

**Dr. Lars Schernikau**

Energy economist, commodity trader, author - contact information is available to BCG

Attn

**Dr. Maurice Berns**  
**BCG Center for Energy Impact**  
**London, UK**

**Switzerland, 24 September 2023**

via email to *Maurice Berns, Patrick Herhold, Rich Lesser, Jesper Nielsen, Cornelius Pieper, Reiko Akiike, Anders Porsborg-Smith, Lenita Tobing, Tom Brijs, Edmond Rhys Jones, and Alexander Ohm*

publicly available at [www.unpopular-truth.com/news](http://www.unpopular-truth.com/news), last updated 27 Sep '23

**Dear Maurice, Dear All**

Having spent 6 years from 1997 to 2003 with BCG, in New York and Munich, the company is still close to my heart and I follow your reports and news on a regular basis. Since leaving BCG, I became an energy economist and commodity trader, have managed a wind park, co-founded and ran various companies in the commodity business. I have written books and academic papers on energy and commodity related subjects, peer-reviewed other's work and books and I am regularly invited to present or run workshops at energy and commodity conferences, financial institutions, universities, conglomerates, or ministries on energy policy subjects.

Your recent report "***A Blueprint for the Energy Transition***" from September 2023 caught my eye. My critical view on the proposed "energy transition" to a wind and solar + hydrogen/battery centered system, is public knowledge and purely based on energy and raw material economics (my subjects) and not on any political or financial agenda. Our businesses benefit from the "energy transition", so I speak against my own financial interests.

I care about the environment, the future of our children and planet as much as BCG and the authors of the report do. We agree that we must endeavor ***to reduce the environmental externalities of all our energy systems*** and continue to optimize energy use. However, the 'transition' to an energy diluted wind and solar based system, leads to an increase in the cost of energy and reduction in reliability which is counterproductive and has undesired human and environmental consequences as explained.

I still identify with many of BCG's principals including BCG's five purpose principles (from your website): which reads No 1 "***We bring insight to light by challenging traditional thinking and ways of operating and bringing new perspectives to the toughest problems.***"

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In this spirit, I write this letter, with good intentions to spark further research and important debates. Since your report is public, my response to is public soliciting further feedback and criticism.

I invite you to respond directly to me and to start a dialogue on the raised issues. I suggest this in the interest to better our analysis of problems of the world for a better future. ***I offer to come to BCG in person for a discussion, presentations, workshop, or debate and hope to hear from you.***



Thank you in advance for your mentioned invitation “Numerous think tanks, research institutions, businesses, and others are performing extensive analyses on many of the topics discussed in this publication. We welcome their engagement and feedback with the aim of improving and revising our work.”

- I do not represent a think tank or any organization, I still consider my feedback sincere, important, and well founded and will hopefully help to “improve and revise” your work.
- The research referenced is only a small selection of scientific work supporting my arguments.

**[electronically signed]**

Dr. Lars Schernikau

*Review:* A list of 16 academics and professionals have reviewed this letter, given their comments, and consented for their names to be included in support of its content. Contact details can be provided upon request.

Our recent book “**The Unpopular Truth... about Electricity and the Future of Energy**”, [www.unpopular-truth.com](http://www.unpopular-truth.com), has more details, backup, and sources than mentioned in this letter

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I have highlighted a few points of your report and have taken the liberty to comment accordingly.

Some of the messages of the BCG “*A Blueprint for the Energy Transition*” report, in my view, could be misleading to those with limited knowledge. I invite you to also consider that some messages are not consistent with actual energy economic nor scientific knowledge. The energy economic or scientific principles I mention, independently, are – in my view – not in dispute.

The interpretation, as always, could differ and is certainly debatable. With your permission, I focus on some key contentious issues, which are in no order of importance, which we do not agree on.

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## 1. Introduction

It appears that climate change and energy policy are closely interlinked. But are they? Aren't they completely different fields? Is it correct to say that, because of IPCC climate model projection, we are embarking on the so called "energy transition" towards primarily wind and solar + hydrogen/batteries?

Why does your report on the "energy transition" focus so much on cherry picked negative "climate change" messages? Why not rather focus on "positive climate change" messages? In a report on energy, ***why don't you focus on what abundant, affordable, and dense energy has done for humanity?*** What high energy density oil, coal, gas, nuclear – in order of importance, accounting for over 85% of all energy today – have done for humanity?

- Longevity? [OurWorldInData](https://www.ourworldindata.org/) based on studies
- Health? No source needed
- Wealth? No source needed
- Safety? [https://doi.org/10.1016/S2542-5196\(21\)00081-4](https://doi.org/10.1016/S2542-5196(21)00081-4)
- Fewer deaths from catastrophes? [Prof. Pielke](https://www.ourworldindata.org/) and [WorldInData](https://www.ourworldindata.org/) based on studies
- Less burnt area global? [Prof Pielke](https://www.ourworldindata.org/) based on IPCC, EU, NFDP
- Gaining land in total and coastal areas? <https://www.nature.com/articles/nclimate3111>
- A greener world? [nasa.gov/fertilization-greening-earth](https://www.nasa.gov/fertilization-greening-earth)

Shouldn't we focus on economically and environmentally viable and long-term energy solutions, on efficient use and supply of energy, independent of climate change projections by the IPCC?

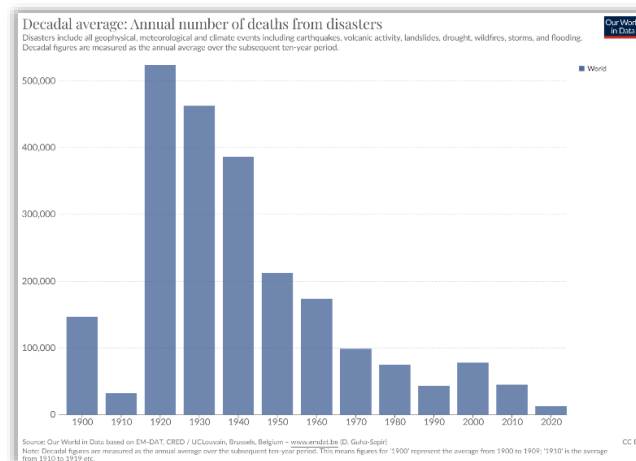


Figure 1

Why does BCG focus on spending trillions on mitigation [(a) hoping that replacing fossil fuels with wind and solar will materially reduce CO<sub>2</sub> concentrations, (b) hoping that less CO<sub>2</sub> will reduce "climate change", (c) hoping this will reduce extreme weather events and sea-level rise] rather than investing a fraction of the money in adaptation such as building dams, making people rich with energy to prepare for extremer weather when it comes... ***or spending such money on health and education?***

Your report does not focus enough attention on geopolitical implications of the "energy transition", the insufficient raw material supply, the complete impossibility to reach "net-zero" CO<sub>2</sub> or "net-zero" environmental impact of energy systems. I must ask, are we misleading the public, press, educational institutions, and economic and political leaders about the costs and impact of the "energy transition"?

*For the record, I do agree that (and am therefore part of the "consensus"): (1) The world is warming (with positive and negative consequences). (2) Humans contribute to measured temperature increase. (3) CO<sub>2</sub> is a greenhouse gas and higher levels contribute to warming.*

*Additional disclaimer: I am personally also invested in coal, oil, gas, and fusion companies. I have managed a wind park in Germany, our main commodity trading company [www.hms-ag.com](https://www.hms-ag.com) also invests in hydrogen, lithium, and coal.*

## 2. Addition or “Transition”?

Your statement that the “transition to “Net Zero” to happen roughly 3x faster than previous transitions” is not based in fact. Basically, *in modern human history to date, a “transition” in energy has never taken place, energy sources were only added.*

Your graph below appears to give the impression that coal replaced biomass and then oil replaced coal and now renewables are replacing fossil fuels, which is not the case. BCG’s chart omitted the most important aspect of humans’ use of energy: the dramatic increase of energy made available to humanity leading to extraordinary improvement in humanity’s well-being and prosperity.

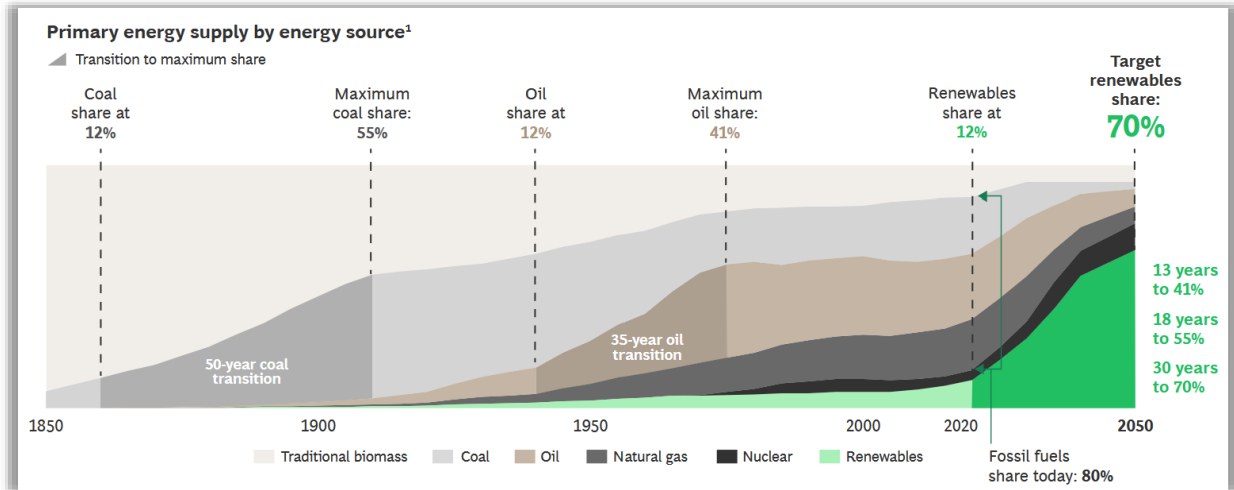


Figure 2

The corrected absolute graph below clarifies that coal never replaced the old biomass-based world, nor did oil or gas or coal or even “renewables” replace(d) any preceding energy sources but simply continued to add to energy sources. This fundamental *difference between “transition” and “addition” is of utmost economic and environmental importance* and touches on the subject of net energy efficiency in the “production” of energy also referred to as eROI (energy return on investment, one of my research topics).

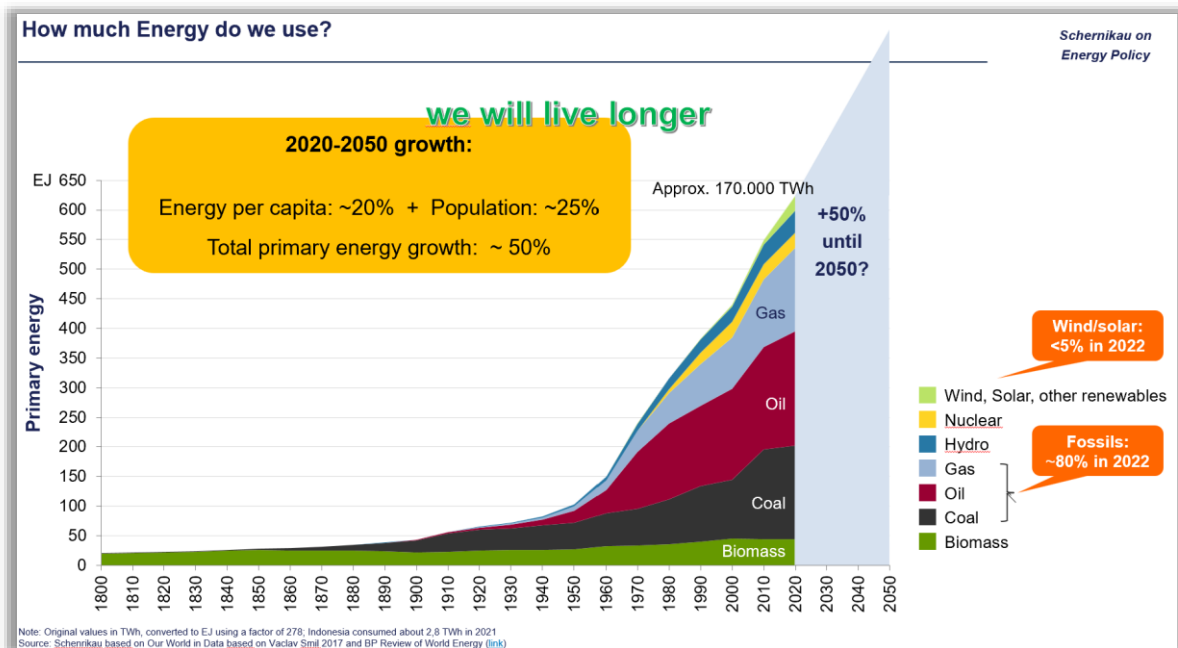


Figure 3

### 3. Cost of power... wind and solar increases (not decreases) costs.

BCG: "We Need to Invest as Much in Our Electric Grids as in New Solar and Wind Capacity"

BCG: "Five Technology Levers Can Get Us to a Net Zero Energy System"

BCG "The Global Industrial Landscape Will Change as New Centers of Low-Cost, Low-Carbon Energy Emerge"

BCG: "Policymakers can level the playing field by taking steps to make non-green offerings more expensive ... or by making green products more cost competitive"

***I find the suggestion of market intrusion surprising from BCG***

There are at least two fundamental errors that permeate through the entire report and above... BCG is basically calling for more rapid adoption of low energy density wind and solar (+ storage, we assume hydrogen and/or battery). The following economic realities are not considered by BCG... which would surely have an impact on your recommendation for rapid adoption of wind and solar.

- **Point 1: *Wind and Solar will always be more expensive*** than conventional high energy density power sources. In fact, they get more expensive the more you have.
  - [OECD NEA 2018](#), p39 confirms "*When VREs [variable "renewable" energy] increase the cost of the total system, ... , they impose such technical externalities or social costs through increased balancing costs, more costly transport and distribution networks and the need for more costly residual systems to provide security of supply around the clock*"
  - "*From the point of view of economic theory, VREs should be taxed for these surplus costs [integration costs] in order to achieve their economically optimal deployment.*"
  - [IEEJ 2020](#), p124ff: "*... the total costs ... increase along with the VRE share...*"
  - [IEA 2020](#), summary: "*...the system value of variable renewables such as wind and solar decreases as their share in the power supply increases*" and they used VALCOE instead of LCOE, which is still incomplete.
  - [Vaclav Smil 2022](#) writes "*Affluent nations would have to devote on the order of 15 to 20 percent of their annual economic product to the task [decarbonization]*"
- **Point 2: *Wind and solar or any grid are NOT "net zero"***
  - The [IPCC](#) confirms that wind and solar are NOT net-zero, however the assumptions the IPCC used are undoubtedly wrong as explained in the following paper
  - [Mariutti 2023](#): *Solar Panels Are More Carbon-Intensive Than Experts Admit*,

The unpopular truth, which is undisputed even by top energy economic institutions such as [OECD](#) and [IEA](#), is that **(a) wind and solar at grid scale are always more expensive** than coal and gas and **(b) the total costs to an economy rises logarithmically with higher wind and solar** share in the power system. The result is that the proposed "energy transition" will cost more than 7 – 10% of the global GDP, amounting to trillions of dollars, and as per IPCC data supersedes the modelled cost of a warming climate by year 2100 ([Sources](#)).

This is very relevant, since a higher cost of energy has direct and detrimental implications for any industrial development, as well as human well-being, especially in poorer countries and for any less affluent people (see [Economist](#): "*Expensive energy may have killed more Europeans than covid-19 last winter*", costing 68.000 lives in one winter alone).



## 4. Coal vs. Gas

BCG “Oil and gas must be phased down rapidly, but selective investments will still be necessary. **We must swiftly phase out coal.** However, most net zero scenarios call for oil and gas supply in 2030 equivalent to 50% to 80% of 2021 supply and 15% to 30% in 2050”

I will not argue the impossibility of running an industrialized world with only 15 to 30% of 2021 supply of oil and gas by 2050 while total energy demand continues to grow. I refer to Section 2 and Figure 3 of this paper for more details.

Rather, I will argue against the strong anti-coal agenda of BCG’s report that mirrors many global institutions, inc, IEA, IRENA, AGORA, UN, and many western governments, while China and India continue to [add 100s of GW](#) of newest, cleanest coal-fired power stations not with German or Western, but mostly with Chinese technology.

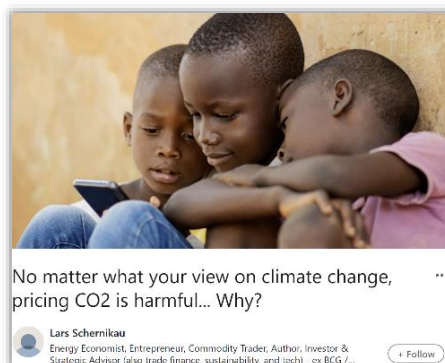
The strong anti-coal agenda of BCG and many western organizations does not only hamper human development and survival (see South Africa, Bangladesh, Pakistan), it is neither humanitarian nor logical. To stop supporting 36% of global power supply and 25% of all energy supply without having a viable, affordable, sustainable, energy dense alternative appears illogical. ***It is time to normalize environmental impact of energy by reliable on-demand-kWh delivered.***

The interesting part is that LNG or gas is more supported – also by BCG – even though coal and LNG are at best on par in relation to the so called “climate impact”, assuming IPCC and IEA correct. We need both gas/LNG and coal, but to switch from lower cost, more secure, simpler coal to higher cost, more difficult to store and transport LNG for “climate reasons” does not make any economic nor environmental sense.

BCG: “Methane emissions are responsible for 10% of long-term energy GHGs” is incorrect

- Over a 20-year horizon, as per IPCC and IEA, methane accounts for ~65% of man-made airborne GHG (~40% over 100-year horizon),
  - see Schernikau Smith 2022, <https://dx.doi.org/10.2139/ssrn.3968359>, Excel table
- The realistic impact of methane and other GHG on “the climate” is explained by Prof Wijngaarden and Prof Happer in [this video](#) and here <http://arxiv.org/abs/2006.03098>

[Schernikau and Smith 2022](#) also determined that over 20 years, ~2% more CH4 emissions from LNG/gas prior combustion compared to coal sets coal and gas on “climate parity”. Since methane emissions are far higher, it is clear than actually ***average coal is “better for the climate” than average LNG***, if one assumes IPCC and IEA data to be correct (we have our reservations, which are stated; methane emissions are [worse than reported](#)).



## 5. Insufficient global investments in supplying energy?

BCG: Oil and gas must be phased down rapidly, but selective investments will still be necessary.

BCG: We need to unlock unprecedented levels of investment.

BCG: By 2030, the energy transition will require at least \$18 trillion in additional capital.

BCG: the global electricity grid alone will require investments totaling more than \$21 trillion until 2050

Your statement: “As demand for fossil fuels declines, the risk of price shocks and volatility will increase” should more accurately read **“As investments in fossil fuels decline, the risk of price shocks and volatility will increase”**

BCG estimates total investment solar + wind + grid (storage not mentioned) until 2050 to reach 41-57 trillion USD (additional about 2 trillion, or 2% GDP, per annum) a fraction of what is to be invested in what powers our world today, coal, oil, gas, and nuclear.

- Your estimates of 41-57 T\$ are based on unrealistically positive assumptions about natural capacity factors, network integration costs, storage/backup efficiency, raw material requirements, -availability, and -costs, etc. The estimates dismiss costs of energy shortages.
- Your investment estimates are significantly below that of McKinsey (Cumulative spending of around \$275 trillion) or WoodMackenzie (US\$75 trillion economic loss by 2050) and other large thinktanks or consulting companies.

I dare to say that all estimates for the cost of the “energy transition” far underestimate the true costs because all make many of the same fundamental mistakes about natural capacity factors, efficiencies, and raw materials. Most importantly **practically all reports** – including from BCG – **appear to ignore the cost to humanity, industry**, and therefore global growth and well-being from rising energy costs and increasing unreliability or energy starvation.

**There is insufficient investment in reliable energy SUPPLY, too much in CONSUMPTION**  
(see ratios below in Figure 6 based on IEA’s “net-zero pathway”)

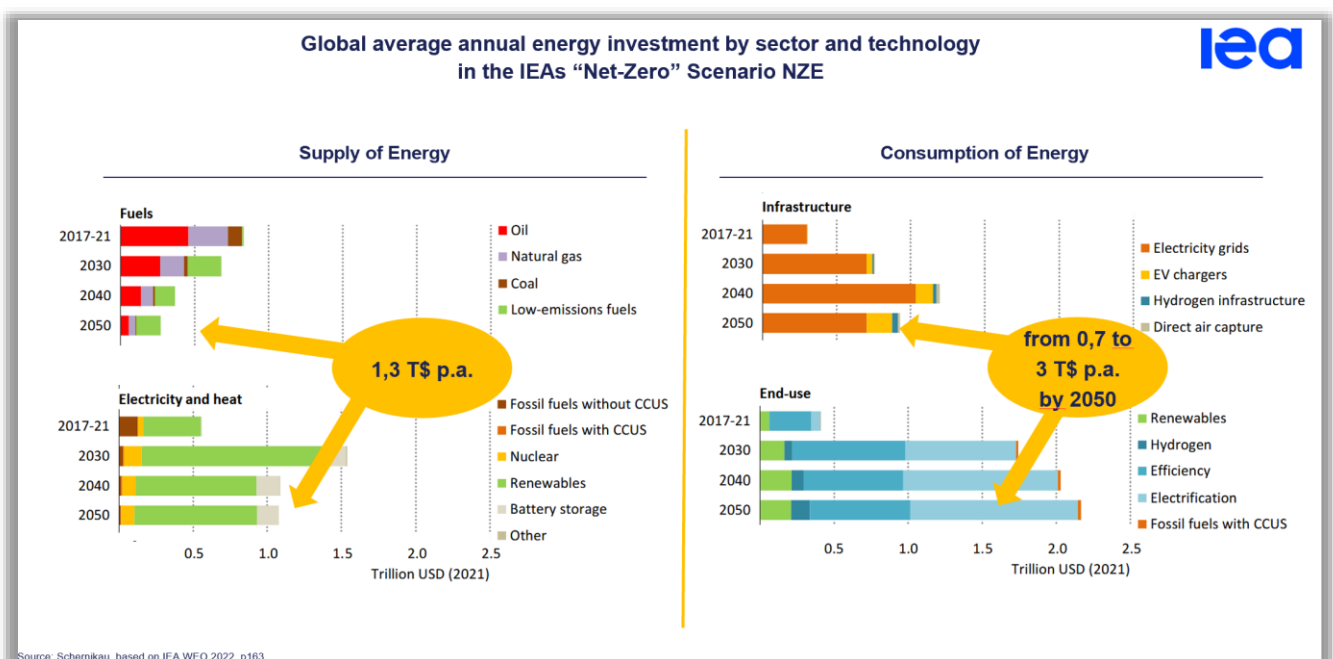


Figure 4

## 6. Supply side variability vs demand side response

BCG “Supply-side variability will increase, requiring innovative market design, demand-side response, energy storage, and firm low-carbon generation”.

We agree that demand will need to be optimized to the best of our abilities in any scenario. However, the “energy problem” cannot be solved with demand side responses...

1 kWh of electricity from coal vs from solar are not the same. The 1 kWh from coal is available when needed, the 1 kWh from solar is available when nature decides. This has energy economic consequences that cannot be avoided with demand side response. **The value of electricity is not measured in kWh but in “kWh available on demand”** ... keeping our grids balanced at 50/60 Hz.

What counts for the future of energy is abundant, affordable, and sustainable access to energy. It is time we start to differentiate between “**suppliers of energy**” (coal, gas, nuclear, wind, solar, geothermal, hydro) and “**consumers of energy**” (EVs, transmission, heat pumps, storage). They are very distinct.

BCG accurately states “Energy Transport Costs Will Multiply, and Storing Energy Will Become More Difficult and Costly” but it appears BCG still drastically underestimates the impact on our energy systems. (see [Prof Curry, Silence of the Grid Experts](#))

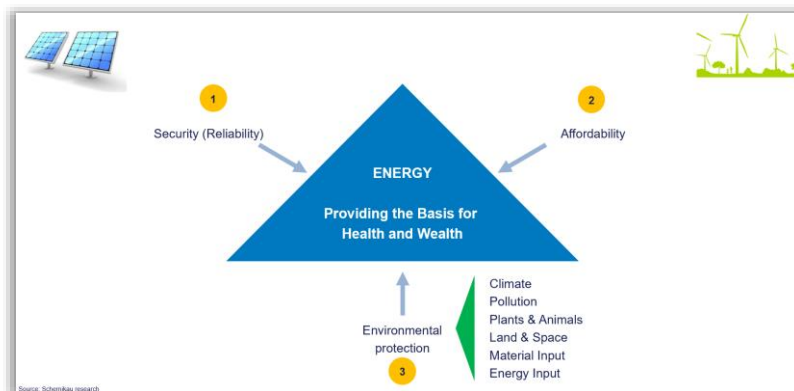


Figure 5

## 7. The trilemma of energy policy

BCG: “A low-carbon energy supply can break many of the trade-offs in the energy trilemma”

Your points are well noted in this chapter, but – in my humble opinion – BCG makes a fundamental mistake by equating (or at least appearing to equate on page 18)...

- ... **Reliability** (most important, order 1) only with reduction in fossil fuel imports... you understand very well that reliability is about reliable supply of usable energy to the end user, not about replacing fossil import dependency with solar panel import dependency.
- ... **Affordability** (order 2) only with reduction in fossil fuel spent... you understand that affordability is what the end user pays for reliable on demand energy, see section 3
- ... **Sustainability** (order 3) only with CO<sub>2</sub> reduction... you understand that environmental sustainability is about so much more and also includes land use, raw material use, energy efficiency, local atmospheric impact, non-GHG emissions, recycling efficiency, etc.

All of these “other important points” seem to be dismissed and largely not considered by your report. See [Schernikau et al 2022](#) or [www.unpopular-truth.com](http://www.unpopular-truth.com) for more details.



## 8. Warming of 1.5°C vs. 2.7°C

BCG: "To limit global warming to 1.5°C above preindustrial levels, we must ramp up renewables and other low-carbon solutions at warp speed."

BCG: "...This rapid transition remains a massive challenge and appears increasingly unlikely: current policies would permit warming to +2.7°C. And the speed of the energy transition in sectors such as industrial manufacturing and buildings is woefully insufficient."

Note 1: the [UN said](#) in Oct 2022 we are on track for 2.5°C not 2.7°C, that is 0.5 °C above the rather random political Paris ceiling target of 2 °C warming from "pre-industrial times".

This is a key and difficult – rather political, and highly disputed – subject. The notion that – at basically any cost – we must and can limit warming and that a warming of measured 2,7°C is undesirable causing detrimental consequences, does to date, not appear consistent with actual data.

Please consider that as per climate models using [MAGICC](#) the **prevented warming from "Net-Zero" is below 0,3°C by 2100 with assumed/exaggerated climate sensitivity of 3 °C**

Please consider the measured temperature increase has many reasons and many impacts:

1. Never has humanity been safer, wealthier, healthier, than today.
  - More humans die from cold than from heat: *Zhao et al 2021*: [https://doi.org/10.1016/S2542-5196\(21\)00081-4](https://doi.org/10.1016/S2542-5196(21)00081-4).
2. Temperature measurements are biased by human growth, by location, urban heat island effect (UHI), and incapable to measure with any degree of certainty.
  - Soon et al 2023: <https://doi.org/10.3390/cli11090179>
  - Frank 2023: <https://doi.org/10.3390/s23135976>
  - Spencer 2021: [Urban Heat Island Effects](#)
3. It appears that BCG assumes that measured warming of about 1,1°C since 1850-1900 is caused primarily by greenhouse gases from human sources, this is clearly in scientific dispute. Other factors, namely natural variability, have **also** contributed. Which climate model explains previous temperature variations? Which climate model considers [increasing sunshine hours](#)?
  - [Clintel](#): IPCC AR6 Analysis - the Frozen Views of the IPCC, May 2023.
  - Pielke Ritchie 2021: Distorting the View of Climate Future: The Misuse and Abuse of Climate Pathways and Scenarios." <https://doi.org/10.1016/j.erss.2020.101890>
  - Scafetta 2022: CMIP6 GCM Ensemble Members versus Global Surface Temperatures." <https://doi.org/10.1007/s00382-022-06493-w>

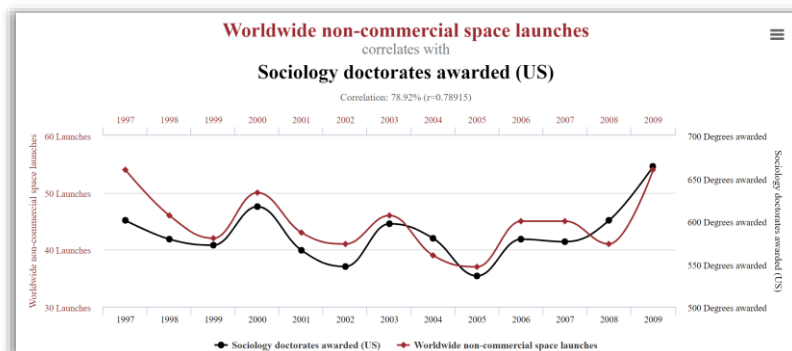


Figure 6

## 9. Extreme weather and catastrophes

I question why BCG writes “Without accelerated action, extreme adverse weather-related events (like the recent record flooding in Pakistan, extended droughts in East Africa, and wildfires on multiple continents) will continue to increase.”

1. Damages and deaths from natural disasters have declined over the past 100 years (not only when natural disasters are normalized by population and by GDP, which they must, to be comparable).
  - Ritchie and Roser 2019: WorldInData: Natural Disasters - Overview, <https://ourworldindata.org/natural-disasters>.
  - Pielke 2023: Global Weather and Climate Disasters 1H 2023, [https://rogerpielkejr.substack.com/p/global-weather-and-climate-disasters-bd2?utm\\_medium=email](https://rogerpielkejr.substack.com/p/global-weather-and-climate-disasters-bd2?utm_medium=email).
  - Bojanowski 2023: Wetterkatastrophen Und Klimawandel, [https://axelbojanowski.substack.com/p/wetterkatastrophen-und-klimawandel?utm\\_medium=email](https://axelbojanowski.substack.com/p/wetterkatastrophen-und-klimawandel?utm_medium=email)
2. Not even the IPCC agrees that Pakistan or East Africa weather events were caused by human energy consumption, or can be attributed to rising CO<sub>2</sub> levels
  - Prof Pielke “Advocates who promote every extreme event as being caused by — linked to, made worse by, fueled by — climate change are promoting misinformation in almost all cases. It is an expression of faith not science.”
  - [Pielke 2023](#): Signal and Noise - Scientific Misinformation,
  - McKittrick 2021: <https://doi.org/10.1007/s00382-021-05913-7>
  - AON insurance company had a recent [interesting article](#)
3. **Positive aspects of warming and CO<sub>2</sub> for Life on Earth are dismissed by BCG**
  - The world has greened in the past decades, as per [NASA](#) and countless [academic studies](#). Croplands are more [fertile](#).
  - Global landmass has increase despite slight sea-level increases of 20-30cm per 100 years (Holdaway et al 2021 <https://doi.org/10.1016/j.ancene.2021.100282> and [Global wildfire](#) down for decades (Europe, lowest in 10 years as per [EC data](#))
  - There are [more deaths](#) from moderate cold than from [extreme heat](#)

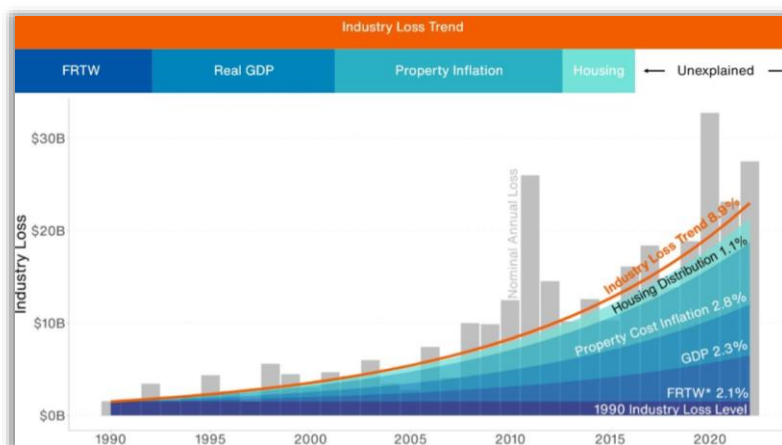


Figure 7

## 10. Poor vs “rich”, impacts of climate change

BCG: “The Poorest Countries Have Contributed Least to Climate Change but Are the Most Vulnerable to Its Impacts”

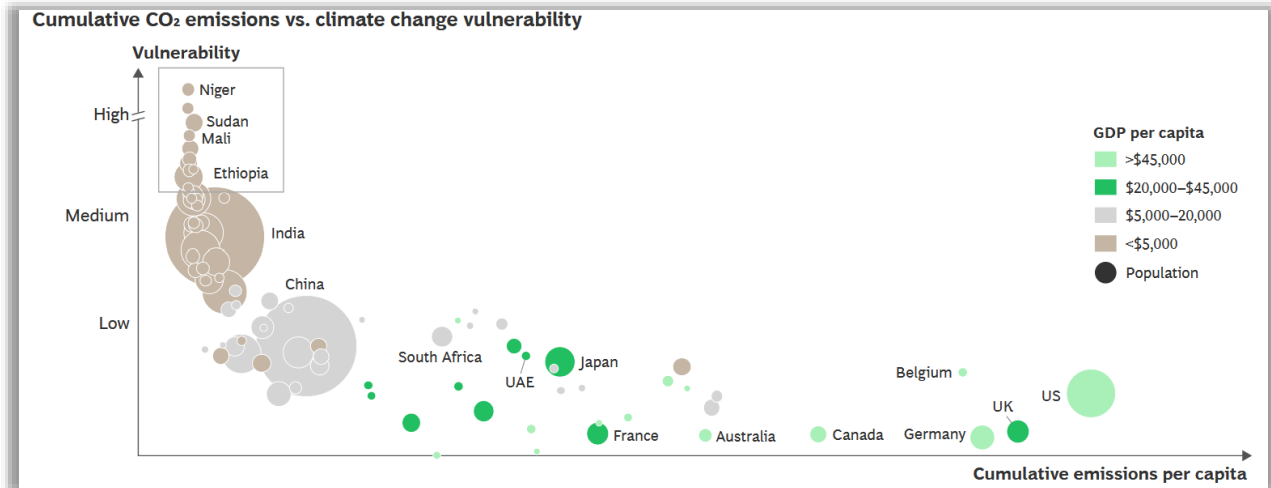


Figure 8

It is accurate that the “poorest” countries have emitted the least CO<sub>2</sub>, which is another way of saying the poorest country had the least access to and consumed the least usable energy. In Europe, when it was poorer, climatic events had a much more dramatic impact than today, illustrated by burning “witches” who were made responsible for droughts or floods (graphs with sources [here](#) and [here](#)).

The **vulnerability to climatic events reduces with wealth and development**. It is logical that poorer countries suffer more from natural disasters. Therefore, I see it desirable to support the developing world by providing reliable and affordable energy, which – as discussed – proves difficult or rather impossible with wind and solar + hydrogen/batteries.

As such, I dare to say that by forcing a “transition” to a more expensive energy system, we are in fact keeping poorer countries poor.

- You indirectly confirm this by saying “*The energy transition will cost consumers in the short to medium term but pay off in the long term.*” [McKinsey](#) and others have also confirmed.
- In fact, the long-term cost you mention is based on computer models, but even as per the IPCC and UN, the cost of the transition is higher than the cost of modelled climatic changes (see [here](#) inc all sources)
- By the way, the warming around the tropics and Antarctic is far less than warming at the Arctic. Tropics and Antarctic undisputedly warm [below average](#).

In summary, **BCG’s graph above appears misleading, as it simply shows that poverty (vulnerability to natural disasters) correlates with access to affordable and reliable energy (cumulative emissions).**

## **11. List of reviewers**

The following academics and professionals from various fields have reviewed this letter, given their comments, and consented for their names to be included in support of its content.

1. Isman Anugerah (energy researcher, Indonesia),
2. Edward Bohn, PhD (Energy/Nuclear R&D Exec., USA)
3. Nico Denner (Geologist, MD Gemecs, South Africa)
4. Ed Hoskins (Entrepreneur, Applied Research Cambridge, UK)
5. Mark van Huisseling (Journalist and author, Switzerland)
6. Sherri Lange (CEO NA-PAW, Canada)
7. Ben Lawson (Vice Chairman Djakarta Mining Club, Indonesia)
8. Sabina Lagerkranser (Banking/investments, Switzerland)
9. Prof. Lothar Meyer (Material Technology, Germany),
10. Douglas Pollock (Industrial Engineer, Economist, Chile)
11. Fred Rumak (Geologist, Canada),
12. Dr. Ing. John Shanahan (ret. engineer, USA),
13. Prof. William H Smith (Earth and Planetary Sciences, St Louis, USA)
14. Gastao Taveira (entrepreneur, INSEAD, ex McKinsey, Portugal)
15. Fransisca Wiryasaputra (Capital Market/Investment, Indonesia)
16. Craig Brown (Retired nuclear engineer (AREVA))