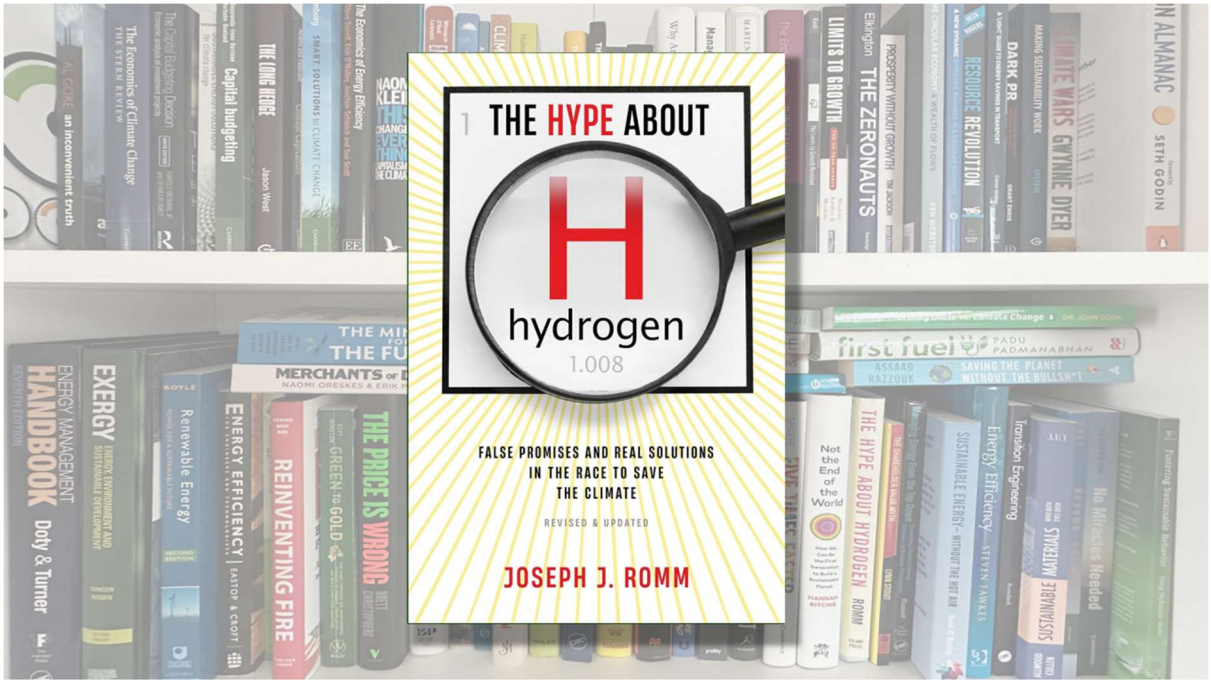
Print Version of book review work by Niall Enright - MA (Cantab), FEI, CEM on "The Hype about Hydrogen" (revised 2025 Edition) by Joe Romm



"The Hype about Hydrogen" (revised 2025 Edition) by Joe Romm

[Niall Enright - MA (Cantab), FEI, CEM]

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April 13, 2025

In my humble opinion						
Relevance	★	★	★	★	★	*Understanding the limitations of hydrogen as fuel is essential*
For practitioners	★	★	★	★	★	*Anyone involved in the "hydrogen economy" whether as a policymaker, investor, activist or citizen will benefit from this very readable and stunningly comprehensive analysis.*
For decision-makers	★	★	★	★	★	
For casual readers	★	★	★	★		*Much more accessible for casual readers than the first edition*
References & index	★	★	★	★	★	*Detailed, accessible and comprehensive, sets the standard for others.*
Overall Ranking	★	★	★	★	★	*An essential read, capable of influencing key climate policies.*

Only my third 5* rating out of 33 already carefully curated books reviewed in my newsletter. This reflects the importance of the conclusions which are supported by a well-referenced and compelling evidence base.

Folks may be aware that I reviewed this book just over a year ago [a] so it is important to emphasize that this is the **revised edition** which is essentially a complete rewrite with 80% new text, so if you have read my first review, please do read this one too – it is **one of the most important books I have ever reviewed.**

Why? I'll let **Joe Romm, Ph.D.** explain:

"Right now, hydrogen is on a path to becoming the biggest boondoggle in the history of climate and energy, undermining the fight to avoid catastrophic and irreversible climate change because of its huge inefficiency, opportunity cost, and leakages."

The current disinformation around hydrogen as a solution to our climate crisis poses a huge threat to us all. If we fall for the hype and pursue some of the false solutions suggested for it, we will seriously impede our ability to limit warming. So I am asking you to help do something about it!

The three things that will help overcome the disinformation are if we all:

1. buy and share Joe's book (see the link at [n])
2. **repost this review**. That could be the most positive thing you could do **today, now this minute** to fix our climate emergency
3. And **also add a comment and tag in any climate activists, policymakers, investors, educators or regulators you know** to spread this very important message.

The importance of Joe's book lies in it's systematic, authoritative, compelling and objective dismantling of the many proposed roles, aka "use cases" suggested for hydrogen. I haven't seen such a powerful piece before, but its power lies in disseminating the evidence as widely as possible. It's no good complaining about disinformation if we don't do anything about it – so here's our chance!

The more we know, the worse it gets

Joe Romm's first edition of *"The Hype About Hydrogen"*, written 20 years ago, was a brave book, challenging the huge wave of hot air about the imminent "hydrogen economy". Joe stuck his head above the parapet and was willing to shout out that the "king has no clothes".

It was an important book because of Joe's credentials having worked for the US Department of Energy for much of the 1990s, overseeing the work of the Office of Energy Efficiency and Renewable Energy, whose remit included R&D on hydrogen. At the time of writing his first edition, he was Executive Director of the Centre for Energy and Climate Solutions.

Since then, Joe has held multiple roles, primarily in the field of climate action communication and policy formulation and he is now a Senior Research Fellow at the Penn Centre for Science, Sustainability and the Media. He is very active here on LinkedIn with authoritative, in-depth commentary on a wide range of climate, political and policy issues.

In that first edition of *Hype* in 2004, Joe's analysis was pretty damning, particularly about the possibility of hydrogen cars:

"Neither government policy nor business investments should be based on the belief that hydrogen cars will have a meaningful commercial success in the near- or medium-term."

Now, twenty years later, with more billions more spent on attempting to solve hydrogen's inherent flaws, much of this public money, the picture is – incredibly - even worse.

Some ideas on which Joe was slightly equivocal in 2004, like the highly-promoted idea that homes could be fitted with steam reformers and fuel cells to convert a fossil gas supply to electricity and heat, have now been shown to be also technically infeasible and uneconomic. Other ideas have actually made it to market, like Fuel Cell Electric Vehicles, only for the brutal reality of costs and inconvenience to crush them definitively.

One reason why *Hype* is such an important book is that the vast majority of Joe's concerns raised in the first edition have subsequently been shown to be true. It is pretty difficult to argue that someone's predictions are implausible when they have a track record of calling things correctly. I suspect that this is one reason why many hydrogen solution proponents will hate this book and why I am rating it so highly.

Comparing the two editions as I have done, one has to conclude that **in every single respect**, **the case for hydrogen in all it's use-cases has deteriorated in the intervening 20 years.**

This is because of three fundamental forces:

1. Hydrogen's core problems lie in its physical and chemical properties which innovation cannot change. Despite the vast sums of money spent, the low energy density, safety issues and thermodynamic inefficiencies repeatedly cause hydrogen projects to fail. Its **physical properties make is inherently unsuitable as an energy carrier** and no amount of wishful thinking or PR can change that.

2. All the proposed use-cases for hydrogen have the alternative of electrification. While hydrogen technologies have struggled to improve, battery electric vehicles, heat pump and storage solutions have grown exponentially, and with that prices have dropped. When a hydrogen option might have previously been twice the cost of the electric one, it is now often four times or more the cost. The gap is widening, not shrinking. Hydrogen has been **outcompeted economically by electrification by a large margin**. This fatal weakness is likely to get worse as the cost of alternatives continue to plummet further and things like very high

capacity charging in the 250 kW to 400 kWh range erode the slim advantage hydrogen could be said to have in land transport.

3. It is now apparent that hydrogen is not a solution to climate change, but rather a very big problem. Not only have we learned that it is a powerful short-acting greenhouse gas but every possible pathway for hydrogen cannibalizes electricity that could achieve much larger and cheaper decarbonization when used directly. **Hydrogen as a chemical feedstock is a huge decarbonisation challenge, while hydrogen as a fuel increases global warming in every pathway**.

Each year, in the face of the accumulating evidence, the size of the "hydrogen economy" keeps being revised downwards by folks like the IEA, so that today, at best, it is unlikely to contribute more than 1-2% of overall net greenhouse gas emissions reductions by 2050 by decarbonising hydrogen's manufacture as chemical agent in industrial process.

The hydrogen as a fuel zombies

But here we are in 2025, and we still see a thriving landscape of hydrogen ventures, many paid for by public subsidy or gullible investors falling for the latest "pump and dump" scam. From hydrogen buses to hydrogen blending in the gas system to hydrogen for long-term energy storage, the potential is enormous we keep being told.

The persistence of the hydrogen hype can be explained in part because the idea of hydrogen is extremely helpful to the oil and gas industry as it allows them to perpetuation their "molecules to burn" business model. Despite incontrovertible evidence to the contrary, fossil gas companies continue to sell the notion of hydrogen as a zero-emissions "drop-in" replacement for gas. They would like us to think that we can simply re-use the existing pipelines and upgrade our boilers and painlessly decarbonise our home heating, when huge and highly disruptive system upgrades would be needed. Hydrogen in cars is convenient since the oil companies can maintain their service stations sales and counter the threat of electrification where consumers can fill-up at home, rendering their infrastructure irrelevant.

Hydrogen is also politically attractive because it gives the impression that we can continue doing what we have done in the past with minimal change. It allows politicians to kick difficult decisions down the road. It enables oil and gas companies to duck their obligations to decarbonise with the promise that the future hydrogen economy means they should keep running their infrastructure. It allows investors and directors to ignore the fact that their gas pipelines are now liabilities rather than assets. In short, hydrogen is the ideal tool for procrastination.

With trillions of dollars of assets, from pipelines to refineries to service-stations to tankers, to gas fields all at risk of being written down in value, no wonder that their owners want to avoid the day of reckoning by inventing an alternative energy system where their assets are still viable. I am sure than many of them know that hydrogen for heating or for cars will never be viable, but that's not the reason they so actively promote these ideas. It is simply to buy themselves time to push back the day when their balance sheets turn from black assets to red liabilities.

Independent, reputable, experienced researchers like **Jan Rosenow**, **Paul Marchant**, **Michael Liebreich**, **Michael Barnard**, **Dave Borlace**, **Michael Sura**, **Bernard Dijk van** and, of course, **Joe Romm, Ph.D.**, and **Hydrogen Science Coalition** and many others I could mention here, keep patiently and authoritatively debunking these ideas here on LinkedIn, but they keep coming back (do follow these folks if you don't already!).

That is why **hydrogen as fuel**, HAF, is often described as a *zombie technology*, no matter how many times you kill it, it keeps rising from the dead. The reason it keeps coming back is that the idea just serves the interests of too many powerful people.

In popular lore, they say that the only thing that can kill a zombie is a severe blow, a bullet to the head or decapitation. *"The Hype About Hydrogen, false promises and real solutions in the race to save the climate"*, to give the book it's full title, is a **zombie-killer**, which is why I am encouraging folks to spread and share the message.

Hype is a baseball bat studded with nails ready to kill the idea of hydrogen as a fuel once and for all. This time around there are more nails, the bat is heavier and the swing heftier and more precise. In the right hands, I can't see that zombie getting up again, but it will only work if you and I get the word out.

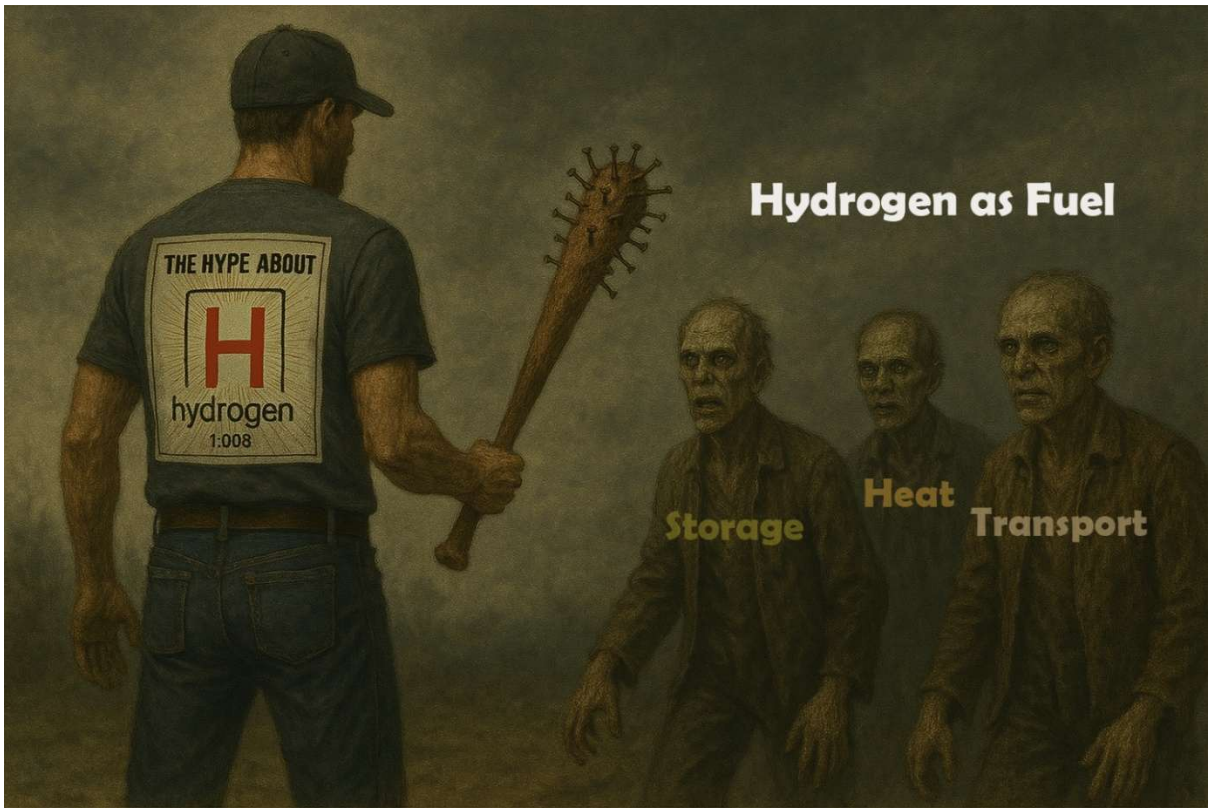

Figure 1 – ChatGPT created illustration of the zombie uses of hydrogen as a fuel about to be dispatched by "The Hype About Hydrogen". First in line are hydrogen as an energy store, for heat and as a transport fuel!

You may consider this metaphor to be tasteless, overdramatic, exaggerated or inappropriate in a professional discussion. But this really is a matter of life-and-death. We now know that rather than being a distraction, these hydrogen solutions will actively harm our decarbonisation efforts.

This is largely because the only feasible way to make hydrogen in a zero emissions way is as "green" hydrogen made from renewable electricity. Because of thermodynamics we will always lose a considerable proportion of that renewable electricity making hydrogen and then concerting that hydrogen to the work that the electricity could have done in the first place. Hydrogen is a green energy destroyer in a world that needs every possible kWh of green energy it can get its hands on for

at least the next 25 years if not longer. *Hype* shows that hydrogen is *always the worst possible choice as a decarbonisation tool, delivering lower emissions reductions at higher costs than electrification.*

Couple this *opportunity cost problem* with the fact that we have recently discovered that hydrogen's global warming potential is around 30 times that of CO2 over the vital 20-year horizon. This means hydrogen can never be truly "zero emissions" solution, given that hydrogen is very, very leaky at every stage of its lifecycle.

Until we get to the point where we have a fully decarbonised energy system powered by entirely by zero carbon generation every minute of the day, introducing hydrogen as an energy carrier will *always* make the situation worse.

This is the central takeaway from *Hype*: **every one of hydrogen's proposed uses actually makes the situation worse, not better**.

Joe Romm does a great job zombie-killing. Not only does he deal HAF a fatal blow, but he also does a decent job killing off its sibling zombies: Direct Air Capture (DAC), Carbon Capture and Storage (CCS) and Bioenergy with CCS (BECCS), which relate to hydrogen eFuels, "blue" hydrogen and organically-derived hydrogen.

Together with a mythical resurgence of nuclear power in the form of Small Modular Reactors, these four zombie technologies form one of the fossil fuel's main propaganda strategies, "innovation will fix this all". **Genevieve Guenther, PhD** so ably explained this strategy of disinformation to delay in her book *"The Language of Climate Politics"* which I reviewed recently [b].

Following on from Genevieve's ideas and the comprehensive way that Joe has mustered the evidence that I had a though – wouldn't it be great if someone were to write companion books in the "*Hype Collection"*. I can see at least three other titles:

· *"The Hype about Carbon removals: DAC, BECCs and CCS"*

· *"The Hype about Small Nuclear Reactors and Fusion: the myth of a nuclear renaissance"*

· *"The Hype about Offsets and the Voluntary Carbon Market"*

Joe Romm, Ph.D. has laid the groundwork for the first two of these! Maybe someone like **Mark Jacobson** might contribute to second title! Its just an idea, but what a powerful quartet these would be! 😊

The book

At 184 pages of text, this book is not a chore to read. In fact, I am very jealous of Joe Romm's almost effortless writing style, which is simple, elegant and yet extremely precise.

Don't let the economy of words and fluid style fool you, this is an immensely comprehensive and superbly well-evidence work. I counted 435 references to articles, studies and papers. I also appreciated the way that those references were incorporated into the text: instead of naming an author the reference is date-led, e.g. *"a 2023 study"* or *"a detailed discussion of EOR by Vox in 2019 noted…"* with the superscript number linking to a chapter-specific list at the end of the book. Other authors would do well to take note of this approach which adds to the readability without diminishing the authoritativeness and ease of access to the sources.

The remarkable richness of external inputs, quotes, references and personal experience make this, in my view, the *definitive catalogue* of hydrogen's repeated inability to deliver on its promise.

Before I jump into the book's contents, let's consider the "colours" of hydrogen. Here it is important to say that hydrogen generally must be *made*. While some folks are hyping up the idea of naturally occurring "*white*" hydrogen that may be exploitable in a similar way to fossil gas, there is currently *no evidence* to suggest that this is available in any meaningful quantities.

We should think of hydrogen as an *energy carrier*, a molecule is made by stripping the hydrogen from another molecule, usually water (H2O) or fossil gas, aka methane (CH4). The way it is made is what determines its colour, and these are all discussed at appropriate points by Joe:

Production from	Terminology	Process	Fuel Source	GHG Intensity (relative)
Water	Green	Electrolysis	Renewable electricity	
	Pink / Red / Purple		Nuclear electricity	
	Yellow		Mixed grid electricity	
Fossil Fuels	Blue	Thermal reforming + CCUS*	Natural Gas	
	Turquoise	Pyrolysis	Natural Gas	Solid carbon byproduct
	Grey	Thermal reforming	Natural Gas	
	Brown	Gasification	Coal (lignite)	
	Black		Coal (black)	

Source: Global Energy Infrastructure, "Hydrogen – data telling a story," 2021.

Figure 2 – the common categorization of hydrogen by "colour" based on its manufacture process and the energy source used. Source [h]

The book starts with an introduction to the major trends driving the discussion about hydrogen, such as climate change, economics and why hydrogen continues to be "hyped" despite the accumulating evidence that shows it to be a false solution.

I was going to give you a breakdown of the chapter contents, but realised that Joe has already done that, so here is the summary in his words:

"Chapter 1 focuses on the history of hyping hydrogen as an energy carrier from the 1990s through today. Chapter 2 looks at the much longer history of hydrogen itself and what might be called the original hype about hydrogen: fusion energy, which is sometimes described as 'the future of energy, and it always will be.'

In Chapters 3 through 5, I'll dive into hydrogen production. Chapter 3 provides an overview of how hydrogen is produced today and how it might be produced with little or no carbon emissions in the future. It explains why green hydrogen is by far the most important type of hydrogen in our rapidly warming world but is hard to make affordably. It also examines why geologic hydrogen is not like to be practical, plentiful, or pollution-free.

In Chapter 4, we'll see why nuclear power is far too expensive and impractical to scale up hydrogen production and dig into the safety concerns with hydrogen generation near nuclear reactors. We'll also examine why 'economics killed small nuclear power plants in the past—and probably will keep doing so,' as the IEEE Spectrum presciently warned in 2015.

Chapter 5 examines the hydrogen production method favored by fossil fuel companies: adding CCS to a traditional system for reforming natural gas into hydrogen. It explains why this approach leads to high GHG emissions and why, if we ever develop a practical and affordable CCS system, we should just use it directly on a fossil fuel power plant.

Chapters 6 and 7 explore some of the major applications for hydrogen currently being funded. In Chapter 6, we'll look at the overhyped, complex, expensive, and inefficient technology of direct air capture of CO2, which many seek to combine with hydrogen to make synthetic liquid hydrocarbon 'e-fuels.' Although e-fuels are often touted as solutions for air travel and shipping—and even ground transport—we'll look at their many fatal limitations, including their huge opportunity costs.

Chapter 7 details another proposed application—hydrogen cars— and why electric cars have crushed hydrogen ones over the past two decades. We'll see how hydrogen's immutable limitations undercut the business case for it as an energy carrier in virtually all applications.

In the Conclusion, I'll review the book's central arguments and examine how we can accelerate real climate and energy solutions while avoiding the huge opportunity cost of the many false promises"

You can see that every aspect of the hydrogen economy and all major use-cases for hydrogen are covered.

What is particularly insightful is that is that Joe is able to, through personal experience, discern long-term trends and cite events over three decades which add credibility to his views about future developments.

Joe's analysis has identified seven root causes for hydrogen's repeated failure:

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1) *High initial cost (of the hydrogen-using technology)*
2) *High hydrogen cost (compared with the alternative form of energy)*
3) *Inconvenience of use*
4) *Limited fuelling/supply infrastructure (chicken-and-egg problem)*
5) *Safety and liability concerns*
6) *Failure to provide cost-effective solutions to climate change*
7) *Improvements in the competition (electrification technologies)*

Any one of these barriers could be a killer, but in many cases, the use-case fails on multiple fronts. Take for example the comparison between using hydrogen in Toyota's Mirai Fuel Cell Electric Vehicle (FCEV) compared to using electricity in an equivalent Battery Electric Vehicle (BEV).

1. A Mirai costs 2-3 the cost of an equivalent BEV to purchase
2. The hydrogen costs at least 4x as much as electricity per km travelled and the car is much more expensive to service and maintain than an equivalent BEV
3. Home fuelling for the Mirai is not an option unlike a BEV

4. There are few hydrogen fuelling stations and these are often out of order. This invariable requires Mirai users to embark on long journeys to fill the car which reduces their effective range

5. Hydrogen is inherently less safe than the electric option, insurance will be higher; and folks wanting to get into the fuelling business will have much greater obstacles to overcome than those wanting to open an electric charging station

6. The Mirai and its fuelling infrastructure require large subsidies which could be better spent on other decarbonisation projects and because of leaks this will never be a zero emissions solution

7. Battery electric vehicles are dropping in price and emerging standards and technologies like vehicle to grid will provide own

For a FCEV owner, the trends above are worsening, not improving. In many markets like California and South Korea, the availability of fuelling stations is decreasing because of the financial losses incurred by operators, or the lack of hydrogen or the unreliability of the compression systems, according to an excellent analysis by @Michael Barnard [i]. Since Michael's piece **Leigh Collins** from *Hydrogen Insight* (possibly the only industry publication not to over-hype) wrote last month that a quarter of Germany's remaining hydrogen filling stations are shutting down by June [j], although the EU has mandated member states to open more fuelling station as part of the Alternative Fuels Infrastructure Regulation. No doubt these will be forced to close once the subsidies disappear or the declining sales of FCEVs bring policymakers to their senses.

Hydrogen as a greenhouse gas

One of the big changes between the first book and the revision is the understanding that has emerged of hydrogen's contribution to climate change. This is not a direct effect, like CO2's infrared-blocking characteristics but an indirect effect due to the chemical reactions with hydrogen that change the abundances of the greenhouse gases methane, ozone, and stratospheric water vapor, as well as aerosols. Over a 20-year horizon the global warming potential of hydrogen is estimated to be 37.3 ± 15.1 [c]. There is quite some uncertainty about this value, but we now know it is high. The biggest source of this uncertainty is the soil sink's rate of sequestration of hydrogen, which accounts for 65-85% of the total hydrogen sink.

To explore the significance of this new information, I though I would see what hydrogen leak rate would negate the benefits of switching away from petrol (gasoline) to hydrogen, i.e switching from a standard Internal Combustion Engine (ICE) car to a FCEV.

This calculation illustrates just about the only positive physical characteristic hydrogen has: its energy density is 120 MJ/kg compared to petrol's 44 MJ/kg. This means that we would need 2.7 times as much petrol *by weight* as hydrogen to get the same initial input energy. But that is actually quite irrelevant since hydrogen has an extremely low volumetric energy density, since hydrogen per unit volume at normal pressure has *3200 times less energy than petrol*. Which leads to all sorts of complicated, leaky, dangerous technology fixes like having to compress hydrogen to around 700 atmospheres in a $1m hydrogen pump. But I digress, back to our calculations:

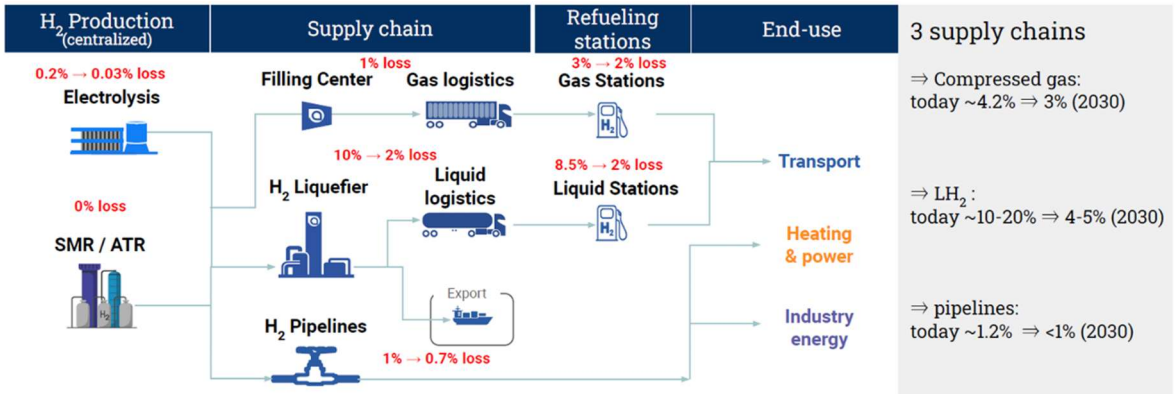
While we now know we need 2.7 kg of petrol to have the same input energy as 1 kg of hydrogen, we also must consider that the ICE is only 20% efficient compared to the FCEV 50% efficiency. That means in terms for the same *useful* energy moving the car forwards we would need 6.8 kg of petrol per kg of hydrogen.

Now each kg of petrol, when burned, has a global warming potential of 3.154 kgCO2e [d] so 6.8 kg equals 21.4 kgCO2 equivalent emissions. In other words, if the hydrogen is green we will have avoided 21.4 kg emissions making the switch away from the petrol ICE to the hydrogen FCEV.

We can now calculate that if we had a leak of 21.4/37.3 i.e 0.573 kg of hydrogen, that would have the same warming effect as burning the petrol (which would be a leak rate of 36% or .573/1.573).

Which raises the next question, what are the leak rates in the hydrogen supply chain?

Figure 10. Hydrogen release fractions to the atmosphere along the hydrogen supply chain and design goals for 2030



Source: **presentation by G. de Reals (Air Liquide)**

Figure 3 – illustration of supply chain leaks for hydrogen. Taken from a 2022 report by the EU's Joint Research Council cited in

Looking at the figure above it seems that if the hydrogen filling station for the FCEV was receiving liquid hydrogen, the total supply chain emissions could be in the order of 10-20%, which means between one third and one half of the emissions reductions benefits from not burning the petrol would be lost.

Now this is an example where liquid hydrogen could be involved in the supply chain. I would like to another use of hydrogen which is to replace fossil gas in domestic heating, another widely promoted use for hydrogen which has huge technical challenges (let alone the economic ones, as Joe explains).

Here, we have the 120 MJ/kg of energy in the hydrogen and 45 MJ/kg in the gas, so we would need 2.7 times as much gas in terms of input weight. We can ignore the relative efficiency of the boilers as a gas and hydrogen boiler are similar. Burning one kg gas will give rise to 2.52 kgCO2e emissions [d], so that makes a total of 6.8 kgCO2e.

To negate this, we would need a leak of only 0.182 kg of hydrogen in the supply chain or a leak rate of 15% (0.18/1.18). Now that is a higher leak rate than the 1-2% or so estimated by the EU study but nevertheless leaks would reduce the emissions reductions by around a tenth.

Turning to the existing 100 Mt of hydrogen used in industrial processes. If we assume a leak rate of 2% that would add the equivalent of 2Mt of hydrogen to the atmosphere which at 20 year-warming effect of 37.3 times that of CO2 means that we are adding the equivalent of 74.6 Mt CO2e to the atmosphere. This is 0.089% of the annual 83 GtCO2e emissions from human activity (using GWP20 [f]). To put it into context, that 2 Mt estimated to leak from existing hydrogen manufacture to the

atmosphere is about 10% of the estimated 23 Gt (Tg) of natural geological outflows of hydrogen to the atmosphere [g].

Although these backs of the envelope calculations are quite simplistic, we can conclude that while hydrogen leaks are a concern, especially where liquid hydrogen is involved in the supply chain, these should not be exaggerated. Hydrogen's main negative impact on global warming remains the *opportunity cost* that arises by diverting the electricity used in its production from other more effective decarbonisation options.

As Joe emphasizes repeatedly, the only viable role for hydrogen as a fuel in any use-case is if a) all other sectors of the economy were fully electrified b) the hydrogen can be produced from renewable electricity and c) there are no other options. These conditions are not likely to be met before 2050.

Until then:

"Hydrogen funding should focus on figuring out how to generate genuinely green hydrogen with near-zero leakage for use as a chemical feedstock"

The switch from using fossil fuels to renewable electricity to make hydrogen will reduce global emissions by around 2%. Recognising that industrial hydrogen demand is likely to fall as its use in refineries decreases following a switch away from petroleum products in transportation, that figure could, in practice be smaller, hence Joe's 1-2% estimate.

Conclusion

The thing that folks who are fighting a war against change don't want you to realise is that *we already have all the tools and technologies we need to cut the vast majority of our energy-related emissions.*

Except for a few sectors like aviation and deep-sea maritime transport we know what needs to be done - and what's more, the solution is cheaper than the technology we will replace!

For those hard to decarbonise sectors it is unlikely that hydrogen or hydrogen-derived fuels like ammonia or eMethanol will be successful, simply because of the economics. Some electrification combined with biomass would appear to be more plausible solution.

In these febrile times politically, one would be mistaken for thinking that the timing of this book, with its emphasis on the US policy scene such as the Inflation Reduction Act, couldn't be worse. In the US we are seeing a deliberate dismantling of science-based climate policymaking in favour of a "fossil-fuels first" agenda, which tends to suggest that a careful analysis such as *Hype* is likely to fall on deaf ears.

However, that would be to misread the situation. The Trump cost-cutting agenda appears to be targeting subsidies for green hydrogen, with four of the seven planned hydrogen hubs (those in Democratic states) being slated for cancellation [k]. It appears that Trump may have personal misgivings about hydrogen vehicles with him quoted as remarking:

"They tend to blow up. And once they blow up, you are not recognizable anymore."

Furthermore, while hydrogen is promoted by the fossil fuels lobbyists as it acts as a counter to their main enemy, battery electric vehicles and electrification in general, it is not their *first* choice. With Trump dismantling electric charging networks and incentives, the status quo of the internal combustion engine is likely to be the main winner. So, I would expect there to be less hype about hydrogen in the US as the pressure on the fossil fuels companies abates and they no longer need to "buy time" domestically.

Of course, the situation in Europe is quite different and we urgently need folks to read *Hype* to counter the Commissions irrational dedication to an energy system based on burning stull, as I pointed out in my review of Eddie O'Connors "Supergrid" (@Lesley O'Connor).

No, *Hype*'s timing is excellent for a number of reasons. We are at a point where many climate policies are being re-examined in light of the last two or three years of unprecedented warming. We are also seeing electrification succeed beyond everyone's best expectations, to the point where policymakers can no longer maintain their *"technology neutrality"*. Investors, too, are becoming savvier in light of a number of failures like that of FCEV truckmaker Nicola [m] which recently declared bankruptcy.

On this occasion I have rated *Hype* a 5* read. That is a reflection of the quality of writing, the outstanding references, the bang-up-to-date evidence and the breadth of coverage. Joe reports that he kept 15,000 words from the original since the fundamental fatal flaws in a hydrogen economy he exposed back then haven't changed, but he has added 60,000+ new words to reflect the latest evidence.

The rewrite has made it more readable, up to date and organised, making it now only my third title to receive a 5* rating (alongside @Mark Jacobson's *"No Miracles Needed"* about 100% renewables energy systems and @Richard Black's *"The Future of Energy"*).

This is an important book. In the right hands it will change things. That is why I am urging you to buy and read it and share/repost this article widely.

The book will be published on 22 April 2025, Earth Day, and can be purchased from Island Press' website [n] or on Amazon US (on Amazon UK, the Kindle version will be available on 22nd April, but the paperback wont ship until 30th of June, unless you order it from the US with an extra shipping charge – although the Kindle version is out on the 22nd April). It will be one of the best $35 you will spend!

For transparency, I should declare that I received a free pre-publication pdf version of this book for the review, but have not been involved in any other way in this revised version.

#climatebook #hopium #hydrogen #zombietechnologies #climatechange

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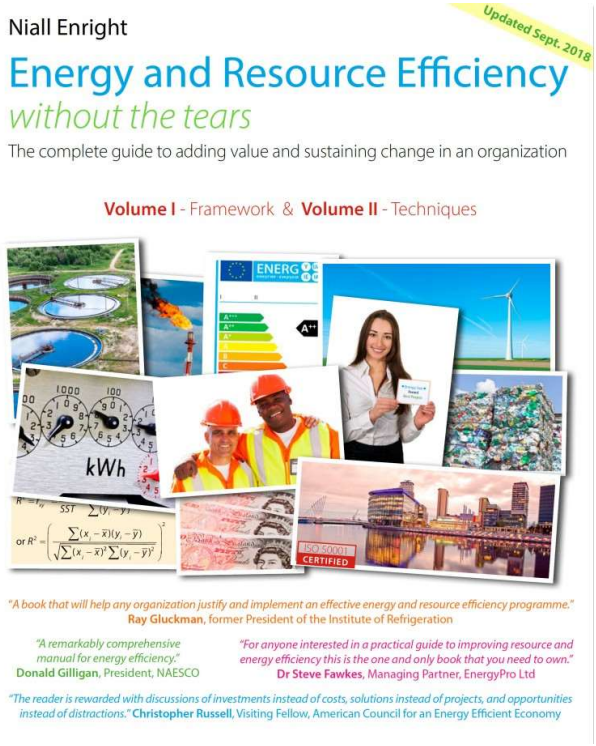
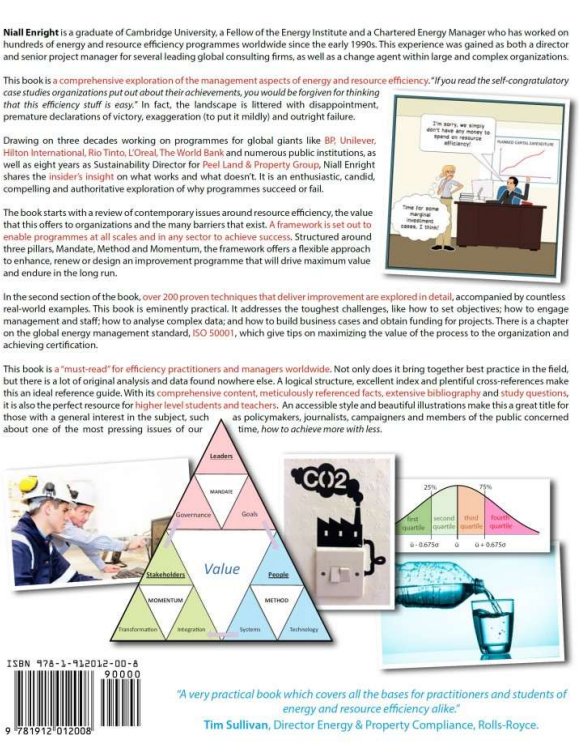
At bottom of review

Folks - if you have read this book please leave your own thoughts in the comments below - you may have picked out different aspects which others would find useful! You may also find my own textbook on energy and resource efficiency helpful - it's free to **download** *:-)*





My textbook on energy and resource efficiency is a comprehensive guide on how to design programs that succeed in the long-run. Its free to download.

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