

FRMO Corp. Q2 2020 Conference Call
Thursday, January 23, 2020

Operator

Good day and welcome to the FRMO Quarterly Conference Call. As a reminder, today's call is being recorded. At this time, I would like to turn the conference over to Ms. Thérèse Byars. Please go ahead.

Thérèse Byars—Corporate Secretary

Thank you, Dan.

Good afternoon, everyone. This is Thérèse Byars speaking, and I'm the Corporate Secretary of FRMO Corp. Thank you all for joining us today.

The statements made on this call apply only as of today. The information on this call should not be construed to be a recommendation to purchase or sell any particular security or investment fund. The opinions referenced on this call today are not intended to be a forecast of future events or a guarantee of future results. It should not be assumed that any of the security transactions referenced today have been or will prove to be profitable, or that future investment decisions will be profitable or will equal or exceed the past performance of the investments. For additional information, you may visit the FRMO Corp. website at www.frmocorp.com.

Today's discussion will be led by Murray Stahl, Chairman and Chief Executive Officer. He will review key points related to the 2020 second quarter earnings.

A summary transcript of this call will be posted on the FRMO website in the coming weeks.

And now I'll turn the discussion over to Mr. Stahl.

Murray Stahl—Chairman & Chief Executive Officer

Thank you, everyone, for joining us and thank you, Thérèse.

I'll begin with the formalities. The reason my colleague, Mr. Bregman, isn't here is he is quite under the weather, and we agreed that it's better that he get into a bed and go to sleep, if that's possible. Or if it's not possible, just to rest. People who customarily listen to these calls might remember that we've both done this call when we were both sick, hacking and coughing and all the other things that go with having a cold. I feel pretty good today and he doesn't, so I'll do the call by myself. At some point, we probably contributed to each other's illnesses back in the day when we did this. So, that's why it's me. And, hopefully, he'll be back to his normal robust health in a couple of days.

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We received a lot of questions for this call, and either you're all collectively incredibly perceptive and are following what we say very closely, or maybe it's that we say some things that pique your curiosity or have resonance with you. Since your questions are really good and touch on many of the topics I would ordinarily discuss in my prepared remarks, I'll keep those shorter and save more time for answering questions. You anticipated what I was going to say anyway, or at least if you didn't anticipate, you're prompting me for information I would otherwise give you in the prepared remarks. So, hopefully, just answering your questions directly will be specifically pertinent to what you want.

Let me first say a few general informational things. There are usually a lot of questions about cryptocurrency, so I'm going to give you some detail right now. Most of our cryptocurrency is in the form of the Grayscale® Bitcoin Trust, ticker symbol GBTC. As of not long ago, if you look at the market value as of the evaluation date in the notes, there was \$9,298,000—I'm leaving out the hundreds—of that security in the Horizon Multi-Strategy Fund. In the Polestar Fund there was \$9,960,000; in CDK Partners, \$661,000, and in Horizon's Multi-Disciplinary Fund, \$894,000. By the way, I'm giving you the market values as of not long ago. Based on today's market value, these numbers would be about 10% higher; that's not precise, but is close enough for our purposes.

We also hold 7,644 shares of GBTC shares directly, which we bought back in the day. We own 33.59 bitcoins themselves. I would give you prices for these coins, but they change every five minutes. We own 34.12 units of Ethereum, 591.66 units of Ethereum Classic, 42.59 units of Zcash, and 210 units of Litecoin. Through the Polestar Fund, we have about \$82,000 of the Grayscale® Ethereum Classic Trust, about \$10,000 of the Grayscale® Zcash Trust, \$15,000 of Grayscale® Litecoin Trust, \$54,000 of the Grayscale® Bitcoin Cash Trust, and about \$62,000 of the Grayscale® XRP Trust (XRP is otherwise known as Ripple). All of that is in the Polestar Fund, so it's not directly owned by FRMO.

The Horizon Multi-Strategy Fund also holds \$64,000 of Bitcoin Cash and roughly \$29,000 of Bitcoin Silver. And Polestar owns about \$5,500 of Bitcoin Gold. CDK Partners owns about \$550 of the Bitcoin Gold. So, add those numbers up and it's a pretty decent size number. The Horizon Multi-Strategy Fund also owns about \$671,000 of XBT. So, I think that covers the directly owned cryptocurrency.

Now, please be aware that those are the numbers that those funds own in their entirety; I don't want you to get the idea, even though this is the way it's presented to me in this sheet I'm reading from, that FRMO owns those holdings in their entirety. What you need to do if you want to find out proportionally what FRMO owns, is to multiply those values by the percentage ownership that FRMO has in each of those funds. Let's take the Polestar Fund example. I just told you that Polestar owns \$9,960,000 worth of bitcoin. You need to multiply that number by the percentage ownership, and that percentage ownership is calculated for me on another sheet of paper, which—I'm a bit reluctant to give you, because I'm not sure this percentage figure is the right one. In the same way—and, again, I'm not so sure this percentage number's right—because FRMO owns 28% of the Multi-Strategy Fund, FRMO

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owns \$2,876,000 of cryptocurrency in that fund. In any event, the aggregate market value of our cryptocurrency holdings, looking through to FRMO, is about \$5 million. I have a feeling that number is about 10% higher today. But as I said, you can do the calculation and, hopefully, your calculation will be in accord with what I just read you. But I wanted to give you all the information.

As to balance sheet highlights, although I was going to say, about 15 minutes ago, that I thought our November 30th cash was the highest in our history, it turns out it isn't. About a year and a half ago, we actually had slightly more cash. So, if my math is right, we're about \$44,000 below the all-time high cash position. So, anyway, the thrust of this point is that we have a very liquid balance sheet.

Also, you'll observe that the figure in the line item Investments in Securities Exchanges is a lot bigger than it was in the prior quarter. Not that we bought anything. We sold our pro rata interest in the Bermuda Stock Exchange to Miami International Holdings (MIAX) in exchange for stock in MIAX itself. So, we now have a decent size investment in MIAX, which is an options exchange.

One other big change you'll notice is in the Cryptocurrency Mining Assets line item. It's primarily comprised of servers. We used to have \$101,000 worth of computer equipment and now we have \$1,281,000 worth of cryptocurrency mining assets. Another interesting change is that we also bought a building for a million dollars, so we have some debt now, because we put roughly \$200,000 down, and we took a mortgage for the balance. You'll notice on the current liabilities section of the balance sheet there's \$27,000 of mortgage payable. That's the portion of mortgage's principal that we have to pay back within the next 12 months. We borrowed the \$727,000 balance of the principle, which will be paid over the life of the mortgage.

We took the mortgage because the interest rate was less than 4%, and we're using that building to house some of our cryptocurrency operations. We were informed by a variety of sources, hopefully reliably, but I can't be sure, that if we were to move the cryptocurrency equipment out of the building and were to develop or sell the property, we'd get a lot higher price. Whether that's true or not, I don't know, but so they said.

So, you have the highlights and I believe, if I'm not mistaken, that shareholders' equity is at an all-time high even with the very high liquidity of the balance sheet and the lack of leverage. And despite cryptocurrency prices being down from their high, actually substantially—though we'll talk about that further in the questions and answers—I think we're doing reasonably well.

Those are the highlights. Now, I'll touch on the questions which, as I said before, will fill in a lot of the information I would have said in the prepared remarks. I'll read the questions as they're presented to me.

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Questioner 1

If the two biggest opportunities presented are bitcoin and TPL, why are they sized so differently with available assets?

Murray Stahl—Chairman & Chief Executive Officer

Well, actually, they're not. What you see on the financial statement is the market appreciation. We didn't pay anything remotely close to the current market values for the cryptocurrency. As a matter of fact, some of the cryptocurrency we just created by mining it. We didn't pay anything like these prices. But I can see why that question would occur to someone by just looking at the market values. It's not that we like one greatly more than another one. We're investing in assets that are, let's say, off the beaten track. The average person doesn't do things like this, and we're not investing tremendous sums of money. If bitcoin were to be a failure relative to our cost, especially net of taxes, it wouldn't be a huge financial tragedy. To manage risk you have to start sizing things small. If you size it big and something bad happens, well, then you're impeding your future.

In our case, we're not doing that. More about that later when we talk about the balance sheet and how we fund these investments, because some of these questions relate to that subject. It's not that we decided to put X percent into bitcoin and Y percent into something else. You can say, okay, we can sell one and put it in the other to equalize them if we like them both equally, but there's a very high tax cost to doing that. So, we'd rather not do that. It doesn't really pay to sell these things, at least given the situation as it exists today.

Questioner 2

What are some of your thoughts about the future of the RENN Fund, your closed-end fund? It's very small, it has a lot of cash, it trades at a significant discount to its NAV, and it earns no fees for Horizon Kinetics. It would seem like a perfect candidate to merge into one of your smaller open-ended Horizon Kinetics Mutual Funds, such as the Market Opportunities Fund or even the Medical Fund, since such a merger would add bulk and cash to these funds and make the investment funds fee-paying to Horizon Kinetics and eliminate the discount, assuming such a merger would be done at NAV for the RENN holders. Is this a possibility or would such a merger result in the end of the tax benefits from the capital loss carryforwards that are inherent in RENN? Or could RENN grow by buying or merging with another closed-end fund, or by slowly continuing to engage in rights offerings, on which there are apparent limits on how much can be done in a given year? Thanks for your thoughts on the RENN Fund."

Murray Stahl—Chairman & Chief Executive Officer

To begin with, we are going to do things with the RENN Fund, but here's something I'm not going to do. We're not going to merge the RENN Fund with the existing mutual funds.

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There are a lot of reasons for that, but one good one is that we would unquestionably lose the tax loss carryforwards that we purchased. There are other reasons, too, but that in itself is enough reason not to do it.

We're going to start doing different things with the RENN Fund that you really couldn't do in a mutual fund. I would love to tell you exactly what they are, but a couple of days from now you'll see the 8-K and you'll see some of what's going to happen. I don't know on what day the attorneys will post the 8-K or I would tell you, but I don't believe it will be very many days. We intend to grow the RENN Fund, and we have a lot of ideas on how that might happen. The 8-K will relate in a small way to one idea, but it applies in a bigger way to using the tax loss carryforwards. That's all I can tell you right now. I wish I could tell you more, but you'll see in a couple of days what we're doing. And you should expect other things. Hopefully, they'll be creative, and they'll be value additive. So, I look forward to your comments on that.

Questioner 3

How close are we to the maximum performance on cryptocurrency mining servers? I know you have mentioned in the past that we might not be far off.

Murray Stahl—Chairman & Chief Executive Officer

To give you an idea, the electricity consumption per terahash, or per server if you want to look at it that way, relative to the prior generation is down roughly 63%. And since electricity is overwhelmingly the biggest factor, in terms of operational expense, it will cost you 63% less to mine. That has implications that we'll touch on in a second, but then there is also the matter of the price per terahash for purchasing the server itself. I'm going to pull my calculator out, so just give me a second and I'll give you a number.

At the end of 2017, if you were buying a 13 ½ terahash S9 Antminer, on a good day—and people at the time thought this was a good deal—according to my calculation, you would've been paying \$162.96 per terahash. Let's call it \$163. You can now buy a machine that consumes 63% less power than the former generation and it would cost you roughly \$23.50 per terahash for that machine. That's a huge increase in performance.

I should tell you, because it's important, that when that happens—and I think there's a later question that relates to this in some degree, so I guess I'm preempting the answer—that's deflationary. Basically, the same technology, give or take, is used in all the servers that mine any cryptocurrency. Why is it deflationary? Well, think about it in terms of the commodities we're familiar with, like wheat or gold, and let's just say for the sake of argument, that technology advanced so much that it cost 50% or 60% less money to grow wheat. That would be a big savings for the farmer. Some farmers would lower their prices to gain market share. Cryptocurrency viewed in that sense is no different. It would be illogical to think that in this competitive world, all of the recent production cost reduction will be kept by the miners. It

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won't be kept by the miners for the simple reason that some will lower their prices to get more volume, more market share.

Then, of course, there's the equipment. We just talked about the cost of, let's say, the labor and harvesting of wheat, if we're using that analogy, or the cost of the seeds to plant the wheat, or the use of fertilizer. That's the analogy for the electricity cost, those are the operating costs. What about the equipment cost? You need harvesters, combines, tractors, barns—you need all sorts of things. Maybe grain elevators. What if the cost of that capital equipment fell in the manner I described? Let's say it was a tractor, so we're dealing with the cost on a horsepower basis. Let's say—these aren't accurate figures, but just for illustrative purposes—if a terahash was like one horsepower, and one horsepower used to cost \$163 and then it dropped to \$23.50, obviously, that means the price of a tractor is a lot lower. That's the analogy, and that's what's happening in bitcoin.

And the equipment is better. It has less downtime. It produces less heat, which lowers the air conditioning cost. It's just much better equipment in every respect. Ultimately, the thrust of your question is: When will we get to the point where that's it, where it has essentially reached the limits of improvement? In terms of the chips, I think they've done everything they can with the algorithm. However, the yield on the chips keeps expanding. Yield, in this instance, refers to what happens when manufacturers create a wafer and break it into the separate chips—how much usable circuitry is on the wafer? That number keeps expanding. That's what drives the price down. We should be able to go to smaller nanometer chips, too. I don't believe that process is complete, even though we made a lot of progress—which is another reason why, in the mining portfolios, we don't go all-in with cash, because we might have to replace the equipment.

The quid pro quo is that we don't have to buy as much equipment as we bought formerly because the Terahashes are so much cheaper. We can get the same processing power for a lower price. Anyway, I don't think we're going to make a radical change in terms of productivity in the next several months. But beyond that, there might be productivity to be gained.

Questioner 4

Regarding Texas Pacific Land Trust, I wonder if the flared gas could be used to power generators to run a mining operation rather than being wasted.

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Murray Stahl—Chairman & Chief Executive Officer

Well, theoretically, anything is possible. Various people have thought of that and, at the moment, there are some firms talking to other firms. I don't think it's happening anywhere that I'm involved, but some miners are talking of buying flared gas. The problem with it is that three pipelines have just opened in the last couple of months. They are Cactus II, the ECL pipeline, and Gray Oak. They're taking a lot of gas away to the Gulf Coast. And I believe there are three others that are in the planning/execution stages.

The amount of pipeline takeaway capacity is only going to go up, and it's going to go up a lot. So, I don't know how many companies will be willing to just swap flared gas at a zero price. When you own a royalty, you have the right to ask for the gas in kind. You don't have to take cash. So, if it's being flared, theoretically, you could ask for the gas in kind, and you could turn it over to a miner that could burn it and drive a turbine. I think there are some people doing it on a limited basis. But if you think about it from the point of view of a producer, you're betting on how much crypto is worth. What is mining profitability going to be? They know the gas price is X per MCF. I shouldn't speak for all the people who produce natural gas in the State of Texas, but I think a lot of them will want to take the price of that royalty and take the cash, rather than take the gas. But who knows what's going to happen? It's very early in the process.

Questioner 5

Is it your opinion that we will continue to see most of the inflation in certain areas like services, healthcare, and housing?

Murray Stahl—Chairman & Chief Executive Officer

In my opinion, no. In my opinion, I suspect there's going to be deflation in housing. One of the reasons I suspect that is because it's become unaffordable, and after the new tax law, most of the property taxes are no longer deductible on your Federal Income Tax. So, if you live in a high-tax area, property prices will be coming down. I personally happen to live in a high-tax area, and I can tell you unequivocally that prices are coming down. And by no small amount either. They're coming down by a lot.

In healthcare, the inflation has to stop. If it doesn't stop, it's a much bigger financial problem than what's going to happen in capital markets. It's an enormous financial problem. And the technologies that are coming out are just unbelievable. They're truly mindboggling. For example, the other day I learned about a company called IceCure. I'm not invested in it. It's a private company. What's IceCure? It is a company that actually freezes tumors. It injects a substance, with what looked to me like a biopsy needle that basically freezes the tumor on contact and kills it. Then, through arthroscopic surgery, which is basically operating through a small incision, they remove the dead matter. Of course, like any cancer removal, there's a 50% chance that the tumor will come back. But you can do the procedure again. Obviously,

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if you advance that in isolation it's a lot cheaper than the currently available therapies, so it's deflationary. I see that technology is going to solve that problem.

On the other hand, the world's central banks are printing up a lot of money. Generally speaking, that's inflationary. Ultimately, I think there will be a push against the wage suppression policies of various governments—that's why we have populism in the world, that's why there's so much unrest. Also, the migration issue is viewed by some people as a wage suppression issue. I'm not taking a side; I'm just trying to answer the question. I'm neither for nor against anything. I just think a lot of people will be against increasing the labor force by the amount necessary to hold down wages. And the unemployment rate is very low. It seems likely to me that inflation will come in the form of higher wages and it will eventually have a spillover effect on other areas as well.

Questioner 6

Note 4 on Page 10 of the FRMO financial statements refers to a \$26 million single equity investment equaling 20% of FRMO's shareholders' equity. Is this Texas Pacific Land Trust (TPL)?

Murray Stahl—Chairman & Chief Executive Officer

The short answer is yes, but let me tell you how this number is calculated and let me give you some highlights. The number is calculated by adding up the market value of TPL in all the various places where we hold it—let's say, Horizon Kinetics Hard Assets, the Polestar Fund, the Multidisciplinary Fund, Multi-Strategy Fund, etc., and comparing that sum to our shareholders' equity.

However, there are some things to note about the accounting treatment that's required. While it's true when it says that's our TPL investment, that is a marked-to-market figure. But what it doesn't tell you is that, in another sense, it's not our investment, because we didn't invest anything remotely close to that amount of money to obtain that market value. So, in terms of what our capital commitment was, it's far, far less.

Secondarily, even if I were to tell you the exact dollar amount of our capital commitment, it still would be misleading. To explain that, maybe it'd be best if you turn to the balance sheet. On the balance sheet for November 30th, on the liability side, you'll notice the Securities Sold, Not Yet Purchased line item, in other words, shorts. There you'll see proceeds of \$14,942,000, roughly, versus a marked to market value of \$7,773,000. That's a substantial gain. But it doesn't represent all of the gain, because we've covered certain short positions in the past. We don't have an option position right now, but we used to have big option positions that expired, or which we covered, and we had certain ETNs that we were short and that matured, and we received the cash proceeds. Thus, the long and short of it is that we made a lot of money and we continue to make a lot of money in shorting. Those gains

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have been used to fund our investments, that's largely where it comes from, which is why the cash keeps growing.

Therefore, if you want to look at it this way—and this is certainly not an accounting appropriate way of looking at it, but I believe it's useful—we're using our cash balances as collateral to sell short path-dependent ETFs. And when we get the margin release, we apply it, net of taxes, to various investments. That's where our investments come from. Yes, that's a big number if you look at the notes, but I really think it's not accurate to say that we invested that money. We didn't invest that money. In our way of looking at it, we just get money for being short something for which we know the outcome. We know that it will gradually decay.

Statistically, sometimes it goes against us, but if you take your typical path-dependent security like that, about 40 weeks out of 52 weeks in a year, it's going in the right direction, not the wrong direction. If it went our way every week, we couldn't sell it to anybody short. So, we're taking a certain amount of mark to market risk in exchange for a highly likely—I don't want to say certain but if you read the prospectus of some of these things, maybe you'll reach another conclusion—to a highly likely rate of return, which is how we fund these activities.

Questioner 7

What do you see as the breakeven mining rate?

Murray Stahl—Chairman & Chief Executive Officer

I'll answer the question specifically in a second, but first it's important to understand that the breakeven mining rate is constantly changing. Those changes are in response to a lot of factors. I'll touch on a few of them. One factor is the hash rate, which is the aggregate computational rate of the whole system. Let's just say for the sake of argument that the hash rate went down because people were turning off their servers, but we weren't turning off our servers, and everything else was equal—or as they say in Latin, *ceteris paribus*—our profitability would go up.

On the other hand, if the hash rate goes up but we don't put more hash on, meaning, we didn't buy any more servers, in isolation you could argue that our profitability would go down, but not necessarily so. Why? Because we would be competing with more people, but the system would be producing bitcoin faster, since if you put enough hash power on, the block generation rate is no longer ten minutes. It might be eight minutes to generate a block. We would be getting less bitcoin proportionally, but it would be produced 20% faster in eight minutes not ten. You have to weigh those two factors. Anyway, at the moment—and this could change in two seconds—but at the moment, we're producing a bitcoin for \$3,500, which I think is pretty good.

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Questioner 8

What do you think one needs to earn a 25% return over three to five years in mining?

Murray Stahl—Chairman & Chief Executive Officer

There are three variables. The first is you need a low electricity rate. There are places right now where we're getting power at 2.2 cents a kilowatt. There are other arrangements that you can make for efficiency, even if you have a higher cost of power; you need to be spot on in your equipment. If it goes down, you need to have your own repair facility, and we have one. The trouble is that not all of our equipment is located in our repair facility. If something goes down and it can't be fixed easily, we have to transport it to our repair facility, which is sometimes cumbersome.

You also need a state of the art cooling system. By a state of the art, I don't necessarily mean the air conditioning. A state of the art cooling system includes running water through vents. The vents have fans in them that draw in the hot air from what's called the hot aisle. Basically, you have the fans facing each other, as if you had two parked cars with the engines running and the exhausts are facing each other. That creates a chimney effect. A vent with a fan is properly positioned to draw in the hot air. And that hot air is basically run through lukewarm water, which absorbs the heat. It's the same principle as cooling a nuclear reactor, so technically it's not air conditioning.

You need a system like that. In the facilities that FRMO owns, we don't have that cooling system yet. Whether we can figure out how to do it and do it at a reasonable cost, I don't know yet. I'd sure like to do it. Anyway, that's what you need. If you can do all those things, you'll have a great rate of return. And as it is, we're learning. We've learned how to buy cheap equipment, we've learned how to parse our purchases in accordance with what the likely life of the equipment is, so we can replace it at a lower cost per hash and we can husband our cash. We now do our own repairs, so we've come a long way. But we're all learning every day, and every day the industry is changing.

Questioner 9

Do you see yourselves committing more resources to mining? What is your price per kilowatt?

Murray Stahl—Chairman & Chief Executive Officer

The short answer to the first part of the question is: yes.

Regarding our price per kilowatt, I want to stress that in the different regions in which we operate we pay different electric rates. Why wouldn't we always go where electric power is cheapest? Because sometimes we're not operating the facility. Sometimes it's someone

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else's facility and they have a state of the art cooling system, which we do not have in ours, so it's worth paying more for that power.

Anyway, I think the highest rate we pay for power anywhere is 5.9 cents a kilowatt. I might be wrong, because we're in a variety of places, but I believe that's correct. We use really great facilities; they're outstanding, so we save on other factors. When it gets too hot, your equipment goes down, so you're not using that capital as effectively; the heat can damage your equipment. You don't want that to happen for sure. You have to weigh all these factors.

Questioner 10

What mining equipment do you favor and why?

Murray Stahl—Chairman & Chief Executive Officer

There are pros and cons to every piece of equipment, and the prices are changing, but so far in my personal experience, the best equipment is the most recent iteration of servers by a company called WhatsMiner. It is a relatively new entry into this space. We bought a few machines to test them and they were fabulous. And in the ensuing couple of months we bought hundreds of them and they're just spot on; they're fabulous. Maybe that's what prompted Bitmain to improve its offering. The Bitmain S17 is a big improvement over the prior generation. At the moment, if you wanted me to vote for one, it would be for the WhatsMiner product; it has a low cost of operation and very little downtime as far as I can see.

Questioner 11

What are the mining entities preparing for ahead of the May halving?

Murray Stahl—Chairman & Chief Executive Officer

I think the mining entities are very well prepared. We've accomplished a major equipment turnaround. Unless the price bitcoin is a lot higher, old equipment from the prior generation will be pretty obsolete. Even if bitcoin goes up, unless it goes up a lot, I don't see making much money with the old equipment. This situation created a problem in the fourth quarter, though not much of one for us, because we were prepared for it. We had to begin the equipment turnaround process, which entailed a lot of work. It's not just identifying equipment and ordering it. You have to de-rack the old stuff, cannibalize it for parts, and install the new units. Then there's the software aspect. There are certain programs you should download on the servers that makes them more profitable than the stated capacities. That software has to be downloaded and tested. There are a lot of boxes and wires to deal with and many steps to the process, and I think the team did an outstanding job.

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That's basically what's involved and although I don't want to say we're 100% prepared for the halving, I think we're almost 100% there. There might be a few odds and ends that we haven't dealt with yet, but I think we're very well prepared for the halving.

Something to keep in mind about the halving, even though this is not the thrust of your question, is that if the price of bitcoin were to remain unchanged, since the block reward will be half of what it was, miners will be earning half the revenue they were getting before. If all other variables remain unchanged, revenue and return will go down. It's just that right now, the equipment is so great and the return on invested capital is so outstanding, that the issue is really about what the hash rate will be at the halving point in May and beyond.

How much more hash rate can come online between now and late May? If enough hash is added, that'll drive the price of bitcoin up. If a lot of hash is not added, the price of bitcoin won't go up. Right now, it's a battle. New equipment is being delivered every day; old equipment is being unplugged because it's wearing out. I don't see very many people replacing the old generation rigs. We, at least, are not buying the old equipment. There was a point in time a couple of years ago, when we did buy used equipment, but we're not buying it now.

Questioner 12

Are you able to work with the present trustees of TPL, and will the corporate conversion happen?

Murray Stahl—Chairman & Chief Executive Officer

As to the latter, you might have observed the SEC filing on TPL. I believe it was filed yesterday, and you can read it for yourselves, but the committee recommended the conversion, and you can see what's going on there. I think that document also answers the first question.

Questioner 13

Bitcoin peaked a little over two years ago. There is a lot of hope that the halving will increase the price. Do you agree with this?

Murray Stahl—Chairman & Chief Executive Officer

I touched on the halving a little bit already, but let's go into more detail. You can't separate the price of bitcoin from the economics of producing bitcoin. There are a number of vectors. It's not like a stock where people say, oh, I'm enthusiastic about the prospects of a certain corporation and I buy it, and if I'm less enthusiastic, I sell it. There may be people who feel that way, but the price—it's a commodity—the price is just based on the economics, which you can look at in a number of ways.

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One way of looking at the economics is the network effect. In this case, the network, which consists of the number of people who buy, sell, trade, and pay with bitcoin, is like a telephone system. There's a formula that describes this phenomenon, and it's called Metcalfe's Law. I'll read you the formula. The formula is: N times N minus 1 divided by 2 (or, if you prefer: $(N(N-1))/2$). N is the number of participants in the marketplace. Let's say you were Alexander Graham Bell and you invented the telephone; you made one telephone. What will you do with it if you have only one telephone? You can't call anyone, and no one can call you, so the value is zero. Plugging the number one into the formula would be $1(1-1)/2$. In that example, the value of one telephone is zero. One minus one is zero; zero times 1 is zero, divided by 2 is still zero. So, according to Metcalfe's Law, the value of one phone is zero. You need somebody to talk to.

Let's say that now there are two people. You build a second phone, and you give it to someone else, so now there are two. Entering the number 2 into the formula gives us $2(2-1)/2$ which equals 1. In going from 1 phone to 2 phones, the value of the network went from 0 to 1.

Now, let's say a third person gets a phone, making it a three-phone network. If we enter 3 into the formula we have $3(3-1)/2$, giving us a value of 3. We've gone from a value of 1 to a value of 3.

We'd be here a pretty long time if I kept increasing this by an increment of one and going all the way up to ten. But if you have a pencil and paper or, if you prefer, if you were writing a computer program to do this, and you bring it up to 10, 20, 30, or beyond, then graph it, you will see a hyperbola. It looks like a hockey stick shaped upward graph. As the network grows, its value increases at an even greater rate.

If you take that graph—however high you decide to go—and you lay it over a bitcoin chart, they look more or less the same shape. That's due to all the improvements in the equipment in terms of the growth of the network. A lot of people bought a lot of crypto mining equipment in preparation for the next generation, but they had no idea how rapidly that equipment could become obsolete. They were injured greatly by what happened, and they have no choice but to shut it down. You have this vector of the increasing hash rate, and another vector for the decrease in the hash rate that comes from people unplugging their machines because they weren't prepared for the future.

You can see this phenomenon very clearly in Litecoin if you look at a graph of its hash rate. Litecoin's hash rate came down a lot after its halving, or actually even slightly before the halving. Now it's on the rise again. So, there's a new generation of equipment for mining Litecoin. It's arriving. As the old equipment goes away, new equipment replaces it. These transitions do take time.

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You might ask me—or I'll ask myself in your absence—how do these vectors actually translate into the price? Think about it this way. If you want to own some bitcoin, you could acquire it in one of two ways: you could buy it or you could mine it. If it were cheaper to buy it than to mine it, nobody would mine the currency, which means that no one would be validating the system. The blockchain wouldn't operate. So, if it cost \$3,500 to buy a bitcoin and \$8,500 to mine a bitcoin, who in their right mind would commit the capital and operating expense to validate the blockchain? Basically, it has to be cheaper to mine it than to buy it, or the system doesn't work.

Let's say that's true. If you mine bitcoin, it's because it's cheaper to do that than to buy it. Now that you're mining bitcoin, you have two more choices. You can say, I'm mining bitcoin, and I'll keep it; or you can say, I'm mining bitcoin, and I'll sell it. Let's say it's so profitable to sell it that you decide to use that money to more machines. When you buy more machines, the network capacity goes up and the hash rate goes up, and that makes it more expensive to produce bitcoin, because there's more competition for getting the block reward and that drives the price up.

When I talked about Metcalfe's Law and the network, you need to consider that the hash rate—the computational power of the system—is just another way of looking at the number of participants. The more participants, the more hash power there will be. Because the hash rates are so huge, they're measured in scientific notation, in exahash. When you use scientific notation and you say something like the amount of exahash applied to bitcoin right now is 127 times ten to the 18th power, that's a number so large that, generally speaking, people have a hard visualizing it, because we're not trained to think in scientific notation. We're trained to think in whole integers. Therefore, I just use an analogy, but really it's a hash rate.

What happens is the very profitability of mining at a given moment has, in a way, the seeds of lowering the profitability thereafter, and that's why the bitcoin mining profitability waxes and wanes. Right now, we're in the waxing mode. Right now, it's unbelievably profitable. As I said, I expect that with the halving, it's going to be less profitable, but we'll see what happens when it comes. However, that can be mitigated if enough people took enough of their profits and bought more machines, and the machines were delivered in time, then the hash rate might go up a lot. In prior iterations, what made bitcoin go up was that the hash rate went up tremendously because of new generations of machines. That might happen right now. I personally think that it has a good chance of happening, but it's not a prediction because we can't forecast how much the production capacity will increase. We don't even know if the orders are going in.

Why don't we know that? Here's another piece of information. Because the equipment chips are made in Taiwan, the assembly is in the People's Republic of China. You make the chips and you send them to the People's Republic of China. What's the problem? The problem is there's a 25% tariff on all electric goods that come from China to the U.S., and there are no exceptions. Even if you had the goods delivered to Canada and they've been sitting there for a year or two, and you even bought them prior to the imposition of the tariff, if you try to

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bring them across the border, the United States Customs will put a 25% percent tariff on the value. The value might be a lot less than you paid, because you can claim, quite properly, from the tax code that you've depreciated the asset. But whatever that number is, there's a 25% tariff on it.

No one liked that situation, and no one wanted to buy equipment and pay a 25% tariff. It really hurts the profitability. The problem is that the equipment was burning out and nobody was able to replace it easily. As a result, you'll see there were periods of time when the hash rate was actually going down. That's one of the factors. Then, the production was moved to Malaysia where there's no tariff. But the workers in their new facilities had to be trained. What's the defect rate? How productive will they be relative to the Chinese workers? Those are all things that are questionable right now.

Anyway, you get the idea. A lot of considerations factor into it, and maybe I just gave you more information than you wished to get on the economics of mining and what drives the price and profitability. But, basically, that's what it is. It's the economics.

Questioner 14

Do you see progress in bitcoin being used as a store of value or in transactions?

Murray Stahl—Chairman & Chief Executive Officer

Yes, I do. There's some minor progress in the form of Bakkt, which is a physical futures delivery. One of the limitations for commercial transactions is that even if merchants accept bitcoin, they don't necessarily want to hold it. They need a mechanism to get rid of it. There needs to be a physical delivery mechanism, and we have it now in the form of Bakkt. I believe there are more ways to do physical delivery being developed; Bakkt is not the ultimate iteration. I believe there will be improved methods, but right now, it's done by the Intercontinental Exchange, which owns Bakkt.

The next challenge is that if people in general are going to hold or transact in bitcoin, they don't want to deal with private keys. Some people might, but the average person doesn't want to do it. So, there needs to be a custody solution, and there are already a number of custodians. You could use the Bakkt warehouse as a custodian, Fidelity has custody, and Coinbase, I believe, has custody now, institutional-grade custody. So, it's coming.

The other thing that the average person needs in order to transact in bitcoin, or any other cryptocurrency for that matter—it's coming and I think it's well underway—is an app kind of like your credit card, or your debit card, or Google Wallet, or Apple Pay, or something on that level. We don't have it yet; however, it's good to bear in mind that Starbucks and Microsoft are partners in Bakkt. And we're given to understand—who knows if this is accurate or not—but we're given to understand that by the halving in the spring, there will be an easy-to-use app available through Starbucks. You would be able to walk in and buy

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anything Starbucks has to offer and pay with bitcoin. From Starbucks' point of view, it's not a big risk. At the end of the day, it's just a cup of coffee. So, if it doesn't work, it doesn't work. They're not risking a lot of money. I think it has prospects of working.

There's also an incentive for retailers to have this payment method work. If paying with bitcoin becomes as ubiquitous and as easy as walking into Starbucks and paying the same way people do when using their various payment apps, there's an enormous advantage for any retailer of whatever scope to get people away from credit cards or debit cards, because it costs the retailers a lot of money, a 2% to 3% fee, depending on the retailer. So, if you're in a low-margin retail business—say you're Amazon—the whole profit margin is not even 2%. Walmart has maybe a 2% profit margin. Theoretically, if Walmart were to accept bitcoin payments—I'm not saying Walmart plans to do this—but if these apps were available to enable that, you're talking about turning a 2% margin into a 4% margin. That's serious money.

Questioner 15

Would it be possible to provide information on the MGEX situation regarding the SPIKES futures?

Murray Stahl—Chairman & Chief Executive Officer

It would be possible if I had the information. This is what I know. There's a jurisdictional dispute between the CFTC and the SEC regarding the SPIKES. The nature of the jurisdictional dispute is not obvious from the written material, so I'll try to explain it. It's a legal question. The SPIKES competes with the VIX, because they're both volatility indexes. There's an element of law, at least in this country, that has to do with whether an index is defined as a broad-based or not. The line of demarcation between the two is ten securities.

The VIX is based on the S&P Futures, but not directly. The S&P Futures is considered to be an index of 500 securities on which they might track X number of options, and it is those options—not the S&P Futures themselves—upon which the VIX is created or calculated.

The SPIKES index uses the SPDR S&P 500 ETF (SPY) as its base, which is actually a security. It is possible to take the legal position that although the SPIKES index is also based on a variety of options, the underlier is one security, not a future composed of 500 stocks. By that line of reasoning, it would not be a broad-based index, in which case it would be regulated by the SEC. That's basically the best way that I can explain the legalities of it.

The only way around that is to get somebody to give permission to operate in a manner slightly different from the common practice. To be fair, no one had even envisaged that this issue would come up. But there you have it. That's the legality of it. You have two different agencies and a lot of lawyers that need to arrive at some conclusion or solution. They're all collectively a lot smarter than I am, and I hope they will come to some reasonable meeting

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of the minds, whatever that might be. I have great respect for all of them, and they might be having the conversation right this second, for all I know. But I won't be able to shed more light on that, because they have to figure out how to solve this issue.

And you can understand the regulators' concern over agency jurisdiction is not a picayune point, to be fair to them. If they set a precedent, it can affect regulation for all sorts of other eventualities that have yet to exist. Even though no one likes the delay that examining these issues causes, you can see how important it is from their point of view. I wish I could tell you what the resolution will be, but it isn't known yet. I didn't go to law school, I'm not a member of the bar, and if I were, securities law probably wouldn't have been my specialty, so I'm not one to opine in this situation. But I'm sure a lot of talented people of good will are going to find a solution. I hope that answers the question.

Questioner 16

Does Horizon Kinetics pay out a regular dividend and, if so, would those dividends show up under the line item 'Dividends and Interest Income, net' on the income statement?

Murray Stahl—Chairman & Chief Executive Officer

Yes, Horizon Kinetics does pay regular dividends. Generally speaking, it pays them quarterly, and because Horizon Kinetics is partially owned by FRMO, that number is in Dividends and Interest Income, net, that's where the number would be.

Questioner 17

Do you have an opinion on the uranium industry or Cameco Corporation (CCJ)? I know you like to research out of favor industries, and this certainly qualifies.

Murray Stahl—Chairman & Chief Executive Officer

Yes, it does, but there are two basic problems with Cameco. It's certainly a cheap stock, and I have been tempted over the years to buy it. I haven't done it yet, though maybe one day I will. But there's a worldwide oversupply of uranium, and that's because the nuclear power industry is not expanding. You could argue that because nuclear is a zero CO₂ emissions source of power, that if you're really worried about the impact of CO₂ emissions on the climate, you'd want to expand nuclear power. But there a couple of complications there.

Number one, it takes a very long time to permit and construct a nuclear power reactor. Secondly, for the people who are worried about climate change, it's worthwhile recalling, with all due respect to them, that they spent 40 years trying to shut down nuclear reactors. Now they've come to the conclusion that we need more nuclear reactors. Well, there's 40 years of legal precedent and Nuclear Regulatory Commission rulings, and all sorts of

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impediments that make it very, very difficult to license a reactor. There are state rules, there are federal rules, and there are usually court filings.

You might remember the movie *The China Syndrome*. In part because of its influence, the average person thinks a nuclear reactor is just a ticking nuclear bomb that will eventually go off. Their fear is that if the containment vessel of a nuclear reactor were to crack and if the moderator, which for nuclear reactors used in the Western world is water, were to leak out, then the reactor would overheat and that you'd get a nuclear explosion. But, from a physics point of view, even if all of those things happened, it's a physical impossibility.

One reason people confuse the leaking of the moderator with danger is because we think of water as a moderator in the same way as we do the coolant in a conventional boiler or an engine, say like ether glycol in your car's radiator. But the water in a nuclear reactor doesn't cool the reactor; rather, it slows the progress of the neutrons. Why do you want to slow it? Because there are molecules moving back and forth with Brownian motion, and if you slow the neutrons, they're more likely to strike a U-235 molecule and split it. To create a chain reaction, you have to slow the free neutrons. In which case, when the water—which basically impedes the speed—leaks out, the neutrons speed up, and you don't get a chain reaction and the reactor automatically shuts down. That's what actually happens.

You might recall in the Fukushima disaster. The same misinformation impacted events there. If you go on the internet after this call—hopefully, you won't do it until the call's actually ended—and you look at the articles of the time of that crisis, they basically were reporting that they think there's going to be another nuclear bomb going off in Japan in the form of the Fukushima reactor, even though the Japanese government tried mightily to convince the various interested parties that that outcome was a physical impossibility. After three, four or five days, enough people who had the scientific acumen to tell the reporters that there's no possibility of its blowing up, whatever else might happen, such as leaked water getting into a river or creek—that could be a problem, but that would be containable and it's limited. Anyway, once they realized the Fukushima reactor wasn't going to blow up, the interest in the story cooled a lot. If you're interested, have a look at those articles.

Anyway, maybe that's more about nuclear power than you want to know.

Questioner 18

Can you give us an update on the state of crypto mining and if you have increased your investment for FRMO given your positive outlook on the crypto mining?

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Murray Stahl—Chairman & Chief Executive Officer

Yes, we have increased our crypto mining investment. We would've increased it more were it not for the fact that until very recently—meaning about ten days ago—if you ordered equipment, you had no chance of getting delivery until Thanksgiving. We had ordered equipment in September, and we started getting delivery—and I say started, not full delivery—a couple days before Christmas.

When you get delivery, as I said, you need to test it, download software, de-rack the old equipment, rack the new equipment, and arrange it in hot aisles and cold aisles. There's a lot of work involved deploying the new equipment. You obviously have to test it and make sure it actually works, that you didn't get damaged equipment, which does happen sometimes, although it didn't seem to happen in this most recent iteration. It takes a number of days to get production online. Therefore, it took us a long time.

Lately, we have been getting the equipment faster. Just for the fun of it, I'm going to go on the internet because I have my phone right here, and I'll look up what it would take to get delivery. If I order an S17 today—and today is January 23rd, it says that the shipping date will be in the range of March 1st to March 10th, which really means March 10th. It is shipped from Malaysia, so it will be on a ship, and it will take two to three weeks to arrive. So, if you order equipment today, at least the S17, which is what I believe is currently the best Bitcoin equipment you can buy, it might be functioning online in early April. I say "might" because these aren't hard and fast numbers.

Ultimately, once the S17 equipment is in place, it's fabulous. Even after the halving, and if nothing happens to improve the bitcoin price even after the halving, it still will be fabulous. That's how productive this machine is. The equipment will arrive and it will be installed. The question is how fast and when? It all pertains to what I said earlier about the move of production from China to Malaysia. Consider the transit: it might travel a couple days in a truck in Malaysia, then across the causeway to Singapore. It has to be loaded into containers and then onto a ship. That ship won't leave until it's fully laden, because the crypto mining servers will not be the only cargo on the ship. Then it has to sail from, I guess it's the Malacca Strait, all the way to the Port of Los Angeles. Then the ship has to be unloaded and the servers get loaded onto a truck that goes somewhere in North America, depending on where it is being sent.

I hope that gives you an idea of what's going on in crypto mining. We plan to increase our investment and, hopefully, we can do that soon. But there are limiting factors that are totally out of our control. We're told we have to live with that, and we do.

That concludes the questions and my remarks. It only remains for me to thank you so much for all the questions. I thought they were fabulous this time, and I really enjoyed answering them. If I missed anything or you want more information, please don't hesitate to contact us and we'll do our best to provide it. And, of course, we will reprise this in about three months.

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We look forward to talking to you and, hopefully, enlightening you. Thank you so much and good evening.

Operator

Thank you, ladies and gentlemen, this concludes today's presentation. You may now disconnect.

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