THE HINDU BusinessLine
CIRCULAR ECONOMY

SOLUTIONS &Co by sparknews

The Hindu BusinessLine Portafolio African BUSINESS Valor CincoDías
PULSO Handelsblatt Hong Kong Economic Journal LesEchos les affaires
LËTZEBUERGER Journal EL ECONOMISTA nòva24 Kommersant L'ECONOMISTE
FINANCIAL TIMES YiCaiGLOBAL BusinessDay EXPANSÃO Le Quotidien de l'ÉCONOMIE

Today, 20 leading business titles are spotlighting 50 business solutions that accelerate the transition towards the circular economy in favor of climate. #CircularEconomy

SUPPORTED BY TOTAL | suez

EDITORIAL

Going round to go forward

The seemingly endless recession that followed the global financial crisis of 2008 has finally begun to show some signs of turning around. While the global growth outlook still remains somewhat gloomy, some of the major world economies like the US, China and India are showing signs of resurgence. While the Eurozone is still roiled by the aftermath of Brexit and the refugee crisis, both these crises have passed their inflexion point.

This is both good news and bad news. Good news because higher growth signifies more jobs and greater economic security for a larger number of people. Bad news, because any resumption of the old consumption-led economy will only increase the stress on resources and the ability of the planet to cope with the impact of human activity. Climate change is now a painful reality for a large part of humanity, as changing weather patterns and global warming unleash climatic catastrophes with increasing frequency and ferocity.

Clearly, the 'business as usual' model is broken and cannot be put back together—at least the way it was. We need a dramatic change in the way we address the fundamental questions we face, both as individuals and as a collective: what we do, why we do it and the way do what we do.

Fortunately, there is a growing realisation of the problem at all levels—societal, governmental and business. An increasing number of individuals, institutions and businesses are innovating and finding more sustainable ways to improve the quality of our lives, without irreparably damaging planet Earth, humanity's only home.

Every year, *BusinessLine* partners with social enterprise Sparknews and leading media organisations around the world to bring you the stories of the people who are—in small ways and big—the change we want to see.

In these pages (and many more online at businessline.in/circular-economy) you can read about how corporates are increasingly embracing solar power in India, meet a husband-wife "smart infrastructure" start-up company in Mumbai, which pioneered an innovative solution to harness rainwater and solar power simultaneously, a Dutch company which allows people to rent jeans instead of buying them, a Brazilian vegan footwear brand at the forefront of the ethical fashion movement, a Chinese social enterprise which produces biofuel from waste resources such as used cooking oil, and many more.

These innovators and businesses are creating a new, sustainable circular economy model. They are the harbingers of hope for the future.

Do read, share and, above all, discuss these stories and the learnings they hold for us. Together, we can make change happen.

— Editor

India's new 'power couple'

The Choksis have dreamed up a clever device to harness rainwater and capture sunshine. And not only is it smart, it's beautiful

By PREETI MEHRA

BusinessLine

When Samit and Priya Choksi returned to Mumbai after several years in the US and the UK, they wanted to start a company that would do more than just pay the bills. Samit's background was in computer science; Priya had majored in architecture and sustainable design. In 2015, they launched ThinkPhi, a clean-tech start-up (www.thinkphi.com).

Their declared mission? "To become the Earth's most sustainable company."

The couple initially set out to design a product that would save water in their drought-stricken region, but the concept quickly morphed into a Smart Infrastructure product that harvested both rainwater and the sun's rays. It was christened Model 1080 (the geometrical angles add up to that number), but it has been nicknamed "Ulta Chaata" because of its resemblance to an umbrella that has been turned inside out by the wind.

Sporting a sleek stainless-steel design, it is lightweight (50 kg), has a footprint that is only 50cm x 50cm and a canopy measuring 4m x 4m. The height can be adjusted to vary between 3.2m and 4m. Solar modules are integrated into the "umbrella" in a proprietary arrangement that allows water to pass through when it rains. The patented system captures and filters 45,000 litres of rainwater while solar panels provide 400 kWp (watt peak capacity) of renewable power and light.

Flexi design

The Ulta Chaata can be used alone or in groupings, a flexibility that makes it suitable for purposes ranging from sheltering parked cars (it can also recharge electric vehicles) to providing shade for people sitting or dining outside.

The company's beta customer was the Godrej Group, followed by real estate developers Rustomjee and the Poonawala and Masina Hospitals. As business picked up, ThinkPhi expanded operations, sales, distribution and R&D, thanks to funding from industrialist Nimmagadda Prasad.

ThinkPhi now has a staff of 12, which includes engineers, computer scientists and designers. Already they have added two new members to the Ulta Chaata family: the 1080WX and the 1080XXL.

The 1080WX has a canopy measuring 5m x 5m, a water-harvesting capacity of 85,000 litres and 2.2 kWp energy capacity. The size makes it suitable for bus stops or work stations where people can sit at tables and recharge their electronics.

The super-sized 1080XXL (20m x 20m) was developed at the urging of Sanjay G Ubale, CEO and Marketing Director of Tata Realty and Infrastructure, who envisioned adapting the Ulta Chaata for use at highway toll plazas.

"He was a big part of the inspiration and asked us to try out the grand version," says Priya. "This kind of interaction with industry leaders helps early-stage companies like ours be more creative." Along with Tata, other companies, including Mahindra and Godrej, are advising the start-up on value engineering and better material selection so that they can scale into new areas.

For the home too

But while ThinkPhi is thinking big, it hasn't forgotten the small customer. The company recently launched the 1080H, a home version that has been installed in several test sites in the US and Australia. This flat-packed kit version is easily assembled, generates up to 40,000 litres of water and provides grid-independent lighting.

Priya acknowledges that combinations of various other structures and equipment could yield similar results, but what makes the Ulta Chaata unique is its sophisticated all-in-one design. "Good design is not a First-World privilege," she says.

Surprisingly, neither design nor engineering has been the company's greatest challenge. "In fact, the biggest hurdle we faced was getting our company registered for Value Added Tax (VAT)," says Samit. "We didn't want to get our hands dirty with 'under-the-table' payments; we were building a company around the environment, and it had to have a clean feeling."

ThinkPhi founders Samit and Priya Vakil Choksi fused their respective interests: computer science, and sustainable design. (top) ThinkPhi's 'inverted umbrellas' at a railway station in Karnataka COURTESY: THINKPHI

Despite great success, Samit says they may soon relocate to Singapore with an eye to expanding into the Asia-Pacific market. "Indian customers do not value innovative products when they are home-grown. Singapore is known for its creative talent, has a good environment for research and attracts considerable start-up capital. That will help us raise our next round of funding."

Up next: storage packs

This new infusion of capital will be vital to ThinkPhi's next project, which involves the most crucial aspect of renewable energy: clean energy storage. The objective is to develop energy storage packs that are mobile, easy to install and that would help people deal with blackouts. "They will be seven times cheaper than diesel generators and totally clean," says Samit.

With the increasing frequency of natural disasters, inventions from ThinkPhi could offer some relief to the millions left without electricity.

preeti.mehra@thehindu.co.in

Online resources

The online edition of *BusinessLine* offers plenty more reading material and interactive elements on the *#CircularEconomy*

Go to **businessline.in/circular-economy** to access the entire package, which includes many more articles from leading media organisations around the world

E-BOOK

Scan this code to access an e-book of the entire content package

INTERACTIVE GRAPHIC

Scan this code for an interactive graphic on the shaping of the #CircularEconomy

VIDEO

The Global Footprint Network estimates that it now takes the Earth a year and a half to regenerate what humans use in a year. The traditional linear thinking about extracting raw materials that will be transformed, consumed and thrown away is giving way to alternative approaches. Specifically, the *#CircularEconomy* approach emphasises that all materials are sourced sustainably.

In Brazil, the Native brand has pioneered large-scale regenerative sugarcane production since 2000. Sugarcane is one of the world's 'thirstiest' crops, and Native's 'circular' model has rendered it the world's leading producer of organic sugar.

Scan this code for a video, produced by Sparknews/Balbao Group, on this inspirational model of regenerative agriculture

EDITORIAL

The 'circle' of life

While we can rejoice in the sharp rise of the global middle class, especially in emerging economies, the accompanying growth in consumption puts further pressure on raw materials and underscores the limits of our linear economic model—"take, make, dispose". According to the Global Footprint Network, it now takes the earth 18 months to regenerate the natural resources we use in one year. Obviously, this is not sustainable.

But there are promising developments under way, too, as innovators around the world pave the way for a "circular" economy to emerge at all levels, giving rise to new business models and economic opportunities.

Today, as a member of Solutions&Co, a network of 20 leading business newspapers from around the world, *BusinessLine* brings you stories about the most innovative companies and initiatives accelerating our transition towards a circular economy.

Some companies are considering their products' life cycles, including recycling, as early as in the design phase. Certain cities are organising industrial parks, where the waste of one company becomes the input of another one. National governments have started banning plastic bags and experimenting with 'repair tax' incentives. Consumers can rent blue jeans instead of buying them. And urban farms are sprouting out of plastic bottles in Cameroon.

The circular economy tackles problems at their roots by reducing our dependence on finite products. It shifts our economies towards a more virtuous circle, designing out waste at all levels while restoring our manufactured, human, social, natural and financial capital. This new economy also represents a remarkable opportunity to protect the environment while creating jobs and wealth—an estimated 1.8 trillion euros by 2030 in Europe alone.

And though the circular economy addresses complex problems, it should not be seen as a simple, standardised solution. Rather, it is a collaborative effort in which everyone—citizens, companies, cities, nations—has a role to play.

For this third edition of Solutions&Co, spearheaded by the social enterprise Sparknews, our readers in India, China, Brazil, South Africa, France, Germany, the UK and elsewhere will discover a range of initiatives accelerating the world's transition towards a circular economy. By sharing these stories, our media network spreads the word about innovative solutions to climate issues near and far.

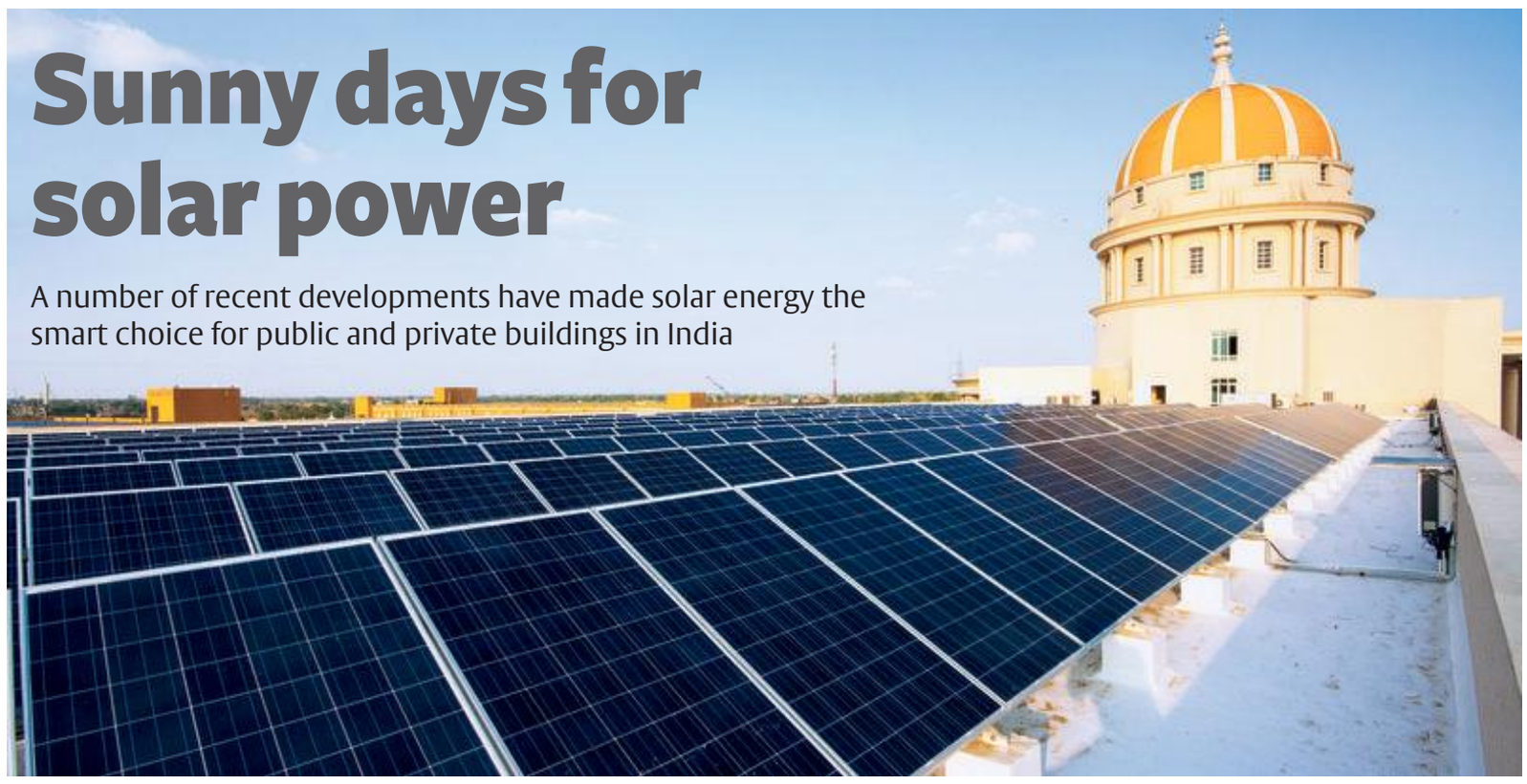
The businesses featured in our previous editions have attracted new opportunities as a result; some have forged partnerships with major companies and organisations. These projects have also inspired the founding partner of Solutions&Co, Total, which is seeking out circular solutions for a sustainable energy transition.

To go a step further, we have created an e-book with insights from leading circular economy experts such as William McDonough, Claire Pinet or Jean-Marc Boursier. Download it via **solutionsandco.org** or **businessline.in/circular-economy** and discover dozens of innovative companies, as well as inputs from experts and business executives, all working to create virtuous economic circles.

— Christian de Boisredon, founder of Sparknews and Ashoka Fellow / The Sparknews Team

Sunny days for solar power

A number of recent developments have made solar energy the smart choice for public and private buildings in India



Rooftop solar panels put up by CleanMax Solar at Manipal University in Jaipur BY SPECIAL ARRANGEMENT

By M RAMESH

BusinessLine

March 2012 witnessed the first commercial solar rooftop project in India when the US company SunEdison put up a 100 kW solar plant on the roof of a building in Chennai owned by Standard Chartered Bank. Under the terms of the project agreement, SunEdison would own the rooftop plant and sell electricity to StanChart at around ₹11 per kWhr (about 20 cents per kWhr at the 2012 exchange rate).

That price was well above what StanChart would have paid for power from the state-owned utility, but burnishing its image as a good corporate citizen outweighed financial concerns.

Today, similar contracts are signed for ₹5 per kWhr (about 8 cents per kWhr), reflecting the steep decline in the price of solar modules. What began five years ago in a spirit of social responsibility has now become economically viable as solar energy becomes cheaper than grid power. Companies are also attracted by what has come to be known as the "opex model"; like StanChart, they simply buy power from a vendor who owns the solar installation on their roof, thus replacing a capital expenditure with operating expenditures.

India has set a target of achieving installed capacity of 100 GW of solar power by 2022, 40 per cent from rooftop solar and 60 per cent from ground-mounted panels. To date, there are 1.3 GW of the former and 14 GW of the latter.

A new crop of solar companies has emerged to boost these numbers: CleanMax Solar, Amplus, Aspiration Energy and Solar Town are some of the biggest players.

All of them deliver "solar-as-service"; as Andrew Hines, co-founder of CleanMax Solar, explained, large companies may not have enough money to put up rooftop solar modules on their own, or if they do, they may not want the risk of this capital expenditure.

"There will always be someone in the board who will poke holes in your proposal," he said. "But if you tell the company, 'Just let us use your roof and we will sell you energy at a price that is less than that of grid power,' they have a hard time poking holes in that proposition."

The pitch worked with Mahindra Research Valley (MRV), the research-and-development arm of the Mahindra group, which makes tractors and vehicles. Aspiration Energy put up a 563 kW plant on MRV's roof, agreeing to sell electricity at a price that was ₹2.80 per kWhr cheaper than grid power, with a 3 per cent annual escalation clause but with the stipulation that the rate would always be at least 50 paise cheaper than grid power. The savings for MRV have been huge. Other satisfied CleanMax customers include Chennai Metro Rail Ltd and Hitachi.

According to Hines, India's solar market is booming. To date, it has been made up primarily of large, AAA-rated companies, but the government is also coming on board; it plans to tender an offer for the installation of 5-7 GW of rooftop solar capacity during the next few years.

The opex model will also be ideal for the country's 50 million small-and medium-sized companies, but solar providers are still wary of this market because of doubts about creditworthiness. "It's a big market, but solar companies will approach it only after the potential of large companies has been exhausted," said Vikram Dileepan, founder of Solar Town, which has installed more than 200 rooftop solar systems.

Another potential market is solar heating. Companies are now realising that solar is a cheaper option whenever their heating requirements are below 80-85 degrees C. Wheels India, which makes wheels for vehicles, used to consume a million litres of furnace oil a day at an estimated annual cost of ₹20 crore (about $3 million). Solar heating has reduced cost by 10 per cent. What's more, Wheels India did not have to spend anything on solar installations; it simply pays Aspiration Energy 70 per cent of its savings for five years.

Aspiration Energy founder Thirumalai Bhuvarahan said the solar heating market, estimated at about 200 GW, is definitely opening up. It used to be much easier to meter and bill electric energy than heat energy, and maintaining heat energy systems has traditionally been more difficult. "But all that is changing," he said.

Thanks to the fortuitous confluence of all these developments, switching to solar is not just good for PR, it's good for the bottomline. And if there's one language that companies are proficient in, it's the language of money.

ramesh.m@thehindu.co.in

Jean therapy is quite the fashion

A Dutch 'circular denim' firm leases jeans in order to make fashion a less dirty business

By SENAY BOZTAS

spark news
have an impact, share solutions

Despite its name, MUD Jeans is anything but dirty. In a business with a history of scandals, from child labour to hazardous processes such as sandblasting, this modest Dutch company aims to make good-looking jeans that are ethically and ecologically sound.

"Fashion is the second-biggest polluter in the world," said 56-year-old chief executive Bert van Son, who has worked for 35 years in the clothing industry. "Some 24 billion tonnes of cotton are made every year, and 24 per cent of all insecticides and 11 per cent of pesticides are used on cotton. It's totally out of hand. We need to use organic cotton—which doesn't pollute the water—or recycle cotton like paper."

Jeans for lease

And so MUD Jeans (www.mudjeans.eu) gives shoppers a unique opportunity: for a one-time €20 membership fee, you can "Lease A Jeans" for €7.50 a month (around US$9), paying €90 in instalments as opposed to €98 to buy a pair of jeans outright.

After a year, you have three options. You can keep your MUD jeans (the company will repair leased jeans free of charge), return them for recycling, or trade them in for a new leased pair. A €10 voucher towards a new pair is given to people who return any brand of jeans, which MUD Jeans patches and sells as "vintage". If the jeans are beyond repair, the company sends the fabric to a factory in Spain for recycling.

The company sells jeans online and through 260 shops in 27 countries, allows retailers to place small orders to avoid overproduction, and never holds sales. Today some 2,000 of MUD's customers rent their jeans, making up a quarter of sales. According to van Son, their average age is 35, they tend to be well-educated, have children, enjoy travelling, eat organic food and welcome new experiences. He noted that 80 per cent of customers send back their old jeans for recycling, whether they lease or purchase them.

A typical pair of MUD Jeans, like the Regular Dunns that he is wearing, consists of 23 per cent recycled jeans, 75 per cent organic cotton and 2 per cent elastane. It is coloured using non-toxic indigo dye and has a printed, rather than leather, label to make recycling easier. The jeans are produced in Tunisia at the Yousstex factory, whose working conditions have been audited by the Fair Wear Foundation.

The eco-fashion trend

MUD's leasing concept was the start of a turnaround for an eco-fashion firm that van Son rescued from bankruptcy in 2012. "We started with 'Lease A Jeans' in January 2013 and that brought us immortal fame as a company because it was such a crazy idea," he recalled, sitting in his office and distribution centre in Almere, in the Netherlands. "Leasing and jeans together are not fashionable, don't fit, and that's why it's so interesting."

The initiative attracted the attention of the London-based Ellen MacArthur Foundation, which profiled the way the company "seeks to close the loop on jeans production" and has just launched its own circular fibers initiative to encourage retailers to design textiles for reuse. "Crucially," the text reads, "(van Son) understands the resilience that circularity could bring to his business, and how this will become an even greater competitive advantage in the future."

Reached by phone, a foundation spokesperson said the MUD leasing model should be more widely adopted, given that today's take-make-dispose approach to fashion creates high levels of pollution and waste—and many clothes are used only a handful of times before being discarded. By sharing clothing among different people, renting increases the number of times each item is used.

It's a struggle

There are challenges to MUD's approach. Recycled cotton is more expensive, the business has struggled to keep up with demand that has doubled year after year, and value-added tax charged upfront affects the cash-flow, as does the leasing concept itself.

And although MUD Jeans has made global headlines, and has won multiple sustainability awards with its rental idea, those distinctions didn't initially translate to sales. "You can have a great story and be as sustainable as hell, but if your product is not fantastically good, at a good price, and widely available, it doesn't mean anything," said van Son.

The company received a recent infusion of cash and knowhow when three skilled investors bought shares: a denim "guru", a sales manager and a social media marketing specialist. MUD has a working capital credit line with Triodos Bank (which finances projects for positive change) and a loan from the DOEN foundation. The company expects to break even with €1 million in sales in 2017.

"You can do a lot with water, clay and sand—put it on your face, build houses, then turn it back to MUD," mused van Son, covering a fresh pot of tea with a MUD Jeans cozy made by his 88-year-old mother from old jeans and a coat. "And out of the MUD, a beautiful lotus flower can grow."

MUD Jeans chief executive Bert van Son has pioneered a fashion line COURTESY: MUD JEANS

Scan this code for a Sparknews video presentation on MUD Jeans' pioneering business model

Turning hazardous e-trash into healthy cash

A Faridabad-based start-up has built a roaring business out of refurbishing electronic waste

By PREETI MEHRA

BusinessLine

Akshay Jain occasionally finds himself referred to as a sophisticated *kabadiwala* (rubbish collector), but he's the one having the last laugh. His e-waste recycling start-up, Namo E-Waste Management Ltd (www.namoewaste.com), is poised to reach a turnover of ₹12-15 crore (US$1.8-2.3 million) this fiscal year—an impressive increase over last year's ₹4.5 crore (US$700,000).

India ranks just behind the US, China, Japan and Germany in the production of e-waste—old computers, mobile phones, TVs and other obsolete electronic gear. The Global E-Waste Monitor, 2014, compiled by the UN think tank United Nations University, estimates that India discarded 1.7 million tonnes of electronics and electrical equipment that year. Since then, the annual amount has likely doubled.

But one man's trash is another man's treasure, and Jain, who studied waste management while completing his MBA at Greenwich University in the UK, saw a business opportunity in the mounting piles of unwanted electronics. In 2014, the then-25-year-old launched Namo E-Waste. He spent two years doing extensive research, sorting out funding issues, acquiring the necessary licences and sourcing the required technology for his plant. Then in 2016, he was finally ready to build a refurbishing and segregating unit on land leased from his father in the Delhi National Capital Region of Faridabad, also the site of his company's headquarters.

E-waste being refurbished; (right) Akshay Jain COURTESY: NAMO E-WASTE

Wealth from e-waste

Namo E-Waste collects all kinds of electronic waste (laptops, air-conditioners, refrigerators, microwaves) and reconditions many of these items for continued use. Items that are beyond repair are dismantled for useful parts, with hazardous materials being segregated from other waste, which goes through a separation process to recover semi-precious metals such as copper and aluminum. The hazardous waste is also separated so that metals may be extracted from it; it is then safely stored and transported to a government-approved treatment, storage and disposal facility (TSDF). To date, Jain and his team have recycled more than two million tonnes of electronic waste.

Last year, Namo E-Waste won two awards—Best Green Start-up and Refurbisher of the Year—from Franchise India. Another boost came from new rules for disposing of e-waste, introduced by the government in 2016.

The regulations put the onus of managing e-waste on the producer. The Extended Producer Responsibility (EPR) rule requires every company to formulate an EPR plan and submit it to the Central Pollution Control Board. The plan must include details of its e-waste channelisation system for targeted collection, including a Producer Responsibility Organization (PRO) and an e-waste exchanger.

The deadline for implementing the rules was September 2017. In anticipation, Namo E-Waste positioned itself to be the PRO for several top Indian companies. Today, its clients include some of the biggest names in Indian business: Flipkart, Telenor, Havells, Voltas, Tata Sky and Godrej. It is also a selected vendor for companies such as Samsung, Whirlpool, Blue Star, Hitachi and Carrier, and can participate in their e-waste auctions.

So far, Jain has encountered little competition for their business.

An e-waste market

Jain and his team are now drafting a consumer-centric model with the aim of expanding into the B2C sector through a programme called Planet Namo. This initiative will create an extended marketplace to buy and sell second-hand electronics and will reach out to the community with e-waste collection drives and a door-to-door pick-up service. "The biggest challenge we face to growth is procurement," says Jain. He notes that his semi-precious metal recovery machinery can handle 500 kg/hour. "But today, it runs at just 10 per cent capacity, even though we buy waste from all available sources—companies, small *kabadiwalas*, electronics dealers..."

Jain also plans to set up a precious metal recovery plant, enabling the company to extract gold and silver from e-waste, a process that is currently carried out only in Belgium and Japan.

For now, however, the young founder is single-mindedly focussing on just one goal: to collect and recycle as much e-waste as possible. It seems that for some, going round in circles can be a profitable entrepreneurial adventure.

preeti.mehra@thehindu.co.in

These shoes were made for upcyclin'

Brazilian vegan footwear start-up Insecta Shoes is catalysing an 'ethical fashion' movement — by implanting an ecological footprint

By ANDREA VIALLI

Valor Econômico

In 2015, Brazilian fashion lover Barbara Mattivy ran an online shop for vintage clothing and wondered what to do with pieces that required alteration. Her friend Pamela Magpali, a footwear designer, suggested upcycling the fabrics to produce a vegan line of shoes. The friends made 30 pairs of shoes and put them online: they sold out in just two days.

The duo quickly recognised a fantastic business opportunity and christened the brand Insecta Shoes (www.insectashoes.com) to underline its nature-friendly focus, and with an investment of R$120,000 (about US$38,000) devoted themselves to product development.

Shoes were initially sold over the internet until positive feedback gave the company the impetus to open its first physical store—located in the city of Porto Alegre, close to the shoe industry hub of Rio Grande do Sul and its third-party manufacturers.

In 2016, Insecta Shoes opened a second store, in São Paulo. At the same time, the company invested in improving its e-commerce footprint. Its online store still represents 65 per cent of sales while offering a communication channel with consumers through a blog that raises issues on conscious consumption, food, veganism and sustainability in fashion.

Insecta Shoes upcycles vintage clothing and plastic bottles into shoes ANGELO BONINI

Imitation leather, naturally

"Reducing waste production and replacing materials with sustainable alternatives is essential to what we do," Mattivy said. No leather, wool or materials of animal origin is used to manufacture Insecta Shoes. Instead, the company sources environmentally friendly vegan materials like cotton fabric coated with natural latex manufactured from recycled PET bottles, or a plant-based laminate that imitates leather.

Barbara Mattivy CLAUDIO BELLI/VALOR

The shoes' insoles are made from textile industry waste, while the outsoles come from upcycled rubber. The brand also tries to use threads, laces and eyelets that can be reused in the future. Designs are printed onto the fabric (made from PET bottles) using water-based pigments.

The fruits of this labour are boots, brogues, sandals and sneakers with an average price tag of R$280 (about US$89), as well as handbags and backpacks. "The company was created for recycling second-hand clothes, but we needed to create new product lines to scale up our operations," commented Mattivy.

Ana Luiza Leal, 31, is one of the customers enchanted by both the quality of Insecta Shoes' products and the concept of the brand. She entered one of their stores two years ago while on the lookout for ethical and comfortable shoes and believes that Insecta Shoes offers shoppers ethical fashion. "We often buy clothes or shoes that may have been made with slave or child labour and we're just not aware. As a consumer, I look for products where I can trace their origin and production history," she said. More than recycling, upcycling offers a creative solution for certain materials that would otherwise be thrown away.

In two years of operation, Mattivy estimates that during the production of approximately 15,000 pairs of shoes, Insecta Shoes has upcycled 3,000 pieces of clothing, 900 kg of fabrics and 2,000 PET bottles.

The young company earned R$1.7 million (US$549,000) in 2016 and expects to grow by 50 per cent in 2017. Today, Insecta shoes is run by three seniors (Magpali left the company in 2016) who manage a small team of seven employees.

Beyond Brazil

The challenge for these 30-something-year-old entrepreneurs is to make sure their brand appeal is not limited to the vegan product niche, which remains restricted in Brazil. Estimates show that there are 16 million vegetarians across the nation (there is no data on the number of vegans), and that the market for products targeted at this group is growing at around 40 per cent per year.

The company has already started exporting shoes and has plans to expand outside of Brazil.

Mattivy believes that consumers need to be educated about more conscientious fashion options, since current trends are still rooted in the phenomenon of fast fashion, where the speed of production, consumption and disposal of textile items is extreme.

"Anyone who buys our products is at the top of the pyramid, in a bubble that does not represent the majority," she said. Mattivy remains optimistic, "People have started to discuss the issue and I believe that, with time, attitudes will change."

The case for a 'circular' tax break

Eco-responsible products merit 'positive discrimination'

By ETIENNE COMBIER

Les Echos

To come up with a "disruptive innovation": that's the goal of Romain Ferrari, director of Fondation 2019 (2019 Foundation). Under the auspices of the *Fondation de France* (Foundation of France), Fondation 2019 has since last July been developing a toolkit with the aim of embedding the circular economy in our daily lives, on a mass scale.

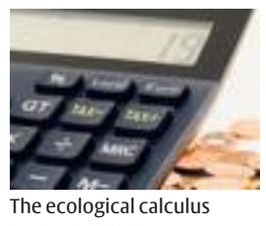
At the heart of the foundation's work—along with that of the French Environment and Energy Management Agency (Ademe) and businesses such as SEB, Samsic and Magencia—is the concept of a circular VAT. The key is to internalise the externalities that arise from the production of goods, in order to promote those that have the least negative impact. The externalities evaluated include pollution as well as health and social problems linked to the production and use of the product.

This circular VAT could take the form of, for example, a reduction in VAT of 10 points for a product that was designed following circular economy principles. Thus, a frying pan containing recycled materials—which is currently more expensive than a 'standard' frying pan—would become the cheaper option.

Give conservation a break

The idea began to take root following from an observation: "a number of products that we need in our daily lives, when they are produced well—in keeping with the circular economy paradigm shift—are more expensive than standard products," Romain Ferrari explained. "Our goal is to ensure that these eco-responsible products are given back a profit margin, which will be shared between the consumer and the producer," he added.

The biggest challenge is to convince government authorities to take on a tax expenditure, without seeing direct revenue from it. While the effects of pollution are measured over a five-, 10- or 15-year period, the state has to present its budget each year.



The ecological calculus
PIXABAY - WERBEFABRIK

"So we want to present authorities with evidence that these products create less externalities than standard options, that this reduction therefore leads to lower public expenditure, through the decrease in pollution and environmental damage," Romain Ferrari argued. "This reduced public expenditure could justify the lower tax rate."

For Romain Ferrari, what makes this study so significant is that it offers government authorities a trustworthy set of tools. The director of Fondation 2019 is aware that this type of analysis is not new. "Life cycle analyses have been carried out for the last 20 years. Our work is to develop the same thing, but for externalities," he said.

If the subject seems highly specialised, in reality it is one of capital importance. "In today's context, with oil prices too low and with too great a supply, we are seeing a loss of competitiveness in recycled materials, which are being sold cheaper than they were ten years ago. Hence the idea of stepping in to correct these market failures," Ferrari maintained.

All the more necessary, according to Ferrari, since he doesn't expect any radical measures to come from politicians, or from Emmanuel Macron, despite the latter having referred to the circular economy as a "new economic model".

"Recycling or the sorting of our waste—that's not circular economy. We need to cut back and have the same product with two times less," Ferrari said.

Paradigm shift

The work of Fondation 2019 is aligned with a wider ecological economy movement, which doesn't seek to make the environment fit into the economy, but rather to adapt the rules of the economy so that environmental issues are taken into account.

"We need to change the transactional market, to adopt new rules. We won't be punitive: these rules will be nice so that consumers love them, manufacturers make the best of them, and politicians tentatively reach out their fingertips to grab them. Without realising that it's going to initiate a disruption. It's our touch of Trojan Horse," Romain Ferrari says with a smile.

The automotive power of 'gutter oil'

MotionECO, a Chinese start-up, makes biofuel from recycled cooking oil, which otherwise slides back into the food chain

By MA YIFEI

YiCai Global

Renowned for its fried dumplings, egg rolls, fried wontons and other culinary classics, China is the world's largest consumer of cooking oil. It also generates the most waste oil—millions of tons every year. Although it is illegal, some unscrupulous entrepreneurs filter the waste oil from restaurant fryers, sewer drains, grease traps and other sources, and sell it to street vendors and small restaurants for re-use. This "gutter oil", as it is called, does not meet the standards of regular cooking oil, and it contains carcinogens and other elements that can cause severe illness. But it has one advantage: it is cheaper than the real thing.

Shutong Liu founded his company, MotionECO (www.motioneco.com), to fight this problem by offering a better way to use recycled cooking oil. His story began back in 2011, when he was a student in the Netherlands. That year, KLM Royal Dutch Airlines made its first flight from Amsterdam to Paris using bio-kerosene produced by biojet fuel specialist SkyNRG. Shutong was so impressed that he went to work for SkyNRG while completing his master's thesis on 'The Potential of Biofuel and Waste in China'.

"When I saw that in Europe, there was already a sophisticated way to make biofuel from waste cooking oil and then use it in sustainable public transportation, I wondered, 'Why can't we do that in China?'" said Shutong.

Big upside

The advantages are clear: The fuel produced from waste can help reduce greenhouse gas emissions by as much as 90 per cent while also dramatically cutting particle pollution, sulfur dioxide and other pollutants in exhausts. And biofuels are often more attractive than solar power or other forms of clean energy, given that little or no additional investment is needed to upgrade traditional engines. Additionally, the process also provides a safer way to dispose of waste cooking oil.

Shutong concluded that there was a potential market in China, and in March 2015, following his return home, he founded MotionECO. The next year, his company was selected as the finalist from China in Chivas's 'The Venture', an international contest that rewards social entrepreneurs using their business as a force for good.

Shutong has discovered that one of his biggest challenges is the efficient recovery of used cooking oil. There is no system in place yet, so someone who sells to a legitimate waste-oil recycler today may sell to a gutter-oil producer tomorrow.

Banking on goodwill

In order to attract loyal and reliable suppliers, MotionECO has set up a public, transparent and traceable process from production to sales. This appeals to chain restaurants, which are reluctant to risk their reputation by selling waste oil to illegal sources. It also works with some large firms, which consider consumer goodwill and sustainability issues along with economic benefits.

MotionECO founder Shutong Liu COURTESY: MOTIONECO

Another big hurdle is price. Gutter oil sells for more than biofuel, so gutter-oil producers can buy waste cooking oil at a higher price than legitimate recyclers can. The fact that gutter oil is illegal is often of little consequence to waste-oil sellers, especially small and medium-sized enterprises with thin margins. "Our team and our partners have to be patient," said Shutong. "Food safety is critical to everyone."

The general climate is improving though, now that Chinese authorities are cracking down on gutter oil. They have notably established a food traceability system and pushed restaurants to monitor more closely the safe disposal of their used cooking oil. Meanwhile, MotionECO has introduced a "safe-oil league" that vets and certifies members, a move that it hopes will increase its supplies and foster good relationships with restaurants.

MotionECO currently sources the majority of its waste cooking oil from the Sichuan-Chongqing area in western China and from the mouths of the Yangtze River and the Pearl River. Shutong has visited some of the filthiest waste cooking oil collection sites in China to learn how they operate.

He jokes that he can tell where waste oil comes from just by looking at the colour: in the Sichuan-Chongqing area, it is is typically red, like the area's spicy hotpot; near the mouth of the Yangtze River, it is usually dark because locals there favour soy sauce and other seasonings.

As awareness of the advantages of the recycling economy increases across the country, Shutong has started to collaborate with local governments. MotionECO's partnership agreement with the city of Nanjing, for example, kicks off at the end of 2017. In this first phase of the project, named Green Oilfield, city buses and sightseeing coaches will be powered by biofuel from waste cooking oil.

MotionECO has five employees and is on track to reach a turnover of 3 million CNY (US$457,000) this year. Yet Shutong says he has no specific timeline for his company's development. His patience seems to be matched only by his determination, reflecting his strong belief in the importance of his crusade.

As he told the audience at a recent TED talk in Suzhou: "We will continue to promote the development of biofuel in China through the recycling of gutter oil, turning one of society's big problems into the solution to another one."

Can dandelions bounce back?

Revisiting a 1930s Soviet experiment in making rubber from dandelion roots

By NADYA KRASNUSHKINA

Коммерсантъ

Oil palms—the source of the palm oil widely used in the commercial food industry—are usually the bad guys in any discussion of the impact of clearing forests to grow crops. Scientists maintain that replacing rainforests with these monocultures destroys biodiversity, deprives animals and birds of their natural habitats, and depletes soil and water resources.

Now, rubber plantations are getting that same bad rap, probably because of their dramatic expansion. The total area under rubber production worldwide has reached nearly 13 million hectares—up more than 2 million hectares from a decade ago. Researchers from the University of East Anglia estimate that to keep up with demand, another 4.3 to 8.5 million hectares will have to be planted by 2024. The environmental consequences could be catastrophic.

The tyre industry uses 70 to 75 per cent of the world's natural rubber, yet only recently has it experienced the same kind of pressure exerted on palm-oil consumers to pay more attention to the sustainability of their supply chains and to combat deforestation. Indeed, goods made from natural rubber, derived from the latex tapped from rubber trees, are still often labelled "eco-friendly".

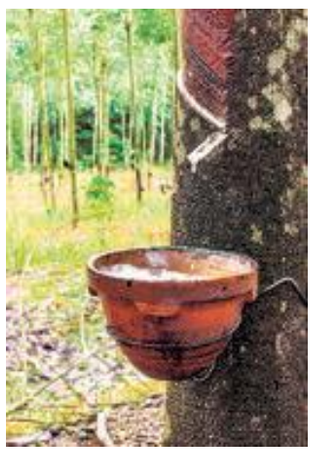
The tyre industry's environmental efforts are entirely voluntary; a leading example is the Sustainable Rubber Initiative launched in 2015. Some companies are also taking their own measures. Last year, Michelin announced that it would not purchase any rubber grown on newly deforested land and declared its intention to work with suppliers and local authorities to develop sustainable forest management. Bridgestone, Goodyear and Continental made similar policy changes.

And in May, General Motors pledged to buy only tyres made from sustainably grown rubber and announced it would work with other tyre manufacturers to combat deforestation and to uphold human rights in rubber production.

A Russian remedy?

Meanwhile, tyre makers and car companies are also researching an entirely different solution to this problem, one whose roots literally and figuratively go back to a 1930s Soviet experiment.

Back then, it was already known that a number of plants besides the Hevea rubber tree also produce latex, and the Soviets, eager to have their own domestic rubber supply, launched a campaign to find them. They eventually discovered that two species of the Russian dandelion, the *koksaghyz* and *krym-saghyz*, would do the trick. Both are native to the foothills of the Tien Shan Mountains and Crimea. Before long, dandelions were being cultivated on a massive scale in Russia, Kazakhstan, Belarus, Ukraine and the Baltic States.



T.DALLAS/SHUTTERSTOCK.COM

Plant selection for favourable traits was a long, slow process, however, and by the time the USSR entered the Second World War, it still depended on its allies for rubber. Following the Japanese occupation of Malaysia in 1942, around 97 per cent of the world's production of natural rubber was concentrated in the hands of the Axis powers, forcing the US and Britain to devote intensive efforts to developing synthetic rubber. Dandelion rubber never did become commercially viable, and the Soviets abandoned the project after the War.

Today, dandelion research is bouncing back, thanks to economic and environmental challenges as well as new developments in selection and genetic engineering.

Advocates cite numerous advantages: dandelions can be grown in northern climates close to industrial centres, a proximity that significantly reduces logistics costs and greenhouse gas emissions. The plants are very low-maintenance, can be grown on land not suitable for conventional agriculture, and harvesting can be fully automated. And their production cycle is much shorter than that of the Hevea, making it possible to react quickly to spikes in demand.

It will probably be at least another 10 to 15 years before dandelion rubber becomes a viable alternative for the car industry. More research is needed into resistance to pests and diseases, and no one has yet developed simple and effective methods for controlling the spread of the plant: dandelions are persistent weeds.

Another unresolved problem is the fact that only 10 to 15 per cent of the plant is used in rubber production, which means huge volumes of waste. One potential solution is the production of inulin, a polysaccharide used as a source of dietary fiber and in the production of prebiotics, now typically made from chicory root. Yet another challenge is the availability of land.

Among the companies sponsoring dandelion rubber research are Bridgestone, Cooper tyre, Goodyear, Ford, Linglong and Sumitomo Rubber. The German tyre firm Continental has emerged as leader of the pack; in 2014 it received the GreenTec Award in the Automobility category for its project to develop snow tyres with treads manufactured entyrely from dandelion rubber.

Earlier this year, Continental announced its intention to invest €35 million in the construction of a laboratory to produce dandelion rubber in Anklam in Germany. It will also increase crop area from 15 to 800 hectares over the next five years, enabling commercial-scale production. If all goes as planned, the harvest will go "from grams to kilos to tons," as one enthusiastic executive put it.

They're sharing cars in Morocco!

How a start-up helps decongest roads while also accelerating the collaborative economy

By STÉPHANIE JACOB

L'ECONOMISTE

It's the perfect match for modern-day living: self-service cars, by the hour or day, accessible 24/7 and with parking, fuel and insurance costs included. This facility, a first for Morocco, is on offer in Casablanca from the start-up Carmine (www.carmine.ma).

Self-service bikes had earlier rolled into the country, and cars are following suit; they offer a much-wanted service in the economic capital, burdened with chaotic traffic. The firm was created in 2014, and tested the waters with a pilot project in July 2015. According to CEO and founder Mohamed Mrani Alaoui, this was "a period during which we really reached maturity."

There are a whole load of necessary stages when a start-up introduces a new product to the market—running trials on rates, defining parking spaces through a partnership with the city, personalising technology and getting to know client needs.

Finding funding

"People generally thought that such a concept would not work in Morocco, an idea confirmed by the amount of time it took us to go into commercial operation. But that pilot period was about making the new service more effective. And then, the hardest part was to find funding. I started out alone with my own savings and we were extra careful until we found investors," Mrani Alaoui added.

Former Minister of Transportation Karim Ghellab signed up as an associate through his investment fund Massir Invest. This is the kind of backing that helped Carmine effectively expand in October 2017.

The cost

To fathom the quality of the service, Carmine must take into account a sample of 40 individual users per shared vehicle; 3,600 users in total for the 120 expected vehicles over a span of four years. Rates start at 30 MAD (US$3) per hour plus 1 MAD (10 US¢) per kilometer, with a subscription ranging between 290 MAD (US$31) for a quarter and 890 MAD (US$95) for a full year — fuel, insurance, and parking included.

Mohamed Mrani Alaoui started up Carmine when he returned from the US

COURTESY: CARMINE

Carmine's corporate philosophy is about more than just offering vehicles; the founder is committed to working towards safer driving habits.

In Carmine's fleet of vehicles, in-car technology saves all information related to clients' driving, be it accelerations or decelerations, turns, speed, and so on. When the vehicle runs at 80km/hr on a road where the limit is 60, the company is sent a warning.

This information, which remains confidential, is then turned into grades. A client who gets less than 7 out of 10 is given a period of time to improve, should they wish to retain their membership.

Incentivising safe driving

On the other hand, people scoring more than 9 out of 10 benefit from special offers. "This is our way of incentivising people to be careful on the road," the CEO said.

Having trained in actuarial methods in Montreal, and later in San Francisco, Mrani Alaoui has always seen himself as an entrepreneur. The idea of a shared car service came to him upon his return to Morocco.

"I didn't have a car when I got back to Casablanca. Coming back from the US, where such services are widespread, while here (Morocco) nothing of this sort was in place, I set myself to work."

The typical clientele interested in Alaoui's service ranges from young professionals such as himself, to people in transit, families or companies in occasional need of a main or secondary vehicle, and university students. In its own way, Carmind is stepping on the accelerator of a circular economy.

The caviar farm and the steel plant

An Italian caviar producer offers a model of an integrated economy by channelling water and heat from a steelworks facility

By ELENA COMELLI

nòva 24

Based in a small town in northern Italy, Agroittica Lombarda is the largest producer of caviar in Italy and has achieved global success, thanks to a model of integrated economy, which is regarded as an example of sustainability. In short, this is the success story of how wastewater from steel manufacturing has been used to facilitate the leading production of one of the world's most high-end foods: caviar.

It all started in the 1970s, when Feralpi steelworks teamed up with a Californian biologist to find a solution to the huge amounts of water and heat that were being wasted during the steel manufacturing process.

The answer lay in fish farming. In Calisano, a small town less than 30 km from Brescia, Agroittica Lombarda began breeding eels in the 1970s and moved on to sturgeon in the 1980s. The farm uses the surplus heat from the Feralpi plant to keep what has grown to over 60 hectares of pools, containing 500,000 Pacific sturgeon, at optimum temperatures.

A business model that represents a win-win approach ZIASHUSHA/SHUTTERSTOCK.COM

Italy has a tradition of fine food, but it was Agroittica Lombarda that established the country's reputation for the production of caviar, selling predominantly under the brand name Calvisius (www.calvisius.com). The world's most prized caviar comes from wild sturgeon in the Caspian Sea, but in 1998, under Cites, the international convention to protect endangered species, fishing of the Caspian sturgeon was restricted, and later banned outright, in 2010.

In 1978 there were 140 million fish living in the Pacific Ocean, but by 2001 this number had already decreased considerably. "This definitely encouraged the era of farmed caviar," said marketing director, Stefano Bottoli. Agroittica Lombarda was well-positioned, as the first sturgeon farmers in Europe, when the global caviar market shifted to farm fishing.

This successful business model runs on energy recovery, with the farm using the plant's energy to heat up rearing facilities, while the plant is refrigerated by the farm's water so that both of them save on energy costs. It is also an example of how high profits can be generated through a focus on sustainability.

The caviar produced at Agroittica Lombarda is farmed from an eco-friendly environment. Since the 1970s, many sturgeon have already disappeared from the waters of the Po River. By breeding these fish, Agroittica Lombarda is helping to protect the stock.

"The caviar cycle is extremely long and complex: the sex of the sturgeon can only be determined when they reach 5-6 years old and at this point, the males are slaughtered for their meat, while the females take at least another 6 years before they start to produce eggs," explains Bottoli.

A heat exchanger takes advantage of the high temperatures of the steelworks to keep the nursery above 20 degrees, and the other pools are maintained at around 16-18 degrees. The timing of the extraction of the eggs (20 kg per fish) is established through the constant ultrasound monitoring of the females, who are all equipped with a microchip. "This way, we ensure that we do not slaughter the fish before the point of maturity, which for wild sturgeon is not possible," notes Bottoli.

Some of the fish can exceed three meters in length and 500 kg in weight. Nothing is thrown away: the meat is eaten and the skin is turned into belts. "Apart from sturgeon meat, we are looking into the possibility of marketing the fish's cartilage, skin, and oil for use in cosmetics and regenerative medicine." Lelio Mondella, director of Agroittica Lombarda, said. "We are trying to build a second era, which is that of Italian caviar."