

## With their Hydraulic Hybrid System, NRG Dynamix has Designed and Developed an Engine for Vehicles that Eliminates the Need for Complex Electrical Circuits, Processors, Platinum Electrodes, Power Conversions or Batteries – All While Delivering 50% and Better Fuel Economy



### NRG Dynamix

Automotive  
Hydraulic Hybrid  
(Private)



**James A. O'Brien II**  
President and Co-Founder

**BIO:** James A. O'Brien II is President and Co-Founder of NRG Dynamix

and Co-Founder of Hybra-Drive Systems, LLC predecessor firm of NRG Dynamix.

In his role as company president, Jim has raised \$14 million to support the firm's go-to-market strategy. He won approval from Michigan Economic Development Corporation and raised matching money from both Venture Capital Companies and Angel Investors.

Jim is the Inventive force behind NRG Dynamix ground-breaking design of hydraulic components used to convert fluid power into transportation applications, most notably. Jim's crowning effort to date is the Drop 'n Hybrid® hydraulic hybrid power train. As part of a Hydraulic Hybrid Working Group, he has contributed to the development of engineering standards for hydraulic hybrid power train systems.

Jim's building block solutions are used in many applications, mostly in transportation and disability access products and he has been sought-after to lecture in venues from Manhattan to Tokyo and at universities, business consortiums, trade shows and manufacturing plants. He co-founded O'Brien Engineered Products, Inc. a designer of prototypes to facilitate these many design successes.

Mr. O'Brien holds 12 patents and has 19 patents pending in the fields of; hybrid vehicle powertrains, regenerative braking systems, latching systems and life safety systems. He completed his formal education in 1985, receiving a degree in Electrical

Engineering from Bailey Tech in St. Louis.

### Company Profile:

NRG Dynamix began with an old subcompact car powered by a 6.5 horsepower lawnmower engine fitted to a cobbled-together hydraulic hybrid system. It was noisy but effective while being driven through streets of Deerfield, Michigan, and like the first horseless carriages, the concept presented huge potential.

### Superior System and Products for Optimal Performance

Hydraulic hybrid power does not require complex electrical circuits and processors, nor platinum electrodes, power conversions or batteries. In fact, the hydraulic system is based on an old and basic mechanical system using compressed fluid to store energy. The concept is elegant in its simplicity, then made more compact, lightweight, rugged and reliable by NRG Dynamix through the use of modern materials, packaging and component innovations.

The inherent power and reliability of a hydraulic hybrid system attracted the attention of the U.S. Department of Defense, garnering a contract to produce military vehicles. Other proven applications include buses, taxis, commercial transport and automobiles.

**Interview conducted by:**  
**Lynn Fosse, Senior Editor**  
**CEOCFO Magazine**

**CEOCFO:** Mr. O'Brien, would you tell us about NRG Dynamix?

**Mr. O'Brien:** NRG Dynamix is developing a new type of hybrid technology that allows us to package all of the fuel economy capability of a hybrid, into the same space that the transmission formally occupied in a vehicle. We are able to obtain the 50% and better fuel economy of a hybrid, without adding all the weight and the negative components of a hybrid system.

**CEOCFO:** How are you able to do attain 50%+ fuel economy?

**Mr. O'Brien:** We are able to do this by using hydraulics instead of electronics to do the work. It is more efficient to move energy mechanically through a power train, than it is to move energy electrically through a power train. Through advances in a device called an accumulator, which is much more efficient than a battery, we are able to get the same type of energy management strategies as what is used in the electric hybrids.

**CEOCFO:** Have similar methods been tried in the past and how did develop the concept?

**Mr. O'Brien:** As far as hydraulic hybrids the answer is yes, there are several companies that have been successful at technology basis with hydraulic hybrids. Those include the EPA, Bosch, Eaton and Parker Hannifin. These are the larger players. All have hydraulic hybrids that work and we also have our own patented technique for making the technology work. What is above and beyond that though is the ability to readily move the technology into a package that fits into the existing architecture of the vehicle. All of the competitive technologies require substantial reengineering of the vehicle that reduces the value proposition of the technology, which is something we have eliminated in the deployment of our technology.

**CEOCFO:** What has NRG Dynamix has figured out that others missed?

**Mr. O'Brien:** The first thing that we figured out that they seem to have missed is whenever you try to move energy long distance you lose a lot of energy along the way. Therefore, we

kept all of the plumbing needed for our hydraulics to work very short and very large. This allows the oil to move very efficiently from point A to point B. Doing this allowed us to shrink all the parts in many ways, the same way your computer chips become ever more capable and ever smaller. We basically applied that same logic to hydraulics, where we found ways to miniaturize the hydraulic system to the point where we can package it in places where none of our competitors have figured out how to do it. The technique required to do that are patented and therefore we can share that with you. It is the fact that we basically have patents on the techniques that are required to minimize hydraulic systems in a similar fashion for the miniaturization that occurred in electronics and we just realized the techniques well in advance of any of our

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competitors.

**CEOCFO:** Is the industry aware NRG Dynamix?

**Mr. O'Brien:** We have our first order from Spartan, which owns Utilimaster to put in E-350s, which are built by Ford. We will be delivering that unit later this year. We have delivered two other vehicles to other companies just late last year that are being evaluated. We do have a very large food distribution company that is preparing to place orders for the initial test fleets that will be needed in the marketplace. Once they have delivered what they have promised, then we have the opportunity to for low thousands of these units to get ordered shortly afterwards.

**CEOCFO:** As you move forward will NRG be doing all of the installation or will your customers be able to do themselves?

**Mr. O'Brien:** It is actually something that we have two different companies that are bidding for the opportunity to be the integration location. We do not refer to what we are doing as retrofit, because that would imply we are going out and finding vehicles in the field. We refer to it as upfitting, where a brand new vehicle is built because they are E-350s. Ford will build a new truck. It will go to an outfit location and I get upgraded with the hybrid technology and then it will be delivered to the customer with all the features they want. The warrantees of the vehicle will still be in tact, which is also something that is important to customers.

**CEOCFO:** What is the typical ROI?

**Mr. O'Brien:** The end customer if it is a delivery truck with a great deal of mileage on it, their return on investment can be as low as 18 months. The initial customers that are preparing to place orders are all expecting a return on investment in less than two years, and that is with no subsidies whatsoever.

**CEOCFO:** How has NRG Dynamix reached potential customers so far and have you spoken with OEMs?

**Mr. O'Brien:** We are speaking with the OEMs and there are several OEMs that are interested in the technology. However, we needed this upfit launched to the marketplace, because the sales cycle is simply too long to go straight through the OEMs. We have always anticipated the interim step of up-fitting or an integration location, to get us to the market space, prior to being offered as an option on the OEM product. There are very few name brands that you are aware of that are not talking to us in a very positive way, both domestic and foreign.

**CEOCFO:** Is the environmental community paying attention?

**Mr. O'Brien:** The EPA actually was working on one of the competitive technologies to us and is still working on one of the competitive technologies to us, but even they just do not have this integration. All hybrid vehi-

cles require a lot of engineering work to get them fit into the vehicle. You do not just see every brand of car suddenly saying that it has a hybrid. It takes a few years for the companies to change the vehicle in the ways necessary to be able to package the hybrid parts in it. The batteries take up room, so suddenly you have a little tiny spare tire or suddenly you have to have more expensive run flat tires. There are a lot of compromises made to fit a hybrid in a vehicle. We eliminate those compromises. We are probably the first hybrid that the OEM does not have to compromise on anything. We literally are an enhancement to their product from day one.

**CEOCFO:** Is NRG dynamics funded well enough to get through the next level?

**Mr. O'Brien:** You always want to be funded better, but yes we do have strong investors in Ridgewood New Jersey and Khosla ventures in California. We have some very supportive angel investors in the mix and they have made sure that we have the money we needed. However, we are always looking for partnerships and we are always looking for alliances to make us stronger and allow us to move faster.

**CEOCFO:** What is the history of NRG Dynamix?

**Mr. O'Brien:** I used to work on the electric hybrids myself and I was convinced they were the right thing to do up until the late 1990's. Then it occurred to me that maybe the logic of a hybrid is a great idea, but maybe the technology I am trying to work with is not. I was fortunate enough to find out and figure out that hydraulics did possess the properties that I needed to be successful with a hybrid, but like any brand-new technology, it takes a few years to think through the bugs. You have to figure out where the shortfalls are and then engineer the

solutions. Here we are roughly 14 years later from when I originally noticed the technology was not right that I was working with to where we have a product that is just beginning to get its first orders and frankly for transportation technologies that is pretty fast.

**CEOCFO:** How do you deal as CEO with the frustration of knowing you have something that can make a monumental change, but there are so many hurdles of getting it in use?

**Mr. O'Brien:** This is not the first new technology I brought to market. I am used to this. You have to have a level of aggressive patience to successfully take any new technology into any marketplace. You have to respect the learning curve of your future customer, you have to make sure that they get the information they want when they need it. You have to just keep them thinking about you and over time they go from resistance to embrace. You walk in the door with something that is just a game changer and you have already had time to convince yourself. Now you have to give them the luxury of convincing themselves that you really do have a game changer. I call it aggressive patience. You just aggressively stay in the loop and patiently wait for their mind to change. That is how we do it. I do not see this as a hurdle. I just see it as a process that must be done properly.

**CEOCFO:** Why should investors take a look at NRG Dynamix today?

**Mr. O'Brien:** We are the hybrid technology that the auto companies would be buying if the government was not distracting them and investing all this money in other places. We were actually doing a very good job in the early days of this company, back in the early 2000s, before all of these subsidies for electric hybrids came out. Of course we took advantage of our fuel efficiency and stuff like that

and got partnerships on the efficiency. This technology at its core is a performance technology that also allows you to get fuel economy. However, our customer, the OEM or the transport or food services or whomever is buying the vehicle could just as likely buy a version of our technology that makes the vehicle accelerate faster or makes it a higher performance vehicle akin to the Turbo Charger. If you remember when Turbo Chargers first came out, it was to make the cars go faster and have higher performance. Today, you see them being used very differently. They are used to make the engine smaller, lighter and get the absolute best fuel economy it can. Therefore, we are more akin to something like the Turbo Charger, where whether you are looking for better performance or better fuel economy, you pick the blend you want of that and deliver a product to your customer that is exactly what you want. This would be instead of like the electric hybrid, where because it adds so much weight to the vehicle and because there are so many things that electric hybrids put in the vehicle that you really prefer are not there, you have to make compromises to how well the car corners or how well the car accelerates. You have to give something up to get the fuel economy out of an electric hybrid. Ours is the hybrid where the question is, "What do I want to enhance with my vehicle?" We give the OEM the chance to pick the DNA that they want their vehicle to demonstrate. We do not come to them saying, "We will give you fuel economy, but we will take away this". Why we are going to be successful is because we do not interfere with that relationship that the OEM has with its customer. We are just another tool in their toolbox to enhance it and that is the core of why we will be successful.



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