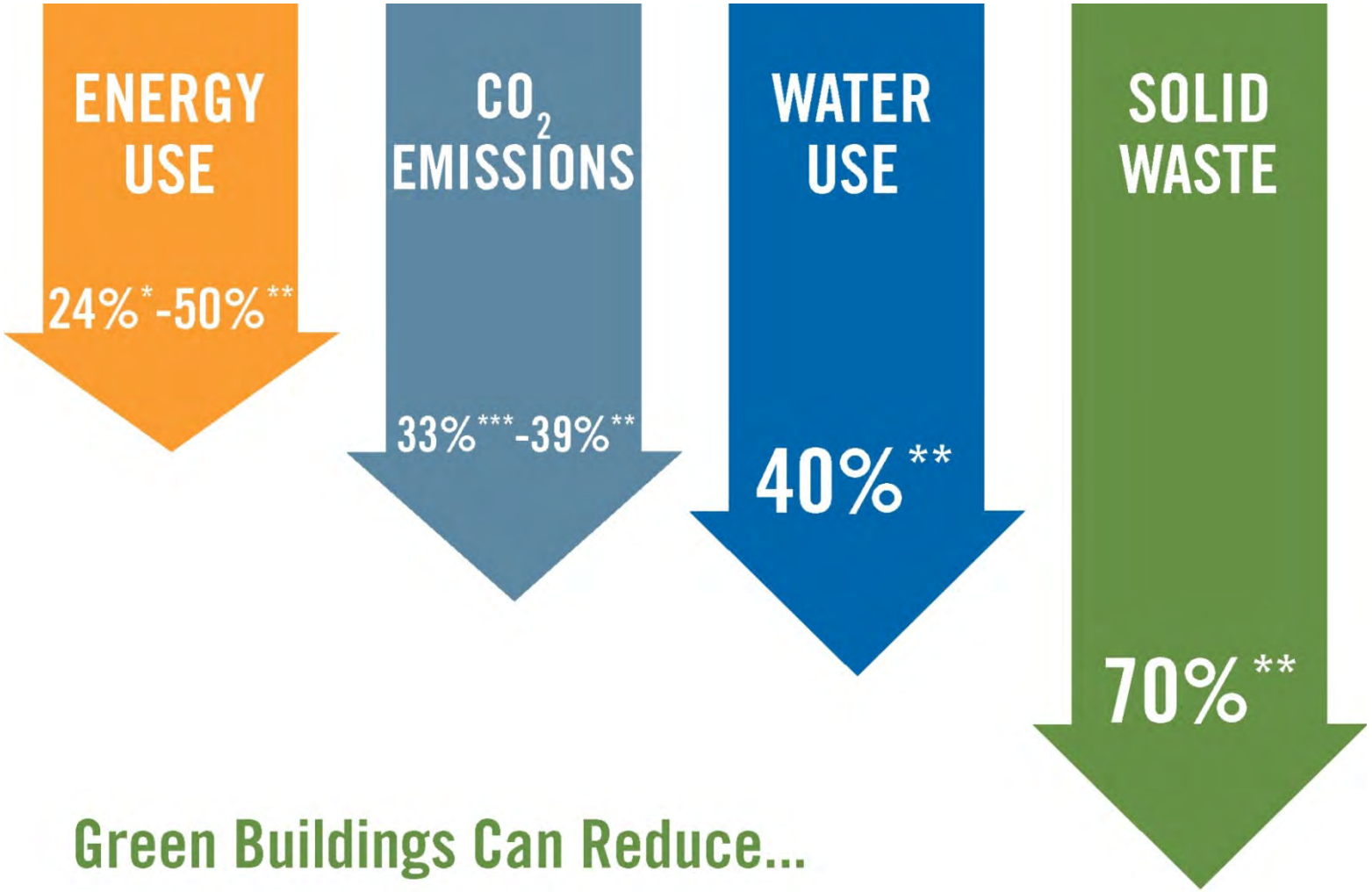

Green Buildings Can Reduce...

* Turner, C. & Frankel, M. (2008). Energy performance of LEED for New Construction buildings: Final report.
** Kats, G. (2003). The Costs and Financial Benefits of Green Building: A Report to California's Sustainable Building Task Force.
*** GSA Public Buildings Service (2008). Assessing green building performance: A post occupancy evaluation of 12 GSA buildings.

Benefits of Green Buildings

Environmental

- Enhance and protect ecosystems and biodiversity
- Improve air and water quality
- Reduce solid waste
- Conserve natural resources

Economic

- Reduce operating costs
- Enhance asset value and profits
- Improve employee productivity and satisfaction
- Optimize life-cycle economic performance

Health & Community

- Improve air, thermal, and acoustic environments
- Enhance occupant comfort and health
- Minimize strain on local infrastructure
- Contribute to overall quality of life

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People

↑ Productivity, test scores, sales, well being

↑ Water & air quality

Profits

↑ Marketability
↓ Resources

Planet

Operating Costs

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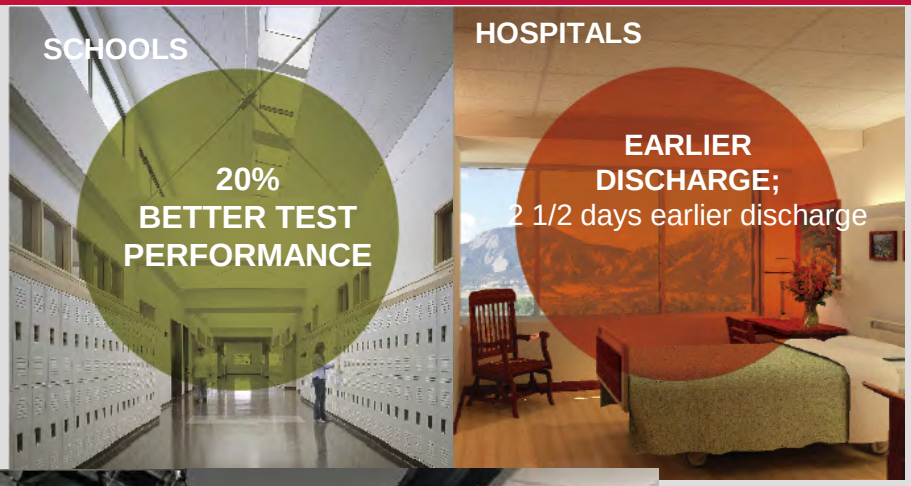
Increased Productivity



Integrated Design

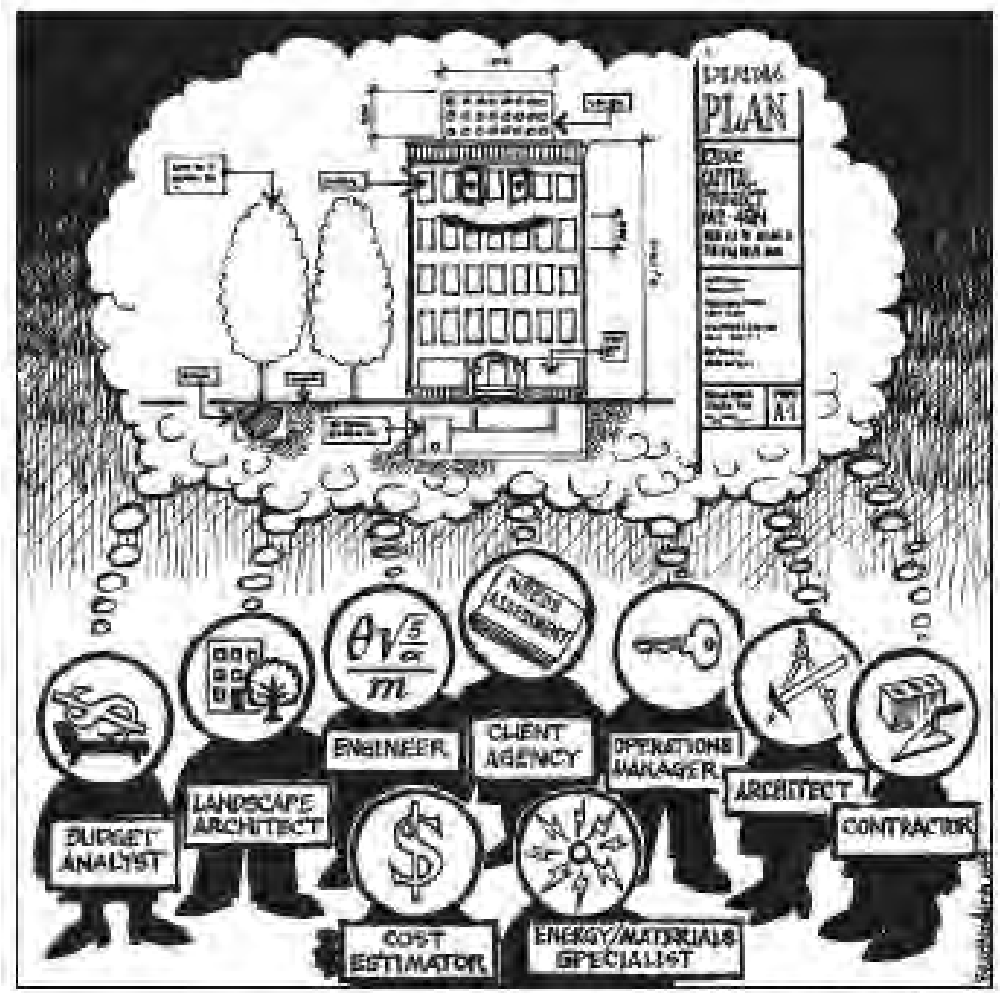
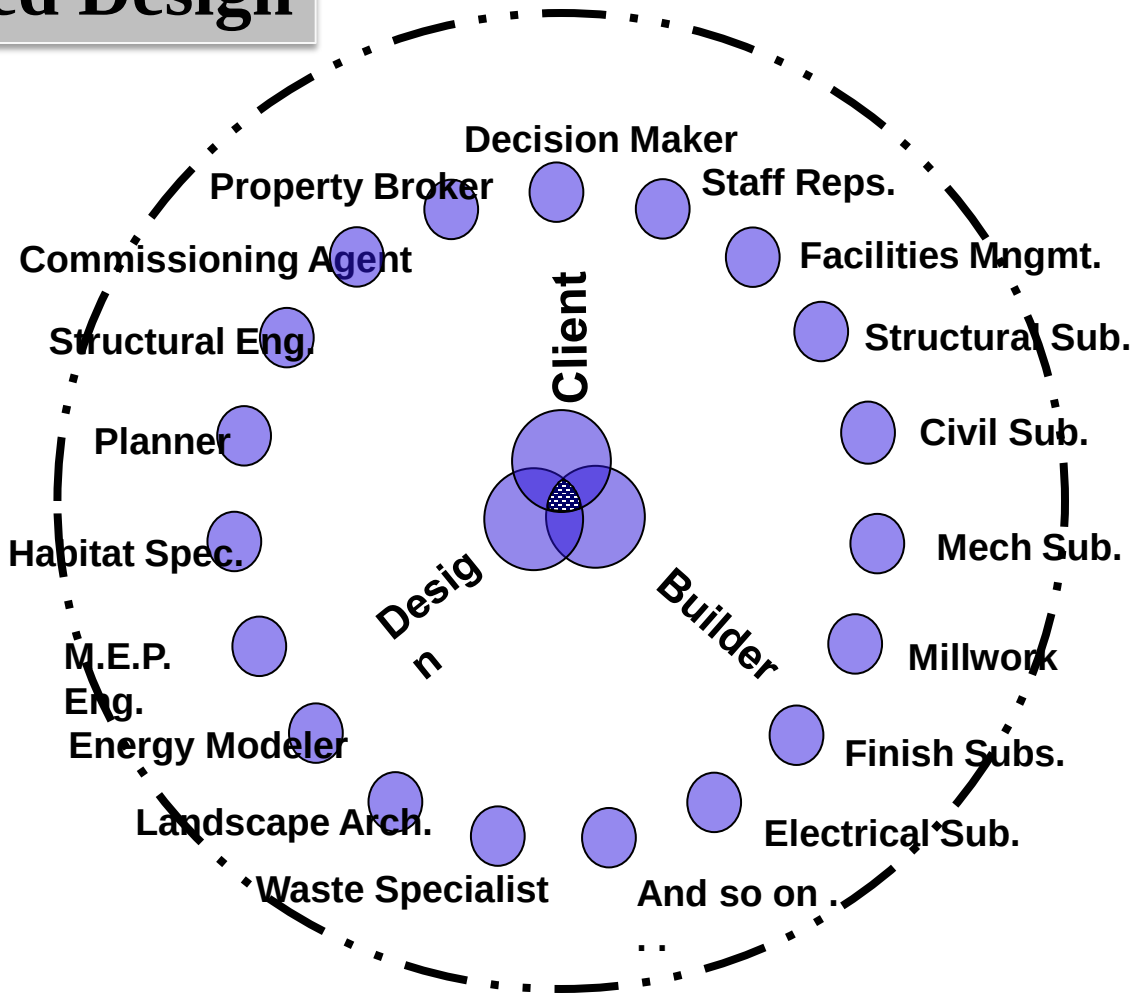


Illustration: Bruce Hendler

Integrated Design



By USGBC

Integrated Design

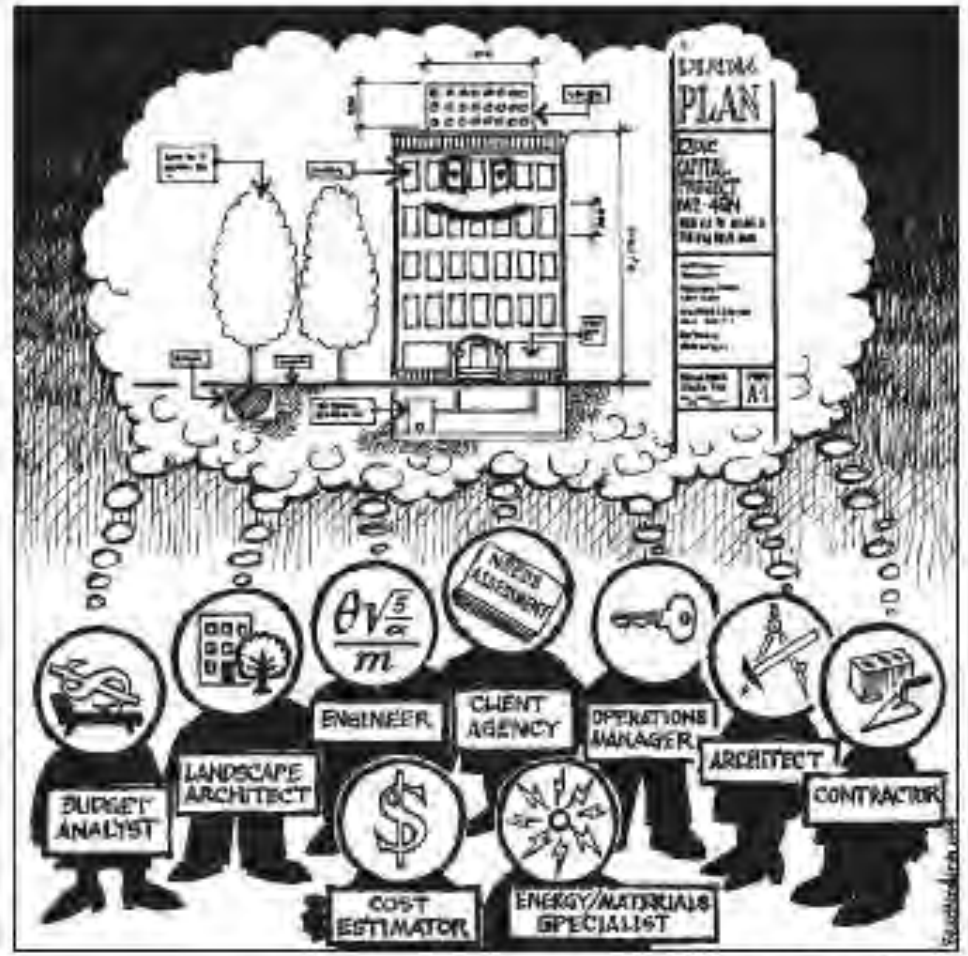


Illustration: Bruce Hendler

=

Integrated Design

=

Think About

How Georgia can benefit from green buildings?

What Is Green Building?

© U.S. Green Building Council, 2008

Sustainable Site

- Why Sustainable Site?
- How is your daily commute impact the environment?
- Why downtown air temperature is higher than its surroundings?
- Where the runoff from rain on building sites goes?

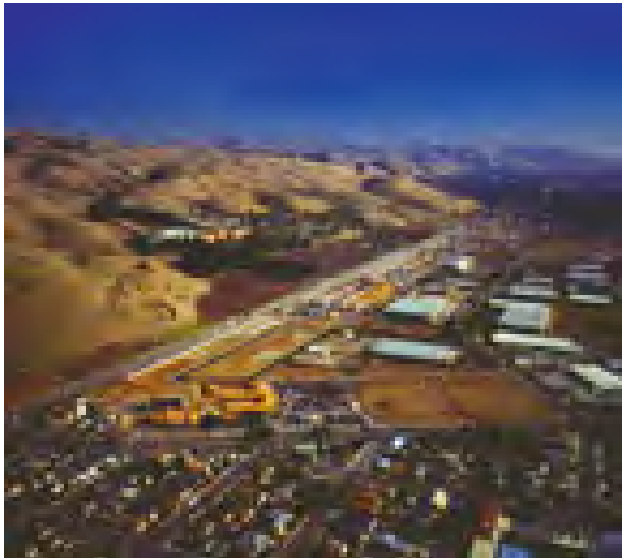
Sustainable Site

Goals:

- Protect and/or restore sites
- Minimize need for vehicular use
- Avoid developing open spaces
- Managing stormwater
- Reduce heat islands and light pollution
- Simplify maintenance

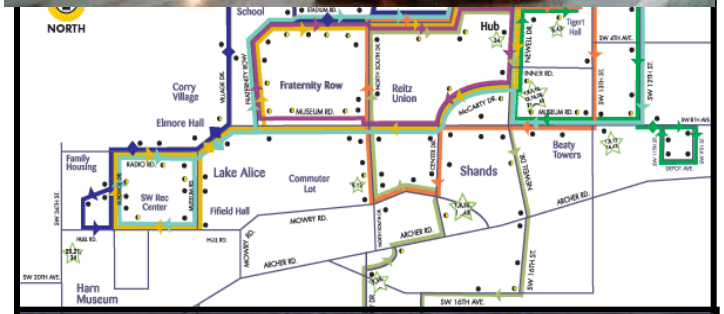
Sustainable Site

- **High density**
- **Brown Field**



Sustainable Site

- **Transportation**
- **Light pollution**

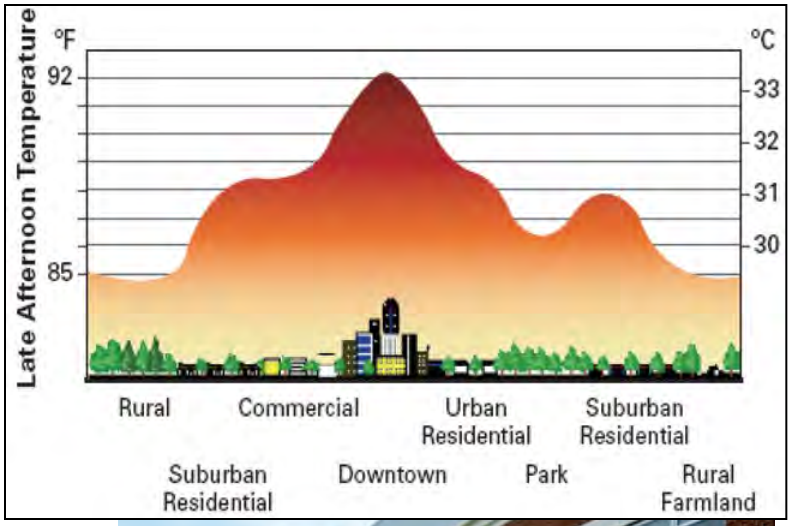


Sustainable Site

- Open spaces
- Storm water

Sustainable Site

- **Heat island effect**
  - **None Roof**
  - **Roof**



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Water Efficiency

Water Efficiency

- How much water is used for irrigation?
- Are the surface water , lakes, rivers, etc. in your area are safe for fishing and swimming?
- Water uses in the building?

Water Efficiency

Goals:

- Reduce use of potable water
- Protect natural water resources
- Promote and encourage use of reclaimed water, graywater, and processed water
- Design to reduce use of potable water

Water Efficiency

Water Efficiency Landscape

Cooling Tower

Water Efficiency

Plumbing Fixtures & Fitting

Water Efficiency

What is gray &reclaimed water?

What are indoor water saving strategies?

Outside water saving strategies?

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Energy & Atmosphere

Energy & Atmosphere

- How much energy a building consumes?
- How much energy an incandescent lamp use compared to CFL?
- How much energy an Owner can save by building energy breakdown in the building?

Energy & Atmosphere

Goals:

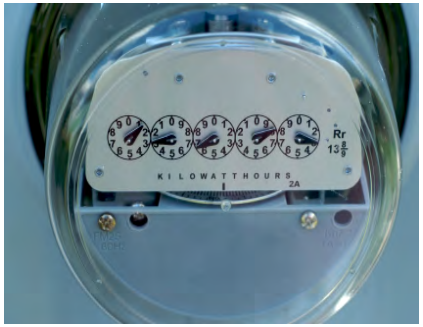
- Monitor and improve building energy performance
- Eliminate CFCs and support ozone protection protocols
- Support renewable and alternative energy sources

Energy & Atmosphere

Auditing & Commissioning

Energy Performance Measures, modeling

Metering & monitoring Measurement & Verification



Energy & Atmosphere

Onsite Renewable Energy
Green Power

Refrigerant Management

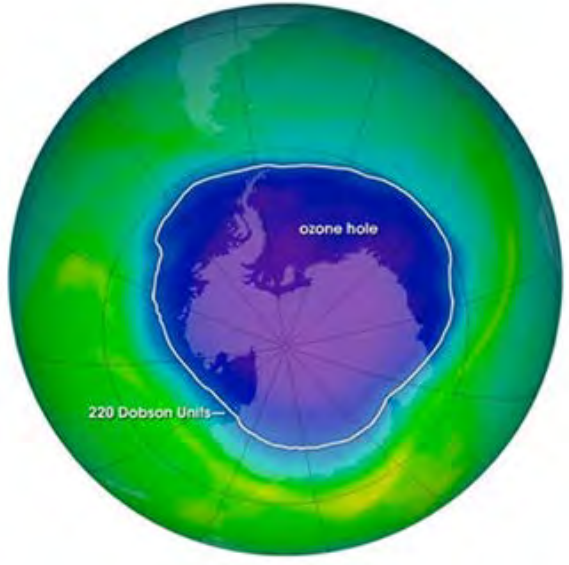


Image from NASA

Energy & Atmosphere

What is green power?

What is onsite renewable energy?

How to monitor energy consumption?

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Materials & Resources

Materials & Resources

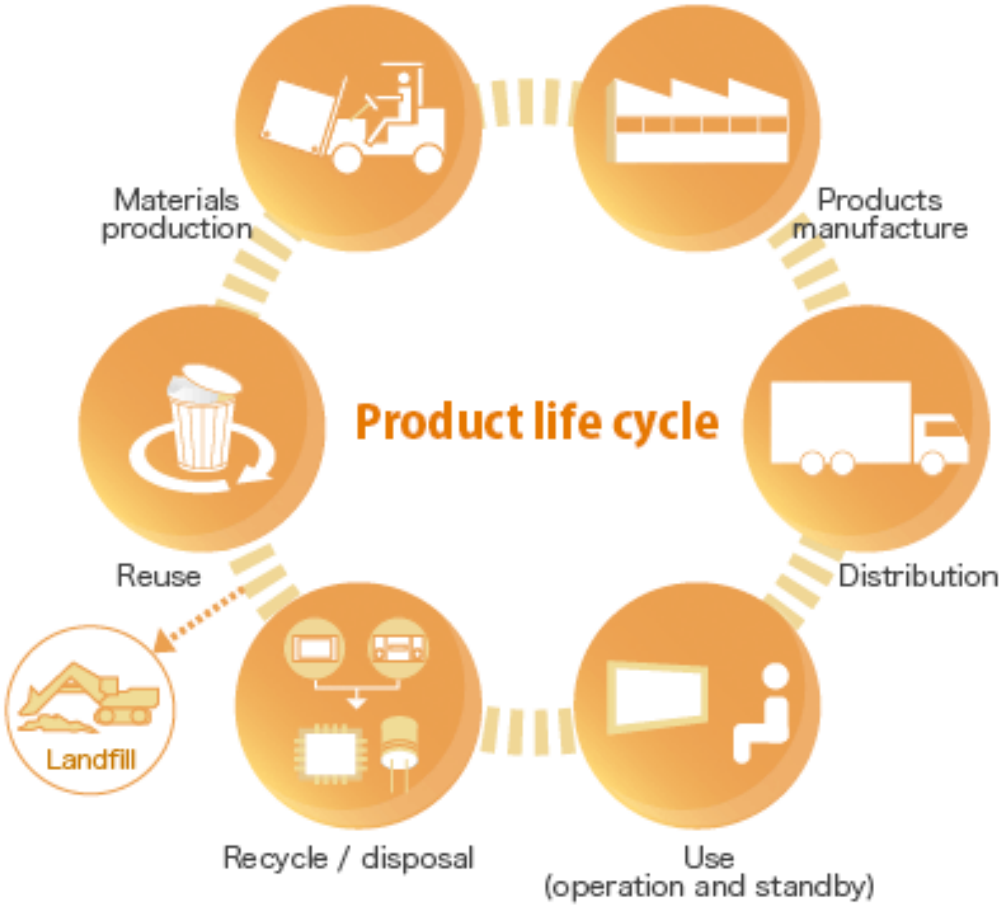
- **Where do building materials come from?**
- **Do you know if your building material is healthy?**
- **Do you know your waste stream?**
- **How much of the waste in Georgia is contributed to construction?**

Materials & Resources

Goals:

- **Reduce the amount of materials needed**
- **Use materials with less environmental impact**
- **Reduce and manage waste**

Materials & Resources



pioneer.jp/envirnment-e/ecoproducts

Materials & Resources

Recycling

- Inside
- Outside

Materials & Resources

Building Reuse

Materials & Resources

Construction Waste Management

Material Reuse

Materials & Resources

Recycle content

Regional material

Materials & Resources

Certified Wood

Rapidly Renewable Material

Materials & Resources

Why regional material?

Which material transformed the market?

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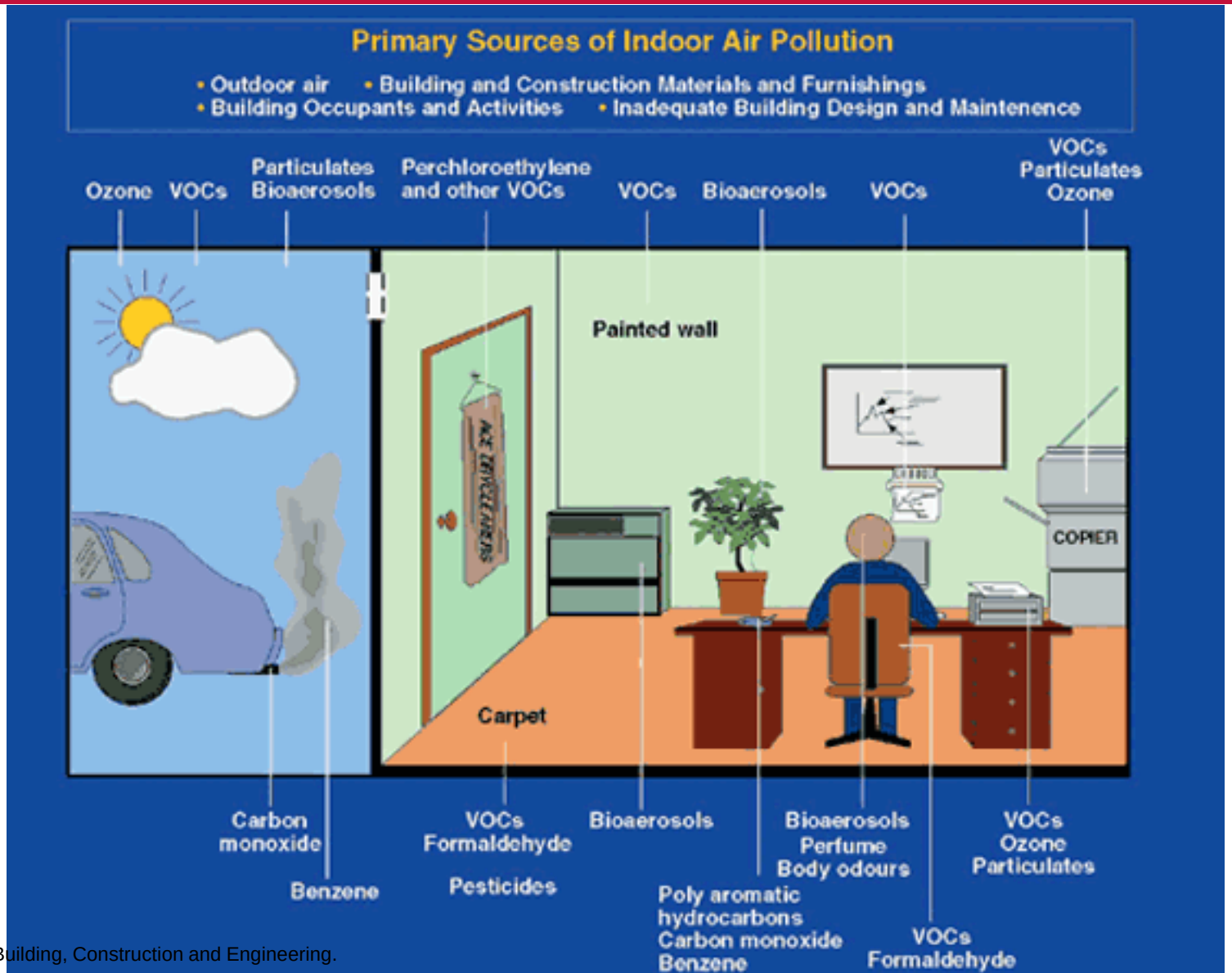
Indoor Environmental Quality

Indoor Environmental Quality

- How does air quality impact human health?
- What makes a cleaning policy green?
- Why should you care about environmental tobacco smoke?
- What can we learn about building performance from occupants?
- Can you have too much ventilation?



Source: CSIRO Building, Construction and Engineering.

Indoor Environmental Quality

Goals:

- Provide a healthy indoor environment
- Eliminate, manage, and reduce indoor pollutants
- Ensure thermal and lighting comfort
- Provide connection to outdoor through ample daylight and view

Indoor Environmental Quality

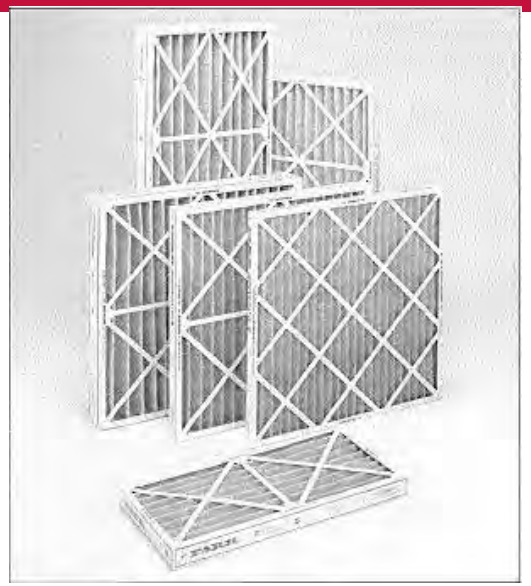
No smoking

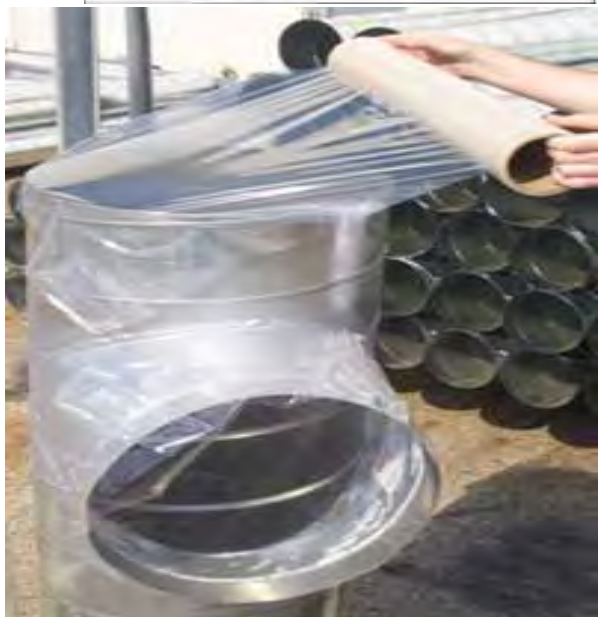
Outdoor air delivery monitoring

Indoor Environmental Quality

Indoor air quality during construction

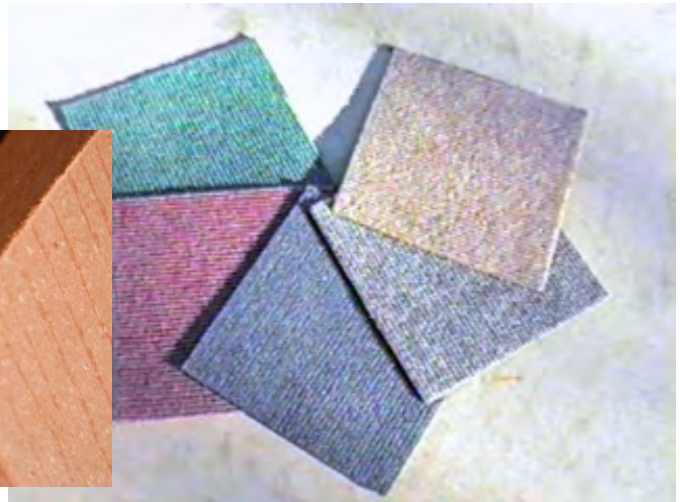
Air sampling before occupancy





Indoor Environmental Quality

Low VOC



Indoor Environmental Quality

Lighting Control

Thermal Control

Indoor Environmental Quality

Green Cleaning

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Indoor Environmental Quality

Day light
&
View

Indoor Environmental Quality


http://www.greenmark.sg

What effect hot & cold have on occupants?

Is daylight & view have effect on performance?

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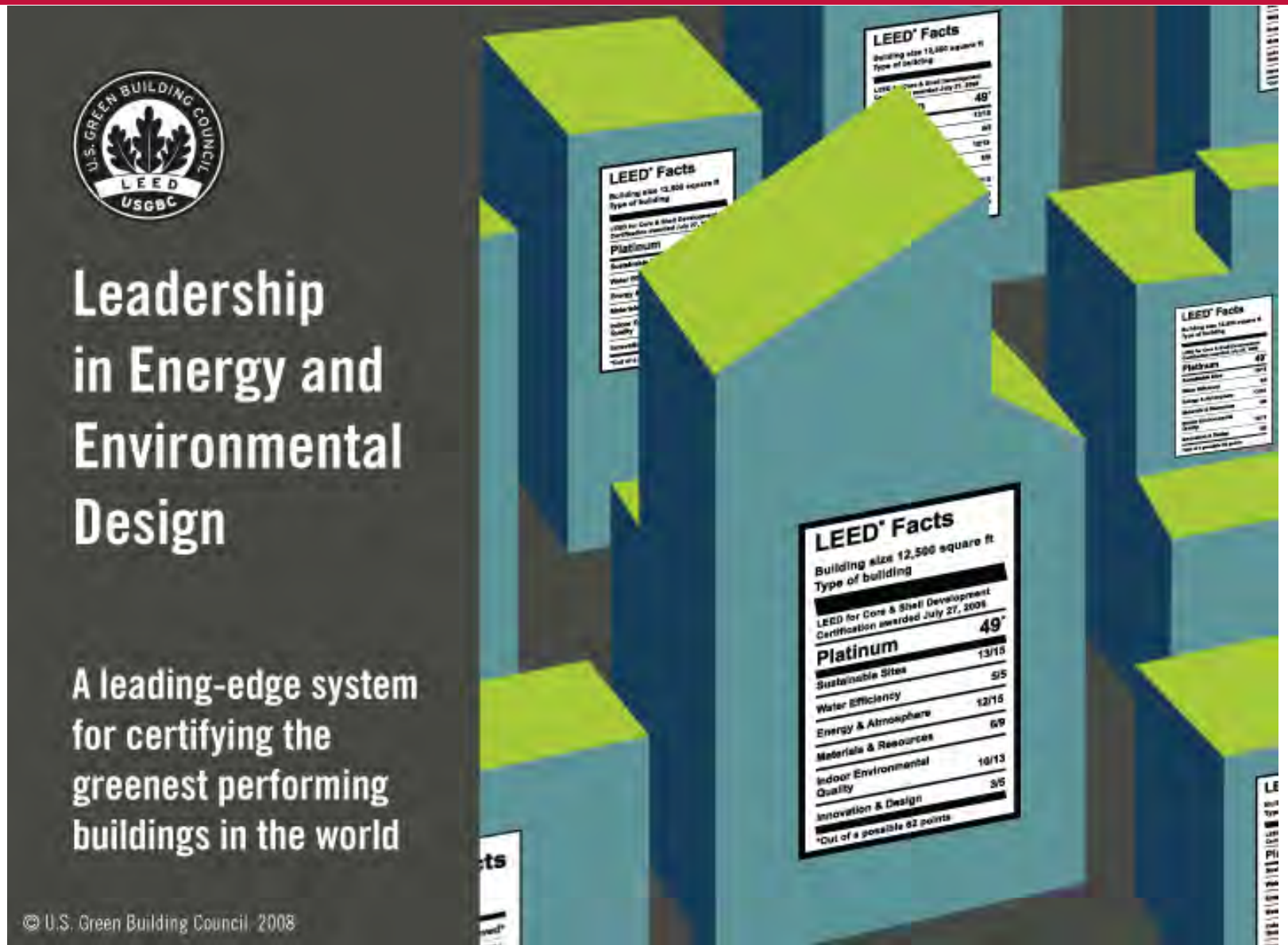
Innovation in Design

Green Building Rating Systems

- **Leadership in Energy and Environmental Design (LEED), USA**
- Building Research Establishment Environmental Assessment Method (BREEAM), UK
- Green Guide for Health Care (GGHC), USA
- Energy Star Program, USA

Leadership in Energy and Environmental Design (LEED)

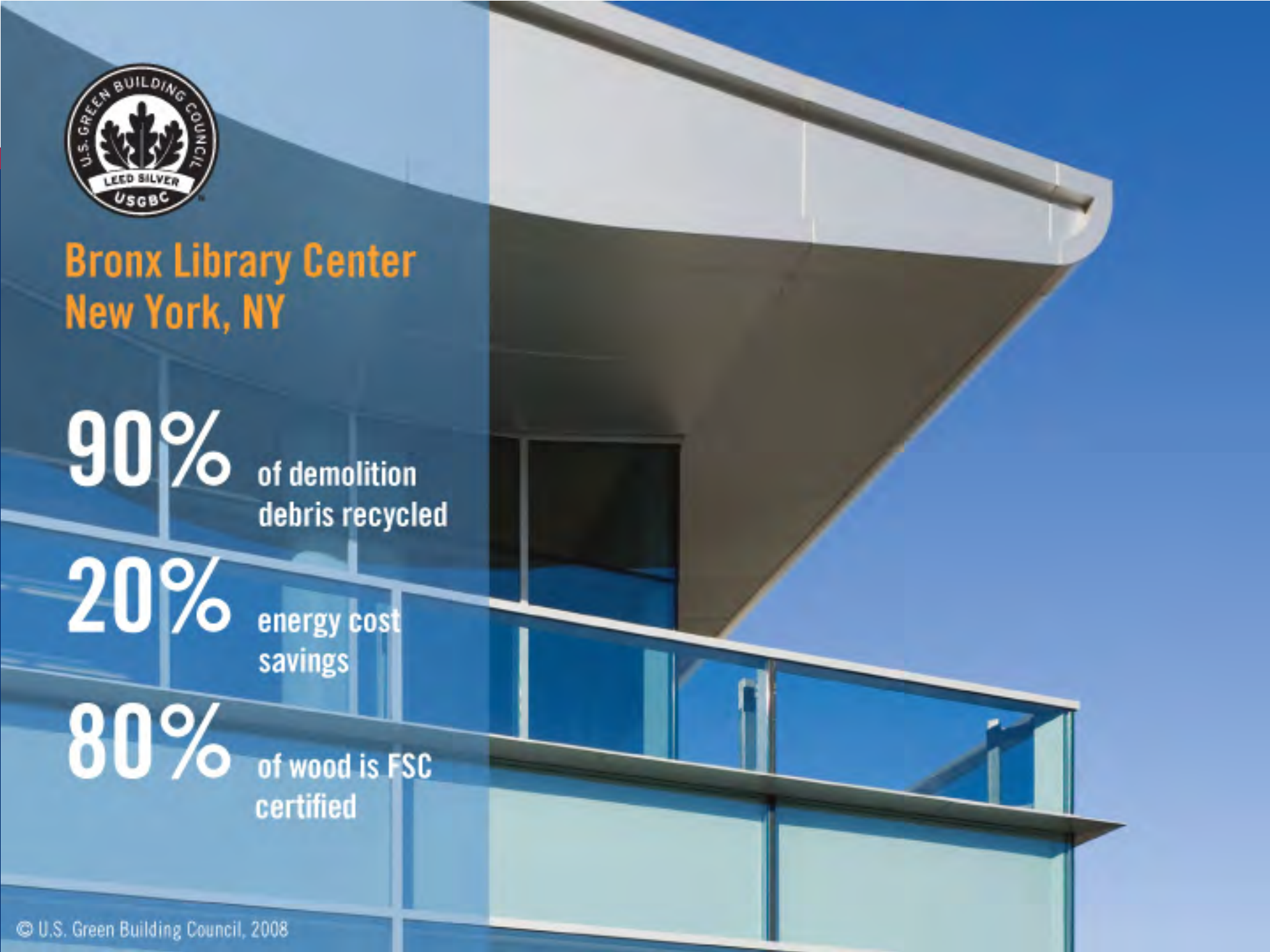

U.S. GREEN BUILDING COUNCIL
LEED
USGBC
Leadership in Energy and Environmental Design
A leading-edge system for certifying the greenest performing buildings in the world
© U.S. Green Building Council 2008
LEED® Facts
Building size 12,500 square ft
Type of building
LEED for Core & Shell Development Certification awarded July 27, 2005
49*
Platinum
Sustainable Sites 13/15
Water Efficiency 5/5
Energy & Atmosphere 12/15
Materials & Resources 6/9
Indoor Environmental Quality 10/13
Innovation & Design 3/5
*Out of a possible 62 points

© U.S. Green Building Council, 2008

LEED Certification Levels

Platinum	**80+ points**
Gold	**60 - 79 points**
Silver	**50 – 59 points**
Certified	**40 - 49 points**

LEED								BREEAM			
1	Austria	7	Finland	13	Italy	19	Romania	1	France	7	Romania
2	Bulgaria	8	France	14	Luxembourg	20	Russia	2	Germany	8	Sweden
3	Czech Republic	9	United Kingdom	15	Netherlands	21	Slovenia	3	Hungary	9	Turkey
4	Estonia	10	Greece	16	Norway	22	Sweden	4	Italy		
5	Germany	11	Hungary	17	Poland	23	Turkey	5	Luxembourg		
6	Spain	12	Ireland	18	Portugal			6	Poland		



© U.S. Green Building Council, 2008

Boulder Associates, Inc. Office Boulder, CO

39% of materials and furniture have recycled content

43% less water use

55% of demolition/ construction waste diverted from landfill

Photography courtesy of Ed LaCasse

© U.S. Green Building Council, 2008

Sidwell Friends Middle School Washington, DC

90% reduced municipal water use

60% less energy demand than a conventional school

80% native plant species planted on site

Photograph Courtesy of Peter Aaron/ESTO

© U.S. Green Building Council, 2008

Tepeyac Haven
Pasco, WA

15 units per acre

29% improvement of attic insulation heat resistance over state code energy

44 homes available for low-income families

© U.S. Green Building Council, 2008

Orchard Garden Hotel
San Francisco, CA

22% of building materials manufactured within 500 miles

77% of construction waste diverted from the landfill

100% of interior spaces designated tobacco-free

© U.S. Green Building Council, 2008

Photograph Courtesy of Orchard Garden

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Thank you

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მშენებლობის კოდექსების დაცვის, ნებართვების გაცემის და შემოწმების მოდელი

2011 წლის 6 სექტემბერი

ბაჰარ არმაღანი

LEED AP BD+C

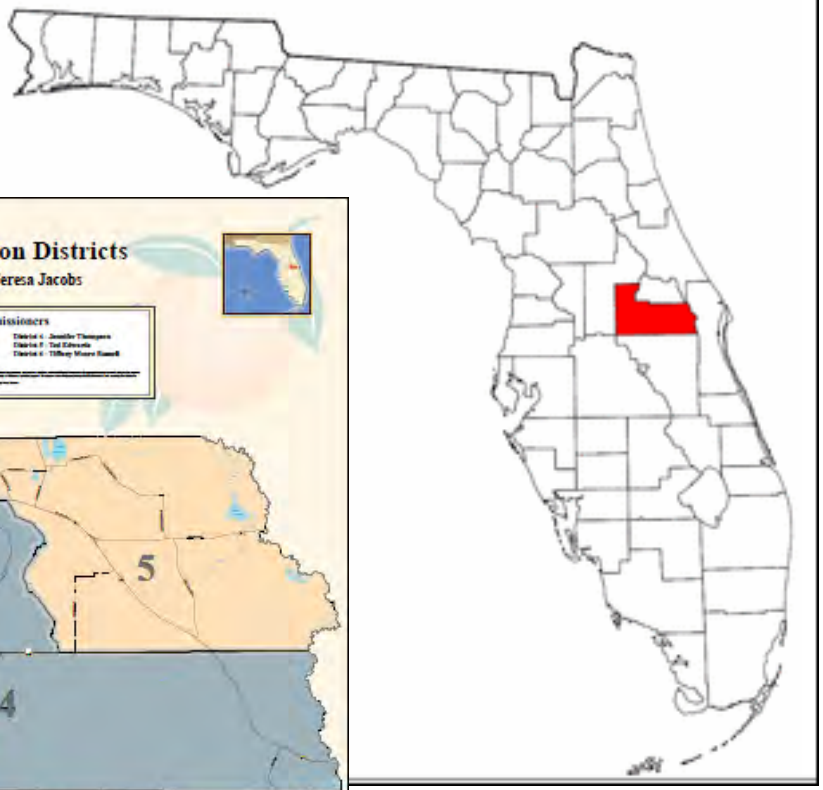
ენერგეტიკის და გარემოს დაცვის ლიდერთა ინიციატივის წევრი

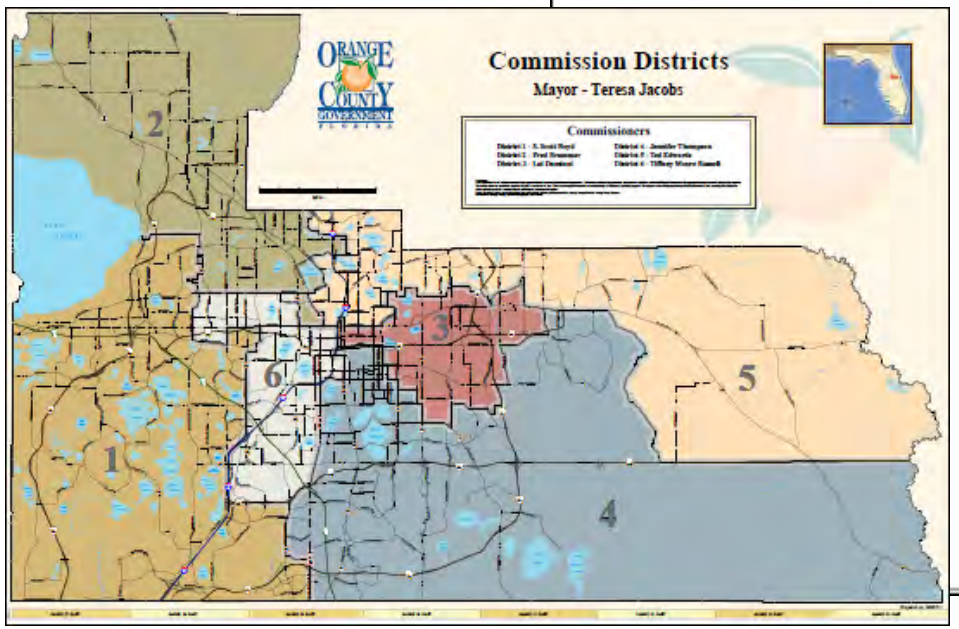
barmaghani@aol.com

ორანჯის ოლქის - ფლორიდის მოდელი

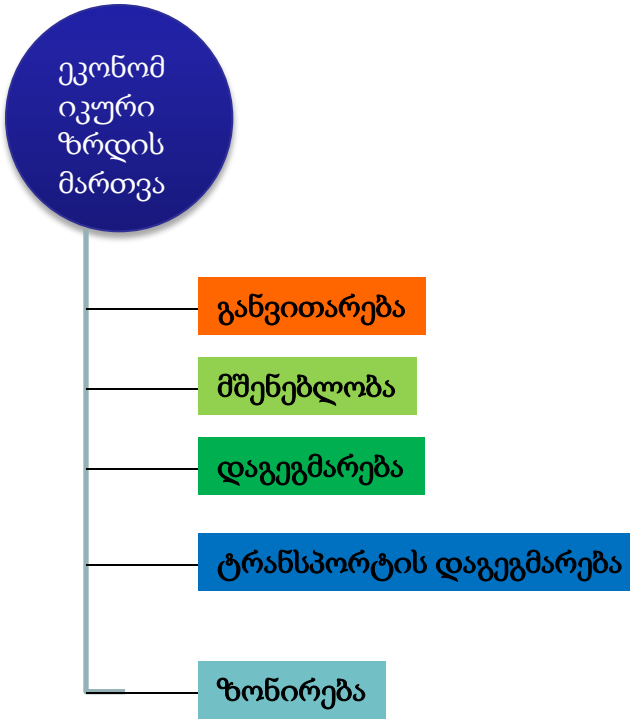
History

Mosquito County was created in 1824. It was renamed Orange County in 1845 for the fruit that constituted the county's main product.





ფორთობლების ოლქის ორგანოები



მშენებლობები

- **ლიცენზირება;**
  კონტრაქტორების მონაცემთა ბაზა, სალიცენზიო ინფორმაცია, რეგისტრაცია და ლიცენზირება
- **ნებართვები;**
  ნებართვები, ქვე-ნებართვები, გეგმების კოორდინაცია, გეგმის მიმოხილვა
- **ინსპექტირება;**
  შემოწმებებიდან მიღებული ინფორმაცია, შემოწმებების გრაფიკი, ინსპექტირების კოდექსები
- **აღრიცხვა:**
  შენობის ვარგისად აღიარების აქტი, მშენებლობის დასრულებამდე ელ. ენერგიით მომარაგების ხელშეკრულებები, დროებითი მიწისქვეშა მომსახურება ელ. ენერგიით.

http://www.ocfl.net/YourLocalGovernment/CountyDepartments/GrowthManagement/DivisionofBuildingSafety/FrequentlyAskedQuestions.aspx

კადრები

პროექტის შემმოწმებელი

- შტატის საბჭოს მიერ ლიცენზირებული პროფესიონალების გუნდი
- პროექტების მიმოხილვა ტერიტორიების მიხედვით
- ყველა ექსპერტს გააჩნია საკუთარი სამოქმედო ტერიტორია

ინსპექტირება

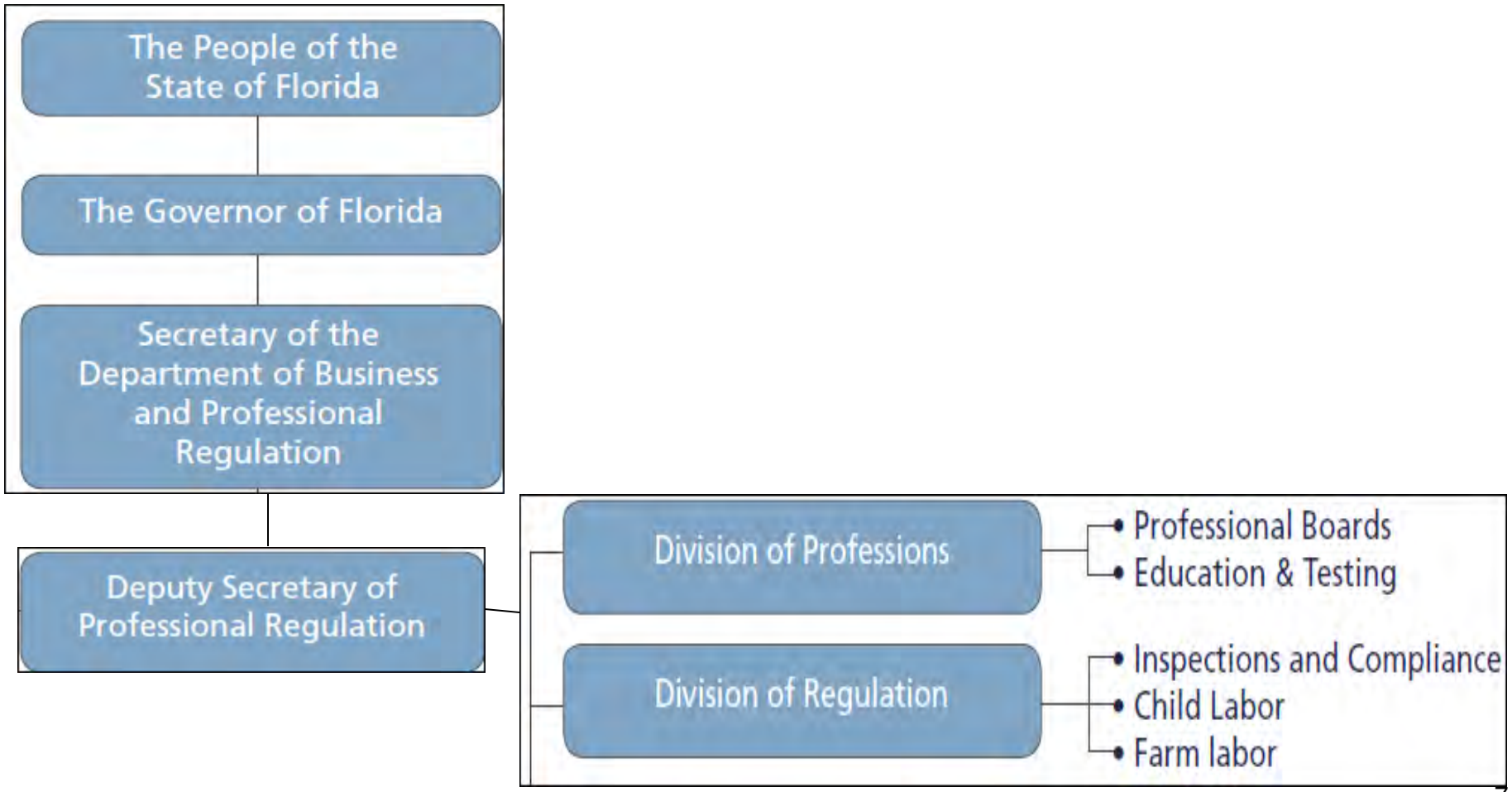
- პროფესიონალთა გუნდები
- დარგობრივი სპეციალიზაცია
- საკუთარი ტერიტორიის შემოწმება

ბიზნესისა და პროფესიული რეგულირების დეპარტამენტი

ბიზნესისა და პროფესიული რეგულირების დეპარტამენტი პასუხისმგებელია ფლორიდის შტატში ბიზნესისა და ისეთი პროფესიების ლიცენზირებასა და რეგულირებაზე, როგორიცაა კოსმეტოლოგი, ვეტერინარი, უძრავი ქონების მაკლერი, და სხვ. დეპარტამენტის მიზანია ეფექტიანი ლიცენზირება და სამართლიანი რეგულირება ყოველდღიური საქმიანობის განხორციელებისას. დეპარტამენტი ექვემდებარება აღმასრულებელ მთავრობას.

http://www.myfloridalicense.com/dbpr/pro/what_does_a_professional_board_do.htm

ფლორიდის შტატის პროფესიონალთა რეგულირების დეპარტამენტის საორგანიზაციო სტრუქტურა



პროფესიათა კლასიფიკაცია

პროფესიული საბჭოები

- არქიტექტურისა და ინტერიერის დიზაინი
- სამშენებლო კოდექსის ადმინისტრირება და ინსპექტირება
- სამშენებლო დარგის ლიცენზირების საბჭო
- საინჟინრო
- ლანდშაფტის არქიტექტურა
- ელ. ენერგიის კონტრაქტორები

განათლება და ტესტირება

- გამოცდების ადმინისტრირება
- საფასური
- უწყვეტი განათლება

რეგულირების სფერო

- პროფესიონალთა საბჭოების და პროგრამების აღსრულების ორგანო
- წესების და სტანდარტების შესრულების უზრუნველყოფა
- საჩივრების მოგვარება

ელექტრონული მომსახურება - სწრაფი წვდომა ონლაინ რეჟიმში მომსახურებებზე და ინფორმაციაზე

- განაცხადის ფორმები
- ზეგავლენის საფასურის გამოთვლა
- ლიცენზირებულ კონტრაქტორთა მონაცემთა ბაზა
- დაჩქარებული ნებართვები
- შემოწმებების ისტორია
- კომერციული პროექტების განხილვა
- ნებართვების ძიება
- საველე კვლევის ანგარიშები

ფლორიდის შტატის მშენებლობის კოდექსები

ამჟამად მოქმედებს შემდეგი კოდექსები:

- 2007 წლის ფლორიდის შტატის სამშენებლო კოდექსი - 2009 წლის დამატებებით
- 2007 წლის ფლორიდის შტატის არსებული შენობების კოდექსი - 2009 წლის დამატებებით
- 2007 წლის ფლორიდის შტატის საცხოვრებელი შენობების კოდექსი - 2009 წლის დამატებებით
- 2007 წლის ფლორიდის შტატის მექანიკური სისტემების კოდექსი - 2009 წლის დამატებებით
- 2007 წლის ფლორიდის შტატის მილგაყვანილობის სისტემის კოდექსი - 2009 წლის დამატებებით
- 2007 წლის ფლორიდის შტატის ბუნებრივი აირით მომარაგების კოდექსი - 2009 წლის დამატებებით
- 2008 წლის ეროვნული ელექტრო ენერგიით მომარაგების კოდექსი
- 2007 წლის ფლორიდის შტატის ხანძარსაწინააღმდეგო კოდექსი
- 2006 წლის NFPA 1 და NFPA 101-ე ფლორიდის შტატის რედაქცია

ნებართვები

- პროექტის განხილვის მიზნით გამართული შეხვედრები
- ყველა კომერციული პროექტი და ნებართვების შესახებ ინფორმაცია წარმოდგენილი უნდა იყოს პროექტების საკოორდინაციო სექციაში
- საცხოვრებელი სექტორის სამშენებლო ნებართვების სექცია გასცემს როგორც საცხოვრებელი მშენებლობების ნებართებს, ასევე საინფრომაციო ფურცელს. სახოვრებელი შენობების ნებართვა თავდაპირველად წარმოდგენილი უნდა იყოს ორანჯის ოლქის ზონირების სამმართველოში.
- ქვე-ნებართვების სექცია გასცემს სახურავების, მექანიზაციის, ბუნებრივი აირითა და ელ. ენერგიით მომარაგების და წყალგაყვანილობის სისტემების ქვე-ნებართვებს.

ფორთოხლების ოლქის ერთი ფანჯრის პრინციპი

One Stop Permitting

Permitting Services was created as a "One Stop Shop" for permitting, ending the need to visit several locations across the county. The one stop shop features a permitting advocate to oversee the process and a customer service team specifically trained to explain and facilitate county procedures.

"By providing one central location, with the right staff on hand, we have streamlined the permitting process which goes to the heart of our mission as public servants – to serve," Mayor Teresa Jacobs

- FAQ

http://www.ocfl.net/Portals/0/Resources/Internet/DEPARTMENTS/Growth_Management/commercialEng0409.pdf

კომერციული

http://www.ocfl.net/Portals/0/Resources/Internet/DEPARTMENTS/Growth_Management/residentialEng0409.pdf

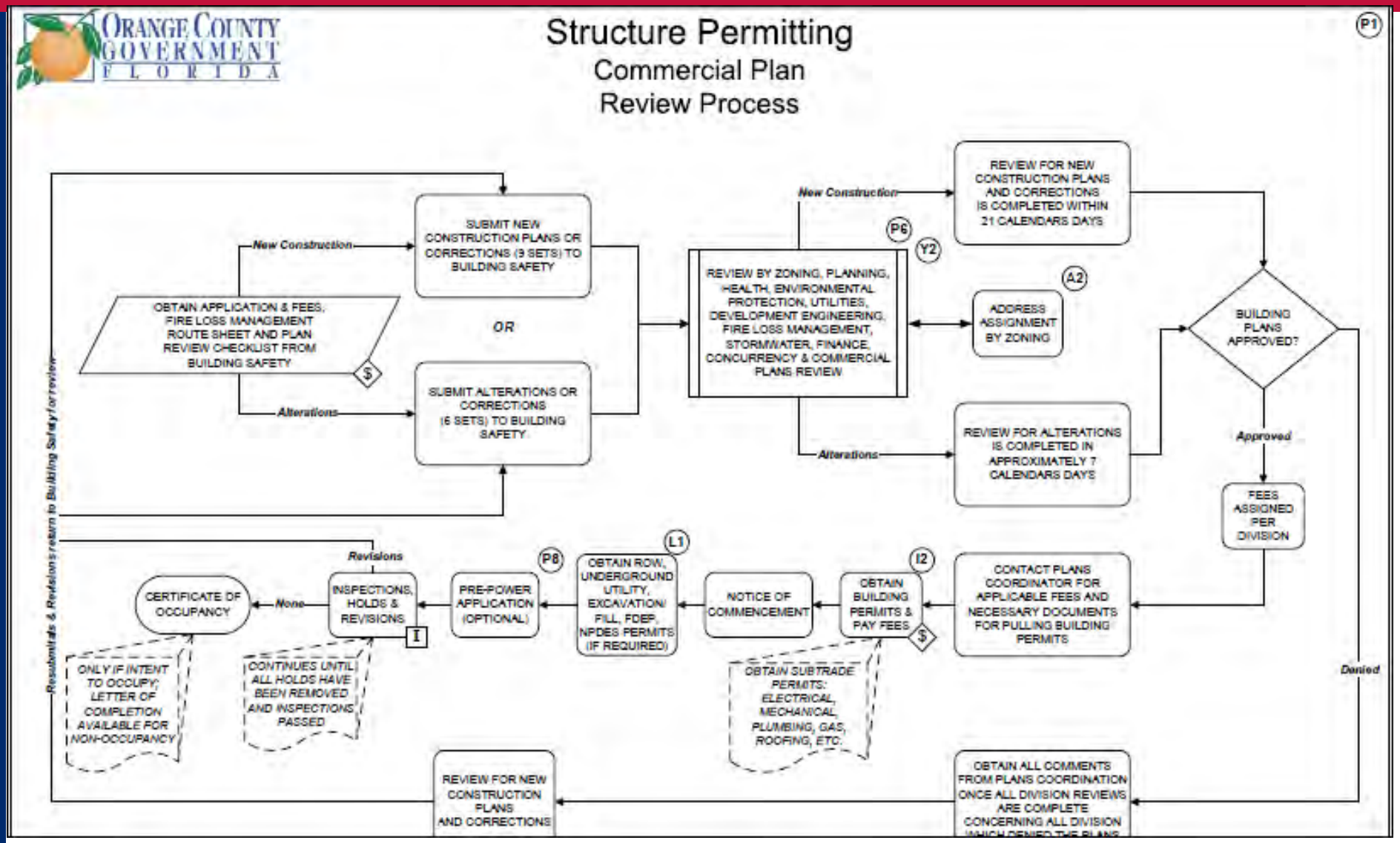
საბინაო

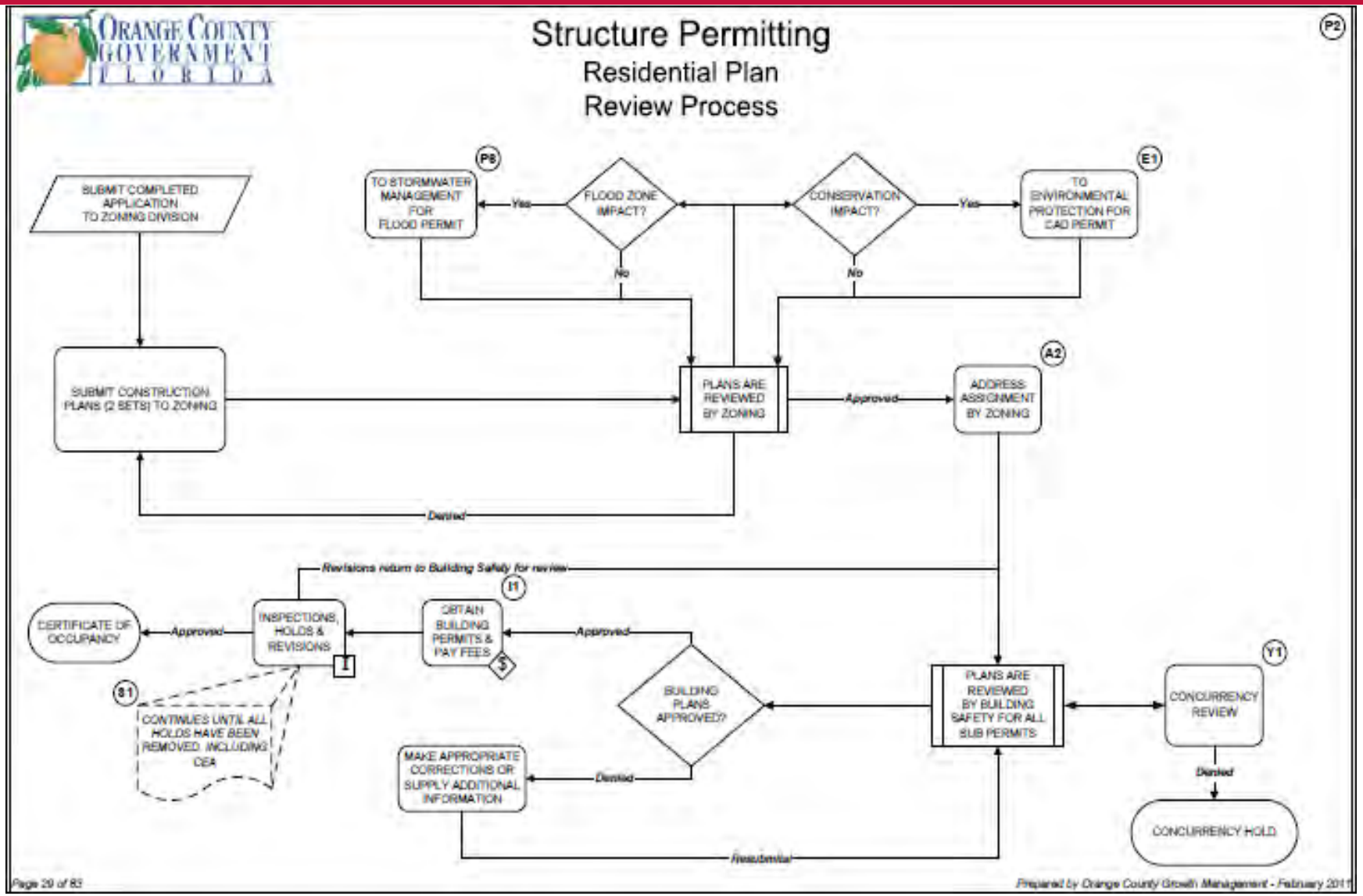
http://www.ocfl.net/Portals/0/Resources/Internet/DEPARTMENTS/Growth_Management/Building/PreConstructionMeetingInfo.pdf

სამშენებლო დეპარტამენტის პრეზენტაცია

ORANGE COUNTY GOVERNMENT FLORIDA

Structure Permitting
Commercial Plan Review Process




ORANGE COUNTY GOVERNMENT FLORIDA
Structure Permitting
Residential Plan
Review Process
P2
SUBMIT COMPLETED APPLICATION TO ZONING DIVISION
P8
TO STORMWATER MANAGEMENT FOR FLOOD PERMIT
Yes
FLOOD ZONE IMPACT?
No
CONSERVATION IMPACT?
Yes
E1
TO ENVIRONMENTAL PROTECTION FOR CAD PERMIT
No
SUBMIT CONSTRUCTION PLANS (2 SETS) TO ZONING
PLANS ARE REVIEWED BY ZONING
Approved
A2
ADDRESS ASSIGNMENT BY ZONING
Denied
Revisions return to Building Safety for review
I1
CERTIFICATE OF OCCUPANCY
Approved
INSPECTIONS, HOLDS & REVISIONS
I
OBTAIN BUILDING PERMITS & PAY FEES
3
Approved
B1
CONTINUES UNTIL ALL HOLDS HAVE BEEN REMOVED INCLUDING CEA
BUILDING PLANS APPROVED?
PLANS ARE REVIEWED BY BUILDING SAFETY FOR ALL SUB PERMITS
Y1
CONCURRENCY REVIEW
Denied
MAKE APPROPRIATE CORRECTIONS OR SUPPLY ADDITIONAL INFORMATION
Denied
CONCURRENCY HOLD
Resubmittal
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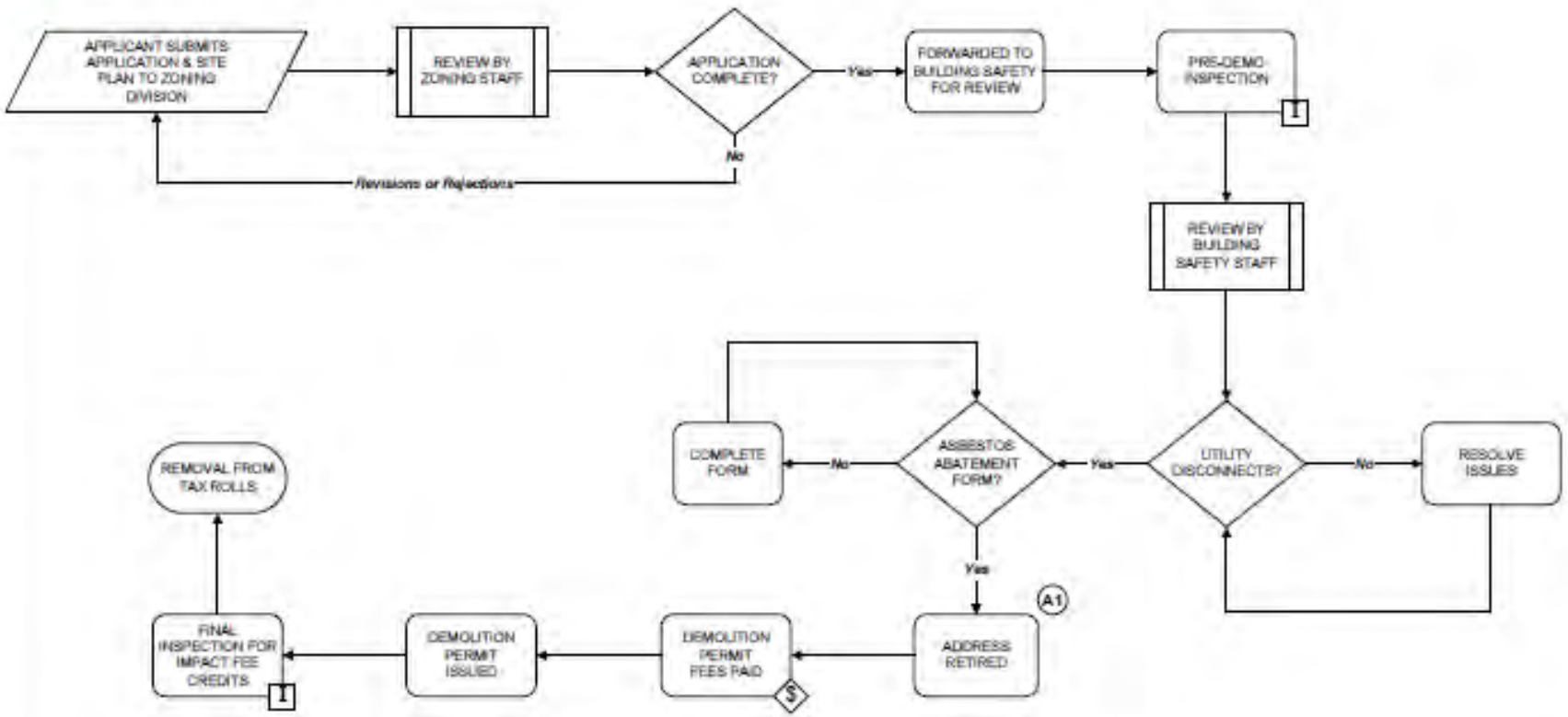
Prepared by Orange County Growth Management - February 2011

ORANGE COUNTY GOVERNMENT FLORIDA

Structure Permitting

Demolition Permit Process

P5



Prepared by Orange County Growth Management - February 2011

მშენებლობათა ინსპექტირება

სამშენებლო კოდექსის დაცვის შემოწმება

- სამშენებლო მოედანი
- საძირკველი
- ფილები
- ფეხით სავალი ნაწილი და სამანქანო გზები
- კოჭები და ბჯენები
- შემკვრელები
- აგურის ან ქვის წყობის არმირება
- ფანჯრების და კარების მონტაჟი
- ფუტლიარები /გარსი
- საბოლოო ჩარჩო კონსტრუქცია

- ბასეინის ზღუდე/უსაფრთხოების მექანიზმები
- ლანდშაფტი
- ხანძარსაწინააღმდეგო მექანიზმები
- ხანძარსაწინააღმდეგო კედლები/დანაყოფები
- დათბუნება
- შემოღობვა
- საშრობი/სახურავის მორწყვა
- სახურავის მოპირკეთება
- დემონტაჟი
- ხანძრით გამოწვეული ზიანი

ელ. ენერგიის კოდექსის დაცვის შემოწმება

- დროებითი მომსახურება
- მიწის ქვეშა გაყვანილობა
- უხეში მიყვანა
- საბოლოო
- საძირკვლის ფოლადთან მიერთება
- ბასეინის განათება/ქვაბულის კომპლექსი
- მრიცხველის გადაყვანა ახალ საწყისზე
- მოხმარების შემოწმება
- მომსახურების ფორმატის შეცვლა

ბუნებრივი აირის კოდექსის დაცვის შემოწმება

- უხეში – გაზი
- საბოლოო - გაზი

მექანიკური კოდექსის დაცვის შემოწმება

- მიწისქვეშა სისტემები
- უხეში მიყვანა
- საბოლოო
- მილებში წნევა
- მილების იზოლაცია
- სარქველი, ვენტილაცია

მილგაყვანილობის კოდექსის დაცვის შემოწმება

- კანალიზაციის კოლექტორი
- მიწისქვეშა სისტემები
- ირიგაცია
- უხეში მიყვანა
- მზის სისტემები
- საბოლოო


მადლობა

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