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2024 | Special Edition

A Sustainable Future?



Editors' Foreword

Reflecting on the tumultuous seas of global affairs, it's remarkable how a single year can encapsulate such a diverse array of themes. From geopolitical tensions to societal upheavals, the canvas of 2023 painted a picture of both challenge and opportunity. However, as we embark on this special edition dedicated we hope to offer glimpses of the future. As many global initiatives, both in governmental policy and corporate action, are embracing sustainability, we are shown that sustainable practices offer important solutions going forward. With this in mind, we thought exploring the potentials of sustainability would be a would be an exciting theme to explore in this Special Edition.

In 'Cultivating Climate Resilience: Traditional Techniques in African Agriculture', Matthew Candau highlights the increasing vulnerability of sub-Saharan Africa's agriculture to climate change. He advocates the use of indigenous knowledge and practices to offer promising solutions for resilience and sustainability for the future.

Bengu Caliel's thought-provoking exploration in 'Is ESG a deception of sustainable finance?' invites us to critically examine the authenticity of sustainable finance initiatives, challenging us to ensure that our efforts align with genuine environmental stewardship. By exploring the origins of ESG, its meteoric rise in recent years driven by global challenges and regulatory initiatives, and the role of ESG ratings in sustainable finance, he critiques

the current state of ESG, highlighting inconsistencies in rating systems and instances of greenwashing by companies.

Lily Bolash's evocative piece, 'Under the Sacred Canopy: On Sustainability, Brazil, and the Amazon Rainforest', transports us to the heart of the Amazon as she discusses the Yanomami people's connection to the Amazon, the threats posed by deforestation and mining while emphasising the global challenge of climate politics and the need for action to address environmental degradation and ensure justice for indigenous communities.

Brooke Ryback examines the rapid urbanization in Latin America in 'The Emerging and Sustainable Cities Initiative: what one program says about Latin America's sustainable development agenda'. She highlights both the positive economic growth and the challenges of urban poverty and environmental vulnerability, noting successes in infrastructure improvements and citizen engagement, yet also the challenges in garnering participation and navigating conflicting interests in sustainable development efforts across the region.

Charlotte Plaskwa's sobering reflection in 'Beyond the Prescription: The Ecological Cost of Pharmaceutical Practices' challenges us to confront the environmental consequences of our healthcare systems, urging us to prioritize sustainability in all aspects of life. The article explores how pharmaceutical practices contribute to environmental degradation through factors like greenhouse gas emissions, waste generation, and pharmaceutical pollution in

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water bodies, underscoring the urgency of implementing sustainable measures and regulatory frameworks to safeguard wildlife, ecosystems, and human health.

In 'Ever-evolving Zoos: The role of zoos in the 21st century?' Logan Elliot examines the contentious history of zoos, critiquing their origins in exploitation and animal abuse while acknowledging recent efforts toward conservation and education. Despite concerns about environmental impact and profit motives, some zoos are shifting toward non-profit models and actively engaging in conservation efforts and community education, challenging traditional perceptions and advocating for a more sustainable approach to wildlife preservation.

Alexander Wylie's incisive inquiry in 'Can Finance be Sustainable in a World of Shareholder Value Maximisation?' challenges conventional notions of financial success, urging us to redefine value in terms of long-term sustainability. He examines the effectiveness of climate activism and questions whether efforts have truly impacted these corporations or inadvertently affected the working class.

Tom Fort's exploration of European hydropower in 'European Hydropower: A Key to Sustain and Strengthen a Continent' underscores the pivotal role of renewable energy in forging a sustainable future for generations to come. He discusses the EU's significant reduction in carbon emissions which is credited to a shift towards green technologies.

As we navigate the complex currents of sustainability, may this Special Edition serve

as a compass, guiding us towards a more harmonious relationship with our planet. Let us seize the opportunities presented by 2023 to redouble our efforts towards building a more sustainable and equitable world.

From the desk of the Editors-in-Chief of the *St Andrews Economist*, we sincerely hope you enjoy!

Alexander Wylie, Brynna Boyer and Molly Pimm

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Cultivating Climate Resilience: Traditional Techniques in African Agriculture

By Matthew Candau

Throughout sub-Saharan Africa, agriculture serves as the cornerstone of countless livelihoods, with farmers tending to fields that have sustained families for generations. However, in recent years, the reliability of weather patterns has wavered. In 2020 alone, over one million Africans were displaced by floods and tropical storms, marking a tenfold surge in flooding events since the 1970s.

Climate change projections foresee volatile rainfall patterns due to mid-latitude region shifts, predicting prolonged droughts in some regions and increased flooding in others. This unpredictability, coupled with rising temperatures, imperils staple crops such as coffee, wheat, and sorghum, projecting yield reductions of up to 25%. Considering the region's population is expected to double by 2050, concerns regarding health and food security cannot be overstated.



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Livestock farming faces analogous challenges; inconsistent rainfall, diminishing grazing lands, and temperature fluctuations render cattle a less reliable commodity, consequently elevating risks of malnutrition and reducing meat yields.

“We depend on livestock, and the ones that haven’t died are weak,” remarked Jala Barako, farmer and grandfather of eight from northern Kenya. “In normal times, they support us. Now we support them.”

These multifaceted challenges underscore the pressing need for solutions. However, the recourse is not solely in technological innovation and extensive investment. Instead, agricultural laborers and companies in sub-Saharan Africa have the unique opportunity to tap into traditional knowledge and methods. These practices, often overshadowed by modern technologies endorsed by Africa’s trade partners and large corporations, harbor immense potential not just for preserving yields but for shaping a sustainable and resilient future in the face of climate change.

For centuries, rural political and spiritual leaders across sub-Saharan Africa have been perfecting the art of ensuring bountiful harvests. In Nganyi village, Kenya, Abachimba (rain-makers) possess the renowned ability to

predict storms and maximize agricultural productivity - a tradition passed down through generations. This knowledge, rooted in astute analysis of wildlife behavior, wind patterns, and other ecological indicators, guides local farming calendars with remarkable accuracy.

Moreover, early appearances of butterflies and safari ants serve as indicators for favorable farming conditions in parts of rural South Africa. Other similar strategies can be observed in pockets of rural communities throughout the continent.

“I do not know when [these practices] started and I do not know when they will end,” one man from Agoro, Kenya said. “What I can tell you is that it helps us a lot in understanding changes in weather conditions and the onset or cessation of the planting season.”

Furthermore, adopting non-chemical crop protection and indigenous pest management methods holds promise for the agricultural industry. Cow urine, for example, utilized by 89% of farmers in Ethiopia’s Debark district, exhibits anti-fungal properties, augmenting seedling germination and land productivity. Indigenous vegetable and crop varieties like millet and cassava inherently resist pests and diseases, consequently necessitating less water and fewer fertilizers. In Mali’s Dogon

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Plateau, farmers form soil mounds between crop rows, fertilizing and protecting crops from runoff. Additionally, Senegalese smallholder farmers utilize traditional sling-style weapons or rattles to deter birds – a more ecologically sustainable and cost-effective alternative to chemical pesticides.

These indigenous agricultural practices, among countless others, ensure not only food security but also economic opportunities and greater nutritional value compared to invasive western crops. Despite challenges in transmitting this knowledge to younger generations due to modernization and urbanization, the adaptability and dynamism of traditional agricultural techniques offer enhancements in rural community livelihoods. By combining these methods with select modern technologies, widespread productivity increases and environmentally-conscious scalability become feasible.

Other sustainable practices, like silvopastoral agroforestry, exhibit promise in fortifying climate resilience. This technique, entailing the planting of fruit-bearing trees in suitable grazing land, not only provides economic upside but aids in carbon sequestration and mitigates the effects of extreme weather. The fruit yields from these trees enhance crop surplus available for sale as well as contribute to improved

livestock nutrition and increased meat yields when fed directly to grazing animals. Additionally, certain native tree species act as natural fertilizers, enriching the soil with nitrogen, sometimes more effectively than synthetic alternatives.

Integrating agroforestry into livestock agriculture augurs increased food accessibility and income generation, combating undernutrition and advancing ecological sustainability. In Burkina Faso, a country that subsidizes the technique, nearly half of farmers report additional income generation through the fruit and wood products derived from indigenous tree planting.

Amid ever-uncertain growing conditions, embracing indigenous knowledge and sustainable practices has emerged as a practical solution. These time-tested methods, deeply rooted in local wisdom and heritage, provide support to the agricultural industry. The value of these practices transcends mere crop yields or economic gains; they represent a profound connection to the land, an intricate fabric of knowledge woven through the generations.

Prioritizing traditional methods over ecologically harmful modern practices elevates the native voices that have long been unheard. In the words of the local chief of Mxumbu village in South Africa,

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“You see, this, your so-called civilization, has destroyed a lot of things relating to African culture and traditions.”

As the world navigates the uncertainties of climate change, it is imperative to recognize and preserve these traditions, for in these unassuming methods lie the keys to a more resilient and sustainable future for food security.

The views expressed in this article are the author's own, and may not reflect the opinions of The St Andrews Economist.

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Is ESG a deception of sustainable finance?

By Bengu Canliel

ESG is a highly-contested acronym and one that has taken over the investment world over the last few years. Most of us, if not all, have heard of it, but what does it mean? Here's an introduction to ESG and why, in its current state, it may not be our solution for sustainable finance.

What is ESG?

ESG stands for environmental, social and corporate governance - the 3

pillars of ESG. Whilst there is no standard ESG framework, these 3 pillars make up a broad consensus on the issues that are covered by it. Designed to encourage responsible corporate behaviour, ESG is a set of considerations established vis-à-vis aspects of a company that are not typically accounted for such as their environmental and societal externalities. Seen by many as an essential component of increasing company value and achieving sustainable development, today, ESG has become a controversial topic that is criticised by many.

Origins of the term and its meteoric rise

ESG gained prominence in its contemporary corporate-governance context when it was first introduced and explored in the UN's Who Cares Wins report of 2004. Crafted by 18 financial institutions, the report advocates for all corporations and their stakeholders to embrace ESG in the long run. It asserts that the effective management of ESG is integral to increasing company value, simultaneously leading to greater investment and the realisation of sustainable societies.

Although ESG has existed for over two decades, it has gained momentum in the last couple of years. Our world is facing several global challenges, non-exhaustive of climate

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change, increasing inequality, poverty, and balancing societal needs with economic ones. Given the severity of these issues, social, governmental and consumer attention on the negative impact of corporations on our societies and our environment has heightened significantly. Consumers, employees, and investors globally are becoming increasingly aware of the social and environmental impact of their purchases, firms' actions, and investments. Today, more and more people are searching for products that align with their financial goals and personal values, thus leading to the acceleration of global sustainable investment.

On April 21, 2021, the EU Commission adopted the sustainable finance package, increasing the scope of reporting required from firms. This they hoped would help accelerate the global transition to a carbon-neutral economy. The EU's adoption of the package generated greater active integration of ESG in most firms. Today, many companies are designating entire departments towards ESG practices. This meteoric rise in ESG-oriented investing has brought global sustainable investment to over \$30 trillion, tenfold its value in 2004.

With sustainability at the forefront of most discussions, there has naturally been an increase in

discussions about ESG and its potential role in the pursuit of sustainable finance.

ESG ratings - A need for new intelligence?

ESG was implemented to help investors identify risks that could be overlooked by conventional financial analysis; ones which could impact financial performance due to operational or litigation costs. To achieve this, ESG data must first be converted into intelligence. To therefore simplify ESG data and convert it into intelligence, financial companies have set up ESG rating companies. In theory, with a universal rating system in place, ESG ratings could be of value to investors by helping them identify the leading and lagging companies within an industry, allowing them to make informed decisions based on flagging opportunities or risks that would otherwise be overlooked.

However, today, there is no single method or universal rating system, meaning that comparisons of ESG between companies worldwide cannot be made. Instead, there are several ESG rating agencies including MSGI, Bloomberg, S&P and Moody's. This is problematic as each agency uses a different grading scale, and curates their own ESG ratings for a company based on which risks they believe are more material for one industry vs

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another, so some companies that rank at the top of some rating systems find themselves at the bottom of other rating systems. Thus, ESG rating systems have often been criticised for being incomplete, unaudited and outdated, stirring distrust amongst actors in sustainable finance. It therefore comes as no shock that over 70% of executives surveyed across different industries and regions reported that they lack confidence in the non-financial reports of companies.

Given the way that ESG ratings are determined based on different criteria, in some cases, energy giants and companies that emit vast amounts of emissions don't have bad ESG ratings. A shocking example is McDonald's - the world's largest beef purchaser. The corporation was responsible for 54 million tons of emissions in 2019, surpassing that emitted by Portugal. Despite continuing to generate copious volumes of greenhouse gas emissions, McDonald's was able to attain a higher MSCI environmental rating. But how is this possible? After all, the corporation has done little to address its supply chain emissions. They installed recycling bins across France and the UK which MSCI viewed as a sufficient commitment to ESG, pushing their rating up. Whilst recycling bins are a great initiative, McDonald's has not made an effort to reform its supply chain, which generates emissions in the

first place. This initiative was also carried out in France and the UK, countries where the company could face sanctions if it doesn't comply with recycling regulations. This makes us question whether the commitment to ESG is genuine, and if the corporation specifically targets the governance pillar of ESG to get a better rating. Cases like this reveal the intentions of firms that adopt ESG practices and ESG ratings. Unfortunately, as Bloomberg put it, ESG ratings are more interested in the “impact of the world on the company and its shareholders” as opposed to the company's impact on the earth and society.

Greenwashing - Investor Fraud

Apart from being inconsistent, ESG funds often fall short of the promises they make as part of their marketing. Whilst ESG funds may claim their intentions to be purely in the interest of the environment and achieving a sustainable future, fine prints reveal that their primary goal is far from this - to assure shareholder profits.

Companies are exploiting the high demand for sustainable financial products by branding themselves as “sustainable” and “ESG compliant”, marketing their products as ecological or sustainable, even if these labels aren't appropriate. Thus, they can obtain loans and investments from ESG funds by

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appearing more attractive to consumers and investors. This misleading of the public is known as greenwashing and can be a form of fraud. Greenwashing promotes false solutions to the climate crisis, delaying credible and concrete action.

Is there potential in ESG?

I believe that ESG, as put forward in theory, could lead to sustainable finance, however, for this to happen, many reforms must be made at once. Starting with what ESG is - a universal definition is necessary. Complementary to this, rating agencies must decide on a set of criteria they all abide by - a universal rating system would be beneficial as it would be more consistent, better audited and has the potential to implement effective regulation followed by all. Additionally, with companies and governments targeting the governance pillar to increase their ratings, perhaps rating systems should adjust the weights of the 3 pillars to elevate the social and environmental pillars. Whilst the ESG movement has accomplished bringing environmental, social and ethical corporate governance issues to the forefront of investment discussions, further actions are necessary to prevent companies from exploiting ESG for their own gain, ensuring that the true objectives of ESG are achieved.

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Image courtesy of Thomas Richter via *Unsplash*

Under the Sacred Canopy: On Sustainability, Brazil, and the Amazon Rainforest

By Lily Bolash



Xapiripë is the name for the spirits Yanomami shamans observe in their visions. For the Yanomami people – one of the largest of the 400 indigenous groups in the ‘Brazilian’ Amazon – ‘every creature, rock, tree and mountain has a spirit.’ Such beliefs render a sacred reverence for the natural world, a sense of care which is common among indigenous groups all over the globe. However, communities

like the Yanomami are among the most vulnerable populations to the consequences of mass environmental degradation. This phenomenon of modernity is a pandemic that plagues ecological stability and environmental justice worldwide, but particularly in the Amazon rainforest. And achieving true ‘sustainability’ in this region requires accounting for all who reside there – plants, animals, and human beings.

Earth’s lungs

The Amazon rainforest has been particularly ravaged by the disease of environmental degradation. The majority of the Amazon lies in Brazil, but also falls within the borders of Bolivia, Colombia, Ecuador, Guyana, Peru, Suriname, and Venezuela. In total, the rainforest constitutes one of the most biodiverse regions of the world. It is home to an estimated 10% of all plant and animal species on Earth and 20% of all freshwater resources; additionally, it produces 6-9% of the world’s total oxygen. For this reason, in addition to its instrumental function as a carbon sink, the Amazon is frequently referred to as the ‘lungs of the Earth.’

It is a dangerously common misconception that these lungs are simply an exotic, untouched basin of ‘flora and fauna.’ The Amazon is home to more, however, than the quintessential

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jaguar or python that may star on the cover of National Geographic magazines. Hundreds of indigenous groups reside within the rainforest; in total, it is home to 50 million human inhabitants who live in a variety of settings, from rural villages to urban cities. For people like the Yanomami, the Amazon is the singular, ancestral home of their community. While still the lungs of the whole Earth, no one is closer to the forest than those whose livelihood and spirituality has been intrinsically tied to it for thousands of years. And today, the land and its people face an existential crisis.

Cancerous threats

Chief among the threats to the Amazon and its people is deforestation. The globalised food economy has prompted extraordinary demand for beef and soy products, of which Brazil is the world's top exporter. Thus, swathes of the Amazon are increasingly cleared to accommodate more and more room for soy agriculture and cattle ranching. The rate and extent at which deforestation has taken place in the rainforest seems entirely out of control: as William Laurance commented in 2015, 'Deforestation is like a tumour; once it takes seed, it tends to spread.'

The cancerous nature of deforestation exists in part because it suits the agendas of a variety of actors in the

region. For one, illegal logging is a major contributor to the crisis. Additionally, there is a violent, ongoing land struggle between communities like the Yanomami and illegal gold miners that seek more territory for resource extraction. Even government-sponsored projects, primarily for transportation infrastructure, have accelerated encroachment into the forest: the first paved highway built in the Amazon during the 1970s is said to have begun as a 'razor-thin cut' – today, it is a path of destruction 400 kilometres wide.

Furthermore, development projects related to dams and energy are frequently tainted with criminal activity and 'rampant corruption.' More and more, their funding originates from sources like the Brazilian Development Bank and the Asian Infrastructure Investment Bank, both of which are accused of vesting 'far less emphasis' on environmental stability than their global counterparts. These projects, and their alleged lack of environmental conscience, benefit a 'profit-seeking minority' at the expense of thousands of people and species alike.

Doctor da Silva?

The security of natural biodiversity and indigenous populations in the Amazon rainforest is indeed in jeopardy. The situation reached a particularly dire

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peak under the leadership of Jair Bolsonaro, the right-wing president of Brazil from 2019-2022. During his administration, deforestation reached a 15-year-high. The country also backtracked on its internationally-pledged contributions to reduce greenhouse gas emissions not once, but twice.

(Devil's) advocates for Bolsonaro would perhaps highlight how some environmentally-positive acts were taken by his presidency; however, these few examples involved the controversial militarization of policy-enforcement practices and excluded representation from Amazonian states in decision-making bodies. The current president of Brazil, leftist Luiz Inácio Lula da Silva, even directly accused Bolsonaro of opening the door to increased environmental and organised crime activity in the Amazon region.

These critical remarks were made at the recent summit of the Amazon Cooperation Treaty Organisation (ACTO) hosted by Belém, Brazil in August 2023. At this event, the first meeting of the treaty group in 14 years, Lula da Silva strove to restore Brazil's reputation as a leader in the climate fight. He spoke positively of the Amazon as a 'flowerbed of possibilities' to be cultivated, while also acknowledging the rampant inequalities in resource distribution and access in the region.

According to Lula, the Amazon's plight has long been fueled by 'prejudice and predatory extractivism' and lack of 'balance between growth and sustainability' – echoing these sentiments, he further asserted the need to respect indigenous rights and listen to indigenous knowledge related to the region.

Leaders often make altruistic yet apathetic remarks at climate policy summits. However, Lula's words reflect genuine policy changes from the Bolsonaro years – and they have already yielded impressive results. In July 2023, a 66% relative decline in deforestation was recorded compared to the same month of the previous year during Bolsonaro's presidency. Lula da Silva has also reinstated the greenhouse gas commitments from the 2015 Paris Agreement that were abandoned under his predecessor, and at the ACTO conference suggested working towards zero deforestation by 2030. The final document produced by the summit, the Belém Declaration, specifically called for increased efforts to fight environmental crime and human rights violations against indigenous people and activists in the Amazon. Overall, it seems as though the call for a 'new Amazon dream' will continue to be supported with action, not just rhetoric.

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Case one of thousands

Unfortunately, the Brazilian story of sustainability, and its failures, is not unique. While there is only one Amazon, issues regarding climate justice and sustainable policies are present in most of the world's largest greenhouse gas-emitting nations. Hopefully, Lula da Silva's leadership in Brazil will serve as an inspiration for these other polluter states.

However, the underlying problem in many of these nations is the politicisation of environmental policy. Worldwide, there is a definitive gap between right-wing "climate denial" and left-wing "climate concern" in domestic politics. An oscillation between concern for sustainability frequently correlates to the political identity of a state's leader, as in Brazil, with Bolsonaro and Lula da Silva, and in the United States, with presidents Donald Trump and Joseph Biden.

For environmental activists and concerned citizens, it is a relief when a liberal, climate-minded leader takes office in Washington D.C. or Brasília. Yet, their environmental agendas are only a patchwork solution while the threat of a right-wing successor looms. There exists an innate urgency for bolder environmental commitments in both countries, and others at the forefront of accelerating environmental

damage around the world. Yet, these issues, and concerns for climate justice, will never receive their due attention nor legal address under such fickle conditions.

It is not just domestic power shifts that compromise the greater climate agenda: internationally, the mainstream mitigation framework relies heavily on multilateral agreements facilitated by institutions like the United Nations. Too often, though, these agreements consist only of empty, unenforceable promises. To the international community, it is currently acceptable to make these "pledges" every so often at summits while making little to no concrete steps at meeting them. So long as this remains the normative standard regarding climate change, the situation will only continue to change for the worse.

Hopes for healing

Deforestation contributes to the loss of ecological resilience in the Amazon; yet, it is essential to remain resilient in combating these adverse effects of environmental damage. There is hope that increased cooperation between the Amazonian nations will promote sustainable approaches. Shared treaties for this purpose, like the ACTO, claim to promote the 'sustainable' use and development of the Amazon rainforest,

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to 'improve the life of all its inhabitants;' its work is important, yet incomplete.

The attention to the experience of indigenous groups at the recent summit was a step in the right direction for comprehensively addressing sustainability in the region. It is much overdue concern, given how the suffering of these communities has long been the untold story in sustainability discourse. For example, the second section of this piece quotes a New York Times article that describes the 1970s highway built through the Amazon as a 'razor-thin' intrusion; in actuality, it was abruptly and destructively constructed by driving bulldozers through the Yanomami community Opiktheri, whereupon two whole villages died of diseases contracted.

Visibility and justice for indigenous communities in the Amazon is thus imperative to composing truly 'sustainable' solutions to the climate crisis. The Amazon is an instrumental environmental asset to the Earth at large: it stores 100 billion metric tons of carbon, is a home to numerous endangered species, and is the origin of ingredients for popular food items and modern medicines. But it is first and foremost a home to thousands of people, and has been for thousands of years. A sustainable future is therefore only one that safeguards their sacred canopy for thousands more generations to come.

The views expressed in this article are the author's own, and may not reflect the opinions of The St Andrews Economist.

Image courtesy of Michael Dantas, WWF Brazil

The Emerging and Sustainable Cities Initiative: what one program says about Latin America's sustainable development agenda

By Brooke Ryback



Latin America's Urbanization

From the end of the 20th century onward, the region of Latin

America and the Caribbean (LAC) has experienced an unprecedented rate of urbanization. According to the United Nations, the region's urbanization rates jumped from 62% in 1980 to 80% in 2011. By 2050, this growth rate is set to hit 85%. This makes LAC the second-most urbanized region in the world, closely following behind North America. Generally, urbanization connotes economic progress and modernization. Indeed, LAC's growing cities continue to encourage economic and productive growth (generating 60% of Latin America's GDP) as well as promote technological innovation and greater digitization for the whole region. Yet, this has also brought about inequalities greatly felt throughout the region, especially urban poverty and environmental vulnerability. Especially within the past decade, urbanization (both the good and the bad) has led LAC to take up a number of sustainable development projects to accommodate such rapid growth and address these two key issues.

One current effort is the Emerging and Sustainable Cities Program. Launched in 2012 and funded by the Inter-American Development Bank, the effort focuses on providing financial and technical assistance to address environmental, urban, and fiscal sustainability in various LAC cities. These funds go to urban housing and infrastructural projects, local healthcare systems, upgrades to

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greener energy and technology, and disaster risk management (IDB). The program's strategy to do so is to work directly with national and subnational governments throughout the region. The goal is that by funding top organizations, resources will then trickle down to the local community with special emphasis for the urban poor. Rather than focusing on established 'megacities,' whose growth has plateaued, the program looks to emerging, intermediate sized cities experiencing population and economic growth exponentially. Yet, despite its promising efforts, the participation of new LAC cities is lacking. According to the UNFCCC Secretariat (UN Climate Change), to date, the ESCP is active in 55 cities throughout the region (reaching 50 million people, 10 million of which are poor). However, this is an underwhelming number for the General Coordinator of the ESCP Ellis Juan, who hoped to assist 150 emerging cities by 2020. Thus, getting new emerging cities on board with the program appears to be a challenge. The intentions of this transnational effort certainly appears good on paper, but successful execution and the willing participation of LAC cities remain uncertain. This may be in part due to a larger, political backdrop occurring within Latin America, where conflict in economic interests - such as continued gold mining and deforestation - as well as targeted violence

towards environmentalists are slowing progress towards sustainable, green efforts. Therefore, in light of this, this article asks a few questions: (1) can the Emerging and Sustainable Cities Program be regarded as a success in Latin America's sustainable development efforts and (2) what does this say about Latin America's stance on sustainability as a whole?

Looking on the Bright Side

Since the Emerging and Sustainable Cities Program remains a relatively new program, determining its overall success is difficult to pinpoint. The most recent and only report specifically on the program, published by the Office of Evaluation and Oversight in 2016, admits "it is still early to assess the effectiveness of individual action plans produced by the initiative". Nonetheless, the report was able to take stock of the overall effectiveness of ESCP thus far. For the most part, the evaluation regarded the program positively, calling its model for knowledge generation and dissemination as well as its transparency as a brand "particularly valuable and novel". In addition, the evaluation praised the ESCP for working with over 70 partners in diverse fields, including various government, academia, and private sectors of development. According to the report, the wide range of partnerships successfully ensured a flexibility in the management and

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execution of the program. Furthermore, diversity of partnerships helps the program meet the ESCP's three pillars of addressing environmental, urban, and fiscal sustainable development. Thus, overall, the way ESCP is run appears to be successful, but can the same be said about its impact on LAC's emerging cities?

Last year, UN Climate Change particularly noticed the ESCP's work in La Paz, Mexico, where the city's public transport system was upgraded to a cleaner, more efficient bus system. This has increased the comfort of up to 50,000 people per day and reduced pollution in the city. They also praised infrastructural improvements made possible by the ESCP in Mar del Plata, Argentina which enhanced the walkability of streets for 13,000 pedestrians per day. In addition, OVE's evaluation found the completion rate of action plans (which include city-specific improvements to water and sanitation, environmental risk management, housing initiatives, and citizen security) to be an indicator of the program's success. By 2016, four years into the program, 35 emerging cities had already finished their action plans, including all five original participants from the program's pilot. Thus, eager implementation of actively participating cities "suggests that the technical assistance provided by the initiative has gone beyond just provision

of knowledge to a potential real impact on cities" (OVE).

Lastly, the program is a success in terms of its global norm-setting potential. OVE's report recommended the initiative to "Explore ways to use the ESCP model of partnerships and knowledge sharing in other initiatives". Furthermore, the ESCP's work as an example for others not only applies to "other initiatives" inside and outside the Inter-American Development Bank. As the world collectively urbanizes with two-thirds of the global population projected to live in cities by 2025, other countries (especially IDB's 22 non-borrowing countries currently investing in these projects) can learn from the successful cases of the ESCP. According to the UNCC, the ESCP's replicability may inspire a "spillover effect," in other multilateral development banks, governments, and non-governmental organizations. Indeed, the UNCC's particular interest in the program shows the ESCP's work in sustainable development is being taken seriously on the global stage.

Current Challenges

No program is perfect, however, especially when it is relatively new. The ESCP is no different, struggling to garner participation from emerging cities yet to join the initiative. To date, the IDB identifies a total of 242 emerging cities within the region,

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meanwhile only 55 are actively participating. Thus, while eager participation was evident amongst emerging cities already working with the initiative, enthusiasm seems to dwindle for those yet to join. This may be a sign that the program is struggling to keep up with the region's exponential urbanization. New emerging cities are popping up rapidly as the region continues to grow. Just in 2015, the IDB identified 140 emerging cities. Thus, within 8 years, 98 cities were added to the ESCP's radar. Therefore, garnering new participants while also remaining invested in the cities already engaged with the program appears to be a juggling task risking ESCP's outreach and effectiveness.

Citizen participation within the cities taking part of the initiative is equally underwhelming. OVE's report flagged this issue, noting this is due to the distrust citizens have towards their local government. They noted this was the case for residents in Quetzaltenango, Guatemala, whose limited trust and lack of experience in local planning processes led to their low engagement with ESCP funded projects. For ESCP's assistance to make a meaningful impact, citizen participation is key in accurately addressing the niche issues and needs of each emerging city (OVE). In addition, "engagement with society" ensures the project's longevity, as citizens can pressure local government officials to

continue their direct work with the ESCP (OVE). Yet, cases like Mar del Plata, Argentina show the ESCP is taking steps to better engage with the citizens they impact by polling stakeholders and partnering with local radio stations.

Progress in a Backdrop of Backlash

Despite participatory challenges, the ESCP can still largely be viewed as a success since emerging cities have eagerly kept up with their action plans and benefited from the ESCP's financial and technical support. Benefits included cleaner transportation and improved infrastructure. Furthermore, this initiative shows the program's potential in influencing other sustainable development projects both at the regional and global level. Thus, through initiatives like the ESCP, many have come to view Latin America as an exemplary champion of sustainable development efforts. The World Economic Forum places Latin America as a global leader in sustainable development stating, "Countries of the region [LAC] have displayed an extraordinary commitment to sustainable development... They must now show their ability to lead the way,".

At the same time, however, the ESCP's participatory challenges not only showed a general distrust between Latin American citizens and their local government, but also to a larger, political backdrop occurring

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throughout the region. Especially in terms of its green policy, Latin America appears to be clashing in interest and values. Whilst taking on sustainable development initiatives such as the ESCP, LAC countries simultaneously continue to pursue their own economic interests in gold mining as well as in the oil and timber industries. Deforestation also remains a regional problem, especially in Gran Chaco where large-scale soy and cattle farms continue to clear the second-largest woodland in Latin America. In addition, backlash against environmentalism has made LAC the most dangerous region for environmentalists (Global Witness). According to Global Witness' 2022 report, the region accounts for 88% of the 177 environmentalists killed globally that year.

With all this context in mind, the World Economic Forum's claim, "Latin America and the Caribbean has yet to close the gap between rhetoric and reality," still holds true. Both the ESCP as a multilaterally funded program and the LAC region as a whole appear to be at a crossroads between progress and challenge, rhetoric and action, as well as support for a sustainable future and a conflict of interest. Yet, this "critical juncture" currently felt in the region (as UN Deputy Secretary-General Amina Mohemmed put it) is not an entirely bleak picture. Certainly LAC's sustainable efforts require accountability where its "leaders will

need to make a choice - to fulfill their commitment to a better future, or let it fall to the wayside" (UN). At the same time, however, both the successes and challenges occurring in Latin America shows that we are the cusp of great potential change both regionally and globally. This complicated picture towards a more sustainable future need not be wary. Rather, it goes to show how global sustainable development takes patience, trial and error, and the shared responsibility of all - governments, NGOs, and citizens alike.

The views expressed in this article are the author's own, and may not reflect the opinions of The St Andrews Economist.

Image Source:

<https://unfccc.int/climate-action/momentum-for-change/lighthouse-activities/emerging-and-sustainable-cities-initiative>



Beyond the Prescription: The Ecological Cost of Pharmaceutical Practices

By Charlotte Plaskwa

The intricate relationship between the pharmaceutical industry and the environment is increasingly recognized as a significant factor in ecological health. This article delves into the multifaceted impacts of pharmaceutical pollution, encompassing both the direct consequences of manufacturing processes and the more insidious, long-term effects of pharmaceutical waste products on wildlife and ecosystems.

The production processes of the pharmaceutical and healthcare industries are highly demanding in terms of resource-utilisation, with significant ramifications for ecological systems and global climate patterns. The medical sector is responsible for almost 5% of global greenhouse gas emissions and has a carbon footprint equivalent to 514 coal-fired power plants. If the sector were a nation, it would be the fifth largest polluter on Earth. The sector's energy demands, notably the thermal regulation of

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medical facilities, contribute substantially to this footprint. Similarly, the manufacturing, delivery, consumption and disposal of products and services adds up to an estimated 60 to 70 per cent of the healthcare sector's global footprint. The consumption of single-use medical items has become an even bigger concern with the onset of the COVID-19 pandemic, as healthcare professionals wear disposable personal protective equipment (PPE) to decrease the risk of infection. The first 20 months of the global COVID-19 response generated an estimated 87,000 tonnes of PPE and 144,000 tonnes of additional waste from vaccines (such as syringes and needles), highlighting the critical need for a reassessment of waste management practices in the healthcare system. The implications of these practices on the environment create a cyclical dynamic, in which changes to the climate exacerbate medical conditions. For example, the increasingly poor air quality can cause respiratory problems and worsen existing conditions such as asthma and make people more vulnerable to diseases. In turn, this escalation in health problems necessitates more healthcare interventions, creating a self-perpetuating cycle of ecological harm.

Beyond the immediate environmental footprint of their production, pharmaceuticals continue to affect the

environment long after their useful life ends. Medications that are excreted by humans and animals, or improperly disposed of, enter wastewater systems and natural water bodies, where they can persist and bioaccumulate. The presence of these substances in the environment, even in trace amounts, poses a significant threat to wildlife behaviour and physiology, and disruptions to reproductive systems and biodiversity because of pharmaceutical pollution. One study by the Aquatic Toxicology Laboratory exposed juvenile fathead minnows to a range of pharmaceutical chemicals, including the opioid pain relief oxycodone, the antidepressant fluoxetine and the sleep-aid temazepam. Juvenile fathead minnows exposed to the pharmaceuticals suffered from reduced growth and altered escape behaviour. This means that, when faced with a threat, the minnows did not escape as efficiently as they normally would, increasing the chances they would be preyed upon, ultimately translating to population level effects. Similarly, larval exposure to specific enzyme inhibitors have shown to disrupt normal sexual development in amphibian species. Another study conducted by the Florida International University found that all the tested cohort of fish contained pharmaceuticals. An average of 7 drugs were detected per bonefish and one bonefish sampled in Key West tested positive for 17 pharmaceuticals – eight of

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them antidepressants that were up to 300 times above the human therapeutic level. The study concluded that pharmaceutical exposure in south Florida's bonefish was widespread and concerning. The researchers also studied 125 animals that bonefish prey on, including shrimp, crabs and small fish. Each contained an average of 11 pharmaceutical contaminants, indicating that the contamination is not limited to bonefish or the primary consumers of the medication. This demonstrates how ecosystems and the organisms within them are also at risk, as these substances can be transferred through the food chain, leading to broader ecological consequences. This begs the question of the long-term health implications for humans, as pharmaceuticals bioaccumulate in our food-chain. The persistence of pharmaceuticals in the environment underlines the need for improved waste management practices, sustainable manufacturing processes, and comprehensive environmental monitoring.

The effects of pharmaceutical contaminants are not limited to aquatic environments. One of the clearest cases of pharmaceuticals causing population-level effects occurred on the Indian subcontinent, where the consumption of carcasses of livestock that were medicated with the anti-inflammatory drug diclofenac resulted in over 95% of

vultures dying of kidney failure through consuming it via dead cows. In this way, pharmaceutical reform is necessary to not just reduce carbon emissions and waste, but also in animal conservation.

Addressing the environmental impact of the pharmaceutical industry requires a multifaceted approach. Regulatory frameworks need to be strengthened to ensure that pharmaceutical companies adhere to stringent environmental standards. The US Food and Drug Administration (FDA) requires environmental risk assessments of human and veterinary medicines on the effects on aquatic and terrestrial organisms before they allow a product to enter the market, and the EU introduced similar requirements in 1997. Government initiatives are also imperative to reduce the carbon footprint of this sector. For example, in 2020, NHS England became the world's first national health service to announce a plan to become a net-zero health system. This means striving for 'net zero' greenhouse gas emissions when accounting for all contributions and offsetting. Similarly, innovative waste treatment technologies and greener manufacturing processes can reduce the ecological footprint of pharmaceutical production. Public awareness and proper medication disposal practices are also crucial in minimising the release of pharmaceuticals into the environment.

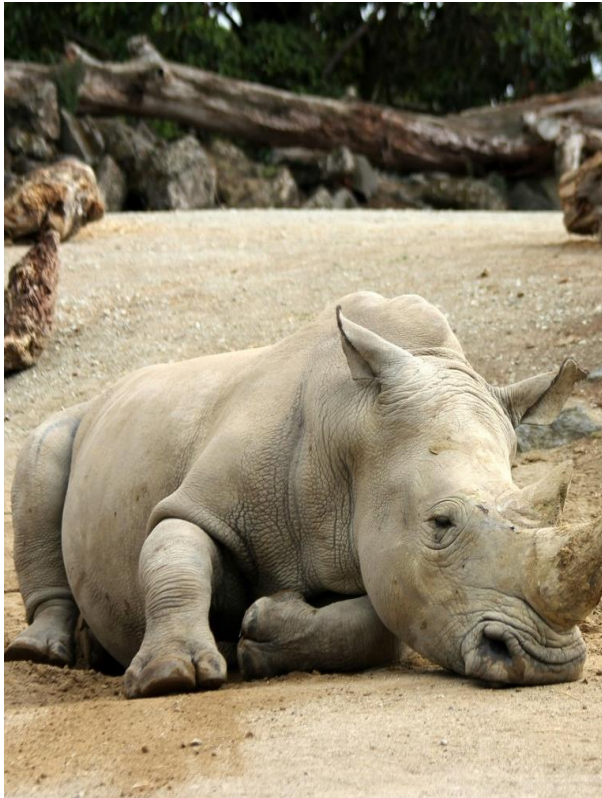
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For example, the pharmaceutical company Astra Zeneca introduced a Safe Discharge Programme for the removal and regulation of medical waste.

In conclusion, the pharmaceutical industry plays a critical role in human health, but its environmental impact cannot be overlooked. A comprehensive understanding of the convoluted relationship between pharmaceuticals and the environment, coupled with concerted efforts to mitigate adverse effects, is essential for safeguarding ecological health and ensuring the sustainability of both the industry and the planet.

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Image Courtesy of ChemistryWorld via Getty Images



Ever-evolving Zoos: The role of zoos in the 21st century?

By Logan Elliot

The existence of zoos has raised issues of animal abuse and exploitation since their inception. The world's first zoo is believed to have been in Hierakonopolis, ancient Egypt, circa 3500 BC. In 2009, archaeologists discovered the remains of baboons, elephants, crocodiles, wild oxen, gazelles, leopards, cats, and dogs. Along with these discoveries however, scientists found broken hands and feet in the baboon, hippo calf, antelope and wild cow remains. In addition, many scientists believed the first zoo served as

an animal sacrifice. For most of history, zoos served as 'menageries' for the rich, based around the displacement and exploitation of animals. Noting this dark history of zoos, it is hard to imagine that zoos now serve as a so-called safe haven for animals.

The history of animal abuse continues to taint people's perspective on zoos, despite countermeasures. For example, PETA argues that zoos' efforts to change their narrative into one of conservation and sustainability, is disingenuous and ineffective. Furthermore, most animals kept in zoos are not endangered, and their living conditions are typically substandard and unstimulating when compared to their natural environment. A PETA study surveyed schoolchildren visiting the London Zoo from ages 7 to 15 and found that the zoo visits for the majority of students had either no positive effect or a negative effect on their knowledge of animals and ecosystems. As the Last Chance for Animals argues, many zoos tout ideas about conservation and education to maintain public support. Because there is little to no legal enforcement that the zoos focus on sustainability efforts, some zoos use the sustainability movement as way to generate visitors rather than genuine conservation efforts. Furthermore, many reintroduction programs fail because the animals are unprepared to survive in a natural environment. Because they are habituated to human contact, they

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often fall susceptible to poachers. A key example of this is with the orca from the film Free Willy, Keiko. A letter writing campaign in 1999 successfully demanded for his release back into the wild. However, because Keiko was so accustomed to human interaction, attempts to introduce him into a pod were futile, and he often swam to ports to seek human contact, eventually dying of pneumonia. This is motivated by the fact that the zoo industry creates massive profits. For example, the Association for Zoos and Aquariums in the United States released that their zoos have generated 24 billion dollars annually. Simultaneously, zoos require enormous levels of resources to maintain their exhibits. The Chimelong Ocean Kingdom in China, for example, holds 12.87 million gallons of water. Furthermore, many zoos use huge amounts of electricity in order to maintain heating and cooling in order to create the right habitat for their animals. In the U.K., the energy crisis has caused zoos, such as the Edinburgh Zoo, to threaten animal euthanasia due to a quadrupling of energy bills. These prerequisites contribute to the processes of climate change that directly cause habitat degradation and displacement. Considering these characteristics, it is difficult to discern the true motivations of zoo conservation efforts and the reality of these efforts. As part of capitalist economies, do zoos follow suit? Are zoos solely focused on

public relations and profits or do they hold a stake in and make an effort towards the betterment of the environment?

When considering the evolution of zoos, it is important to recognize the strides certain organisations have made in changing the narrative. For example, there has been an increasing number of zoos that have become non-profit, eradicating the motivations for profit-maximization and shifting the focus onto the wellbeing of the animals. For example, the Wildlife Conservation Society is a non-profit that operates zoos and aquariums and is directly involved in conservation and sustainability efforts. Using donations and fundraising, the organization funds and directs efforts globally. For example, in an attempt to combat the issue of emissions, the Bronx Zoo has switched to sustainable energy powered carts for transporting animals and resources throughout the zoo. It is important that the largest urban zoos in America is committed to education and environmental efforts. For example, the Bronx Zoo organizes a community 5k in order to raise money for different endangered species annually. These efforts not only better the environment, but also rally communities around conservation efforts. In Philadelphia, a study showed that, on average, zoo guests used less electricity than their non-visitor counterparts, highlighting the positive role of zoos in

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environmental education. Similarly, the Association of Zoos and Aquariums has spent 230 million on field conservation work. Transforming the narrative from zoos as a spectacle to an opportunity to learn about the environment and then go directly to the most afflicted area, zoos such as these helps combat the negative connotations of keeping animals in exhibits. Despite critics arguing against the numerous rehabilitation claims, many zoos do make efforts to reintroduce animals into their natural environments. For example, the Columbus Zoo works with the U.S. Fish and Wildlife Service in the Manatee Rescue and Rehabilitation Partnership to help heal and reintroduce local manatees. The humanitarian role zoos worldwide are stepping into is crucial in creating a sense of community and an environmentally-conscience community at that. For a city as large as New York, for example, these grassroots initiatives to garner support are vital for the wellbeing of the citizens. Community engagement is shown to have great effects on a sense of belonging and overall happiness. Furthermore, by unifying community under the umbrella of climate change and environmental advocacies, zoos serve as a powerful tool to reach the public about environmental issues as an interactive facet of the community. As a center that brings together people from all diverse backgrounds, zoos have

become a unique mecca for environmental awareness. Concurrently, it is important to recognize the context of zoos as an anthropomorphic attempt to shape and commoditize nature, typically abusing animals in the process. There are also many challenges with the existence of zoos that directly conflict with sustainability. However, as seen by some of the organizations mentioned, zoos have the potential to be a key factor in the environmental movement and the link between the public and nature. Highly controversial, the debate around zoos is complex and involves political, economic, and societal issues. Each zoo is different and must be analysed as an individual entity with its own context and pressures. However, the argument surrounding zoos highlights that these organisations have a responsibility to clearly recognize and address issues of animal wellbeing, habitat displacement, and environmental degradation. To protect our habitats and their animals, it is required to transform the perception and narrative of zoos, to use the medium of wildlife centers as powerful tools to raise awareness and aid rather than caged animals for spectators to ogle at.

The views expressed in this article are the author's own, and may not reflect the opinions of The St Andrews Economist.

Image Courtesy of Sandy Millar via *Unsplash*



Can Finance be Sustainable in a World of Shareholder Value Maximisation?

By Alexander Wylie

With the considerable increase of the sight of orange paint, powder and clothing flooding our newsfeeds, one wonders to what capacity the efforts made by a certain activism group go towards tackling the climate issue we face as a species. From getting

dangerously close to Formula 1, necessitating a hoover to be brought out at the snooker and Johnny Bairstow requiring to carry one protestor off the Lord's turf; the costs to major sporting events and local communities to heighten security have certainly been hit, but what about those of the large oil and gas companies they supposedly target. With the goal of stopping new oil and gasⁱ one questions the extent that the organisation has met this aim, or rather if their efforts have been harsher upon the working class trying to get to work through their blockages. Have they hurt profits of Oil and Gas or simply bolstered those of orange dye makers and is there perhaps a more transitional and economically sound route to climate change targets.

There is consensus that traditional economic theory in finance and climate action are mutually exclusive in the sense that a drive for profits will forgo any action to cull the harmful emissions escaping into the atmosphere for the whole population to deal with the consequences. In a free market economy, with costly negative social externalities unhonoured by the producer and the subsequent exclusion of this from the profit maximisation mechanism leads to the overproduction of the good involved. In the case of oil and gas, this means the optimal level of output is superseded and pollutants are created in excess of the social optimum

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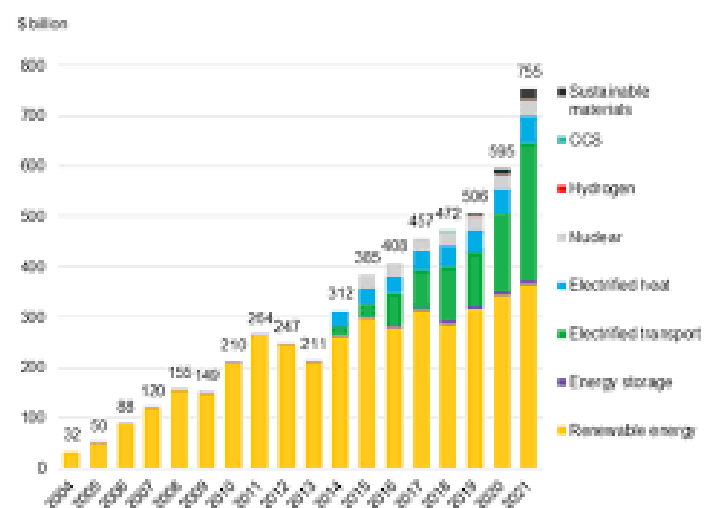
level. It is important to know the extraction of oil and gas is still present as the benefit to society as an energy source for heating and transport still outweighs the integrated costs and the externality combined.

In the real-world regulation can play a part in curbing this overabundance of output, in hopes to return it to the social optimum. Taxes per unit equivalent to the cost per unit of the negative value to society of the pollution or limits in production placed at the required level, can act to appropriate the output to the favourable level. So, if there is a known solution, why doesn't it happen in practise?

With the global nature of these externalities the cost is not borne by one singular legislative region. Therefore, if agreements cannot be made between all countries to tax each of their home nations oil and gas exploiting firms, then a lack of universal accountability will always make it so abnormal profits can be made. In game theory, it is such that the best response to any other countries decision would be to not regulate their own firms and as such the Nash Equilibrium of said game is to let them pollute to their own content. With Western politics transitioning into a state of isolationism, a singular global legislative body for pollution may be difficult to achieve. However, initiatives like the EU Emissions Trading System

(EU ETS)ⁱⁱ appear to be a step in the right direction towards climate accountability.

With future cash projections internalised into a stock's current price. Predicted growth rates in years to come can account for a considerable part of a stock's current market capitalisation. Growth's intrinsic nature means investment decisions by a firm's CFO must be to maximise ROI (Return on Investment) to maximise shareholder value. With Shell a frontline target of many climate protests due to their considerable pollution levels, it is promising to note that almost a third of their investment in 2022 was in 'low-carbon energy and non-energy products'ⁱⁱⁱ, with the trend of this proportion allocated to said investment growing year over year. Global investment in energy transition has shown promising increases also.



Source: BloombergNEF^{iv}

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A concern of many however is the difficulty for those saving in retirement funds to have a say in where their capital is allocated and the researched and effort required to circumnavigate companies with poor ESG scoring. However, pressure from shareholders of pension funds and asset managers seems to have influenced their willingness to invest in fossil fuel companies. ‘As of early September 2022, around 1,500 institutions had publicly committed to divesting from some form of fossil fuels, representing just over \$40 trillion in assets.’^v This demonstrates both firms own consensus to transition away from fossil fuels and fund managers or individual investors.

While the race to net-zero is certainly off the mark, spurred on by individuals firms and climate organisations alike and the view that Shareholder Value Maximisation will achieve this; will the current trajectory be capable of executing this path in the most harmless possible way to the individual or does orange dye need to see a further hike in demand if we are to attain our most socially affluent future.

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Image courtesy of Micheile Henderson via *Unsplash*

¹ <https://juststopoil.org/>

¹ https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en

¹ <https://reports.shell.com/energy-transition-progress-report/2022/financial-framework/investing-in-net-zero.html>

¹ <https://about.bnef.com/energy-transition-investment/>

¹ <https://www.bloomberg.com/news/features/2022-10-20/how-to-purge-fossil-fuel-investments-from-your-401-k-or-ira>

European Hydropower: A Key to Sustain and Strengthen a Continent

By Tom Fort



Recently, the European Union recorded a significant reduction in its emissions of carbon dioxide to the lowest levels recorded in as much as sixty years. Between 2022 and 2023, carbon dioxide emissions from fossil fuel consumption in the EU fell by eight per cent, with Isaac Levi, an analyst at Crea, remarking that: ‘EU CO2 emissions have now returned to levels reminiscent of (...) the 1960s.’ Europe has been no stranger in recent years to falling levels

of carbon emissions, with the year 2020 recording a similar decline owing to the emergency measures hastened in by governments to combat the spread of COVID-19. The continuation of this decline several years later however implies a vitality to Europe’s environmental strategies characterised by a greater reliance on green technologies. There are, however, critical vulnerabilities in the EU’s activity. Of all energy sources, hydropower is unique, a renewable option which can simultaneously strengthen the bloc’s long-term environmental and political vitality.

As of 2021, hydropower accounts for 32% of the EU’s renewable energy production, and 12% of the bloc’s electricity overall. Figures are even higher in individual member states, with hydropower accounting for approximately 45% of electricity generation in Sweden. The expansion of wind and solar power generation has formed a key pillar of the bloc’s renewable energy strategy, yet this ‘ever-increasing share’ has placed pressure on the electricity grid owing to the intermittent nature of these sources. For example, supply is not necessarily guaranteed with such sources, owing primarily to weather-related constraints. Such concerns may be further exacerbated at peak hours during the evening and mornings, when the demand for electricity particularly in domestic settings rises significantly. The consistency of electricity production from hydropower however means that these gaps can be more easily filled and so the electricity grid

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can be stabilised, enhancing the credentials of a sustainable electricity supply in Europe. Hydroelectric plants along rivers can furthermore help to regulate the flow of water, able to provide increased supplies during times of drought and conversely help protect against flooding. This level of control can help to both predict and limit the secondary damage to ecosystems and habitats which can result from extreme weather events which are noticeably increasing.

Aside from being able to offer the EU a source of renewable electricity to cope with intermittent demand and emergency situations, hydropower's invaluable role in energy storage through pumped storage power stations could also strengthen the EU's environmental and consequently political autonomy. As of October 2023, pumped storage hydropower provides over 90% of electricity storage capacity in Europe and as such, hydropower can allow for the integration of great quantities of renewable energy from previously discussed intermittent sources. Many believe that hydroelectric power remains an under-exploited field, with some estimates suggesting that electricity storage capacity in the European Union could rise by as much as 80% with improvements to reservoirs.

A wider storage capacity for electricity and greater potential for the integration of other renewable sources of energy may afford greater flexibility to the bloc at times of uncertainty beyond its borders by affording diminished

dependency on external providers of energy. Such uncertainty has been in plentiful supply in recent years, firstly with Russia's invasion of Ukraine and the subsequent halting of gas deliveries westward, seen for example in Moscow's decision in September 2022 to shut down Nord Stream 1. More recently, attacks by Yemen's Houthis on shipping in the Red Sea, through which around 13% of Europe's liquefied natural gas passed as of 2023, has posed an additional threat to the arteries which sustain the continent's economic activity. Greater European control of European electricity generation through a more dependable political climate could help to make current and future European targets on carbon emissions more achievable and Europe's industries and populations less vulnerable to the effects of energy shortage.

There remains however an important distinction between renewable and green sources of energy. While being able to produce renewable electricity, hydropower's green credentials may be severely damaged if its operation were to result in environmental damage or disturbance. As a more mature technology, hydropower is theoretically well placed to play an expanded role in supplying Europe's energy, its operation better tested and understood compared to many other technologies. Theory however has been reinforced through practice, with EU-led policies being put into place. One such project, the FIThydro project, set out to investigate measures which may help mitigate the potential negative impacts

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of hydropower on the environment. Solutions developed as part of this project have included measures to guide decision-making regarding hydropower plants and also to protect marine life, such as with systems to help fish pass safely through turbines and to predict the risks of fish mortality. In this way, political forces can help ensure that a renewable source of energy is able to function in harmony with its surroundings.

As the fight against climate change continues, hydropower may be able to provide the dependable supply, long-term security and environmental health needed to ensure a truly sustainable energy policy in the EU. While able to add vitality to the EU's political autonomy, a greater exploitation of hydropower technology could truly raise the status of the bloc yet further as an independent geopolitical actor. For example, greater energy security could change the nature of the EU's relationships with 'friendly states', a key example being the United States, from which the EU imported a total of just over 2.7 billion cubic meters of liquefied natural gas in September 2023 alone. This wider freedom to dictate policy underscores yet again how sustainability can be diversified in both environmental and political terms, affording the EU an even greater chance to weather the natural and the geopolitical storms of the 21st century.

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Image Source:

<https://www.themayor.eu/en/a/view/two-major-hydropower-plants-to-be-constructed-in-salzburg-and-carinthia-7447>

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