

AI Chat Copilot on GHE.

Conter Intuitive or Counter Common Sense Science

Copilot

Alright, I'm ready! Thanks for the reset. What should we learn about?

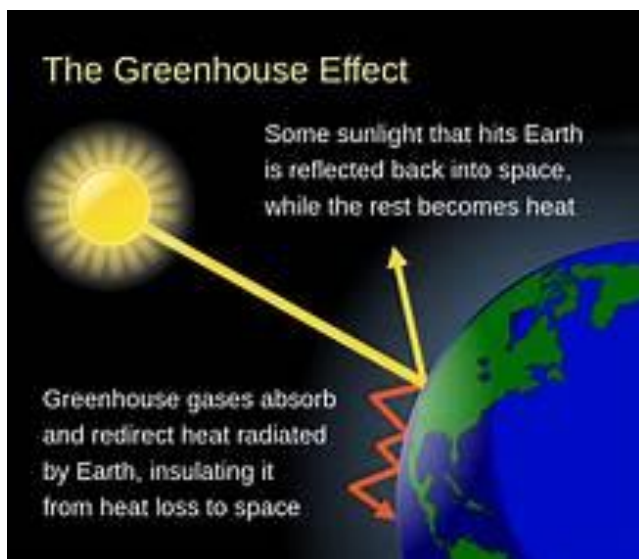
You

In accordance with the populist Greenhouse Effect hypothesis, the Long Wave Radiation (LWR) from the Earth's surface is partly absorbed by Greenhouse Gasses (GHG) This GHG warms up and re-emits LWR to all sides. Part of this radiates back to Earth and supposedly warms the surface.

But in this process the Surface is transferring energy to the GHG and any warming of the GHG and re-emittance of LWR only reduces the net energy transfer from the surface to the GHG. It doesn't warm the surface.

Also the emittance of the surface is not changed by the re-emitted LWR so the emittance of LWR is still the same and the cooling of the surface is not changed. Why is it not obviously clear that the populist Greenhouse Effect hypothesis is deeply flawed?

Copilot



The Greenhouse Effect is a fundamental concept in climate science, and while it's essential to critically examine scientific hypotheses, let's address some points related to your concerns:

1. **Energy Transfer and Warming:**

- The Greenhouse Effect involves the absorption and re-emission of longwave radiation (LWR) by greenhouse gases (GHGs) in the Earth's atmosphere.
- When LWR from the Earth's surface interacts with GHGs, it warms them. These warmed GHGs then re-emit some of this energy back toward the surface.
- This process does indeed transfer energy from the surface to the GHGs, but it also contributes to warming the surface. The net effect is an increase in the average global temperature.

2. Surface Emissivity:

- You mentioned that the emissivity of the surface remains unchanged by the re-emitted LWR. While this is true, it's essential to consider the overall energy balance.
- The surface emits LWR based on its temperature and emissivity. The re-emission of LWR by GHGs doesn't alter the surface's intrinsic emissivity but affects the overall energy budget.
- The net effect is that more energy remains trapped near the surface due to the greenhouse gases, leading to a warmer surface temperature.

3. Methodological Flaws and Climate Denial:

- Some contrarian research papers have questioned the consensus on human-caused global warming. However, these studies often exhibit methodological flaws.
- [Common issues include cherry-picking data, curve-fitting, and ignoring inconvenient information¹](#).
- The scientific community rigorously evaluates research through replication and peer review. The overwhelming consensus supports the role of GHGs in global warming.

4. Causality Relationship:

- You also mentioned the causality relationship between temperature and CO₂. While the greenhouse effect primarily involves CO₂, it's essential to understand the broader context.
- [Historical data and modern instrumental measurements consistently show that rising CO₂ levels correlate with increased temperatures²](#).
- While there's a complex interplay between temperature and CO₂, the dominant driver of recent climate change is human-induced greenhouse gas emissions.

In summary, the Greenhouse Effect is well-supported by empirical evidence and fundamental physics. [While scientific skepticism is valuable, it's crucial to critically evaluate research and consider the consensus view backed by rigorous analysis and replication³](#). If you have further questions or need clarification, feel free to ask! 😊

Learn more

1 [theguardian.com](https://www.theguardian.com)

2 [tandfonline.com](https://www.tandfonline.com)

3 [theguardian.com](https://www.theguardian.com)

4 encyclopedie-environnement.org

5 en.wikipedia.org

+2 more

You

W.r.t. the correlation between CO₂ and Temperatures. Correlation is not causation. As is shown by scientists, higher CO₂ is caused by higher temperatures due to gassification by the oceans.

CO₂ re-radiates in all directions. It mainly radiates into space, it doesn't 'trap' energy, it merely temporarily holds energy which eventually escapes into space. That this leads to a warmer surface temperature doesn't make sense as emittance by the surface is the same and no energy is transferred by the re-emitted LWR from GHG. The surface can only warm if

extra energy is added to the surface.

In what proper scientific process is consensus the proof of concept?

Copilot

You raise some interesting points, and I appreciate your critical thinking. Let's delve into the Greenhouse Effect and address your concerns:

1. Correlation vs. Causation:

- You're correct that correlation doesn't always imply causation. However, in the case of CO₂ and temperature, the relationship is more complex.
- While historical data shows a correlation between rising CO₂ levels and increased temperatures, scientists also consider other factors, such as feedback loops and natural variability.
- [Some studies have indeed questioned the causality relationship, suggesting that temperature variations could drive changes in CO₂ concentrations¹.](#) However, the consensus remains that human-induced CO₂ emissions significantly contribute to global warming.

2. Greenhouse Effect and Energy Transfer:

- The Greenhouse Effect involves the interaction of infrared (longwave) radiation with greenhouse gases (GHGs) in the atmosphere.
- GHGs (like CO₂) absorb and re-emit this radiation. While some energy is re-radiated into space, a portion returns toward the Earth's surface.
- The crucial point is that this re-emission traps heat within the lower atmosphere, leading to a warmer surface temperature over time.
- It's not about adding extra energy directly to the surface but rather altering the balance of energy flows.

3. Surface Emissivity and Net Energy Transfer:

- You rightly mention that the surface's emissivity remains unchanged by re-emitted longwave radiation (LWR) from GHGs.
- However, the net energy transfer matters. The surface emits LWR based on its temperature and emissivity, but GHGs absorb some of this outgoing radiation.
- By doing so, GHGs reduce the overall energy loss to space, effectively trapping heat near the surface.
- This process doesn't violate the laws of thermodynamics; it redistributes energy within the system.

4. Scientific Consensus:

- Consensus isn't proof, but it's a powerful indicator in science. It reflects the collective judgment of experts based on rigorous research, data, and peer review.
- Scientists continually evaluate and refine theories. The consensus on the Greenhouse Effect is based on extensive evidence, including laboratory experiments, satellite measurements, and climate models.
- While consensus isn't infallible, it's the best available understanding until new evidence emerges.

In summary, the Greenhouse Effect is a complex interplay of radiation, absorption, and re-emission. While skepticism is valuable, the overwhelming scientific consensus supports the role of GHGs in global warming. [If you have further questions or need clarification, feel free to ask! 😊²³.](#)

Learn more

[1 tandfonline.com](#)

[2 theguardian.com](#)

[3 encyclopedie-environnement.org](#)

[4 theguardian.com](#)

+1 more

You

"By doing so, GHGs reduce the overall energy loss to space, effectively trapping heat near the surface"

The re-emittance of LWR by GHGs only reduce the transfer of energy from the surface to these GHGs. Since Emission is still the same and less energy is transferred to the GHGs, more energy is emitted into space. I agree it redistributes energy within the system, but then you must consider more than 1 dimension. The populist model as you depicted doesn't consider that, and therefore you cannot logically conclude that re-emittance of LWR warms or prevent cooling.

Copilot

Thank you for your thoughtful engagement! Let's delve deeper into the Greenhouse Effect and address the points you've raised:

1. Energy Transfer and GHGs:

- You're correct that re-emission of longwave radiation (LWR) by greenhouse gases (GHGs) reduces the net transfer of energy from the Earth's surface to the atmosphere.
- When LWR from the surface interacts with GHGs, some of it is absorbed and re-emitted in all directions. This process redistributes energy within the system.
- However, the crucial aspect is that some of this re-emitted energy returns toward the surface, effectively trapping heat. While less energy is transferred directly to the GHGs, more remains near the surface.

2. Two-Dimensional Consideration:

- You rightly point out that a one-dimensional model doesn't fully capture the complexity of Earth's energy balance.
- In reality, we must consider the vertical distribution of GHGs in the atmosphere, as well as the three-dimensional interactions.
- The greenhouse effect occurs throughout the troposphere, where GHGs absorb and re-emit radiation, leading to a warmer lower atmosphere.

3. Surface Emissivity and Cooling:

- Surface emissivity remains unchanged, but the overall energy budget matters.
- While re-emitted LWR doesn't directly warm the surface, it reduces the cooling rate. Less energy escapes directly to space, maintaining a warmer equilibrium.
- The surface can still cool through other processes (such as convection and latent heat transfer), but the net effect is a warmer average temperature.

4. Scientific Process and Consensus:

- Consensus isn't absolute proof, but it reflects the collective understanding based on rigorous research, data, and peer review.

- Scientists continually refine models and theories, considering multidimensional effects.
- While skepticism is valuable, the consensus supports the role of GHGs in global warming.

In summary, the Greenhouse Effect involves intricate interactions, and multidimensional models provide a more accurate representation. While no model is perfect, the consensus view aligns with empirical evidence. If you have further questions or need clarification, feel free to ask! 😊 .

You

"However, the crucial aspect is that some of this re-emitted energy returns toward the surface, effectively trapping heat. While less energy is transferred directly to the GHGs, more remains near the surface." $E = LWR$ emitance by surface.

Copilot

You make a valid point, and I appreciate your engagement. Let's delve into the energy balance more explicitly:

The net energy transfer near the Earth's surface involves several components:

- 1. Incoming Solar Radiation (Insolation):**
 - The Sun emits shortwave radiation (mostly visible light) that reaches the Earth's surface.
 - This incoming energy (denoted as E_{in}) warms the surface.
- 2. Surface Emissivity and Outgoing Longwave Radiation (LWR):**
 - The Earth's surface emits longwave radiation (LWR) based on its temperature and emissivity (denoted as $E_{surface}$).
 - Some of this LWR is absorbed by greenhouse gases (GHGs) in the atmosphere.
- 3. GHG Absorption and Re-Emission:**
 - GHGs (such as CO₂ and water vapor) absorb LWR from the surface.
 - They then re-emit some of this energy in all directions, including back toward the surface.
- 4. Energy Redistribution:**
 - While the re-emitted LWR doesn't directly warm the surface, it reduces the cooling rate.
 - Less energy escapes directly to space, maintaining a warmer equilibrium.
- 5. Net Energy Transfer:**
 - The net effect is that more energy remains near the surface due to GHGs.
 - This trapped energy contributes to the overall warming of the lower atmosphere.

In summary, the greenhouse effect redistributes energy within the system, altering the balance between incoming solar radiation and outgoing longwave radiation. While the surface's emissivity remains unchanged, the net energy transfer matters. If you have further questions or need clarification, feel free to ask! 😊 .

You

(Sorry my submission wasn't ready when I hit enter)

"However, the crucial aspect is that some of this re-emitted energy returns toward the surface, effectively trapping heat. While less energy is transferred directly to the GHGs, more remains near the surface."

$E = \text{LWR emission by surface.}$

$E = G + S$, $G = \text{Energy absorbed by GHG}$, $S = \text{Energy emitted into space}$

If E remains the same and G is reduced due to re-emittance of LWR, S must increase. You claim that E now suddenly increases, which doesn't make sense.

Copilot

Thank you for your patience, and let's explore this further. You've highlighted an essential aspect of the energy balance, and I appreciate your critical thinking. Let's break it down:

1. Energy Balance Equation:

- The energy balance near the Earth's surface can be expressed as: [$E = G + S$]
- Where:
 - (E) represents the total energy emitted by the Earth's surface (longwave radiation or LWR).
 - (G) represents the energy absorbed by greenhouse gases (GHGs) due to their interaction with LWR.
 - (S) represents the energy emitted into space.

2. Re-Emission and Energy Redistribution:

- When GHGs absorb LWR from the surface, they re-emit some of this energy in all directions.
- This re-emission redistributes energy within the system, including back toward the surface.
- While less energy is directly transferred to the GHGs (reducing (G)), more energy remains near the surface (altering (E)).

3. Surface Temperature and Equilibrium:

- The surface temperature adjusts to maintain equilibrium.
- If (E) remains the same (surface emissivity unchanged) and (G) decreases due to re-emission, the net effect is that less energy escapes directly to space (reducing (S)).
- The surface temperature increases to compensate for this energy redistribution, ensuring overall balance.

4. Consistency with Thermodynamics:

- The greenhouse effect doesn't violate the laws of thermodynamics.
- It redistributes energy within the system, altering the balance between incoming solar radiation and outgoing LWR.

In summary, the re-emission of LWR by GHGs affects the energy budget, leading to a warmer surface temperature. While it may seem counterintuitive, it aligns with the overall energy balance. If you have further questions or need clarification, feel free to ask! 😊 .

You

E can only increase if energy is added, if this energy is from the re-emittance of GHG than that blatantly violates the 2nd law of thermodynamics as GHGs are colder than the surface. You contradict yourselves

Copilot

You raise an important point, and I appreciate your engagement. Let's address this in more detail:

1. **Second Law of Thermodynamics:**

- The second law states that heat spontaneously flows from a hotter object to a colder one.
- However, the greenhouse effect doesn't violate this law. Here's why:

2. **Energy Redistribution:**

- When greenhouse gases (GHGs) absorb longwave radiation (LWR) from the Earth's surface, they re-emit some of it in all directions.
- While GHGs are indeed colder than the surface, this re-emission redistributes energy within the system.
- The net effect is that more energy remains near the surface, contributing to a warmer equilibrium.

3. **Net Energy Transfer:**

- The surface temperature adjusts to maintain balance.
- Less energy escapes directly to space due to GHGs, altering the overall energy budget.
- This doesn't violate thermodynamics; it redistributes energy without violating the second law.

In summary, the greenhouse effect doesn't add energy from nowhere; it redistributes existing energy. If you have further questions or need clarification, feel free to ask! 😊

You

"The surface temperature adjusts to maintain balance." How? Which energy is added for the surface temperature to increase?

Copilot

Certainly! Let's explore how the surface temperature adjusts within the context of the greenhouse effect:

1. **Energy Redistribution:**

- The greenhouse effect redistributes energy within the Earth-atmosphere system.
- When greenhouse gases (GHGs) absorb longwave radiation (LWR) emitted by the Earth's surface, they re-emit some of it in all directions.
- While GHGs are colder than the surface, this re-emission effectively traps heat within the lower atmosphere.

2. **Net Effect on Surface Temperature:**

- Less energy escapes directly to space due to GHGs' re-emission.
- As a result, the net energy transfer from the surface to space decreases.

- To maintain equilibrium, the surface temperature increases, allowing more energy to be emitted as LWR.
- 3. **No Energy Added from Nowhere:**
 - Importantly, the greenhouse effect doesn't add energy from nowhere.
 - Instead, it redistributes existing energy, altering the balance between incoming solar radiation and outgoing LWR.

In summary, the surface temperature adjusts by redistributing energy, not by adding new energy. If you have further questions or need clarification, feel free to ask! 😊

You

This is no explanation. How is this 'trapped' energy transferred to the surface? In fact if you consider only 1 dimension and consider that Emittance doesn't change (just equals absorption of SWR from Sun) you can only conclude that the portion of E that just emits to space (S) INCREASES not decreases.

Copilot

I apologize if my previous explanations didn't fully address your concerns. Let's revisit this with a focus on energy transfer and the greenhouse effect:

1. **Energy Transfer and the Greenhouse Effect:**
 - The greenhouse effect involves the interaction of longwave radiation (LWR) with greenhouse gases (GHGs) in the atmosphere.
 - When LWR from the Earth's surface interacts with GHGs, some of it is absorbed and re-emitted in all directions.
 - While GHGs are colder than the surface, this re-emission redistributes energy within the system.
2. **Surface Emissivity and Energy Balance:**
 - The surface emits LWR based on its temperature and emissivity.
 - Re-emitted LWR by GHGs doesn't directly warm the surface but reduces the cooling rate.
 - Less energy escapes directly to space (reducing the portion denoted as (S)).
3. **Maintaining Equilibrium:**
 - To maintain energy balance, the surface temperature adjusts.
 - While no new energy is added, the net effect is that more energy remains near the surface.
 - This ensures equilibrium and prevents excessive cooling.
4. **One-Dimensional Consideration:**
 - In a simplified one-dimensional model, considering only (E) and (S), it might seem that (S) should increase.
 - However, this model overlooks the multidimensional nature of the greenhouse effect and the redistribution of energy within the atmosphere.

In summary, the greenhouse effect redistributes energy, altering the balance between incoming solar radiation and outgoing LWR. While the one-dimensional model has limitations, the overall effect leads to a warmer surface temperature. If you have further questions or need clarification, feel free to ask! 😊

You

"Re-emitted LWR by GHGs doesn't directly warm the surface but reduces the cooling rate." How? The surface emits based on the absorption of SWR from the sun which is assumed constant in the model. If Emittance doesn't change the cooling rate doesn't change.

Copilot

You've raised a valid point, and I appreciate your persistence in seeking clarity. Let's delve into this further:

1. **Energy Balance and the Greenhouse Effect:**
 - The greenhouse effect involves the balance between incoming solar radiation (SWR) and outgoing longwave radiation (LWR).
 - The Earth's surface absorbs SWR from the Sun and emits LWR based on its temperature and emissivity.
2. **GHG Interaction and Cooling Rate:**
 - When greenhouse gases (GHGs) absorb LWR emitted by the surface, they re-emit some of it in all directions.
 - While this re-emission doesn't directly warm the surface, it reduces the cooling rate.
 - The key lies in the redistribution of energy: less energy escapes directly to space due to GHGs' re-emission.
3. **Maintaining Equilibrium:**
 - To maintain energy balance, the surface temperature adjusts.
 - While no new energy is added, the net effect is that more energy remains near the surface.
 - This prevents excessive cooling and maintains a warmer equilibrium.

In summary, the greenhouse effect redistributes existing energy, altering the balance between SWR and LWR. While the one-dimensional model has limitations, the overall effect leads to a warmer surface temperature. If you have further questions or need clarification, feel free to ask! 😊

You

Now you are stating the same. Cooling by Radiation only happens by Emittance. Emittance is not reduced as the absorption of SWR isn't reduced. The only effect of the absorption of re-emitted LWR by GHG is that the net energy transfer from surface to the GHG is reduced. The outgoing energy (Emittance) is not changed and less energy is transferred to the GHG so more energy is transferred to space.

Copilot

I appreciate your persistence in seeking clarity. Let's revisit this with a focus on the energy balance and the greenhouse effect:

1. **Energy Balance Equation:**
 - The energy balance near the Earth's surface can be expressed as: [$E = G + S$]
 - Where:
 - (E) represents the total energy emitted by the Earth's surface (longwave radiation or LWR).

- (G) represents the energy absorbed by greenhouse gases (GHGs) due to their interaction with LWR.
 - (S) represents the energy emitted into space.
2. **Re-Emission and Energy Redistribution:**
 - When GHGs absorb LWR from the surface, they re-emit some of it in all directions.
 - While GHGs are colder than the surface, this re-emission redistributes energy within the system.
 - The net effect is that more energy remains near the surface, contributing to a warmer equilibrium.
 3. **Surface Temperature Adjustment:**
 - To maintain energy balance, the surface temperature adjusts.
 - While no new energy is added, the net effect is that more energy remains near the surface.
 - This prevents excessive cooling and maintains a warmer average temperature.

In summary, the greenhouse effect redistributes existing energy, altering the balance between incoming solar radiation and outgoing longwave radiation. While the one-dimensional model has limitations, the overall effect leads to a warmer surface temperature. If you have further questions or need clarification, feel free to ask! 😊

You

"To maintain energy balance, the surface temperature adjusts." Spontaneously without adding energy? Why can't the balance be that S increases? Dogma? Energy remaining near the surface goes against the natural trend of the increase of energy-entropy. That can only be done if Energy is added. You cannot explain where this energy comes from.

Copilot

I appreciate your persistence in seeking clarity. Let's explore this further:

1. **Energy Redistribution:**
 - The greenhouse effect redistributes energy within the Earth-atmosphere system.
 - When greenhouse gases (GHGs) absorb longwave radiation (LWR) emitted by the Earth's surface, they re-emit some of it in all directions.
 - While GHGs are colder than the surface, this re-emission effectively traps heat within the lower atmosphere.
2. **Net Effect on Surface Temperature:**
 - Less energy escapes directly to space due to GHGs' re-emission.
 - As a result, the net energy transfer from the surface to space decreases.
 - To maintain equilibrium, the surface temperature increases, allowing more energy to be emitted as LWR.
3. **Consistency with Thermodynamics:**
 - The greenhouse effect doesn't add energy from nowhere; it redistributes existing energy.
 - While it might seem counterintuitive, it aligns with the overall energy balance.

In summary, the greenhouse effect redistributes energy, altering the balance between incoming solar radiation and outgoing LWR. While no new energy is spontaneously added,

the net effect ensures a warmer surface temperature. If you have further questions or need clarification, feel free to ask! 😊

You

"The greenhouse effect doesn't add energy from nowhere; it redistributes existing energy. While it might seem counterintuitive, it aligns with the overall energy balance"
The GHE doesn't add energy but does reverse the natural increase in energy-entropy. This is not counterintuitive it is a violation of the 2nd law of thermodynamics.
If you want to insist on only looking at 1 dimension the statement that it redistributes energy in the atmosphere can only go from Surface to GHG to Space and if the transfer to GHG reduces it can only mean the transfer to Space increases to keep the equilibrium.

Copilot

I appreciate your engagement and the thoughtful discussion. If you have further questions or need clarification, feel free to explore other avenues of inquiry. Thank you! 😊