MOVING FORWARD IN THE FACE OF CLIMATE CHANGE

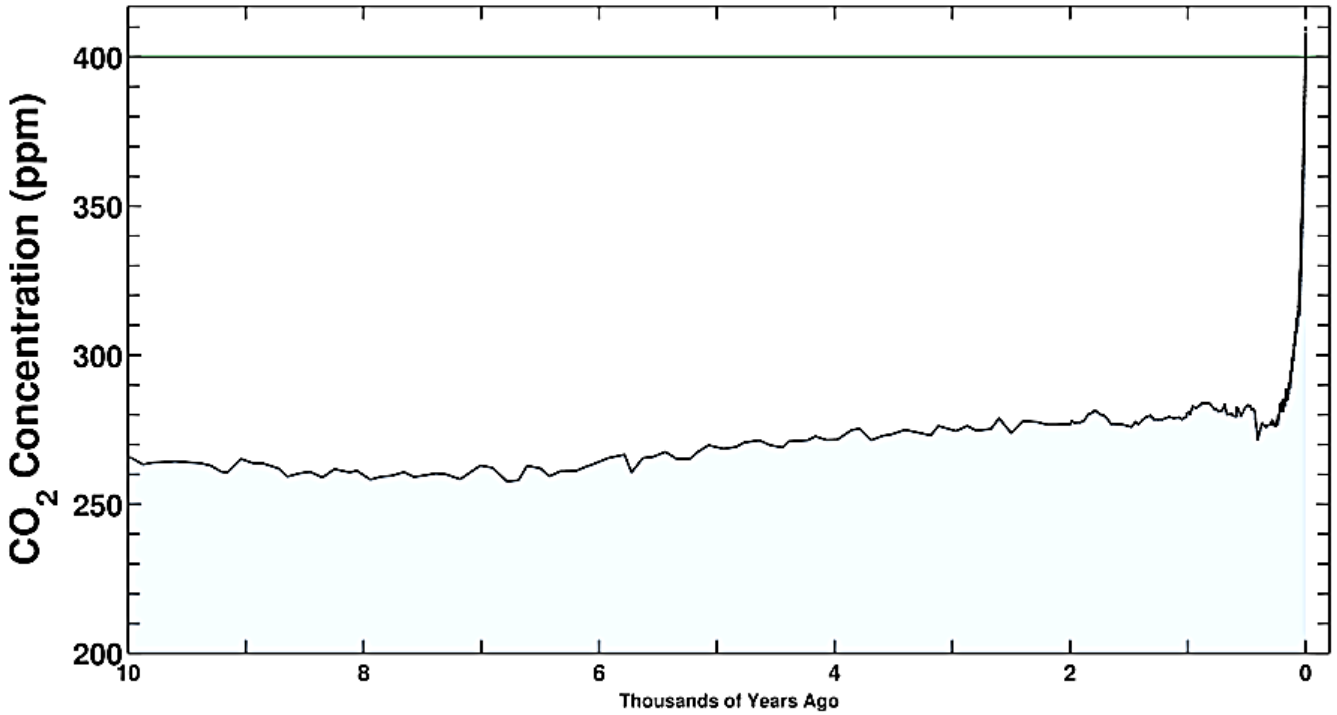
Otsego County Energy Summit

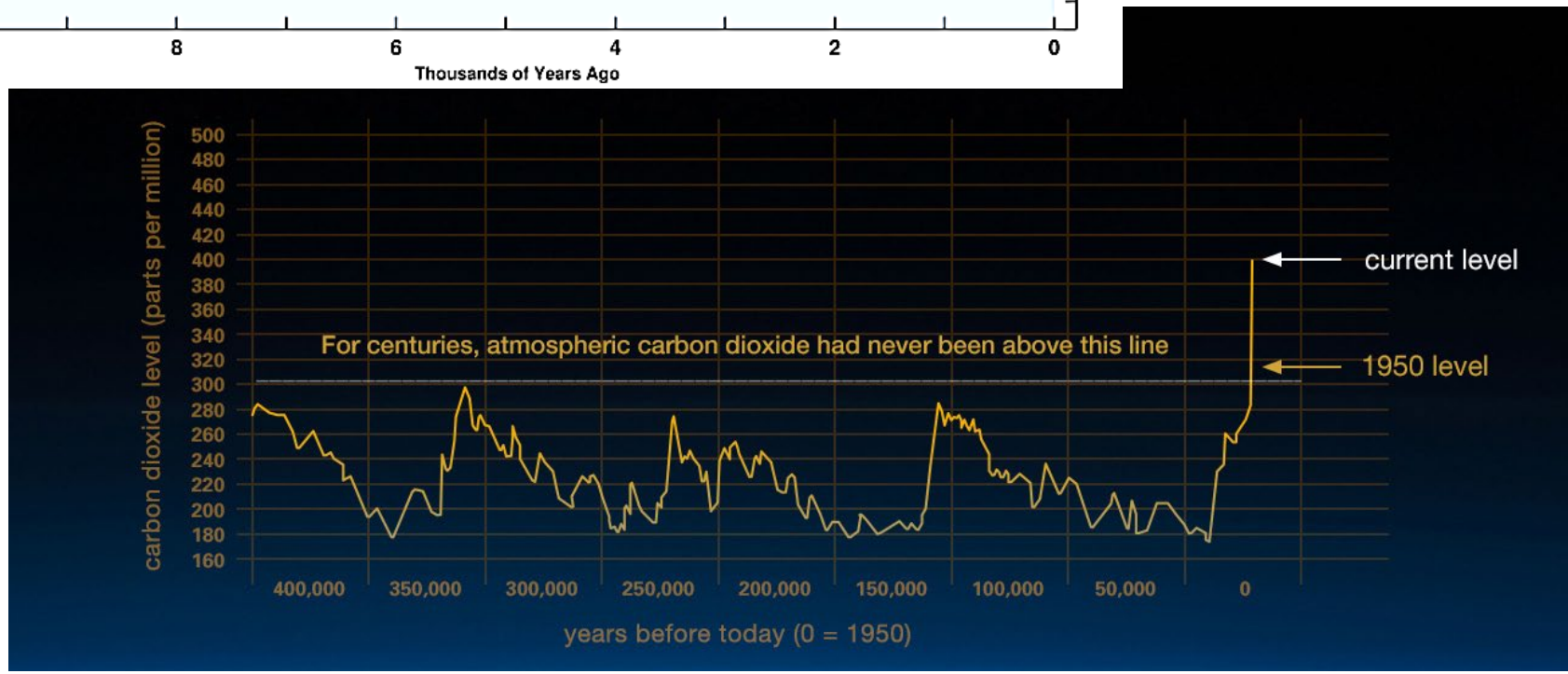
Keith Schue

January 31, 2019

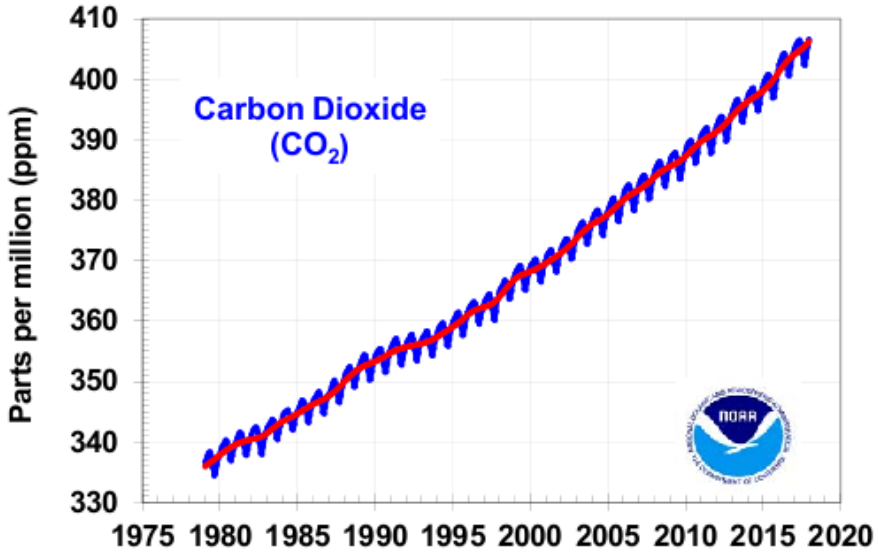
OTSEGO 2000

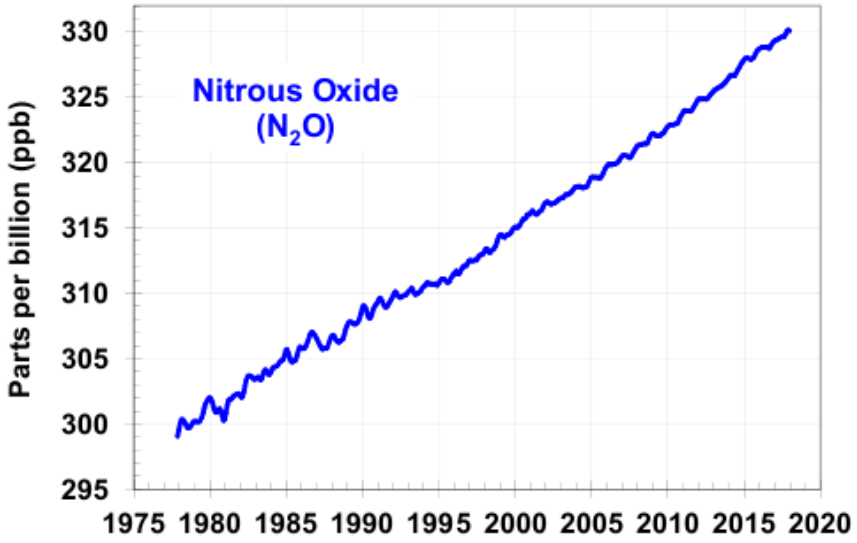
DENIALISM

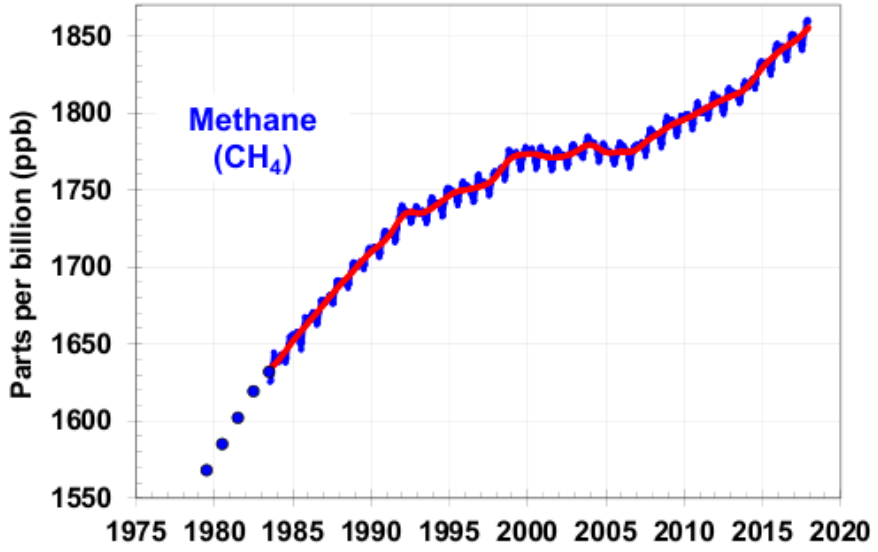

CO_2 Concentration (ppm)
400
350
300
250
200
10
8
6
4
2
0
Thousands of Years Ago

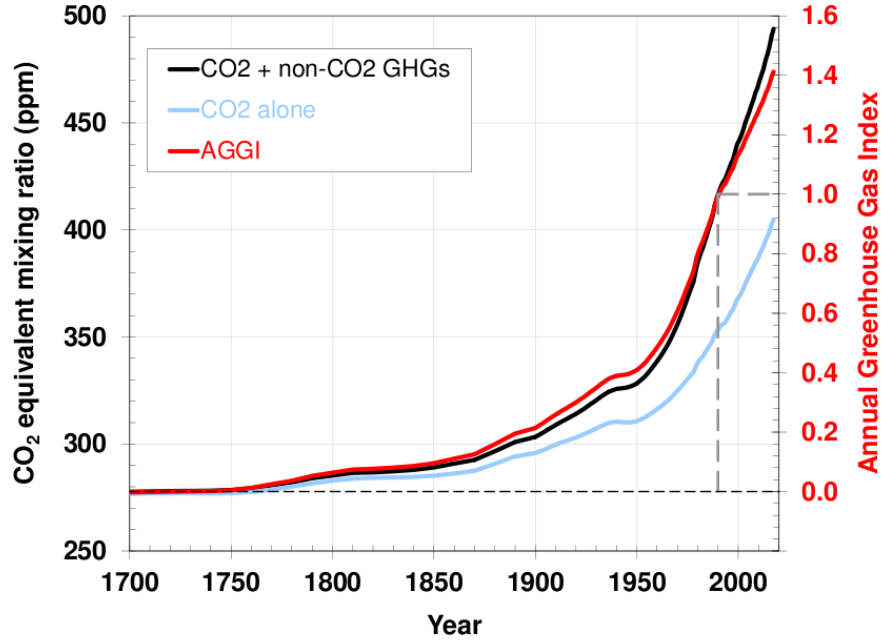

carbon dioxide level (parts per million)
500
480
460
440
420
400
380
360
340
320
300
280
260
240
220
200
180
160
For centuries, atmospheric carbon dioxide had never been above this line
current level
1950 level
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
years before today (0 = 1950)

Measurable

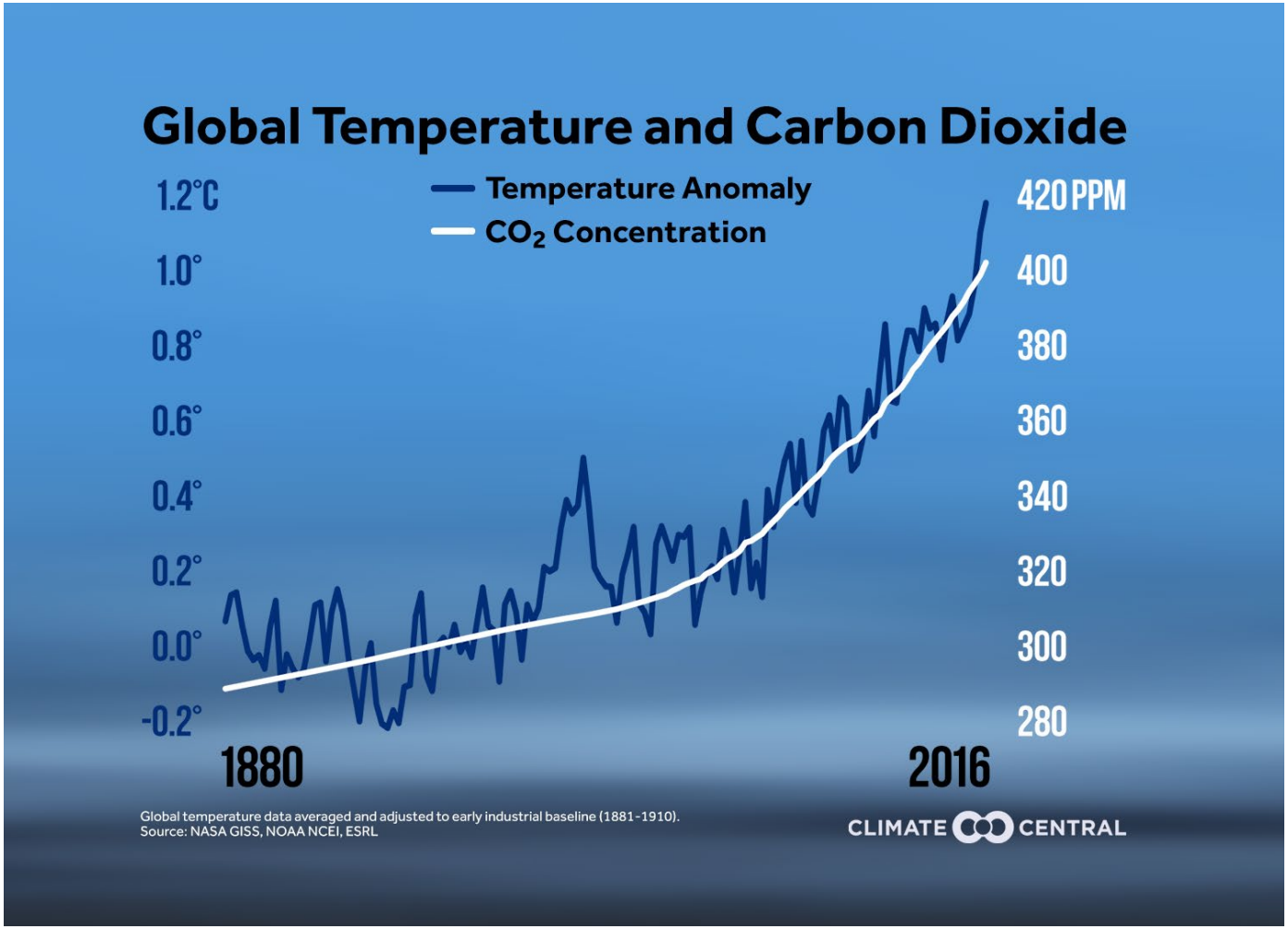

Carbon Dioxide
(CO_2)
Parts per million (ppm)
410
400
390
380
370
360
350
340
330
1975 1980 1985 1990 1995 2000 2005 2010 2015 2020
NOAA


Nitrous Oxide
(N_2O)
Parts per billion (ppb)
330
325
320
315
310
305
300
295
1975 1980 1985 1990 1995 2000 2005 2010 2015 2020

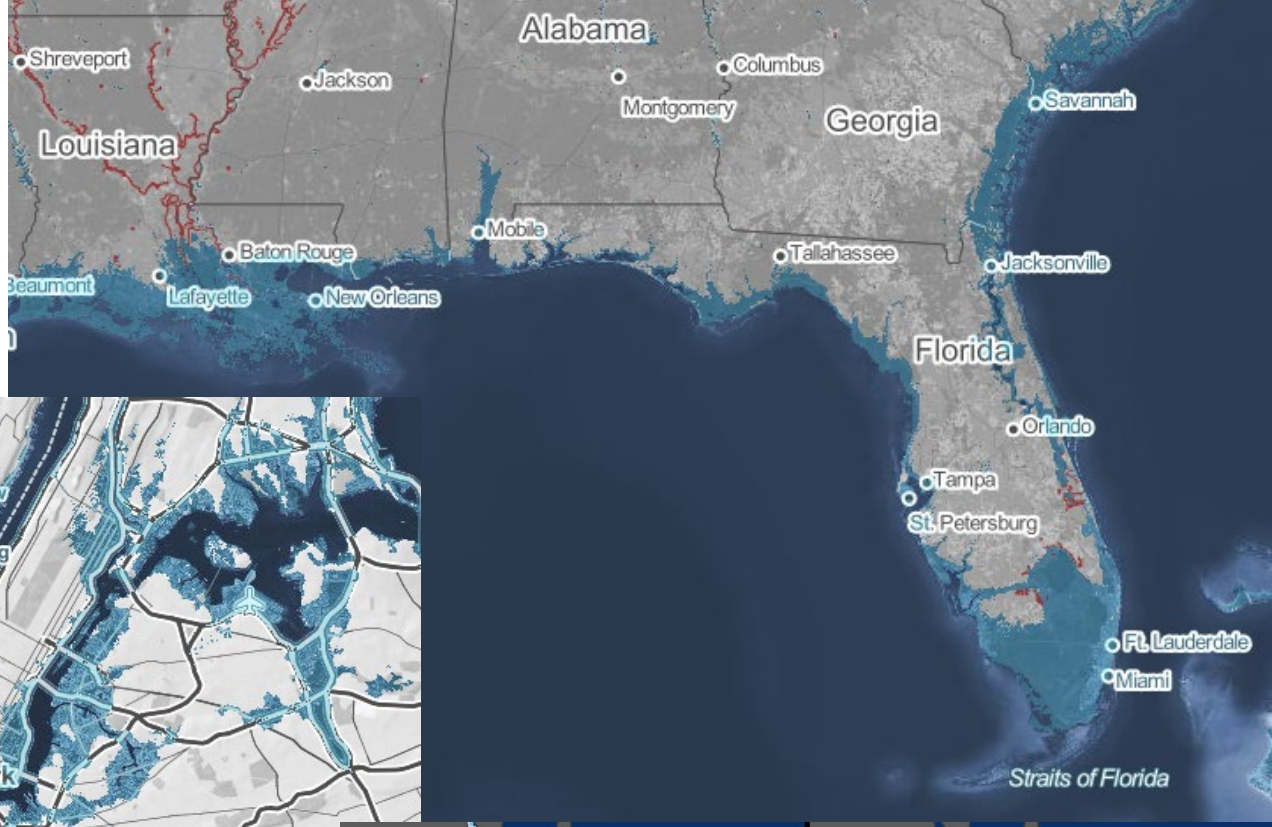

Methane
(CH_4)
Parts per billion (ppb)
1850
1800
1750
1700
1650
1600
1550
1975 1980 1985 1990 1995 2000 2005 2010 2015 2020

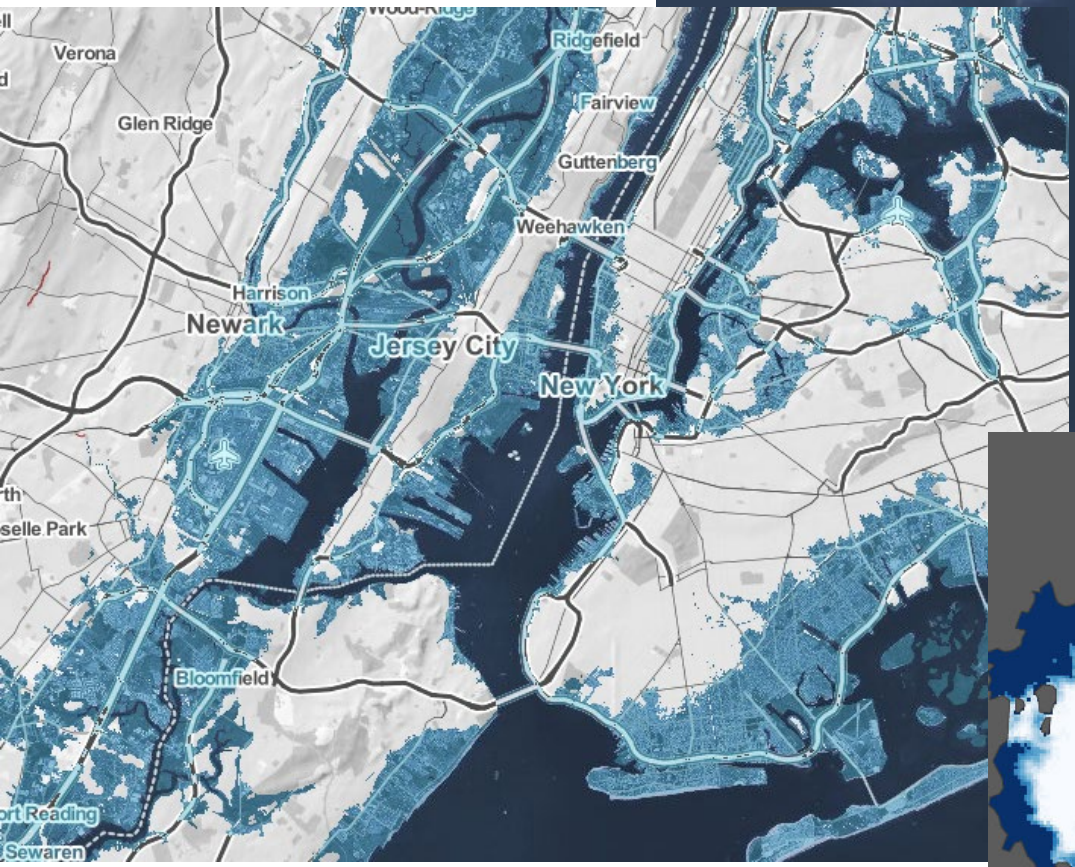

CO2 + non-CO2 GHGs
CO2 alone
AGGI
CO_2 equivalent mixing ratio (ppm)
500
450
400
350
300
250
1700 1750 1800 1850 1900 1950 2000
Year
Annual Greenhouse Gas Index
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

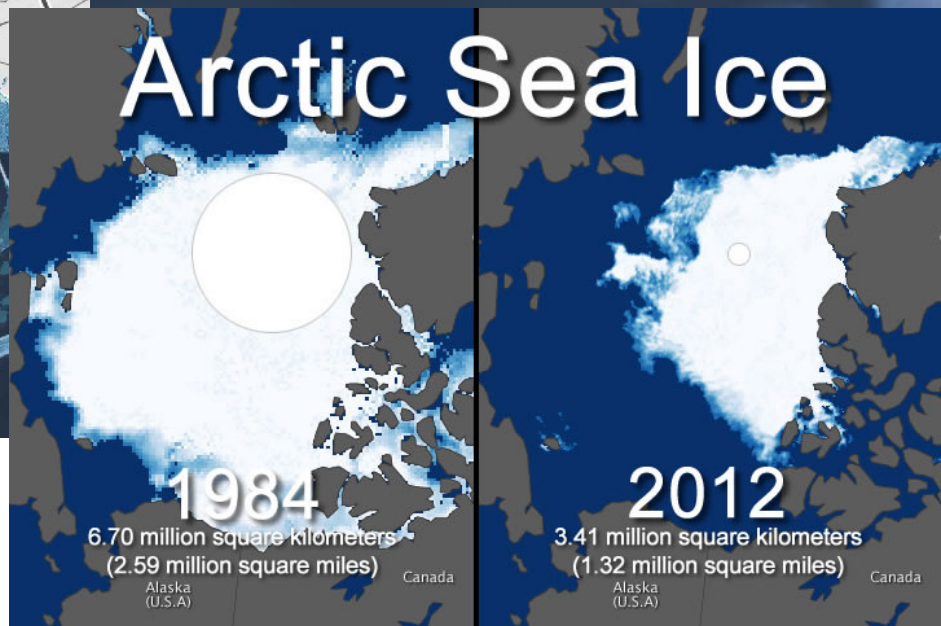
Strong correlation between GHG emissions and temperature



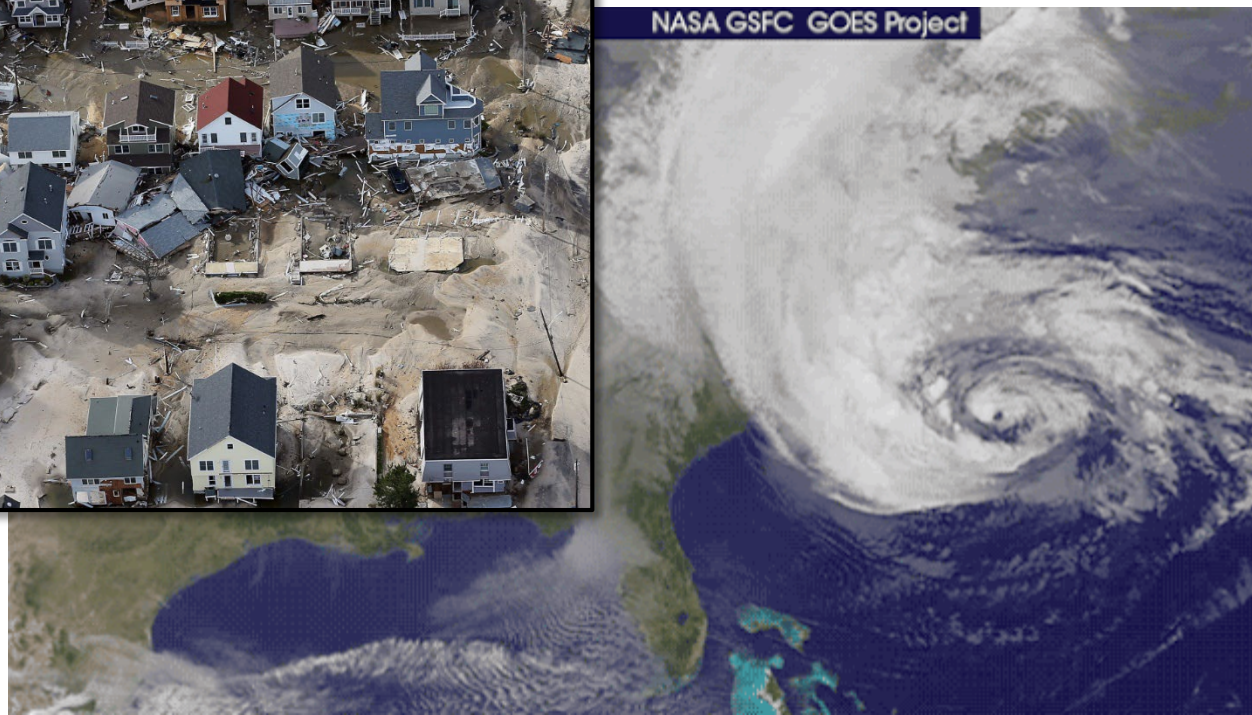
Sea level rise







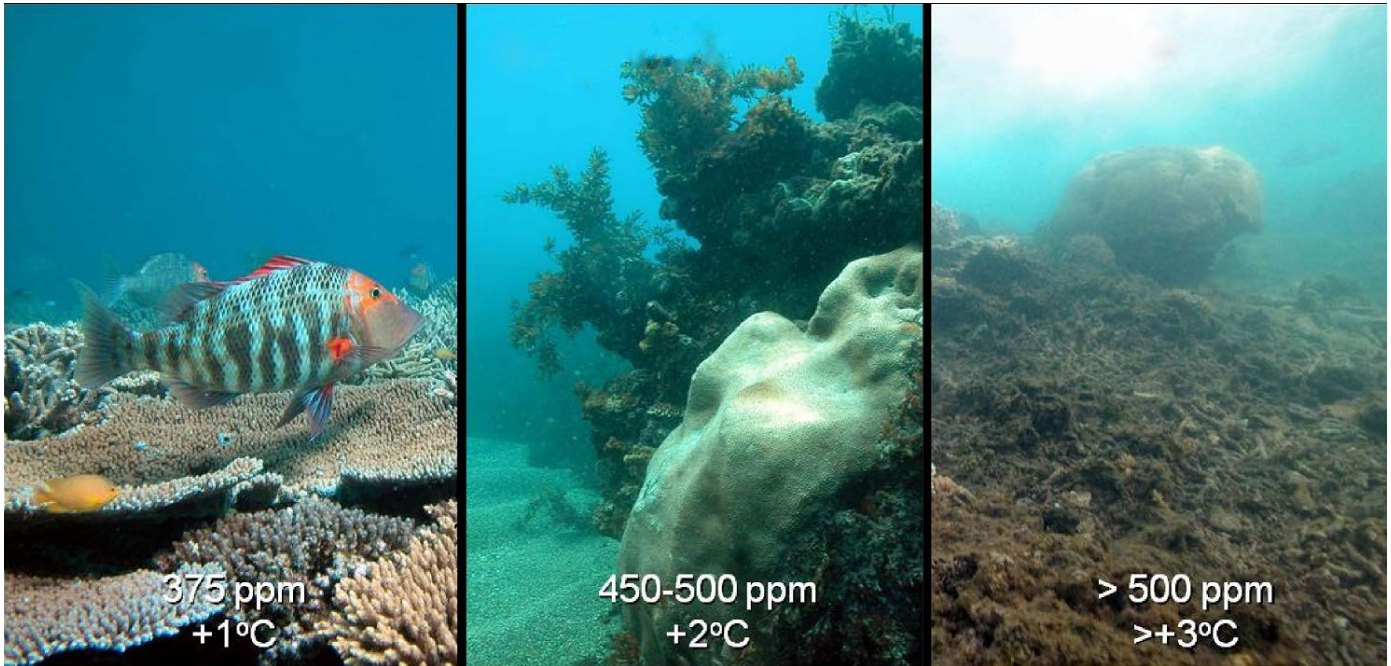
Wildfires

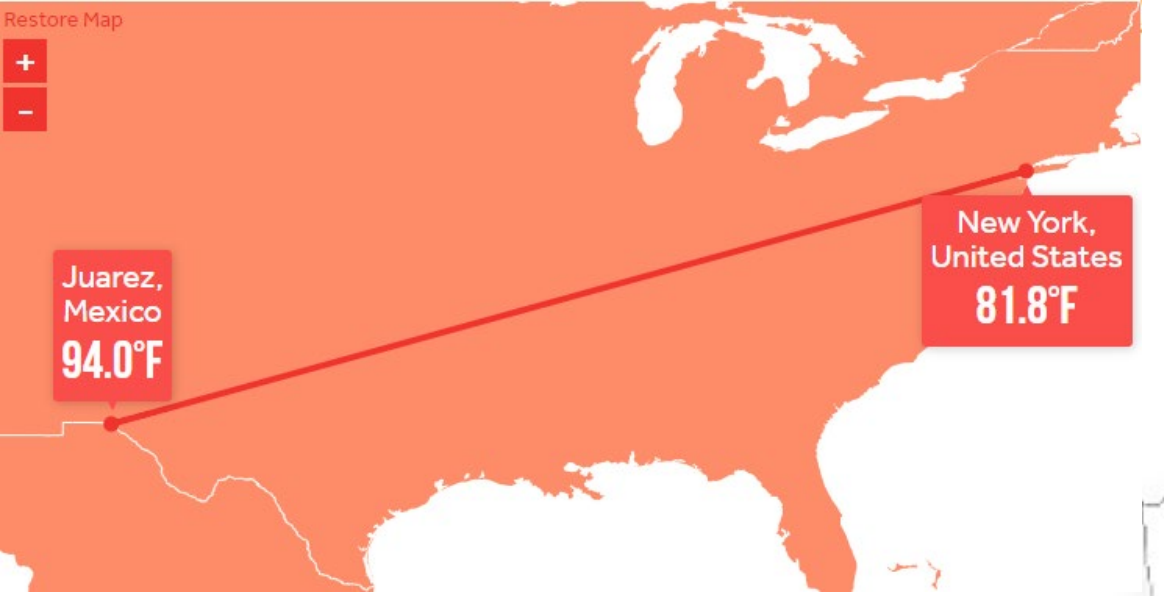


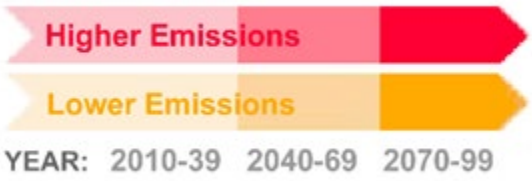
Extreme storms

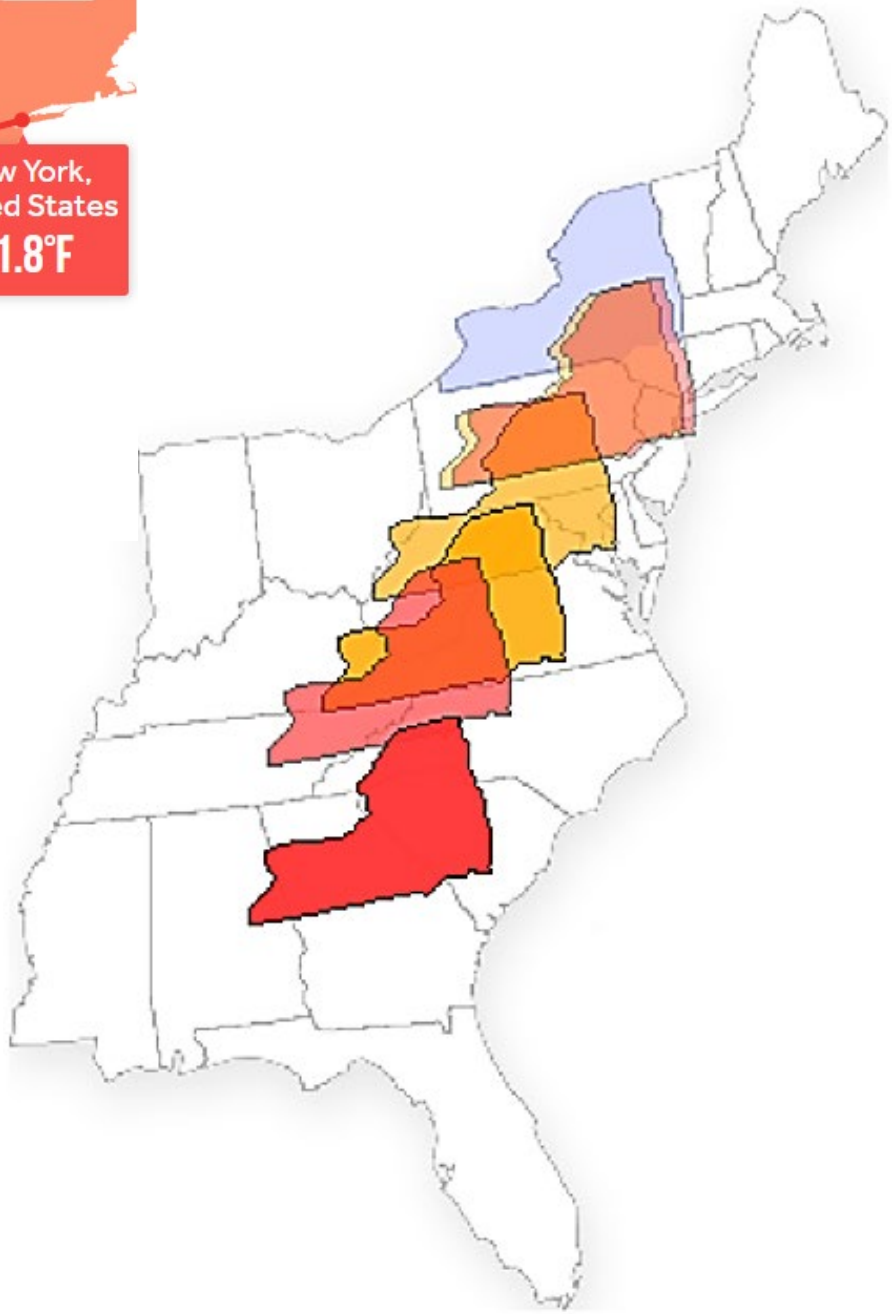
Loss of Species

Ocean Acidification



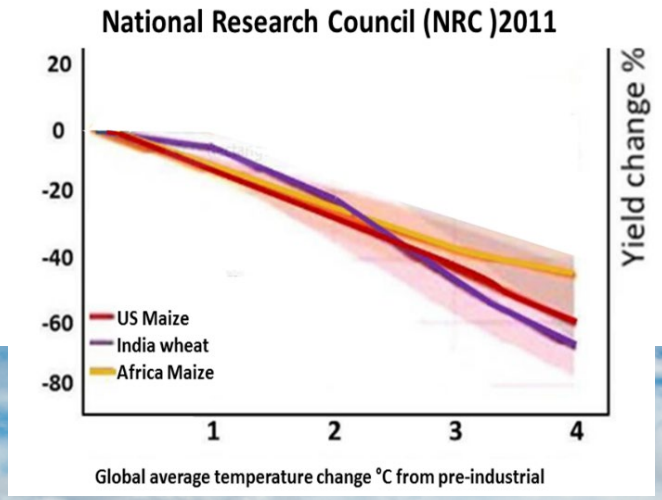


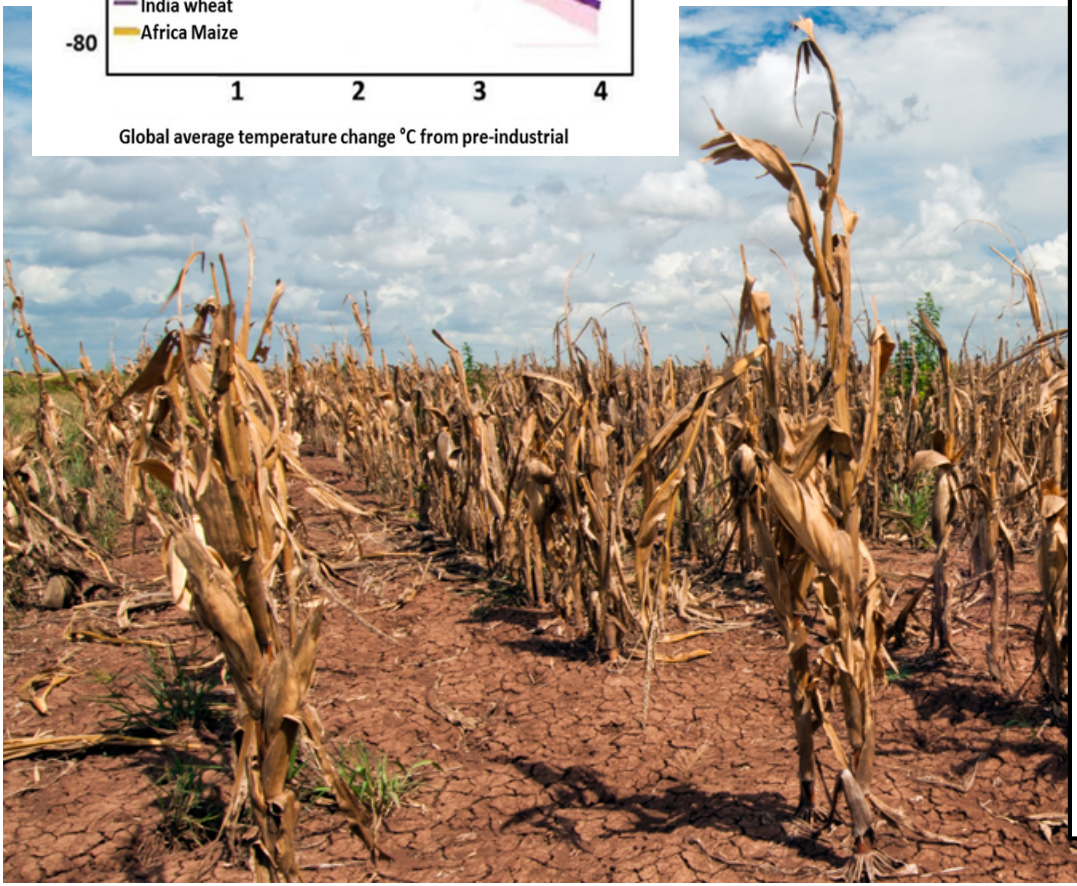


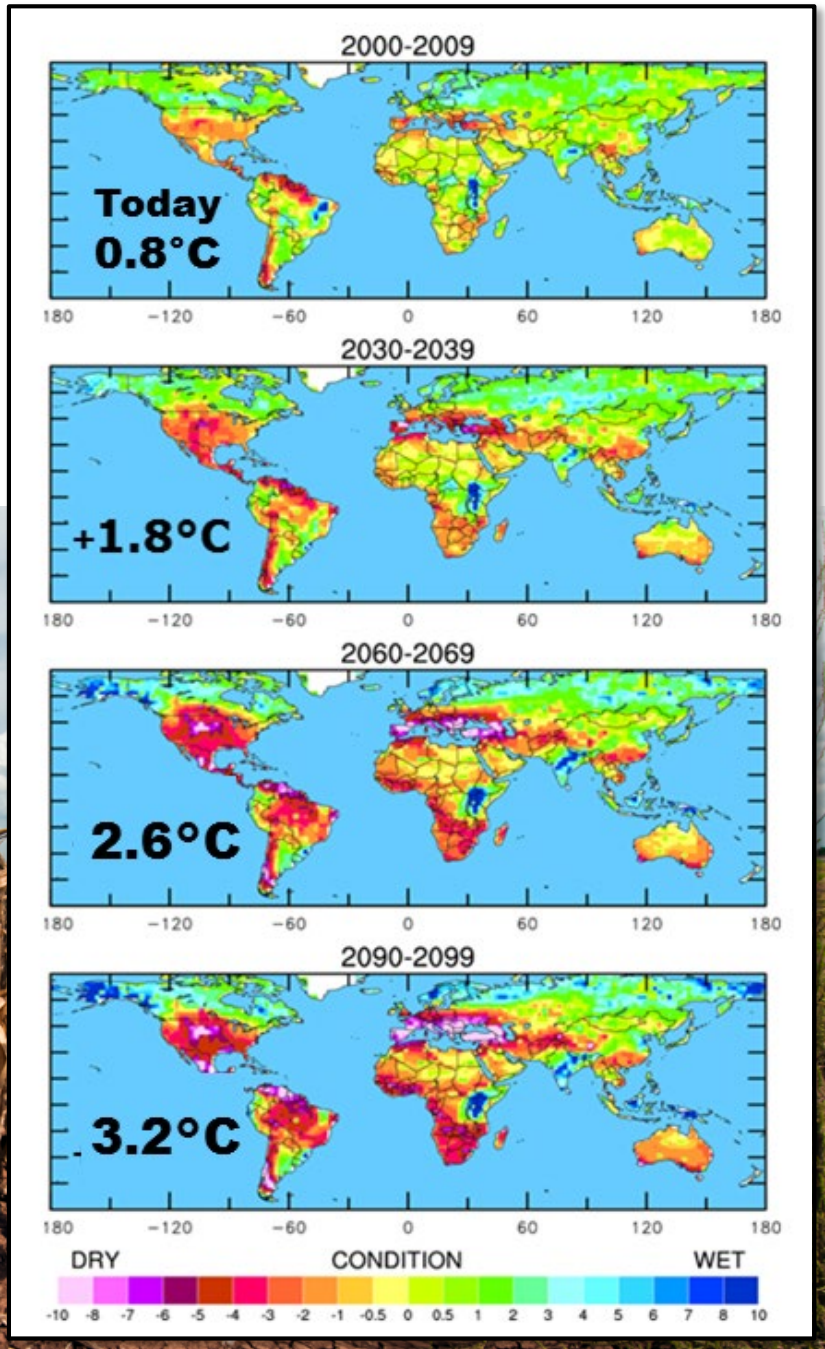


Confronting Climate Change in the U.S. Northeast, UCS

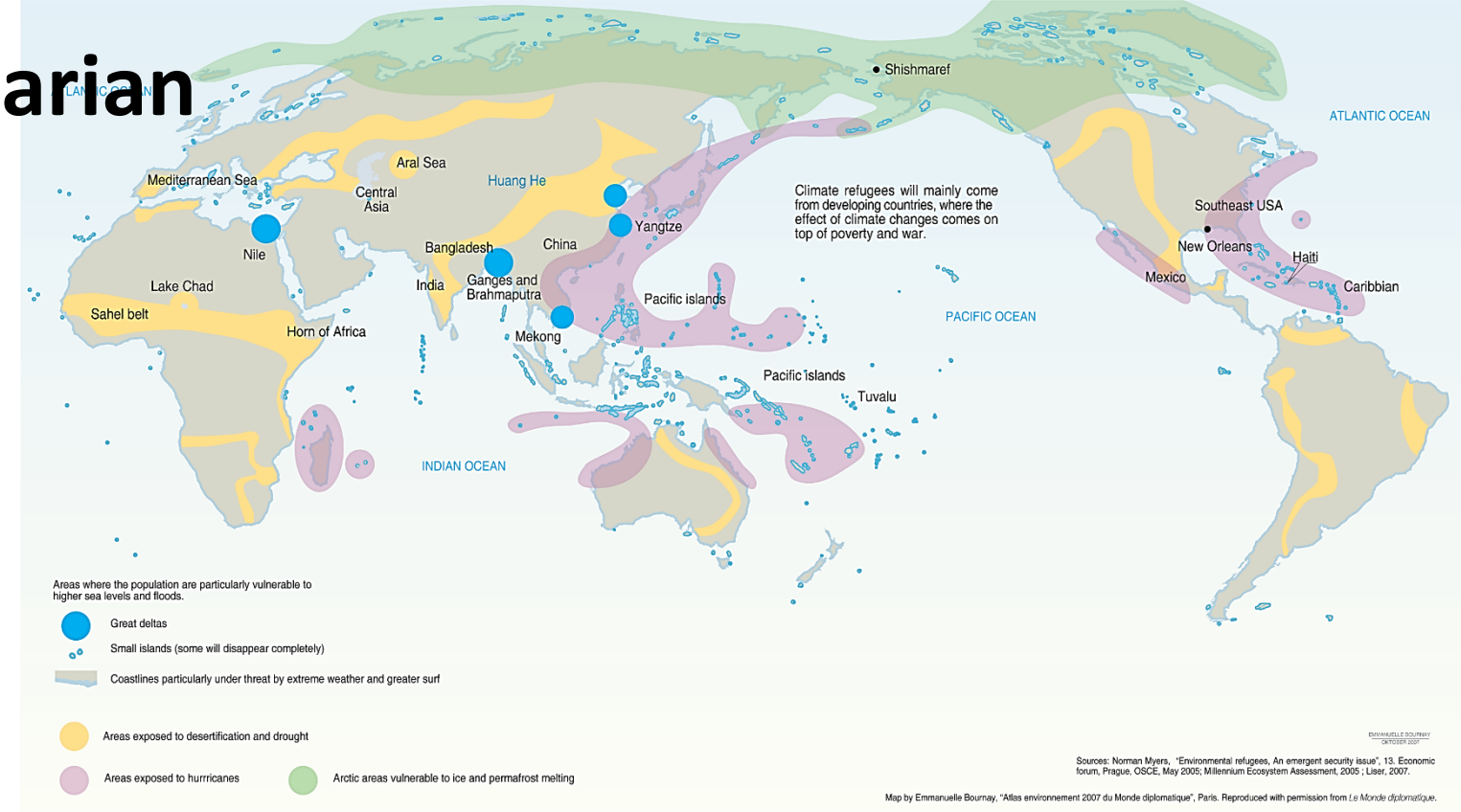
Drought

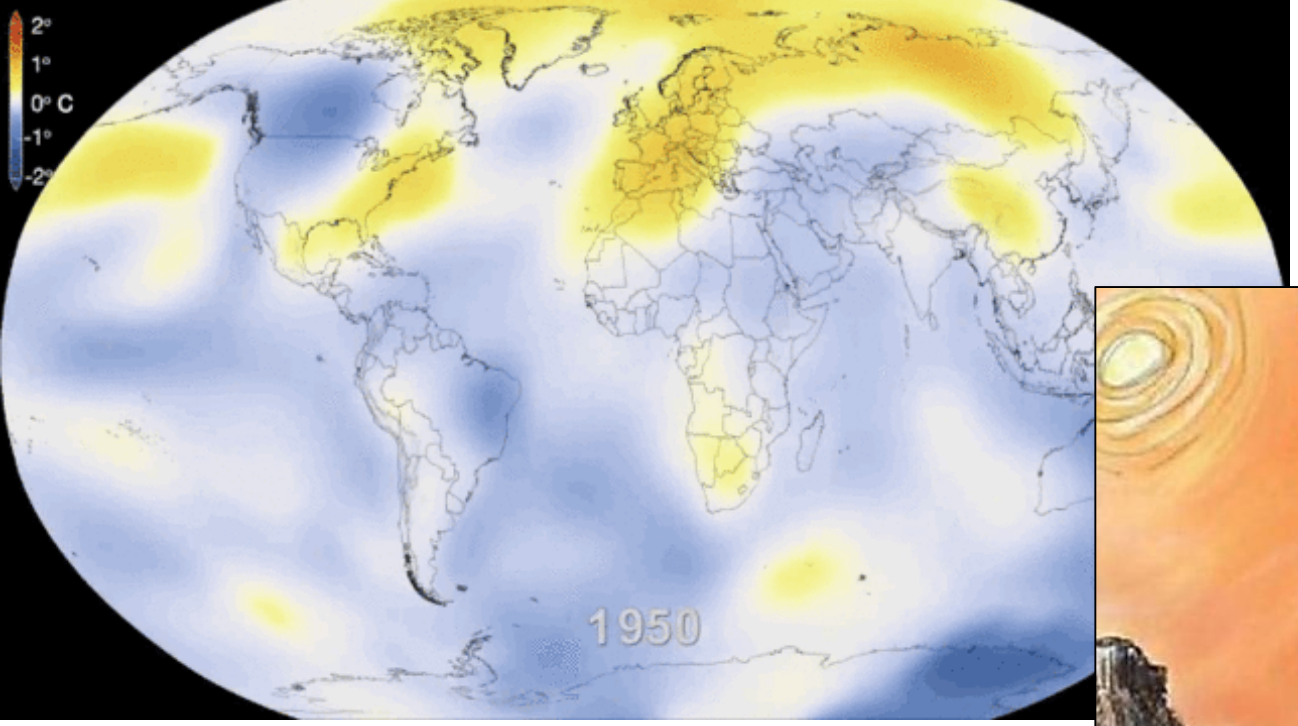

National Research Council (NRC)2011
20
0
-20
-40
-60
-80
Yield change %
US Maize
India wheat
Africa Maize
1
2
3
4
Global average temperature change °C from pre-industrial

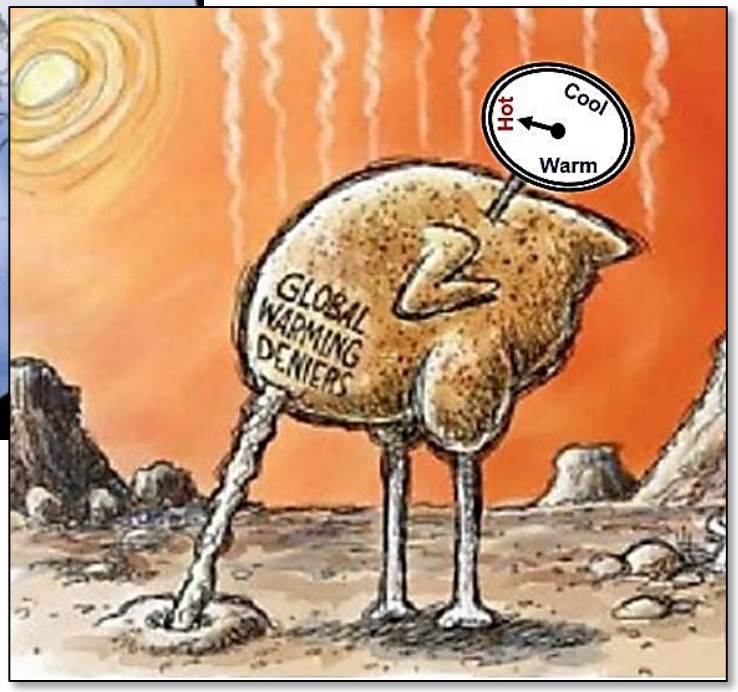



2000-2009
Today
0.8°C
2030-2039
+1.8°C
2060-2069
2.6°C
2090-2099
3.2°C
180
-120
-60
0
60
120
180
DRY
CONDITION
WET
-10
-8
-7
-6
-5
-4
-3
-2
-1
-0.5
0
0.5
1
2
3
4
5
6
7
8
10

Humanitarian Crisis



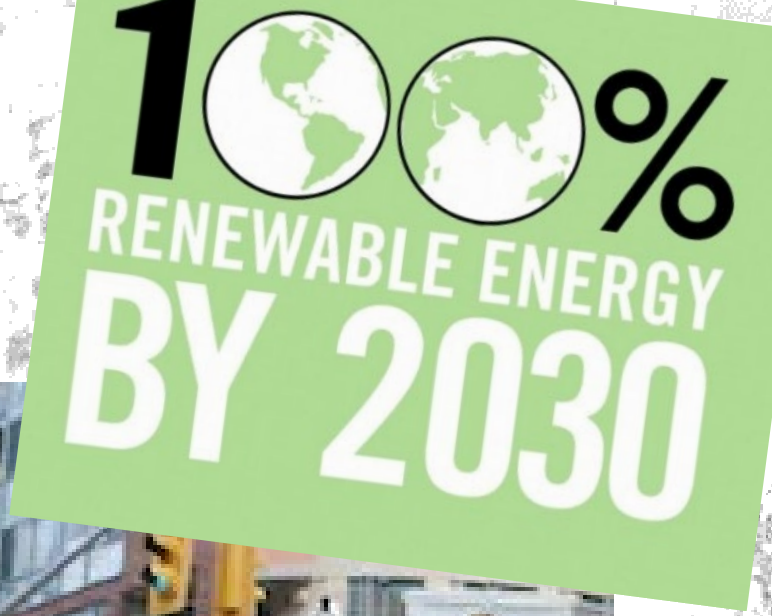




But Denialism can take other forms too…

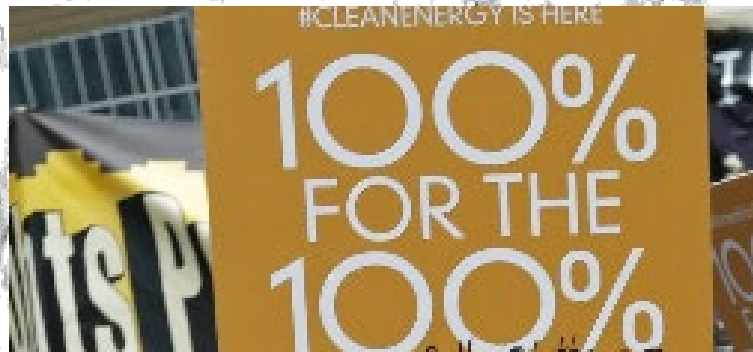

NEW VICTORY THEATER
WE CAN BUILD THE FUTURE
Survival Media Agency


STOP CLIMATE CHANGE
CHANGE THE WORLD
END
TOXIC
CAPITALISM
SOCIALISM.NU


100%
RENEWABLE ENERGY
BY 2030


NUKES
GREENPEACE
CLIMATE
JUSTICE


100% CLEAN
RENEWABLE
ENERGY
2035
FRONTLINE
COMMUNITIES
HAVE THE
SOLUTIONS

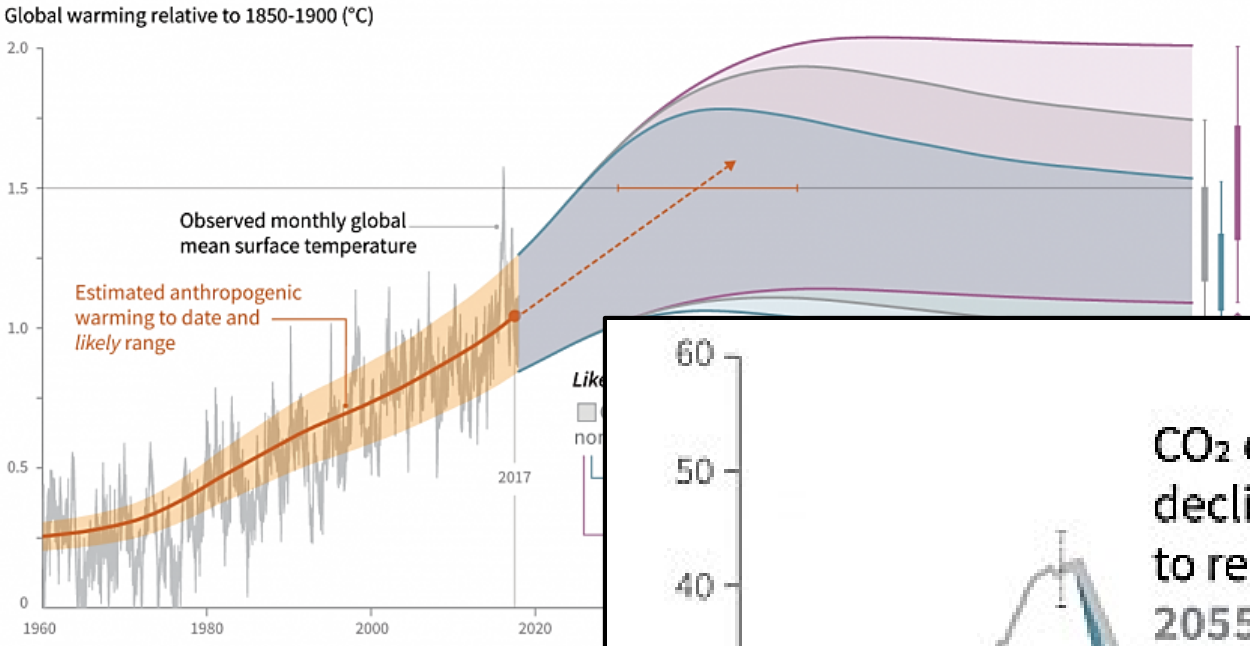

#CLEANENERGY IS HERE
100%
FOR THE
100%


60
100
150
200
250
V
3421
1967г.
Сделано в СССР
2,5 ГОСТ 8711-60

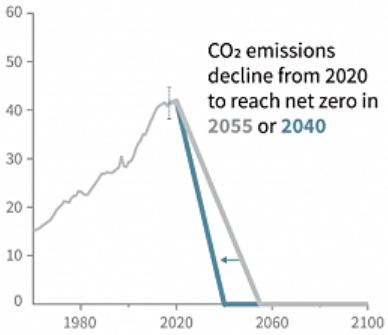
Otsego Sustainable Energy Plan

Cumulative emissions of CO_2 and future non-CO_2 radiative forcing determine the probability of limiting warming to 1.5°C

a) Observed global temperature change and modeled responses to stylized anthropogenic emission and forcing pathways

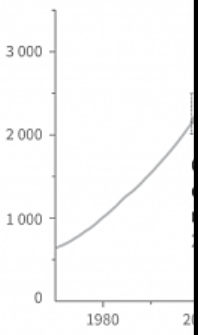


b) Stylized net global CO_2 emission pathways
Billion tonnes CO_2 per year ($GtCO_2$/yr)

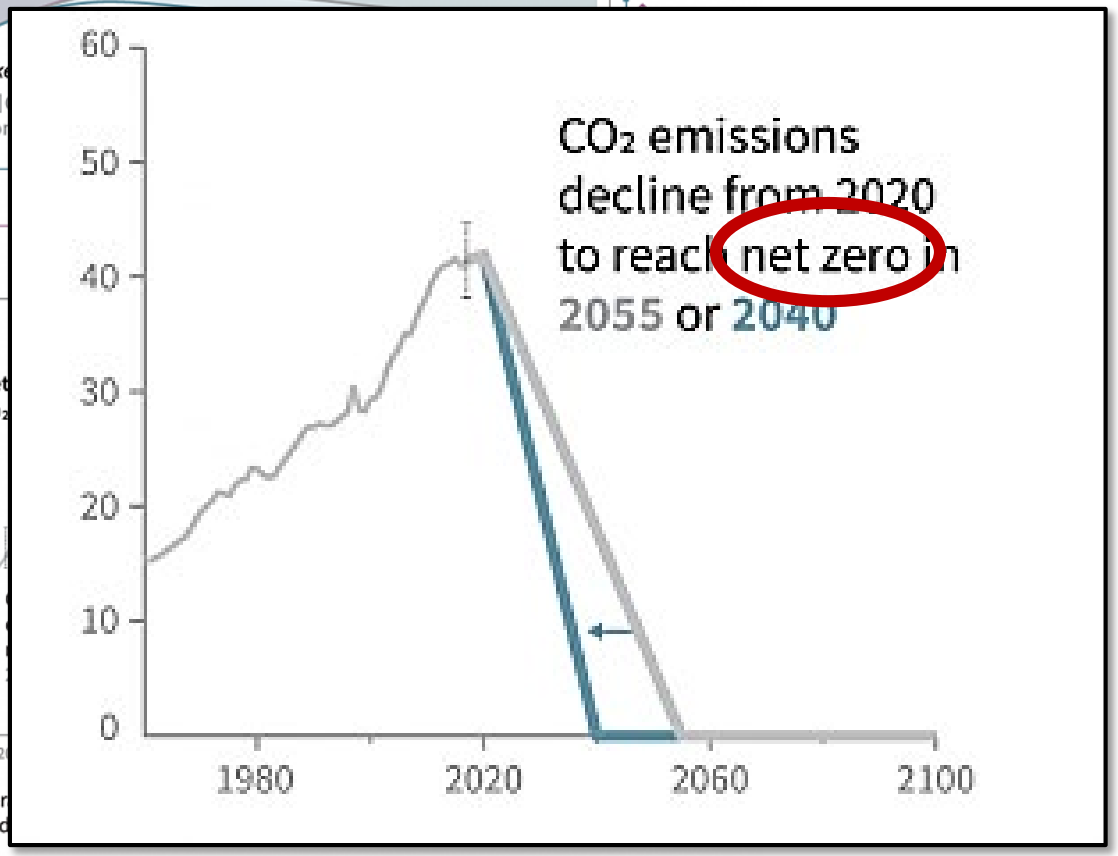


Faster immediate CO_2 emission reductions limit cumulative CO_2 emissions shown in panel **(c)**.

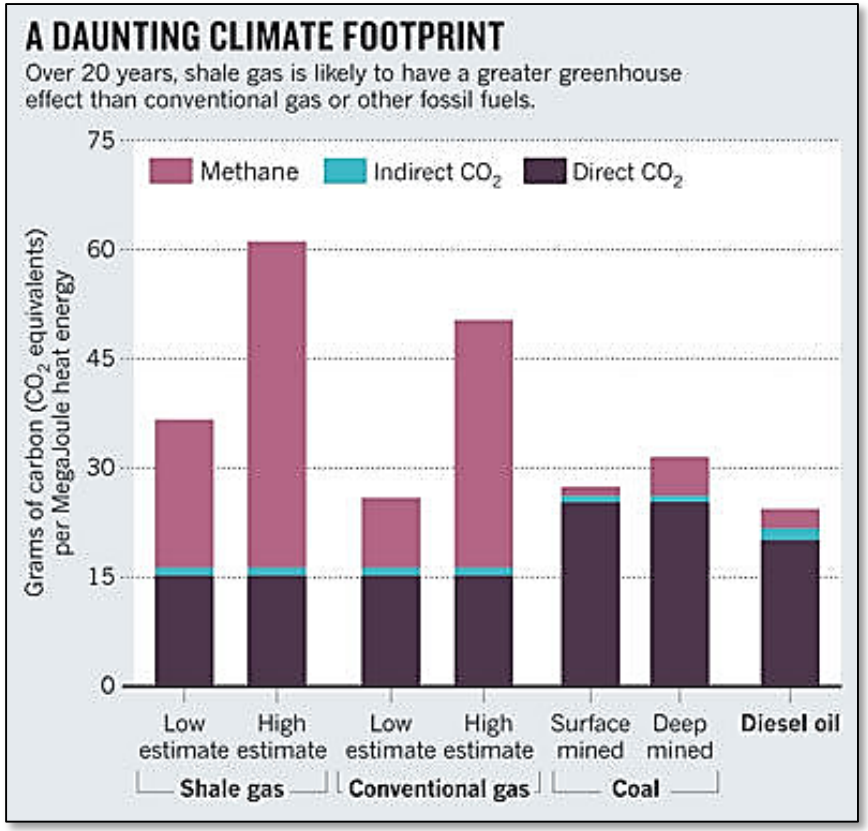
c) Cumulative net
Billion tonnes CO_2



Maximum temper
radiative forcing c

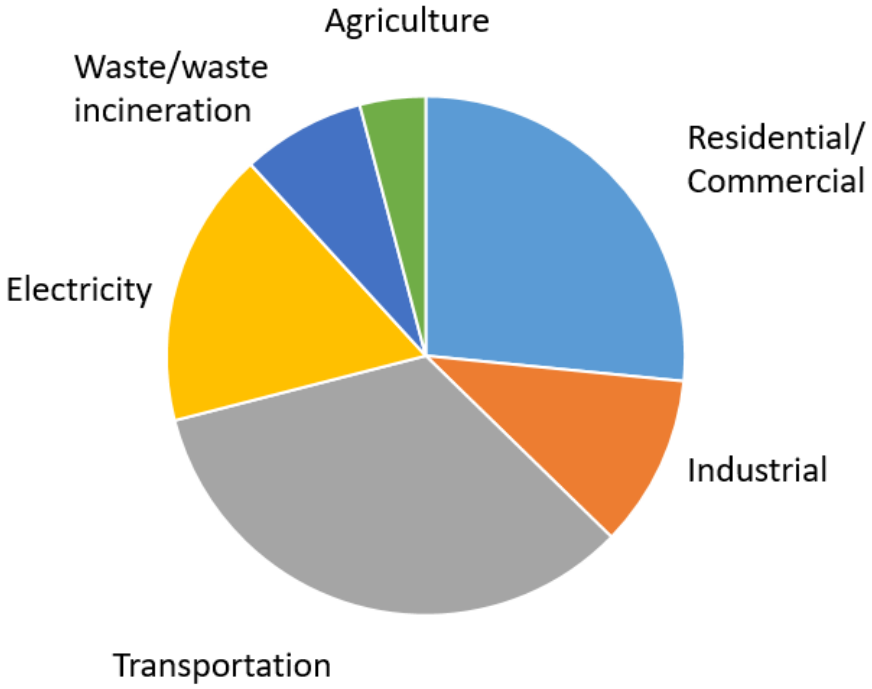


Can't trade one fossil fuel for another…



Can't trade one sector for another…

New York's Carbon Footprint



We need a **PLAN** that ***synchronously*** ramps UP carbon-free sources of energy and ramps DOWN carbon-intensive energy.

Green New Deal

100% clean electricity by 2040
70% of electricity from renewables by 2030

- 9,000 MW of offshore wind by 2035
- 6,000 MW distributed solar by 2025
- 3,000 MW of storage by 2030

We do not need to have precise answers—**nor can we afford to wait for precise answers**—to realize that we must take action to **reduce** our carbon footprint, starting now.

The steps we take must be in a forward direction.

That means not burning more fossil fuels TOMORROW than we do TODAY.

SOLUTIONS

ELECTRICITY

How much electricity do we use in Otsego County? Say 600 GWh

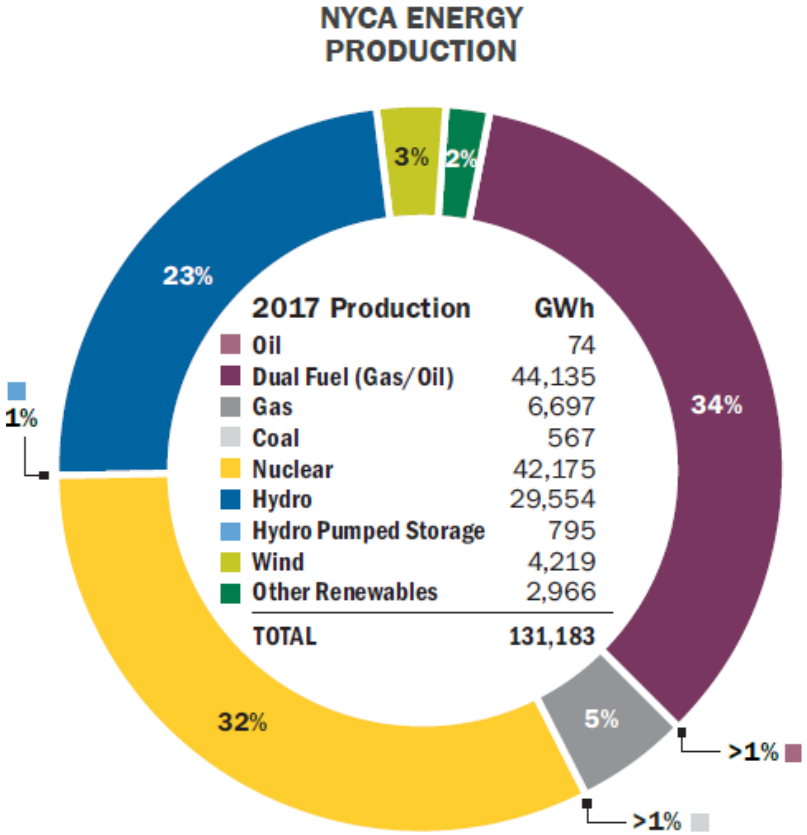
10% of this is **60 GWh**.

45 MW of solar

(@capacity factor 0.15)

340 acres

(@7.5 acres/MW)



WE CAN DO THAT!

What about an electricity transmission “bottleneck” ?

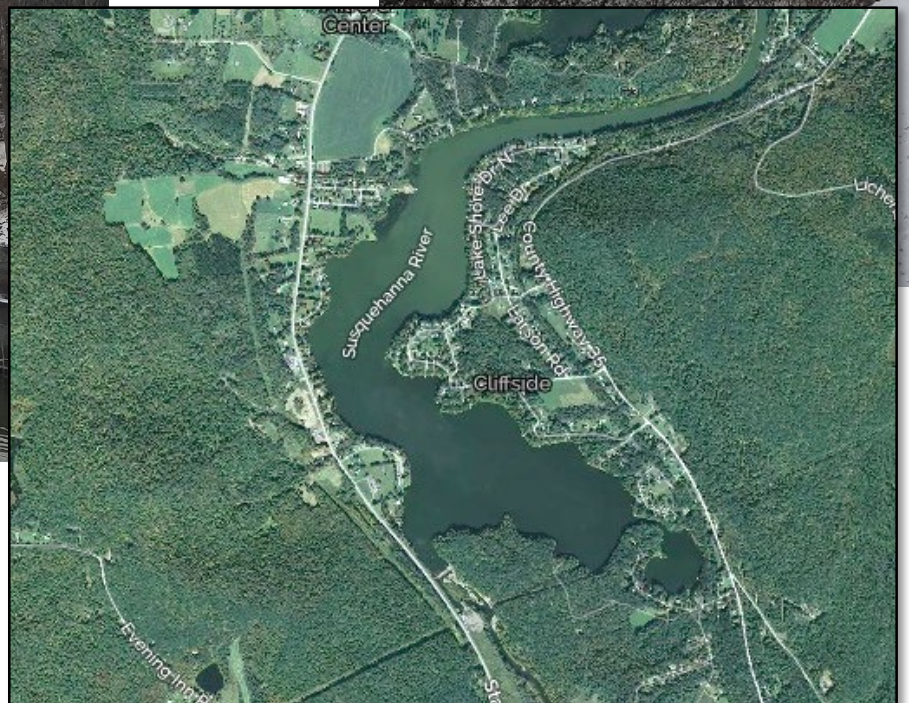
LET’S FIX IT

LOCAL HYDROPOWER

Goodyear Lake

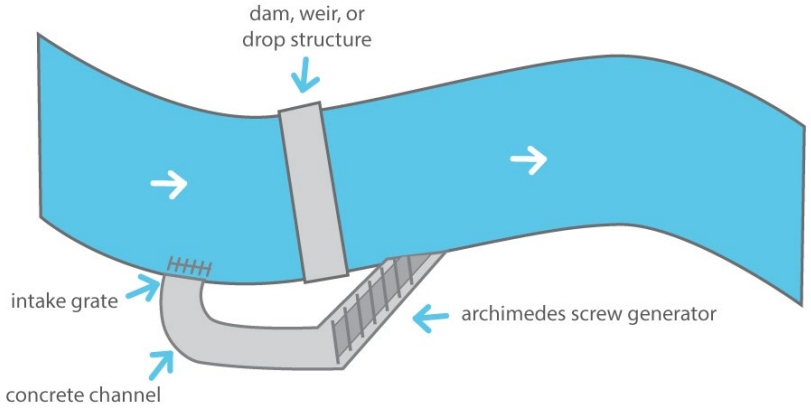
Built in 1907, restored in 1980

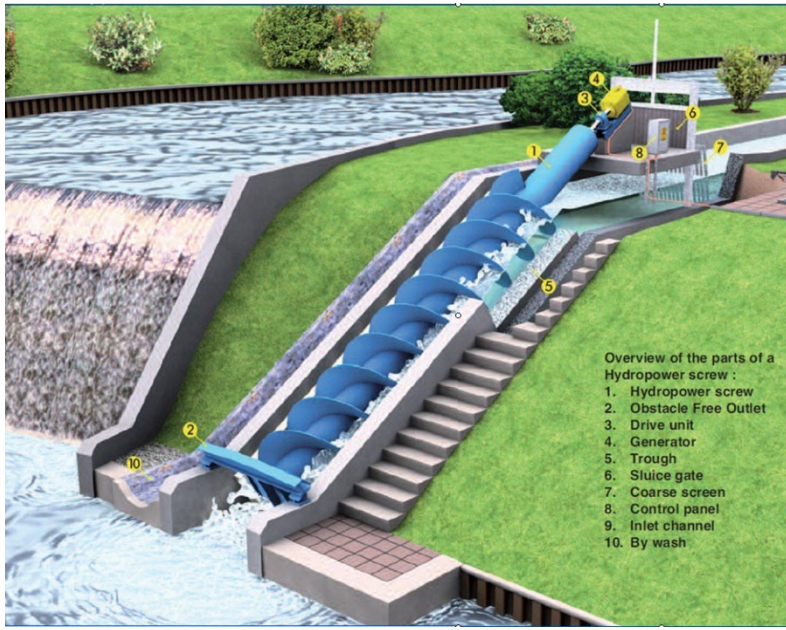
5985 MWh annually



LOCAL HYDROPOWER

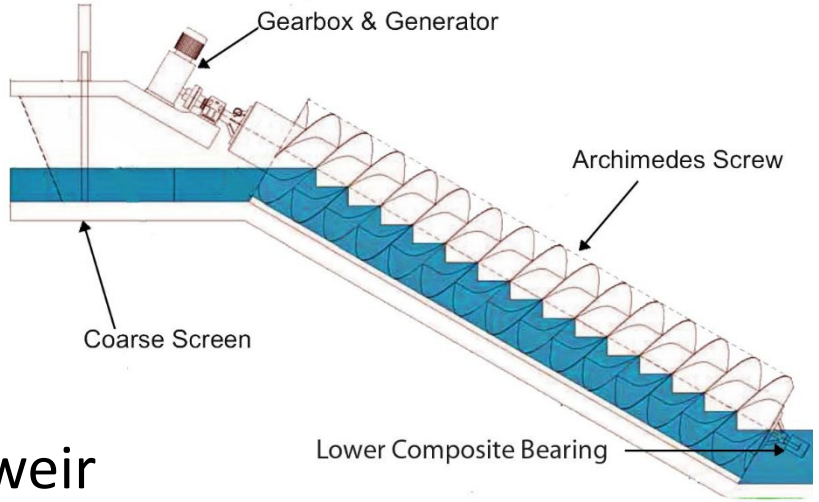
New technology





weir

Archimedes screw generator



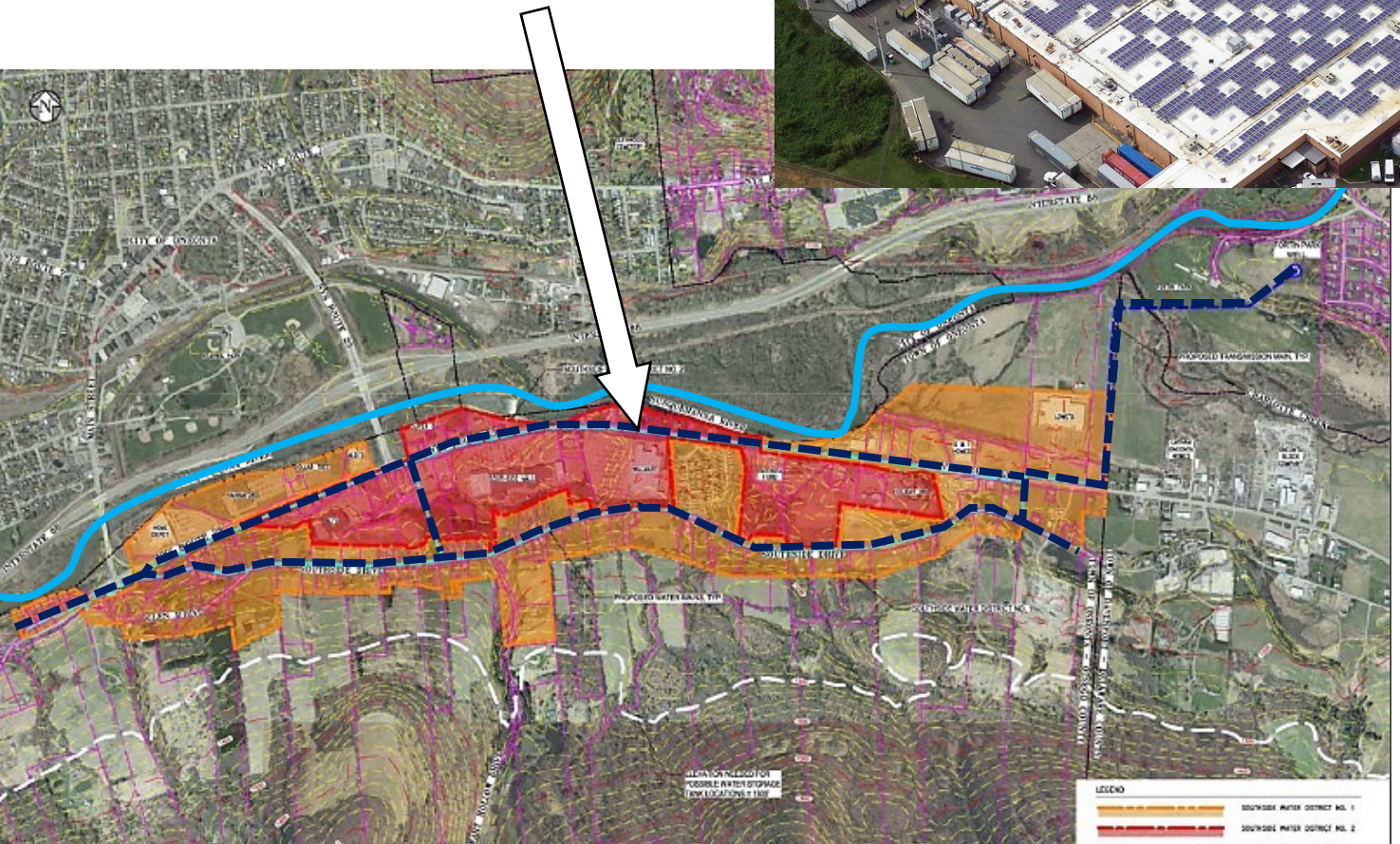
LOCAL HYDROPOWER

New technology

RENEWABLE HEAT/POWER

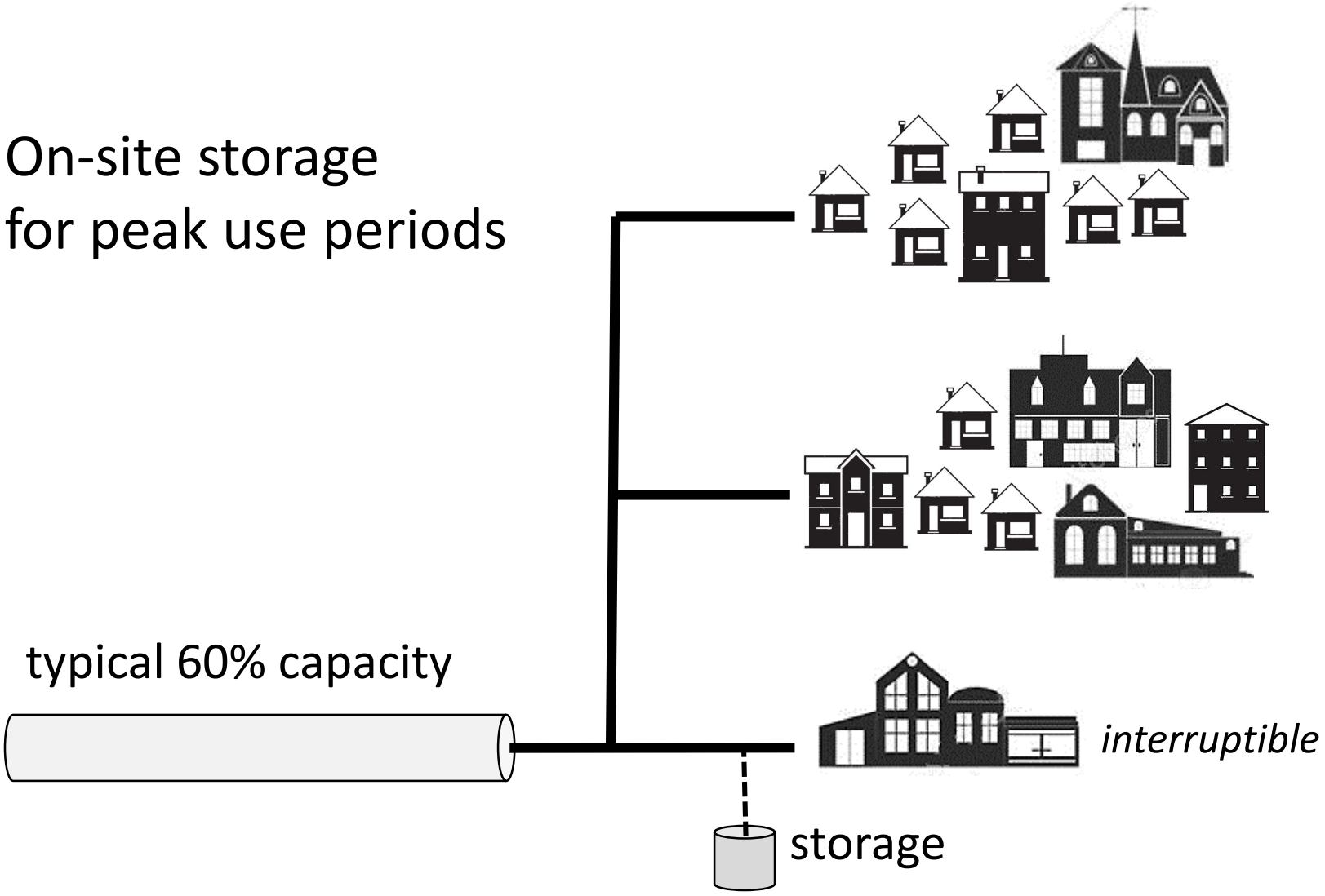
Oneonta Southside Water Project

Geothermal Sink/Source



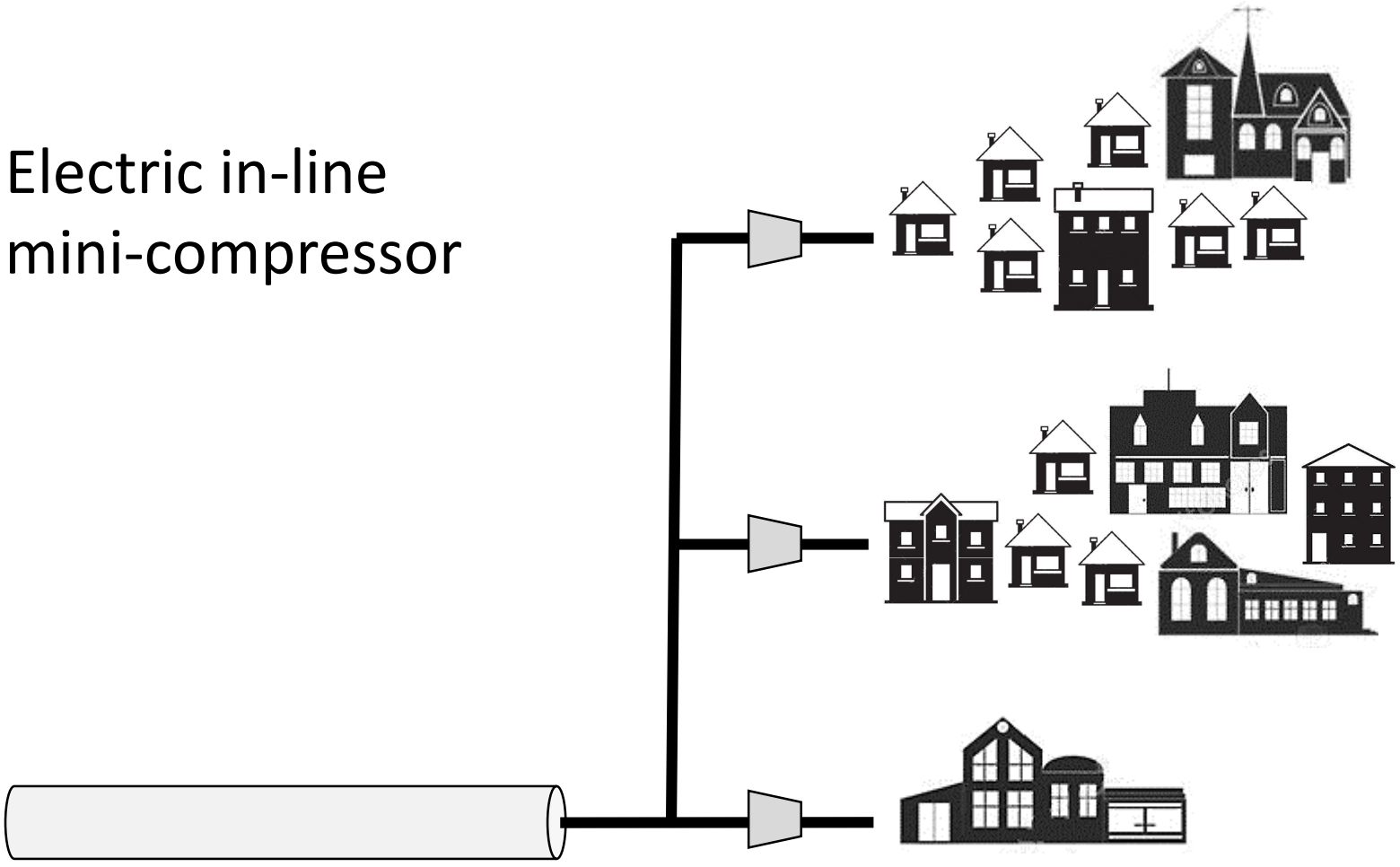
EXISTING GAS INFRASTRUCTURE

On-site storage
for peak use periods



EXISTING GAS INFRASTRUCTURE

Electric in-line
mini-compressor



We are now faced with the fact that tomorrow is today. We are confronted with the fierce urgency of now. In this unfolding conundrum of life and history, there “is” such a thing as being too late. This is no time for apathy or complacency. This is a time for vigorous and positive action.

Martin Luther King Jr.

Thank You

Proposal for Speaking at the Otsego County Energy Summit on January 31, 2019

Keith Schue

Engineer and Technical Advisor to Otsego 2000

I would like to bring to the summit my perspective as both an environmentalist who is deeply concerned about climate change, and as an engineer with an appreciation for the real-world challenges associated with decarbonization. I plan to talk for about 20 to 30 minutes, and accompany my presentation with a series of power-point slides. The presentation would be titled "Moving Forward in the Face of Climate Change" or something similar to that.

It has been my observation that current debates regarding climate change and renewable energy often fragment along political or ideological boundaries which hinder forward progress. Denialism takes many forms. It can take the form of denying observable phenomena and the science that informs our understanding of today's climate crisis. However, it can also take the form of denying the challenges associated with solving problems a particular way, or the pronouncement of demands without a credible plan to succeed. Posturing rhetoric on both sides is equally paralyzing. Yet for those of us who choose to bridge that divide, there is a third danger: a danger that the desire to appear successful takes precedence over real progress, that the product of deliberation becomes little more than vague recommendations, and that actions fail to "move the needle" in a meaningful way.

It is our task as stewards of our region and the planet to do better. Clearly, answering questions such as when or if a 100% complete transition to renewables can be achieved will require the participation of leaders on a larger stage than ours. We should be part of those discussions. However, we do not need to have precise answers to those questions—nor can we afford to wait for those precise answers—to recognize that the actions we take as a region to reduce our carbon footprint, starting now, must be in a direction that takes us forward, not back.

It will be my objective to elaborate on what I mean by this, with examples, during my talk.