



National Energy Code of Canada for Buildings (NECB) 2011

Presentation to BCAP Annual Meeting

Washington DC

December 1, 2015

Ian Meredith, Office of Energy Efficiency,
Natural Resources Canada



Natural Resources
Canada

Ressources naturelles
Canada

Canada 



Overview

- Building energy codes in Canada
- NRCan's Role in energy code development
- NECB 2011 Adoption in Canada
- NECB 2011 compared to ASHRAE 90.1
- Residential energy codes (NBC, Section 9.36)
- NECB Compliance – Status and Challenges





Energy Codes in Canada

Overarching context

- Canadian building codes now address energy both for large (C&I) buildings and houses
 - this presentation will focus on buildings
- Canadian energy code experience is “newer”
 - especially WRT adoption and compliance
- Canada and U.S.A. share interest in energy codes but climatic and political/administrative distinctions are worth noting

3



Natural Resources
Canada

Ressources naturelles
Canada

Canada



NRCan's Role in Code Development

- Canada is a confederation of provinces
- Provinces maintain constitutional responsibility over natural resources (including energy) and regulating the construction industry (i.e., building codes)
- NRCan (through the OEE) aims to continuously improve energy efficiency of buildings in Canada
- OEE programming is developed and delivered in consultation and cooperation with provinces, utilities, industry and other stakeholders





National Model Codes System

- National Building Code
- National Fire Code
- National Plumbing Code
- National Energy Code for Buildings



Provincial/Territorial Building Codes

- Model National Codes updated every 5 years

5



Natural Resources
Canada

Ressources naturelles
Canada

Canada



NRCan's Role in Code Development

- 1997, NRCan supported the National Research Council (NRC) development of the first Model National Energy Code for Buildings (MNECB 1997)
- MNECB 1997 provided energy criteria to augment basic (safety, structural) code requirements
- Codes must be adopted by provincial/territorial authorities to become law; none chose to adopt MNECB 1997
- MNECB provided basis for an OEE design incentive program (CBIP) and LEED-NC Canadian energy reference
- These initiatives established increased energy awareness, energy modelling profession and more efficient designs

6



Natural Resources
Canada

Ressources naturelles
Canada

Canada 



NRCan's Role in Code Development

- In 2006 the Council of Energy & Mines Ministers committed to a cycle of continuous energy code improvement
- In 2007 NRCan secured funding to update MNECB 1997, energy goal of being 25% more stringent than the old code
- National Energy Code of Canada for Buildings (NECB 2011) was published in November 2011
- NECB 2015 will be published in December 2015
- The NECB is now on the same 5-year update cycle as NBC, NFC, NPC; however a 2017 interim update is anticipated

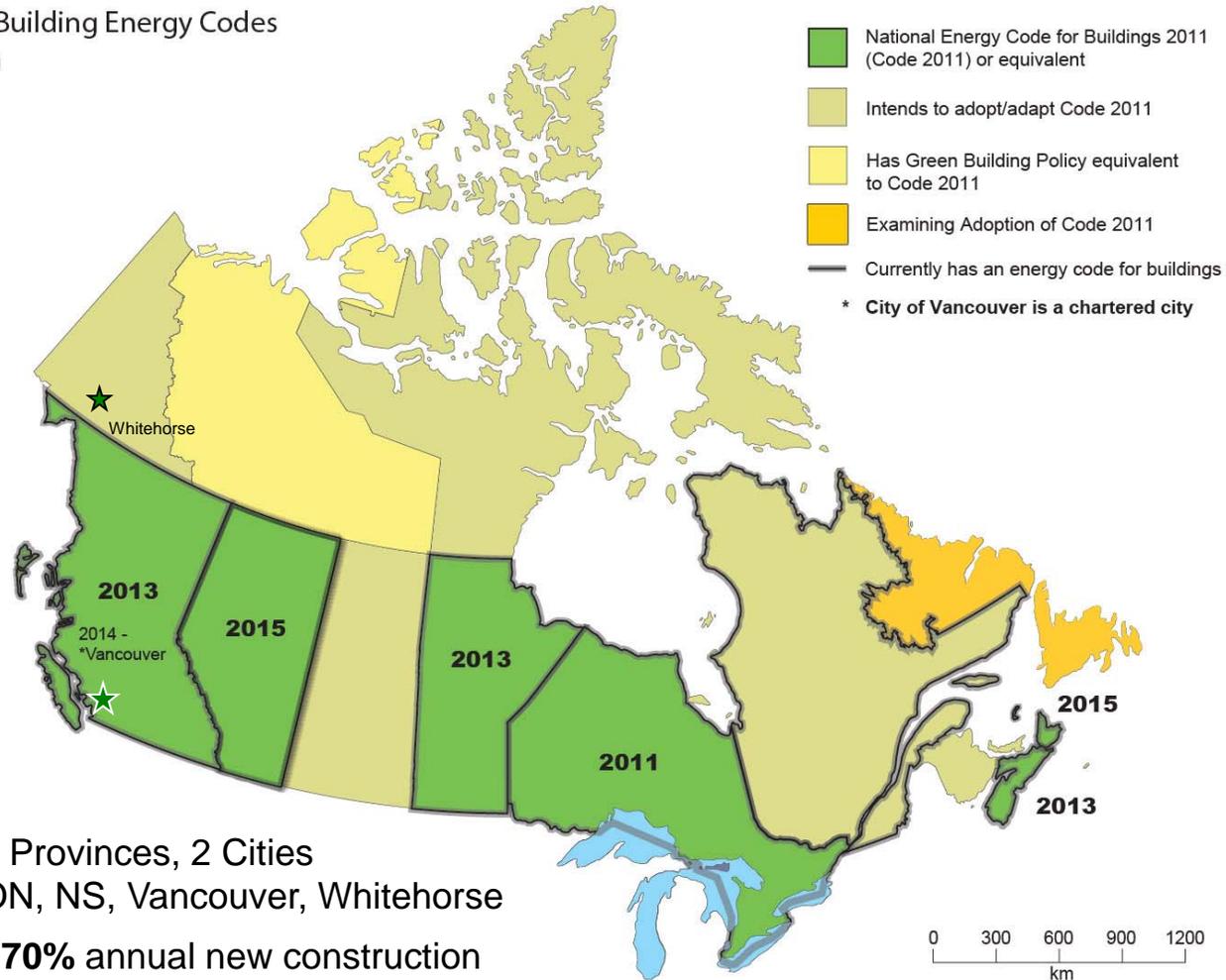




NECB 2011 Adoption in Canada

Status of Building Energy Codes in Canada

May 2015



NECB 2011: 5 Provinces, 2 Cities
 BC, AB, MB, ON, NS, Vancouver, Whitehorse
 - represents ~ **70%** annual new construction

© 2015. Her Majesty the Queen in Right of Canada, Natural Resources Canada.
 Sa Majesté la Reine du chef du Canada, Ressources naturelles Canada.





National Energy Code of Canada for Buildings (NECB)

- **Objective based code:**
 - To limit the risk that the design/construction of the building will have an “unacceptable effect on the environment”;
 - specifically limit the “excessive use of energy”
- **Criteria linked to functional statements:**
 - “limit the thermal transfer through the envelope”
 - “limit the inefficiency of specified equipment”
- **Otherwise technically similar to ASHRAE 90.1**
 - addresses all fundamental building elements (envelope, HVAC, lighting , service water heating, etc.)
 - Treats energy as “source-neutral” – priority on consumption

9



Natural Resources
Canada

Ressources naturelles
Canada

Canada



NECB 2011 vs ASHRAE 90.1

General distinctions

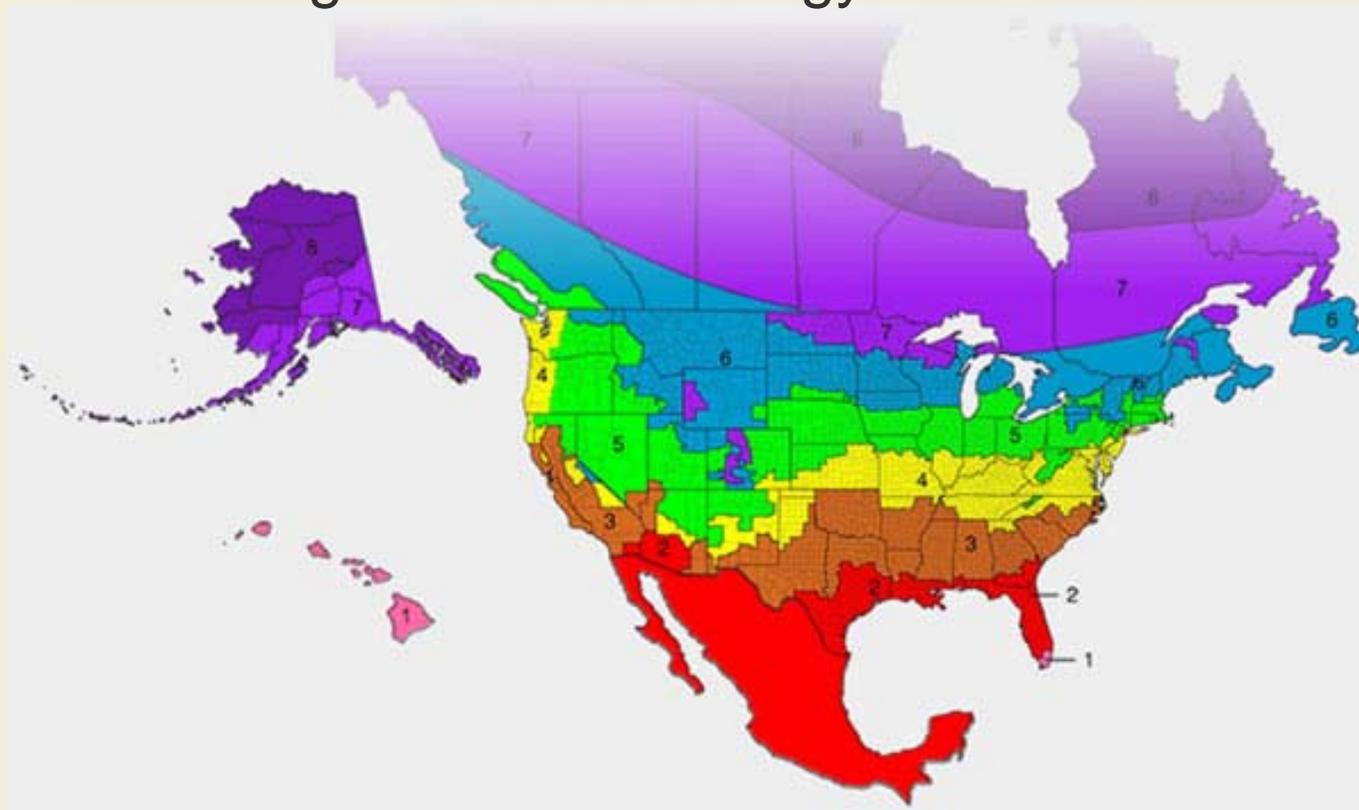
	ASHRAE 90.1	NECB 2011
Document type	Industry Standard	Model Code
Original creation	1975 (ASHRAE 90)	1997 (MNECB)
Continuous improvement	2001 – 3-yr cycle	2006 – 5-yr cycle
Current adoption	43 States (22 @ 2010+)	5 Provinces
Adoption coverage	> 90% new floorspace	70%
Climate Zones	1-8; mostly 2-6	5, 6, 7A, 7B, 8
Climatic focus	Temp + Humidity	Temperature only





Canada and U.S. Climate Zones

- Most Canadians live in Zones 6 and 7a (75 % within 100 miles of the U.S. border)
- Heating dominates energy demand over cooling



11



Natural Resources
Canada

Ressources naturelles
Canada

Canada



NECB 2011 vs ASHRAE 90.1

Technical distinctions

	ASHRAE 90.1	NECB 2011
Climatic orientation	Cooling regime	Heating regime
Units	Imperial & Metric versions	Metric only
Compliance paths	Prescriptive, Performance, Trade-off options (more extensive in NECB)	
Performance path/ modeling basis	Energy <u>cost</u> budget	Energy <u>use</u>
Language	English only	Bilingual (English/French)

- Relative stringency depends upon iteration, but NECB tends to be more stringent for heating

12





Residential Energy Code

- National Building Code Part 9 provides requirements for houses and small buildings
- Energy efficiency now addressed in Section 9.36 (as of NBC 2010)
- Comparable to NECB, but simplified and scaled to smaller structures
- In theory, provinces adopt with NBC, but are free to defer or adapt specific measures.

13



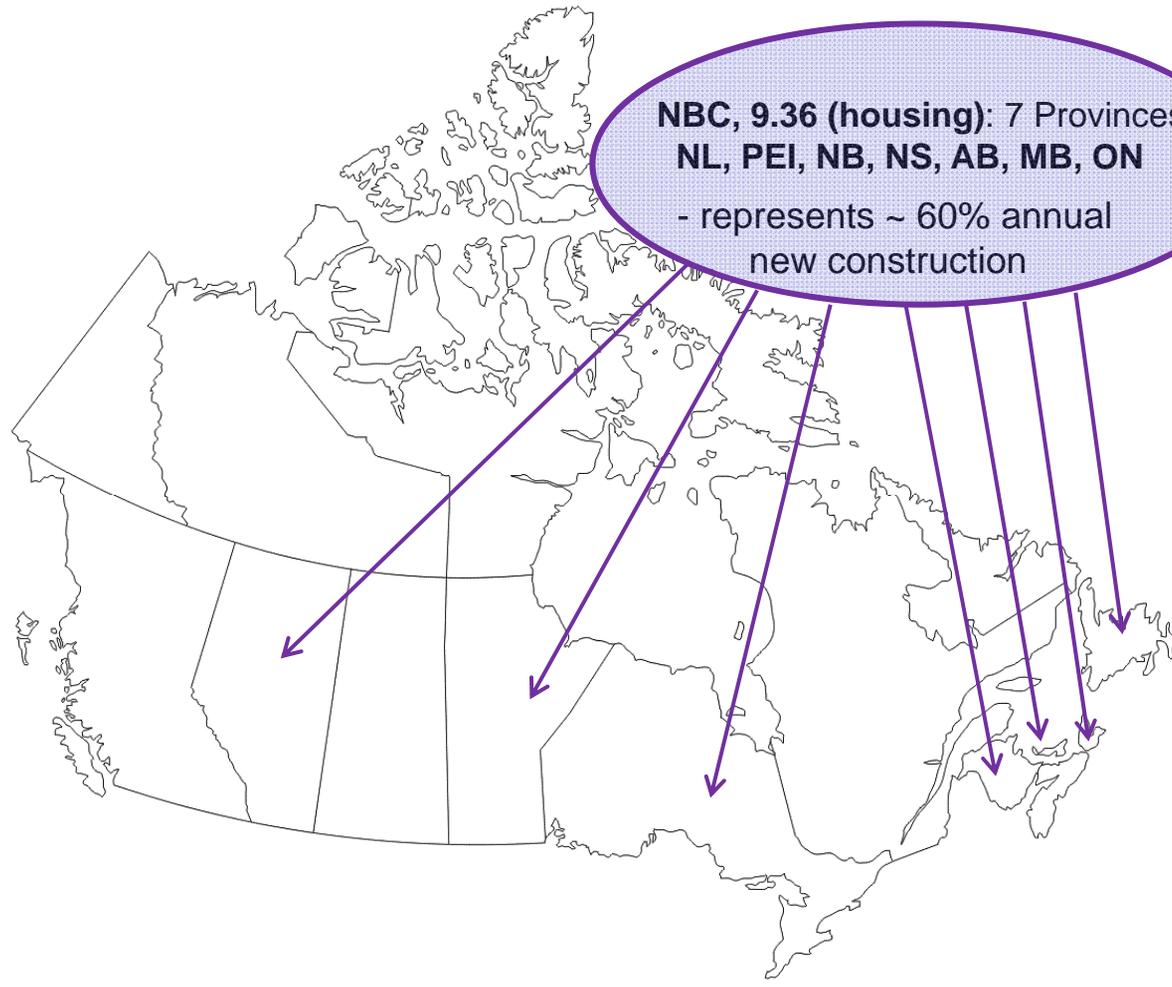
Natural Resources
Canada

Ressources naturelles
Canada

Canada 



NBC 9.36 Adoption in Canada



14



Natural Resources
Canada

Ressources naturelles
Canada

Canada



NECB Compliance

Tools Available to Support NECB 2011 Users

- Code User's Guide
- Compliance checklists
- Trade-off path calculators (NRCCan):
 - Part 4 (Lighting), Part 5 (HVAC) & 6 (SWH)
- CanQuest Building Energy Modelling Software
 - Auto-generates compliance report
- CanQuest Training (1-day and 2-day courses)

15





NECB Compliance

A variable landscape

- Variation in adoption across Canada
 - ON, BC builders have option of referencing other Codes (ASHRAE 90.1, MNECB + 25%)
 - Designers more familiar with existing references ...and software tools (EE4)
- Wide variation in compliance and enforcement
- Some AHJ are very progressive; others struggling to adapt to added compliance

16



Natural Resources
Canada

Ressources naturelles
Canada

Canada 



NECB Compliance

Challenges and Barriers

- Code officials (local) tend to be overworked and under-resourced
- Competent but challenged to learn energy aspects:
 - Subjectivity and complexity of energy criteria
 - Range of technical disciplines (envelope, HVAC, etc.) – expertise required to judge compliance in all areas
- Tendency to depend upon engineers' stamp
- Paucity of reliable data on compliance

17





NECB Compliance

Our questions for you...

- How exactly to define “compliance”?
 - ...and “% rate” of compliance?
 - ...and encourage credible data collection?
- Proven best practices and facilitation techniques?
- Engaging smaller communities (vs. large cities)

18



Natural Resources
Canada

Ressources naturelles
Canada

Canada



Thanks for your attention! 😊

Further questions?

Ian Meredith

Senior Officer, OEE

(613) 296-0390

Ian.Meredith@canada.ca

19



Natural Resources
Canada

Ressources naturelles
Canada

Canada 