town of BRIDGEWATER

ENERGIZE BRIDGEWATER

Smart Cities Application

April 24, 2018

SECTION I: APPLICANT INFORMATION

Question 1: Please provide the following information on your community.

Answer:

- Name of community: Town of Bridgewater
- Province/Territory: Nova Scotia
- Population: 8,532[1]
- Indigenous community: No

Question 2: Please Select a prize category.

Answer: $5 million

[1] 2016 Federal Census (http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/pd-pl/Table.cfm?Lang=Eng&T=301&SR=451&RPP=25&S=3&O=D&CMA=0&PR=0#2016A00051206004)

SECTION II: PRELIMINARY PROPOSAL

Question 3: Please define your Challenge Statement in a single sentence that guides your preliminary proposal. It should describe the outcome (or outcomes) you hope to achieve.

Answer: *Our community will lift 20% of its residents out of energy poverty by 2028.*

Question 4: Please describe the outcome (or outcomes) your proposal seeks to achieve by elaborating on your Challenge Statement.

Answer:

In Bridgewater, our best available evidence suggests that 2 in 5 residents (40%) experience some form of energy poverty either as a chronic or periodic condition depending on their income prospects and their health and social needs.

Energy poverty is closely linked to "core housing need", defined as housing that falls below at least one of the adequacy, affordability or suitability standards; where the household would have to spend 30% or more of its total before-tax income to pay the median rent.[2] Core housing need is experienced by 1199 households, or 27.9% of Bridgewater residents[3]. Energy poverty is when a household spends more than 10% of its after-tax income on energy to heat and power the home (electricity, fuel oil, propane, firewood, etc.), as well as for the fuel it needs for its routine commutes.

Energy poverty is a debilitating problem in our community, as it is for many communities across Canada. Almost 70%[4] of community members surveyed last month know someone who has experienced energy poverty.

[2] Core Housing Need Defintion (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/households-menage037-eng.cfm)

[3] Core Housing Need, 2016 Federal Census (http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/chn-biml/index-eng.cfm)

[4] Question 2 from the "Creating a community response to the challenge of ending energy poverty in Bridgewater" survey

Living in energy poverty profoundly impacts the wellbeing of individuals and families. The Town of Bridgewater, and its many community partners, have documented the following impacts among many others:

- mental health impacts resulting from anxiety, stress, and shame
- social stress and isolation due to a lack of available resources for leisure activities or the inability to host friends and family in a cold home
- physical health impacts resulting from insufficient heating and ventilation, as well as from sacrificing food, medication, and other health essentials to pay off utility bills
- physical discomfort as the home or certain rooms are not maintained at a livable temperature
- inability to be reconnected to electrical services if utility bills are unpaid, resulting in a loss of housing
- financial stress resulting from unpaid bills, use of high interest loans or credit cards, and poor credit-worthiness
- inability to afford fuel for travel to medical appointments, or to places of employment, education, or leisure

These impacts are particularly felt in the winter when energy spending is highest and costs are the most volatile. While charitable and government poverty relief services exist, there is broad agreement across the community service sector that existing services are unable to address the magnitude of the problem, and are failing to address the structural and systemic causes of energy and housing poverty.

Residents of Bridgewater, as in much of Atlantic Canada, are particularly vulnerable to energy poverty for the following root causes:

i. **High cost of energy and price volatility:** Bridgewater is dependent on externally-sourced energy. Power is supplied by a single entity that generates electricity from 70% fossil fuel sources, and distributes it through an aging grid. This high carbon energy is highly susceptible to volatile global markets, carbon pricing, and the impacts of climate change. Nova Scotians pay 15.3 cents[5] per kilowatt hour before taxes, well above the Canadian average of 12.9 cents per kilowatt hour[6], and substantial electricity price increases have already been approved by the utilities regulator for the coming years.

[5] Nova Scotia Power Energy Charge (https://www.nspower.ca/en/home/about-us/electricity-rates-and-regulations/rates/domestic-service-tariff.aspx)
[6] National Energy Board, Price of Electricity per kilowatt hour (https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/snpsht/2017/02-03hghcstpwr-eng.html?=undefined&wbdisable=true)

ii. **Low and stagnated median incomes:** general economic depression, the loss of traditional industries such as forestry, fishing, and mining, and an aging population have left many Bridgewater residents with limited incomes. The median household income is $46,836[7], and households face limited options to increase it. Coupled with limited financial and health literacy, and insufficient capacity among community service organizations to support struggling families, many find themselves trapped in a vicious poverty cycle.

iii. **Aging and inefficient housing stock:** as an older Nova Scotia community, Bridgewater has many homes that are over 100 years old. Low average property values and low energy literacy in general, combined with high capital costs to upgrade buildings to modern efficiency standards, have generally prevented property owners from making those investments, with the result that many homes and apartments are highly energy inefficient. As evidence, the average Bridgewater household spends a shocking $4,100-$5,600 [8]a year on energy utilities. Furthermore, the problem of "split incentives" (where it is not in the landlord's financial interest to pay for energy improvements) prevent landlords from making efficiency improvements to rental housing, which comprises 43%[9] of Bridgewater's housing stock.

iv. **High mobility needs coupled with lack of mobility options:** as a regional town in a rural landscape, Bridgewater residents need to travel extensively to access employment and amenities, and to visit friends and family. Public transit services are still in their infancy, and substantial infrastructure investments are required to make Bridgewater a walking and cycling-friendly community for all demographics. As a result, personal vehicles are still by far the dominant mode of transportation: personal car use accounts for 89%[10] of all commutes, and the average household spends $1,600 annually[11] on automotive fuel. Combined with home energy costs, this means that Bridgewater households spend an

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[7] Median Household Income Pre-Tax, Federal Census 2016 (http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=POPC&Code1=0096&Geo2=PR&Code2=12&Data=Count&SearchText=Bridgewater&SearchType=Begins&SearchPR=01&B1=Income&TABID=1)

[8] Annual household spending range on utilities , 2012 figure, CEIP, Page 105 (https://www.bridgewater.ca/document-library/sustainability/sustainable-bridgewater/1512-bridgewater-community-energy-investment-plan-technical-backgrounder/file)

[9] Percentage of Bridgewater households that rent, # households=1442, from the National Household Survey page 28, (https://www.cip-icu.ca/Files/APE-2017-Projects/SSHAC_Housing_Needs_Assessment_CIP_Submission.aspx)

[10] Personal Vehicle portion of mode split in the Town of Bridgewater based on National Household Survey (file:///C:/Users/nnola/AppData/Local/Packages/microsoft.windowscommunicationsapps_8wekyb3d8bbwe/LocalState/Files/S0/18/ToB%20Transit%20Feasibility-Final%20Report-Feb%2021-2017%20edited[1674].pdf)

[11] Annual expenditure on fuel for personal transportation, CEIP, page 105 (https://www.bridgewater.ca/document-library/sustainability/sustainable-bridgewater/1512-bridgewater-community-energy-investment-plan-technical-backgrounder/file)

average of $5,700-$7,200 on energy for their home and transportation needs, well above 10% of the community's after-tax median household income.

While there has been, and there will continue to be, improvement in these factors over time, the overall trend is worsening, in particular the inability of incomes to keep up with inflation, especially energy cost inflation.

As a 'have not' province, Nova Scotia has struggled for decades with the issue of widespread poverty and low incomes, and sought ways to boost its lagging economy. The Government of Nova Scotia passed Bill 94 in December 2007 to establish a Poverty Reduction Working Group. Based on the working group's recommendations, the Province released a report titled "Preventing Poverty, Promoting Prosperity" in April 2009 which set out four main goals: enable and reward work, invest in households in need, focus on children, and coordinate and collaborate. It committed $155 million in new investments, in addition to $200 million in programming investments made in the three years prior to the release of the plan. However, several poverty indicators have remained stagnant, or worsened, since these plans were announced. [12] Initiatives such as the Nova Scotia Commission on Building Our New Economy have attempted to boost economic development, but with mixed results.

Given our region's and our community's overall economic challenges, energy insecurity adds a real and growing threat to our ability to meet our basic needs. Over the past decade, the average cost of power in Nova Scotia has increased by more than 70%, far exceeding the cost of living increase of just over 22%. [13] In addition, the long-term socio-economic burden of inaction could be crippling. According to the Nova Scotia Health Authority, "the costs of 'doing nothing' to address poverty – as measured by increased health, justice, education and social services costs – far outweighs the cost of solutions."

When we asked our community partners to tell us how urgent the need is to address energy poverty in relation to other issues in Bridgewater, Family Service of Western Nova Scotia summed up many concurrent points of view by stating: "this may be the least talked about yet most significant and productive structural, community, and individual issue we could tackle." Many other partners have testified as to the great importance of this issue to the community, a sentiment that was echoed by the 91% of community members surveyed last month who were concerned regarding energy affordability and poverty in Bridgewater.

[12] Poverty indicators include LICO,LIM, MSM, welfare recipient and good bank usage, from the Nova Scotia Poverty progress profile (https://www.cwp-csp.ca/resources/sites/default/files/resources/ProvincePovertyProfiles-NS.pdf)
[13] From Nova Scotia's electricity plan, page 3 (https://energy.novascotia.ca/sites/default/files/files/FINAL%20Our%20Electricity%20Future(1).pdf)

The challenge of energy poverty, as evidenced above, is daunting and overwhelming. Yet the Town of Bridgewater is firmly convinced that it is possible to create a profound shift in this situation and lift 20% of the town's residents (1 in 5) out of energy poverty within 10 years.

The basis for this belief is a combination of the advanced clean energy transition planning work that has been taking place in the community over the past three years, and the deep network of community partnerships and collaborative potential that exists here. Those two assets have led the Town and its partners to conclude that the reduction, and ultimate elimination, of energy poverty is a defining challenge for this community.

We summarize the systemic approaches that can be employed in Bridgewater to respond to the root causes of energy poverty as follows:

High cost of energy and price volatility:

- Reduce dependence on external energy
- Transition to low-carbon energy sources

Low and stagnated median incomes:

- Bolster local systemic poverty reduction initiatives
- Increase collaboration, efficiency & effectiveness of local poverty reduction services
- Create new sources of income through accessible small scale clean energy investments
- Increase training and job opportunities in new economic sectors
- Increase financial literacy

Aging and inefficient housing stock:

- De-risk clean energy investments and connect investors to local opportunities
- Create rental housing retrofit solutions that eliminate split incentives
- Increase energy literacy

High mobility needs coupled with lack of mobility options:

- De-risk clean energy investments and connect investors to local opportunities
- Increase health literacy

We believe that the systemic approaches described above, while challenging to implement, are fundamentally achievable. Their effective deployment would result in a broad and interconnected set of measurable outcomes that concretely describe the achievement of Bridgewater's Challenge Statement:

> **Outcome 1**: 1000 dwelling units of existing lower-income housing stock are retrofit to very high energy efficiency standards (targeting net zero)

Outcome 2: 150 dwelling units of new lower-income housing stock are constructed to very high energy efficiency standards (targeting net zero)

Outcome 3: lower-income residents demonstrate improvements in mobility, with a focus on accessible and affordable low-carbon modes of travel

Outcome 4: lower-income residents demonstrate a decrease in shelter-related spending (rent + utilities, as proportion of income)

Outcome 5: lower-income residents demonstrate an increase in income from energy dividends and clean tech sector employment

Outcome 6: lower-income residents demonstrate an improvement in overall health

Outcome 7: local service organizations that support people living in poverty demonstrate improved efficiency and effectiveness in service delivery, coordination, and collaboration

Outcome 8: local service organizations that support people living in poverty demonstrate a reduced demand for, and spending of, funds for emergency energy-related uses, and an increased allocation of those funds toward long-term and structural solutions to poverty and energy poverty

The achievement of every one of these outcomes would be supported by a Smart Cities problem solving approach. Better use of data and connected technologies will powerfully enhance our community's ability to implement our systemic solutions to energy poverty.

Given the large diversity in age and construction style of our housing stock, detailed building and energy performance information is needed to pinpoint the building envelope and heating system improvements that can be implemented cost-effectively to each home. Integration of solar PV systems requires precise data on the solar orientation and shading characteristics of each property. We also require information on the occupants' behaviour and energy needs in order to create an accurate energy profile for the home, and to determine whether the occupant is in need of greater comfort or is 'fighting' with their energy systems on a regular basis. Data collection can work in tandem with, and enhance, existing practices in home energy retrofit planning, including use of the standardized NRCAN Energuide For Houses rating system which we and our partners are actively using and expanding in Bridgewater. The employment of home energy monitoring systems, infrared imaging, and remote data analysis processes would be an effective use of connected technology to solve this challenge. Such systems can

also communicate directly with building occupants, giving real-time feedback on behaviours that affect energy consumption, and increasing energy literacy.

From a mobility perspective, additional data is needed on residents' transportation habits and the accessibility of existing street infrastructure and transit services so that these can be cost-effectively improved. GPS-enabled applications on mobile devices and fixed-location transportation monitoring systems would be effective tools in this endeavour.

This data also has a critical role to play in de-risking investments in building stock and transportation infrastructure. Careful analysis, management, and communication of the data would enable the packaging of clusters of upgrades into investment-ready opportunities. An Open Data portal for internal and external investors can be deployed to attract investment dollars and communicate project risk profiles, as well as the intended benefits of those investments (more comfortable, healthier, safer homes, etc.). Connecting such a portal to real-time data sources in the community would offer a powerful justification of just how well the community understands its infrastructure and its investment needs.

Following the implementation of improvements, the same data collection tools would then verify the effectiveness of the solutions, and maintain communications with residents so that any new issues can be flagged quickly and interface with quality control and continuous learning processes to mitigate them. Improvements in energy and financial performance can be reported back to investors in real-time. This would also allow the community to refine its return on investment calculations, thereby further de-risking future energy investments.

Finally, connected technologies and better data management and sharing can substantially enhance the community's capacity to implement poverty reduction solutions. Connected technology can engage residents in energy initiatives and help improve their energy, financial, and health literacy and outcomes. It can increase access for lower-income residents to income opportunities in the clean tech sector, and local energy projects. And it can help build community capacity and improve the efficiency and effectiveness of poverty reduction services. For these solutions, we envision a community data management platform where information can be effectively and securely shared between clients and partner organizations, and meaningful collaboration tools can be crafted.

In summary, Bridgewater's proposed initiative would stand to benefit substantially from:

- improved data collection through housing and transportation monitoring systems and connected devices
- improved data management, analysis, and communication
- improved communications between vulnerable residents and community partners
- improved collaboration and information sharing between community partners

- improved data sharing between vulnerable residents, community partners, and investors

Those same data and connected technology approaches can also assist in the verification that outcomes are being achieved:

Outcome 1: number of unit retrofits, and energy performance of units as monitored through in-home systems and occupant reporting, and verified through post-retrofit energy audits

Outcome 2: number of new units constructed, and energy performance of units as monitored through in-home systems and occupant reporting, and verified through post-construction energy audits

Outcome 3: improved transit system service, kilometers of improved active transportation infrastructure, and increased use of transit and active modes of transportation by low income and vulnerable residents, as monitored through stationary and mobile travel monitoring devices, and resident reporting.

Outcome 4: measured through monitoring of home energy and transportation use as described above, and verified by community service organizations.

Outcome 5: measured through participation in community energy investment systems and employment income, and verified by community service organizations.

Outcome 6: measured through combination of resident reporting, surveys on mobile devices and delivered in-person, and verified by community service organizations.

Outcomes 7 and 8: measured through improved performance metrics that will be established in partnership with community service organizations, and verified through periodic evaluations and qualitative and quantitative indicators analysis. Performance information will be shared, compiled, and analyzed using online data management platform.

Additional details on Bridgewater's proposed program are provided in later questions.

Question 5: Please describe how your community residents have shaped your Challenge Statement. Describe your plans for continuing to engage and involve them in your final proposal going forward.

Answer:

The origins of the Challenge Statement date back to 2008, when a two-year community consultation led to the development of the Integrated Community Sustainability Plan (ICSP). The initiative was widely recognized as a leading community engagement and sustainability planning process in Nova Scotia.

The community chose to define 'sustainability' as "living within the Earth's means while meeting basic human needs", a theme that is still represented strongly in this proposal. Even at that time, community members ranked energy issues over other sustainability concerns by a considerable margin, and the issue of affordability was brought up in all major sustainability focus areas covered by the ICSP. The Plan was well supported by residents and community partners and its implementation has remained a central focus for three successive Council mandates. This demonstrates not only the degree of continuous support these priorities have received, but also the integrated and complex nature of social, economic, and environmental policy and program development that Bridgewater has actively pursued now for a decade.

Following the completion of the ICSP, the urgency of the energy poverty problem has emerged through successive rounds of community engagement on topics related to energy, housing, affordability, quality of life, and transportation.

The South Shore Housing Action Coalition (SSHAC) released a Housing Needs Assessment in 2016, which detailed the immense challenges to housing affordability our region faces. Community surveys and focus groups involving local citizens, service providers, and council members identified rising rents, inadequate housing, and utility costs as the most pressing areas of concern. As a central component of housing affordability, residents recognized household energy-related costs as one of their top concerns for the next five years. Testimony from the SSHAC and several of its partner organizations is provided on Bridgewater's Smart Cities Challenge webpage. The Town of Bridgewater's 2014 Municipal Planning Strategy (MPS) also captured the voice of the community's housing affordability concerns as communicated by a diverse Planning Review Advisory Committee and several public open houses. The MPS laid out specific strategies to address these concerns.

For at least a decade, the Bridgewater community called for the development of a local public transit service – a strong sentiment that was captured in the ICSP and MPS community consultation processes. A 2017 Public Transit Feasibility Study included feedback from focus groups, interviews, and an open house and found that a public transit service would address

the high costs of private vehicle transportation. Resident and council support successfully paved the way for the provision of Bridgewater's first municipally operated fixed-route transit service in 2017. A recent Transit Pilot Evaluation included consultation findings from two well-utilized online surveys, an on-bus survey, and two focus groups. These consultations found a high level of satisfaction with the service and documented its physical and financial accessibility benefits to previously under-served residents. In response to these findings, securing stable long-term funding for the service, and ultimately improving and expanding it, are high priorities for Bridgewater Town Council.

The last major community planning and engagement process undertaken by the Town was the Community Energy Investment Plan (CEIP), which was formally adopted by Bridgewater Town Council in January 2018. The Plan recently won the 2018 GLOBE Climate Leadership in the Small Municipal Trailblazer category. Provincially and nationally, the CEIP is widely recognized for its thorough community engagement effort, as well as for its ground-breaking approach and findings.

The CEIP development process employed a multi-pronged approach to engage the community, including:

- The BCEI Advisory Committee: a committee of local stakeholders (including energy utilities, businesses, and residents) provided valuable project advice and connections to stakeholders in the community. Several stakeholders represented low-income and vulnerable residents, and the community organizations that served them.
- Community consultation & crowdsourcing: the Town used community meetings and workshops, focus groups, online polls and surveys, door-to-door surveys, public events, and individual correspondence and meetings with specific stakeholders. Dedicated focus groups were held with low-income and vulnerable residents.
- The Bridgewater Energy Partnership: a learning and action program for local businesses and organizations that encourages innovative energy solutions and increases the collective knowledge of energy sustainability. Several of the Energy Partners serve low-income and vulnerable residents, and represent their interests.

The CEIP's community consultation process reinforced the urgent need for the community to control its spiraling energy costs. Staff, Council, and community stakeholders alike were genuinely shocked when it was discovered, through a combination of household energy surveys and utility-level data analysis, that average annual energy expenditures (housing + transportation) per household were $5,700 - $7,200, and $88 million for the community as a whole. Initial cost figures were so disputed that the project consultant was asked to recalculate them from the ground up; the figures were confirmed and even increased slightly as a result.

A “Culture and Behaviour Change Assessment” engaged community members in developing a narrative for the communities transition from its current use of energy to desired new future state. “Affordable”, “secure”, “efficient”, and “clean” emerged as 4 widely desired characteristics for the community’s desired future energy systems. The results of this investigation shaped the main content and findings of the CEIP.

One of the major concerns that emerged from the CEIP’s community consultation process were the closely-related challenges associated with rental housing and housing poverty. The planning team responded by initiating a detailed investigation into this topic area. Through focus groups and interviews with low-income residents, landlords, and housing sector agencies and organizations, the state of the community’s rental housing stock was surveyed and energy improvement challenges and opportunities were documented. Existing rental housing energy improvement programs, including Nova Scotia’s highly successful HomeWarming program, which provides free energy upgrades to income-qualified homeowners, and Bridgewater’s innovative Clean Energy Financing program, which provides low-interest property-assessed energy upgrade financing to qualifying homeowners, were catalogued. The development of recommendations for improved program promotion, integration, and expansion were started and are ongoing.

On initiating its Smart Cities Challenge application, the Town of Bridgewater quickly realized that energy poverty remained a core challenge for its ongoing energy transition work, and felt that the issue was large enough to justify a whole-community problem solving approach. We also realized that data collection and management, and information sharing, were key challenges that could be overcome using the Smart Cities approach.

The Town of Bridgewater wanted the public to teach us about energy poverty, their experiences, core concerns, and suggestions on how a town strategy could reduce energy poverty and create prosperous economic outcomes. We specifically wanted to hear from those who are experiencing energy poverty. We received over 200 responses to surveys that were taken both in person and online and had direct conversations with dozens of residents in different locations across Bridgewater.

The feedback we received reinforced the moral and economic imperative of reducing energy poverty. Key themes that emerged from the community include:

- The average Bridgewater household is experiencing or has experienced energy poverty due to high energy costs that take away from spending on other essentials.
- There is broad support for the idea that reducing energy poverty helps to alleviate other poverty conditions.

- The majority of residents surveyed advocate for energy poverty reduction on a local level through home retrofits and locally-generated renewable energy.

The Town of Bridgewater also connected with dozens of diverse stakeholders to better understand the causes energy poverty as well as its solutions. By achieving our outcomes, stakeholders confirmed that we can reduce social inequity, increase the community's future financial security, and decrease the strain on community organizations. Our stakeholders recognized the urgency of dealing with underlying causes of energy poverty, stating that they lacked the capacity to continue to provide band-aid solutions. There was wide recognition that there are few existing models of successful municipal-scale efforts to alleviate energy poverty. Based on Bridgewater's trailblazing work and its position as a platform for spreading sustainability practices regionally, many stakeholders supported Bridgewater as an ideal candidate to create a scalable and replicable program to reduce energy poverty.

"The Energize Bridgewater campaign has been particularly effective for demonstrating the Town's commitment to acting on energy issues that concern their citizens. This commitment to long-term positive change directed by the constituents' needs is one of the many reasons that Bridgewater should continue to be supported in their work." (Emma Norton, Ecology Action Centre, Letter of Support)

Independent of its Smart Cites Challenge application, Bridgewater plans to sustain engagement with our community and our partners around this topic throughout 2018 and beyond. The Town will undertake at minimum the following engagement actions:

- Form an advisory committee to provide guidance and coordination to the initiative
- Host ongoing dialogue, problem clarification, and solutions design with our partners
- Maintain the Bridgewater Energy Partnership and Living Energy Laboratory programs and make energy poverty alleviation one of their core focus areas
- Conduct interviews with residents living in energy poverty
- Conduct interviews with landlords
- Conduct additional community surveys

With additional resources, more comprehensive engagement actions would be undertaken as a Finalist - please see the proposed budget for details.

SECTION III: PRELIMINARY PROPOSAL

Question 6: Please describe your preliminary proposal and its activities or projects.

Answer:

Bridgewater proposes to achieve its Challenge Statement and its 8 Outcomes through a set of 7 interlocking programs that are organized into 3 themes.

THEME 1: HOUSING AND TRANSPORTATION INVESTMENTS

Outcomes 1, 2, 3, and 4 are achieved by developing a local financing system that is able to source about $40 million in capital improvement dollars to renovate or construct 1150 lower-income housing units to high energy performance standards, and about $4 million to improve public transit services and street infrastructure to enhance its walkability and cyclability.

PROGRAM A: LOCAL CLEAN ENERGY INVESTMENT SYSTEM

Understanding that $44 million cannot be raised upfront by the beneficiaries of these service and infrastructure improvements, the Town of Bridgewater has committed to developing set of local investment vehicles that will aggregate the necessary capital dollars to complete the work, while providing dividends to the investors. The Town has initiated research into a set of possible energy development and financing strategies including: Local Energy Utility, Municipal Green Bonds, Crowdfunding, Energy Services Contracts, as well as other models.

Following additional assessment, the most feasible system(s) will be created, applied to local energy projects, and scaled up over time. Using the Smart Cities approach, the Town proposes to improve data collection and assembly, data analysis, and communications using connected technologies, in order to build the business case for these investments and connect investors with local investment-ready opportunities. An online and mobile platform for investors will describe the investment-ready upgrade opportunities, the anticipated return on investment, and real-time evidence of the results of those investments. This information platform doubles as an Open Data source for the publicly-communicable program data, trends, and results.

The investment system will allow low-threshold investment opportunities and make them available to the same lower-income and vulnerable residents that are the beneficiaries of these investments. The intention is that these investments generate long-term income streams for residents that grow over time as their investments increase. This concept is important because every dollar counts for people living in energy poverty. This program therefore also contributes directly to Outcome 5 (increase in income).

PROGRAM B: COMPREHENSIVE RETROFIT IMPROVEMENT PROGRAM FOR LOW-INCOME HOMES AND RENTAL PROPERTIES

The goal of this program is to upgrade 1000 lower-income dwelling units by 2028. Interfacing directly with the energy investment system described above, a turn-key deep energy retrofit program will upgrade dwelling units inhabited by lower-income and vulnerable community members, similar to the HomeWarming and Clean Energy Financing program models.

Managed by an external administrator, and with substantial quality control measures in place, the program:

1. conducts a comprehensive home energy audit and infrared imaging
2. installs an advanced home energy monitoring system
3. collects information from residents on their home energy habits and needs
4. assembles the information into an investment-ready opportunity and presents it to the owner
5. allows the owner to seek co-financing support by packaging the project into a larger set of similar projects and posting it to the investment platform
6. retains the necessary contractors and orchestrates the upgrade work, with the owner's permission and with regard to the needs of the home's occupants
7. verifies the effectiveness of the upgrade using the same tools described above
8. repays investors with interest through long-term financing agreements with the property owner

The program allows property owners to trade energy costs for financing costs, with the goal of achieving long-term reductions in overall costs, levelling out the home's monthly operating costs, and insulating the owner and occupants from energy price volatility and increases.

Bridgewater is exploring a possible project relationship with SimpTek Inc, whose Building360 technology combines home energy monitoring equipment with comprehensive analytics and communications tools. This technology gives all residents of the community access to their open energy data set. It also creates an online marketplace for local electricians, contractors, installers, energy experts, and engineers from the community to pair their services to the building data. Regardless of whether or not SimpTek becomes the preferred technology partner for the project, technology decisions will be based on maximizing positive impacts for the community, and building long-term capacity.

Recognizing that around 70% of Bridgewater's lower-income and vulnerable residents live in rental properties, the majority of the program's effort will be focused on rental homes and apartment buildings. To avoid rental rate increases and overcome the "split incentive" problem, a rent control agreement will be signed with the property owner, binding them to affordable rent provisions before they are given access to program resources and financing.

PROGRAM C: REGULATIONS AND INCENTIVES FOR THE CONSTRUCTION OF NEW HIGH-ENERGY-PERFORMING AFFORDABLE RENTAL UNITS

The goal of this program is to achieve 150 new high-energy-performing lower-income dwelling units by 2028. Bridgewater will work with developers and property owners to incentivize the construction of these homes. Incentives currently being contemplated include development bonuses, a commercial property tax phase-in, and financing options that bridge the incremental cost difference between conventional and highly energy efficient construction. Financing systems will interface with the investment platforms described in Program A. On the regulatory end, Bridgewater will investigate opportunities to add minimum energy efficiency standards into its development agreements and site plan approval requirements, as well as to its land use by-laws. Any dwellings constructed under this program will have their energy performance verified by the same tools described in Program B.

PROGRAM D: PUBLIC TRANSIT AND ACTIVE TRANSPORTATION SERVICE AND INFRASTRUCTURE IMPROVEMENTS

Functioning on the same logic as the housing stock programs, transit services and street infrastructure will be the beneficiaries of similar assessment processes and investment dollars. Desired improvements to the community's active transportation infrastructure are described in Bridgewater's Active Transportation and Connectivity Plan (2008), which will be renewed and updated in 2019. Transit system expansion and improvement efforts will be ongoing, and based in system performance metrics and a variety of evaluation processes. The program will be supported by mobile and stationary monitoring systems that will collect transportation and mobility data from both residents and transportation services and infrastructure (e.g. on the bus).

THEME 2: RESIDENT ENGAGEMENT AND CAPACITY BUILDING

Outcomes 5 and 6 are achieved by engaging lower-income and vulnerable residents and enhancing their energy, financial, and health literacy levels and employability skills.

PROGRAM E: ENGAGEMENT PROGRAM FOR RESIDENTS

The goal of this program is to create effective and meaningful channels of communication with lower-income and vulnerable residents, and to engaging them in solutions. The program can be organized around 3 forms of literacy in order to support the main Outcomes of this initiative:

- Energy literacy (Outcomes 1, 2, and 3)
- Financial literacy (Outcomes 4 and 5)
- Health literacy (Outcome 6)

The program should function as a “one stop shop” and contain both a person-to-person element, as well as for an online platform that enables digital connectivity to the various program elements.

Human contact will be critical to the success of this program. Most people living in energy poverty already interact with one or community support organizations, such as the food bank, Department of Community Services, or local faith groups. We propose to work closely with these service providers, and identify the most reliable and trustworthy points of contact in people’s lives. These points of contact can act as ambassadors for the program and assist in collecting information about the clients.

We envision a digital platform that allows residents to easily communicate with their service organizations about a variety of topics, and find relevant information with ease. It would be available both as a mobile app and as a web portal that can be accessed by a home computer or a computer/tablet provided in-person by a local service organization, to support those who are not connected to the internet or who may need support in using it.

The platform would provide high quality information, including but not limited to:

- Interfacing directly with their home energy monitoring system to provide real-time data and projected end-of-month utility projections
- Energy, financial, and health literacy information and guidance
- Information on local energy investment opportunities
- Delivers e-learning modules provided by community college

The platform can also securely collect information (with permission):

- Periodic polls on home energy habits and level of comfort, as well as whether they are experiencing problems with their energy systems
- Periodic polls on health and financial situation
- GPS tracking logs travel information (for apps running on mobile devices)

PROGRAM F: CLEAN TECH SECTOR TRADES TRAINING PROGRAM FOR RESIDENTS

The goal of this program is to increase the employability and labour market readiness of lower-income and vulnerable residents in the clean tech sector. With thousands of building retrofits and large new community energy systems in the pipeline, the community will need more skilled tradespeople (e.g. electricians, roofers, heating and ventilation contractors, window installers). The Community Energy Investment Plan has projected that the energy transition in Bridgewater alone will create a net cumulative increase of 3,700 person-years of employment by 2050.

This program will train unemployed and underemployed residents in these trades, thus focusing on the people who have the most to gain from the additional income. We will work

with trades training partners such as the Nova Scotia Community College (NSCC) to implement this program. NSCC is already working with the Town to train local contractors to be able to implement building envelope retrofits to Net Zero standards through the Clean Net Zero program.

THEME 3: PARTNER COLLABORATION AND CAPACITY BUILDING

Outcomes 7 and 8 are achieved by increase the capacity of community service organizations and improving their ability to collaborate and share information.

PROGRAM G: DATA SHARING AND COLLABORATION PROGRAM FOR PARTNER ORGANIZATIONS

The goal of this program is to improve the effectiveness and efficiency of service delivery to lower-income and vulnerable residents. We propose that the program consist of both an information and data sharing platform, as well as an organizational structure to facilitate collaboration and improved decision making.

The data sharing platform will act as a kind of 'headquarters' for digital project information. It will integrate the information and data that is collected under Programs A, B, C, and D, E, and F, and ensure that high quality information is available to support organizations.

During the planning stage, it can assist service organizations in identifying high priority homes and apartment buildings to target for energy upgrades, as energy and resident survey data will reveal the dwelling units that are the least efficient, and where residents are struggling most to meet their energy needs. It will allow service organizations to monitor transportation systems and learn where mobility challenges exist in the community, so that investments can focus first in those areas.

During the investment stage, service organizations participate in the assembly of investment-ready energy opportunities, and assist in communicating with potential investors about the positive impact their investments can have on their clients.

To support upgrade processes, the data platform helps service organizations to monitor their clients' needs, flag and trouble-shoot problems as they emerge (e.g. defective heating systems or installation quality concerns), and communicate with residents by providing them with high quality information on the process and their expected energy savings. After improvements, service organizations receive information on the verification process to confirm that their clients' homes and mobility systems have yielded actual benefits.

The data platform also acts as the interface with the residents' digital platform, allowing service organizations to send curated energy, financial, and health literacy information as well as training and employment information to their clients, and respond quickly to concerns and

questions that may be posed to them. In this way, the platform also supports the delivery of Programs E and F.

Finally, the data platform collects information on the services provided by the partner organizations, and assists them in collectively measuring their performance and the outcomes of their work, thereby measuring the performance of this Program, and its corresponding Outcomes.

The data sharing platform will be supported by an organizational structure that is yet to be determined, but that will involve funding, decision making, and reporting protocols.

Question 7: Please describe the ways in which your preliminary proposal supports your community's medium and long-term goals, strategies, and plans.

Answer:

Integrated Community Sustainability Plan (ICSP, 2010) – Identifies energy sustainability, security, and affordable energy as core priorities. Our proposal is intended to achieve several central goals in the ICSP, including:

- All people can afford energy for their homes, businesses, and transportation means
- Our community has reduced the energy needed to build, maintain, and power our built environment
- People choose to use active transportation (AT) as the primary means of getting around town
- All people in our community have access to a successful public transit system
- All people have learned about sustainability by taking individual and collective action
- All people in our community have access to a decent livelihood and a good standard of living

Municipal Climate Change Action Plan (MCCAP, 2013) – Establishes greenhouse gas (GHG) reduction goals for the Town and articulates local climate change adaptation issues. It identifies concerns and priorities regarding vulnerable populations impacted by economic and social problems caused by climate change.

Municipal Planning Strategy (MPS, 2014) - Establishes policy for the creation of public and active transportation systems, affordable housing provision, and renewable energy. Several actions to address housing affordability included incentivizing the development of subsidized affordable housing units through bonus zoning, and permitting the use of accessory buildings as living units in residential neighborhoods. The MPS also requires that the review of any land use bylaw amendments and development agreements by council should consider sustainable

design principles and energy efficient technology requirements. The MPS sets in motion policies for a functional and sustainable transportation system, advocating for development that favors active transportation access over personal vehicles, with a focus on pedestrian walkways, sitting areas and bicycle parking.

Community Energy Investment Plan: The Way Forward (CEIP, 2018) - Provides a fully costed pathway towards a low carbon economy through energy efficiency and renewable energy. Through community engagement and technical analysis the CEIP envisions how Bridgewater can reduce GHG emissions 80% by 2050. One of three core strategies laid out in the CEIP is to invest in energy efficient buildings (p.28). A three-year timeline is laid out in the plan to undertake deep energy retrofits to all buildings in Bridgewater and ensure that new buildings are built to superior energy standards. Building community capacity and developing local energy investment vehicles is a major supporting strategy throughout years 1-3.

Economic Development Action Plan (2018-2020) - Outlines 3 years of Council's priorities. Priority action 2 is the implementation of the CEIP, with the intended outcome that "energy opportunities drive community prosperity". The action plan instructs the creation of a Bridgewater Technology Strategy which intends to drive community engagement, innovation, creativity, commerce and personal quality of life. Part of the Bridgewater Technology Strategy will include increased access to Open Data, improved online engagement, and leading digital strategies to compliment Town services and assist with the development of town priorities. An Awesome Bridgewater Index will facilitate in measuring data related to quality of life and energy indicators including transit ridership, energy consumption, cycling lanes, and a GHG inventory.

Question 8: Please describe your community's readiness and ability to successfully implement your proposal.

Answer:

For a small community, Bridgewater punches far above its weight when it comes to planning, managing, and evaluating complex and transformative projects. Coordinated by the Planning Department and supported by the Town's senior administration, Bridgewater has developed a solid foundation in implementing projects of this type. Lead staff on this file will include:

- Richard MacLellan, CAO. Richard managed Halifax Regional Municipality's sustainability program before transferring to Bridgewater. His accomplishments include developing HRM's successful Solar City program, which won the Federation of Canadian Municipalities' Sustainable Community Award in 2015 in the Energy Program category.

- Jessica McDonald, Director of Planning. Jessica spent over a decade coordinating multi-sectoral environmental policy initiatives and programs for the Province of Nova Scotia. In Bridgewater,

her accomplishments include stewarding the design and implementation of the Town's ambitious Pijinuiskaq Park and King Street streetscape enhancements, and overseeing the development of its first fixed route public transit service.

- Leon de Vreede, Sustainability Planner. Leon has managed the Town's sustainability program for over 10 years. Specializing in innovative planning, program design, and community engagement practices, Leon's work has been recognized by the Province of Nova Scotia through an inaugural Clean Climate Leader award in 2015, and by the Federation of Canadian Municipalities through his designation as a PCP Local Climate Change Hero in 2016.

Under the stewardship of the members of this capable team, Bridgewater's energy and climate programs have won prestigious awards, including:

- The Town's comprehensive energy management program won a Bright Business Award in 2014 for its achievement in reducing energy consumption and emissions at municipal facilities by 15%, presented by Efficiency Nova Scotia

- The Clean Energy Financing program won the 2016 UNSM Climate Change Leaders Award from the Union of Nova Scotia Municipalities

- The Town's Pijinuiskaq Park and King Street streetscape enhancements won the Canadian Society of Landscape Architects' Small Scale Public Landscapes Designed by a Landscape Architect award in 2018.

- The Town's advanced climate change mitigation initiatives won a GLOBE Climate Leadership Award in the Small Municipal Trailblazer category, presented by The Honourable Catherine McKenna on behalf of Environment and Climate Change Canada.

As these awards demonstrate, Bridgewater has developed proficiency in implementing innovative community-scale projects and solutions. Over the past decade, the Town has been an active partner in multi-sectoral initiatives around topics as diverse and complex as food security, affordable housing, youth retention, health services planning, seniors safety, transportation, gender-based violence prevention, alcohol harm reduction, economic development, and a variety of community development initiatives.

A project currently underway that illustrates the Town's innovation and partnership building capabilities is the Clean Net Zero program. Co-designed with Clean Foundation, this ground-breaking pilot program will perform deep energy retrofits to 10 local homes to bring them up to Net Zero efficiency standards, as well as train local contractors in the renovation techniques required to do this work well. Innovative financing for the retrofits is offered jointly by the Town and the LaHave River Credit Union. Program partners also include the Nova Scotia Community College, BFree Homes, Efficiency Nova Scotia, the Nova Scotia Department of Energy, and Sustainable Alternatives Consulting. The program is funded by Natural Resources Canada, as a leading national example of innovation in the residential energy

efficiency sector. Our current proposal seeks to build on the direct experience of that program and find ways to scale it up.

"Clean is confident in the ability of the Town of Bridgewater to effectively coordinate and work openly and transparently with multiple partner organizations to implement any programs or solutions that can be funded by the Smart Cities Challenge grant." (Scott Skinner, Clean Foundation, Letter of Support)

The Town of Bridgewater's main weaknesses stem from its small size and limited staff capacity. The Town effectively compensates for this by employing a number of strategies to build its capacity and achieve excellence in its initiatives, including:

- Forming advisory committees that represent diverse stakeholder interests. Committees are formed through open calls for applicants, and vetted by staff and Council. Many of the members who participated in the advisory committee for the development of the CEIP have expressed strong interest in continuing their participation for the Smart Cities Challenge initiative.
- Maintaining technical advisory committees that advise on complex technical issues associated with the project. With its past experiences, Bridgewater has develop a large network of professionals and experts that would be pleased to support this initiative in this capacity.
- Retaining qualified project consultants, which would certainly be the case for this proposed initiative. See our proposed Finalist grant budget for a sense of the types of professional support sought for this project.
- Retaining additional qualified staff in order to build local project management capacity, which would be the case for this proposed initiative
- Implementing a program evaluation and quality control process from project inception
- Placing high value on communications and engagement.
- Maintaining a broad coalition of community partners and stakeholders. In this initiative, we will draw on the Bridgewater Energy Partnership program to assist with the project, and seek to grow participation in that program from community non-profit and charitable organizations.
- Generating knowledge transfer documentation at key points in the project, so that other communities can benefit from Bridgewater's lessons learned. Following the completion of the CEIP, Bridgewater produced a guidebook titled "Economic Development Through Transformative Community Energy Planning: A Toolkit for Municipalities Everywhere"

Project management decisions will be made by the Director of Planning and the CAO, and key decisions that affect town services (e.g. selection of technology partners, and key program design considerations) will be brought to Council for direction. The advisory committee will review all project documentation (including staff-generated reports, RFPs and Terms of Reference, and consultant and legal reports) and provide feedback and guidance to staff throughout the process.

Question 9: Describe your plan for using the $250,000 grant, should you be selected as a finalist. Provide a high-level breakdown of spending categories and an accompanying rationale.

Answer:

PRIORITY 1: INCREASE CAPACITY & KNOWLEDGE

Rationale: we lack the staff and volunteer capacity to deliver a competitive final application. We also require more detailed baseline information on housing, transportation and poverty.

Budget: $50,000 from Smart Cities Challenge plus $20,000 from the Town of Bridgewater = $70,000

Actions to be undertaken using budget:

- Form a project advisory committee comprised of community stakeholders and subject area experts
- Hire a project manager
- Re-allocate staff time toward this initiative
- Pay local community service organizations to assist with data collection to build their capacity to participate in the project

PRIORITY 2: ENGAGE COMMUNITY

Rationale: community and partner engagement is critical to forming a competent and competitive final proposal, and additional resources would substantially enlarge this effort

Budget: $45,000 from Smart Cities Challenge plus $7,000 from the Town of Bridgewater = $52,000

Actions to be undertaken using budget:

- Retain community engagement expertise to assist with the engagement effort
- Conduct detailed stakeholder consultations
- Host paid focus groups with lower-income residents
- Host public events & surveys
- Conduct engagement activities through the Bridgewater Energy Partnership and the Living Energy Laboratory
- Document the effort through a video and social media project led by at-risk youth

PRIORITY 3: REFINE APPROACH TO TECHNOLOGY & DATA

Rationale: we need to better understand the role of data and connected technology in the initiative, and select appropriate data sharing frameworks and technology partners.

Budget: $65,000 from Smart Cities Challenge plus $5,000 from the Town of Bridgewater = $70,000

Actions to be undertaken using budget:

- Retain a technical consultant to provide advice, and to assist in selecting the appropriate technologies and technology partners
- Assess technology options and limitations
- Recruit technology partner(s)
- Develop a data sharing and privacy framework between partners and between clients and the overall initiative

PRIORITY 4: REFINE SERVICE DELIVERY APPROACH
Rationale: we need to better understand the role that can be played by local partners that already provide services to vulnerable community members, and to develop a collaborative strategy for information sharing and service improvement. Includes an assessment of local financing options.

Budget: $85,000 from Smart Cities Challenge plus $20,000 from the Town of Bridgewater = $105,000

Actions to be undertaken using budget:
- Assess service delivery limitations, needs & opportunities
- Assess investment systems that can interface with the project
- Design a collaboration, decision-making, and communication framework
- Conduct a legal & regulatory review of the proposed collaboration and sharing frameworks, and all contracts
- Develop a program evaluation strategy

PRIORITY 5: CREATE FINAL PROPOSAL
Rationale: effort is needed to produce the final proposal

Budget: $5,000 from Smart Cities Challenge plus $2,000 from the Town of Bridgewater = $7,000

Actions to be undertaken using budget:
- Write final proposal
- Assemble supporting documents
- Seek steering committee & Town Council approval

GRAND TOTAL
$250,000 from Smart Cities Challenge plus $54,000 from the Town of Bridgewater = $304,000

Question 10: Describe the partners that are or will be involved in your proposal. Where partners are not yet determined, describe the process for selecting them.

Answer:

The Town engaged about 30 local and regional partner organizations in the development of this proposal. Through those engagements, we have developed a preliminary list of likely project partners, and identified their possible roles. Partners are identified below, arranged by the Outcomes that they can most meaningfully contribute to (note: some partners will contribute to multiple outcomes):

Outcomes 1, 2, and 3:

- Clean Foundation (environmental non-government organization): Programs related to energy assessments, retrofits, financial, and technical solutions to energy poverty.
- SimpTek Inc (technology firm): Possible technology partner. Can contribute Building360 equipment, software, and services – see Question 6 for description).
- Acadia University (academia): Research and data collection efforts, needs assessment and evaluation processes for programming.
- South Shore Housing Action Coalition (advocacy network): Community-wide energy poverty reduction effort partner, collect and provide data on energy poverty and affordable housing, and community consultation.
- Energy Utilities (Nova Scotia Power, Efficiency Nova Scotia, Wilson's Fuel Co.): Deploy household and community scale energy systems.
- Ecology Action Center (environmental non-government organization): Community capacity building and training activities, and coordinate stakeholders.
- QUEST (Smart Energy network) : Community and technical capacity building and training activities, and technical or financial solutions related to energy poverty.

Outcomes 4, 5, and 6:

- Society of St Vincent de Paul (charitable organization): Collect data/information related to energy poverty, and energy grants.
- NSCC Lunenburg Campus (community college): Energy sector training through applied learning activities, and energy related employment opportunities.
- Freeman House and Family Services of Western Nova Scotia (community resource provider): Building capacity with other stakeholders, collect data related to energy poverty, financial and health indicators, and community consultations.

- Nova Scotia Works (employment services center): Collect data related to employment income, and coordinate data collection.
- Nova Scotia Health Authority (provincial health authority): Provide data on health indicators, energy literacy initiatives, and build capacity with stakeholders.
- Housing Support Program (community housing program): Provide data on health indicators, energy literacy initiatives, and capacity building with stakeholders.
- Salvation Army (charitable organization): Building capacity with stakeholders, collect data related to energy poverty, financial and health indicators, and undertake community consultation.

Outcomes 7 and 8:

- Affordable Energy Coalition (advocacy coalition): Capacity building support, program design, and training activities.
- South Shore Family Resources Association (community organization): Connect with other organizations, collect energy poverty related data, community consultations, and community capacity building.

Supporting testimony and letters of support from many of these organizations can be found on the Town of Bridgewater's Smart Cities web page. All partnerships still need to be confirmed and formalized in writing.

Where partners are not yet determined or where additional partners are required, these will be selected in the Finalist stage of the process. The Town of Bridgewater's usual method of partner engagement is to issue public calls for participation through local media channels and by circulating them through partner networks. When a limited number of partners or stakeholders can be represented, for example on the project advisory committee, the Town will establish membership criteria to balance the membership needs, and applications will be solicited from the community.

Question 12: Provide a 200-word summary of your preliminary proposal. You may provide an image that represents your preliminary proposal.

Answer:

Energy poverty is having a profound and debilitating impact on our community. It systematically strips many of our residents of their dignity and damages their physical and mental well-being.

Yet, the real, lasting, and practical solutions to this problem are so close at hand that we can already see them emerging. Our community is planning for a new kind of energy economy - one where energy services are universally available and affordable, clean, efficient, and secure. We are ready for a massive shift toward a smart energy economy… one that leaves no family behind. We are also ready to show Atlantic Canada, and the nation, how it can be done.

With $5 million in Smart Cities funding, our town will install sophisticated energy monitoring and communications equipment in over 1000 low-income homes, develop a self-funding energy retrofit financing program, improve its transportation systems, and increase local clean tech sector training and literacy. It will allow our community partners to increase their capacity to exchange knowledge and work more efficiently and effectively to reduce, and ultimately end, energy poverty in our community.

Every dime will be used, because the need is so great.