

No Virginia, Cooler Objects Cannot Make Warmer Objects Even Warmer Still

Pierre R Latour, PE, PhD Chemical Process Control Systems Engineer rebuts Dr. Roy Spencer's article, '[Yes, Virginia, Cooler Objects Can Make Warmer Objects Even Warmer Still](#)' (published July 23, 2010). [1.]

I have admired and learned from Roy Spencer's work on AGW & GHG for several years. He taught me a lot. He is well recognized in his field. Now I write to return the favor and teach him about the errors in his posting and how he can learn from my field. I read all 350 blog responses, and identify the correct ones at the end.

Spencer's setup through paragraph 11 is OK, assume start is steady-state, all $dT/dt = 0$. Spencer does not say whether the chiller chamber surroundings at 0F are held there by constant heat removal rate (= plate power input rate) or constant $T = 0$ (adjusting power input rate). Spencer's paragraph 12 claims that the radiating plate temperature will increase from 150 to 160F by absorbing some back-radiation from the inserted non-radiating 100 plate is merely a claim, without scientific theory or evidence to back it up.

His statement "*This is because the second plate reduced the rate at which the first plate was losing energy.*" is provably false. And the answer to his subsequent question in parentheses is: no. His statement "*Again, the reason the heated plate became even hotter is that the second plate has, in effect, "insulated" the first plate from its cold surroundings, keeping it warmer than if the second plate was not there.*" is not true.

If the claim were true, the total surroundings, including cooler plate, would receive more radiation from T difference = $160 - 150 = 10F$ and the chiller chamber temperature would increase to $T > 0$, even if the portion of surroundings blocked by the cool plate gets colder. The rest gets warmer. The chiller would have to remove more heat to maintain 0, but input electrical energy to the 150 plate is constant, so this requires creation of energy. The 100 plate does not insulate the 150 plate from all 0 surroundings.

The Stefan-Boltzmann law radiation law says radiation rate is proportional to its absolute temperature T^4 , no T difference involved; the radiation rate of 150 is proportional to its radiating $T = (65.6 + 273)^4$, no matter what the surroundings. However, the absorption rate of real bodies depends on whether the absorber T (radiating or not), is less than the intercepted radiation T , or not. If the receiver $T >$ intercepted T , no absorption occurs; if the receiver $T <$ intercepted T the absorption rate may be as great as proportional to $(T_{\text{intercepted}} - T_{\text{absorber}})$, depending on the amounts reflected, transmitted or scattered.

What actually happens is the chiller radiates to the hot plate, but the plate cannot absorb any of it because it is too cold. The hot plate reflects, transmits or scatters colder radiation, just like my roof does for cold radio waves. Insertion of the 100 plate blocks hot radiation to the portion of

the surroundings behind it, cooling them to $T < 0$. But the 100 plate also radiates to the rest of the surroundings, heating it to $T > 0$. The combined effect is no change in radiation absorbed by total surroundings and average radiating temperature remains 0. The hot plate does indeed intersect 100F radiation from the cold plate, just as it intersects 0F radiation from the surroundings, but it cannot absorb any of it and warm since the incident radiation is too cold, < 150 .

Examples are all around us. Chemical engineers design and operate radiant, convection and conduction furnaces, kilns, forges, chemical reactors and boilers for refining petroleum, manufacturing chemicals and generating electricity since 1920. We no longer need more experiments. No back-radiation is observed. Conducting this experiment will allow nature to tell which prediction is correct. This has been done already by [Prof Nasif Nahle](#), reported on 26Sep11 [2.]. Findings confirm the prediction T remains 150 is correct because a warm body cannot absorb cooler back-radiation.

An easy proof experiment is to park your car along a busy road at night with the headlights on. Move 5 meters in front and watch or measure your headlight emission brightness as approaching cars shine on them. Have you ever noticed your headlights getting brighter; then flickering back down as the oncoming car passes? No! Why? The hot bulb filaments do not absorb the low intensity, T , radiation from oncoming headlights, and reradiate it, brightening them.

Mathematics. Back-radiation may be represented by finite difference equations:

$f_i = f_0 + K \cdot f_{i-1}$, and $F_i = F_0 + k \cdot f_i$, where:

i is the iteration number, $i = 1, 2, 3, \dots$ infinity

F_{i+x} is the energy rate from the first bar at iteration $i+x$ ($x = 0|1$). Given $F_0 > 0$.

f_{i+x} is the energy rate from the second bar at iteration $i+x$ ($x = 0|1$). Given $f_0 \Rightarrow 0$.

K is the fraction of radiation from the first bar absorbed by the second colder bar, $0 < K \leq 1$.

k is the fraction of re-radiation from the second bar absorbed by the first hotter bar, $0 \leq k \leq 1$.

Substitute the first equation into the second to get $F_i = F_0 + k \cdot [f_0 + K \cdot f_{i-1}]$

$\Delta F_i = F_i - F_{i-1} = - (1 - kK) \cdot f_{i-1} + F_0 + k \cdot f_0$

This sequence converges to $F_j - F_{j-1} = 0 = - (1 - kK) \cdot F_j + F_0 + k \cdot f_0$, and

$F_j = [F_0 + k \cdot f_0] / (1 - kK) \Rightarrow F_0$, constant, provided $kK < 1$, and

$f_j = f_0 + K[F_0 + k \cdot f_0] / (1 - kK) \Rightarrow f_0$.

The change in radiation energy rate to surroundings, E_s , is the final rate minus initial rate minus amount initially diverted from surroundings to the injected cold plate, $K \cdot F_0$,

$E_s = (F_j - F_0) + (f_j - f_0) - K \cdot F_0 = [(1 + k) \cdot K \cdot F_0 + (1 + K) \cdot k \cdot f_0] / (1 - kK) - K \cdot F_0$.

For any $K > 0$ and $k > 0$, $E_s > 0$. This would constitute creation of energy, a violation of the first law of thermodynamics. Since K may be > 0 , $E_s = 0$ if and only if $k = 0$.

Since this is the only possible solution, k must be identically zero, so no cold back-radiation is absorbed and T remains 150. Quod Erat Demonstrandum, QED.

Chemical Engineering. Here is the corresponding radiation energy transfer engineering (Perry, John H, "Chemical Engineers Handbook", 1950, H C Hottel, Section 6, Radiant Heat Transmission , pp. 483-498; Bird, R Byron, Warren E Stewart & Edwin N Lightfoot, "Transport Phenomena", John Wiley, 1960, Chapter 14, Energy Transport by Radiation; Bennett, C O & John E Myers, "Momentum, Heat and Mass Transfer", McGraw-Hill, 1962, Chapter 28, Radiant Heat Transfer, p371):

Hot emitter rate at T is $Q_e = 5.7 \cdot X \cdot T^{**4}$, S-B relation, where X is radiating area, m^2 , $T = 65.6 + 273 = 338K$.

Hot radiation absorbed by cold at $t < T$ is $Q_a = a \cdot b \cdot Q_e$, where a = view factor of q from Q , < 1 . Fraction of Q emission intercepted by q .

b = absorption factor of q , < 1 . Depends on amount of incident radiation $> t$. Amount $< t$ is not absorbed. Rest, $(1-b)$, is reflected, transmitted or scattered.

Hot radiation re-emitted by q at t is $q_e = c \cdot Q_a = 5.7 \cdot x \cdot t^{**4}$, where x is radiating area, m^2 , $t = 37.8 + 273 = 311K$. c = emission factor of q , < 1 . The rest $(1-c)$ is converted to thermal heat to warm the cold body, increasing thermal t , and releasing heat to its colder surroundings by convection or conduction, until they equilibrate. Any change in radiating t depends on the nature of the radiating body and the absorbed radiation; it can be complex. I shall assume t remains constant for simplicity, no thermal effects, just like Spencer.

Re-emission energy from q intercepted by Q is $q_i = A \cdot q_e$, where A = view factor of Q from q , < 1 , fraction of q emission intercepted by Q .

Amount of re-radiation from q absorbed by Q is

$q_a = B \cdot q_i = B \cdot A \cdot q_e = B \cdot A \cdot c \cdot Q_a = B \cdot A \cdot c \cdot a \cdot b \cdot Q_e = abcAB \cdot Q_a < Q_a$, where B is absorption factor of Q , < 1 .

This describes radiation from a furnace flame to boiler tubes and fire walls then onward from fire walls (not backward) to tubes.

Physics says when $T > t$, $B = 0$. So $Q_a = 0$. There is no back-radiation energy transfer from cold to hot. QED.

Radiant energy transfer rate from Q that is absorbed by q and re-radiated by q to surroundings $t_s < t$ is

$Q_T = Q_a - q_e = ab \cdot Q_e - c \cdot Q_a = ab \cdot 5.7 \cdot T^{**4} - cx \cdot 5.7 \cdot t^{**4} = 5.7 [abX \cdot T^{**4} - cx \cdot t^{**4}]$

Some call this Q_T the net radiant energy transfer from Q to q accounting for q_e because it has a temperature difference factor. This is not the difference between hot radiation emitted and cold back radiation re-absorbed by the hot emitter. When the surroundings are black, $x = X$, and when the radiating body is grey, $c = a \cdot b$, so

$Q_T = abX \cdot 5.7 [T^{**4} - t^{**4}]$, provided $T > t$.

Note S-B law is not used for this analysis; it is a side information issue because it just assigns a radiating T for a particular Q/X. It is only needed to verify whether $B = 0$.

All these equations are first law conservation of energy balances.

Black and grey bodies are introduced to simplify the analysis, neither exists in nature. Engineers determine view factors a and A . That geometry is the hard part for furnace duty. Conduction and convection modeling is harder still, and significant. Since materials that behave like black and grey bodies are most useful for radiant energy transfer equipment, these assumptions with experimental adjustment factors are used for commercial engineering design of furnaces, kilns and forges.

Major furnace constructors like Babcock & Wilcox, Foster - Wheeler, Stone & Webster, Selas, KTI, KBR, Combustion Engineering, and Lummus have developed and built proprietary furnace designs world-wide for decades. Earth's surface and atmosphere radiation may deviate from black and grey as well. And engineers never assume radiators get hotter by absorbing their own generated energy re-radiated back from colder absorbers. If one assumes everything is a theoretical black body, everything works like a black body, but nature may not quite.

Kirchhoff's law assumes absorbed radiation is completely re-emitted (none is converted to thermal energy) and then proves the obvious, the ratio of emissive power to absorptivity is the same for all such bodies; equivalently the fraction of incident radiation absorbed, absorptivity, equals fraction emitted, emissivity. While emissivity depends only on the nature of the emitting body, absorptivity also depends on the nature of the incident radiation absorbed (but if this can be neglected, it is called a grey body, to simplify analysis). So emissivity can be less than absorptivity for real, non-grey bodies, they convert the difference to thermal heat. I have not assumed it or violated it in this analysis.

Spencer's statement of Kirchhoff's law is not precisely correct and was irrelevant to his claim hot bodies absorb cold radiation, just an interesting comment about the weather.

Unlike Spencer, I tend to include the physics of what happens on the molecular, atomic and photon level; it often overturns common sense and experience, leading to a more complete understanding of physics and natural phenomena. I do not arbitrarily dismiss physics because I do not understand it; only if I do and know it to be irrelevant. I am aware professional radiation physicists may have more precise descriptions of the un-absorbable colder T criteria from particle physics. Claes Johnson gave a plausible explanation of cutoff frequencies in "Slaying the Sky Dragon", 2011. Irwin Hasenwinkle (30Jul10, 6:38 am) provided a convincing supporting explanation from Maxwell's field equations.

Spencer imagined a physical situation and claimed what would happen; a radiating plate would get warmer if another colder, non-radiating plate were introduced, with no supporting physics or evidence. Then he claimed it was correct because he claimed it to be so. This is a circular argument, an invalid tautology; claim something and use it to prove the claim. Logic

shows this proves nothing. Circular arguments should be avoided in a court where the judge and jury understand and reject invalid tautology.

Conclusion, the hot plate remains at 150. All physics I know supports it; no physics offered refutes it. Spencer mistakenly assumed the 150 plate absorbs incident 100 radiation. Introducing change to surroundings, like a new 100 plate, will simply change the temperature of the rest of the surroundings (cooling them to < 0), absorbing the same radiation from the 150 plate. Not only did Spencer fail to prove his claim but I have offered an alternative theory that refutes it. The generalized claim that a cooler object placed near a warmer object cannot result in a rise in temperature of the warmer object stands.

Another Spencer misstatement is revealed in paragraph 14 and repeated in subsequent blog comments: an unclear description of the first law conservation of energy ODE: input rate - output rate = accumulation rate = $mC_p \cdot dT/dt$. So imbalance does not cause T , it causes dT/dt or temperature change. T will keep changing until a T is reached that restores the balance; this always occurs because an input and/or output rate always depends on T .

If not T would go to 0 K or infinity. Surely every climatologist, weatherman, climate change artist, Congressman, engineer and high school graduate worth his salt knows how to quantify change and what a derivative is, (Newton, I, "Principia", 1687). While this may seem picky, AGW promoters have claimed since 1997 ice melts because the atmosphere is warming, temperature is increasing, $dT/dt > 0$, when in fact ice melts because the atmosphere is too warm, when $T > 0C$, and at a rate proportional to T , not because atmosphere is warming, $dT/dt > 0$. Further, $[CO_2]$ significantly affects C_p of air, which affects the lag time of T responses to energy imbalances but may not affect the steady-state equilibrium value much. AGW debate is filled with sloppy language, inconsistent definitions and hence confusion.

Just because the K-T energy flow diagram balances does not prove GHG back-radiates 333 w/m² from the cold sky GHG's, or warmer Earth absorbs all of it and as a consequence warms further, as indicated at the far right of K-T diagram. The 396 w/m² emitted by the surface and 333 w/m² back-radiation absorbed could just as well have been 63 w/m² emitted and 0 w/m² reabsorbed.

What I feel with a warm blanket is reduction in heat transfer rate, not higher temperature. (Skin may sense T change but mostly Q change.) A blanket reduces the conductive heat transfer coefficient, U , between my body and air. Since $Q = UA \cdot (T_{\text{body}} - T_{\text{air}})$, Q decreases with U so long as $T_{\text{body}} > T_{\text{air}}$. Metabolism adjusts Q to hold T_{body} constant 98.6F (37.0 C for Europeans). When you die, $Q = 0$, and $T_{\text{body}} = T_{\text{air}}$, no matter what U is or how thick the blanket is. Blankets, coats and gloves reduce the rate of heat loss from one's body, and hence the required shivering metabolism rate to maintain 37C. They do not warm cold stones. To confirm my opening sentence, turn a fan on. You feel cooling because the fan increases the convective heat transfer coefficient at your skin,

increasing Q at constant T . You feel increase in Q . Besides your experiment is about radiant energy transfer only, you ruled out conduction and convection, so the blanket conduction analogy is invalid if radiant and heat transfer are different mechanisms. Radiant energy transfer does not work the same way as conductive & convective heat transfer, as you know. Energy from colder cannot heat hotter further because the second law of thermodynamics says so, because nature says so; always and everywhere.

Spencer attempted to show how his claim relates to how much CO_2 affects atmospheric temperature.

His opening universal statement about energy transfer to outer space "*Putting anything between that (essentially infinite) heat sink and the Earth's surface will cause the surface to warm.*" should say space is an infinite radiation energy transfer sink, but it is an empty infinite barrier to conductive and convective heat transfer, since there is nothing out there to conduct or convect heat. Further, the statement for radiation would be false for any atmosphere that is transparent to the emitted radiation, like transparent gases for visible light, a tent for radio waves or my body for x-rays.

Since all atmospheres must get colder with altitude as kinetic energy is transformed into potential energy in a planet's gravitational field, the lower atmosphere must be warmer than upper atmosphere, even if there is no radiation involved. This follows from the perfect gas law, $PV = nRT$. (The slope of the h vs. T line, the lapse rate, is $-g/C_p$.) Since air heat capacity, C_p , increases with exchange of O_2 for CO_2 , the slope gets more horizontal and the surface T may increase. And the length of the line increases with the amount of atmosphere, also warming the surface.

This is not how a blanket works; is not even Spencer's mischaracterization of how a blanket works. A planet's surface temperature increase due to the presence of an atmosphere depends on the amount of atmosphere and its C_p . Its average re-radiation rate is set by the atmospheric energy balance dominated by solar input, adjusted for changes in reflectivity, surface inputs like respiration, combustion and mantle eruptions and outputs like photosynthesis, stabilized by ocean CO_2 and energy sinks and sources. Short term weather has nothing to do with this because weather is a natural result of energy, mass and momentum transport within a turbulent three phase system driven by planet surface changes, rotation and orbit, lightening, ionosphere ionization and auroras.

So not only was the cold heats hot statement not proven to be correct, it is actually not true. In fact there is no heat transfer (heat means thermal energy, not radiation energy) involved from Earth's surface to stratosphere on average either, because heat cannot escape to space and average $dT/dt > 0$, always. Of course there is tremendous mass, energy and momentum underway within Earth's turbulent three-phase atmosphere, causing weather. The only mechanism I can see for Spencer's assertion is if the atmosphere converts thermal heat to radiation to space, just as the surface does. And how much $[CO_2]$ affects that

transformation. Which leaves us with total energy leaving Earth is that radiated by its surface and atmosphere. There is no back-radiation energy transfer from cold sky absorbed by Earth's warmer surface.

Spencer did not prove his claim "*ANY infrared absorber that gets between the Earth's surface and space will cause the surface to warm.*" He just asserted it. If that IR absorbing gas absorbs solar IR rather than letting the Earth surface absorb it, (thereby cooling surface) would not the gas re-emit all of it, even at a somewhat lower T and spectrum, as colder radiation and thermal heat? Thereby releasing all the energy it absorbed, and not influencing Earth energy balance one whit? Would it not just modify the distribution between radiant and thermal energy? Maybe more thermal T and less radiant T? According to Kirchhoff's law!

Spencer's far right downward orange arrows get wider because the amount of atmosphere overhead increases as you go down, not because warm lower atmosphere absorbs and reemits colder IR. Upper atmosphere IR in the widest arrow down has cooled more by dispersion and is not absorbed by the warmer surface below, just scattered. And the orange upward arrows are correspondingly narrower.

The statement "*As a result of the atmosphere's ability to radiatively insulate the Earth's surface from losing infrared energy directly to the "cold" depths of outer space, the surface warms to a higher average temperature than it would have if the atmosphere was not there.*" is an unproven assertion. I accept the next statement "*This, then, constitutes the basic mechanism of the Greenhouse Effect. Greenhouse gases represent a "radiative blanket" that keeps the Earth's surface warmer than it would otherwise be without those gases present.*" because Spencer is more expert than I on that subject. But I have proven the basic mechanism is wrong.

I inserted clarifications in next paragraph: "*Many well-meaning people think that one of the consequences of Kirchhoff's Law of radiation is that an individual layer of the atmosphere that absorbs infrared energy at a certain rate must also emit energy at the same rate. This is NOT true. **OK, because it is not a black or grey body. It is true for every molecule though, because of conservation of energy.***"

*The rate of emission becoming the same as the rate of absorption occurs in the very special case where (1) the temperature has reached thermal **(change thermal to radiant)** equilibrium, and (2) that equilibrium is the result of only those two radiative flows, in and out of the object. **And this condition is met at the molecular level.***

*Interestingly, this condition of a layer emitting the same amount of IR as it is absorbing is virtually never met anywhere in the atmosphere **instantaneously, but it is satisfied in aggregate, on average, for well mixed gases.** This is because of the vertical, convective flows which are also transporting energy between layers **that affect local conditions but not average behavior.**"*

Then Spencer asserts, *“In the global average, air below about 5,000 feet in altitude is absorbing more infrared energy than it emits, while air above that altitude (up to the top of the troposphere, the 80% of the atmosphere where weather occurs) is losing infrared energy faster than it is gained.”* without explanation or evidence. If true, wouldn't air below continue warming forever; and air above continues cooling forever? Since I don't know, I must remain skeptical.

Can Energy “Flow Uphill”? Spencer says *“In the case of radiation, the answer to that question is, “yes”. While heat conduction by an object always flows from hotter to colder, in the case of thermal radiation a cooler object does not check what the temperature of its surroundings is before sending out infrared energy. It sends it out anyway, no matter whether its surroundings are cooler or hotter. Yes, thermal conduction involves energy flow in only one direction. But radiation flow involves energy flow in both directions.”*

I say “In the case of radiation, the answer to that question is, “no”. While heat conduction by an object always flows from hotter to colder, in the case of thermal radiation a cooler object does not check what the temperature of its surroundings is before sending out infrared energy, but the receiving absorber does and will only absorb radiation hotter than itself, otherwise it reflect, transmits, or scatters it. It sends it out (emits) anyway, no matter whether its surroundings are cooler or hotter.” Yes, thermal conduction involves energy flow in only one direction. But radiation flow involves energy flow in both directions, but actual transfer in only one from hot to cold, just like conduction and convection.”

Spencer offers *“But, if ANY flow of energy “uphill” is totally repulsive to you, maybe you can just think of the flow of IR energy being in only one direction, no, it emits in all directions, but with it's magnitude being related to the relative temperature difference between the two objects. OK. The result will still be the same: The presence of a cooler object can STILL cause a warmer object to become even hotter.”* **Nope, if you agree the magnitude of actual transfer is related to $T_{hot}^4 - T_{cold}^4$ then you cannot then assert the contrary. Contradiction is not allowed.**

To recap, Spencer did not correctly describe how radiating plates work; how a blanket works or how the atmosphere works. There is no Green House in the sky. Cooler objects cannot make warmer objects even warmer still. QED.

Anyway, that's my story, and I'm sticking to it, until someone convinces me otherwise. I trust this clears up the controversy. It is hard to translate the language of nature, mathematics, into the language of humans, like English. If it's all about semantics, get the definitions right. History since Socrates teaches high standards of skepticism are warranted because most speakers and writers are wrong, including scientists. That is why establishing the truth is difficult. Call it wisdom if you please.

I am left to assume Spencer devised this provocative plate experiment claim to test how many student bloggers can rebut it correctly. I think Vangel, Dusty, Eilert, Anonymous (25Jul10, 1:51am, 6:17am), Tom Rowan, jae, Brian Strong, Andrew S, Eilert (25Jul10, 3:29am), Joletaxi, Colin Henderson, old construction worker, Spencer (27Jul10, 9:58 am), william, KuhnKat, Gord, robjMitchell, Irwin Hasenwinkle (30Jul10, 6:38 am), John Onsager, Gerlich and Tscheuchner, and Rudolf Clausius would. I hope his daughter would too. I would not want to deliberately mislead Virginia either.

By the way, I worked for NASA, Apollo, 1967-69. In 1997, I proved using fossil fuel combustion for Earth's thermostat cannot work because the system is un-measurable, unobservable and uncontrollable.

[1.] Rebuttal of Roy Spencer's 'Cool Things Can Warm Hot Things'
<http://www.drroyspencer.com/2010/07/yes-virginia-cooler-objects-can-make-warmer-objects-even-warmer-still/> Posted by Roy Spencer, PhD, 23Jul10 to 27Jul10

By Pierre Latour (4Nov 2011)

[2.]http://principiascientific.org/publications/New_Concise_Experiment_on_Backradiation.pdf

From: sr2@msn.com

To: Roy@DrRoySpencer.com; roywspencer@hotmail.com

Subject: No Virginia, Cooler Objects Cannot Make Warmer Objects Even Warmer Still

Date: Mon, 7 Nov 2011 17:38:14 -0600

Dear Dr Roy Spencer,

I have shared your scientific skepticism of Global Warming and Greenhouse Gas theory promoted by the UN IPCC for a number of years.

While Earth's radiating temperature goes up and down from time to time, and atmospheric CO2 concentration has been increasing during the last few decades, I have yet to see a plausible theory connecting anthropogenic CO2 to significant temperature effects, like plus or minus 1C for say 10% changes in fossil fuel combustion. Any net steady-state effect appears to be vanishingly small. I believe there are numerous flaws in GHG theory.

I studied your website developed in late July 2010 with considerable interest:

<http://www.drroyspencer.com/2010/07/yes-virginia-cooler-objects-can-make-warmer-objects-even-warmer-still/>

My analysis and conclusions were posted 6Nov11 at

<http://climaterealists.com/index.php?id=8610&linkbox=true&position=2>

The source I prepared is attached for your consideration: No Virginia Cooler Objects Cannot Make Objects Even Warmer Still edited.pdf

I attached my earlier publication: Thermostat CO2 HPFeb10.pdf

I hope you find them interesting and informative. I welcome any claims of provable errors I may have made; I want to learn, I have no stake in the outcome.

My resume is available upon request.

Sincerely

Pierre R Latour, PE, PhD Chemical Process Control Systems Engineer
President, CLIFFTENT Inc.
Houston

From: Roy Spencer [<mailto:roywspencer@hotmail.com>]

Sent: Monday, November 07, 2011 5:49 PM

To: sr2@msn.com

Subject: RE: No Virginia, Cooler Objects Cannot Make Warmer Objects Even Warmer Still

Hi Pierre:

Good to hear from you.

Rather than the hypothetical experiment with plates, etc., let me ask you one question:

Why does a hand-held IR thermometer measuring a clear sky apparent temperature of, say, 0 deg. F, increase its reading to, say, 40 deg. F when it is pointed at a low cloud, in both cases the ground air temperature being (say) 60 deg. F?

The point is that the sky-viewing portion of the thermopile warms when it is pointed at the cloud, even though the thermometer itself is warmer than the cloud. How do you explain that without downwelling IR radiation being part of the atmosphere's (and surface's) energy budget?

-Roy

From: sr2@msn.com

To: roywspencer@hotmail.com

Subject: RE: No Virginia, Cooler Objects Cannot Make Warmer Objects Even Warmer Still, v1.1

Date: Tue, 8 Nov 2011 09:38:51 -0600

Dear Roy Spencer,

Both questions are easy. Your next to last sentence is correct.

Q1: Because that cloud can re-radiate absorbed solar radiation more intensely than transparent, low density air. IR pyrometers measure intensity of radiation (and corresponding Boltzmann temperature), a point property of EMR field at the receiving pyrometer sensor (thermopile), generated by some body, like a nearby cloud. (Gee, that sounds poetic, make a good song lyric.)

Thermometers and thermocouples measure a different point property, thermal temperature of matter, the molecules surrounding the bulb or thermocouple, like the surface air around it. Radiating matter has two different types of temperatures.

That is why we use pyrometers to measure radiation intensity of electric fields and thermometers to measure thermal heat intensity of gases, liquids and solids. (This is basic physics, chemical engineering and instrumentation business.)

One of many causes of confusion in the low level public literature on GHG is failure to understand these two temperatures and how they are related to two different physical phenomena and energy

transfer mechanisms: radiation by 300k km/s pure energy field of zero mass and slow conduction/convection by matter.

Q2: So Earth's surface and atmosphere has two kinds of temperatures, just like a burning log or candle; one for radiant energy (mostly to space) and one for thermal heat (trapped in our thermos bottle). GHG theory is all mixed up. "Down welling IR radiation", just like all radiation is certainly a part of Earth's energy budget; reflected, scattered, transmitted and absorbed (by colder molecules only).

The references I supplied do a better job answering your questions than I can.

Does your prompt abandonment of your hot plates thought experiment indicate you see I may have a point? How firm are you in your belief *Cooler Objects Can Make Warmer Objects Even Warmer Still*? If you have elevated that assumption beyond belief to knowledge and your mind is quite closed on the subject, please tell me in fairness; we are both busy.

Thanks for your prompt reply, questions and interest in my views. Feel free to ask more questions. Your reply made history; only the second time I know of where a meteorologist responded to a chemical engineer (Richard Lindzen did in 2009). Your attached [TruthAboutClimateChangeOpenletterFeb11.pdf](#) was sound engineering and an act of courage.

To learn why process control engineering standards for knowing truth exceed scientists, study attached [FbKnwArtLtrs BentWinSpg11.pdf](#) (my 2 cts on last page).

Pierre R Latour, Chemical Process Control Systems Engineer

From: Roy Spencer [<mailto:roywspencer@hotmail.com>]

Sent: Tuesday, November 08, 2011 9:56 AM

To: sr2@msn.com

Subject: RE: No Virginia, Cooler Objects Cannot Make Warmer Objects Even Warmer Still, v1.1

Pierre:

But the IR thermometer measurements can prove the same point at night, too! OK, so do the test INSIDE your house....let the IR thermometer warm up in your hand, then point it at the inside of a refrigerator (reading a cold temperature). Then point it at the outside of the refrigerator (reading close to room temperature). (Turn the light off in the room and do it again. Same result.)

And, yes, I am aware of the differences between thermometers, pyrometers, thermocouples, etc.

I have not abandoned the theoretical example of hot and cold plates...instead, the IR thermometer test described above is the most direct proof of the concept, which you can perform yourself. Because the lens-illuminated side of the thermopile is actually changing its temperature in response to changes in incident IR, and will warm even if the object it is viewing is colder than the thermopile (when its field of view is changed from the inside of the refrigerator to the outside).

Pierre, surely you are smart enough to recognize this as basic thermal radiation physics.

-Roy

From: Pierre Latour [mailto:sr2@msn.com]
Sent: Wednesday, November 09, 2011 12:18 PM
To: 'Roy Spencer'
Subject: Cooler Objects Cannot Make Warmer Objects Even Warmer Still, v1.2

Dear Roy Spencer,

Thank you for your second reply below, 18 min after I sent mine. You are quick on the draw.

So you want to modify your experiment a third time. You can do that forever. Rather than trying to disprove my explanation by simply asking me to explain all your experiments, you should work to prove your own theory, or better yet disprove it; you first Alphonse.

Recap. First a recap to ensure we are on the same page(s). We are discussing a very important issue for mankind. Back-radiation from cold GHG reabsorbed by warmer surface is one foundation pillar of GHG theory supporting AGW and CO2 pollution forecasts. See famous Kiehl-Trenberth diagram attached, particularly far right side. Since 1997 Kyoto Protocol, world governments have spent > \$100 billion with government and academic groups to prove fossil fuel combustion increases CO2 and warms the Earth significantly. The back-radiation hypothesis of GHG theory has been cracking under skeptic's scientific scrutiny for years and is crumbling into the dust bin of history these days. Many powerful vested interests are waging a world-wide war to rescue it. Australia just adopted a carbon tax law on 7Nov11 which Viv Forbes claims will cripple Australian industry. Greece, Spain, Italy, Ireland, Europe, Japan, Mexico and US can no longer afford to borrow from future generations to finance more GHG theory research and the world is left to rely on Syria, Iran, N Korea and Zimbabwe to take up the slack. I realize US DoE, EPA, Congress, NAS, UN IPCC, *National Geographic*, American Meteorological Society, most universities and the "overwhelming consensus" of meteorologists and scientists believe in back-radiation, fervently, for some reason. I just can't find out what it is. I would like to get it right for once, so I can rest in peace. They tell me I must accept it on their authority. After all, Al Gore won the popular vote in Nov 2000. Even though I am an environmentalist, I fear when AGW promoters discover I remain skeptical, have questions, and proved *Cooler Objects Cannot Make Warmer Objects Even Warmer Still*, they will get upset, perhaps even angry. I am afraid I will be called derogatory names like truth denier, oil industry lobbyist, wing-nut, ding-bat, or nut case. I **hope** they can **change** and don't hurt me. I consider Roy Spencer a hero.

I think the use of historic data to build statistical regression models capable of forecasting, without the underlying relationships of physics and chemistry, mass, energy and momentum conservation and rate laws, is known to be a fundamentally flawed method. It would be like regressing hourly stock market price data for forecasting. If Prof Michael Mann, University of East Anglia and UN IPCC can do it for climate, they can do it for investments and retire to Monaco. The HPI abandoned that approach for rigorous engineering models of oil refinery processes by 1970, because empirical regression models do not work in distillation column feedback

control systems where accurate extrapolation, not just interpolation, is required. Expert systems are no longer in vogue for similar reasons.

I have identified several more chemical engineering flaws in GHG theory. What a tangled web we weave, when -----.

Move on. I am pleased you want to move on from hot plates and my reply, seek my assistance to refute more GHG theory errors. I assume you have read all of my original analysis and references, found no errors and concur with my conclusions. Attached *Cooler Objects Cannot Make Warmer Objects Warmer Still.pdf* replaces the *.pdf I sent you; it clarifies one equation; the conclusion remains valid. My mathematical model of your theory represents it correctly. (If not, could you provide the correct math and physics? And please identify where the net increase in energy radiation from your two plates comes from; the energy balance on your whole system and every component in it.) I was correct to assume your hot plate > 150F radiates to all its 0F surroundings, not just to the cold plate. Otherwise how could one explain if a hotter surface can absorb cold incident re-radiation, heat further and radiate more, then why can they also say on the second merry-go-round round the cold surface does not absorb the hotter radiation and re-radiate it a second time? One iteration is enough?

Background. Consider reshaping the colder plate to a parabola. We know radiation (and thermal) shields, reflectors, lenses and telescopes focus radiation, $A_1 \cdot I_1$, by increasing incidence over a smaller area, $A_2 \cdot I_2$, from constant receiving power, watts = $e \cdot A_1 \cdot I_1 = a \cdot A_2 \cdot I_2$. So $I_2 = I_1 \cdot (eA_1/aA_2)$. If a cold absorber focuses large A_1 to smaller A_2 such that $aA_2 < eA_1$, then $I_2 > I_1$. If hot focused spot Boltzmann $T_1 > T_2$ of receptor, receptor can absorb it, even if emitter $T_1 < T_2$. Focused solar eclipses burn holes in paper on Earth. Now some skeptics of my explanation conclude this proves back-radiation from a cold body to a hot one can be absorbed by the hot one, making it hotter, which of course, with proper understanding of the English words, does not follow. Beware of Mumbo Jumbo.

My radio antenna detects and absorbs cold radio waves but it does not reemit them with higher intensity than it intercepted them. My 1200 w microwave oven heats coffee to boiling; when I turn it off the boiling stops abruptly, within a few seconds. I suppose coffee re-emits some intense (hot) microwaves converted to IR for a while. I think the IR rate drops very quickly when the oven stops and equalizes with my kitchen IR as I drink it. I am not able to determine how long the coffee continues to radiate above background T.

I accept radiation detector surfaces need not be colder than the incident radiation to detect and measure cold radiation. My eyes see ice. My eyes do not re-radiate ice light. Penzias & Wilson detected [CMBR](#) = 3.7 K in 1964 with a radio telescope in a warmer NJ. Radio telescopes do not re-radiate CMBR. I suppose warm IR thermometers can indeed measure radiating temperature of colder refrigerators, without absorbing refrigerator radiation and warming further. What does that have to do with whether warm radiators get warmer from cold re-radiation?

Regarding "back-radiation", physics professor Nasif Nahle wrote: "I prefer to call it "downward" radiation, not "backradiation", for the same reasons you expose. Downward radiation can be composed of two or more sources; remember the atmosphere is heated up also by solar radiation. The air absorbs 14% of solar radiation before it touches the surface. Oxygen, water vapor, and dust are the components of the air that absorb directly part of the incoming solar radiation. We cannot count the whole percentage of solar energy absorbed by the atmosphere as energy emitted towards the surface as a warm wrapper because it is dispersed immediately to winds, in the form of kinetic energy, to space like thermal radiation, and to other systems like unusable potential energy. However, the main reason other systems do not absorb thermal radiation from the atmosphere is that the wavelength of the emitted electromagnetic energy does not correspond to thermal energy, i.e. it cannot be transferred as heat to other systems, because of redshift. Downward radiation exists, but it cannot warm up systems that are warmer than the air."

http://www.biocab.org/Mean_Free_Path_Length_Photons.html

Clouds. With that, let us consider your question about clouds.

I accept your description of your experimental evidence is valid. You say clouds radiate more IR than open clear sky (not transient but at steady-state, 0200). I accept that because a cloud has liquid and therefore higher density than clear, transparent sky, so cloud can convert the internal energy it absorbed from daylight to lower T IR (I am not an expert at how and how fast matter actually does this). Easy to accept clouds radiate more intensely (higher T) than gas. If night cloud IR intercepted by surface is warmer than surface, $T_i > T_s$, surface can absorb some of it and reradiate some. But it cannot absorb it if $T_s < T_i$. To conclude Earth's warmer surface absorbs colder IR from clouds, one must assume IR pyrometers are radiators; I need proof. See [Pyrometer](#) and [Infrared thermometer](#); neither mentions radiating pyrometers. Thin [filament pyrometers](#) developed since 1988 improved measurement of gases. Since the distance to spot ratio is hard to set for clouds, IR readings may not be accurate. (Thanks for assuring me I am smart enough to recognize basic thermal radiation physics. You probably reached that conclusion from my work to help you understand why *Cooler Objects Cannot Make Warmer Objects Even Warmer Still.*)

Whether IR detectors or Earth surface absorbs radiation from nighttime clouds, warm and re-radiate back still depends on the nature of the incident spectrum and the interceptor, so I cling to my belief warmer radiating surface will not absorb colder cloud radiation either.

Your night experiment is easily explained: low lying clouds radiate IR in the dark for a while, like my house and body do. How they do that is a different subject; your job. My experience is they radiate differently (probably by reflection) in daytime than at nighttime, in the visible to my eyes. Moonlight helps me see them at night radiating by reflection.

So far I have refuted every back-radiation claim I have encountered; no one has refuted any of mine. Since some of your questions are answered in the references I provided and a new book "Slaying the Sky Dragon", 2011, (<http://www.slayingtheskydragon.com/>), I suggest you read them. If you have any further questions for me, be assured I will reply with my best understanding or "I don't know".

Roy, surely you are smart enough to recognize cold radiating plates warming hot radiating plates to radiate more intensely violates basic physics. When you think our exchange reaches the quality of your "Yes Virginia" blog, Jul11, you have my permission to post our exchange on your blog, entirely. May I pass it to Richard Lindzen and Marc Morano? My *Cooler Objects Cannot Make Warmer Objects Even Warmer Still* is already at [Climate Realists](#) and [Climate Change Dispatch](#).

Math Theorem: The set of all incorrect statements includes the set of all politically incorrect statements, so a correct statement can never be politically incorrect. QED.

Pierre R Latour, Gaston

Slay Sky Dragon Blog:

<http://www.slayingtheskydragon.com/en/blog/185-no-virginia-cooler-objects-cannot-make-warmer-objects-even-warmer-still>

Nullius In Verba (NinV@mailinator.com, IP: 92.18.204.140) — 2011-12-19 12:47
Just for fun, I had a go at re-working Spencer's example more precisely.

We start with a 1 m² thin black-body plate in a vacuum chamber with walls held at 0F (thermostat controlled, variable power). To keep the geometry simple, we assume the chamber is the same shape as the plate and only slightly bigger, so we can treat it as flat plates to either side and ignore end/incidence angle effects. The plate is supplied with 1018 W to the heating element, and radiates 748 W/m² to either side. It's total area for both sides is 2 m² so it radiates 1496 W. It receives 239 W/m² from the walls at 0F, total from both sides 478 W. The net power lost by radiation is 1496 - 478 = 1018 W. The plate is in thermal equilibrium.

Now we add a second thin 1 m² plate parallel and very close to the first one. This one is unheated. The temperature of the new plate is 112F, radiating 578 W/m², 578 W to either side. The original plate increases in temperature to 182F radiating 917 W/m², 917 W to either side. The original plate radiates 1834 W in total, receives 239 W from the wall on one side, and 578 W from the unheated plate on the other. 1834 - 239 - 578 = 1017 W net radiated (rounding error). The second plate radiates 1156 W in total, and receives 917 W from the heated plate on one side, and 239 W from the vacuum chamber wall on the other. 1156 - 917 - 239 = 0 W.

Spencer, I think, made the numbers up for illustration. I expect that with the right geometry they could be achieved, but for people who don't consider the physics obvious, doing it with less than full rigour is probably a mistake.

And the whole thing is a completely pointless exercise as far as AGW is concerned, since the 'greenhouse effect' warming isn't actually caused by back-radiation. It's a consequence of the increased average altitude of emission to space combined with the limit the adiabatic lapse rate sets on convection. Backradiation does exist, and is absorbed thermally, but there are comparable situations where backradiation is just as intense and no warming occurs - because the adiabatic lapse rate is near zero and therefore convection can carry all the excess heat away.

Latour Reply Posted 1330 cdt 21Dec11

Verba starts by postulating a situation similar to mine, also in perfect agreement with the First Law: $inputs = 1018 + 239 + 239 = 1496 \text{ w/m}^2 = outputs = 748 * 2$.

The difference is Verba postulates all cold incident radiation $239 (-18C) * 2$ is absorbed by the hot plate that would otherwise radiate at $1018/2 = 509 (34.8C)$ if the incident 239 were reflected and scattered to surroundings instead of absorbed. He assumes absorptivity = 1, no matter what the intensity/temperature or spectrum of the incident 239 from surroundings. And this cold $239 (-18C)$ is postulated to be reradiated to surroundings at $748 (66C)$. This assumes plate is a black body with emissivity of 1, no matter what color it actually is. This means cold $239 (-18C)$ incident radiation is upgraded to hot $748 (66C)$ radiation.

Dr Claes Johnson, "Slaying the Sky Dragon", 2011, Chapter 19 shows this violates Second Law. Many scientists and radiation engineers agree. The debate is whether the incident 239 is absorbed and reradiated by colorful, real plates or merely reflected, scattered or transmitted. Surroundings see the same $239 * 2$ either way. Question is which path does it follow? Verba says absorbed and reradiated at higher T, Johnson says reflected.

My understanding is Prof Nasif Nahle has performed an experiment that proves Claes Johnson is correct about back-radiation. So Verba must provide experimental evidence he can build such a system that behaves according to his postulate.

Verba introduces the second plate, $578 (44.75C = 112.55F)$, postulating a situation similar to mine, also in perfect agreement with the First Law: $inputs = 1018 + 239 + 578 = 1835 \text{ w/m}^2 = outputs = 917.5 * 2$.

The difference is Verba postulates all cold incident radiation $239 (-18C)$ is absorbed by the hot plate that would otherwise radiate at $(1018 + 578)/2 = 798 (71.4C)$ if the incident 239 were reflected and scattered to surroundings instead of absorbed and all hotter incident $578 (44.75C)$ is absorbed and reradiated. He assumes absorptivity = 1, no matter what the intensity/temperature or spectrum is of the incident 239 from surroundings. And this cold $239 (-18C)$ is postulated to be reradiated to surroundings at $798 (71.4C)$. This assumes plate is a black body with emissivity = 1, no matter what color it actually is. This means cold $239 (-18C)$ incident radiation is upgraded to hot $798 (71.4C)$ radiation. That does not seem to be in accord with Second Law.

However since second plate has no power supply, if it is a black body it will immediately cool to $<509 (<34.8C)$, decreasing with distance from the radiator. It has no effect on either first plate or surroundings; it just absorbs and emits = 1. If it is colorful, it will cool more and radiate less intensely. Both plates remain in harmony with both Laws of thermo.

Verba closes with claim Dr Roy Spencer's exercise relative to GHG theory is pointless because GHG theory does not employ back-radiation. So he is dismissing Kiehl-Trenberth diagram of GHG theory and invokes yet another ill-defined version of GHG

theory. In fact he agrees with me “back-radiation” does not exist (as I have defined it), after assuming it does from the start. This is called incoherence.

Verba did not find any fault in my math and engineering proofs that back-radiation violates both First and Second Laws of thermodynamics. He demonstrates he understands the First Law. But there is more to physics than the First Law.

Ceri Phipps2011-12-22 14:27

Spencer uses an interesting observation which I have noticed myself on many occasions and that is that on a cold clear night with snow on the ground, when a cloud comes along, the air temperature rises. Given that the snow forms an effective insulator, and presumably the air becomes colder with height, where does the energy come from to increase the temperature at the surface.

Latour Reply Posted 1823 cdt 25Dec11

I observe the same thing, with or without snow on the ground.

Air thermal temperature decreases with altitude; solar radiation intensity increases.

Nighttime clouds radiate more energy down than the clear night air they displace, because they have greater mass and radiating surface. So the air below absorbs more radiation from clouds and warms. When clouds pass, night air cools.

Daytime clouds reflect, scatter and absorb more solar radiation than the clear blue sky they displace, because they have greater mass and absorbing surface. So less solar radiation reaches the air and surface below and it cools. When clouds pass sunshine returns and daytime air warms.

Since Dr Roy Spencer did not refute this elementary explanation after I offered it, it is fair to conclude he accepts it.

#Nullius in Verba2012-01-09 14:04

Hi Pierre,

Yes, I assumed black body, for simplicity. It's easy enough to do grey body (e.g. emissivity 0.98), and rather harder but still possible to do coloured bodies, but there's not much point since you don't believe in the standard absorption/emission physics anyway. My aim was simply to give a more rigorous version of Spencer's example, for clarity. Arguing the case that it's correct would take a far longer comment, and there's a comment length limit here that makes that difficult.

The Kiehl-Trenberth diagram isn't the basis of the GHG theory. The original Arrhenius mechanism was disproved shortly after publication by Angstrom. The modern theory was developed in the 1960s, works in a completely different way to the Arrhenius back-radiation/trapping argument, and is rarely explained in public by climate scientists. I've written on it extensively elsewhere - e.g. see Climate Etc. 'Best of the Greenhouse'. You're aiming at the wrong target.

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#Pierre R Latour2012-01-10 11:01

Nullis in Verba, Thanks for your interest in my work and concession you simplified Earth's atmosphere to an imaginary black body. It is easy enough to handle real, colorful bodies, as I did in my analysis of Roy Spencer's claim cold bodies heat warmer ones, which I fit in the limited space available. I assume you are not able to refute it. By the way, Hoyt Hottel, "Radiant Heat Transmission", 1954, measured emissivity of CO₂ = 0.002, not very black.

You are quite correct, I do not believe in the "standard absorption/emission physics", promoted by GHG theorists, because it has been easily falsified on many grounds by professional physicists, chemists and engineers as outside science. Study Gerlich & Tschuschner, "Falsification of the Atmospheric CO₂ Greenhouse Effects Within the Frame of Physics", Jan 2009 (arxiv.org/abs/0707.1161) and Kramm & Dlugi, "Scrutinizing the atmospheric greenhouse effect and its climatic impact", Dec 2011 (www.scirp.org/journal/PaperInformation.aspx?paperID=9233). I understand why you are compelled to clarify Spencer's example with some clarity, as I did. My aim also was simply to give a more rigorous version of Spencer's example, for clarity.

Your claim K-T is not the basis of GHG theory is novel; requires some evidence. What is the basis of GHG theory, pray tell? I agree the "Arrhenius back-radiation/trapping argument" was disproved long ago, but I have 2011 references supporting it to defend GHG theory. I also agree your "the modern consensus, mainstream theory, developed in 1960's" is rarely if ever explained in public by GHG promoters and remains obscure, without any authors. I have a plausible explanation for this strange situation.

Like the moon, Venus and every planet with or without an atmosphere, Earth's atmosphere makes the surface cooler than it would be if the atmosphere were thinner or nonexistent, because it absorbs highly directional solar radiation and scatters and emits it in all directions. The more mass and thickness, the cooler the surface becomes. Gravitational compression of gases explains the universal decrease in thermal temperature with altitude nicely. Rather than

acting like an insulating thermal blanket, an atmosphere acts like a radiation reflector/absorber/emitter.

I trust this clarifies the mystery for you and we are in close agreement. Have you purchased and read O'Sullivan, et al, "Slaying the Sky Dragon – Death of the Greenhouse Gas Theory", 2011?

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Greenhouse Gas Theory Trashed as Dissenters Build Compelling Case, John O'Sullivan

<http://www.slayingtheskydragon.com/en/blog/189-greenhouse-gas-theory-trashed-as-dissenters-build-compelling-case>

Barry Bird 2012-01-27 13:51

Arguments have to be good to successfully demolish the well-established green house gas theory. Some seem to me to be good, others questionable, and that weakens the case.

The argument that heat cannot pass from cold to hotter bodies, thus decreasing entropy, which is against the second law of thermodynamics looks like a killer argument to me. The heated ground can radiate to the colder atmosphere above it, but the reverse cannot happen, and surely this putative reverse radiation is what constitutes the greenhouse effect. However the paper then goes on to say that energy is created, violating the first law. They are only saying that existing heat is radiated back, as I understand it, not that more is created. This part seems wrong to me and unnecessary. The second law is violated. That is quite enough - although the law only applies to closed systems. That issue ought to be addressed.

The paper also says that the atmosphere acts to attenuate the incoming solar radiation, according to the Beer-Lambert law. This sounds good to me. It is evidenced in the oceans, the way light only penetrates to a certain depth, and the heat of the Moon's sunlit surface in the absence of an atmosphere, the Moon being at the same distance on average from the Sun as the Earth, and so receiving the same level of radiation. This provides the explanation of the moderating effect of the atmosphere that we experience: it is not due to some greenhouse effect. I would say that yes, the atmosphere is a refrigerator during the day, but at night it is a blanket, impeding the loss of heat by radiation. However the paper then goes on to say that the atmosphere is heated by adiabatic compression, as you get in diesel engines. That may have been true once, but that must have been a long time ago and the heat would have dissipated by radiation and convection long ago. The temperature can only be maintained by solar radiation. The

higher heat capacity of CO2 is hardly significant!

Nevertheless this is a useful article. I learnt something from it.

#**Pierre R Latour**2012-01-10 11:01

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I recently proved the GHG theory back-radiation assumption that violates the Second Law, energy transfers only from hot to cold, leads naturally as a consequence to creation of energy, a violation of the First Law as well.

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Study my definitions and concluding equation for the change in radiation rate from the GHG back-radiation assumption:

$$E_s = [(1 + k) * K * F_0 + (1 + K) * k * f_0] / (1 - kK) - K * F_0 = (K * F_0 + f_0) (1 + K) k / (1 - kK).$$

Since the denominator is $0 < (1 - kK) < 1$, it follows that for any $K > 0$ and $k > 0$, $E_s > 0$. $E_s = 0$ if and only if $k = 0$. k is the fraction of back-radiation.

This is an example of the classic mistake made by those who attempt to engineer things that violate the Second law, perpetual motion machines.

That is your killer argument #2.

Bird seems to have missed the main point of this Whatchamacallit essay, the bogus vector math 33C GHG effect is your killer argument #3. I do not know how many strikes the CO2 Sky Dragon gets. I agree science requires only one.

GHG promoters actually claim a bias to perpetual global warming, which needs a perpetual motion machine to sustain it. It seems reasonable to suspect they invented this PMM to justify their AGW claim. QED.

I agree the higher heat capacity is hardly significant; it only affects the transient response lag time to changes in thermal heat inputs and outputs. CO2 "traps" a bit of heat, with higher internal energy/mol-C, a cooling effect.

Some physicists tell me the Second Law applies to the universe as a whole, open or closed, contracting, expanding or accelerating.

Anyway the thin atmosphere wrapping Earth is bounded by solids and liquids on one side and empty space on the other, closed to mass and heat transfer, not radiation. It scatters, reflects, attenuates and absorbs/reradiates radiation intensity penetrating in either direction, from sun or Earth, provided it is intense enough.

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#**Pierre R Latour**2012-01-28 19:16

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slayingtheskydragon.com/.../...

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