



Municipal Solar Workshop- Part I



Agenda



01

Introductions activity

02

Background & Municipal Solar

03

Norwich solar presentation and Q+A

04

Next Steps



Poll 1- Who's here today?

Remember to Scroll to answer all the questions!

Reeds in snow, Marshfield, Vermont
Photo by: David Underwood

Background



Commitments

Global Warming Solutions Act

- 26% emissions reductions compared to 2005 baseline by 2025.

Comprehensive Energy Plan

- 75% of energy from renewable sources by 2032.

Incentives & Programs

Incentives

- Direct payments replacing tax incentives

Programs

- Municipal Energy Resilience Program ([link](#))
- Energy Efficiency Community Block Grant ([link](#))
- USDA Rural Development Grants ([link](#))

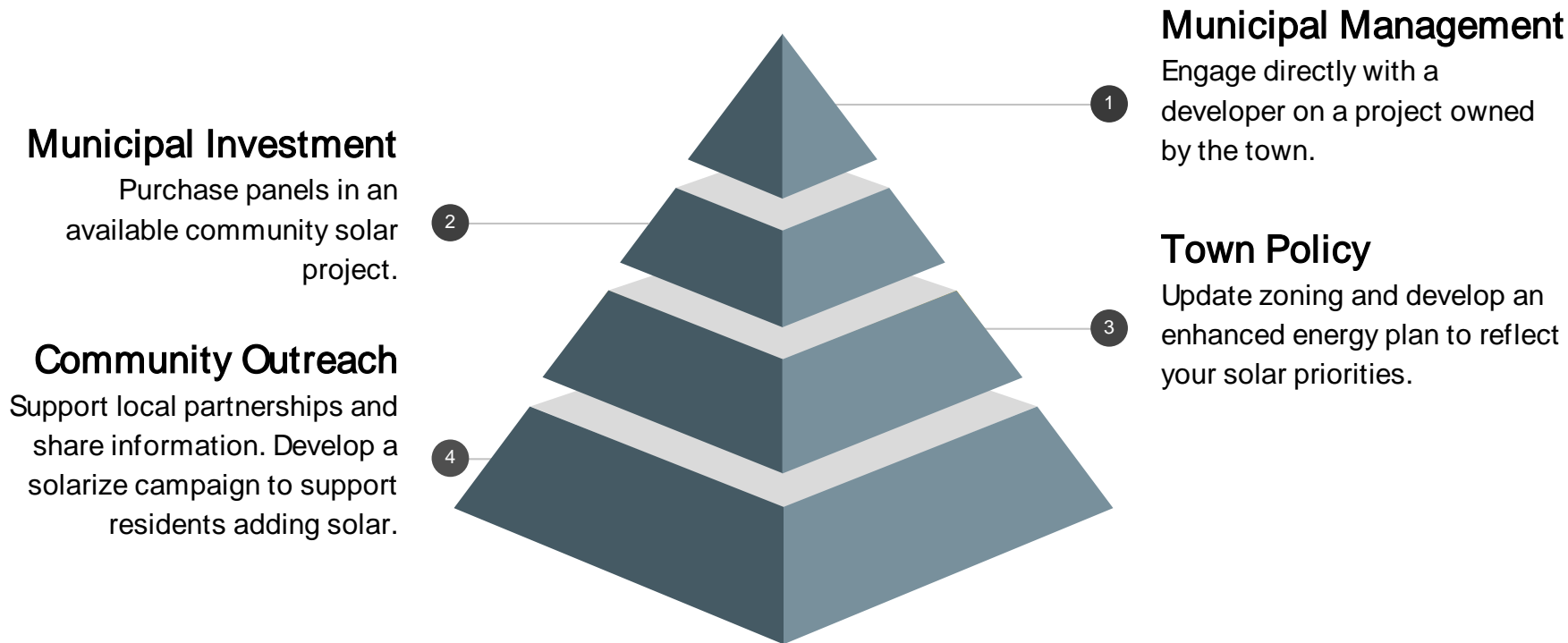
General


- Local solar keeps energy spending in the community
- Supports energy equity (reducing pollution and increasing access to energy generation ownership)

Benefits of local solar

- Social
 - Creative ownership models incorporate affordability program
 - cost savings (direct and indirect)
 - Large municipal assets (e.g. wastewater facility)
 - Meet increased demand and expand assets supported (e.g. cooling and warming centers)
 - Resilience
 - Increase response time and energy resilience (severe weather, outages)
- Environmental:
 - Reduce GHG emissions
 - Facilitate electrification of other assets (EVSE)
 - Resilience
- Financial:
 - Reduce municipal costs (direct and indirect)
 - Reduce energy burdens
 - Municipal tax
 - Resilience
 - Variability rates

Levels of Solar Investment



A scenic landscape photograph featuring a bright sun low on the horizon, creating a strong lens flare effect. The sun is partially obscured by a line of trees on a hill. In the foreground, there are fields of autumn-colored vegetation in shades of orange and red. In the middle ground, a white church with a tall steeple is visible, surrounded by more trees. The background shows rolling hills and mountains under a sky filled with dramatic, dark clouds. The overall mood is peaceful and inspiring.

Poll 2 - What are your goals?

Remember to Scroll to answer all the questions!

Municipal? Solar



Think big but adapt to your town

- Coordinated investment in municipal buildings/ facilities to support broader community infrastructure (social and physical)
 - +storage
 - Future demand (electrification, expansion of services/concentrated growth)

Decision Fatigue:

- Types of Installation
- Demand (town assets- present and future) and sizing
- Ownership models
- Siting

FIRST: communicate early & often, build team & community literacy, and consensus around priorities

Approaches to Municipal Solar:



Old Schoolhouse Common, Marshfield (2012+)

- 3 tracker system
- Federal tax credit, State and Utility incentives, grant, borrowed from dedicated town fund

Warren Municipal Solar Array (prev image)

- Ground mount array (162kWh)- Group Net Metering
- Bond, VT Clean Energy Development Fund



Craftsbury Library Resilience Center Project

- [DIY](#) (misnomer) ([permit package](#))
- Rooftop, paired with battery back-up system
- ARPA funds, VCRD Grant, Volunteer Labor, IRA solar/storage credit 30%



NORWICH SOLAR™



Martha Staskus

Chief Development Officer
(Chair Waterbury Planning Commission)



Geoff Martin

Development Project Manager
(prev. IREC Two Rivers-Ottawaquechee
Regional Commission)



-- bottom line.... it's complicated

A look at Vermont Siting Solar



Presentation Outline

- Who we are
- Overview of Siting Considerations
- Sampling of Solar Stories





Norwich Technologies

Martha Staskus

**Norwich Technologies, Chief Development Officer
Town of Waterbury, Planning Commission Chair**



**Norwich Technologies Inc.
White River Junction, Waterbury
& Windsor VT, Brunswick ME
Plainfield NH**

Our mission is to rapidly advance affordable solar power to help New England companies, communities and institutions improve their Triple Bottom Line – Financial, Social and Environmental.

Norwich Solar specializes in complete end-to-end solar solutions, including Design & Permitting, Engineering, Procurement, Construction (EPC), Power Purchase Agreements, Structured Financial Solutions and Operations & Maintenance (O&M).

Founded in 2011 with a vision of installing leading-edge innovations in Clean Technology.

<https://norwichsolar.com/>



Siting Considerations

- ❖ **Economic Balances**
 - equipment, taxes, generation compensation rate
- ❖ **Societal Benefits**
 - Jobs, clean air health benefits
- ❖ **Vermont Stakeholders**
 - Landowners, customers, neighbors
- ❖ **Site Conditions**
 - Sun, geology, land uses, natural resources, cultural resources
- ❖ **Electrical Interconnection Conditions**
 - Stability and reliability distribution system improvements
- ❖ **Regulatory Participants, Rules & Guidances**





Economic and Societal Considerations

- ❖ Each 500kW ground mount solar system typically brings benefits to Vermont including:
 - \$1 million directly invested in the Vermont labor economy.
 - 11 Fulltime Job Equivalents.
 - Employment of local businesses and independent contractors
 - \$150,000 in utility upgrades paid for by the solar project system owner.

Solar:

- ❖ Diversifies the State's sources of electric energy
 - producing locally and recirculating our energy dollars instate.
- ❖ Protects against fossil fuel price fluctuations & foreign influences beyond our control
- ❖ Increases reliability and stability of our electric system with project-paid interconnection upgrades
- ❖ Contributes to Municipal and State Property Taxes; to State Education Fund (production tax)
- ❖ Contributes to the State's goals for renewable energy, the Global Warming Solution Act, the Comprehensive Energy Plan





We are the Stakeholders

30 V.S.A. § 8010(c)(1)(E) states PUC

“shall establish and maintain a net metering program that: (E) ensures that all customers who want to participate in net metering have the opportunity to do so.”

This means: Landowners, Homeowners, MLI Housing Partners, Renters, Businesses, Communities, Schools, Public Institutions, Non-Profits Organizations



Patricia Horn & Mary Louise Sayles, Cedar Hill Co-owners



St. Johnsbury School District



Holland Dairy Air Farm

Norwich Solar assists these customers because benefiting from locally generated solar electricity can be a rather complicated process.



VINS



Not all Customers have space or ability to host solar.



KING ARTHUR BAKING



MORRISON'S CUSTOM FEEDS



MT. ASCUTNEY HOSPITAL



WENTWORTH HOUSING



HARPOON BREWERY

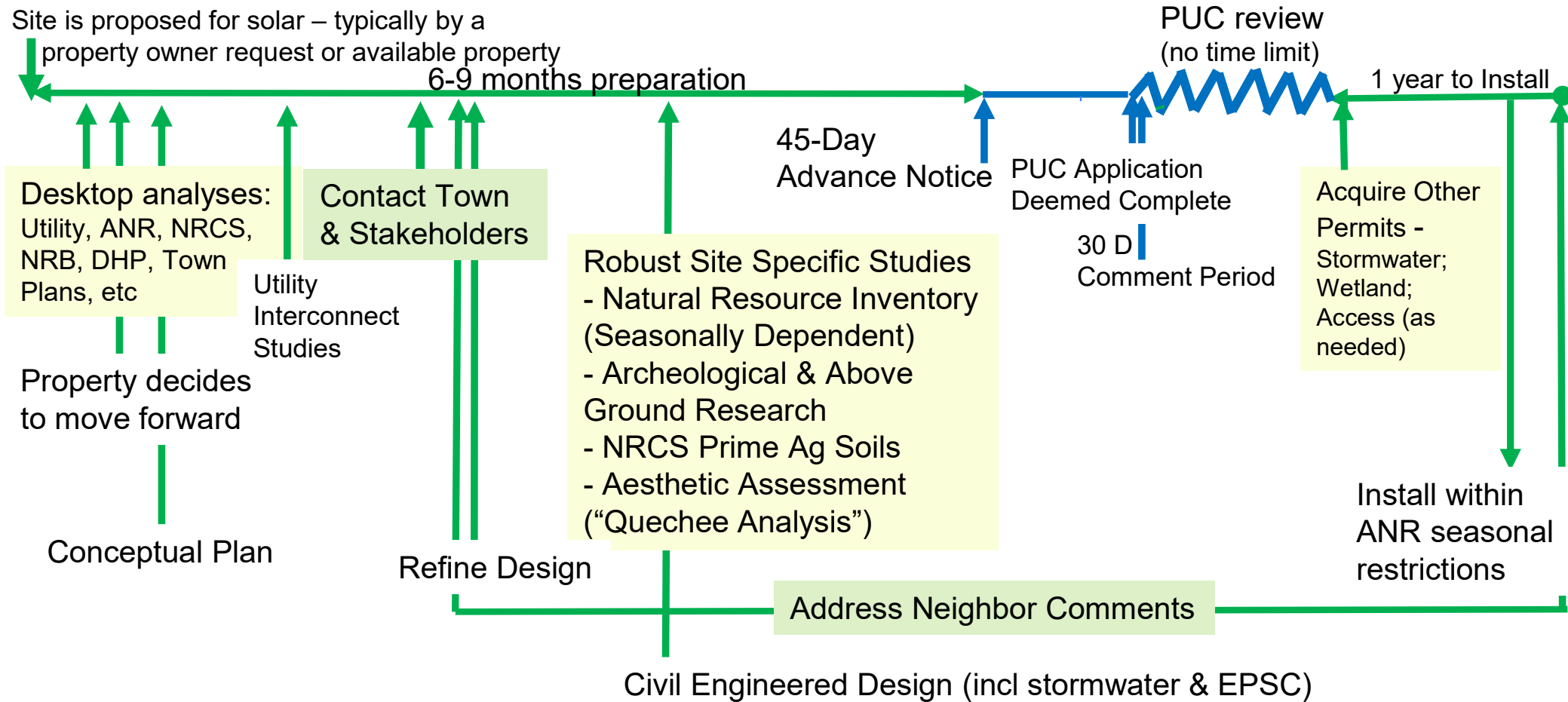


WINDSOR, VT TOWN &
SCHOOLS

<https://norwichsolar.com/featured-solar-installation-projects/>



General Timeline





ANR Section 248 review guidance

- [Flood Hazard Area and River Corridor Protection Procedure \(2017\)](#)
- [River Corridor Protection Guide \(2008\)](#)
- [Conducting Rare, Threatened, and Endangered Plant Inventories \(2016\)](#)
- [Non-Native Invasive Plant Species Monitoring and Control \(2016\)](#)
- [Review and Minimization of Impacts to Bats from Wind Energy Facilities \(2016\)](#)
- [Design of Stream/Road Crossings for Passage of Aquatic Organisms in Vermont \(2009\)](#)
- [Review & Mitigation of Impacts to White-Tailed Deer Winter Habitat in Vermont \(1999\)](#)
- [Planting Guidance for the Revegetation of Riparian Areas in Vermont \(2016\)](#)
- [Guidance for Agency Act 250 and Section 248 Comments Regarding Riparian Buffers \(2005\)](#)



Preferred Site Designation

Means 1 of 9 possible criteria including:

On a new or existing structure, parking lot canopy, brownfield site, sanitary landfill, gravel pit site; National Priorities List (NPL) site; on a parcel, or directly adjacent, with >50% of the output.



Frequently:

A specific location designated in a duly adopted municipal plan under 24 V.S.A. chapter 117 for the siting of a renewable energy plant or specific type or size of renewable energy plant, provided that the plant meets the siting criteria recommended in the plan for the location; or a specific location that is identified in a joint letter of support from the municipal legislative body and municipal and regional planning commissions in the community where the net-metering system will be located.



Criteria/Process Varies at Town/Regional Level

Norwich March 2020 Plan

Regional Commission Format

For solar generation projects sized from 15kW to 500kW the presumption is that all of Norwich meets the Public Utility Commission definition of 'preferred site', notwithstanding the existing areas of local concern including the Ridgeline Protection Overlay Area and the historic village district as identified in the Norwich Land Use Regulations.

Section 248 TRORC Review Protocol – Preferred Site Letter of Support

Please provide a general site map at the town scale, and at the site scale, showing the entire parcel and lands/E911 structures within 100 meters. Provide other maps as requested. Maps should use public data when easily available.

ANR Atlas is found at <http://anrmaps.vermont.gov/websites/anra5/>
Biofinder is found at <http://anrmaps.vermont.gov/websites/BioFinder2016/>
FEMA Map Service Center <https://msc.fema.gov/portal>

TRORC will review requests for Preferred Site Letters of Support by completing the following table:

	Name of Project:	
	Date:	Size of solar project:
	Docket No:	
	Developer:	
	Owner:	
	Is the solar facility site affecting...	Yes/No
1	Provide FIRM map showing FEMA Floodway, if present. ANR Atlas does not have all FEMA maps, so outside of Windsor County use FEMA Map Service Center. If yes and not on existing building, TRORC will NOT issue Preferred Site Letter of Support.	
2	Municipal letters of support from SB and PC, or in TP mapped preferred site? If site does not have both, TRORC will NOT issue a Preferred Site Letter of Support.	
3	Provide FIRM map showing FEMA Special Flood Hazard Area, if present. Describe. If yes, provide estimated lowest elevation of panels/inverters etc., floodproofing measures and BFE.	
4	ANR Atlas review – River Corridors Describe distance to top of bank. Is river in active movement/site likely to erode?	
5	ANR Atlas review – Wetlands Describe: Has a wetland delineation been done?	
6	ANR Atlas review – Prime Agricultural Soil Describe: Is site in active agricultural use?	
7	BioFinder review – Provide map showing forest blocks and habitat connectors, if present Describe:	

8	Aesthetic/Historic Siting review Provide photo(s) from nearest public road. Is proposed facility visible from public roads or adjacent owners? Are any dwellings within 100 meters? Describe lighting, traffic, fencing, noise, glare. Describe any ground disturbance and tree cutting.	
9	Municipal concerns? Describe any issues the town has raised.	
10	ANR Atlas review – Threatened and Endangered Species/significant natural community/deeryards/ critical habitat Describe species and provide map.	
11	TRORC Regional Plan conformance? Describe using Regional Plan and TRORC Energy Implementation Plan:	

TRORC will provide a Preferred Site Letter of Support for a renewable energy project when requested by the Town or the developer for projects:

1. That have a level of specificity enough for us to make determinations using the above checklist AND
2. That TRORC has determined there is minimal impact to human and natural resources as illustrated on the checklist AND
3. That have written municipal support from the Selectboard and Planning Commission AND
4. That TRORC finds in conformance with the TRORC Regional Plan

For projects lacking enough detail to make findings, TRORC is not able to issue the Preferred Site Letter of Support.

TRORC will provide a letter of Preferred Site status after completing a review above, finding the project and site in conformance with the Regional Plan, and receiving copies of Preferred Site Letters of Support from the Town SB and PC. Language in the Preferred Site letter will include: "Having made our review, the TRORC wishes to support the Project location as a designated "Preferred Site" under Net Metering Rule Section 5.103 (7). The TRORC does not take a position certifying or approving the Project's compliance with any other applicable provisions of Vermont law. This letter is solely for the purpose of providing support for designating the site as a "Preferred Site" under Net Metering Rule Section 5.103 (7).



Public Utility Commission Application Package



Newbury Town Seal

TOWN of NEWBURY

P.O. Box 126, Newbury, Vt. 05051

802-866-5521

Public Service Board of Vermont
112 State Street
Montpelier, VT 05620-2701
Ms. Judith Whitney, Clerk

Re:
Des:
K. Prc.
Please
5.100 on
providing
Sincerely,
Newbury Selects

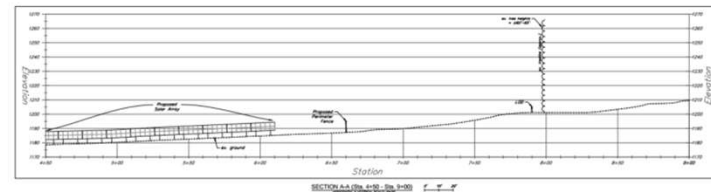
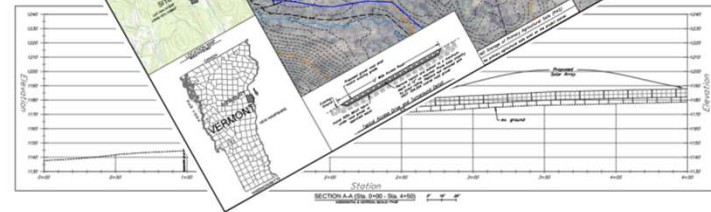


Exhibit MS-5

Newbury
Community
Solar, LLC

VERMONT
State of Vermont
Division for Historic Preservation
1 National Life Dr., Davis Building, 8th Floor
Montpelier, Vermont 05620-0501
http://www.vermont.gov/strong_communities/preservation/

Agency of Commerce and
Community Development
(Phone) 802-828-3045
(Fax) 802-828-3208

HISTORIC PRESERVATION PROJECT REVIEW COVER FORM

Please complete this form and attach it to the top of all information submitted to this office for review.
Accurate and complete forms will assist in the timely processing and response to your request.

1. DOES THIS INFORMATION RELATES TO A PREVIOUSLY
SUBMITTED PROJECT? Please check box.

☐ If you have checked this box and =
previous Project Review (PR)
assigned by this office =
continue unless B*
information =

1a. PREVIOUS PROJECT REVIEW NUMBER OR PROJECT NAME

TOWN: _____ CO: _____

2. IS THIS A NEW PROJECT? ☒ If you have checked
to complete
info =

Project Name: Tunbridge

Location: 7 Bell



Cons.

Feasibility Study for St. Johnsbury Lapierre Solar, LLC
500 kW Solar Project
located at 0 Lapierre Drive, St. Johnsbury, Vermont
on the GMP BA-672 Circuit at Line 61 Pole 15 Tag 456342
Bellevue, Dan
June 26, 2020

Exhibit MDK-2

Newbury Community Solar Project
1 Hollow Road, Newbury, Vermont
Orderly Development Assessment Report
April 7, 2020

NORWICH
2001-A-11-15 COMMUNITY DEVELOPMENT
15 RAILROAD ROW, SUITE 101
WHITE RIVER JUNCTION, VT 05001

Component	Dist to Residence (FT)	dBA @ Dist
Transformer 001	940	10.9
Transformer 002	940	10.9
Transformer 003	970	10.9
Transformer 004	1000	10.9
Transformer 005	1040	10.9
Transformer 006	1070	9.9
Transformer 007	960	10.7
Transformer 008	1140	9.9
Transformer 009	1130	9.2
Transformer 010	1170	9.9
Transformer 011	1200	9.2
Transformer 012	1120	1.7
Transformer 013	1120	1.7
Combined Impact (dBA)		20.3

Relevant equations:
FT-M conversion: 1 foot = 0.3048 meter

Sound level of individual components:

$R2 = 10 \cdot \log_{10}(D)$

Where:

R2 = sound level at user-specified distance

R1 = sound level at one meter distance

D = user-specified distance, in meters

Combined sound level:

$RN = 10 \cdot \log_{10}(10^{R1/10} + 10^{R2/10})$

Where:

RN = sound level of combined components

R2 = sound level at user-specified distance

norwich town plan
ADOPTED MARCH 7 2020

Exhibit NLH DB-2

Natural Resources Assessment for:
500 kW Photovoltaic Electric Generation Facility
Newbury Leighton Hill 9A Solar Project

Newbury, Vermont

Prepared by:
Arrowwood Environmental, LLC

October 23, 2020



Installation process





Construction / Operations & Maintenance

❖ Construction Challenges

- Protected rare, threatened, endangers species setbacks
- Deer wintering area (DWA) seasonal restrictions (Dec 15 – Apr 15)
- Bat habitat seasonal restrictions (Apr 15 - Oct 31)
- Amphibian seasonal restrictions (Mar 15 – May 14 and Sept 1 – Oct 15)

❖ Operational Maintenance

- Annual ground maintenance and perhaps shade management
- Grassland birds seasonal mowing restrictions
- Non-native invasive species (NNIS) monitoring for up to 5 Years



Tunbridge Belknap Brook Solar

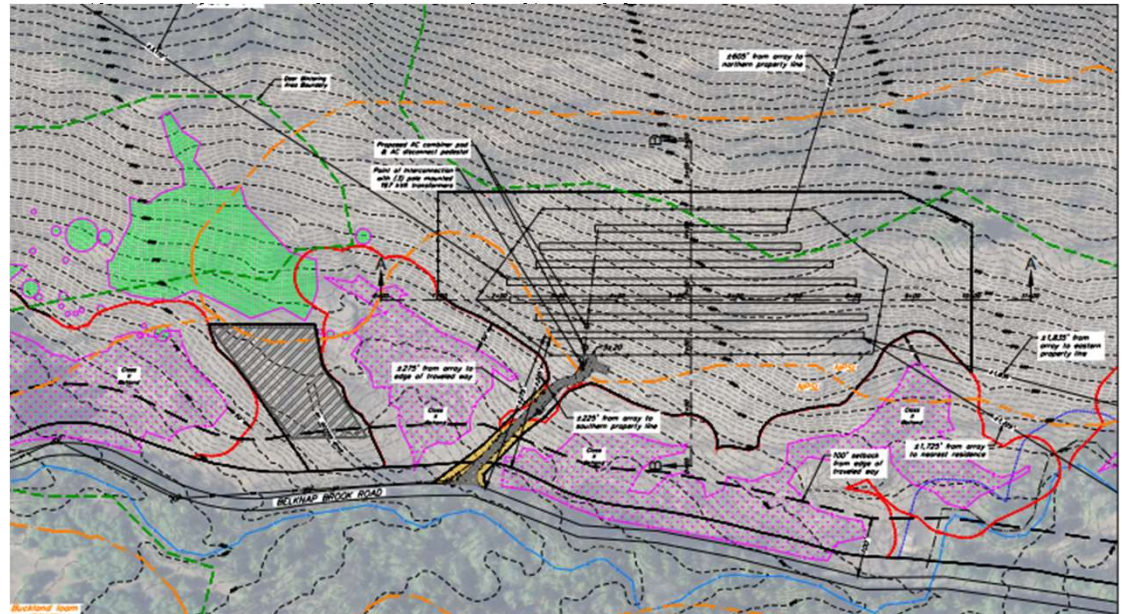


Sheep to graze under the solar array.

CPG conditions:

- Installed within 1 year of
- DWA installation restriction 12/15-4/15
- Time of Day/Holiday Installation limitations
- Record CPG Notice in town records
- Wetland permit for array access
- Stormwater construction permit
- 5 years of NNIS monitoring

Through the efforts of the White River Land Collaborative, the farmer, the Vermont Land Trust and Norwich Technologies, this community-based land ownership structure bring farming, solar energy, recreation and housing together and continue the agricultural attributes of this historic farm as a model that helps young farmers





Star Lake Housing Community Solar



Solar Electricity
Production
**82,000 KWH
PER YEAR**



Lifetime Benefit
\$88,000



Community solar allows a collection of residents to go solar and save money with no upfront costs.

Our group of *Community Impact Investors* have come together to invest in residential community solar, including lower income families' housing.

For lower income families in affordable housing communities reducing electricity costs can be challenging, financing difficult, and the process time consuming.

14 single family homeowners receive the net metering credits. Twin Pines Housing owns the land and manages the property. The homeowners purchase to solar net metering credits at a discounted rate, saving money on their electricity bills while fostering clean locally produced solar electricity.



Cedar Hill Continuing Care Community



Same family owned and operated Cedar Hill Continuity Care Community receives the net metering credits generated from the solar array they have installed on their own property.

Over \$62,000 municipal taxes annually (\$1.5 million over 25 years) Over \$21,000 school taxes annually (\$518,000 over 25 years)

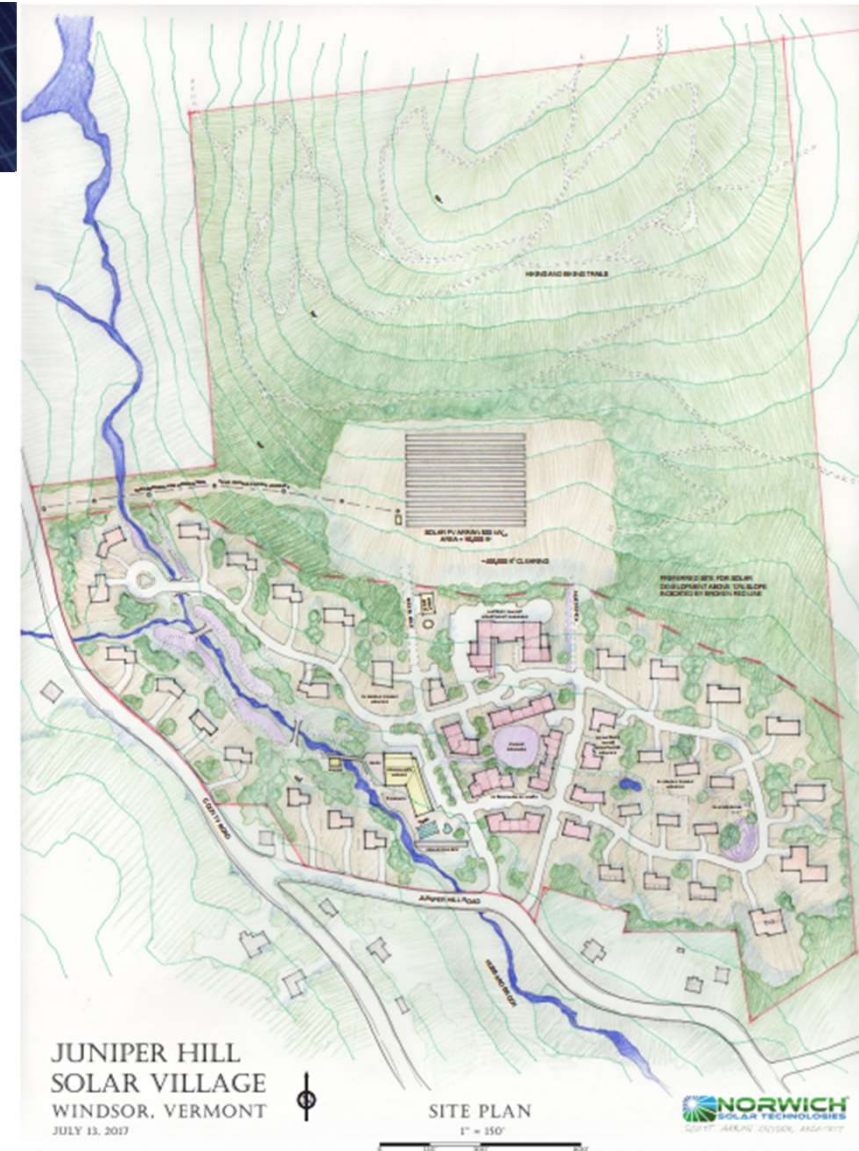
Cedar Hill is off-setting their energy costs by \$100,000 per year, (~\$3 million over the life of the project)

615,000 kWh projected annual output
200 local business and contractors work to install the arrays.



Windsor Juniper Hill Solar

- ❖ Schools in Windsor, West Windsor, Hartland, Weathersfield schools and early childhood programs are receiving the net metering credits
 - Annual 710,000 kWh consumption
 - Combined >\$139,000 electric bills
 - Now saving \$19,000 annually for other programs
- ❖ STEM educational opportunities are included
- ❖ Taxes to Windsor > \$150,000 over 25 years
- ❖ Other Net Metering Benefits
 - Significant discount on the schools' power bills
 - No upfront capital expenditure and with the
 - Option to Own the array after 7yrs or continue Net Metering Credits for additional 18 yrs
 - > \$900,000 lifetime savings over 25 yrs.





Thank you.

The process is complicated

It takes a long time

**We are rapidly advancing
affordable solar power**

Martha Staskus
staskus@norwichsolar.com



References

Who Benefits ?

Turnbridge Belknap Brook Solar

Cedar Hill Community Care Center, Windsor VT

Star Lake Community Housing, Norwich VT

Windsor Juniper Hill

PUC Public Utility Commission

ANR Agency of Natural Resources – Planning Division

DPS Department of Public Service – Siting Electric Generation

NRB Natural Resource Board Act 250 Online Data - Compliance

AAFM Agency Agriculture, Food & Markets - Land Use & Renewable Energy

ACCD/DHP Agency of Commerce & Community Development Division of Historic Preservation

GMP Solar Map 2.0

Preview Part II

- Solar and Working Lands (dual use/agrovoltaics)
- Solar as part of a resilient energy system (combo with storage!)
- Future demand (sizing)
- Siting (environmental, proximity to consumers/development, interconnection)

Homework

1. Complete the [post webinar survey](#)!
2. Start conversation in your community:
 - Who are potential partners?
 - What are potential sites for solar?
 - What is the town's current energy demand?
 - Current municipal projects that could include solar?

Resources & Technical Assistance (highlights)

Planning and project development (2015):

- [Solarize Toolkit \(Month by Month Workflow\)](#) Vital Communities
- [2015 School and Municipal Solar Resources](#) (VECAN, VLCT, TEC, PSD)
- <https://solarpvtraining.com/courses/residential-solar-installation-design/>
- Municipal Solar+Storage ([Clean Energy Group](#))

Planning & Community Engagement: VCRD - [Vermont Community Leadership Network](#) and past [workshop recordings](#)

Federal Funding: [Vermont League of Cities and Towns](#) (federal funding guides and assistance)

Pair Efforts with:

- [Health Equity & Community Design Technical Assistance Pilot](#) → [Better Places](#)
 - ◆ E.g. Warming and cooling centers components
- [Municipal Energy Resilience Grant Program](#)
 - ◆ Fuel Switching, Thermal Envelope, etc

And more...contact mshropshire@acrpc.org or lash@cvregion.com