

**Town of Rush Energy Advisory Committee
Report
June 20, 2016**

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Summary

We are pleased to present this report and recommendations to the Rush Town Board. As a citizens' committee, we have worked together diligently to answer key questions regarding how we can use conservation strategies, renewable energy, and current state and federal incentives, to reduce the cost of energy for the Town of Rush.

Our activities included researching all of the current technologies and opportunities that are available for renewable energy. Based on our review of options solar power is the only feasible choice to reduce the cost of electricity for town services at this time. Geothermal and wind power are potential options for consideration in the future.

We recommend three primary objectives to achieve greater energy independence.

1. Improve energy conservation strategies to reduce energy consumption.
2. Reduce the use of fossil fuels by installing solar for electric power.
3. Save money for taxpayers by consolidating and redirecting savings gained from conservation and solar installations; managing and reducing installation costs; and reducing the pay-back time.

We recommend amending our comprehensive plan and zoning code. We also recommend the town board establish a standing energy advisory committee as many other towns have done. This committee can work with the town board to stay informed on new opportunities and move forward with conservation and renewable energy initiatives. The committee can promote ongoing educational activities to ensure that town residents, farmers, and businesses have the knowledge and access to opportunities to use available renewable energy solutions to reduce their use of fossil fuels and increase their energy conservation strategies.

We spent many volunteer hours engaged in research and contacting and meeting with people who had experience and expertise with solar installations. We wanted to find out and learn from what other communities are doing – especially those in Monroe County, and other regions of New York State. As a result of these inquiries, we increased our knowledge and gained valuable insights from engineers, vendors, and officials from other municipalities.

This report represents this combined effort. It recommends a step by step plan with realistic benefits. Implementation of the plan will move our town to greater energy independence, reduce the use of fossil fuels, and reduce the cost of electricity for day to day operations.

Implementing the recommendations can help to achieve a better quality of life for residents by reducing the cost of local government. Our recommendations maximize the impact of every dollar spent on utilities in our town. An investment in conservation and renewable energy will continue to pay back taxpayers in years to come. If initial costs are reduced, and cost-savings redirected, taxpayers will benefit more quickly. Our efforts align with goals set at the county, state and national level to improve conservation and reduce the use of fossil fuels. We hope our work will be a model for other small communities.

Rush Energy Advisory Committee

Beth Hoak

Harvey Seymour

Kathryn Hankins

Bethany Choate

Robert Powers

Marianne Rizzo

Matthew Heimbueger

Carolee Powers

Rita McCarthy, Liaison

Energy Advisory Committee Mission Statement

The Energy Advisory Committee values environmental stewardship, long-term sustainable energy and cost-control. We will strive to be a leader in these three areas.

Our mission is to develop a plan for the conservation of energy and the use of renewable energy sources throughout our town.

Our goal is to find solutions that are in harmony with our town's character. We are searching for solutions that will reduce our town's use of fossil fuels that cause harmful carbon dioxide emissions.

Once this plan of action is developed, we will present it to the Rush Town Board.

Specific Committee Goals and Objectives

1. Investigate all possible options for the Town of Rush to reduce their use of fossil fuels and move to renewable energies.
2. Protect taxpayers by finding solutions that result in the greatest cost-savings, use of tax dollars, and reduction of taxes in the future.
3. Take advantage of any state and federal incentives directly or through a partnership with private vendors.
4. Review of current zoning ordinances to support renewable energies
5. Implement conservation strategies
6. Community education
7. Use renewable energy – focus on solar but explore wind energy, geothermal + other alternatives
8. Decrease use of fossil fuels, particularly by diminishing electrical usage in town buildings.
9. Reduce costs of utilities for taxpayers
10. Achieve 100% electric energy independence by 2020.
11. Review and recommend amendments to our town's zoning codes to promote and support the use of renewable energy in our residential and commercial areas; protect our farm and open space; and identify and designate the appropriate places where solar farms would be permitted through a special use permit.

Background on Development of Committee

How Committee was started

The Rush Citizens Concerned about Hydrofracking, (RCCH) was the forerunner to the Rush Sustainability Committee. In this effort, a significant amount of research was done on renewable energy as an alternative, and an effective way to reduce the serious consequences of global warming as a result of using fossil fuels.

After the Town Board passed a resolution to ban hydrofracking in our town, and the ban was successfully passed at the state level, many committee members wanted to continue to provide community education and advocacy to strengthen our town's long-term stability as a small town, rural, residential community. This became the Rush Sustainability Committee.

The members felt this was the natural progression of helping our community grow in a most positive way. The issue of renewable energy was recognized as a primary objective. In the fall of 2014, the Rush Sustainability Committee resolved to request the Town Board to form a citizens' committee to do the research on the options available to transition to use renewable energy for electrical needs.

Jordan Kleiman and Bob Powers, members of the Rush Sustainability Committee, met with Rich Anderson, former Town Supervisor. At the meeting, they presented the committee's recommendation to form a citizens committee to investigate solar and transition to renewable energy in our town. On November 26, 2014, they presented the request to the full Town Board. On February 25, 2015 the Town Board agreed to form a Citizens' Energy Advisory Committee.

Excerpt from the minutes of that meeting,

“Supervisor Frank stated that she has received the Renewable Energy Committee proposal submitted by Jordan Kleiman and Bob Powers and 9 letters of interest in being members of the citizens committee. Once the attorneys have reviewed the information, a 9 person citizens committee will be formed. Supervisor Frank stated that it is important that a public forum be available when a report of progress is being presented to the Town Board. The presentations are not intended to be interpreted as a public hearing but an information sharing process. There will be three presentations to the Town Board.”

In 2012, the Town Board had started investigating the option of a Purchase Power Agreement (PPA) for town electrical power. Also, during this time, NYS Energy Research and Development Authority (NYSERDA) was developing and implementing a series of financial incentives to support the growth of additional companies to start solar. In early 2015, the Town Board was presented with a formal proposal from Larsen Engineers for a PPA. After a review of a proposal, the Town Supervisor decided that a PPA did not provide a good opportunity to save money for the town.

Excerpt from the Town of Rush board minutes, 3/25/15 pg. 5-6:

“C. Solar Proposal Update – Supervisor Frank spoke on the solar proposal. There are three areas that raise question and concern on whether or not this is the right fit at the right time for the Town of Rush.

(1) Technology – Twenty years ago, a mainframe computer was present. Satellite television was available with a huge saucer sitting in a person’s yard or on top of a building. Today’s technology uses a small dish positions on buildings. There are also hand-held devices such as small tablets, iPads, cell phones and similar devices that do a number of tasks without taking up much space and at prices that all can afford. The technology of today’s solar panel and the Larsen Engineering proposal encompasses 2 acres of land. Hardware is reducing in size and increasing in capability which expedites its functionality. At the 20 year point when the Town can actually benefit from the solar energy, the technology may be out of date.

(2) The Second area of concern is who will benefit. In the onset, the investors, contractor, and engineers will benefit. This Larsen Engineering proposal is not one that the Town sought but one that presented itself.

(3) Thirdly, when do the financial contributions and rewards of the project appear? At first the town may save a penny or two per kilowatt hour depending on the proposals that come back from the Request for Proposal (RFP). The Town is now engaging in a true savings at no risk for electricity and gas for at least a 2 year period of 14% electricity and 6% gas. The main savings in Larsen’s solar proposal is in the 20th to 30th year. There are too many unknowns to commit to the timeframe with the current hardware. There may be other innovative solutions to alternative renewable energy in the next few years.

There are no other towns in Monroe County currently adopting a solar energy initiative. Larsen Engineering provided examples of larger towns that are engaging in the solar panels, however, they have many more municipal operations for public works reaping the benefits of energy versus paying electrical bills. There may be devices in the future that not only supply energy but store energy that can be used at peak time.

Supervisor Frank stated that the Sunshine Camp located on Five Points Road has solar panels which are used solely to generate electricity to heat their pool during summer months. Their investment provides immediate return instead of paying thousands of dollars a month to heat the pool.

Councilperson McCarthy added that the Renewable Energy Advisory Committee will be able to broaden their scope in looking at more viable options for municipality energy. “

Background on Climate Smart Communities

In 2014, Climate Smart Communities (NY DEC) was inviting communities to sign on with their pledge to reduce greenhouse emissions. In turn they would receive timely information on local climate action, notification of funding and educational opportunities, while enabling each community to choose the activities that suit them best.

The Committee recommended to the Town Board that Rush become a Climate Smart Community to be engaged with leaders engaged in promoting renewable energy and conservation strategies; and be informed about innovative approaches and models from other municipalities. The Board did not agree. For further information on this program for NYS towns: <http://www.dec.ny.gov/energy/50845.html>

There is a “Climate Smart Communities Guide to Local Action” which contains overviews of possible community actions, how-to-do scenarios, and case studies to help communities to move forward in becoming more aware of energy conservation. The online guide can be a valuable tool for our community. The pledge to be a Climate Smart Community is a public commitment to reduce greenhouse gas emissions and become better prepared for unavoidable climate change. The guide helps communities to set goals, inventory the town’s current emissions, and develop a local climate action plan that includes policies, planning goals, responsibilities and a timeframe for accomplishing agreed upon objectives.

There are case studies on local climate action plans that can serve as models. The goal is to decrease community energy to reduce greenhouse gasses and taxpayer cost for electricity and fossil fuels. The program is designed to encourage an Increase in the community use of renewable energy; identify benefits of recycling and other climate-smart solid waste management practices; use available climate-smart land-use tools; and prepare for the effects of climate change. The Climate Smart Communities program is jointly sponsored by the following six New York State agencies: Department of Environmental Conservation; Energy Research and Development Authority; Public Service Commission; Department of State; Department of Transportation; and the Department of Health.

Town Board Resolution Authorizing the scope and work of committee:

On March 11, 2015 The Renewable Energy Advisory Committee was authorized by Town Board Resolution to begin its work.

RESOLUTION #83-2015

Councilperson Steiner moved to authorize the Supervisor’s appointment of a Renewable Energy Citizen’s Committee consisting of resident members Bethany Choate, Beth Hoak, Jordan Kleiman, Kathryn Hankins, Carolee Powers, Robert Powers, Marianne Rizzo, Matthew Heimbueger, and Harvey Seymour for the purpose of serving as an advisory committee to the Town Board. The committee will provide recommendations to the Town Board for renewable energy programs and/or options for the municipality of the Town of Rush. This committee will choose a chairperson to represent the committee and facilitate the meetings and a secretary to provide the Town Board and Town Clerk with meeting minutes and a quarterly progress report that can be presented in person at a Town Board meeting.

The committee will be evaluated on an annual basis. A committee charter is also to be developed within two months of the committee formation. Councilperson McCarthy seconded the motion. The motion was carried unanimously. Other town board members present: Councilperson Woolaver, Moore, and Supervisor Frank aye.

Timeline

2013	Larsen Engineers presents proposal to develop a Purchase Power Agreement for a solar farm (proposed location was the former BOCES property)
Fall 2013	Meeting with Rich Anderson of Sustainability Committee
11/26/2014	Presentation by Rush Sustainability Committee to Town Board on the goals of an Energy Advisory Committee.
3/11/2015	Committee is authorized by the Town Board to begin their work.
	Committee commences and work begins. Field trips, investigations, research into existing agencies (NYSERDA, Climate Smart Communities, and N.Y. State Public Service Commissions' REV -Reforming the Energy Vision). Discovering and sharing nearby communities' actions and their energy savings plans; towns of Spencerport, Scottsville, Honeoye Falls, Lima, Hamlin, Towns of Wheatland, and Riga. Engineers and vendors present information to the committee
7/8/2015	First report to the Town Board
July 2015- May 2016	Site visits. Meetings with Vendors. Investigation of various alternatives to increase energy conservation and pay for solar installations.
5/25/2016	Presentation to the Town Board on highlights of committee's recommendations
6/20/2016	Final Written Report and Addendum on Impact of National Grid Demand Charges and Becoming a Climate Smart Community

Review and Analysis of Research Findings

A wide range of activities were conducted to gather data and information including:

- On site visits to all town properties:
- Presentations and interviews with local vendors.
- Site visits to the solar facilities of the Town of Williamson, Rotary Sunshine Camp, and Bloomfield Central School District
- Interviews, research inquiries, and conversations with residents who have solar installations, elected and appointed officials, and vendors. Our inquiries included exploring what other municipalities and organizations in Monroe County and nearby communities are doing; and learning more about the process to develop successful strategic solar projects and implement energy conservation strategies.
- These inquiries and reviews included the Town of Williamson, Town of Penfield, Avon Scottsville, Spencerport, Lima, Honeoye Falls Village, Wheatland, and Riga

Current Town of Rush Electrical Energy Usage Chart

This chart is taken from the Larsen Engineering Report developed in 2014 for the Town of Rush from a review of utility bills. These usage rates do not reflect the impact of the energy saving activities that have been undertaken.

Town Location	Kilowatt Hours Needed
Town Hall	106,000
Library	43,000
Highway Department	48,000
Fire Department	74,000
Town Street Lights	Flat Rate

Figures from Larsen Report – Full Report in Appendix

Analysis of the Impact Charges

Is it worth investing in Solar at this point for our town? Are solar panels expected to be improved significantly within the next 20 years?

As referenced above, Cathy Frank, Rush Town Supervisor, raised these two important questions when she determined that a Power Purchase Agreement (PPA) was not a reasonable return on investment (ROI) for our town. (See excerpt above from 3/25/15). She cautioned at that time, “The technology will change, maybe it’s better to wait.”

We asked these same questions and considered this position as well in our deliberations. After careful consideration, the committee found that the town should move forward as soon as possible to replace the use of fossil fuel with solar panel installations. Incentives from the state are rapidly changing. All of the vendors indicated that the price of solar panels will not decrease significantly as the technology becomes more widespread.

From our extensive review, and consultation with professionals we found:

- All municipalities should take up the call of action to reduce energy consumption and move to renewable energy sources.
- The budgetary amount allocated for utilities can be more appropriately used as investment dollars to purchase solar energy.
- If we can move carefully but quickly, the pay-back will be fewer years; the short term impact on taxpayers will be reasonable, and the long-term cost-reduction and ROI will be significant and beneficial to taxpayers from a financial perspective. While new technology at first requires an initial outlay of cash, this can be accomplished in a number of ways.
- The current technology can be expected to be state of the art for the next 20 years. This position was reinforced by all of the engineers and vendors that we consulted with, as well as the resources from NYSERDA and US Department of Energy;
- If we phase in solar, we can demonstrate value to the community.
- We can finance the installations using a combination of short-term municipal loans; and reallocation of budget expenditures for utility costs, and energy conservation savings.

- We need the Town Hall, Highway Department, and Fire Department to agree to use and share their roofs or land for solar installations that will benefit all town electrical needs.

Highlights: Meetings with organizations, vendors, and officials from other communities:



Seth Sykes, Facilities Manager, Rotary Sunshine Camp Solar Energy Project

- 50 Kilowatt system, 116 modules, 6 inverters – SMA (brand), Ground mounted, weighted with cinder blocks
- Manufacturer of panels – Evergreen Solar
- System cost \$158,000.
- Built in November of 2011. Functioning in spring of 2012
- Lease for 15 years at approximately \$100 per month, although the facilities manager was not entirely sure. Able to buy the system for \$ 1.00 at the end of the 15 year lease period. Solar Liberties of Buffalo put up panels and received tax credits
- Includes a utility usage monitor/feedback system to show how much power the solar installation is generating
- The panels provide electric to the manager's house and first cabin (2 structures total).
- There is an ongoing Sustainability Committee that evaluates light usage, and conservation practices and improvements.
- Conservation strategies include: motion sensors throughout the campus; thermostats down to 40 degrees when not in use (bleed water from pipes for all buildings not in use; and investigation of other alternatives to reduce energy consumption and cost savings such as wind energy.

John Conklin, Matt Vanderbrook, Sustainable Energy Development Company (SED):

- The company uses materials manufactured in other countries (PVC Kyocera panels).

- SED surveyed our buildings and developed two proposals - one for the Pavilion building, which was estimated to be sufficient to provide 30% of the Town Hall needs; and one for installing solar arrays at two other town building sites. Together, these three ground-mounted solar arrays would provide for the town's total needs.
- The Pavilion project cost was approximately \$50,000 with an estimated payback of 17 years.
- The 320 kw proposal is for a ground mounted array behind the Fire Hall.
- The fixed cost estimate was \$.12/kwh for 20 years.

Please note: Our recommendations are for American made solar panels to support American business. We also recommend roof mounted panels to save land, be more secure, and be less intrusive on limited town properties.

Floyd Bayley and Lane Young, O'Connell Electric

- The fixed cost per kilowatt is expected to be \$.12/kilowatt for the contract period.

Bob Kanauer, LTHS Solar

- The town could issue a Request for Proposal (RFP) or Request for Application (RFA) to hire a consulting company. The consultant would serve as the project manager and would recruit a NYSERDA qualified electrician that would be paid directly by the town during the project. The consultant would schedule and coordinate the purchase of all labor and materials necessary to complete the installation of the solar panels at each of the sites. If possible, Highway Department employees could be recruited to reduce the labor cost of installation.
- In a private-public partnership, only NYSERDA incentives would be available to the consulting company. Federal incentives would not be available since the town would be purchasing their own solar panels and paying directly for labor costs.
- This option would result in passing the NYSERDA incentive savings back to our town. Because municipalities do not pay sales tax, the Federal tax credits are not necessary, and this would be an additional cost-savings for the town.
- Maintenance for NYSERDA sponsored projects would be the private installer's responsibility for 5 years.
- From his experience, the town could expect that the inverters would not need to be replaced during the 20 year timeframe.

Andrew Heiligman, ACES Energy (Alternative Carbon Energy Systems)

- The company is located on Route 15A, and they have done several large installations in the area.
- They would respond to an RFP, and would use his workers for installation.
- They said that they could offer a reasonable cost because of the proximity to Rush.
- All private companies that provide both labor and materials would be able to obtain the necessary incentives from both federal and state.

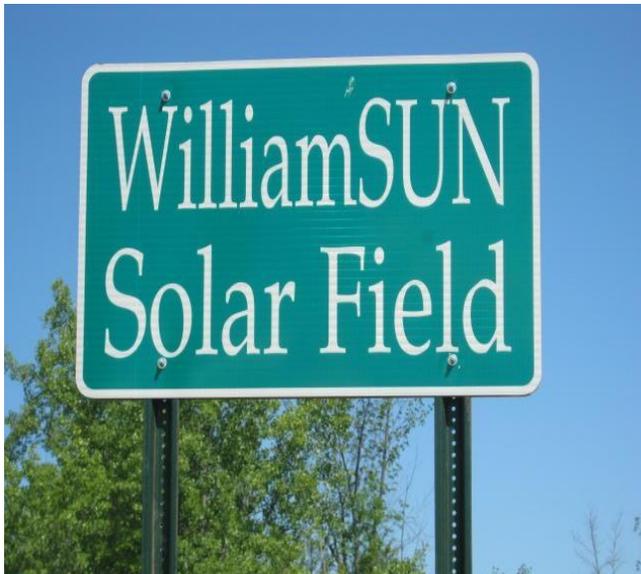
Mayor Paul Gee, Town of Scottsville

- Their goal is to become a net zero village.

- Their current project is a solar array, 75' by 200', located in a secluded area by their Department of Public Works. The system generates 105 MW.
- The system was financed with a Purchase Power Agreement (PPA), and a buy-back clause, which allows them to purchase the array at predetermined time intervals (renewable every 5 years).

Shawn Lessord, Renewable Energy, for the Village of Spencerport

- They have a solar roof installation on one of their village's town buildings.
- They have 40 panels that generate approximately 10.2 KW.
- He believes that educating town residents on why there is a need to reduce the town's carbon footprint is critical in order to give them the knowledge taxpayers need to be prepared to transition from fossil fuels to renewable sources of energy, and be willing to pay for solar installations.
- He is very knowledgeable and offered to do a presentation for the town on the use of renewable energies, especially solar.



James Hoffman, former Supervisor, Town of Williamson

- They located their solar farm on an old abandoned land fill. This way they did not use valued farm and open space.



Superintendent Michael Midey, Bloomfield Central School District

- November 2014-present PV system power 49.00 kWp
- Energy produced: 93,174.59 kWh
- CO2 avoided: 65,222.21 kg
- Reimbursement USD : 11,180.95
- 96 panels on the elementary school and 96 panels on the high school.

Impact of the Demand Charges on all municipal solar projects:

There are two meters, one for usage (kwh), and one for demand. Demand billing is to cover the cost of the infrastructure needed to supply the level of energy we use. A demand meter is installed when a customer use exceeds 2000kwh/month for four consecutive months. Demand billing continues until consumption is less than 2000kwh for 12 consecutive months. Demand is billed for the highest average kw during a 15 minute period in the billing cycle.

Bob Bianchi, the Energy Consultant referred by Bob Kanauer, reviewed the town's National Grid bills for the last 24 months. His conservative estimate of a 25% demand reduction with an 18 month payback would not offset the cost of identifying the cause of the demand peaks, little less the cost of remediation. **See Addendum to this report for additional information.**

At this time, it appears that the only way to reduce the demand charge is a long, sustained energetic conservation effort by the town.

For municipal solar projects currently, the net metering credit applies only to usage and not to the demand charges. For the usage portion, the payback would be 7 to 10 years depending on the size of the project. Penfield, which has been one of our models in developing our

recommendations, was not impacted because demand charges were optional at the time. This option is no longer available.

The impact is that with the demand charges, this is over \$10 KW which makes the cost prohibitive. Renewable Rochester indicated that, financially, we need to wait a few years, until we can find a way to reduce the demand rate which is a separate charge on our bills

National Grid was contacted in order to try to find out more on how to reduce this demand charge. In addition, Ken Olsen from Rochester Renewable, is watching what is happening in California. California is the first place to install a battery system to reduce their peak rate. This would eliminate the demand charge. Mr. Olsen believes that the use of the battery in NYS may take 2-3 more years.

What are the primary goals? While there may be some heightened interest and consciousness of the environment, the goal of transitioning to solar power is not only to decrease our carbon footprint, but to reduce the town's charges. While sustainability is a primary goal, the finances are equally, if not more important, for many.

Renewable Rochester reviewed all the utility bills for the Town of Rush. Unfortunately there is no viable way to move forward with PV at this point in time. The challenge is that the town currently pays only 3 cents per kWh for electricity. However the four major town accounts are on Demand rate SC2D.

This means that a great portion of what the town pays is in "Demand Charges" which is directly related to the highest peak demand for power.

Photovoltaics can offset kWh used, but cannot offset peak demands as the times of highest demand are not concurrent with PV production. At this point in time the town's best strategy would be to find ways to reduce peak demand. Emerging technologies which incorporate battery storage with PV hold the promise of reducing peak demand for power thereby reducing related charges.

Recommendations

There currently does not appear to be a cost-effective way to move forward at this point to install solar because of the unexpected demand charges from National Grid. This recent development prohibits any solar installation plan from being cost effective. When this barrier is eventually resolved or removed the recommendations related to installing solar can proceed.

An Addendum was developed for the committee's report to provide more information regarding the demand charges and further support the recommendation to become a Climate Smart Community. The committee recommends prompt and thorough Investigation and resolution to the demand charge issue by either determining the cause through an analysis of recent audits, or hiring a consultant. Some recommendations need to have the demand charge resolved, while all can be assessed by the town board at this time with decisions made to move forward in developing a timeframe for implementation.

The recommendations are presented as action steps that need to be accomplished. Many of the recommendations (#1-5) are focused on achieving the primary objective to install roof mounted solar panels to meet all of the electrical energy currently used by town operations.

1. Formalize a collaboration with the Highway Department and Fire Department. Advocate to National Grid for help coordinating the net-metering and demand charge issue. Implement a solar installation plan to meet all town operations' current electricity needs.

Rationale:

- The Fire Department is not governed by the Town Board. They are a separate incorporated body, and would need to agree to forge an agreement with the Town Board to use their roof to install solar panels that would benefit not only the Fire Department but the Town buildings as well. The Fire Department's budget is presented and approved separately by residents.
- This agreement would include how the different costs for solar installations would be allocated. and utility costs prorated,
- The Highway Department manages their activities separately, but their budget is an integral part of the Town's budget, and presented to taxpayers as one budget, and approved by the Town Board at the same time.
- There is a significant positive impact if a collaboration is developed among these entities to install solar. This could be accomplished through a memorandum of understanding that would identify how the utility costs would be distributed.
- The result will be an increase in efficiency, effectiveness, and cost-savings for taxpayers if all three entities work together.
- It will also strengthen the presentation to the community how a collaboration will work to identify and share the installation costs and benefit from the energy savings.
- The Fire Department and Highway Department have more suitable roof space for roof mounted solar panels than the Town Hall. Our research indicates that each site can have different meters to guarantee that each department continues to be charged only for the utility costs they consume, and receive the direct benefit of their energy conservation efforts.
- Each new meter is estimated to cost between \$1,000 to 2,000. A collaboration agreement can ensure that the number of meters is kept to a minimum.

2. Establish an Energy Capital Reserve Fund.

Rationale:

- A reserve fund could formally designate that any remaining budget allocations approved for utilities could be stored there to be used to pay for energy conservation projects and to pay the costs for solar installations. This fund could reduce the amount needed to borrow; reduce the pay-back period; and result in an increase in the Return on Investment (ROI) for taxpayers.

- If legally possible, increase the amount of funds in the reserve fund by calculating and allocating all cost-savings incurred from energy conservation strategies to the fund. An example would be the cost savings gained from the proposed town lighting.
- Also, if possible, we recommend allocating the income that the town receives for utility franchises such as Time Warner and the cell-tower located in the town.
- If possible, amend the current year's budget to reallocate funds to start the reserve fund, and to start the first phase of solar installation in 2016.
- Transition to solar should be a major priority in the budget since the cost-savings will be considerable to taxpayers.
- This proposed Energy Capital Reserve Fund would be used to lower the amount of the loan needed for solar installations.

3. Develop a reasonable Financial Plan, with contingencies, to pay for solar installations in an efficient and timely manner without raising current level of taxes.

Rationale:

- A critical goal is not to raise taxes. The goal would be for a bond to be paid within 7-10 years without an increase in the tax rate (e.g. after the completion of the current bond is paid for the Town Hall renovations.)
- If the town board sets solar installation as a priority, this could lead to a time-limited reduction of some other town budget expenses in order to reallocate additional funds to support solar installation.
- The goal is to spend the lowest amount of taxpayer dollars for the solar installations; and to pay back any loans for installation as soon as possible.
- There are many variables that will impact both the cost of solar installations and the pay-back period. The most important factor will be the financial plan that is selected and approved by the Town Board. If a referendum is deemed necessary and approved, the voters will have to agree to raise the funds required to pay for solar installations.
- **Solar Installation Payment options for consideration in order of preference:** For these recommendations, we are assuming a financial spending agreement can be successfully forged between the Fire Department and Town Hall. If necessary, there could be a need to develop two plans.
 - A. **Referendum for Capital Expenditure for roof-top solar installations.** This option will allow the town to move forward quickly, and still redirect the historical payments for utilities to reduce the amount of the loan and reduce the time required to pay off the loan.
 - B. **Funding alternatives if a capital expenditure referendum is not passed include:**
 - Set up an LLC or a Municipal Bond offer. This option would require a legal and financial plan and approval to issue a time-limited municipal low interest bond. The recommended reserve fund could be used to manage the receipt and distribution of the funds.
 - Solicit private investors in the community.

- Phase-in the solar installations using funds raised through energy conservation and utility savings.

4. Educate and Engage the Community

The recommendation is for the Town Board to actively communicate and engage the public on the merits of solar installation and the positive benefits of passing the referendum.

The goals of the proposed information campaign are to provide residents with the facts they need to make an informed decision; and once solar installations are started, increase the awareness and understanding of both the short term and long term positive impact of implementing the proposed solar energy plan.

A. Develop key messages to educate taxpayers, gain their input, and seek their support.

- Describe the short and long term return on investment (ROI).

Example: We are moving from paying a utility company with annual escalation of costs to a community-purchase that will have a defined, short-term, pay-back period.

- Promote understanding and appreciation of need to reduce the use of fossil fuels.

Example: Together we are all beneficiaries of this investment. We are helping our town reduce its carbon footprint through the use of alternative fuel sources.

- Explain the Town Board's Commitment to the citizens of Rush that all utility cost savings from implementing effective conservation strategies and solar installations will be redirected to pay the costs of solar installations or the loans incurred to pay for the installations.

Example: The Town Board has made a commitment to work with all town departments to devise a financial strategy to make conservation and transition to solar energy a reality.

B. Community Education Campaign.

- This activity can include displays in the library and town hall that report utility expense cost savings as solar installations are implemented; and energy saving as a result of implementing conservation strategies.
- Public Information Meeting to present town recommendations and answer questions. Shawn Lessord from Renewable Rochester has volunteered to make a presentation to the community.
- Develop a page on the Town of Rush website to report on cost and energy savings; as well as include periodic reports included in our bi-monthly town newsletter.
- A visual stand-up trifold display presentation in the town hall and informational brochure could be developed to inform residents.
- Place a display and energy savings progress monitor in the Rush Library and/or Rush Town Hall that would track our progress on energy savings and energy conservation for the Town Hall, Library, Highway Department and Fire Department.

5. Implement plan for solar installations. Install roof-mounted solar panels to provide electrical energy for all Town Buildings, Highway Department, the Fire Department, and Street Lights. Develop a Public-Private Partnership to directly pay for the labor and materials for roof-mount solar installations.

Once there is a feasible financial plan that is not subject to the current demand changes, there would be two options for consideration: a phase-in project plan, or a single phase project plan. The phase-in plan offers an opportunity to monitor and measure the impact of each solar installation before moving to the next phase. This option can demonstrate to the community the cost-savings; allows control of funding; and would require a reduced financial investment to get started. A single phase plan may be less expensive, more efficient, and results in more energy savings sooner.

The loan agreements may be more favorable for a single phase project.

This option may also ensure we can receive the benefit of current incentives, and reduce the pay-back period. The Village of Scottsville is currently setting such an example.

Since either option would still require a public referendum, the recommendation would be that the proposed referendum would be constructed to authorize the town to seek a low-interest loan that would cover the anticipated cost of the entire project.

Rationale:

- The preferred plan that will result in the lowest cost of solar installation and the most favorable financing option would be to install roof-top solar panels through a direct labor and materials purchase plan. (This plan is dependent on the ability to meter and distribute kilowatts from one location to another – e.g. Town Hall activities receiving power from the solar panels installed at the Highway Department or Fire Department)
The town departments would pay for both labor and materials directly, and hire a consultant company that is selected through an open review process.
- This option allows the consultant to take advantage of the current state incentives and pass a portion of these savings back to the town. This public/private partnership results in the lowest cost for labor and materials. This option would also provide the shortest pay-back time.
- The estimate is that a public-private partnership agreement to install the solar panels can reduce by approximately 10% the total cost of materials and labor to install all of the solar panels required to generate the solar energy needed for all town services.
- Using this partnership model, the town receives the benefit of the NYSERDA incentives.

Building Roof Mounted	Kilowatt Hours Available from Different Sites	Estimated Cost before incentives
Pavilion	29,000	\$ 65,000
Fire Department	133,000	\$300,000
Highway Department	192,000	\$400,000
Total	354,000 Kilowatts	\$765,000

We do not recommend a Power Purchase Agreement (PPA). The reasons we do not recommend a PPA include:

- PPA may be cost prohibitive for a small town.
- Would require the use of valued town land.
- Benefits only the company rather than the town for more than 20 years.
- Initial high costs, with little to no short term Return on Investment.
- Based on the proposals submitted by both Larsen Engineers and O’Connell Electric, while the town’s utility cost per kilowatt would stay stable, the overall cost could increase.
- The town would not receive any immediate benefit from implementing conservation of energy strategies – this decrease of use would only benefit the company, not the town.
- The Larsen proposal was an example. The company proposed a much larger system than our town needed for its own energy use. The extra energy produced would belong to the company. While this option would likely hold our utility costs to today’s cost, this option offered no promised savings. While we would receive funds for the lease of our land, these funds would not offset the costs we would be obligated to pay for utilities.
- The cost of utilities could go down, then only the company would profit.
- This proposal would also take prime land and redirect it to commercial use.

Guidance on Selection of Company to implement the Solar Installation Plan:

- Develop and release a Request for Proposal (RFP) to seek a consultant company that would be able to manage, direct, and supervise the project, and work directly with the town. The town would purchase the materials directly, and have the option, if feasible, to provide a portion of the labor to reduce the cost of the project, and speed up the implementation.
- Seek the assistance of the Town Highway Department staff that are capable of assisting in the installation of solar panels, with training and supervision, and have a potential cost-savings of approximately 10% of the installation costs.
- Design the RFP to require an itemization of all required labor and material, and the cost for management. Seek bids that will allow vendors to partner with the town to reduce costs by separating out costs, allowing the town to pay directly for labor and materials; and paying directly for consultation, oversight, installation, materials, engineering, and maintenance costs.
- We have talked with two companies that we know would be interested in sending us their proposal for this type of a cooperative project: Robert Kanauer of LTHS in Penfield, and Shawn Lessord with Renewable Rochester.

6. Become a Climate Smart Community

- Provides a guide to promote community actions to help communities implement practices and strategies to reduce the use of carbon emissions.

- The Climate Smart Communities program is jointly sponsored by the following six New York State agencies: Department of Environmental Conservation; Energy Research and Development Authority; Public Service Commission; Department of State; Department of Transportation; and the Department of Health.
- The commitment to be a Climate Smart Community helps to focus and energize all town officials, employees and residents to the importance of reducing carbon emissions.

7. Develop an Energy Conservation Plan. Reduce the need for energy by promoting, implementing, and monitoring proven energy conservation strategies, and approaches.

Our research indicates that all towns can lower their electrical usage by a minimum of 20%. That would be approximately 66,000 kW less or \$8000/year.

Each department (town hall, library, fire, highway, etc.) would develop a plan to reduce their use of energy. We encourage innovative ideas and a plan to increase the use of conservation strategies such as switching to the most current, most efficient lighting technologies, presently LED and setting programmable, thermostats.

An established Energy Advisory Committee could be actively involved in identifying new evidence-based energy saving strategies.

Expected energy conservation strategies and activities include:

- Programmable, time/task oriented thermostats
- Conversion to the latest most energy efficient lighting.
- Geo-Thermal energy for new buildings or when new heating systems are required.
- Include effective strategies to reduce air conditioning/heating needs. Ensure proper insulation, door and window treatments in order to not heat or cool the outdoors.
- Monitor electrical usage to ensure lights and other equipment is turned off when not in use.
- Monitor and set thermostat fan switch in order to save energy. (Leaving the thermostat on the "on" position keeps fan running constantly which not only uses more energy, but overtime will result in increased expenditures for fan replacement.)
- Have an established schedule to program thermostat temperature to reflect scheduled usage of rooms and buildings to ensure that energy is not used when rooms and buildings are not in use, going beyond the minimum of programming for night-time use, weekends, and holidays)
- Use motion-detector lights for all outdoor lighting.
- Plug all electronics into a power strip.
- Set refrigerator temperature between 32-42 degrees Fahrenheit, and unplug refrigerators when not in use.
- Plant trees to provide shade on the sunny side of buildings.
- Set computers to sleep/hibernate mode instead of using a screen saver to reduce energy use during periods of inactivity. Turn computer screens off when not in use.
- Unplug battery chargers after batteries are charged, or chargers are not in use to avoid drawing power even when the device is not plugged into the charger.

8. Amend the Town Comprehensive Plan to promote renewable energy in appropriate areas of our community.

Rationale:

- The current Town of Rush Comprehensive Plan was developed in 1993. Renewable Energy is not found currently in the plan, or addressed in our current zoning ordinances.
- Many communities have moved forward to include a clear message and vision for their community to encourage and embrace renewable energy. The plan should identify appropriate land areas where solar installations can be placed and maintain the small town, rural character of our community, safeguard our farmland and open space, support the Farmland Protection Plan, and safeguard our wildlife, forests, wetlands, and other environmentally sensitive land features.
- A municipality's comprehensive plan establishes broad objectives to guide its growth in the near and foreseeable future, while zoning ordinances contain specific strategies to achieve those objectives.
- The comprehensive plan is critical in determining areas that are best suited for solar farm projects. Courts also look to comprehensive plans when judging the rationale and intent behind local zoning ordinances.
- Revising our comprehensive plan will help to facilitate effective development of wind and solar energy projects. We recommend a thorough review of solar and wind energy projects and description of where they would be best located; and where they should be prohibited.
- The proposed revisions should be based on many considerations including:
 - What areas of the natural landscape have a high potential to support solar or wind energy?
 - What are both the natural and cultural assets that must be protected?
 - How large should a plot of land be for a proposed wind or solar project?
 - What land uses can coexist on the same land as solar or wind energy projects? What uses are compatible? What uses are incompatible?
 - What impact do wind and solar projects have on recreational land use, scenic landscapes, wildlife, and bird and bat populations?
- The comprehensive plan process begins by establishing a community vision and defining key goals that are supported by the residents. We recommend that town's residents be actively engaged, informed, and involved in making the choices regarding where wind and solar energy projects should be located in our town.
- A town's comprehensive plan directly informs the process of developing zoning ordinances.
- We recommend including a positive statement in the comprehensive plan that promotes renewable energy development and uses including:

- Supporting residential and commercial property owners to construct renewable energy development in their land development projects. for their own use
- Identify land use areas that should not be used for solar farms for commercial, utility purposes
- Make a clear statement that fully supports the Farmland Protection Plan.
- Protect and do not reduce the limited amount of forest.
- Limit or prohibit solar farms in high density residential and recreation areas.
- Develop an environmental sensitive overlay that will provide clarity in identifying these areas.

Specific Issues to be included in the discussions of Comprehensive Plan updates and zoning amendment considerations:

Solar Farm in Residential Areas: This is an area that has been thoroughly reviewed by other towns and best practices developed at colleges. A model ordinance was drafted for the Town Board using a template developed by Columbia University. This model ordinance is included in the Appendix.

Solar Farm Siting: There is a Need for Updates/Amendments to our Comprehensive Plan and corresponding amendments to our Zoning Ordinances to Encourage Solar while adhering to the principles identified in the Farmland Protection Plan, and Protecting and Ensuring Appropriate Land Use and Protections.

Example: Sun Edison Company made two presentations to the Town Board in 2015 seeking a commitment of the town to be supportive of property owners in Rush who are interested in leasing their land for commercial solar farms to companies such as SunEdison.

Allowing solar farms is also a major concern for use of public land. The Rush town attorney indicated that the same zoning rules would apply for any commercial solar farm regardless of where it would be located or who owns the property. The current NYS rules permit solar installations on a property when there is a direct use by the property owner. The rules allow a maximum size based on need. When solar installations are designed and implemented solely for the property owner, this is not considered a commercial solar installation, and land-use zoning rights are not challenged. For all other uses, even when the town is the property owner, the rules of solar farm siting should be followed and environmental concerns, and a SEQRA review should be required.

Currently renewable energy, including solar, is not mentioned in our zoning code. This should be considered a major issue and concern for our community. The resolution can only be properly addressed through a revised comprehensive plan that identifies appropriate land areas that would be suitable for solar arrays to ensure farmland, open space, and character of the community is not compromised; and subsequent amendments to our zoning code to ensure appropriate practices are followed, including set-backs, visual barriers, glare, and other protections for neighbors to ensure their property values are preserved, and rural peace and serenity are maintained.

The representative from Sun Edison indicated in their presentation to the Town Board that they were currently reviewing 4 potential property sites to develop in the town; and that

the property owners have already signed initial lease agreements contingent upon their company's review and town approval. They indicated that each potential site must meet specific criteria in order for it to be feasible for the company to develop a solar farm. The criteria for siting a solar farm includes many factors, including easy access to the grid, open flat land, minimal need for land development.

Municipalities can establish additional criteria that must be met in order to protect neighbors, and maintain the stability of neighbors' residential property values. Issues such as minimum size of a contiguous parcel (e.g. 100 acres), required setbacks from neighbors, fencing, protection of wildlife, mitigation of land impacts, maintenance, safety and security, company stability, land succession plans if sold. All of these issues need to be addressed in a zoning ordinance that can limit where commercial solar farms are permitted; and the requirements that are needed in order to gain approval to develop land.

Each commercial solar farm land lease is for 25-30 years. An ordinance can spell out what would happen if the company goes out of business; what permits are required; or what happens if the company sells the solar farm to a new company; or the homeowner sells their land; or it is abandoned for any reason. The company's reputation and financial stability can be included as criteria that should be considered.

These reviews can only be accomplished if the Town updates their comprehensive plan, and develops zoning ordinances that spells out the process for the subdivision of property that would allow for a commercial solar farm. This is the most fair and equitable way to do it for land owners who are interested in leasing their property for commercial use; and ensure our precious farmland and open space is not depleted. With proper land use regulations, the Town of Rush could achieve both.

It is possible that there after a thorough review of land in Rush, mid-size solar farms could be permitted, and still protect our natural environment. Other towns have created "solar overlays" in their zoning so, similar to "environmentally sensitive overlays" that can identify specific sections of the town that would or would not allow solar farms. A potential first step would be to analyze what parcels would be part of an environmental overlay, and what parcels would ensure protection of farmland and open space.

90% of the land in the town is currently zoned residential; our zoning code allows agricultural use throughout the town. While one of the recommendations in the Farmland Protection Plan was to designate agricultural zones, that goal has not been pursued. We do not have solar farms listed as a special use in residential areas. If the Town Board wants to promote solar, and support landowners who want to lease land for solar farms, and at the same time protect their neighbors, we must develop recommendations for zoning amendments that can be reviewed by the Town Board and submitted to the public for their consideration and comment.

9. Amend Zoning Code. Pass Zoning Amendments to support renewable energy in our residential, commercial, and industrial zones.

- A. Use the template for a zoning amendment that was developed for NYS towns to promote effective use of renewable energy and ensure appropriate permits, Appendix.

- B. Depending on the type and size of installation and zone, require additional requirements, such as Special Use Permit, SEQRA, lot size, set-backs, and location of ground-mount solar installations to ensure that our farmland and rural character is not negatively impacted.

Rationale: see Comprehensive Plan.

A packet of potential zoning conditions that was developed to help municipalities is included in the appendix.

10. Establish a Standing Energy Advisory Committee

Rationale:

- Modeling from what other towns have done, we recommend the establishment of an energy advisory committee for the town. The mission of the committee would be to promote energy conservation, energy efficiency, and explore other ways to reduce use of fossil fuels and carbon emissions among the town's residents, businesses and municipal activities.
- The committee's goals would be accomplished through educational activities and programs designed to focus on energy needs, use of energy, and promote new ways to change to more positive energy efficient behaviors.
- The committee could research, make recommendations, and communicate with town boards and committees; as well as engage with other public and private groups and individuals with similar concerns; and stay informed with the appropriate agencies of the county, state and federal governments working to promote the interests of our community and nation in meeting our energy needs and goals.
- We recommend that the committee be composed of a minimum of 4 citizens and a maximum of 7, plus one Town Board liaison. The Planning, Zoning, and Conservation Boards would also be encouraged to actively participate in the committee, and select and send a liaison. The committee would be expected to meet a minimum of 6 times per year; and more often on a scheduled basis as needed to review all plans and proposals that relate to energy for our community.

Other specific suggestions in developing this committee include:

- Citizen volunteers would have an opportunity to renew their commitment and appointment every year at the Organizational Meeting.
- This committee would initiate and monitor the conservation initiatives.
- Assist in the implementation of the solar energy plan approved by the Town Board, including formulating reports for the community, measuring progress made to meet energy savings goals, problem-solving, and other support as necessary to the Town Board.
- Provide feedback and identify needed expertise when necessary to respond to town board needs.
- Recommend budget allocations to support energy conservation and use of renewable energy.

- Seek to implement conservation strategies.
- Continue to research alternate energy sources
- Monitor Energy Financial Reserve Fund for ability to fund new energy producing or saving projects
- Provide input into the development of the Town Comprehensive Plan, and zoning ordinances related to renewable energy.
- Work with citizens to form Community Solar projects as appropriate.
- Promote ongoing conservation efforts,
- Explore areas in Town that are generally not suitable for other uses, and hidden from view (best suited for solar farms), continue to research possible use of geothermal and other energy sources in combination with our solar, help individual residents find information about home installations creating energy savings,
- Represent a voice attending to include all the ways a timely, efficient and fossil fuel free usage can be included in a new Town Comprehensive plan.
- Research and recommend how Rush might utilize the new movements towards Community Solar Farms.
- Assist residents to utilize solar applications for their use.

11. Develop and approve a timetable and action plan to achieve specific recommendations.

Each recommendation requires the accomplishment of specific task activities. Establishing a set timetable is critical in order to continue to move forward and achieve the outcome goals. The timetable needs to be structured and flexible, changing goals based on the outcomes of each activity. Examples of what the timetable would include at the onset are dates to accomplish:

- Collaboration agreement on solar installations between Fire Department and Town of Rush.
- Referendum for a capital fund for town solar installations.
- Public Educational Forum
- Pass a budget amendment to redirect available funds in the current budget to issue an RFP to recruit a consultant who can develop a public-private implementation plan.
- Reallocate available funds to install solar in phases.
- Create an energy reserve fund before next budget
- Pass proposed Zoning Ordinances
- One of our major recommendations is to implement solar power on the roofs of three of our town's buildings. The implementation can be done in phases.

Acknowledgements

There have been several people who have assisted us in gaining the knowledge and understanding of options available:

Rita McCarthy, Liaison to the Committee, Rush Town Board Member
Donald Reynolds, Finance Director, Town of Rush

Floyd Bayley and Lane Young, O'Connell Electric

Bob Bianchi, Power Quality Partners

John Conklin, Matt Vanderbrook, Kevin Schulte, Sustainable Energy Developments, Inc. (SED)

Paul Gee, Mayor Village of Scottsville

Andrew Heiligman, Alternative Carbon Energy Systems (ACES-Energy)

James Hoffman, former Supervisor, Town of Williamson

Charlie Johnson, Lima and Honeoye Falls Building Inspector

Bob Kanauer, LTHS Solar

Larsen Engineers

Shawn Lessord, Renewable Rochester

Owen Macintee, Village of Spencerport, member of Board of Trustees

Superintendent Michael Midey, Bloomfield Central School District

Seth Sykes, Facilities Manager, Rotary Sunshine Camp, Rush

Appendix

Glossary of Terms

Alternative Energy Systems: Structures, equipment, devices or construction techniques used for the production of heat, light, cooling, electricity or other forms of energy on site and may be attached to or separate from the principal structure.

Building-Integrated Photovoltaic (BIPV) Systems: A solar energy system that consists of integrating photovoltaic modules into the building structure, such as the roof or the façade. It does not alter the relief of the roof.

Collective Solar: Solar installations owned collectively through subdivision homeowner associations, college student groups, “adopt-a-solar-panel” programs, or other similar arrangements.

Community solar: A group of people who own and construct a common solar array for use on an unrelated group of buildings. It usually functions with net metering.

Flush-Mounted Solar Panel: Photovoltaic panels and tiles that are installed flush to the surface of a roof and which cannot be angled or raised.

Freestanding or Ground-Mounted Solar Energy System: A solar energy system that is directly installed in the ground and is not attached or affixed to an existing structure.

Kilowatt: a measure of 1,000 watts of electrical power. The **kilowatt hour** (symbol kWh, kW·h, or kW h) is a derived unit of energy equal to 3.6 mega joules. If the energy is being transmitted or used at a constant rate (power) over a period of time, the total energy in **kilowatt-hours** is the product of the power in kilowatts and the time in hours. The **kilowatt-hour** is commonly used as a billing unit for energy delivered to consumers by electric utilities.

Land Mount: Solar panels mounted on the land.

Net-Metering: A billing arrangement that allows solar customers to get credit for excess electricity that they generate and deliver back to the grid so that they only pay for their net electricity usage at the end of the month. It also refers to a system in which solar panels or other renewable energy generators are connected to a public-utility power grid and surplus power is transferred onto the grid, allowing customers to offset the cost of power drawn from the utility.

NYSERDA: New York State Energy Research and Development Authority

Payback period in capital budgeting refers to the period of time required for the return on an investment to “repay” the sum of the original investment. For example, a \$1000 investment which returned \$500 per year would have a two year payback period. The time value of money is not taken into account. Payback period intuitively measures how long something takes to “pay for itself.” (Definition from Wikipedia)

Photovoltaic (PV) Systems: A solar energy system that produces electricity by the use of semiconductor devices, called photovoltaic cells that generate electricity whenever light strikes them.

Photovoltaic mounting systems: are used to fix solar panels on surfaces like roofs, building facades, or the ground. These mounting systems enable retrofitting of solar panels on roofs or as part of the structure of the building.

Power Purchase Agreement (PPA): A contract between two parties, one which generates electricity (the seller) and one which is looking to purchase electricity (the buyer). The PPA defines all of the commercial terms for the sale of electricity between the two parties, including when the project will begin commercial operation, schedule for delivery of electricity, penalties for under delivery, payment terms, and termination. A PPA is the principal agreement that defines the revenue and credit quality of a generating project and is thus a key instrument of project finance. There are many forms of PPA in use today and they vary according to the needs of buyer, seller, and financing counterparties-(Wikipedia)

Power Source: A system that converts AC current from the wall outlet into the DC currents required by electronic circuits.

Qualified Solar Installer: A person who has skills and knowledge related to the construction and operation of solar electrical equipment and installations and has received safety training on the hazards involved. Persons who are on the list of eligible photovoltaic installers maintained by the New York State Energy Research and Development Authority (NYSERDA), or who are certified as a solar installer by the North American Board of Certified Energy Practitioners (NABCEP), shall be deemed to be qualified solar installers for the purposes of this definition. Persons who are not on NYSEDA's list of eligible installers or NABCEP's list of certified installers may be deemed to be qualified solar installers if the [Town/City/Village] determines such persons have had adequate training to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to perform the installation safely. Such training shall include the proper use of special precautionary techniques and personal protective equipment, as well as the skills and techniques necessary to distinguish exposed energized parts from other parts of electrical equipment and to determine the nominal voltage of exposed live parts.

Rooftop, Roof Mount or Building Mounted Solar System: A solar power system in which solar panels are mounted on top of the structure of a roof either as a flush-mounted system or as modules fixed to frames which can be tilted toward the south at an optimal angle.

Small-Scale Solar: "Small-scale solar" refers to solar photovoltaic systems that produce up to ten kilowatts (kW) per hour of energy or solar-thermal systems which serve the building to which they are attached, and do not provide energy for any other buildings.

Solar Access: Space open to the sun and clear of overhangs or shade including the orientation of streets and lots to the sun so as to permit the use of active and/or passive solar energy systems on individual properties.

Solar Array: Electrical device consisting of a large **array** of connected **solar** cells.

Solar Collector: A solar photovoltaic cell, panel, or array, or solar hot air or water collector device, which relies upon solar radiation as an energy source for the generation of electricity or transfer of stored heat.

Solar Easement: An easement recorded pursuant to NY Real Property Law § 335-b, the purpose of which is to secure the right to receive sunlight across real property of another for continued access to sunlight necessary to operate a solar collector.

Solar Energy Equipment/System: Solar collectors, controls, energy storage devices, heat pumps, heat exchangers, and other materials, hardware or equipment necessary to the process by which solar radiation is collected, converted into another form of energy, stored, protected from unnecessary dissipation and distributed. Solar systems include solar thermal, photovoltaic and concentrated solar.

Solar Farm, Solar Park: A photovoltaic power station, also known as a solar park, is a large-scale photovoltaic system designed for the supply of merchant power into the electricity grid. They are differentiated from most building-mounted and other decentralized solar power applications because they supply power at the utility level, rather than to a local user or users. They are sometimes also referred to as solar farms or solar ranches, especially when sited in agricultural areas. The generic expression “utility-scale solar” is sometimes used to describe this type of project. A solar farm is a several acre solar array – the largest scale solar sites.

Solar Panel: A device for the direct conversion of solar energy into electricity.

Solar Storage Battery: A device that stores energy from the sun and makes it available in an electrical form.

Solar-Thermal Systems: Solar thermal systems directly heat water or other liquid using sunlight. The heated liquid is used for such purposes as space heating and cooling, domestic hot water, and heating pool water.

List of Appendix Items submitted in separate files:

1. Model Residential Solar Siting Ordinance Columbia University
2. Draft of Town of Rush Zoning Code for Residential Properties 11.11.15
3. Examples of Renewable Energy Zoning Ordinances
4. Draft Town of Rush Resolution for Climate Smart Communities
5. American Planning Association Planning and Zoning for Renewable Energy Resources
6. National Grid Commercial Metering Overview
7. Siting Solar Panel Under NY Zoning Laws

Resources:

Draft Zoning Ordinance for Residential Properties – developed for Town of Rush using the NYS template developed from Columbia University: website reference:

<https://view.officeapps.live.com/op/view.aspx?src=http%3A%2F%2Fweb.law.columbia.edu%2Fsites%2Fdefault%2Ffiles%2Fmicrosites%2Fclimate-change%2Ffiles%2FResources%2FModel-Ordinances%2FModel-Small-Scale%2FModel%2520Ordinance%2520Solar%2520v.7.doc>

Climate Smart Communities, <http://www.dec.ny.gov/energy/50845.html>

Sample RFPs, guides, studies, National Renewable Energy Laboratory, http://www.nrel.gov/http://www.nrel.gov/tech_deployment/state_local_governments/basics_solar_rfps.html

Understanding Electric Demand, article from National Grid, https://www9.nationalgridus.com/niagaramohawk/non_html/eff_elec-demand.pdf

Zoning for Solar: Resource Guide, [https://training.ny-sun.ny.gov/images/PDFs/Zoning for Solar Energy Resource Guide.pdf](https://training.ny-sun.ny.gov/images/PDFs/Zoning%20for%20Solar%20Energy%20Resource%20Guide.pdf)

NYS Energy Research and Development Authority: <https://www.nyserda.ny.gov/>