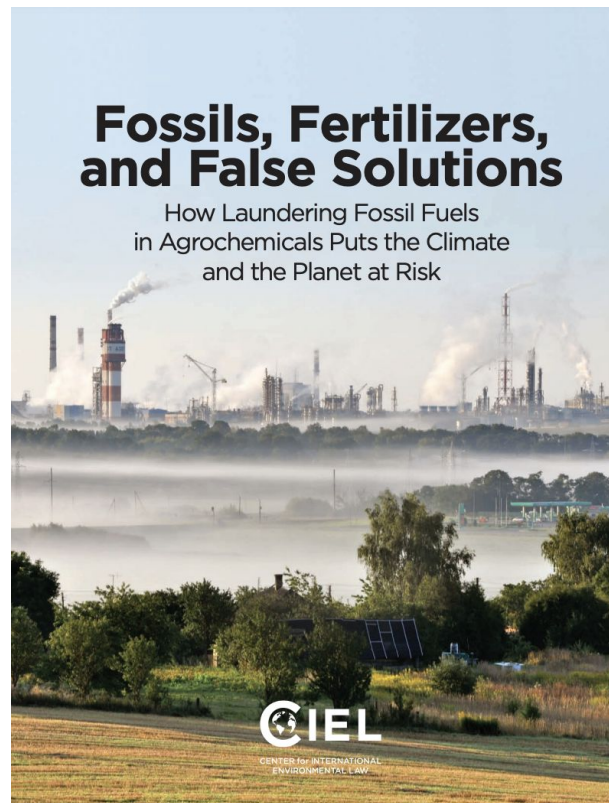


Fossils, Fertilizers, and False Solutions

Report by CIEL: **Fossils, Fertilizers, and False Solutions: How an Industry Push to Launder Fossil Fuels in Agrochemicals Puts the Climate and the Planet at Risk**

The report reveals how the fossil fertilizer industry is advancing a new business model that will **extend the fossil economy and entrench industrial agriculture in the midst of the climate emergency.**

www.ciel.org/reports/fossil-fertilizers



Synthetic nitrogen fertilizers are fossil fuels in another form

Fertilizers include Phosphorus (P), Potassium (K), and Nitrogen (N). P & K are mined → still synthetic, but not fossil fertilizers. US uses 40% of

Gas for feedstock (70%) AND energy (30%): Today, 3-5 % of the global annual fossil gas consumption is used to produce nitrogen fertiliser. For the Haber-Bosch process, you need hydrogen (today 99.8% fossil) to synthesize ammonia with N from the air.

Volatility: 60% to 90% of production costs for fertilizers are fossil gas costs. [Profiteering](#) from high gas price as fertilizer companies could increase price beyond increase in own production costs

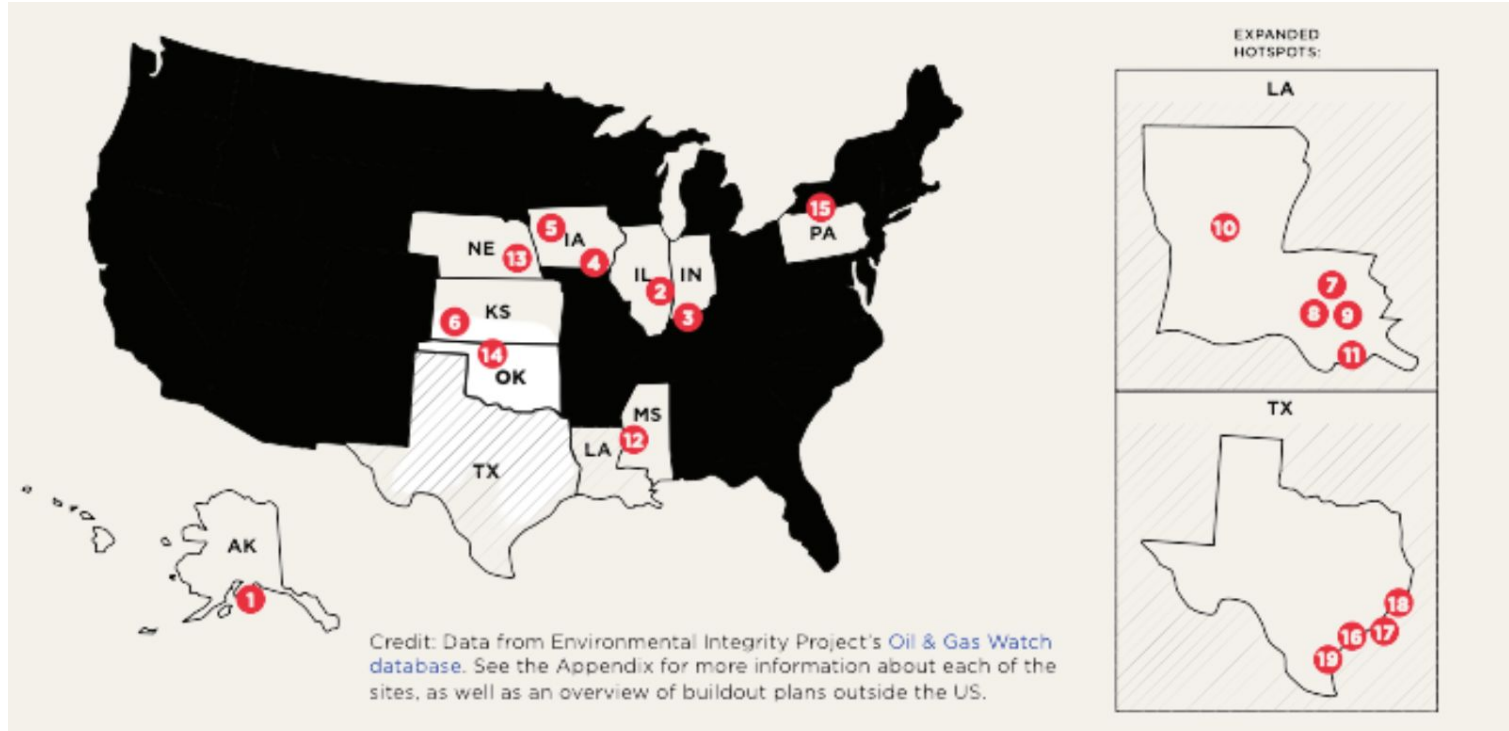
Emissions: Global climate impact of N fertilizer exceeds that of commercial aviation (2%)

Growth: Fertilizers are the biggest growth engine for non-energy use of methane gas. The FAO projects that N fertilizer use could grow another 50 percent by 2050.

Interlinkages: Common interests/ownership in agrochemical, plastics and fossil industries, fertilizer companies want to provide the “energy for the future” (ammonia), regionally very clustered production

Public money: Well positioned for CCS subsidies to allegedly “clean up” industry and shipping

Fertilizer and fossil fuel companies are operating or actively exploring dozens of **new or expanded production facilities**, including projects in eight US states already affected by polluting industries. IRA contributes to the expansion.



So, what about green hydrogen for fertilizers?

All hydrogen has significant limitations

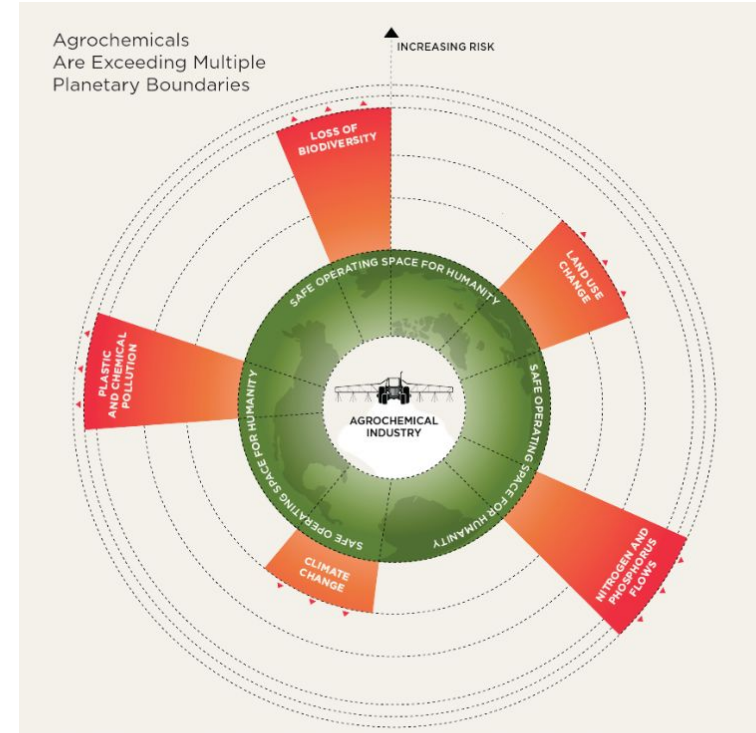
- Difficult to transport
- Explosive, even when mixing with ambient air
- Produces 6x NO_x of burning methane
- Prone to leaking, indirect greenhouse gas

Ammonia (not the “perfect” shipping fuel):

- Is extremely toxic, and “promptly lethal” if one is exposed in high doses
- Is highly corrosive, limiting its use as a fuel
- Also releases large amounts of NO_x when combusted
- Poor combustion properties

Green H₂: requires enormous renewable energy and (fresh) water inputs

AND: at best it mitigates a fraction of process emissions, but does not address other greenhouse gases associated with fertilizer use (more than half are on field!), neither any other planetary boundaries high N fertilizer use is impacting!





KEY TAKEAWAY

- 1) **N fertilizers are fossil fuels in another form.**
- 2) The fertilizer and fossil fuel industries are betting on **blue ammonia** as an ever-expanding source of both “**clean**” energy and “**clean**” agrochemicals. **It is neither.**
- 3) **Switching to green hydrogen does not address the problem** adequately, either.

Annex

Fossil Fuels to Fertilizers

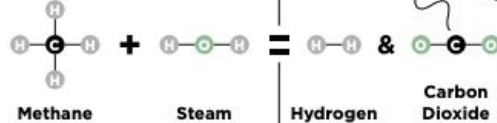
Step:

1

Create hydrogen from methane

Steam reforming

Methane molecules are blasted with steam, creating hydrogen and carbon dioxide.



Carbon dioxide emitted

Carbon dioxide captured

Some carbon dioxide is captured from these processes and used later in the creation of urea.

2

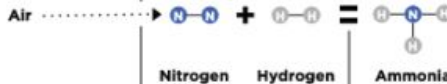
Create ammonia from hydrogen

Air separation

Nitrogen is separated from the other constituents of air.

Haber-Bosch process

Nitrogen and hydrogen are combined and subjected to high heat and pressure, creating ammonia.



3

Create urea from ammonia

Urea production

Ammonia is combined with carbon dioxide, producing urea and water.



Fossil gas inputs to produce hydrogen

Fossil gas to create enough pressure and temperature for the reaction

Carbon capture of some of the emissions to produce urea has been practices for decades

The N fertilizer industry's bet on blue hydrogen to "clean up"

The Hydrogen Rainbow

