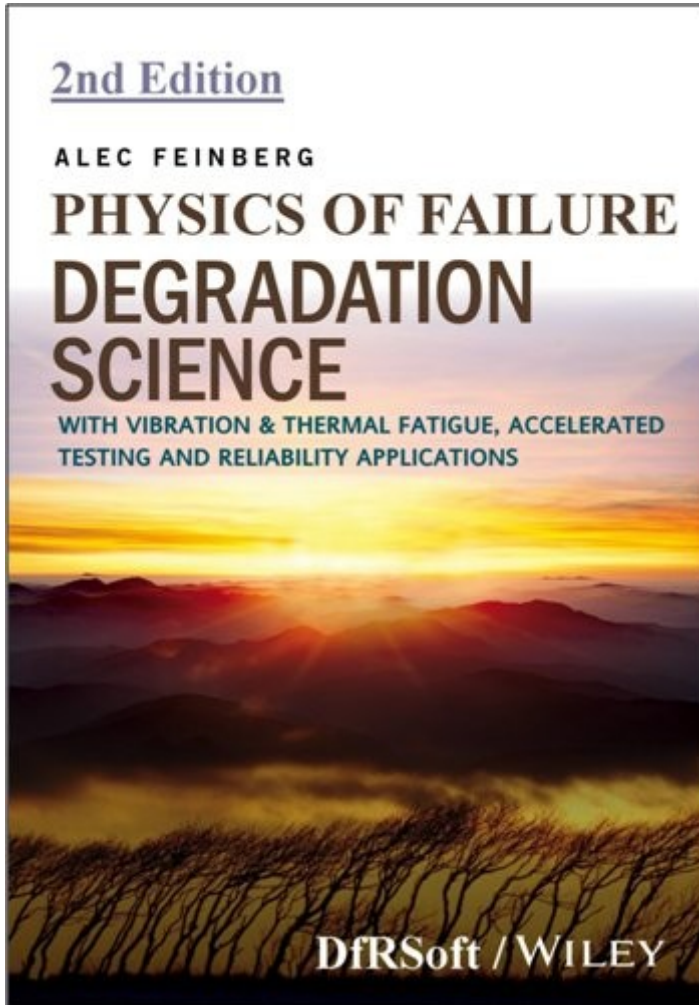


A 5th Grade Calculation Explains Global Warming



Author

Alec Feinberg, Ph.D.
DfRSoft

This is a published talk now on
youtube

As of 2/19/2020

Climate Change Forcing Causes & Effects

Actually Explaining this part



Urban Heat Islands & Roads,

Greenhouse Gases

Global Warming

Root Causes →

Global Warming

Amplification

Effects →

Increase in Specific Humidity, Decrease in land albedo due to cities & roads, Ice & Snow Melting

McKittrick and Michaels

- ***(2007) UHI may explain as much as half the observed land-based warming trend.***
- ***Highly controversial paper between IPCC members and these authors who have had to defend their paper over many years***

•McKittrick, Ross and Patrick J. Michaels (2004). ["A Test of Corrections for Extraneous Signals in Gridded Surface Temperature Data](#) *Climate Research* 26 pp. 159-173.

•R. McKittrick, P. Michaels, Quantifying the influence of anthropogenic surface processes and inhomogeneities on gridded global climate data, *J. of Geophysical Research-Atmospheres*, 2007

•McKittrick, Ross R. (2010) [Atmospheric Oscillations Do Not Explain the Temperature-Industrialization Correlation.](#) *Statistics Politics and Policy* Vol 1. No. 1., July 2010

•McKittrick, Ross R. and Nicolas Nierenberg (2010) [Socioeconomic Patterns in Climate Data.](#) *J. of Economic and Social Measurement*, 35(3,4) pp. 149-175. DOI 10.3233/JEM-2010-0336.

Goals of This Talk

- Using a Back of the Envelope 5th Grade Calculation
- Raise Awareness that UHI are a significant cause of Global Warming
- Get the IPCC and World Leaders to set Albedo Goals for Cities & Roads
- Encourage you to get the full understanding by seeing our 1 hour talk (next Slide)

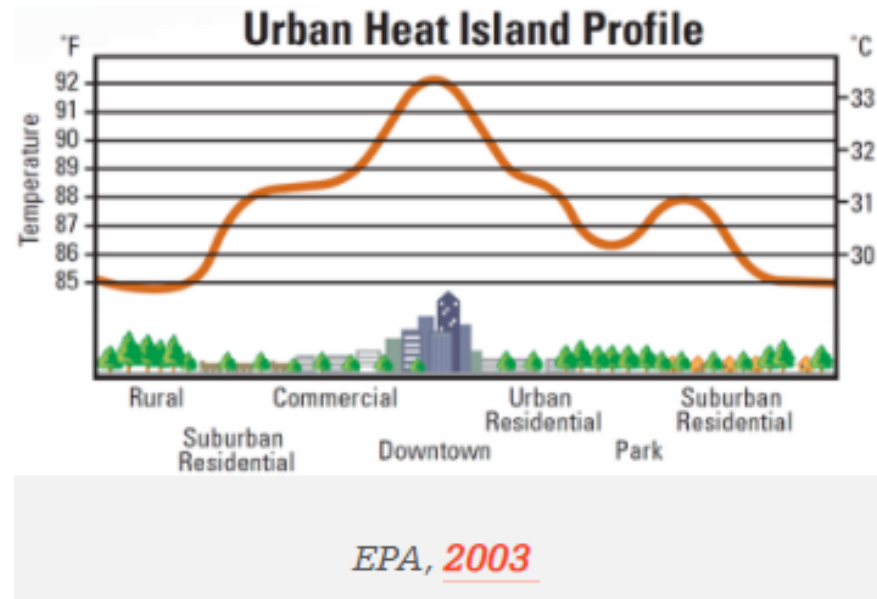
- IPCC =International Panel on Climate Change

- Part 2 of a 3 part series Full Understanding
- **Part 2: Global Warming Forcing Cause & Effects: UHI, CO2 & IPCC Issues – Full Understanding**

(Level of Talk is For Everyone also)

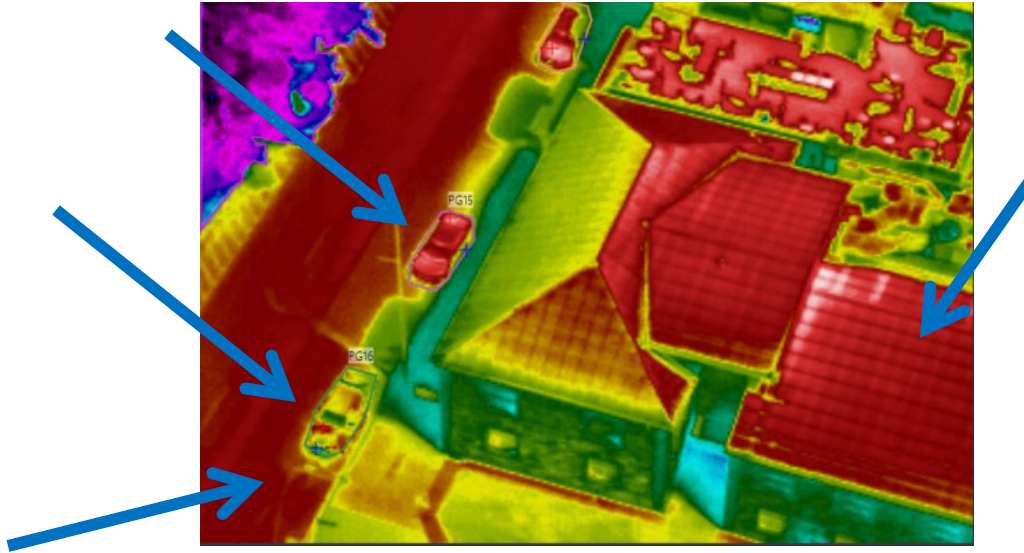
Concept of Urban Heat Island (UHI)

- UHI concept needed for this talk is a phenomena of many cities. The temperature profile mimics an island like profile. Cities designs create complex problems with the Environment & Warming

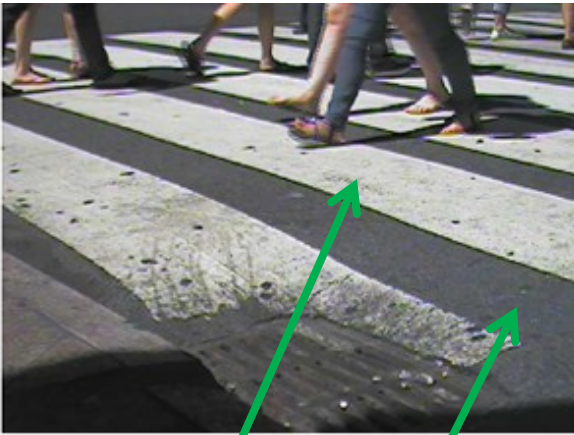
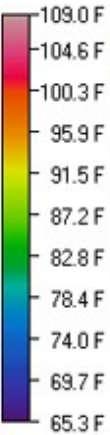
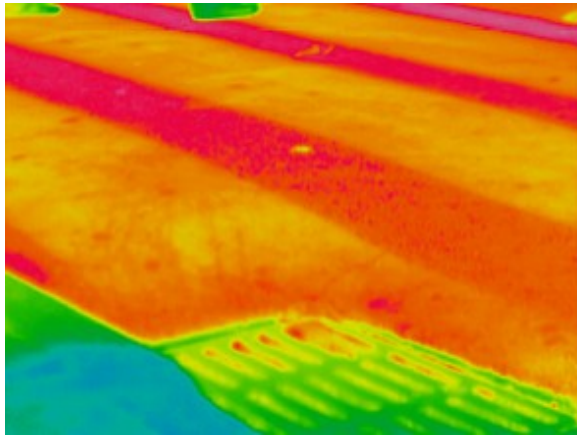
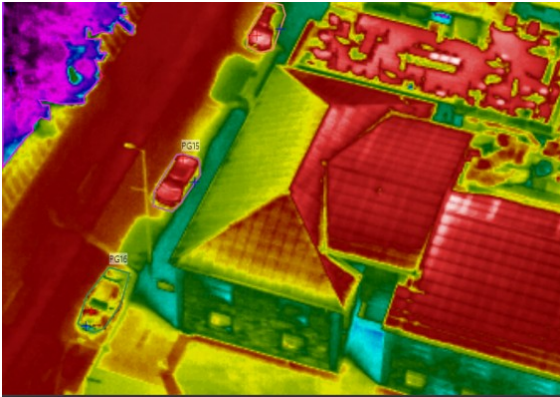


Infrared Urban Hotspots Picture

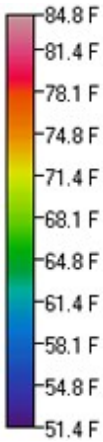
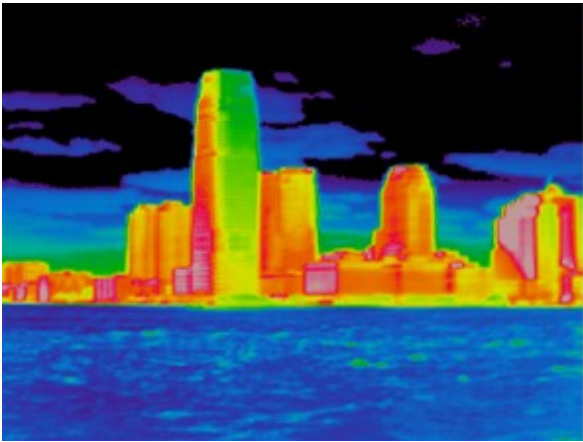
- Note differences in Car Colors & Dark Roofs, Roads Surfaces



Thermal Images of Urban Hotspots

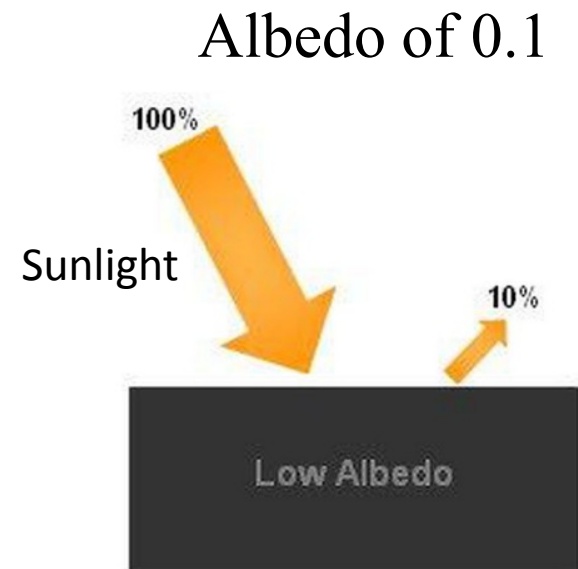


Albedo White Paint=0.8 (looks like ~93F)
Albedo of Asphalt =.04 (looks like ~103F)



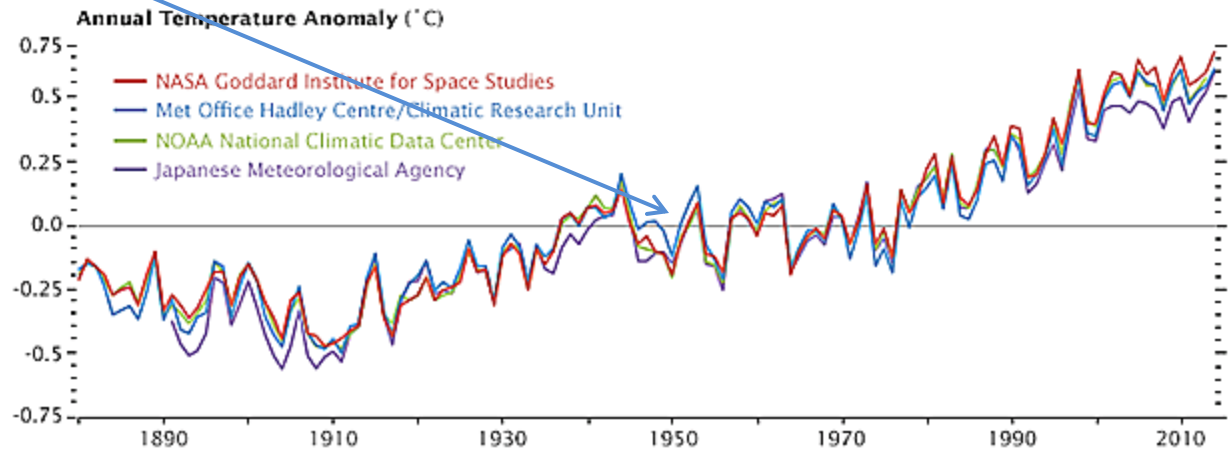
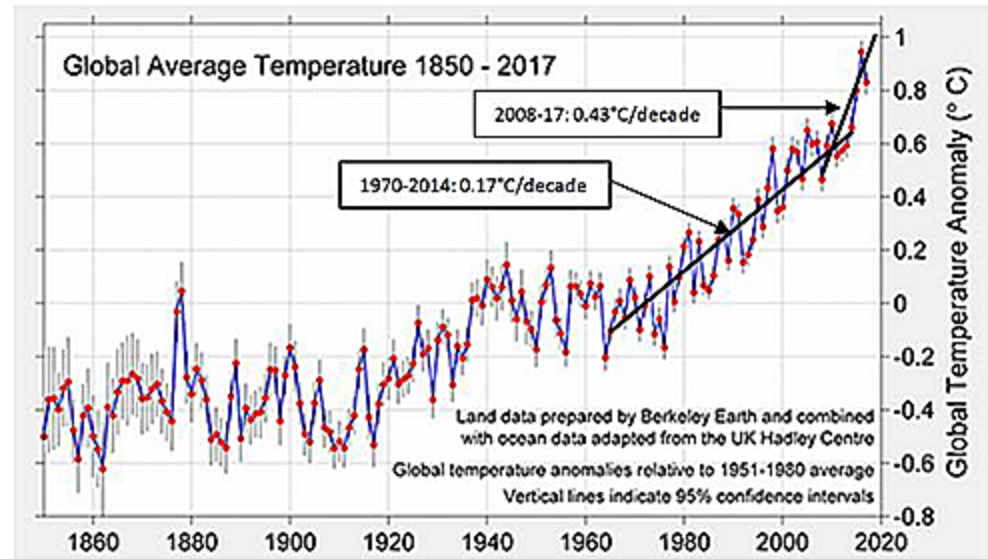
Albedo Concept Needed for this Talk

- Albedo – is a measure of the reflectivity from the sun. Example: Snow 0.8 (or 80% reflective 20% absorbing), Black Roads 0.04 (of 4% reflective or 96% absorbing).
- Cities and Roads are hotter – absorb more sunlight than rural areas

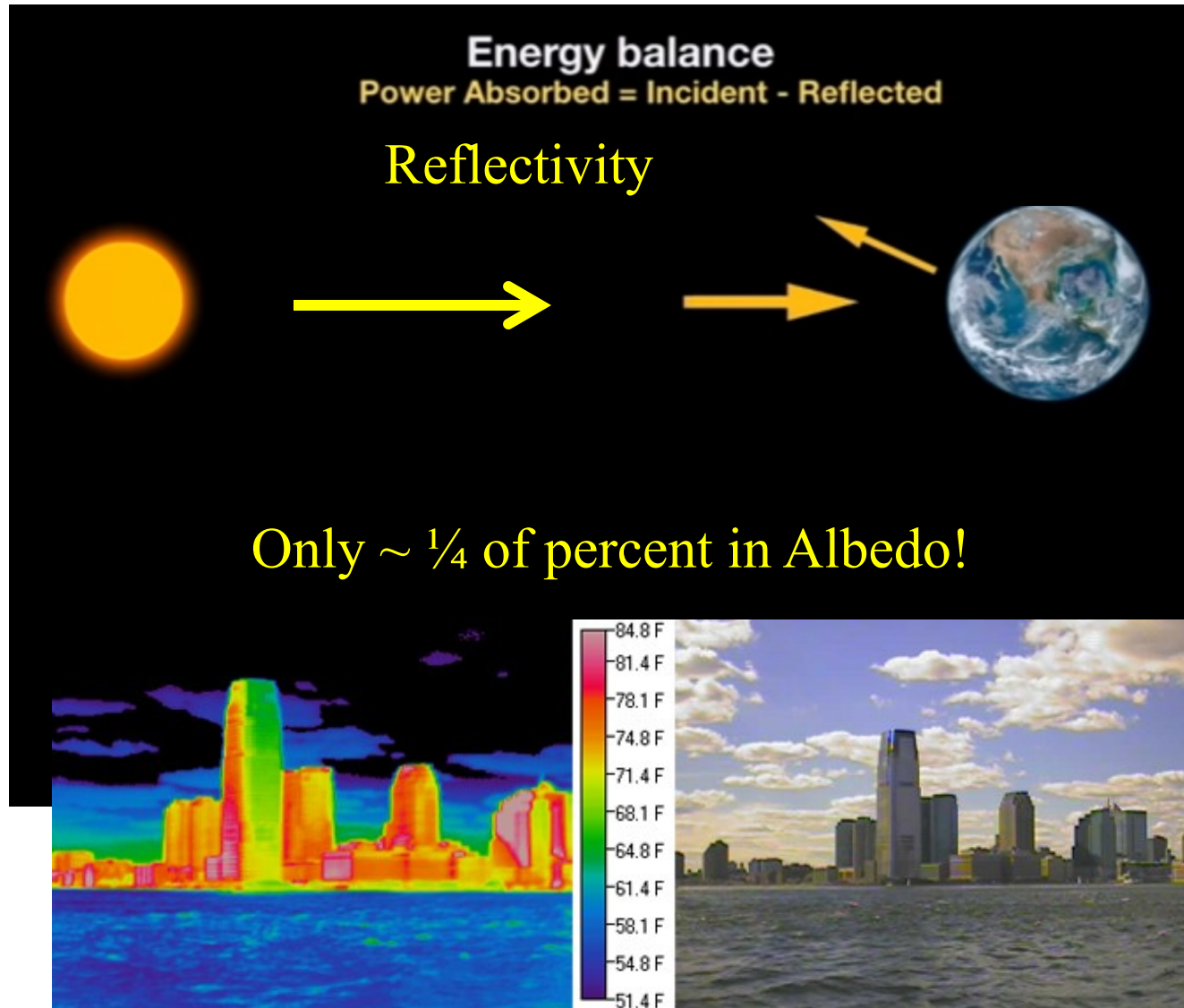


Global Warming Trend - Exhibit A

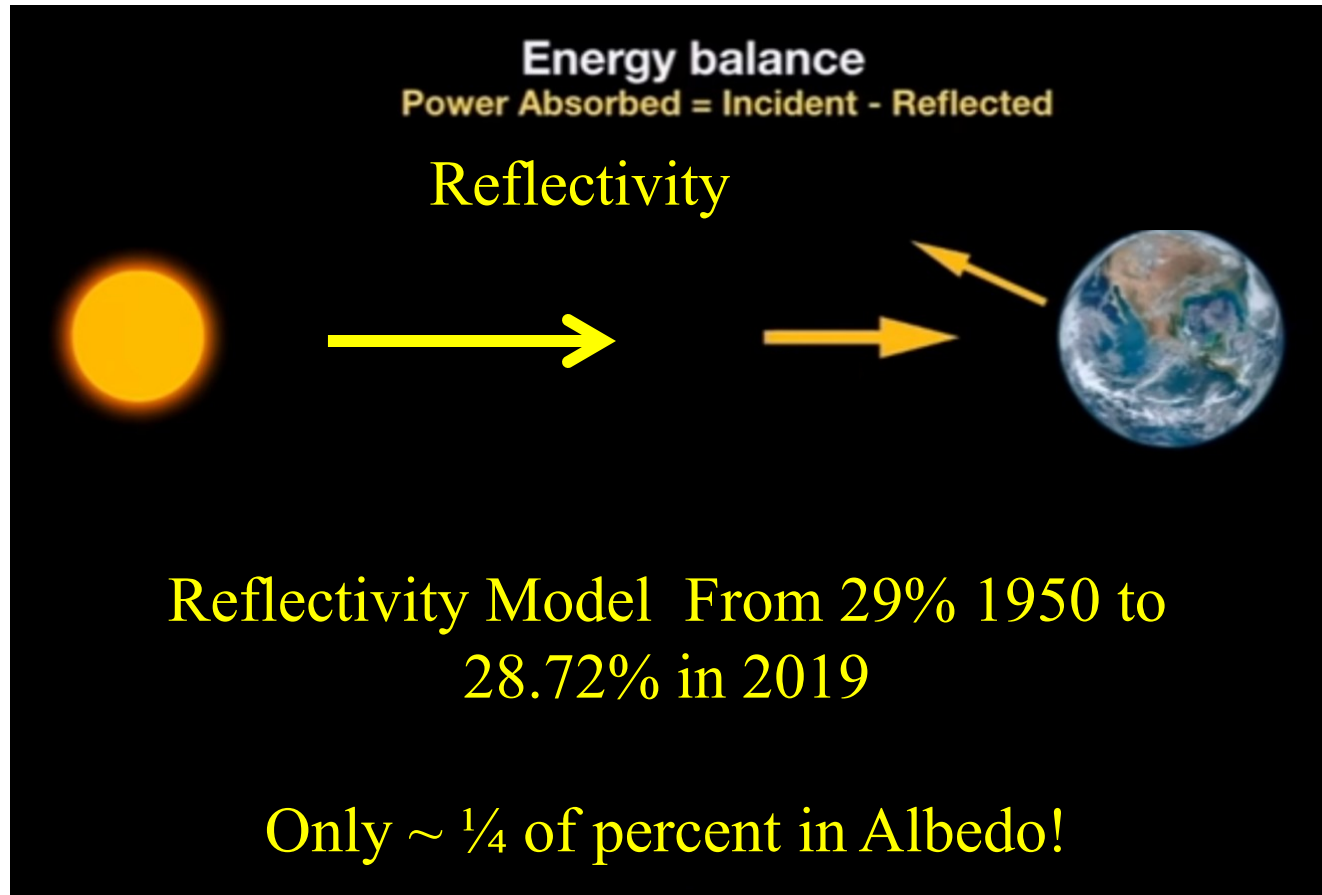
- A 0.95°C Rise Corresponds to a 1.7°F Rise
- 1950 Average Temp 57°F
- 2019-2020 Average Temp = 58.73°F



Calculation Requires Common Sense



Earth Albedo (Reflectivity) 2019



Let's Make it Simple!!

Back of the Envelop Calculation

- Don't you think its possible with all the millions of black city roofs, roads and buildings in the world that an albedo change of about $\frac{1}{4}$ of a percent (out of 29%) or greater is highly likely from 1950 to 2019??
- Keep in Mind that over $\frac{1}{2}$ world lives in Urban areas
- Then we can do a simple calculation to verify

LETS MAKE IT SIMPLE – Two Equations

- $P_{\text{Energy Budget}} = 1361 \text{ W/m}^2$ {0.25 x 1-Albedo}
- $P = \sigma T^4$ Black Body Radiation Formula, $\sigma = 5.670367 \times 10^{-8} \text{ W} \cdot \text{m}^{-2} \cdot \text{K}^{-4}$

1950

Albedo=29% so 1-Albedo=1-0.29=0.71

Power Absorbed = $0.25 \times 0.71 \times 1361 \text{ W/m}^2$
=241.58 Watts/m²

$P = \sigma T^4 = 241.58 \text{ W/m}^2$

$T^4 = 241.58 \text{ W/m}^2 / 5.67 \text{E-}8$

$T = 255.5 \text{ K} \sim 0.22^\circ \text{F Cold } (-17.65^\circ \text{C})$

2019

Albedo =28.72 so 1-Albedo=1-0.2872=0.7128

Power Absorbed = $0.25 \times 0.7128 \times 1361 \text{ W/m}^2$
=242.53 Watts/m²

$P = \sigma T^4 = 242.53 \text{ W/m}^2$

$T^4 = 242.53 \text{ W/m}^2 / 5.67 \text{E-}8$

$T = 255.73 \text{ K} \sim 0.644^\circ \text{F Cold } (-17.42)^\circ \text{C}$

Amount Warmer = $-17.66^\circ \text{C} - (-17.42^\circ \text{C}) = -0.24^\circ \text{C}$ Warmer due to Cities

Full Amount Warmer is 0.95°C

i.e. 25% of Global Warming Due to Small Albedo Change of Only 0.28%

My UHI Albedo Study Results

Table 5 Calculated Forced Effects Causing Global Warming from 1950 to 2019

Forced Effect	Contributing Change	Temperature Increase	Radiative Forcing (W/m ²)	Percentage
Albedo (Cities & Roads)	0.29 to 0.2872	0.43°F (0.24°C)	1.05	25.2%
Water Vapor	183 PPM increase	0.638°F (0.355°C)	2.1	37.3%
CO ₂	100 PPM increase	0.638°F (0.355°C)	2.1	37.3%
Greenhouse Gas Increase	1.46%=60.8%-59.32%	(~0.63 °C, H ₂ O + CO ₂)		
Totals	283PPM	1.71°F (0.95°C)	5.25	100%

- Estimates ignore other greenhouse gases and holds all albedo and areas constant except area Change of cities

A.Feinberg, Review of Global Warming Urban Heat Island Forcing Issues Unaddressed by IPCC Goals Including CO₂ Doubling Estimates and Albedo Modeling, Feb. 10, 2020, DOI: 10.13140/RG.2.2.25357.90087 vixra:2001.0415

Climate Change Forcing Causes & Effects

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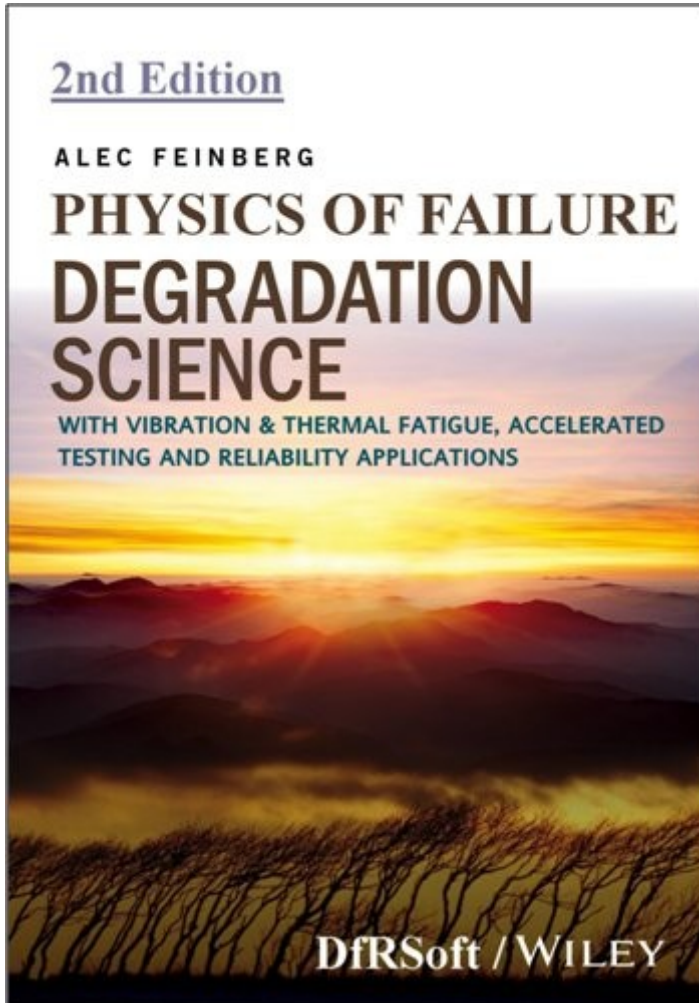
Global Warming (GW) Risk

Believe it is Only CO2

- Risk = Probability of Failure x Severity
- To Quantify
 - If you are a 99% GW only CO2 (Prob. of Fail=1%)
 - Severity = World Population 7.7×10^9
- GW Risk = 1% x 7.7 Billion People=77 Million People
- This is the risk if
- IPCC – Does not recognize UHI global warming need for Albedo Goals
- Conclusion: **Better Safe Than Sorry!**



Global Warming Forcing Causes & Effects: UHI, CO2 & IPCC Issues



Author

Part 2 1950-2019

February 12, 2020

This Presentation is Posted
on Youtube

(Slides & Calculator Available at
https://www.dfrsoft.com/DfR_Articles.html)

Alec Feinberg, Ph.D.
DfRSoft