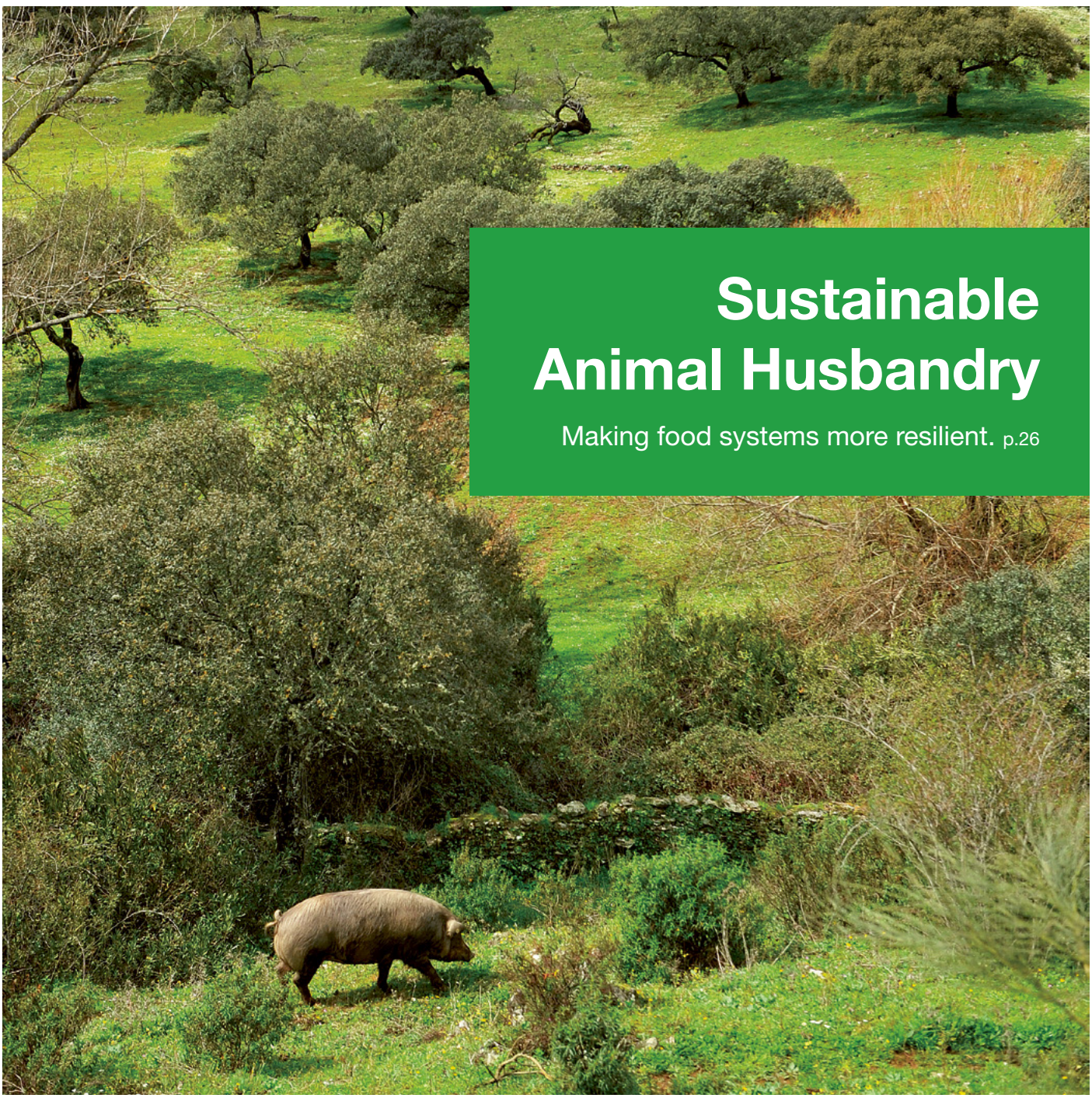
REVOLVE

QUARTERLY INSIGHTS INTO A CHANGING WORLD

N°47 | Spring 2023



Sustainable Animal Husbandry

Making food systems more resilient. p.26

Tall Timber Towers p.35 A Bio-Based World p.76 Energy Efficient Business p.52
Sustainability Meets Aesthetics p.10 Gender Conscious Mobility p.62

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Becoming Nature Positive

As a society we must do more to facilitate the restoration of the natural world. Working towards a 'nature positive' future we can ensure a healthy and resilient planet for future generations.

In this issue we explore how we can secure a more biodiverse future, starting with the sustainability of animal husbandry – a practice that has been with us for thousands of years and how research and innovation in the sector will play a critical role in redesigning a future of sustainable food systems.

Nature also has an active part in modern urban architecture. Paul Brannen tells us about the New European Bauhaus, and the key role that wood can play in lowering the carbon footprint of our buildings, as well as being an era-defining cultural development for Europe. This does not have to stop at low-rise buildings, as our VIEWS takes us to the skylines of cities hosting the tallest timber towers that are defining the urban vistas of tomorrow.

To understand the future, we must also understand our past. Historian Narayani Basu tells us stories of bravery and sacrifice, of the women who have and continue to lay down their lives in the name of nature conservation in India. According to the UN, women and girls experience the greatest impacts of climate change, which amplifies existing gender inequalities and poses unique threats to their livelihoods, health, and safety. These gender inequalities are especially prevalent in urban mobility, where women's mobility patterns shed light on the importance of inclusive, sustainable mobility, and we interview Rita Jacinto to learn more.

We turn to our ocean to unpack the consequences of decades of plastic mismanagement, and how projects in the Mediterranean can offer hope for a cleaner future. These small-scale actions can have huge implications; this is no more apparent than in the small to medium-sized businesses of Europe, that with better support, could hold the key to securing Europe's decarbonized future.

Finally we explore perspectives on recovered resources, where advancing the bioeconomy and recovered products can make our urban centers more resource efficient and reduce their environmental impact. ●

Do you want to contribute to REVOLVE? Send us your ideas: **editors@revolve.media**

Thanks for revolving with us!

Nature Positive by 2030

Biodiversity loss is a reality of our times that is scientifically proven by the **tragic depletion and indeed extinction of thousands and thousands of species.** According to Elizabeth Kolbert, we are living through the **“Sixth Extinction”** – the defining era of the Holocene epoch – in which human activities are causing severe climate altercations, including massive ‘die-offs’.

This visual shows **the loss of nature in our contemporary** world **and represents the restoration of nature post-2030** whereby the deeper greens to the right symbolize **the recovery of +30% of nature** as defined by the environmental goals set at the December 2022 United Nations Biodiversity Conference (CoP15) in Montreal, Canada.

Via a new set of stripes, REVOLVE brings together past, present and future in an abstract depiction of reality.

REVOLVE's visualization was inspired by the biodiversity stripes by **Miles Richardson** and the **Nature Positive** concept visual by **WWF** to go beyond 2030 towards a greener world again.

CIRAWA

Agroecological Solutions for
Resilient Farming in West Africa

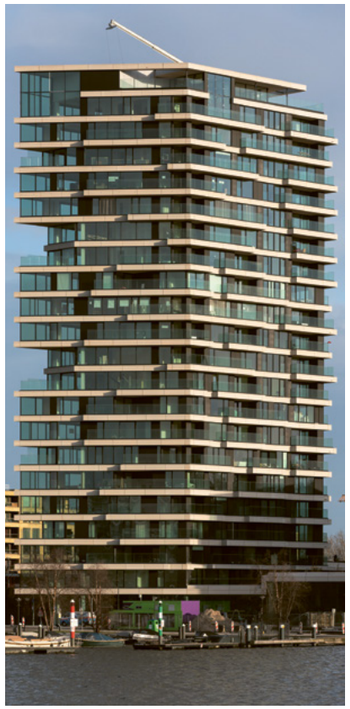
CIRAWA is working with small-holder farmers in West Africa to improve food nutrition, local livelihoods, and ecosystem health.

Bringing together 14 partners from 9 countries, CIRAWA is developing new agroecological-based practices that build on existing local and scientific knowledge to create more resilient food supply chains in 8 regions across Cape Verde, Ghana, Senegal, and The Gambia.

www.cirawa.eu

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Sustainable mobility must be inclusive for a just transition for all.



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R&D Project Officer, Cyprus Research and Innovation Center

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Joana Anjos

Research and Innovation Consultant, CONSULAI

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Narayani Basu

Author and Historian

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Paul Brannen

Director Public Affairs, CEI-Bois & EOS

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Marta Castillo Sánchez

Correspondent, REVOLVE

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Mariana Couto

International Project Officer, ECOVALIA

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Athena Fosler-Brazil

Junior Correspondent, REVOLVE

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Josh Franklin-Mann

Communication Officer, REVOLVE

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REVOLVE is committed to climate-conscious reforestation and tree-planting initiatives as part of our company's sustainability policy to mitigate the impact from our business and project travel activities.

revolve.media/reforest

To date, REVOLVE has planted 261 trees in reforestation projects in Roupage (BE) in 2020, Stoumont (BE) in 2021, and Martouzin (BE) and Zaragoza (ES) in 2022.



Rita Jacinto

Programme Manager, Lisbon City Council

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Danielle Kutka

Project Manager, REVOLVE

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Dina Lopes

Research and Innovation Director, CONSULAI

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Asya Al Marhubi

Communication Officer, REVOLVE

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Cover image:

The winner of REVOLVE's photo competition was provided by the mEATquality project and taken in Sierra de Huelva, Spain. 'Dehesas' or 'montados' are Mediterranean agroforestry systems characterized by scattered oak trees with an understory grazed by a combination of cattle, sheep, goats and pigs. This extensive farming system generally uses low animal densities. One of its main features is the native Iberian pig that eats acorns in addition to pasture resulting in their fatty, characteristic meat renowned as Iberico pork.

Photo: Ecovalia

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Shipping

REVOLVE is delivered to you on bicycle or with e-vehicles. (International shipping via larger carriers.)

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REVOLVE Group is dedicated to communicating sustainability. With offices and staff in Barcelona, Brussels, Lisbon, Mumbai, and Vienna, we publish an international magazine (ISSN 2033-2912) that compiles the 'best of' from our online content in quarterly issues focusing on water (winter), ecosystems (spring), energy (summer), and transport (autumn) with the circular economy as a recurrent theme. To subscribe, order back issues, or discover all our publications, including our country and industry reports, visit: **revolve.media/shop**

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Wood Defining Europe's Cultural Future

WRITER: **PAUL BRANNEN**

With the New European Bauhaus, wood can be the sustainable backbone of skylines of the future.



1

According to Forbes, European Commission President Ursula von der Leyen is the most powerful woman in the world. How one measures 'most powerful' I don't know, but presumably it involves the assessment that this is someone who can 'get things done.'

I remember reading a post-premiership interview with Tony Blair in which he recounted finally reaching the role of Prime Minister, only to discover that while there are many levers to pull to get things done, when he pulled them, nothing happened.

The mechanics of the Berlaymont must work better than those at 10 Downing Street because von der Leyen is getting things done. In part by circumnavigating the existing structures, she has developed and implemented her own special project – the New European Bauhaus.



2

What is the New European Bauhaus?

There was an 'old' European Bauhaus or, to be precise, a Bauhaus Movement. The Bauhaus was a school of applied arts established by Walter Gropius in Germany in 1919 and was noted for its refined functionalist approach to architecture and industrial design.

Born in part out of the horrors of the First World War, there was a clear sense of creating utopia as seen in Gropius's description: "let us strive for, conceive and create the new building of the future that will unite every discipline, architecture and sculpture and painting, and which will one day rise heavenwards from the million hands of craftsmen as a clear symbol of a new belief to come."

As a movement the Bauhaus was phenomenally successful until the Nazis rose to power and snuffed it out in Germany. However, the vision of the Bauhaus school had permeated into the wider world of architecture.

The style lived on, becoming in the words of Charly Wilder in 'The New York Times,' "wildly influential". She goes on to say, "It's difficult today to find some corner of design, architecture or the arts that doesn't bear its traces. The tubular chair, the glass-and-steel office tower, the clean uniformity of contemporary graphic design—so much of what we associate with the word 'modernism'—has roots in a small German art school that existed for only 14 years."

> "It's difficult today to find some corner of design, architecture or the arts that doesn't bear [the Bauhaus'] traces."
>
> — Charly Wilder

Material sustainability

Eighty-six years later, the Bauhaus Movement's DNA has been extracted and injected in 2020 into von der Leyen's New European Bauhaus (NEB).

In its own words, the New European Bauhaus is "a creative and interdisciplinary initiative that connects the European Green Deal to our living spaces and experiences."

The initiative calls on all of us to imagine and build together a sustainable and inclusive future that is beautiful for our eyes, minds, and souls.

Historically, the European Commission has adopted a position of material neutrality, not favoring material X over material Y when it comes to construction. This approach sits comfortably with two of the NEB's attributes: beauty, which after all is in the eye of the beholder, and inclusiveness. But sustainability? What if material X is indeed more sustainable than material Y?

Wood can certainly make our buildings more sustainable. Using more wood in construction can safely store vast amounts of carbon, which has been removed from the atmosphere through the sequestration ability of trees, via timber used in the built environment.

So in the world of wood, we certainly sat up and took notice on hearing von der Leyen's first State of the Union address (September 2020) in which she explained how buildings generate 40% of our emissions, and must become "less wasteful, less expensive and more sustainable."

She went on to set out her vision for a construction sector that can be turned from a carbon source to a carbon sink, "if organic building materials like wood and smart technologies like AI are applied."

For von der Leyen, the NEB is less of an environmental or economic project and instead more of a new cultural project for Europe. "We need to give our systemic change its own distinct aesthetic – to match style with sustainability."

In her words, this is why she set up the NEB to be "a co-creation space where architects, artists, students, engineers, [and] designers work together to make that happen."

From the perspective of the European wood industries, von der Leyen is 'opening the door' to an increase in nature-based materials. In response, we created the Wood4Bauhaus Alliance (W4B) with the specific aim of collectively engaging with the NEB.

The New European Bauhaus

Beautiful are the places, practices, and experiences that are:

Enriching, inspired by art and culture, responding to needs beyond functionality.

Sustainable, in harmony with nature, the environment, and our planet.

Inclusive, encouraging a dialogue across cultures, disciplines, genders and ages.

The New European Bauhaus is a creative and interdisciplinary initiative that connects the European Green Deal to our living spaces and experiences.

Source: European Commission

New European Bauhaus



3

In June 2022, von der Leyen called a major conference 'Reconstructing the Future for People and Planet – a New European Bauhaus Initiative' hosted by Pontifical Academy of Sciences in Vatican City, pulling in big names in the battle against climate breakdown, including a representative of W4B.

There she stated that, "sustainably harvested timber can reduce a building's carbon emissions by up to 60%. Pope Francis is right when he says that humans are not meant to be inundated by cement and steel. Building more with natural elements, like wood, is both good for the planet, and good for the well-being of people."

Needless to say, the world of wood was delighted to see that von der Leyen had secured the backing of the Pope for her New European Bauhaus, with its strong sustainability message – including more wood in construction.

That said, there is some way to go before the wood-in-construction revolution really takes off. As von der Leyen remarked at Into the Woods in 2022:

"Today, 3% of the overall material input in the European construction is timber. So, I would say that it is still a niche, but with a big room for improvement. And the demand is growing fast."

Professor John Schellnhuber of the Potsdam Institute of Climate Impact Research in Germany is one of the key thinkers behind the NEB. Schellnhuber's thinking is at the forefront of the argument that an increased use of wood in construction can decarbonize the built environment via substituting wood for materials such as concrete and steel that are together responsible for more than 12% of global carbon emissions. At the same time, using more wood in construction can safely store vast amounts of carbon, which has been removed from the atmosphere via the sequestration ability of trees.

Timber towers

What's holding back more construction in wood? Technically, we can do it. Engineered timbers, such as cross-laminated timber (CLT), have the structural strength of steel and concrete and their arrival has already enabled the construction of timber skyscrapers.

One such example is in Austria, which until 2019 held the record for the world's tallest timber building with their 18-story HoHo Wien building in Vienna, which stands at 85m. Now the Norwegians hold the record with the Mjøstårnet Tower. While having the same number of storeys as the HoHo building, it is 60cm taller.

The record will soon be heading to Australia, where the planning authorities in Perth have been asked to sign off on a colossal 183m wooden tower – taller than 'The Gherkin' in London – due for completion in 2025.

Offsetting costs

One factor holding back a profusion of new tall wooden buildings in our cities is cost. However, this may be about to change following a legislative initiative from the European Commission and a proof-of-concept scheme at the University of Washington in the United States.

In November 2022, the European Commission issued a proposal on carbon removals which will be discussed in the European Parliament in 2023. It opens the way to the development of a methodology for measuring carbon stored in wood products in the built environment that in turn will enable this stored carbon to be monetized and sold as carbon offsets. In the future,

> "3% of the overall material input in the European construction is timber. I would say that it is still a niche, but with a big room for improvement. And demand is growing fast."
>
> — Ursula von der Leyen

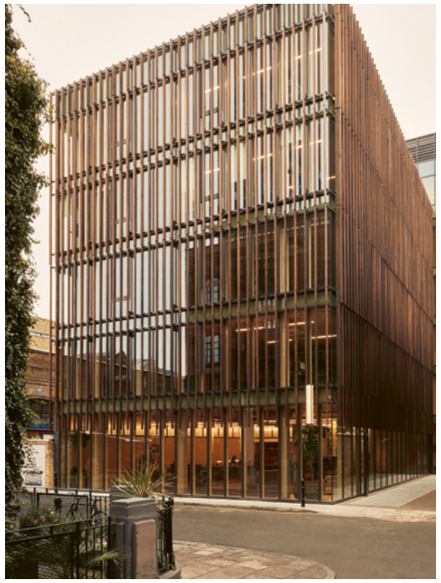


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1. Mjøstårnet. **Photo:** Moelven
2. 'Composition', screen printing by Theo van Doesburg. **Source:** Museum of New Zealand
3. The Mjøstårnet tower in Norway is the tallest timber building in the world. Completed in 2019, the wood tower symbolizes a shift in construction that centers sustainability. **Photo:** Moelven
4. Mjøstårnet. **Photo:** Moelven



5



6



7

any long-haul flights you take could be offset by purchasing the carbon stored in the engineered timber, making up some of the components in a wooden skyscraper.

In the United States, Aureus Earth calculated the carbon stored in the new Founders' Building at the University of Washington. Built from engineered timber, the carbon offsets generated were sold for the sum of $150,000. Such carbon offsets generated from storing carbon in timber in the built environment can be used to generate additional income for timber manufacturers, income which can be used to close the price gap between building with wood or building with carbon-intensive steel and concrete.

5. Black and White Building, London. **Photo:** Jake Curtis

6. Black and White Building, London. **Photo:** Jake Curtis

7. Black and White Building, London. **Photo:** Jake Curtis

But is there enough wood?

In 2022, the Potsdam Institute crunched the numbers and concluded that essentially 'yes': we will need to plant more and be highly materially efficient, but it is possible. The study explained that in 2020, forest plantations were only about 4% of global natural forests but accounted for more than a third of industrial roundwood production.

"In the mid to long-term, highly productive plantations could therefore increase wood production while alleviating harvest pressure from natural forests under strict biodiversity and land protection regimes," the study said.

Without doubt, the NEB is helping facilitate the transition to more wood in construction – a transition that is confirmed by a steady stream of new timber builds such as the Black and White Building, which is London's tallest wooden office block that opened to glowing reviews.

With its external tulip wood fins, its lift cabin lined with panels of cork and its structural columns and beams made from beech laminated veneer lumber, this is a beautiful building. A building in the style of von der Leyen's New European Bauhaus – beautiful, inclusive, sustainable. Hopefully one day she'll get to visit!

The New European Bauhaus

In 2020, the European Commission announced the New European Bauhaus (NEB) to connect a creative dimension to the European Green Deal and demonstrate how sustainability, aesthetic beauty and accessibility can interconnect as the European Union strives for a "greener" and more inclusive continent. The initiative creates a platform for institutions, citizens and professionals in business, science, art and design to collaborate on projects that align with the NEB vision.

President of the European Commission Ursula von der Leyen presented the NEB as being the initiative through which Europeans will "see, feel and experience the European Green Deal," positioning the movement as being the aesthetic and practical manifestation of the ambitious climate change policy targets.

The NEB offers financial prizes to EU Member State initiatives that champion the NEB's core tenets of sustainability, beauty and inclusivity. The funding goes to a diverse range of projects that address social, environmental and economic issues.

The 2022 NEB prize winners included Gleis 21, a cooperatively-owned and -operated housing project in Vienna; a sand dune regeneration initiative in Barcelona; and De Korenbloem, a Belgian housing project designed to provide care to people living with various disabilities.

In April 2022, the Commission launched The NEB Lab, a co-creation space that aims to create tangible results that align with NEB goals. The NEB Community and EU institutions create project proposals for the NEB Lab, which then helps ensure projects have the conditions and framework to facilitate a green transition.

New European Bauhaus

A People's History of Conservation in India

WRITER: **NARAYANI BASU**

For 600 years women have been at the heart of peaceful environmental protest in India.

1

The Thar Desert stretches, like an undulating golden-grey quilt, across Rajasthan. Summers here are blindingly hot, with temperatures reaching 50°C in the shade, and winds laden with sand, swirling across the landscape. The towns are bustling hubs of tourism and commerce, but in the outskirts, there is little to catch the eye, save for a scrubby, dry horizon. Here and there, breaking the monotony, you may find the unassuming khejri tree. This small but sturdy evergreen tree has been at the heart of battles since the beginning of time. During the days of the Ramayana, Lord Rama worshipped this tree before he went into fateful battle with Ravana, king of Lanka. Since then, the tree has been worshipped by Rajput royalty, for its auspicious symbolism. But in 1730, on an aridly hot day in September, the khejri tree found its roots bloodied by a new kind of conflict.

Amrita Devi was a member of the Bishnoi community, native to Rajasthan. The Bishnois are followers of the 15th century seer, Guru Jambheshwar, whose 29 commandments define the community's way of living. The tenets are fairly simple, preaching good social behaviour, personal hygiene, daily worship and the protection of animals and trees. Yet behind these simple rules lay a complex framework of coexistence and harmony, for the Bishnoi to practice a sustainable existence in an otherwise inhospitable climate. The khejri tree was the beating heart of that way of life. Not only did it provide invaluable shade, but its leaves were fodder for livestock, its pods were edible and its wood could be used for fuel. This last characteristic of the khejri tree was the most attractive for Abhay Singh, ruler of Jodhpur, on that September morning in 1730.

The king had decided to build a new palace for himself and needed wood to keep the massive kilns in Jodhpur firing. Abhay Singh had heard of the green groves of khejri that grew abundantly in a village called Khejarli, some 20 kilometres out of the city gates. He dispatched men to the village, with orders to cut down the trees and bring back supplies of wood. There was absolute uproar in Khejarli when the king's men arrived. Cutting down – or otherwise harming – trees was against the dharma of the Bishnoi. An argument ensued and voices were raised.



2

On hearing the commotion, Amrita Devi rushed out of her house. Her curiosity soon transformed into shock. She launched herself at the nearest tree, hugging it desperately. If the men wanted to cut it down, she told them, they would have to take her with it. The story goes that the men didn't hesitate, slicing cleanly through Amrita with their axes and hacking the tree down with her. Distraught, her three daughters – who had followed their mother out of the house –clasped nearby trees too. They were mowed down as well. By this time, word of the bloodshed in Khejarli had spread to over 80 Bishnoi villages. A hasty council of village elders produced one result: for every tree that would be cut down, one Bishnoi volunteer would sacrifice his or her life. In all, 363 Bishnois across 49 villages laid down their lives that day.

The implications of that act were resounding. Abhay Singh, overcome with remorse, issued a public apology and a decree, prohibiting the cutting of trees and hunting of animals within and near Bishnoi villages. That decree holds even today.

In pre-colonial times, actions like those of Amrita Devi were not sensational acts of sacrifice, but accepted practices, based on ideas of land ownership. These, for the most part, were based on communal ownership, an inherent respect for nature and the belief that humans were part of a larger ecosystem. In pre-colonial ecological Indian history, the emphasis was on man appreciating nature as a valuable entity, despite a more practical system for revenue and agriculture being in place.

Ecological Struggles in Post-Colonial India

Centuries have passed since Amrita Devi gave up her life for the khejri tree. India is home today to communities that are as diverse as they are independent of each other – from the tribes of the Andamans to the nomadic shepherds of Himachal Pradesh; from the textile mills in Coimbatore to the steel towns of Jamshedpur; from the toddy-tappers in Tamil Nadu to the pottery kilns of Rajasthan. Yet, modern India is also a society deeply riven by economic, social and political conflicts, most of which centre around ecological resources.

Harsh Sethi, a lawyer and leading scholar on environmental issues, divides the environmental struggles in India into five categories:

a) Forest based
b) Land use based
c) Against big dams
d) Against industrial pollution
e) Against the exploitation of marine resources

Post-independence, as constitutional and political reform took centre stage, the environment barely figured into discussions on national progress. Even as Indira Gandhi was forming Project Tiger, to save the majestic animal from extinction, there was a greater push towards industrialisation, towards the kind of progress that could be quantified in concrete terms.

Around the same time, the densely forested Terai region of Uttarakhand, nestled in the Himalayan foothills, had caught the eye of timber merchants. By early 1972, large-scale deforestation was scything through the hills, resulting in the loss of topsoil and, inevitably, landslides and floods. Women were devastated by the consequences of this brazen deforestation. It now took them twice as long to collect wood for fuel, fodder or water. The discontent in the region began in Chamoli, taking shape in the voices of Bachni Devi, Sudesha Devi and Gaura Devi. Each of these women shared similar stories – of resilience, of courage and of, despite a lack of formal education, an almost instinctive awareness of the impact of ecological imbalance of any kind.

In 1974, when contractors hired by a sports equipment organisation from Allahabad came to the village of Raini to

Ecological struggles in post-colonial India have been those of the poor, the dispossessed, the marginalized and discriminated, and the landless.

begin felling trees, Gaura Devi, accompanied by 26 other women, went into the woods late at night and faced down the company's workers. Gaura called the trees her maika (mother's home) and invited the loggers to shoot them instead of cutting the trees. Work was halted all night as the women hugged the trees, despite a hail of abuse and threats. Over the next few days, more villagers joined the protest.

Gaura Devi's bravery inspired other movements across the environmentally sensitive region, finding echoes in the protests against the building of the Tehri Dam across the Tehri River in 1978. Sudesha Devi, who had been a leader of the Chipko Movement herself, went up against local police and contractors against the preservation of the Rampur Forest, and was jailed for three weeks for her stand. In the 1980s, Chipko activists protested limestone mining in the Doon Valley, leading to the banning of quarrying in the region and a vast public drive for afforestation.

Ecological struggles in post-colonial India have been those of the poor, the dispossessed, the marginalised and discriminated, and the landless. Most movements have also been around the conservation of natural resources to sustain livelihoods. The role of women, and rural women in particular, in modern-day fights cannot be underestimated. In rural India, women are responsible for sustenance and survival, for bringing in water, fuel, fodder and generally ensuring a functional hearth and home. They are keepers of biodiversity, taking on the burden of seeding, weeding and harvesting. For them, the impact of deforestation and the need to conserve water and other resources is far higher. Small wonder, then, that Amrita Devi's sacrifices found an echo in women's struggles in modern India, particularly in the Chipko Movement of the 1970s.



3



4

1. Women's in Ranthambore. Rajasthan, India. **Photo:** Kandukuru Nagarjun
2. Khejri trees on the Bikaner-Jaipur highway, India. **Photo:** Kandukuru Nagarjun
3. Tigress at the onset of summer. Mukki Zone, Kanha National Park, India. **Photo:** Kandukuru Nagarjun
4. Migration season at Keoladeo National Park, Bharatpur, India. **Photo:** Kandukuru Nagarjun
5. Woman carrying freshly cut grass. Village near Bandhavgarh, India. **Photo:** Kandukuru Nagarjun

Echoes of the Chipko movement in Modern India

The Chipko Movement opened the floodgates for women's participation in conservation in modern India. There were many ways in which women could and did participate, and each of these methods relied on non-violence – from hugging trees to wielding their pens in protest. In 1976, an article written by the environmental activist, Prof. M.K. Prasad drew attention to one of the most endangered yet least studied habitats on earth: the Silent Valley in the district of Palakkad in Kerala. The central government wanted to build a 120 MW hydroelectric project amidst the greenery of the Valley. A committed conservationist and a secret poetess, Sugathakumari lost no time in bringing together a small group of activists and scientists who shared her concerns for the fate of Silent Valley. Her poem, Marathinu Stuti (Ode to a Tree) became the anthem for the movement to save the Silent Valley. As a result, the Forest Conservation Ordinance was passed in 1980, which stipulated that non-forestry on forest lands couldn't be re-routed without the prior approval of the central government. In 1983, the Government of India abandoned the hydel project altogether, in order to conserve the Valley.

In the Uttara Kannada region of Karnataka, the Appiko Movement saw women coming out to protest the widespread devastation caused by major industries like pulp and paper mills and hydel projects in the area. The immense damage was leading to the submersion of huge swathes of forest and agricultural areas and a



5

sharp shrinkage in forest cover. A massive padyatra was undertaken across the Western Ghats, from Karnataka to Goa, to raise awareness about the evils of deforestation.

Then, there was the Narmada Bachao Andolan, a movement that gained immense publicity under the leadership of Medha Patkar. The Andolan galvanised awareness of ecological disasters that could stem from projects aimed at development. Several more women have since become the faces of various major milestones in India's ecological politics. Noted river activist Latha Anantha, who passed away in 2017 after battling a prolonged illness, fought spiritedly for the restoration of natural river flows, including against the construction of the dam on the Chalakudi River.

Then, there are those who continue to fight quietly, like Nizara Phukan, the 31-year-old PhD student from Jawaharlal Nehru University, who embarked on a padyatra from her native home in Sivasagar to New Delhi in 2019, in order to raise awareness about the impact of climate change. Then, there is Saalumarada Thimmakka, the woman who planted and nurtured over 380 banyan trees in a single stretch of four kilometres on a barren highway between Hulikal and Kudur in her native state of Karnataka. The story goes that these banyan trees were, for Saalumarada, like her own little children – for she was unable to have any of her own.

But in all these cases, women tended to underscore the point that violence is not required to effect immediate change. It is a quiet list, but it is all the more powerful because of the wide spectrum of women, across class, caste and community, involved in the fight to protect the environment. Seen from a historical lens, then, it is clear that environmental fissures are as deeply gendered as political or social fissures, even in the 21st century.

That is why even though women's interactions with nature and their responses to environmental devastation must be seen within the parameters of labour, power and ownership of property, it must equally be recognised that women are not merely victims of an unequal socio-economic matrix. They are key agents of change, whether rural or urban. In order to reframe the struggles of women – from Amrita Devi to Medha Patkar and from Gaura Devi to the more recent example of Dr. Purnima Devi Barman, fighting to save the Greater Adjutant Stork from extinction in Assam – in trying to protect the environment, there must be a shift in perception, from treating women as objects of policy to recognising their capacity to catalyse change. Only then can women truly emerge from the shadows of India's complex conservation politics.

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Coming in 2023

Livestock for Sustainable Food Systems

WRITERS: **DANIELLE KUTKA, MARIA ANASTASI, MARIANA COUTO, DINA LOPES, AND JOANA ANJOS**

How research and innovation in livestock husbandry can enable more sustainable food systems.

1

A practice dating back 11,000 years, animal husbandry has been vital to the settling of people and civilization as we know it today. While the approaches to raising livestock for meat, milk, eggs, and other products have changed drastically throughout the course of history, one constant is the relationship between people, animals and nature that has sustained populations for centuries: animals are assured food, shelter and care, while the people that raise them benefit from their produce.

Any livestock farmer will tell you their animals are at the heart of what they do. Farmers are the backbone of the European economy, with rural economies depending on agriculture and livestock rearing. As a matter of fact: of the 10.5 million farms in the EU, over 95% are considered family farms. Living on and with the land, these farmers and their livestock can offer a multitude of benefits and ecosystem services – from the provision of goods that support local livelihoods and food sovereignty, to contributing to nutrient cycles and meaningful aesthetic, cultural values.

Yet in the context of the climate crisis and socio-politics, the indisputable impacts of livestock farming can overshadow the farmers, vets, and other value chain actors working day-in and day out to ensure we have food on our plates. With the strains on our global food systems in the wake of COVID-19 and Russia's war on Ukraine – from food shortages to fertilizer crises amidst pressures of extreme weather, supply chain disruptions, population growth, animal diseases, and mounting consumer demands – today's farming is not the farming of yesteryear.

Towards sustainable farming by 2050

Food production accounts for one-third of global greenhouse gas (GHG) emissions and nearly 70% of all EU agricultural emissions come from the livestock sector. With global demand for meat products projected to double by 2050, more intensive production will likely put further strain on natural resources with greater impacts on the environment. As a result, the EU livestock sector is front and center of a much-contested sustainability debate. While many arguments circulate amongst the farming community, academics, and consumers on what types of livestock systems are most sustainable, a future without livestock is neither probable nor practical.

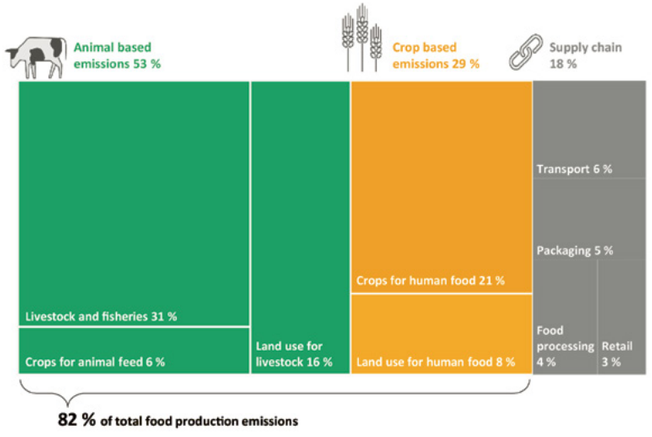
With the dawn of the EU Green Deal setting forth Europe's ambitions to become climate-neutral by 2050, the Farm-to-Fork Strategy aims to make food systems sustainable with targets for reaching 25% of organic agricultural land farming, 50% less pesticide use, 20% less fertilizer use, and halving the sale of antimicrobials used for farmed animals by 2030.

Reaching these targets will undoubtedly influence the livestock sector but shifts in policy and consumer demands are already spurring innovations towards sustainability. But what does a sustainable European livestock sector look like and how do we get there? To answer this, we delve into the work of four research projects – PATHWAYS, mEATquality, CODE: Re-farm, and INTAQT – which are examining different sustainability indicators in livestock farming systems to measure the trade-offs, productivity, and welfare aspects that need to be considered when meeting consumer demands for quality, sustainable products.

95% of the 10.5 million farms in the EU are considered family farms.

Source: Eurostat

Global greenhouse gas emissions from food production



Source: From 'Common Agricultural Policy and Climate Special Report', ECA based on Poore, J. and Nemecek, T.: Reducing food's environmental impacts through producers and consumers, 2018.



2



3

Complexities of different livestock systems

Europe is home to many different husbandry systems that were shaped over centuries by ecology, traditions, resources, and socio-economic factors that culminated in the techniques we see today. Different breeds of livestock, how they are kept, and the management of landscapes all determine the type of system – from intensive production systems to extensive production systems that range from conventional to organic and free-range.

Robust science is pivotal to understanding the complexities of these systems and the role of livestock in shaping sustainable food systems. However, we first must understand what contributions the sector has to society – a difficult order considering no holistic assessment exists to do so. This is one of the main aims of the PATHWAYS project: to understand livestock systems' contributions to indicators such as productivity, health, animal welfare, GHG emissions and ecosystem services by developing a multi-dimensional assessment and holistic scenario evaluation to assess livestock systems from farm to fork. The project is co-designing scenarios and associated transition pathways for a sustainable European livestock sector with all stakeholders – from farmers to policy-makers and consumers.

Shifts in consumer expectations towards animal welfare, demands for nutritional products, and social and environmental factors are fostering novelties in the livestock sector; however, these advancements have not been systematically or scientifically evaluated, especially regarding the sustainability of production and the quality of the products coming from different EU farming systems.

Over the past 50 years, the intensification of animal production has grown to meet global demand and along with it concerns of the impacts these systems have on the environment and animal welfare that can undermine product quality. This has led to public skepticism about the sustainability of intensive production methods that often house animals in specialized, indoor mechanized farming operations. It is largely regarded that good animal health is a driver for better production and even for the environment (improved diets and nutrition can lower emissions). As such, intensive farming does not necessarily equate to negative animal welfare or worse environmental impacts and can even result in better care for animals and the use of resources, having positive outcomes for sustainability metrics such as gas emissions. The work of these projects to assess and measure sustainability indicators and uncover these nuances will help elucidate the tangible trade-offs between different farming systems and their productivity.

Extensive livestock production systems, on the other hand, are low-input systems that are often deemed the most idealistic production system, prized for their perceived quality. Extensive systems play a critical role in supporting rural communities and known examples include pasture-fed beef or dairy cows that graze on diverse grasslands – an efficient land management practice that enables animal welfare and soil regeneration by aiding in carbon sequestration, forage production, and water cycles. Such systems are also crucial for economies and community, as farmers can make a premium on the products sold from these husbandry practices.

But what is the relationship between the quality of the product and the system type – do extensive husbandry practices really mean higher quality products? The mEATquality project is working to link extensive husbandry practices to the intrinsic quality of pork and broiler meat by analyzing consumer preferences on sustainable meat production and applying extensive husbandry practices to different production systems. The project is testing new solutions with farmers and chain partners to address demands, environmental concerns, and economic needs on farms and in the chain for higher quality meat by considering on-farm factors such as genetics, feed or forage-based diets, and the quantity and quality of the space and stress of the animal.

Consumer demands for quality, sustainable products

Modern consumers want quality, sustainably produced, welfare-friendly products at their fingertips. When considering social and ethical aspects of livestock production, it is often believed extensive production to be synonymous with better production quality. However, the economic sustainability of these systems has also been called into question as they can face challenges of natural resource limitations, adverse climatic conditions and disease. Products from extensive systems are perceived as being of superior quality, but their resource-limited environments can undermine their safety.

Delving deeper into the links between husbandry systems and the intrinsic



4



5

1. A cow looks on from its pasture. **Photo:** Paid for by the INTAQT project
2. PATHWAYS partners and cows mingle during a trip to the SLU's Swedish Livestock Research Centre. **Photo:** PATHWAYS
3. Meat stand. **Photo:** Benjamin Ashton
4. Intensive Broiler system in the Netherlands. **Photo:** CODE: RE-FARM
5. Cheese production in Italy. **Photo:** CODE: RE-FARM

quality of the derived products, CODE: Re-farm is comparing different production systems on commercial farms – both intensive and extensive – by testing combinations of breeds, production lines, and farming systems for poultry production (meat and eggs) and goat milk production – to assess each combination's animal health and welfare indicators, product yields, quality and nutritional value.

Through using new technological tools for milk and egg analysis, pre-clinical mastitis detection, microbiome analysis, automated animal health and welfare assessments and gas analysis, producers will be able to evaluate more holistically the health and sustainability of the system while ensuring consumers that the derived products are of high-quality with animal welfare and the environment in mind.

Building on the aspects of quality and sustainability, the INTAQT project is contributing towards the "One Quality" concept – a new concept that can be used to evaluate products for their attainment of high quality and sustainability.

Focusing on chicken, beef and dairy products, INTAQT is assessing the relationship between the quality of products and the associated husbandry system and sustainability of its production. The evaluation of trade-offs or synergies between quality traits or between product quality and other components of the farming system's sustainability will be done with relation to competitiveness, animal welfare and environmental impact. The efficiency of similar tools has been demonstrated already, for instance, in the Australian beef industry which adopted a scoring tool that resulted in supplying better and appropriately labelled beef to consumers that increased the selling price of bovine carcasses by 5.5% when compared to non-labelled.

> "Finally we will be able to address the intrinsic quality of products and the sustainability of production methods, which is essential for consumers to make informed choices. No more partial approaches that lead to misleading conclusions."
>
> — Bruno Martin, INTAQT coordinator

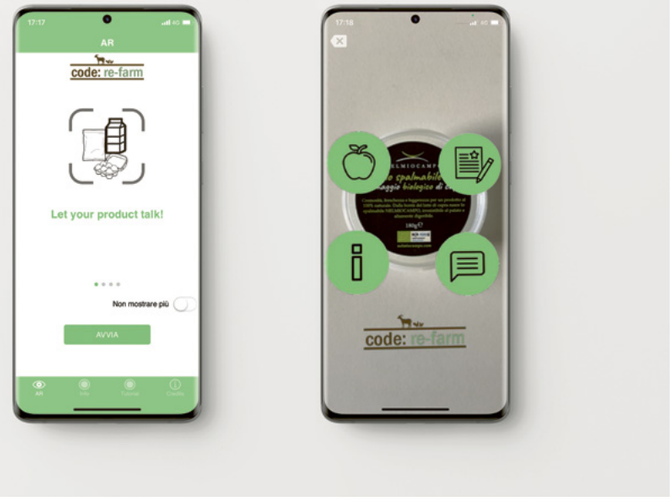
Consumers play a critical role in shaping sustainable food futures – a point that cannot be overlooked when seeking to improve transparency between livestock value chains and the checkout counter. These projects are also looking to empower consumers through innovative means, such as mobile applications that foster the transfer of information from farm to fork of the related sustainability and welfare components of animal products. By doing so, the aim is to reinforce consumer confidence and willingness to pay for products whose origins have been verified and their quality and sustainability validated by a defined set of holistic standards. Additionally, combating food fraud, mEATquality will test fingerprinting and blockchain technology for final product authentication.

The ongoing research and innovation in these livestock-focused projects are laying the groundwork for a future of more sustainable livestock systems through holistic assessments that could enable a farming revolution. When considering the future for livestock systems, the tradeoffs between having higher sustainability standards, costs, and other probable factors need to be studied to ensure that policy, practice, and consumer choices for sustainable livestock husbandry is science-based. The testing of innovations in living labs is an opportunity for practitioners to exchange on new best practices, while working together with all food chain actors, policy-makers and consumers will help design and promote innovative and sustainable husbandry practices while producing high-quality products.

The essence of these projects is to bridge the gap between farm to fork – from the hands of the farmer to our plates. If successful, the EU could very well be the leader it aims to be by redesigning the livestock sector with quality and sustainability becoming inherent to each another.

Consumer and Producer Applications

The **CODE: Re-Farm App (2024)** will create an interactive link between consumers and the rest of the value chain by increasing the information already available on a product's packaging, showcasing the journey of a product, from farm to fork. It will use augmented reality to offer consumers information on the health and welfare of the animals involved in the making of a product, the product's nutriscore, recyclability of the packaging, and information on the producer, as well as recipe suggestions that allows consumer to provide feedback on the products and submit their own recipes.



The **PATHWAYS Consumer App (2025)** will allow users to choose between different balanced diets concerning nutrition and sustainability. The website will include a decision-tree journey to take consumers down possible future sustainable livestock scenarios.

The **mEATquality Extensive Practices App (2025)** is for pig and broiler producers and will advise farmers on the extensification of their farming systems and present "what if" options for their situation.



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VIEWS

Timber Towers

Climate-conscious construction takes to new heights

REVOLVE's Forests in Cities VIEWS cover story premiered in Spring 2018 with a look to low-carbon wood structures and integrating greenery in urban architectural design. Half a decade later, we are taking stock of the world's tallest mass timber concepts and constructs.

Europe has the most high-rise timber buildings making up around 71% of the total, followed by North America at 18%. As of February 2023, the tallest concrete-timber hybrid is Ascent MKE in Milwaukee, USA – a 25-story (86.6-meter) luxury apartment high-rise, while the 18-story mixed-use building Mjøstårnet in Norway is the tallest all-timber building to date at 85.4 meters.

Growing trends to use low-carbon construction materials such as cross-laminated timber (CLT) and glued laminated timber (glulam) are popular with developers and clients for its aesthetic appeal; however, the devastating earthquakes in Turkey in early 2023 are a stark reminder of the benefits that timber constructions can have in building more climate-resilient cities. The strength and natural elasticity of wood, in combination with good seismic design can be a changemaker for earthquake prone areas that can even exceed the seismic performance of comparable steel and concrete structures.

With the CLT market projected to reach 3.2 million USD by 2030, more than triple what it was in 2021, the future is betting on wood for more climate-conscious, modern constructions – but just how high does the world's timber tower ambitions go?

HAUT, Amsterdam, The Netherlands. **Image:** Jannes Linders





Milwaukee, WI, USA – Ascent is a luxurious apartment high rise at an impressive 25-stories (86.6 m) on the Milwaukee skyline. It took the title for the world's tallest mass timber structure when it finished construction in August 2022. The project received a US Department of Agriculture grant awarded through the Forest Service's Wood Innovations Grant program that supported the testing of mass timber to match the performance of concrete and steel to meet US building codes. **Photos:** (left and above) Nate Vomhof (below) New Land Enterprises.





Brumunddal, Norway – At 18 stories, 85.4 meters high, Mjøstårnet is the world's tallest all-wood construction completed in 2019. It is now Norway's third tallest building with that serves as a residence and hotel. The design concept of Mjøstårnet was inspired by the Paris Agreement and aimed to sustainably source construction materials locally.









Vienna, Austria – At 84-meters, 24-story high wood-concrete hybrid structure HoHo Wien houses a hotel, apartments, restaurant and wellness center and offices and relies on renewables high efficiency helps the building to save 2,800 tons of carbon emissions compared to conventional structures of a similar size. **Photos:** (left) Robert Fritz / DERFRITZ (above and below) Sima Prodinger





Skellefteå, Sweden – At 75-meter high, Sara Kulturhus Centre in Skellefteå created a new space for arts, performance, and literature in the Sweden's tallest timber building to date. Crafted from timber harvested around Skellefteå, it is equipped with solar panels, batteries, and a heat pump in efforts to maintain a carbon neutral energy system.
Photos: (above and below) Johan Wennerstrom









Amsterdam, The Netherlands – At a height of 73 meters, the 21-story HAUT Amsterdam is the Netherland's tallest hybrid wooden building, and equally one of the tallest in the world. Through a bio-based structure of 2,000 cubic meters of timber, the building can sequester and store around 1,800 tonnes of CO2. **Photos:** Jannes Linders







Victoria, Australia – At a height of 69.7 meters, 55 Southbank Boulevard is the first cross-laminated timber (CLT) high-rise hotel in Australia. Leading the way in sustainable design, approximately 5,300 tons of CLT were used to add 10 levels to an existing commercial building, offsetting nearly 4,200 tons of CO2 from the atmosphere. **Photos:** Bates Smart / Peter Clarke





Vancouver, BC, Canada – Brock Commons Tallwood House is a 53-meter high residence hall at the University of British Columbia constructed from mass timber elements that were fabricated from the province. Brock Commons is home to over 400 students and provides study and amenity spaces. **Photos:** (left and above) Steven Errico / Brudder Productions (below) Michael Elkan.





Toronto, ON, Canada – Under construction, at 52.5 meters and with expected completion in 2024, the Limberlost Place at George Brown College is constructed with 'Made in Canada' mass timber. This net-zero carbon emissions project will be able to run passively 50% of the year.



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Energy Audits for More Sustainable Business

WRITER: **JOSH FRANKLIN-MANN & ATHENA FOSLER-BRAZIL**

SMEs are at the heart of Europe's decarbonization plans.

1

Europe's energy context

In 2021, the EU's 'Fit for 55' plan legally codified its ambitious goal of reducing emissions by at least 55% by 2030. This goal has since become a necessity, in light of Russia's invasion of Ukraine in February 2022 placing increased scrutiny on the Continent's decarbonization plans. The subsequent fluctuation of prices in the energy market has forced the EU to bring forward its plans for both finding alternative sources of energy and reducing energy consumption.

Between February and July of 2022, wholesale gas and electricity prices in Europe skyrocketed by 115% and 237% respectively. Worldwide in 2022, high fuel costs accounted for 90% of electricity price increases, leaving 70 million people in developing countries with recent access to electricity no longer able to afford it.

People in the EU were also hit hard. According to the Council of the European Union, consumer electricity prices in 2022 were 35% higher than in 2021, illustrating an enormous strain on both households and businesses to pay energy bills across the continent.

In 2022, Reuters reported that in Belgium 24% of businesses were at risk of collapse in contrast to past years when the average was closer to 5%. That same year in the UK, approximately 96% of businesses were concerned about energy prices, with 53% of UK small and medium-sized enterprises (SMEs) expected to close or reduce their activities as a result.

This strain on businesses – SMEs in particular – is widespread across Europe. While energy-intensive sectors such as building materials, metal, and refining industries have been singled out as most at-risk by Oxford Economics, small firms in the service and retail industries have reported the highest amounts of debt acquisition due to rising energy costs.

What is an SME?

The EU defines an SME as a business that meets at least two of the following criteria:

(1) having fewer than 250 employees with an annual turnover of less than €50 million, or

(2) an annual balance sheet total of less than €43 million.

Given these specifications, **SMEs account for 99% of all businesses in the EU, employing around 100 million people.** The impacts of the energy crisis on these businesses means **a ripple effect on individuals, communities and national economies.**

As the backbone of the wider EU economy, **SMEs need support to recover from the energy crisis of 2022 and to become more resilient should such crises recur in the future.**



2

Continental business impact

Immediately following Russia's invasion of Ukraine, the EU acted to mitigate the impact of the impending energy crisis with its REPowerEU plan that focused on reducing the EU's dependence on Russian gas, while also "tackling the climate crisis" through energy savings and an accelerated roll-out of renewables.

There was initial skepticism of the approach, given their inclusion of policies that discouraged growth of companies producing electricity from renewables and the rise in share of petroleum and natural gas imports by 2.2% and 8.1% respectively in autumn of 2022.

This fueled fears that Europe could see a dramatic shift towards coal and oil to replace Russian gas, especially after European Commission President Ursula von der Leyen met with the CEOs of Shell, BP, Total, Eni, E.ON and Vattenfall in March 2022 to discuss the need to secure the short-term supply of petroleum.

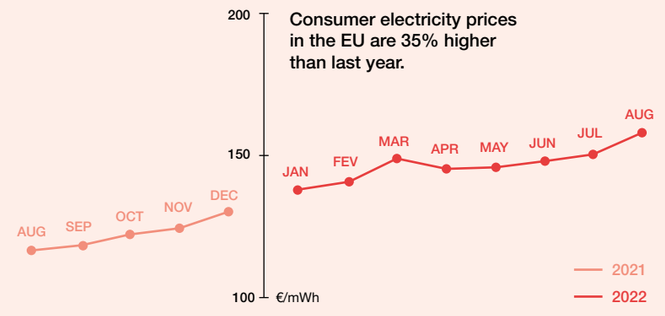
However, these fears did not fully materialize as the share of electricity generation from wind and solar surpassed that of fossil fuels for the first time in the EU.

This shift towards renewables is a welcome one, but the EU cannot meet decarbonization targets just through an increased focus on renewables and greater energy independence. Without increased energy efficiency, there can be no Net Zero.

1. Properly supporting SMEs to decarbonize has an important contribution to long-term climate targets. **Photo:** Erik Mclean / Unsplash

2. Wind turbine in the French countryside. EU's Fit for 55 plan will increase the binding energy efficiency target from 9% to 13%. **Photo:** Yves Bernardi / Pixabay

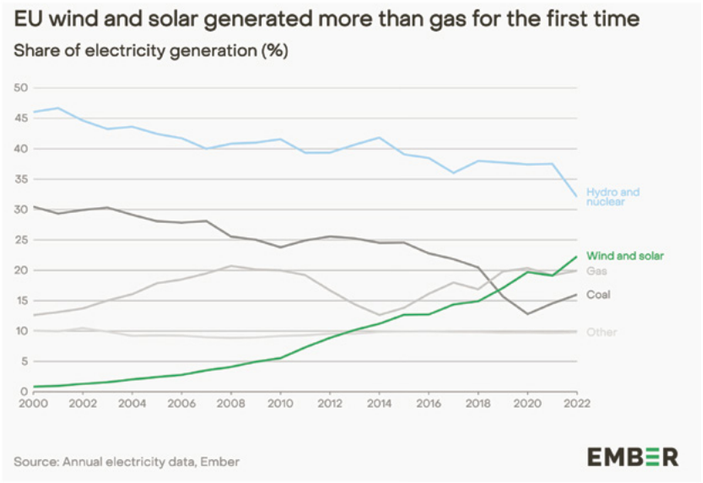
Energy prices in the EU



Source: Adapted by REVOLVE from www.consilium.europa.eu/en/infographics/eu-measures-to-cut-down-energy-bills



3



Decarbonization with ‘energy efficiency first’

The need for increased energy efficiency in the EU has been officially recognized for over a decade. In 2012, the EU announced its Energy Efficiency Directive (EED) requiring Member States to implement energy efficiency measures. Amended in 2018, it set the goal of a reduction of energy consumption of 32.5% by 2030, but such a decrease in energy use still wouldn’t be enough to stay on target for Net Zero by 2050.

Taking this into account, the EU set a new energy efficiency target of a 42.5% reduction of primary energy use by 2030. Speaking at World Sustainable Energy Days in Wels, Austria, Carlos Sanchez Rivero from DG Energy stated that “Renewables, electrification and energy efficiency are the main pillars of the energy transition.” He went further, reiterating the increase of the EU’s Fit for 55 binding energy efficiency target from 9% to 13%.

But a large part of the EU’s communication on energy efficiency focuses on changes in energy choices, which are “mainly voluntary and rely on goodwill.” This can have some effect on Europe’s overall energy efficiency, with the IEA stating that choices alone could reduce gas consumption by 5%. But the people running small businesses need more guidance to understand exactly how they can be more energy efficient.

An essential part of businesses receiving this guidance is through energy audits. Adrianna Threpsiadi, from the UK’s Energy Saving Trust, emphasized the important role energy audits will play in meeting decarbonization targets.

3. In 2022, the share of electricity generation from wind and solar surpassed fossil fuels for the first time in the EU. **Photo:** F. Heiberger / Pixabay
4. Coal fired power station. **Photo:** Pixabay
5. The advantages of energy audits are not restricted to monetary benefits and energy savings, but also non-energy benefits such as health, well-being, innovation and competitiveness. **Photo:** Remy Gieling / Unsplash
6. SMEs are the backbone of the EU economy, making up 99% of all businesses. **Photo:** Arno Senoner / Unsplash

“Properly supporting SMEs to decarbonize can have a really important contribution to those long-term climate targets, and audits are an important part of the framework that is needed,” Threpsiadi said.

But for these audits to be effective, SMEs must have the resources available to them to understand exactly what an energy audit is, and how they can get access to one.



4

The Importance of Energy Audits

The energy audit process normally involves several steps, including data collection and analysis and evaluation of different processes conducted by the business such as heating, refrigeration, transportation and other industrial processes. This analysis is then presented to the business with recommended ways to improve their energy efficiency.

Energy audits are pivotal to increasing awareness of energy efficiency as well as suggesting concrete actions to improve it. The role of energy audits is recognized in the EED, with the European Union requiring all large businesses to conduct an energy audit every four years. Small businesses, however, are not required to do so.

According to research done by the LEAP4SME project, the voluntary nature of energy audits is seen as a barrier to increasing energy efficiency by both businesses and by national organizations. The implementation of the findings of energy audits is also not compulsory.

Energy audits are key for businesses to understand where they can save energy and reduce costs, particularly during periods with high energy costs. But it is also important to understand that energy audits can provide numerous non-energy benefits, such as improved air quality and an overall improved working environment with implications for better health and well-being.

Claudia Toro, from the Italian National Energy Agency, explains that businesses are often unaware of the benefits of energy audits.

“SMEs are not conscious of the advantages of energy efficiency, which are not only related to energy. There are a lot of other non-energy benefits which are completely unknown for companies,” Toro says.

According to a survey conducted by LEAP4SME, companies ranked improving the their perceived image right below the direct economic and environmental benefits of increased energy efficiency. Therefore, being able to demonstrate a commitment to sustainability is no longer an option for businesses, but a necessity.

However, that same survey showed that there are still several barriers for businesses wanting to implement energy saving measures. Energy audits can be expensive, and the recommendations they make often require substantial investment to implement, even if the rate of return on those efficiency investments is high.

This is what makes strong, robust, energy audit policies so important. In areas where energy audits are heavily subsidized, and the implementation of audit recommendations are compulsory, there is an acceleration in the transition towards energy efficiency.

“If countries like Italy want to reach the targets of savings and reducing CO2 emissions, SMEs should be involved in this process.” Toro claims. “We need

Through the Energy Efficiency Directive (EED), the EU requires all large businesses to conduct an energy audit every four years, however SMEs are not required to do so.



5

Steps of the usual energy audit



Source: LEAP4SME Energy Audit Guide



6

SMEs to move towards energy efficiency, and of course energy audits are the first step for them, because energy audits are the only way for a company to understand how they are consuming their energy, where they are consuming it, and how they can improve their energy efficiency level."

For Europe to fulfill its energy efficiency potential, energy audits should be as commonplace as a financial audit. They are essential not only for more sustainable, resilient businesses, but more profitable ones as well. ●

Energy Audit Best Practices

Ireland's Energy Audit Support Scheme

The Sustainable Energy Authority of Ireland (SEAI)'s support scheme for energy audits offers SMEs a €2,000 voucher towards the cost of an energy audit. In most cases, this covers the total cost of the audit.

Austria's klimaaktiv Building and Renovating Scheme

This scheme is working towards energy-efficient building and utilizing renewable sources of energy to cut greenhouse gasses. More than 1200 buildings have been built or renovated with new energy efficiency stands since the program started in 2005.

Italy's Energy Intensive Industry Program

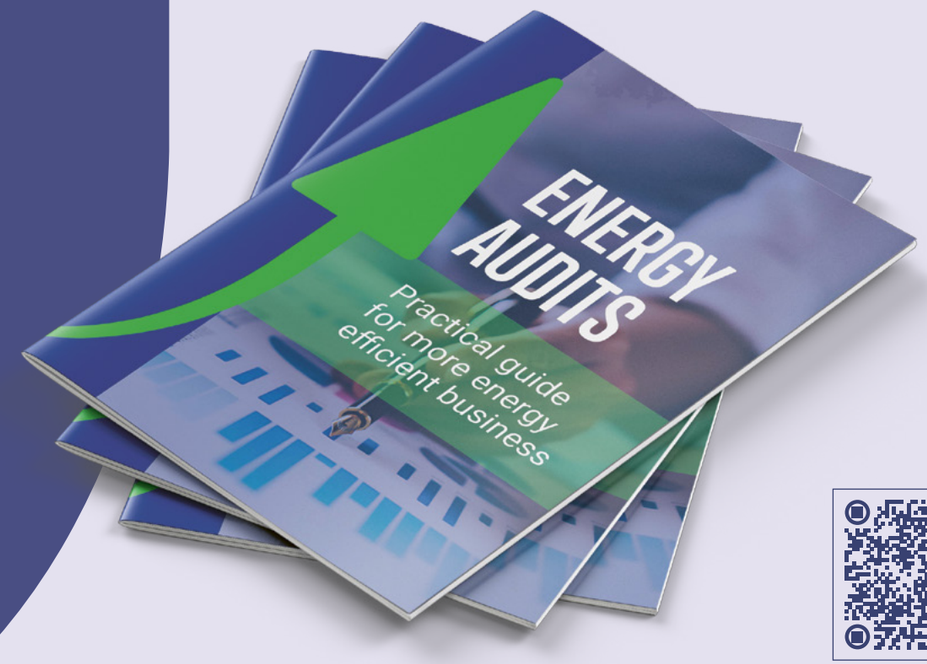
All energy intensive companies – regardless of size – must carry out energy audits. Of the energy efficiency measures suggested in the audit, the company must implement at least one. As of July 2020, over 2,500 SMEs had carried out energy audits.

LEAP 4 SME

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This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 893924.

Gender Inequality in Urban Mobility

INTERVIEW BY
BELÉN GUTIÉRREZ CARMONA
WITH **RITA JACINTO**

Women are some of those most affected by inaccessible or unsafe modes of transport.

1

Viewing mobility issues through the leans of gender inequality is key to ensuring inclusive, safe and equal mobility for all. The transition to decarbonized transport systems must prioritize affordability and accessibility.

REVOLVE talked to Rita Jacinto, Program Manager at the Division for Pedestrian Mobility in Lisbon, Portugal, whose work focuses on pedestrian accessibility as well as women in mobility, safety and convenience for women in transit.

Why is it important to consider gender when addressing mobility challenges?

Women have different mobility patterns from men. Women have what is called 'trip chaining,' so several interconnected trips throughout the day, that are not as long as the average trips that men are doing. So, if a family has a car, it is much more likely that the man drives the car. He might commute for a longer time, or perhaps a longer distance, but he will be inside the car, and it will be one trip.

Women do 75% of the world's unpaid care work. We're talking about grocery shopping, taking the kids to school, taking another relative to the doctor, doing some errands for their family. Most of public transport users, or people walking, are women. It's very important to look at their mobility patterns and the conditions women face while doing these errands. Every time we invest in car-centric policies, we are investing mostly in men and not as much in the mobility patterns of women.

How can the study of gender disparities in mobility contribute to building a more equitable mobility sector?

In terms of research and data, it's important to look at what you measure and how you measure it. We cannot just measure which means of transport people take and if they are sustainable. How satisfied is the person? And what would be the behavior if the person got a larger salary? From my experience with some women, they tell me that if they had a driver's license or if they had the money to have a car, they would take this option and they are only taking public transport because they cannot afford to do something else. If users would be more satisfied with public transport, walking or cycling, perhaps those taking the car would have a greater modal shift towards taking sustainable transport options.

Every time we invest in car-centric policies, we are investing mostly in men and not as much in the mobility patterns of women.



2

1. Bus window. **Photo:** Mehmet Turgut Kirkgoz / Pexels
2. Bus Crossing a Railroad. **Photo:** Enrico Hänel / Pexels

What exclusion factors need to be urgently tackled and what solutions do you propose?

We need to talk about infrastructure and what policies are put in place and how. We need places where women feel safe. There needs to be good lighting, no dark scary alleys, the bus needs to stop closer to home or stop close to where there's other people. And a number to call if women feel in danger, with someone on the other side prepared to respond. We need places to leave grocery bags and toilets where you can also take children or older people, for example. All these infrastructural factors need to be in place for women not to feel excluded or uncomfortable or unsafe.

In one of our projects, a woman explained that every morning she walked to her son's nursery to drop him off and then walked to take the bus to work. The nursery didn't have a place for her to leave the stroller, so she had to carry her son in her arms with everything else she had to carry. She complained that sometimes she had grocery bags or her other child and she didn't have a free hand. We can't just look at the fact that there's a bus stop in front of the nursery and she's taking the bus. These situations need to be adjusted and made convenient. It may seem like small things, but they make a huge difference in all these different mobility patterns.

For instance, one could have a look at what's making women so afraid of taking the bus in certain places and times. Imagine you're afraid at a bus stop alone at night after a party: if you'd have the financial possibility, maybe you'd call an Uber so as not to be in that situation and go home. But if that's your daily life, if you are doing a cleaning job in the city center and live far away, you're doing shift work and you wake up at 4:00 in the morning, you're not going to call an

Uber every day. This is totally different. You just wait for the bus, afraid, day after day. If we only look at the exclusion factor, these women aren't being counted as 'excluded' because they are still taking the bus, but they may hate the position they're in.

We know that men and women have different trip patterns, but the male trip pattern has shaped our transport policies and transport systems. How can we change that?

We need to have disaggregated data. We need to investigate detail. And we need to act on it on the ground, real action and real change, embedded in a vision for the city we want to live in.

If I tell you that around 75% of people in Lisbon know how to ride a bicycle, perhaps that's okay. One of our studies tells us that approximately 90% of men know how to ride a bike, but only 61% of women do. Disaggregating data is hugely important to know that there may be an issue. If you just look at the bigger picture, you don't get all the right information.



3



4

We need places where women feel safe. There needs to be good lighting, no dark scary alleys, the bus needs to stop closer to home or stop close to where there's other people.

These patterns usually disregard safety and security aspects, essential for women. How can this be addressed?

It's important to consider what women need when they move: the small trips, the last mile trips, the lighting, the location of stations, accessibility, infrastructure where you can leave your strollers, or where you can leave bags. Someone who drives to work told me that her job doesn't provide parking spaces anymore. I encouraged her to cycle, and she told me about the clean desk policy. She had to carry her laptop with her every day, her gym material, the grocery bags, and in the end the bag was too heavy. Companies must be part of this change as well. If you're always carrying everything on your back, of course it is not comfortable, a lot of people would just prefer to put it in the boot of a car.

What generally makes women feel unsafe on public transit?

Sexual harassment is a highly underrated offense, and it's really affecting not just adult women, but also girls in their mobility options. It influences the trips they take, if they change streets, if they avoid a dark alley or a dark station, if they hide behind their clothes. It's just accepted that women shouldn't do this or shouldn't do that because they're women. This shouldn't be normalized. Women are as entitled as men to use public space, day and night.

When women complain about sexual harassment, they might not even call it sexual harassment because it's so normalized. But if a woman takes the step and has the courage to denounce the harassment, staff are often not prepared to receive the complaints or there's no procedure in place. A woman once told us she complained to the bus driver that a man had inappropriately touched her inside the bus, and the driver answered, "If he does it again, tell me." This is not acceptable. I believe the bus driver also didn't know how to react in any other way. We can't just blame the person for not knowing how to react, we need to give them the tools, collect the information and do something about it. It will be

Women are as entitled as men to use public space, day and night.



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a deterrent and women will feel more empowered. Women should not feel forced to take a car because they feel unsafe in public.

Could you tell us more about your Project in Bairro Padre Cruz?

We had been putting the topic of women in public spaces on the agenda for some time in the city council and interviewing different women with different mobility patterns. We thought we should do a pilot project and really put this into action. We came to the neighborhood of Bairro Padre Cruz, which is mainly a social housing neighbourhood and many women work in shifts taking the bus to the city center. The neighborhood has access to the bus, but there are no train stations, no tube station and no shared mobility schemes.

We involved the local associations to find out how women think about public space, how their access to public transport is and perhaps how to make it better. We asked them questions about how they felt in public spaces throughout the neighborhood, dividing it by themes such as road safety, accessibility and sexual harassment. We had the map of the neighborhood and by theme we asked them about places where they would and wouldn't feel safe to go and why. We involved teenagers from a local school, adults, working and unemployed women, women with children and older women.

We focused on the infrastructure. As a result of our project we planned the redesign of some streets, as well as new locations for some bus stops. There was no bus going through what we considered the liveliest street of the neighborhood, the area with a café, the local market, the post office and the cultural center. We planned to redesign some streets of the neighborhood quite considerably, prioritizing convenience, accessibility and safety factors.

3. Woman entering taxi. **Photo:** Roberto Hund / Pexels
4. People in metro station. **Photo:** Juan Pablo Serrano Arenas / Pexels
5. Woman crossing street. **Photo:** Faruk Tokluoglu / Pexels
6. Street art in Bairro Padre Cruz, Lisbon, Portugal. **Photo:** r2hox / Flickr
7. Street art in Bairro Padre Cruz, Lisbon, Portugal. **Photo:** r2hox / Flickr

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Plastic Pollution

WRITER: **MARTA CASTILLO SÁNCHEZ**

Understanding the full consequences of more than 70 years of global plastic obsession.

1

The Great Pacific Garbage Patch might be the most striking and visible representation of marine debris. The so-called Plastic Continent is a collection of marine litter floating in the gyre of the North Pacific Ocean. However, the garbage continent is just a visible impact, what is harder to see are the widespread impacts on human health, ecosystems, and wildlife.

The connection between plastic chemicals in the marine environment and human health has not yet been studied in depth. However, some of the chemicals present in plastics "are associated with serious health impacts, especially in women," as the United Nations Environment Programme (UNEP) highlighted in its global assessment of marine litter and plastic pollution.

"Not all the chemicals in plastics are hazardous but one quarter is of concern," claims Magali Outters, the team leader of the Policy Area at MedWaves – the UNEP/MAP Regional Activity Centre for Sustainable Consumption and Production (SCP) – who emphasized that the main problem is the lack of transparency and regulation in the composition of plastics.

Plastic everywhere

Over the last 70 years, plastics have penetrated every aspect of our life. This versatile material started its significant expansion during and right after the Second World War. Plastic does not need to be constantly demonized. It can provide important benefits, from life-saving medical devices to safe and long-life food storage. However, unnecessary and avoidable plastics, particularly single-use packaging and disposable items, are polluting our planet at alarming rates, as the UNEP report highlighted.

The From Pollution to Solution report showcases that decades of economic growth and an increasing dependency on throw-away plastics have taken us to the current torrent of unmanaged waste that "pours into lakes, rivers, coastal environments, and finally out to sea, triggering a ripple of problems." According to UNEP predictions, the estimated 11 million metric tons of plastic entering the ocean annually will triple in the next twenty years reaching 37 million metric tons. That is equivalent to 50kg of plastics per meter of coastline worldwide.

According to UNEP predictions, the estimated 11 million metric tons of plastic entering the ocean annually will triple in the next 20 years reaching 37 million metric tons.

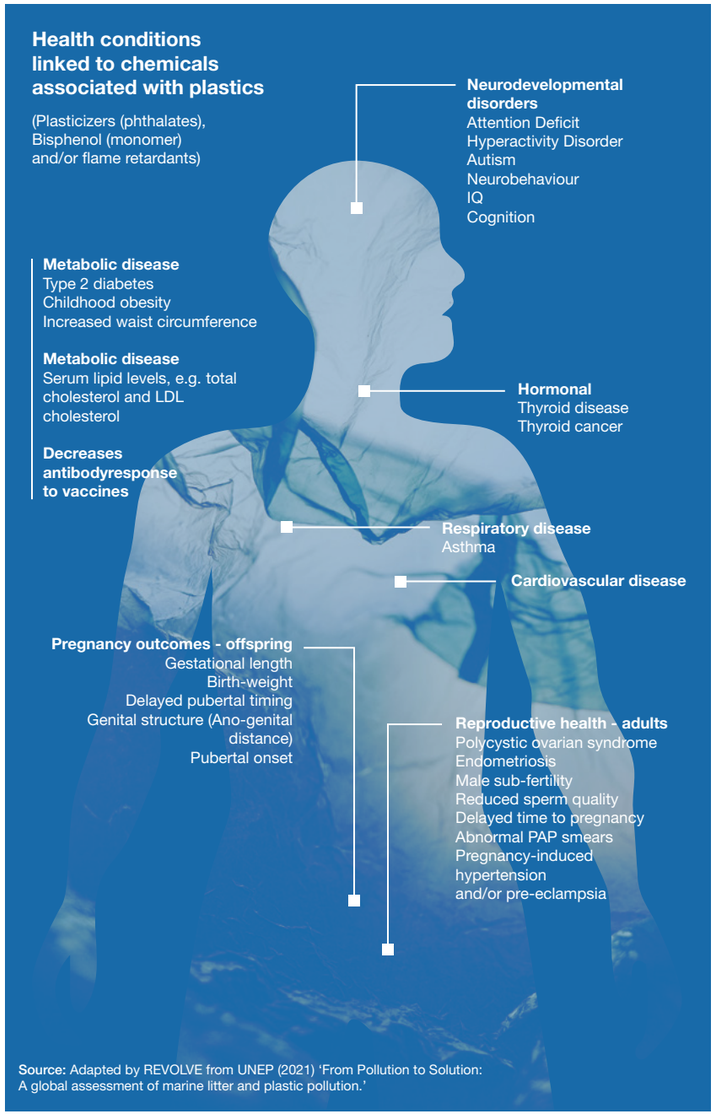
On a global scale, plastic pollution has become an epidemic and needs to be stopped. It might seem surprising but the first reports of the negative impact of marine plastic debris on marine species date back to the 1960s. However, it was not until 2022 that the UN Environment Assembly in Nairobi endorsed a historic resolution "to end plastic pollution, and forge an international legally binding agreement, by the end of 2024." This means that Heads of State, environment ministers, and other representatives from 175 nations acknowledged the urgency of this problem and the need to take action.

Forever chemicals in plastics… in the sea… and in humans

Plastic waste can be found across the planet, from the Arctic to Everest to the Mariana trench, and traces of plastic chemical components can be found in the blood of European and American citizens, affirmed the European Chemicals Agency (ECHA). The poly- and perfluoroalkyl substances (PFAS) – also known as 'forever chemicals' for their high persistence – are present in many plastics used for food packaging such as microwave popcorn bags or fast food wrappings.

There are 4,700 substances listed as PFAS in the OECD's Global Database, so why are we being poisoned with these chemicals if they are identified? One of the answers is the opacity in the composition of the plastics. "Now we know the polymers in the plastic, but not the chemicals," Outters explains.

Plastic is a highly resistant material due to the combination of chemicals that compose it. More than half of the plastics found floating in some gyres were produced in the 1990s and earlier, showed the report 'From Pollution to Solution'. The plastic composition has been refined over decades to develop



Source: Adapted by REVOLVE from UNEP (2021) 'From Pollution to Solution: A global assessment of marine litter and plastic pollution.'

a vast range of versatile products that can be present in every sphere of life. PFAS play an important role in plastic persistence. "Even if we stopped manufacturing PFAS tomorrow, they would still be around for generations as no other manufactured chemicals stay in the environment as long as them," stressed the ECHA.

Chemicals are very minute but they pose a serious threat. Some of the chemicals associated with plastics are recognized as mutagens and carcinogens, as scientific evidence has shown. "Exposure to Persistent Organic Pollutants (POPs) can lead to serious health effects including certain cancers, birth defects, dysfunctional immune and reproductive systems, greater susceptibility to disease and damages to the central and peripheral nervous systems," pointed out the Stockholm Convention on Persistent Organic Pollutants.

Looking into more detail marine plastics, the UNEP report pointed out a gap saying that "the potential health hazards of the polymers that are the structural backbone of marine plastics have been less well studied." The main concerns are the infamous microplastic and nanoplastic particles and microfibres formed when plastic waste enters the oceans and breaks down under the influence of weathering, mechanical abrasion, and photodegradation.

The annual intake of microplastics by some humans has been estimated to range from 39,000 to 52,000 particles, depending on age and gender, rising to 74,000 to 121,000 particles when inhalation is considered, according to research published in the Environmental Science and Technology Journal. The exposure from marine sources is most likely to be via ingestion of seafood rather than inhalation. The overall exposure levels and health impacts remain uncertain as well as the gender-disaggregated data on those impacts. However, the evidence available shows that women have tested for significantly higher levels of toxic chemicals, as the report Plastics, Gender and the Environment highlights.

Is there a way forward?

The Stockholm Convention emerged as a global answer to the threat of 'forever chemicals'. The Convention was adopted in 2001 and entered into force in 2004. It is a global treaty to protect human health and the environment from chemicals that:

remain intact in the environment for long periods, become widely distributed geographically, accumulate in the



2

fatty tissue of humans and wildlife, and have harmful impacts on human health or on the environment.

The Convention is almost universal regarding geographical coverage and 186 countries. The long-range transport of chemicals makes no government able to act alone in protecting its citizens or its environment from the forever chemicals.

Banning chemicals is difficult, as Magali Outters highlights: “We need different approaches to ban groups of chemicals.” Magali leads the policy area of MedWaves, part of the worldwide network of sixteen regional center of Stockholm Convention to provide technical assistance and to promote the transfer of technology. This responsibility brings a special mandate to assist Mediterranean countries in phasing out toxic chemicals and transitioning to safe and innovative alternatives.

MedWaves – a member of the AMWAJ Alliance – links key topics to ensure more sustainable consumption and production: circular economy, sustainable blue economy, marine litter and plastics, and toxic chemicals. The center works to build bridges between the global and regional level efforts and different actors at the regional and local levels, such as experts, civil society and policy-makers.

The Mediterranean region is one of the world’s most affected areas regarding plastic marine litter. Plastics account for 95-100% of total floating litter and over 50% of seabed litter, as was highlighted in the data shared by the Mediterranean Action Plan of the United Nations Environment Programme (UNEP/MAP). The Mediterranean region is also the world’s fourth-largest producer of plastic goods, underlined in the ‘From Pollution to Solution’ report.

1. ‘Take a walk a few Km’s from your next resort, here is what the beaches of the world really look like these days’. **Photo:** Dustan Woodhouse / Unsplash

2. Aerial view of Plastic Island or Great Pacific Garbage Patch or Pacific Trash Vortex, consisting mainly of plastic, light metals and organic residues of garbage in ocean. **Photo:** Benny Marty / Shutterstock

Tourism plays an important role in plastic waste generation increasing it by up to 1/3 during the summer in some Mediterranean countries. Poor waste management is also a key element in reducing the impact of the litter produced on land on the water ecosystem and human health. For that, “there is not a single solution but different approaches such as regulation, agreements such as Plastic Pacts, public-private collaboration, or labeling,” as Magali asserts.

Any of these solutions like regulations or banning have a socio-economic impact that needs to be measured. It is important to also look at the situation at a national and local level. For example, regarding waste management. As Magali explained in her conversation with REVOLVE, the waste management sector is sometimes an informal sector in some countries of the region. That is translated normally in workers coming from a low-income part of society that work unsafely managing toxic products – like burning waste that contains plastic; Magali says: “We need to integrate them in the sector.”

Switching sides: cooperation and exchange of solutions

Phasing out plastics and tackling plastic pollution is taking more attention lately. As Inger Andersen – Executive Director of UNEP – underlines in the foreword of the ‘From Pollution to Solution’ report, “it is vital that we use this momentum to focus on opportunities across the life cycle of plastics and from source-to-sea for clean, healthy and resilient oceans.” And there are plenty of approaches to seize that momentum.

Besides regulations, like the historic adoption of the Council of the EU in October 2022 to reduce the presence of persistent organic pollutants in waste, there are plenty of initiatives, organizations, and individuals working to shift away from plastics and toxic chemicals around the Mediterranean, such as The Switchers Community – an inspirational network of green entrepreneurs funded by MedWaves.

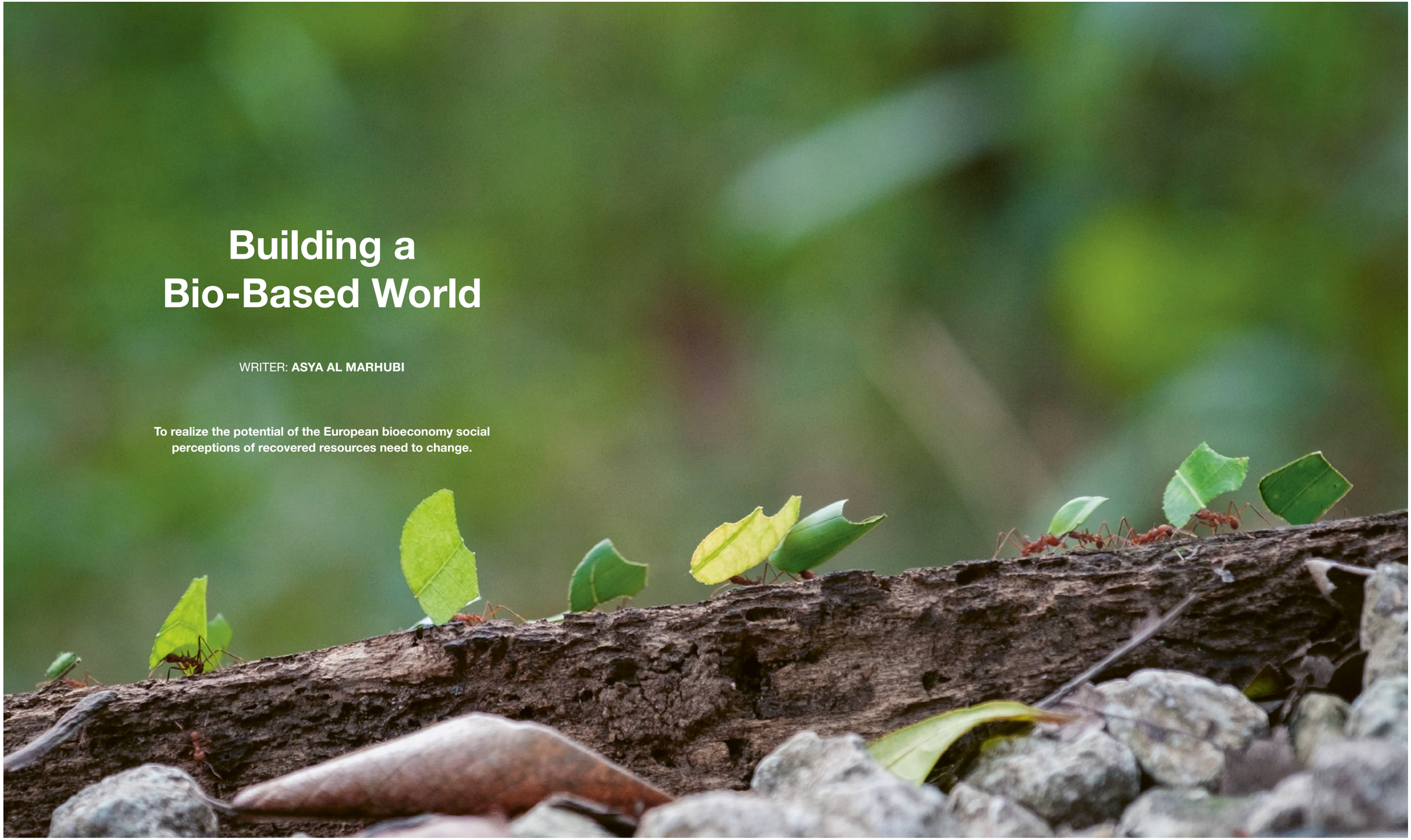
To phase out plastics, there has to be solutions proposed and the Switchers Community focuses on that. The members are green and circular businesses implementing eco-innovative solutions that contribute to sustainable and fair consumption and production models. Many of the Switchers are focused on toxic chemical-free products and the sound management of plastics, like Staramaki and Mumo. These Switchers, based in Greece and Turkey respectively, work on alternatives to single-use plastic products like food wrapping and straws.

This community is an example of two of the key elements to any change of paradigm: cooperation and available alternatives. Initiatives like the Switchers show that there are alternatives and solutions and that we can cooperate to make them happen. As Ms. Outters claims: “it is important to show solutions and actions implemented in the field.” That is the way forward to spark change and action.

Building a Bio-Based World

WRITER: **ASYA AL MARHUBI**

To realize the potential of the European bioeconomy social perceptions of recovered resources need to change.



1

Europe has positioned itself successfully as a global pioneer in the development of novel bio-based and circular industries, alongside bio-science and technology leaders such as Japan and the United States. For Europe, the bioeconomy represents an opportunity to solidify the Continent's position as a leader in bio-based industries and processes.

In 2012, the European Union introduced its Bioeconomy Strategy with transversal impacts across key sectors including energy, agriculture, forestry, fisheries, waste and water management, among others. In 2018, the Strategy was updated to respond to new EU policy priorities, including those outlined in the updated Industrial Policy Strategy, the Circular Economy Action Plan, and the Communication on Accelerating Clean Energy. For the EU, a successful European bioeconomy "needs to have sustainability and circularity at its heart. This will drive the renewal of our industries, the modernization of our primary production systems, the protection of the environment and will enhance biodiversity."

But, first, what is the bioeconomy?

The bioeconomy encompasses all sectors that rely on biological resources (animals, plants, micro-organisms and derived biomass) to provide products, energy, and services. This includes primary sectors agriculture, forestry, fishing and aquaculture, as well as those dependent on the resources they produce to make food, feed, and bio-based energy and products. A sustainable bioeconomy is one that reduces pressures on natural resources and takes planetary boundaries into consideration to enhance and safeguard

5 Goals of the EU Bioeconomy Strategy

1. Ensure food and nutrition security
2. Manage natural resources sustainably
3. Reduce dependence on non-renewable, unsustainable resources
4. Limit and adapt to climate change
5. Strengthen European competitiveness and create jobs

Source: EU, 2018



2

the functioning of our ecosystems and thus the ecosystem services upon which society relies.

In 2022, the world had depleted an entire planet's worth of resources by July 28. By the end of the 2022, we used the equivalent of one-and-three-quarter planet's worth of resources; a 75% increase since the start of the 1970s. And yet, to meet the growing global demand for agricultural products we will need to produce sustainably almost 50% more food, feed and biofuel by 2050, as compared to 2012 levels. (See fig. next page).

How can the bioeconomy help resolve this disconnect between what society needs and what the planet needs? The challenge is even greater still when we consider that primary production such as agriculture that is linked inherently with the boundary whose threshold we have long passed (nutrient cycling) through the application of nitrogen and phosphorous-based fertilizers.

How can nature provide food for ten billion people without putting further pressure on planetary boundaries and threatening the ecosystem services upon which we rely?

1. Ants at work. **Photo:** Christian Holzinger / Unsplash
2. Rolled hays. **Photo:** Austin Wegener / Unsplash
3. Dried fruits on a field. **Photo:** Joshua Hoehne / Unsplash

Ecosystem Services and **Planetary Boundaries:** Two terms to help understand and improve our relationship with nature.

Ecosystem services are the benefits that nature provides to society and that underpin all economic activities. They are often categorized as four types:

1 **Provisioning services**: Benefits to society from the environment including supply of food and water resources.

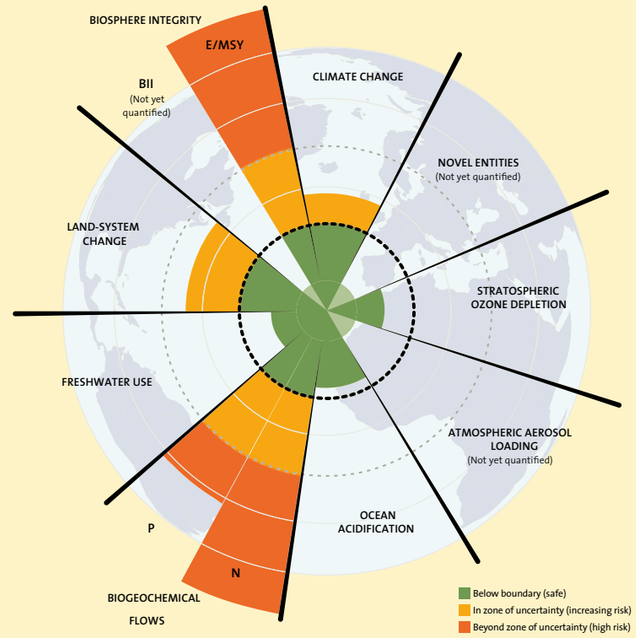
2 **Regulating services**: Benefits to society through the regulation of ecosystem processes such as soil and air quality, flood control, and crop pollination.

3 **Supporting services:** Services that are necessary for the production of all other ecosystem services such as providing habitats for plant and animals and preserving biodiversity and genetic diversity.

4 **Cultural services:** Non-material benefits people derive from nature including spiritual well-being, cultural identity, aesthetic and engineering inspiration.

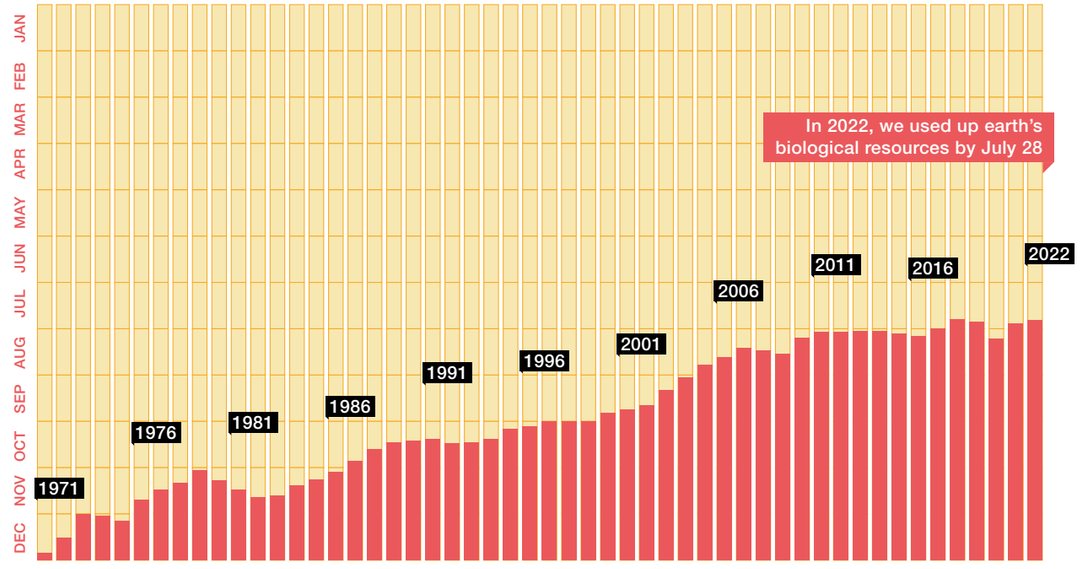
Planetary boundaries:

First proposed in 2009, the planetary boundaries concept identified nine planetary life-support systems that underpin life on Earth as we know it. For each boundary, safe operating spaces have been defined. Living outside of these boundaries threatens the resilience and stability of these life-supporting systems and thus the continued functioning of vital ecosystem services that support our lives and economies. We have already passed safe thresholds for four of the nine boundaries, including climate change.



Source: J. Lokrantz/Azote, based on Steffen et al. 2015.

Global Overshoot Days from 1971 to 2022



Source: Adapted by REVOLVE from the graphic 'Earth Overshoot Day, 2022' by National Footprint and Biocapacity Accounts 2022 Edition (**www.overshootday.org**)

Biomass: sustainable production and circular recovery

There are two options for sourcing biomass for the bioeconomy: Cultivating biomass through primary production and recovering it from secondary waste streams.

As we are already using more resources than the Earth can offer and we are pushing planetary boundaries in terms of land-use change and nutrient loading, scrutiny of what sustainable biomass production looks like is to be expected.

In the realm of bio-based energy, forestry advocates have been criticizing the EU regarding the threat to European and global forests posed by the Renewable Energy Directive (RED) and the classification of woody biomass as a carbon-neutral feedstock. A 2021 report highlighted five cases within and outside the EU's borders that demonstrate how the sustainability criteria in place do not impede "destructive biomass" production. In September 2022, following a three-year campaign to urge the EU to declassify woody biomass as a renewable carbon-neutral energy source, the European Parliament voted to uphold the classification. The vote came as a blow after earlier victories in 2022 including a "historic breakthrough" with the introduction of new rules of what will be counted as "sustainable" biomass.

Debates about the sustainability of other primary sectors are also taking place: In February 2023, over 250 organizations shared an open letter urging the European Commission (EC) to "keep environmental and social sustainability at the centre of the policy debate around food, agriculture and fisheries" during the development of the legislative Framework for Sustainable Food Systems (FSFS). The FSFS has a core objective of promoting "policy coherence at EU level and national level, mainstream[ing] sustainability in all food-related policies, and strengthen[ing] the resilience of food systems […] to accelerate and make the transition to sustainable food systems easier."

It goes (almost) without saying that sustainable biomass production and what it will look like in our climate-neutral future is still up for debate.

So, if not new resources, why not old ones?

Finding the value in waste

Valorizing waste is the "process of re-using, recycling or composting waste materials and converting them into more useful products including materials, chemicals, fuels or other sources of energy." It offers the opportunity to support climate action by reducing landfill and incineration-based emissions and pollution, reduce pressure on natural resources and dependence on fossil-based resources while developing new markets and products to invigorate local economies.

Each year, 2.153 million tons of waste are produced in the EU by all economic sectors – equivalent to 4,813 kg of waste per person, with only 38% of all the waste produced in the EU being recycled in 2020. This includes all solid waste from all economic sectors, including households, which make up almost 10% of total solid waste production.

For the circular bioeconomy, biowaste – mainly food and garden waste – is a key waste stream to create high quality bio-based products. At more local levels, biowaste makes up the single largest component of municipal waste, representing 34% of municipal waste collected, making addressing the biowaste challenge central to reaching the EU's 65% recycling target for municipal waste (in 2020 this figure was 39.2%) by 2035. If collected properly, treated biowaste offers a domestic supply of resources for food, feed and bio-based energy and products, reducing EU imports and creating new economic opportunities.

The value in waste may be clear, but the entry of bio-based products into the market is a sensitive issue. There are new technologies, products, and services that touch health and safety, as well as some products' significant "yuck" factor to consider. Proposing insects for food or feed or bio-based products, such as those made from recycled feminine hygiene products, have additional barriers from social norms and conventions which can hinder their use.

Old habits (and attitudes) die hard

While the term "bioeconomy" omits the social dimension, social aspects have a large role to play in the development (and acceptance) of bio-based products, from engagement in food waste sorting and reduction strategies to the consumption (or not) of bio-based products.

A key challenge to increasing biowaste recycling rates in plastic contamination, which cause biowaste to fall short of quality criteria required for composting and other upcycling processes. As part of the 2018 revision to its Waste Framework Directive, the EU adopted stricter rules on separate waste collection (including biowaste) to go into effect by December 2023. Putting overarching systems in place help provide



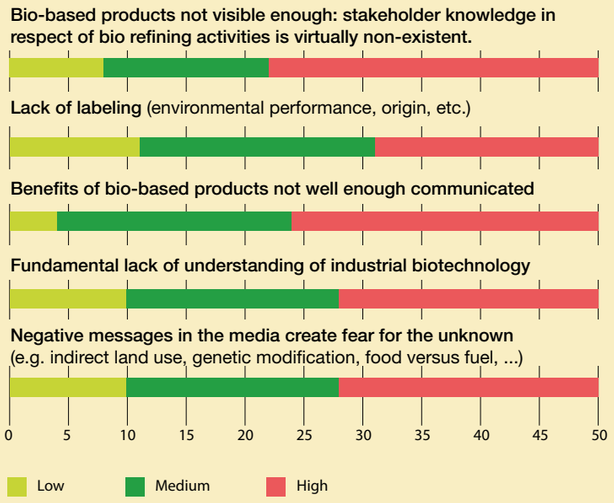
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parameters and public administrations are interested increasingly in finding ways to foster waste sorting behaviors.

At the consumer end, a survey conducted by BioBase4SME found that stakeholder perception barriers were the second most important barrier to bio-based Small and Medium-sized Enterprises (SMEs) in North-West Europe, after demand-side policy barriers. Over half of the SMEs surveyed found lack of stakeholder knowledge (such as the difference between biodegradable and bio-based plastics) and proper communication of the benefits of bio-based products to be high barriers to their businesses. (Fig)

Stakeholder Perception Barriers

Suggested barriers in the category of stakeholder perception barriers with the number of SMEs that scored the barriers as low, medium or high.



Source: "Needs and challenges of companies in the bioeconomy in NW Europe", BioBase4SME, 2019.

Changing hearts and minds to enable the circular bioeconomy

At REVOLVE, fostering cultures of sustainability is quite literally our business, and we make it our business to work with projects that do the same.

On one side of the recovery equation – the resource side – for bio-based industries, the EU-funded HOOP project (aiming to vitalize the urban bioeconomy) is finding new ways of reaching out to stakeholders and interested citizens. Through regular Biowaste Clubs in eight Lighthouse cities across Europe, HOOP is bringing people together to develop a shared vision for how their city can become more circular. Harnessing the power of technology and citizen science, HOOP has also developed a citizen science app that uses gamification to engage users on an interactive journey to discover the potential in circularity. The app shares knowledge about proper waste sorting and the potential of the urban bioeconomy while gathering data on specific research questions from each of the eight Lighthouses to address during Biowaste Clubs. These findings are then shared with cities and regions across Europe through the HOOP Network.

On the output side of the equation – bio-based products – the EU-funded FER-PLAY project is conducting social acceptance surveys (be part of the findings! visit: fer-play.eu) to unearth potential challenges and to help bio-based businesses address consumer concerns. As part of work to increase the production and uptake of alternative fertilizers made from secondary resource streams, FER-PLAY aims to replace conventional fertilizers (rich in nitrogen and phosphorus) with alternative ones (like compost and manure) to help prevent water and soil contamination, mitigate emissions from the agricultural sector, and improve resource independence. This will promote the development of the circular bioeconomy at local and regional levels - but only if farmers buy them (and only if we continue to buy their products).

The big picture: a just transition

For many, the concept of sustainability is fundamentally a debate about how to realign economic and environmental goals, giving nature's needs the same weight as those of our economy. But that understanding leaves out the human dimension. The letter to the EC regarding the FSFS emphasized both, and a 2022 report from the McKinsey Global Institute underscored the social barriers to the transition to a net-zero economy. According to the report, the green transition could create 200 million jobs and provide a host of environmental and economic benefits in Europe for generations to come. Similarly, 185 million indirect and direct jobs could be lost, with reverberating impacts for local communities across Europe. In this scenario, considering the social dimension means ensuring the transition leaves no one behind.

Vitalise Europe's Urban Bioeconomy

The **HOOP project** supports **8 lighthouse cities and regions** in developing large-scale urban circular bioeconomy initiatives that will focus on making bio-based products from urban biowaste and wastewater.

Join the HOOP Network of Cities and Regions!

Helping territories to improve the valorisation of biowaste and wastewater by facilitating knowledge exchange and mutual learning.

- In-person knowledge exchange activities
- Urban bioeconomy resources
- Self-assessment tool for circularity
- Network and connect
- Expert advice and best practices

Ready to join? Sign up through **www.hoopproject.eu**

The HOOP project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°101000836.

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