

Q&A with Chad Joshi, Founder and CEO of Advonex International developing and commercializing Renewable, Plant-based Alternatives to Petroleum Products that require Larger Molecules to make Lubricants, Oils for Cosmetics and Personal Care and Transformer Oils



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CEOCFO: Mr. Joshi, would you tell us about Advonex?

Mr. Joshi: Advonex is focused on addressing climate change through the development and commercialization of renewable, plant-based alternatives to petroleum products. Our science will enhance our customers' business and make the world a better place.

CEOCFO: What have you been looking at and how do you decide what to consider?

Mr. Joshi: The most important aspects of switching to a different resource is how efficiently you can convert that resource into the

products that you want. We have developed a proprietary technology that enables us to transform plant-based materials into hydrocarbons, which are the main stay of what comes out of petroleum. What we are interested in is not replacing fuels, because there are many people that are working on that already, as there are already commercial facilities making ethanol that replaces gasoline, etcetera. What we are interested in is the larger molecules, which is where most of the value is in terms of petrochemical margins. We are interested in making things like lubricants, oils for cosmetics and personal care and transformers. These are much heavier molecules than what is used for fuels and they have much more value and that is what we are focusing our efforts on.

CEOCFO: In layman's terms, could you explain the technology and why it is good for all plants?

Mr. Joshi: The core of our technology is an electrochemical process. We use electricity to change the chemistry of organic oils, fats and greases. The key difference between organic materials and hydrocarbons is that organic materials have oxygen. What we have done is found an efficient way to remove the oxygen without having to break the molecule down to its bare constituents. Usually bio-based technologies break organic material down into carbon monoxide and hydrogen and then rebuild what they need. We do not break it down that far, so our process is much more efficient in terms of process and cost.

CEOCFO: How did you know that it would work the way it does?

Mr. Joshi: This is the idea that came from my co-founders who are very good chemists and they suggested the electrochemical process, which is an unusual approach in the chemical industry. There are not many people that use electrochemistry. One of the things that we have been able to do is take an old electrochemical process, change the

formulation to reduce the amount of electricity to make it happen. By reducing the amount of electricity, we reduce the operating cost by almost a factor of 10, so from dollars per kilogram to a few cents per kilogram. That makes it much more cost-effective in terms of making chemicals.

CEOCFO: *Would you tell us about the processes that are available today?*

Mr. Joshi: There are different types of waxes that are available. These are cosmetic waxes that will be used for things like lipstick, deodorant, or gels. These are high-quality waxes and the important thing is that most hydrocarbons have some aromatic materials in them and these are compounds that have carcinogenic properties. There is a lot of work that comes into cleaning up the wax that comes from petroleum. Ours does not have any of that to begin with so it is inherently safe, especially if you are going to put it on your skin or in your body. Those waxes are our first products that go to market. We also have a series of liquid hydrocarbons that can improve the fuel efficiency of your car just by changing the engine oil. That is an important thing as engines are getting smaller and because car companies want to improve the fuel efficiency of their engines. Those are very important characteristics that we can bring to the table. In addition to improved performance, we can also give you a 100% green product.

CEOCFO: *Why did you choose the name “Entrada” for your products?*

Mr. Joshi: Entrada is a Spanish derivative word that means entry or trade or exchange. We wanted to evoke something that was opening up as opposed to trying to close something out. We wanted an open idea and concept in terms of the name.

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CEOCFO: *Are your products in use today?*

Mr. Joshi: We have been working with key customers to develop ingredients to their specific requirements. Because our technology is a platform of technology, we can customize waxes, lubricants, and oils for our customers. Working with them, we have been getting feedback about what properties they like and do not like, so we are now at the point where we are ready to build a pilot plant to start producing and selling these ingredients.

CEOCFO: *When you are speaking with the right person at any of your target industries, do they understand immediately?*

Mr. Joshi: They understand the basic concept. They are intrigued in that we are using an electrochemical process which is different from what many other companies use. Most chemical processes are thermal processes where you use a catalyst to create the chemical changes. Electrical processes can be much more targeted and much more efficient, as we are demonstrating to our customers.

CEOCFO: *With so much opportunity, how have you decided where to focus your efforts?*

Mr. Joshi: Certainly I think the types of molecules that we can make easily have in some instances dictated the market that we would go after. It is much easier for us to make the larger molecules than it is to make small ones. The quantities that would be required dictate where we could possibly sell. The lubricant industry is a very large industry and the quantities that we are making now or in the near future, will not make a big difference in the automotive sector because that is much larger than what we can do. In the interim, until we grow to the size of what the automotive industry needs, we have been looking other markets where the quantities are smaller but the value is much higher. That is why we have been focusing on the cosmetics and personal care industry.

CEOCFO: *When people are looking at green products how do you compare what people might be doing now, and will people pay more?*

Mr. Joshi: If you are asking people to pay more for just a green version of what they are already using, that is a pretty hard sell. What we are bringing to the table is enhanced performance, especially in the lubricants space. There, we have clearly shown that our products improve their range of performance and that is something for which they are willing to pay, and by the way, it is green. The sell is much easier.

CEOCFO: *Are people as interested in non-petroleum products as they might have been some years back?*

Mr. Joshi: The interest is still there in the companies. The reality is that the companies that I am selling to, the large cosmetics companies and the large oil companies, the lubricant companies, they are operating globally. They are selling

in North America, Europe and Asia. They are not going to just follow one country's rules. While the market in the US may have slowed down, the rest of the world is still marching forward with wanting renewable products. These companies are continuing their development of greener and better products that go to a global market and not just the US.

CEOCFO: Are you funded for the steps going forward and are you seeking partnerships or investment of any kind?

Mr. Joshi: What we have been doing is building partnerships with various companies both on the feedstock side, as well as on the off-take side. For example, we have a partnership with Minnesota Soybean Processors, where they would be able to supply us with soybean oil for producing our products. On the off-take side, we have Valvoline who has been developing motor oils using our materials. In fact, Valvoline is so impressed with our technology that they are now developing custom motor oils for their Formula One racing program, using our materials.

CEOCFO: What has surprised you as Advonex has grown and evolved?

Mr. Joshi: When you try a new technology, you always get surprised at what results from your efforts. Initially when we were developing the technology, we had been focused on trying to make a better diesel fuel but it turned out that as we were making the diesel fuel, we were also making these much larger molecules. It turned out that we can make those larger molecules more efficiently than we could make the diesel so the question was what can we do with that? We ended up redirecting the company to focus on those larger molecules and that is what resulted in us being where we are today.

CEOCFO: Why is Advonex International an important company?

Mr. Joshi: We are developing a technology that will have widespread implications. The reality is that if the world is to address climate change, we need to have non-petroleum sources of these liquid hydrocarbons. Digging oil out of the ground is not going to be sustainable in the long-run, so by using plants which have captured carbon dioxide from the air, we maintain a sort of equilibrium. That is the key and we cannot do that unless we reduce the use of petroleum based products. That is where we fit. We are amongst hundreds of other companies moving in that direction. All the other oil companies are taking notice. Valvoline is a partner with us and we are talking with several other lubricant companies because they see the writing on the wall that they are going to need to be involved in these non-petroleum technologies. That is going to be key to their survival.



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