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LEEP 2.0: What's coming next for builders and renovators?

CHBA Net Zero Council Webinar

September 27, 2017

1. LEEP 2.0 delivery overview
2. BC LEEP highlights
3. Proposed roll-out for new, retrofit, and MURBs
4. LEEP technology costing spreadsheet
5. Upcoming Events:

LEEP Retrofit workshops

LEEP Gas Mechanicals Technology Forums

James Glouchkow & Patric Langevin

Office of Energy Research and Development, Innovation and Energy Technology Sector



1. The LEEP 2.0 Delivery Model

LEEP is a builder driven innovation accelerator.

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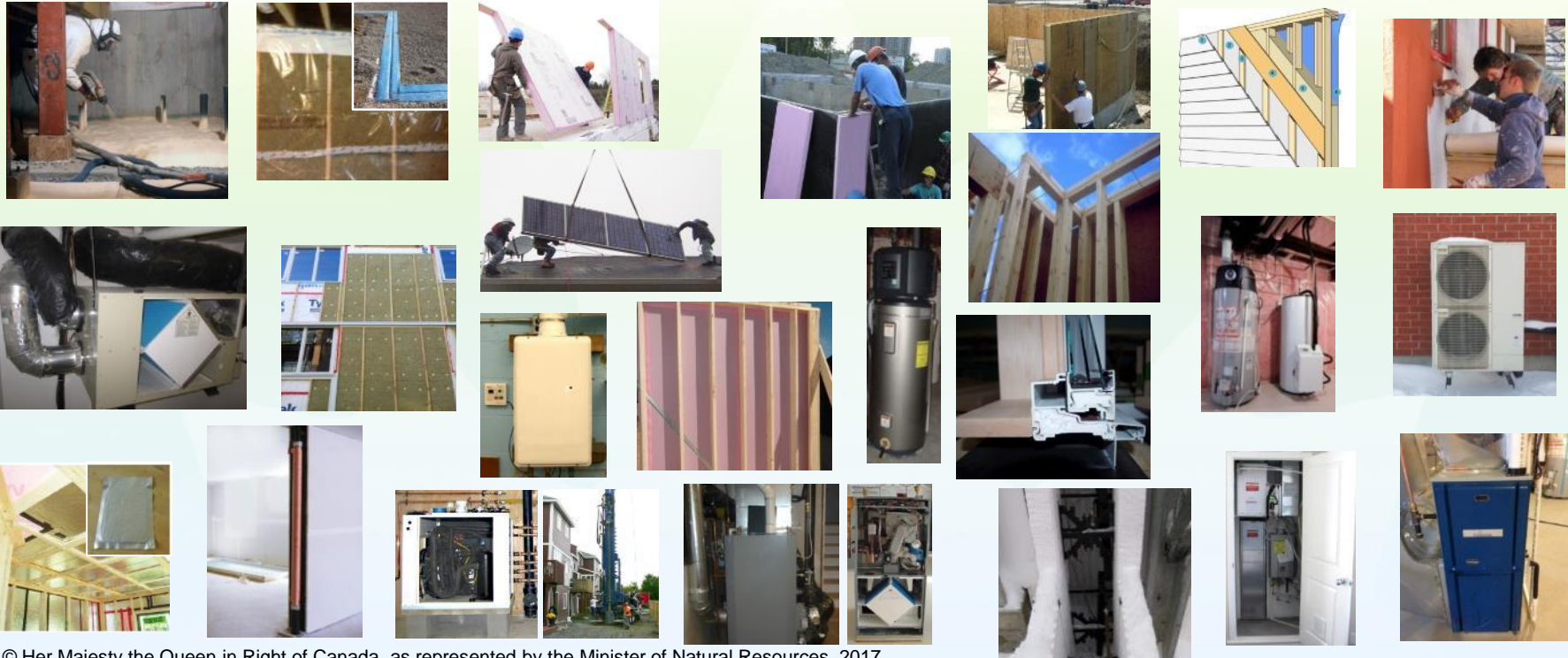
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Change from a builder perspective...

What change to try next? Why? What are trades, cost and schedule impacts? .. ?



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Builders use LEEP to:

- **reduce their time and risk** in finding and trying innovations that can help them build higher performance homes better, faster and more affordably.
- **find federal research results** that inform their technology decision making.
- **pool their buying power** regionally to make it worthwhile for manufacturers to address the builder group's issues. *Builders in LEEP groups typically represent 50% of local production.*

Canadian
Home Builders'
Association



"LEEP assists with bringing innovation into the market in a well thought out and responsive way."

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LEEP 2.0 Delivery Model

Start

Builder Planning Workshop:
where technologies are
selected



~ 3 months later

LEEP Technology Forums:
enabling 'apples to apples'
comparison



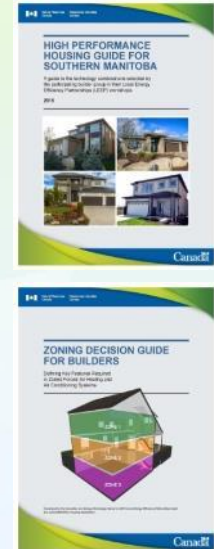
Completed within ~ 16 months

Builder Technology Trials:
unlocking market change
& inform NRCan



Ongoing – web search:
NRCan LEEP

New LEEP Tech Guides:
following each market's
field trial learnings



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Responsive to regional builder needs

Content and presenters change according to market interest.



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Feedback on Recent LEEP Technology Forums:

Builders wrote:

"This ...has opened my eyes to many new ways of getting more energy efficient."

"Once again I'd like to say how informative the LEEP Forum was, probably the best seminar I've ever attended! Great job done by all who organized and presented."

"I think the forum was a huge success and I can confidently say it was the most practical and educational event I've attended as a builder. Keep up the good work."

32 Field Trial homes (13 in Prince George, 19 in Kelowna) with 8 builders in the field trial group moving forward with first-time attempts to build net-zero energy ready houses.

BC Provincial & Utility Partners have requested:

Expanding the LEEP initiative to more markets in BC (in both location and for other types of buildings).

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2. BC LEEP highlights



The Voice of the Residential Construction Industry in BC



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40 BC LEEP Field Trials Homes



All field trial builders are:

- trying new technologies they selected through LEEP
- building homes that range in performance from ENERGY STAR® to Net Zero Energy
- Using Energy Advisor services
- Evaluating design heating and cooling loads using CSA F280-12 for the first time

Also of interest:

- Most builders are participating in programs for the first times (including some reaching for NZER)
- Energy Advisors being trained to support NZER & NZE builds
- Province and utilities providing new training on how to size heating and cooling systems using materials developed through LEEP

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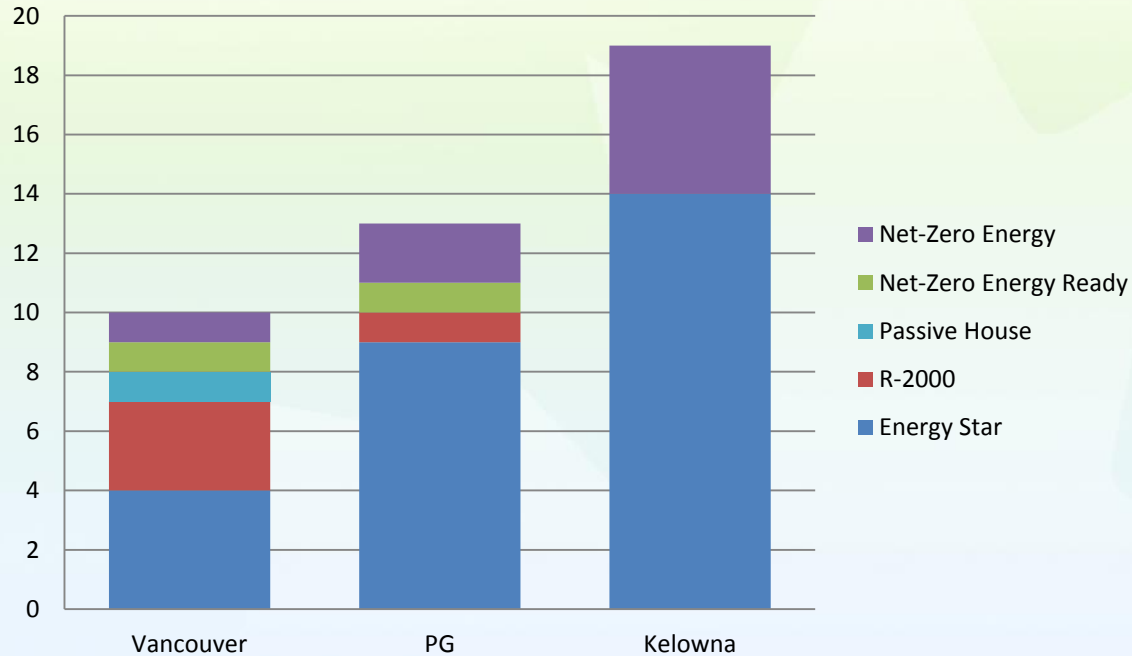
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LEEP BC Field Trial Trends

Builder Intent by Market



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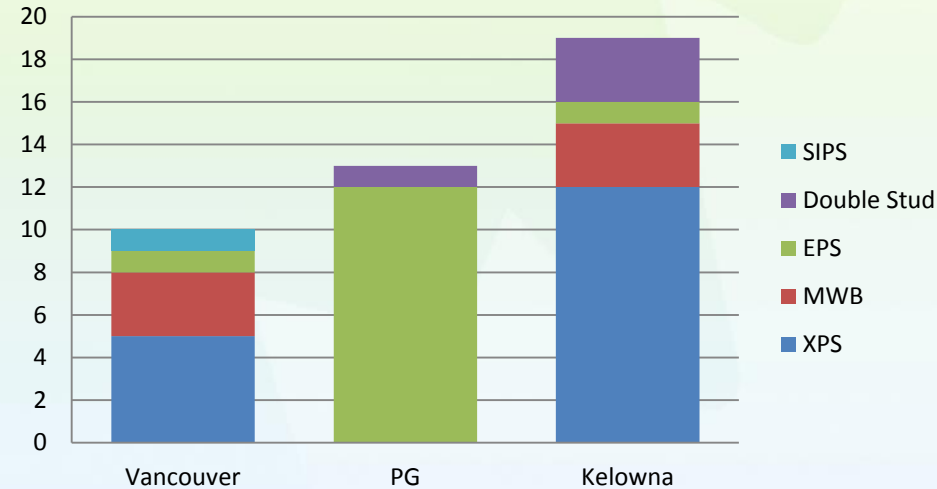
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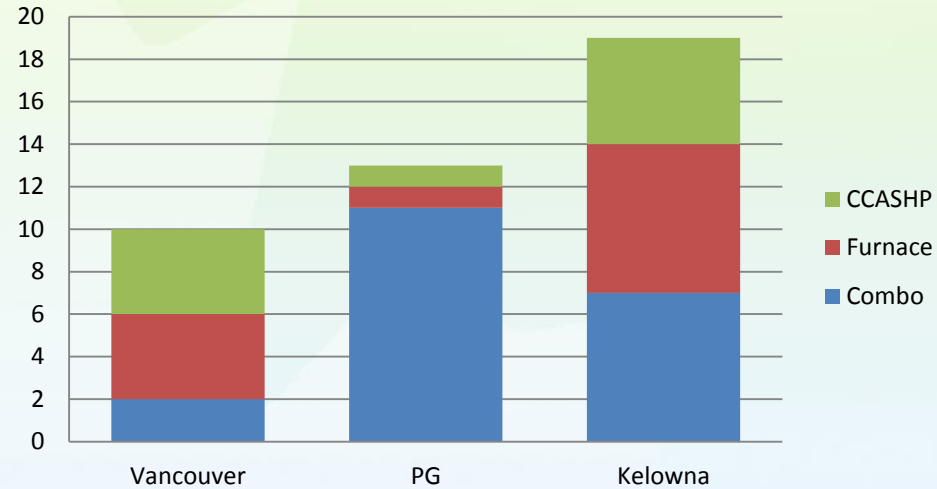
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LEEP BC Field Trial Trends

Wall Types by Market



Mechanicals by Market



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Design Heating and Cooling Loads

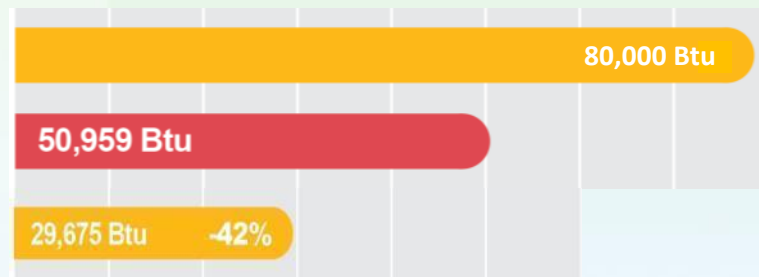
Some builders had been quoted on systems that were 2 to 4x the required size!



Courtesy of the Icon Homes

Design heating load (Icon Homes Example)

- Using BCBC spec and 'rule of thumb'
- Using BCBC spec and [CSA F280-12](#) analysis
- Including one upgrade option for the envelope, windows and air tightness, and [CSA F280-12](#) analysis



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Two Northern BC Case Studies:

1. Shay Bulmer – Northern Homecraft Ltd., Vanderhoof, BC



2. Sam Zirnhelt – Zirnhelt Timber Frames, Williams Lake, BC



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Both builders...

- Have been building homes for many years
- Had not participated in any programs previously (R-2000, ENERGY STAR® etc)
- Participated in the Prince George LEEP Technology Forum last November.
(Shay was also at the builder planning meeting that set the tech focus for the Forum.)
- Found some technologies they wanted to deploy in builds they were already planning.
- Signed the one page letter of intent to build a high performance field trial home deploying these technologies *(13 Northern BC builders signed by the end of the Forum.)*
- Went back to their customers and found ways to build towards...

CHBA Net Zero Ready

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Northern BC Net Zero Ready

Northern Homecraft Ltd.



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Northern BC Net Zero Ready

Northern Homecraft Ltd.



Striving to be the first CHBA Net Zero Ready labelled home for CHBA Northern BC!

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Northern BC Net Zero Ready

Zirnhelt Timber Frames

Esk'Etmec First Nation Health and Wellness Centre



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Northern BC Net Zero Ready

Zirnhelt Timber Frames

Esk'Etmec First Nation Health and Wellness Centre



Striving to be the first CHBA Net Zero Ready building on First Nation Lands & one of the first CHBA Net Zero Ready commercial buildings!

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Design Considerations

... & how we used LEEP to help us address each one

Element	Northern Homecraft Ltd.	Zirnhelt Timber Frames
Energy Advisor	☑	☑
NZ Energy Advisor Support	☑	☑
HL/HG Calculation	☑	☑
Mechanical Design	☑	☑
Envelope Upgrades	☑	☑
Mechanical Upgrades	☑	☑
Renewable Energy Systems	Solar Ready	Solar Ready
Anticipated Energy Performance	Net Zero Ready	Net Zero Ready

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LEEP VIDEO 1701 AGASSIZ - NATHAN STONE

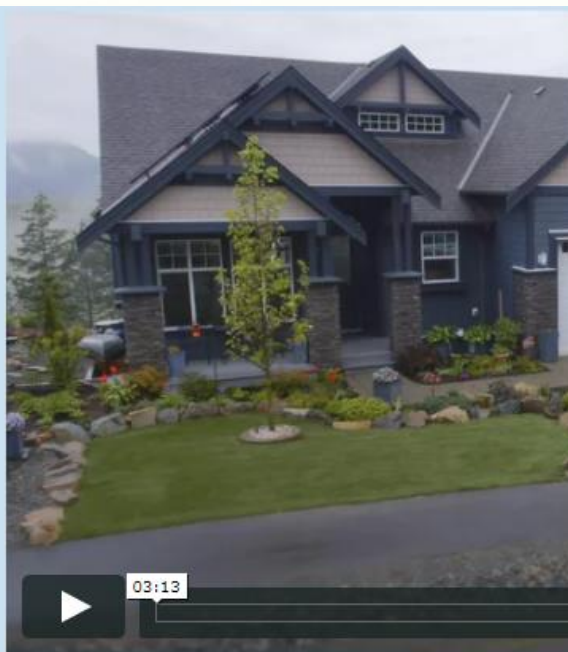
CLIENT: BC HOUSING - KAREN KARAKOULAS
BC HOUSING - CARLY HUNTER

PRODUCER: TNE - KYLE KOCH
TNE - CARRIE RICHES

VERSION: V16 - FINAL
DATE: SEPT 10, 2017

FORMAT: 3840x2160 23.98
RUNNING TIME: 3:12

DOWNLOAD LINKS: [h264 1920x1080](#)
[h264 3840x2160](#)
[ProRes422HQ 1920x1080](#)
[ProRes422HQ 3840x2160](#)



Agassiz British Columbia

3900 ft² Residence

BC Energy Step Code: 3

Climate Zone: 4

Air Tightness ACH @50Pa: 1.9

Energy Rating: 63 GJ/year

Certified ENERGY STAR®

Look for Sam and Shay in upcoming Highlights!

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3. Proposed roll-out for new, retrofit, and MURBs

Tentative subject to funding approvals

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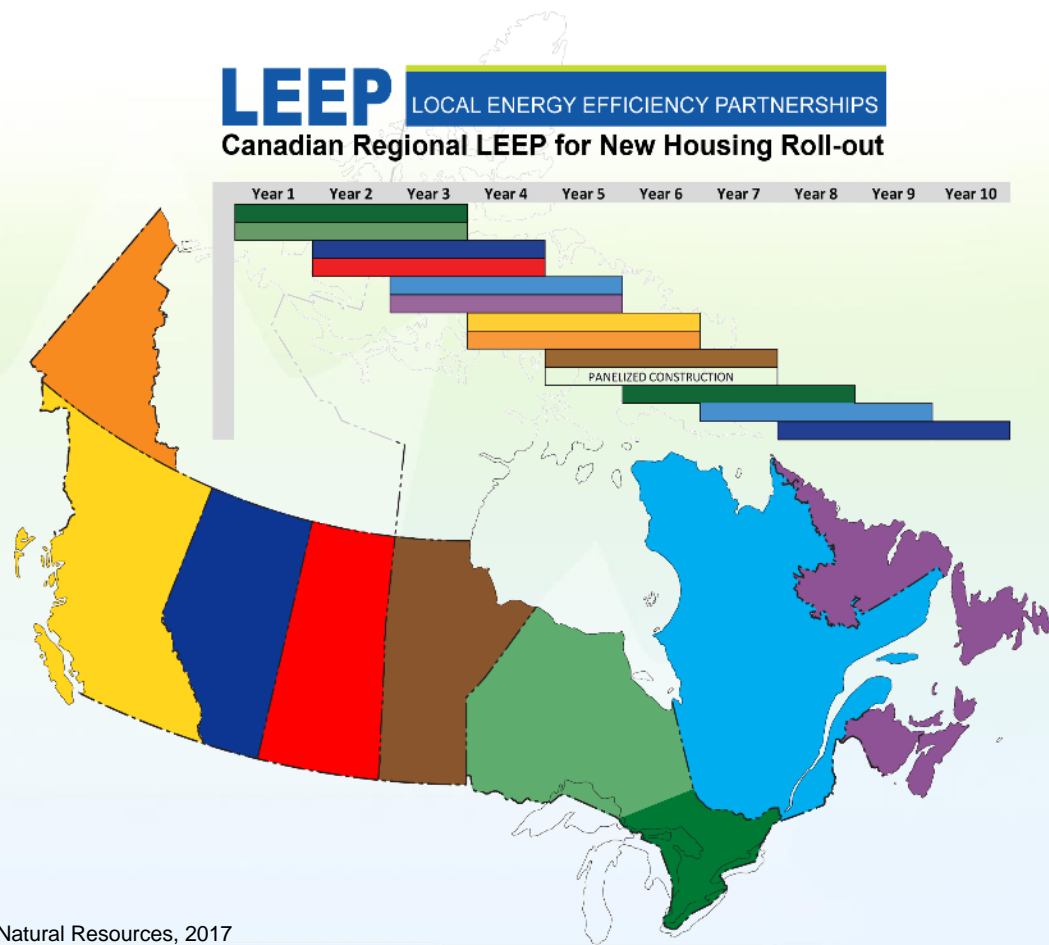
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LEEP for New Housing

- **LEEP for New Housing:**
Expanded delivery with 2 new regional deliveries beginning every year. (Order of regional delivery may change.)



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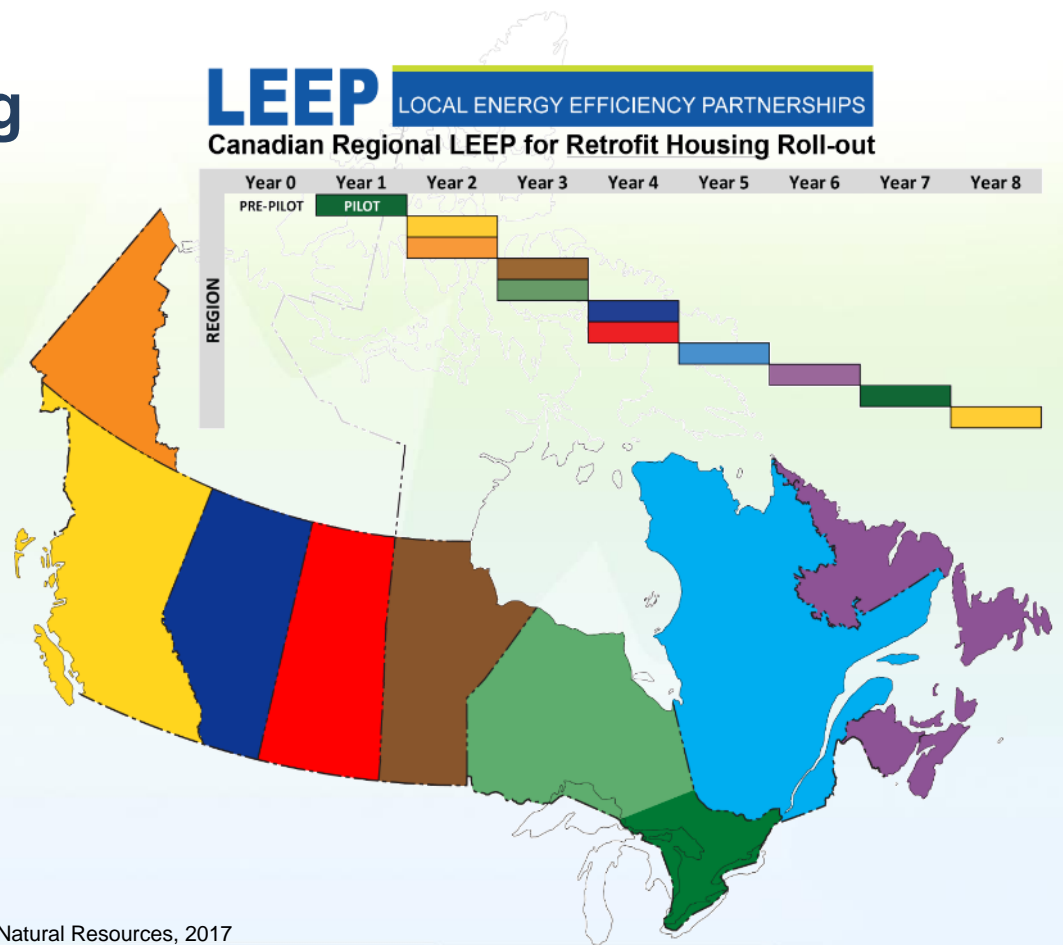
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LEEP for Retrofit Housing

- **LEEP for Retrofit Housing: New** initiative that will start by developing a new model and then have new regional deliveries every year. (Order of regional delivery may change.)



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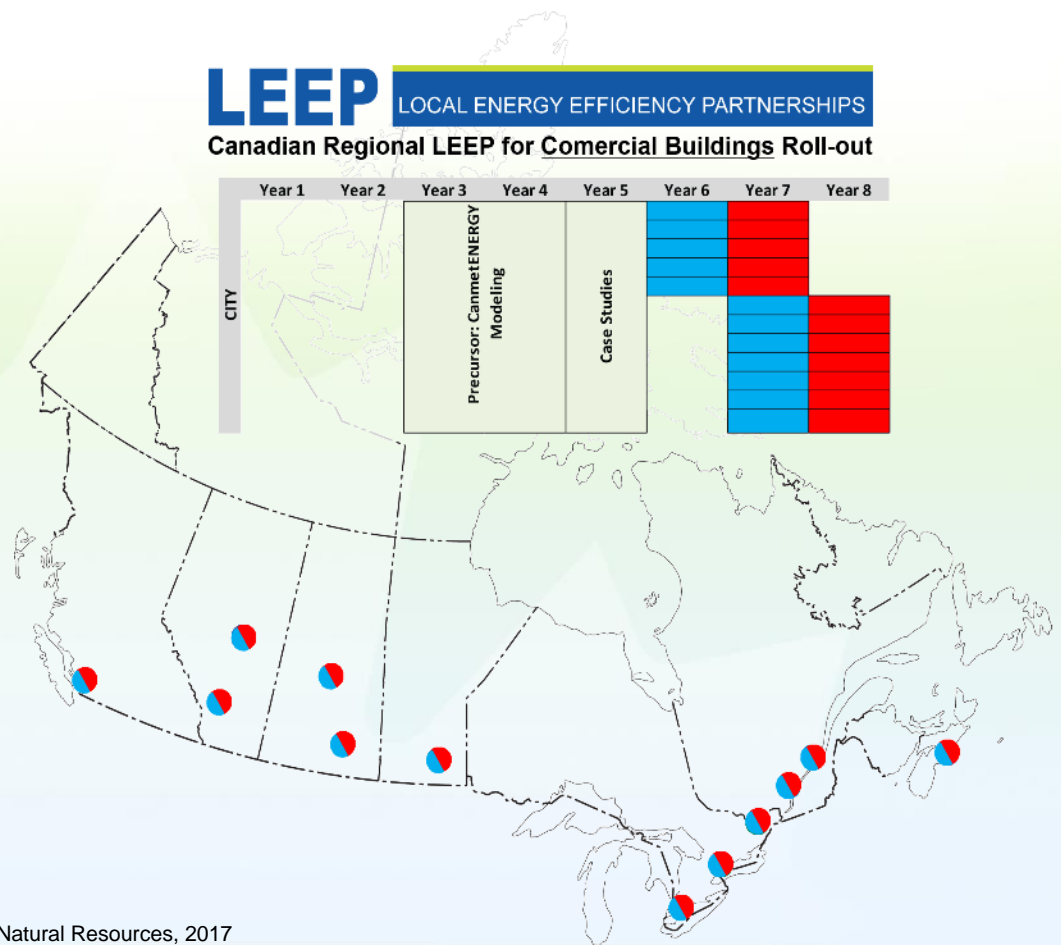
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LEEP for Commercial Buildings

- **LEEP for Commercial Buildings:**
New initiative with delivery starting later in cycle once LEEP for Retrofit has been established and CanmetENERGY has developed base materials. It will likely focus on new Multi Unit Residential Buildings (MURBs).



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4. LEEP technology costing spreadsheet

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LEEP Costing Spreadsheet Vision

To enable builders to:

- Cost technology innovations that LEEP builders have incorporated in their homes.
- Customize this spreadsheet to their own specific conditions so that it is relevant to the homes they build.
- Use costing to help select high performance housing technologies.

To enable industry to have a common costing framework for new innovative technologies that they can develop and share as they see fit.

CHBA has requested a copy of the worksheet that they can share with those that are interested through the NZ Council.

File Home Insert Page Layout Formulas Data Review View Tell me what you want to do...

Clipboard Font Alignment Number Styles Cells Editing

Normal Bad Good Neutral Calculation Check Cell Explanatory... Input Linked Cell Note

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

ENERGY EFFICIENT TECHNOLOGY COST COMPARITOR SPREADSHEET

Provides an automated template to compare the installed cost of energy efficient component upgrades to envelope, mechanical or renewable systems against a base case on a per unit basis.

Background

The Canadian Home Builders Association (CHBA) has requested to distribute this spreadsheet developed by Natural Resources Canada's Local Energy Efficiency Partnerships (LEEP) team to support its membership in estimating the costs of upgrading their homes to achieve higher energy performance.

Costs shown in the spreadsheet were collected in 2012 by a 3rd party cost consultant. These were subsequently updated by builders and manufacturers where LEEP workshops were held. Builders should update technology descriptions, line items and costs to make them relevant to their practices for their homes in their regions.

Vision

This tool has been developed to enable builders to:

- Cost technology innovations that LEEP builders have incorporated in their homes;
- Customize this spreadsheet to their own specific conditions so that it is relevant to the home they build; and
- Use costing to help select high performance housing technologies.

Additionally, this tool will enable industry to have a common costing framework for new innovative technologies that they can develop and share as they see fit.

Each spreadsheet will provide a cost comparison against a user defined base case specification. As shown to the right.

Costing is an imperfect science!

The cost estimates provided in this spreadsheet reflect technology upgrades for envelope, mechanical and renewable technologies requested by LEEP builders in BC's Lower Mainland. They provide a starting point for builders to consider high performance alternatives to current building practice. Builders must consider these alternatives in the context of their market supply chain, specific design approach, trades capacity, material availability, volume of purchasing, and local technical capacity.

Builders must adjust costs to reflect their local market conditions for this to have value.

To use this spreadsheet, follow the instructions provided in the instructions highlighted in green on the right hand side of each of the "STEP" worksheets (light blue tabs). These will provide information on how to use the spreadsheet to compare your base case home with your common local specifications against higher performance envelope (orange tabs), mechanical (dark blue tabs), and renewable systems (purple tabs).

ENERGY EFFICIENT TECHNOLOGY COST COMPARATOR SPREADSHEET									
BASE TECHNOLOGY: CONVENTIONAL FRAMING		INNOVATIVE TECHNOLOGY: R-24 EXTRUDED POLYSTYRENE (XPS) WALL							
HOME MODEL, LOCATION, BUILDER: 3376 sq. ft. Walkout, located in Abbotsford, BC, built by BC Lower Mainland LEEP									
DESCRIPTION	UNITS	QTY	MATERIAL & LABOR UNIT COST (\$)	UNIT COST (\$)	LABOR UNIT COST (\$)	UNIT COST (\$)	UNIT COST (\$)	TOTAL UNIT COST (\$)	TOTAL COST (\$)
BASE TECHNOLOGY: CONVENTIONAL FRAMING									
Framing, conventional, 2x6 hollow (2x4) @ 40mm (15" c.c.)	sf wall	3,751.24	0.00	2,365	0.00	1,980	4,345		
Insulation, 2x6 hollow (2x4) @ 40mm (15" c.c.)	sf exposed	3,421.00	0.07	1,400	0.06	1,200	5,180		
Insulation, R24 batt (fibreglass)	sf exposed	3,421.00	1.10	3,763	0.06	900	4,700		
Vapour barrier, 6 mil polyethylene	sf wall	3,421.00	0.11	370	0.06	900	1,230		
Water Resistant Barrier (WRB) (includes taping seams)	sf exposed	3,421.00	0.10	400	0.06	900	1,400		
Sheathing, 1/4" @ 16" c.c.	sf wall	3,421.00	0.10	340	0.06	1,710	2,050		
1/2" Gypsum board	sf wall	3,421.00	0.05	1,200	0.01	1,400	2,000		
	-	-	-	0	-	0	0		
TOTAL				\$ 10,000		\$ 9,240	\$ 19,240		
INNOVATIVE TECHNOLOGY: R-24 EXTRUDED POLYSTYRENE (XPS) WALL									
Framing, conventional, 2x6 hollow (2x4) @ 40mm (15" c.c.)	sf wall	3,751.24	0.00	2,365	0.00	1,980	4,345		
Insulation, XPS Type 2, 1/2" @ 20mm (2")	sf exposed	3,421.00	1.40	4,790	0.06	3,400	8,250		
Insulation, 2x6 hollow (2x4) @ 40mm (15" c.c.)	sf exposed	3,421.00	0.06	900	0.06	1,200	2,100		
Insulation, R24 batt (fibreglass)	sf exposed	3,421.00	0.01	1,400	0.06	900	2,360		
1/2" Gypsum board	sf wall	3,421.00	0.05	1,200	0.01	1,400	2,000		
Sheathing, 1/4" @ 16" c.c.	sf wall	3,421.00	0.10	340	0.06	1,710	2,050		
	-	-	-	0	-	0	0		
TOTAL				\$ 10,000		\$ 10,360	\$ 20,360		
INITIAL COST IMPACT: \$ 1,120									

FileHomeInsertPage LayoutFormulasDataReviewViewTell me what you want to do...

CutCopyFormat Painter

PasteFormat Painter

Clipboard

Arial14A⁺A⁻

B*I*U

Font

Wrap Text

Merge & Center

Alignment

General

\$ % $\frac{\square}{\square}$ $\frac{\square}{\square}$

Number

Conditional Formatting

Format as Table

NormalBadGoodNeutralCalculation

Check CellExplanatory...InputLinked CellNote

Styles

InsertDeleteFormat

Cells

AutoSumFillClear

Editing

Sort & Find & Filter > Select >

Editing

A1 STEP 1: GEOMETRY OF THE HOME

A B C D E F G H I J K L M N O P Q R S T U

1

STEP 1: GEOMETRY OF THE HOME

2

HOUSE IDENTIFICATION

3

BUILDER

BC Lower Mainland LEEP

4

MODEL

3370 sq. ft. Walkout

5

LOCATION

Abbotsford, BC

6

ABOVE GRADE WALLS

HEIGHT (ft)

PERIMETER (ft)

AREA (sq.ft.)

7

WALLS

8

First Floor

9.08

185.66

1,593

9

Second Floor

8.00

207.08

1,507

10

Basement Walkout

0.00

0.00

651

11

Subtotal - Wall Area

3,751

12

HEADERS

13

First Floor Header

0.83

159.16

132

14

Second Floor Header

0.00

0.00

0

15

Subtotal - Header Area

132

16

TOTAL WALL AREA (headers included & windows removed for calculating sheathing and/or me

3,422

17

BELOW GRADE WALLS

HEIGHT (ft)

PERIMETER (ft)

AREA (sq.ft.)

18

Foundation Wall

9.00

201.50

1,162

19

ROOF

AREA (sq.ft.)

20

Insulated Attic

1,423

21

Cathedral Ceiling

242

22

WINDOWS

calculate total area per floor

AREA (sq.ft.)

23

SLIDERS

24

Below Grade

125

25

First floor

174

26

Second Floor

164

27

Third Floor

0

28

Subtotal Area - Slider Windows

462

29

CASEMENT

30

Below Grade

0

31

First floor

0

32

Second Floor

0

33

Third Floor

0

34

Subtotal Area - Casement Windows

0

35

PICTURE

36

Below Grade

0

37

First floor

0

38

Second Floor

0

39

Third Floor

0

40

Subtotal Area - Picture Windows

0

41

FIXED

42

Below Grade

0

43

First Floor

0

44

Second Floor

0

45

Third Floor

0

46

Subtotal Area - Fixed Windows

0

INSTRUCTIONS (DOES NOT PRINT)

Colour Legend: Values in BLUE TEXT cells require users to select inputs from dropdown menus OR by manual entry. All other values will automatically update; no user input is required.

Enter the house dimensions in order to establish the material and labour quantities that will be used to populate the base case and technology comparison worksheets.

Also see line-specific instructions below.

For walkout basement, subtract "basement walkout" area from total

Share

This command is currently unavailable

Your administrator has disabled this command through group policy

Tell me more

3	SPECIFICATION	UNITS	QTY.	MATERIAL & EQUIP.		LABOUR		TOTAL COST (\$)
				UNIT COST (\$)	COST (\$)	UNIT COST (\$)	COST (\$)	
4	CONVENTIONAL FRAMING							
5	Framing, conventional, 38x140mm (2"x6") @ 406mm (16") o.c.	sf wall	3,751.24	0.63	2,365	0.53	1,990	4,355
6	Plywood, 13mm (1/2")	sf applied	3,421.68	0.57	1,950	0.36	1,230	3,180
7	Insulation, R24 batt (fiberglass)	sf applied	3,421.68	1.12	3,830	0.28	960	4,790
8	Vapour barrier, 6 mil polyethylene	sf wall	3,421.68	0.11	370	0.28	960	1,330
9	Water Resistant Barrier (WRB) (includes taping seams)	sf applied	3,421.68	0.13	445	0.29	990	1,435
10	Strapping, 1x4 @ 16" o.c.	sf wall	3,421.68	0.10	340	0.50	1,710	2,050
11	1/2" Gypsum board	sf wall	3,421.68	0.35	1,200	0.41	1,405	2,605
12		-		-	0	-	0	0
13		-		-	0	-	0	0
14		TOTAL			10,500		9,245	19,745

[illegible]

16	Windows, DG, vinyl, high SHGC, low-e, argon, insulating spacers - casement	1st applied	451.67	22.98	10,610	0.00	0	10,610
17		-	0.00	-	0	-	0	0
18		-	0.00	-	0	-	0	0
19		-	0.00	-	0	-	0	0
20		-	0.00	-	0	-	0	0
21		TOTAL			10,610		0	10,610

22	Средства на счета в банках (субсчета "Средства в банках", "Средства в банках - валютные средства", "Средства в банках - валютные средства - валютные средства")	1 100 00	7 00	0 005	1 10	1 005	10 500
----	---	----------	------	-------	------	-------	--------

23	Concrete cast-in-place foundation wall, 203mm (8") excluding footings	sf wall	1,162.08	7.63	8,895	1.46	1,635	10,560
24	Exterior dampproofing	sf applied	1,162.08	1.50	1,745	0.18	205	1,950
25	Framing, conventional, 38x83mm (2"x4") @ 406mm (16") o.c.	sf wall	1,162.08	0.46	535	0.53	615	1,150
26	Insulation, R12 batt	sf applied	1,162.08	0.36	420	0.28	325	745
27	Vapour barrier, 6 mil polyethylene	sf wall	1,162.08	0.11	125	0.28	325	450

11

ENERGY EFFICIENT TECHNOLOGY COST COMPARITOR SPREADSHEET

2	BASE TECHNOLOGY: CONVENTIONAL FRAMING	INNOVATIVE TECHNOLOGY: R-30 EXTRUDED POLYSTYRENE (XPS) WALL
3	HOME MODEL, LOCATION, BUILDER: 3370 sq. ft. Walkout, located in Abbotsford, BC, built by BC Lower Mainland LEEP	

5	6	SPECIFICATION	UNITS	QTY.	MATERIAL & EQUIP.		LABOUR		TOTAL COST (\$)
					UNIT COST (\$)	COST (\$)	UNIT COST (\$)	COST (\$)	
BASE TECHNOLOGY: CONVENTIONAL FRAMING									
7		Framing, conventional, 38x140mm (2"x6") @ 406mm (16") o.c.	sf wall	3,751.24	0.63	2,365	0.53	1,390	4,355
8		Plywood, 13mm (1/2")	sf applied	3,421.68	0.57	1,950	0.36	1,230	3,180
9		Insulation, R24 batt (fiberglass)	sf applied	3,421.68	1.12	3,830	0.28	960	4,790
10		Vapour barrier, 6 mil polyethylene	sf wall	3,421.68	0.11	370	0.28	960	1,330
11		Water Resistant Barrier (wRB) (includes taping seams)	sf applied	3,421.68	0.13	445	0.29	990	1,435
12		Strapping, 1x4 @ 16" o.c.	sf wall	3,421.68	0.10	340	0.50	1,710	2,050
13		1/2" Gypsum board	sf wall	3,421.68	0.35	1,200	0.41	1,405	2,605
14		-	-	-	0	-	-	0	0
15		TOTAL				\$ 10,500		\$ 9,245	\$ 19,745

INSTRUCTIONS

General Notes

Colour Legend: Values in BLUE TEXT cells require users to select inputs from dropdown menus OR by manual entry. All other values shown will automatically update; no user input is required.

Important: Costs will vary substantially for each technology based on components, volume, location, trades capacity and many other factors. Builders must update technology descriptions, line items and costs to make them relevant to their practices for their homes in their regions. See disclaimers on OVERVIEW tab.

Step-by-Step Instructions for Use

Step 1: Describe the innovative system to be compared to the base case in cell F2.

Step 2: Confirm that the BASE CASE SYSTEM specifications match those found in the "STEP 2 BASE CASE SPECIFICATIONS" worksheet for that technology.

INNOVATIVE TECHNOLOGY: R-30 EXTRUDED POLYSTYRENE (XPS) WALL

18	Framing, conventional, 38x140mm (2"x6") @ 406mm (16") o.c.	sf wall	3,751.24	0.63	2,365	0.53	1,930	4,355
19	Insulation, XPS Type 3, rigid, 25mm (3")	sf applied	3,421.68	2.10	7,185	0.89	3,045	10,230
20	Oriented Strand Board (OSB), 12mm (7/16")	sf applied	3,421.68	0.26	890	0.36	1,230	2,120
21	Insulation, R22 batt (fiberglass)	sf applied	3,421.68	0.71	2,430	0.28	960	3,390
22	1/2" Gypsum board	sf wall	3,421.68	0.35	1,200	0.41	1,405	2,605
23	Strapping, 1x4 @ 16" o.c.	sf wall	3,421.68	0.10	340	0.50	1,710	2,050
24		-	-	0	-	-	0	0
25		-	-	0	-	-	0	0
26	TOTAL			\$ 14,410			\$ 10,340	\$ 24,750

28	INITIAL COST IMPACT	\$ 5,005
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Step 8: Compare the cost impact of an Innovative Technology against a Base Case Technology for your home in the "INITIAL COST IMPACT" cell.

5. Upcoming Events:

LEEP Retrofit workshops

LEEP Gas Mechanicals Technology Forums

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LEEP Retrofit workshops

Objective:

Reduce renovator time and risk in identifying, refining, and selecting innovations that can improve the energy performance of the homes you fully renovate (with or without an addition) by at least 40% all the way to Net Zero Ready.

Retrofit LEEP responds to CHBA's request to: “...**expand (LEEP) to include energy retrofit technologies.**” *Canadian Home Builders Association, 2016*

Preparing Renovators for Increased Home Energy Performance



Net Zero

Net Zero Ready
(~80% better)

~40% better

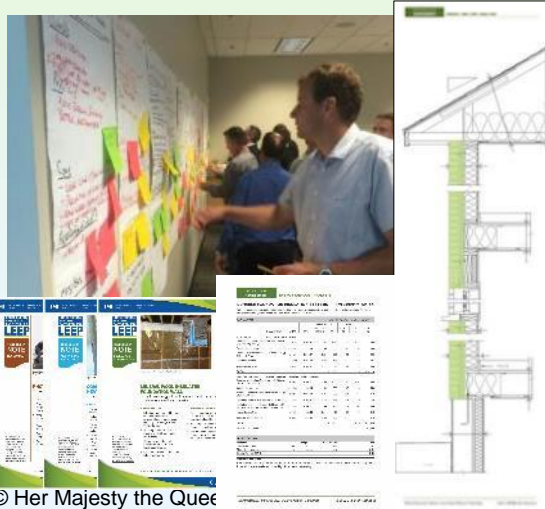
1980's home

Retrofit LEEP Planning Steps

November 2017

1. Renovator Planning Meeting #1

- Define gaps, barriers and benefits of preferred envelope systems
- Prioritize envelope systems
- Define technical challenges
- Identify those who can address the technical challenges and supply preferred envelope systems.



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April 2018

2a - Industry response to renovator envelope system requirements

- Assess manufacturer/supply chain response
- Select manufacturer/supply chain to present preferred systems at LEEP Forums

2b - Assess and prioritize requirements for mechanical systems

- Define challenges on priority approaches



June-July 2018 (...or wait until fall?)

3. LEEP Renovators Technology Forum(s)

- Selected manufacturer/supply chain respond to renovator planning groups' defined challenges for envelope and/or mechanical systems



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Next Steps:

- Renovator Planning Meeting #1 November 21st in London, ON
- London Home Building Association (LHBA) is prime delivery partner.
- LHBA and CHBA actively recruiting renovators for first meeting from London and surrounding HBAs.
- Technical materials and content under development.
- Facilitation for planning meeting #1, under development.



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Image courtesy of: Stuart Fix - Renu



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LEEP Gas Mechanicals Forums

One day forums coming this fall and winter

Partners: CGA, Atco Gas, SaskENERGY, Enbridge, Union Gas,

CHBA, LHBA, BILD, GOHBA, HHHBA, BILD-Calgary, CHBA-Edmonton, SRHBA, RRHBA

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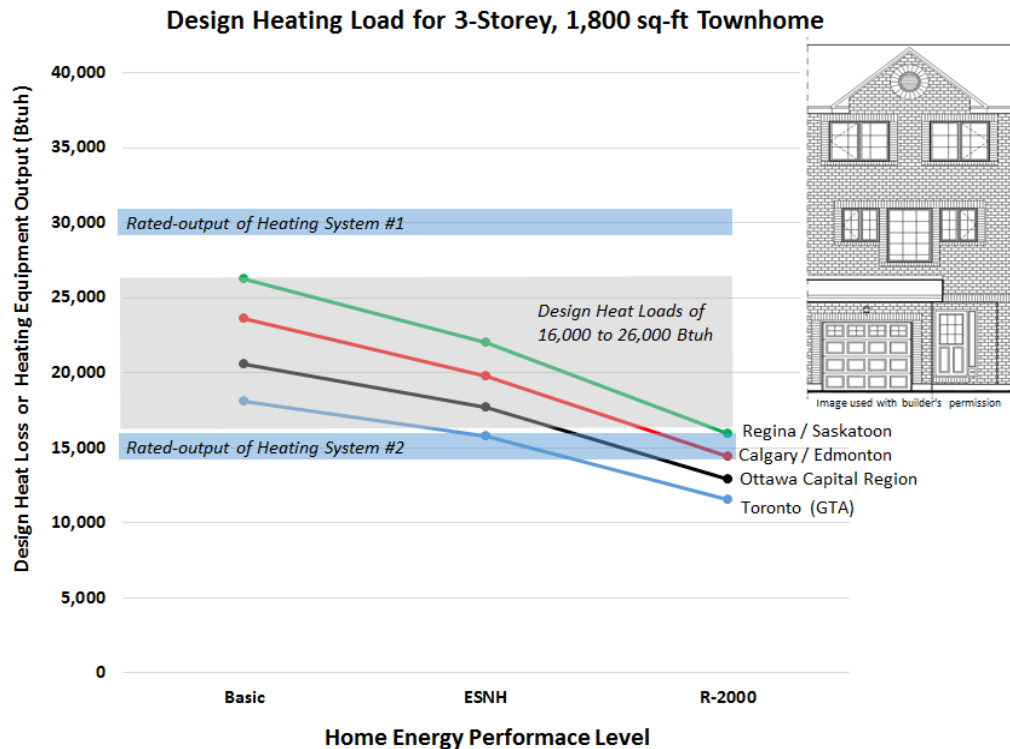


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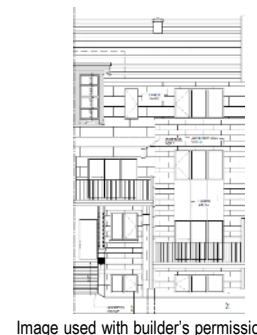
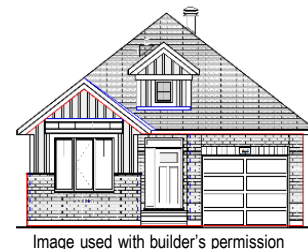
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Many of today's homes need smaller heating systems



These singles have similar low design space heating loads



Design space heating loads can be far less yet for back-to-backs and stacked towns

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Mechanical challenges for the low load home market

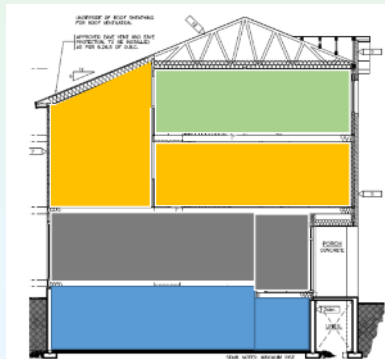
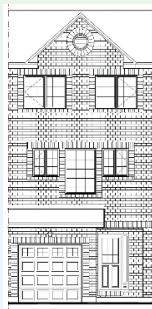
- Builders individually and through the CHBA's Technical Research Committee (TRC) have identified the need for more appropriately sized systems.
- Through LEEP we have seen equipment being quoted that is 2 to 4x the calculated Design Heating Load!
- The Canadian Gas Association and 5 member utilities (FortisBC, Atco, SaskEnergy, Enbridge and Union Gas) have contracted the LEEP team to address the sizing issue raised at TRC.
- The Forums will also address needs such as: improving air distribution in tall homes; window selection and impact on air conditioner sizing; and cost effective energy efficient solutions.



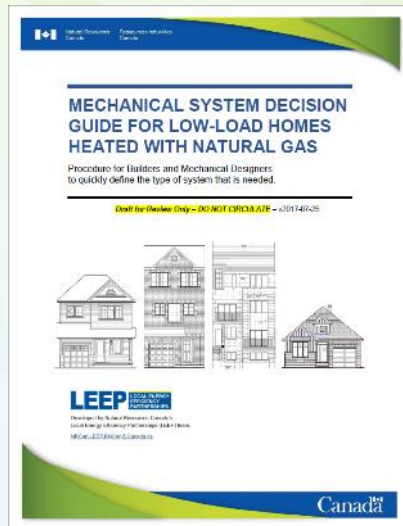
LEEP Gas Mechanicals Technology Forums

At these one day forums, participants will:

1) Interact with an expert panel to review today's HVAC challenges



2) Learn to use a new 12 step decision guide to find the types of mechanical systems you want for the homes you build



3) Learn about and compare costed best practice HVAC systems for a case study home from 4 utility selected manufacturers.



Systems shown are those selected by Union Gas for presentations in London and Hamilton

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Saskatoon – Date TBD

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Questions?

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