



# Compliance Management in BC

## Building Envelope Focus Group

By Dave Ramslie MSc, MCIP RPP LEED AP  
Principal, Integral Group

December 2<sup>nd</sup> 2014

# What is compliance management?

- The process by which submissions are reviewed and approved for building permits.

Objectives of the Study and Working Group:

- What are the issues generally?
- What are the issues as they relate to Building envelope?
- How can they be addressed?
- What could some of the tools be?
- What are some ways that BCBECC, BC Hydro, and others can collaborate to improve code compliance?

# Energy efficiency policy

---

**Baseline**  • ASHRAE 90.1 2004 – BCBC 2008 - LEED NC-1

---

**5%**  • ASHRAE 90.1 2007 – VBBL 2008 - LEED 2009

---

**10-15%**  • ASHRAE 90.1 2010 – BC/Vancouver 2013

---

# Application of the Standards

- BC Hydro Study on Code Compliance in BC for residential buildings

Weather Region	Sample Size	Number Compliant	Share Compliant
Lower Mainland	69	63	91%
Southern Interior	41	14	34%
Vancouver Island	49	28	57%
North	28	13	46%
<b>Total</b>	<b>187</b>	<b>118</b>	<b>63%</b>

- No imperial study research on Part 3 construction, but estimates based on a RDH/Integral indicate rates they are lower.

# Is it just us?

- US DOE Study in 2005 of Code Compliance in 10 states:

Residential energy code compliance in 10 states, Yang, 2005

State	Baseline construction year	Sample Size	Compliance
AR	1997	100	55%
CA	1999/2000	758	70%
ID	1998	104	52%
LA	2000	73	65%
MA	1999	186	46%
MT	1998	61	87%
NY	2003	76	0%
OR	1998	44	100%
VT	2002	158	38%
WA	1998	157	94%

# Current Practice

## ASHRAE 90.1-2010

*Energy Standard for Buildings Except  
Low-Rise Residential Buildings*

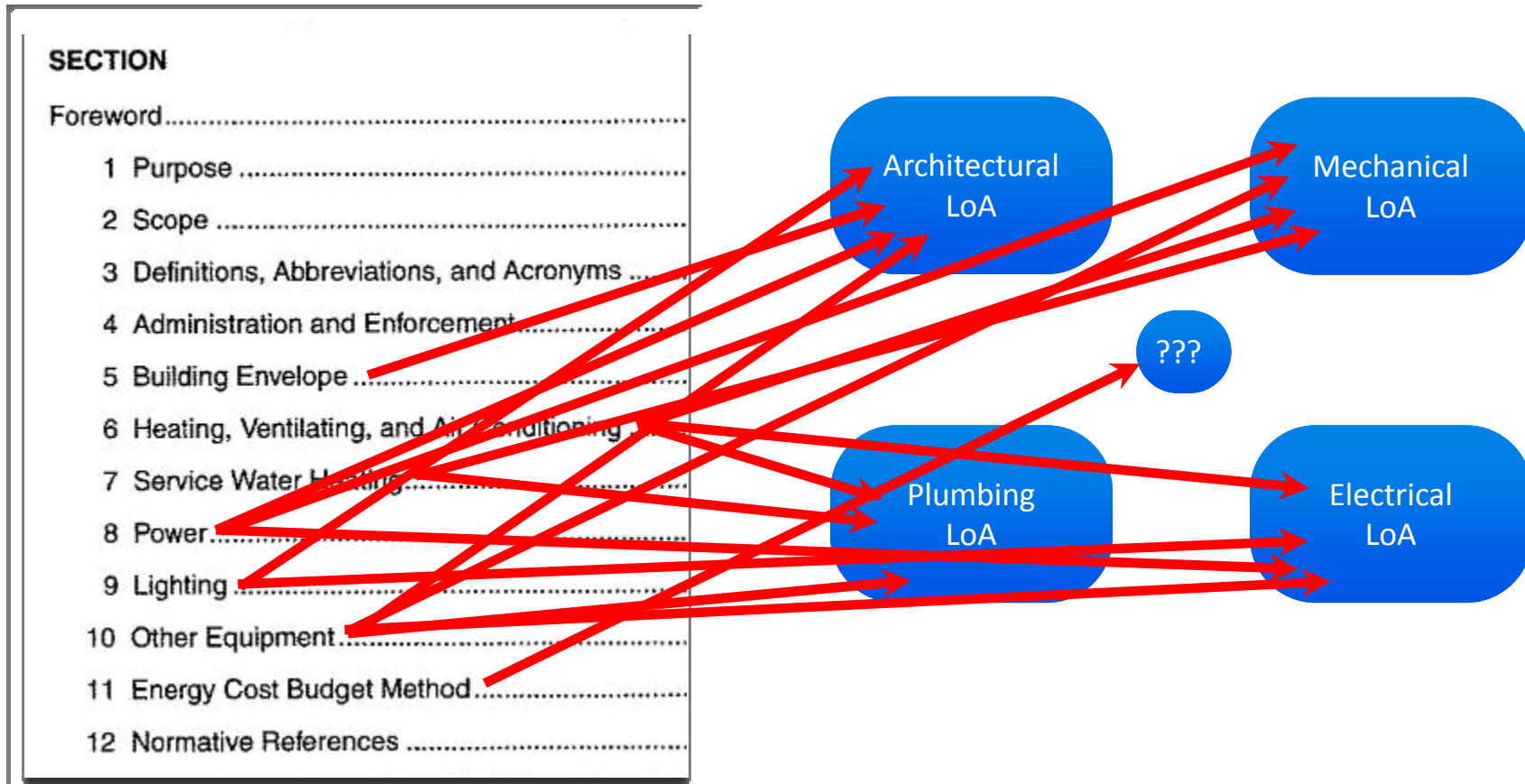
CONTENTS	
ANSI/ASHRAE/IES Standard 90.1-2010 Energy Standard for Buildings Except Low-Rise Residential Buildings (I-P Edition)	
SECTION	PAGE
Foreword.....	4
1 Purpose.....	4
2 Scope.....	4
3 Definitions, Abbreviations, and Acronyms.....	5
4 Administration and Enforcement.....	21
5 Building Envelope.....	23
6 Heating, Ventilating, and Air Conditioning.....	38
7 Service Water Heating.....	70
8 Power.....	73
9 Lighting.....	75
10 Other Equipment.....	86
11 Energy Cost Budget Method.....	90
12 Normative References.....	99
Normative Appendix A: Rated R-Value of Insulation and Assembly U-Factor, C-Factor, and F-Factor Determinations.....	103
Normative Appendix B: Building Envelope Climate Criteria.....	134
Normative Appendix C: Methodology for Building Envelope Trade-Off Option in Subsection 5.6.....	145
Normative Appendix D: Climatic Data.....	151
Informative Appendix E: Informative References.....	199
Informative Appendix F: Addenda Description Information.....	201
Informative Appendix G: Performance Rating Method.....	209

**NOTE**

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE Web site at [www.ashrae.org/technology](http://www.ashrae.org/technology).

© Copyright 2010 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.  
1791 Tullie Circle NE  
Atlanta, GA 30329  
[www.ashrae.org](http://www.ashrae.org)  
All rights reserved.

# Delegation of Responsibility





# TEAMWORK

THE SATISFACTION OF HAVING OTHERS TO BLAME



# City of Vancouver

- Show your home work
- Hire technical staff
- Support with customer service
- Go digital

ASHRAE 90.1 2010 Documentation Submission Checklist (for final TL or N/C of Part 3, Part 9 Non-Res)				
Project Address: Specific Address:		Building Permit Application No.:		
<b>This form is to be completed digitally. For ease of use, drop boxes and pop-up instructions are included.</b>				
<b>VBEL Requirement for ASHRAE 90.1 - 2010 Compliance</b>				
In accordance with the City of Vancouver Building By-Law 2014, Division B - Part 10, Section 10.2.1.1. Design: *) Except as provided in Sentence (2) or (4) and Subsections 10.2.2. and 10.2.3., all buildings shall be designed and constructed to conform to ASHRAE 90.1-2010, "Energy Standard for Buildings Except Low-Rise Residential Buildings," and, the following deliverables are required for submission to the CoV for Building Permit:				
<b>Building Use, Area &amp; Performance Information</b>		Development: Indicate all that apply: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Primary Use & Area:		Building Envelope Area (m <sup>2</sup> ):		
Secondary Use & Area:		Vertical Forestration Area Ratio (%):		
Tertiary Use & Area:		Skylight Roof Area Ratio (%):		
Additional Use & Area:		Non-residential Conditioned Space Area (m <sup>2</sup> ):		
Additional Use & Area:		Residential Conditioned Space Area (m <sup>2</sup> ):		
Total Area (m <sup>2</sup> ):		Semiheated Space Area (m <sup>2</sup> ):		
Overall Effective R-value (entire BE) <input type="checkbox"/> (Opaque) <input type="checkbox"/> Combined: <input type="checkbox"/> Non-Flex: <input type="checkbox"/> Res: <input type="checkbox"/> Semiheated: <input type="checkbox"/>				
<b>Building Energy (Reasoning Conditions (RUR/LEED) Renewable / High Performance Energy Systems, District Energy Systems)</b>				
LEED year:		LEED targets:		
Energy reduction: achieved: <input type="checkbox"/>		Energy reduction: achieved: <input type="checkbox"/>		
<b>Renewable / High Performance Energy Systems</b>				
- Renewable Energy systems: <input type="checkbox"/>				
- High Performance Energy systems: <input type="checkbox"/>				
<b>District Energy</b> If Development is within a DE zone, indicate which zone: <input type="checkbox"/> NA		Does the Development require connectivity to a District Energy system, either now or in the future? <input type="checkbox"/> NA		
<b>ASHRAE 90.1 - 2010 Compliance Path Options</b>				
When envelope work is part of scope of work, check and complete <u>one</u> of the following Section 5 Options; Prescriptive Building Envelope, Building Envelope Trade-Off, or Energy Cost Budget Method (ECB). Indicate all additional Options / Methods used.				
Sect 5: <input type="checkbox"/> Prescriptive Building Envelope		Sect 6 - HVAC (Check and Submit One Method only)		
<input type="checkbox"/> Building Envelope Trade-Off		<input type="checkbox"/> HVAC Simplified Approach Option		
<input type="checkbox"/> COMcheck Modeling Software		<input type="checkbox"/> Mandatory Provisions &/or Prescriptive Req'ts		
<input type="checkbox"/> EPF Calculation		Sect 9 - Lighting (Check and Submit One Method only)		
<input type="checkbox"/> Energy Cost Budget Method (ECB)		<input type="checkbox"/> Lighting: Building Area Method		
ECB Software: <input type="text"/>		<input type="checkbox"/> Lighting: Space-By-Space Method		
<b>ASHRAE 90.1 - 2010 Sections - Applicability &amp; Responsible Party</b> Is there a CP on this project? <input type="checkbox"/>				
For the following: 1) List the responsible party for each ASHRAE 90.1 Section, by company name and profession. 2) If an ASHRAE Section is not applicable, indicate N/A and have the responsible party provide a letter of explanation. (Letter of Explanation not required for Power, Other Equipment, COMcheck or ECB Modelings, or Building Performance Data)				
Examples:	<input checked="" type="checkbox"/> Building Envelope	ASCO Arch Ltd - Architect	Letter of Explanation	N/A
	<input checked="" type="checkbox"/> HVAC	STG Eng Ltd - Mech Engineer	Letter of Explanation	Yes
	<input type="checkbox"/> Sect 5) Building Envelope		Letter of Explanation	
	<input type="checkbox"/> Sect 6) HVAC		Letter of Explanation	
	<input type="checkbox"/> Sect 7) Service Water Heating		Letter of Explanation	
	<input type="checkbox"/> Sect 8) Power		Letter of Explanation	N/A
	<input type="checkbox"/> Sect 9) Lighting		Letter of Explanation	
	<input type="checkbox"/> Sect 10) Other Equipment		Letter of Explanation	N/A
	<input type="checkbox"/> Envelope Modeling (COMcheck)		Total Number of	
	<input type="checkbox"/> Building Modeling (ECB only)		Letters Submitted	
	<input type="checkbox"/> Building Performance Data (nonECB)			

<http://vancouver.ca/home-property-developers/application-forms-and-checklists.aspx>

DOC/2012/110302

Version: 12/001-1

# City of North Vancouver

## Energy Efficiency Design Verification

### Design Verification Documents

for Buildings designed to meet ASHRAE 90.1-2010 (DRAFT)

### Cover Sheet

#### Instructions:

Applicable to Building Permits applied for on or after December 20, 2013.

Projects subject to the requirements of Part 10 of the BC Building Code and are seeking to comply with ASHRAE 90.1-2010 must complete and submit:

- Project details cover page (this page).
- Design Verification Report for ASHRAE 90.1-2010, accompanied with
- Separate Design Verification Letters for Sections 6, 7, and 9 of ASHRAE 90.1-2010.

The Design Verification Report must be completed by the Coordinating Registered Professional or Registered Professional of Record and must be submitted with the applicable Design Verification Letters to the Authority having jurisdiction prior to the issuance of a Building Permit.

#### Project Details

Building Permit #: \_\_\_\_\_  
 Building Address: \_\_\_\_\_  
 \_\_\_\_\_

Document: 1071T07-v1

## Energy Efficiency Design Verification

### Overall Design Verification Report

for Buildings designed to meet ASHRAE 90.1-2010 (DRAFT)

To: Chief Building Official, \_\_\_\_\_  
(Authority Having Jurisdiction)

The undersigned have coordinated the design of the above-mentioned project to substantially comply with the requirements within ASHRAE 90.1-2010 - Energy Standard for Buildings Except Low-Rise Residential Buildings, as required by Part 10 of the BC Building Code.

The following compliance pathways were utilized for each Section of ASHRAE 90.1-2010, and where applicable, the responsible professionals for the sections are indicated and the design verification letters (template provided) are attached:

Section	Compliance Pathway Utilized (please check)	Responsible Party	Section-Specific Design Verification Report Attached? (Please check)
6 - Building Envelope	<input checked="" type="checkbox"/> Prescriptive <input type="checkbox"/> Building Envelope Trade-Off		<input checked="" type="checkbox"/>
8 - HVAC	<input checked="" type="checkbox"/> Simplified Approach <input type="checkbox"/> Mandatory + Prescriptive		<input checked="" type="checkbox"/>
7 - Service Water	<input checked="" type="checkbox"/> Prescriptive		<input checked="" type="checkbox"/>
8 - Power			Not Applicable
9 - Lighting	<input checked="" type="checkbox"/> Building Area Method <input type="checkbox"/> Space by Space Method		<input checked="" type="checkbox"/>
10 - Other Equipment			Not Applicable
OR			
11 - Energy Cost Budget Method	<input type="checkbox"/> Energy Cost Budget		Not Applicable

Name: \_\_\_\_\_ (please print)  
 Signature: \_\_\_\_\_  
 Date Signed: \_\_\_\_\_ (affix professional seal)  
 Firm Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Phone: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Document: 1071T07-v1

# Goals for Provincial Compliance Program

- Will improve compliance
- Will improve energy literacy
- Can be supported by stakeholders
  - APEG BC
  - AIBC
  - BOABC
  - UDI
- Will generate useful data to improve policy



# Gap Analysis:

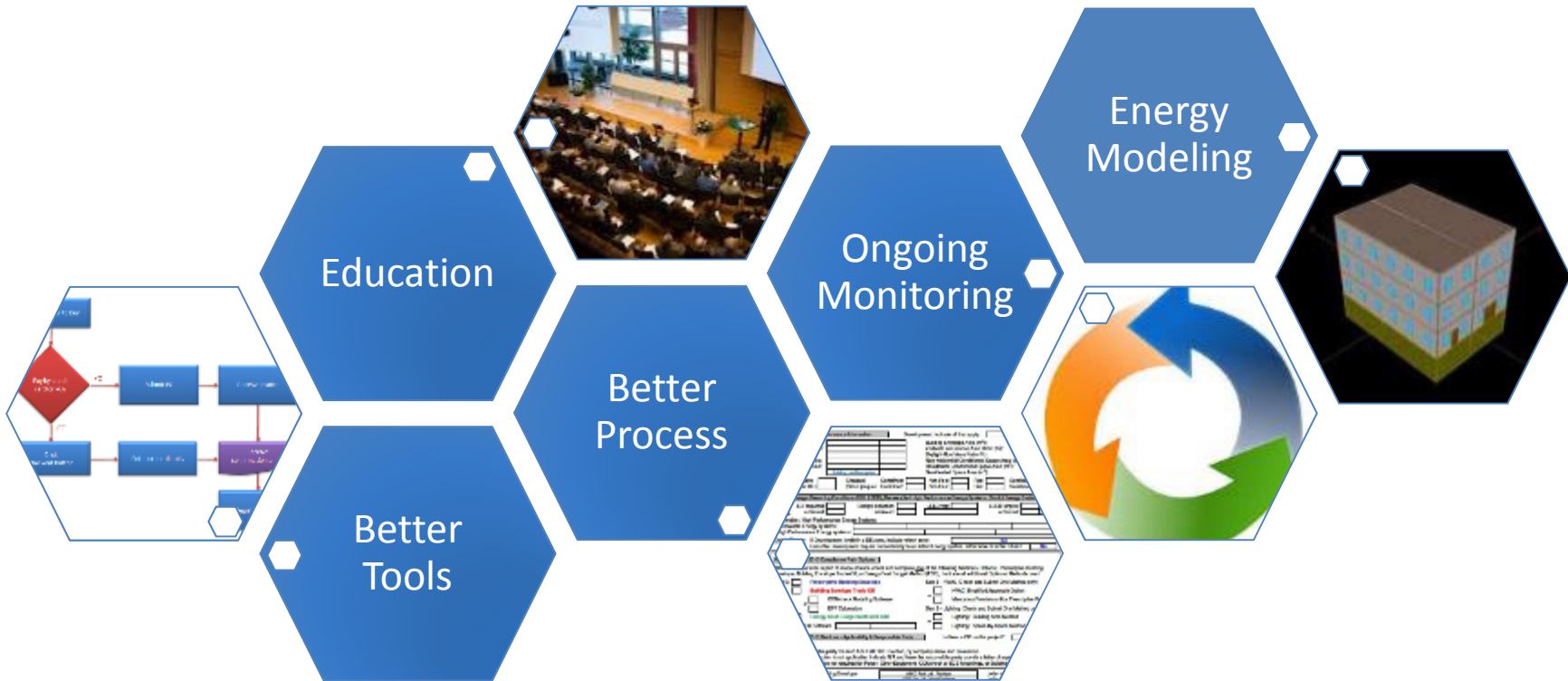
- Interviews with:
  - 28 Local Governments
  - Professional Associations
  - Industry professionals

## Feedback:

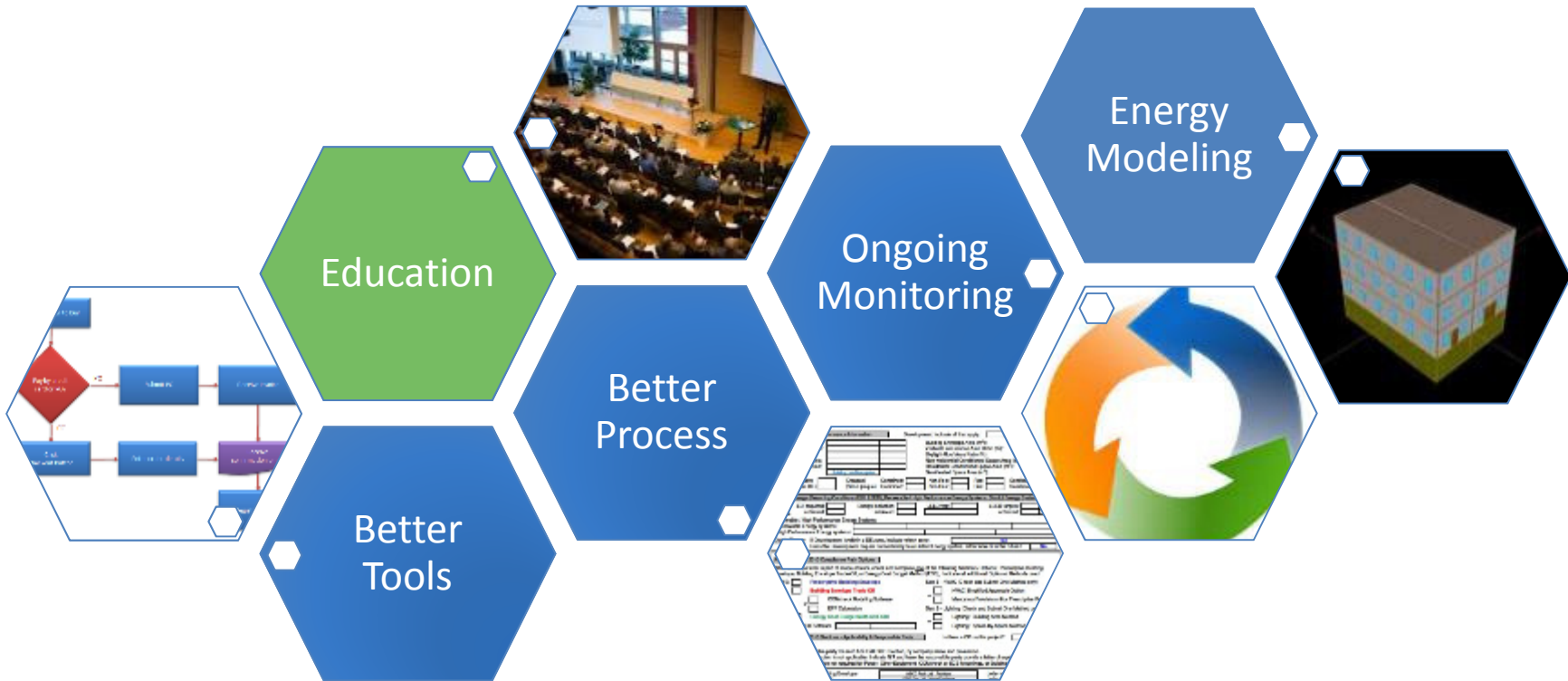
- Simple to submit & review
  - Technician level of expertise (review)
  - Does not add to staff burden
  - Does not increase liability (for Local Government)
- Compels design team coordination
- Increased capacity is required



# Compliance Management is Comprehensive



# Compliance Management is Comprehensive



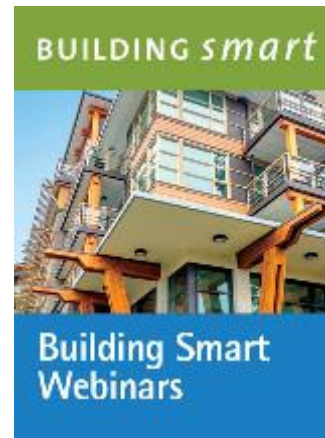
# Education

<http://www.hpo.bc.ca/building-smart-seminars#webinars>



# Education

- General Overview/  
Compliance
- Building Envelope  
Requirements
- HVAC and Service Water  
Heating
- Lighting and Electrical
- Energy Modelling



## BC Building Code - Energy Modelling - June 13, 2014

Energy Modellers will soon be using new standards to demonstrate energy efficiency compliance with the upcoming BCBC and VBBL. This webinar provides an overview of those requirements for both ASHRAE 90.1 2010 and the National Energy Code for Buildings (NECB) 2011.



Christian Cianfrone  
M.A.Sc., P.Eng., LEED AP - Morrison Hershfield

## BC Building Code - Overview and Compliance - June 18, 2014

Focussed on the new BC Building Code, with a section on the unique requirements of the VBBL, this presentation examines the new energy efficiency requirements in the code and orients professionals with the proposed new model compliance process in BC.



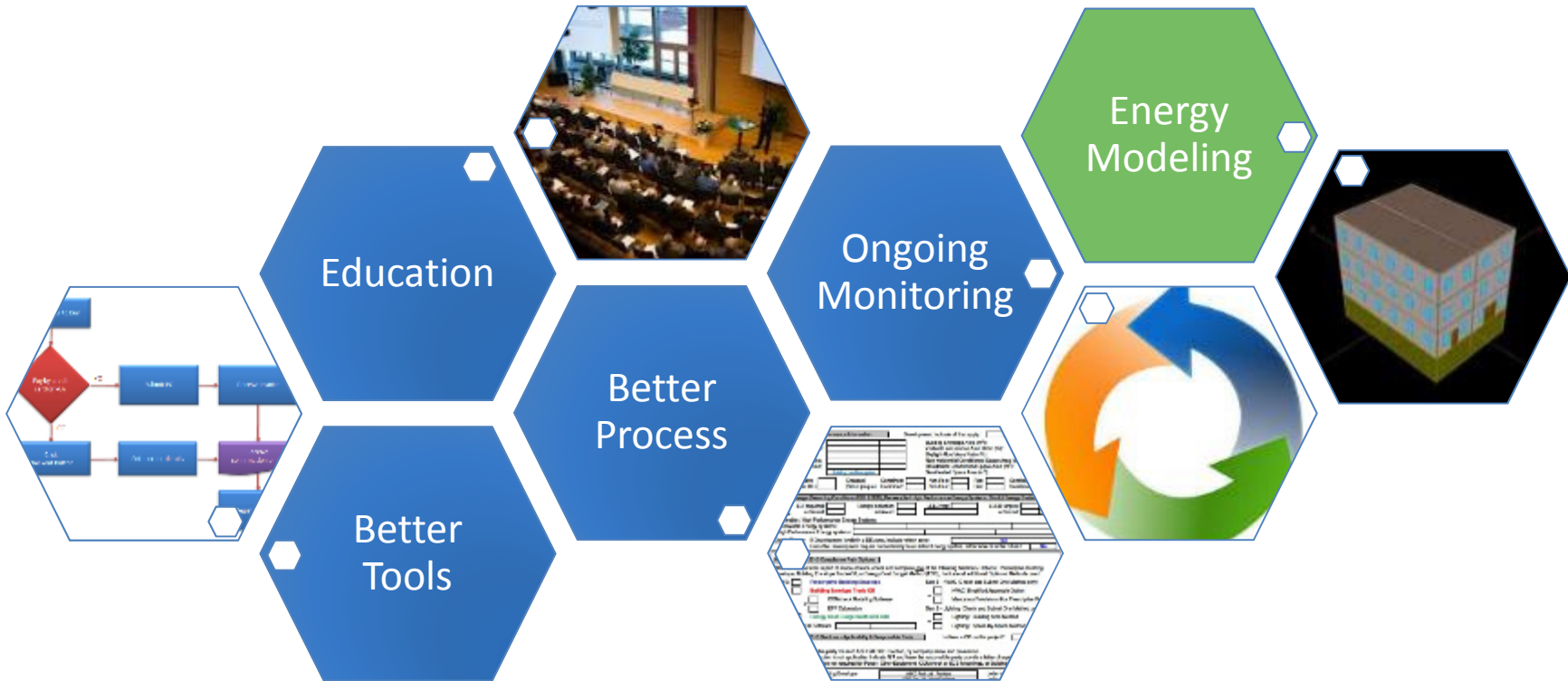
Tim Ryce  
P.Eng., LEED AP  
Assistant Manager, Permits & Inspections, City of North  
Vancouver



Greg McCall  
P.Eng., LEED AP  
Energy Policy Specialist, City of Vancouver



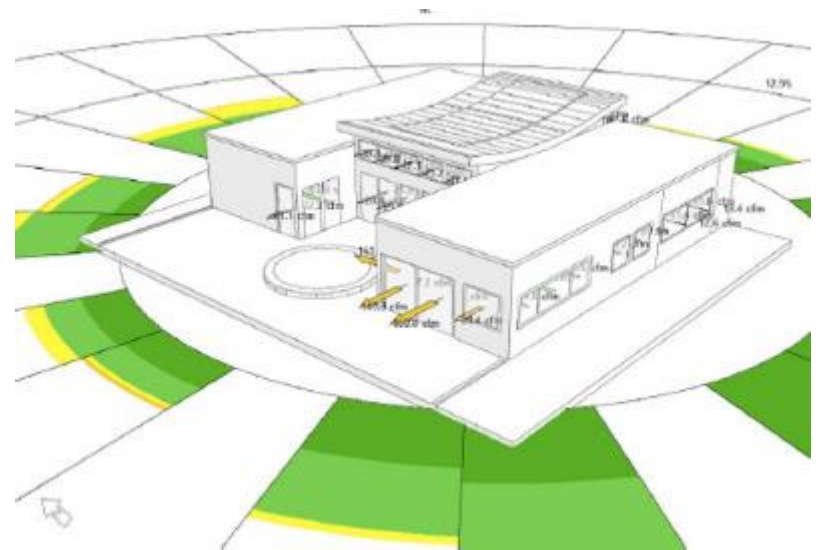
# Compliance Management is Comprehensive



# PPG for Energy Modeling Services

Led by APEGBC:

- Generally define scope of “professional’ energy modelling services.
- Who is generally qualified to do it
- How this work will be done
- How compliance will be demonstrated
- Intended to be adopted by AIBC



# Pilots Projects on Improving Compliance

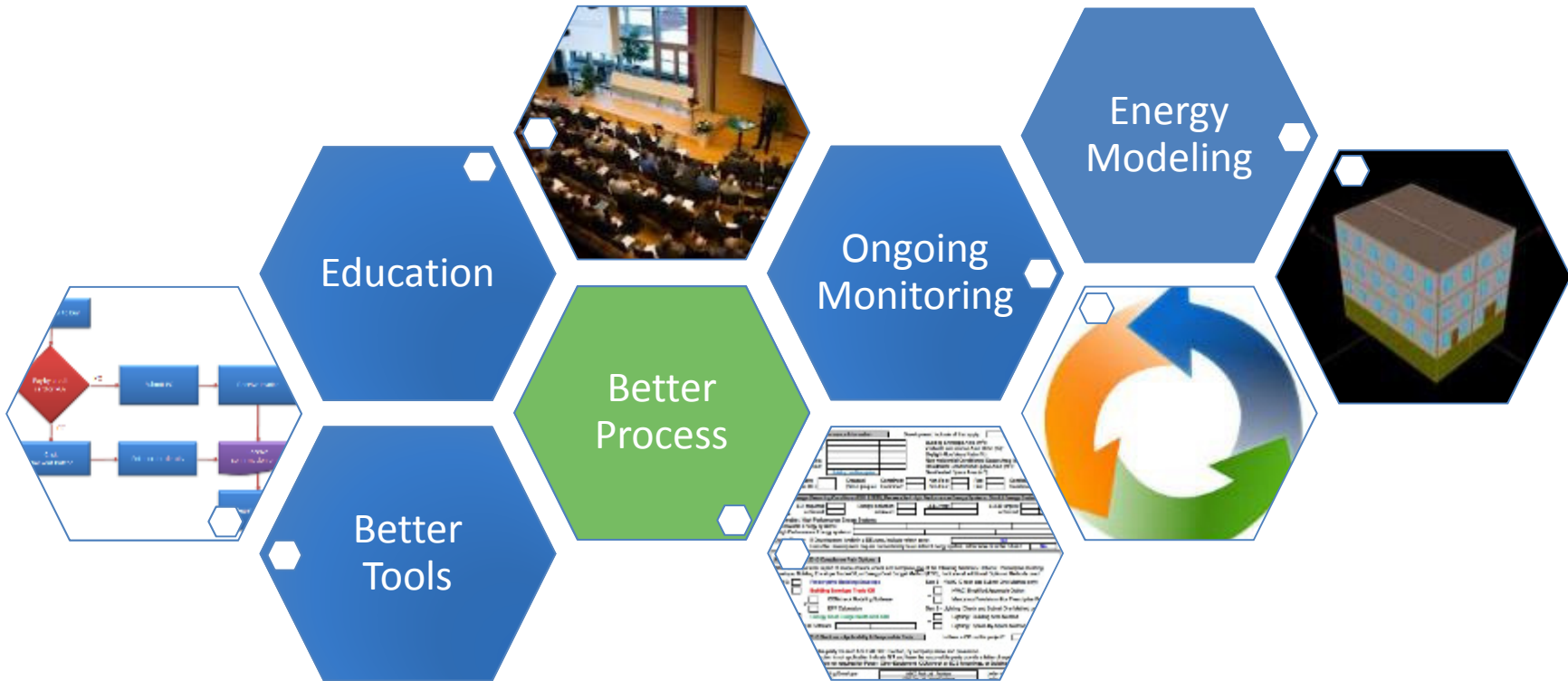
- Showing compliance information on drawings
- Ongoing development of civic check lists.
- Investigating new administrative requirements in the next version of the BCBC



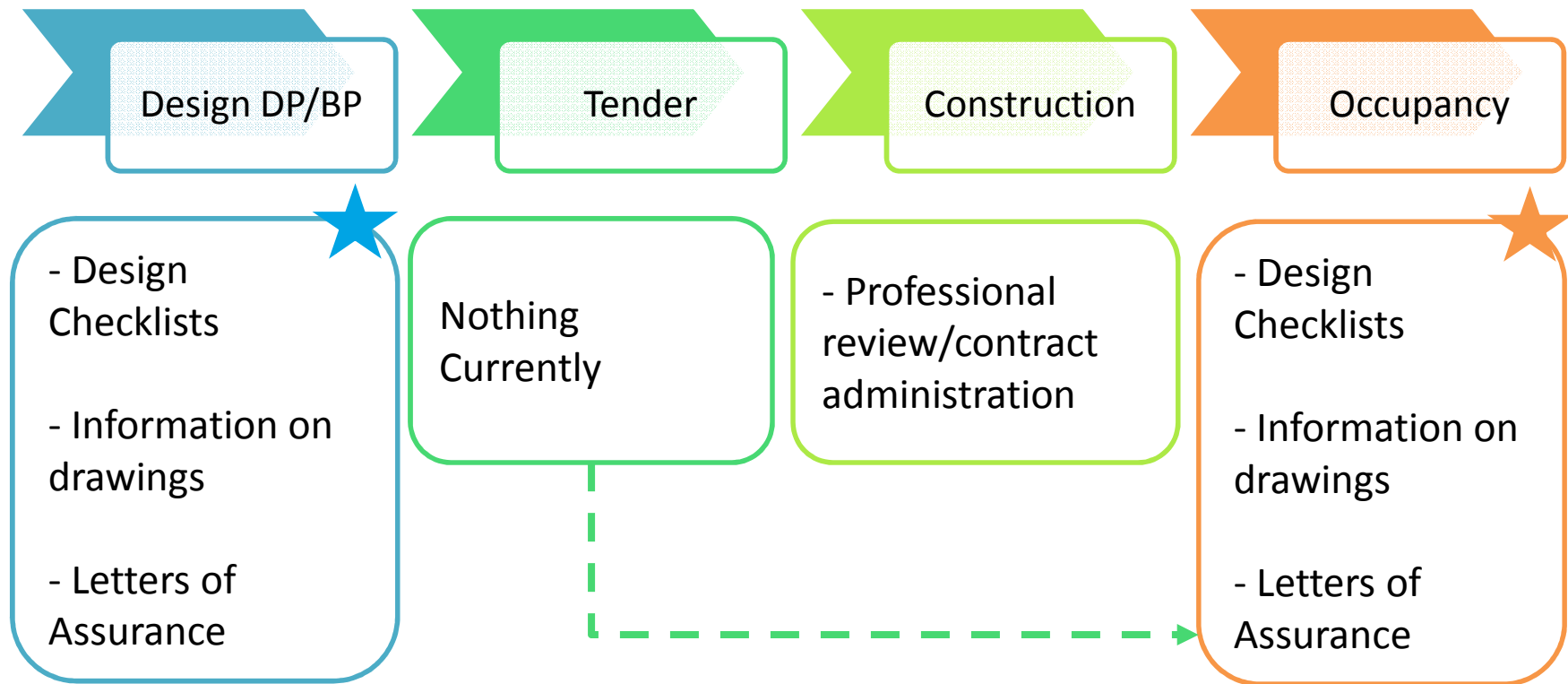
# Compliance Management is Comprehensive



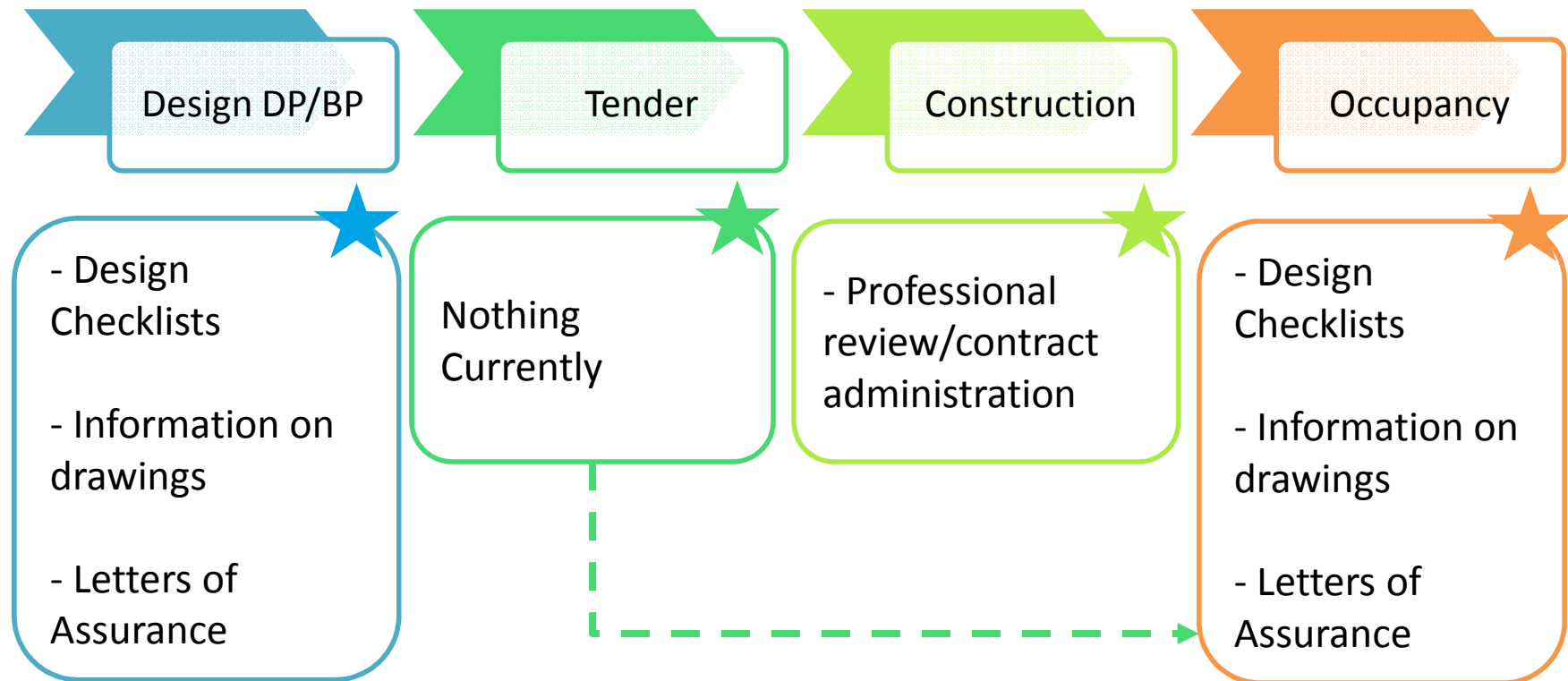
# Compliance Management is Comprehensive



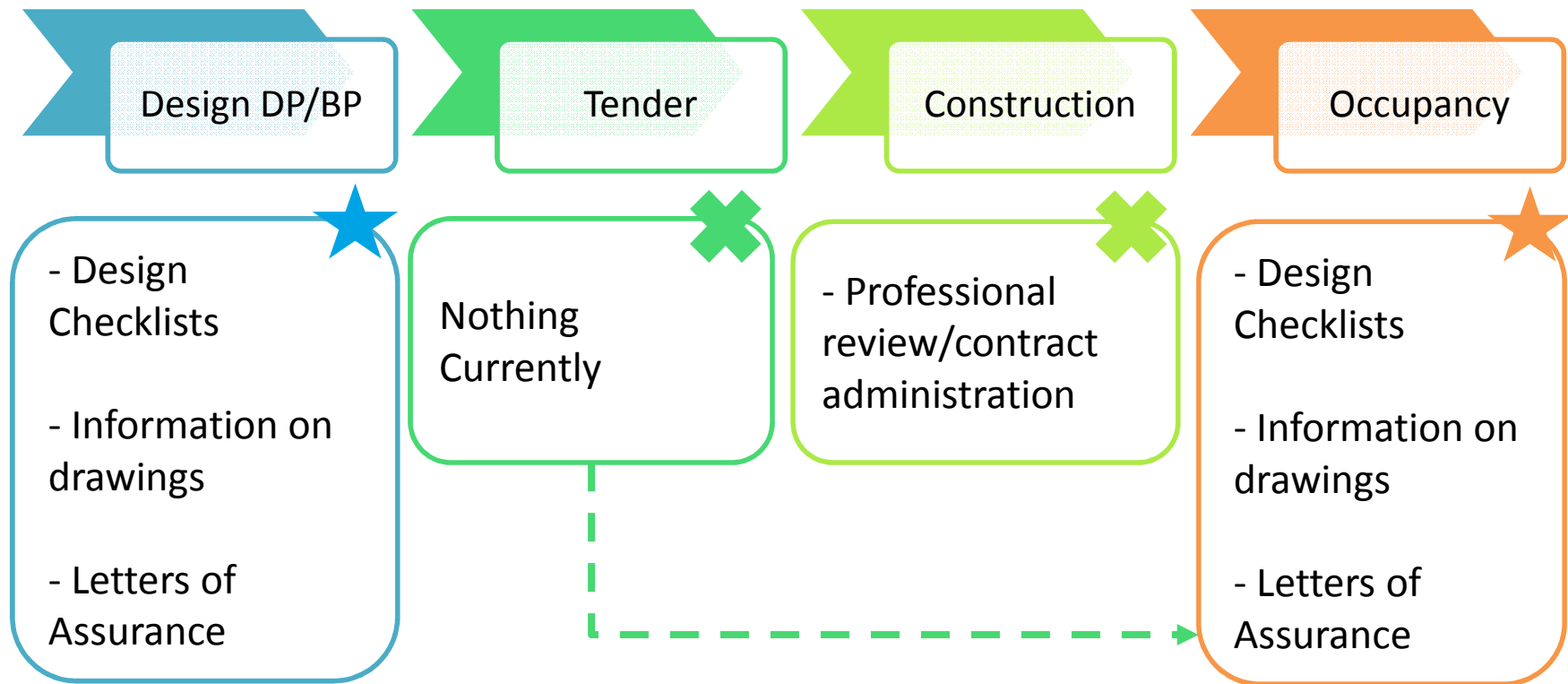
# Process - General



# Process – Electrical/Mechanical



# Process – Envelope





# Why is Envelope more complicated?

- Assembled on site
- Complexity is not often understood
- The devil is in the details
- Interrelationships are not always understood.
- Authority for part 10 can be complicated



# Air leakage testing?

- What do people think of this as an option?
- Do we have the capacity?
- What are the trade offs?



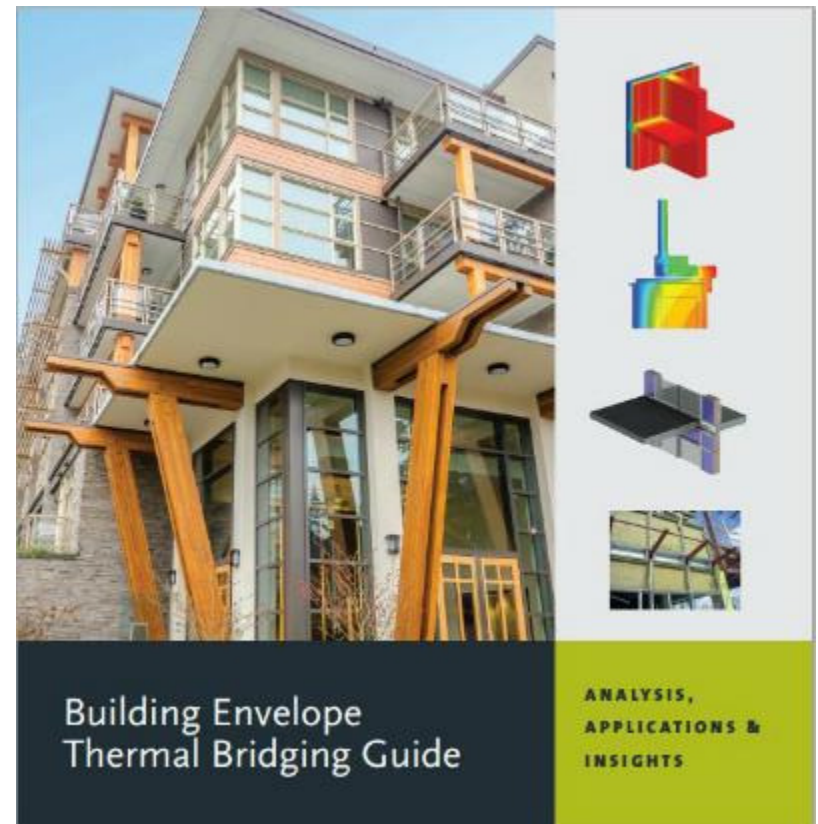
# Re-scoping the LOA

- Could there be better definition in the LOA's or the professional practice guidelines related to envelopes?



# More Prescriptive Measures?

- Standardisation of wall assembly performance with regards to energy use?
- Can design stage interventions help us in tender and construction?
- What are the trade offs for this approach?



**Thanks!**

[dramslie@integral-group.ca](mailto:dramslie@integral-group.ca)

By Dave Ramslie MSc, LEED AP  
Principal, Integral Group

November 25<sup>th</sup> 2013

