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Special Call

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Presentation

Operator

Good day, and welcome to the Amyris Virtual Investor Mini Series. [Operator Instructions] Please note this event is being recorded. I would now like to turn the conference over to Han Kieftenbeld, Chief Financial Officer of Amyris. Please go ahead.

Hermanus Kieftenbeld
Chief Financial Officer

Thank you, Chad, and good morning and good afternoon, everyone. With me today are John Melo, President and Chief Executive Officer; and Sunil Chandran, Senior Vice President, Research and Development. Today's webcast is the first session in the Amyris Virtual Investor Mini Series. The theme for the series is Delivering on the Promise of Synthetic Biology. And today, we will feature our proprietary science and technology platform.

During this call, we will make forward-looking statements about future events and circumstances such as those related to future transactions, financial performance, operating activities, market opportunities and growth prospects. These statements are based on management's current expectations and actual results and future events may differ materially due to risks and uncertainties, including those detailed from time to time in our filings with the Securities and Exchange Commission.

Amyris disclaims any obligation to update information contained in these forward-looking statements, whether as a result of new information, future events or otherwise.

Before we begin today, I'd like to note that included in our webcast is a slide presentation we will refer to in today's presentation. The slides are also posted on the Investor Relations section of Amyris' website. During our hour together today, John will provide a business update, followed by a 30-minute technology overview by Sunil and we will conclude with a 15-minute Q&A session.

I'll now turn the call over to John Melo. John?

John G. Melo
President, CEO & Director

Thanks, Han. Good morning and good afternoon, everyone. Thank you for joining today. We'd really prefer being with you in person, and I look forward to the day soon when that will be possible while keeping us all safe and healthy. 2020 has been a year of extreme uncertainty. We're very fortunate that it has also been one of the most productive years in the company's history, where we have transformed our business, accelerated our industry leadership and are well advanced to becoming the first fully funded business in our sector.

I'm very thankful for the support of our investors and the resilience, collaboration and innovation of our teams and partners working jointly to meet the needs of consumers and respond to the world's need for a much more robust response system to global pandemics.

While we recognize this year has not been perfect, we have continued to focus on delivering industry-leading operating and financial performance. We have had several setbacks, where we were unable to ship what we planned the last few quarters. This is part of pioneering new technology and processes during a global pandemic, but nonetheless, an important lesson in becoming better at setting and communicating expectations while continuing to deliver outstanding operational performance.

For today's business update, I'll cover 3 items. First, an update on the transactions that we referenced during our last earnings call; secondly, a review of our portfolio; and then thirdly, a look at the road ahead for Amyris. Let me start with an update on our transactions. We previously mentioned that we are actively working on 3 transactions, covering 4 components of our portfolio. We previously indicated a total value

of $350 million across the contemplated transactions. I am pleased to report that we've made significant progress since our November earnings call.

We have successfully advanced the total value to over $450 million for the 3 transactions. The $450 million value represents a combination of upfront payments, milestone payments and royalty arrangements. The first transaction is an exclusive license valued at $50 million for the use of farnesene to produce 1 molecule. This agreement is signed. Closing is expected over the next 10 days, pending approval by the Board of Directors of both companies. We expect around 75% of this transaction's value to be recognized as revenue in the fourth quarter. We will provide more details on this transaction when we issue a press release announcing the closing.

The other transactions have signed term sheets with agreement on the key business terms and are moving through due diligence and contracting at this time. We expect 2 additional transactions to be completed by the end of the first quarter. The upfront portion of the 3 transactions combined is expected to be more than $200 million, with payments expected between now and the end of the first half of 2021. We see a clear path ahead that is strategic and value-accretive for all parties involved.

I'd like to now review our portfolio. Through this process of these transactions, we have developed a clear understanding of the current market value of our assets and technology. We believe there is a significant gap between our current equity valuation and the market value of our assets and technology. Our portfolio strategy is to simplify and focus our activity, while monetizing parts of the Ingredients portfolio that are delivering less than 50% annual growth, have a longer cash cycle and are on the lower end of our gross margin hurdle rate of a 50% pro forma gross margin.

We believe we are 3 to 5 years ahead of other sector peers and competitors in terms of number of molecules commercialized, number of molecules with an engineered and proven pathway ready to commercialize. Think of this as our technology pipeline and related TAM, our recurring revenue, our recurring revenue growth rate and our gross margin profile.

Our go-forward, combined, Consumer & Ingredients product portfolio is expected to continue at the current growth rate with a pro forma gross margin above 50%, along with a much shorter cash cycle. Our R&D and process development functions have been very productive this year with 6 new molecules and a significant expansion of our R&D pipeline.

Our 6 new molecules are vanillin flavors, CBG, Biosilica, [ethanol], squalence and Bonsucro ethanol for the personal care industry. This is double the target we set for 2020 of 2 to 3 new molecules to market. These new molecules are expected to generate 2021 revenue that is close to 2x the 2020 revenue attached to the molecules we are monetizing through these transactions. The transactions have provided us with a sound market-based current valuation of our assets.

Regarding our consumer portfolio, our target markets have a TAM of approximately $250 billion. We are growing the consumer part of our business at 3x this year against a stated target of 2x annually. We estimate our Consumer business to have a market value of around $800 million based off our current annualized revenue run rate. Based on the attained valuation of the Ingredients products we are monetizing, we believe that the combination of our existing Ingredients portfolio and the addition of 6 new molecules to have an estimated valuation greater than $1 billion for our Ingredients products.

Beyond the 6 new molecules I mentioned, we have a current development and scale up pipeline of 18 molecules that should attract future valuations, similar to what I just described. Also, our technology platform has successfully engineered yeast capable of producing at least 250 different molecules through 20 different biological pathways. Additionally, we have designed pathways, but not yet produced for 200 molecules. This is a total potential of 450 molecules that are at different phases of current development. This inventory of strains in molecules ready to develop and scale should we decide to commercialize, represents a suggested current market value of over $10 billion.

Think of our technology platform as the operating system for making clean chemistry and remaking the world a healthier place, kind of like Windows or the Apple OS or Tesla batteries' operating logic. We are the equivalent for remaking chemistry. Recognizing the full value of our technology can be

challenging since it's not immediately visible in day-to-day products. Already, more than 1/3 of you are likely consuming a product with an Amyris sustainable molecule inside at some low content level. Clean chemistry will continue to become a bigger component in applications for everyday consumer products as consumers continue to demand more natural and sustainable solutions. Our future growth is about more molecules into more products and used at higher rates in each applications, much like the Apple business model of getting the operating system in the device in your hands and then becoming your everything from music to your source of movies to your connectivity and your productivity tools.

Our track record of monetizing molecules and our current use cases demonstrate that we have built an engine for continuous value creation. The more molecules we scale, the more efficient we become and the more value we aggregate for the technology platform.

So how about the road ahead for Amyris? The successful completion of these transactions, combined with continued strong operational performance, establishes a clear path for self-funding. We do not have any current plans for major fundraising through debt or equity to meet our operational needs or to support our current growth.

In 2021, we will be very focused on completing new Brazil manufacturing facility. Given our business progress and these transactions, we will need this production capacity to meet demand in 2022. We are focused on continuing our leadership position in Clean Beauty and personal care and health care markets with our leading consumer brands and the key platform ingredients that are making the personal care industry more sustainable. This is a business where we are fully integrated and own the value chain. We are expanding and deepening our partnerships to accelerate the number of molecules we are developing and scaling through collaborators outside of Clean Beauty, personal care and health care markets.

In summary, our business model is working. Our proprietary technology is delivering clean, sustainable solutions. Our technology is also demonstrating how valuable it is as evidenced by our ability to monetize molecules that we have developed, scaled and commercialized. We continue to improve and accelerate our time from lab-to-market to deliver our no-compromise products for a healthier planet, and that is the focus of the rest of our session.

Let me now pass to Sunil, who will explain in more detail our technology platform. Sunil, so glad you're with us and looking forward to hearing your update.

Sunil Chandran
President of Research & Development

Thanks, John, and hello, everyone. I would like to start by emphasizing that, over the years, we have continuously -- we have been continuously innovating and investing in our technology platform. Our first commercial product took about 40 months to go from strain to pilot plant run. And today, we average less than a year. Our cost of product development has dropped by 90%, our time-to-market has reduced by 80% and we have been able to do this by increasing the bandwidth of our R&D pipeline by 500% since 2012, while increasing OpEx by only 20%.

Today, our goal is to walk you through the integrated Amyris R&D PD manufacturing technology platform. At Amyris, our goal is to disrupt conventional production systems that rely on destructive and nonsustainable practices and replace them with highly scalable, clean manufacturing powered by biology. Our platform enables a scientist to precisely engineer microbes like Saccharomyces cerevisiae to fermentatively convert sugar to a variety of ingredients that consumers use on a day-to-day basis. Using our technology platform, we can offer better performing ingredients at lower cost using a process that is far better for the environment.

Now, in order to modify a microbe like Saccharomyces cerevisiae, which has evolved for billions of years to consume sugar to produce ethanol, we need to go through a highly creative process, where we design the strains, build the strains, test them, learn from the data, and based on that data, redesign the next set of strains. Now biology being unpredictable, if we can only build and test a few strains at a time, we would need to go through a huge number of iterations through this pipeline, thereby increasing the time line and investment needed for commercial success.

We solve for this unpredictability using our proprietary lab-to-market operating system designed to continuously learn from previous iterations via highly optimized and automated molecular biology, analytical and process development tools, combined with machine learning algorithms and statistical models, enabling us to collect larger amounts of quality data. The final result is a fully integrated end-to-end R&D PD manufacturing solution that is built to disrupt how companies traditionally approach this problem. This integration means that, today, we start every project with the end in mind. And before we even start designing our first strain, we have a good understanding of our manufacturing process, our cost targets and how we will get there. Today, we'll walk you through this integrated pipeline in detail.

So let's start with automated design, which is our proprietary programming package, enabling us to access the chemistry in living systems and find the optimal biochemical route from sugar to the target molecule. Now all living cells carry out a series of chemical reactions to convert sugar into a variety of molecules. Nature combines various chemical reactions into unique combinations to form routes or biochemical pathways. Hence, in order to engineer a microbe to convert sugar to a target molecule, the first step is to understand what reactions and routes we need to optimize within the microbe.

At Amyris, we have built an atlas of all the living reactions that are known to occur in nature across multiple organisms, and we have invested considerable effort to understand how they are linked to each other. Now the closest analogy that I can give you is that we have created the Google Maps for metabolic pathways. And just like we can ask for the most optimal route from, say, New York City to Boston from our mapping app, we can ask for the most carbon efficient route from sugar to the target molecule.

Now just like our map -- app needs to keep track one-way roads and shouldn't ask us to cross a river at a spot where there's no bridge, our computation program needs to keep track of reaction directionality, thermodynamics and biological feasibility. The result isn't necessarily the shortest path from sugar to the target molecule, but the most efficient path, keeping in mind several biological limitations. The program will also calculate how much sugar can theoretically be converted to the product as shown here.

So in this example, for every 100 grams of sugar fed, 23.8 grams are converted to the product. This number is important because it sets a biological limit on the manufacturing costs we can achieve at scale.

Now every biological reaction is associated with a DNA sequence, and our program will collate a list of all the DNA sequences needed to compile these reactions in our microbes. If a microbe were a software program, then you need multiple lines of code or commands to specify a program that introduces new functionality into the microbe. So that instead of converting sugar to, say, ethanol, the microbe starts executing a new program to convert sugar to, say, farnesene. To date, we have verified programs for greater than 215 molecules.

Now Amyris got its start by producing terpenes, and we have expanded this expertise beyond terpenes. Our strategy has been to invest a lot of effort in building platform strains. We optimize the carbon flux to a common metabolic node that enabled us to access a wide range of subsequent molecules with only 1 or 2 genetic changes. Today, we have a suite of platform strains stored in our freezers, and when we decide to go after a target molecule, we already have a platform strain with a large number of the genetic bells and whistles already incorporated into the strain for that target molecule.

Now this multicolored wheel on this slide is a chemical dendrogram, and it represents more than 500 molecules classified by their chemical functionality into 15 distinct chemical classes. We now have a panel of platform strains, allowing us to access all these 15 chemical classes, encompassing more than 20 biochemical pathways. We have, to date, gone after more than 500 target molecules and produce more than 250 of them. So today, if a partner comes to us with a target molecule in mind, we have either attempted and reduced that exact molecule or a molecule that is only 1 or 2 steps from the desired target.

Now let's come back to the analogy of a microbe being a computer program and DNA being code. Well, software engineers don't code in 0s and 1s. They use programming languages. So why should biologists code in A, T, G and C. At Amyris, we have hence developed a programming language for DNA called Genotype Specification Language, abbreviated as GSL. So a single line of code, like the ones shown here, fully specify a DNA command containing thousands of base pairs and the process is nearly instantaneous and error free.

So let's wrap up the design section by comparing where we were in 2008, where every design had to be manually curated and specifying 20 designs would take a scientist 3 weeks, to today, where that same scientist can come up with 1,000 designs in 10 minutes or less.

Now everything we have discussed so far has been the [in-cyclical] process, and we now need to introduce the DNA design into a yeast strain using our automated strain engineering platform so that the microbe can convert sugar into the target molecule.

Let me start here by using another analogy. Most of us are familiar with Legos. Let's say, I give you 10 Lego parts and ask you to make a Lego car. Well, that's easy enough. But suppose I give you 10,000 Lego parts and ask you to make 1,000 Lego cars for me. That suddenly becomes a challenge. However, what if I provide you with a database that contains all the parts and a software package that allows you to design all the cars? And that same software package associates all the parts with all the designs and provides all the instructions to mix the parts and assemble the cars on an automated workstation. Well, we applied the same analogy to strain construction. Every DNA part has a specific function, and we have a database of greater than 200,000 DNA parts and a software package that associates the parts with the designs and computes the robotic workers to assemble the DNA designs.

Let's continue with the Lego analogy a little more. Every Lego part has a unique function, but each Lego part can be connected to another part due to the compatible ends. We apply the same concept to DNA parts, and we introduced common sequences at the end of all our DNA parts, so that when different DNA parts are mixed in a single reaction, they come together in a predictable fashion to form the large target DNA design, which is then inserted into the strain. We currently assemble about 1,500 DNA designs for cycle and start a cycle every 2 weeks.

So let's wrap up the strain construction section by comparing where we were in 2008, when all our strain construction operations were manual, to today, where we have applied a high level of automation to the whole process, resulting in a thousandfold increase in throughput but with hundredfold lower cost.

The next step in the lab-to-market pipeline is creating all the strains that have been generated. At Amyris, we generate more than 0.5 million unique genotypes that result in about 7.2 million strain candidates in a year, which now need to be screened to find the strains that efficiently convert sugar to the final molecule. Think of this process as a giant funnel, which sorts out the performing from the nonperforming strains. At the end of the day, on average, only about 100 of the top strains are sent to fermentation per month.

This screening process required a lot of investment in terms of development of proprietary statistical models and machine learning algorithms. You have to remember that the end state for our strains is performance in large fermentation tanks. But there isn't enough capacity in the world to test all our strains in fermenters. So we instead use 96 well culture plates to rapidly sort through the strains. When we first started measuring strain performance in plates and try to predict a fermented tank performance-based on individual measurements, the data is as shown on the left. On the X axis is the performance in plates based on 4 different types of plate data sets. The Y axis shows how those same strains performed in tanks. If the correlation between plates and tanks was good, you would expect the data points to cluster closer together along the line, but instead, we'll see a complete scattering of the point showing poor correlation.

The reason for this is obvious. The conditions in the plate are quite different from those in the tank. So in effect, it's the equivalent of trying to pick a world-class marathon runner, but you can only test your athlete using a rapid 100-meter race. So what we started doing is measuring multiple data sets and combining them all in a multi-weighted analysis model and using statistics and machine learning to predict tank performance. We not only measure the levels of our target molecules, but a whole range of intermediates that the strains produce en route to the target molecules as well as side products that the strains may be making. When we started implementing these models, we started observing better correlation between our predicted and observed tank yield, as shown by the data points coalescing along the straight line in the right hand graph. Today, we develop models like these for every new molecule project that we go through.

So again, in 2008, we were working on a single molecule, only ran a single assay. And today, we run more than 30 assays for more than 18 molecules on any given day at a throughput that is hundredfold higher. And more importantly, we are collecting about hundredfold more data than we used to. While we consider a platform so far to be disruptive, the next phase is where we truly differentiate ourselves from other companies in our space. And this is our experience in traversing the valley of death that all companies need to go through when scaling up their strains and lab processes. When you think about where you start in the lab at 100 microliters, and where we end up at 100,000 liters or higher, we are talking about a billionfold increase in scale. And the transition from each step to the next is a failure point that can derail the entire project. We have been successful at managing these transitions with a well-developed fermentation pipeline, where the data quality is robust and where we are measuring the right parameters to enable success at the next scale.

Our experience with process development on 13 molecules has allowed us to develop lab scale processes that mimic manufacturing scale such that our performance translates both effectively across various platforms, as shown by the tight correlation in this graph for real-world data, comparing our lab performance to commercial scale performance. What this means is that we can go from a 0.5 liter tank directly to a 200,000 liter tank with high reproducibility, thereby, reducing risk and cost and speeding time to market.

So again, in 2008, we used to run standard 2-liter tanks and ran 1 process and had experience with just 1 molecule. Today, we run a wide range of high-throughput fermentation and purification systems and have developed more than 50 processes and have collected data for more than 50 molecules.

Let's now see how this all comes together using rebaudioside M, or Reb M, as a case study. Amyris' Reb M, is a great tasting, natural, non-GMO, 0-calorie sweetener with a market value of at least $2 billion. It is 200- to 400-fold sweeter than regular sugar, depending on the application and formulation. And the process results in a product with no bitter aftertaste. Reb M is an extremely complicated molecule to make wide fermentation, and yet our team has been able to double strain yield and productivity every 6 to 9 months and we have now surpassed our original targets. And to emphasize just what it takes to achieve success in this space, this is what it took to double strain performance every 6 to 9 months.

We had to optimize 8 different enzymes, screened about 100 genes per screen and carried out 6 separate enzyme evolution projects. On the strain side, we introduced 17 novel enzyme activities that did not previously exist in yeast, altered 53 native genes, screened more than 0.5 million strains and ran more than 1,500 fermentations to find the right manufacturing candidates. And this doesn't even include the novel fermentation and downstream purification operations that across this development team implemented to drive cost down.

So to conclude, let's reiterate what we covered today. Since 2012, we have continued to deploy our industry-leading R&D, PD and manufacturing platforms to the commercial scale manufacturing of 13 different molecules. We have done this by continuously innovating in all facets of a fully-integrated platform, allowing us to reduce product development costs and time-to-market.

John, your thoughts on what we have communicated so far?

John G. Melo
President, CEO & Director

Thanks, Sunil. I really appreciate the overview. And I'm always in awe about the amazing power of biology. And it's -- John Doerr, our largest shareholder, always has a simple way to explain it. His view is, you feed these amazing bugs sugar and they poop amazing molecules. And the stuff in between is exactly what you just described, which is actually where all the magic is. And I think we're just scratching the surface. It's taken quite a bit to get here. I think a lot of times, people bring up competitor names as like, "Oh, yes, they've got a great story and look at all the buzz words they use. So how are you different?"

And everything you've just said and the metrics you just put out as to the progress we made in lowering costs, increasing productivity and throughput, focusing on cycle time to learning and always starting with the end in mind. Because at the end of the day, the technology only matters if it actually makes a product

that makes the world better. And I think that is, in spades, what you and the team have done, and it's really appreciated. So thank you for updating us on all the amazing work. I hope that everybody was able to keep up with you.

And without question, once we get through the pandemic and where -- and how we're living our lives, it will be great to get folks back engaged in the lab to experience the amazing work you and the team have done. So let me now turn to make a few final comments on our thesis at Amyris.

We think our thesis is pretty simple. Consumers are demanding natural products that are clean and sustainably sourced. This is true for all consumer goods, including beauty, personal care, health and nutrition markets. We deliver better-performing molecules at a lower cost, and they're sustainably sourced. We call this our no-compromise promise for customers and consumers, and this promise is delivering industry-leading growth. Said differently, every time we execute on our promise, the molecules we take to market become the leading molecules and the market share leader in their category.

To make the world sustainable, our company needs to be sustainable. The simplification of our portfolio, and our continued operational performance, enables us to become one of the first companies in our sector to become financially self-sustaining. And I think that is game-changing for synthetic biology. We are very excited and pleased with this moment in the momentum in Amyris' life cycle. We welcome you to join our journey to creating a healthier and more sustainable planet through synthetic biology and fermentation. They need to go together to create real products that make a real difference that drive value for everyone.

Before we turn to Q&A, I wanted to let everyone know that we will make an effort to address everyone's questions, but I also want to be mindful of time. Keep in mind, if we do not get to your question, please submit it to our Investor Relations email, and Peter, working with our partners at [Argo], I'm sure will help get back to you as quickly as possible.
With that, let me open the call up for questions and turn to Chad, our operator, to help facilitate that. Chad?

Question and Answer

Operator

[Operator Instructions] And the first question will come from Doug Schenkel with Cowen.

Doug Schenkel
Cowen and Company, LLC, Research Division

Good morning and good afternoon, everybody, and thank you for taking our questions. Thanks for all the updates, both on the business opportunity as well as the monetization front. I wanted to really just ask a couple of questions on the financing and strategic events there. Just a clean up question.

I thought I heard in your prepared remarks that the full amount of the $50 million that you expect in the first transaction would be monetized as an upfront almost immediately. But then you talked about the 75% of the $50 million being recognized as revenue in the fourth quarter. Just to clarify -- either way, it's a win, but how much of the $50 million do you expect to receive in a cash flow upfront?

John G. Melo
President, CEO & Director

Doug, first of all, thank you very much for being on the call, and appreciate your feedback. And I'll -- this is John. I'll start and then, Han, anything you want to throw in. We said a couple of things regarding the first transaction. First of all, that we expect about 75% of the $50 million to be recognized as revenue. Regarding the cash flow of the $50 million, we expect $30 million to be paid in immediately at the close, which we expect to be very soon, just pending really Board approval by both companies. And then another $10 million to be paid by March 31. So that's $40 million of the $50 million to be paid, again, very quickly, $30 million now, $10 million by March 31, and the rest of it is tied into a milestone payment. So I hope that helps, Doug, and clarify exactly how the $50 million from a cash flow perspective impacts us. Han, is there anything else you want to add to that?

Hermanus Kieftenbeld
Chief Financial Officer

No, I think that's exactly right. No further comments on that.

Doug Schenkel
Cowen and Company, LLC, Research Division

Okay. That is super helpful. And then if, I guess, as a way to stay compliant and only ask one more, I'll make it a 2-parter. In terms of the next 2 term sheets, could you just talk about essentially what's left before close? And essentially, what I'm trying to get at there is, what type of due diligence do your partners require? And how would you characterize the associated risk there? So that's the first part.

Kind of pulling all this together, I'm just wondering if you could help us out in thinking about how much 2020 revenue is expected to be divested over all of these transactions? It's exciting that the 6 new molecules you talked about are going to generate twice the revenue being divested in these transactions, but actually understanding essentially how much is moving out of the 2020 base would be really helpful. So first question is on diligence to get to a close, and the second is on revenue impact.

John G. Melo
President, CEO & Director

Yes. I love that, Doug. You ended up getting a couple in there, but I appreciate it because the they're actually great clarifying questions. So look, when I say the term sheets are signed, these are pretty detailed term sheets. We actually worked quite a bit with both buyers to ensure we wouldn't have any surprises. So we've got detailed term sheets, all the business terms agreed. And obviously, they need to be translated into contracts, and that's work that's happening as we speak.

Regarding the diligence, we don't see any significant concern around the diligence. There's normal diligence. We understand what the diligence is. We've been very clear and have shared the information. There are data rooms that have been available for a while to both of these partners. So I don't think there's -- well, let me say it differently. I think the risk profile is the same of any other transaction we've been very confident about. I don't -- it's obviously not done until it's done, but I don't suspect or expect any major issue and really, definitely, not around the diligence.

We do have to get them contracted, and that's, obviously, work -- that's, obviously, work that needs to get done.

Regarding the revenue, I believe the total revenue from all that we're divesting for 2020 is somewhere around the $30 million range. And again, as we said earlier, there was actually quite a bit more than $30 million -- quite a bit more than double $30 million built into the 6 molecules we're launching. And the 6 molecules we're launching are molecules that are now actually in production. We've demonstrated clear targets and deliverables, some of which are already delivering revenue this year. So -- actually, I think most of which are delivering revenue this year. So we feel very good about the visibility. We feel very good about how we're upgrading for a more consistent margin and a simpler manufacturing process for the new molecules. So I hope that helps. And Han, did I miss anything that we should correct?

Hermanus Kieftenbeld
Chief Financial Officer

No, I think that's framing it very well. As these transactions come to a conclusion, we will announce -- we'll obviously give you clarity on all the details. But I think, in order of magnitude, thinking about what is involved with these transactions and what comes, what goes, what stays and what comes anew, we should have a good order of magnitude here.

Operator

And our next question is from Amit Dayal with H.C. Wainwright.

Amit Dayal
H.C. Wainwright & Co, LLC, Research Division

It was good to get a refresher on the impressive science behind the business again. John, just to begin with, you had mentioned 450 molecules in inventory, I believe. Are these developed based on collaborations with customers? Or are these sort of organic efforts that you might try to bring to the market through partnerships, et cetera? Any color on how you plan to sort of leverage this asset base, I guess, going forward?

John G. Melo
President, CEO & Director

Yes. No, thanks, Amit, and I appreciate you being on the call. Look, I think the majority, and I'll ask Sunil to correct me after I make my initial comments if I don't get this right. I think the majority of the 450 million were actually developed in a collaboration that we had with DARPA. DARPA really wanted to build out synthetic biology in a much deeper way as part of national security. And as part of that, they really wanted to focus on additional pathways, additional tools and a lot more flexibility in what synthetic biology could do.

So the #1 benefit from having this inventory is actually the fact that we now have built out 20 pathways, more than 20 pathways, different classes of chemistry and a real deep understanding of what biology can do and what it should do in places where biology and fermentation is a better path to make chemistry than what exists today. So the learning, the data, the tools and the investment from DARPA were huge wins. I think the inventory just enables us to be faster to market. If you think about the last few molecules we've developed have all been kind of less than a year to get to a point where we've got a great strain ready to scale. And so that, for me, really proves the whole thesis around, over time, different pathways, different organisms, different chemistry being where the world ends up being with synthetic biology and the funding from DARPA helped us to get there.

So I hope that helps. And regarding new partners for the molecules, we're in active discussions with some of the world's largest consumer companies. And my guess is you'll just start seeing more partnerships and deeper relationships with current partnerships that continues our path of at least 2 to 3 new molecules scaled every year. Sunil?

Sunil Chandran
President of Research & Development

No, that -- you captured that perfectly, John. It is definitely a combination of the investment we got from DARPA. And then combining that with the lessons learned from the rest of our product portfolio that we have commercialized, right? So combining both of those together allowed us to what I like to call is a molecule-agnostic platform today. So no, you capture it perfectly.

Amit Dayal
H.C. Wainwright & Co, LLC, Research Division

Just one more from me, and I'll get back in queue. So for the last couple of years, the yearly performance has pretty much come down to meeting 4Q expectation. With these monetization events that are planned, is this part of the story going to change in 2021?

John G. Melo
President, CEO & Director

Look, I mean, I think our growth rate quarter-on-quarter this year has been pretty phenomenal. I think we've been at a pretty constant click of about 20% or better quarter-on-quarter performance or growth in our product portfolio. We had said that expect the fourth quarter to be much greater than that, and that is exactly how we're performing.

We expect to meet analysts' expectations for the fourth quarter, and we expect to have a great 2021. And I think the big difference is, I don't see the fourth quarter being as much of a standout. It's still always a better quarter just because of seasonality in some of our business, but I don't expect it to be as much of a hockey stick next year for sure. I think, secondly, and the biggest change is, we're not running from one fund raising to the other. We're not running from one bad debt structure to the other. And we're not taking a big chunk of our cash and using it to pay down debt. We actually are now at a point where the sustainable part of our business and how we're able to fund our growth and focus on delivering on our objectives, I think, is really the freeing part of where we are.

So I hope that helps, not as much of a hockey stick in '21. For sure, fully funded, which changes our whole approach to how we look at the business and then on track to meet expectations in the fourth quarter.

Operator

And the next question will come from Colin Rusch with Oppenheimer.

Colin William Rusch
Oppenheimer & Co. Inc., Research Division

Given the accelerated time frame on the molecule development that you guys have seen this year, what are you seeing on the customer front in terms of interest level activity and folks that we know have been looking for support on the sort of molecule development and coming back to you guys in getting more serious about future programs?

John G. Melo
President, CEO & Director

Yes. Colin, by the way, thanks for being on the call. It's a great question. And what I would tell you is we have, obviously, market leaders in segments where biology makes amazing chemistry, meaning pure, better performing, lower cost. And those market leaders, what I'd say, are taking more and more advantage of the platform to get to the objectives that they have, whether it's new molecules or whether it's the current molecules performing at a lower cost, whatever it may be, what I would tell you, we're

experiencing is just a deepening and broadening of collaborations with the current partners. There are some new partners coming to the mix really because of our expansion into some areas like proteins and to the health care area.

So we are seeing new partners, but I wouldn't say, Colin, and mainly because of our focus that all of a sudden we're broadening and opening the floodgates to a bunch of new companies across a bunch of different industries. I think we're staying focused on we know where the technology plays best, we have great relationships already with market leaders, we're adding a few, and we're really deepening with what's there today.

Colin William Rusch
Oppenheimer & Co. Inc., Research Division

That's helpful. And then as you look at this growing number of molecules and accelerated pace, can you talk about the decision-making process that Amyris goes through in deciding, which molecules to develop internally for their own brands? And how you guys think about working with partners to monetize the sale or the licensing of molecules?

John G. Melo
President, CEO & Director

Look, I think for our own brands, and I'll start there, we're very focused on the market. We're very focused on where is the consumer and what is it that we have that can very quickly get to market and make a real difference. And I'll give you 3 different examples, again, focused on Clean Beauty and personal care, which is really where we want to drive the chemistry for ourselves.

I'll give you 3 examples that are very interesting. One, really comes out of the HMO work we've been doing. When you look at the HMO, the oligosaccharides are set a different way. The small sugars that exist in mother's milk actually have some amazing attributes beyond human nutrition and beyond the microbiome, the gut microbiome. There's a molecule as an example called L-fucose. L-fucose is an amazing molecule for wrinkle removal or wrinkle reduction. Wrinkle reduction in aging, we know is a big, big deal for consumers. You can put me on that list. And I'm looking for products that are sustainable, that are healthy, that are naturally sourced that actually do a great job removing wrinkles. L-fucose is a perfect example. We have a great way to make L-fucose and it's a perfect example about how we leverage the platform. L-fucose is made through a pathway that's funded from a partner for HMOs, where we can actually go a little further in that pathway, be able to make L-fucose and go into market and keep it for ourselves. That's one example.

Another example is really Reb M. One of the things we found is the yeast that makes Reb M with a Reb M that's left and some of the chemistry that's left, there's a class of molecules that's left in that Reb M that actually is great for collagen production. It actually ends up producing collagen at double the rate of the best technology in the world today.

So another example of we built for one, and we actually were able to leverage and apply it to the market we're in to be able to benefit and take it to market. The third example I'll give you is a bio-based or a sustainably based preservative. One of the things we have found in talking to a lot of our personal care partners is a great preservative that's natural is actually very hard to get. Most natural preservatives don't perform as well as the synthetic ones that are available. We've actually discovered one from our waste streams from the production of sugarcane and the processing of sugarcane. So, to me, there's 3 examples of game-changing molecules that we're leveraging the technology from making things for partners that we can then extract some value and drive those and own those to the end market.

So I don't know if that helps, Colin, just give you color into how we think about the portfolio and how we focus in on our own partners. And then I think regarding the partners, it's really things that they would like that we're not in the market for, and we don't want to invest in channel and market development that we're happy to use our platform for because that's what our platform was designed and built to do.

Hermanus Kieftenbeld
Chief Financial Officer

So before we take the next live question, there's a question that came on from Laurence Alexander, who couldn't be live on the phone, from Jefferies. Let me quickly direct it to Sunil, perhaps. Sunil, here is the question. To what extent has the commoditization of data science, high throughput screening and genomics reduce the cost of duplicating Amyris' platform? Where do you see the most intractable bottlenecks or even areas of cost inflation for new entrants relative to what Amyris endured?

Sunil Chandran
President of Research & Development

Got it. Great question. Thanks, Han. Yes. So I mean they've always been off-the-shelf solutions, right, for data science, screening, genomics, automation and what have you. The key to what Amyris has done is not the fact that we invested in these off-the-shelf solutions, but the fact that we integrated them into a cohesive end-to-end solution. So you might buy order packages that are out there, but unless you can get them to work in a pipeline where each part of the pipeline talks to the other, you're going to be behind the curve, so to say -- so to speak. So that's one part of it. It's not just individual operations, it's how they come together to form a single pipeline.

The second part is, we -- at Amyris, we end up -- our automation solutions of proprietary workstations that our engineers have assembled on-site through disparate pieces that they acquired. So again, these are not off-the-shelf robots that you can just buy and apply. We have developed a lot of proprietary work solutions. And finally, the process development and manufacturing. We've talked about this a lot. You have to go through that experience to really understand what it takes to scale up a molecule. So that is something that you have to endure. And that will -- that is an area where Amyris has differentiated itself 13 times to date.

John G. Melo
President, CEO & Director

Yes. Sunil, I want to really add on to your last point, right, which is, everybody uses the buzzwords and the tools are available. And I mean like buying DNA from Twist, it's fantastic, and it's something we shouldn't worry about. The industry should provide that. It's almost like, I think of Twist as the Intel of the semiconductor industry. Like they provide chips, we've used those chips, it's all good. Actually, the place, I think, we've created the biggest bottleneck for the rest of the industry is having our own manufacturing, our own process development and ensuring that every strain we scale can actually scale and be produced at a large plant. We have not had 1 failure of taking a final molecule to scale and producing it at a large plant since 2012. And I think that is the big differentiator. And we haven't seen anything emerge from our competitive set that would let us believe that anyone is close to figuring that out.

Sunil Chandran
President of Research & Development

Yes. Absolutely, John. Couldn't agree more.

Hermanus Kieftenbeld
Chief Financial Officer

Okay. That's great. Thank you both for addressing that question. Chad, I'll pass it back to you for the next live question over the phone.

Operator

Certainly. And that question will be from Randy Baron with Pinnacle.

Randy Baron
Pinnacle Associates Ltd

What a great call. Sunil, that was very educational. Well done. John, I just want to drill down into 2 specific verticals that you talked about during this year, but haven't yet addressed on today's call. The first is adjuvants. I keep reading in the press about the limitation of the COVID vaccinations that are now approved and rolling out. I imagine the government is similarly concerned about scale and reach. So my

first question is, does Amyris have a relationship today with Pfizer and/or Moderna? And what would it take under Operation Warp Speed to introduce an adjuvant to those approved formulations?

John G. Melo
President, CEO & Director

Randy, thank you for being on the call. That's a pretty direct question, like always, and I appreciate it. We obviously, both through our mRNA license with IDRI and around the adjuvant, have been in a lot of discussions with Operation Warp Speed over the last couple of weeks, and there have been discussions with some of those companies. I don't want to call anybody out specifically. And there is a lot of learning coming out of the last couple of weeks. So my only summary is to say, it is clear that one, what we have in the mRNA technology really does facilitate scaling and likely delivering a better mRNA technology that exists today. On the other hand, like being in market fast and getting treatments or vaccines to patients is so critical that, I think, these companies have done an amazing job focusing on time-to-market. And then the next generation, I think, will focus, not only on time-to-market, but how to solve some of the problems that we now are aware of in some of these approaches.

So I don't -- I also want to be careful that I don't want to imply that there is or that there will be a specific solution that we end up being able to support or help or engage with Moderna or with Pfizer. I really don't know whether that ends up being the case, which is different than our opinion as to whether it would be helpful. But I do know and can confirm that we are in discussions with several other pharma companies, and you will end up seeing our technology, both the adjuvant for sure, and then, hopefully, our mRNA technology. I'd say that part of it, we have more work to do, in final products. So I hope that helps, Randy.

Randy Baron
Pinnacle Associates Ltd

No, that's great. And I'll make sure my second question is much broader before I go back in queue. But you mentioned in your answer to Colin...

John G. Melo
President, CEO & Director

That's okay, actually. Yes.

Randy Baron
Pinnacle Associates Ltd

No, no, no, but this is great. It's a great dialogue. You mentioned in your answer to Colin, something that a lot of us that invest in the space have thought about for a long time, but Amyris has really only started to discuss, which is proteins and specifically synthetic animal protein. So can you just tell us about where Amyris is with its effort in the synthetic animal protein space? Is there a potential customer? Is that coming to market soon?

John G. Melo
President, CEO & Director

Yes. Look, I'm going to pass this one to Sunil after giving you the commercial side and letting Sunil give you his perspective on the technology application. I think you'll see in the current transactions our move into proteins, and how we think about partnership in that area. And I won't say any more on that because, again, we're in process of contracting. So that would be the first answer. Commercial is in play, and we expect to be complete by the end of the first quarter on the protein side. And then Sunil, maybe on the technology side, you can provide a perspective on that.

Sunil Chandran
President of Research & Development

Yes. During the presentation today, we talked about Reb M, right? And we talked about all the enzyme evolution and engineering we have to do to bring that product to market. We do that for pretty much every molecule we work on. So what that has resulted in is a robust enzyme optimization and engineering

pipeline that we believe we can now apply towards protein production. So instead of trying to optimize 10 different proteins, focused on a single one, the two sets actually translates really, really well, through that same platform.

It also -- we've also dabbled in other organisms, other than Saccharomyces cerevisiae, that are more adaptable for protein production. So the platform is set up right now for us to accelerate in this space. So it's a natural transition for us, from small molecules to protein, and the platform is well set up to that.

John G. Melo
President, CEO & Director

Look, I think the other piece, Sunil, that you've been very helpful for me in thinking about the strategy is actually how we leverage the platform or said differently, evolve the platform when we can make it a play around 2 potential types of technology. So the idea that the platform can do proteins in the same section or area of the platform is also similar to what we will use for monoclonal antibodies as a way to really leverage investment. And this goes back to exactly my example in L-fucose. We get to L-fucose by developing the HMO pathway. The HMO pathway to 1 partner, and we like to take L-fucose to market. I think when you think about monoclonal antibodies and proteins, it's that same kind of direction, but obviously, much bigger market opportunities for 2 different categories of proteins, right? So I just wanted you to be able to also reference that.

Sunil Chandran
President of Research & Development

Yes. The antibodies is definitely a space where we have worked in, right? We actually have even published the work in that space, where we actually produced monoclonal antibodies like Herceptin in some of these hosts. So this is not a new -- this is not a new space for us. We've actually made a lot of progress here, and that's definitely a market we are interested in pursuing in the near future.

John G. Melo
President, CEO & Director

Great. Thanks, Sunil. Randy, I hope that helps. Next question.

Operator

Yes. And that next question is from Graham Tanaka with Tanaka Investments.

Graham Yoshio Tanaka
Tanaka Capital Management, Inc.

Hello?

John G. Melo
President, CEO & Director

Graham, we got you on.

Graham Yoshio Tanaka
Tanaka Capital Management, Inc.

Yes. This is a great call. Thank you very much for tying everything together, making it very understandable. I'm very encouraged, again, I have been by your R&D pipeline and it's appearing to be in itself kind of an ultimate renewable resource because you keep adding molecules in and pulling new ones out. And what my question is, how much faster can this renewable resource produce new molecules? It appears to me that you're coming out with, I think, you said 6 this year and 2 or 3 per year in the future. It looks to me like you have the potential to generate more than that in, say, next year and the following year.

And then secondly, you typically like to have 20 molecules in the pipeline. I'm wondering if you might expand that in the future.

John G. Melo
President, CEO & Director

Yes. I mean, I'll hit the pipeline as far as number of molecules. And then, Sunil, leave it to you to talk about the speed and your vision, which I wholeheartedly support. Look, I think regarding the pipeline, it is actually much more important to get quality right than quantity. What I mean by that is, picking the right molecules and the right partners matters a lot. And a lot of that is really about our understanding of the end markets and the connection to the technology's ability to win in that end market. So adding another 20, that's the easy part. Getting 20 that can actually be delivered, being delivered on target, and actually start contributing to revenue and margin quickly, that's the hard part.

So I wouldn't -- as much as I'd love to say, "Hey, we'll double the pipeline next year," I don't want to set that expectation. I want to set an expectation that our pipeline will continue to be focused, highest quality in the industry, which results in successful product launches that deliver strong revenue growth and make both our partners and us happy. Sunil?

Sunil Chandran
President of Research & Development

Yes. Graham, thanks for that question. The way I think about this problem is, I don't necessarily want to just increase the size of the pipeline. I would like -- we are trying to make it more efficient, right? Now we've talked about taking a molecule to the pilot plant in 1 year or less. In some cases, we've done it in 6 months or less. Theoretically, you should be able to do this in a few months, I mean, 2 to 3 months. And I think we have the technology platform to do that. So the question isn't how big or how fast you can do it. The question is, can you do it in 2 months or 3 months? And there's data that we can be collecting, so that, let's say, in the future, we go after a molecule, a single design is all it takes. A single design, a single strain is all it takes to successfully produce a molecule.

Are we there yet? No, but we're definitely on the way there. That's the vision. That's how I would like to see our R&D, PD and manufacturing groups heading towards. So size of the R&D pipeline, yes, but really, let's talk about how efficient it can get. And so that's where my head is at right now.

Graham Yoshio Tanaka
Tanaka Capital Management, Inc.

That's really terrific. And I appreciate your comment on the success rate. It appears you've had a very high success rate, which some have not been very sure about -- other analysts and other investors have not been sure about. But it appears that you've had close to 100% success rate for the last few years. And with new -- these new asset sales, the 4 possible asset sales, it appears to me that you're getting much, much greater industry awareness in what you are doing, the value of what you're doing and the importance of them as potential partners or buyers of the assets.

So my question is, as you -- as the publicity expands, and you will probably get more interest in the next year or 2, where do you see yourselves as far as how many other assets you may have to sell? It appears to me, you may not need to sell other assets. You may be able to keep more as Amyris-owned molecules and yeast strains?

John G. Melo
President, CEO & Director

Look, Graham, great observations, and I'd make a few points. When you think about our current operating performance, we don't see a need to sell assets, which is different than, should we be opportunistic? And then who is the natural owner for some of the molecules? So the way I think about it is, like we've demonstrated an ability to create a lot of value after a molecule is in market and established. So I don't see a design, scale, sell. I see design, scale, produce. And then once the molecule has established market leadership, ask ourselves the fundamental question, are we the natural owner? Or is it is it a peak valuation and an opportunity to monetize? And we're going to keep doing that on a consistent basis because, I think, that's just the right thing to do from a business perspective, not necessarily connected to we need the cash from that molecule. So I think that's just an important point.

Look, regarding the valuation, I did not expect for us to be where we are in valuation. And I think there are 2 key factors. The world is transitioning fast. And this year has been an acceleration of this issue to natural, sustainably sourced ingredients for a lot of the personal care and consumer products around the world. And we have some of the best technology to do that. And we're seeing that prove out. And I think the way that that's been proved out is the number of interested buyers and the number of people that approach this regarding the assets that are in play are at a greater level than we had ever experienced or expected.

And that's made, again, the process a much better one for us to be able to manage. So I hope that helps. It's -- the world's shifted. We're beneficiaries of that based on what our platform does and is, and that's been kind of like very fortunate for us.

Graham Yoshio Tanaka
Tanaka Capital Management, Inc.

So related to that valuation is I can sort of append this question on valuation and corporate sort of strategic goals possibly changing as you become more self financing. And maybe this is really for Han. As you generate a better balance sheet, cash flow, earnings and that kind of thing, what is your observation or what do you think is the biggest challenge for the company? We've been talking a lot here about opportunities. What's the biggest challenge either financially or otherwise?

Hermanus Kieftenbeld
Chief Financial Officer

Yes. Thanks, Graham. Great question. The way I look at it is really about -- and we're going down this path of being clear about the choices and priorities we make in terms of the markets we serve. As John said, we do believe that thinking about developing, scaling, commercializing these molecules is part of our business model, and monetizing it is also part of our whole business model, and we see that going forward.

But I think really the focus, and John mentioned it in some of his prepared remarks, is around beauty, personal care and health care, where we will have a keen focus in terms of what we believe, with clean chemistry, we can contribute to those markets and then invest accordingly. So I think it's really about the right choices, the right priorities, deploy our investments accordingly. And obviously, for maximum impact in terms of contributing to the sustainable solutions in the marketplace and equally to valuation, and that's how I see it.

John G. Melo
President, CEO & Director

Han, I just want to build one point that connects to what you just said. I mean, look, I think focus is our biggest risk and opportunity, right? And like a great example, we -- just in the last couple of weeks, I've been testing our new hair products, the shampoo, the conditioner and some of the scalp oils we're actually taking to market. And very soon, you're going to see us announce an amazing partnership with a very popular person with great hair to actually take the market, what -- based on the performance of these hair products, it's the best-performing hair products in the world. And like, I look at that like the hair product brand, I look at what we're doing in color, like the number of retailers who want to carry our color line because of the clean nature, the aesthetics of it, how beautiful they are and the fact that they want Rosie's brand. Like the assets we're building and the ability to really accelerate growth by focusing and delivering a great experience with the best chemistry, I think, is really what I see is the greatest opportunity, and the risk is to get distracted by the next shiny object. We really cannot let that happen.

Graham Yoshio Tanaka
Tanaka Capital Management, Inc.

Well, thank you very much for explaining. You give us a scientific background and logic for this and to talk about your opportunities and challenges, I think it's terrific.

Operator

The next question will be our last phone question as we need to turn to some of the questions submitted through the webcast. And the final phone question will come from Rick Schottenfeld with Schottenfeld Opportunities Fund.

Richard Paul Schottenfeld
Schottenfeld Group LLC

Congratulations. This was a great presentation and a great day. The question is sort of around the last 2 questions, which is with these private market valuations of 15x revenue for molecules, have there been other transactions that sort of establish that as the market clearing level for your IP? And is it fair then to look at this year's crop of molecules and say that the 6 new molecules you're introducing now are going to do -- you said revenues have doubled, so almost $60 million. That would basically imply that just the 6 molecules are your total market cap right now? Is that a fair way to look at the company right now? And are these valuations pretty consistent?

John G. Melo
President, CEO & Director

Rick, by the way, thanks for being on the call. And I'll break the questions into 2 part -- or 2 answers, okay? First, I'm not going to actually comment on the market asset valuation because the disconnect is so ridiculous that -- and I think like to be fair, the disconnect was there because we haven't had visibility and some people thought we couldn't actually pay off our own debt. I mean I know it's ridiculous, but it's rational. It's kind of what you would see if you read our financials. The good news is, that's never been a problem. And better news is, we're now fully funded and have complete visibility in servicing our own debt, and more importantly, investing and growing without having to issue new shares or take on new debt, and that's a great place to be.

Your valuation point regarding the assets is really important. You're absolutely right. There have been several transactions this year. Most recently, [a quota] acquisition and [a summarize] acquisition that really helped us to establish the valuation for the molecules we're selling. And the way to think about it is, this is not true for all the molecules, but in general, the molecules we're selling, we're selling at about 20x, roughly, plus or minus, 20x 2021 operating income for those molecules. And we think of that as fair market value based on the transactions that we're seeing.

Now if you add the long-term royalty, and if you add some of the other sources of cash that these partnerships are bringing to the table as part of these contracts, it's actually more than that. But if you look at just the rough face value without looking at some of the long-term payout, that's about what we've based the valuation on. And I shouldn't say based because, obviously, these were tough negotiations, but those recent transactions were very helpful. I hope that helps, Rick, in thinking about what's happened in the market and how those valuations got established.

Richard Paul Schottenfeld
Schottenfeld Group LLC

So that kind of begs the question here, which is now that you've established this sort of new source of funds that we hadn't considered before, and with the public market giving you basically a 3 multiple on revenues, would you consider offsetting some of the dilution with buybacks if you get to a position where your balance sheet can support them?

John G. Melo
President, CEO & Director

Look, too early to make comments on that. I mean, at this point, like we have so much to execute operationally. I would tell you that after Han has an opportunity to breathe a bit and process all this, I'd expect sometime maybe in our first quarter earnings call to really be able to talk to that more intelligently than just giving you a quick answer. So for now, I'll leave that alone. Han, I don't know if you have a different view on that?

Hermanus Kieftenbeld

Chief Financial Officer

No, I would concur with that. I think let's land these transactions finalize, as we've outlined them and then take a good sharp look at next steps.

Richard Paul Schottenfeld
Schottenfeld Group LLC

Congratulations, guys. It's a great accomplishment.

John G. Melo
President, CEO & Director

Thanks, Rick. And look, I think your question, obviously, has been in our mind, especially as you look at what our cash balances end up resulting and as a result of all this over the next few years. But the opportunities are also pretty significant. We want to make sure we're wise, especially with the amount of return we're generating, like, another way to think about it is, we're generating about 11x return on some of these assets for cash invested over the last 4 years. So the ability to generate returns is pretty significant. And we need to be thoughtful about how we use proceeds. So let's -- I think we're going to move to questions that came in, right, Han?

Hermanus Kieftenbeld
Chief Financial Officer

Yes. We're going to do. We're looking at the clock here, and we very much appreciate everybody staying with us here. We have a lot of interest and a lot of folks online. So that's been great. I'm going to wrap it up, though. So we'll take one more question that we see online here, and I'm going to read it out, and I'm going to direct it at Sunil.

So in 5 or 10 years, will Amyris continue to lever the same workhorse organisms? Just do it better? Or should we expect a broader range of host organisms to exploit different biological pathways? Sunil?

Sunil Chandran
President of Research & Development

Yes. Answer is actually both. So we will continue to drive innovation and increasing the rate of progress and, say, our workhorses like Saccharomyces, but we have already expanded that capability to other microorganisms. I do believe that it is important to ensure that the pipeline is flexible enough to accommodate these other microbes because Saccharomyces may not be the best host for every product that's out there in every market. At the end of the day, this is going to be driven, of course, again, like I said, keep the end in mind, right?

So if your final manufacturing, if we judge that molecule is better produced in a microbe, like say, I'll pick an example, Baccilus, for example, that's where we will go after. And we have invested effort in ensuring that the pipeline does translate from cerevisiae to a host of other microorganisms. So definitely, the answer is actually both, improve what we have today and continue to improve other microorganisms at the same time.

Hermanus Kieftenbeld
Chief Financial Officer

Okay. That's great. John, did you want to make some closing comments, perhaps?

John G. Melo
President, CEO & Director

Yes. Let me wrap it up. And I'll pick up right where Sunil left off. And Sunil, it's been a pleasure having you on.

Sunil Chandran
President of Research & Development

No. This is great. Thank you.

John G. Melo
President, CEO & Director

[I've not seen you in] the office and interacting more. So -- and look, I think there are several points that Sunil just made that I want to just wrap up with. The first is this idea of single design to scale is actually like the idea. And to really get single design to scale means having so much data that you can just really put in what chemistry you need, press a button, design happens, you put it through the robotics, you get a strain and that strain scales. That is what we're all building for, and that is really the dream for synthetic biology. And I think we're nearer that than anyone else, but there's still work to do because like getting the maps all identified, I think, the analogies, Sunil used Google Maps, like biology is very complicated. There's a lot of reactions that occur every time you make a modification to the coding of an organism, but that is really where we ought to go. Data is the key, and we've got the right tool set and the right scientists and talent to get there.

I think second, the last point, Sunil made, and part of single design to scale is actually using the right organism for the right chemistry. And I think that is kind of the next evolution. It's not a single host that does everything. It's actually figuring out the right host for the right kind of chemistry based on what that chemistry is about. So we're on our way, long ways to go, and the focus in the near-term is making sure we're working on the things we have being as effective and as efficient as possible so we continue being the most productive company in our sector.

I'd like to thank you -- to everyone, actually, for joining us today and for your continued interest and support. If we did not get to your question, please follow-up with our Investor Relations team. I know Peter Denardo will be more than happy to get on it right away and work with [Argo] to make sure we're connecting with you directly. And we wish everyone a very happy holiday season, and please stay safe and healthy because we'd love to see you and your families in the new year. Thanks again for taking time to be with us today.

Operator
And thank you, sir. The conference has now concluded. Thank you for attending today's presentation. You may now disconnect.