00:00

When I was a kid, I lived in a pretty analog world. But then, that all started to quickly change. My music, my communications, my social networks -- everything started to become digital. And the force behind it all was this thing that seemed, at least to me at the time, almost magical. This thing called "software." But then, over time, I realized that software isn't magic, it's just logic. It's code that tells the computer what to do and how to do it. And that early realization really still sits at the core of how I view my job as Microsoft's Chief Environmental Officer, where I help the company play its part in developing the code behind one of the most complex programs the world has ever dared to develop: a program that takes, as input, all of the carbon associated with all of the economic activity on the planet, and returns, as output, the value zero. Zero additional carbon accumulating in the atmosphere by the year 2050.

01:05

Now Microsoft's contribution to this is both simple and ambitious. By 2030, we've committed to reduce our emissions by half or more and then physically remove the rest from the atmosphere. And then, from 2030 to 2050, to continue not just zeroing out our annual emissions, but to go back in time and remove all the emissions we're associated with since we were founded in 1975.

01:30

(Applause)

01:31

Thank you.

01:34

And what we've learned as a result of our almost two years working towards this target is that any developer of a net-zero carbon program really faces the same challenges that your typical software engineer might. They must avoid bugs in their code. Bugs are errors that cause a program not to work or to do things that its author didn't intend or doesn't understand. And if you know anything about software, you know that bugs are bad.

02:06

Well, unfortunately, what's become clear is that there are already a few clearly significant bugs in the world's early net-zero program. For instance, we lack a common meaning of the term "net-

zero." We lack a common unit of measurement to assess the climate impact of any net-zero approach. And we're failing to mature the markets the world will need to achieve a net-zero carbon economy by 2050. And so what I want to do is just go into a few details, I guess, on each of these bugs, and then talk really quickly about how I think we might be able to fix them.

02:45

And first up is the meaning of "net-zero." Now, the global definition of net-zero is pretty simple: ll of the carbon that humans put into the atmosphere, humans must take out. That sounds supersimple; as we all know, it's turning out to be extremely difficult to do, but that's especially so if you have not ensured alignment between individual, organizational and global definitions of "net-zero." And I want to talk, just really quickly, about what I mean by that. And, to use an example to do so, let's pretend that you want to go on vacation, a vacation that's going to require transportation, food and lodging, all activities that will emit, let's say, three tonnes of carbon into the atmosphere. But you want your trip to be net-zero. Well, today, you really have three options. You could, of course, simply decide not to go, in which case your trip wouldn't be net-zero, it would be absolute zero. Or you could decide to continue on with your trip, but in this case, pay somebody, on your behalf, to not emit three tonnes of carbon that they otherwise would have. Now, in accounting parlance, this is what's called an avoided emissions offset. But it comes with a catch. Because while you may now be able to claim your emissions to be net-zero, and thus, your trip to be net-zero, as a result of canceling out your emissions with those of someone else, you're relying on an approach that we know simply can't scale to a global net-zero outcome. And the reason that that is true is simply because carbon will still be emitted, although less, but not removed. In the third option -- it's similar to the second -- you're going to continue to go on your trip, but in this case, you're going to pay somebody to physically remove three tonnes of carbon from the atmosphere on your behalf. And this type of payment, called a carbon-removal offset, could theoretically scale from individual, to organizational, to global net-zero outcomes. But in order to do so, it's going to have to have significant technological advances and breakthroughs to achieve the scale necessary.

05:02

But the point here is really simple: it's that in today's terminology, zero is not always zero. It depends on your definition. And that is a problem. And it's a problem that brings us to the second bug in our net-zero program: problems with measurement, and specifically, problems with the way that we do or don't measure the climate impacts of different carbon offsets. Because not all offsets are created equal. The additionality of a project, the certainty with which you know that carbon will be avoided or removed, the duration of time over which your investment will remain valid. Those and a whole host of other factors -- they all influence the climate impacts of your investments. But today, we don't do enough to measure those differences. And we have to do better, because if we can't appropriately measure the climate impacts that those differences represent, then we'll never be able to appropriately assign the correct monetary value to any

particular offset. And if we can't get the valuation right, from both a climate and a financial perspective, then we're not going to mature the markets that we need. And the reason for this is actually pretty simple, because it turns out to be relatively cheap to pay somebody to stop doing something. And so avoided emissions offsets can often be purchased for less than 10 dollars per tonne of carbon avoided. Carbon-removal offsets, on the other hand, often span prices from the high tens, to hundreds, to low thousands of dollars per tonne of carbon removed, particularly for advanced technology solutions, like direct air capture, which literally sucks carbon out of the atmosphere and stores it permanently deep under the Earth's surface.

06:54

But if each of these types of offsets counted the same for your carbon accounting, which would you choose? Well, most organizations will choose the cheapest option, and that might make sense for them from a financial perspective, but it causes significant market dysfunction because it starves early, emerging and scalable solutions that we know we will need in the future; it starves them of desperately needed, early capital, and it ultimately slows or stunts their growth. And at Microsoft, we've experienced this, because for nearly a decade, we were a significant purchaser of avoided emissions offsets, before switching our strategy to only purchasing carbon removal. And in fact, just last year, we purchased 1.3 million metric tons of carbon removal. And as a result of that purchase, what we learned is that Microsoft's demand alone represents a significant fraction of all of the carbon removal available on the world's markets today.

08:01

And so when you take this all together, what you quickly realize is that the world's early net-zero program simply won't compute. It's predicated on a poorly defined program structure, where carbon is still emitted, but not removed, and where markets don't mature. Now that all sounds pretty depressing, and I would say I wouldn't be doing my job if I didn't think these problems could be fixed, if I didn't think that these bugs in the software couldn't be bashed. But doing so is going to require all of us to accept an extremely significant amount of urgency, to realize that there is a whole lot of hard work ahead, and the need for a plan. A four-point plan -- at least in my opinion, there needs to be a four-point plan -- a plan that shares a single, common, global definition of net-zero, not an organizational or individual one. A plan that deploys a single common unit of measurement so that we can appropriately compare and contrast the climate and financial impacts of any type of net-zero investment. A plan that records the carbon inputs and outputs of every organization and country on Earth so that we can appropriately map out and assess progress towards a net-zero future. And a plan that uses market maturation at such a scale that develops markets to the scale that the world needs for every individual and organization so that they can rely on these markets, not just a few individuals and a few organizations.

09:44

And so we now find ourselves collectively coding this program update against the clock, and the urgency could not be greater. But what I want to urge everyone is to constantly remind ourselves to always predicate our work on logic. Because if we can do that, then we can be confident in our ability to pull off the most seemingly magical feat of all: a recoding of our current course on climate change and a promise for a more sustainable future to generations to come.

10:21

Thank you.

10:22

(Applause)