



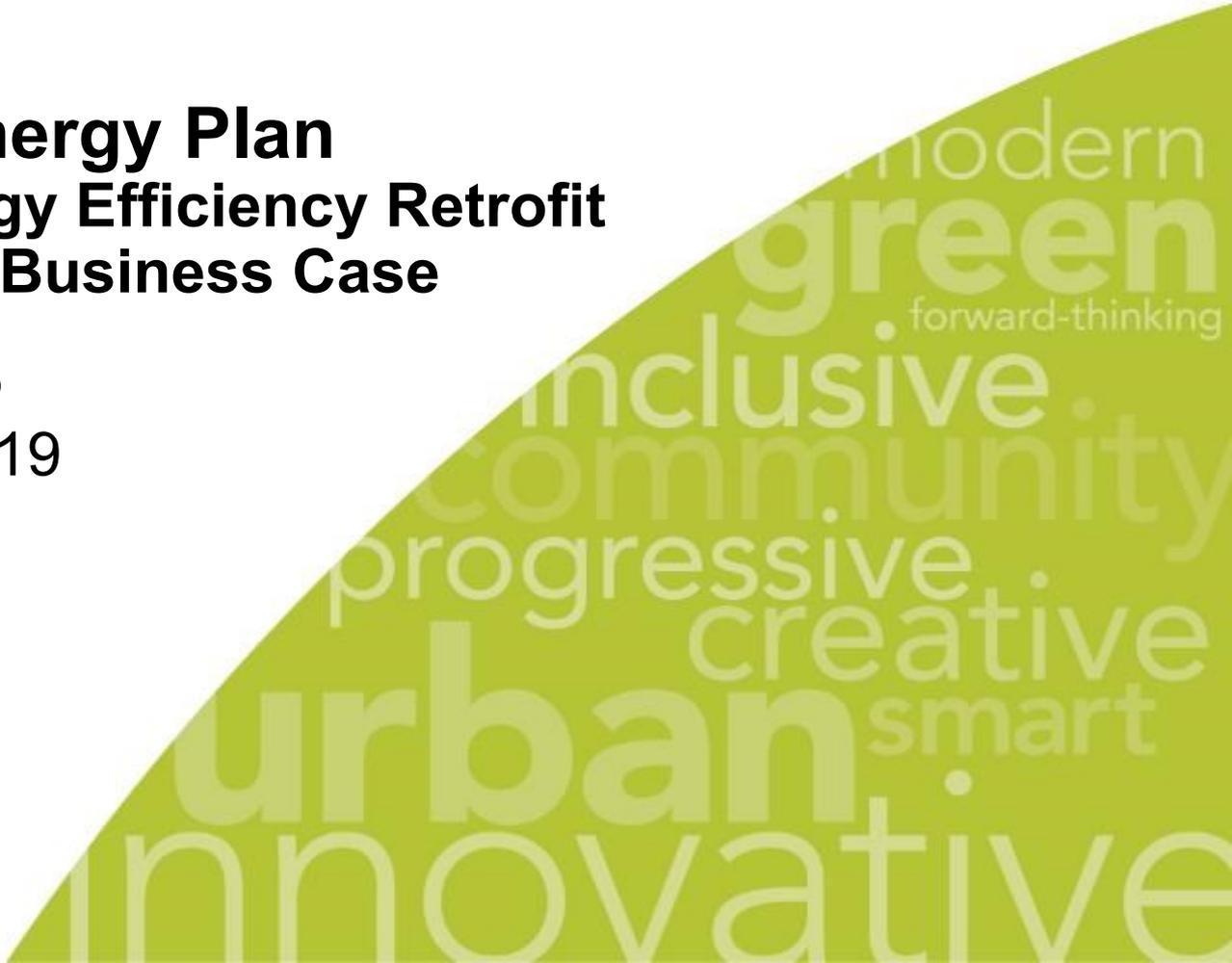
# Community Energy Plan Newmarket Energy Efficiency Retrofit Home Efficiency Business Case

Council Workshop  
September 30, 2019

Planning & Building Services  
Planning Division

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# Background

## *Grounded in the CEP*

- Newmarket CEP approved in 2016
  - *40% per capita reduction of energy consumption and emissions by 2031 from 2013 levels*
- CEP Strategy 1A - increase residential energy efficiency
  - *Deep retrofit 80% of existing home by 2041 to achieve a 30 to 50% increase in energy efficiency depending on the age and type of home*
    - *Creation of an entity to deliver standardized retrofits by home age and type*
    - *Team with local contractors, material suppliers and investors to transform the energy retrofit market*
    - *Use LIC financing and standardized pricing approaches to create scale*

# Background

## *Grounded in leadership*

- Town Council approved the development of a “Business Case” in 2018 to investigate the feasibility of the CEP home energy efficiency strategy (Strategy 1A)
  - *Under a credible set of assumptions, can the case be made to establish an Entity with a mandate to deliver high quality, standardized residential energy retrofit packages to most Newmarket homes?*
- *Project Working Team & Stakeholder Advisory Group was established to lead the project and report back with their findings and recommendations*

# SAG Recommendations

## *Program Enablement*

The SAG recommends that Town Council:

- Endorse the Final Report
- Incorporate a Municipal Services Corporation
- Apply for FCM funding
- Enact an LIC By-law and enter into an agreement with the Municipal Services Corporation
- Address program accessibility in the final program design

# Planning and Decision-Making Process

## *Where are we?*

Led by Town

Program Enablement

- Establish Entity
- Apply for FCM funding
- Pass LIC By-law (at Program Launch)

Led by Entity

Program Design

- Additional Market Research
- Program Risk Assessment
- Partnership Development

Program Launch

- Final Business Plan
- Town-Entity Agreement

# Municipal Commitment

## *What would this mean?*

Phase	Commitment	Estimated Cost	Risk	Risk Rating	Mitigation
Program Enablement	Create Entity with appropriate governance	Town resources (primarily legal)	Entity is created and never used. No return on investment.	Medium	The development of the Business Case helps mitigate this risk. The corporate structure could be “moth-balled” and repurposed at some future date.
	Pass LIC By-law	Town resources (primarily legal)	By-law is passed and not used.	Low	The By-law would be contingent on the execution of a Town-Entity Agreement and that agreement would be contingent upon the Entity developing a Business Plan to the satisfaction of Town.
	Apply for FCM funding to resource Entity	Town resources	Funding is not received.	Medium	Proactively engage with FCM.

# Municipal Commitment

## *What would this mean?*

Phase	Commitment	Estimated Cost	Risk	Risk Rating	Mitigation
Program Design	Secure start-up capital to hire a General Manager and provide the Entity with enough resources to develop the Business Plan	Estimated at approximately \$300,000	Entity is not successful in developing a Business Plan based on the Business Case (i.e., no return on investment).	Medium	Pursue FCM funding to mitigate financial risk.

# Municipal Commitment

## *What would this mean?*

Phase	Commitment	Estimated Cost	Risk	Risk Rating	Mitigation
Program Launch	Enter into an agreement with the Entity to collect LIC payments from NEER-eligible homeowners on their behalf	Entity and Town internal resources	An agreement is not reached.	Medium	Appropriately resource Entity to develop the Business Plan. Budget for an experienced General Manager.
	Administer LIC payments	Two additional FTEs estimated @ \$164,000	Impact on tax base	Low	Recoup administrative costs from the Entity (Town-Entity Agreement)

# NEER Business Case

## *Three key assumptions*

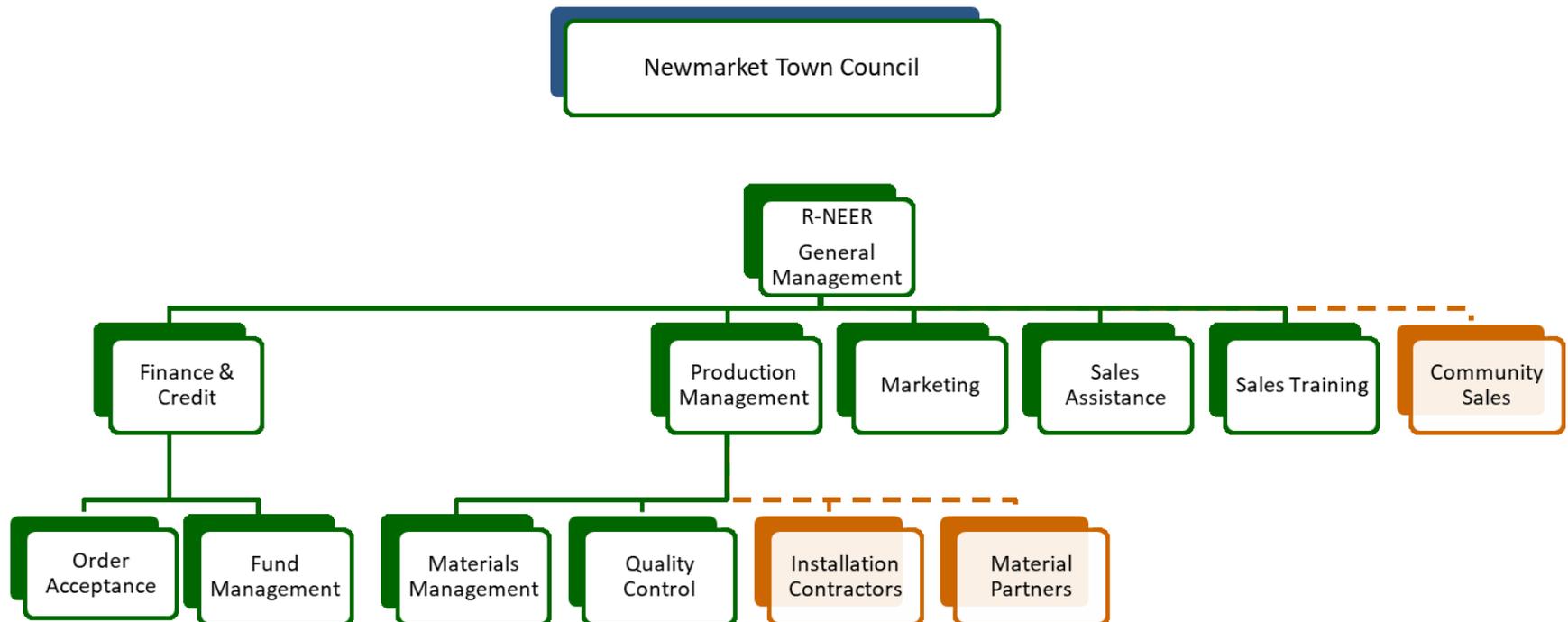
- Governance assumption
  - *Establish a Municipal Services Corporation*
- Business model assumption
  - *Deliver standardized retrofits at volume*
- Financing assumption
  - *Municipality collects LIC payments from NEER-eligible homeowners on behalf of the Entity to pay for the retrofit*

# Governance

- Flexible financing approach
  - *Minimize municipal liability*
  - *Leverage private sector investment*
- Facilitate private sector partnerships
- Transfer program delivery risks to MSC
  - *Borrowing is placed on the MSC's balance sheet*
- MSC not limited to working within municipal boundaries
  - *Municipal partnerships*

# Corporate Governance *Owned by Town*

Entity owned directly by Town or through a Holding Company



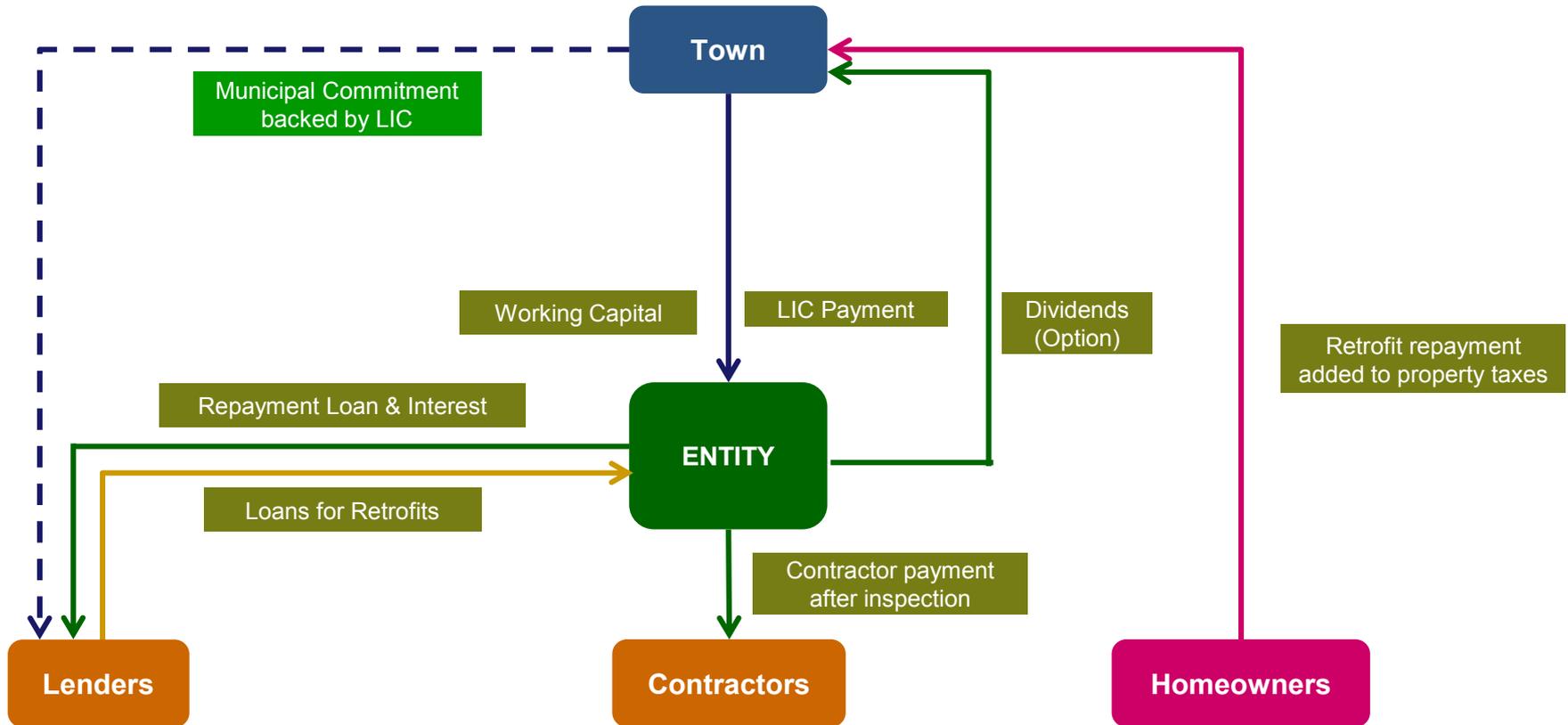
# Business Model

- Market problem
  - *Disaggregated*
  - *High transactional costs (low margins)*
  - *Low volume*
  - *Weak business case (cost > energy savings)*
- Product solution - standardized deep energy retrofits
  - *Market consolidation*
  - *Increased margins*
  - *High volume*
  - *Strong business case (cost of average retrofit reduced by 33%)*

# Financing

- LIC Financing Strategy
  - *Reduces financial barriers for homeowners*
    - *No up-front capital costs*
    - *Low cost financing*
    - *Payments matched to energy savings*
    - *Payments remain with the property if the homeowners sells*
  - *Municipality enters into an agreement with NEER-eligible homeowners to collect LIC payments on behalf of the Entity*
    - *Debt managed on Entity's balance sheet*
    - *Entity secures private sector loans to pay contractors*

# NEER Financing Strategy



# LIC Risk Assessment Dashboard

Risk	Rating	Risk	Rating
1. LIC legislation	Green	11. Corporate governance	Yellow
2. LIC by-law	Yellow	12. Program delivery	Green
3. Capital resources	Yellow	13. Debt management	Green
4. Operating resources	Green	14. Homeowner default	Green
5. Building department	Yellow	15. Interest rates	Green
6. Tax department	Red	16. Liability (defective work)	Green
7. Homeowner mortgage	Green	17. Administrative costs	Yellow
8. Property assessment	Green	18. Regulatory compliance (LIC)	Green
9. Real estate market	Yellow	19. Regulatory compliance (OBC)	Green
10. Municipal tax sales	Green	20. Regulatory compliance (MSC)	Yellow

# Analytical and Modelling Highlights

- Market
- Retrofit Packages
- Opportunity Size
- Retrofit Pricing & Managing Pricing Risk
- Financing & Funding Flow
- Results
  - *Cash Flow*
  - *Typical Homeowner*
  - *Stakeholder Benefits*

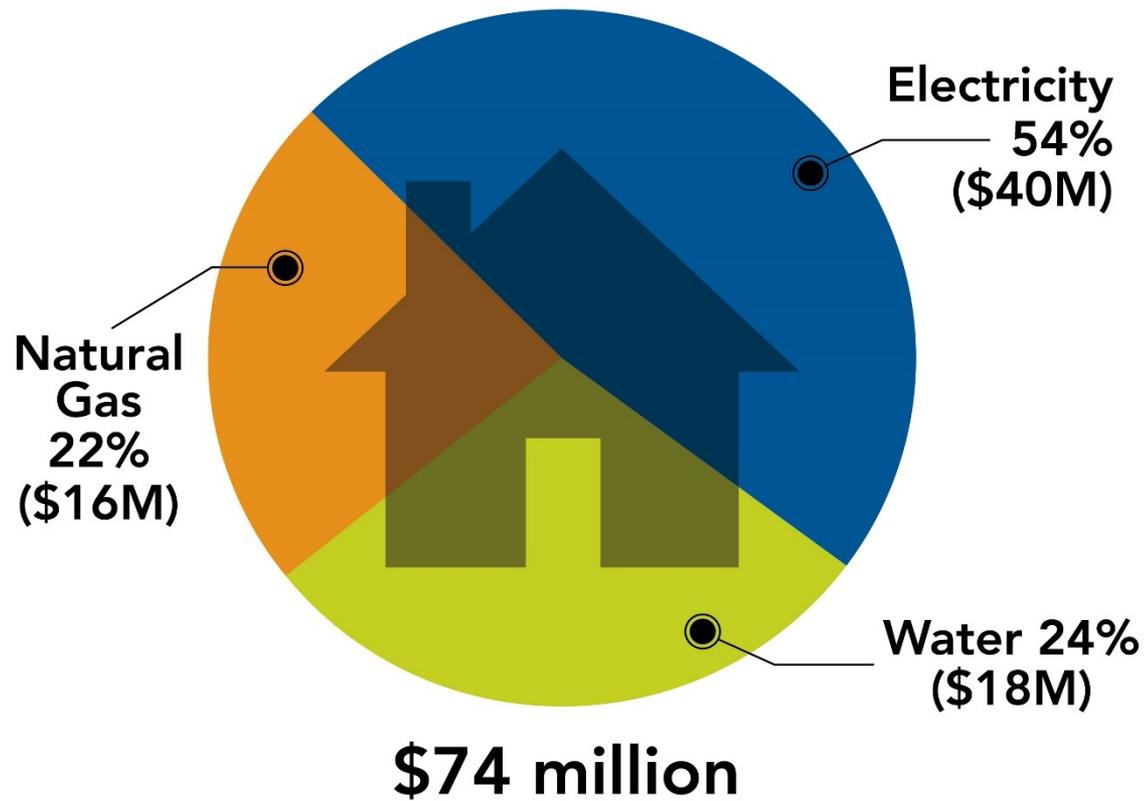
# Residential Energy Efficiency Retrofit Business Case

## Market

# Background

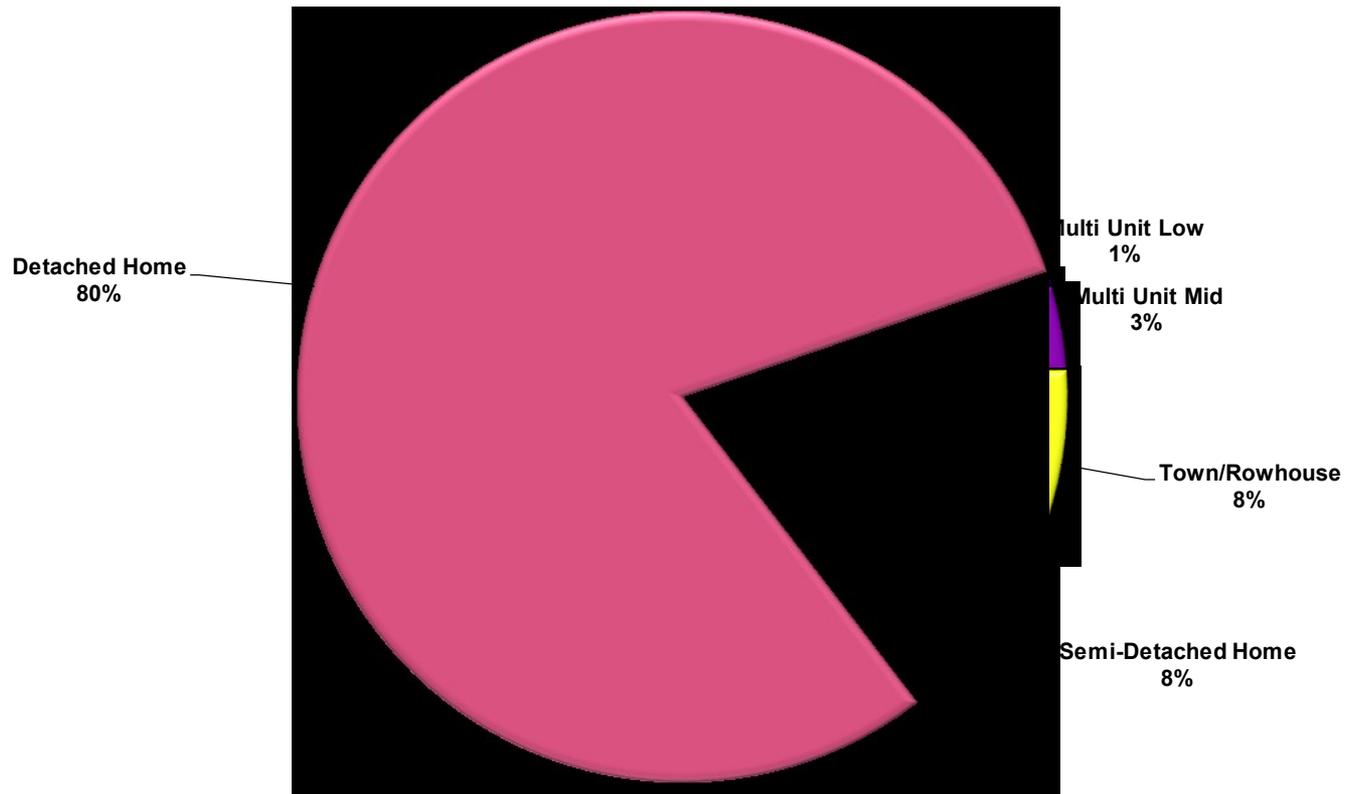
## *Reducing energy, emissions & cost*

How much do Newmarket residents pay for energy and water each year?



# 2017 Residential Baseline *Site Energy – Type – 3.0M GJ*

R-NEER Newmarket - Site Energy Usage by Building Type - Baseline 2017



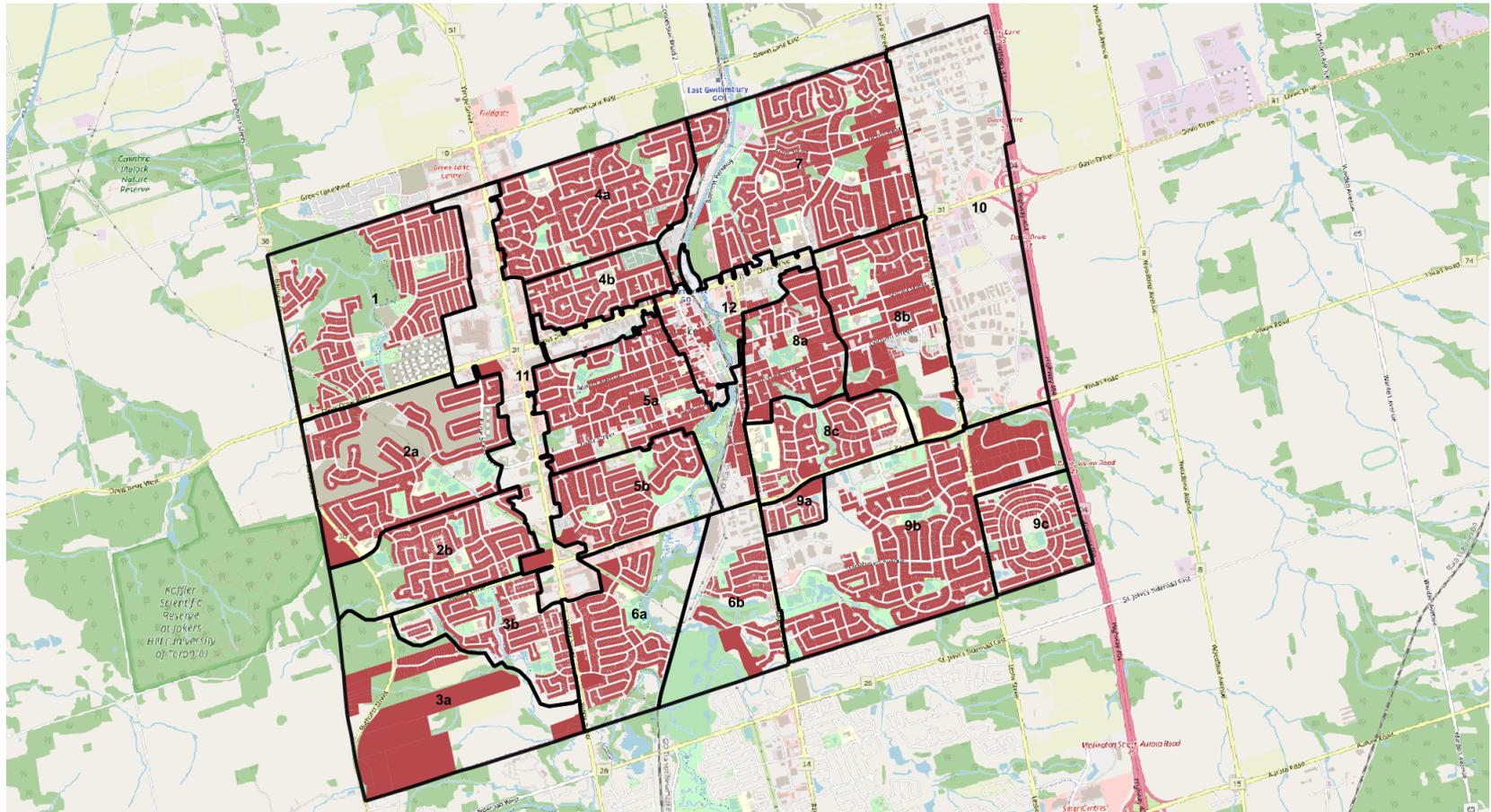
# NEER Business Case

## *Target Markets*

- Potential
  - *All existing Homes in 2017*
- Prioritization - Type
  - *Detached Homes - Highest*
  - *Semi-Detached Homes - High*
  - *Town/Rowhouse - Medium*
  - *Other - Lower*
- Prioritization – Age
  - *Older to newer*
  - *Prior to 2012 OBC change*
- Prioritisation – Ownership
  - *Owner occupier – Highest*
  - *Housing Associations – High*
  - *Landlords - Lower*

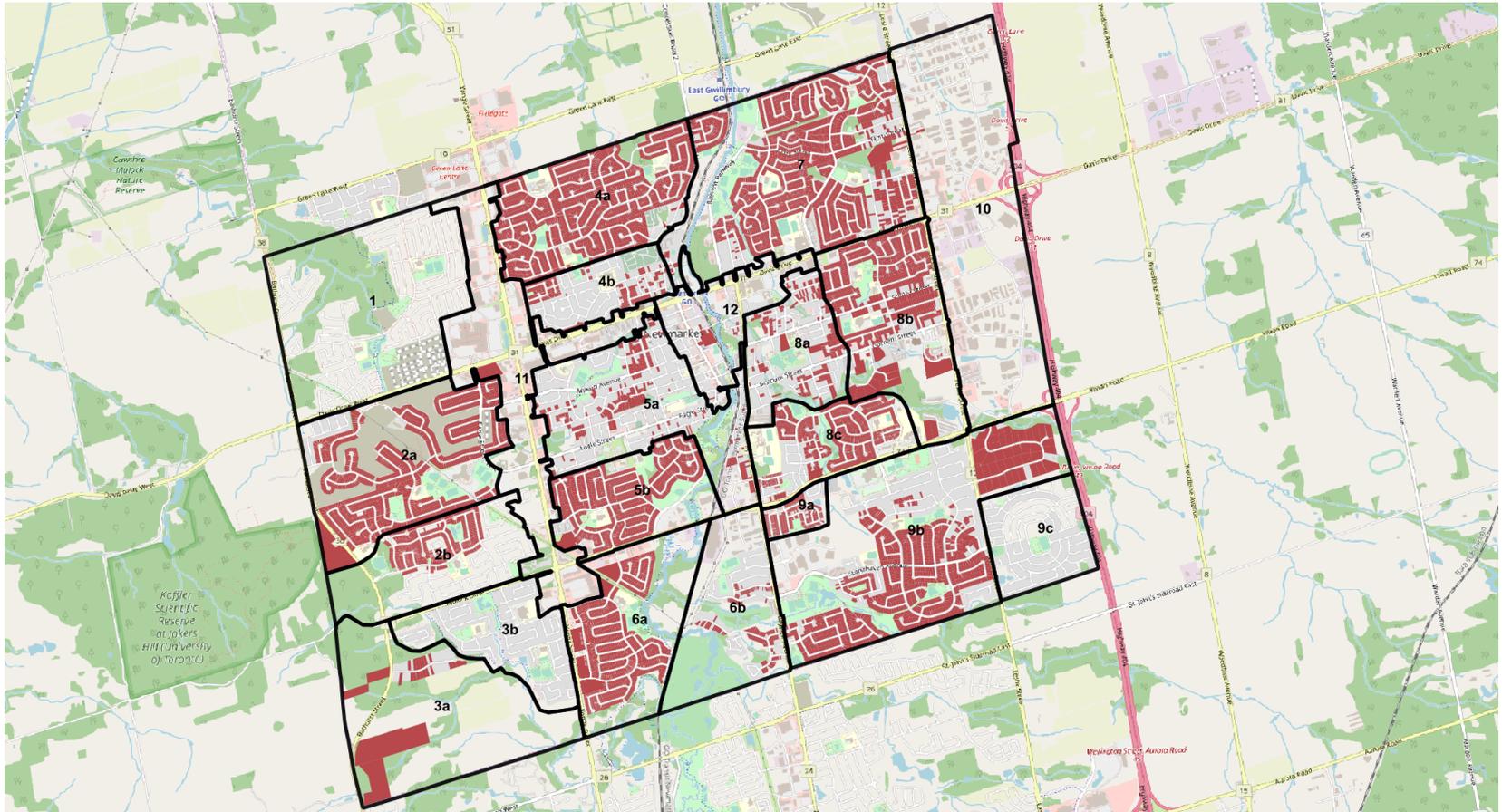
# Newmarket Residential Sector 2017

## Single Units (All) – 27,000 / 4.6 M m<sup>2</sup>



# Newmarket Residential Sector 2017

*Single Units >20 yrs old – 15,000 / 3.0 M m<sup>2</sup>*



# Residential Energy Efficiency Retrofit Business Case

## Retrofit Packages

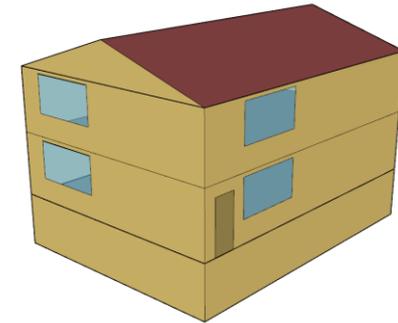
# Single Units (Detached, Semi, Town) Archetype Characteristics - Baseline

**Type:** Single Units with, attic roof, wood-frame walls, slab-on-grade foundation, and metal-frame windows. Served by furnace and split AC units.

**# Floors:** 2

**Area:** 223 SM

**Window-to-Wall Ratio:** 15%

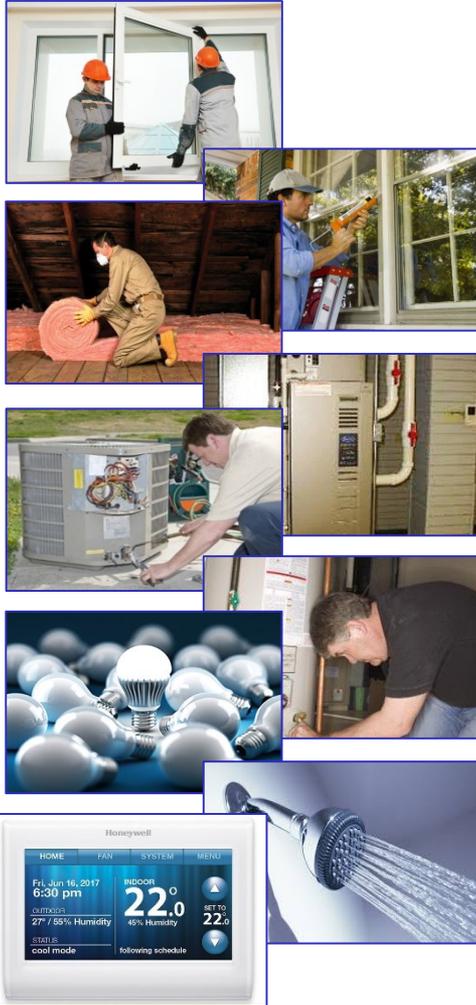


	Pre-1975	1975-1997	1998-2011	Post-2011
<b>Window Properties</b>	U-2.96 [SI]	U-2.27 [SI]	U-1.99 [SI]	U-1.40 [SI]
<b>Wall Properties</b>	R-1.06 [SI]	R-1.49 [SI]	R-3.03 [SI]	R-4.24[SI]
<b>Roof Properties</b>	R-1.04 [SI]	R-2.01 [SI]	R-5.24 [SI]	R-6.15 [SI]
<b>Heating Efficiency</b>	78%	78%	80%	84%
<b>Cooling Efficiency</b>	3.13 COP	3.13 COP	3.97 COP	4.10 COP
<b>Lighting Power Density</b>	3.88 W/SM	3.88 W/SM	2.57 W/SM	2.57 W/SM
<b>Equipment Power Density</b>	6.53 W/SM	6.53 W/SM	6.53 W/SM	3.97 W/SM
<b>Infiltration</b>	6.5 ACH50	5.0 ACH50	4.0 ACH50	3.5 ACH50



# Retrofit Core Package

## *Standard Package by Home Type & Age*



- Windows
  - *Replace windows to target efficiency level*
- Weatherization
  - *Weather-strip all doors, windows and other openings*
- Attic insulation
  - *Upgrade to target R-Value with “batts” or “snow”*
- Other insulation wherever feasible
  - *Allocation for high-impact measures*
- HVAC upgrades
  - *Replace AC / Furnace / Water Heater to target efficiency levels*
  - *Limited pipe and duct insulation*
- Lighting / Other Electricity
  - *100% LED re-lamping*
  - *Allocation for Smart Strips*
  - *Occupancy sensors*
- Water / Hot Water
  - *Low-Flow faucet regulators & shower heads*
  - *WC flow regulators*
- Comfort Controls
  - *Install Smart Thermostat assuming utility rebate*

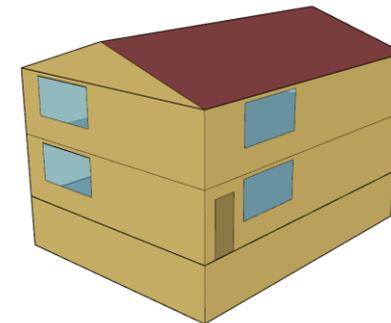
# Single Units (Detached, Semi, Town) Archetype Characteristics - Retrofitted

**Type:** Single Units with, attic roof, wood-frame walls, basement, and metal-frame windows. Served by furnace and split AC units.

**# Floors:** 2

**Area:** 223 SM

**Window-to-Wall Ratio:** 15%



	Pre-1975	1975-1997	1998-2011	Post-2011
<b>Window Properties</b>	U-1.0 [SI]	U-1.0 [SI]	U-1.0 [SI]	U-1.0 [SI]
<b>Wall Properties</b>	R-1.23 [SI]	R-1.63 [SI]	R-3.07 [SI]	R-4.24[SI]
<b>Roof Properties</b>	R-6.10 [SI]	R-6.10 [SI]	R-6.10 [SI]	R-6.15 [SI]
<b>Heating Efficiency</b>	96%	96%	96%	96%
<b>Cooling Efficiency</b>	4.10 COP	4.10 COP	4.10 COP	4.10 COP
<b>Lighting Power Density</b>	1.5 W/SM	1.5 W/SM	1.5 W/SM	1.5 W/SM
<b>Equipment Power Density</b>	4.97 W/SM	4.97 W/SM	6.53 W/SM	3.05 W/SM
<b>Infiltration</b>	4.6 ACH50	3.5 ACH50	2.8 ACH50	2.5 ACH50
<b>Retrofit Cost Index</b>	<b>216 \$/m2</b>	<b>211 \$/m2</b>	<b>186 \$/m2</b>	<b>143 \$/m2</b>



Cost Indexes based on current market practices

# Residential Energy Efficiency Retrofit Business Case

## Opportunity Size

# Market Penetration Operational Targets

- First targets are older Single Units
- 4% of these renovated annually
- After 2 years target older Multi Units
- 3% of these renovated annually
- As homes become 20 years or older, they are targeted
- Maximum uptake in any category is 80%
- Start ramp (% of yearly rate):
  - 2021: 25%
  - 2022: 50%
  - 2023: 75%
  - 2024: 100%

Home Category	Start Year	Yearly Rate	End Rate
Pre-1975 Multi Unit Low	2025	3.0%	80%
Pre-1975 Multi Unit Mid	2025	3.0%	80%
Pre-1975 Town/Rowhouse	2021	4.0%	80%
Pre-1975 Semi-Detached Home	2021	4.0%	80%
Pre-1975 Detached Home	2021	4.0%	80%
1975-1997 Multi Unit Low	2025	3.0%	80%
1975-1997 Multi Unit Mid	2025	3.0%	80%
1975-1997 Town/Rowhouse	2021	4.0%	80%
1975-1997 Semi-Detached Home	2021	4.0%	80%
1975-1997 Detached Home	2021	4.0%	80%
1998-2011 Multi Unit Low	2027	3.0%	80%
1998-2011 Multi Unit Mid	2027	3.0%	80%
1998-2011 Town/Rowhouse	2025	4.0%	80%
1998-2011 Semi-Detached Home	2025	4.0%	80%
1998-2011 Detached Home	2025	4.0%	80%
POST-2012 Multi Unit Low	2035	3.0%	80%
POST-2012 Multi Unit Mid	2035	3.0%	80%
POST-2012 Town/Rowhouse	2033	4.0%	80%
POST-2012 Semi-Detached Home	2033	4.0%	80%
POST-2012 Detached Home	2033	4.0%	80%

# NEER Opportunity Overview

	2021	2022	2023	2024	2025	2026		2039		2042
Total M	\$4.4	\$8.8	\$13.3	\$17.9	\$23.8	\$24.0		\$30.8		\$20.9

- Annual retrofits from 170 to 1,140 per year
- Local contractor employment ~33% of value
- High material volumes – most Canadian
- Annual energy cost reduction between \$43M and \$77M by 2042

# Residential Energy Efficiency Retrofit Business Case

## **Retrofit Pricing & Managing Pricing Risks**

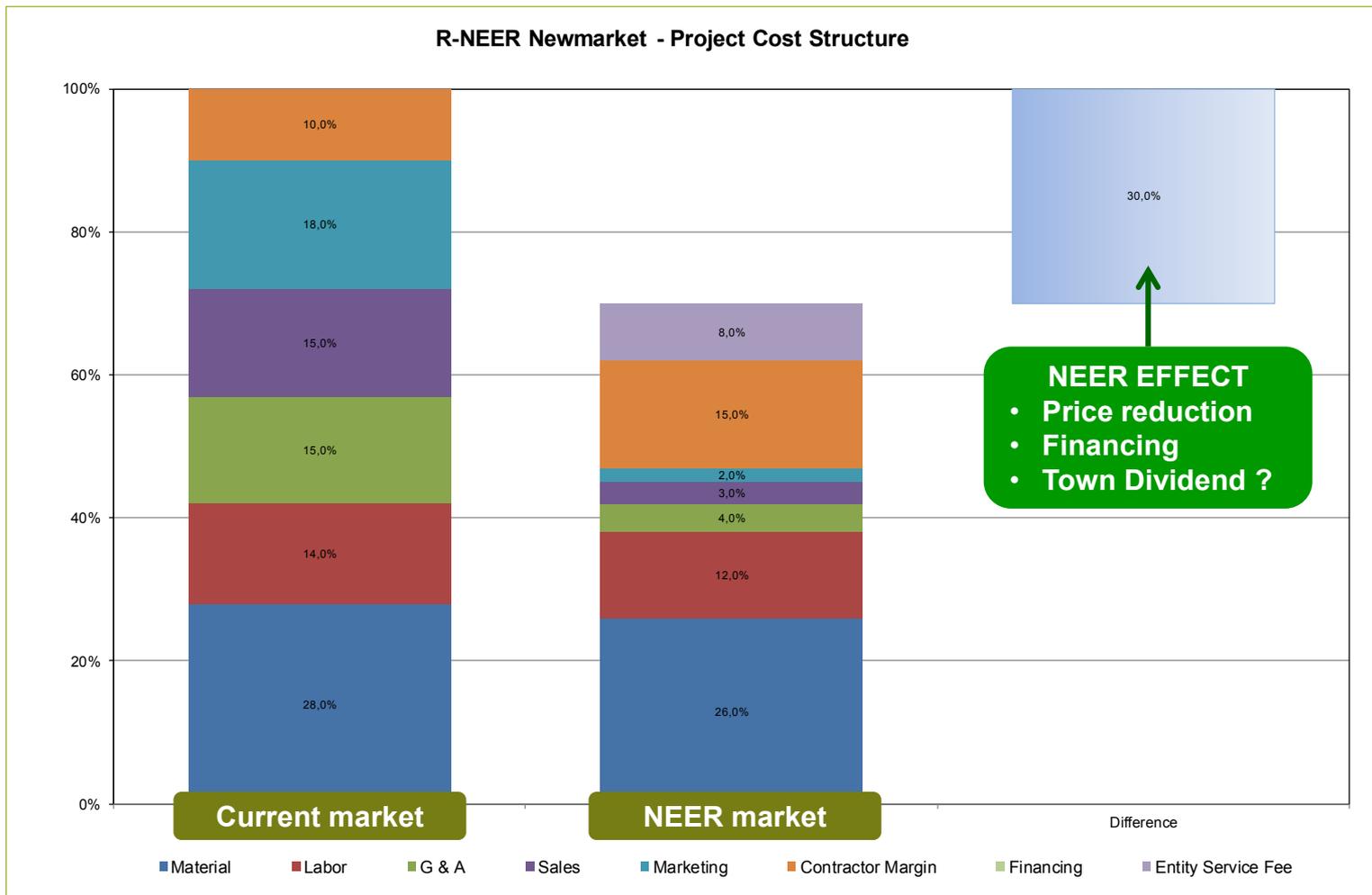
# Retrofit Pricing Approach

## *Minimize Transaction Cost & Complexity*

- Pricing Approach
  - *Core Package defined by type and age of home*
  - *Current market contractor cost estimated in \$/m<sup>2</sup>*
  - *Scale productivity factor applied*
  - *R-NEER entity cost coverage added to index*
  - *Price calculated based on specific home area*
- Benefits
  - *Easy to buy*
  - *Drives high volumes*
  - *Easy to sell by community groups*
  - *Avoids site evaluation costs/activity prior to sale*
- Possible Risks
  - *Gap between estimates and actuals*
  - *Conditions needed for specific EEM exclusions*
  - *Inequitable impact on Property Taxes*
  - *Achieving benefits of scale*

# NEER Market Transformation

## *Typical Retrofit Initial Cost Structure*



# NEER Market – Typical Home Retrofit

## *Impact of Scale*

Item	Market Norm	NEER gain	NEER	Comments
Materials	28%	10%	26%	<ul style="list-style-type: none"> <li>Volume prices for higher-performance materials (<i>“Better stuff – Better price!”</i>)</li> <li>Negotiating “carrot” includes R-XEER proliferation - initially to Brampton, Oakville and Windsor</li> <li>Preference for material partners’ commitment to establish local facilities</li> </ul>
Labour	14%	15%	12%	<ul style="list-style-type: none"> <li>Multiple retrofits on similar homes - geographically clustered</li> <li>Minimized teams’ down time</li> <li>Complete skills structures &amp; minimal sub-contracting &amp; higher % of apprentices</li> </ul>
Contractor G&A	15%	75%	4%	<ul style="list-style-type: none"> <li>Simplified transaction ordering and billing through standardization</li> <li>Single ordering/payment entity - NEER</li> <li>Simplified personnel management</li> </ul>
Contractor Selling Expense	15%	80%	3%	<ul style="list-style-type: none"> <li>Detailed proposals eliminated through standardization</li> <li>NEER handles necessary permitting</li> <li>Contractor promotes of R-NEER programme</li> </ul>
Contractor Marketing Expense	18%	90%	2%	<ul style="list-style-type: none"> <li>NEER responsible to promote R-NEER programme</li> <li>Marketing to Community and to NEER to maintain “approved contractor” status</li> </ul>
<b>Contractor Profit</b>	<b>10%</b>	<b>50%</b>	<b>15%</b>	<ul style="list-style-type: none"> <li>Improved margin for Entity “approved contractors”</li> </ul>
NEER G&A	0%	NA	5%	<ul style="list-style-type: none"> <li>Based estimates of entity mature organization structure</li> </ul>
NEER Sales & Marketing	0%	NA	3%	<ul style="list-style-type: none"> <li>Assumes mature selling expense of less than \$1000 per retrofit</li> <li>Standardized retrofit and pricing greatly simplifies selling and closing process</li> <li>Marketing simplified using existing Town and other information platforms</li> </ul>
<b>Retrofit Price</b>	<b>100%</b>	<b>30%</b>	<b>70%</b>	<ul style="list-style-type: none"> <li>Price before financing</li> </ul>

# Residential Energy Efficiency Retrofit Business Case

## Financing & Funds Flow

# NEER Financing

## *Sources & Uses of Funds*

### ■ Sources of Funds

- *Loans from Lender Partners*
- *Customer payments via property taxes*
- *Interest on unused loans*
- *Initial working capital to form entity*
- *Public incentives (assumed zero in current analysis)*

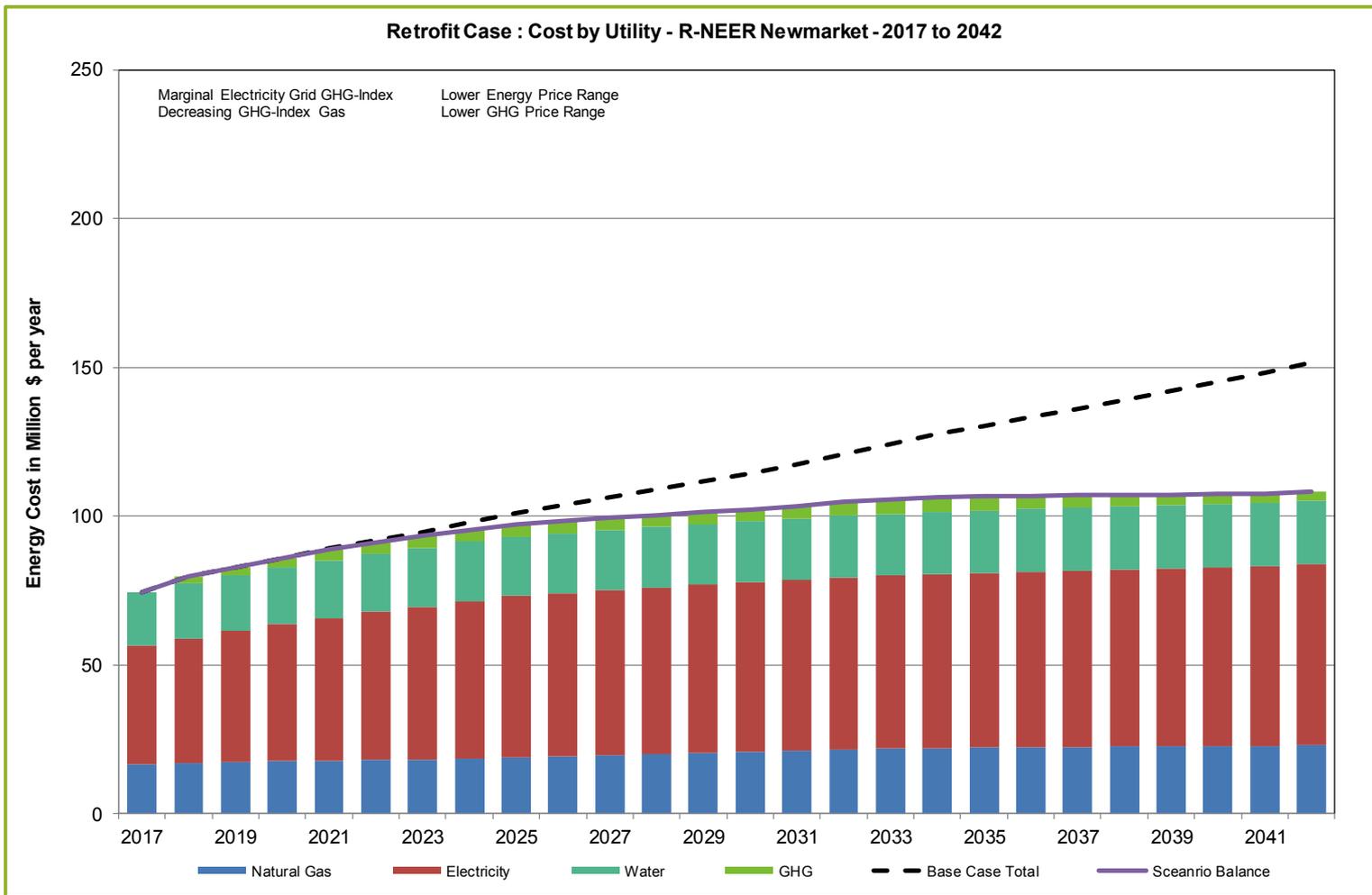
### ■ Uses of Funds

- *Lender interest payments*
- *Lender capital repayments*
- *Contractor payments*
- *Entity operational expenses*
- *Community Group sponsorship*

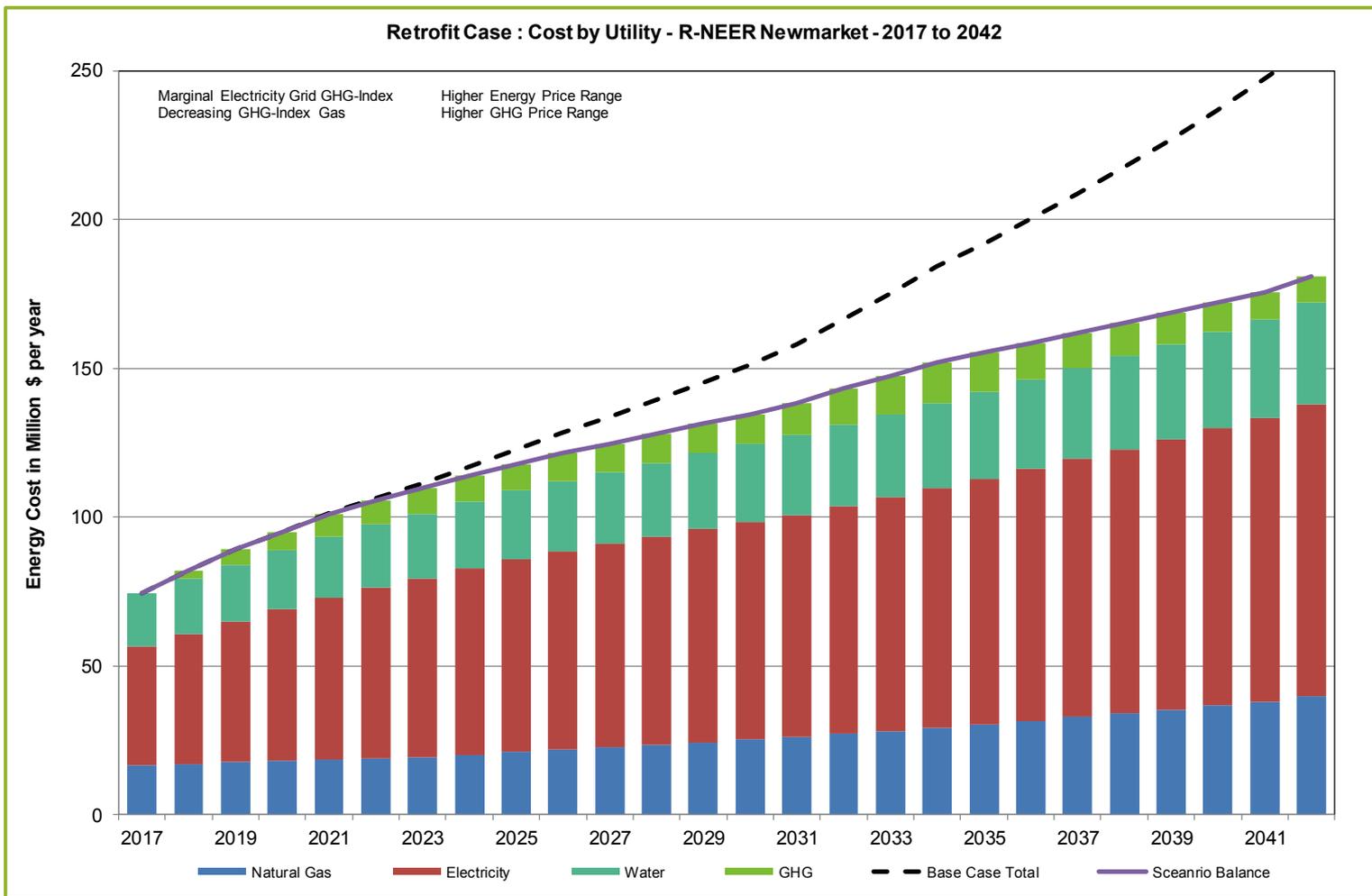
# Residential Energy Efficiency Retrofit Business Case

## Results – Cash Flows

# 2017-2042 Residential Retrofit Case Cost Outlook - Utility - Lower Price

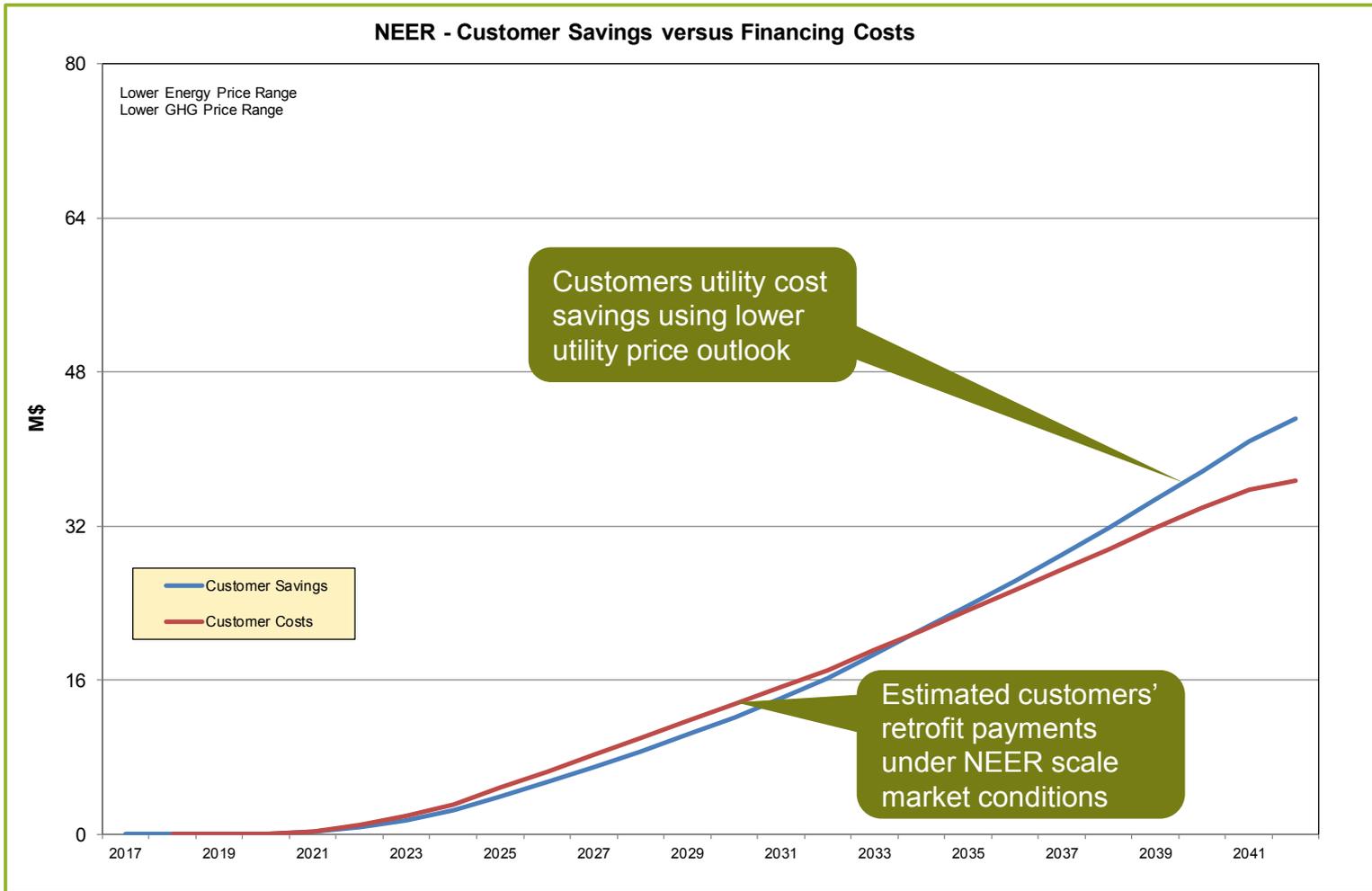


# 2017-2042 Residential Retrofit Case Cost Outlook - Utility - Higher Price



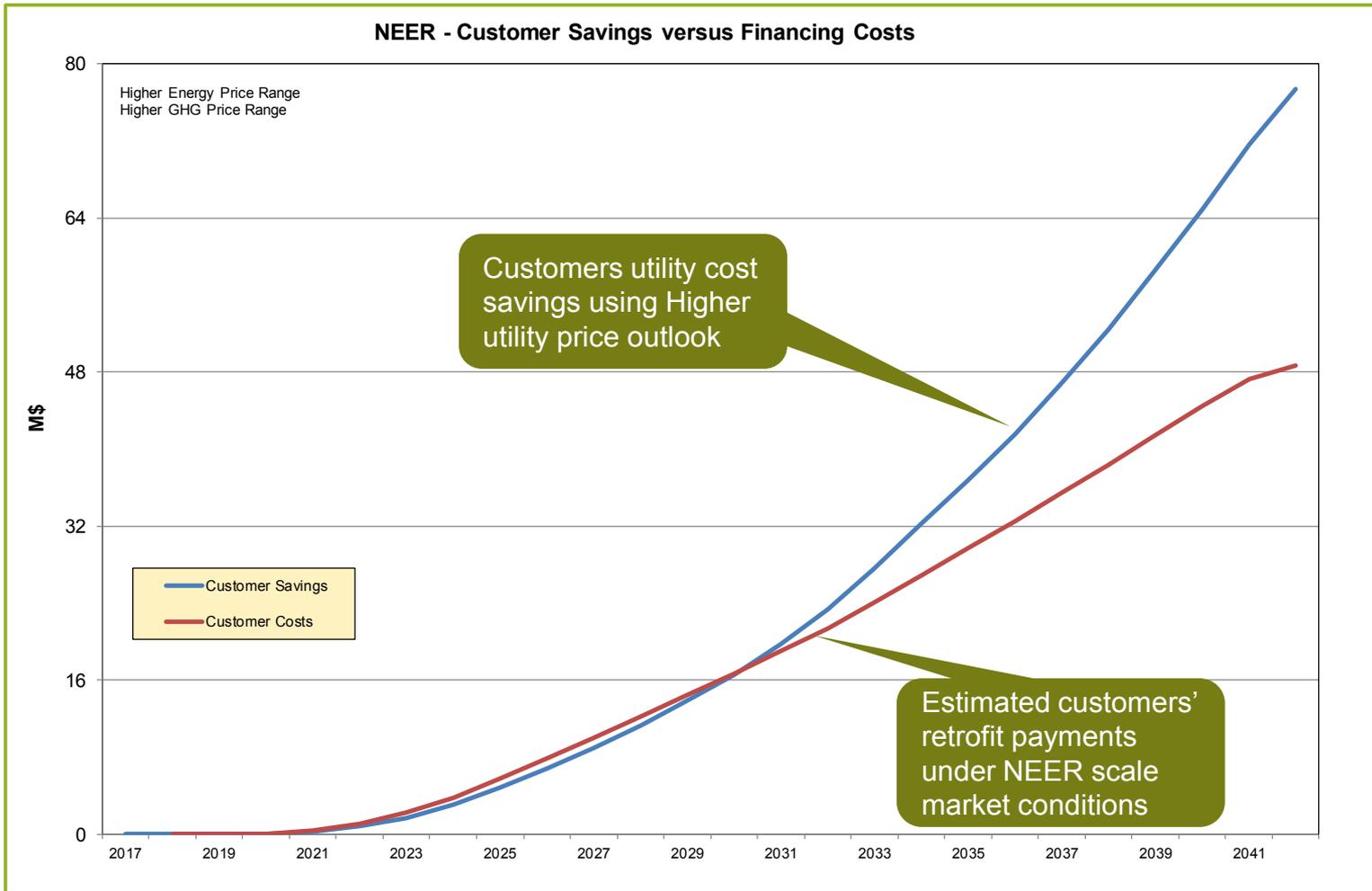
# R-NEER Programme Savings & Costs

## Result – Lower Prices & Interest



# R-NEER Programme Savings & Costs

## Result – Higher Prices & Interest



# NEER Entity Financial Summary

## *Profit / Retained Earnings*

- Profit after Tax
  - *Entity taxed at 26.5%*
  - *Year 1: \$(960k)*
  - *Year 2: \$(630k)*
  - *Year 3: \$(30k)*
  - *Year 4: \$400k*
  - *~ \$2M / year from Year 10 through 2041*
- Total Retained Earnings
  - *\$ 37M – 2041*
  - *\$ 48M – 2052*
  - *\$ 44M - 2062*
- \$60M Equity in 2042 at P/E Ratio of 20

# Residential Energy Efficiency Retrofit Business Case

## Results – Typical Homeowner

# NEER Retrofit Content and Cost (2021)

## *Homeowner's Perspective*

- Home
  - *Detached Home dating from 1975*
  - *Finished area of 170 square meters*
- Retrofit Costs
  - *\$26,530 (priced at \$156m<sup>2</sup>)*
  - *3.5% interest rate*
- Standard Retrofit Content
  - *Weather-stripping, windows, AC, furnace and water heater, attic insulation, LED Lighting, Smart Thermostat, Smart power strips,*
- Repayments & Savings
  - *LIC payment \$1,900 per year for 20 years*
  - *Total payments \$38,000*
  - *Total 20 year saving at least \$45,800*

# Residential Energy Efficiency Retrofit Business Case

## Stakeholder Benefits

# Stakeholder Benefits

**Contractor**

**\$ Profit  
more than  
today**

**Homeowner**

**\$ Saved  
more than  
\$ Spent**

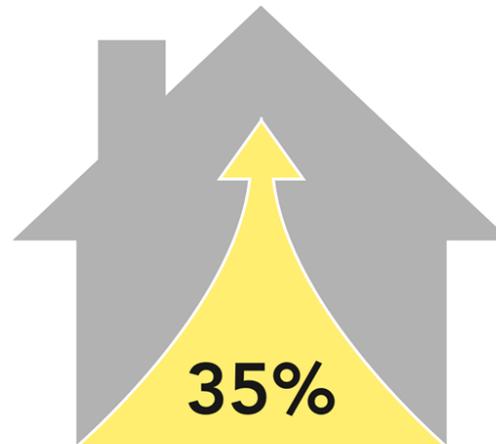
**Investors**

**\$ Earned  
more than  
Ontario Bonds**

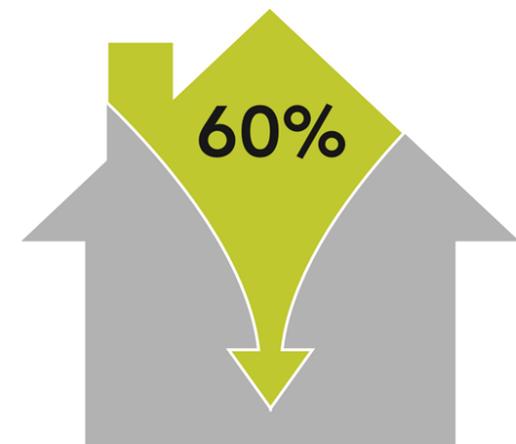
**Water Efficiency**



**Energy Efficiency**



**GHG Emissions**



# NEER Stakeholder Benefits

## *Homeowner - Contractor*

### ■ Homeowner

- *Reduced energy and maintenance costs*
- *Increased property value*
- *Increased comfort*
- *Environmental satisfaction*

### ■ Contractors

- *High project volume*
- *Minimal marketing expense*
- *Higher margins*
- *Reduced general and administrative costs*
- *Growth – non-residential program & other municipalities*

# NEER Stakeholder Benefits

## *Town / Community Groups*

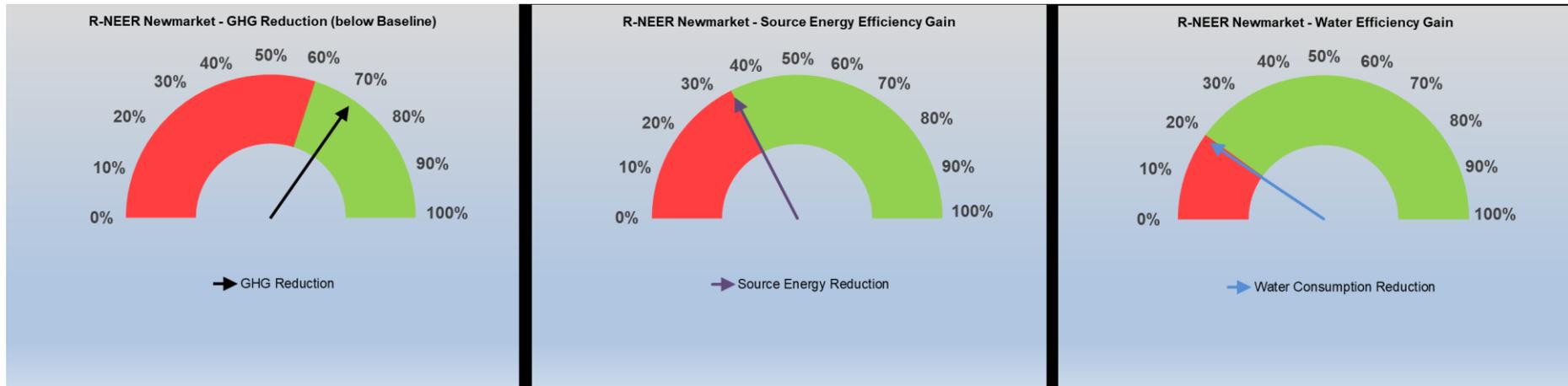
- **Town of Newmarket**
  - *Aligned with CEP goals*
  - *Valuable Municipal Services Company with growth potential*
  - *Energy saving spent in community*
  - *Local employment*
  - *Increased property values*
- **Community Groups**
  - *Neighbourhood revitalization*
  - *Support environmental mission*
  - *Potential funds for other social projects*
  - *Competitive spirit / cohesion*
  - *Youth employment as a public good*

# NEER Stakeholder Benefits

## *Utility / Province / Material Partners*

- Gas and Electric Utilities
  - *Scale support of statutory efficiency targets*
  - *Reduces future capital requirements*
- Province
  - *Scale prototype for other communities to follow*
- Material Partners
  - *Volume material sales from NEER*
  - *Future sales potential from non-residential program*
  - *100's of comparable cities in Ontario & beyond*
  - *Increased viability of higher performance products*

# R-NEER Business Case Summary Performance



- Meets goals aligned with overall CEP targets
- Total cost saving between \$390M & \$620M
- Valuable new Municipal Services Company
- Multiple homeowner, contractor and material partners benefits

# Project Engagements

- Project Working Team
- Stakeholder Advisory Group
- Major Stakeholder Groups
  - *Homeowners*
  - *Contractors*
  - *Investors*
  - *Newmarket Tay Power*
  - *Enbridge*
- Public
- SLT
- Mayor & Council

# Utility and Municipal Co-operation *Program Design and Launch*

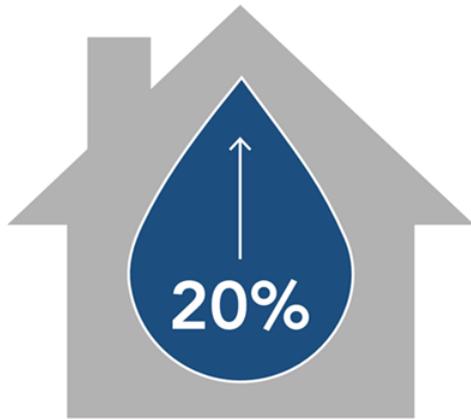
## ■ Utility Co-operation

- *One-stop shopping for homeowners*
- *Channel partner to promote incentive programs*
- *Potential integration of programs into standardized packages*

## ■ Municipal Co-operation

- *Deliver retrofits in other municipalities*
- *Back office collaboration*
- *Joint ownership of Entity*

### Water Efficiency



### Energy Efficiency



### GHG Emissions



# Thank You