

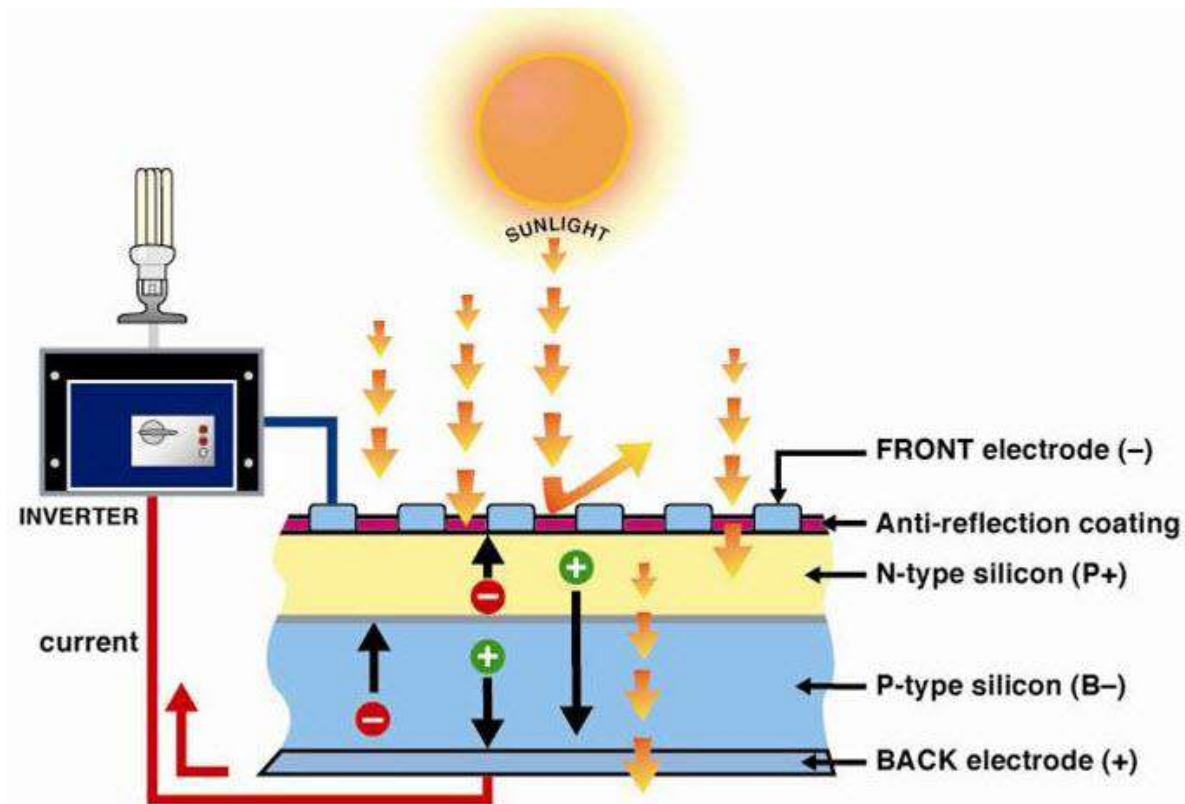
SOLAR POWER FOR FALMOUTH

LWVF Natural Resources Committee 2018



A Brief Introduction to Photovoltaics

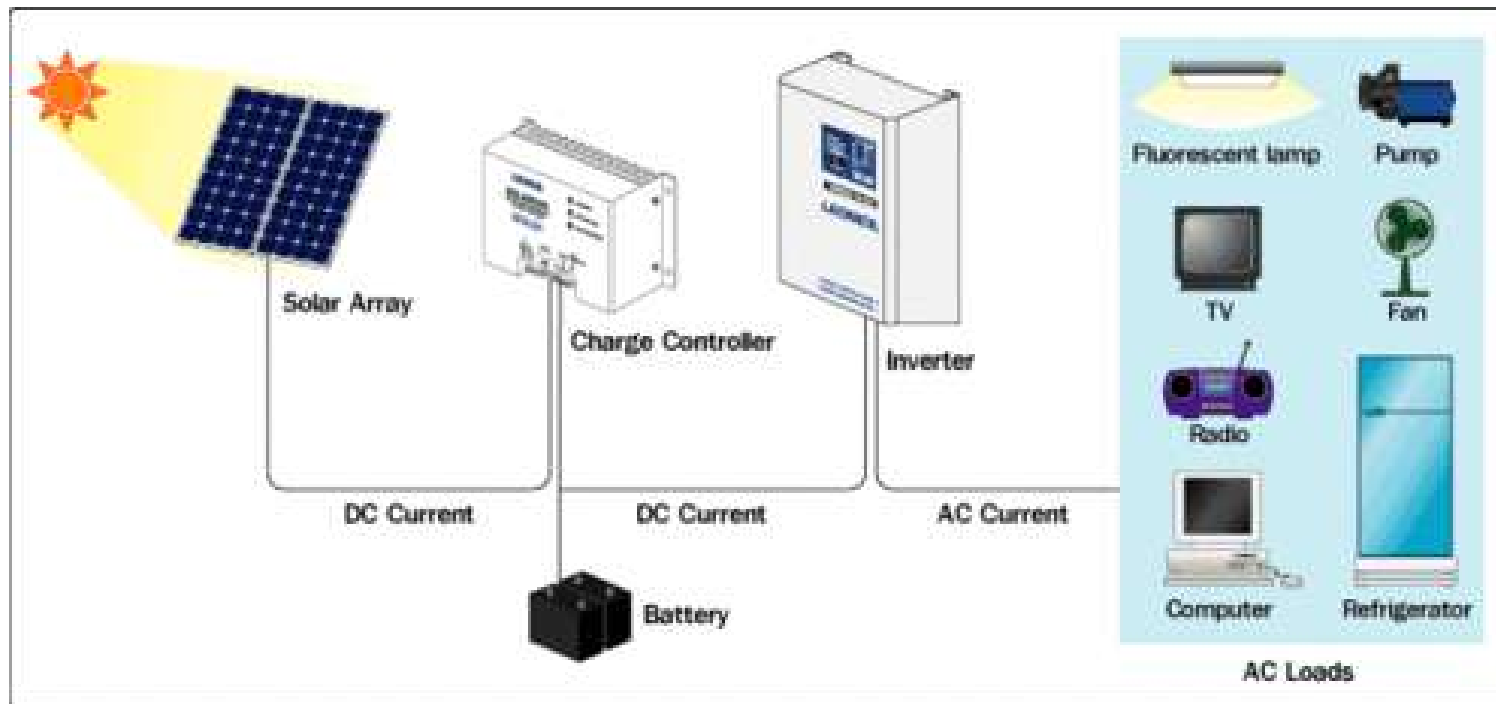
- ▶ Photovoltaic panels are composed of electrodes and layers of highly refined silicon of two different types, which create an electric current when exposed to sunlight.



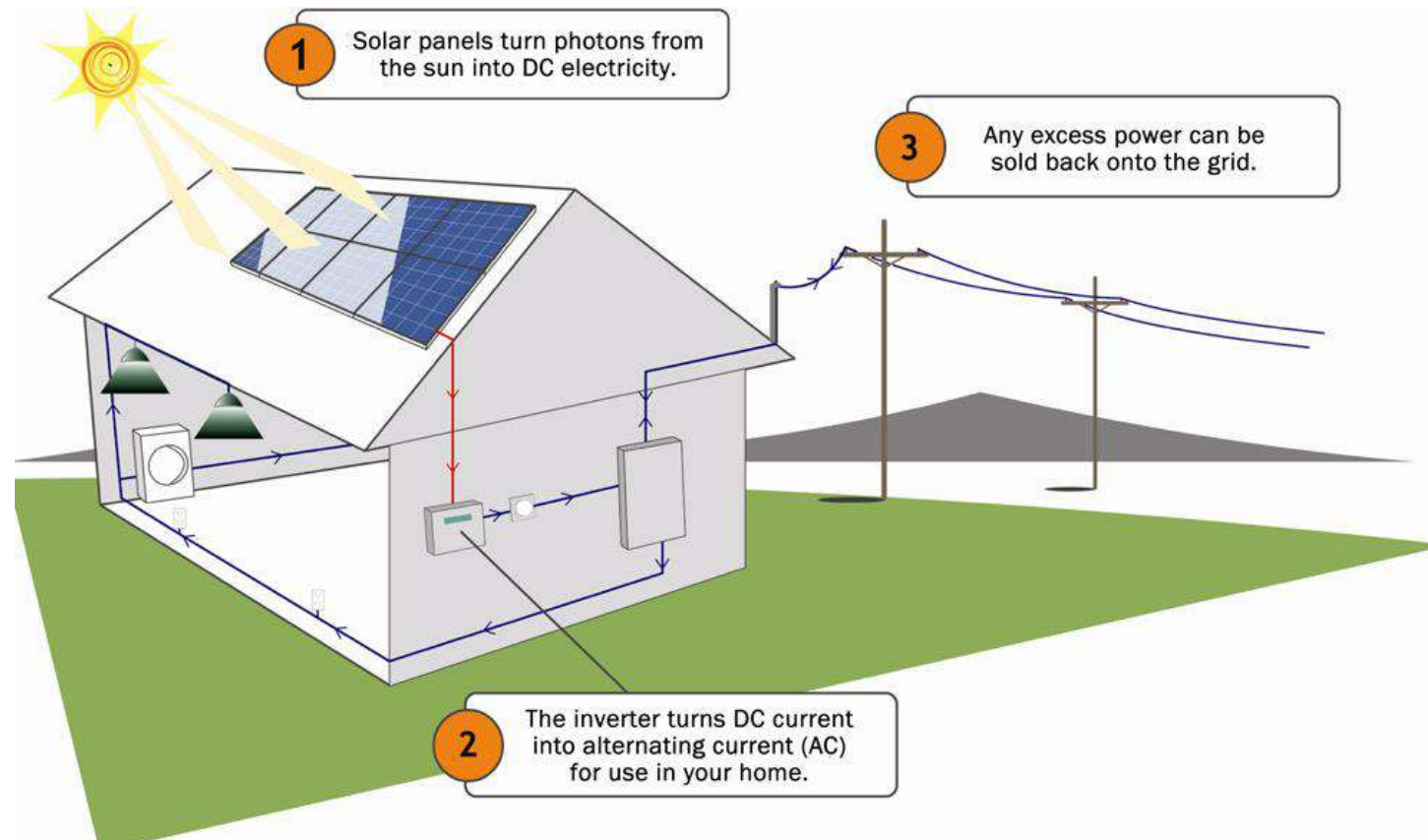
- ▶ An average panel for home use is 65" by 39" and may generate 250 watts of power: a range of efficiencies is available.
- ▶ Smaller panels are used for portable or low energy-requiring uses such as parking meters, etc. Larger panels are used for large energy generating arrays.



- Solar Panels generate a direct current which must be converted to the alternating current used by most appliances.

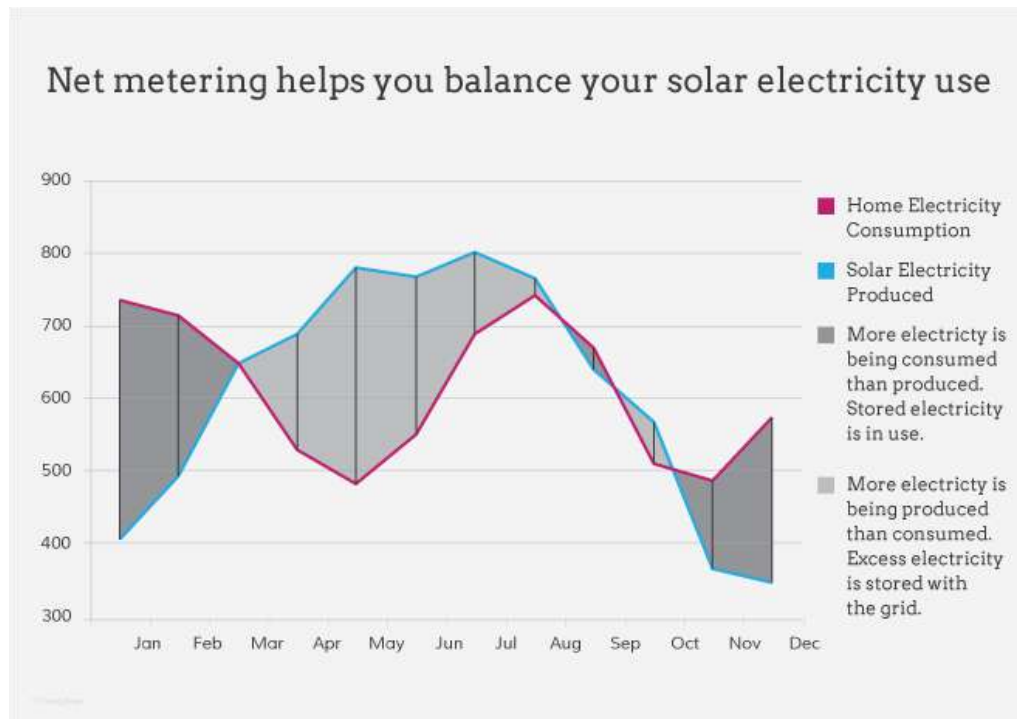


- ▶ Excess power is sent into the grid for others to use, crediting the system owner.



Net Metering

- ▶ Connecting your photovoltaic system to the grid is governed by the rules of Net Metering and requires consent from the power company.
- ▶ Residential systems under 10kW are accepted by Eversource and National Grid. Larger systems are evaluated and are subject to caps.
- ▶ You receive a credit for energy produced in excess of your needs which can offset energy you draw from the grid at night or whenever your PV system does not meet your total energy needs.



- ▶ In Massachusetts, the average home uses 10,000 Kilowatt hours of electricity per year.
- ▶ 10,000 divided by 250 equals 40 panels needed.
- ▶ Five rows of eight panels would require a mounting area of 27' by 26'.
- ▶ A south facing roof tilted at 30 to 36 degrees is ideal.



Larger Systems

- ▶ A commercial business may use far more power and need a larger system, such as a grocery store with multiple coolers, freezers and significant lighting and air conditioning costs.
- ▶ PV arrays on flat rooftops need to be angled towards the sun and need larger surface areas.



Supply NE on Dillingham Ave.



- ▶ The angle is determined by geographic location and the range of sun angle change through the year.
- ▶ Rows are spaced so they never cast shadows on each other.
- ▶ These systems are likely to be larger than 10KW and subject to Net Metering.



- ▶ When the roof is not flat or well oriented toward the south, other alternatives are needed.
- ▶ Parking canopies and mobile mounts are two options, each with significant structural or equipment costs. Mobile mounts can track the sun and adjust to sun angles, and are more efficient though more costly.



- ▶ In Falmouth, we have two well known examples of solar parking canopies:
- ▶ Kenyon's Market has several smaller parking canopies set well back from Rt 28, screened from that view corridor by existing trees along the road and in parking island end caps.



- The Falmouth Ice Arena has enough photovoltaic panels to supply all of its power needs. This location is more isolated from public view and the parking canopies are massive. This is a 950 kW system.



- Still larger in area covered is the parking canopy at the Bourne Upper Cape Tech, covering most of its parking lot including travel lanes: this is a 663kW array.



- Parking canopies are easily adaptable to scale and materials.



- Solar Parking Canopies provide parking sheltered from rain, sun and snow, and can be well illuminated at night.



- They can also incorporate electric vehicle charging stations.



- The Falmouth Energy Committee has performed a detailed assessment of town-owned properties and their suitability for solar canopy installation, with the High School and Gus Cnty Center each strong candidates.



Ground Mounted Arrays

- ▶ Large scale power generation can be achieved through panels mounted on the ground with minimal structure.
- ▶ Vegetation control is essential to keep the panels from being shaded.
- ▶ Falmouth EDIC has installed an 4.3 MW array at the capped landfill. A 2 MW addition is planned.



- This array's primary purpose is energy generation and is not linked to a building (a primary use, not an accessory use).



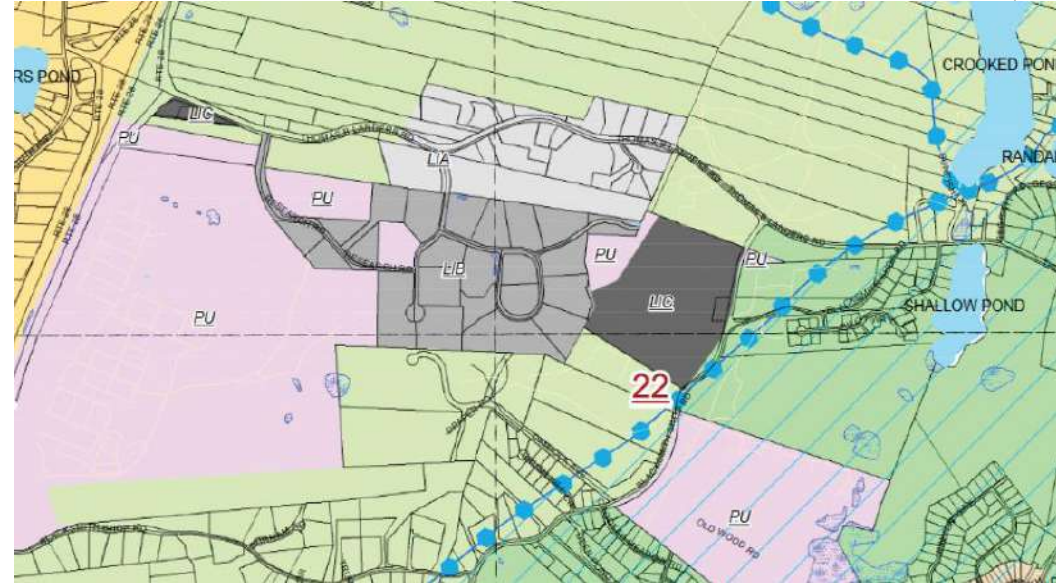
Zoning Issues

- ▶ The current Falmouth Zoning Code is silent on solar parking canopies, as they have no footprint and require a simple building permit with no site plan review.
- ▶ Article 7 on the Fall Town Meeting Warrant seeks to change this by adding the word “structure” to the list of elements requiring Site Plan Review by the Planning Board. No standards are proposed governing size or location of parking canopies.
- ▶ Large commercial ground mounted solar arrays as a primary use are restricted to Light Industrial C zoning districts. Only the capped landfill is large enough in this zoning designation for an array. The Planning Board proposes the creation of a large solar array overlay district on properties adjacent to the landfill for November Town Meeting approval, Article 8.
- ▶ A few small ground mounted arrays exist as accessory uses, such as at the Woods Hole Research Center headquarters.



Zoning Alternatives

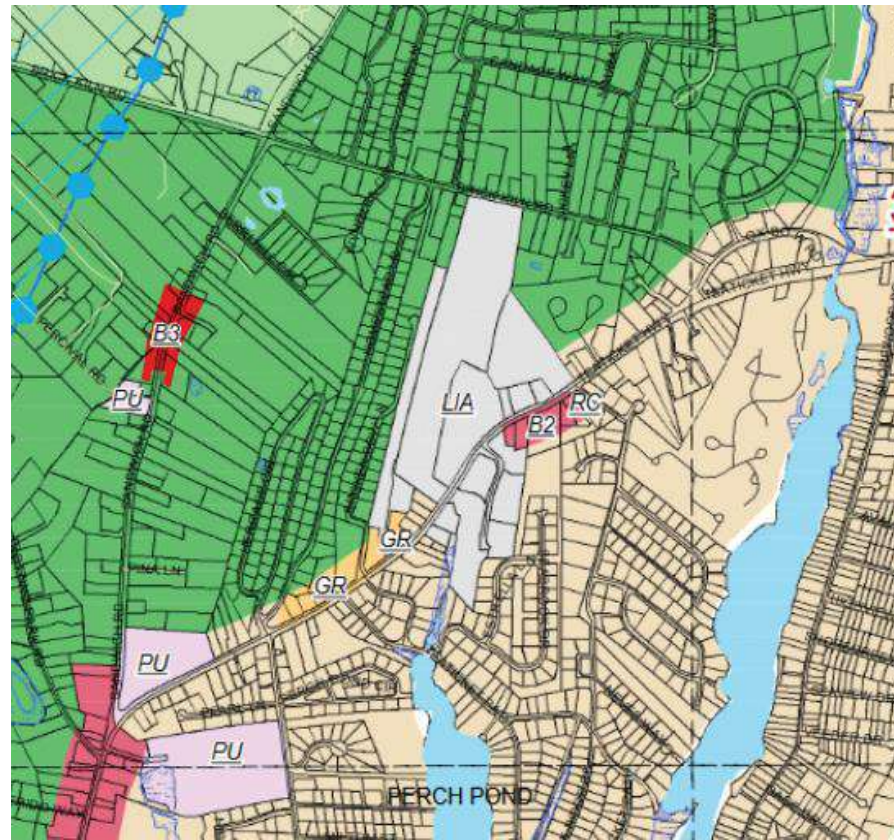
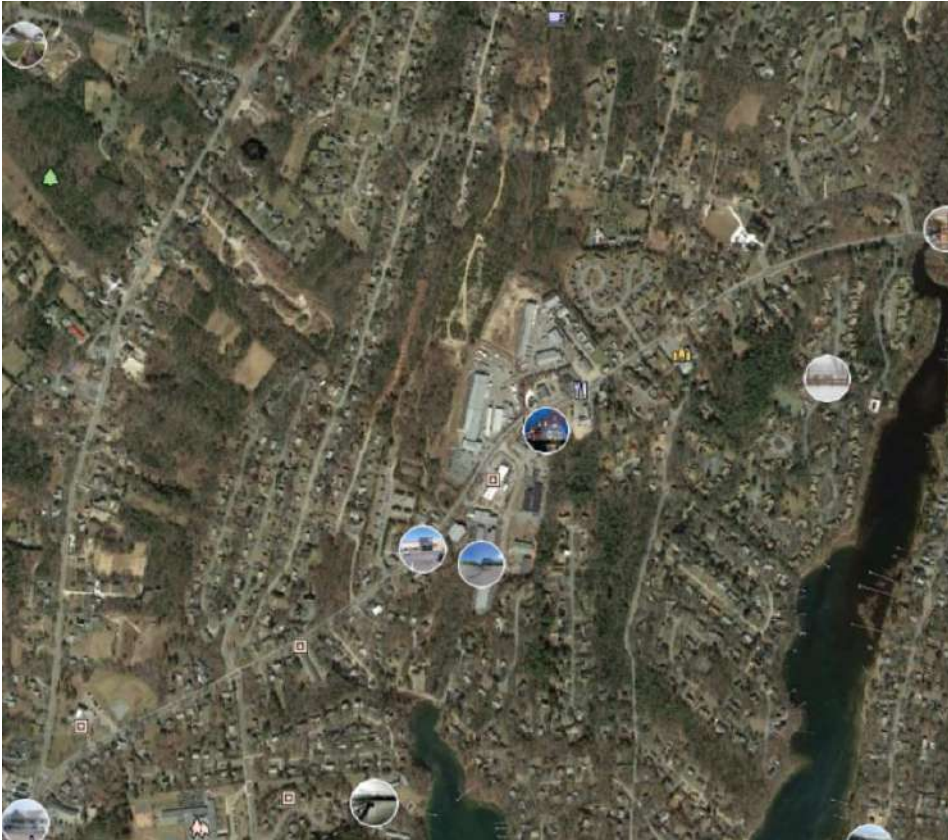
- Opening all Light Industrial districts to Parking Canopies and Ground Mounted Arrays as primary or secondary uses would allow significant expansion of solar energy generation at the Tech Park, particularly at the SSA parking facility.



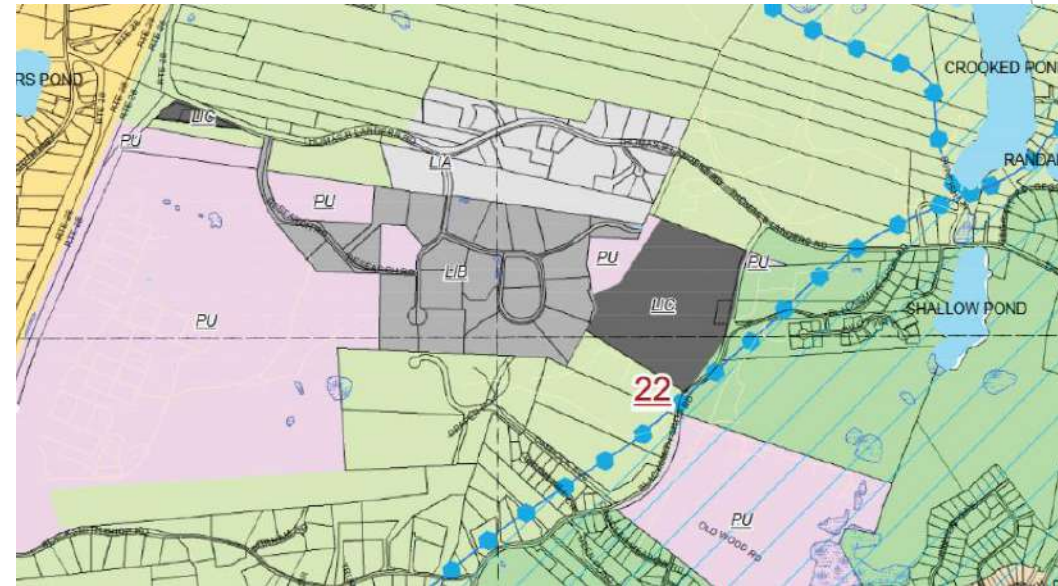
- This is the subject of two petition articles for the Town Meeting this month, Article 9 submitted by Ronald Zwieg, and Article 10, submitted by Christopher Lynch.



- The East Falmouth Light Industrial district (near Falmouth Lumber) might also be suitable for ground mounted arrays.

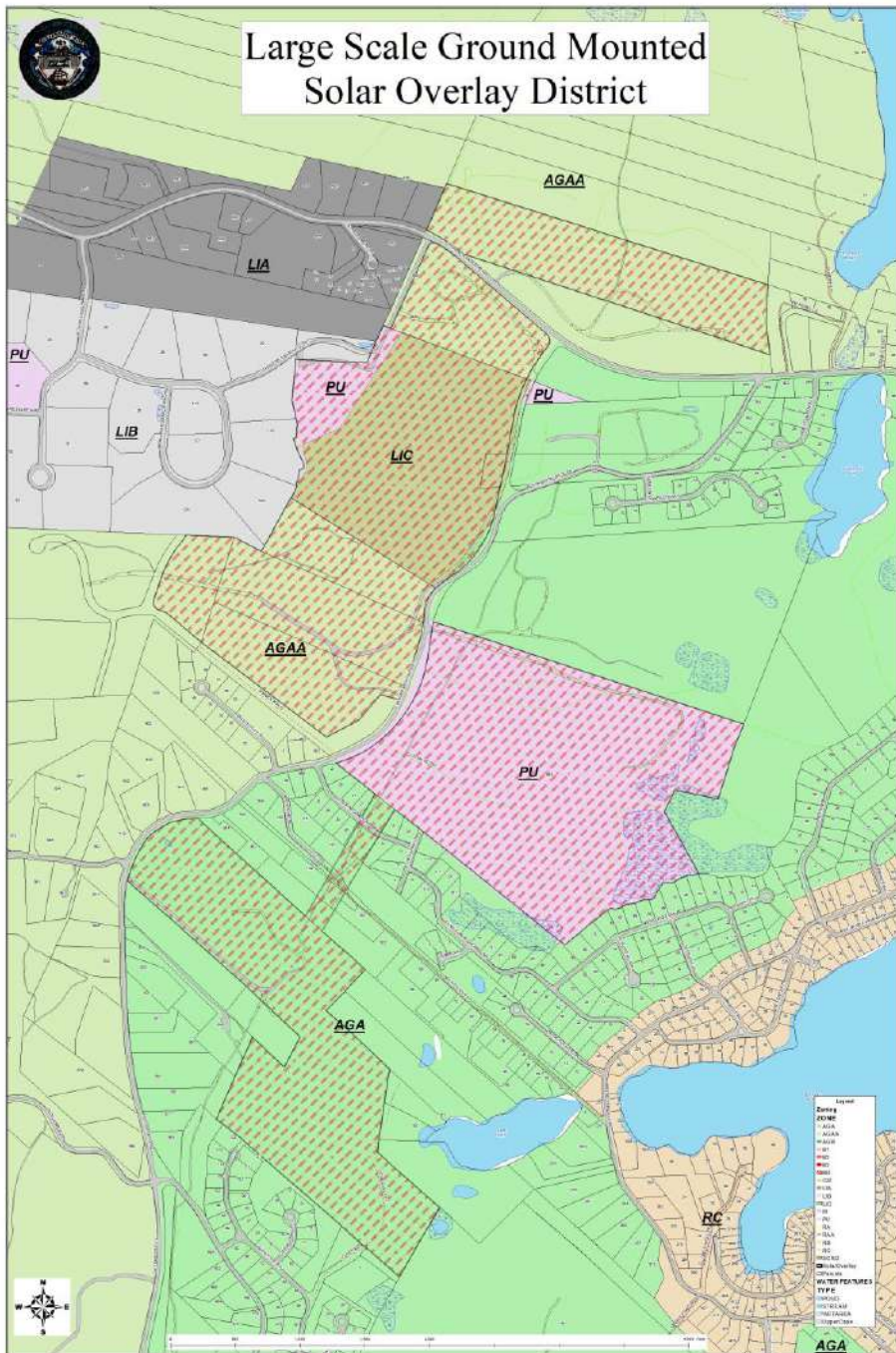


- Creation of a Solar Energy Overlay District would be useful, incorporating gravel pits and other industrially developed lands adjacent to the land fill, currently zoned Agricultural or Public Use, without changing the underlying zoning designation.



- ▶ Article 8 proposes a Large Ground Mounted Solar Overlay District near the capped landfill.
- ▶ Among the standards proposed for the overlay district are provisions for 100' front yard "no disturb" setback, 35' side and rear yard "no disturb" setbacks; if the project abuts a Residential or Agricultural district, the side and rear setbacks increase to 100'.
- ▶ A second standard states that no more than 2 acres of land may be cleared to build the ground mounted solar array.

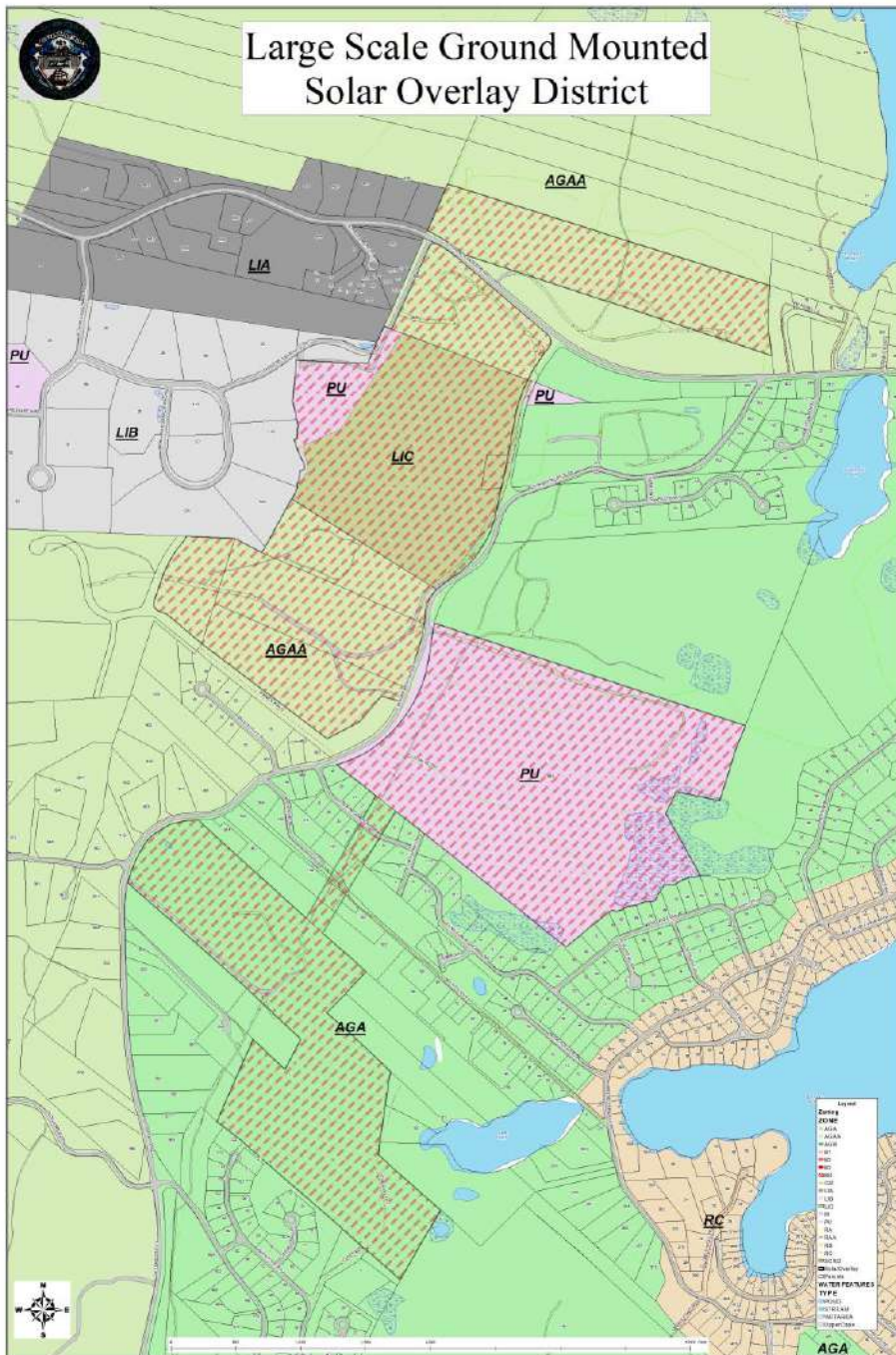




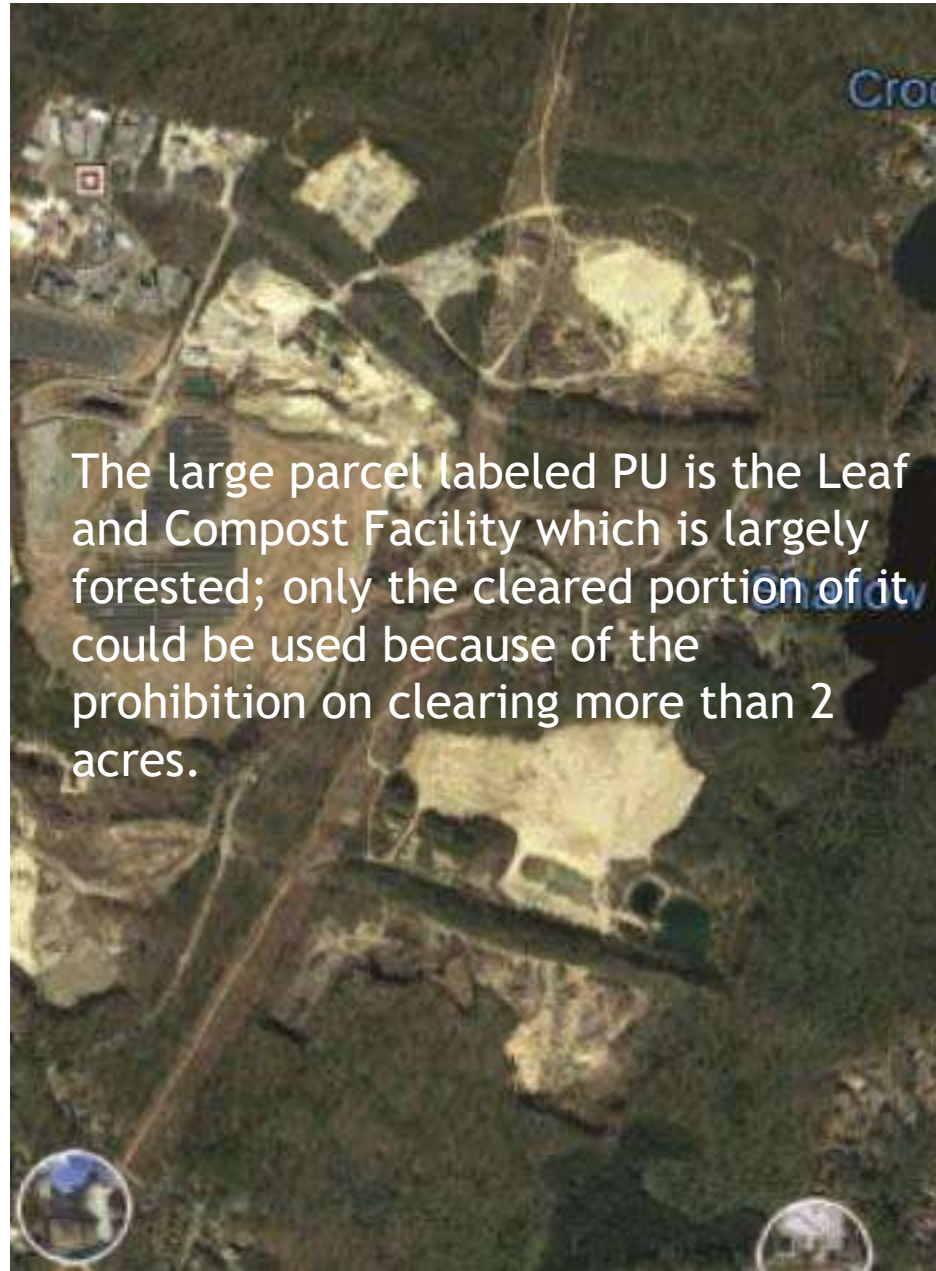
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An aerial photograph of a coastal area. A red square marker is located in the upper left quadrant. The text 'Crocodile' is visible in the top right corner, and 'Shallow' is visible in the middle right. The image shows a mix of land and water, with some areas appearing to be cleared or developed.

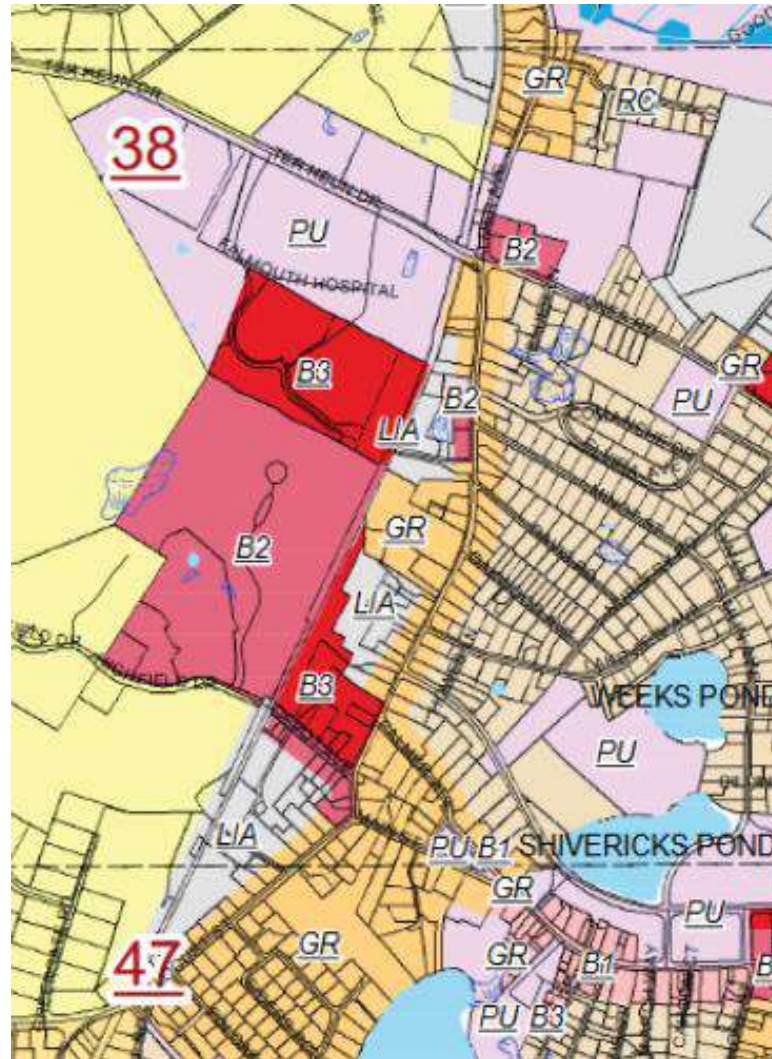
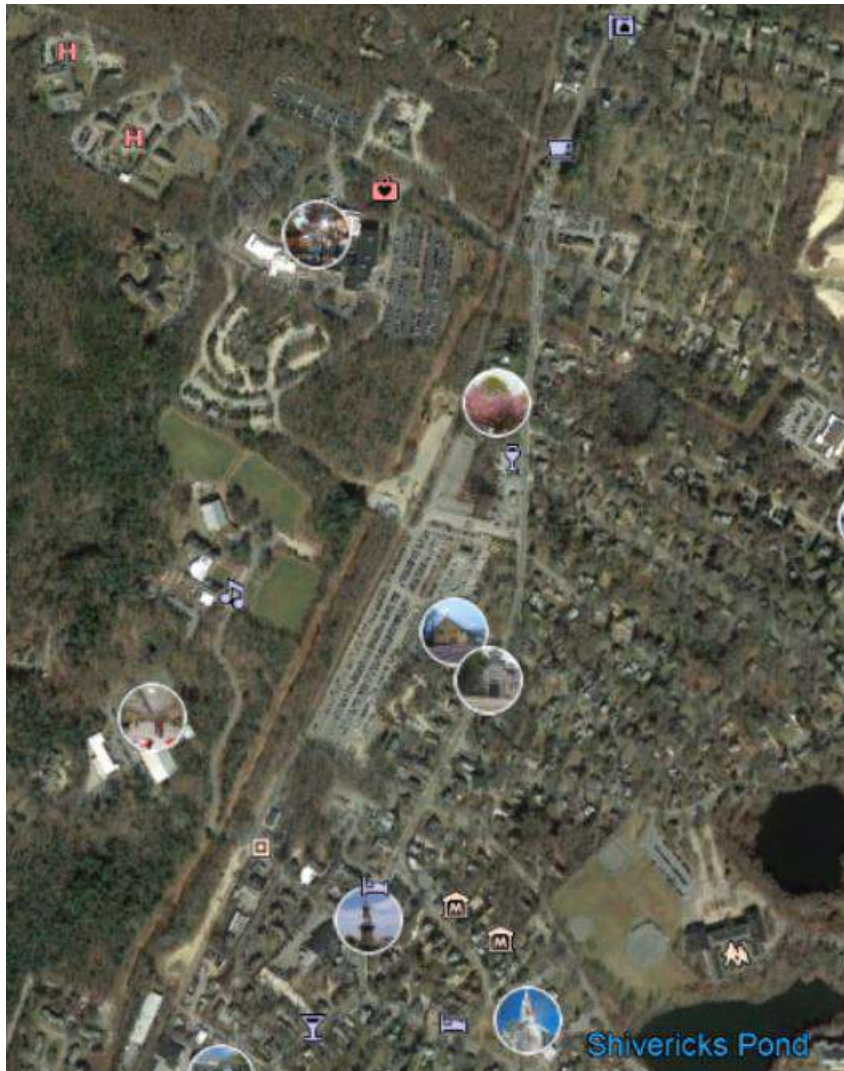




The large parcel labeled PU is the Leaf and Compost Facility which is largely forested; only the cleared portion of it could be used because of the prohibition on clearing more than 2 acres.



- A second district might include Palmer Avenue, specifically the SSA and Falmouth Hospital parking lots.



- As a precedent, the Town of Barnstable has created a Solar Overlay District centered on the airport and incorporating land zoned for Industrial use and other purposes, the blue line hatched area in the image. A similar overlay district was created at their capped landfill.



- ▶ As another precedent, the Town of West Tisbury allows small (less than 1500 sf) ground mounted arrays in any district provided they are not in the front yard or over 12' high; variances are possible by special permit from the ZBA.
- ▶ Tisbury allows ground mounted solar arrays in Business II Zoning Districts with Site Plan Review from the Planning Board.
- ▶ Cronig's Market is a prominent example, with free electric vehicle charging stations.



- ▶ Article 9 proposes that all Light Industrial Districts be opened to large ground mounted solar arrays as Principal and Accessory Uses. This is proposed by Ronald Zweig.
- ▶ No standards were included in this article for design, setbacks, clearing, etc.
- ▶ Planning Board does not support this Article, citing the lack of standards and the possibility of incompatible uses in LIA and LIB zones.



- ▶ Article 10 requests that ground mounted solar arrays be allowed as principal uses on Agriculturally Zoned lots greater than 20 acres in size, as well as Light Industrial A and B zones with Site Plan Approval from the Planning Board, submitted by Christopher Lynch. Standards are proposed similar to Article 8, with the exceptions of the stringent setbacks and prohibition on clearing more than 2 acres.
- ▶ This article, if passed, would open more areas to the possibility of ground mounted solar arrays.
- ▶ The Warrant states that Article 10 will not be moved by the Petitioner if Article 8 passes as written.



Agricultural Zoning Districts

- ▶ Well spaced ground mounted solar arrays are very compatible with certain types of agriculture, particularly with sheep (cows are too tall and goats like to climb).





- ▶ Article 11 is proposed by the Planning Board and calls for a moratorium on solar array projects for a period of one year, until November 2019.
- ▶ The wording is imprecise enough to be confusing to applicants; does it apply to residential scale projects or only to larger commercial projects?
- ▶ The intent seems to be to allow time for Planning Board to develop standards for solar parking canopies for approval by a future Town Meeting.
- ▶ A one year delay is significant given the time it takes to design and permit significant projects.
- ▶ The Warrant states that this Article will not be moved if Article 7 is passed.

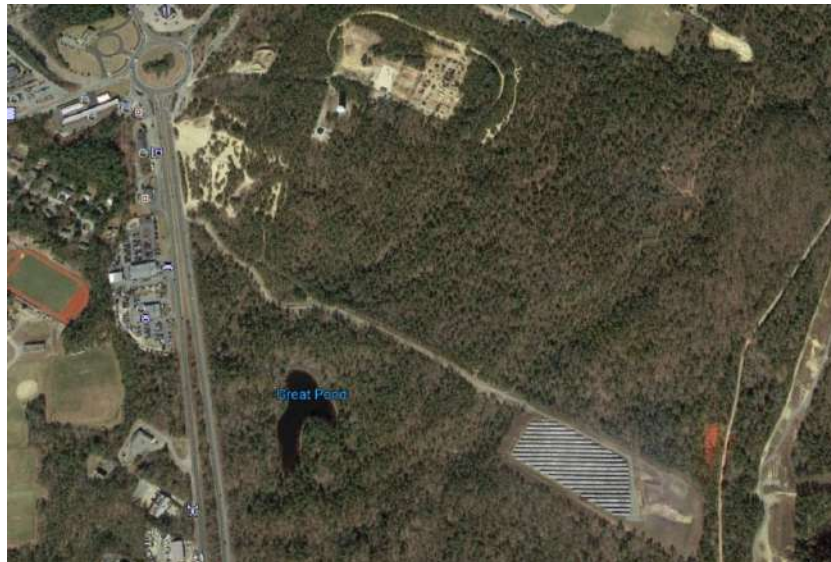


- ▶ Grant Walker has submitted a petition Article 12 to Town Meeting in support of solar power, removing the caps on net metering, and Community Solar. This article does not propose changes in the Zoning Code, but urges the Town to support changes at the State level.
- ▶ Net metering caps the amount of power from non-utility sources at 6% from private sources and 7% from public sources (systems under 10kW are exempt). Once that cap is reached, no new large energy installations may be accepted. Removing the caps would be good.
- ▶ The Department of Energy Resources is developing a Solar Massachusetts Renewable Target (SMART) program, creating a long-term sustainable solar incentive to promote cost-effective solar development in the Commonwealth. Grant Walker's petition article also urges the government to support this program once it is implemented, to eliminate caps on megawatts included, and to change the proposed way that compensation is calculated.



Community Solar

- ▶ Community Solar is a program by which a developer of a solar farm can sell shares to homeowners or businesses, enabling them to earn energy credits without installing solar on their sites. Falmouth Zoning currently allows solar farms only at the capped landfill, so Community Solar is not an option at the moment. If the ground mounted solar overlay district (Article 8) passes, or if Article 10 passes, Community Solar will become more possible in Falmouth. There are many examples elsewhere in the state.
- ▶ A Community Solar installation was built in Bourne, with the Recreation Authority as a principal client.



- ▶ New technologies are introduced often, so the future of solar power is evolving.
- ▶ Cape Light Compact (www.capelightcompact.org) will conduct a free energy audit of your home or business to advise you on energy efficiency and opportunities for improvement.
- ▶ Massachusetts Clean Energy Center (www.masscec.org) has a wealth of information about energy efficiency and solar power, including tax incentives and rebates.
- ▶ Solarize Mass is a program that seeks to increase the adoption of small-scale solar electricity in participating communities through a competitive solicitation process that aggregates homeowner buying power to lower installation prices for participants. The town must apply for this to the Department of Energy Resources.



Recap on Warrant Articles

- ▶ Article 7 if passed will bring solar parking canopies under Site Plan Review by the Planning Board.
- ▶ Article 8 if passed will open the possibility of additional large ground mounted solar arrays near the capped landfill; though the standards may be too stringent and the mapped area may be too small, these can be amended by Town Meeting in the future.
- ▶ Article 9 is flawed in that it lacks necessary regulatory standards.
- ▶ Article 10 if passed provides for large ground mounted solar arrays in Agricultural Districts and provides for appropriate standards.
- ▶ Article 11 proposes a moratorium on permits for solar arrays for a period of one year. The language is imprecise and confusing.
- ▶ Article 12 is a non-binding recommendation on state policy supporting solar power.
- ▶ Note that several of the Articles were revised and reissued to Town Meeting Members on November 1, but are not yet available to the public.



It is the LWVF's position that solar power should be encouraged in Falmouth

- ▶ It is a clean, renewable energy resource.
- ▶ The investment payback period for a well-designed system is around 7 years, and panels are typically guaranteed for 25 years.
- ▶ Changes in the Zoning Code should be carefully crafted to facilitate investment in solar energy at a variety of scales: individual homes and businesses, solar parking canopies, ground mounted solar arrays and Community Solar.
- ▶ Given the recent UN Report on Climate Change, it is important that we make active progress in reducing dependence on fossil fuel and strive towards a carbon neutral future. Solar Power is a key tool in this process.

