

# **Carmel city fleet first to use our patented technology that creates hydrogen energy on demand**

- Millenium Cell, JADOO, Bluebird, Brunton, Powerball, Ergenics, ECD and other companies ate it, or went out of business, violating our patents on products we were first to invent and build and supply to government and commercial clients. Why does Carmel and AlGalCo think they don't need to pay to use our invention? They are welcome to buy or license our invention but they are not welcome to steal and profit off of our invention.

[London Gibson,](#)


The city of Carmel is about to become the first in the nation to retrofit some of its fleet vehicles with a new technology that produces cleaner-burning and more fuel-efficient hydrogen energy.

The technology was formed at Purdue University and commercialized by Carmel-based company AlGalCo, which after 14 years of beta testing and patent processes is finally rolling out products for Carmel's city fleet.

The new technology creates hydrogen energy on demand out of a special aluminum alloy. How does it work? Just add water.

And a little secret sauce.

"It's on demand ... and also it's totally renewable and sustainable," said AlGalCo founder and president Kurt Koehler. "After all those years in the back of a pickup truck trying to figure this out."

 Kurt Koehler, Founder and President of AlGalCo, shows his HOT (Hydrogen on Tap) system in a City of Carmel Street Department truck, Thursday, April 9, 2020. The new technology will allow Carmel's city fleet to run off of less gasoline, saving in money and emissions. Koehler patented the technology and his company is finally rolling out products after years of testing and acquiring patents.

[Buy Photo](#)

Kurt Koehler, Founder and President of AlGalCo, shows his HOT (Hydrogen on Tap) system in a City of Carmel Street Department truck, Thursday, April 9, 2020. The new technology will allow Carmel's city fleet to run off of less gasoline, saving in money

and emissions. Koehler patented the technology and his company is finally rolling out products after years of testing and acquiring patents. (Photo: Kelly Wilkinson/IndyStar)

The new tech gadget, which has been approved by the Environmental Protection Agency, attaches to the back of a vehicle and connects to the engine. It produces the hydrogen energy that supplements gasoline, boosting gas mileage and saving fuel.

Hydrogen fuel technology burns with zero emissions and is considered by many to be on the cutting edge of sustainable energy. The science is still somewhat new but expanding — Indiana-based engine company [Cummins Inc. unveiled](#) a heavy-duty truck powered by battery and hydrogen last year, and the world's first bus system powered by hydrogen technology [debuted in France](#) in December.

Fully hydrogen-powered vehicles require an all new engine, and such a conversion might be too expensive for a city. AlGalCo's technology, Koehler said, supplements an existing engine without those obstacles.


"There are different ways you can make hydrogen on demand, but not the way we do it," Koehler said. "The chemistry is just so elegant."

# Just add water

ALGalCo — a shortened name for "Aluminum Gallium Company" — takes regular aluminum and adds to it a "special sauce," covered by patent. This special sauce transforms the material into an aluminum alloy that stays solid.

That is, until you add water to it.

The H<sub>2</sub>O molecules in water — two hydrogen atoms, one oxygen — have a special interaction with the aluminum alloy. When combined, the water molecules fall apart, the oxygen atoms attaching to the aluminum to create aluminum oxide and the hydrogen atoms breaking off to create energy.

 Kurt Koehler holds a pod of aluminum alloy, that by adding water it causes it to react and become hydrogen. The hydrogen is used to fuel the engine.

Buy Photo

Kurt Koehler holds a pod of aluminum alloy, that by adding water it causes it to react and become hydrogen. The hydrogen is used to fuel the engine. (Photo: Kelly Wilkinson/IndyStar)

ALGalCo uses a container attached to the back of a vehicle to deliver this energy to the vehicle's engine. When the driver runs out of hydrogen, they can easily swap out the canister inside for a new one.

"You don't have to modify the engine, you don't have to do have any special fuel infrastructure, you don't have to do anything,"

Koehler said. "You come in, take out the old canisters, off you go."

The aluminum oxide left over in the process can be recycled indefinitely, Koehler said, even re-smelted down to be used again in new canisters. He said he's currently speaking with wind farms about using their extra energy for this process.

In tests, the product showed a 15% improvement in gas mileage and a 20% reduction in carbon emissions, Koehler said.

Get the Coronavirus Watch newsletter in your inbox.

Updates on how the coronavirus is affecting your community and the nation

**Hydrogen energy:** [Purdue professor met with Pope Francis to discuss it](#)

Pricing and lease contracts are still being negotiated with some of the cities considering AlGalCo technology, but Carmel Mayor James Brainard said the city would be spending about \$5,000 this summer to outfit more than five vehicles.

Depending on the agreement reached, the product's monthly cost could be lower than the projected savings in fuel, around \$80, Koehler said. He said this means the stainless steel system, designed to last at least 10 to 20 years, could save the owner money from the beginning.

Citing the billions of dollars Americans spend on gasoline each year, Koehler said he sees a lot of opportunity for something that could cut fuel costs.

"It's a pretty big market," he said.

## 14 years of work

In a sense, Koehler's hydrogen fuel system is the intersection of the state's two largest academic institutions: the science and technology expertise of Purdue University and the business savvy learned at Indiana University.

Koehler's a businessman, not a chemist. He graduated with a degree in marketing and management from IU and went on to earn a Master's in European History.

As luck would have it, an encounter with Purdue representatives at the Indiana State Fair piqued his interest and ultimately led him to Purdue professor Jerry Woodall, who had developed the aluminum alloy technology. The IndyStar was not able to reach Woodall, who is retired from Purdue.

Koehler saw huge potential. He began licensing the technology from the Purdue Research Foundation, he said, and by 2007 had set up the company.

For years, the idea of using hydrogen technology was still so radical that the company struggled to attract startup financing, said Pete Carlino, a board member and the company's first investor.

"I think a lot of people just, even though they can see it with their own eyes, it's hard for them to fathom that we can have something really significant in the field of energy," Carlino said.

After Koehler reached out, in 2013, the city of Carmel agreed to work with the company on beta testing a product for the city's

fleet of vehicles — a milestone Kim Morris, the company's director of business development, says accelerated their work.

"Once we were able to partner with the city of Carmel they have been integral in the recent growth we've seen in the last couple of years," Morris said.

Brainard had already issued an executive order requiring fleet vehicles to be powered by hybrid power or alternative fuel. When he heard from Koehler, Brainard said, the technology seemed to fit with that vision. He agreed to let him use city vehicles for beta testing.

For the next few years, AlGalCo rolled through many different prototypes, finally settling on Version 5.0 last year. Now, Koehler said, they're starting to fill the orders that have been rolling in in the last couple of months and have been speaking with other cities in Hamilton County.

This summer, Carmel will be the company's first customer, Brainard said. He plans on seeing how the first few vehicles do before buying more products, but believes there's a good chance the city will purchase more.

"We want to encourage entrepreneurship and small businesses here," Brainard said. "Whether you believe that climate change is a problem or not, the world is demanding products that help keep our air cleaner and this is one way the city can help."



## From Carmel to New York City

ALGalCo may be just beginning, but the company has already received interest from cities outside of Indiana — notably, from New York City.

After Brainard mentioned the technology to a New York City official at a conference, the city called to ask about ordering several hundred units for the fleet. Koehler visited New York with an earlier prototype, but didn't have the capacity to make as many units as the city needed. As soon as the company is able to reach that level of production, he said he plans to resume communication with New York.

"If they were at some point able to produce hundreds of these," Brainard said, "it could result in great economic development for Central Indiana."

**Climate change:** [Carmel mayor has unusual plan to reduce city's carbon footprint](#)

Koehler hosts weekly demonstrations of the aluminum alloy technology out of Carmel's street department garage for anybody interested to see how it works. He estimates about 300 to 400 people have attended over the course of the last few years.

These demonstrations have been put on hold while the COVID-19 pandemic runs its course, but will continue, Koehler said, when shelter-in-place orders are lifted.

Climate change is here in Indiana and its effects are growing stronger, Purdue researchers say. We can expect more flooding in spring and drought conditions in summer, among other changes. IndyStar

The future could be bright for AlgGalCo — Koehler hopes to work with delivery companies such as UPS and FedEx soon about adapting the product for their diesel engines.

"The ultimate goal," Morris said, "would be to make this available on the national spectrum."

In the last 14 years, AlGalCo has transitioned from a period when people were still a little uncomfortable with hydrogen energy to a time when it's being actively considered as the next big clean energy source.

Now that the product is finally reaching vehicles, Koehler said, it feels good.

"There were lots of lonely nights, when we thought we had a good solution and nobody really cared," Koehler said. "It's very satisfying now."

*Contact IndyStar reporter London Gibson at 317-419-1912 or [lbjibson@gannett.com](mailto:lbjibson@gannett.com). Follow her on Twitter [@londongibson](https://twitter.com/londongibson).*