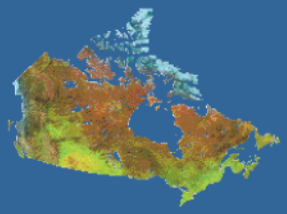


ecoENERGY
an ecoACTION initiative
ENERGUIDE
RATING SYSTEM
© Natural Resources Canada

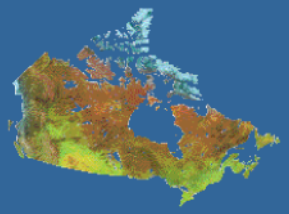
R-2000

ENERGY STAR
HIGH EFFICIENCY
HAUTE EFFICACITÉ

NEXT GENERATION OF ENERGY EFFICIENT HOUSING IN CANADA

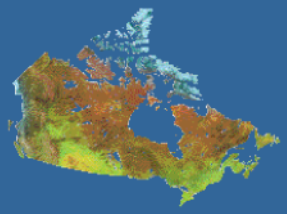
Presentation to the
CMX CHIPEX Learning Forum
March 22, 2012

Today's Topics

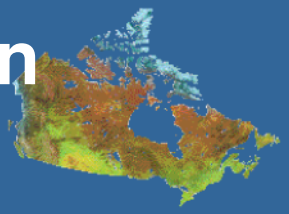


- The EnerGuide Rating System for Houses (ERS): key recommendations for the next generation ERS
- Next Generation Housing Programs
  - ENERGY STAR for New Homes
  - The R-2000 Standard

ERS is a comprehensive system with many components

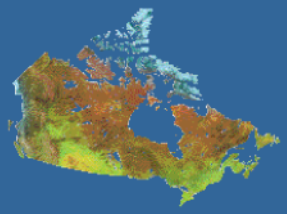


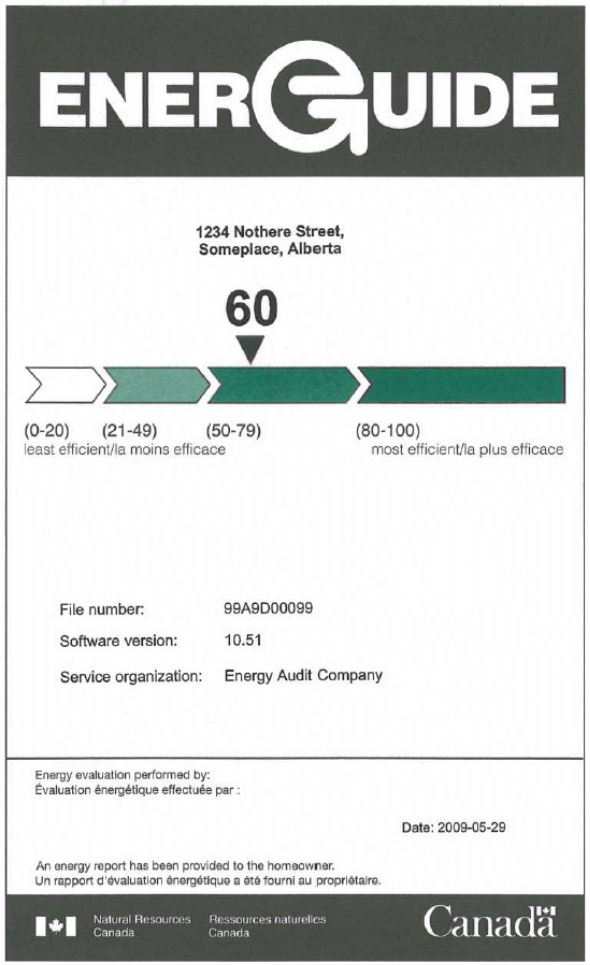
In its current form the ERS has been very successful



- Introduced in 1998 for Federal voluntary programs on existing houses
- Scope has broadened:
  - New housing (including net zero)
  - Provincial/territorial programs
  - Industry programs
  - Regulation
- An industry has been developed around rating and labelling of homes
- Over 1 million homes evaluated under ERS

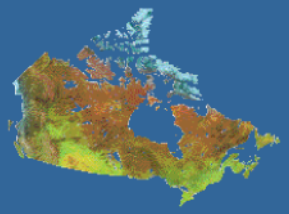
Current ERS scale





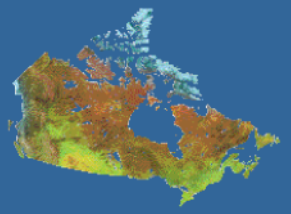
Scale:	▪ 0 to 100, where 0 is least efficient, 100 is Net Zero ▪ 1 point = 5-6 GJ = 1389–1667kWh ▪ Rates the house, not how the occupant uses the house (asset rating) ▪ Calculated using HOT2000
Reference:	▪ None
Scope:	▪ space heating & hot water & ventilation
Greenhouse gas reporting:	▪ in report
Additional material:	▪ Renovation Upgrade Report for existing homes
Improvements required:	▪ More easily explain the scale and the percentage improvement of upgrades ▪ Harmonize direction of scale with EnerGuide for appliances ▪ Need to be able to measure overall consumption/performance as well as energy efficiency

Next Generation ERS



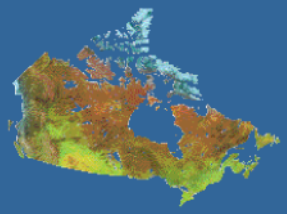
- The system needs to evolve to meet increasing demands of stakeholders:
  - Support for evolving code requirements
  - Support for possible mandatory labelling
  - Increase scope of the rating and information transfer
  - Improve the communications elements of the homeowner information, including the scale

Recommendations Developed by National Committee



- A standard development process using:
  - A Standard Council of Canada based approach,
  - Committees of balanced representation,
  - A process based on consensus principles, and
  - Public review.
- Ensures transparency and buy-in by all stakeholders

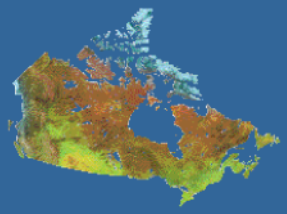
ERS Committees



- Policy Development
  - Undertaken by the Policy Advisory Committee
    - Executive (voting): representatives of Provincial/Territorial energy programs/policy ministries
    - Advisors (non-voting):
      - Provincial code representatives
      - Sub-Committee Chairs: technical, information and delivery
    - Ex-officio (non-voting): NRC, CCBFC, CMHC, NRCan

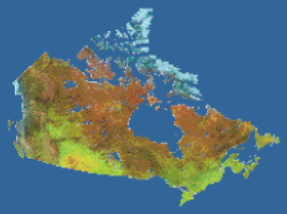
- Detailed recommendations
  - Undertaken by Sub-committees (technical, information, delivery)
    - balanced representation of expertise and geography
    - Industry well represented

Next Gen ERS Parameters



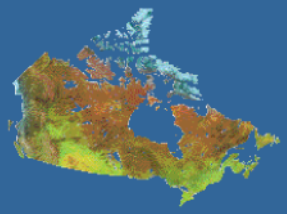
- The system must be able to rate the energy efficiency of both existing and new houses including net zero homes on the same scale
- The rating system must only rate energy and factors that are related to energy use in the home
- The rating system must have the ability to account for electrical loads, air conditioning and renewable energy
- The rating system must be complementary to energy codes
- The rating system must offer stability for stakeholders using the system
- The system must be able to help homeowners make informed decisions about energy use in their homes

Vision of ERS in the marketplace



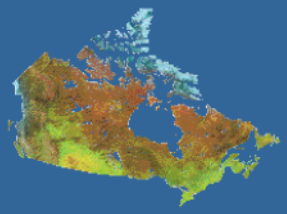
- The ERS will provide a national system, supporting (and supported by) regional solutions, to:
  - Help Canadian homeowners, industry and stakeholders, become "*energy literate*" regarding houses and the decisions related to them
  - Provide specific, readily accessible energy performance information to support decision making in designing, constructing, purchasing, renovating or operating a house

ERS Objectives



- Provide the consumer, industry and other stakeholders with clear, easily understood, home energy information at a reasonable cost
- Serve as the backbone of all home energy programming and policy development in Canada
- Provide a robust, efficient and effective delivery model
- Account for total energy use and production

ERS Key Considerations

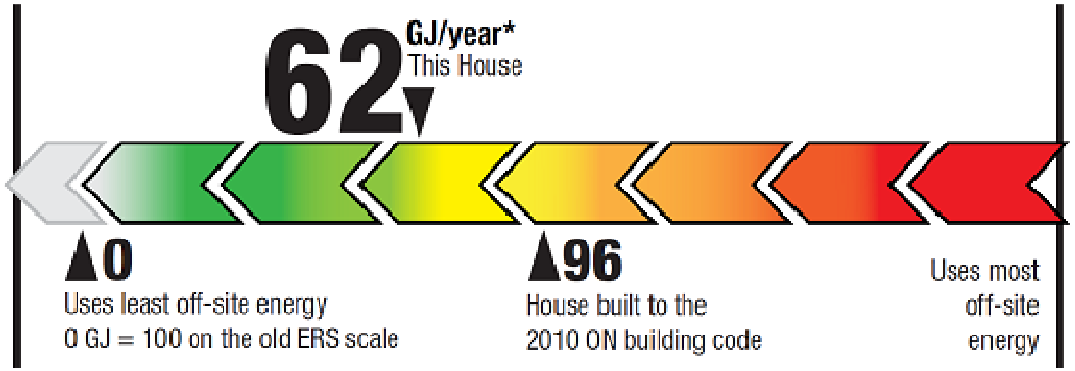


- Stability
- Reproducibility
- Code compatible
- Jurisdictionally/regionally-adaptive
- Energy source neutral
- Include air conditioning/ electric base loads
- Renewables
- GHGs
- Energy literacy
- Meaningful scale
- Blower-door testing
- Supporting Tool(s) – design, compliance, decision-making
- Design matters?
- Prescriptive equivalency
- Administration/delivery framework
- Affordability

Provide the consumer and stakeholders with clear, easily understood, cost effective home energy information

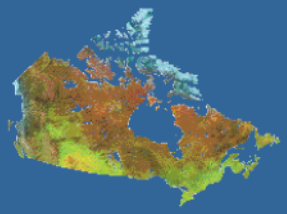
Whole house consumption

Energy Rating:



- Straightforward, meaningful portrayal of home energy use
- Allows comparison of all homes regardless of type or location
- Good design is reflected in the rating – design matters
- Positions the house against the same house built to code
- Energy improvement can be expressed in straight percentages
- Harmonizes with the appliance scale
- Energy source neutral, size neutral, seamless with any code and with any code changes

Provide the consumer and stakeholders with clear, easily understood, cost effective home energy information



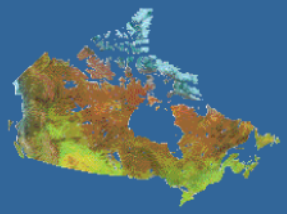
In addition to the energy use figure, provide a "nutrition label" style array of information

- Increases energy literacy
- Allows the consumer or regulator to extract the selective information they require
- Provides information to support policies

The label will be supplemented with a Guide to the Label and a Homeowner Information Sheet.

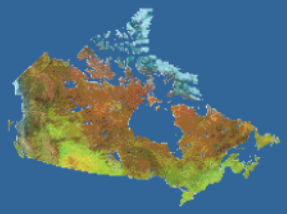
Additional information will be available through a suite of on-line services at myEnerGuide.gc.ca

Proposed ERS Label



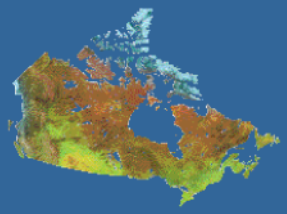
Scale:	▪ Consumption based scale in GJ/year, where 0 is Net Zero and no upper end to the scale ▪ Rates the house, not how the occupant uses the house (asset rating) ▪ Calculated using HOT2000
Reference:	▪ The house if it were built to the building code
Scope:	▪ Space heating, hot water, ventilation, cooling and renewables
Greenhouse gas reporting:	▪ on label
Additional material:	▪ Guide to the label ▪ Homeowner Information Sheet ▪ Renovation Upgrade Recommendations Report ▪ New Construction Upgrade Report ▪ Efficient Living Assessment Report (eventually)
Improvements:	▪ straightforward portrayal of home energy use ▪ direction of scale harmonizes with EnerGuide for appliances: 0 uses least energy ▪ a house that consumes less energy than another will rate lower & energy efficiency metric (GJ/m^2) ▪ Percentage improvement is clear ▪ Increased information on the label to help increase energy literacy

Provide the consumer and stakeholders with clear, easily understood, cost effective home energy information



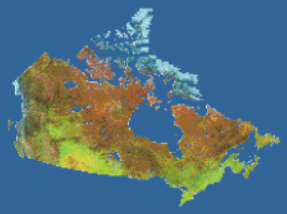
- The My EnerGuide Homeowner Information Sheet will include such information as:
  - A description of how energy is used in the home
  - A listing of data that was collected to rate the house incl.:
    - Insulation levels
    - Window details and performance
    - Mechanical system performance
    - Airtightness levels
  - The next steps a homeowner can take to upgrade the energy performance of their house

Provide the consumer and stakeholders with clear, easily understood, cost effective home energy information



- The front page will provide a description of how energy is used in the home in both tabular and graphic formats.
- The second page will proved a listing of data that was collected to rate the house including:
  - Building envelope details
  - Window details
  - Mechanical system details
  - Airtightness levels
  - The heated floor area of the home and
  - Significant energy uses not included in the rating

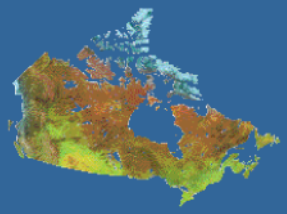
Provide the consumer and stakeholders with clear, easily understood, cost effective home energy information



- The third page is a glossary that defines the various terms used in the document. This is another contribution to the ongoing process of energy literacy. Ideas such as energy from solar and insulation levels are explained.

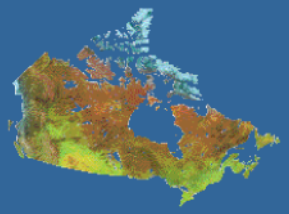
- The last page provides a reproduction of the label, an indication of how the house has improved since it was last rated (this would only appear if it applies), and a next steps section directing the homeowner to further action.

Serve as the backbone of all home energy policy and programming in Canada



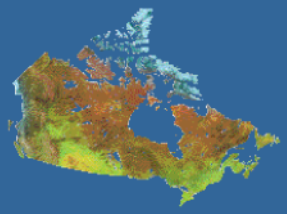
- Standard home evaluation
  - Streamlined base rating with blower door test
- Add-on modules:
  - Renovation Upgrade Evaluation
  - Construction Upgrade Service for New Homes
  - Efficient Living Assessment
  - Construction Blower Door test
- Complimentary to code
- Report on GHGs, regionally

Account for total on-site energy use and production



- The ERS will consider:
  - Heat loss through the building envelope
  - Base house energy use and production
    - space heating and cooling, hot water heating and mechanical ventilation
    - passive solar gains and gains from active renewable energy systems
  - Occupancy driven energy use
    - set to standard operating conditions

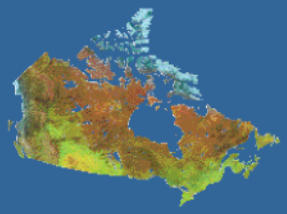
Account for total on-site energy use and production



PAC Recommendations:

- The rating should cover the house itself, not the property
- Large a-typical loads will not be included in the rating but will be noted on the homeowner information sheet (e.g. pools, hot tubs)
- On-site renewable energy will be included
  - solar thermal
  - solar PV
  - wind
  - micro hydro

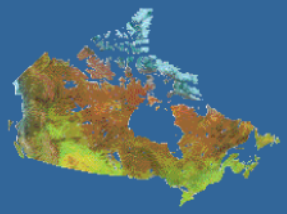
Upgrade Report – pages 1 & 3



- Page one provides comparisons of the house as rated and the energy performance of the house after all upgrades recommendations have been implemented as well as to the R-2000 Standard and other houses in their category.

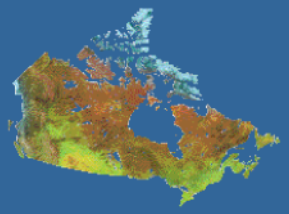
- Page three provides the upgrade recommendations in the form of an energy action roadmap – based on house as a system principles – the recommended upgrades and their order of implementation.

New Home Upgrade Report



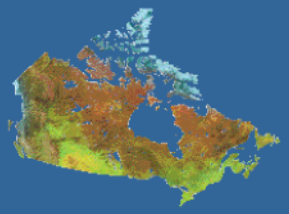
- A template to be used by the energy advisor
- Provides the builder with the details of their base case as well as several upgrade options to increase the energy efficiency of their house plan.
- Also provides the ENERGY STAR for New Homes and R-2000 targets for the house.

ERS Next Steps

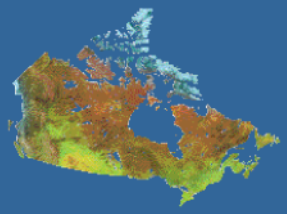


- Public review: April 2012
- Pilot: 2013
- Launch: January 2014

Next Generation ERS



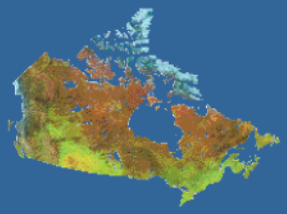
Questions?



Next Generation

ENERGY STAR for New Homes and R-2000

Standards and Labels



Notional future ERS levels for the NRCan framework and suite of standards and labels

Current EnerGuide Rating Scale

100 — Net Zero

– R-2000, as best practice, serves as basis right up to Net Zero

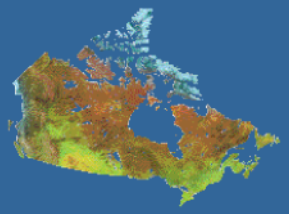
**86 is key point where renewables start to kick in*

86* — R-2000 – a best-in-class performance brand, 50% better than code for premiere builders, leading energy performance and innovation

82 — ESNH – a prescriptive energy performance brand 20% better than code

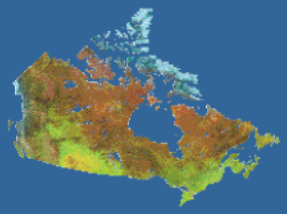
80 — Code

Key Developments



- CCBFC – energy in building code
- Provincial legislation
  - Energy in codes – ERS 80, ~R-2000/ESNH levels
  - Labelling
- Industry and provincial support for labelling
- Over a million ERS labels, over 1,500 NRCan Certified Energy Advisors
- Net zero homes / EQuilibrium homes

Next Generation Processes



- Standard development processes using:
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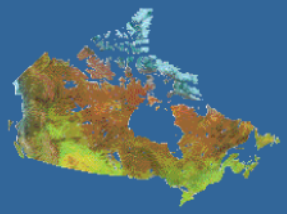
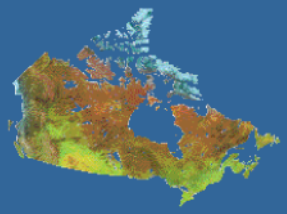
  - Open to Observers, and
  - Public review.
- Ensures transparency and buy-in by all stakeholders

Next Generation Processes



- ENERGY STAR:
  - Committee of 13 voting members and 6 ex-officio
  - Public review October, 2011
    - 781 downloads of the document with 240 comments
  - To be published April 2012
- R-2000:
  - Committee of 15 voting members and 6 ex-officio
  - Public review September, 2011
    - 140 registered users and 80 comments
  - Published February 2012

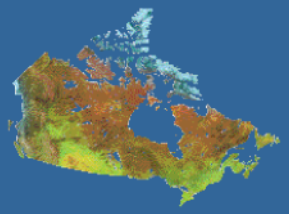
ESNH Overview



ESNH Vision

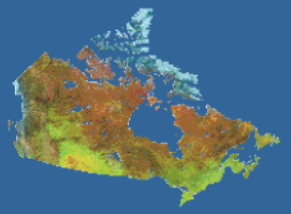
To provide consumers with access to energy efficient new homes, and builders with a means to building these homes in a timely, simple and cost-effective manner using common building practices.

Key Recommendations (1 of 2)



- Use code reference house as the baseline
- More stringent energy target: 20% more efficient than code house, e.g. if code is ERS 80, ESNH would be ERS 83
- Minimum insulation requirements
- Account for air conditioning

Key Recommendations (2 of 2)



- Compliance methodologies
  - Prescriptive – core BOP plus upgrade list
  - Performance – meet ERS target / BOP target
  - Hybrid – NEW (under development)
- Electrical savings: 400 kWh/yr minimum
- ENERGY STAR qualified products

Overview of ESNH Requirements

1
Meet Min. Reqt's

2
Choose Approach

3
Pick Upgrade Options

Minimum Requirements
ENERGY STAR fenestration
HVI-certified H/ERV
Minimum Insulation Levels
Minimum Airtightness
Electrical Savings

Prescriptive

Core BOP
Mechanical
Building Envelope

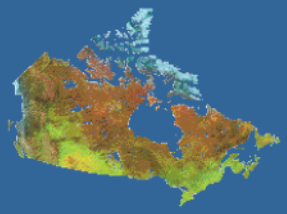
Upgrade List
Building Envelope
Mechanical
Airtightness
SHW
Appliances
Lighting

Performance

Energy Target
Prescribed energy target

LEGEND
Mandatory Requirements
Upgrade Options

Recommended Prescriptive Methodology



- One core Builder Option Package (BOP) with list of upgrade options per climate zone per province
- BOPs to be developed for ON & SK, then NB/PEI, BC & AB

EXAMPLE

1 - Core BOP (ERS 80)

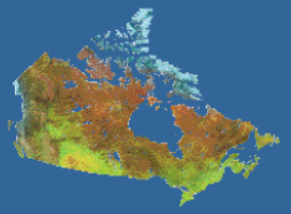
2 - Upgrade Options – choose minimum increase of 3.0

Element	Value
Ceiling with attic	R 50
Walls above grade	R 24
Floor header	R 20
Walls below grade	R 20
Furnace	95 AFUE
DHW	EF 0.67
HRV	SRE 60%

Element	Upgrade		Rating increase
Foundation slab	u1a	add R5	0.9
	u1b	add R10	1.0
Basement walls	u2	increase to R28	0.1
Main walls	u3	increase to R30	0.4
Attic	u4	increase to R60 with 1.5” high heel	0.2
Windows	u5	increase to triple pane low-e argon (incl. basement)	1.0
Domestic Hot Water	u6a	upgrade to instantaneous with EF 0.82	0.6
	u6b	upgrade to instantaneous condensing with EF 0.90	0.8
HRV	u7a	upgrade to 75%	0.3
	u7b	upgrade to 85%	0.5
ACH	u8a	improve to ACH 2.0	0.4
	u8b	improve to ACH 1.5	0.8
SDHW	u9	add solar domestic hot water with 6000MJ/yr	0.9

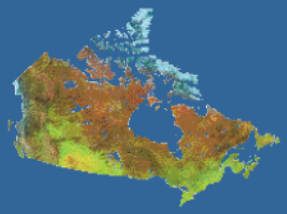
The values in the tables are for illustrative purposes only and are not proposed levels

ESNH Transition



- Short Term:
  - April, 2012: new standard (voluntary)
  - October 1, 2012: new standard (mandatory)
  - Builders must have built and labelled the house within 24 months of enrolment to build to current specification
  - Ontario and Saskatchewan have prescriptive BOPs, other provinces to follow
- Ongoing (i.e. future updates)
  - Major changes to correlate with code cycle (e.g., every 5 years)
  - Minor changes, such as clarifications to take place annually (e.g. January 1st)

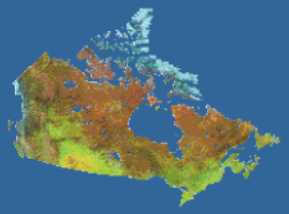
R-2000 Overview



R-2000 Vision

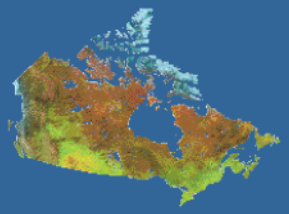
To provide the home building industry and consumers with a technical standard that represents the leading edge of commercially-viable new home construction, based on available and proven technology, products, materials and building techniques.

Key Recommendations (1 of 2)



- Use code reference house as the baseline
- Increase whole house energy target: 50% lower than code reference house
- Add an interim building envelope target: 25% lower than code reference house

Key Recommendations (2 of 2)

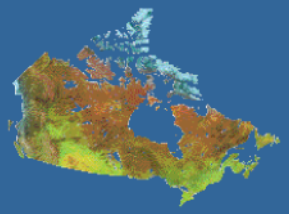


- Account for AC
- Account for solar thermal and micro power generation

Rated House =
[space heating + water heating + space cooling + ventilation + base loads]
- renewable energy contributions

- Offer a broader Pick List
  - 8 items from 5 categories: IAQ, Energy Efficiency, Environmental Stewardship, Resource Management Water Conservation

Administrative Procedures

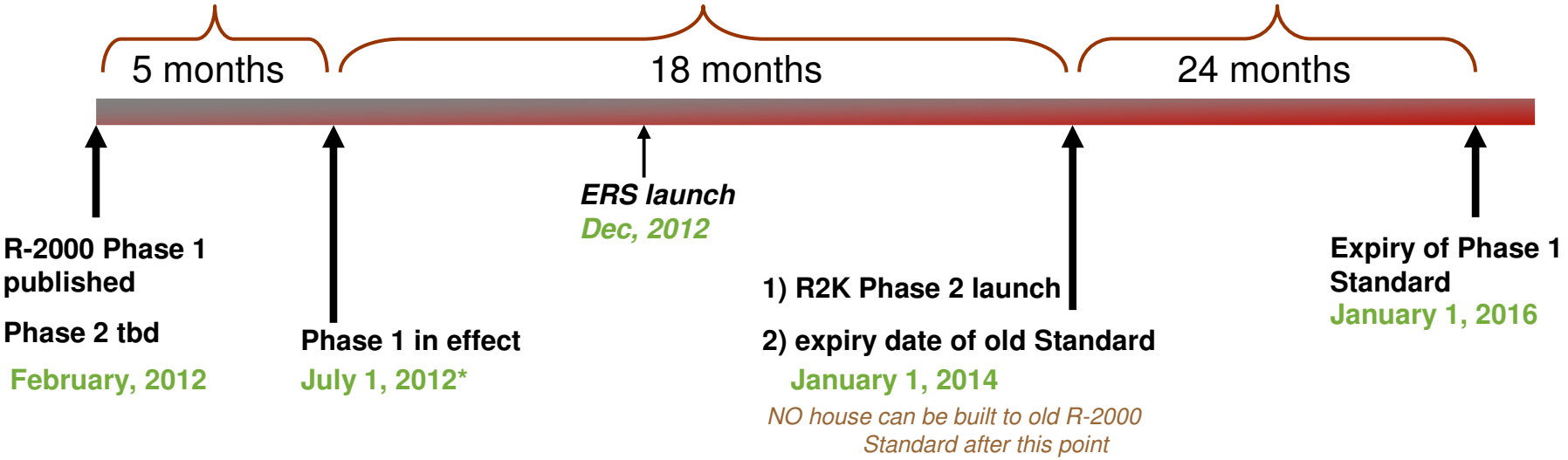


- Open Market for Service Organizations
- Merging of R-2000 Roles (R-2000 Plan Evaluator, R-2000 Airtightness Tester, and R-2000 Inspector) into R-2000 Energy Advisor
- Role of File Manager – rolled into EA and SO roles
- EA Licensing - with ERS and R-2000

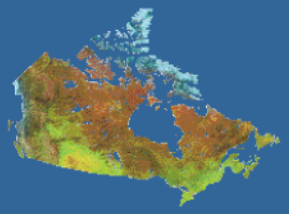
Phased-In Implementation

Timeline for transitioning R-2000 Standard

if enrolled in this period, can build to the old Standard provided house is certified by the expiry date



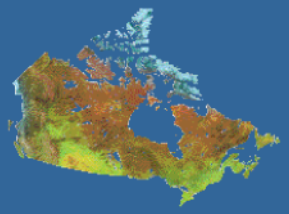
More Information



- Development of Next Generation Energy Efficiency Housing Standards:
  - http://oee.nrcan.gc.ca/residential/housing-initiatives.cfm

- To register as an Observer for any of the processes e-mail:
  - R-2000: R2000secretariat@nrcan.gc.ca
  - ERS: ERSsecretariat@nrcan.gc.ca
  - ESNH: ESNHsecretariat@nrcan.gc.ca

ESNH and R-2000



Questions?