



**NYSERDA**

# Setting the Stage

- NYSERDA's Environmental Research Program
- Future climate
- Future electric system

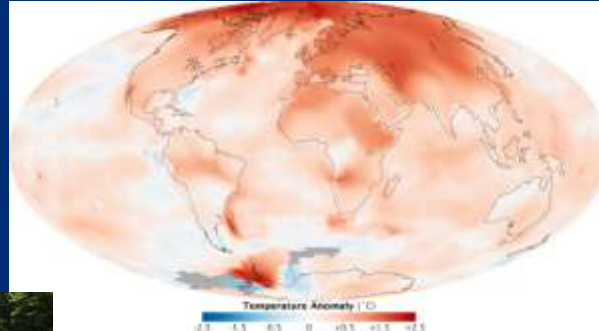
# NYSERDA's Environmental Research Program

# NYSERDA's Mission

To advance innovative energy solutions in ways that improve New York's economy and environment

# Environmental Research Program

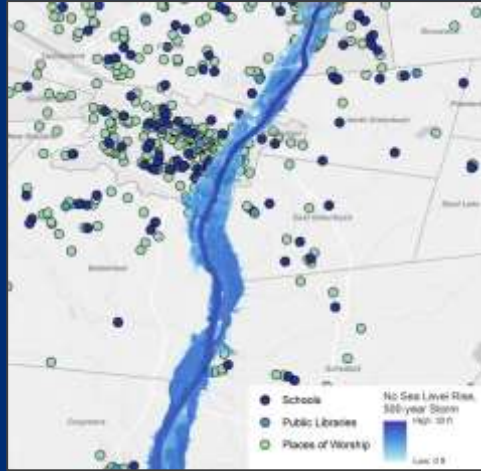
Support policy-relevant research to enhance understanding of energy-related environmental issues



# Climate Change and Adaptation



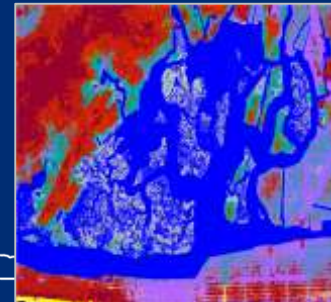
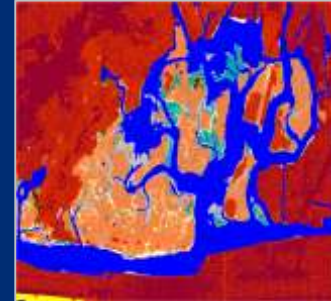
[www.nyscrda.ny.gov/climaid](http://www.nyscrda.ny.gov/climaid)



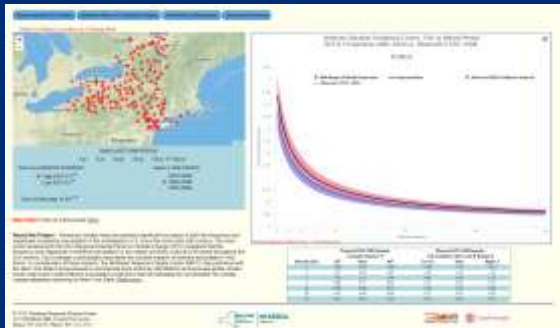
[www.ciesin.columbia.edu/hudson-river-flood-map](http://www.ciesin.columbia.edu/hudson-river-flood-map)



[www.nyclimatescience.org](http://www.nyclimatescience.org)



[slammview.org](http://slammview.org)



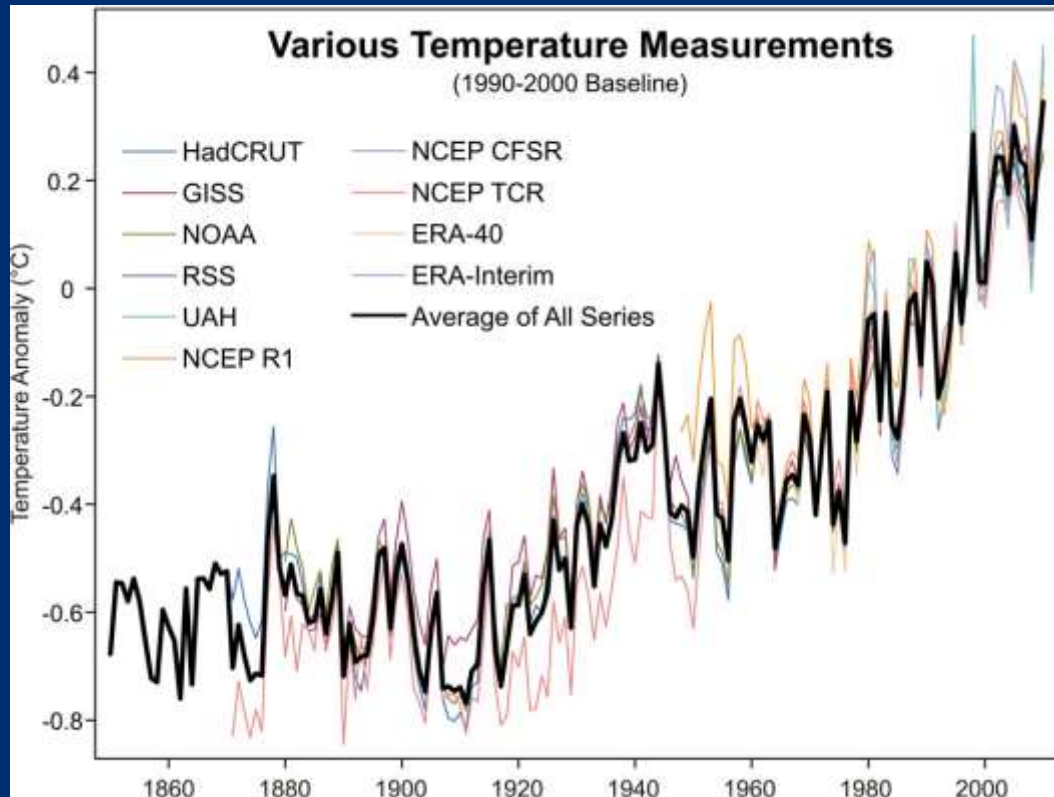
[ny-idf-projections.nrcr.cornell.edu/idf\\_viewer.html](http://ny-idf-projections.nrcr.cornell.edu/idf_viewer.html)



[services.nyscrda.ny.gov/SLR\\_Viewer/About](http://services.nyscrda.ny.gov/SLR_Viewer/About)

# Observations

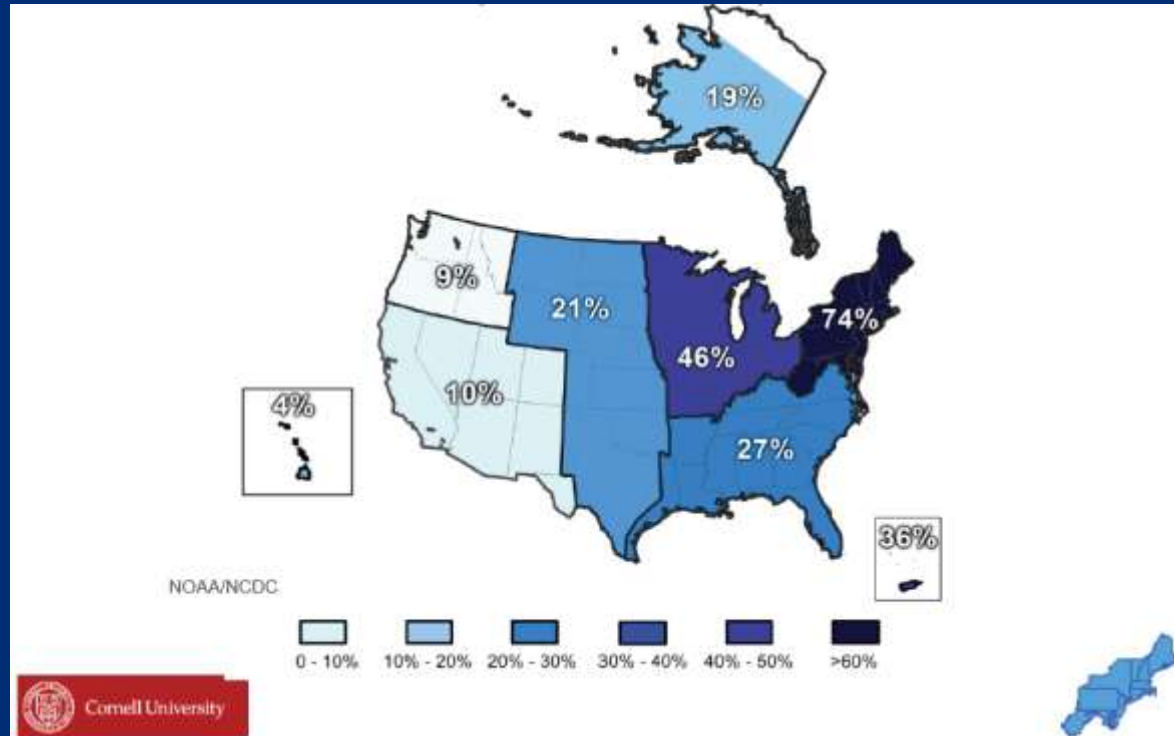
# Temperatures are increasing



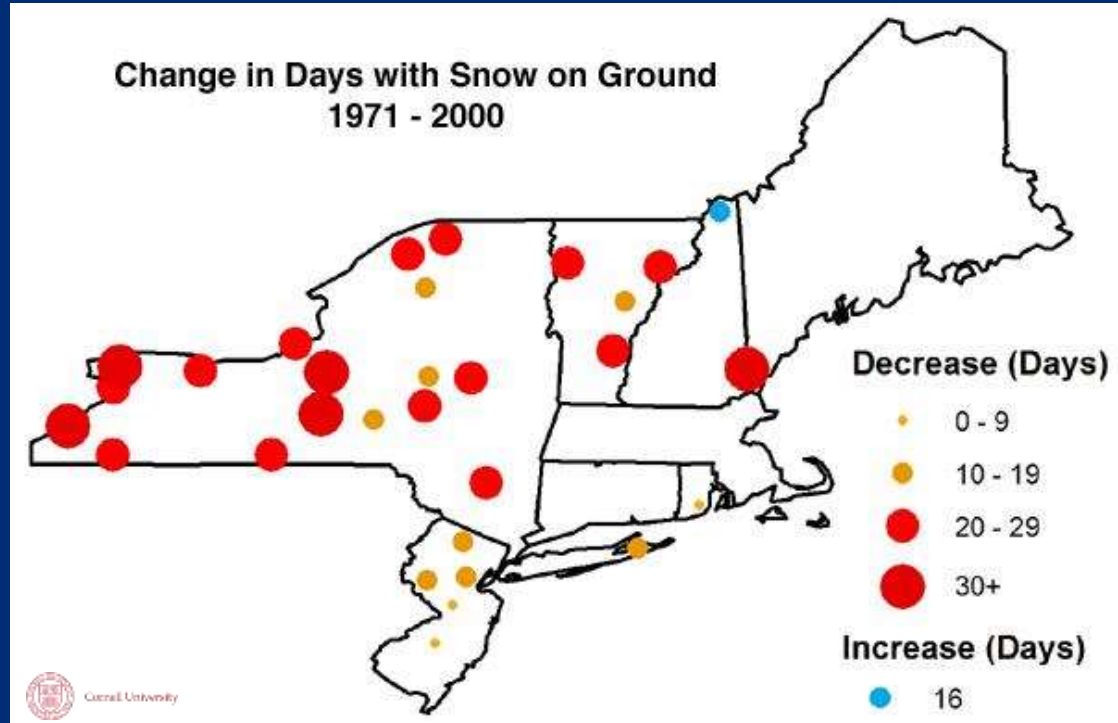
Skeptical Science



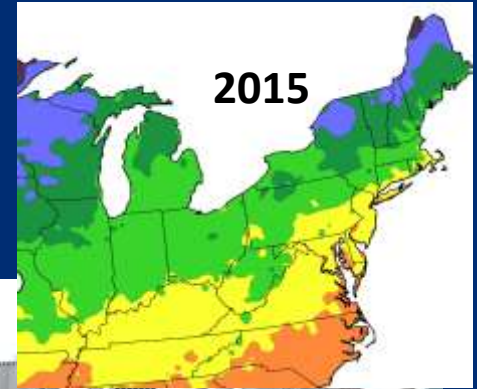
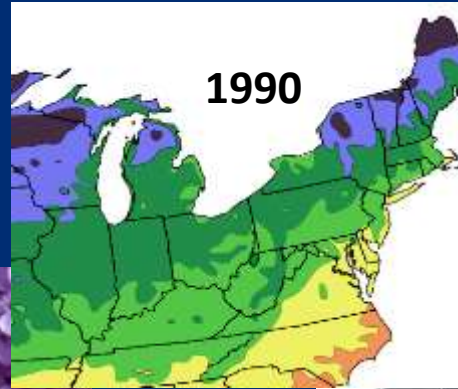
# Observed Trends in 1-day Very Heavy Precipitation (1958 to 2010)



# Days with snow cover have decreased



# Over the past several decades, noticeable changes have taken place



# Projections

# ClimAID provided climate projections for each region of the state

## Region 4 (New York City) – Temperature

Baseline (1971-2000) 54.6 °F	Low Estimate (10th Percentile)	Middle Range (25th to 75th Percentile)	High Estimate (90th Percentile)
2020s	+ 1.5 °F	+ 2.0 to 2.9 °F	+ 3.2 °F
2050s	+ 3.1 °F	+ 4.1 to 5.7 °F	+ 6.6 °F
2080s	+ 3.8 °F	+ 5.3 to 8.8 °F	+ 10.3 °F
2100	+ 4.2 °F	+ 5.8 to 10.4 °F	+ 12.1 °F

## Region 4 (New York City) – Precipitation

Baseline (1971-2000) 49.7 inches	Low Estimate (10th Percentile)	Middle Range (25th to 75th Percentile)	High Estimate (90th Percentile)
2020s	- 1 percent	+ 1 to + 8 percent	+ 10 percent
2050s	+ 1 percent	+ 4 to + 11 percent	+ 13 percent
2080s	+ 2 percent	+ 5 to + 13 percent	+ 19 percent
2100	- 6 percent	- 1 to + 19 percent	+ 25 percent



# What it could mean



and/or





# Changes in extreme precipitation by 2050 (Lower Hudson region)

	10-yr Event	100-yr Event
Current event rainfall	4.5"	8.1"
Future event rainfall	5.2"	9.2"
% increase in rainfall	15.5%	14.0%
Future recurrence interval of current rainfall amount	5 years	62 years

# Sea Level Rise Projections

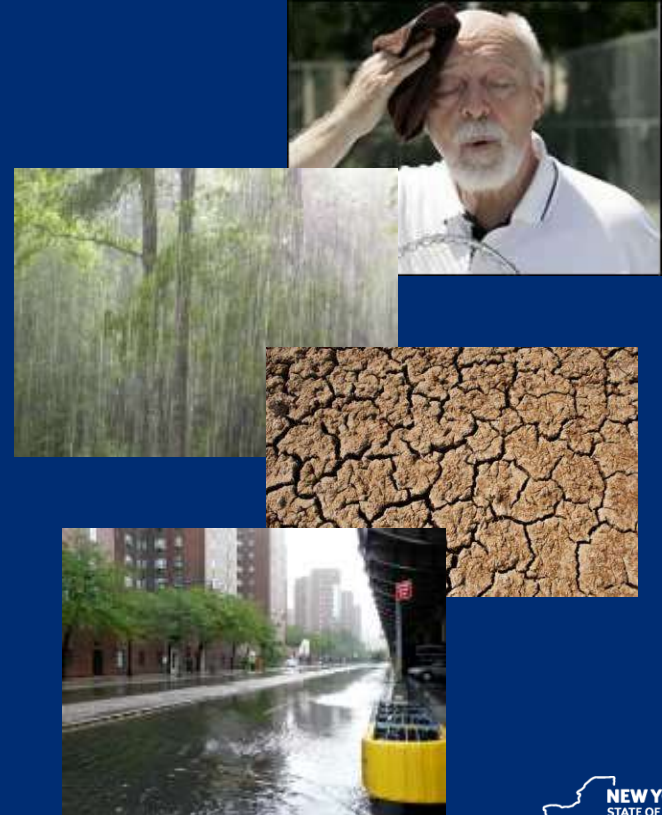
6 NYCRR Part 490, Projected Sea-level Rise. Inches of rise relative to 2000-2004 baseline.

	Region	Long Island					New York City/Lower Hudson					Mid-Hudson				
	Descriptor	Low	Low-Medium	Medium	High-Medium	High	Low	Low-Medium	Medium	High-Medium	High	Low	Low-Medium	Medium	High-Medium	High
Time Interval	2020s	2	4	6	8	10	2	4	6	8	10	1	3	5	7	9
	2050s	8	11	16	21	30	8	11	16	21	30	5	9	14	19	27
	2080s	13	18	29	39	58	13	18	29	39	58	10	14	25	36	54
	2100	15	21	34	47	72	15	22	36	50	75	11	18	32	46	71

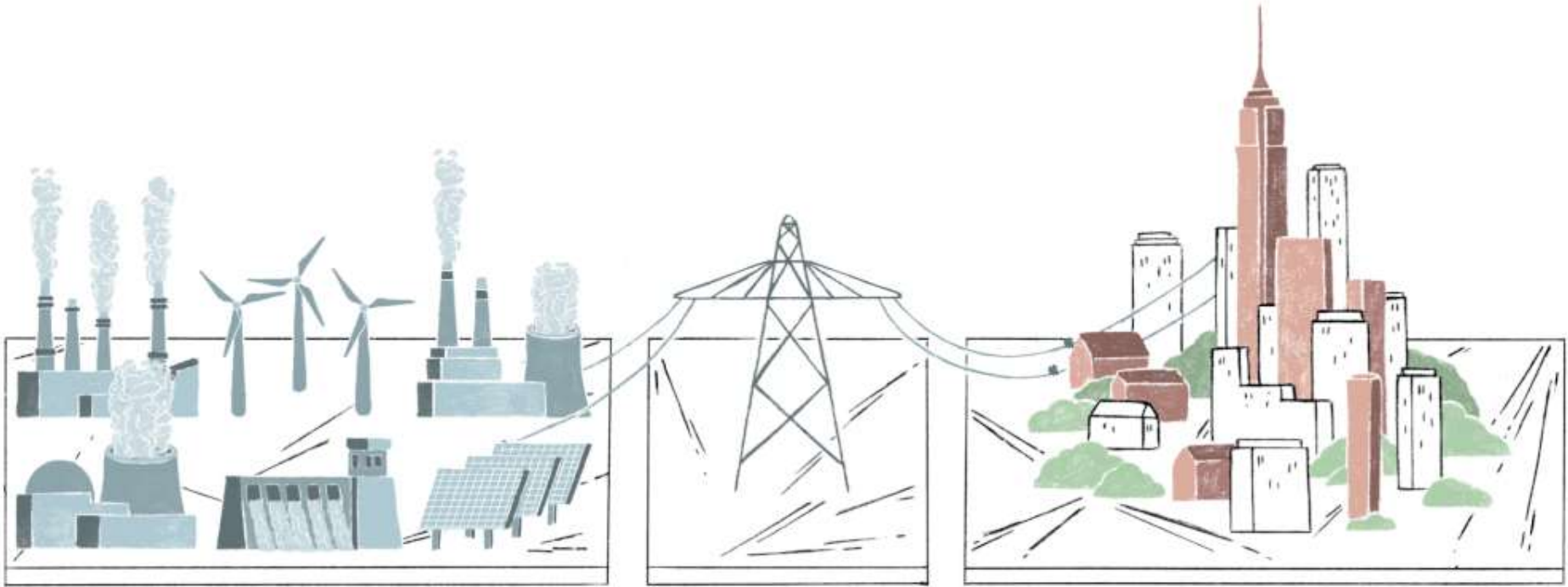


# In general for NYS:

- Warmer temperatures with more heat waves
- More frequent and intense precipitation events—and droughts
- Increased sea level rise and coastal flooding



# Electricity sector resilience



# New York's Future Electric System

# How Demand/Supply Could Change by 2050

- Continued EE and Codes/Standards Improvements
- More Flexible Loads
  - Increased responsiveness and control can help manage peaks
- Electrification
  - Electrification has the potential to reduce total emissions
  - But, this could lead to higher loads in the long-term, meaning more low- or no-carbon supply and flexibility needed
- Increased Renewable Generation