



Stanford eCorner

Planning for the Market

John Melo, *Amyris Biotechnologies*

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Even after the first round of financing, budding start-up Amyris Biotechnologies didn't quite realize the potential of its assets or its market possibilities, says company CEO John Melo. The company made a choice. And rather than exploring the limits of the technology simply for technology's sake, they thought instead about exploring the needs of the marketplace. They first looked at the attributes of existing energy sources, and then investigated molecular alternatives that can mesh with current capabilities.



Transcript

Unfortunately, these don't happen in a single discovery "aha" meetings. It's one of these things that, probably, over a year of just constant conversation and understanding what it was we were really doing that we realized what we really had. Then it became a matter of choice. I can tell you when brought in our series A, our first equity-based financing. At that time, we still did not realize the markets we had access to or the potential of the core technology. At that point, John Doerr will say this openly. He was making a bet. He basically loved the team. He thought it was interesting technology and he thought, "With this team and that technology, there's got to be a market somewhere." And he loved the cause. I think the cause was one of the initial hooks.

He couldn't resist the cause, and it was a great team with an interesting technology. So maybe let's shift and talk about the hydrocarbons for a minute. You've said that synthetic diesel is not a substitute, really. It works in the same way that regular diesel does. Can you talk a little bit about how you picked that of all the things you could make with the hydrocarbons that were spun off of the Artemisinin? When I joined the company, we started to think about our product selection from the market in. Instead of thinking about, "What can the technology make?" we started with, "What does the world need?" We started with really understanding diesel today and biodiesel today. We realized that biodiesel today had some limitations, and that there wasn't a real scalable renewable diesel available. So it was from that perspective, kind of market in, that we realized there were three attributes that would be critical for a renewable product to win. The first is it had to have either as much or more energy content than the existing product, because if you took energy away, it would be a compromise for the whole chain, especially the end consumer. The second thing is the cetane level which for diesel is the equivalent of octane.

It had to have as much or more cetane than petroleum-based diesel. The third was temperature. We realized that one of the weaknesses with the seed oil-based biodiesels is that they got really sticky and gummy and thick anywhere below 10-12 degrees Fahrenheit. So we decided to focus on a molecule that would have a freeze point of about 40 degrees Celsius below zero. So that's kind of what we did. We said, "What are the most important attributes in the market from the customer's perspective?" Once we chose the attributes we wanted to be very distinctive in, then we asked ourselves, "Could we make that molecule?" We actually had in interim step which was from a chemistry perspective. We asked ourselves, "Which molecules in the world have similar attributes?" Then, we got to the third step which was, "OK. So there's a set of molecules that could work." We got to the third step then of saying, "So can we actually make those? Can we make get bugs with the pathway we control to make that molecule?" That whole process, beginning to end, once we knew what the right attributes were to focus

on, was about a six-week process. We think that's pretty distinctive going from targeting what we want from an attribute perspective to making it in the lab, getting the bugs to produce it in six weeks. We think it's pretty cool.