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ANALYST REPORT: REVIEW OF RECYCLLUX APPROACH TO MARINE PLASTIC RECYCLING

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Recycllux

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This TAG analyst report provides an overview of the Recycllux approach to marine plastic pollution including its many benefits to global sustainability.

INTRODUCTION

Plastic pollution in our oceans has emerged as a critical environmental challenge that demands immediate attention. It is now clear, in fact, that plastics constitute one of the largest and most harmful components of marine litter, accounting for high percentages of total marine pollution. Future generations will certainly suffer if measures are not taken today to address this significant issue.

To give this some context, consider that literally tens of millions of tons of plastic are now being circulating in our planet's marine environments. This partially interferes with the ocean's ability to absorb some of CO2 we emit into the air by burning fossil fuels. Further, the decomposition of marine plastic pollution emits CO2 directly into the atmosphere. What's more, as plastic degrades into tiny particles (microplastics), it is ingested by marine organisms, reducing their ability to eat what they need to survive. This should be alarming to any observer, especially since the problem is so invisible to most citizens. The role our oceans play in maintaining a stable global ecosystem is just not well-known to most individuals and groups.

Start-up vendor Recycllux addresses this marine plastic pollution through the creative application of some advanced technologies and sustainable practices. They take advantage of some of the most important and powerful advances in areas such as earth observation, artificial intelligence, and blockchain to address marine plastic pollution. This TAG Infosphere Research Report aims to inform stakeholders about their approach and its many benefits.

RECYCLLUX'S INNOVATIVE APPROACH

Recycllux leverages three specific cutting-edge technologies and approaches, each of which contributes to the mitigation of marine plastic pollution. This is welcome since the purpose of technology innovation is to enable new applications, and one might not have anticipated how advanced technologies could be applied to areas such as climate science. The specifics are as follows:

1. **Earth Observation Data** – Recycllux is built on the notion that satellite-based Earth Observation data can be used to identify marine plastic litter problem spots. This data, which is obtained from the European Space Agency's Copernicus program Sentinel missions, provides critical insights into the location and extent of plastic pollution in our oceans, allowing for targeted interventions. This is an effective means for developing data collection and identification processes that will scale across vast portions of the seas and oceans.

2. **Machine Learning Algorithms** – Advanced artificial intelligence (AI) and machine learning (ML) algorithms are then employed by Recycllux to process the collected Earth Observation data. The goal is to use the ML data sets to build models that can accurately identify areas that will have high concentrations of plastic waste (based on the distinct spectral signature of plastic litter aggregations picked up from orbit) and predict where collection efforts should be focused (by integrating in the model of various other climate variables such as wind and water currents). This intelligent AI-based analysis enables Recycllux to optimize waste collection efforts, making the solution both fast and efficient.

3. **Blockchain** – In addition, Recycllux orchestrates an "uberized" approach to marine waste management by seamlessly connecting the socially responsible companies interested to implement environmental actions, with fishing ships and local NGOs to collect and sort the waste, and with recycling companies to transform the waste into second generation material, thereby creating a self-sustaining system that benefits both the environment and those actively engaged in cleaning it up. Through blockchain-based mechanisms, Recycllux elevates transparency levels within the marine plastic waste management cycle. It introduces immutable records and cryptographic hashing, ensuring a tamper-proof ledger of every transaction and action. Blockchain enables thorough provenance tracking of marine plastic waste from collection to recycling and transformation into second generation plastic materials.

BENEFITS FOR SUSTAINABILITY

As one might expect, Recycllux's novel approach to addressing the problem of global marine plastic pollution offers many significant benefits for sustainability, which fully encompass environmental, economic, and social aspects. Here are some of the more substantive contributions that such an approach provides through clean-up of plastic pollution from our oceans:

1. **Emission Reduction** – An obvious benefit that Recycllux offers involves enabling the direct reduction of CO2 emissions from the atmosphere. That is, by efficiently collecting and recycling marine plastic waste, Recycllux has the potential to save billions of tons of carbon dioxide that would otherwise be released into the atmosphere. A typical Recycllux intervention involving the collection of up to 10 tons of plastic waste by a fishing vessel can save 35 kg of CO2. The company's scalable approach, which involves multiple subsequent interventions, has the potential to save billions of tons of CO2eq annually. This represents a significant contribution to global climate action efforts.

2. **Ecosystem Restoration** – A second environment benefit of the Recycllux approach involves marine ecosystem restoration. That is, removing plastic pollution from the oceans is crucial for the restoration of marine ecosystems. Plastic waste poses a severe threat to marine animals and biodiversity, causing harm through entanglement, ingestion, and habitat disruption.

3. **Economic Benefit** – In addition, Recycllux offers significant economic gains. Plastic pollution interferes with many industries, such as fishing, shipping, and aquaculture, which depend on healthy marine ecosystems. Disruption of these industries can result in financial losses, reduced job opportunities, and economic instability in coastal regions. A 1% to 5% decline in the provision of marine ecosystem services due to plastic pollution is equivalent to an annual loss of up to $2.5 trillion. By removing plastic waste from marine environments, Recycllux contributes to the productivity and resilience of marine-based industries.

4. **Smooth ESG Implementation and Regulatory Compliance** – It is well-known that organizations, including companies and corporations. Companies often grapple with challenges in the realms of Environmental, Social, and Governance (ESG) reporting, perhaps via regulator (directives that holds them accountable for plastic waste footprint) or other pressures such as inadequate control and monitoring of sustainability plans, or lack of transparency. Recycllux provides a sustainable business model with reasonable economics making it easier for companies to accomplish their ESG objectives. Recycllux ensures complete transparency so companies can report to regulators or share their accomplishments with consumers in a trustworthy and verifiable manner.

SOCIAL AND POLICY RESPONSIBILITIES

In addition to the advantages listed above, there are also various social and policy-related considerations that should influence to decision to engage in a Recycllux intervention. First, there is the issue of marine animal welfare. Marine plastic pollution results in the suffering and death of over 1.5 million marine animals each year, creating a significant humanitarian concern. Recycllux's efforts to remove plastic waste contribute to the well-being of marine life.

There are also implications for human health. That is, microplastics from degraded plastic waste contaminate marine food chains and have potential human health consequences. The exposure to microplastics poses a broad spectrum of potential health repercussions, including diverse afflictions such as cancer, infertility, asthma, and disorders in embryo development, among other concerns. By reducing plastic pollution, Recycllux indirectly safeguards the health and well-being of present and future generation human beings. Again, this is a poorly understood concept for most individuals since the role of the seas and oceans in our health tends to be overlooked.

Recycllux's data-driven approach also has significant policy implications. Knowing the precise location and extent of plastic pollution allows authorities to calculate the emissions impact of specific litter accumulations. This knowledge is crucial for planning ecosystem-based conservation efforts that effectively mitigate threats posed by plastic pollution. Additionally, identifying pollution sources, such as ghost gear, enables authorities to develop targeted strategies to combat marine plastic pollution more effectively.

CURRENT STAGE AND SCALABILITY

Recycllux has made significant progress in its development, reaching Technology Readiness Level (TRL) 5. This progress is a direct outcome of being fast-tracked by the European Institute of Innovation and Technology (EIT) Climate-KIC in the Black Sea ClimAccelerator Program, , organized in collaboration with Impact Hub Bucharest. The project's success has been officially acknowledged, with results published on the European Commission's Horizon Results Platform in April 2023. While reaching TRL 5 underscores the commitment to an innovative, technology-driven solution for addressing marine plastic pollution, which is operationally ready for deployment, the primary challenge remains the validation of the solution through a first end-to-end real-world intervention.

Scalability is a core component of Recycllux's strategy. Initially targeting the Black Sea basin, the company has engaged with relevant stakeholders to ensure commitment and support for marine plastic litter collection and recycling interventions. However, the model is designed to be easily adaptable to cover other European or worldwide basins through engagement with local stakeholders.

CONCLUSION

The Recycllux approach to leveraging Earth Observation data, machine learning, and blockchain technology, is highly recommended here for any organization who chooses to tackle this pressing global issue. The benefits for sustainability are far-reaching, encompassing environmental, economic, and social dimensions. By efficiently collecting and recycling marine plastic waste, Recycllux not only reduces CO2 emissions but also preserves marine ecosystems, protects marine life, and contributes to a sustainable future for our planet.

ABOUT TAG

TAG is a trusted research and advisory company that provides insights and recommendations in climate science , cybersecurity, and artificial intelligence to thousands of commercial solution providers and Fortune 500 enterprises. Founded in 2016 and headquartered in New York City, TAG bucks the trend of pay-for-play research by offering unbiased and in-depth guidance, market analysis, project consulting, and personalized content—all from a practitioner perspective.

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