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Andy Karsner is a senior strategist and “Space Cowboy” at X, the “moonshot factory” at Alphabet (Google’s parent company). He has spent two decades driving renewable energy innovation and other climate solutions, including serving as the Assistant Secretary for Energy Efficiency and Renewable Energy from 2005 to 2008. In this talk, Emily Ma, Food Systems Lead at X, interviews Karsner about the nation’s preeminent natural security challenges and explores where he finds the greatest hope for designing solutions.



Transcript

- [Narrator] Who you are defines how you build.. (dramatic music) - Hello everyone, my name is Emily Ma, and I'd like to welcome you to the Entrepreneurial Thought Leaders series presented by the Stanford Technology Ventures Program, the entrepreneurship center in the School of Engineering and BASES, the Business Association of Stanford Entrepreneurial students.. I'm super excited to introduce you to Andy Karsner today.. Andy is a Senior Strategist & Space Cowboy at X, the Moonshot Factory Alphabet.. Andy has spent the last two decades driving renewable energy innovation and other climate solutions.. In addition to his role at X, Karsner is the Founder and Executive Chairman of Elemental Labs an organization that pursues systems based solutions to promote a sustainable future and equitably empower communities.. Also from 2005 to 2008, Andy served as the Assistant Secretary for Energy Efficiency & Renewable Energy managing a \$2 billion annual federal portfolio devoted to applied science, research and development.. In this role, he helped to assemble significant bi-partisan coalitions to implement and enact the Energy Policy Act, the Energy Independence and Security Act, and the American COMPETES Act, all of which continues to remain foundational to U.S.. energy policy.. So I'm very excited 'cause Andy is my colleague and I get to work with him, and today I get to ask him all sorts of questions that we don't normally talk about (laughs) at work..

So I'm gonna start with the first one, Andy.. I know your journey through the world and you collected exceptionally rich set of experiences from Houston to Hong Kong.. What would you like as a 20 year old? Most of the folks in this class are in their 20s and curious, I'm curious how you were motivated (mumbles) during that time.. - Oh boy (clears throat) yeah, that's a good question.. First of all, yeah, I have such respect and esteem for you my colleague though I should be interviewing you, but I'm honored to have the tables turned.. At 20 years old, I had as much nervous energy and drive as I do today, I would say.. I was really deeply moved by what was the existential challenge of the day, which was living under the threat of nuclear annihilation.. That was top of mind to me.. It was something that I grown up with as a military kid on BASES.. So much of my experience as a young person was the Vietnam War and I was young, I didn't participate in Vietnam War, but my father was deployed abroad and then other school children's fathers..

And so that sort of constant overhang of a fairly militarized society deeply engaged in foreign places and with a cloud of Cold War and then arms race really consumed much of my mission.. And it drove me to really want to eliminate nuclear weapons.. So at 20, that's what I was engaged in, I'd the other fun things too, going to the pub and having a good time and all the other crazy things but that was an overriding political and social sentiment of the day.. - Amazing, so that means from nuclear weapons you went into energy and then nature.. So I wanna talk about experience I had with you about two years ago now.. And as part of the Andy Course Fun Club, we get to do some really fun things like go and walk through new woods and sit under the redwoods where the UN's came together and sat in 1945 in honor of FTR.. It was a totally visceral experience for me because these trees have been around for hundreds of years and I recognized at that point and many times when we go on walks these days that, it's not humans and nature like separate.. Humans are part of nature and you have over time from nuclear proliferation to nature and you've developed a really deep connection with nature and deep respect and commitment for it.. Tell us more about that.. - Well that's a fun I wanna play with (clears throat)..

I felt like I left my self hanging there was sort of a dark cloud with that last answer.. I should give you the other half of the answer.. You very specifically asked about when I was 20, but when I was 22, you and I had the conversation before that was 24 months later and I couldn't have predicted it, I was at the Berlin Wall chipping it away at the Dawn of a brand new era..

Gorbachev take this Wall down, the strategic arms reduction talks at the end of the Cold War, things that people didn't see coming 90 and 120 days out.. So it wasn't that the darkness and that overhang and the anxiety and hiding under the desk and Dan rather reporting from Saigon, all that stuff influenced the rest of my life.. It was deeply eclipsed by the spirit of hope and optimism that I experienced as a graduating senior when I was 22, which is very different than when I was 20 and taking courses in East German economics and comparative communist systems that have served me nothing in my whole life.. (Emily laughs) So then you'd say, well what do you do when you're 22 and the world has changed different from the courses you were taking your senior fall semester and now there's been such an inflection, such a vertical shock to the world order.. Well, I was challenged by this, Oh, what do they use to say? Let's make a new world order and I wasn't making the world safe for democracy is making new world order.. And so I strapped on a backpack and wanted to go see the earth a little bit and understand about it.. And I found much like when I was a child acting as the navigator on the cross country trips my family would take from the open, fairly deserted hot plains of Texas up through the Arbuckle Mountains and the fault lines in the seismology of Oklahoma and into the wheat fields of Kansas, and across the Ozarks and up through the corn fields, and finally ending up in the land of 10,000 lakes in Minnesota with firs and pine trees and all kinds of natural wonder..

I found myself much more enamored with nature than with man built things on the journey like that.. And I found the same experience while a lot of my classmates peers were going from your rail, train station to train station and logging all the wonderful things that our culture, Western civilization producers in Paris and the Prado in Madrid and so forth.. I found myself camping in pharma fields and just more enamored in the natural open spaces and what I could learn about them.. I don't think that I developed it particularly stronger than anybody else.. It's hard to walk in anybody else's shoes.. I like to think that we all have a sensibility and a relationship with nature and it's really a question of whether we remove the insulation that we've built for ourselves and allow ourselves to encounter it.. Because basically, whether I'm a small boy traveling, navigating in a car with running a young backpacker or whether it's today, going to a major conservation area, in all cases it's just connecting with my own innate sense of wonder and discovery and then letting that fire my serotonin and synaptic impulses.. - [Laughs] You know what? This is the time for force-feeding, I realized how much and how important it is for us to just be outdoors once a day.. As we're sitting together here on a screen, I'm glad I still get to connect with you, but now I go on daily walks.. And it's just a reminder that we operate in a different frequency than the digital world..

But with that, it's interesting for me because I think you talked a lot about, you've had nature as a passion, you've been committed to it, and you spent a lot of time thinking about how we might value nature differently, I value nature, but I can't put a price tag to that tree outside.. How do you think about that now and why should we value nature? What difference would that make if we could measure the treasure as you speak? - Yeah, even when I can't do the daily walk, I got to say that every morning that I go into my backyard and look at the redwoods with the morning light, I think of it as a miracle.. And Einstein used to say, there's only two kinds of people in the world, those that think that nothing is a miracle and those who think that everything is a miracle.. I'm deeply in that latter camp, and I always kind of think that actually everybody is, they just have to allow themselves to not lose their eight year old spirit.. But I don't think it's a choice of whether we're going to ultimately value nature.. I think it is an inevitable, inexorable necessity.. As in if we fail to do it, we will be the first species to have designed our own demise.. That's an incredible thing.. We don't have a big claws and camouflage and Harry pelts and the things that nature provides to so many other a species.. We have our brains, that's what we have..

That is the only evolved piece of our entire being that is of any use in ensuring our longevity and the survival of our species.. And if we neglect to use it and manage in a sustainable way, those things that give us security to eat and drink and breathe and thrive, then we have our own will be the only species known to have designed our own demise.. And so since we have designed systems which do put a value on nature, it puts a value on exploiting nature, on extracting nature, on destroying nature, we can also design to conserve nature.. To use nature as an ally in enhancing our quality of living, to use nature as an ally in mitigating the problems that have been self-imposed.. So it's not like some people look at and go, "Well, what a radical theory to create valuation" "and market pricing for natural capital." And I would say having grown up in Texas and being part of the energy industry my whole life, we actually do this all the time.. We value a tree, we value it as lumber.. And if we don't value it as lumber, we value it as worthless or potential lumber.. The only question is whether we're actually going to value it for what we scientifically know it can provide to us, a source of respiration and transpiration, a source of oxygen production.. Unlike any machinery we could possibly devise, a source of sequestration.. Unlike anything, we have yet to biomimic..

And so it's a foolhardy mission to say, let's take away those miraculous beings that coexist with us in symbiosis, let's remove symbiosis to make it harder for our species to thrive.. So since we've imposed this design and designed the market system, designed a tragedy of the commons, of course we can design a remedy of the commons.. But that's why I go back to this Berlin Wall thing.. I'm of the belief that we can, we can solve big intractable problems.. We can preempt our own worst tendencies to destroy ourselves or erode our capacity or live with hostility.. And in this case, we actually don't have a choice.. We just have to execute and fast.. - So why is it that we haven't accelerated towards this and what is holding us back? Are we the frog in the boiling water? I think most of us really do appreciate nature, but what are the obstacles in a way for you seeing our ability to remedy the commons and what are the obstacles that prevent corporations and nonprofits and governments from treasuring the wonders? - No, it's a great question and it's a question bigger than me.. in the sense that all I can do is speculate on it.. I feel like there's a sociological underpinning to it in truth..

I felt so gratified to grow up in a country where you were empowered to do anything, if you worked hard enough and tried

to pursue it and you had a good idea, this time is coming, that's really the student constituency we're talking to, they're entrepreneurs, they're innovators, they're capitalists.. And I think that used to come with a sense of boundless optimism.. And my sense is that optimism has eroded.. It's either become somewhat complacent.. or it's become self doubt and there's insufficient, there's not a similar of gravity or leadership even from our highest offices that would inspire a sensibility that we should be confident that we can devise solutions, particularly for those problems that we have self-imposed.. The motto I've always lived by is, if you can see and you believe it, you're gonna achieve it.. And so the first thing is, there's no lack of concept.. I think there's a lack of belief but I'm not even remotely deterred.. And you know this from where we work that we have the technological means and the capacity to innovate solutions at scale and speed commensurate with the problems we face.. The question is, us as a bottleneck in our optimism, our decision-making, our collaboration and our execution..

- That's great.. I agree with you wholeheartedly, it's an interesting time.. You mentioned earlier, the world changed for you when you were 22 year old within nearly 120 days.. So kind of (mumbles) state? There're seniors sitting in the audience right now who just saw their entire role change, all the students (mumbles).. The same thing, you've probably seen some interesting parallels and yet as you choose to believe decades ago, rather than it being a dark time, you choose to see the hope in that situation.. What would you say to the seniors today who are graduating into this extraordinary time? - It's hard, my daughter's graduating from high school in this virtual thing where we should be hugging each other and holding each other and hi fiving each other, and everybody worked so hard and my heart hurts for this idea that the very thing we need most is something that could harm us.. It is a perverse irony and you can say all the hominems you want about adversity breeds strength and so forth.. We're certainly testing that, but you're right in the analogy, I feel very strongly about that.. And the last time I felt this way of course was 9/11.. By the time the Great Recession came about, people were, "Oh my God, the Great Recession." But if you'd gone through sort of 9/11 or the 1987 pullback, the Great Recession felt like an economic adjustment..

It's the same here a little bit.. We've got a corollary that is an extraordinary economic adjustment.. It's a jolt, it exceeds the Great Recession, and yet it is bifurcated unusually unlike anything we have ever seen in the history of mankind that we have accelerating market performance with record unemployment.. We have a complete cognitive dissonance of separation because all the policy was directed towards mitigating a financial crisis.. In fact, it was the only learning curve or tools the federal government had.. So basically in the entire existence of the Republic, we've accumulated a trillion dollars of debt until this stimulus in which we now gone to about three and a half trillion in a matter of weeks.. So a three and a half trillion and where does that liquidity go at a time that we're completely closed? Well, it all goes to Wall Street.. And so everybody's recovering everything on their equities and they're raising to see where the top is.. and it's completely irrationally bifurcated financial crisis from economic crisis.. And of course, all these graduating seniors are moving into economic crisis world..

Not financial crisis that didn't happen.. (mumbles) what happened with that and the summer's gonna be tough.. But when they go out into this economic recession world, the first thought is, "Oh my God, with all the jobs going" "what am I gonna do and so forth." The next thought ought to be, "I'm a Stanford student" "I'm an empowered, educated, a valuable individual" "I'm an entrepreneur, I'm an innovator" "the world needs my wits, my guts," "my capacity to sleep on a couch, my capacity to use it," "affirming and call my network, my capacity to come up" "with a better idea." Because as hard as these times are the greatest opportunities, the greatest opportunities for reflection are veiled in misfortune.. And we have never seen this level of misfortune.. And so, most of these students won't have kids yet.. They don't have family obligations, they got debt probably going into it, but when they get out there, full of ideas in energy and action.. and then Stanford right here at the epicenter of global innovation, a true sort of Florence kind of place, the opportunities are going to be immense but they're going to be self-made.. This is not through the career placement office, this is not somebody who's going to train me and apprentice me, this is going to be, I'm applying my energy, my ideas and my sense of mission, and then I will follow.. the stream to the river and end up with a torrent.. And I guaranteed the people who are in this podcast are all gonna be fine..

And then so the first thing they've got to say to their self is, "I'm fine and I'm in America and I'm safe, "and I have a Stanford degree, and I'm an entrepreneur, "and I'm here in Silicon Valley, and thank God.. "because I've got it as good as anybody "possibly could right now." - For sure, for sure, you know what? We are safe, we have food to eat for the most part.. Might be limited in choices.. Our environment is actually quickly healing right now with fewer cars on the road, and we're seeing some patterns.. This is the great experiment right now with shelter at home in Santa Clara County and the Bay Area.. There's lots of great things to look forward to (mumbles) Sorry, Emily I didn't mean to cut you off, but the entrepreneur in my portfolio one of the greats, he was entrepreneur the year last year Joseph DeSimone from Carbon3D who you might remember (mumbles).. Carbon3D had a big \$800 million contract with Adidas and they've got Ellen Kullman from Dallas, the CEO, Joe's very self-actualized, put her in place and Mulally on the board.. And they were right on their way to unicorn status.. And the minute this hit, instead of saying, "Oh my God, people aren't gonna buy tennis shoes." Joe said, "Oh my God, I can produce more swabs "than any swab factory in ways nobody remotely anticipated.. "So I'm gonna go to Stanford Hospital, "I'm gonna get the spec, I'm gonna understand it to a T." Ellen called me, we hooked up with the governor's task force and now that entire company is a leader in swabs..

That's not a high margin, high frame business, but nobody will ever forget the decisive leadership action, risk-taking, intelligent, finding the stream to the river that Joe has done here.. And I guarantee that when he goes out for his next round, people are gonna go, "That company can do anything." So I just bring that up because I'm not just (mumbles) the sky, there are manifestations of this entrepreneurship, and that's why California in my view is not getting hit as hard as what is

happening on the East coast.. - I really appreciate that example because I've been noticing with my own team, with our partners on the ground that people have been willing to step outside of their normal day-to-day in ways that I've never seen before.. So a good example of this is, in healthcare, we would have never imagined even six months ago that one could get reimbursed for a video call, and yet this is the normal, this is the new normal.. We have to do (mumbles) because you can't go to a hospital just to check in with your doctor anymore.. What other things have you seen? I feel like this is a great time of unlocking where people are no longer holding themselves to timelines that they thought that they needed to be beholden to or particular domains of expertise.. People are just going and solving, what else have you seen? - Can I embarrass you? You're one of these great leaders.. You've pivoted from distribution, from how do we optimize tracing and distribution with precision so that we can understand with great efficiency and not let a single mango go to waste anywhere in the supply chain and we can track the fish and make an intelligent help species.. You had a whole scheme, you've been developing a technology in a world class team and then you pivoted if you will to redistribution, or maybe it's the other way around, from redistribution to distribution, elimination of waste in a supply chain.. And now how can you help the most people in the most intelligent way with the greatest good? So functionally what that points to is the highest value society will award is to problem solvers..

It's not just to the product of their labor or a service you put out, product and service is just a medium of exchange.. It is the idea, the solution, the efficacy and the relentless, passionate pursuit of the outcome.. So you're that, I call those people doers.. And Joe's a doer, you're a doer.. And probably most dedicated people on this call are doers.. But that's what we've gotta do, is we've gotta go out there and do.. I think the examples are countless.. Bob Kolker who is leading the government's task force on testing, he's a partner at Venrock.. That's on his day job.. He's managing a portfolio of great biomedical companies, but he's spending five days a week in Sacramento and trying to ramp certain metrics and everything you're testing 'cause there's no Calvary coming from the federal government..

This is each state for themselves, each community with themselves.. I wish it wasn't so it is, but it's good to see that we were in the community, in a state where everybody acts with minute men like precision and goes to the front and says, "How can I be helpful?" - Well since you turned the tables on me for a second, let's talk about Natural Security and food security.. So everything we're doing right now at X and food has been about not just food security as a reaction and part of the recovery, the hope is that we will have food security in the long-term during a period or (mumbles).. You and I chatted about that.. What does this mean for Natural Security? We talked about this, you did your testimony to Congress some time ago.. You've been encouraging people to think about Natural Security being as important, if not more important than National Security alongside it.. What do you think the future looks like now with Natural Security? - Yeah, well, you can have Natural Security without National Security, but you can't have National Security without Natural Security.. And we're just trying to help people think through things.. I'm an old cold warrior, like I said, I got to take down the Berlin Wall.. The truth is most of the foreign policy complex never took off their cold warrior jackets..

The world changed, then we became a globalized planet.. Truthfully the world changed 50 years ago when for the first time in my lifetime we saw images of a blue marble from another celestial body.. For the first time ever, we understood we were interconnected.. That was the aha moment but we were still in cold war, we were still very factionalized.. We had the UN aspiration and all the beauty that was launched there and were woods.. But the truth is we weren't living up to it, to a degree, the end of the Cold War meant a recognition of interdependence on an unprecedented level.. And if you were a trader or a developer or an investor or a financier, you just called it globalization, or Tom would call it, the world is flat.. And I'm part of all these organizations, Trilateral Commission Council on Foreign Relations, et cetera and everybody still has a bit of that Cold War patina.. They're still wearing the jacket.. They haven't really left the Letterman's jacket behind and said, "What is the new thing" And it's the same right now with globalization, that interdependence was far more than free trade flows and 20 foot containers from China, and how many toys could we get, how cheap at Walmart, that globalization was how do we treat the global comments that are unaccounted for, but that ultimately are the safety and the security and the quality of our species existence..

Things that we have taken for granted because we thought they were inexhaustible or without impact, we now know that it's beyond a shadow of a doubt that when you can hit 70 degrees in the Antarctic peninsular that was once completely frozen and lose the last an ice shelf when you are losing permanently the ice cap in the North and all the reflectivity that goes with it.. And because we can't rephrase Greenland, we know we have permanently messed with things.. So we can't necessarily undo the damage, but we can adapt and protect ourselves intelligently by designing systems that commensurate global scale of interdependence.. So when we talk about Natural Security, we're basically saying, "Look, I'm not worried anymore" about those big goosestepping Chinese and Russian parades of the communist past and we're viewing stand and the missiles they're going to launch in Kim Jong-un and that whole drama, it's a pain, you gotta manage it.. There's a human diplomatic area, but it's not nearly as consequential as the frequency and severity of natural changes that are occurring that are going to affect our food supply, our water supply, our capacity to insure ourselves from damages and flooding in the streets in Miami and elsewhere.. - One final question for you before we open it up to the students and everything they wanna quote your brain about.. So these students who have come together today are here because they're interested in being an entrepreneur.. How do you define entrepreneurship for yourself and how are you an entrepreneur? - What a great question.. Well, I think of it as a privilege.. I wouldn't have described myself as entrepreneurial till somebody else did..

Years later, actually, I don't think anybody described me as an entrepreneur until I sold my first company.. But before that, they just said, "Yeah, there's that kid with a shoe box again." That kind of thing.. But an idea of course was removed from the

entrepreneurial ecosystem that exists out here, it's so extraordinary.. If it were in the rest of the nation, anything like it, our productivity would be just multiplicative, but this is that argument of nature versus nurture.. Are you born an entrepreneur, can you learn entrepreneurship? I'm not sure, it's like so many other things are journalism, public speaking, et cetera what do you have a predisposition to? But I do believe that the common denominator no matter how well you do and that's whether you're running a local floral office that supports the baseball team, or whether you've got some limited partnership for a wind project or whether you're Elon Musk or Jonas at the moment.. In all cases, the person has got to be driven by what we used to call fire in the belly in Texas, I think you call it inner fire here, but you've gotta have something burning inside you that creates a relentless passion for risk-taking and achievement beyond resource, with the idea that you are going to create and add value.. And usually that latter thing, creating an add value is linked to the fire.. 'Cause if it's not, I never have known an entrepreneur that succeeded by exclusively focusing on money.. That's where certain things go wrong, in fact, sometimes they go off the rails completely and fail to self actualize.. But if you can be guided by something bigger and higher, something meaningful, it doesn't matter what it is..

It could be your family's name and legacy.. It could be your involvement in the Church or community.. It could be your love of the Redwood trees.. It could be wanting to solve COVID-19 with a vaccine or with swaps, whatever it is that you tether, your sense of value added mission that will ignite your fire, if you are the type of person who is an entrepreneur, you become a catalyst.. You look around the world and you don't see any obstacles of beaver dams, you see fresh tinder and you're gonna be the catalyst, and you're gonna create a bonfire of opportunity.. And so I think the relentless passion to me is the main thing.. Everything else is acquirable.. People say, "Well man, you either been lucky or (mumbles) "or something along the way." I always tell people, I don't didn't get MBA, so I only to have one real talent and I don't practice it all the time, and that is self-actualization.. And it's just knowing the limits and boundaries.. of your capability and inviting other people to share your fire and have a growth mentality to engage with them, accompany them on journey and pursue a common objective in a common way..

I think that formula is so beautiful in America and we've been proselytizers around the world of it.. I've seen Europe become more entrepreneurial.. Having gone to Sweden for 30 years that didn't exist 30 years ago.. And now you have Daniel Ek in Spotify, and just incredible entrepreneur epicenters.. all around the world.. And so I think it's proliferating in a beautiful and positive way.. - Love it, well we have five questions queued up already and more coming.. So without further ado, let's go through them.. Shall we? - (mumbles).. Okay..

Eleven Velts, it says, what are the most important technological developments that you would like to see in the energy sector and what can we do to accelerate progress towards them? - Great question.. In the energy sector, I don't know if that refers to the conventional energy sector, I never really think of it that way.. I actually think of it as, what technology are we applying to the physics of energy that creates a healthy, balanced output for nature and humanity's productivity? So to me it's not like, "Oh my God, here's a windmill "and that's better than the coal thing," that's a rudimentary mechanical substitution and it's important.. I don't wanna discount it.. I used to be a wind developer so of course I love that.. But I think that to me the most important thing right now, is again (blows air), to shift our thinking and to say, we are in a new era.. The stone age didn't end for lack of stones, the oil age will not end for lack of oil.. What we just had for the first time in the history of oil, negative pricing, meaning a producer had to pay a receiver to take the product.. He had no place to put it, we are putting out more than we are taking.. So we just had a first ever negative inversion now, because well, that's a quirky thing but oil has been in the doldrums for years and years and years..

Thank God, that's why we created that whole movement and addicted to oil and addiction is something that will kill you.. I think we have with the lines crossed, while I was Assistant Secretary, where all these things became commercial.. and clean tech was born, where billions of dollars of capital formation happening created whole new sectors that are now thriving.. And I think that it's not that we're at the end of that, we have to keep those accelerations going but they will.. Once they become market driven solutions and aren't dependent exclusively on policy, they will self propagate.. The bigger challenge now is to understand the strategy for how are we applying ourself, which is the answers to the question.. And I think instead of applying ourselves to rudimentary systems that will fall of their own weight from substitution, I think we have to say, look, oil is not the thing anymore.. Data is the thing, data is the new oil, data is the drive of all value and growth in the 21st century.. So what is the energy consumption profile of data since it is exponentially increasing? And so would you ask me what's most important to me? It is getting on top of the unchecked growth rate of data, which is fine to stay on check because it is helping humanity compute ironically it is what is the toolkit we will need to solve the greatest problems we have.. But to do that, we are suctioning uncounted for energy and not accounting for how that energy's footprint looks..

And so the thermal efficiency of a semiconductor chip, believe it or not, at the smallest level, what is happening in thermal efficiency that is driving the consumption of data centers is an all consuming thing to me.. How do you get the thermal efficiency of the knowledge tool at the atomic level that is driving all change of value and growth in the world and be as vigilant about that as we are to drive train for a vehicle.. How do we think about data centers and the building envelope and how the racks are stacked and the design architecture as vigilantly as we have building codes and high efficiency LEDs for our buildings, that is where I'm turning my biggest challenges I think existed energy right now.. - Incredible, incredible.. I heard once that we will run out of electricity in the UK if we continue to increase the data consumption rates in the UK in the next five years.. And that's how much we're doubling and tripling our data usage.. So time, energy and data is a bridge that I have not thought about so thank you for that.. All right, next question, we'll do maybe two or three more.. Jane says, how did

you keep that energy you had in your 20s until today? - Oh, that's so funny.. Gosh, that is a great question..

I do not know, I've been accused to being ever ready.. as an energizer bunny for most of my life so I don't know.. It's certainly not the best healthy diet or something.. So I think in my own case, I guess so you don't walk anybody's shoes.. I'm not a Tony Robbins type guru or anything, but I believe you have to have a sense of mission.. I believe you have to have a sense of purpose beyond yourself.. I think Emily, you asked this question earlier, which is linked to this about nature and my affinity for it.. The only place where I can truly be still where I can truly be calm and at peace and serene and deeply introspective is in nature.. And so for me it is like a bomb the pharmaceutical industry could not possibly device.. And so there's something magic about contemplating the aerodynamics of a dragon fly's wing or the miracle of a chrysalis or the dance of a bee..

And so stirring myself in that way and fortifying my imagination brings me back to the same imagination I was blessed with a long time ago.. I never want to lose imagination or growth mindset.. My father used to say, "The day you stop growing" "is the day you start dying." And I can see from, my father is 90 years old that he's still working on growing.. Either he intends to live every breath until he dies, and that's the journey I wanna be on.. And so I think as long as you maintain a growth mindset and an openness to not calcifying yourself and declaring you're done at any moment and continually inviting new ideas and people and energy and positivity for its purpose that you'll stay very young.. - So good, so good.. All right, next one, Jenny asks, what is the most effective way to shift the public attitude regarding the urgency of addressing these permanent environmental changes? - Such a great question.. The most important thing for me when you desire a shift in attitude is not to presume that you are the subject of the action and the other party is the object of the action.. I have a solution and if only everybody else was privileged to me with access to resources who had my education and were up the curve high enough, if they were simply as smart where I could be on par, then the world would be better off.. And unfortunately, regrettably, many of the people I admire for the content of their message have a failure in the tactical delivery on that, righteousness sometimes to be perceived as self righteousness and and then rather than a helpful hand of generous outreach to bring people along and invite them into coalition in the mutual best interest of the common denominator verse humanity, we end up in a condescension of separation quite often generated by some of the smartest minds simply saying, you are the other, and if the other was more like me, we'd be better..

And I don't believe in that approach.. I'm from a different place and I believe in meeting people where they are and understanding the circumstance and the consequence of what is happening in the middle of our country.. And part of which is that they have nothing like the resources on the Northeast corridor or in our cities on the West coast.. And so to me, the next time there is a proactive design in policy and some form of exercised leadership in our country, it ought to be aimed at unifying us and not unifying us around, this is how smart I'm, and when you catch up with me, we'll all be okay.. If you're only as liberal as I'm, you'll be acceptable.. That is the wrong thinking.. For me, I don't think you'll ever, ever, ever win with that.. I think instead you have to say, we are going to create a new era of prosperity on a bag of old tricks called the American free enterprise system and the boundless innovation of mother necessity of being powerful for an idea whose time has come.. We're gonna go back to that and everybody's all in.. And instead of concentrating the money exclusively on the epicenter incur on the cost, we're going to make sure that that is shared collectively across communities, and we're gonna bind up those communities with broadband so that everybody has equitable access to speed and everybody has equitable access to technologies that will liberate you and remove all big clunky 19th century layers that separate you from the sunshine..

And we can do this because we're Americans and we always have, but when we've done it before we did it by design, we transitioned ourself with thoughtful, equitable, designed and made us freer and thrive at a greater level.. If you don't have a design, then you're drifting by default and when you're drifting by default, you end up with this polarity and this very unfortunate animus.. And then people are asking the question, "Well, how do I get over the animus?" Well, the first thing is, don't create it, don't create it.. Designed for unity, and that may not be the answer you were looking for but it's the one I genuinely believe in.. - One of my favorite Andy Karsner's comments was, I think it was you who said, there's red states, there's blue states.. We're actually just all purple, we're just one especially when it comes to questions of Natural Security.. So time for the purple, time for the purple.. - Yeah.. All right.. This is an easy one maybe not, it depends..

It's a interesting one.. Alex asks, what's up with the shirt from Scott Base Antarctica.. (laughing) - Yeah, what's up with it today is, it's got this really cool high dry thing so I really like the way it wicks.. (Emily laughs).. I was a little nervous down here, but Scott Base has the best pub down in Antarctica, that's important to know.. I don't know if I've got time for the story but one of the greatest honors I had as an accidental tourist in Public Service was when they said, "Someone's gotta go and inaugurate "the new South Pole Station, it's been built over 10 years "and it just got completed and we need somebody from the science complex who will do it." And I was like, "Oh pick me, pick me, pick me." And everybody else took a step backwards so they're like, "Okay, guys whose going," "he's on his way to the South pole, "they're there two weeks down.. "So you go to Christ Church where we have the USNRT program, "you go to McMurdo Station." Unfortunately for me, we had an unbelievable three to four days of blizzards.. So I got to hang out at McMurdo Station.. It was like delay of game and I'm hanging out at McMurdo, and I'm learning everything about it.. And of course McMurdo shares its grid powered by diesel engines with Scott Base with the Kiwis..

And every day, if you've not known me about this, this to me is one of the greatest achievements of our country and its history, conserving an entire continent of this earth for nothing other than the betterment of science and humanity, we did

that.. We went down there, was the only country standing after World War II with 17 countries exercising colonial claims and we denied them all.. And we built a science station in South Pole.. We built the biggest one at McMurdo where the historic Explorers Huts were.. And we said, "This continent remains open.. "It will not be exploited, it will not be extracted.. "There will be no mining, we'll as a species come together.. And that's why we have the best air quality measurement.. That's where we have the ice core samplings that give us millennia of data.. And any way in that place, we opened up this thing from 10 years earlier..

I gotta to go with one of my heroes Dr.. Neal Lane, who was at Rice University with me, was the Science Advisor to Bill Clinton and we're writing down our C-130, we opened up the South Pole Station inevitably, but at Scott Base, because I'm an energy guy, went around, I checked out all of these engines and I'm like, "What with the diesel engines?" With jet fuel that we bring in for the highest dollar in the world other than what we delivered on the Afghan front, the highest dollar of delivered fuel, not even regular fuel but jet fuel to power diesel engines, to power incandescent light bulbs for linking drafting cabins for our scientists.. And I'm going, "Whoa, I'm the Assistant Secretary of Energy "Are you kidding me? "I've got this science mission and we are just wasting "money on all this logistics and overhead "while I'm doing, I will be lighting everything else." So in the last month of the Bush administration, I called up the National Science Foundation who run the base, and I said, "If I get a deal for you, "I wanna give you, I'm gonna go to National Renewable Lab "and I'm gonna give you some wind turbines "when we get rid of those diesel engines "and this is a great thing." But those guys in Washington, they were like, "Whoa, this is the asset in Bush administration "I'm not touching this, I got new bosses coming, man." So they start slow rolling me.. But the way I called back up, I just said, "I met with Helen Clark, the Prime Minister "of New Zealand on the way home.. And I called back up and I said, "Look, if I got a deal for you, I can't get rid of these "wind turbines with the guys across the street "who're my colleagues, the National Science Foundation, "how about if we work with you guys to put up wind turbines "on the condition that you share them with McMurdo." So in that way, I made a lot of Kiwi friends and to this day, I spend a lot of time with the New Zealand science complex because they're just so good, they're so active and I'm just so blessed to have taken part in their great efforts.. (dramatic music)..