A Report by the Non-profit Architecture 2030

NATION UNDER SIEGE

Sea Level Rise at Our Doorstep

A Coastal Nation

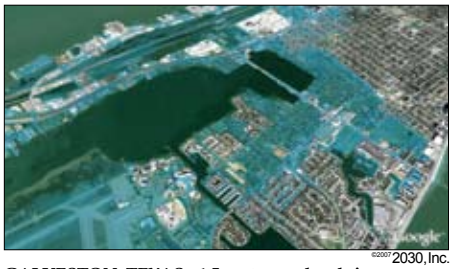
Beginning with just one meter of sea level rise, our nation would be physically under siege, with calamitous and destabilizing consequences.

The US is a coastal nation with over 12,000 miles of coastline. With 53% of all Americans living in and around coastal cities and towns, it is important to understand the impact of climate-induced sea level rise on our nation. Previous studies have focused on a six-meter rise. The following study takes a more conservative approach, beginning with a sea level rise of just one meter.

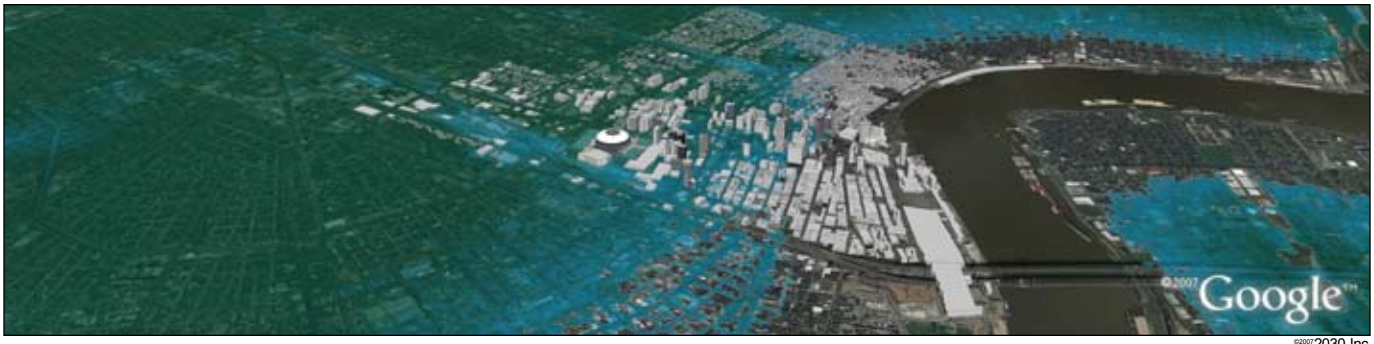
MIAMI BEACH, FLORIDA - 1-meter sea level rise (illustrated in blue)
Population: 87,933 Data Source: LIDAR IHRCS

HOLLYWOOD, FLORIDA - 1-meter sea level rise
Population: 139,357 Data Source: LIDAR and USGS 10M NED

SAN FRANCISCO AIRPORT - 1.25-meter sea level rise
Population: NA Data Source: USGS 2M DSM



GALVESTON, TEXAS - 1.5-meter sea level rise
Population: 57,247 Data Source: NOAA NGDC

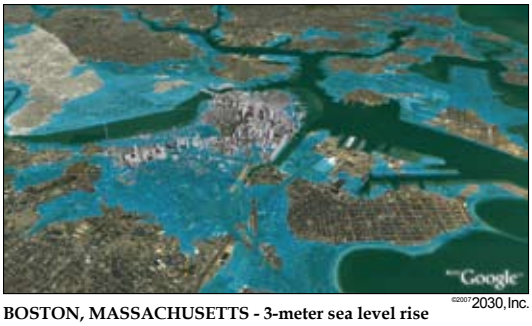


NEW ORLEANS, LOUISIANA - 1-meter sea level rise
Population: Unknown Data Source: USGS 10M NED

MIAMI, FLORIDA - 1.25-meter sea level rise
Population: 362,470 Data Source: LIDAR IHRCS

ATLANTIC CITY, NEW JERSEY - 1.5-meter sea level rise
Population: 40,517 Data Source: LIDAR and USGS 10M NED

HONOLULU, HAWAII - 1.75-meter sea level rise
Population: 371,657 Data Source: LIDAR and USGS 10M NED

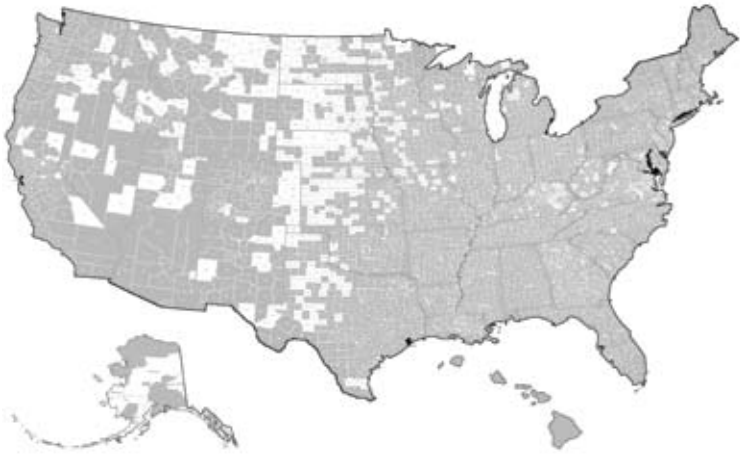


BOSTON, MASSACHUSETTS - 3-meter sea level rise
Population: 589,141 Data Source: LIDAR and USGS 10M NED

Sea Level Rise

Once the process of ice sheet disintegration begins, the impact on the US is unremitting, and at each additional increment, additional cities and towns will be adversely affected.

As can be seen from the following images[1], a sea level rise of even one meter has serious consequences for the US. Our nation will be physically under siege, vulnerable to catastrophic property and infrastructure loss with large population disruptions and economic hardship.



Katrina evacuee destinations by county
Source: FEMA, Census Bureau

A Lesson Learned?

Scientists forewarned of the consequences of a hurricane hitting New Orleans. The above image illustrates the counties affected by Hurricane Katrina (in gray). A single catastrophe in just one city, in one way or another, affected the entire country. The cost to avert this tragedy was approximately two billion dollars. It will cost taxpayers 200 to 300 billion dollars to rebuild this one city.

Current Trends

Scientists are now forewarning that, at approximately 450 parts per million (ppm) CO_2 in the atmosphere, we will trigger potentially irreversible glacial melt and sea level rise "out of humanity's control".[2] We are currently at 383 ppm, and are increasing atmospheric concentrations of CO_2 at about 2 ppm annually. Continued growth of CO_2-producing infrastructure and emissions for another 10 years will make it impractical, and most likely impossible, to avert exceeding the 450 ppm threshold.[3]

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[1] Maps are based on LIDAR data, USGS 10m NED and USGS 2m DSM. Maps are illustrative; areas in blue depict various potential inundation scenarios. Map accuracy is dependant on the accuracy of the geospatial data.

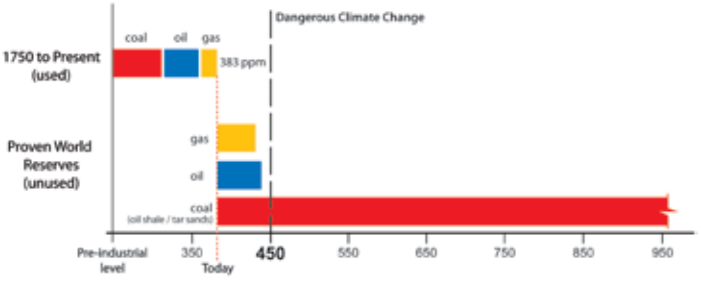
[2] Hansen, J. et al., "Dangerous Human-made Interference with Climate: A GISS Model E Study," Atmospheric Chemistry and Physics, 29 March, 2007: 2298.

[3] Leslie McCarthy, "Research Finds That Earth's Climate is Approaching 'Dangerous' Point," NASA, http://www.nasa.gov/centers/goddard/news/topstory/2007/danger_point.html.

The Silver Bullet: A Moratorium on Coal

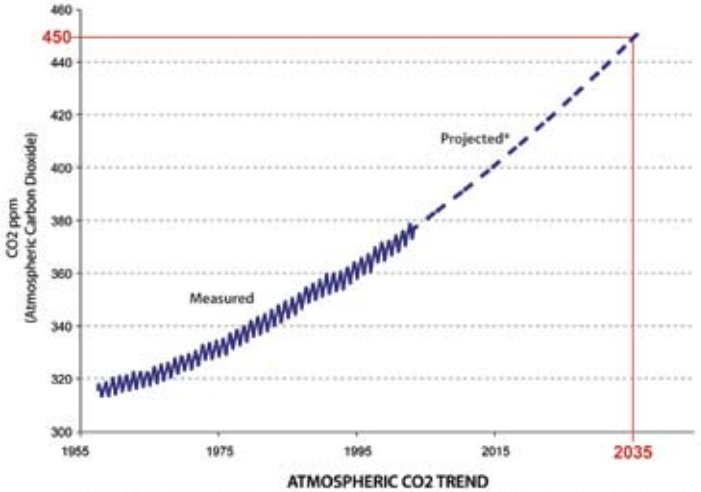
The US alone has 151 new conventional coal-fired power plants in various stages of development. Globally, at least one new conventional coal-fired power plant is being added each week.

It has become common today to declare that there is no 'silver bullet' for solving the global warming crisis. This, in fact, is not correct. The one fossil fuel positioned to push the planet beyond 450 ppm, and trigger dangerous climate change, is coal. This fact, coupled with the fact that a coal plant built today has a life expectancy of 50 years or more, mandates that the time for positive preventive action is now, and that this action must be a moratorium on coal.



FOSSIL FUEL RESOURCES & CO2 EMISSIONS

Source: Adapted from J. Hansen et al.: Dangerous Human-made Interference with Climate, 2007



ATMOSPHERIC CO2 TREND

Source: Adapted from Scripps Institution of Oceanography and National Oceanic and Atmospheric Administration
1958-1974 Scripps Institution of Oceanography
1974-2006 National Oceanic and Atmospheric Administration
*2006-2035 2030, Inc.: Projected trend based on Atmospheric CO2 as measured at Mauna Loa Observatory

PROTECT YOUR EFFORTS

Home Depot

Home Depot has funded the planting of 300,000 trees in cities across the US to help absorb carbon dioxide (CO_2) emissions... *The CO_2 emissions from one medium-sized coal-fired power plant, in just 10 days of operation, would negate this entire effort.*

Wal-Mart

Wal-Mart is investing half a billion dollars to reduce the energy consumption and CO_2 emissions of their existing buildings by 20% over the next 7 years. If every Wal-Mart Supercenter met this target… *The CO_2 emissions from only one medium-sized coal-fired power plant, in just one month of operation each year, would negate this entire effort.*

California

California passed legislation to cut CO_2 emissions in new cars by 25% and in SUVs by 18%, starting in 2009. If every car and SUV sold in California in 2009 met this standard… *The CO_2 emissions from only one medium-sized coal-fired power plant, in just eight months of operation each year, would negate this entire effort.*

Every Household

If every household in the U.S. changed a 60-watt incandescent light bulb to a compact fluorescent… *The CO_2 emissions from two medium-sized coal-fired power plants each year would negate this entire effort.*

These efforts, and many others, are critical in our attempt to address global warming. They are wasted if we do not also come to terms with the damaging effects of burning coal.

Those who invoke China's emissions as an insurmountable obstacle to emissions reductions, fail to understand that the US, Japan and the European Union consume 78% of all Chinese exports, fueling China's economic growth. If we collectively call for a global halt to the construction of any new conventional coal-fired power plants, China will follow to ensure its continued growth.

Replacing Coal

Without an increased demand for electrical energy, there is no need for additional coal-fired power plants.

Buildings account for approx. 48% of total annual US energy consumption (40% for building operations, 8% for building construction). Globally, the percentage is even greater.

Building operations (heating, cooling, ventilation, hot water, etc.) account for 43% of total annual US greenhouse gas emissions.[4]

76% of all the electricity produced at power plants in the US goes to operate buildings.

While a moratorium on the construction of any new conventional coal plants is a must to keep atmospheric levels of CO_2 below 450 ppm, it is also necessary to address the increasing energy demands of the US. With 76% of all the electricity produced at power plants going to operate buildings, reducing the operating energy demand of the Building Sector is essential. Without an increased demand for electrical energy, there is no need for additional coal-fired power plants. Therefore, as we implement a moratorium on coal, we must simultaneously focus our efforts on reducing energy consumption in the Building Sector.

[4] Marilyn Brown, Frank Southworth, Therese Stovall, "Towards a Climate-Friendly Built Environment," Oak Ridge National Laboratory, June 2005.

The 2030 Challenge

By the year 2035, three-quarters of the built environment in the US will be either new or renovated.

Each year, we build approx. five billion square feet of new buildings, renovate approx. five billion square feet and demolish approx. 1.75 billion square feet of existing buildings. By the year 2035, three-quarters of the built environment in the US will be either new or renovated. This transformation of the built environment over the next 30 years represents a historic opportunity to dramatically reduce the Building Sector's CO_2 emissions.

To take advantage of this opportunity, Architecture 2030 issued the '2030 Challenge', calling for an immediate 50% fossil-fuel energy consumption reduction for all new and renovated buildings, incrementally increasing the reduction for new buildings to carbon neutral by 2030. The Challenge has been adopted and supported by the US Conference of Mayors, American Institute of Architects, US Green Building Council, National Association of Counties and numerous states, counties and cities.

By implementing the 2030 Challenge, we can first stabilize, and then begin reducing fossil-fuel energy consumption in the Building Sector. Renovating existing buildings to consume 50% less fossil fuel energy allows for new efficient buildings to be built without increasing the sector's energy demand.

If we begin now, we make it; the numbers are on our side. If we wait, even 10 years, this window of opportunity is lost.

Been There, Done That

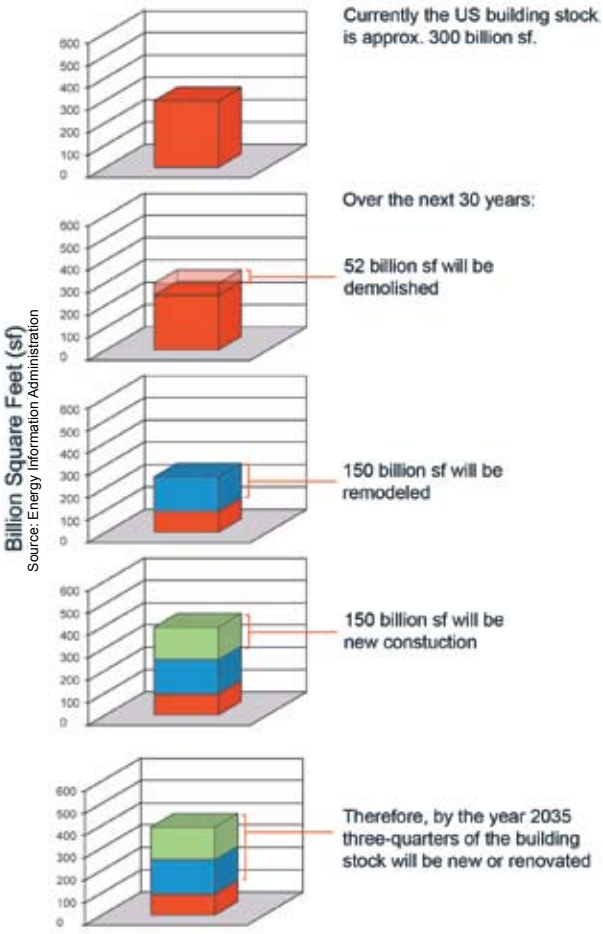
The US has accomplished similar tasks before. During the 1970's oil crisis (an 11-year period from 1973 to 1983), this country, drawing on American determination and ingenuity, increased its real GDP by over one trillion dollars and added 30 billion square feet of new buildings and 35 million new vehicles, while decreasing total US energy consumption and CO_2 emissions. This was accomplished with increased efficiency and with cost-effective, readily available, off-the-shelf materials, equipment and technology.

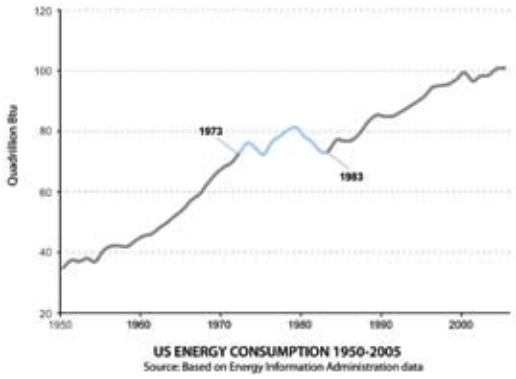
If we stop building conventional coal-fired power plants, phase out existing coal plants and simultaneously reduce the emissions of the Building Sector, we can avert the worst consequences of climate change.

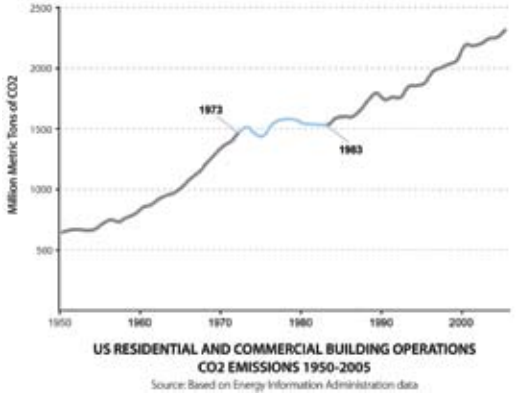
Katrina Revisited

The global warming discussion must now center on the question "How much are we willing to risk?"

Do we do what it takes to solve this crisis, or do we push the planet to 450 ppm?







For the full study with additional mapping, "Coastal Impact Study: Nation Under Siege," contact:
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