# Article information:

Pathways toward carbon-neutral coal to ethylene glycol processes by integrating with different renewable energy-based hydrogen production technologies - ScienceDirect  
<https://www.sciencedirect.com/science/article/pii/S0196890422003259>

# Article summary:

1. The coal-to-ethylene glycol (CTEG) process emits a large amount of CO2, making it difficult to achieve carbon neutrality.

2. Integrating renewable energy-based hydrogen production technologies, such as proton exchange membrane electrolysis and solid oxide electrolysis, can improve the techno-economic-environmental performance of the traditional process.

3. The proposed processes have better anti-risk ability against fluctuations in coal and ethylene glycol prices and show promising industrialization prospects.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article "Pathways toward carbon-neutral coal to ethylene glycol processes by integrating with different renewable energy-based hydrogen production technologies" presents a study that proposes two coal-to-ethylene glycol (CTEG) processes integrated with proton exchange membrane electrolyzer (PEM-CTEG) and solid oxide electrolysis electrolyzer (SOEC-CTEG) technologies. The aim is to address the shortcomings of traditional CTEG processes, such as high carbon emissions and an unreasonable process structure. The proposed processes are integrated with different renewable energy-based hydrogen production technologies to achieve carbon neutrality.

The article provides a detailed analysis of the techno-economic performance of the proposed processes compared to traditional CTEG processes based on modeling and simulation. The results show that the proposed processes increase carbon utilization efficiency by 20.64% and reduce CO2 emissions by 84.01%. Additionally, the exergy efficiency of the PEM-CTEG and SOEC-CTEG processes is enhanced by 8.29% and 13.98%, respectively, while the internal rate of return is improved by 3.50% and 10.09%.

The article highlights the urgent need for low-carbon emissions coal-based chemical technologies in Belt and Road Countries, which have rich coal resources but lack natural gas and oil. However, it fails to acknowledge that coal-based chemicals are not a sustainable solution in the long run due to their high carbon emissions.

Moreover, while the article presents evidence supporting the effectiveness of integrating renewable energy for hydrogen production in CTEG processes, it does not explore potential counterarguments or risks associated with this approach fully.

Additionally, there may be potential biases in favor of promoting these new technologies without considering alternative solutions or acknowledging potential limitations or drawbacks.

Overall, while this article provides valuable insights into novel approaches for achieving carbon neutrality in CTEG processes, readers should approach its claims with caution and consider alternative perspectives before drawing conclusions about their feasibility or effectiveness.

# Topics for further research:

* Limitations of coal-based chemicals in achieving long-term sustainability
* Risks associated with integrating renewable energy for hydrogen production in CTEG processes
* Alternative solutions for reducing carbon emissions in chemical processes
* Environmental impacts of traditional CTEG processes
* Technological advancements in carbon capture and storage for coal-based chemical processes
* Economic feasibility of transitioning to low-carbon chemical processes in Belt and Road Countries

# Report location:

<https://www.fullpicture.app/item/a616ff323ee0cfbefc43d4814f312177>