Solar PV

South Burlington Energy Committee

presentation to

South Burlington Planning Commission

"Climate Change is projected to significantly affect human health, the economy, and the environment in the United States…

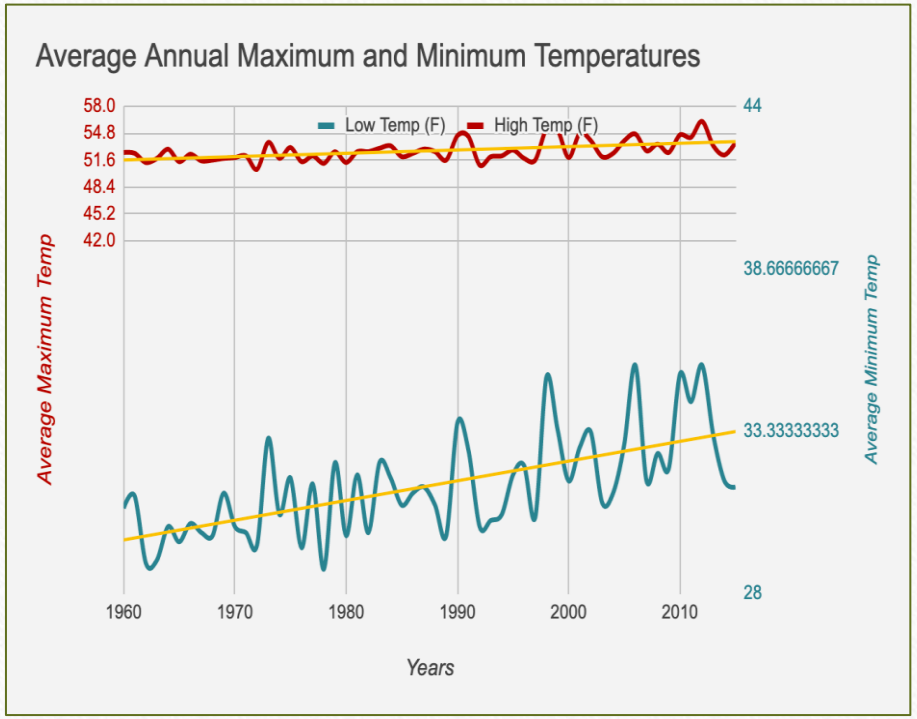
…without substantial and sustained reductions in greenhouse gas emissions (GHGs) and regional adaptation efforts, there will be substantial and far-reaching changes over the course of the 21st century with negative consequences for a large majority of sectors."

- US National Climate Assessment 2018, US Global Change Research Program

Climate Change in Vermont

- **More rain, floods and intense storms**
  - Rainfall up 71% in most intense storms since 1958
- **Winters warmer and less snow**
  - Snow season is 8 days shorter since 1970, hurting tourism and winter recreation jobs
- **Health impacts worsening**
  - VT highest per capita rate of Lyme disease in US in 2017, compared to almost none in 1990s
  - VT now 5th highest in asthma rate in the US (costs $7 million/year)
- **Federal disaster declarations up**
  - Growing each decade since 1990 (10, 12, 18) compared to (3,3,2) in the previous 3 decades

VT Temperatures steadily increasing



Source: VT Agency of Natural Resources

SB Climate Change Commitments

In August of 2017, the City of South Burlington

- Joined the Vermont Climate Pledge Coalition and committed to meet or exceed the US obligations under **the Paris Climate Agreement to reduce GHGs by 26-28% below 2005 levels by 2025**
- Directed the City Manager to work with appropriate committees and the public to undertake the creation of a South Burlington Climate Action Plan that:
  a) includes specific goals
  b) identifies sectors of South Burlington (municipal, institutional, commercial, residential) that contribute to GHG emissions, and
  c) develops strategies that effectively address these emissions

Data has not been not collected or maintained to enable the City to determine whether it is meeting the goals described in these resolutions, but it appears unlikely that the City is on target.

Why Solar PV?

- While the energy mix provided by Green Mountain Power (GMP) to South Burlington is relatively clean (90% carbon free and 60% renewable in 2018, after factoring in renewable energy credits purchased by GMP) there remains a critical demand for more clean electricity as electric cars, heat pumps and other electrification measures are anticipated to draw ever larger amounts of electricity
- The Vermont Energy Action network concluded that, among other things, to meet its pledge the State would need to add at least 500 MW of solar photovoltaic (Solar PV) power by 2025
- A nationwide poll conducted by Morning Consult in 2018 found 63% support for a Solar PV requirement on new homes
- The SBEC proposes that the City enact a Solar-Ready PV requirement for new commercial construction and consider a Solar PV requirement for commercial construction
- The residential stretch energy code already requires new homes to be Solar-Ready for PV.

Commercial Solar Ready

- An optional solar ready mandate is included as "Appendix CA" to the Vermont Commercial Building Energy Standards (the "Commercial Standards").
- Pursuant to Appendix CA, commercial buildings that are five stories or less and have either low-slope roofs, or roofs that are oriented between 110 degrees and 270 degrees of true north, would be required to dedicate 40 percent of the roof area as a "solar-ready zone".
  - The text of the Appendix CA is set out on the following pages.
- SBEC proposes that South Burlington adopt the optional solar ready requirements of the Commercial Standards.

APPENDIX CA SOLAR-READY ZONE—COMMERCIAL

SECTION CA101
SCOPE

CA101.1 General.
These provisions shall be applicable for new construction where solar-ready provisions are required.

SECTION CA102
GENERAL DEFINITION

SOLAR-READY ZONE. A section or sections of the roof or building overhang designated and reserved for the future installation of a solar photovoltaic or solar thermal system.

SECTION CA103
SOLAR-READY ZONE

CA103.1 General.
A solar-ready zone shall be located on the roof of buildings that are five stories or less in height above grade plane, and are oriented between 110 degrees and 270 degrees of true north or have low-slope roofs. Solar-ready zones shall comply with Sections CA103.2 through CA103.8.

Exceptions:

1. A building with a permanently installed, on-site renewable energy system.
2. A building with a solar-ready zone that is shaded for more than 70 percent of daylight hours annually.
3. A building where the licensed design professional certifies that the incident solar radiation available to the building is not suitable for a solar-ready zone.
4. A building where the licensed design professional certifies that the solar zone area required by Section CA103.3 cannot be met because of extensive rooftop equipment, skylights, vegetative roof areas or other obstructions.

CA103.2 Construction document requirements for a solar-ready zone.
Construction documents shall indicate the solar-ready zone.

CA103.3 Solar-ready zone area.
The total solar-ready zone area shall be not less than 40 percent of the roof area calculated as the horizontally projected gross roof area less the area covered by skylights, occupied roof decks, vegetative roof areas and mandatory access or set back areas as required by the *International Fire Code*. The solar-ready zone shall be a single area or smaller, separated sub-zone areas. Each subzone shall be not less than 5 feet (1524 mm) in width in the narrowest dimension.

CA103.4 Obstructions.
Solar ready zones shall be free from obstructions, including pipes, vents, ducts, HVAC equipment, skylights and roof-mounted equipment.

CA103.5 Roof loads and documentation.
A collateral dead load of not less than 5 pounds per square foot (5 psf) (24.41 kg/m^2) shall be included in the gravity and lateral design calculations for the solar-ready zone. The structural design loads for roof dead load and roof live load shall be indicated on the construction documents.

CA103.6 Interconnection pathway.
Construction documents shall indicate pathways for routing of conduit or piping from the solar-ready zone to the electrical service panel or service hot water system.

CA103.7 Electrical service reserved space.
The main electrical service panel shall have a reserved space to allow installation of a dual-pole circuit breaker for future solar electric installation and shall be labeled “For Future Solar Electric.” The reserved space shall be positioned at the end of the panel that is opposite from the panel supply conductor connection.

CA103.8 Construction documentation certificate.
A permanent certificate, indicating the solar-ready zone and other requirements of this section, shall be posted near the electrical distribution panel, water heater or other conspicuous location by the builder, registered design professional or design professional.

Commercial Solar PV Requirement

- The current Commercial Standards do not require that new buildings install solar PV, but solar PV is an option that builders can use to satisfy the energy efficiency/renewable energy requirements of the Commercial Standards.
- The SBEC urges the Planning Commission to consider requiring that commercial buildings thus required to have a "solar-ready zone" be required to install a Solar PV system designed to reasonably maximize (assuming the use of standard solar panels) the Solar PV potential of the solar-ready zone.
- Commercial developers that we spoke with were receptive to a Solar PV mandate. At current prices and with current incentives, it should be cheaper to generate electricity from a solar array than to buy it from GMP.