Operator

Good day, ladies and gentlemen, 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, so please go ahead.

Thérèse Byars—Corporate Secretary

Thank you, Keith.

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

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 and Steven Bregman, President and Chief Financial Officer. They will review key points related to the 2022 third 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

Thanks, Thérèse, and thanks everybody for joining us. We're going to leave plenty of time for questions, because I understand there are quite a few of them. One of the things that I've been asked to do—I'm going to do it right away before I get into my commentary—is provide a bunch of numbers. I have them in front of me, so I apologize for just reading them like this, but everyone wants these figures, to know how much bitcoin we have, how much TPL we have, how many other cryptocurrencies, and so on. So, here we go.

The first set of numbers are investments we own through our participation in various funds. Therefore, these are indirect numbers. We have the Bitcoin Investment Trust, GBTC, 588,796 shares. We have 95 units of Bitcoin SV, which is the spinoff—or the fork, I should say, from Bitcoin Cash. We have 4,220 shares of the Ethereum Classic Trust. We have

26,778 shares of the Bitcoin Cash Trust. One of the reasons we have that is we took our Bitcoin Cash and we tendered it to the fund. A reason for doing that is that we got a pretty good deal by participating. We have 606 shares of Grayscale's eCash Trust. We have 5,895 shares of Litecoin Investment Trust.

All these, by the way, are at big discounts to net asset value, which you should take into consideration when we provide the market values.

We have some Bitcoin Gold. That was a fork from bitcoin. These are actual coins. We have 224 of those. In the past, I've given my theory about the bitcoin forks and their ultimate value, so I won't reprise that unless somebody wants to ask a question about it.

Here's what we own directly, as opposed to through funds. This is bitcoin itself, bitcoin that we have mined through our own mining efforts. We have 123 actual bitcoins. We have 7,644 shares of the Grayscale Bitcoin Investment Trust, GBTC. We have 18 shares of the Ethereum Classics Trust, another Grayscale product; 12 shares of the Grayscale Bitcoin Cash Trust; and seven shares of the Grayscale Litecoin Trust. We also have mined some Litecoin, and have 1,514 actual Litecoin. We have 35 Ethereum, actual coins that we've mined ourselves. We have 661.7 Ethereum Classic coins we've mined, and 61.4 Litecoins.

Then, we own 30.8% of Winland Holdings, formerly known as Winland Electronics. They have 52.9 actual bitcoins that they've mined. They actually purchased or acquired indirectly—these are through other modalities—another 7.4 that they didn't mine. They've mined 14.9 Litecoin, they've mined 53.5 Zcash, they've mined 1 Bitcoin Cash, 8.7 Bitcoin Gold, and 9.4 Ethereum Classic.

To derive our implied ownership, via Winland's direct holdings, multiply by 0.308 all those previous numbers.

And you probably want to know how many shares of Texas Pacific Land Trust we have, which I will read you. We have, indirectly through investment funds, 50,729 shares, and directly we hold 7,374 shares. Add those two numbers, and obviously, it's over 58,000 shares.

Now you know where we stand on crypto and TPL holdings. I think the balance sheet speaks for itself. The salient quarterly event impacting our value, at least our shareholders' equity, is a decline in the value of bitcoin and the Bitcoin Investment Trust. Texas Pacific, which is our biggest holding, didn't do a heck of a lot in the quarter, either positive or negative. So, that's that and you see what it is. Of course, the value we used for TPL at February 28th was \$1,188.73 a share. Obviously, it's changed since then, so take that into consideration when you're looking at the financial statement. Everything else is fairly self-explanatory.

One or two things are in the process of happening, which, when we get to my various points, I'll refer back to that document. In any event, you can clearly see that much of what we're doing in in Horizon Kinetics an investment sense, including much of what we're doing in cryptocurrency, has to do with inflation. We've been doing this for about six years now. So, let me make several general remarks about inflation, just to set the tone. Then we'll go into crypto and various other undertakings, and some other activities I think you'll find interesting.

Historically, wealth was hard-asset wealth. That really changed in our society, beginning probably in about 1980 or 1981 to about a year ago. In that period, it was financial assets that became wealth. That had to do with the decline—not elimination of, but the decline—in the inflation rate that characterized the '70s, up to 1980. From 1981 to, I would say, at least 2020, probably much of 2021, too, there wasn't a lot of measured inflation. We could disagree about what that rate really was, but it wasn't of concern to people. What I'm going to do is point out a number of events—the type I would say are once in a millennium events—that I would argue interrupted the inflation that we were experiencing up through 1980.

One of those events was the collapse of Soviet Communism. In 1980/1981, Soviet Communism had not yet collapsed. It was in the process of doing so, and not wanting their society to collapse, the leaders of that needed to get hard currency in the world market, and they only thing they really had to sell—what was that? Commodities of every possible type. Everything from oil to copper to iron ore and uranium. You name it, and that went on the market. And that was a major disruption to the global commodity markets, one that went on for decades.

The second, I would say, seminal, once in a millennium event was the almost simultaneous collapse of Chinese Communism—the conversion from a Communist state to a state capitalist enterprise. China, though, didn't really have a lot in the way of commodities to put up on the world commodity markets; some, here and there, but not sufficient to have a meaningful impact. But what they did have is 1.4 billion people to put on the world labor market. That was a big deal. Maybe even a bigger deal than the Russian commodity sales—1.4 billion is a lot of people. That caused societal shifts in terms of where goods were produced, and displaced a lot of workers worldwide. That process has, more or less, played itself out, as has the Russian sales of commodities, for reasons that you can read about in the paper every day. Now we're in the world of sanctions and embargos, so we're in a different world.

The third inflation interrupting event was the rise of the emulators—quite a few of them, actually—of the Chinese government putting their labor on the world market. I would say this is the emerging markets labor supply: India, Pakistan, Bangladesh, Thailand, Vietnam, the Philippines, Malaysia, etc. There are plenty of other countries I could name. Mexico would be a good example. Add those to the Chinese labor market. I could also add, to a lesser degree, the labor markets of the Eastern European countries, also formerly Communist. You're talking about possibly over 3 billion people in various points in time over the course of 40 years put into the world labor market. That's done; that process is over.

Two lesser important points, I'll just mention them so you can understand how the world is changing. You'll recall South Africa was sanctioned because of apartheid. Apartheid ended and therefore the sanctions ultimately ended, and so South Africa, a commodity rich nation, was reintegrated into the world. Their commodities came onto the world market. They certainly had a lot of needs. That was a once in a lifetime event, maybe a once in a millennium event.

And then another thing that happened, something that really started in the '70s but certainly gained force in the '80s, was the integration of women in the workplace. So, half of the planet got integrated into the workplace, whereas historically that workforce didn't actually exist.

So, all those five phenomena that I mentioned were major counter-inflationary trends. And all those counter-inflationary trends were playing themselves out or, I would argue, have played themselves out. In a macro sense, if you want to think in those terms, that's what led to the investment posture we have. The most important investment posture we have, in my opinion, is not Texas Pacific Land Trust, but crypto. And we invest crypto in a variety of ways. One way is our mining efforts, which we'd like to expand, and in due course we will.

Now, you might say that we have plenty of cash and we have plenty of assets, so why don't we go out and buy more mining rigs? Well, the answer is very simple, because as the mining rigs become more efficient—which they actually have, and recently there's been another quantum improvement in power consumption efficiency in that respect—the prices of the rigs actually fall. If the prices of the rigs fall, that interrupts the rise in value of. Why does it do that? You might think, why doesn't the bitcoin just purely reflect inflation or purely reflect the supply-demand of the commodity itself? Because it's no different in that respect than gold: if it's cheaper to produce the coins, meaning, it's cheaper to mine them, then some of that cost savings—and I would argue all of or virtually all of that—is going to be passed on to the people who would buy the coins, just like if gold became cheaper to produce, it's going to be reflected in the price of gold. The same for wheat or soybeans or corn, when from time to time they get cheaper to produce and that gets reflected in the price.

Bitcoin is no different than any other commodity in that respect, with one incredibly salient exception. That salient exception is that, in principle, supplies of any commodity are not really fixed. If the equipment is readily available to produce more gold, and it can be produced cheaply enough, more gold is going to be produced. The same is true of oil, the same is true of soybeans, or wheat, or corn, or whatever commodity you can name. In the case of bitcoin, over 19 million coins have now been mined. There are only going to be 21 million coins in the year 2140. There's less than 2 million to go, and they're going to become increasingly scarce. Eventually the scarcity factor is going to overwhelm the continual improvements in the efficiency of the mining equipment. So, fixed- or limited-supply crypto, especially bitcoin, is unlike any of the other commodities. That makes it an asset class in itself. I believe the day is not long in coming when it's going to be a perfectly legitimate asset class and that's why it's so important to be there.

Now, apart from our own mining, we have four other investments in crypto that are worthwhile noting. One is called HashMaster. We own, I think it's 7.1%. Horizon Kinetics itself owns over 50%, so we obviously have a big stake in it. HashMaster does a number of things. First, it's a hosting facility, so, it's a datacenter for other miners. Secondly, it repairs equipment. Strategically it's very important to us to have that faculty. And, thirdly, it actually mines for its own account. So, HashMaster now owns coins as well.

Then there is Consensus Mining. This is the outgrowth of something we started a number of years ago with HK Cryptocurrency Mining LLC, which we merged with a newly created company called Consensus Mining and raised a fair amount of capital in the process. And we own a piece of Consensus Mining. Technically, Consensus Mining is publicly traded. It was a public offering, but it won't actually be trading in the marketplace: there's a lockup provision, and all the insiders who have shares can't until the lockup expires on November 30, 2022. We're in April, so in, call it about a half a year, on December 1, 2022, that will be publicly traded.

Then, of course, there's Winland Holdings, formerly known as Winland Electronics. We own 30.8% of that. That's another mining company. They do something else that is interesting: they make sensors—for heat, temperature, moisture, those kinds of things—and that's a small business, but it's profitable.

And we own a small stake in Digital Currency Group. Digital Currency Group, of course, manages the Grayscale trusts which, perhaps one day, will be cryptocurrency ETFs maybe. If that happens, GBTC will be a bitcoin ETF and it will be the leader, as it has been throughout in the cryptocurrency effort. So, that sums up our cryptocurrency investments, although I'm sure you'll have more questions about that.

A couple other points I want to make that I think are important, about securities exchanges. In the last couple of meetings, we haven't talked about exchanges, but, just to review and as you are probably aware, we merged our stake in the Minneapolis Grain Exchange with Miami International Holdings, which was once the Miami Options Exchange. Now it's a bona fide stock exchange, and an options exchange, and a commodities exchange. We also merged our Bermuda Stock Exchange with Miami. Our financial statements now show a $14 million stake in what we refer to as MIAX. And that shows you just how something truly substantial can grow from small investments. I have a lot of high hopes for MIAX. If you go to their website or, alternatively, the Minneapolis Grain Exchange website, you can see what's happening in terms of volume expansion, and I think you'll agree the company is thriving by every conceivable measure a company can thrive by.

Also, a lesser investment for us that's thriving—or blossoming even—is the Canadian Securities Exchange. The idea of the Canadian Securities Exchange was to provide a venue for small cap natural resource companies, which is a lot of what's in Canada, to get better access to capital markets, essentially replacing the role the Toronto Venture Exchange—well, the Vancouver Exchange, which became the Toronto Venture Exchange—once played in Canada. And it's thriving and blossoming. One of the reasons is that natural resource development requires substantial capital. Canada literally has thousands of such companies that are in need of capital, and the commodity cycle, in my opinion, has just started. So, this company is thriving in every conceivable way.

Now, as to Horizon itself, we had—you could argue—12, maybe even 14 years, of issues, challenges. No different than the issue every value investor faced. Number one, every value investor was overshadowed by the rise of the enormous technology conglomerates and their eventual dominance of the indexes. They're really outside of what value investors typically invest in, so we really didn't participate in that performance. The whole value investing asset class was impacted. But I would argue it was impacted to an even greater degree by the rise of indexation. Indexation basically overwhelmed the practice of active management for 12 or possibly even 14 years; that's what was happening.

The follow-on challenge was the rise of ETFs. One could say that the rise of ETFs is related to the rise of indexation, but we all believe as active managers that the ETF was not an asset class that would ever be permissible for active managers. There are certain disclosure rules in ETFs that are problematic for an active manager, so no one believed that an active manager would ever get permission to do an ETF. Plus, the increasing flow of funds out of active management – which includes mutual funds, of course – is a serious problem because the mutual fund—which is very, very important for Horizon Kinetics—is inherently operationally less cost efficient than an ETF. And that's what we had before us.

There's also the issue of platform fees the mutual fund manager. A large portion of your fee income actually goes to that mutual fund platform. That means that if someone takes $10,000 they have in some money market fund, and they happen to put it in your mutual fund, you'll be paying a fairly substantial number of your basis points to that platform just because the money came from there. That has a major impact on profitability. So, we had that issue, in addition to the competition with indexation and competition with ETFs.

But recently, it came to our attention that the ETF regulation had changed, that we could manage an ETF. And the first ETF we launched, was—and in light of everything I said, it could be no other—the Horizon Kinetics Inflation Beneficiaries ETF. That was launched on January 12, 2021. Now we're in mid-April, 2022, so in 15 months we now have over $1.4 billion in assets under management. So, a sea change has opened up to us, just because of that regulation change. That is a major positive factor that we now can access ETFs.

Another important positive factor for us is that, over those 10 or 14 years when value investors suffered a continual decline in assets under management, anything you could reasonably describe as an inflation beneficiary was gradually lessened in the index weightings. In some cases, inflation beneficiaries were actually purged from the index itself.

As a consequence, the indexes no longer have much – by and large de minimis – positive exposure to inflation. Which means that if we're really right, if serious inflation is in our future, indexation is going to have its troubles just because of lack of positive exposure. That's separate from the fact that inflation, when it does occur, can have such an overwhelming negative impact on financial markets.

Anyway, needless to say, we're going to soon be launching some other ETFs. I wrote down on another sheet of paper four of them—actually five—that we're going to be launching. I would tell you the names, but I fear to do that, because somebody might copy them. Rest assured, though, that we're going to do some interesting things, and you will be seeing new ideas in the not too distant future in the world of ETFs. Some of them are in the equity market, some of them, believe it or not, are in the bond market. I think you'll find them all interesting, so stay tuned and you'll learn about them.

The last point I want to make before the questions and answers segment is something that isn't on the financial statement as of February 28th, because technically we started it on March 1st. In addition to HK Hard Assets, whose major position is TPL, we started a fund—I alluded to it in the last conference call, I believe—called HK Hard Assets II. Although there are some shares of TPL in there, just to give the fund some life, we're buying something in the world of hard assets that's an entirely different focus. In due course we'll be able to talk about it. But on March 1st, we made our first investments in it and we'll be adding to our investments as the months progress. And all I'll say about it now is that it is, no question, an inflation beneficiary.

Those are the salient remarks I wanted to make with regard to Horizon and FRMO.

Questioner 1

Is there any policy whereby FRMO employees must own stock? Given management's views on inflation and bitcoin, coupled with the recent mainstream discussion of inflation and decline in bitcoin price, are FRMO employees and management buying FRMO stock? If not, why not?

Murray Stahl—Chairman & Chief Executive Officer

You may be aware there are only two paid employees of FRMO and they're our in-house counsel, Jay Kesslen, and Therese Byars, our corporate secretary. Then there are the two unpaid employees, both on this call: me and Steve[1]. That's it. And we both own considerable

[1] We, Murray and Steve, have never taken cash compensation. At some point, we were informed that the IRS requires recognition of compensation – which is to say they don't recognize the concept of working for no compensation, even though that's what we do – so on an accounting basis, we record non-cash compensation expense that is posted along with an identical entry that increases the additional paid-in capital account.

amounts of stock. Usually during the course of a quarter, I myself buy some more shares. I like to buy gradually during the course of the quarter, but I own way in excess of 7 million shares. You also might be interested to learn that Horizon Kinetics itself, which we obviously have a big stake in, buys shares in accordance with one of these preordained programs wherein you declare your intention to the regulators that you're going to buy X number of shares a day. I forget how many shares we buy each day, but Horizon Kinetics is in the market every single day buying shares of FRMO. And that goes to our benefit as well.

On a personal basis, I'm still restricted from buying FRMO shares—actually, because I'm doing this call—but if I'm not mistaken, I can begin buying again as of April 21st. Horizon Kinetics, though was buying stock today, as it does every day. I hope that's a direct answer to your question.

Questioner 1 (cont.)

What are management's biggest fears for the company's business right now? What does management see as FRMO's five-year-plus destination? And what do you see as the most plausible narrative of failure in accomplishing that?

Murray Stahl—Chairman & Chief Executive Officer

Number one, we would like to have an operating business within the context of FRMO, and we haven't achieved that yet. I mentioned it last time. There are two primary reasons, really. The first relates to businesses we could have bought, but we didn't know enough about any of them to warrant buying one. Secondarily, even for some of operating businesses we knew a lot about, we didn't like the valuation, so we didn't buy. Ultimately, though, we'll do something, eventually we'll get there.

At the moment, I'm leaning towards crypto, because we have all the makings for that, but it doesn't have to be crypto. It could end up being something else. However, whatever it ends up being, it's going to be something with which we have a lot of expertise and knowledge. That doesn't mean we're going to run the business on a day-to-day basis, but we're not going to go outside of our circle of competence.

In terms of what do we fear? For openers, I think it should be self-evident that we've made a fairly big investment in inflation beneficiaries. And what if there's not inflation? What if there's disinflation? What if there's deflation? All those alternative scenarios are possible. I personally don't think, at the moment, they're all that likely, but the best laid plans of mice and men oft' go awry. It's possible, it has to be considered, and we're constantly reevaluating that. Were that circumstance to arise, we're going to have to do a lot of repositioning of assets, but it doesn't seem like it's happening at the moment. So, I guess that's the greatest fear.

We don't have a leveraged balance sheet, we don't have any meaningful liabilities. The only debt we have is the $707,000 mortgage for the HashMaster building. I personally believe the mortgage is, at most, about a quarter of the market value of the building. So, we're in good shape there, not that $707,000 is such a big deal in relationship to our balance sheet.

The other concern I'll mention, if one could call it that, if we were to have an operating company, is that we would then have some employees, and with employees come various personnel management problems that we haven't had in the history of FRMO. But, we'll deal with it when the time comes. That's why whatever we buy is going to have to have its own management. That will come with an employee expense item, and there'll be other expense items of running the business. Therefore, the character of the income statement will change.

Questioner 1 (cont.)
In the past, management has talked about employee retention and how no one has ever left the company. Taking an employee's perspective, what would management say is the worst or most difficult part of working for FRMO?

Steven Bregman—President & Chief Financial Officer

A couple of technical points, communication issues. It is no doubt easy if someone is speaking with Murray or me to mistake when we might be speaking about FRMO Corp as opposed to Horizon Kinetics. I, for instance, can be a little sloppy with pronouns. The questioner might have confused one company with the other with respect to the discussion of employees. As to FRMO Corp., there only the two paid officers and the two unpaid employees, and you're on the line with those two, and none of us have never left the company.

In speaking about Horizon Kinetics, there are certainly employees who have left. As far as room for confusion in that regard, someone may have once spoken to me, for instance, asking me about our research efforts and how we handle analyst investment reports versus our investments for clients and how that relationship works. And I might have said—which would have been the case at the time—that no analyst has left the firm in many, many, years, maybe a decade. And that's still the case. But I would have been speaking about that particular portion of Horizon Kinetics, the research staff.

As to taking an employee's perspective and what would management say is the worst or most difficult part of working for FRMO Corp? Well, that would be us, Murray and me. So, the questioner may be thinking there are a lot more employees at FRMO Corp than there are, because it's just the two of us.

Murray Stahl—Chairman & Chief Executive Officer

Yes, just us, and we're not going anywhere. But, as I said, one day, if we have an operating business, there are going to be employees and that will be a more pertinent question. We'd like to achieve that, but it hasn't happened yet. In terms of Horizon, if I wanted to interpret the question that way, I never calculated the turnover rate. Any way you do it, it's low. We don't have a lot of turnover. We've got roughly 80 people. The number waxes and wanes. I would say in a normal year, we might have one or two resignations, something like that.

Sometimes we're in the growth mode. Lately, that's the case. So, in the last couple of years, we actually brought some people on pertaining to the effort in ETFs. Right now, we're thinking of hiring yet another person for the bond ETF effort. We haven't done that, but we're thinking about it. We don't have a lot of turnover, though.

What is that attributable to? I don't think we pay such crazy great salaries. I think we're reasonable. I think we're fair. I think we have a fabulous health plan. Maybe that's part of it. But I think we try to make it an interesting and fun place to work, and I believe that's part of it.

And, secondarily, if you were inside the company, you would have experienced that when we went through our rough periods in investment management, we didn't lay anybody off. We didn't make the employees pay for what were our misjudgments. That was on the partners, it was on us. So, I presume everybody appreciates that. We were very unlike the typical Wall Street firm when it goes through a rough patch, and for us it was a 12-14 year rough patch, depending on how you calculate, because we stayed with our value investing approach, and you all know what that entailed. It was not pleasant, but if you were an employee, I dare say, I don't think anybody was all that worried about it. Personally, I wasn't all that worried about it either. Maybe I should have been, but I wasn't. I was very confident in our investment posture. I'm just being honest, that's how I felt.

Questioner 1 (cont.)

There are some who say that quantitative easing by the Federal Reserve is not, as some take as axiomatic, "money printing." And, in fact, argue that quantitative easing has historically caused deflation or disinflation rather than inflation, and that the bond market has correctly predicted this each time and is, presumably again correctly, predicting a similar situation this time around. That is, "the bond market isn't buying it" argument. Could management explain exactly how quantitative easing is money-printing from the perspective of the real economy? Are there any primary data sources where you believe this direct cause and effect can best be traced through, for example, that bank reserves and non-bank deposits resulting from quantitative easing are being spent largely on things other than financial assets? That is, exactly by what means is quantitative easing—which results in increased bank reserves at the Fed,—"debasing" the dollar?

Murray Stahl—Chairman & Chief Executive Officer

Well, long question, but easy to answer and I'll give you my data sources. I'll name the sources in just a second, but let me just state the principle. The principle basically is there's a supply of goods and services in a growing economy that increases at a certain average rate. And that could be oil, it could be cheese, it could be cars, whatever product you want. However, the supply of money in the system is expanding faster than that vast, infinite variety of products and services you could buy with that money. What's going to happen is that the money, a given quantity of money, will buy less products and services, because that's simply how the law of supply and demand works.

The data source for money supply is M2SL, and you'll find a chart of it on the St. Louis Federal Reserve website. In recent months, in round numbers, the money supply is growing at about 10% a year. Now, we can have a lively debate about what's happening to global production. Remember, we're in a global market, and we're talking about the whole panoply of products. But, of all the things you can buy, I don't think anybody would assert that the supply of anything you're likely to buy is growing at 10% a year – but money is. That's debasement. That's the way it is.

If you were to take products and services in and of themselves—whatever you like, be it a medical procedure, which is a service, a raw commodity like lumber, or soybeans or iron ore, natural gas—look what has happened to their prices. If you really want to get esoteric, here's another—I just cite it because I find it interesting—the price of lithium. I'm not even going to cite the number, because it's up so much, you might think I'm exaggerating. But you can look it up on a website called Trading Economics and you'll see just how astounding the price increase is.

Just about any raw commodity I can think of is up tremendously in the last 12 to 15 months It might be hard to believe, but natural gas, as an example, just from December 31st to mid-April is up over 100%. And we need natural gas. Coal, theoretically, is on its way out; but practically speaking, the world, believe it or not, even the United States, is producing about as much coal as was ever produced; maybe even more coal than has ever been produced in the history of the planet. My data source is the U.S. Energy Information Administration (eia.gov). So, the price of coal, measured in BTU, is up big. I think the National Debt Clock provides a measure. Somewhere on the National Debt Clock, I believe there's an energy output chart for the world. On it, the biggest source of energy in terms of BTU is natural gas, with coal a tiny fraction less.

Compared it to wind power, as an example, in terms of BTU, I would say coal is probably 12 times greater. Now, that's the way they measure the output. I don't even believe that measurement is accurate. That's because if you have a coal-fired generator and it's working 24/7, if that's the level of power output you want, that's what you get. But wind doesn't blow the entire day. I believe what they're measuring, though, is the rated capacity of a wind turbine; they're not measuring the output. But that's another discussion .

Back to quantitative easing, a point that people miss is that you don't have to be the Federal Reserve to buy bonds and create money. Banks can do it. How? Because they can buy more treasuries with a given capital base, but they can't issue loans. Why? Because a Treasury is risk-free, whereas a conventional loan is not risk-free, meaning you have to reserve more capital against a conventional loan than against the Treasury. So, if the banks shift their balance sheets even slightly towards Treasuries, which I would say most banks have been doing, in addition to increasing the size of their balance sheets, they wield enormous purchasing power. The balance sheet of the big banks—Wells Fargo, Bank of America, Citigroup, J.P. Morgan Chase—are measured in trillions of dollars. So, even though when a bank gives credit, they're not printing money with a literal printing press, they are creating money, they are creating liquidity.

Now, I think the last part of your question is about what the bond market is predicting. This is the only point where I'd be a little strident and say, I don't think the bond market is predicting anything. Why not? Because the bond market is managed. I don't even think it should be called a *market* any longer. The size of the Federal Reserve balance sheet alone is over $9 trillion. Then you have the banks and how many Treasuries they hold—they work hand in glove with the U.S. Treasury. Then you have the various indexes that buy bonds just to hold them; and they're required to be price indifferent – so long as they have net inflows, they buy and continue to hold. So, what is the bond market? It's comprised of indexes, and indexes have been the marginal trade for many, many years. They're not active managers making, in part, assessments of how much money is in or will be flowing into or out of bond indexation. I wasn't anticipating the question, so I don't have that figure readily at hand, but it's a huge number.

So, I don't think bond prices are predicting anything. I just think they are just reflecting a policy of managing the interest rate. If you go to the Federal Reserve website, you'll find an endless stream of articles and discussion points about how that's exactly what they're doing. I haven't even mentioned the central banks of other nations that also own the U.S. Treasuries. In which case, I should add the International Monetary Fund and also the Bank for International Settlements. So, to say that bond prices reflect a free market clearing price, that the bond market is making a prediction while the world's central banks, with their vast balance sheets, are doing everything they can to control rates, I just don't think that's the right way to look at it. But that's just me, but I hope you can see why I don't even regard the bond market is predicting anything. But that's the only point I'm going to be strident on.

Questioner 1 (cont.)

In FRMO's Q2 2020 conference call, management mentioned Metcalfe's law when discussing a view of bitcoin pricing. This appears to be a common argument when discussing the value of bitcoin. What are management's thoughts on parallels that have been made between the argument for bitcoin's value based on Metcalfe's law and the use of that same logic in elevating the prices of telecom and business-to-business stocks during the dot-com bubble (that similarly rose on arguments based on Metcalfe's law and artificial supply deficits)?

Murray Stahl—Chairman & Chief Executive Officer

Well, you could say that. The only difference is this: that in the dot-com bubble of the late 1990s up to 2000, there was no limit to how many websites you can create. Absolutely none. There was no limit to how many searches you could make, practically speaking. I mean, maybe there was a limit in theoretical physics terms, but not as a practical matter. Bitcoin, though—there's a limit to it, to its supply. That's probably the single most important factor about bitcoin. So you can't make a scarcity argument for websites and their ultimate value; you can make a scarcity argument for bitcoin.

You should know that, as to the dot-com bubble, I myself was one of the people—if I go back to my work in the '90s—who would write about the bubble. A particular piece that I'm very proud of, called "The Infinite Bear Market," went through this logic in great detail. I didn't accept the valuations, because there was no limit to the supply of what could be produced. But there is a limit to how much time people can be on the web, to the demand function. A human being can only be on the web so many hours a day and that's it.

In crypto, bitcoin in particular, it's the reverse. There's a limit to how many bitcoins are ever going to be created and we are, by the way, just about exactly 90% of the way there. On the other hand, there is no theoretical demand limit to how many goods and services people are going to want to buy in the fullness of time. If there's a fixed amount of bitcoin, it is going to become more scarce relative to the total scale of demand. That's all there is to it. So, I don't think Metcalfe's law can be used to argue against the value of bitcoin and turn it into a dot-com argument.

Questioner 1 (cont.)

Given FRMO's interest in converting to a crypto-based operating business, are there any risk mitigation or hedging strategies being employed or considered as FRMO goes further into the cryptocurrency space beyond, at this point, what would appear to be a de minimis investment, given that management has said repeatedly that the crypto space still has a reasonable chance of going to zero?

Murray Stahl—Chairman & Chief Executive Officer

Well, the way I put it is that it has a reasonable chance of failure. I'm more confident in it than I was a year or two ago, and while I don't think it's going to fail, it's possible. I can even come up with a number of possible failure scenarios. So, because the whole project can fail, we don't invest more capital in it than we can afford to lose. But I'm not going to hedge it with futures, I'm not going to hedge it with options. I'm just constraining the amount of capital put into it – that's the risk control, that we're taking a certain, discrete amount of risk – and the result is going to be what it's going to be.

Maybe—although this is not very likely—I'll be brilliant enough to see that it's going to fail before anyone else sees it, and we could manage not to suffer a complete loss. I wouldn't be confident that I have the ability to do that. Actually, I'm pretty confident that I don't have the ability. But, in any event, when you look at our balance sheet anyone can see that we could survive a complete failure of the project. Maybe we'll be brilliant enough to be able to sell before it fails. It's possible, but I don't think it's very likely. But we could survive a failure, if that's what happens. Time will tell.

Questioner 1 (cont.)

Would FRMO's transition to a crypto-based operating business be linked to the progress of FRMO's up-listing to a major U.S. exchange, as mentioned during the Q4 2021 earnings call?

Murray Stahl—Chairman & Chief Executive Officer

No, it's not—one is not dependent on another. As a matter of fact, Consensus Mining is going to be listed, for starters, on OTC Markets. So, I don't think it's necessary to be up-listed. We just have to see what happens in the world of crypto. In the last 24-36 months, crypto has made enormous progress. Let's just recap.

> Number one, they've established institutional-grade custody. That's a very big deal. It took a while to accomplish, but that's now a reality.
>
> There are now established actual ETFs in crypto. In Canada, there is a bitcoin ETFs right now.
>
> In the U.S., we have a crypto ETF. It's futures-based, but there is now a futures market in bitcoin, and I would say that's the prelude to a cash market.

The reason the futures market comes first is that in the futures market, one is just betting on what they think the price of bitcoin is going to be. But the shortest-term future is a proxy for what the cash price of bitcoin should be. The traded price in these various crypto exchanges (that are really brokerages, not true exchanges) should converge to the regulated futures price, and that's beginning to happen.

> The next step, which is a big one, but I believe it's going to happen within a year, will be some exchange somewhere that makes a cash market in the actual physical bitcoin.
>
> Another progress item is that the controller of currency has approved banks taking bitcoin deposits. There are now, I believe, at least three banks that take bitcoin deposits. That's a very, very big step.

As I said, what we don't have yet is the cash market, which would enable truly transparent pricing, and that would open up the crypto market to genuine institutional investing. There is now some institutional investing, but it's not big yet. It's interesting that, of course, somebody had to be the first, and we achieved that. But the average institution is not investing in bitcoin.

There is one other important development that relates to the banks taking deposits of bitcoin: there is now a bitcoin yield curve. In other words, you can lend your bitcoin out and receive a rate of interest. Believe it or not, the interest you get on your bitcoin is a lot greater than the interest you get on your dollars. That's an incredibly important point —just think back on our discussion so far, and the state of the world's interest rate structure and central banks' monetary policies. Ultimately, maybe that's the biggest deal of all.

Underlying all of this discussion, the dollar is being debased and will continue to be debased in terms of bitcoin – the exchange rate – over time. Why is that true? Because in the next 118 years, a bit over 1.9 million new bitcoins will be produced, meaning the supply is going to expand by a cumulative 10% or so. The money supply of the world might be 10% higher in less than a year. There's no question about what the dollar/bitcoin exchange rate is going to do. The dollar is going to decline relative to bitcoin. As soon as people, and financial institutions, have a method of realizing that differential— that you get a considerably higher interest rate in bitcoin than you get in the fiat currency of your choice—the dollar as an example, though it's true of the euro and the yen—money is going to gravitate there.

Your money's purchasing power will be enhanced, and your interest income will be enhanced. Why wouldn't you do it? Investors just don't have confidence in it yet, because the infrastructure is, as of yet, incomplete.

And one other minor point, related to what I just said, relates to the way bitcoin is quoted. They quote it like it's a stock. They shouldn't do that. It should be quote like a currency. It's not a big deal to change it. It's just a convention. You don't need a lot of software to do that; anybody can do it. It's just a matter, basically, of taking the bitcoin price chart, and turning it upside down. Then it's not a chart of bitcoin going up, like a stock is going up; it's an exchange rate chart of the value of the dollar declining relative to bitcoin.

The difference is not just definitional, it's conceptual and incomparably more impactful. If the question were, instead of "what's the price of bitcoin?", "what is bitcoin priced in dollars?," one would immediately see that the value of the dollar over the last 10 years has crashed in relation to bitcoin. When people start seeing it that way and they get a higher interest rate, I have no doubt that crypto is going to win the day. I hope that's an appropriate answer to the question.

Questioner 1 (cont.)

Would FRMO, given management's opinion on bitcoin versus the U.S. dollar and other fiat currencies, ever consider distributing cryptocurrency to shareholders in the future?

Murray Stahl—Chairman & Chief Executive Officer

Yes, as a matter of fact. One of the assets—it's de minimis, so I don't even know if it shows up in the aggregate number—we have on deposit, is a fraction of bitcoin. I just wanted to see how the lending market works. It might be 0.02 bitcoin or 0.03 bitcoin, so if the whole deposit were lost, you wouldn't know, at least not on the balance sheet. Anyway, we are testing out the interest rate market on bitcoin. We're learning about it. It's a brand-new exercise. Ultimately, that's going to be the attraction. People need income. You can't raise interest rates materially globally, and you certainly can't do it in the United States because the debt levels are too high. I quoted a number before of total debt in the U.S.—it's almost $90 trillion. It comes from the National Debt Clock, it's called total debt. People should pay attention to that.

The idea that, with that level of debt relative to the size of the economy and existing budget deficit, that you could raise the interest rate materially and the country would be able to pay that, is just an escape from reality. I can give you more figures about that, but I want to be direct to the question so I'll defer. But you can ask me and I will go into great detail on that subject.

A key issue is that people need a way of getting income. Trust accounts, as an example. But that's not the half of it. There are assets—let's say, hard assets like bridges, tunnels, whatever—that have a capital fund; or college savings accounts, as another example. You can't invest in an equity for college savings. What if, when the student reaches the 18th year and has to go to college, you say to the student, the market's down, you can't afford to go to college? Ironically, you need the emergence of a real market-derived yield curve, which no longer exists, which goes to a previous response I made: that's bitcoin. And it's going to evolve in the not-too-distant future, and for a number of other cryptos as well.

Questioner 1 (cont.)

What does FRMO management think about the Tether controversy? That is, that it doesn't have the actual U.S. dollars reserved to back each USDT issued by Tether. And the consequences of that for bitcoin prices—given that Tethers are used to facilitate roughly 60% of bitcoin exchange transactions, looking at the money flow chart from coinlab.io. Even the recent so-called audit report released by Tether in September 2021 appeared to be more an opinion based on what Tether management is deciding to show, rather than the results of an independent audit process. The main question being: how much actual USD—not Tether's or other USD derivatives—does FRMO believe is sitting in banks that have been exchanged for or converted to bitcoin?

Murray Stahl—Chairman & Chief Executive Officer

Well, I don't know how much cash is backing Tether. I've never really undertook to know—it's not important to me. The problem with Tether is that it's like buying a money fund. As an investor, you can pick which money fund you want to be in. Some have very low risk. Your money's not there, though, even in a conventional money market fund, though, because it's lent out. It's not like there's a big basket of money that you could reach into and get dollars. There's no money in any money fund; only securities. Those securities have very short periods of maturity, and if it's very low-risk paper, you'll get your money back, it's not a big deal. The trouble in this case, is that a lot of it is not low-risk paper; a lot of it is high-risk paper. And if there were a default there, it would start a run on Tether, at least part of Tether, and that would be a problem.

Would it disturb the bitcoin market? Yeah, maybe for a couple weeks. In the long run, it's not going to do anything for bitcoin. There are people who trade in and out of bitcoin, and those are the people, or at least some of the people, who have Tether balances. So, they buy bitcoin and maybe they make a profit or maybe they don't, and then, when they sell it, they want their money sitting there waiting for the next trade. They want to get interest income. And they put the money in Tether and they think Tether is a cryptocurrency.

But Tether is not a cryptocurrency, and people should know that even before one gets to a discussion of the fragility of the asset, because it's an unlimited issuance crypto – that's its monetary policy. Why would you want to put your money in an unlimited issuance security? Now, they say the reason to do it is because it's price is tethered, so to speak, to the dollar, so it's always going to be worth a dollar. Well, then why not put your money in a conventional money market fund like a government-guaranteed money fund that holds T-bills? Then your money would be safe. That's because with Tether you can pick from a variety of options to get a higher interest rate. And it's not because it's not regulated.

I don't think it's well-explained that you're taking a risk. How big the risk is, I don't know. I suppose it depends on which investment option you select. But Tether doesn't have major long-term implications for bitcoin. I suppose if the whole thing blew up for a couple weeks, there'd be a lot of excitement in bitcoin. I don't regard it as a big deal.

Questioner 1 (cont.)

From the start of 2020 until around May 2021, the transaction fee for bitcoin reached a high of $62. What does this kind of cumbersome transaction fee imply for the future utility of bitcoin as a medium of exchange?

Murray Stahl—Chairman & Chief Executive Officer

You should be aware that most of the people who transact in bitcoin are buying and selling mining equipment, so, the transaction fee doesn't mean anything to them. There publicly traded companies that are buying millions of dollars' worth, in some cases, tens of millions of dollars' worth of mining rigs in one transaction. To my knowledge, none of the mining equipment manufacturers will take U.S. dollars; they want crypto, and it's usually a bitcoin. If you're making transactions that high, I don't think the transaction fees are very significant.

Anyway, that's the market for bitcoin mining equipment. Operationally, when you mine bitcoin, you might need to sell some of what you mine in order to pay some of your electricity expenses, or salary or other expenses. We do that. If you're mining on a large scale your monthly electricity bill could be in the hundreds of thousands of dollars, and in some cases in the millions. Imagine having a $200,000 electric bill. You're going to pay that bill in dollars, but you've got to get dollars from somewhere, and you'll sell some bitcoin to get them. So, is $62 a lot of money for a transaction in bitcoin? I don't think so. In the long run, all that's going to work its way out. The market's going to set the bitcoin transaction price. I'm not really very worried about it.

Questioner 1 (cont.)

What is Horizon Kinetics' plan regarding turnover for the INFL ETF? There have been several Horizon Kinetics publications espousing a low turnover, letting winners run, a Kahnweiler method of investing. Is this the long-term plan for the INFL ETF as well, or is it something more algorithmic or rules-based? Do the managers of INFL directly own any shares thereof?

Steven Bregman—President & Chief Financial Officer

Let me answer the last portion of the question. The primary manager of the fund gave me permission to inform you all that over a quarter of his liquid net worth is in the fund and he buys more each quarter.

Murray Stahl—Chairman & Chief Executive Officer

Well, that answers that question. I, myself, buy a little bit of INFL every day. I'm in the market every day buying it. I think it's a great fund. In terms of the turnover, it's going to follow the normal Horizon procedure. You'll see in all our funds very, very limited turnover. It can never be zero, because there are fund flows and other considerations beyond our control, but it's going to be as low as we can possibly get it. We're not traders and I don't see a need for that, so I think it's going to be extremely tax efficient.

Questioner 2

In the January 18, 2022 Q2 conference call transcript on Page 6, the question requesting an update on FRMO potentially becoming an operational business rather than just an owner of assets was answered by: “The easiest path is to acquire 51% of one of our publicly traded subsidiaries. The company we have the biggest stake in right now is Winland . . . So, if we end up going in that direction with one of our businesses, we’d acquire 51%, if we could, and conduct our operations via that entity.” The latest Winland Holdings March 2022 annual report lists FRMO as still having a 29.1% ownership. Since FRMO does not appear to be an active ongoing buyer of Winland stock, are there any near-term future plans to have a majority-owned operational business rather than FRMO being just a minority owner of a collection of assets?

Murray Stahl—Chairman & Chief Executive Officer

Well, the most recent figure that is given to me is 30.8%. That’s the current figure. If we have the opportunity to buy more, of course, we’ll seriously consider that. Obviously, I’m not going to tell you that the next quarter we’re going to buy X number of shares. It wouldn’t be very intelligent nor even be proper to say that. But that’s not the only avenue for us. There are plenty of things we can do, and it doesn’t necessarily even have to be in crypto. There are a variety of very small companies that are interesting and some might be inflation beneficiaries.

By the way, even if some future such company ended up being an inflation beneficiary, which is a different business than crypto, it still might be a crypto business. And it might even be the one you mentioned. I’m not excluding it; I’m just saying we’re looking at a lot of different things and we haven’t found something to our liking yet. I’m not sorry we didn’t do anything. The opportunities that were presented to us, what we found over the years, by and large, weren’t within our circle of competence, and of the ones that we did find attractive, the valuation wasn’t. There was one—I won’t mention what it is—that could have been a very substantial transaction, at least in terms of the metrics; the price was right. But it involved getting into a business that I personally was just dead-set against. I didn’t want to do it.

I always have an open mind, but I guess I didn’t have an open mind in that instance. I went in prejudiced against it, and it was presented, and the more I heard the less I liked about it and, as I said, I wasn’t inclined to do it in the first place. Then when we found out what happened in the aftermath, I was really glad we didn’t do it. Really, really glad. It would have been nice to announce one day, ‘we now own 50-something percent of’ whatever the heck it was. As a matter of fact, we would have owned 100%, and would have regretted every penny we threw into it. You’ve just got to be careful and it takes as much time as it takes. That’s the best answer I can give you.

Questioner 2 (cont.)

Since FRMO does not have a majority-owned operating business under management at the present time, do you have any thoughts on whether a prospective investor should distinguish between the stock FRMO for purchase versus closed-end mutual funds that may be selling at premiums or discounts to their net asset value of underlying assets that they own? At the moment, FRMO has book value of $6.79 and has a stock price that sells at a premium to the underlying book value.

Murray Stahl—Chairman & Chief Executive Officer

Well, that's a very simple answer because we're not a collection of assets, even now. The reason we're not just a collection of assets is the revenue share. We get a bit less than 5% of the revenues of Horizon Kinetics. There is no closed-end fund of which I'm aware that has any security remotely like that. You saw what just happened to the Inflation ETF. It went from nothing to over $1.4 billion of assets under management in not much more than a year. Whatever the net revenue is to Horizon Kinetics, we're going to collect 5% of that. In the asset management business, it's possible to gather a tremendous amount of assets. It's possible for the cash flow of FRMO to expand enormously. As a matter of fact, it's not only possible, it's actually happening, so no, it's not a closed-end fund.

Now, you could debate how you're going to value that revenue share, but it that must take into account that there is no associated cost, none whatsoever. Just revenue received, with no effort. So, you can't take the number we came up with for the balance sheet, using standard analytical methods, and take that as a representative value of what the revenue share is worth. In any event, you can see that the Horizon Kinetics revenues go up and they go down. Lately, they're going up. So, the revenue share could end up being much more successful than anybody has any right expect, but whatever the ultimate outcome is, the revenue share is an important valuation consideration. In and of itself, whatever that number is, FRMO is nothing even remotely close to a closed-end fund.

If we needed to get an operating business, we can get an operating business. The thing is, we want to have the right transaction. The opportunities to have the right transaction, for reasons I stated previously, just haven't presented themselves. Wrong transactions presented themselves on a variety of occasions, and we rejected every single one of them. And if the wrong transaction presents itself again, we're going to reject that, too. That doesn't mean we're not looking, but it takes a while. We've worked a long time to build FRMO up to where it is; we're not going to risk a lot on something that we're not sure about. And, as I said, it's got to be within our circle of confidence. We'll see what happens.

Questioner 2 (cont.)

In the January 18, 2022 Q2 conference call transcript on Page 20, Mr. Stahl mentioned that Digital Currency Group did a recent transaction in selling shares in which he personally purchased some additional shares, and he thought Digital Currency Group was undervalued. Was there a rationale why FRMO did not participate in that transaction, since cryptocurrency is a focus of investment interest for FRMO?

Murray Stahl—Chairman & Chief Executive Officer

Very simple. When the original transaction opportunity presented itself some number of years ago, there was a limited number of shares we could buy, so we allocated it. Basically, FRMO got a lot more shares than I got. I didn't really get a lot of shares personally, and would have bought more, if I had the opportunity to add to my investment and bring it up to what it would've been at that time. FRMO got the allocation that we thought we needed to get, and there was no reason to increase it, so we didn't. Some might well argue it's worth more, maybe considerably more, than we have it on the books for.

The short answer is, I basically sacrificed. In order to make room for FRMO to have a bigger allocation, I didn't buy as much as I would have. So, I thought the fair thing is—and I'm buying at a higher price—was that now I should have a chance to buy some personally, and FRMO already got some. I think that's reasonable and fair. I didn't buy a tremendous quantity. And, given the size of FRMO's balance sheet, the amount I bought wouldn't have made that much difference to FRMO. But it just brought me up to what I thought I should've had in the beginning. That's all it was.

Questioner 2 (cont.)

You have a long public track record of demonstrated skill and are very generous in sharing your time and insights with us, but there is still a large disparity in transparency between FRMO's opaque financial reporting and NASDAQ-listed crypto miners, such as Core Scientific, which now reports bitcoin production on a daily basis. What would you say to give minority shareholders confidence in management's alignment with their interest?

Murray Stahl—Chairman & Chief Executive Officer

Well, in a way we did report daily production, because we give you the holdings of mined crypto at the end of the prior quarter. We give you the end of the current quarter. There are 93 production days in a quarter, so if you divide by 93, you're going to know what we produce on a typical day. On a typical day, even though the production varies, it doesn't vary greatly. We only have two employees, so there's the burden of putting it on a website daily. We can calculate what the change in mined crypto is in the last 93 days—it's got to be one of us, or we can assign the task somebody—to post that we got a couple of fractions of a bitcoin on a given day. Is anybody really going to benefit from that? I want to be transparent, but there is work that we're going to have to do to produce that. We have no secrets. We don't care if people know. Is the work that we're going to have to do for a daily report of our various crypto production figures going to provide anybody any meaningful value? If, crudely, you just take the quarter-to-quarter differential in holdings and divide by the number of days in the quarter, I think you'll see that there's no meaningful information gathered.

As to the other publicly traded miners, I can see why they do it. They have an entirely different philosophy. They invested tens of millions of dollars in mining equipment in one shot. I don't think that was such a smart thing to do, but you can look at what's happened to their stock prices in the last quarter. I know bitcoin went down, and that's a factor, but you can see what's been happening in the quarterly results. Ultimately, these machines depreciate, they wear out. I don't know what the accounting treatment is going to be, but we might have to mark them to market. They're not worth what they paid for them, and eventually they're going to be worth zero. So, I don't daily production figures tell you a lot.

Anyway, if someone really insisted, I suppose we'd do it, but I don't think you're going to learn a heck of a lot from it. We produce information where we think it's a benefit to shareholders. But I don't know what shareholders are going to get by out telling them: today we mined a tiny fraction of a bitcoin. If you really insist on knowing, it's not a secret, we'll tell you.

Questioner 3

Does FRMO have any financial ownership in Horizon Kinetics Hard Assets II?

Murray Stahl—Chairman & Chief Executive Officer

Yes, it has a substantial ownership in HK Hard Assets II, because HK Hard Assets II is jointly owned by three entities: Horizon Common (not Horizon Kinetics), FRMO, and yours truly, me. I don't remember what the ratios are, but at the end of the quarter we're going to disclose that. So, next quarter you're going to know what FRMO owns in relation to what I own and Horizon Common owns, and to two decimal places, so it should be adequate for your needs.

Basically, the whole idea was to give life to the Fund. And we gave it life, we thought, on February 28th, so that it could be on the financial statements. The trouble is that the accounting treatment for the assets and monies that we put in on February 28th—at least from our point of view—was legally received on March 1st and, therefore, didn't appear on the this quarter's financial statement. But it will appear on the next quarter-end statement, and you'll have the exact number.

Questioner 4

Do you think Ethereum Classic (ETC) will have increased value when Ethereum (ETH) goes from proof of work to proof of stake?

Murray Stahl—Chairman & Chief Executive Officer

The short answer is yes. Because, what are the Ethereum miners going to do with their mining equipment? Ethereum Classic is not going to stop being mining; it's going to stay as a proof of work model. All those Ethereum miners will have no alternative. In a matter of hours they're going to migrate to Ethereum Classic, and that's why we take the trouble of mining Ethereum Classic. It's a small cryptocurrency, it doesn't have a lot of market value, and not many people are interested. Again, you have to pose the question, if Ethereum were to go to proof of stake, what's going to happen to all the mining equipment?

You could argue that the mining equipment might still have some value in Ethereum, but not very much. What a miner will really need is the stake. A miner will have to put up a lot of Ethereum, and who's going to want to do that? None of the small miners are going to want to do it, and they don't have the capital to do it, anyway. That highlights one of the problems with the proof of stake model—and I don't think they've worked it out—which is that almost of necessity, I'd say, the validation is going to be performed by those parties with the biggest stakes. As I understand it, it's going to be structured like a lottery system, so that a small validator can actually have a chance to validate transactions. But what if a small validator did something wrong? They don't have a big stake, so what are you actually going to seize if they do something wrong,? I don't know how democratic and how decentralized you can really make such a system. I have my doubts about whether you could ever make proof of stake work.

I say this all the time and I'll just repeat it: I have an open mind, and I'm willing to listen if someone tells me that proof of stake is going to work. Nevertheless, the more I think about it, the less enamored I am of it. They've been talking about it for years and it hasn't happened, nor is it happening tomorrow. Ultimately, I don't think it's feasible. See, that's one of the basic misunderstandings about cryptocurrency—the only reason that bitcoin remains the dominant cryptocurrency, is not because it is a better technology. There are plenty of better technologies. It's not because the miners are loyal to bitcoin or that there is a large community of miners, or any of that. It's basically because the bitcoin programmers did one thing that no other cryptocurrency is ever going to replicate, although they could do so, in theory.

When the bitcoin blockchain started in 2009, it was a labor of love. Essentially the entire corpus of what was going to be issued, other than maybe the genesis block, was essentially reserved for the miners. Understand that designing a cryptocurrency takes a lot of work, and many of these cryptocurrencies, in my opinion, are just brilliant. A lot more brilliant than whatever the bitcoin protocol is. The trouble is, are you – as the creator or creators – willing to be generous and say, I'm going to allocate the bulk of the coins to the validators, which is to say the miners – to incentivize them instead of reward myself? Human beings aren't wired that way. They're not wired to make a new cryptocurrency an act of love, or let's say passion, like they aren't wired to do so for any asset. That's what makes bitcoin dominant, that there is a lot more value available for someone, anyone, to get out of it. That's why the miners are there.

A lot of other cryptocurrencies, they don't even have mining. There are all kinds of quasi-incentives to validate transactions and achieve consensus. The only one that I could say is intriguing, although the jury is out on that, is Ripple's XRP. In the XRP model, you're not actually paid a fee to mine. So, you could ask, then, why would anyone mine? Because there is a transaction fee, represented by a coin, and the transaction fee is burned, meaning that the total units outstanding is always shrinking. So, mathematically XRP is a deflationary currency. That makes it extraordinarily interesting. The trouble with it is you don't have to be a validator to get that benefit; you could just be a holder. The challenge for the whole venture is making sure there is sufficient security in the network—they're just going to need a lot more validators and they don't have them right now. And within the context of what's presently being done in XRP, I'm not sure if that degree of system integrity can be achieved.

For a long time, it XRP was a permission network, and that was how they got their security. Only a couple of big banks were allowed to validate—and it's still largely the case. On that front, regarding security, those actors are not likely to pull anything. More recently, they've decentralized a bit and let some other people into it. I don't know if there's a good solution to that in XRP. It may be a viable currency in a permission marketplace, in which case, it's going to have a narrow application. Maybe that's its ultimate fate.

Back to Ethereum Classic, if Ethereum is really serious about proof of stake, then ultimately Ethereum Classic could be the winner among the two. Ethereum faces some other issues aside from the proof of stake challenge. I wrote a paper on this—you might want to get a copy of it. It might be hard to believe, but I assure you this number is accurate, but it uses 100,000 times the power of bitcoin per transaction. So, if Ethereum were ever to try scale up, might really have a power problem.

Another problem with Ethereum is its infinite issuance policy. It is true that the denominator, which is the cumulative number of coins issued, increases at a decreasing rate, because the denominator keeps getting bigger but the issuance per year is constant. Eventually, if you go out enough years, it would approach the issuance rate of bitcoin. Enough years meaning that all of us are going to be long gone by the time that happens. So, that's another problem. Ethereum is, in my opinion, very ambitious with the smart contracts and all the functionality they add. It wants to do a lot of things, but the smart contracts are not really part of the system. They're only as good as the programming written by the people who design it. So, in a smart contract sense, it's hackable. And it has been hacked, and it frequently gets hacked. That's not hacking the currency, mind you, it's just hacking the smart contracts. There are many technical issues that need to be worked out. We're a long way from success mode in that kind of crypto.

Anyway, now you understand why bitcoin remains the dominant cryptocurrency. It's not about the technology. That's a major misconception in crypto generally, because all the code is open source; anybody can copy it, anybody can improve it, or design a similar or almost identical cryptocurrency. If another cryptocurrency has a feature the bitcoin community collectively likes, they can adopt it, if they choose to. It's really about how to give prospective miners an incentive to transact and validate. How do you do that if you're the originator – and yes, you've done a lot of work – and you want to get paid for that, you want the wealth for yourself? Well, you can only have 100% of anything, and that leaves no incentive, or insufficient incentive, to assemble a sufficient and sustainable network of validators. That's a serious problem and so far no one has an answer, at least none that I've ever been able to see.

Questioner 5

Given the developments on Bitcoin's layer 2 protocols, such as Liquid and Lightning protocols for scalable transactions, etc., and further adoption by companies such as Shopify and Block (formerly Square) of these protocols, where does FRMO see future value coming from in other blockchain protocols such as Ethereum and Litecoin in comparison?

Murray Stahl—Chairman & Chief Executive Officer

I wouldn't make too much of Liquid or Lightning, because while you could fork it and change the bitcoin protocol, nobody really is that greatly interested in doing that. So, what some have done, as opposed to forking bitcoin yet again, is create these parallel pathways. This is not a good expression, but I'll use it because I think people understand the imagery—it's like a service road or a service lane by a highway. The whole idea is o get to scale is by creating this parallel roadway for small transactions won't get written to the blockchain immediately, but at a point of opportunity as a consolidated single transaction.

I don't know how scalable bitcoin becomes and, frankly, I'm not in bitcoin because of scalability. The notion that there are going to be billions and billions of bitcoin transactions per day—well, if that's what you're looking for, there are hundreds of cryptocurrencies that can do that. Bitcoin is designed to solve one problem in the world of private money – because that what it is, private money. The idea of private money goes back hundreds of years. There was a limiting factor though, as stated in the book *The Denationalization of Money* by Friedrich Hayek, which is the authentication problem.

What's the authentication problem? Let's say I, personally, created a currency. It doesn't have to be crypto, it can be anything. I created a currency and I told you, like bitcoin, there are 21 million units. The problem: how do you know you can trust me? How do you know that I didn't make 22 million units or 23 million units and kept some for myself or gave some to my friends. Or even if took none it for myself, what if I just honestly went about creating more currency, effectively creating a new central bank. How do you know, I'm not going to do that if I'm in control of it?

There was no answer to that question, until there was a blockchain. With a blockchain, we can now authenticate every transaction. The whole purpose of bitcoin is centered around what happens when you have a fixed issuance currency; it's supposed to function like Gresham's law, which means, bad money drives out good. So, gold is better money than, let's say, the dollar. A lot of people say that and I personally agree. But what happens from time to time is that there develops a huge market for gold, and the volume, the issuance, rises. Still, if you count the number of transactions per day in dollars versus gold, dollars has gold beat hands down. Count the market value of the all the transactions in the dollar versus the market value of all the transactions in gold? Even if you took the euro-based and the yen-based transactions and converted them into dollars and compared it, gold is a tiny fraction of the dollar-based transactions. And the reason gold is it's a store of value.

In accordance with Gresham's law, what people are expected to do – and which they do – is to hang onto their gold, and transact in or let go of their dollars. They're not really supposed to use the gold for transactions, except occasionally. You can see how, with that construct, you don't need to scale the gold transactions up. I don't see a purpose in scaling it up, really. If people want to trade gold, I would advise them to trade a future, which can be transacted in instantaneously. You don't need bitcoin to have that kind of scalability.

That being said, if you go to the blockchain explorer known as bitinfocharts.com, you'll see, somewhere on that website, the Rich List. It's a list of every public key—you can see it—who owns bitcoin, and you can view every transaction. You don't know the names, but you can see every transaction, if you have the patience to look, that was ever done in the world of bitcoin. Based on my calculations—you can try to verify it yourself—87% of all the bitcoin outstanding is probably owned by fewer than 100,000 addresses. Moreover, I think that's not even close to 100,000 people because we, at Horizon, for instance, have multiple addresses. I'd be surprised if it's more than 23,000 to 25,000 people who own 87% of the bitcoin. It's working exactly in accordance with Gresham's law. The big holders rarely trade – that's something you can observe on the website, too – and when they do, they're almost always buying. They're hoarding it because they know it's going to have value in the future.

So, why in the world are they building these scalable networks for bitcoin? I have no idea what they're trying to accomplish. I look at those efforts, because it's intellectually interesting, but I don't think it has a lot of impact on bitcoin. I know hundreds of articles, maybe thousands, have been written on how important it is to bring scalability to bitcoin. It's not going to be MasterCard, it's not going to be Visa. That's not what it was intended to do. I think scaling misses the whole point.

In fact, you'll observe that every one of the various bitcoin forks was an attempt, in one way or another, to scale it. And it did scale it. It makes it a lot faster, and bitcoin is a lot more scalable in the forks. Yet, you see what happened – no one, or at least not very many people, are vitally interested in the forks. Now they think that potential users are not vitally interested in a given fork because they didn't scale it sufficiently; that if they'd only scaled it even more, then people would come to it. I think it's a false assumption, and I wouldn't recommend people waste a lot of time with that. But, you know, that's what makes a free market, I guess.

Questioner 5 (cont.)

Noting the development talent in bitcoin, such as having the attention of Jack Dorsey and his development team at Spiral and other high-caliber open-source developers with proven track records contributing, such as Dr. Adam Back, how does FRMO see these individuals stacking up to Vitalik Buterin and Charlie Lee?

Murray Stahl—Chairman & Chief Executive Officer

The truthful answer is I don't know, because I don't know what day or to what extent anybody's going to get a bright idea. They're all brilliant people, mind you, and they're all capable of doing wonderful things with regard to crypto. But even those people themselves don't know. Tomorrow morning, one of them might wake up with a brilliant idea, or maybe they woke up with a brilliant idea today and are in the process of implementing as we speak. I really don't know.

For me, bitcoin at least is not about technological expertise. One reason, to start, is that we don't need to scale it. All we need, technologically, was to solve the authenticity problem and the authentication problem—we solved it. We don't need scalability, and we don't need fancy technology. There are thousands of cryptos. I wish I had the time to read all of the papers, but the ones I read are absolutely, astonishingly brilliant. And I'm sure the people you mentioned are brilliant, as well. Just recognize that we don't need that kind of brilliance to solve the authentication problem. We need security and we need authentication, and I believe we have it.

I'll say one other thing. In the world of rare assets—let's take something for which there's potentially an infinite number of units, like rare books. There are only so many copies of a first edition Charles Dickens, okay? Charles Dickens lived in the 19th century, and there are first editions of authors who lived in the 20th century. The number of first editions expands by the day. Yet, the mere fact that you have the accretion of supply of every new author—some of them might be better than Charles Dickens—doesn't destroy the value of a Charles Dickens first edition. Likewise, the idea that someone is going to come up with a better technology than bitcoin, that doesn't destroy the value of bitcoin. If bitcoin does what it's supposed to do and it's authenticated, it's a rare asset. So, that's the way people need to look at it.

The problem for new cryptocurrencies is that it's very hard to create a rare asset—the next evolution of cryptocurrency—and reserve enough for the brilliant people who come up with that, and still have enough to sufficiently compensate the validators to properly authenticate the transactions. That's basically the problem. I haven't seen anybody solve it yet, although maybe these people can do it, in which case, I might buy their cryptocurrency and I might sell the bitcoin, and that cryptocurrency success might be bitcoin's failure. We have to keep our eyes open for that, so I look forward to their brilliant future work.

Thérèse Byars—Corporate Secretary

Well, thank you, Murray, and thank you, Steve. That was your last question.

Murray Stahl—Chairman & Chief Executive Officer

Okay, well, thanks, everybody, for listening. I was very impressed with the questions today. People are really doing their homework and that's all to the good. And I look forward to doing this again in about three months. And if there's something we didn't answer or data that you think we should be providing, don't hesitate to contact us and we'll see what we can do in that regard. So, thanks, everybody, and talk to you soon. Thanks for your support. Good afternoon.

Operator

Ladies and gentlemen, this concludes today's conference. We appreciate your participation. You may now disconnect.

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