

PACE Research and Projections

1. Background

Property assessed clean energy (PACE) financing is when loans are provided by the municipality to residents for energy efficiency retrofits or renewable energy installations for either residential or commercial properties. Loans are repaid through regular installments as part of their property taxes.

Introducing PACE financing in Saskatoon contributes towards seven actions in the Low Emissions Community (LEC) Plan. 14.233 million CO₂e cumulative emissions reductions could be achieved if all the actions' individual uptake targets are achieved.

An amendment within Bill 194 - *The Miscellaneous Municipal Statutes Amendment Act, 2019*, which passed the Legislature and received Royal Assent in July 2020, enables the City of Saskatoon (the City) to establish a financial program designed to encourage energy efficiency, renewable energy, and other environmental improvements for properties in Saskatchewan.

1.1. Current Energy Demand and Efficiency

Approximately 83% of Saskatchewan's electricity is sourced from fossil fuels with 43% of energy generated from natural gas and 40% generated from coal.¹ 82% of homes use natural gas for heating air and water.² Currently these fuel sources are stable and cost effective. However, the LEC Plan model predicts that the demand and price of energy will rise substantially by 2050. The model predicts an 84% increase in energy demand, from 38 million Gigajoules (GJ) in 2016 to 70 million GJ by 2050 and an increase in energy prices of 2% annually going from \$866 Million spent per year in 2016 to \$2 Billion spent per year in 2050.³

These rising demands are largely due to increased population and housing needs in the city. It is anticipated that new residential homes will be built to higher energy efficiency standards than existing building stocks as national building codes may target Net Zero Ready construction by 2030 as the minimum requirement.⁴ However, by 2030, 75% of

¹ National Energy Board. (2020, April 8). Provincial and Territorial Energy Profiles – Saskatchewan. Retrieved from

<https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/sk-eng.html>

² Natural Resources Canada. (2017). Heating System Stock by Building Type and Heating System Type. Retrieved from

<https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&or&juris=sk&rn=21&page=0>

³ City of Saskatoon, Low Emissions Community Plan (2019, August 8) Retrieved from

https://www.saskatoon.ca/sites/default/files/documents/low_emissions_report-aug8_web.pdf

⁴ Natural Resources Canada. (2019). Net Zero Energy and Net Zero Energy Ready Housing. Retrieved from https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/pdf/Net_Zero_Energy_Pilot_LessonsLearnedFINALEN.pdf

homes in Canada will already be built, meaning in order to achieve energy use and emissions reductions in the housing sector, deep energy retrofits we will be required.

Saskatchewan

In 2020, Efficiency Canada completed a ranking and scorecard analysis for ten provinces based on energy efficiency policy and programming in 2020.

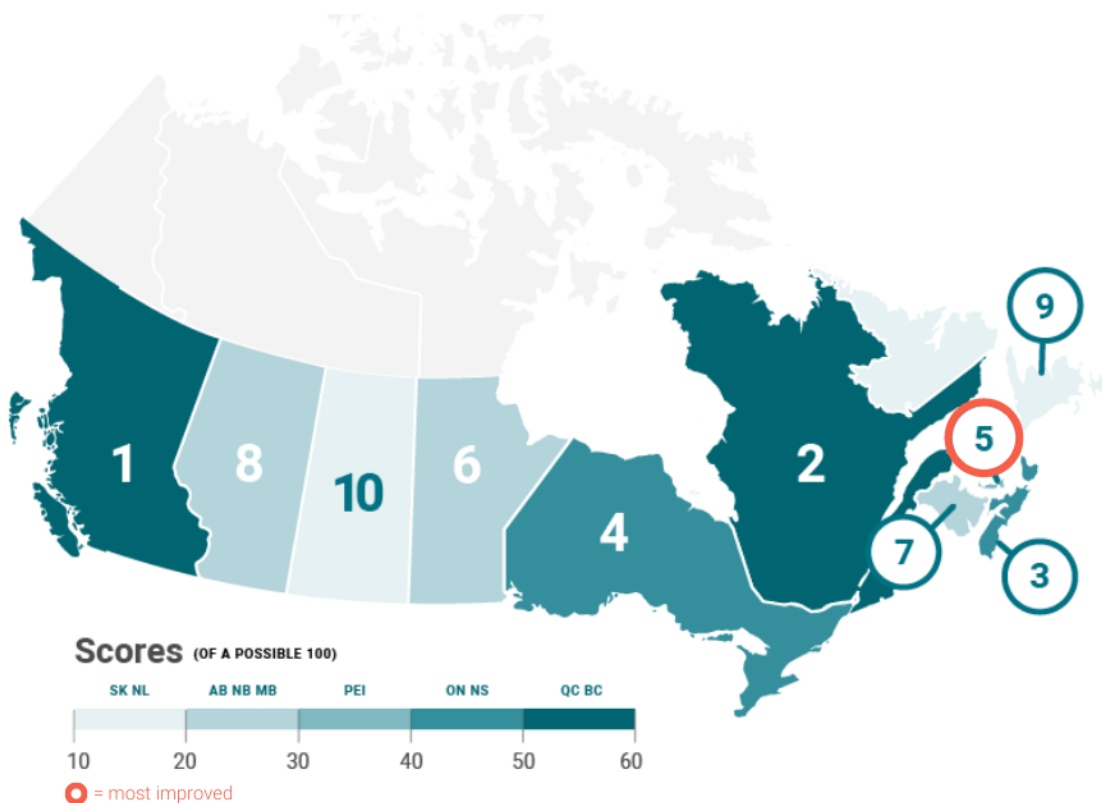


Figure 1 – Energy Efficiency Canada ranking

Overall, Saskatchewan scored 17/100 points and was ranked last out of 10.⁵

This showcases that more is needed in the form of programs and policies to support energy efficiency, renewables and electric vehicles in the province.

⁵ Efficiency Canada, (2020) Canadian Provincial Energy Efficiency Scorecard – Saskatchewan. Retrieved from <https://database.energycanada.org/SK/>

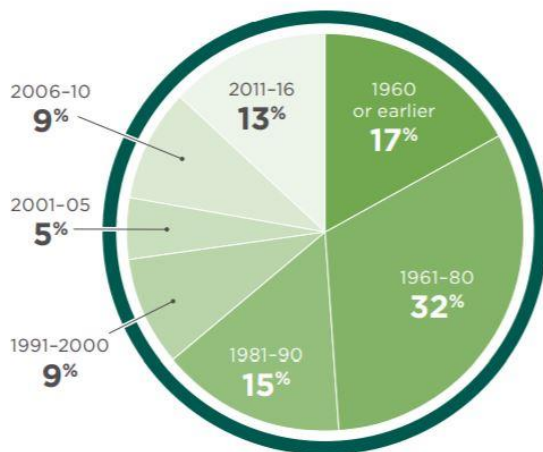
Saskatoon

In Saskatoon, 79% of homes were built before 2006 of which 17% were built before 1960.⁶ This further showcases that programming is needed to encourage deep energy retrofits in the community.

Additionally, there is a high level of home ownership in Saskatoon where 70% of homes are owned and 30% are rented and 4.7% of homes in need of major repair.⁶ The large percentage of ownership suggests that targeting home owners with an energy efficiency program could be wide reaching and have sustained uptake in the city.

Figure 2 - Age of private dwellings in Saskatoon, Statistics Canada 2016

AGE OF PRIVATE DWELLINGS IN SASKATOON:



1.2. Home Buyer Preferences

The Canadian Home Builders Association completed a study in 2018 which surveyed over 4,000 new home buyers across Saskatchewan with approximately 1,300 surveyed in Saskatoon.⁷ When looking for a home, the top 3 ranked features included:

1. Energy efficient appliances,
2. High efficiency windows, and
3. Overall energy efficiency home.

60% of respondents cited lower utility costs as the primary motivation for choosing energy efficient features; the second highest cited motivator (18% of respondents) was to protect the environment.⁷

⁶ Statistics Canada. (2019, August 9). Census Profile, 2016 Census Saskatoon, Saskatchewan. Retrieved from <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CMA&Code1=725&Geo2=PR&Code2=47&SearchText=Saskatoon&SearchType=Begins&SearchPR=01&B1=Housing&TABID=1&type=1>

⁷ Canadian Home Builders' Association, 2018 CHBA Home Buyer Preference Survey, Saskatchewan Results. Sourced from Saskatoon & Region Home Builders' Association (2019).

The respondents were also asked what they were willing to spend on energy efficiency. 37% of respondents wanted to break even on their energy efficient investment, 40% wanted a return on their investment, and 22% were willing to spend more on energy efficiency than the return.⁷ Additionally, 23% were willing to invest \$10,000 or more on energy efficient home features.⁷

1.3. Energy Poverty

A household is defined as experiencing energy poverty if they spend a disproportionate amount of their income on household energy needs; this is most often considered to be households that spend 6% or more (approx. twice the national median) of their after-tax income on energy bills. Energy poverty affects both homeowners and renters. Households with low income levels are more vulnerable to energy poverty than those with high levels of income.⁸

More than a quarter (over 117,000) of Saskatchewan households are identified as experiencing energy poverty, which is above the Canadian mean. In Saskatoon, 16% of households are experiencing energy poverty, with 66% of those being owners and 34% renters.⁸ When equity considerations are embedded in program design, a PACE financing program can aid in alleviating energy poverty in the local community.

2. PACE Best Practise Research

Best Practice research was conducted through online research, literature review, and municipal interviews. The interviews were with municipalities with long standing PACE programs such as Halifax's Solar City Program and Toronto's Home Energy Loan Program (HELP); municipalities that are in the design or pre-launch phase of their PACE programming such as Saanich, Edmonton, and Windsor, and third-party organizations. These organizations either manage PACE Programming for multiple municipalities such as The Clean Air Partnership in Ontario, Clean Foundation in Nova Scotia, and Energy Efficiency Alberta or are assisting with implementing PACE Programming such as Our Energy Guelph and PACE BC.

In total, nine PACE Programs were reviewed which represent 24 municipalities in Canada. Eight of these municipalities are in Nova Scotia, eleven are in Ontario, three are in Quebec, one is in British Columbia and one is in Alberta. Three of the reviewed programs have been established for over a year and have program participation history to draw from. One is a pilot program that has been completed and the remaining five programs are in the early design phase, implementation design phase or soon to be launched.

⁸ City of Saskatoon, Equity Toolkit for Sustainability Initiatives (Draft), 2020

2.1. Types of PACE Programs

Residential PACE

Residential PACE programming applies to single family residential buildings such as townhouses, condominiums, and single detached homes. Residential PACE programs are more common than commercial PACE programs in Canada. A review of PACE programs, both emerging and established, showed that approximately 70% of the programs focused on the residential sector with one program allowing non-profit organizations to also access loans.

Residential PACE requires a higher number of individual applications compared to Commercial PACE to achieve a financially self-sustaining program and to achieve significant greenhouse gas (GHG) emission reductions. However, without PACE, it can be difficult to encourage residential property owners to reduce emissions as they require large upfront homeowner investment with long payback terms.⁹

In Saskatoon, it is more common to offer residential programming prior to commercial. For example, the City provided residential recycling first, and then developed the plan for the single-family residential organics program, before beginning development of the Industrial, Commercial, and Institutional recycling and organics programs.

Commercial PACE

Commercial PACE programming (C-PACE) usually applies to offices, multi-family residential buildings, hotels, industrial buildings, and retail.¹⁰ Commercial PACE programming is more common in the US, as 21 states have active programs.¹¹ In Canada, Toronto is the only municipality with an established Commercial PACE program which is called the High-rise Retrofit Improvement Support Program (Hi-RIS) for multi-unit residential buildings.

The City of Edmonton intends to launch a commercial PACE program but is starting with a residential program. The City of Edmonton expects that a commercial program will require additional staff and a more complex energy audit than residential projects as each project will need to be customized to the building.¹²

Commercial PACE can produce larger revenues and emissions reductions with fewer projects. However, Commercial PACE projects are more complex, require longer construction periods, and larger total financing volumes in comparison to residential projects. In Toronto, the average project cost for a Hi-RIS project is \$735,000

⁹ City of Edmonton, Dunsky Consulting (2019, May 31) Clean Energy Improvement Program Business Case Model

¹⁰ PACE Alberta. (2017 October 29). PACE for Commercial Building Owners. Retrieved from <https://paceab.ca/commercial.pdf>

¹¹ PACE Nation. (2017). Economic, Energy, and Environmental Impact Report. Retrieved from https://paceab.ca/resources/08_Commercial_PACE_Impact_Report_2017.pdf

¹² Barbara Daly, Program Coordinator PACE Edmonton, City of Edmonton, Phone Interview, (2020, January 20).

compared to just \$22,000 for a residential project; the average completion timeline is 15-17 months per Hi-RIS project compared to 4-6 month per residential project.¹³

2.2. Eligible Projects

Programs were reviewed to identify the type of projects eligible for financing in other jurisdictions. Energy efficiency retrofits were included in all but one program. Renewable energy projects, water conservation measures, and electric vehicle charging infrastructure were also very common. Table 1 shows each program and the type of projects allowed.

All programs required that the upgrade or technology installed must be permanently affixed to the property and that anything removable (e.g. lightbulbs or an electric vehicle) would not be considered for financing.

Table 1 - Eligible Projects Under PACE Financing Programs

	Halifax	Toronto	Guelph	Windsor	Clean Air Partnership (ON)	Edmonton	Clean Foundation (NS)	Saanich	Quebec	Total
Energy Efficiency		*	*	*	*	*	*	*	*	89%
Renewables	*	*	*		*	*	*			67%
Battery Storage		*	*		*		*			44%
Water Conservation (Toilet replacement, tank less water heater, grey water recovery systems)		*	*	*	*	*	*			67%
EV Charging		*	*		*	*	*			56%
Resiliency (Landscaping to prevent flooding, storm doors, etc.)			*							11%

Table notes:

- At the time of writing this report, details on Windsor’s PACE program are very limited.

¹³ Clean Air Partnership, Accelerating Home Energy Efficiency Retrofits through Local Improvement Charge Programs: A Toolkit for Municipalities. (2020).

- The program in Saanich is a limited scope Pilot for conversion of oil-based heating to air source heat pumps only as Provincial Legislation does not allow for PACE Programming yet.
- The Quebec program was a short-term pilot which has now completed without further action and Provincial Legislation does not allow for PACE Programming yet.
- Halifax is looking to revamp their program in 2020/2021 to include energy efficiency measures.

2.3. Loan Terms

The way in which financing was structured varied between programs as shown in Table 2. The key takeaways included:

- All programs have very low, fixed interest rates between 0-5%.
- 80% of programs charge an administration fee either through a fixed amount during application, as a percentage of the loan value, or as an interest rate rider.
- Two programs did not charge an administration fee but both are/were short term pilot programs.
- Average maximum loan is ~\$20,000, with Edmonton and Toronto allowing loans up to \$50,000 and \$75,000 per project.
- 80% of programs offer loans with fixed years for repayment, with majority basing repayment terms on the useful life of technology installed.
- All programs allow participants to pay off their loans early with no penalties and all programs allow the transfer of the loan at time of sale of the property. However, in practice when speaking to two program administrators they noted most individuals will pay off the loan entirely at the time of sale.

Table 2 - Program Options for Financing

Financing Detail	Options	# Programs	% of Total
Interest Rate	Fixed, between 0-5%	8	89%
	Flexible, Participant chooses rate	1	11%
Administration Fees	Flat Amount	3	33%
	% of Participant Loan Value	3	33%
	Included in Financing Rate as Interest Rate Rider	1	11%
	None	2	22%
Maximum Loan Value per project	\$10,000-\$25,000	4	44%
	\$25,000-\$75,000	2	22%
	% of Total Property Value	1	11%
	Undetermined	2	22%

Repayment Terms	Fixed, 10 Years	3	33%
	Fixed, 20 Years	1	11%
	Fixed, Based on Useful Life of Technology	3	33%
	Flexible, Participant chooses term	1	11%
	Undetermined	1	11%

2.4. Eligibility Requirements, Energy Audits, and Eligible Properties

Nine programs were reviewed for eligibility requirements and are summarized in Table 3. All nine programs required the applicant to be the owner of the property, required a copy of the title as proof, and that all property taxes were paid. Three programs also required utility payment history. None of the programs reviewed check credit rating or do formal income verification to date. One program (Toronto’s HELP) required mortgage consent. However, this resulted in increased application turnover time and was estimated to have reduced the number of successful applications in Toronto’s program by approximately 50%.¹⁴

80% of programs require an EnerGuide Home Energy Audit pre and post project construction.

Table 3 – Program Options for Application Eligibility

Financing Detail	Options	# Programs	% of Total
Property Eligibility	Proof of title	8	89%
	Property tax payments in good standing	8	89%
	Utility payments in good standing	3	33%
	Mortgage lender consent	1	11%
	Unknown	2	22%
Energy Audit Requirement	Home Energy Audit Required	7	78%
	No Audit Required	2	22%

2.5. Contractor Requirements and Payment

Nine PACE programs were reviewed to identify the type of quality controls in place to reduce the risk of low-quality work being performed, as well as how contractors were paid. The results are summarized in Table 4. Most of the programs reviewed have controls in place, and only Toronto’s HELP allows Do-it-yourself (DIY) projects. Controls included:

- Publishing a preferred contractor list or online portal that participants are mandated or recommended to choose from;

¹⁴ Clean Air Partnership, Accelerating Home Energy Efficiency Retrofits through Local Improvement Charge Programs: A Toolkit for Municipalities. (2020).

- Requiring contractors to provide proof of liability insurance and proof of workers compensation board clearance.

Some administrators noted providing a preferred contractor list simplifies the process for homeowners when it comes to completing their project.

For contractor payment, interviewees noted that paying the contractor directly is beneficial to program participants as it ensures they are not paying any money upfront for the program. However, paying the contractor directly can give the false premise that the administrator is liable for the quality of work performed.

Table 4 – Program Options for Contractor Quality

Financing Detail	Options	# Programs	% of Total
Contractor Quality Control	Preferred contractor list	4	44%
	Minimum requirement for contractors	2	22%
	No minimum requirements, DIY projects allowed	1	11%
	Undetermined	2	22%
Contractor Payment	Paid by program participant	3	33%
	Paid directly by municipality/program administrator	4	44%
	Undetermined	2	22%

2.6. Program Uptake

Program uptake refers to the number of participants utilizing the program. Interviews were conducted with the Clean Foundation of Nova Scotia, the City of Halifax, and the City of Toronto in March-April of 2020 to determine their program uptake to the interview date. Findings included:

- The Clean Foundation reported 197 applications, 52 projects completed, between 2015 and April 2020 throughout Nova Scotia (excluding Halifax).
- The City of Halifax reported 2,700 applications, 500 projects completed, between 2013 and March 2020.
- The City of Toronto reported 1,000 applications, 273 completed and 35 in progress, between 2014 and April 2020.
- Edmonton’s projected medium annual uptake for a City administered program is approximately 50 participants in the first year and 125 participants annually in years 2,3 and 4¹⁵.

Toronto’s program requires mortgage consent to be obtained before an applicant can be approved for a PACE Loan. This resulted in a low project completion rate relative to the number of applications received for the program.

¹⁵ City of Edmonton, Dunsky Consulting, Clean Energy Improvement Program Business Case Model (2019, May 31)

2.7. Other Program Details

Other elements of PACE programs such as how the program is administered, how it is funded, how it is marketed, and how much staff time was required to run the program were also reviewed. Table 5 outlines other elements of PACE programs found during interviews with other program administrators and research.

Table 5 – Other PACE Program Details

Discussion Themes	Responses
Program Administration	<ul style="list-style-type: none"> • Halifax and Toronto PACE Programs are administered through the municipality directly. • Remainder of programs reviewed are expected to be administered by third party organizations or a municipal service corporation incorporated for PACE Programming specifically. • With all programs, municipality is responsible for managing property tax history reviews during the application phase, collections of payment from participants (through property tax payments), and for registering a lien on the property.
Program Funding	<ul style="list-style-type: none"> • Halifax’s program was initially funded through a grant from Federation of Canadian Municipalities. • Ongoing program costs are funded through municipal capital reserves or existing cash flows. • One program, not yet launched, is planning on borrowing to lend (flowing money through financial institutions to program participants). • Borrowing from municipal finance corporations <ul style="list-style-type: none"> ○ PACE loans are usually not included in credit rating or debt ratios unless in default. • Initial funding from debentures or green bonds issuances.
Staff & Operational Resources	<ul style="list-style-type: none"> • Toronto and Halifax programs use 0.7-1 full time equivalents (FTE) for managing applications, intake and approval process; 0.3 FTE to check property tax payment history; 0.3 to supervise program manager. • Clean Nova Scotia uses 3 FTEs to run 7 PACE Programs for small municipalities across Nova Scotia. • Halifax’s administration fees do not cover the full cost of operating the program. • Toronto and Halifax’s operating costs have been consistent from year to year now that the program in place, staffing is the main expense.
Marketing & Communications	Examples of marketing from other municipalities included:

	<ul style="list-style-type: none"> • Attending home-shows and events, • Social media campaigns successful, • Utilizing general contractors, energy audit and solar installation companies to advertise and communicate program details, • Targeted mail drop slips lead to hundreds of calls, wards with older housing stock were targeted for mail slips, • Radio advertising, • News advertisements less successful, • Utility and property tax bill inserts, and • Word of mouth is very powerful, notice applications will trickle in from the same street or neighborhood after a few projects are completed in the area.
PACE Loan Transfer on Sale of Home	<ul style="list-style-type: none"> • Toronto and Halifax found that the seller usually pays off the loan in full at the time of sale. • Toronto noted that the new buyer must consent to take over PACE loan, in practice the buyer does not, and the seller just includes PACE balance in their selling price. • In Halifax the participant agreement includes a Sale & Release clause - the seller and buyer sign an assignment novation and release form when property is sold.
Low Income Participation	<p>Municipalities interviewed varied in whether the specifically targeted low income households. For those that did, some methods to increase uptake included:</p> <ul style="list-style-type: none"> • Focusing a proposed program on MURBs to address renters living in energy poverty, • Integrate program with other low income household rebates at provincial and utility level, • Add flexible repayment terms (allowing participant to choose length of loan), • Reserve 50% of year 1 program slots for income-qualified households, and • Waive administration fees for low income households.
Most Popular Upgrades	<ul style="list-style-type: none"> • Insulation is popular due to quick payback period and rebates, • Solar PV, • Heat pumps are common, and • Heating and cooling equipment.

3. Saskatoon HELP Projections

3.1. Program Uptake

In order to project program uptake, the project team reviewed a business case provided by the City of Edmonton¹⁶ which included potential program uptake for residential program participants in a city-wide PACE Financing Program. This business case included low, medium, and high project uptake scenarios over a four-year period and concluded that the number of participants in Edmonton is expected to be low in the first year, increase slightly in the second year, and remain constant for years 3 and 4.

Edmonton and Saskatoon have many similarities that make following Edmonton’s methodology and assumptions a reasonable approach. Similarities include:

1. Geography and climate considerations,
2. Resource based economies,
3. Rates of home ownership, both at 70%, and
4. Percentage of private non condominium households compared to total private households (Edmonton 80% compared to Saskatoon at 82%).

Actual and estimated program uptake, as noted in section 2.6, from Edmonton (projected), Toronto, and municipalities in Nova Scotia were adjusted for population to estimate a range of uptake estimates for Saskatoon, as shown in Table 6. The project team expects Saskatoon to have high uptake due to the following factors that may help to increase program uptake in Saskatoon:

- A 10.5% Provincial Tax Credit for 2020-2022 is available to residential households for renovation work completed on homes. This includes renovations to install Solar PV.
- On November 30, 2020 The federal government announced it will provide “\$2.6 Billion over 7 years, starting in 2020-21, to Natural Resources Canada to help homeowners improve their home energy efficiency by providing up to 700,000 grants of up to \$5,000 to help homeowners make energy-efficient improvements to their homes”. Currently information on the federal programming is limited, but it is expected the opportunity to stack both provincial and federal programming with the municipal PACE program will drive up uptake for the program, making the high uptake scenario most likely.

Table 6 – HELP Program Uptake Projections

Program Year	1	2	3	4	Total
Annual Participants Low Uptake	10	20	30	60	120
Annual Participants Med Uptake	20	50	75	150	295

¹⁶ ibid. Section 2.6.

Annual Participants High Uptake	35	70	105	210	420
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Estimating program uptake is challenging as interest in the program can be affected by numerous external factors such as availability of provincial or federal rebate programming, household income levels, and competition from financial institutions with increasingly competitive interest rates offered by financial institutions. Projections should therefore be considered rough estimates, done for planning purposes that will be revised as better information becomes available.

3.2. HELP Projections for Type and Size of Retrofits

The July 2020 residential HELP survey asked residents what they would be willing to spend using a PACE Financing Loan. The survey showed that 37% of respondents said they would spend less than \$5,000 or did not provide an amount (5% said less than \$3,000, 13% said less than \$5,000, 11% said they were not sure, and 8% said other), 45% of respondents said they were willing to spend \$10,000-\$20,000, and 18% said they are willing to spend more than \$20,000.

According to the Clean Air Partnership, a project costing \$10,000-\$20,000 amounts to a 20%-30% reduction in energy¹⁷ which is considered a deep energy retrofit. Also, the average cost of a residential solar installation in Saskatoon is approximately \$23,000.¹⁸

While survey results are not necessarily representative of what future HELP participants would spend, it is a good starting point. Therefore, for projections of project types it is assumed 37% of participants would pursue inexpensive, light energy retrofits, 45% of participants would pursue a deep energy retrofit, and the remaining 18% would pursue a renewable energy installation.

Table 7 shows the number of expected retrofits for different project types in each year, assuming a high uptake projection.

Table 7 - Types of retrofits over four years

	Year 1	Year 2	Year 3	Year 4	Total
Number of Light Retrofits	13	26	39	78	155
Number of Deep Retrofits	16	32	47	95	189
Number of Renewable Energy Installations	6	13	19	38	76
Annual Participants High Uptake Projection	35	70	105	210	420

¹⁷ Clean Air Partnership, Accelerating Home Energy Efficiency Retrofits through Local Improvement Charge Programs: A Toolkit for Municipalities. (2020).

¹⁸ The average size of a solar system in Saskatoon from 2010-2020 according to internal data is 7.86kW and the average cost per watt installed in the province is \$2.93 according to <https://www.energyhub.org/saskatchewan/>.

3.3. Long Term Program Projections

Using projections estimated from section 3.1, the total number of participants, revenues, and greenhouse gas reductions are estimated in Table 8 for the next 2, 4, and 8 years of the program assuming the high projection scenario.

Table 8 - HELP long term projections

	2 Years	4 Years	8 Years
Annual Participants	70 in year 2	210 in year 4	360 in year 8
Total Number of Participants	105	420	1,600
Total Loan Value (\$)	\$ 2,500,000	\$ 10,000,000	\$40,000,000
Annual GHG Reduction (tCO2e)	308	1,232	4,687
Cumulative GHGs avoided to 2050 (tCO2e)	8,932	35,728	135,923

Figure 2 shows the annual net profit (loss) for the program over an 8-year period relative to the annual number of participants. As shown, by year 7 the revenues collected from the participants exceed the cost to run the program (assumes 358 participants and a \$500 administration fee/participant).

Figure 1 - Annual net profit (loss) and annual participants

