

SUSTAINABLE HEROES

Green Leaders
in Focus



Trade not Aid

Ana Haurie, CEO, Respira International

Ana Haurie, CEO of carbon finance company Respira International, is using the principal of 'trade not aid' via the voluntary carbon markets to empower communities and get us to net zero.

Purpose over Profit

Vineet Mittal, Chairman, Avaada

Scaling Solar

Alexander Arcache, Managing Director & Founder, Kronos Solar

Magic Meat

Josh Tetrick, CEO, Eat Just

Battery Reincarnation

Lina Lee, Executive Director & Co-Founder, Durapower

HEROES Green Leaders in Focus

Scaling Solar
Alexander Arcache, Managing Director & Founder, Kronos Solar
Alexander Arcache, Managing Director and Founder of Kronos Solar, believes agricultural will be a key driver of solar deployment.

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Vineet Mittal, CEO of renewable company Avaada, is expanding clean energy across India to help lift people out of poverty.

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Ana Haurie, CEO of carbon finance company Respira International, is using the leverage of finance to help all the countries carbon markets to prosper, contribute and get us to net zero carbon.

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Battery Reincarnation
Lina Lee, Executive Director & Co-Founder, Durapower
Lina Lee, co-founder and executive director of Singapore-based energy storage provider Durapower, is pioneering a circular economy in electric vehicle batteries by giving them a second life as energy storage for renewables.

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Resilience

Dear Reader,

“We are in the fight of our lives and we are losing. We are on a highway to climate hell with our foot on the accelerator. Our planet is fast approaching tipping points that will make climate chaos irreversible”

That was UN Secretary-General Antonio Guterres speaking in November at the UN’s COP27 climate change summit in Sharm El-Sheikh, Egypt exhorting world leaders to prioritise reducing carbon emissions.

And climate chaos was on full display in Pakistan recently when catastrophic flooding displaced more than 30 million people while leaving a third of the country underwater. Coastal areas in warm climates are fast becoming uninhabitable danger zones yet we continue to burn more fossil fuels.

An analysis by the Global Carbon Project using multiple streams of data to estimate emissions for 2022 found that fossil fuel related CO2 is on course to rise by 1% to 36.6bn tons, the highest on record.

Meanwhile, the global population hit 8 billion in November intensifying pressure on our food, energy, water and waste systems.

Taken together, these factors mean we need faster action and greater investment in renewables to avert more severe climate damage.

But it takes courage to get there and political will to make changes. Christina Figueres, former executive secretary of the United Nations Framework Convention on Climate Change characterised it best when she said it takes ‘stubborn optimism.’

And there are many reasons to be positive. The US promised the biggest climate investment in history when it passed the Inflation Reduction Act and Brazil’s new president ‘Lula’ has pledged to end deforestation in the Amazon.

As humans, we have the capacity and ingenuity to defeat climate change provided that we have the resilience to see it through.

All of this edition’s heroes have a single-minded focus on transforming our systems, using the power of nature and technology to restore the planet’s balance.

Ana Haurie is CEO of Respira International, a carbon finance company. Ana advocates the principal of ‘trade not aid’ via the voluntary carbon markets to empower communities and get us to net zero. Ana is inspired by the ‘Ecopreneurs’ or project developers whose passion drives the protection and restoration of communities.

Vineet Mittal is Chairman of Avaada, an Indian renewables company. Vineet is expanding clean energy through solar and hydrogen across India to help lift people out of poverty.

Alexander Arcache is Managing Director and founder of Kronos Solar, a German renewables company. Alexander believes agrivoltaics – the shared use of land for both solar power generation and agriculture – will be a key driver of future solar deployment.

Josh Tetrick is CEO of Eat Just, a US food startup. Josh is on a bold mission to scale cultivated or lab-grown meat and alter consumer habits to drastically cut emissions from animal protein, one of the biggest drivers of climate change.

Lina Lee is co-founder and Executive Director of Durapower, a Singapore-based energy storage provider. Lina is pioneering a circular economy in electric vehicle batteries by giving them a second life as energy storage for renewables.

At Nomura Greentech, we are enabling technology and driving change for a better world.

We hope that these Sustainable Heroes can inspire the next generation of entrepreneurs and industrialists to help us reach net zero by 2050.

Together, it can be done!

Jeff McDermott








Jeff McDermott

Global Co-Head
Investment Banking
Founder Nomura
Greentech

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“We provide a conduit for private capital to invest in nature based projects.”

Trade not Aid

Ana Haurie is CEO of Respira International, an impact-driven carbon finance company. Ana tells Nomura Greentech that she is using the principal of ‘trade not aid’ via the voluntary carbon market to empower communities and get us to net zero.



Q | Why did you create Respira International and what first sparked your interest in sustainability?

Back in 2018, I had been working on a sustainable timber business operating in Peru and the Amazon, and we were struggling to raise institutional capital.

At around this time following the Paris agreement in 2015, climate consciousness had started to gain momentum, fuelled by movements like Extinction Rebellion and personalities like Greta Thunberg. The feeling in civil society and among millennials was that we had to start taking action on climate change.

That also started to feed through into the corporate world. Initially, it was more as a social license to operate but that started to really change.

So this top down shift and bottom up groundswell triggered an ‘aha’ moment as I thought, why are we trying to raise money to essentially cut down trees albeit in a sustainable way. The Amazon rainforest is the lungs of the world so it makes more sense to pay nature for the services that it provides by turning CO2 equivalents into an asset class.

And that was really the beginning. We wanted to contribute to slowing down climate change and we foresaw a significant role for the voluntary carbon market.

On a personal level, I started to take an interest in regenerative agriculture several years ago. That’s probably where the seeds were planted. I wasn’t thinking about sustainability but I loved agriculture and real assets because they were so tangible. I had also co-invested in two farms in Africa - in Mozambique and Zambia.

Q | What role does Respira play in the voluntary carbon market?


We provide a conduit for private capital to invest in nature-based climate mitigation projects.

Our skillset combines an understanding of carbon markets, financial markets and financial institutions to bridge that gap between passionate and earnest developers and private markets.

We raise institutional capital through fund structures. We differ from competitors as we use our own balance sheet to underwrite the projects as opposed to broking or matching a buyer with a seller.

We generate returns by creating a margin from the onward sale of those credits to corporate buyers who use them to progress their own decarbonization pathways.

We provide project developers with the equivalent of the power purchase agreement in the renewables world, which we constructed in the form of an off-take agreement. We offer them a guaranteed floor price for current and forward issuance of carbon credits. But we also offer a profit-sharing agreement by rebating a proportion of the gross margin back to those project developers so that they can participate in the price appreciation taking place in the voluntary carbon market.



“An important part of nature based projects is to give back to communities.”

That was a core part of our thesis. An important part of nature-based projects is to give back to communities. If you are enabling nature to be a revenue provider through the systems, water and people that depend on it, then you need to create those economic incentives to preserve it.

This is also about generating returns for our investors so it's a win-win-win. We really need to focus a lot more on this kind of 'trade not aid' in terms of generating revenue for those taking genuine climate action.

Q | How important is the voluntary carbon market in reaching net zero emissions?

It's only voluntary because it doesn't fall within a compliance market. I think it's becoming less voluntary and should instead be renamed the verified carbon market, reflecting the carbon credits sold within them.

It's really important to note that this is private sector led. That's where you're really starting to get traction now. As a company, net zero means you have got to a point where you can no longer reduce your emissions any further and you need carbon credits to compensate for those residual emissions. If you haven't counterbalanced the unavoidable emissions that still remain as part of your operations you absolutely need the voluntary carbon market, and for corporates that may change over time as technology enables us to decarbonise completely.

Along the decarbonisation pathway to net zero, companies can use carbon credits to mitigate emissions within their core operations.

And I think that they also serve another really important function. Nature is the only tool available at scale right now to remove carbon from the atmosphere. Nature-based solutions can account for one third of the mitigation that we need between now and 2030 in order to even be on a global net zero track.

Certainly, more corporates are talking about net zero pathways and an increasing number of companies are using carbon credits. The market has grown from about \$240 million a few years ago to \$2 billion this year but it needs to be in the trillions of dollars so we see the potential to grow 50-fold.

That's why we need to also deal with the perceptions and lack of trust in this market. Corporates may be deterred because of the greenwashing risk and in some instances they choose to do nothing. Other companies are taking the right actions but don't want to publicize it for the same reasons. That's led to a phenomenon known as 'Green Hushing' where you keep the good work quiet.

Q | Some carbon credits relate more to avoidance projects like building a solar plant rather than sequestration that removes carbon. Should more be done to ensure high standards?

We've always worked on projects with carbon credits that are issued by reputable registries like Verra and Gold Standard, and those standards evolve over time to ensure best practice.

The issue around financial additionality (whether the project would have gone ahead without the carbon credit funding) for renewable energy projects is absolutely valid and that's why projects in developed countries and even in many developing countries no longer qualify to generate carbon credits.

But there are still emerging countries and island states that do require the funding to put in place renewable energy projects. In rural areas that aren't connected to the grid, that additional revenue from an alternative source can make the difference between a project proceeding or not. Arguably even more important than renewable energy carbon credits, high-quality forest-protection credits, or REDD+, are critical if we are to stop deforestation this decade.

Q | What's the best way to scale the voluntary carbon market and channel more private money into nature-based solutions?

It comes down to embedding integrity and transparency into the system. Groups like the Voluntary Carbon Market Integrity initiative for the demand side, and the Integrity Council for the Voluntary Carbon Market on the supply side are doing a good job in establishing the baselines we need for that trust to develop.

The establishment of exchange futures markets like Climate Impact X in Singapore is another tailwind. Developing that capital market infrastructure will really facilitate scale while channelling capital flows to the right places.

Q | What potential do you see in the blue carbon credit market, for example using mangroves and seagrass?

We are one of four buyers of the Delta Blue project in Pakistan's Indus Delta, the largest mangrove carbon offset in the world. The project has taken several years to get off the ground as it involved extensive growing and planting. It highlights why private capital is critical to decarbonization. Channelling private capital to the global south – that's bearing the brunt of the effects of climate change - is essentially what the VCM for nature is doing.

The Indus Blue project manager said to us 'I want trade not aid' as it's much more useful and sustainable.

We auctioned the Delta Blue carbon credits on Singapore's Climate Impact X. A total of 250,000 tons of credits were available and it was oversubscribed with bids for over 300,000 tons at a price, \$27.50, above market expectations, underscoring the demand for high quality credits.

That supply crunch is also starting to be felt from the verifiers. The backlog with registries like Verra and Gold Standard is now holding up issuance of credits that could be coming to market. So you have a dual effect going on.

Q | Will we ever get a global carbon price?

If we actually priced in the cost of carbon for all the fossil fuels we've used, they certainly wouldn't be as cheap as the current price.

The compliance markets and EU emissions trading scheme in particular is the highest available carbon price.

In the voluntary carbon market, I don't think we will ever get a unified carbon price. A lot depends on the source or the technology that underlies the carbon credit.

Direct air capture is about \$2000 per ton as it's so expensive to produce while avoided deforestation projects are going at \$16 per ton. That's a huge price discrepancy. And even within nature-based projects they're trading at different prices. In theory you should have a unified price because a ton of CO2 is a ton of CO2 equivalent but other components go into it. For example, nature-based carbon credits come with

excellent co-benefits to people and biodiversity that it's worth paying extra for, especially if you are a corporate with nature and sustainability goals too.

Q | Several companies are looking at carbon capture and storage programs with scope to sell these credits. Is this the future of the carbon credit market?

Carbon capture and storage is going to be a really important part of the voluntary carbon markets.

We need them because they are permanent removals, particularly those which involve mineralization or permanent storage under the seabed.

We have signed a memorandum of understanding with Drax which is building plants in the US and creating bioenergy with carbon capture and storage credits. We are starting to see the potential for real scale in the storage of bioenergy emissions generated from burning waste wood.

Q | Do you think COP27 delivered on its goals?

While there were some wins, for example on the loss and damage fund, my impression is that in general COP27 has been a disappointment for global climate action. One area of concern for the voluntary carbon market is around Article 6 letters of authorization, with some countries stating that they can be revoked. That creates too much uncertainty. Markets only operate when you have certainty and we need a smooth, confident system.

Q | Who is your sustainable hero and why?

I am going to give you three. My first is Mark Carney for his ability to mobilize private sector capital, and the best way to do that is through capital markets. We can't rely on governments, aid and charitable money alone. All too often, it takes too long to deploy and becomes a hostage to politics.

The private sector gets on with it and Mark has opened up the dialogue and raised awareness in the financial community.

The second one is Salesforce for walking the walk on sustainability. It's a complex task for companies to navigate net zero and Salesforce is making the process easier and less daunting.

It has created the Net Zero Cloud and Net Zero Marketplace platforms. The former enables Salesforce subscribers to do their own carbon measurement and accounting by simplifying the process to track, manage and monitor value chain emissions.

Once corporates have accounted for their emissions, they can source high quality carbon credits to complement their own decarbonization pathways through the Net Zero Marketplace. It's universally available and third-party agencies provide ratings for different projects.

My third category broadly classifies the 'Ecopreneurs' - the project developers that believe passionately about nature. Without their vision and absolute commitment to the protection and restoration of communities, we wouldn't be able to defeat climate change.

“‘वसुधैव कुटुम्बकम्’ This is the true embodiment of our Indian culture. The whole adage strongly reflects the belief that the entire world, with all its life forms, is truly ‘just’ a tightly knit interconnected family, transcending multiplicities. The whole world is a single family.”



Purpose over Profit

Vineet Mittal is Chairman of Avaada Group, a leading Indian renewables company. Vineet explains to Nomura Greentech how his clean energy plans can help lift people out of poverty.



Q | Avaada means the promise of a sustainable future. What first sparked your passion for sustainability, and how has your career evolved so far?

I've been a serial entrepreneur. I come from a Marwari community known for its enterprising and 'never say die' attitude.

After studying electronics and communications engineering, I joined the Government of India and was fortunate to be part of the team which brought the internet to the country. Realizing the huge potential, I left my government job and floated a dot-com company, followed by a foray into IT services, which I sold in 2008.

However, I was missing a purpose. It dawned on me that one of the fundamental growth drivers for a nation was electricity access and in 2009, 350 million people in India had no electricity. I wanted to solve this problem. Thus, I decided to get into the sector, help India grow, and help lift the masses from poverty.

I co-founded a renewable energy platform in 2009, which became India's largest renewables firm by 2016. We monetized the operating assets by selling them to Tata Power while retaining the core team. The demerged entity was rechristened as Avaada Energy in 2017. Within five years of inception, we have grown rapidly, and with an installed base of 5 gigawatts (GW), we are now among the top renewable energy generators in the country.

By the grace of god, the journey till now has been rewarding, and with the global energy transition in focus, we are well-positioned to move to the next orbit of our growth.

Q | Do you view the clean energy transition in India as an opportunity or a challenge considering the number of people who need to be brought out of poverty?

A fundamental reason for the limited access to energy is higher prices. Solar is presently the cheapest form of electricity. It presents a massive opportunity to increase energy access, especially in rural areas, which were previously deprived of electricity.

I have first-hand experience witnessing the transformational change that renewable energy plants bring to communities. Jobs are created, power supply access improves, and it has a massive impact on the local economy.

We have 700+ districts abundantly endowed with solar radiation. If we can generate 100-150 megawatts (MW) in each district, it implies uniform development across the country and enhances energy access, which can have a multiplier impact on the economy and poverty levels.

Q | How many people have grid access in India today?

Courtesy of the Saubhagya scheme, launched by the present government, 97% of Indian households are connected to the grid. Some of those that remain unconnected are in the remotest parts of the country. These areas are also being served through microgrids.

“We already have a 5% market share for green energy in India.”

The only challenges I foresee are hours of supply. Electricity distribution companies are in financial distress, and it's less profitable to supply consumers in remote areas. They are typically underserved.

However, things have improved considerably in the last few years, and I am sure energy access won't be a major issue in times to come.

Q | Is India's 2070 net zero goal ambitious enough considering what's at stake with climate disasters intensifying?

After the US and China, India is the third largest emitter of greenhouse gases, and we are also home to 5 of the most polluted cities in the world. We can't allow the next generation to be born in places where children would suffer in the most severe cases.

I see that the 2070 target may not look ambitious, but we are putting enormous efforts into adopting renewable energy across the spectrum, including for farmers, industry and households. We should have given the external world a net zero target of 2050, but policymakers probably want to under promise and over deliver.

What our Prime Minister is trying to do through his five nectar elements (Panchamrit) of India's climate action or five commitments (including 50% renewable energy by 2030) to decarbonize India, is very encouraging.

I tell my team that it is just the beginning, and the real action will start from 2023 onwards with a huge expansion in the manufacturing of solar panels, batteries, wind turbines and electrolyzers.

India takes off from 2025, after which there's no looking back. India has a target of adding 40 GW in renewables. I sense that we will add more than 50 GW for decades to come after 2025.

Q | Isn't decarbonization even more important for India as it bears the brunt of severe heat waves and flooding?

Right, so what the world sees in video, we experience. Even if a single life is lost due to a flood or natural disaster, it's not acceptable to any country's leadership, let alone India.

India is becoming more conscious of its role in stabilizing global carbon emissions. We are still one of the lowest emitters of greenhouse gases per capita but our large population increases our overall emissions. We will continue the good work, but we must also engage and negotiate harder with world leaders, especially developed countries, to do more.

Q | Which areas of green energy is Avaada focused on, and what are your targets for the coming decade?

If I have to describe to you in a single sentence, we will be a sand-to-molecule company. We will convert sand into silica, silica into wafer, wafer into cell, cell into module, module into electricity, and electricity into green ammonia, green methanol and sustainable aviation fuel (SAF). What does that mean?

Currently, we have almost 4 GW of operating assets. We are looking to add around 3 GW + every year for the next decade to become a 30 GW company by 2030. So our end goal is to sell green molecules, not green energy.

For our renewable energy portfolio, we are targeting 1 GW of electrolyzer manufacturing and almost 10 GW of silica to module manufacturing. We see tremendous opportunity in this area. Even if we only capture a 3-4% market share, that would be large enough to make it a success.

We already have a 5% market share for green energy in India. We have built expertise around energy performance contracts, execution, and community relationships, which are central to resolving the allocation of transmission lines for large land acquisitions.

Labour is critical for construction work. We focussed our energies on the problem and I have a database of 3000 labourers with skills in welding, bar bending, piling and module installation. We also have strong relationships with equipment suppliers and vendors for fabrication and material supplies.

Regarding the economic opportunity, we can deploy billions of dollars yearly in our business if we have access to more capital because the cake is big enough for 10 or 20 players like us to coexist and keep growing.

Q | Is India too dependent on imports for components like solar panels to meet its sustainability targets?

Yes, you are right and that will all change soon.

The Indian Government has come out with a very ambitious plan called 'Self-Reliant India' or AatmaNirbhar Bharat, in which it allocated \$26 billion under the production linked incentive (PLI) scheme. The goal is to encourage domestic manufacturing and make India self-sufficient for supplies of major inputs across industries.

Under the PLI scheme, Solar PV manufacturing has been allocated almost \$3 billion. The first tranche of bidding has already been concluded, and the second round is expected soon.

This will help bolster energy security. India also has the chance to build a very strong supply chain in semiconductors and renewable energy components.

Q | You recently signed an agreement to set up a green ammonia facility in Rajasthan. Is there more to come in this space?

We are heavily focused on green hydrogen and its derivatives like green ammonia, green methanol and SAF. India is already blessed with an abundance of sun and wind, the key inputs for the production of green ammonia which positions it perfectly to become a global manufacturing hub for green hydrogen. We plan to sign agreements with more Indian States for grid and land access.

There is significant demand in geographies like the EU, Japan and Korea, and India has a tremendous opportunity to capture the value. The Government of India is also working on imposing green hydrogen / ammonia purchase obligations on certain sectors, and once that kicks in, it will also create massive domestic demand.

Q | The Russia-Ukraine war has accelerated the need for alternative energies, especially green hydrogen. Does that create an opportunity in the Indian market?

The Russia-Ukraine war has brought a sense of urgency to energy transition and independence.

It has opened up the global market. Europe is talking to Indian and Middle East players to guarantee their supply from multiple countries rather than depending on a single source for their energy needs.

Europe has a 20 million ton hydrogen requirement by 2030, which means a 100 million ton equivalent of ammonia and methanol that can be produced locally in the form of hydrogen. That leaves 50 million tons for import.

India has the chance to be among the top 5 players in the world alongside Europe, the US, the Middle East and Australia. So even if Europe imports 10 million tons from 5 countries, India can play a role as a supplier, which could lead to a green corridor. And that will change industrial behaviour and technology adoption.

Prime Minister Modi recently announced a significant hydrogen policy that involves the state government allocating land to renewables producers and the national grid operators setting up the power grid. Polluting industries like oil, gas and fertilizer companies agree to buy green hydrogen and green ammonia from electricity distribution companies who feed their surplus power into the grid. This surplus power, known as banked energy, is then supplied back to energy producers during periods of low renewables generation to help them scale up green hydrogen, ammonia and methanol for hard-to-abate sectors.

Q | Are the prospects good for independent power producers in India like yourself?

It's a huge opportunity. The renewable installed capacity targets are 500 GW by 2030, and we are still at around 120 GW. It implies annual capacity addition of ~40 GW. This will include a huge public procurement marketplace and open access segment for commercial & Industrial consumers.

Currently, the biggest challenge in India is grid connectivity and land access, and players who successfully navigate these twin challenges will be the winners.

Q | Who's Your Sustainable Hero and Why?

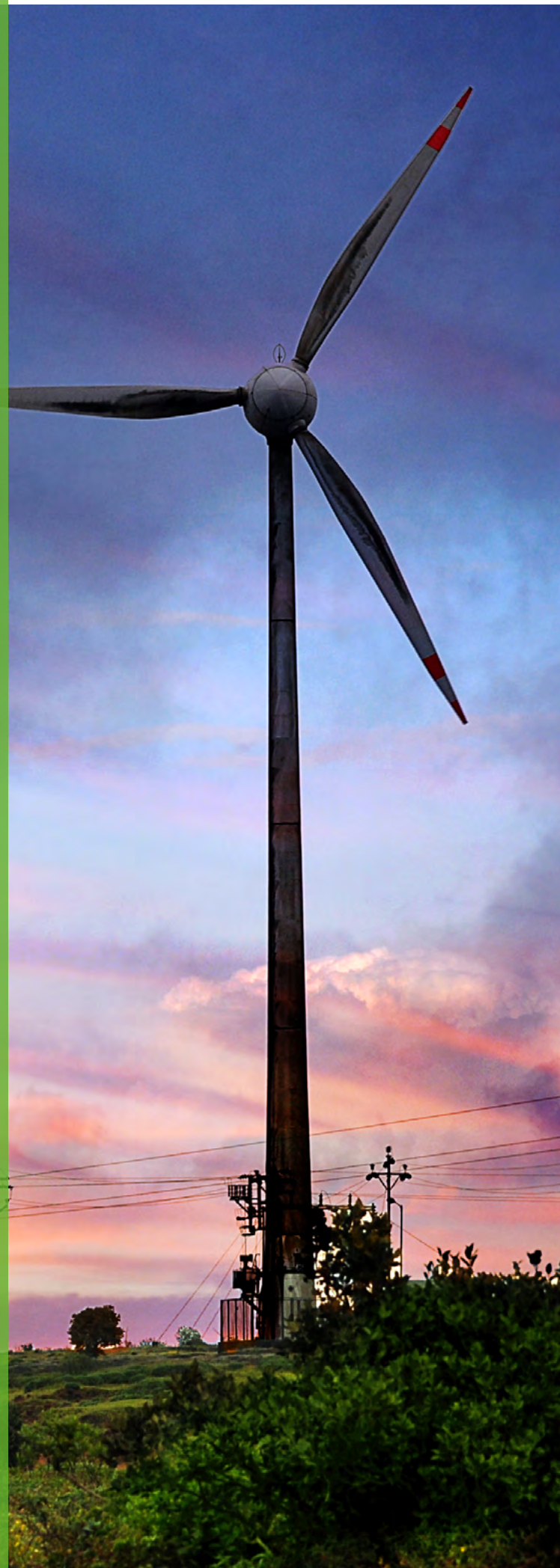
My hero is my Indian culture for the inspiration it has given me. It teaches us that the whole universe is one, and you have no right to abuse something given by Mother Earth.

We have to live responsibly. We were probably the first country to say that plants have lives and emotions, which science has now proven after thousands of years.

And we were taught to coexist with nature, but our material needs and western culture's influence have confused us. We are returning to basics by rewarding our doctors if patients don't get sick.

India realizes that many pieces of evidence exist regarding how we used to live, whether it was the concept of fasting or minimalism, taking care of others in society and living responsibly with nature.

“वसुधैव कुटुम्बकम्” This is the true embodiment of our Indian culture. The whole adage strongly reflects the belief that the entire world, with all its life forms, is truly 'just' a tightly knit interconnected family, transcending multiplicities. The whole world is a single family.





“Entrepreneurs have a tool box that includes the ability to structure and prioritize problems.”

Scaling Solar

Alexander Arcache is Managing Director and founder of Kronos Solar, a German renewables company. Alexander believes agrivoltaics – the shared use of land for both solar power generation and agriculture – will be a key driver of future solar deployment.



Q | What made you establish Kronos Solar? Tell us about your career journey?

I was a consultant at McKinsey for nearly a decade but I was looking for an exit because for as long as I can remember, I wanted to be an entrepreneur.

I studied business and during my last few years at McKinsey I was advising utility clients. I had a personal network in renewable energies and sensed the potential because at the time it was a very young and dynamic industry. It seemed like a great area for entrepreneurship while offering meaningful work due to the urgency of climate change.

Back in 2008 the solar industry value chain was changing rapidly. It was a time of great turmoil because the upstream component manufacturers had most of the bargaining power due to insufficient inventory to fulfil market demand. But then capacities were building up in China creating greater supply.

I saw an opportunity to develop solar projects because on the development side it was driven by very localized, unprofessional structures that lacked nationwide operations let alone international capabilities.

So Kronos was founded in 2009. One of my co-founders was the former chief technology officer of Q Cells and we had a small amount of seed money. As we were cash constrained, we would fly with EasyJet in the UK alongside the British heading for vacation with their straw hats while my partners and I were in suits planning our drive to Cornwall.

Entrepreneurs have a tool box that includes the ability to structure and prioritize problems. You learn that at McKinsey but the other part is believing in your gut feeling, judgment and ruthless operational will.

Q | Did you encounter any significant challenges along the way?


In the early days, photovoltaics - producing electricity from sunlight via semiconductors - was mostly driven by subsidies and feed-in tariffs. In 2011 we had a near death experience when tariffs in the UK, our core country of activity, were slashed by 70%. When the market changes in such a brutal way, it tests your survival.

There was a deadline for commissioning projects to the grid in order to capture and secure the tariff. We were building a large solar park of 30 to 40 acres - which is small in comparative terms today - so we had millions of dollars at stake on a construction project where we had to make the deadline, which is a very dangerous situation.

We survived by commissioning a few sites early enough but others weren't so lucky. Entrepreneurialism often means no sleep for long periods but eventually after 2011 the upward trajectory has been pretty positive.

Q | Why did you choose the UK as your first market?

The UK market in 2011 was opening up. It hadn't previously seen renewables at large scale so we wanted to get that first mover advantage. Believe it or not, of the first five solar parks that were granted planning permission in the UK in 2011, three went to the German Kronos solar. So that was really our big success story.



Q | How worried are you about the speed of global warming?

The honest answer is I'm very worried for three main reasons. Firstly, there's a lack of global prioritization. Second, is a lack of operational control and thirdly, a lack of alignment and leadership.

On the first point, I think global warming remains pretty high on the agenda in most OECD countries and there's determination via global meetings like COP27, yet when other matters become more pressing, we lose traction and support.

The second problem is that we are capable of defining targets as a global society to map the journey yet even in our most developed democratic systems there's a lack of power to translate targets into action. Global warming doesn't ask for best efforts. It asks for results.

Take Germany as an example, this spring the new government communicated a so-called Easter package setting an enormous ambition where renewables are supposed to quadruple in deployment over the coming years. But the underlying system that allows the operational transmission into action has not changed.

And then the third one is a lack of continuous political leadership by the most important parties, which immediately leads to finger pointing, tricks and escapes.

It allows people to stray from the path that we have seemingly chosen together as a global society. And as a result, based on where we are today, I don't believe the 1.5C limitation on global warming is within reach.

Q | You recently sold a stake to EDP Renewables. What was the rationale? Is scale the most important factor in getting to net zero carbon emissions?

Scale matters greatly because it brings economies of scale and it isn't realistic to be competitive with small structures.

At the end of the day, power generation through renewables needs to meet market demand and needs to be produced at a competitive market rate. We need to be cheaper than power generation from nuclear and fossil fuels in heavy industries.

It's not the only lever but it's a material one. And as Kronos and I want to achieve much more, it was a very logical combination to team up with one of the best players globally to become a leader in our core markets in the UK, Germany, France and The Netherlands.

Q | What does being part of EDPR mean in practice for your goals?

It means that we can grow faster. We will have the ability to operate alongside the comprehensive downstream solar value chain – installation and financing - to hedge our risks.

This means that we can be more resilient and given the scale that comes with EDPR, we can invest more and therefore deploy more renewables and larger solar parks across the group.

Q | Renewables are hampered by intermittency. Does that mean we will always have to complement solar with energies like nuclear?

Renewable energies are not the only solution or a standalone solution but at the same time, if I look at the average cost of storing one kilowatt hour of renewables, it is decreasing significantly. And if we can take a similar cost curve development in battery storage that we have seen in solar - where today we can build a solar plant for 10% of the cost 15 years ago - then there's a great journey ahead for renewables even without complimentary sources of energy from nuclear or gas fired power plants. Green energy combined with storage is very exciting.

And on top of this comes the question around green hydrogen. I'm very positive on that development. Together with EDPR we are looking at the entire solutions space; so energy storage, battery driven systems and green hydrogen may be part of the equation for us going forward.

Q | What are the challenges of installing solar in the UK compared to Mediterranean countries?

It is a common misconception that the intense Mediterranean sun is required to get solar going but that's not the case. Solar radiation is one element that makes a solar system work. Other factors include local market pricing, demand for renewables, and consumers that want green power. There are also questions about the structure for offtakers (the parties who buy the electricity produced by solar developers). So it's a



“At Kronos Solar we are trying to be one of the leaders in agrivoltaics.”

fairly complex ecosystem where many elements play a significant role.

To take an example, in Germany the grid connection, operations and maintenance costs of running a solar system are very competitive whereas the sun is maybe 50% less powerful than in some parts of Italy and Spain. But the overall question is whether it works in the local context when you put everything together. And that's a case-by-case analysis. In Germany, photovoltaic solar is extremely competitive and could even become the most competitive source of power generation going forward.

But solar radiation is important and we all wish for more sun to increase the power generation from a single panel.

Q | With the Russia-Ukraine war, have you seen an uptick in business arising from energy dependence concerns?

I think there's a greater public awareness that we need to be more independent from Russian gas and oil. Whether that translates into greater support for individual projects is a different story. It has not led to a change in the underlying system yet and brings us back to the operational transmission. In an ideal world there's a delay. In the worst case there's just political gridlock.

Q | Do you see Agrivoltaics as the future of solar?

There has been considerable talk about agriculture and solar production sharing space and in an ideal world they are not enemies but friends.

I think the idea behind agrivoltaics can be very impactful but it needs to reflect

the land value of the underlying soil. For example, where we have existing grazing by sheep, it's mostly grass production so combining solar and sheep makes perfect sense. Where growing certain crops is required and that's the most compelling factor we need to question whether adding solar is really worthwhile.

At Kronos Solar we are trying to be one of the leaders in agrivoltaics. We are developing projects in France and Germany and believe this is a fantastic opportunity which needs to be dealt with in the localized context. It will be a key driver but not the leading element of solar deployment over the coming years.

Q | The fall in 'learning rates' over recent years means that energies like solar have become cheaper. Will that trend continue or do you foresee bumps in the road ahead?

For the time being I see a higher cost per kilowatt hour for solar energy amid a dramatic increase in component prices over the past 12 months.

Raw material prices have spiked and a solar power block consists of steel, glass and cable - all precious raw materials. So we are currently going through a bump but I expect that we will go back to more reasonable levels over the next 24 months and I hope that it doesn't become a long bumpy ride.

Q | Does that mean we've already extracted all the price efficiency over the past decade or so?

Efficiency in renewables needs to be distinguished into two different drivers or buckets. One is cost efficiency so that we

can produce more power from a single cell and the other is technologically driven efficiency to improve the cells themselves.

I expect cell efficiency to continue but at a slower pace than in the past. We are not expecting significant jumps in contrast to the efficiency that comes from economies of scale by building these solar modules cheaper via better raw material prices and a more productive setup of components.

This has been the core driver of the shift in total system efficiency over the last decade to a greater extent than efficiency from technological advancements.

So technology improvements are being offset by the current cost increase. These technological advancements are now more gradual and smaller in scale and therefore they cannot compensate for the cost increase.

Q | Who's your sustainable hero and why?

My sustainable hero is Luisa Neubauer. First of all, she's German and we are headquartered in Germany.

She is one of the voices behind Fridays for Future (the movement started by Greta Thunberg to protest against inaction on climate change). She's a young advocate fighting global warming. She has a strong following and we need voices like hers to spread the word that things need to change.

She's an inspiration to me. And if she has the ability to inspire me I'm sure she's able to inspire the decision-makers of my generation.



“The meat that we consume is responsible for more emissions than all our transportation sources combined.”

Magic Meat

Josh Tetrick is CEO of Eat Just, a US food startup. Josh tells Nomura Greentech how he is pioneering cultivated or lab-grown meat to drastically cut emissions from animal protein.



Q | What first sparked your interest in sustainable food and why did you start Eat Just?

The trigger for me was when a good friend, Josh Balk, got me thinking about the pain, emissions and damage inherent in our food system, where our meat comes from and the processes involved before it lands on our plate.

And then about 10 years ago I decided to take all those questions and form a company to create meat and eggs without the issues that exist today.

We shouldn't have to eat lunch in a way that's causing harm to another living being or to a rainforest that we can't see. When we sit down to dinner, we shouldn't have to think about how we are contributing to biodiversity loss.

I came to the conclusion that we could do things differently.

Q | How concerned are you about climate change and its impacts on food security?

I'm concerned about climate change for several reasons. The meat production system of today means that about a third of our planet is dedicated to sowing corn just to feed the animals we eat.

As a consequence, we take bulldozers to large areas of rainforest just to have enough room to plant soy and corn fields. Instead of taking in carbon emissions those trees are chopped down with the loss of many extraordinary animals.

The meat that we consume is responsible for more emissions than all our transportation sources combined.

By building a food system that's centered on animal protein, we leave ourselves vulnerable to drought, feed fluctuations and volatile weather events.

Q | You've pioneered plant-based eggs. Can you take us through the process?

About 2 trillion eggs were laid last year in a market worth \$238 billion. An egg has 22 different functionalities - it gels, binds, browns and aerates.

Our goal was to find a plant that could do many of the same things. We developed a process for screening these functionalities and discovered that mung beans had the right storage protein. We mill the mung bean into flour and spin it at high speed through a process called centrifugation.

Gravity separates the fat, protein and starch. We take that liquid protein and dry it. That's the key ingredient to make Just Egg.

Q | Did you have seed money or were you bootstrapped to begin with?

I had about \$3000 in my bank account. My friend gave me a couch to sleep on for about six months. That was our first headquarters to figure it all out. We then raised seed money

from a VC firm named Khosla Ventures, which allowed us to move to a garage which became our second headquarters. It was our first place in San Francisco and was about 3500 square feet.

That allowed us to really start building the company and hire a team across 14 different scientific disciplines including molecular biologists, engineers, analytical chemists and chefs. We all work from a larger facility in East Bay now.

Q | Why are you backing cultivated meat as a solution to reduce livestock emissions instead of plant-based meat?

We strongly considered plant-based meat given our expertise in protein functionality. The reason we didn't comes down to what underlies people's protein choices. Taste, texture and price are motivators but there's another factor that's harder to pinpoint. It's cultural identity - how do I feel when I eat this food? One of the biggest barriers for many people is that it's not real meat.

The problem is that more people are eating conventional meat than this time last year, which doesn't bode well for the planet. So we are making a big bet on creating real meat in a way that's much less harmful to the environment.

There are over 50 billion chickens on the planet today yet they don't resemble their ancestors from 200 years ago. They're genetically bred to optimize the production of breast meat, they're not a vehicle for nesting in a tree. We have hijacked the evolution of the chicken to feed ourselves in a way that looks pretty unnatural.

Before the advent of industrial animal agriculture it made sense to slaughter an animal for food. But the same argument is hard to justify on a large scale that requires tens of billions of animals to feed a population that's set to reach 10 billion in 2050.

Q | Lab-grown meat used to be in the realms of science fiction just a few years ago. How do you produce it and where are you taking it?

Cultivating meat is an intersection of three different industries. The first is biopharmaceutical manufacturing. For decades big pharma companies have been using bioreactors like ours, to grow cells to produce antibodies for vaccines.

The second industrial process is health fermentation that instigates a microbiological reaction similar to beer-making. And the third industry is food production. We take principles from all three to grow our meat.

The Intergovernmental Panel on Climate Change has described it as a 'transformative mitigation technology'.

We're still the only company in the world to have sold cultivated meat. Our first sale was in December 2020 at a restaurant called 1880 and then we hosted pop-ups at famous hawker stalls like Mr. Lu's, a street vendor who has been making chicken curry and rice for about 60 years. We are on the foodpanda home delivery app and we've been on the menu at high end restaurants selling very small volumes.

We are focusing on eggs and the major types of animal protein: chicken, pork, beef, lamb and eventually fish. Before the end of 2023 we hope to launch beef.

We're investing tens of millions of dollars on infrastructure and working with regulators in the US to get approval here.

The US Food and Drug Administration has asked about how we ensure sterility through the process including microbiological content of the end product. It has little to no traces of e coli, salmonella and faecal contamination in contrast to conventional animal protein.

Q | How did Singapore get approval first? Is it because they import most of their food?

Singapore is ahead of other countries when it comes to food sustainability and food security. The government has an initiative called '30 by 30' which aims to produce 30% of food domestically by 2030.

State-fund Temasek is one of our early investors. As we were thinking about where to launch, it became obvious that more animal protein is consumed in Asia than anywhere else in the world.

Singapore consumes roughly 300 million pounds of chicken annually and well over 90% is imported, much of it from Malaysia. Malaysia recently instituted a ban on the export of certain types of chicken (it's since been lifted). Those kinds of food shocks, and protectionism make it more imperative to build a resilient food system that's not reliant on the whims of weather events or other countries.

Q | Has the Russia-Ukraine war accelerated concerns around food security given the issues around trapped grain?

The war in Ukraine added another layer of destabilization, creating price shocks from rising grain prices.

From a country level perspective, whether it's Singapore or the US, food security is the single biggest driver of food system change. It trumps climate, disease, consumer preference and animal welfare.

It's that basic desire not to depend on someone else to feed ourselves especially when it concerns the core ingredients on our plate.

That's now being reflected in China's five year agricultural plan, which incorporated

cultivated meat. The Biden administration also announced the inclusion of cultivated meat as part of a new initiative that includes a range of new investments and resources intended for the U.S. to tap the full potential of biotechnology and biomanufacturing innovation.

Q | Did Covid accelerate food security concerns?

It caused supply chain disruptions, the closing of borders and general concern. It destabilized the system and impacted the flow and price of food.

For many countries around the world it helped to reveal what was lingering beneath the surface and triggered what is now being discussed with the highest level of urgency.

When you combine a world with more droughts, supply chain disruptions from war and pandemic, it concentrates the minds of policymakers to think more seriously about building a resilient food system.

Q | What are the limitations of cultivated meat because it sounds like a real panacea?

The first limitation is demand. Young people tend to embrace the idea and not mind if meat is coming out of a stainless steel vessel while older folks are generally more hesitant.

Another limitation arises from the capital intensive nature of the processes. There are some similarities to the cost of decarbonizing the planet and shifting to renewables.

That's a massive societal project and this is no different. We've already invested tens of millions of dollars. The industry will need to invest tens of billions of dollars to design, build and install bioreactor vessels across the world.

The third barrier is regulation, especially in countries that are influenced more by politics than science. If regulators focus too much on what farmers think, they are not concentrating on whether cultivated meat is safe for human consumption.

Q | Will costs come down as you scale up?

Our goal by 2030 is to make tens of millions of pounds of meat at a cost below slaughtered chicken, beef and pork and in a way that's acceptable to regulators.

To reach that target we need to invest in giant vessels. We signed an exclusive partnership agreement with a bioprocess equipment company called ABEC and we're in the process of ordering materials for 250,000 liter vessels. Our plan is to build a 200,000 square foot facility to house 10 x 250,000 liter vessels.

The feed cost also needs to come down. The cells, just like animals, need to consume nutrients including amino

acids, fats, sugars and salts. We need to move from dollars per liter to cents per liter. We can get there by purchasing more and developing a more efficient feed formula.

Q | What kinds of emissions savings are available for cultivated meat?

Our emissions estimates are based on extrapolating our processes at a much larger scale. We have calculated 70% + savings relative to conventional methods of producing animal protein.

The primary savings come from freeing up many hectares of land required to feed animals. It cuts out significant inputs, energy and carbon.

Q | Gazing into your crystal ball, how do you see the food system in 2050 when the world's population will be around 10 billion?

In 30 years' time I believe we'll be approaching a world where the vast majority of meat is from cultivated sources. We'll look back on the era when 99.99% of meat came from slaughtering animals as old technology in the same way as we look back now at how people used to listen to music on tapes.

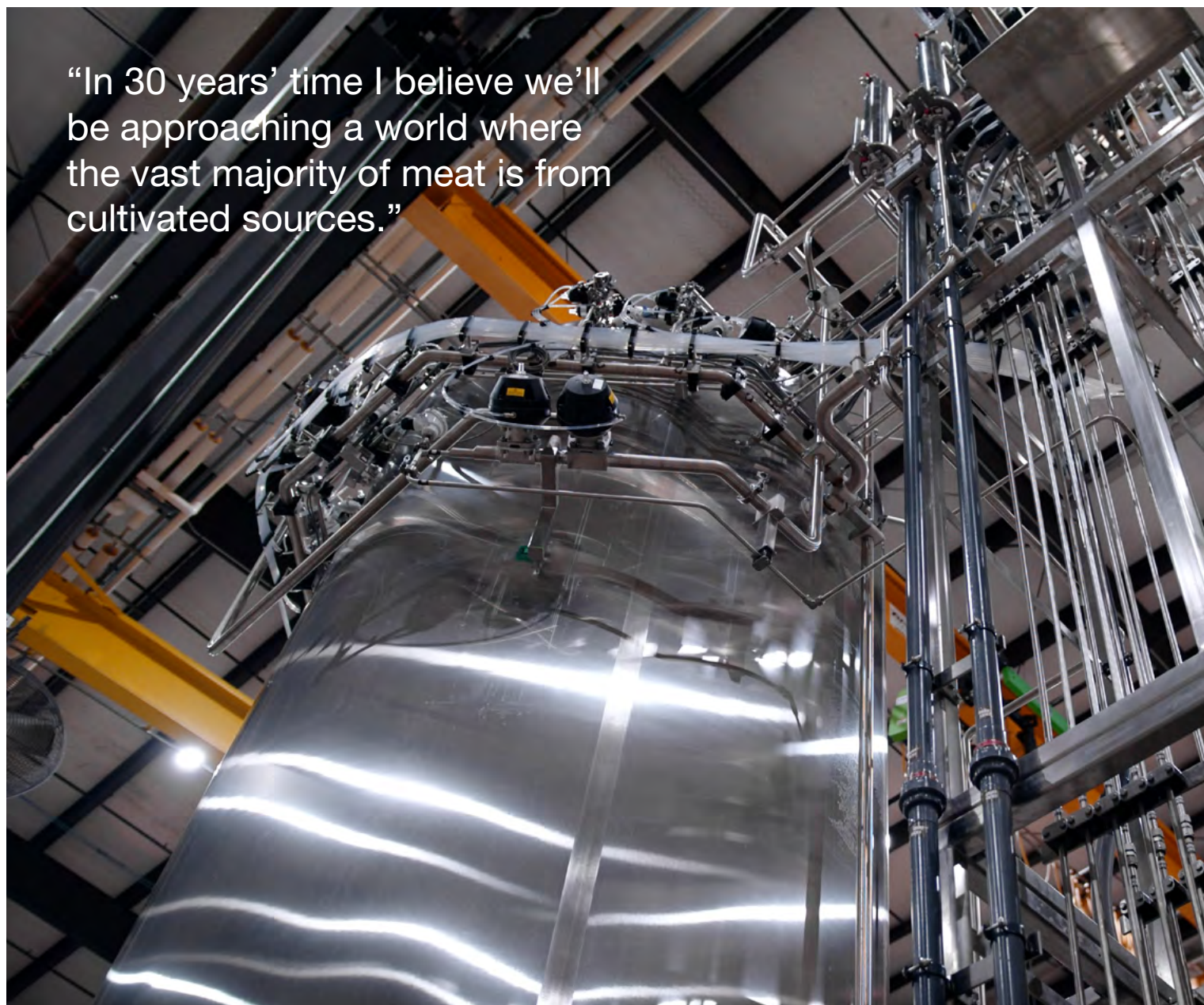
Incumbent meat companies will have transitioned to cultivated methods. Just as GM, Ford and other car companies are transitioning to electric, they won't do it because they care deeply about the climate but because they want to win in the market.

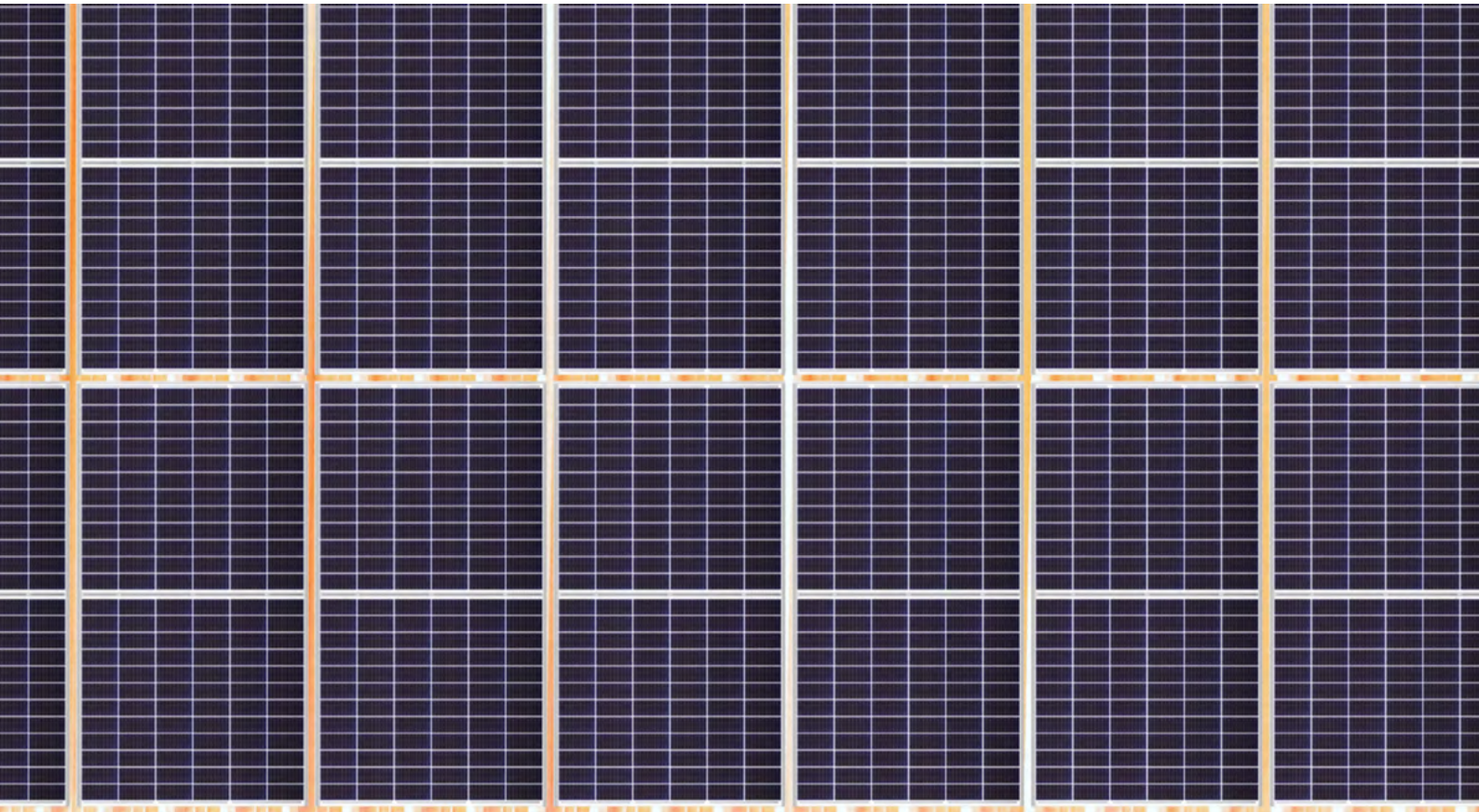
Q | Who's your sustainable hero and why?

My sustainable hero is Josh Balk who has led the charge to pass laws and move the United States towards a system of cage-free production of eggs and crate-free pork production. He helped push the passage of a California initiative called Proposition 12 to give animals more living space. He's worked with some of the biggest grocery stores on the planet to move their supply of eggs and pork to more sustainable approaches of production. He paved the way for companies like Eat Just.

His work is having a radical impact on the lives of billions of animals and he does it with selflessness and humility. He's not getting Silicon Valley funding. It's just the everyday work of being an advocate for animals, often behind the scenes but one that is having an enormous impact.

“In 30 years' time I believe we'll be approaching a world where the vast majority of meat is from cultivated sources.”

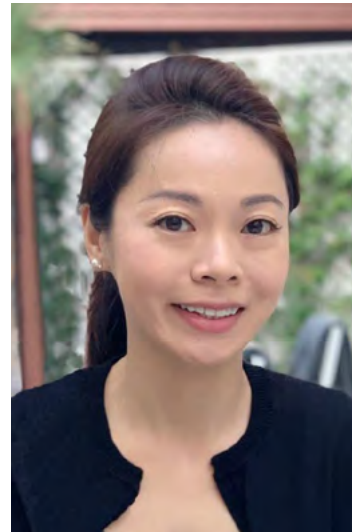




“Batteries are a key enabler of renewable energy.”

Battery Reincarnation

Lina Lee is co-founder and Executive Director of Durapower Holdings Pte Ltd, a Singapore-based energy storage solutions provider. Lina tells Nomura Greentech that she is extending the duration of electric vehicle batteries by giving them a second life as energy storage for renewables.



Q | Durapower's motto is 'lives empowered future transformed'. What first sparked your interest in sustainability? And can you tell us about your career journey?

I co-founded Durapower in 2009 together with my family at a time when fossil fuel depletion and air pollution was an emerging theme.

That led us to really think about the deployment of renewables. Electric vehicles were in their infancy but when you look into the EV transition, energy storage is a very big component.

Batteries are also a key enabler of renewable energy. Solar energy is taking off in many countries but we need to address intermittency and grid instability. Storage is the answer when the sun isn't shining. We entered this business to build that core enabler for the EV and energy transition.

I've always been mindful of environmental issues and climate change. We only have one Earth and we have to protect it not only for our generation but for future generations too.

Q | What does your role as executive director at Durapower involve?

I'm involved in company strategy, and I also look after the corporate functions such as human capital development.

Through Durapower's corporate vision to power the future, I strongly believe in empowering people to achieve their potential. And this is the key agent to drive and transform the future.

We are centered around our core values. To travel globally we need a visa and at Durapower we have our own VIISA, which stands for value creation, integrity, innovation, sustainability and adaptability.

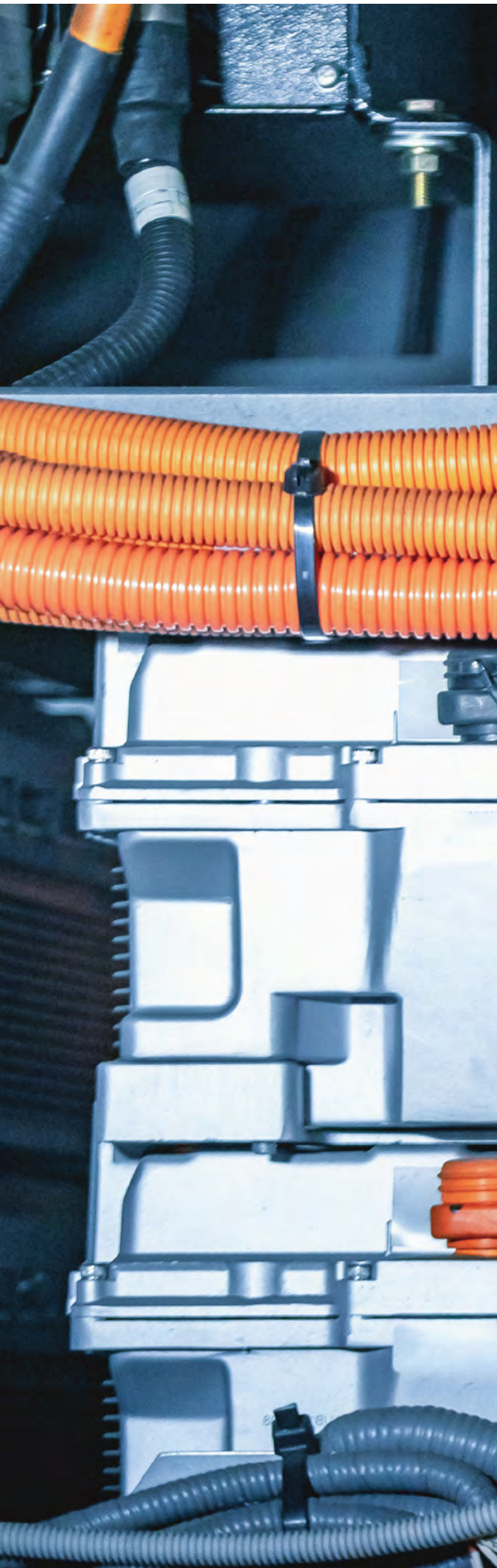
It means understanding client needs and building that roadmap together to create value. We are constantly innovating as a key driver to be a leader in the commercial electric vehicle sector.

And every business has to be sustainable so at Durapower that's about the circular economy that we build end-to-end from the research and development of battery materials to cell manufacturing, integration and recycling them back to second life and end of life.

So sustainability is very important to us. And in today's dynamic world, being adaptable is very important.

Q | Your business model is centered around large battery systems suitable for heavy duty and autonomous vehicles and the battery circular economy. How will Durapower develop over the next decade?

We've been supplying battery solutions for commercial electric vehicles from hybrid fleets of buses to full electric since 2011. We started with the China market and today we are present in more than 20 countries and over 40 cities across the world.



We are headquartered in Singapore and have our manufacturing base in China, with immediate plans to build global manufacturing facilities. We have more than 450 employees, a big presence in Europe and plans to grow there to be closer to our clients.

We recently announced a joint venture in Thailand for battery assembly set up.

Q | You recently supplied batteries for the world's first automated port and hybrid ferry. What were the challenges?

Battery technology has grown leaps and bounds but there's still much room for improvement. We have different battery solutions for different applications. In commercial fleet operations, a critical factor compared to regular passenger vehicles is the total cost of ownership which means fast charging capability to reduce downtime, and lightweight batteries that reduce the weight load and space for more passengers and goods.

For port operations, we have been supporting the PSA Singapore (Port of Singapore Authority) since 2012 starting with two hybrid diesel-electric automated guided vehicles (AGVs) to now fully electric AGVs.

In 2020 we started developing marine applications for our battery solutions. We built on the technology during the Covid-19 pandemic when everybody was in lockdown.

We are blessed to have strong partners and engineers that were able to deliver even during the challenging circumstances of the pandemic.

Singapore's first hybrid ferry, equipped with Durapower's lithium-ion battery solution, operates in the Singapore waters, and we also power fully electric vessels operating in Thailand.

Marine electrification is progressing rapidly amid a realization that sea transportation is also a big source of pollution and destroys precious marine life. I'm happy to say that today Durapower is one of the few battery companies worldwide that are both automotive and marine certified.

Q | Do you see any limitations for battery technology?

The sky's the limit. Efficiency gains are available in the chemical processes, performance, capacity and integrating the technology into real world solutions.

There is often hype in the market on breakthrough technologies but we must be mindful about the business viability. If it's still at the lab level, it may take time to commercialise technology for mainstream electrification.

Q | Are you concerned about mineral shortages and price spikes in lithium considering the importance of energy storage in the green transition?

The supply chain crunch has been a big topic this year and we have seen volatile prices for battery materials. It suggests demand outstripping supply as multiple companies look to scale up fast.

There was a time lag as the upstream exploration and extraction companies couldn't match the demand from downstream producers. But I expect this to resolve itself over the next few years as more mineral processing comes into development.

We are agnostic in terms of materials. As part of our future roadmap, we continue to invest in R&D to create next generation batteries that are less reliant on scarce resources.

Q | Singapore recently announced a net zero 2050 target. What role can Durapower play as a domestic company in helping achieve that milestone and how important are public-private partnerships to achieve your goals?

In Singapore, emissions are dominated by industry and energy sectors. Durapower is ready to support the acceleration towards net zero emissions.

For green public transportation, the Land Transport Authority aims to electrify half of its public bus fleet by 2030. Durapower has expertise in bus fleet electrification.

Singapore has set a goal to deploy 60,000 electric vehicle charging points by 2030 and Durapower foresees a role in helping the government reach that target. We have proposed solutions to integrate our energy storage with their charging infrastructure to reduce the burden on the grid.

Public-private partnerships play a crucial role in terms of funding support for pilot projects as proof of concept. We have co-invested with the Singapore government and Institutes of Higher Learning to set up a battery material research lab to house research outcomes and key intellectual property. We are working with our partners to establish local supply chains and mass production of the new generation batteries within the region.

Q | How do you see the market opportunity developing in the ASEAN countries between public transportation and 2-wheelers / micro-mobility?

ASEAN (the Association of Southeast Asian Nations) is a very exciting place right now. The Southeast Asia region is ready to build a local ecosystem through a bloc of countries with everything from upstream resources, IT, manufacturing, logistics and R&D capabilities to downstream implementation and demand.

For certain countries, two and three wheelers might be the main target for electrification while for others it may be public transportation. We are also trying to develop the market for battery cell manufacturing.

It's really about identifying what makes sense for each market and forging partnerships with local companies and the local governments. Southeast Asia is where we will see an inflection point in this EV and energy transition over the next few years. It is the place to be and home to Durapower and we hope to continue to contribute in building up the regional ecosystem and create value and jobs.

Q | You have an arm that provides a second life for used batteries. Is that a significant growth area given the increase in old batteries from EVs? And how far away are we from achieving a circular economy in the battery industry?

Once batteries reach 60-80% efficiency they are no longer used in the automotive industry but they are viable for stationary storage to support renewable energy. This gives them a second life in an economical and sustainable way.

Our digital platform, DP Pulse, was launched earlier this year. It leverages data science and machine learning to extract value from data collected by batteries, enables battery owners to make data-driven decisions to improve battery life, health and performance, and enables predictive maintenance, failure prevention and replacement planning.

DP Pulse can help optimize the use of these second life batteries to maximize performance and prolong the life of the battery system.

It's a very interesting market but it's still at a nascent stage. Second life batteries also have the potential to benefit the underprivileged. In Southeast Asia, some rural communities have no access to a clean and stable source of electricity so used EV batteries can help support rural electrification.

Certain battery materials are more valuable than others when it comes to recycling them back into raw materials. We are researching how to return them to the value chain as a circular economy solution.

Q | Who's your sustainable hero and why?

It is really every person on the street who is playing their part to protect the environment through small actions like recycling materials or not using plastic straws.

They are the sustainable heroes that are unseen but through small actions great things can be achieved. The ordinary person making a difference highlights that through collective action we can decarbonize the planet.



“Once batteries reach 70-80% capacity they are no longer usable in the automotive industry but they are viable for stationary storage to support renewable energy.”

The Future Heroes

This magazine intends to showcase our sustainable heroes and heroines by celebrating their achievements and providing key insights into how they are shaping our future.

We look forward to partnering with you!



Jeff McDermott



Derek Bentley



Anoop Chaudhry



Laurent Dallet



Pearse Davidson



PJ Deschenes



Andrew Horn



Michael Horwitz



Olav Juntilla



Kanishka Kelshikar



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Komu Kumar



Steve Megyery



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Daisuke Miyazaki



Frank Nicklaus



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Damien Sauer



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Keith Tauro



David Verbitsky



Duncan Williams



Niul Wood



Alex Wotton



Stuart Yardley



Enrico Zini



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Lee, Executive Director &
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et Mittal, Chairman, Avacada

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Green Leaders
in Focus

Purpose over Profit
Vineet Mittal, Chairman, Avaada
Vineet Mittal, CEO of renewable company Avaada, is expanding clean energy across India to help lift people out of poverty.

Scaling Solar
Alexander Arcache, Managing Director & Founder, Kronos Solar

Magic Meat
Josh Tetric, CEO, Eat Just

Battery Reincarnation
Lina Lee, Executive Director & Co-Founder, Durapower

Trade not Aid
Ana Haurie, CEO, Respira International

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SUSTAINABLE HEROES

Green Leaders in Focus

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Ana Haurie, CEO, Respira International
Ana Haurie, CEO of green finance company Respira International, is using the power of 'Trade not Aid' to help the economy combat climate change by engaging governments and get all in the same direction.

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