NY Residential Energy Code Allies and Assets

Presenter Name
Date

1 CHAPTER

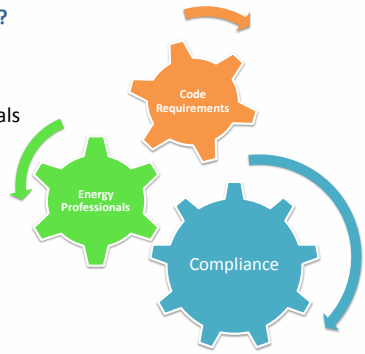
INTRODUCTION

SIGN-IN & EVALUATION REQUIREMENTS FOR CEUs

- **ALL** attendees **MUST** sign the PSD/IBTS attendance sheet
- Those requesting DOS CEUs **MUST ALSO** sign-in **and out** of the DOS attendance sheet
- **ALL** attendees **MUST** complete PSD/IBTS post-session evaluation to receive their certificate of completion
- Those requesting DOS CEUs are encouraged to complete the DOS post-session survey

WHY ARE WE HERE?

- Using 3rd party energy professionals to achieve compliance with ECCCNYS-2016



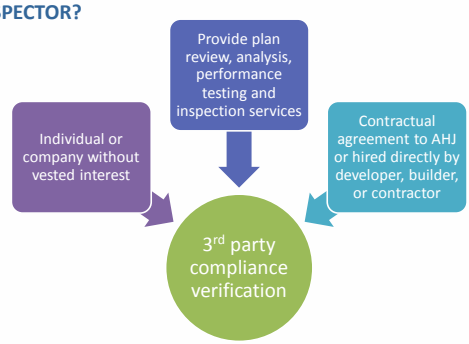
COURSE GOALS

- ☑ Familiarize audience with code provisions that permit the use of energy professionals
- ☑ Introduce the most common energy professionals and demonstrate their skill set and capabilities
- ☑ Discuss the benefits of using each energy professional in code compliance
- ☑ Identify how and where energy professionals fit into current code compliance processes.

WHO ARE YOU?

- ✓ Name
- ✓ Organization / company
- ✓ How long have you been in the industry?
- ✓ What do you hope to get out of this course?

WHAT IS A 3rd PARTY ENERGY PROFESSIONAL / SPECIAL INSPECTOR?



ENERGY PROFESSIONALS

CONSIDER USING SPECIAL INSPECTORS AND ENERGY PROFESSIONALS

- The ECCCNYS-2016 is complex with significant requirements for
  - 104 – Inspections
  - 402 – Envelope
  - 403 – HVAC
  - 404 – Electrical Power and Lighting
  - 405 – Simulated Performance Alternative
- ***New*** Compliance Option
  - 406 – Energy Rating Index
- Required Inspections
- Jurisdiction time, man power, and resources are limited and plan review and inspection staff have many priorities

ENERGY PROFESSIONALS

2 CHAPTER

WHERE DO THIRD PARTY ENERGY PROFESSIONALS FIT INTO THE ECCCNYS – 2016?

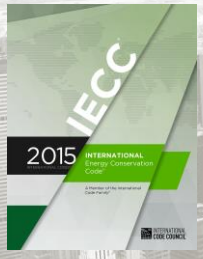
OVERVIEW OF CODE REQUIREMENTS

NEW YORK STATE BUILDING CODES

Building Code
Residential Code
Existing Building Code
Fire Code
Plumbing Code
Mechanical Code
Fuel Gas Code
Property Maintenance Code
Energy Conservation Construction Code

ENERGY PROFESSIONALS CODE OVERVIEW

ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE



ENERGY PROFESSIONALS CODE OVERVIEW

A LOOK INSIDE – RESIDENTIAL REQUIREMENTS

Chapter 1 – Scope and Administration

Chapter 2 – Definitions

Chapter 3 – General Requirements

Chapter 4 – Residential Energy Efficiency
- Section 401 General
- Section 402 Building Thermal Envelope
- Section 403 Systems
- Section 404 Electrical Power and Lighting Systems
- Section 405 Simulated Performance Alternative
- Section 406 Energy Rating Index Performance Alternative

Chapter 5 – Existing Buildings

Chapter 6 – Referenced Standards

ENERGY PROFESSIONALS CODE OVERVIEW

WHAT IS A RESIDENTIAL BUILDING?

Defined as one- and two-family R-2, R-3, R-4 ≤ 3 stories

All buildings that are not "residential" by definition are "commercial"

Includes additions, alterations, renovations and repairs

COMPLIANCE OPTIONS

Prescriptive
- Sections R401-R404
- Mandatory provisions must be met
- No trade-offs permitted
- No software tools needed

Total UA Alternative
- Section R402.1.5
- Mandatory provisions must be met
- U-factor and assembly area used to determine trade off
- REScheck or approved method

Performance
- Section R405
- Mandatory provisions must be met
- Simulated energy performance analysis comparing annual energy cost

Energy Rating Index
- Section R406
- Mandatory provisions must be met
- Building envelope requirements of 2009 IECC (ECCCNYS – 2010)

RESIDENTIAL PROVISIONS THAT PERMIT USE OF ENERGY PROFESSIONALS

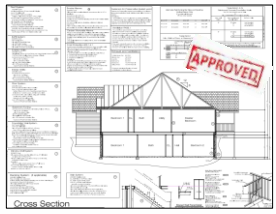
Scope and Administration	Building Thermal Envelope	Systems	Simulated Performance Alternative
• R103 Construction Documents • R104 Inspections	• R402.4 Air Leakage	• R403.3.2.1 Sealed air handler • R403.3.3 Duct testing (Mandatory) • R403.3.4 Duct leakage (Prescriptive) • R403.7 Equipment sizing and efficiency rating	• R405.4 Documentation

ERI Compliance Alternative
- R406 Energy Rating Index Compliance Alternative

SCOPE AND ADMINISTRATION

R103 CONSTRUCTION DOCUMENTS

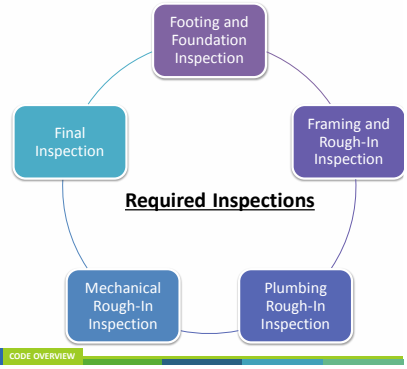
Documents must include:
- Insulation materials and R-values
- Fenestration U-factors and SHGCs
- Area-weighted U-factor and SHGC calculations
- Mechanical system design criteria
- Mechanical and service water heating system and equipment types, sizes, and efficiencies
- Equipment and systems controls
- Duct sealing, duct and pipe insulation, and location
- Air sealing details



Code official may require all documents to be prepared and/or approved by a registered design professional.

R104 INSPECTIONS

Approved third party inspection agencies:
- Not affiliated with building's design or construction
- No conflict of interest



FOOTING AND FOUNDATION INSPECTION

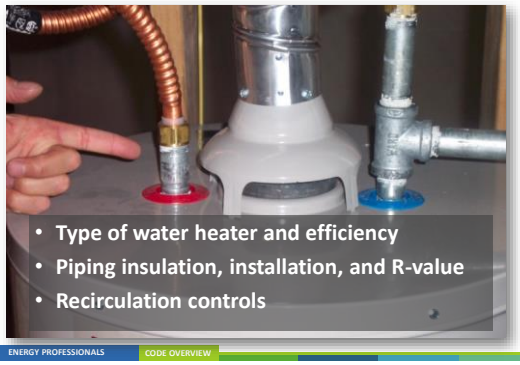
ENERGY PROFESSIONALS CODE OVERVIEW

FRAMING AND ROUGH-IN INSPECTION

- Types of insulation and R-values
- Correct location and proper installation
- Window and door glass U-factor and SHGC
- Proper installation of air leakage controls

ENERGY PROFESSIONALS CODE OVERVIEW

PLUMBING ROUGH-IN INSPECTION



ENERGY PROFESSIONALS CODE OVERVIEW

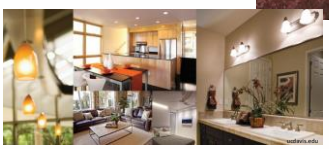
MECHANICAL ROUGH-IN INSPECTION

- HVAC equipment type and size based on Manual J
- Required controls
- Duct and piping insulation and R-value
- Programmable thermostats
- Dampers
- Visual inspection for duct sealing, proper connections, and installation per Manual D

ENERGY PROFESSIONALS CODE OVERVIEW

FINAL INSPECTION

- High-efficacy lighting
- Ceiling insulation and air sealing
- Thermostats
- Other efficiency features



ENERGY PROFESSIONALS CODE OVERVIEW

IMPORTANCE OF CONSTRUCTION DOCUMENTS AND INSPECTION REQUIREMENTS

- ❑ Holds designers, builders, and contractors accountable for meeting code requirements
- ❑ Simplifies enforcement process
- ❑ Ensures major systems are meeting code requirements
- ❑ Saves time

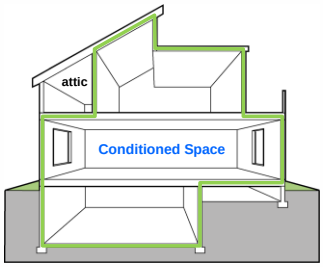
ENERGY PROFESSIONALS CODE OVERVIEW

BUILDING THERMAL ENVELOPE

BUILDING ENVELOPE

Conditioned space: An area or room within a building being heated or cooled, containing un-insulated ducts, or with a fixed opening directly into an adjacent conditioned space

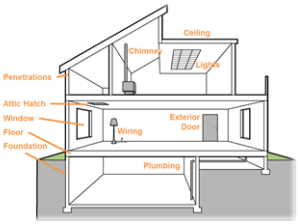
- Walls
  - Above grade
  - Below grade
  - Mass walls
- Ceilings
- Fenestration
- Floors
- Slab
- Crawlspace



R402.4 AIR LEAKAGE (MANDATORY)

All components must be installed in accordance with manufacturer's instructions and Table R402.4.1.1.

An **approved third party** is permitted to inspect components for compliance (R402.4.1.1).



- Homes tested to ≤3 ACH50
- Multifamily to .3cfm50/ft^2
- Testing **may be conducted by a third party** after rough-in (R402.4.1.2 Testing).

R402.4.2 FIREPLACES

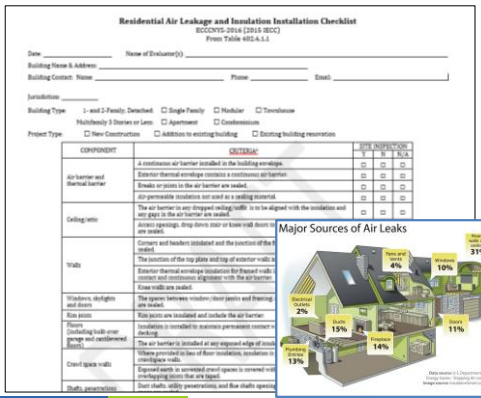
R402.4.2 Doors on factory-built fireplaces must be listed and **labeled** with UL 127.

Doors on masonry fireplaces to be listed and **labeled** with UL 907.

UL LISTED

R402.4.5 RECESSED LIGHTING

Recessed lighting must be IC-rated and **labeled**


Residential Air Leakage and Insulation Installation Checklist
ECCNYS-2016 (2015 IECC)
From Table 402.4.1.1

Major Sources of Air Leaks

IMPORTANCE OF AIR LEAKAGE REQUIREMENTS

Tight building envelopes:

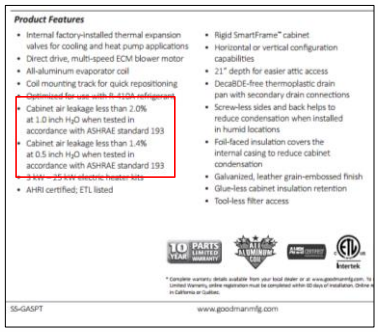
- ❑ Save energy
- ❑ Lower utility bills
- ❑ Improve indoor air quality
- ❑ Reduce pollutants
- ❑ Increase comfort by reducing drafts and noise
- ❑ Help control moisture (reduce mold)
- ❑ Can reduce HVAC size – allow "right-sizing"
- ❑ Reduce callbacks

Air leakage accounts for 25-40% of energy used for heating and cooling in a typical home

SYSTEMS

R403.3.2.1 SEALED AIR HANDLER

Air handlers must include a manufacturer's designation for air leakage of no more than 2% of the design air flow rate when tested in accordance with ASHRAE 193.



Product Features

- Internal factory-installed thermal expansion valves for cooling and heat pump applications
- Direct drive, multi-speed ECM blower motor
- All-aluminum evaporator coil
- Coil mounting track for quick repositioning
- Optimized for use with R-410A refrigerant
- Cabinet air leakage less than 2.0% at 1.0 inch H_2O when tested in accordance with ASHRAE standard 193
- Cabinet air leakage less than 1.4% at 0.5 inch H_2O when tested in accordance with ASHRAE standard 193
- 3 kW – 25 kW electric heater kits
- AHRI certified; ETL listed
- Rigid SmartFrame™ cabinet
- Horizontal or vertical configuration capabilities
- 21" depth for easier attic access
- DecaBDE-free thermoplastic drain pan with secondary drain connections
- Screw-less sides and back helps to reduce condensation when installed in humid locations
- Foil-faced insulation covers the internal casing to reduce cabinet condensation
- Galvanized, leather grain-embossed finish
- Glue-less cabinet insulation retention
- Tool-less filter access

10 YEAR PARTS LIMITED WARRANTY

THE ALUMINUM CASE

ASHRAE 193 COMPLIANT

ETL Intertek

* Complete warranty details available from your local dealer or at www.goodmanmfg.com. See Limited Warranty, online registration must be completed within 60 days of installation. Online registration not required in California or Québec.

SS-GASPT

www.goodmanmfg.com

R403.3.3 DUCT TESTING (MANDATORY)

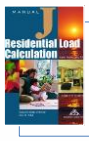
R403.3.4 DUCT LEAKAGE (PRESCRIPTIVE)

Rough-In Test	• Total leakage: ≤4 cfm/per 100 ft² at 25 PA at rough-in • Without air handler: total air leakage ≤3 cfm/per 100ft² at 25 PA
Post Construction Test	• Total leakage: ≤4 cfm/per 100 ft² at 25 Pa across entire system, including air handler, and all register boots taped or otherwise sealed
Written Report	• Qualified third parties permitted to conduct duct testing

Exception: Test not required if air handler and all ducts are within conditioned space.

R403.7 EQUIPMENT SIZING AND EFFICIENCY RATING

IRC M1601.1 DUCT DESIGN



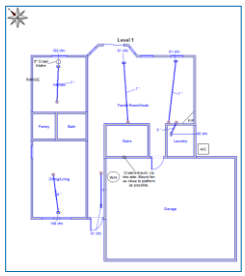
Building loads calculated using ACCA Manual J or other approved methodology

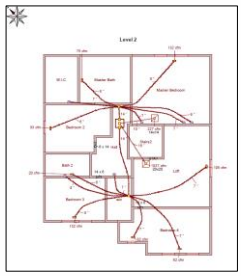
HVAC equipment must be sized to ACCA Manual S and calculated loads

HVAC equipment efficiency ratings must be equal to or greater than federal minimum

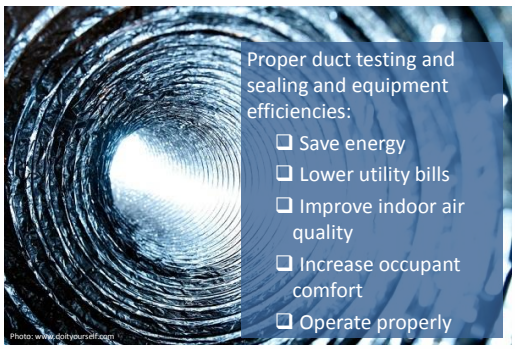
ACCA MANUAL D REQUIRED BY IRC

ACCA Manual D is used to design duct systems that are properly sized for a home.





IMPORTANCE OF DUCT AND EQUIPMENT REQUIREMENTS



Proper duct testing and sealing and equipment efficiencies:

- ❑ Save energy
- ❑ Lower utility bills
- ❑ Improve indoor air quality
- ❑ Increase occupant comfort
- ❑ Operate properly

SIMULATED PERFORMANCE ALTERNATIVE (PERFORMANCE)

R405 SIMULATED PERFORMANCE ALTERNATIVE (PERFORMANCE)

R405.2 Mandatory requirements

Mandatory requirements of prescriptive path, including those that permit the use of third parties, must be met.

R405.4 Documentation

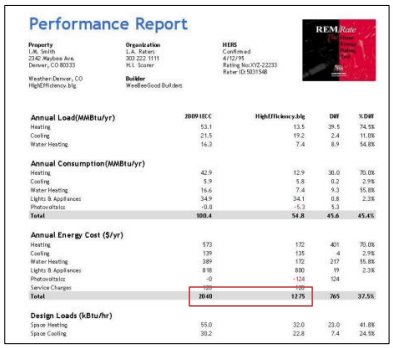
Approved third parties permitted to produce and compile compliance documentation.

RESNET Accredited Software

- Ekotrope, HERS Module v2.0
- EnergyGauge® USA V 5.0
- IC3 v4.01
- REM/Rate REM/Design v14.6.2
- Right-Energy(R) IECC

REM/*RATE* PERFORMANCE REPORT

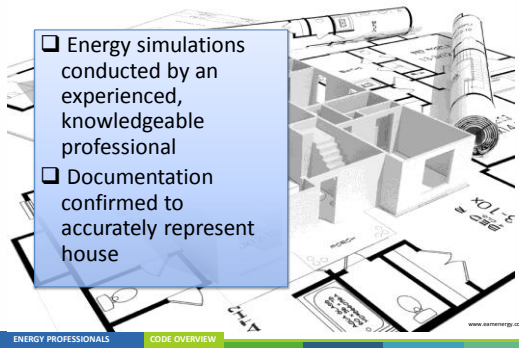
REM/Rate™



Performance Report

Annual Load(MMBtu/yr)	2009 IECC	HighEfficiency.hig	Diff	%Diff
Heating	53.1	13.5	39.5	74.5%
Cooling	21.5	19.2	2.4	11.0%
Water Heating	16.3	7.4	8.9	54.8%
Annual Consumption(MMBtu/yr)				
Heating	42.9	12.9	30.0	70.0%
Cooling	5.9	5.8	0.2	2.9%
Water Heating	16.6	7.4	9.3	55.8%
Lights & Appliances	34.9	34.1	0.8	2.3%
Photovoltaics	-0.8	-5.3	5.3	
Total	**100.4**	**54.8**	**45.6**	**45.4%**
Annual Energy Cost ($/yr)				
Heating	573	172	401	70.0%
Cooling	139	135	4	2.9%
Water Heating	389	172	217	55.8%
Lights & Appliances	818	800	19	2.3%
Photovoltaics	-0	-124	124	
Service Charges	120	120		
Total	**2040**	**1275**	**765**	**37.5%**
Design Loads (kBtu/hr)				
Space Heating	55.0	32.0	23.0	41.8%
Space Cooling	39.2	22.8	7.4	24.5%

IMPORTANCE OF USING ENERGY PROFESSIONALS IN PERFORMANCE CALCULATIONS



- ❑ Energy simulations conducted by an experienced, knowledgeable professional
- ❑ Documentation confirmed to accurately represent house

ENERGY RATING INDEX COMPLIANCE ALTERNATIVE

WHAT IS THE ENERGY RATING INDEX?

- Compliance by target ERI score
  AND
- Meets mandatory provisions
- Hot water pipe insulation requirements
- Prescriptive envelope requirements from the 2009 IECC (ECCCNYS – 2010)
- **Requires 3rd Party verification**

The ERI score is defined as a numerical score where:
- 100 = 2006 IECC
- 0 = net-zero home
- Each number lower = 1% improvement in energy usage of design.

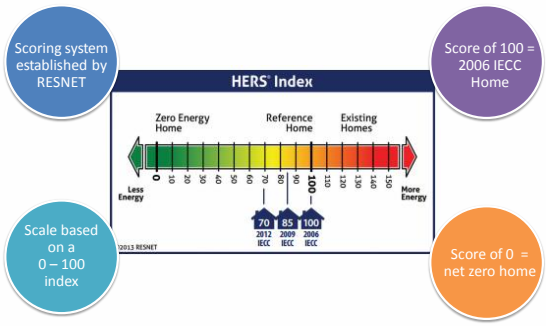
R406.5 VERIFICATION BY APPROVED AGENCY

States and jurisdictions can specify which qualifying ERI method to use

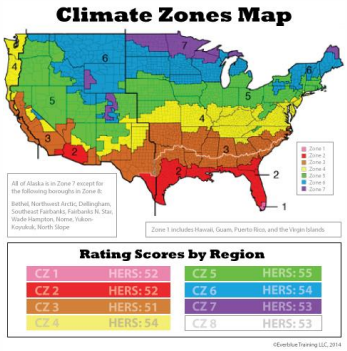
RESNET HERS Index is the existing compliant ERI method

Nationally recognized	Based on ANSI RESNET Standard 301-2014	Used to rate over 1.5 million homes in the U.S. to date	Employs qualified HERS raters and provide QA review

WHAT IS A HERS INDEX SCORE?



ERI SCORES BY CLIMATE ZONE



WHAT IS A HERS INDEX SCORE? - VIDEO

Source: RESNET

VARIABLES IN ENERGY RATINGS

Energy ratings are based on a number of variables including the type and efficiency of each of the following:

- Equipment
- Appliance upgrades
- Ceilings and roofs
- Attics, foundations and crawlspaces
- Windows and doors, vents and ductwork
- HVAC and water heating systems
- Air leakage of the home
- Exterior walls (both above and below grade)
- Floors over unconditioned spaces (such as garages or crawlspaces)
- Leakage in the heating and cooling distribution system

IMPORTANCE OF ENERGY PROFESSIONALS AND ERI REQUIREMENTS

- ❑ An approved party without a vested interest is rating the home
- ❑ Quality assurance by using certified providers

Increase Energy Savings

Improve Home Comfort

Reduce Carbon Footprint

ENERGY PROFESSIONALS | CODE OVERVIEW

3 CHAPTER

PILOT COURSE RESULTS

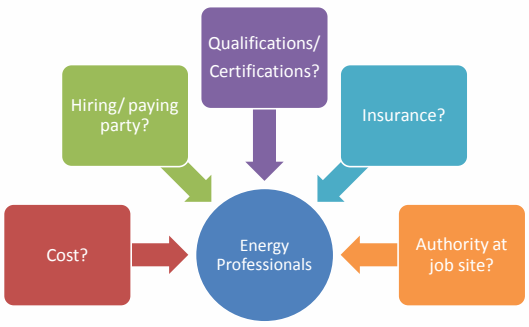
PILOT COURSE OVERVIEW

- Six statewide courses – December 2015
- Employers of energy professionals discussed:
  - Experiences, questions and concerns with employing third parties
  - Obstacles to incorporating energy professionals into current industry processes
  - Thoughts on building a third party infrastructure.

Feedback gathered from discussion, reports from trainers, and end of course surveys

PILOT RESULTS

PILOT COURSE FEEDBACK



ENERGY PROFESSIONALS | PILOT RESULTS

4 CHAPTER

SKILLS AND SERVICES OF THIRD PARTY ENERGY PROFESSIONALS

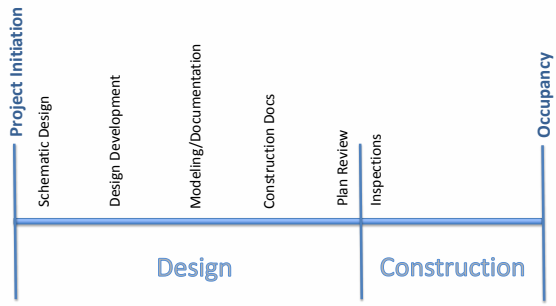
AND THEIR VALUE TO YOU

COMMON RESIDENTIAL ENERGY PROFESSIONAL SERVICES

- Building Design and Engineering
- Material and Product Specification
- Plan Review
- Inspection
- Home Energy Rating
- Duct and Envelope Tightness Verification
- Compliance Documentation

ENERGY PROFESSIONALS SKILLS/SERVICES

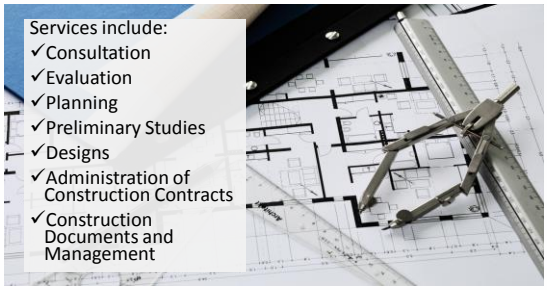
DESIGN AND CONSTRUCTION PHASES OF A PROJECT



ENERGY PROFESSIONALS SKILLS/SERVICES

SERVICE: BUILDING DESIGN AND ENGINEERING

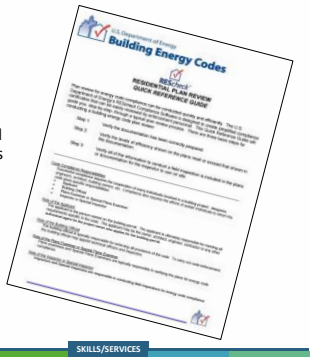
Architects and Engineers are trained professionals that specialize in the planning and design of buildings.



ENERGY PROFESSIONALS SKILLS/SERVICES

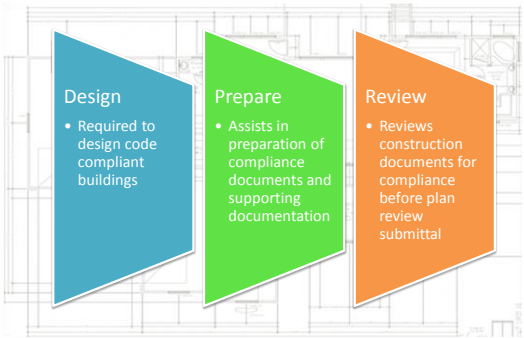
A&E SKILLS/CERTIFICATIONS

- Degree in architecture, engineering or related field
- Registered and licensed by the New York State Education Department
- Knowledge of current state and local energy code requirements
- Knowledge of building science, system design, and performance
- Knowledge of design resources
  - Energy modeling
  - Design guides
  - Compliance tools



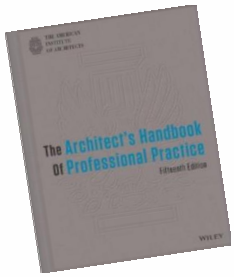
ENERGY PROFESSIONALS SKILLS/SERVICES

A&E ROLE IN COMPLIANCE



ENERGY PROFESSIONALS SKILLS/SERVICES

CODE COMPLIANCE – THE ARCHITECT'S HANDBOOK OF PROFESSIONAL PRACTICE



Excerpt from The Architect's Handbook of Professional Practice, 13th edition, ©2000

Summary

CODE COMPLIANCE SERVICES

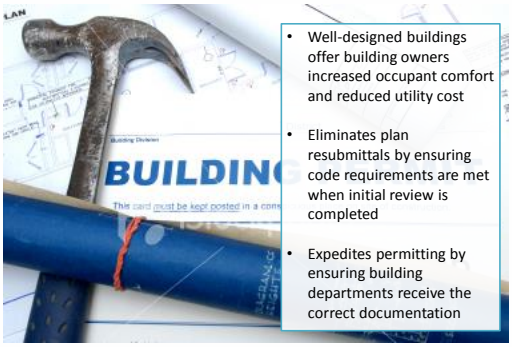
Why a Client May Need These Services
- To evaluate code issues for facilities of a complex nature
- To determine whether alternative methods or materials meet code requirements
- To assist in interpreting controversial code issues
- To assist clients in jurisdictions without a building code

Knowledge and Skills Required
- In-depth knowledge of building codes
- Knowledge of building service systems
- Knowledge of fire safety concepts and technologies
- Experience in the code review and approval process

Representative Process Tasks
- Analyze preliminary design
- Prepare preliminary report, including code summary and potential code-related design issues
- Obtain review of design development documents by code officials
- Submit request (if needed) for discretionary action before local code officials
- Review construction documents
- Prepare final report

ENERGY PROFESSIONALS SKILLS/SERVICES

VALUE OF EMPLOYING ARCHITECTS & ENGINEERS



- Well-designed buildings offer building owners increased occupant comfort and reduced utility cost
- Eliminates plan resubmittals by ensuring code requirements are met when initial review is completed
- Expedites permitting by ensuring building departments receive the correct documentation

ENERGY PROFESSIONALS SKILLS/SERVICES

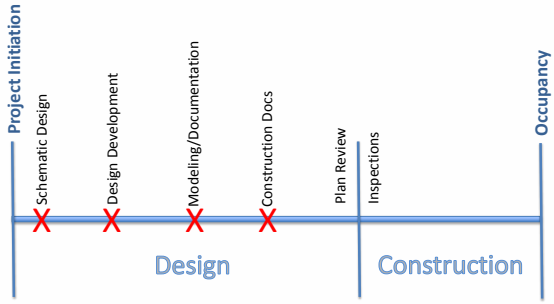
WHAT IS THE COST OF A&E SERVICES?

Parameters for cost

- Design services
  - ❑One-of-a-kind design fee is 8 – 15% of construction costs
    - Includes energy evaluation to meet jurisdiction needs
  - ❑Simple home fee is 6 – 10% of construction costs
    - No engineering
    - Jurisdiction doesn't require great detail
- Plan review and REScheck or REMRate simple code review for compliance
  - ❑Based on complexity
  - ❑$500 range

ENERGY PROFESSIONALS SKILLS/SERVICES

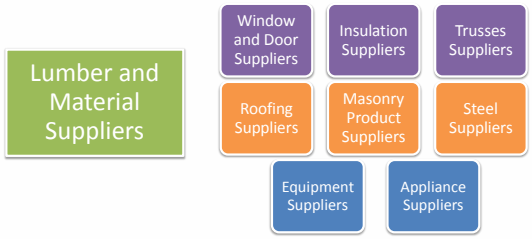
WHEN SHOULD YOU USE AN ARCHITECT AND/OR ENGINEER?



ENERGY PROFESSIONALS SKILLS/SERVICES

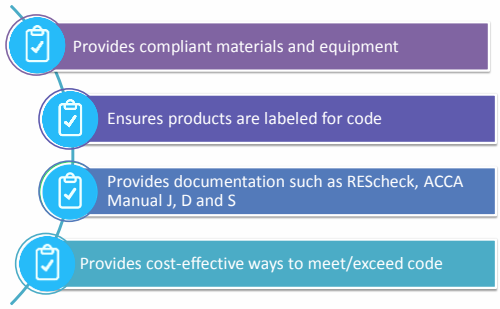
SERVICE: MATERIAL AND PRODUCT SPECIFICATION

Material suppliers provide code compliant goods and services to the construction industry.



ENERGY PROFESSIONALS SKILLS/SERVICES

MATERIAL SUPPLIER AND PRODUCT REPRESENTATIVE ROLE IN COMPLIANCE



ENERGY PROFESSIONALS SKILLS/SERVICES

PRODUCT LABELING FOR CODE COMPLIANCE

- Labels demonstrate whether code requirements have been met by products and materials
  - – NFRC labels
  - – Insulation R-Value labels
  - – Product labels
    - UL – 181 mastic for duct sealing

ENERGY PROFESSIONALS SKILLS/SERVICES

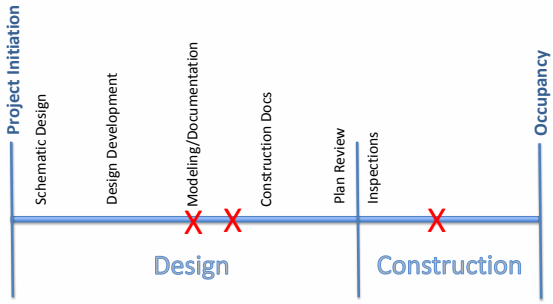
BENEFITS OF USING MATERIAL SUPPLIERS AS ENERGY PROFESSIONALS

- ❑ Material suppliers advise on materials purchases
- ❑ Provide accurate estimates per design drawings
- ❑ Ensure building materials meet code minimums
- ❑ Supply necessary documentation
- ❑ Provide proper building materials which ensure home-owner safety, comfortability, and energy efficiency



ENERGY PROFESSIONALS SKILLS/SERVICES

WHEN SHOULD YOU USE A MATERIAL SUPPLIER?



ENERGY PROFESSIONALS SKILLS/SERVICES

SERVICE: PLAN REVIEW AND INSPECTIONS

Plan Reviewers

- Architects, engineers, or other construction specialists
- Approved third party plan reviewers
- Energy rater
- Building performance specialist

Inspectors

- Approved third party agencies that specialize in third party inspections for code
- Energy rater
- Building performance specialist
- DET verifier

ENERGY PROFESSIONALS SKILLS/SERVICES

PLAN REVIEWER AND INSPECTOR SKILLS/CERTIFICATIONS

Plan Reviewers

- Knowledge of residential design process including load calculations, building materials, and construction techniques
- Understand code provisions at some level
- Understand what is necessary and important for compliance submittal
- Should be ICC certified

Inspectors

- Expertise in the energy code
- Understand what to look for in the field and how to go about looking
- Should be ICC certified

ENERGY PROFESSIONALS SKILLS/SERVICES

PLAN REVIEWER AND INSPECTOR ROLE IN COMPLIANCE

Plan Reviewers

- Plan review
  - Section R103.3

Inspectors

- Inspections now required by code
  - Section R104
- Envelope visual inspection
- Inspections required as part of the ERI compliance path

ENERGY PROFESSIONALS SKILLS/SERVICES

VALUE OF EMPLOYING A PLAN REVIEWER AND INSPECTOR

Plan Reviewers

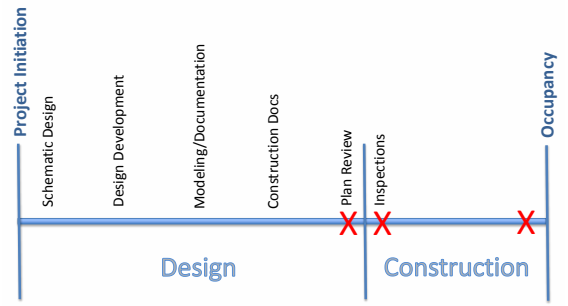
- Take energy code plan review pressure off of the jurisdiction

Inspectors

- Assists the jurisdiction in ensuring that energy code measures are installed per plan and specifications

ENERGY PROFESSIONALS SKILLS/SERVICES

WHEN SHOULD YOU USE A PLAN REVIEWER AND INSPECTOR?



ENERGY PROFESSIONALS SKILLS/SERVICES

SERVICE: HOME ENERGY RATING

The efficiency of a home and corresponding energy rating is based on:

- Equipment and appliances
- Exterior walls, foundation
- Floors
- Ceilings, attics, and roofs
- Windows and doors
- Ventilation, HVAC, and distribution
- Water heating systems
- Whole – house air leakage
- Duct leakage

RESNET's HERS index is the compliant ERI method used in NY and is nationally recognized for inspecting and calculating a home's energy performance.

ENERGY PROFESSIONALS SKILLS/SERVICES

ENERGY RATER SKILLS/CERTIFICATIONS

- RESNET HERS Energy Rater Certification
- RESNET Rating Field Inspector Certification (DET only)
- BPI Rater
- ICC IECC Residential Energy Inspector/Plan Examiner certification – *recommended*

ENERGY PROFESSIONALS SKILLS/SERVICES

ENERGY RATER SKILLS/CERTIFICATIONS

Skill set should include:

- ✓ Building science
- ✓ Insulation and window efficiencies
- ✓ DET Procedures and verification
- ✓ HVAC types and efficiencies
- ✓ Lighting systems
- ✓ Site inspection
- ✓ Knowledge of local/state incentives, EEMS

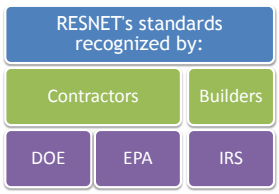
ENERGY PROFESSIONALS SKILLS/SERVICES

CERTIFICATION SPOTLIGHT

Certified RESNET HERS Rater

RESIDENTIAL ENERGY SERVICES NETWORK (RESNET)

- RESNET is a recognized national standards-making body for building energy efficiency rating and certification systems in the U.S. involving:
  - A consensus based standard development and amendment process
  - Transparent review and adoption process
  - Formal public review and comment process



ENERGY PROFESSIONALS SKILLS/SERVICES

HOW TO BECOME A RESNET HERS RATER

- Complete comprehensive RESNET HERS training course
- Perform two ratings, including software operations, in the presence of trainers
- Pass the RESNET National Raters Exam
- Join a RESNET Rating Provider to be mentored through three probationary ratings
- Ongoing quality assurance

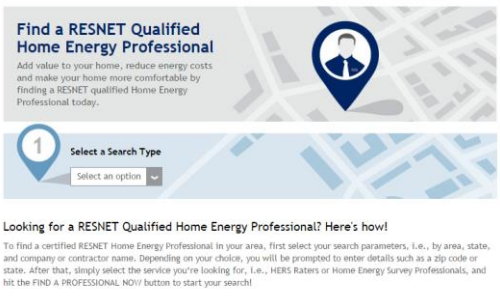
ENERGY PROFESSIONALS SKILLS/SERVICES

WHAT DO YOU GET WHEN YOU USE A RESNET ENERGY RATER?

ENERGY PROFESSIONALS SKILLS/SERVICES

HOW TO FIND A RESNET HERS RATER

www.resnet.us/directory/search



ENERGY PROFESSIONALS SKILLS/SERVICES

ENERGY RATER ROLE IN COMPLIANCE

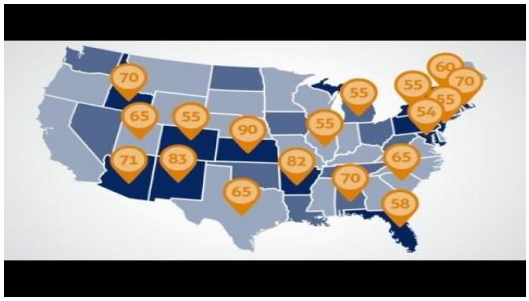
Compliance with ERI = Compliance with the ECCCNYS

The process includes:

- Plan review and initial rating
- Review for code compliance
- Inspections and testing
- Final energy rating and code compliance

ENERGY PROFESSIONALS SKILLS/SERVICES

HERS INDEX – THE NATURAL ENERGY CODE COMPLIANCE OPTION - VIDEO



Source: RESNET

ENERGY PROFESSIONALS SKILLS/SERVICES

VALUE OF EMPLOYING ENERGY RATERS

Builder	Code Official	Jurisdiction	Consumer
• Lower first costs • Building innovation • Increased design flexibility	• Reduction in enforcement time • Quality assurance • Building performance	• National Standard • Improved Review and Approval Process Time	• Utility Bill Savings • Resale Value • Comparison Shopping for Beyond Code homes

ENERGY PROFESSIONALS SKILLS/SERVICES

WHAT IS THE COST OF AN ENERGY RATING?

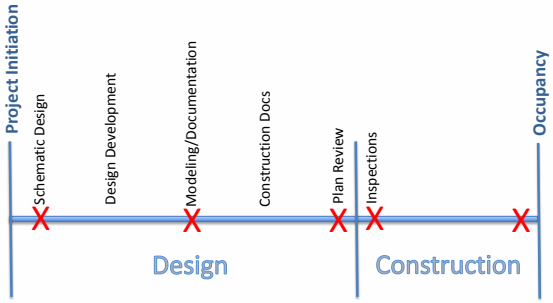
- Cost data collection
  - Contractor met with 19 raters from NY
- Parameters for cost
  - Consult with builder to prepare compliance documentation
  - Prepare plan submittal documentation that demonstrates how the project will meet the ERI score
  - Provide consulting services during the construction of the house that includes two site visits
  - Preparing documentation to demonstrate that the house complies with the ERI value
    - ❑$500 and up for simple ERI; price increases for large homes and full HERS rating

ENERGY PROFESSIONALS SKILLS/SERVICES

WHAT IS THE COST OF AN ENERGY RATING?

ENERGY PROFESSIONALS SKILLS/SERVICES

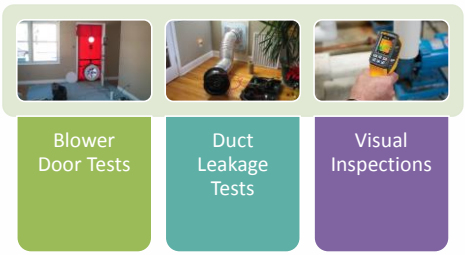
WHEN SHOULD YOU USE AN ENERGY RATER?



ENERGY PROFESSIONALS SKILLS/SERVICES

SERVICE: DUCT AND ENVELOPE TIGHTNESS VERIFICATION

DET Verifiers test for duct and envelope tightness



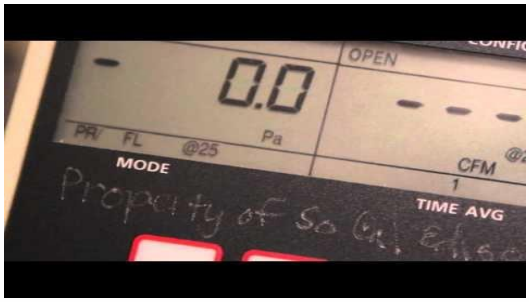
ENERGY PROFESSIONALS SKILLS/SERVICES

BLOWER DOOR TESTING – VIDEO

Source: Fine Homebuilding

ENERGY PROFESSIONALS SKILLS/SERVICES

USING A DUCT BLASTER – VIDEO



Source: SoCal Edison

ENERGY PROFESSIONALS SKILLS/SERVICES

DET VERIFIER SKILLS/CERTIFICATIONS

Recommended qualifications for an approved provider:

- Certified RESNET HERS Rater
- Certified BPI Building Analyst (BA), Envelope (ENV), or Infiltration & Duct Leakage (IDL) Professional
- Other nationally recognized certification or designation approved by NY-DOS

RESNET RESIDENTIAL ENERGY SERVICES NETWORK · BPI · ENERGY STAR · Southface

ENERGY PROFESSIONALS SKILLS/SERVICES

CERTIFICATION SPOTLIGHT

Certified BPI Building Analyst Professional

BUILDING PERFORMANCE INSTITUTE

- National standards development organization for residential energy efficiency and weatherization retrofit work
- Standards developed using consensus-based methodology
- Accredited by ANSI
- BPI develops:
  - professional certifications for individuals
  - companywide credentials for BPI GoldStar Contractors
  - home energy rating systems
  - quality assurance services
- Vital connection between contractors, technicians, training organizations, and programs

Certifications include:
- Building Analyst
- Envelope Professional
- Infiltration and Duct Leakage
- Energy Auditor
- Rater
- Multifamily Building Analyst
- Many others

ENERGY PROFESSIONALS SKILLS/SERVICES

CERTIFIED BPI BUILDING ANALYST PROFESSIONAL

BPI Building Analysts:
- Evaluate the energy efficiency, health, and safety of a home
- Use diagnostic equipment to identify areas for energy savings
- Use modeling software to produce an audit report
- Develop a prioritized scope of work for customers

ENERGY PROFESSIONALS SKILLS/SERVICES

HOW TO BECOME A BPI BUILDING ANALYST

Building Analyst exams verify:
- Knowledge of fundamentals of building science
- Skills and abilities to conduct comprehensive building performance audits, including DET
- Ability to assess whole-building ventilation, measure airflow
- Combustion safety testing (CAZ)
- Data collection
- Professional ethics, conduct & communications

ENERGY PROFESSIONALS SKILLS/SERVICES

HOW TO FIND A BPI BUILDING ANALYST

www.bpi.org/individual_locator.aspx

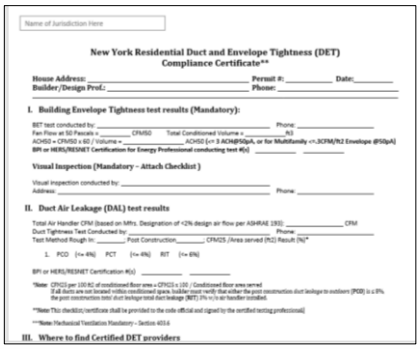
ENERGY PROFESSIONALS SKILLS/SERVICES

DET VERIFICATION IN CODE COMPLIANCE

- Ensure all buildings meet energy code requirements for maximum allowable air leakage rates
  - Building envelope
  - Duct systems that run in unconditioned space or external to building

ENERGY PROFESSIONALS SKILLS/SERVICES

DET COMPLIANCE CERTIFICATE (SAMPLE)



Name of Jurisdiction Here

New York Residential Duct and Envelope Tightness (DET) Compliance Certificate**

House Address: _____ Permit #: _____ Date: _____
Builder/Design Prof.: _____ Phone: _____

I. Building Envelope Tightness test results (Mandatory):

DET test conducted by: _____ Phone: _____
Fan Flow at 50 Pascals = _____ CFM50 Total Conditioned Volume = _____ ft3
ACH50 = CFM50 x 60 / Volume = _____ ACH50 (<= 3 ACH@50pA, or for Multifamily <=.3CFM/ft2 Envelope @50pA)
BPI or HERS/RESNET Certification for Energy Professional conducting test #(s) _____ _____

Visual Inspection (Mandatory - Attach Checklist)

Visual inspection conducted by: _____
Address: _____ Phone: _____

II. Duct Air Leakage (DAL) test results

Total Air Handler CFM (based on Mfrs. Designation of <2% design air flow per ASHRAE 193): _____ CFM
Duct Tightness Test Conducted by: _____ Phone: _____
Test Method Rough In: _____ Post Construction _____ CFM25 /Area served (ft2) Result (%)*

L PCO (<= 4%) PCT (<= 4%) RIT (<= 6%)

BPI or HERS/RESNET Certification #(s) _____

*Note: CFM25 per LEO #2 of conditioned floor area = CFM25 x 100 / Conditioned floor area served
If all ducts are not located within conditioned space, builder must verify that either the post construction duct leakage to outdoors (PCO) is ≤ 8%, the post construction total duct leakage test (RIT) 3% or less air handler installed.

**Note: This checklist/certificate shall be provided to the code official and signed by the certified testing professional.

***Note: Mechanical Ventilation Mandatory - Section 403.6

III. Where to find Certified DET providers

ENERGY PROFESSIONALS SKILLS/SERVICES

VALUE OF EMPLOYING DET VERIFIERS

- Improve accuracy of load calculation for builders
- Reduce HVAC loads of the home
- Help builders meet air leakage requirements
- Educate industry professionals on ventilation strategies
- Document airtightness levels for home labeling programs, such as HERS and ENERGY STAR
- Quantify a home's air tightness to prospective buyers
- Improve and assure overall home performance

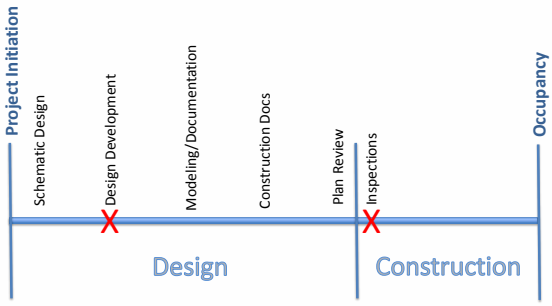
ENERGY PROFESSIONALS SKILLS/SERVICES

WHAT IS THE COST OF DET VERIFICATION?

- Cost data collection
  - Contractor met with 19 raters from NY
- Parameters for cost
  - Perform post-construction duct leakage test
  - Provide documentation
    - ❑Blower door test: $250
    - ❑Duct blaster test: $250
    - ❑When performed together: $350 - $400
  - Perform a follow-up duct blaster test
    - ❑Duct blaster test: $250

ENERGY PROFESSIONALS SKILLS/SERVICES

WHEN SHOULD YOU USE A DET VERIFIER?



ENERGY PROFESSIONALS SKILLS/SERVICES

SERVICE: COMPLIANCE DOCUMENTATION

Documentation authors

- Provide proper documentation to code official.
- Enter design and construction data into fillable forms or checklists to demonstrate compliance.
- Use software-generated reports to demonstrate compliance.

ENERGY PROFESSIONALS SKILLS/SERVICES

DOCUMENTATION AUTHOR SKILLS/CERTIFICATIONS

Documentation authors can be:

- ❑ Design firms that specialize in REScheck
- ❑ Modeling engineers
- ❑ Specification writers
- ❑ Submittal specialists

Technical Knowledge
- Building Science
- Energy Code Requirements

Compliance Tools Proficiency
- REScheck
- REM/Rate & REM/Design
- EnergyGauge

Documentation Expertise
- State & Local Forms/Checklists
- State-Specific Documentation
- Verification Worksheets

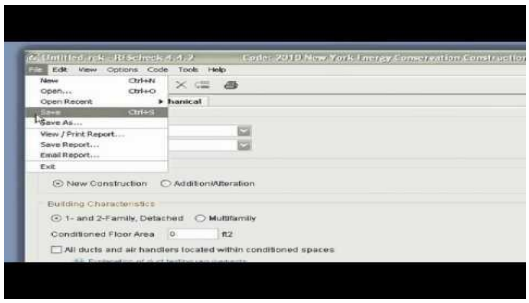
ENERGY PROFESSIONALS SKILLS/SERVICES

DOCUMENTATION AUTHOR ROLE IN COMPLIANCE

- Proper documentation enables code officials to properly perform plan reviews
- Projects that pass plan review are generally compliant if construction follows the details of the plan
- Modifications made during construction are properly accounted for to ensure compliance

ENERGY PROFESSIONALS SKILLS/SERVICES

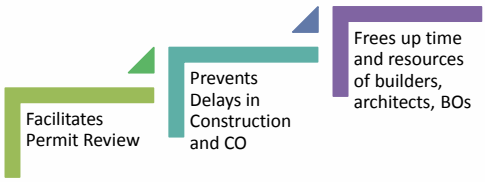
DEMONSTRATING COMPLIANCE USING RESCHECK



Source: deMarne Productions

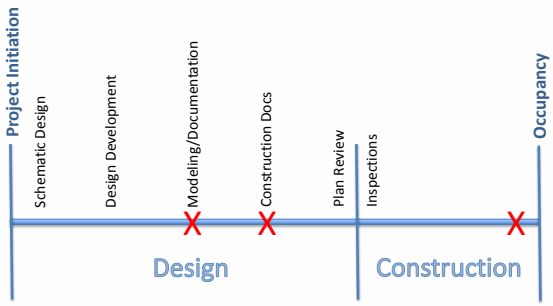
ENERGY PROFESSIONALS SKILLS/SERVICES

VALUE OF EMPLOYING DOCUMENTATION AUTHORS



ENERGY PROFESSIONALS SKILLS/SERVICES

WHEN SHOULD YOU USE A DOCUMENTATION AUTHOR?



ENERGY PROFESSIONALS SKILLS/SERVICES

SUMMARY OF ENERGY PROFESSIONAL AND SPECIAL INSPECTOR BENEFITS

Using third party energy professionals and special inspectors:

- Ensures code requirements are met and energy savings are realized
- Improves review and approval process times
- Reduces time needed to verify compliance
- Lowers operating costs
- Encourages building innovation and increases flexibility in compliance
- Ensures smooth design and construction process (prevents violations, delays, stop-orders, etc.)
- Frees up time and resources of the building official and jurisdiction

ENERGY PROFESSIONALS SKILLS/SERVICES

5 CHAPTER

CASE STUDIES

HOW TO INCORPORATE ENERGY PROFESSIONALS AS PART OF CODE COMPLIANCE

In general, jurisdictions follow one of the following models:

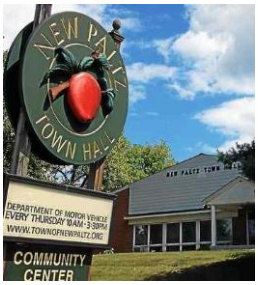
- Jurisdiction makes mandatory and
  - includes in permitting fees
  - provides list of approved/vetted individuals – applicant pays
  - allows choice of compliance path – fee based on path selected and paid for by applicant
  - uses Special Inspector program model – establishes lists of approved specialists.

ENERGY PROFESSIONALS CASE STUDIES

Energy Professionals Required by Code

ENERGY PROFESSIONALS Case Study

TOWN OF NEW PALTZ, HUDSON VALLEY, NEW YORK: ENERGY PROFESSIONALS AND ENFORCEMENT



- Employs local energy professionals – HERS raters and BPI professionals
  - Plan reviews and REScheck reports
  - Full performance code compliance
- Takes plan review and site inspections off CBO plate
- Streamlines and shortens compliance
- MUCH higher quality QAC
- Provides options for builders
- Paid for by homebuilder/owner

ENERGY PROFESSIONALS CASE STUDY

TOWN OF GREENBURGH, HUDSON VALLEY, NEW YORK: ENERGY PROFESSIONALS AND ENFORCEMENT

- Adopted NY ENERGY STAR as residential energy code – Green Building Plan
- Employs local energy professionals – HERS raters
- Requires HERS score of 70 and ventilation, CAZ test – adapting to new E-Star standard currently
  - Ventilation requirements
  - MUCH higher quality QAC
  - Provides options for builders
  - Paid for by Homebuilder/Owner

ENERGY PROFESSIONALS CASE STUDY

TOWN OF BEDFORD, WESTCHESTER COUNTY, NEW YORK: HERS INDEX AS CODE

- Employs local energy professionals – HERS raters
- Adopted HERS 70
  - Requires HERS certification
  - ENERGY STAR ventilation and CAZ test
  - MUCH Higher Quality QAC
  - Paid for by Homebuilder/Owner
- Incentivized with quicker review time
- Looking Forward to ERI as Update

ENERGY PROFESSIONALS CASE STUDY

TOWN OF BABYLON, LONG ISLAND, NEW YORK: HERS INDEX AS CODE

- Chapter 89: Building Construction Article VI: HERS 70 ENERGY STAR Requirements
  - Initially Incentivized by LIPA
  - HERS Ventilation, HVAC sizing, CAZ
  - Paid for HERS Rating Initially
  - Now paid by builder/homeowner
- All major Long Island towns adopted because of initial LIPA incentive
- Supported by LIBI – Builders Association

ENERGY PROFESSIONALS CASE STUDY

CITY OF BOULDER, COLORADO: HERS INDEX AS CODE

City of Boulder, Boulder County and other local governments:

- Require HERS Index target as part of jurisdiction's building code

The City of Boulder - Green Building and Green Points Program

- "Encourages the use of… building methods and technologies that conserve energy, water and other natural resources"
  - Homes must meet a HERS Index score
- Code language found at https://www-static.bouldercolorado.gov/docs/PDS/forms/902_GP%20Guideline%20Booklet.pdf

ENERGY PROFESSIONALS CASE STUDY

BOULDER COUNTY, COLORADO: HERS INDEX AS CODE

- Boulder County maintains list of approved, vetted energy professionals
  - must attend energy code specific training and pass course
  - must receive continuing education credits regularly

ENERGY PROFESSIONALS CASE STUDY

CITY OF BOULDER, COLORADO: ENERGY AUDITS AS CODE

- Energy audits required for additions and remodels
- **Audits must be performed by a BPI certified professional or RESNET HERS rater**
- Proof of energy audit must be provided with building permit application
- Code language found at: https://www-static.bouldercolorado.gov/docs/PDS/forms/902_GP%20Guideline%20Booklet.pdf

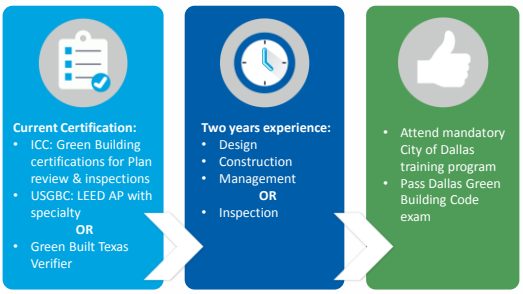
ENERGY PROFESSIONALS CASE STUDY

DALLAS, TEXAS: THIRD PARTY PROVIDER PROGRAM

- Longtime use of 3rd parties throughout TX
- Dallas 3rd parties mandatory in "Green Building Program"
  - Registration as third party provider required
  - Attendance at orientation mandatory
  - Compliance with 2009 IECC must be demonstrated by City of Dallas registered Third Party Energy Provider

ENERGY PROFESSIONALS CASE STUDY

DALLAS, TEXAS: THIRD PARTY PROVIDER PROGRAM



ENERGY PROFESSIONALS CASE STUDY

DALLAS, TEXAS: THIRD PARTY PROVIDER PROGRAM

- Example of third party directory

LIST OF GREEN BUILDING PROVIDERS - PHASE 2

Contractor	Green Provider	Phone	Email	Type License
ACE COMPANIES	DELUCK, CHERIE	(972) 647-8376	acecompanies4dallas@gmail.com	Commercial and Residential
ALERT RESIDENTIAL INSP	HACKNEY, JERRY D	(817) 808-0274	alertinspection@hotmail.com	Commercial and Residential
ALIAS ARCHITECTS	ALALI, BAN	(214) 500-1373	BALALI@ALIASARCH.COM	Commercial and Residential
AOS ENGINEERING	SPARKS, SANDRA	(972)-369-6745	SSPARKS@AOS-ENGINEERING.COM	Commercial and Residential
BLUEGILL ENERGY MANAGEMENT	FARMER, CLAYTON	(281) 802-1224	cfarmer@bluegillenergy.com	Commercial and Residential
BR ARCHITECTS & ENGINEER	RUSSELL, BRADFORD	(972) 235-8308	brad@brarchitects.com	Commercial and Residential
CITY SERVICE LLC	WEBB, JOHN	(972) 937-8260	johnwebb@energysmart.us.com	Commercial and Residential
CONTECTS, LLC	HENDERSON, CHIP	(210) 824-8758	chip@contects.com	Commercial and Residential
ENERGY INSPECTORS TEXAS	MCGHEE, CODY	(469) 441-9795	CMCGHEE@ENERGYINSPECTORS.COM	Commercial and Residential
ENERGY IQ	SENGLIN, CRAIG	(214) 929-7317	CRAIG.SENGLIN@ENERGYIQ-USA.COM	Commercial and Residential
ENQUISTICS CONSULTING	BROWN, LINDA	(214) 208-4618	linda_brown2011@earthlink.net	Commercial and Residential
EVANS SERVICE COMPANY, LLC	EVANS, MILTON K	(972) 351-9302	mkevans@evansservicecompany.com	Commercial and Residential
EWC ARCHITECTURAL SERVICES	CUMMINGS, ELIZABETH	(214) 562-5095	elizabeth@ewc-architect.com	Commercial and Residential
FOX ENERGY SPECIALISTS	LYONS, DONNIE	817-913-9178	dlyons@foxenergyspecialists.com	Commercial and Residential
FOX ENERGY SPECIALISTS	CHAVILA, PATRICIA	(817) 545-0150	PATRICIA@FOXENERGYSPECIALISTS.COM	Commercial and Residential
GREEN ENERGY ASSOCIATES	ATKINSON, RICK	(817) 219-2435	rcatkinson@sbcglobal.net	Commercial and Residential
HUTT-ZOLLARS INC	BROCK, BRIDGETT	214971-1311	bbrock@Hutt-Zollars.com	Commercial and Residential
ID STUDIO 4	TIFREA, MALINA	(972) 870-1288	mtifrea@idstudio4.com	Commercial and Residential
INSPEC SUSTAINABILITY GROUP LLC	CORNETT, ALLEN	972-754-7839	acornett@inspecsonline.com	Commercial and Residential

Special Inspector Model

INTERNATIONAL BUILDING CODE AS MODEL

CHAPTER 17, SPECIAL INSPECTIONS AND TESTS

- Sets minimum quality standards for the acceptance of materials used in building construction
- Establishes requirements for special inspections, structural observations, and load testing
- Identifies duties for:
  - Applicant of record
  - Special inspection agency
  - Permit holder

A special inspector is a person who has been approved by the building official to perform certain types of inspection as detailed in IBC Section 1704.

CHAPTER 17, SPECIAL INSPECTIONS AND TESTS– WHAT ARE SPECIAL INSPECTIONS? VIDEO

Source: Alan Margolin & Associates

IBC SPECIAL INSPECTION CATEGORIES

Special inspection requirements in IBC:

- Inspection of fabricators
- Steel construction
- Concrete construction
- Masonry construction
- Wood construction
- Soils
- Pile foundations
- Pier foundations
- Wood panels and veneers
- Sprayed fire-resistant materials
- Exterior insulation and finish systems
- Special cases
- Smoke control
- Special inspection for seismic resistance and wind requirements

Use this model for ENERGY inspections!

INTERNATIONAL ACCREDITATION SERVICE AND SPECIAL INSPECTION AGENCY ACCREDITATION PROGRAM

- IAS developed accreditation program for agencies providing special inspections
- IAS Special Inspection Agency Accreditation Program based primarily on requirements of the IBC
- Program requires special inspection agencies to operate under a quality management system documented in a manual and requires agency to be assess in the field

IAS ACCREDITATION SERVICE®

IAS accreditation is based on the assessment of a special inspection agency's inspection procedures, the competence of its inspection staff, and its reporting procedures.

IBTS Energy Professional Registry – Coming Soon!

- Independent listing of EOPs and certifications, experience
- EOP must attend NYSERDA/IBTS Training
- Verify active in trade
- Outreach for new EOPs

6 CHAPTER

DISCUSSION WRAP UP

Reflecting on the Course

What is something new you learned?

Which energy professionals will be most valuable to you?

What tools or information would be most valuable moving forward?

RESOURCES AND MORE INFORMATION: MATERIALS

- RESNET
  - ERI Factsheets
    http://www.resnet.us/blog/resnet-publishes-new-series-of-factsheets-on-home-energy-ratings-and-the-2015-international-energy-conservation-code/
  - ERI Presentations
    http://www.resnet.us/professional/main/Hers_index_and_energy_codes
- IMT
  - 2015 IECC Major Changes Factsheet
    http://www.imt.org/uploads/resources/files/IECC_Fact_sheet-2015_residential_changes.pdf
- Model Program for Special Inspection: Based on IBC Chapter 17
  - http://www.fayetteville-ar.gov/DocumentCenter/Home/View/1952

RESOURCES AND MORE INFORMATION: MATERIALS

- Residential provisions of the IECC PowerPoint
  https://www.energycodes.gov/sites/default/files/becu/2015_IECC_residential_requirements.pdf
- NYC Special Inspection and Progress Inspection Requirements Video
  https://www.youtube.com/watch?v=_Q-MAxLs0Do&ebc=ANyPxKo9WnziWxDVCBS7hoOTor1INb9cShJo_oe-YltsOwk0o9DvW5QLNEakh-taRDRWWKkSNLFTfPevetMSfPN8fU3_mUUBWQ
- NYC Special Inspections NYC Video/ Alan Margolin and Assoc.
  https://www.youtube.com/watch?v=xH_ChKXspGU
- Dallas, TX Building Inspection Information
  http://dallascityhall.com/departments/sustainabledevelopment/buildinginspection/pages/Inspections.aspx
- Difference between BPI and RESNET
  http://www.everbluetraining.com/blog/difference-between-bpi-and-resnet

RESOURCES AND MORE INFORMATION: NATIONAL AND INTERNATIONAL ORGANIZATIONS

- ICC/ IECC – www.iccsafe.org
- ASHRAE – www.ashrae.org
- NYSERDA – www.nyserda.ny.gov
- IBTS – www.ibts.org
- Cadmus – www.cadmusgroup.com
- CLEAResult – www.clearesult.com
- K energy – www.kenergy.us
- PSD – www.psdconsulting.com
- RESNET – www.resnet.us
- BPI – www.bpihomeowner.org
- ENERGY STAR – www.energystar.gov
- USGBC/LEED – www.usgbc.org/leed
- ANSI – www.ansi.org
- BECP – www.energycodes.gov
- BCAP – www.bcap-energy.org

RESOURCES AND MORE INFORMATION: FIND AN ENERGY PROFESSIONAL

- RESNET Certified Professionals – www.resnet.us/directory/search
- BPI Certified Professionals – www.bpi.org/individual_locator.aspx
- Home inspectors – www.nachi.org/find-an-inspector
- LEED Certified Professionals – www.usgbc.org/profile
- ENERGY STAR RA or PE – www.energystar.gov/index.cfm?fuseaction=PE_DIRECTORY
- ENERGY STAR New Homes Partner – https://www.energystar.gov/index.cfm?fuseaction=new_homes_partners.locator&s=footer
- NYC Special Inspector Agency – www.nyc.gov/html/dob/html/development/special_insp_overview.shtml
- New York Registered Professional – http://www.op.nysed.gov/opsearches.htm

RESOURCES AND MORE INFORMATION: VIDEOS

- Proper System and Duct Sizing, slide 36
  - Outer Banks Heating & Cooling. "Proper System and Duct Sizing." Online video clip. YouTube. YouTube, 4 February, 2011. Web. 1 February 2016.
- HERS Index Score, slide 46
  - RESNET. "Looking for a Home? Ask for the HERS Index Score." Online video clip. YouTube. YouTube, 9 October, 2015. Web. 1 February 2016.
- Blower Door Testing, slide 56
  - FineHomebuilding.com. "Blower Door Testing." Online video clip. YouTube. YouTube, 7 November, 2013. Web. 3 February 2016.
- How to Use a Duct Blaster, slide 57
  - SoCal Edison. "Southern California Edison's Tool Lending Library presents: How to use a Duct Blaster." Online video clip. YouTube. YouTube, 14 December, 2013. Web. 1 February 2016.

RESOURCES AND MORE INFORMATION: VIDEOS

- HERS Index, slide 78
  - RESNET. "HERS Index – The Natural Energy Code Compliance Choice." Online video clip. YouTube. YouTube, 17 June, 2015. Web. 3 February 2016.
- Energy Audit, slide 87
  - Home Performance. "More than an Energy Audit." Online video clip. YouTube. YouTube, 10 January, 2013. Web. 1 February 2016.
- REScheck, slide 99
  - deMarne Productions. "ResCheck Lesson 1 Part 1." Online video clip. YouTube. YouTube, 7 October, 2013. Web. 15 February 2016.
- Special Inspections, slide 125
  - Alan Margolin & Associates. "What are Special Inspections? AMAA." Online video clip. YouTube. YouTube, 5 January, 2016. Web. 1 March 2016.

SIGN-IN & EVALUATION REQUIREMENTS FOR CEUs

- **ALL** attendees **MUST** sign the PSD/IBTS attendance sheet
- Those requesting DOS CEUs **MUST ALSO** sign-in **and out** of the DOS attendance sheet
- **ALL** attendees **MUST** complete PSD/IBTS post-session evaluation to receive their certificate of completion
- Those requesting DOS CEUs are encouraged to complete the DOS post-session survey

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