REVISION ENERGY

Solar for NH Communities

Lakes Region Planning Commission | June 26, 2023

ReVision Energy • Since 2003 • Brentwood and Enfield, NH

REVISION ENERGY

15,000+

Clean energy systems installed since 2003

400

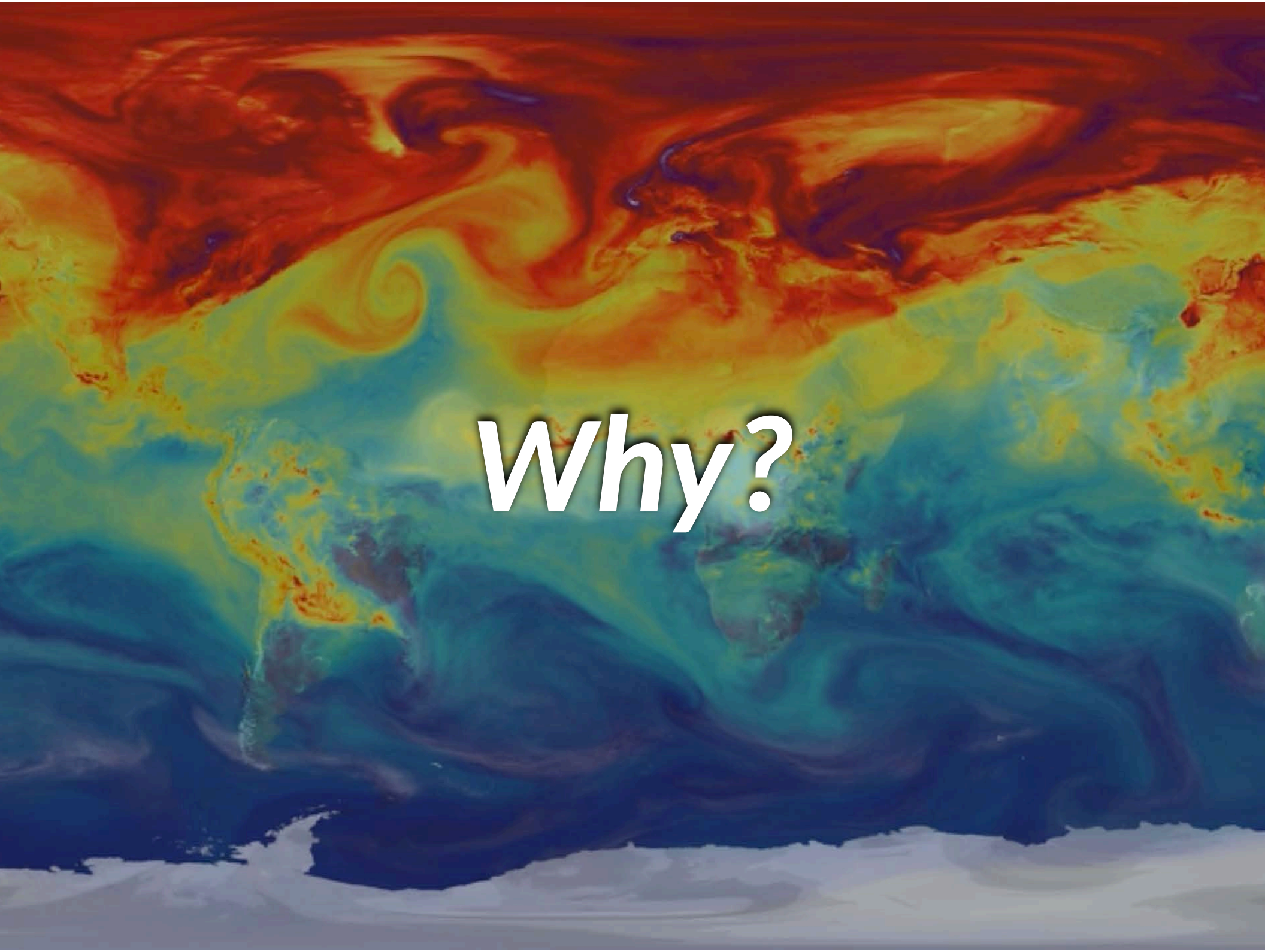
Employee-owners across 5 branches in NH, ME, and MA

#1-rated

rooftop solar installer in New England *(SPW)*

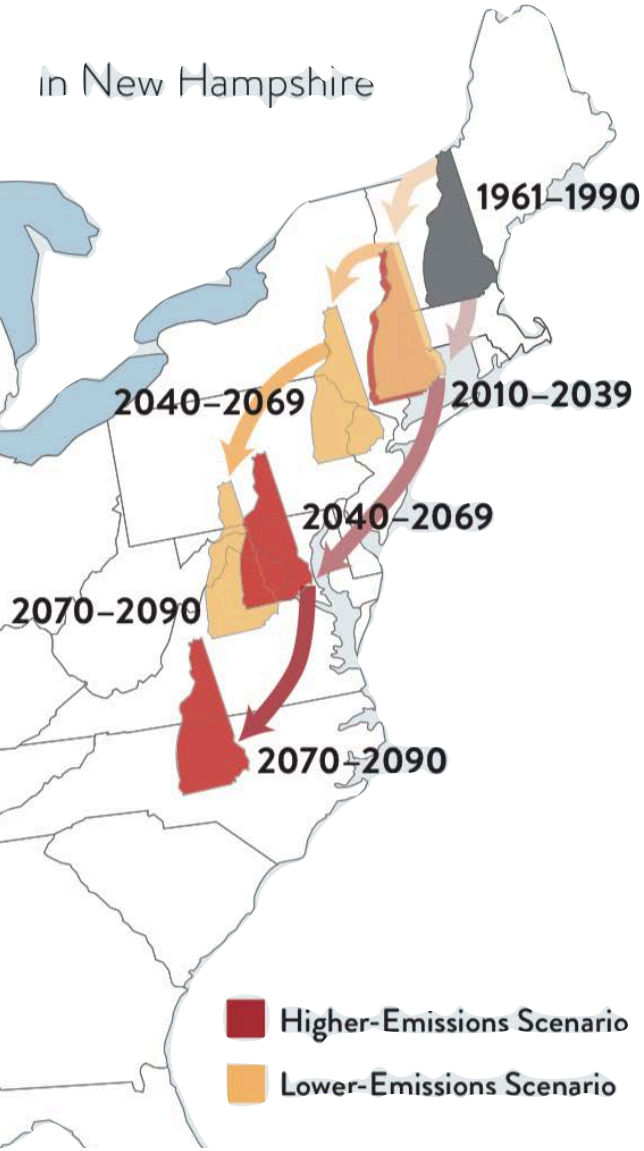
100%

Employee-owned proudly certified B Corporation

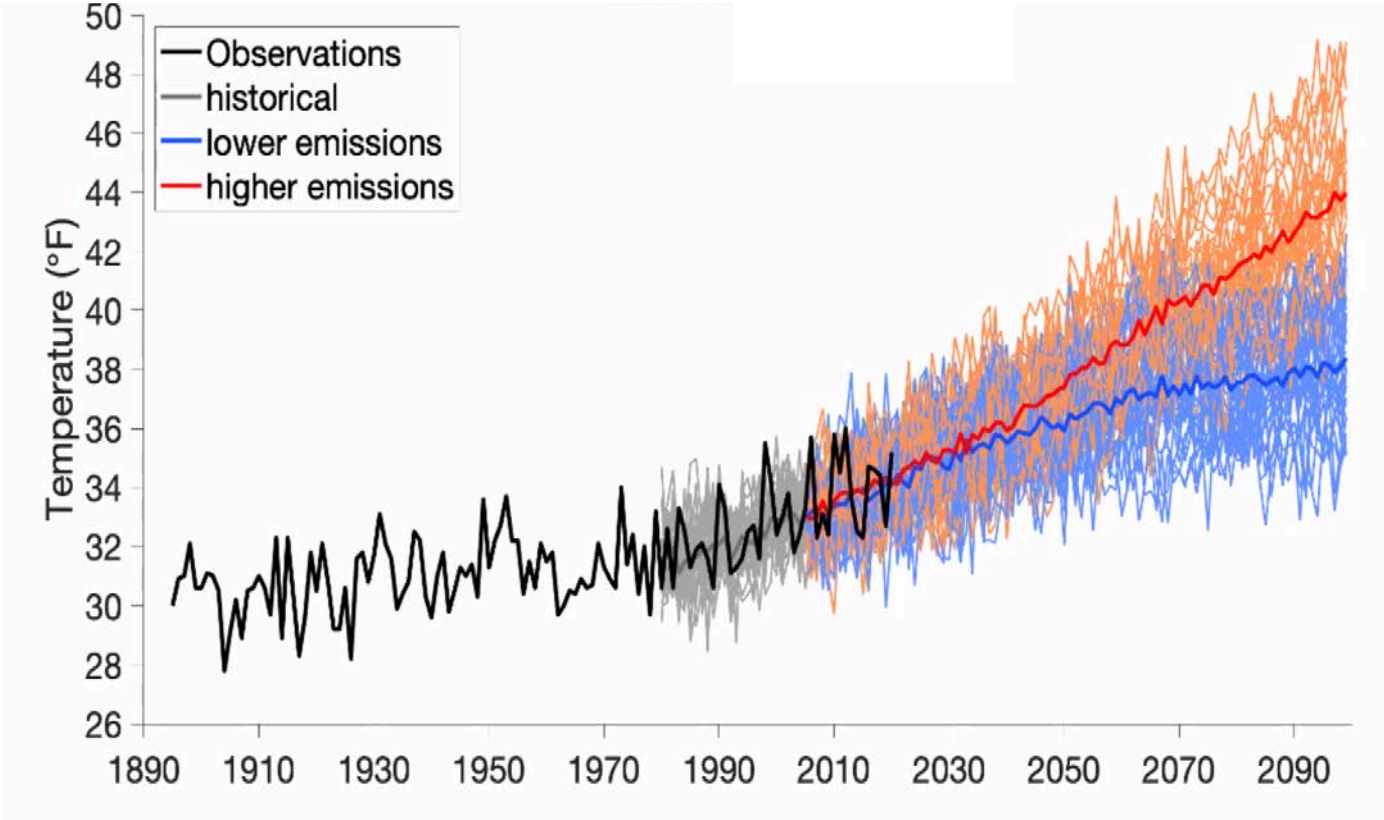

Why?

Climate Change in New Hampshire

Summer Climate
1960-2100



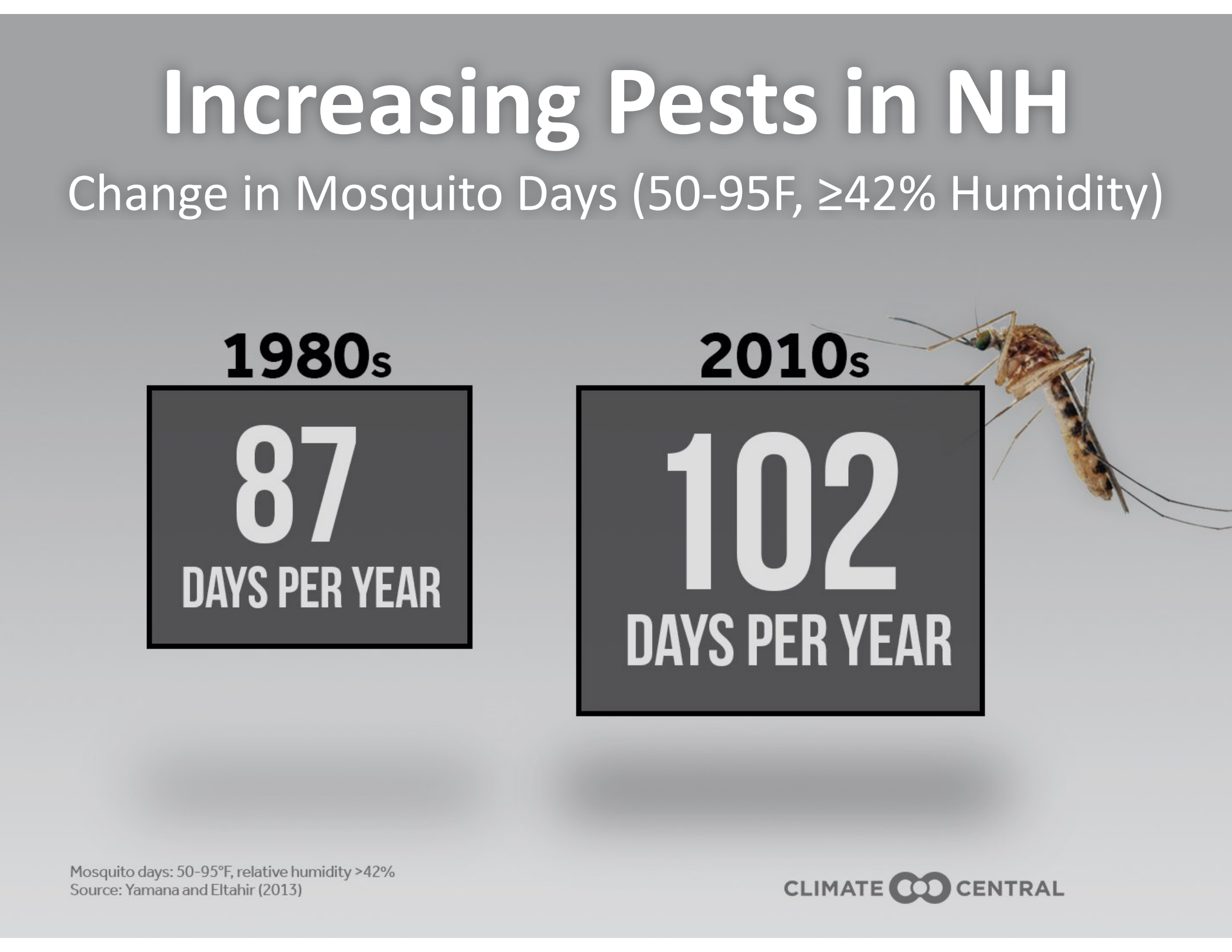
Winter Temperatures
1890-2100



(NHDES, NECIA, UNH)

Increasing Pests in NH

Change in Mosquito Days (50-95F, ≥42% Humidity)



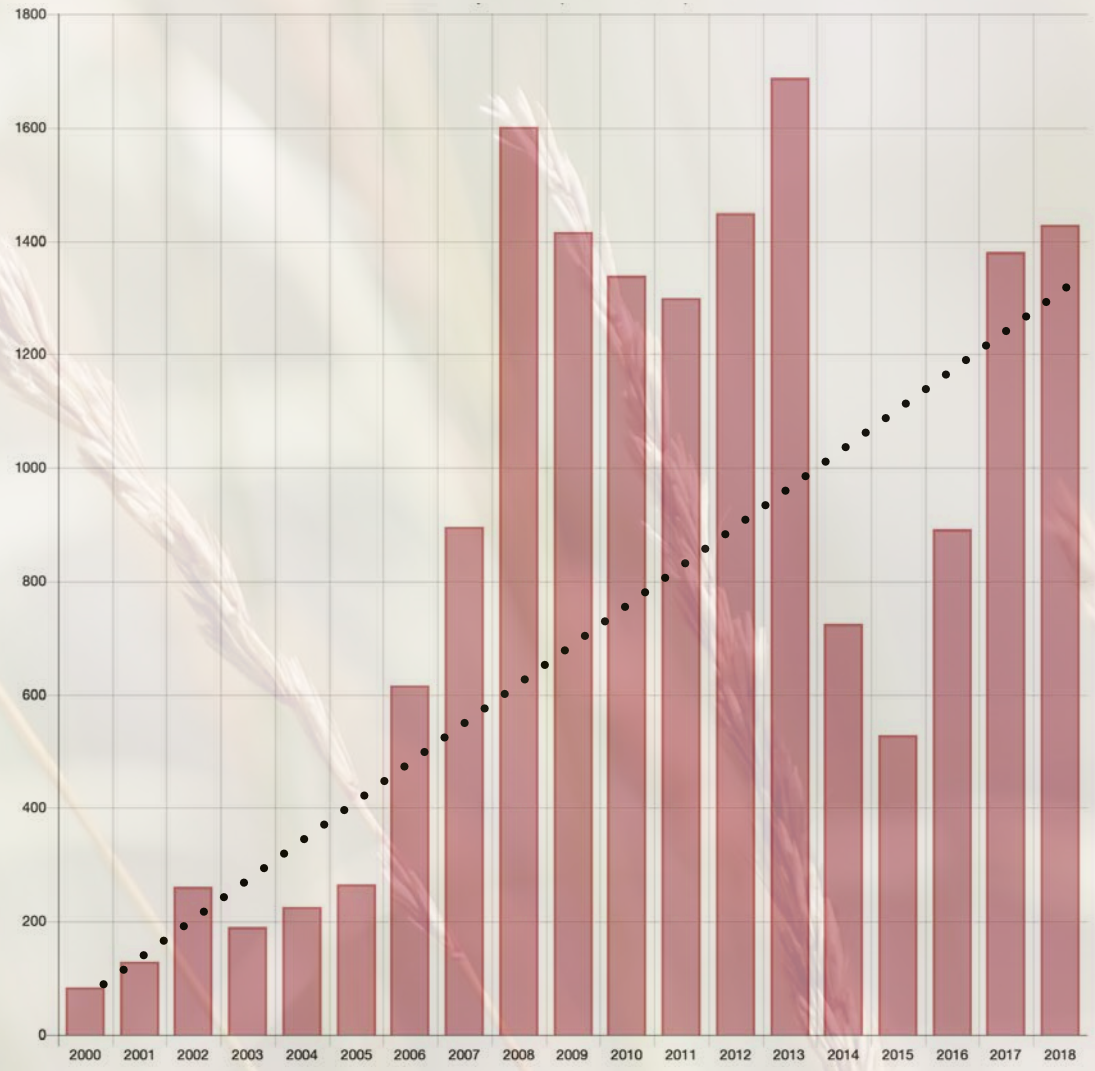
Mosquito days: 50-95°F, relative humidity >42%
Source: Yamana and Eltahir (2013)

CLIMATE CENTRAL

Lyme Disease in NH

Reported Lyme Disease Cases in NH, 2000-2018

15,795



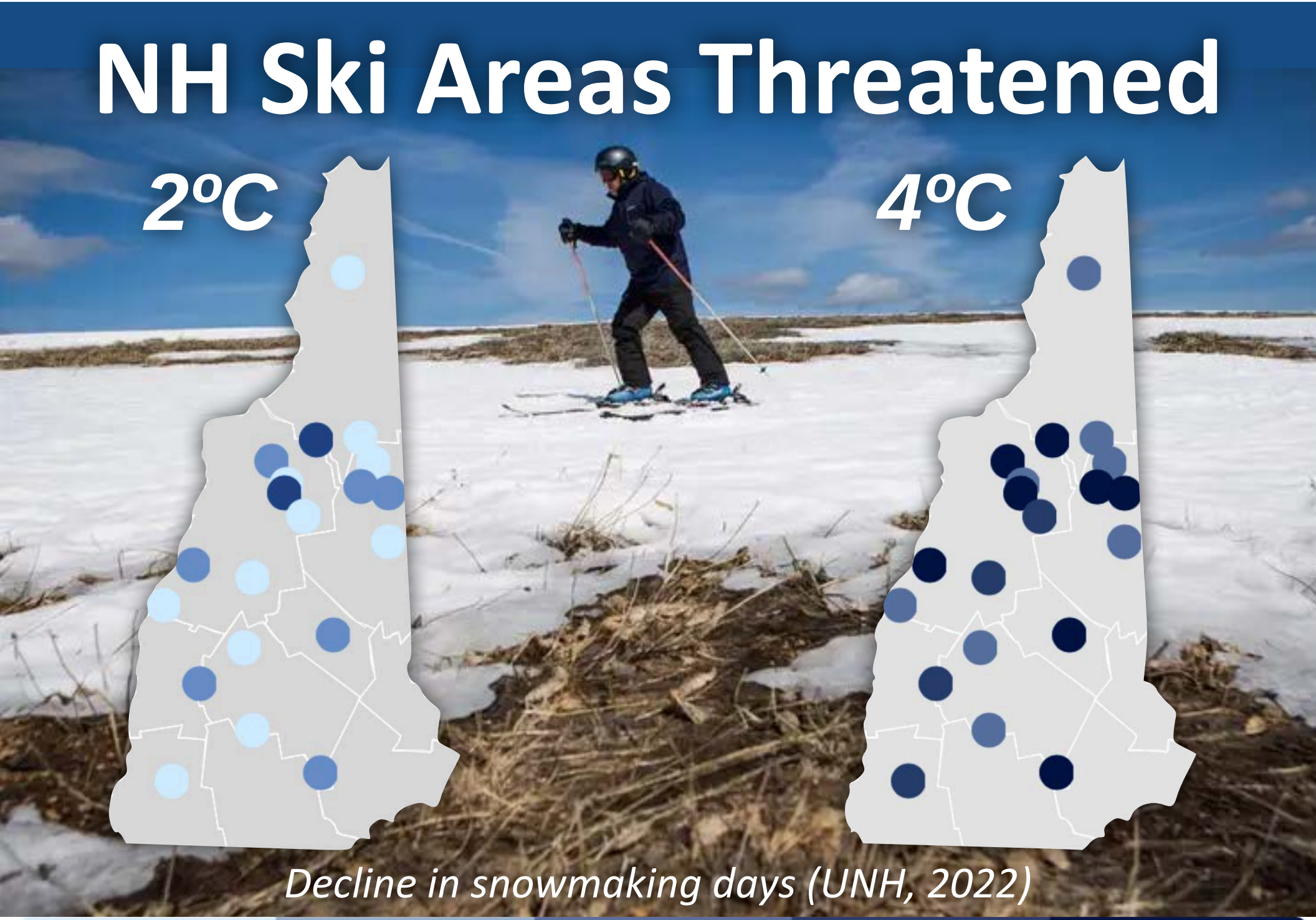
Loss of Moose in NH

70% drop
in calves (UNH)

47,371
ticks per moose

Declining Maple Trees

NH Ski Areas Threatened



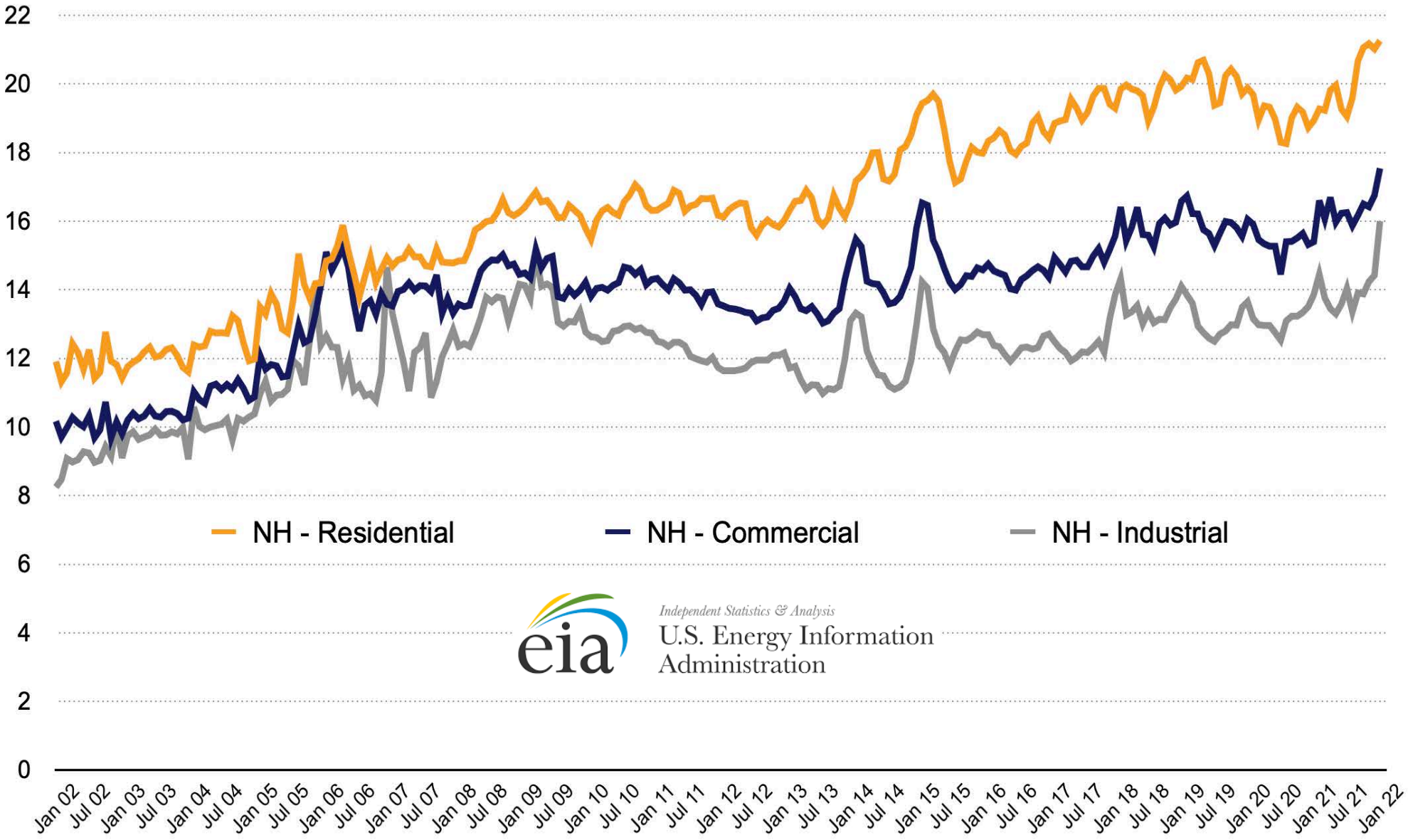
NH Public Health Impacts

Est. Annual Average Health Incidents from Air Pollution

Public Health Impact	*$PM_{2.5}$*	*Ozone*
Premature Deaths	1,296	16
Emergency Room Visits	221	28
Lost Work Days	67,175	N/A
Acute Respiratory Symptoms	518,676	62,611
Total Valuation (2010$)	$3.7 Billion	$132 Million

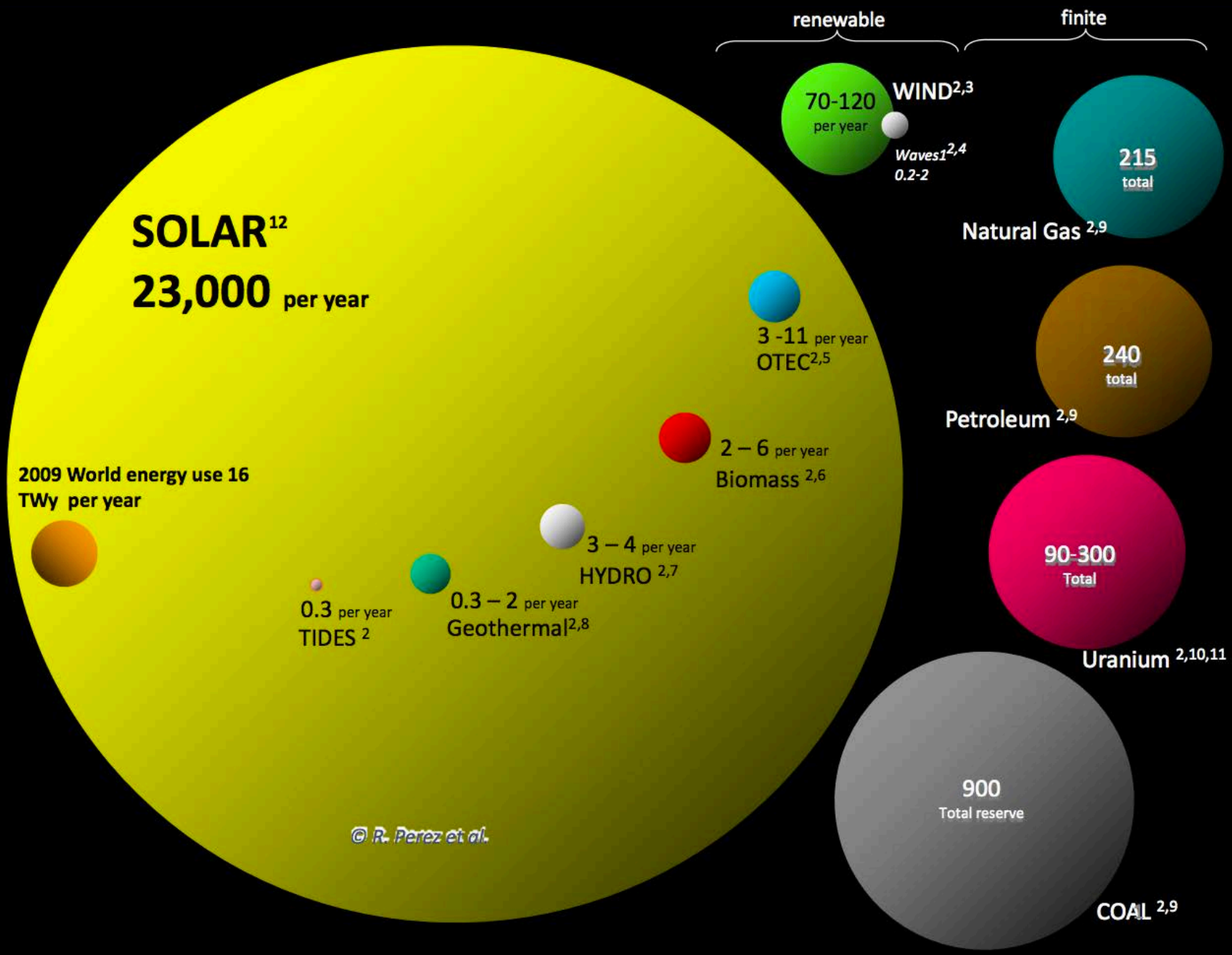
NH Department of Environmental Services, 2017

NH Cost of Electricity, 2002-2022

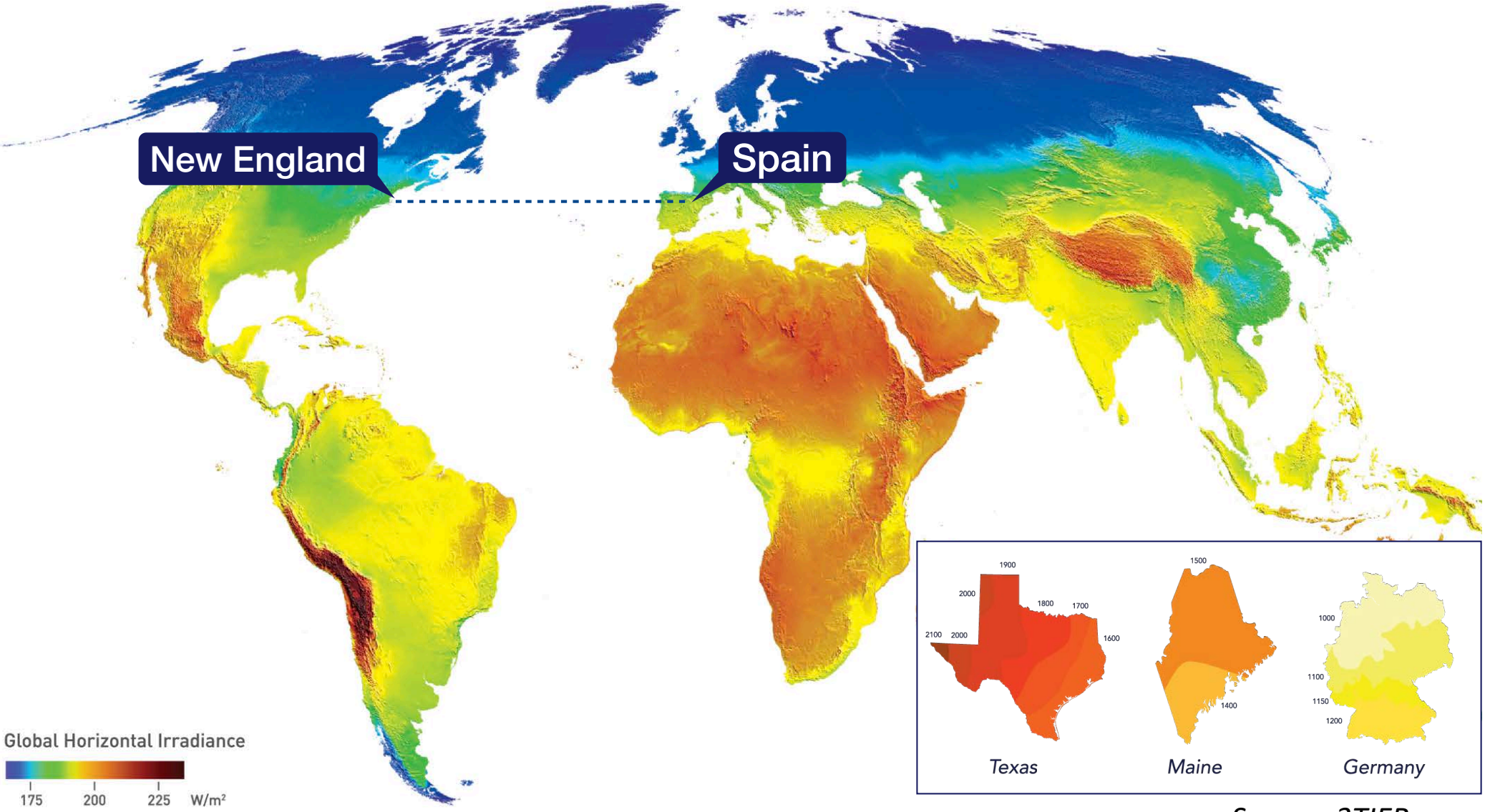



Enough sunlight reaches Earth in 1 hour
to **power the world for 1 year**

Renewable vs. Finite Energy Sources

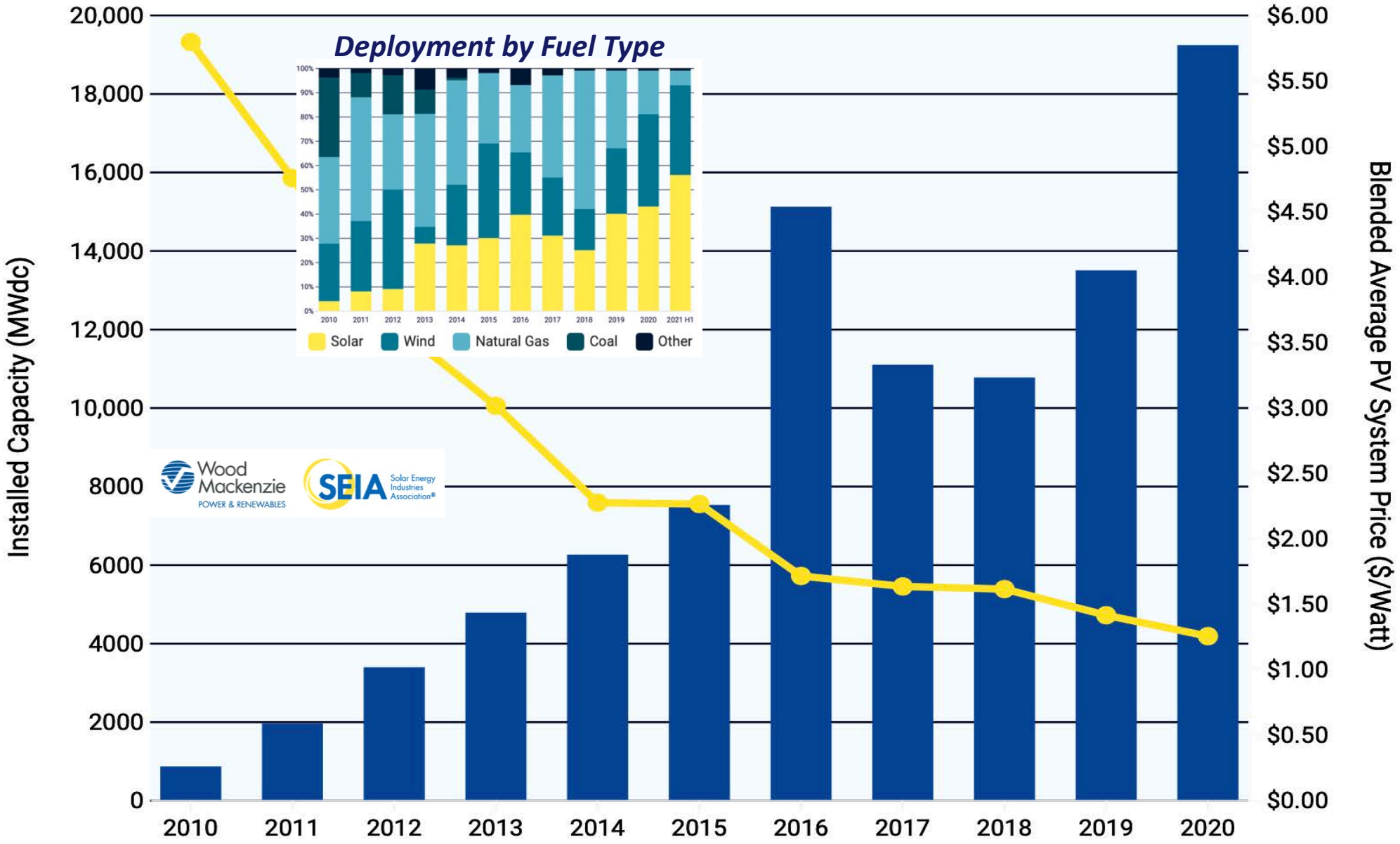


Map of Global Solar Irradiance



Source: 3TIER

Solar Cost & Deployment, 2010-2020



What's New In Solar

POLICY CHANGES FOR MUNICIPAL SOLAR

Solar Policy Change in the News

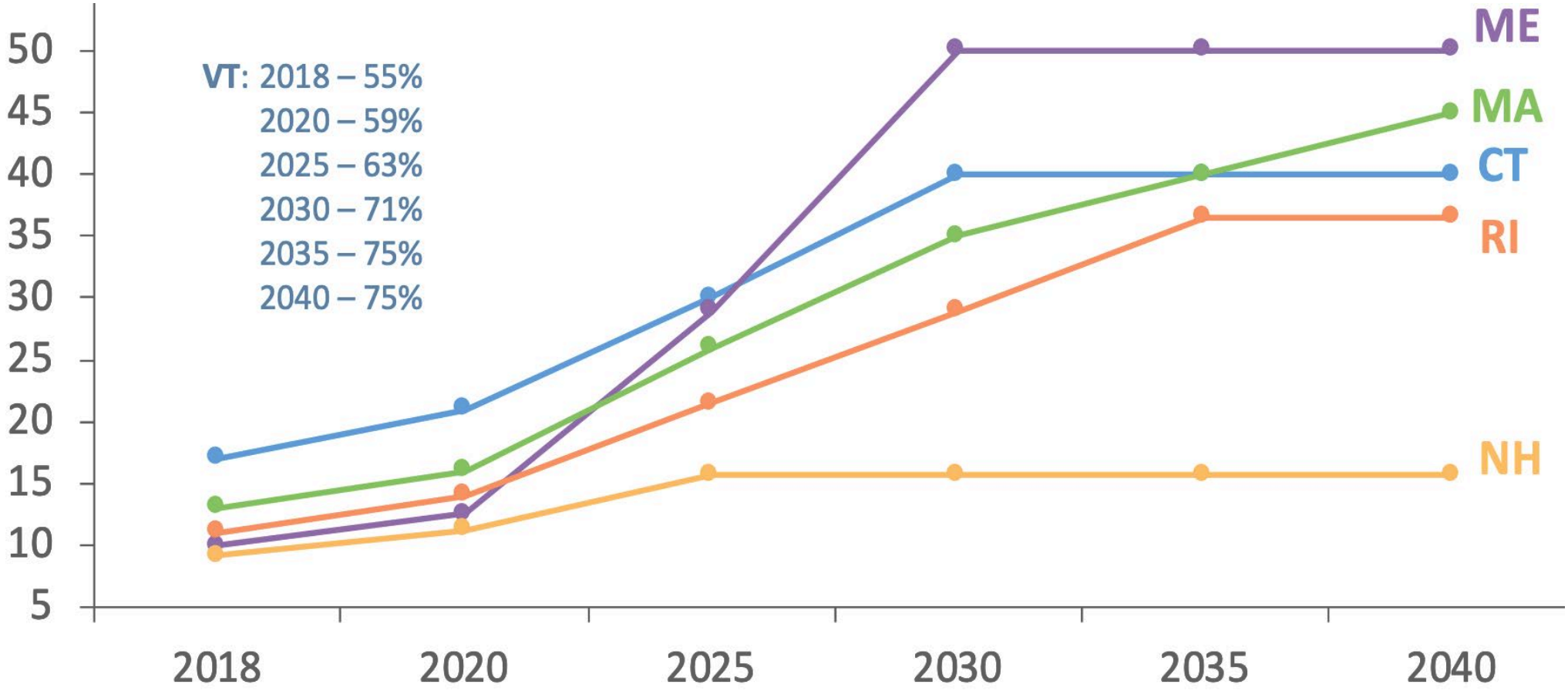
- **Net Metering Cap Raise (HB 281)**: bipartisan bill expected to pass with strong municipal support raises net metering cap from 1MW to 5MW for local governments that use 100% of generation

- **Community Power Aggregation (HB 315):** NH municipalities moving forward with community power option to choose 3rd party supplier in place of utility default; option to include locally-generated clean energy in supply mix

- **Inflation Reduction Act**: Raises and extends federal clean energy incentives incl. 30% tax credit through 2032 with bonus credits for brownfields, LMI, etc.

… with plenty of room to grow!

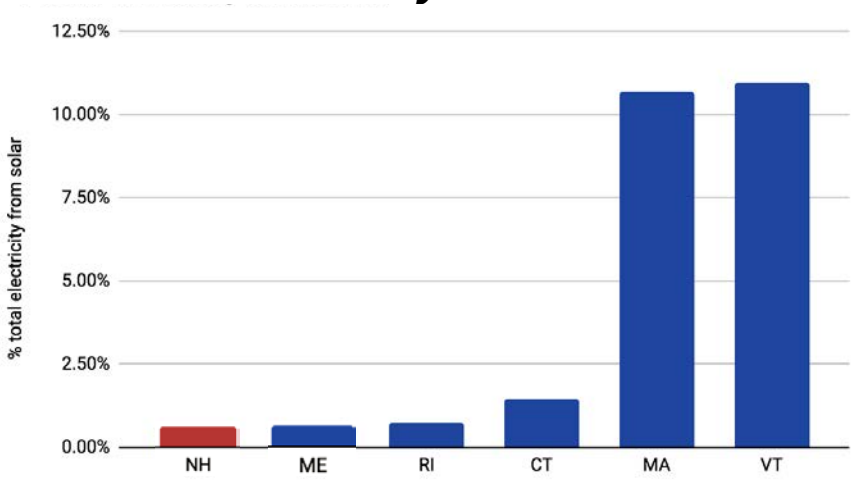
New England State RPS: New Renewable Energy



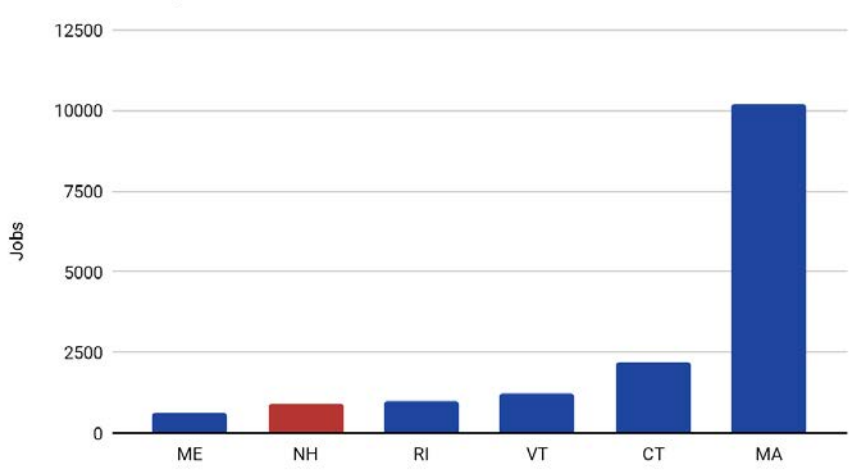
Source: Independent System Operator of New England, 2019

New England Solar Snapshot

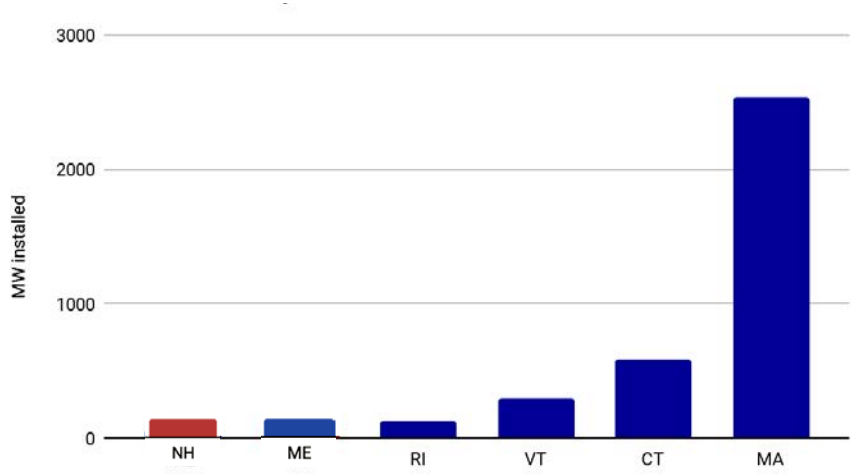
% Electricity from Solar



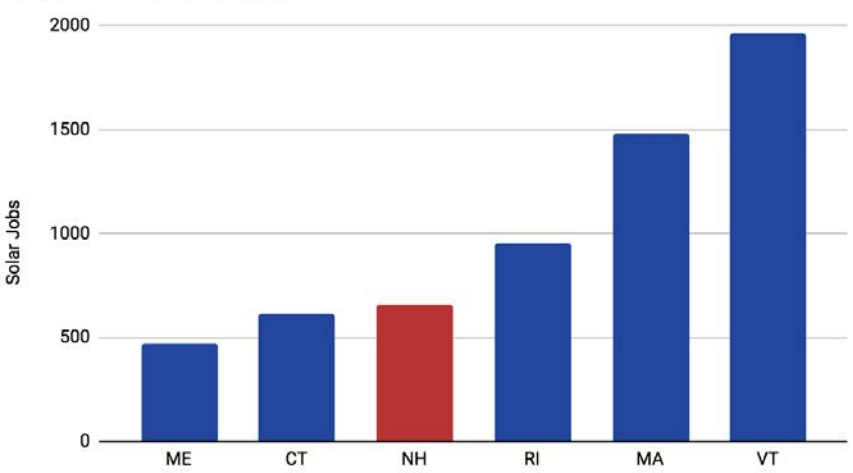
Total Solar Jobs



MW of Solar Installed



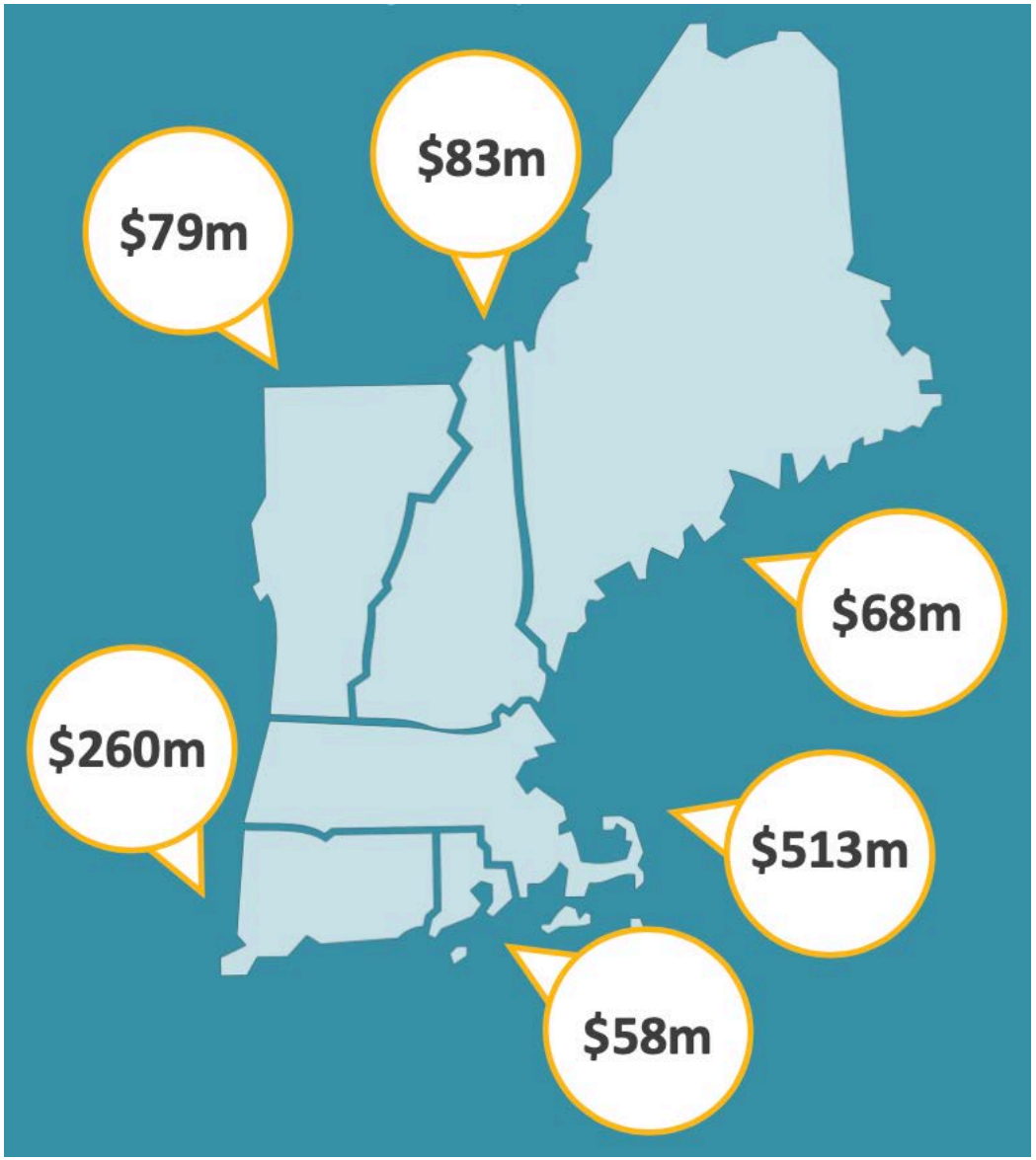
Solar Jobs per Million



Source: Solar Energy Industries Assoc., 2019-20

Value of Solar in New England

Savings by State, 2014-19



Est. Avoided Emissions

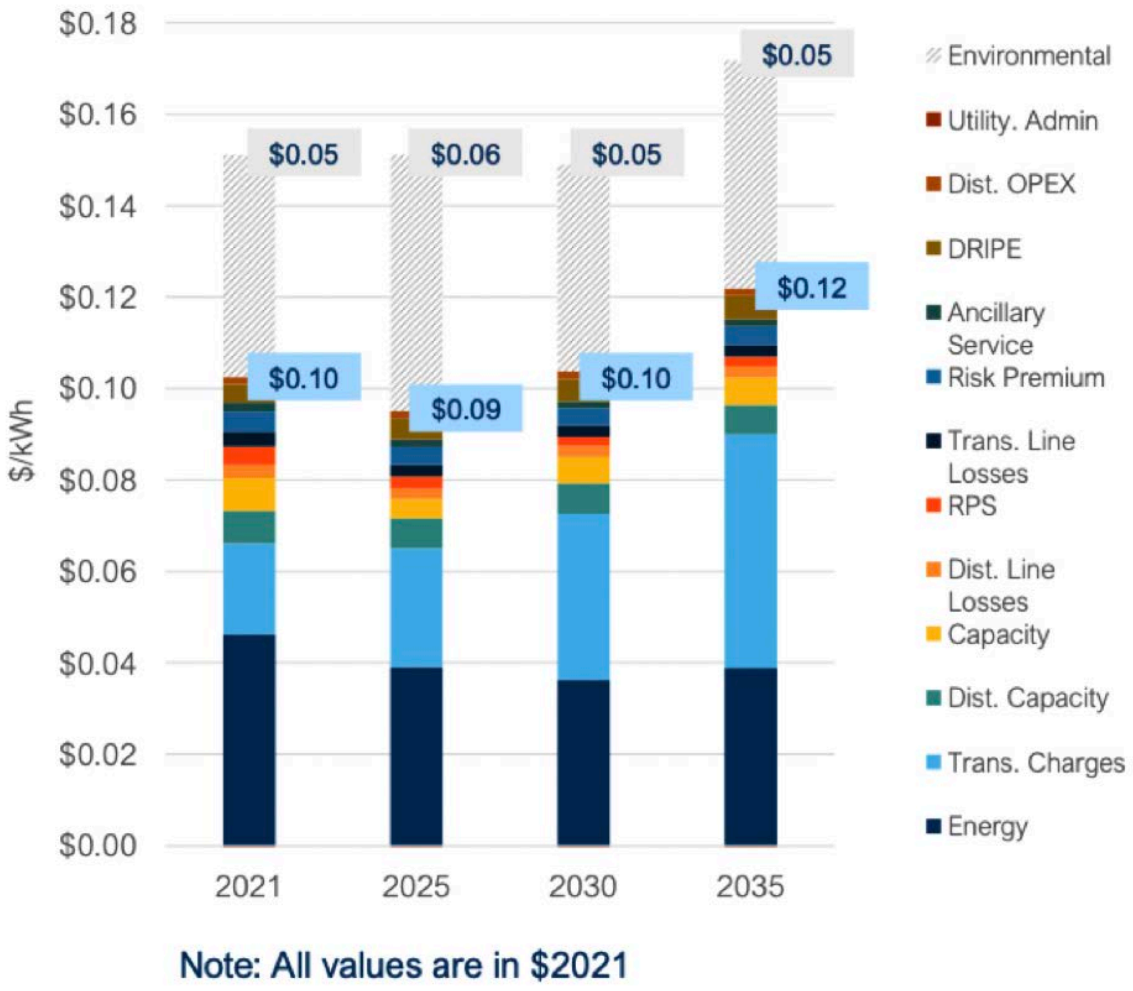
Pollutant	Avoided emissions
Greenhouse gases (reported in million metric tons)	
Carbon dioxide (CO_2)	4.6
Criteria pollutants (reported in pounds)	
Sulfur dioxide (SO_2)	2,380,000
Nitrogen oxides (NO_X)	3,280,000
Particulate matter ($PM_{2.5}$)	340,000

Resulting Monetary Benefits

Pollutant	2019 $ M	2019 cents / kWh
Climate benefits from reduced greenhouse gas emissions		
At $112/MT	$515	6.0 ¢
At 200/MT	$918	10.7 ¢
At $425/MT	$1,948	22.6 ¢
Public health benefits from reduced criteria pollutants		
SO_2, NO_X, and $PM_{2.5}$	$87	1.0 ¢

Synapse Energy Economics (2020)

Value of Solar in New Hampshire



Note: All values are in $2021

NH 2021 COMPARISON *120 MW Solar, ~132 GWh/year*	**Average DER** *All Configurations* *100%*
Value of DER Study	
All DER - Energy (kWh)	$0.10
All DER - Environmental (kWh)	$0.05
Solar - Energy (kWh)	$0.16
Solar - Environmental (kWh)	$0.05
Solar - Total Value (kWh)	$0.21
Solar - Aggregate Value	$27,786,000
Solar Value vs. all DER	140%
Actual Value Received (NEM)	
Solar - Eversource (kWh0	$0.115
Solar - Liberty (kWh)	$0.135
Solar - Unitil (kWh)	$0.130
Solar - Average (kWh)	$0.126
Solar - Aggregate Value Received	$16,692,280
Solar Actual vs. VDER (kWh)	60%
Solar "Reverse cost shift"	-$11,093,720

Dunsky / NH Dept. of Energy (2022)

Siting Solar Projects

MUNICIPAL SOLAR SITING OPTIONS

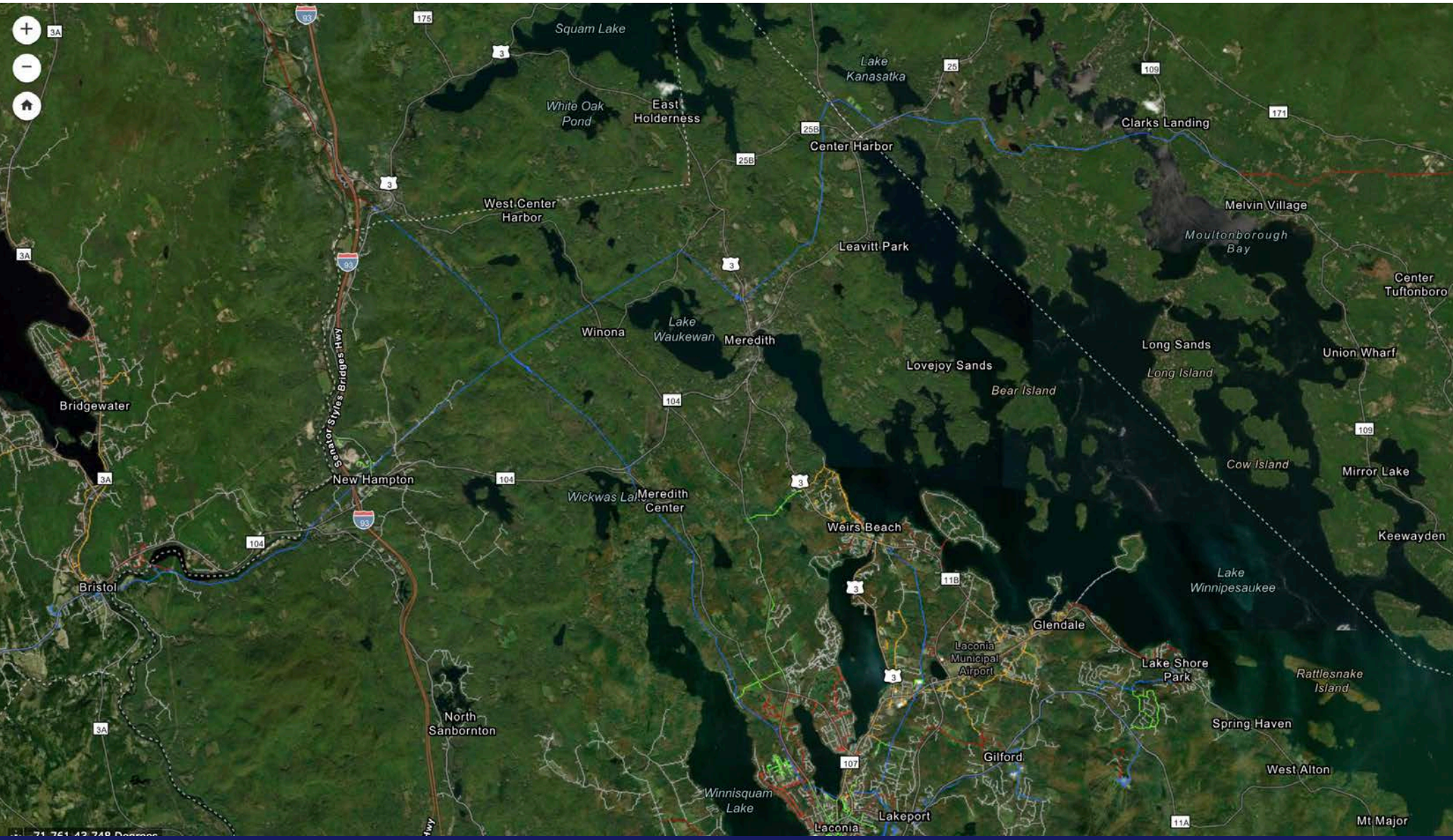
Municipal Solar Siting Options

1. Onsite Solar: Rooftop and ground-mounted co-located at municipal buildings; offset electric bills with require little, if any, additional infrastructure

2. Landfill/Brownfield Solar: Solar farms require 3-phase power and hosting capacity; energy value improves when municipal electricity load is onsite or nearby

3. Community Solar Farms: Multi-megawatt solar farms for local governments that use the power produced; 10–20-acre plots with 3-phase power and substantial electric load; public or privately-owned

Interconnection Capacity



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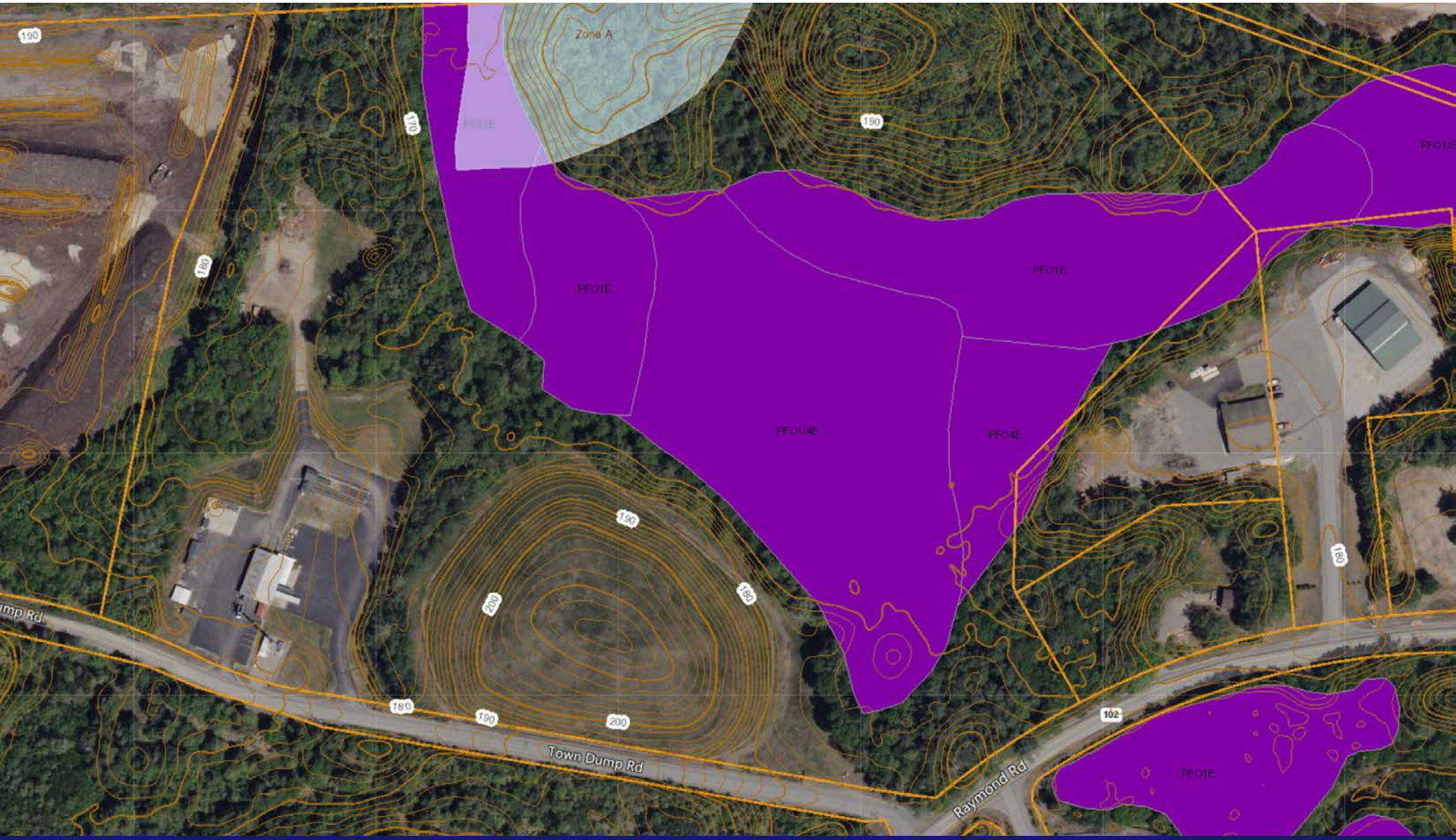
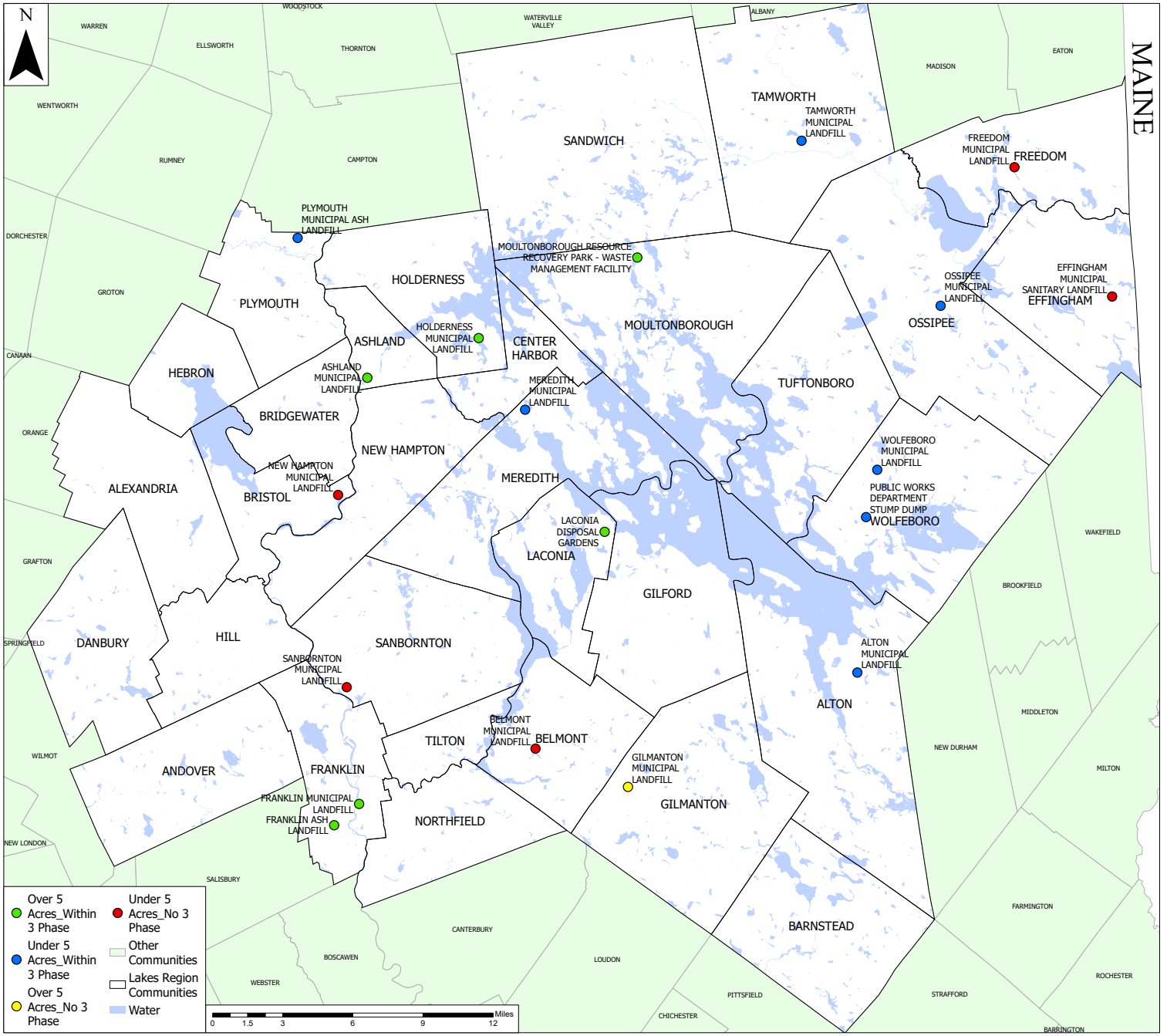
Site Conditions (GIS Mapping)



Lakes Region Potential Solid Waste Solar Sites

Solar Criteria
- Minimum 5 acres (1mW/5 acres rule of thumb)
- Not more than a mile from 3 phase power
- No hydric soils (wetlands)
- No steep slopes (>15%)
- Maximize southern exposures (minimal north facing slopes)
- Access/ ROW to Site

Methodology
1. Obtained 2022 Digital Elevation Model data from USGS.
2. Obtained solid waste facility locations from NHGranit layer.
3. Used state tax parcel map to identify boundary lines of solid waste properties.
4. Verified on town tax maps.
5. Used slope tool to get percent of slope.
6. Used aspect tool to tell direction of slope.
7. Removed all north, northeast, and northwest facing slopes.
8. No slopes over 15 percent.
9. Created polygon of suitable locations using satellite basemap to include mostly cleared areas and minor wooded areas.
10. Used national wetland inventory (NWI) to create potential areas outside of known wetlands.
11. Avoided built infrastructure when creating polygons of suitable area.
12. Calculated acreage and separated parcels into “over 5-acres” and “under 5-acres”.
13. Used NH utility companies hosting capacity maps and to determine distance of potential sites to 3-phase power lines.
14. Checked google street view, where available, to inspect for 3-phase lines.
15. Created color-coded points to make sites more visible on a regional level.



L·R·P·C

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Onsite Solar: Rooftops

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Onsite Solar: Ground Mounts

Landfill Solar Projects

Community Solar Farms

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Putting the "Farm" in Solar Farms…

Financing Solar Projects

MUNICIPAL SOLAR FINANCIAL OPTIONS

Municipal Financing: Challenges

- **Incentives:** Tax-exempt entities cannot access federal solar investment tax credit (ITC) and federal/state depreciation

- **Capex/ROI:** Solar arrays require substantial upfront capital expenditure; outright ownership can result in extended payback absent incentives

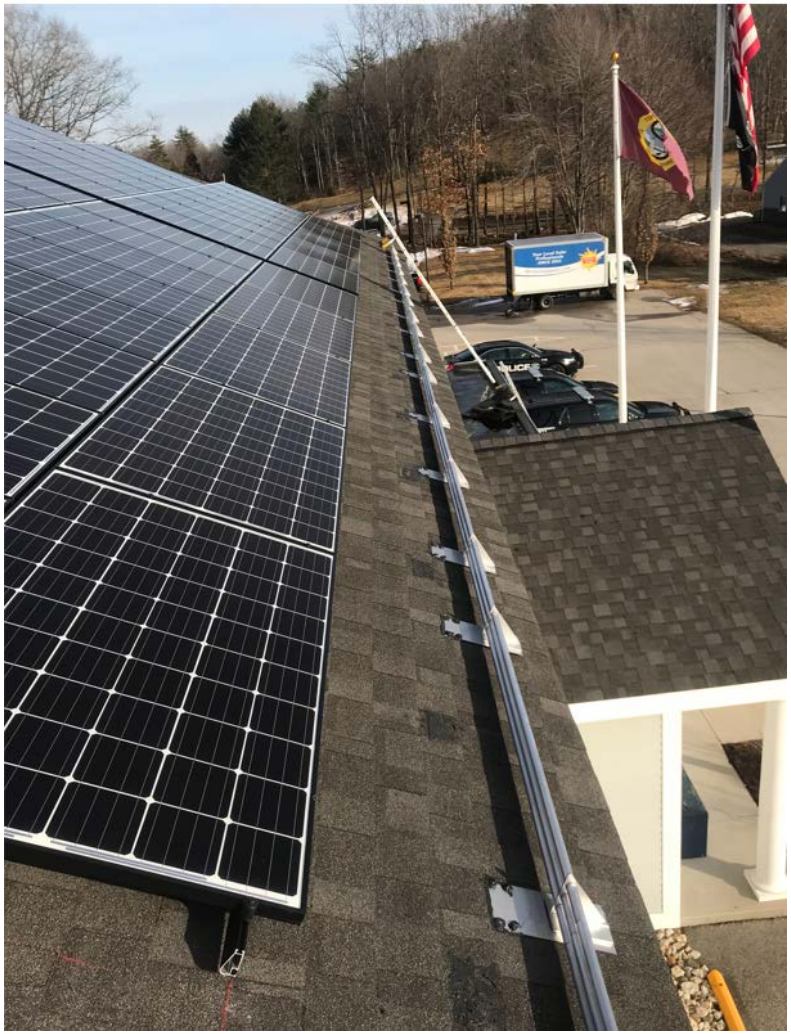
- **Management:** Ongoing system O&M, net metering, etc.

Municipal Financing: Solutions

1. **Power Purchase Agreements (PPA)**: Municipalities go solar with $0 cost by partnering with mission-aligned investors who utilize tax incentives and provide discounted energy rates, buyout options

2. **Land Lease Options**: Municipalities with solar-ready land can enter into long-term lease/PILOT agreements with solar developers to offset municipal loads

3. **Federal Supports**: IRA direct pay, grants, and/or low-interest muni bonds enable outright ownership on a cashflow-positive basis, with or without capex



1. Municipal Solar PPAs

- **$0 Upfront Cost:** Power purchase agreements or low-interest loans ensure a cashflow-positive investment with electricity savings greater than PPA cost from day 1
- **Impact Investor Financing**: Local, mission-driven impact investors cover system installation and full operations & maintenance throughout PPA term (25-year warranty)
- **Net Metering**: Solar offsets full retail electricity rates onsite, provides net metering revenue from excess or offsite generation
- **Levelized Cost of Energy**: Factoring in upfront cost and O&M, solar provides lowest average cost of energy at 4-7 cents per kWh over system life – 50%-75% lower than utility

Solar PPA Financial Structure

ReVision Impact Investor

- Provide capital and form solar LLC
- Build, own, operate array 5+ years
- Recoup investment through:
  - Federal tax credit, depreciation
  - Energy payments from municipality
  - REC sales, rebates (if applicable)
- Pass on savings by selling array to municipality in year 6 or later (optional)

PPA

Municipality

- License roof/ground space for solar
- Purchase solar electricity produced on site at below-market rates
- Purchase solar array in year 6 or later (optional) at significant discount
- Maximize electricity cost savings by owning and operating solar array for full 40+ year lifespan

Finance Partner(s)

- *Tax Investor*
- *Major Donor*
- *ReVision Energy*

Special Purpose LLC

- *Build solar project*
- *Own, operate for 6+ yrs.*
- *Sell power to host org.*

PPA

Host Municipality

- *Lease space for solar*
- *Buy solar power*
- *Option to buy array*

PPA Solar Impact Investors

- **ReVision Solar Impact Partners** builds on ReVision's decade of experience bringing solar PPAs to **over 100 local nonprofits**
- RSIP pairs **tax equity** and **lender-investors** with established nonprofits ready to go solar
- RSIP enables mission-motivated investors to **cut climate pollution** while earning a low-risk, predictable return on equity or debt


Manchester Boys & Girls Club


Town of Newfields, NH

ReVision Solar Impact Partners (RSIP) include:

COMMUNITY LOAN FUND

CEI
Coastal Enterprises

BLUEHAVEN SOLAR

BALLENTINE PARTNERS

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2. Municipal Land Lease Options

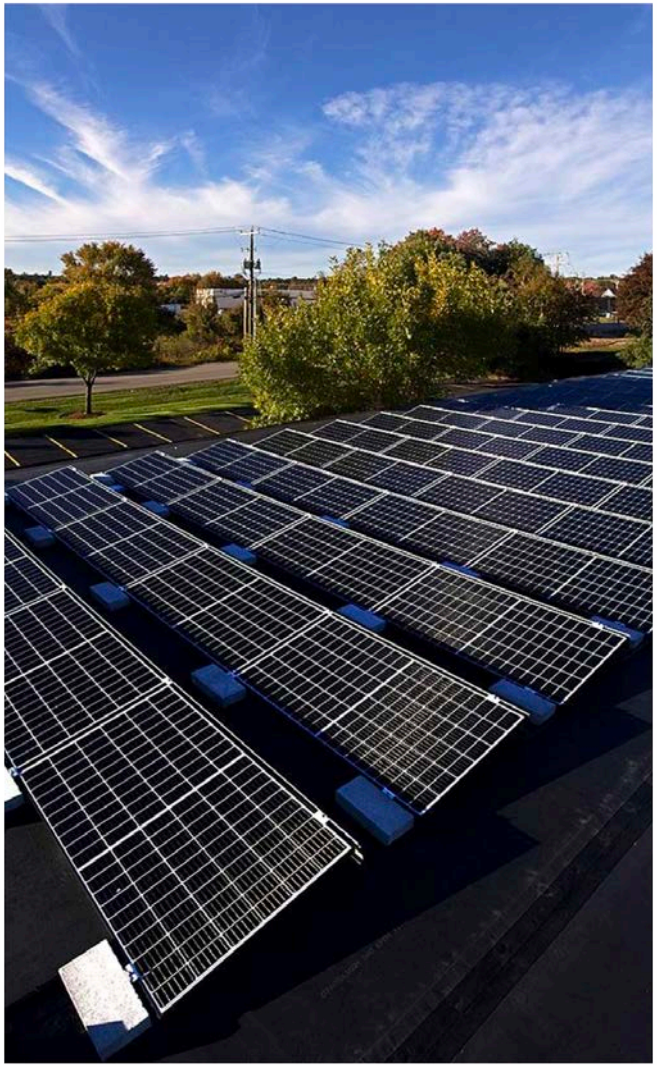
- Municipality leases solar-ready land to solar investor for 20+ year term
- Investor partner builds, owns, and operates solar array; owns the ‘host meter’ and associated risks
- Town assigns municipal loads to the host meter for 20+ year term
- Revenue from lease/PILOT and potential energy savings; option remains for competitive supply contract or community power

3. Federal Supports for Municipal Solar

- **Inflation Reduction Act** provides “direct pay” of 30% federal tax credit with potential 10% or 20% adders for brownfields, LMI and domestic content

- **American Rescue Plan Act (ARPA)** allocated $350 billion to local governments ($1.5 billion NH) for wide range of pandemic response/infrastructure improvements; US Treasury Interim Final Rule 31 (2021) permits green energy projects esp. in connection with water infrastructure; ARPA spending deadline of 12/31/24.

- **Municipal Bonds** cashflow-positive investments to offset municipal loads; owner derives further revenue from Renewable Energy Credits



Solar Next Steps

MOVING FROM CONCEPT TO CONSTRUCTION

Solar Development Process

1. Municipal government **commits to pursuing clean energy** project(s)
2. Municipality issues **RFP / RFQ to select a qualified partner** – LOI/contract
3. Partner conducts **load analysis to determine net meter strategy**
4. Municipality and partner complete **detailed building/ground site assessments**
5. Partner files **utility interconnection application** for system impact study
6. Partner finalizes **system design and engineering** for municipal board approval
7. Municipality and partner complete **local/state permitting** requirements
8. Partner commences system **procurement, construction, and commissioning**

Does it work?

Inter-Lakes High School

Site

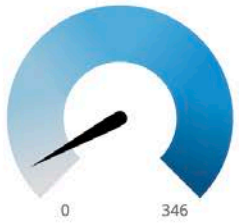
Overview | Operations | Analysis | Reports | Files | Config

Dashboard | Hardware List | Custom Displays

Current PV Production

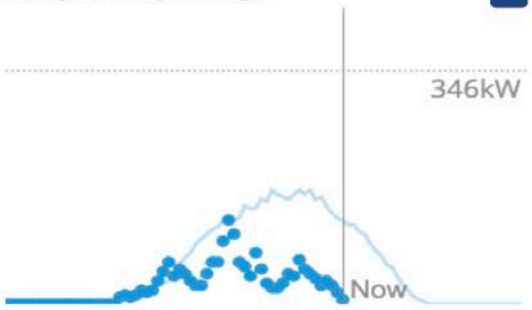
PV Production: 21.1 kW AC

PV Capacity Factor: 6%



PV Size: 346 kW (AC) / -- kW (DC)

Today vs 7-Day Average

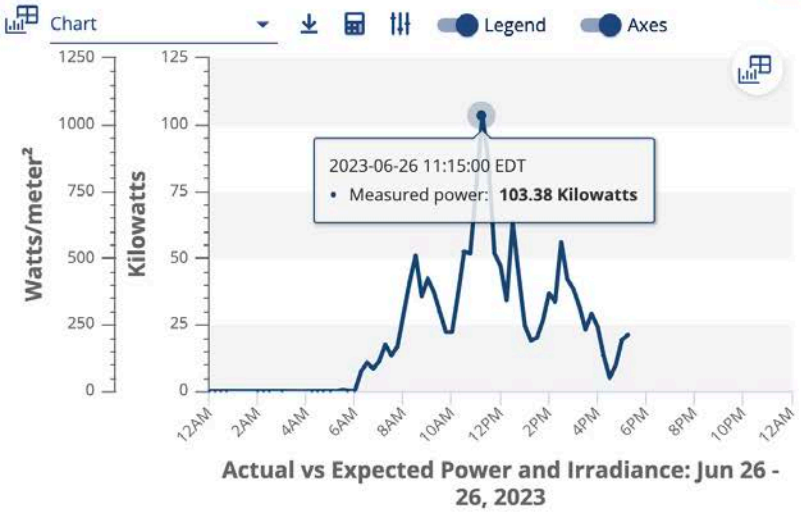


PV Past Performance

	Actual
Today	370.13 kWh
Yesterday	1.24 MWh
Last 30d	29.92 MWh

Actual vs. Expected Power and Irradiance

Day | 3 Day | Week | Month | Year | Lifetime



Actual vs Expected Power and Irradiance: Jun 26 - 26, 2023

Hardware

> PRO | Production meters

> WS | Weather stations

> GW | Gateways

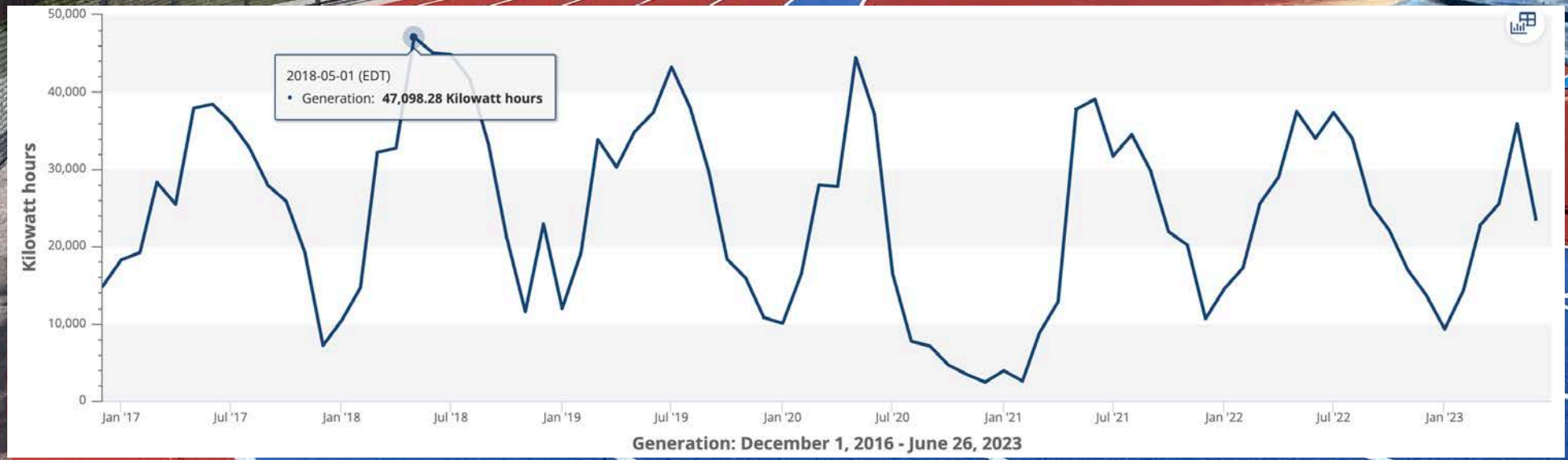
View All Hardware >

AlsoEnergy

Last Refresh: a minute ago

Time at Site: 5:24:52 PM EDT

1,737,825 kWh…


2018-05-01 (EDT)
• Generation: 47,098.28 Kilowatt hours
Kilowatt hours
50,000
40,000
30,000
20,000
10,000
0
Jan '17
Jul '17
Jan '18
Jul '18
Jan '19
Jul '19
Jan '20
Jul '20
Jan '21
Jul '21
Jan '22
Jul '22
Jan '23
Generation: December 1, 2016 - June 26, 2023

2,715,139 Pounds **of Carbon Dioxide (CO_2) equivalent**

This is equivalent to greenhouse gas emissions from:

274 gasoline-powered passenger vehicles driven for one year

3,157,180 miles driven by an average gasoline-powered passenger vehicle

This is equivalent to CO_2 emissions from:

138,581 gallons of gasoline consumed

120,979 gallons of diesel consumed

This is equivalent to carbon sequestered by:

20,364 tree seedlings grown for 10 years

1,469 acres of U.S. forests in one year

8.2 acres of U.S. forests preserved from conversion to cropland in one year

Questions?

Dan Weeks
Co-Owner/Vice President
dweeks@revisionenergy.com

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