

Hot Science Cool Talks

UT Environmental Science Institute

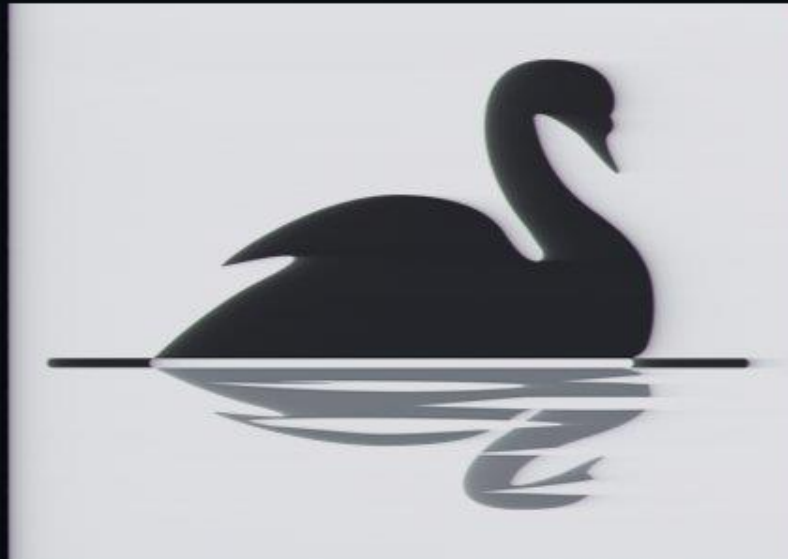
79

Black Swans & the U.S. Future: Building Sustainable & Resilient Societies

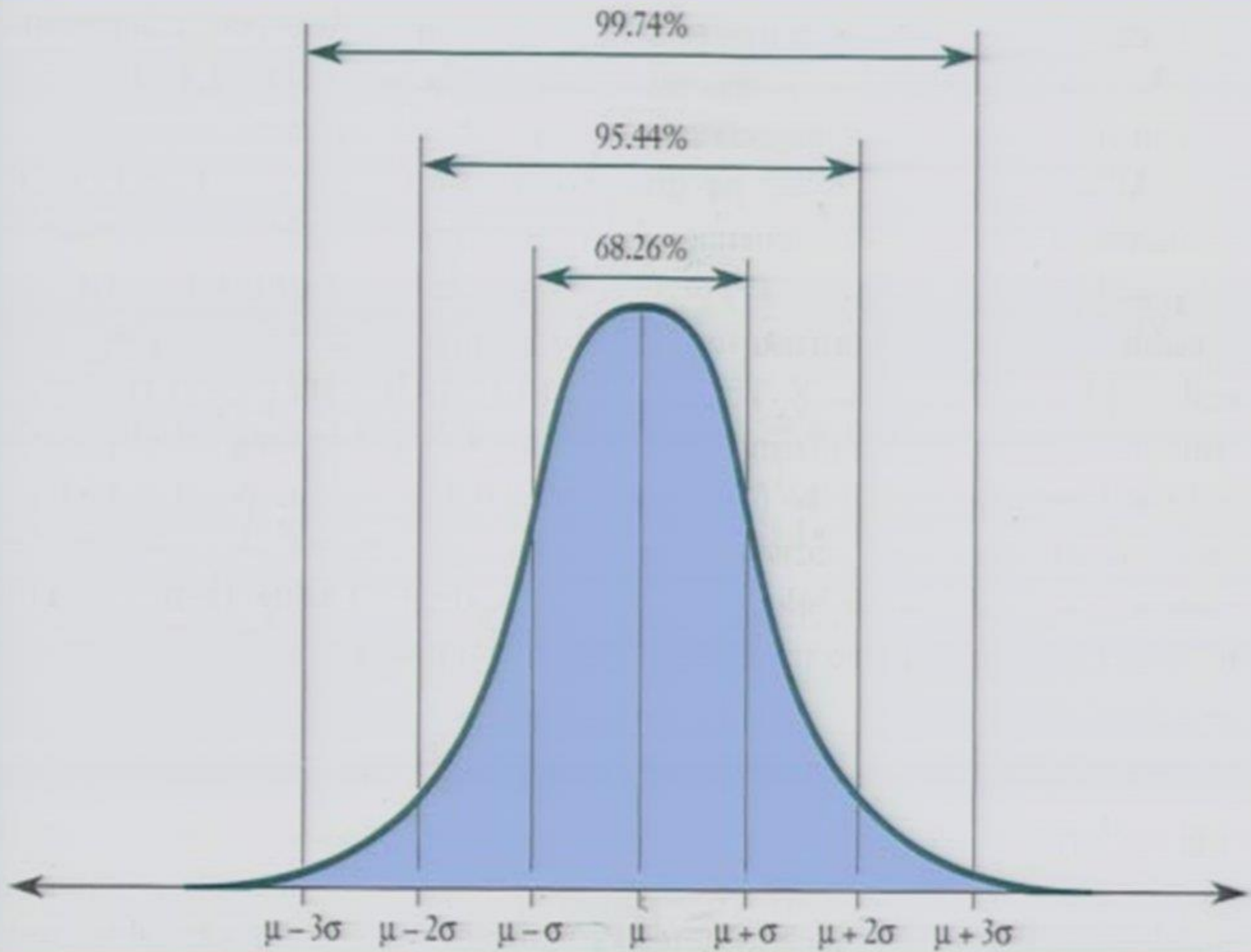
Dr. David Orr
September 14, 2012

Produced by and for *Hot Science - Cool Talks* by the Environmental Science Institute. We request that the use of these materials include an acknowledgement of the presenter and *Hot Science - Cool Talks* by the Environmental Science Institute at UT Austin. We hope you find these materials educational and enjoyable.

designing resilience
in a black swan world



David W. Orr
University of Texas
September 14, 2012









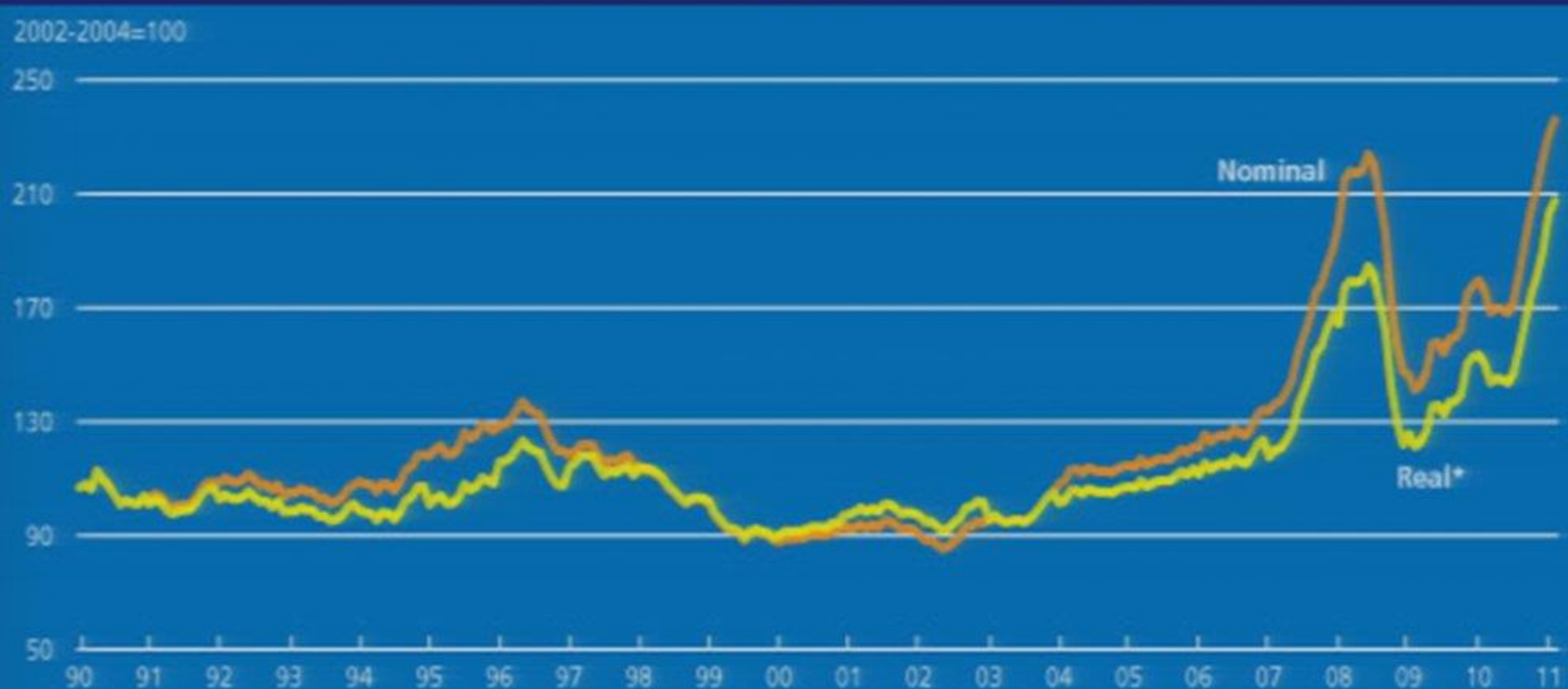


Yasi—February 2011



Slow Variables: soil loss, climate, energy costs, population growth, political instability, education, ecology, technology, grain markets, flooding

FAO Food Price Index



* The real price index is the nominal price index deflated by the World Bank Manufactures Unit Value Index (MUV)





FEBRUARY 23, 1998 \$3.50

TIME



The Clintons:
Their future

Who Wrote
Shakespeare?



THE COMMITTEE TO
SAVE
THE WORLD

The inside story
of how the
Three Marketeers
have prevented a
global economic
meltdown—so far

Rubin, Greenspan and Summers
at the U.S. Treasury last Wednesday

Those of us who have looked to the self-interest of lending institutions to protect shareholder's equity, myself included, are in a state of shocked disbelief **Yes, I have found a flaw.** I don't know how significant or permanent it is. But I have been very distressed by that fact.

Alan Greenspan,
October 23, 2008



1. that laws of economics 234 years old can be made to work with those of evolution ~3.8 billion years in the making;
2. i.e. that infinite growth can continue in a finite system;
3. that nature's capital [soils, biological diversity, climate stability, clean air and water etc] has no value;
4. technology can substitute for ecological scarcity
5. that more stuff = more happiness

A tale of two deficits

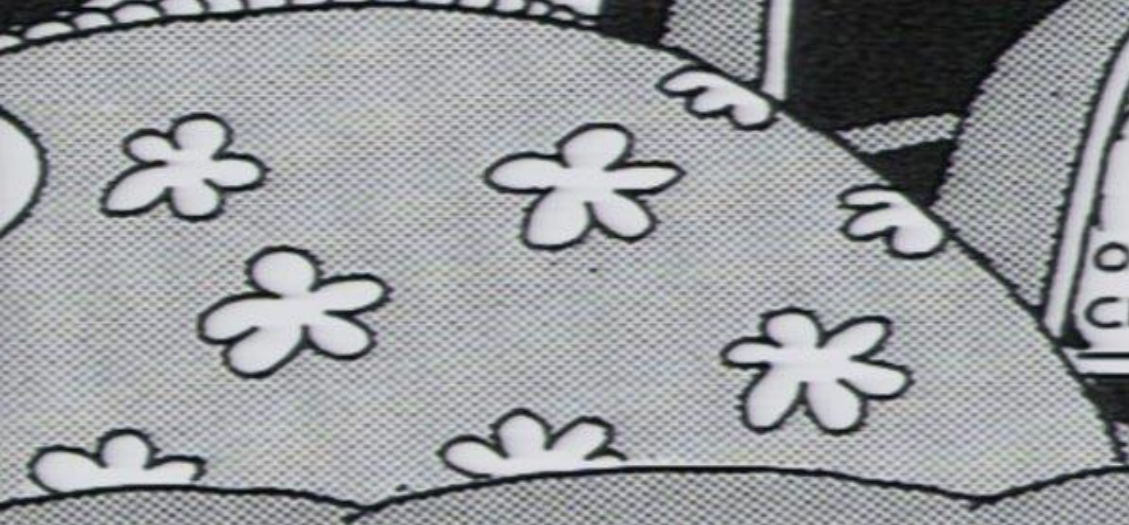
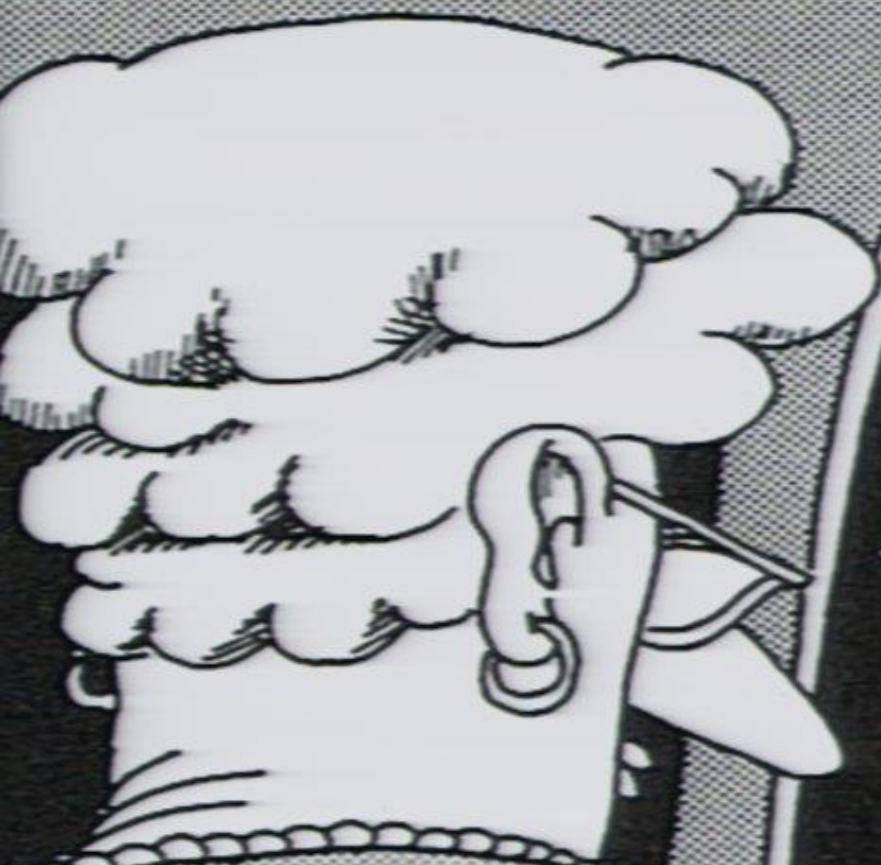
Economic

Climate deficit: 7 billion tons carbon . . .

time span of, say, Stonehenge +

potentially fatal to civilization





OBJECTS IN MIRROR ARE
CLOSER THAN THEY APPEAR

Curve recognition



Atmospheric CO₂ at Mauna Loa Observatory

Scripps Institution of Oceanography
NOAA Earth System Research Laboratory

PARTS PER MILLION

380

360

340

320

1960

1970

1980

1990

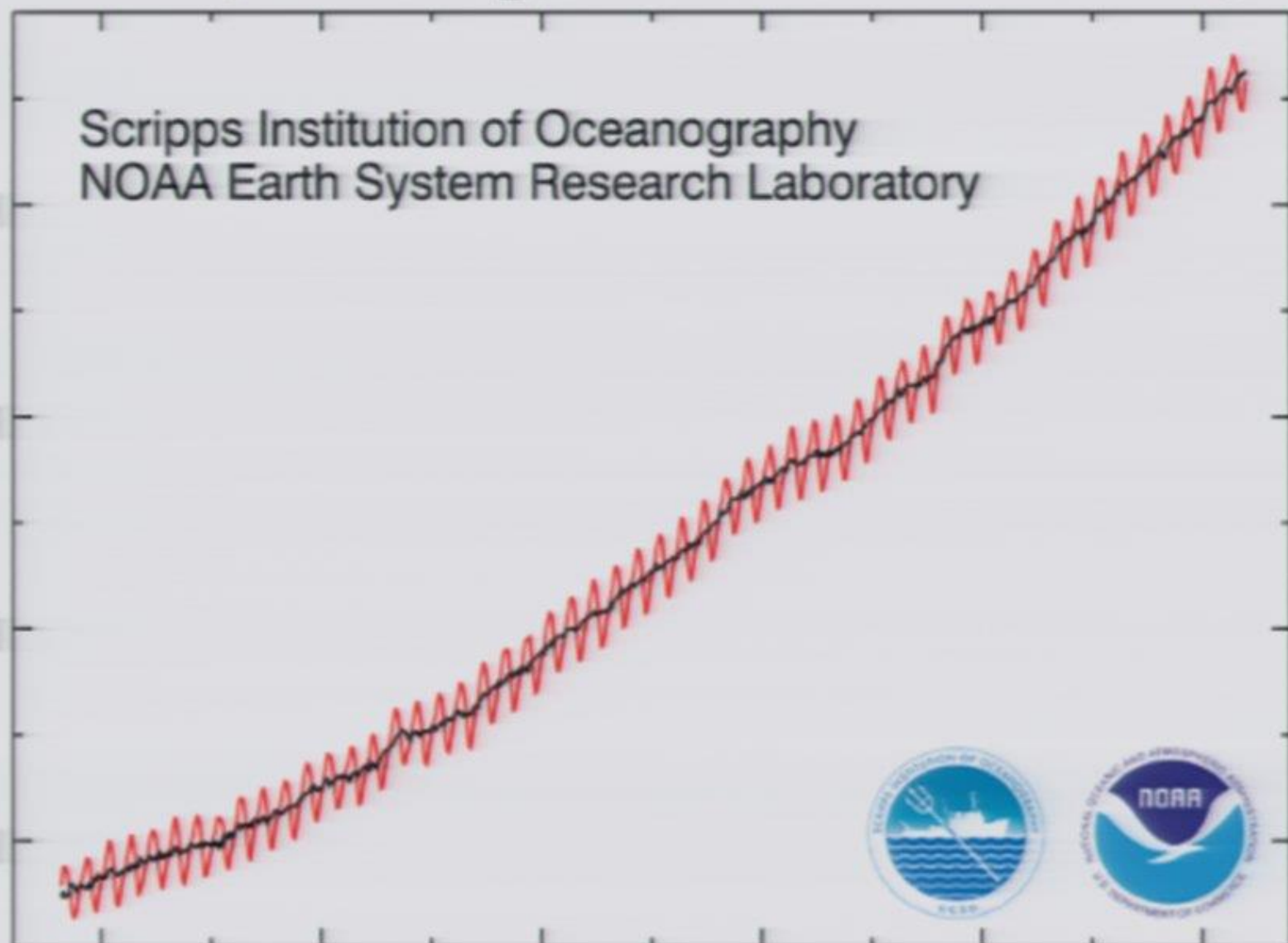
2000

2010

YEAR



January 2012



Atmospheric CO₂ at Mauna Loa Observatory

Scripps Institution of Oceanography
NOAA Earth System Research Laboratory

PARTS PER MILLION

380
360
340
320

1960 1970 1980 1990 2000 2010

YEAR



January 2012

Atmospheric CO₂ at Mauna Loa Observatory

Scripps Institution of Oceanography
NOAA Earth System Research Laboratory

PARTS PER MILLION

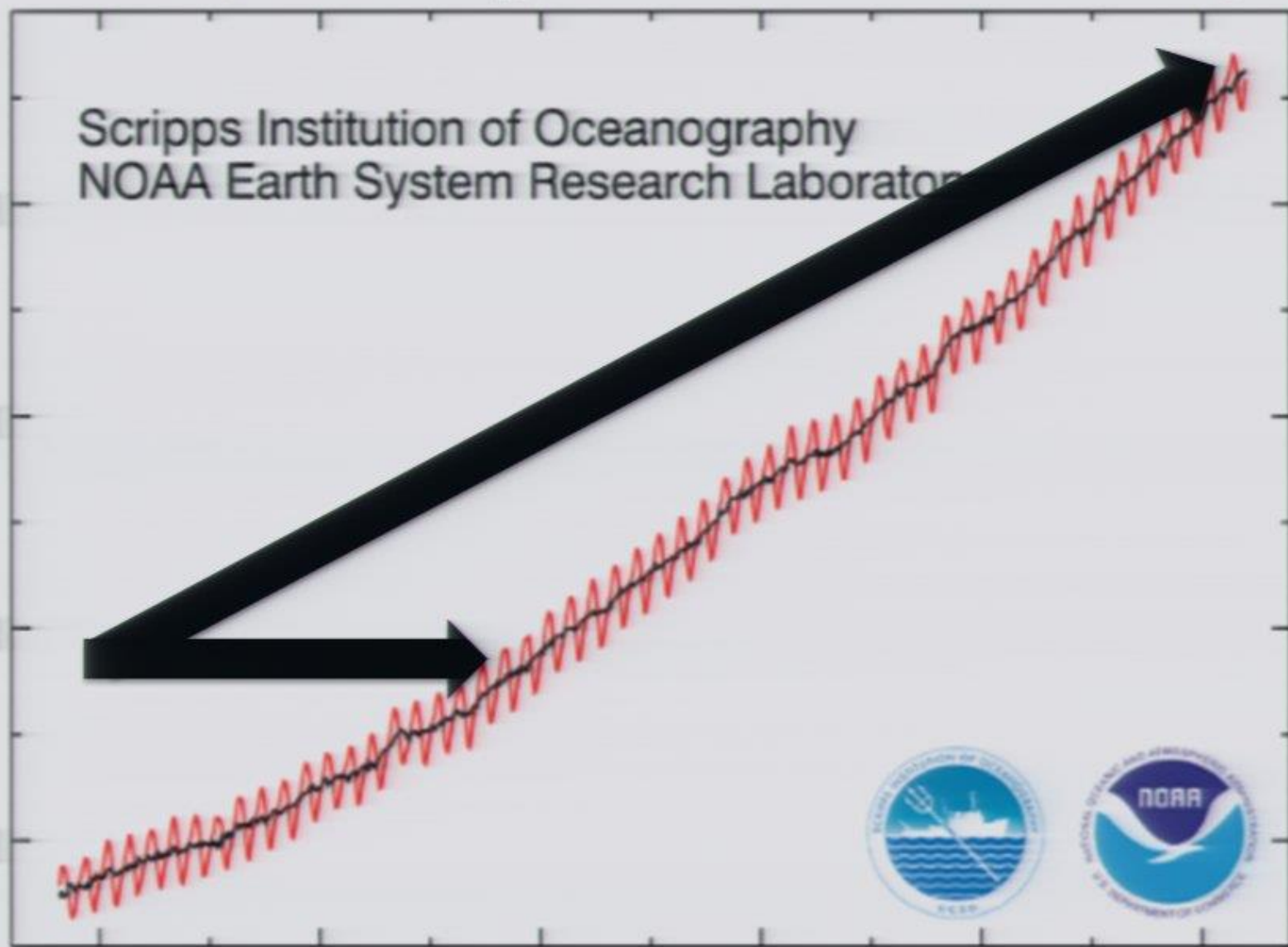
380
360
340
320

1960 1970 1980 1990 2000 2010

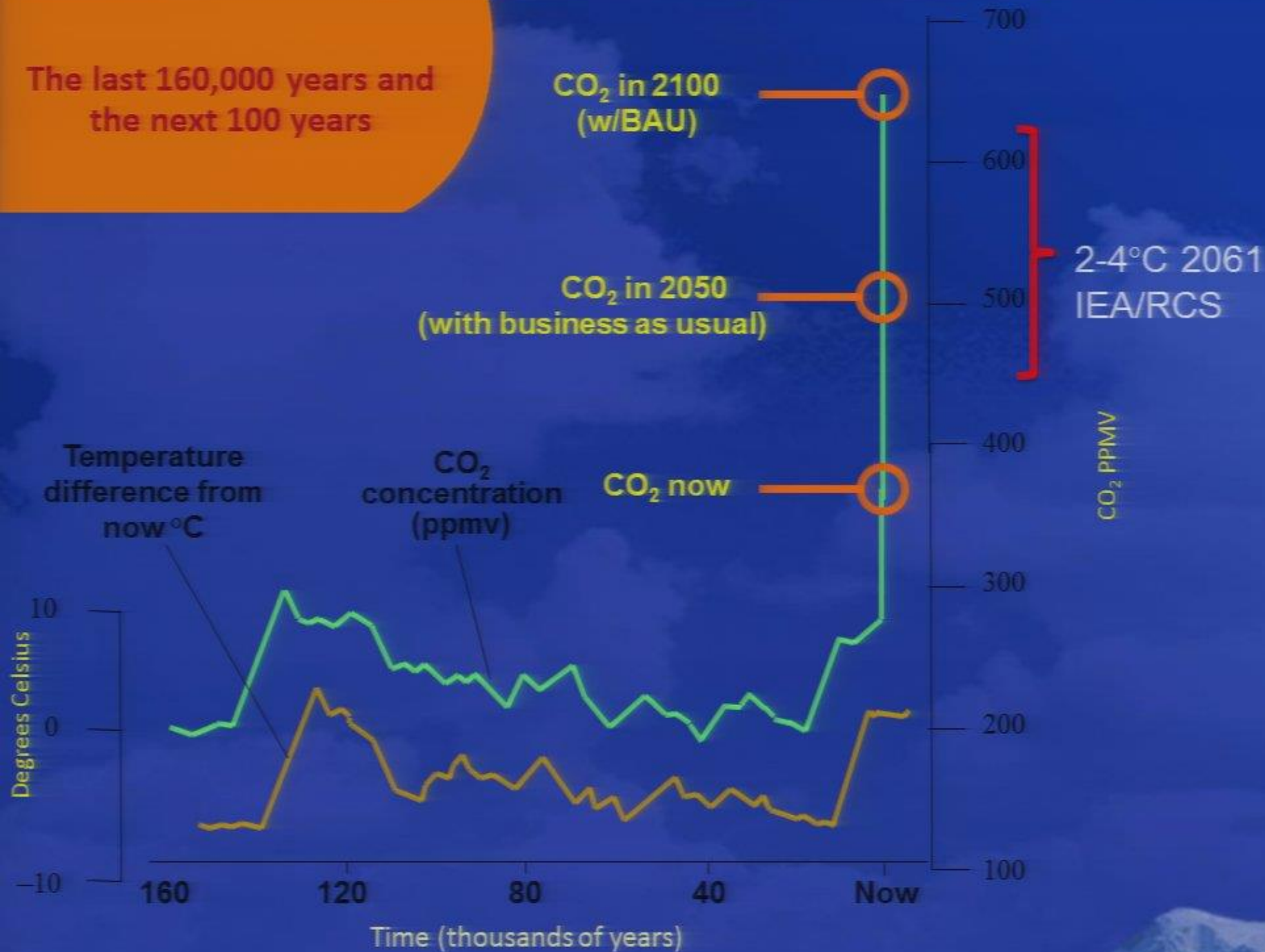
YEAR



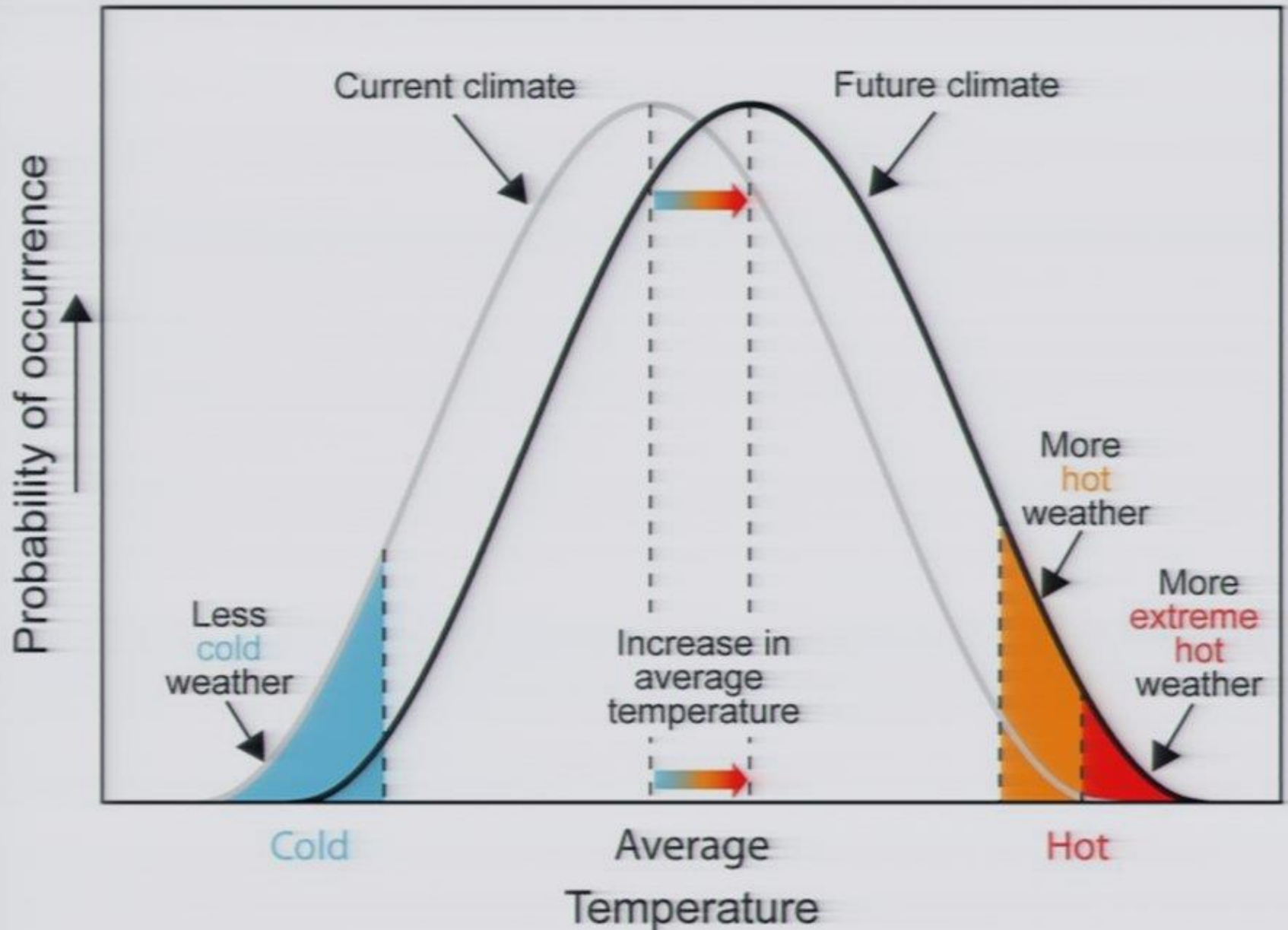
January 2012



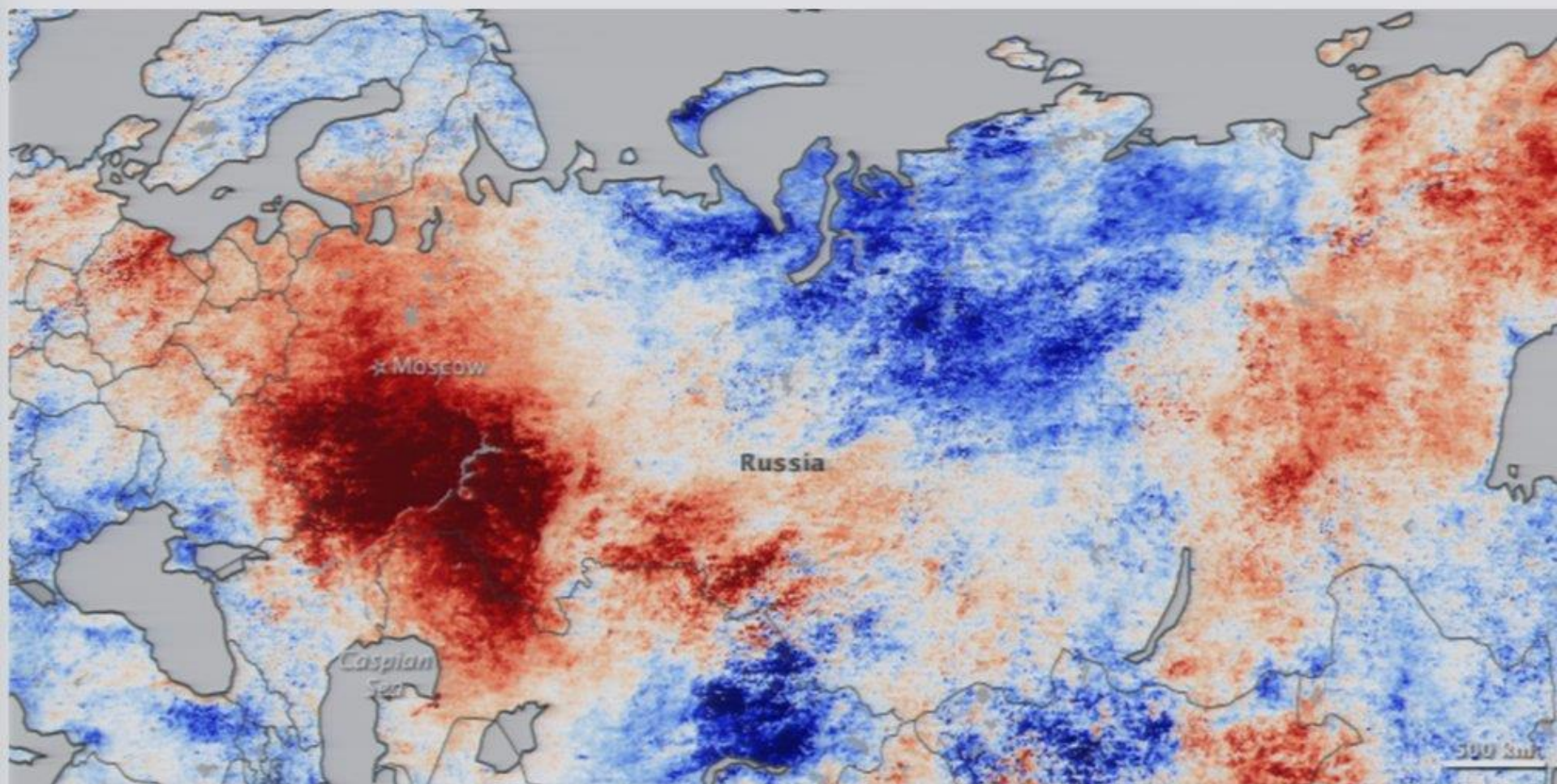
The last 160,000 years and the next 100 years



Future Climate Shift

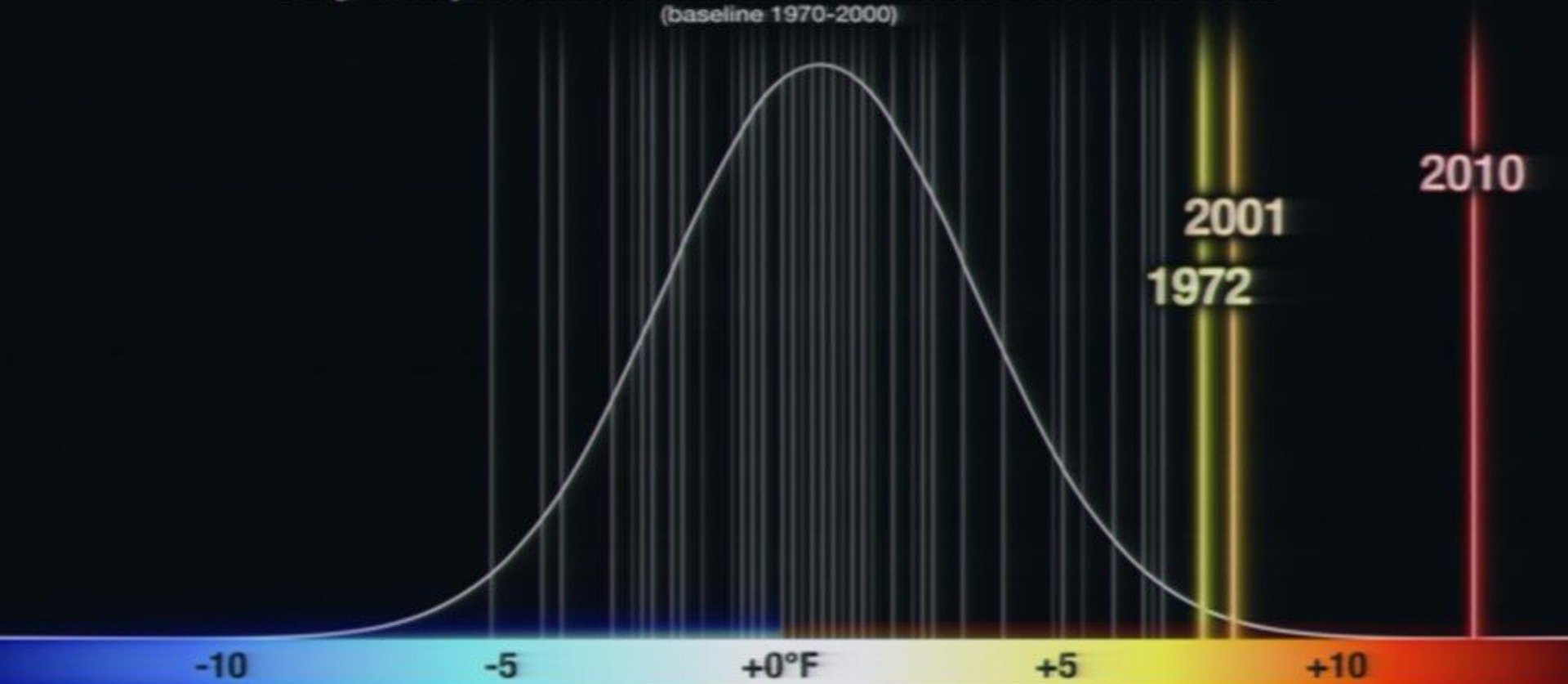


Russia Summer 2010




July Temperature Anomalies in Moscow since 1950

(baseline 1970-2000)



Sources: NOAA NCEP CPC CAMS DATA - FROM IRI/LDEO ONLINE DATA LIBRARY

 climatecentral.org

The climatic impacts of releasing fossil fuel CO₂ to the atmosphere will last longer than Stonehenge. Longer than time capsules, longer than nuclear waste, far longer than the age of human civilization so far. Each ton of coal that we burn leaves CO₂ gas in the atmosphere. The CO₂ coming from a quarter of that ton will still be affecting the climate one thousand years from now.

David Archer, 2009

climate change is not:


1. global warming, but planetary destabilization
2. a matter of belief, but physics & chemistry
3. an isolated problem, but a system crisis
4. controversial, but consensus science
5. a natural variation, but driven by humans

The Oberlin Project 2009

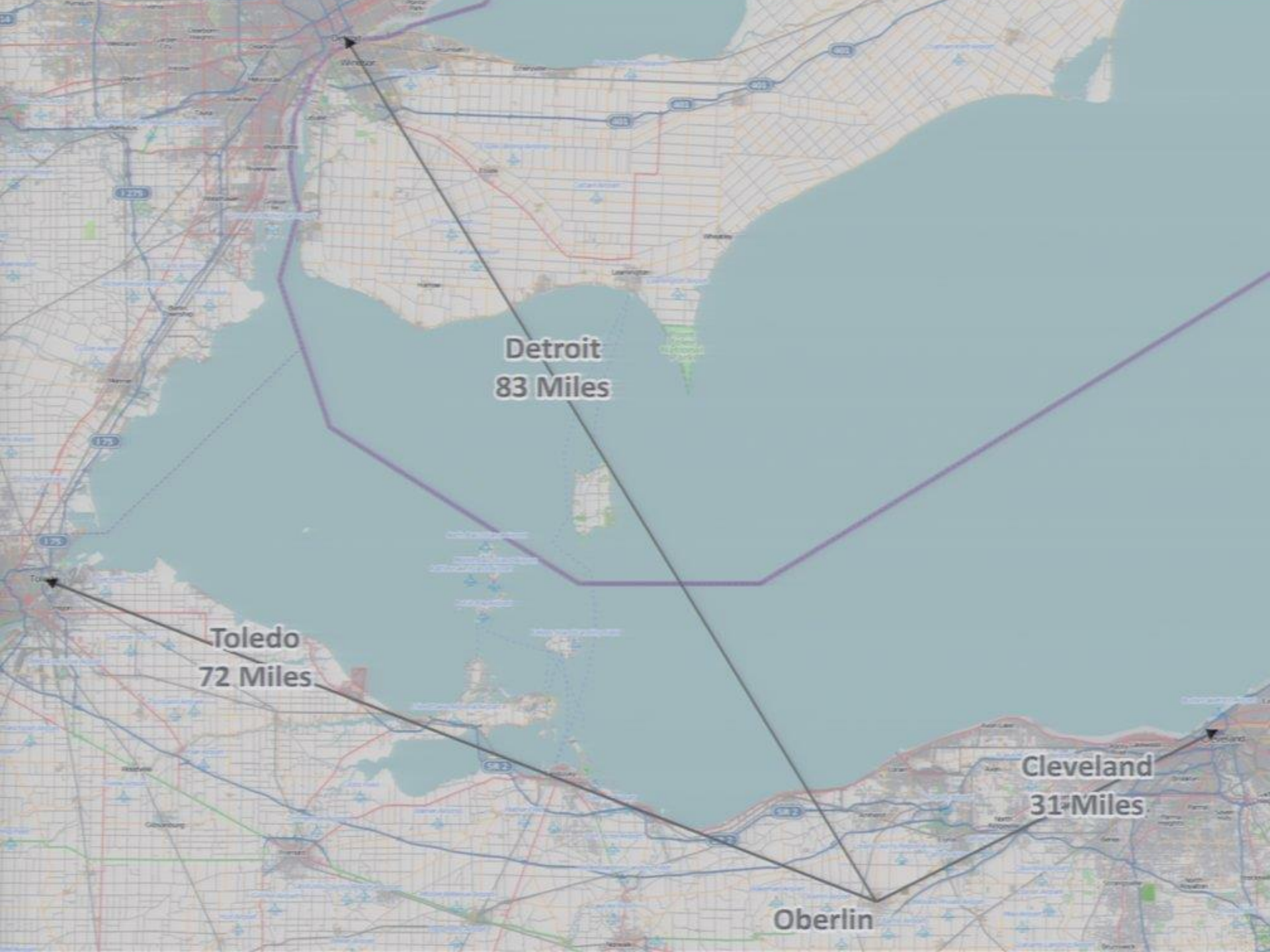


Photo courtesy of John
Petersen

The Oberlin Project 2009



Founded 1832
City of ~10,000
28% below poverty
52% free/reduced lunch



Detroit
83 Miles

Toledo
72 Miles

Cleveland
31 Miles

Oberlin



04/14/2010 21:38



The Adam Joseph Lewis Center

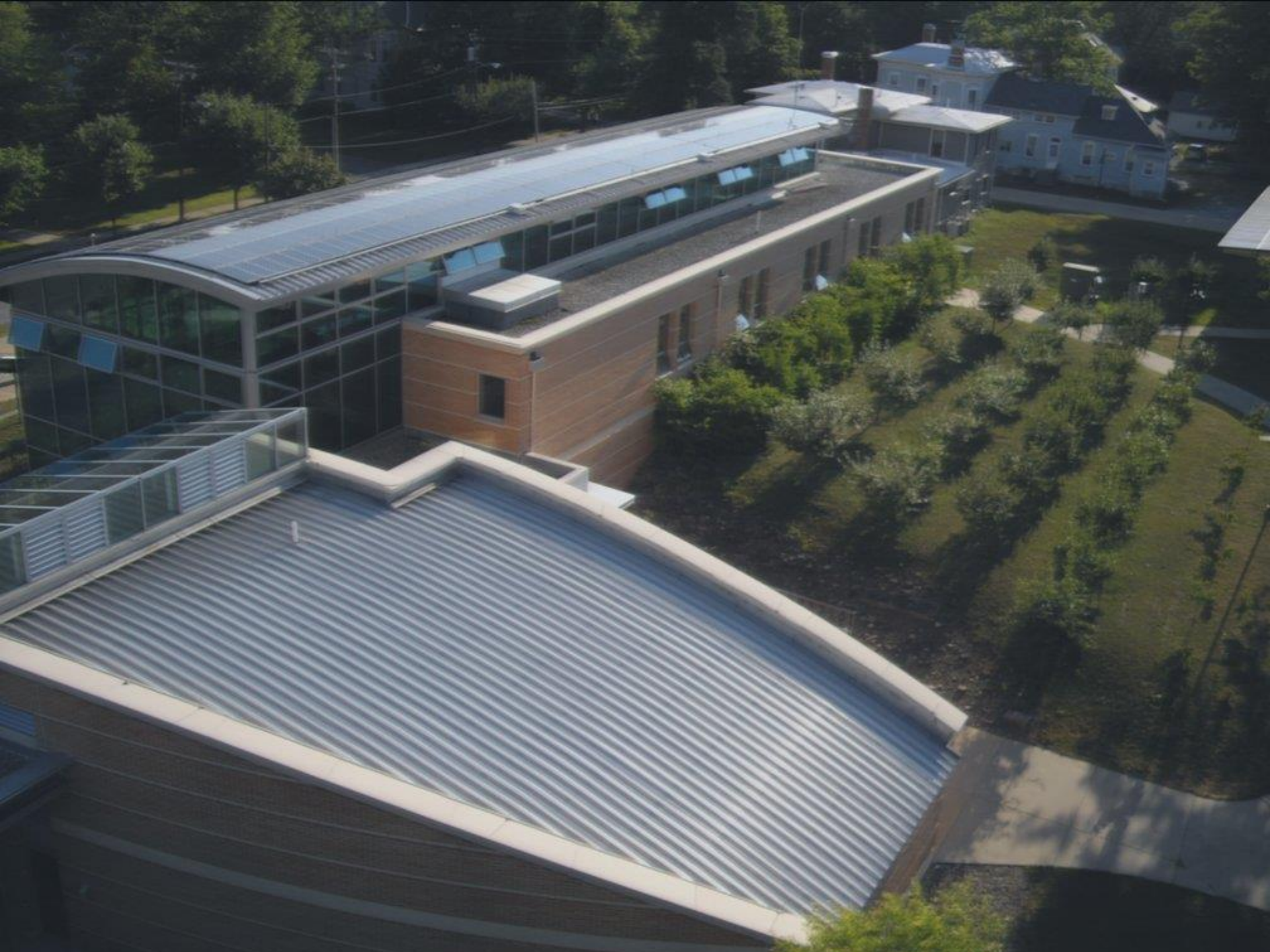


one of thirty milestone buildings in the 20th Century" USDOE

the most important green building in past 30 years" *Architecture* 201



Adam Joseph
Lewis Center





04/25/2011 04:41





Community renewable energy companies
The Lewes Community Solar Power Station

INVEST IN LOCAL POWER.

THE UK'S FIRST COMMUNITY-OWNED
SOLAR POWER STATION

SHARE LAUNCH AT LEWES TOWN HALL
APRIL 19TH 7-9PM

Speakers (to be confirmed):

Huw Irranca-Davies (Shadow Energy Minister)
Norman Baker, Caroline Lucas



HARVEYS

OVESCO
www.ovesco.co.uk

Let's make it happen

goals . . .

- 1) 13 acre development—Green Arts District
 - USGBC Platinumnd & economic revitalization
- 2) Climate neutral—City and College
 - Clinton Climate Initiative
- 3) 20,000 acre greenbelt: local foods 70%
- 4) education—1000 students/10 years
 - College, LCCC, LCVS, & public schools
- 5) replicate: National Sustainable Communities Coalition

full spectrum sustainability: parts reinforce the resilience of the whole




Places to intervene . . . (Donella Meadows)

-
- The diagram lists 12 levels of intervention, numbered 1 to 12 from bottom to top. The levels are grouped into three categories using red curly braces on the right side:
- slow damage** (levels 10, 11, 12):
 - 12) subsidies, codes, standards, taxes
 - 11) sinks, buffers
 - 10) infrastructure, stocks and flows
 - Δ structure** (levels 4, 5, 6, 7, 8, 9):
 - 9) information relative to system change
 - 8) negative feedback loops ie. disincentives
 - 7) positive feed back loops ie. Incentives
 - 6) access to information
 - 5) rules of the system ie. punishments, constraints
 - 4) power of self to evolve
 - Δ consciousness, but how?** (levels 1, 2, 3):
 - 3) goals of system
 - 2) mindset & worldviews
 - 1) transcend paradigms/beliefs



sustainability—a large conversation:
arts + humanities + sciences





Allen Art Building

This aerial photograph shows a portion of the Oberlin College campus. Three buildings are highlighted with white rectangular boxes. The top box contains the Allen Art Building, which has a distinctive orange-brown roof. The middle box contains the Hall Auditorium, a tall, modern structure with a grey, angular roof. The bottom box contains the Oberlin College Inn, a large building with a dark grey roof. To the right of these buildings are several parking lots filled with cars. The surrounding area includes green lawns, trees, and residential streets with houses.

Hall Auditorium

Oberlin College Inn



SCENE DOCK / DOCK SUPPORT (BELOW)

ALLEN MEMORIAL ART MUSEUM (RENOV.)
WARD

ART HISTORY (RENOV.)
- Library Expansion
- Book Study
- Slide Library
- Faculty/Staff Offices

ART LIBRARY (RENOV.)

LAB BOX

BLACK BOX

PERFORMING SPACES (SHARED)
- For Green Theater, Lab Box,
Black Box, Chamber Music
Ticketing
Lobby
Concessions
Toilets

HALL AUDITORIUM (RENOV.)

GREEN THEATER

ECO MACHINE

STUDENT HOUSING
4 Person Suites

CURRICULAR ARTS BUILDING

- Shared Lecture Spaces
- Cinema Studies
Student Studios
Faculty Offices
Visiting Faculty Space
- Theater
Acting Studios
Faculty/Staff Offices

2 LEVEL PARKING (UNDER PV ARRAY)

FORUM

STUDIO ART

- Drawing
- Painting
- Critique/Pin Up
- Capstone Studios
- Faculty Offices and Studios
- Smart (Media) Studio

WORKSHOP

- Professional Scene Shop
- Student Shop
- Costumes
- Lighting and Sound Design
- Media Labs

GATEWAY BUILDING

HOTEL DROP-OFF



OBERLIN GREEN ARTS DISTRICT

DNIM

SCENARIO B

03.29.12













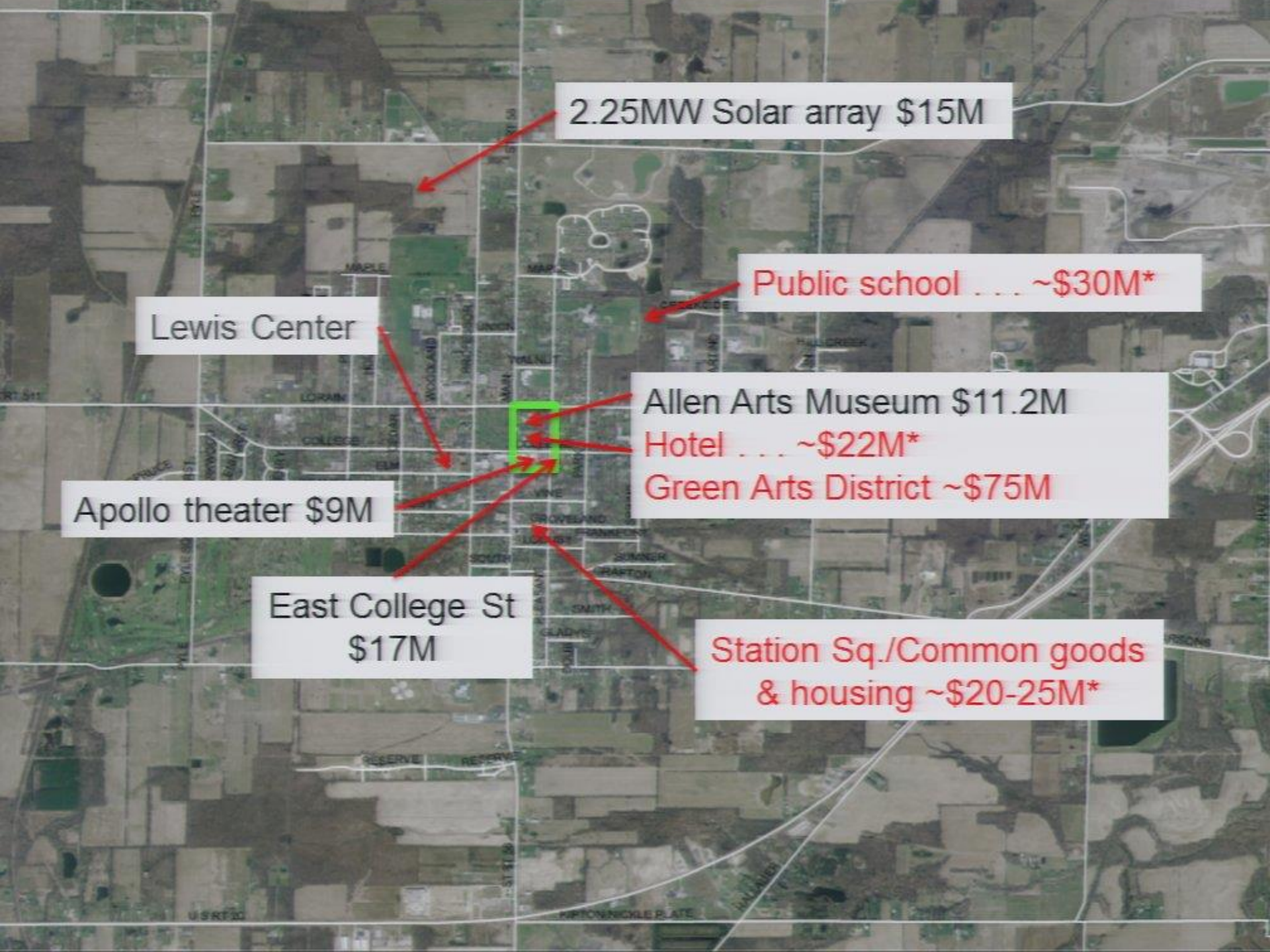
04/14/2010 21:31











2.25MW Solar array \$15M

Public school ~\$30M*

Lewis Center

Allen Arts Museum \$11.2M

Hotel . . . ~\$22M*

Green Arts District ~\$75M

Apollo theater \$9M

East College St
\$17M

Station Sq./Common goods
& housing ~\$20-25M*

Oberlin Project to date . . .

- ✓ City/College partnership
- ✓ one of 16 Clinton Climate positive cities
- ✓ 90% carbon free 2013
- ✓ \$1.1M DOE study on energy policy NE OH
- ✓ Office & staff
- ✓ community organized in 7 teams
- ✓ College “Star index” Gold
- ✓ 2.25 MW solar array (summer, 2012)
- ✓ \$52M expended through 2012
- ✓ site plan for Green Arts District

Oberlin Project goals 2012-2014:

- ❖ hotel-Gateway building
- ❖ city-wide efficiency program
- ❖ retire college coal plant
- ❖ food depot + affordable housing
- ❖ platinum+ public school . . . etc.



cool 24/7 downtown

better facilities

more business

economic renewal

climate action

educational laboratory

ecological design

national security

**“We must squarely face the awful fact that our
security will become ever more perilous.”**

**Joshua Cooper Ramo,
The Age of the Unthinkable**

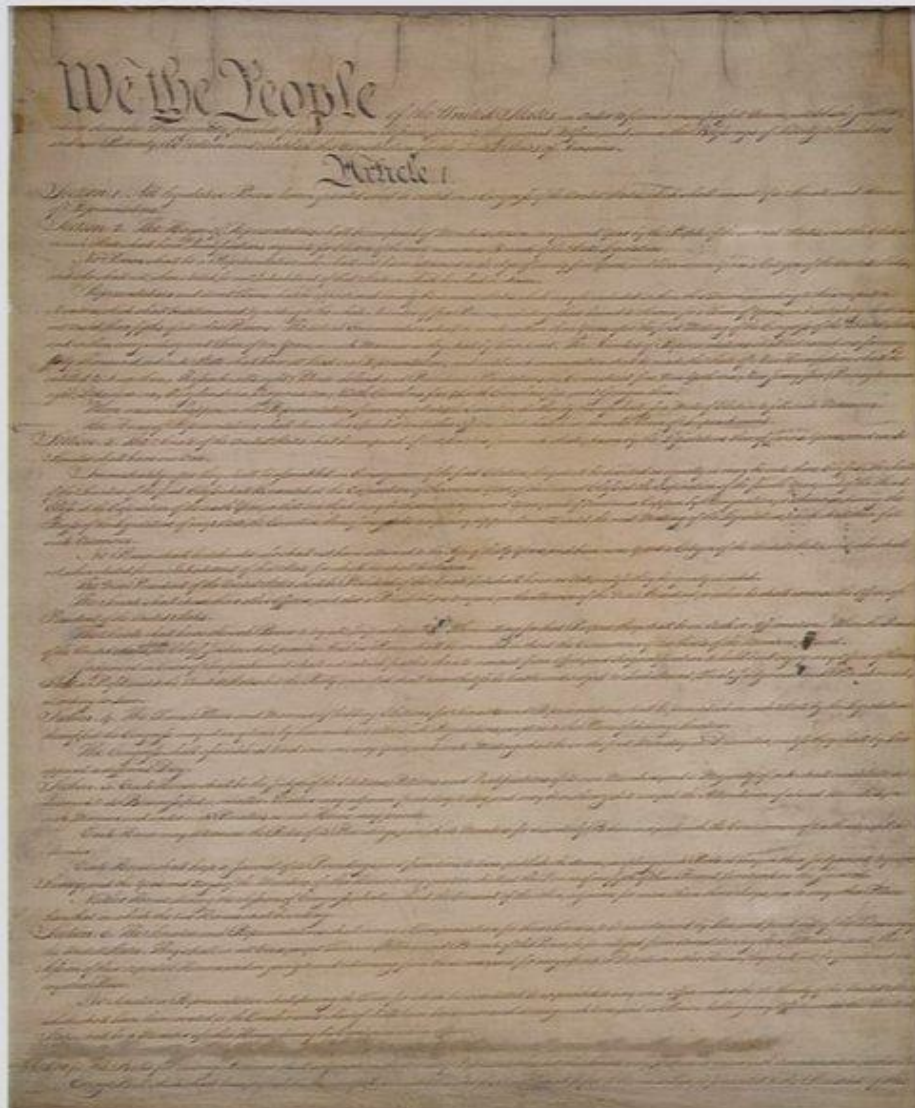
What do we do?

1. Federal level: National Strategic Narrative-- sustainability

2. Specific policies targeting high leverage issues eg. transportation, smart-growth, energy

3. Grass-roots: National Sustainable Communities Coalition.





We the people of the United States, in Order to form a more perfect union, establish Justice, insure domestic tranquility, provide for the common defense, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this Constitution for the United States of America.

wealth of top 400

=

that of bottom 150,000,000

Nassim Taleb: Learning from Nature



- “Mother Nature likes redundancies” but not
- anything too big or too
- connected, i.e. globalization
- upshot: design “a society robust to error”

Life in a greenhouse world

- local food/farms
- powered by sunlight
- walk and bike more
- local businesses
- regionally appropriate skills
- front porches
- community. . . neighbor as a verb
- fewer shopping malls
- less traffic
- no wars for oil
- no oil saturated politics
- cleaner air
- relearn self-reliance

sustainability—the rules:

play fair

clean up your messes

share your cookies

don't take things that aren't yours

hold hands crossing the street

Robert Fulgham, All I Really Need to Know I learned in Kindergarten (1986)

Dr. David W. Orr



David W. Orr is one of our generation's leading environmental philosophers and educators. He is the recipient of five honorary degrees and other awards including The Millennium Leadership Award from Global Green, the Bioneers Award, the National Wildlife Federation Leadership Award, a Lyndhurst Prize acknowledging "persons of exceptional moral character, vision, and energy". Dr. Orr has lectured at hundreds of colleges and universities throughout the U.S. and Europe, and has served as a Trustee for many organizations including the Rocky Mountain Institute and the Aldo Leopold Foundation. He has been a Trustee and/or advisor to ten foundations. His career as a scholar, teacher, writer, speaker, and entrepreneur spans fields as diverse as environment and politics, environmental education, campus greening, green building, ecological design, and climate change. He is the author of six books, including his best-selling 2005 title "Ecological Literacy: Educating Our Children for a Sustainable World