

ALLIANCE
TO END
PLASTIC
WASTE 



ALL-TOGETHER

ALLIANCE
IN ACTION

PROGRESS REPORT 2021



Alliance in Action

This year, we set in motion the work to scale for impact after 2 years of foundation-laying. Efforts are well under way and we are already beginning to see early results.

This third edition of the Progress Report was inspired by the collective action of our partners on the ground and the positive impact we are having on the communities where we operate. Like ripples on the water, we believe the work that has started can grow and expand to drive long-lasting transformation in ending plastic waste. This is our Alliance in Action.

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The good news is that significant capital can be unlocked by demonstrating sustainable, circular, scalable, and economically viable solutions.

Chairperson's message



As the first chairperson of the Alliance to End Plastic Waste, what are some of your biggest takeaways over the past 3 years?

It has been my pleasure to serve as the Chairperson and to contribute to developing the initial concept of an alliance into what is now an independent, fully functioning entity. We have made tremendous progress in nearly 3 years and now have a strong foundation in place. Our cross-value-chain collaboration continues to grow, from 27 members when we started to now about 65 members helping to drive Alliance efforts.

Each member is demonstrating their commitment to the cause of ending plastic waste in the environment, not only in support of Alliance activities but also within their own companies. Ending plastic waste requires all of us to engage, to play a leading and participatory role. With a strong resolve, together, we can end plastic waste in the environment.

Looking ahead, what will it take for the Alliance to fulfil its mission of ending plastic waste in the environment?

We are seeing good progress despite challenges of the global pandemic. Through partnerships on the ground, programmes are advancing, with over

35 projects in various stages of implementation spanning 80 cities worldwide. When fully operational, the collective impact of these early efforts can divert and recycle up to hundreds of thousands of tons of plastic waste.

Of course, we must do much more. The Alliance team is building out a suite of solutions to advance a circular economy for plastic waste. By de-risking and demonstrating solutions, we are presenting opportunities for further investment, replication, and scaling. The good news is that significant capital can be unlocked by demonstrating sustainable, circular, scalable, and economically viable solutions. It is through the connection of capital with these solutions that we will see impact on a global scale.

What insights can you share with our incoming chairperson?

Jim Fitterling is a strong and capable leader who has been with the Alliance since the start. He knows the importance of innovation and collaboration, and how the benefits of pooled resources can help unlock the needed investment to drive a truly circular economy. It is the uniting of technological innovation and sound investments with an unyielding commitment for positive impact that will drive exponential, positive change. I know Jim will build on our solid foundation, help drive even stronger private sector support, and propel the Alliance towards much larger impact.

This mission is more important now than ever, and we remain committed to help end plastic waste in the environment.

David S. Taylor

Executive Chairman
The Procter & Gamble Company
Chairperson, Alliance to End Plastic Waste

Message from the CEO



2021 was a defining year for plastic waste, as the issue grew in priority, urgency, and magnitude. Countries, businesses, and communities need more practical solutions to address their waste management and plastic waste problems. This urgency to act mirrored our journey at the Alliance too.

Over the past 12 months, we have grown our technical expertise, enhanced our project portfolio, and strengthened our partner network as we scale up efforts to help end plastic waste in the environment.

The Alliance in Action

We crystallised our approach for translating our mission into action, with 6 gaps that must be bridged to achieve plastics circularity. These reinforce and build on our 4 strategic pillars (Infrastructure, Innovation, Education & Engagement, and Cleanup), and are the roadmap through which we are working with stakeholders to identify and implement solutions to advance a circular economy.

Work to bridge these gaps is well under way. In 2021, we grew our portfolio by about 80% and expanded our footprint in Asia, Africa, Europe, and the Americas. We now have more than 35 projects across 80 cities. The majority of these are in various stages of implementation, and we are confident that the impact of our work will soon be visible in the locations we serve.

We made progress despite the effects of the COVID-19 pandemic, which were keenly felt by the Alliance. We experienced some project disruptions and a project closure. Travel restrictions regrettably prevented us from being on the ground as often as we had wanted. However, site visits to support and accelerate implementation efforts are resuming as the world carefully opens. I am proud of the team for continuing to work closely with our partners to advance our mission.

A key learning for us this year was demonstrating that our approach works. We invest time, as well as financial and technical resources, to de-risk projects at the seed stage, ensuring their long-term viability and potential to grow.

For instance, our partners in Ghana and the Philippines successfully expanded their operations and attracted additional investors after receiving our support in the early development stages. Though smaller in capacity for now, they are showing meaningful impact and are examples of how sustainable models can have a positive ripple effect—by growing businesses, creating better jobs, and transforming communities.

Preparing to scale

The size of the plastic waste challenge means we must do more. And we will, by unlocking more resources and working with a wider network of like-minded partners to enable viable, investable solutions at scale. We believe we have the foundation and are well placed to scale for impact.

Our work would not be possible without the partnerships forming the backbone of the Alliance. More parties are coming alongside us on this important mission. This year, we grew our network to about 65 members across the plastics value chain and welcomed new partners.

We also established our independent Advisory Council, comprising environmental policy and opinion leaders from government, intergovernmental organisations, civil society, and academia. Together, they provide expert advice and recommendations to the Alliance.

The next chapter

I would like to take this opportunity to express our sincere thanks to our Officers David Taylor, Bob Patel, and Jean-Marc Boursier for their steady leadership and guidance in our formative years.

Now more than ever, we must stay focused on our mission. We have our work cut out for us—there is no silver bullet to ending plastic waste. We remain fully committed to our ambition of diverting millions of tons of plastic waste. I believe we have the right resources, capability, and conviction to help make a difference. Together with like-minded partners, we can end plastic waste in the environment.

Thank you.

Jacob Duer

President and CEO
Alliance to End Plastic Waste



Member's message



We have a bold ambition to end plastics waste in our lifetime. While there is still much to be done, we are proud of the progress we have made this year. NOVA Chemicals joins our fellow Alliance members in our commitment to communicating our progress and holding ourselves accountable as we move towards a low-carbon, zero plastic waste future.

Noteworthy accomplishments from NOVA Chemicals this year include:

- We are developing innovative new solutions and products that help retain the value of plastics in the economy through reuse, recycling, and recovery.
- We are propelling into the post-consumer resin (PCR) market and are selling high-quality, mechanically recycled PCR today. Our first three recycled linear low-density polyethylene (LLDPE) offerings launched in May 2021 and railcar quantities are now available. Quantities of recycled high-density polyethylene (rHDPE) are expected soon. Our team of scientists and researchers are finding novel solutions to improve the quality and consistency of PCR to advance a circular economy.
- We entered our second year as the lead corporate sponsor of the Great Lakes Plastic Cleanup. The initiative aims to combine innovative capture and cleanup technologies to remove plastics from the Great Lakes with messaging to communities and consumers about the importance of reducing, reusing, and recycling material waste.
- We joined Dow, LyondellBasell, and Closed Loop Partners to establish a \$25 million investment fund to use catalytic capital investments to advance the recovery and recycling of plastic materials in North America. Sealed Air and SK Global Chemical have since pledged their support. The Closed Loop Circular Plastics Fund is now at \$35 million with ambitions of \$100 million.

It will take continued collaboration, innovation, and investment to solve our world's most complex challenges. I'm passionate about the value of plastic materials and the role our industry will play in solving those complex challenges. I know that by working together we can shape a world that is better tomorrow than it is today.

Luis Sierra

Chief Executive Officer
NOVA Chemicals



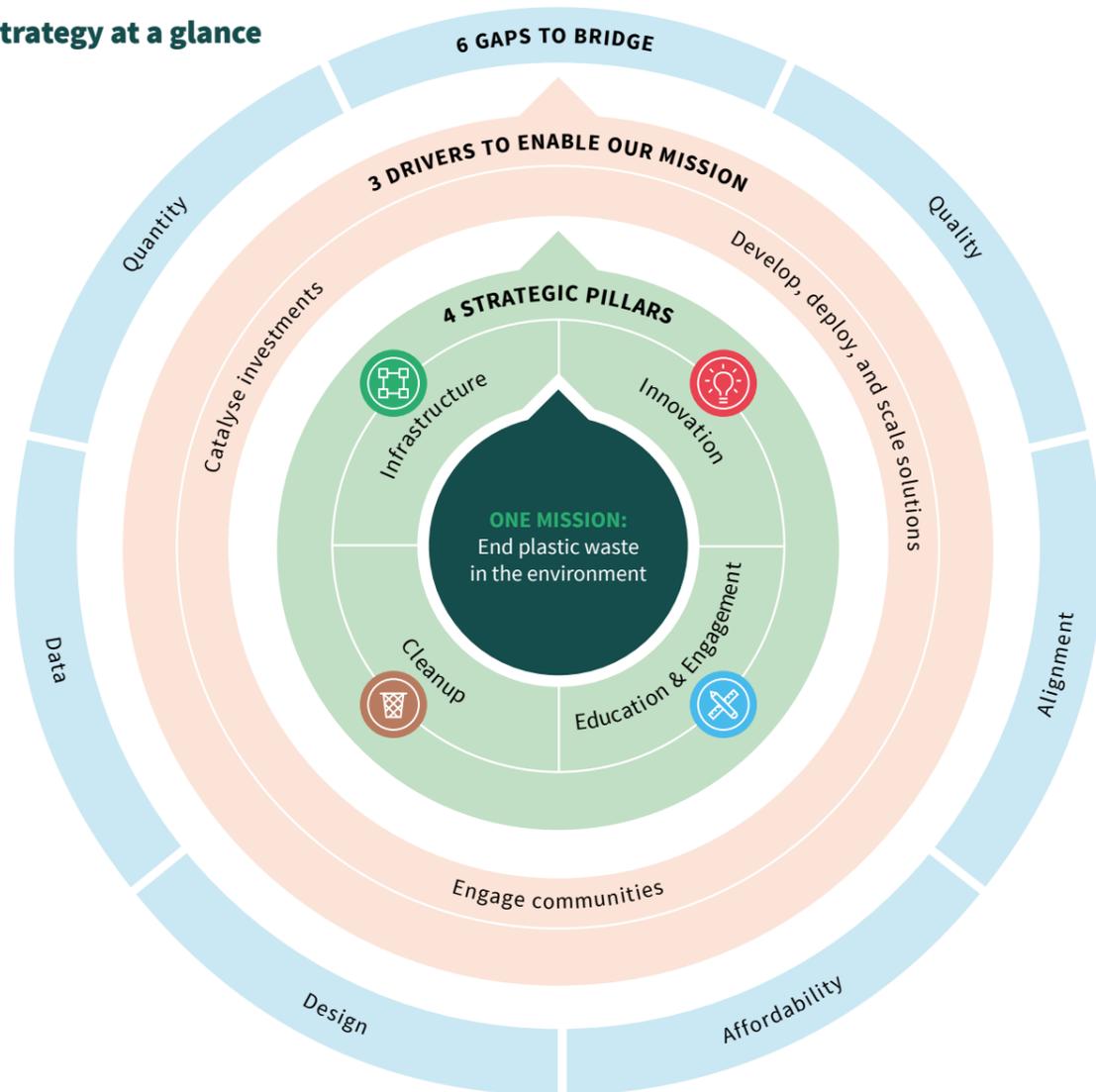
Translating our mission into action

Transformational change must be underpinned by practical alignment and collaboration among a diverse spectrum of stakeholders, including the private sector, governments, development agencies, local communities, and civil society partners.

We have identified 6 gaps that must be bridged to advance plastics circularity. This builds on the 4 strategic pillars and 3 drivers that enable our mission. It is our roadmap for working with a global network of partners to divert plastic waste, improve livelihoods, and contribute towards creating a circular economy.

We are demonstrating how cross-value-chain partnerships can unlock capital at scale and accelerate the pace of development for solutions. Together, we can help to end plastic waste in the environment.

Our strategy at a glance



4 strategic pillars as the foundation of our approach



Infrastructure

We aim to support communities by developing and investing in systems to collect and manage plastic waste and recycling.



Innovation

We incubate and accelerate ideas that, in turn, help to scale new technologies and solutions for a circular economy.



Education & Engagement

We enable lasting change by empowering stakeholders to understand and play their part to end plastic waste in the environment.



Cleanup

We work with partners to address plastic waste at source and aim to provide communities with an environment free of plastic waste.

3 drivers to enable our mission

Develop, deploy, and scale solutions

We collaborate with members and partners to help develop and implement scalable projects around the world. We aim to de-risk these initiatives by providing guidance on their viability, while offering funding and access to a network of like-minded Alliance members to secure collective action.

Engage communities

To ensure our projects can have the greatest impact possible, we work with local communities, providing the resources and information to help them understand the benefits of eliminating plastic waste. At the same time, we create platforms that facilitate community activations in cleanup and recycling.

Catalyse investments

We aim to catalyse investments from a wide network of investors, including Development Finance Institutions, the private sector, and philanthropic organisations, to support the creation and replication of successful initiatives.

6 gaps to bridge for plastics circularity

Quality

Challenge: To ensure that recycled materials meet the performance requirements of the intended use
Approach: Exploring advanced recycling and innovative sorting technologies as a means to improve recyclate quality, and enabling 'fit-for-use' recyclates without contamination, e.g. HolyGrail 2.0

Design

Challenge: To design products and supply chains that focus on a circular economy to replace a traditional make-use-dispose approach
Approach: Enabling systems and technologies that use recycled resin, optimise material usage, consider alternatives, and design for circularity, e.g. End Plastic Waste Innovation Platform

Quantity

Challenge: To increase the amount of recycled plastic purposefully collected for recycling—diverting it from informal landfills, open burning, burying, and indiscriminate littering
Approach: Enabling better collection, processing, and advanced sorting to allow for better recovery as well as capture of more forms of plastic waste, e.g. Closing the Loop, Project STOP Jembrana

Data

Challenge: To provide reliable, accurate data at all points in the global plastics value chain
Approach: Enabling accurate data capture across the value chain to help improve understanding of the cause and effect of plastic waste in different geographies, as well as identify best practices and investable ideas, e.g. Plastics Recovery Insight and Steering Model (PRISM)

Affordability

Challenge: To make recycling solutions economically viable compared to fossil fuel-derived virgin plastic
Approach: Enabling cost-effective processing of recyclates and to unlock value, e.g. RESIN8™ from CRDC, Integrated recycling and manufacturing

Alignment

Challenge: To overcome multiple, differing viewpoints on the problems and solutions to end plastic waste
Approach: Enabling increased collaboration, support, and alignment across different stakeholder groups and approaches to develop a successful circular economy for plastic waste



Our strategy in action

Plastic waste must be addressed across the entire plastics value chain. We convene a growing coalition of leading companies, development agencies, international organisations, and civil society—committed to tackling this complex challenge on all fronts. Guided by our strategy, we are focused on solutions that improve waste collection, sorting and processing to help stop plastic waste leakage, and that better address plastic waste already in the environment.

The Alliance is committed to acting now or we risk damaging the environment for future generations. In the last 3 years, we have put in place an approach that helps us to identify suitable partners that understand the local challenges around plastic waste, and know what it takes to overcome them.

We translate our strategy into action. Apart from contributing financing, we back each project we invest in with technical expertise and business model development to de-risk them and assure their viability. Working with experts, from within the Alliance and externally, we apply evidence-based models. Our aim is to deliver feasible outcomes that ensure the projects we implement not only address the practical needs of the communities that need them, but are cost-effective and sustainable as well.

This approach to project implementation and action is robust and essential, as our ambition is to build, over time, scalable projects that yield long-term positive impact. In only 3 years, we are starting to reap positive results.

Together with our partners, we have over 35 projects in 80 cities. For a start, our portfolio has diverted and recycled a combined total of over 4,000 metric tons of plastic waste, and engaged over 460 communities.

These smaller-scale, local solutions are just the beginning. Our purpose is to contribute to developing infrastructure systems—underpinned by innovation and technology—that can eventually be owned and operated by the communities they benefit.



A fundamental gap in ensuring waste—plastic, glass, metal, or otherwise—does not enter our environment and oceans is the lack of proper waste management infrastructure. The World Bank estimates that roughly 2 billion tons of municipal solid waste is generated annually on a global level. About 33% of that is not managed in an environmentally safe manner. In low- and middle-income countries, up to 90% of waste is openly dumped or burnt. We can, and must, do more.

Much of our work to date has been to support underserved communities in priority regions in Asia and Africa. We are also expanding our footprint in Europe and the Americas, because plastic waste knows no borders. To date, our projects span 29 countries.

To complement this work, our members are responsible for demonstrating their commitment to ending plastic waste by catalysing investments in this space.

As of 2021, about 40 member companies have collectively committed to support an additional 60 projects through their member directed commitments.

These include a range of initiatives from infrastructure development to advanced recycling, and from community engagement to cleanups.

The following pages highlight some examples of the progress made this year.

>35 projects

>80 cities engaged

29 countries



PROJECT: Project STOP Jembrana
LOCATION: Jembrana, Indonesia

Community-level waste management

Project STOP Jembrana’s vision is to create an economically sustainable, and circular, waste collection and sorting system. By 2022, it aims to collect up to 18,000 metric tons of municipal solid waste annually to help reduce plastic waste leakage in the Jembrana and Negara districts of northwest Bali. Key to the project has been the need for multi-stakeholder collaboration across public, private, and people sectors.

Working to scale for the future

A new waste management facility in Jembrana began operations at the start of 2021 after construction was completed. The development is part of a collaboration with Project STOP, a programme initiated by Borealis and SYSTEMIQ, and is being delivered in close partnership with regional and local government.

The goal is to help communities better manage their municipal solid waste by offering a holistic solution for collection, sorting, and processing. In addition, income from service fees and the sale of recyclable materials will be used to cover running costs of the system.

Despite disruption by the COVID-19 pandemic, waste management services were steadily rolled out to 10 of the 22 villages that will eventually be included in the programme. More than 60 jobs were created to facilitate this expansion—including collection workers, material sorters, organic processing workers, and management. A total of 135 community outreach facilitators were also trained.

The aim is for the Jembrana Regency, the area’s municipal government, to eventually own and operate the system. In addition to supporting community engagement efforts with Project STOP Jembrana, the regency is also supporting a rejuvenation of the municipality—with cleanup activities and the redevelopment of some illegal dumpsites into new public spaces for the community.

The system is expected to serve approximately 160,000 people, or about 40,000 households, with a capacity to process up to 2,200 metric tons of plastic waste annually when fully operational by the end of 2022.

Partnering with the community for long-term change

Community involvement is an essential component in ensuring the long-term success of the project. Each participating household is provided with 2 bins—for organic and inorganic waste—to help residents better sort their trash. However, there was initial hesitation from residents who did not see the immediate benefit of the system.

To better address this, teams ramped up community engagement efforts to explain why proper waste management is fundamental to improving public health and safety, as well as providing a cleaner environment. Educational resources to help residents understand the negative effects of burning waste and open dumping, as well as the benefits of proper waste management and recycling, were also provided.



Ibu Sriyani
Resident in Jembrana

“Previously I dumped my waste near the village, and I thought that was acceptable because no one told me otherwise. When the facilitators started visiting my home to teach me about the Jembrana programme, I thought that would be a better option. Not only does the driver come directly to my house, my family and I are also helping to care for the environment.”



PROJECT: Closing the Loop
LOCATION: Accra, Ghana

Empowering lives in Accra through plastic waste

In 2021, the ASASE Foundation expanded operations of their first CASH IT! recycling facility. They also began exploring 2 other facilities around Accra, with funding from the Alliance and additional support from the European Union. Each recycling plant will be able to process up to 2,000 metric tons of plastic waste per year once fully operational. The project demonstrates how efforts can be scaled to have meaningful impact once early development risks are addressed.

The ASASE Foundation is a female-run organisation empowering women in Accra. Through the collection and recycling of plastic waste, participants in this social enterprise can achieve financial security and play a role in improving their communities. Today, the programme has created employment opportunities for over 150 women and men, many of whom were previously informal waste pickers.

Staying on track

We began working with ASASE in 2020 to improve the processing capacity¹ of the CASH IT! recycling facility. From just 35 metric tons in 2019, capacity grew to 500 metric tons of plastic waste annually by the end of 2020. This year, the focus was on ramping up plastic waste collection and recycling even further, which included investing in new equipment.

Their first extruder was installed, turning the collected plastic waste into pellets, increasing the value from the flakes already produced at the CASH IT! recycling facility. This improved the long-term economic viability of the business.

In addition, 2 new collection centres, equipped with balers, were opened in Gbestsile and Kpone, Accra, where the 150 waste pickers from ASASE’s network of suppliers can sell their collected plastic waste to the Foundation.

From January to September 2021, the ASASE Foundation diverted some 600 metric tons of plastic waste from various sources, including collection centres and schools, and monthly cleanups conducted by the Foundation along Accra’s coastline.

Investing in the next generation

The ASASE Foundation also ramped up their partnerships with schools, technical institutes, and universities to prepare young minds for a more sustainable future. This year, they worked with 58 schools, teaching students about waste management, segregation, and recycling, and then channelling collected plastic waste to the facility for further processing.

Students from the Design and Technology Institute are currently working with the Foundation to help design and fabricate the second CASH IT! facility, with the hope they can be employed upon graduation to maintain and operate the plant. ASASE is providing employment to a new generation of engineers.



CASH IT! in action

Growing the domestic recycling industry in Ghana is helping to provide access to stable income for residents in the community, including Eunice Otipeseku. The widow and mother of 4 used to be an informal waste picker who struggled to provide for her children’s education.

After 3 years with the ASASE Foundation, Eunice has been able to put her 4 children through school.

“When I started, I was picking small quantities and giving it to recyclers. The ASASE Foundation gave me money and a tricycle, so now I can collect even more. I’m supplying 10 metric tons of waste per month to them, and that has helped me pay for my kids’ education and support 8 other dependents. One of my kids just graduated university! I’m very thankful for the help from the ASASE Foundation.”



1 Processing capacity is the optimal amount of plastic waste a recycling plant can process with a continuous supply of plastic waste.

PROJECT: Planks of Promise
LOCATION: Manila, Philippines

Where environmental protection meets social impact

Every year, millions of people across Asia are impacted by the effects of natural disasters. Planks of Promise offers a viable emergency shelter solution for those displaced by natural disasters by creating 100% recyclable construction materials from hard-to-recycle plastic waste, such as flexible packaging.

In 2021, social enterprise The Plastic Flamingo (The Plaf) demonstrated its first eco-shelter prototype, made from recycled plastic lumber produced at its recycling facility.

Material analysis is under way to determine the product's advantages in weight, strength, and durability over traditional wooden planks used for low-cost housing. In the meantime, tests are under way to further develop and optimise the formula for this eco-lumber before it is sold more widely.

The Plaf has also secured commercial contracts to supply their recycled plastic products to partners via their plastic offsetting programme. Partners include global snack company Mondelez, French shipping group CMA CGM, and consumer goods company P&G. They also moved into series A funding in 4Q2021.

Making it easier to recycle

To assure the operational success of its manufacturing plant, The Plaf set up plastic waste collection points across Metro Manila. As of September 2021, The Plaf had set up 170 collection points across the Luzon and Visayas regions. This was achieved despite initial delays due to COVID-19 lockdowns.

With the support from the Alliance, the project aims to enable the recycling of 2,000 metric tons of plastic waste by 2023. To date, over 100 metric tons have been collected, including hard-to-recycle materials like PVC and plastic film, and the plant has an output capacity of approximately 500 planks per month.

Engaging the community

Community members play an important role in enabling the collection and processing of plastic waste for a cleaner, healthier environment. Over 15 residents from the surrounding Muntinlupa community now work full time with The Plaf team to collect, sort, and recycle plastic waste. Over 30 jobs were created in 2021, with plans for 20 more by the end of 2022. The enterprise has also formed a partnership with a local university to establish an internship programme through which students can gain experience in the waste management and recycling sector.

Becoming advocates in the community

Residents hired from the surrounding neighbourhood in Muntinlupa to work in The Plaf have changed their outlook on the value of plastic waste since they started learning about the importance of recycling their household waste.

"We used to throw everything directly into the bin, but now in our house we segregate waste such as sachets, HDPE, PP, and PET bottles," said Ryz Lara Mae Ortiz, a waste sorter working at The Plaf.

Sharing their newfound knowledge with friends and neighbours has also led to visible improvement in their physical environment. "After I explained to them that throwing plastic waste irresponsibly could cause flooding in our area by blocking drainage, they saw how this is helpful to them," explained Flora Villaraza, another Plaf waste worker.



Manila, Philippines: The Plaf's 'eco-lumber' can be made from hard-to-recycle plastic waste such as films or sachets, providing communities with a durable building material.



PROJECT: Integrating recycling and manufacturing processes
LOCATION: Omaha, Nebraska, US

Firststar—uniting recycling and remanufacturing

Across the US, a key barrier to sustainably handling hard-to-recycle plastic waste is the lack of end markets for these materials. Recycling service company Firststar Fiber Corporation (Firststar) is working with the Alliance to develop a new model for recovering, reselling, and remanufacturing hard-to-recycle plastic.

In 2021, we inked a partnership with Firststar to expand the recycler's existing materials recovery facility into an integrated recycling complex.

Over the next 3 years, the partnership aims to develop a pre-processing facility on site where plastic waste can be further sorted and processed, and where hard-to-recycle plastic waste can be sustainably and economically remanufactured into marketable feedstock and products. In the first instance, the company will focus on transforming these materials into plastic lumber for use in decking and furniture.

A multi-faceted approach

The collaboration plans to tackle the challenge of hard-to-recycle plastic waste on 3 fronts:

- Establish integrated sorting, processing, and manufacturing facilities to improve operational efficiencies and reduce the cost of recycling.
- Create value for hard-to-recycle plastic waste by converting it into materials for a variety of useful applications, including lumber for decking.
- Explore the establishment of localised advanced recycling technologies to produce the raw material building blocks for new plastics.

Expanding capabilities

Firststar is a leading provider of recycling services across several Midwestern states and is already responsible for processing and marketing nearly 100,000 tons of recyclable materials every year. We will support Firststar in implementing additional technologies at their site in Omaha, Nebraska, to enable the integration of several operations in a single location. The equipment for the first phase of the plastic pre-processing facility is currently being installed and is expected to commence operations in 1Q2022.

As well as producing plastic lumber, the company will explore the potential of using advanced recycling technologies to manufacture other products from hard-to-recycle materials. If successful, this model could then be replicated at other recycling facilities across the US.



Omaha, US: Firststar Fibre's new facility will focus on turning hard-to-recycle plastic into construction materials or outdoor furniture.

PROJECT: Circular Polymer plant
LOCATION: Bang Phli, Thailand

SUEZ Circular Polymer plant in Thailand

Thailand experiences one of the highest leakage rates for plastic waste in the world. In 2019, French environmental services provider SUEZ Group announced a plastics recycling plant in Bang Phli, a district of Samut Prakan Province. The purpose-built facility aims to help raise recycling rates in Thailand, while contributing to the country's ambitious sustainability goals of achieving 100% plastic recycling by 2030.

The SUEZ Circular Polymer plant has almost completed its first full year of operations since its official opening in December 2020. The landmark project is one of Thailand's largest recycling plants specialising in low-density and linear low-density polyethylene, with an annual processing capacity of 30,000 metric tons. It is also one of the most sustainable, using solar energy and an advanced water-reuse system. The recycling plant helps to avoid about 35,000 metric tons of greenhouse gas emissions annually, which is equivalent to the planting of 1.5 million trees.

High-quality post-consumer resins that compare favourably to virgin plastics are produced at the plant and then distributed to brand owners and manufacturers in Southeast Asia, in partnership with SCG Chemicals in Thailand. As a leader in the region, SCG provides access to exclusive marketing channels and also supplies waste feedstock for SUEZ's production.

In July 2021, the plant achieved accreditation by the Plastic Credit Exchange (PCX) plastic offset platform following an independent assessment by auditor PricewaterhouseCoopers.

The accreditation affirms that the plant's operations follow PCX's Pollution Reduction Standard—a globally recognised framework for the implementation of a credible and traceable plastic offsetting scheme. Plastic offsets follow a model similar to carbon markets, where plastic credits are used to limit the amount of plastics produced by a company.





PROJECT: Plastics Recovery Insights and Steering Model (PRISM)
LOCATION: Global

Closing the data gap

Ending plastic waste can be more effective with rigorous data analysis and insights. Understanding the local, regional, or global waste management context, consumption patterns, and the available infrastructure is as crucial as demographic and socioeconomic data points. Enter PRISM, a single aggregated source of actionable data to address this gap.

The PRISM platform came to life in a beta version during 2021, with a user-friendly interface providing data and analysis tools, modelling capabilities, and the inclusion of thousands of data sets from more than 800 vetted sources.

PRISM is being built in partnership with IBM and aspires to be one of the world's first publicly available data platforms that allows users to integrate and view multiple plastic waste data sets. It aims to help decision-makers analyse opportunities and measure the impact of solutions to improve waste management programmes.

The tool is designed to support waste management solutions that meet local needs. With PRISM, users can visualise, analyse, and compare data from trusted sources down to the city level. It is also able to harmonise data across various methodologies, and perform data modelling and forecasts.

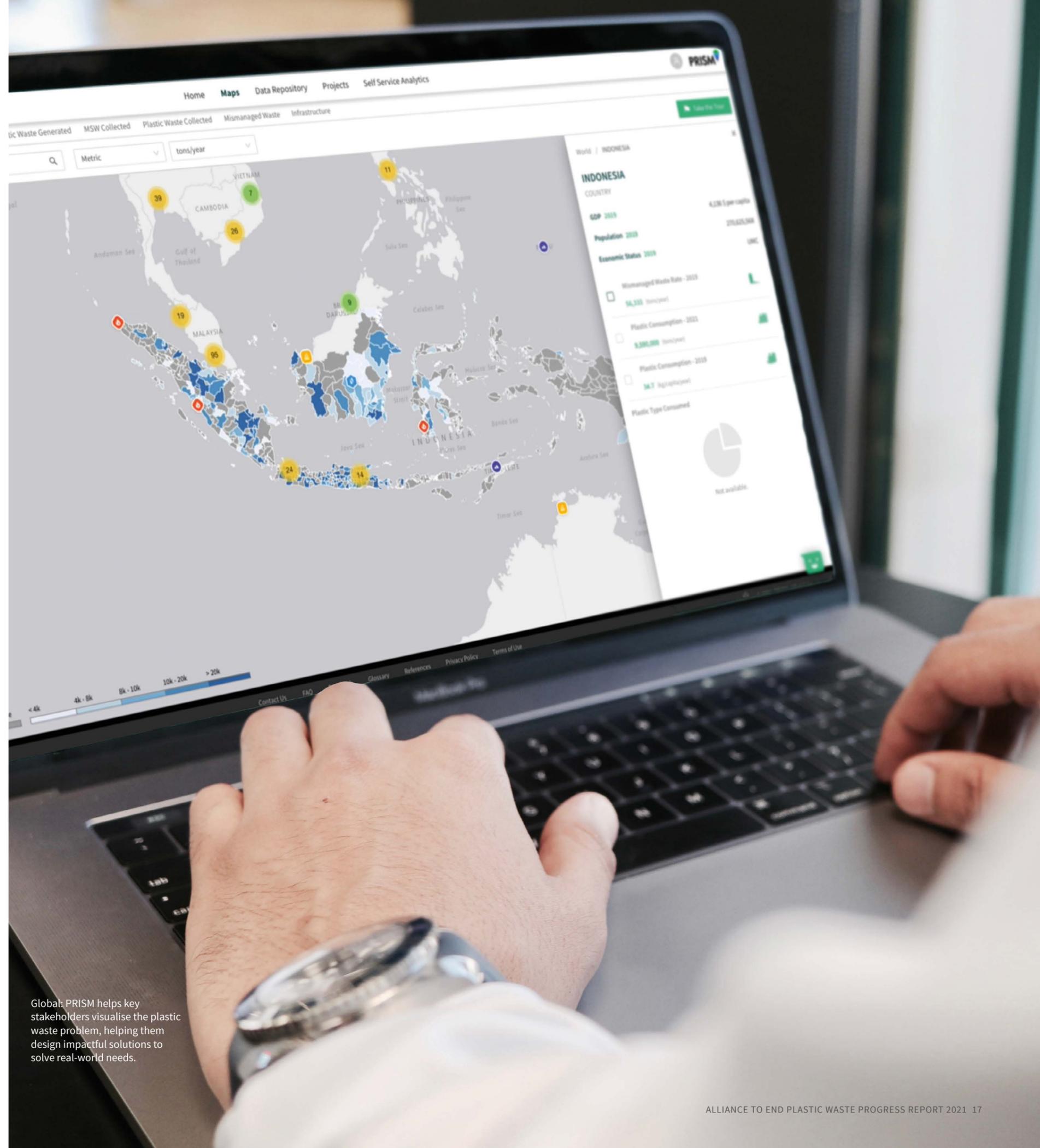
PRISM is currently being piloted in the Alliance community, capturing user feedback for improvements to further refine the tool.

The technology behind PRISM

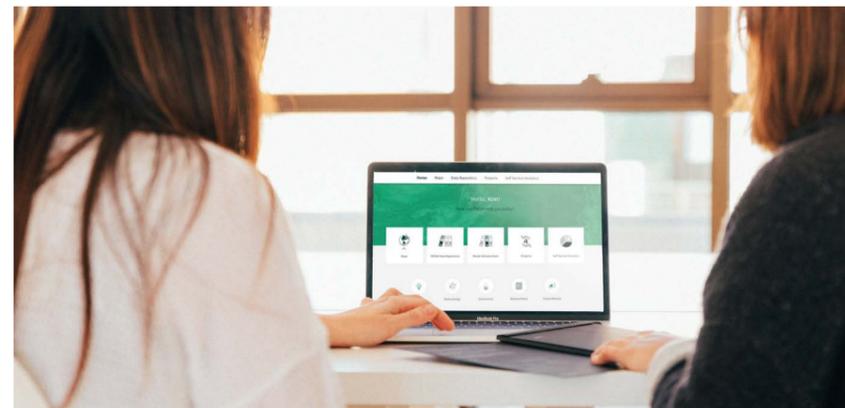
PRISM uses the IBM Cloud and artificial intelligence (IBM Watson) to harmonise data from a multitude of publicly available sources. This includes information from the UN Environment Programme, UN Habitat, WWF, the International Union for Conservation of Nature (IUCN), and the World Bank.

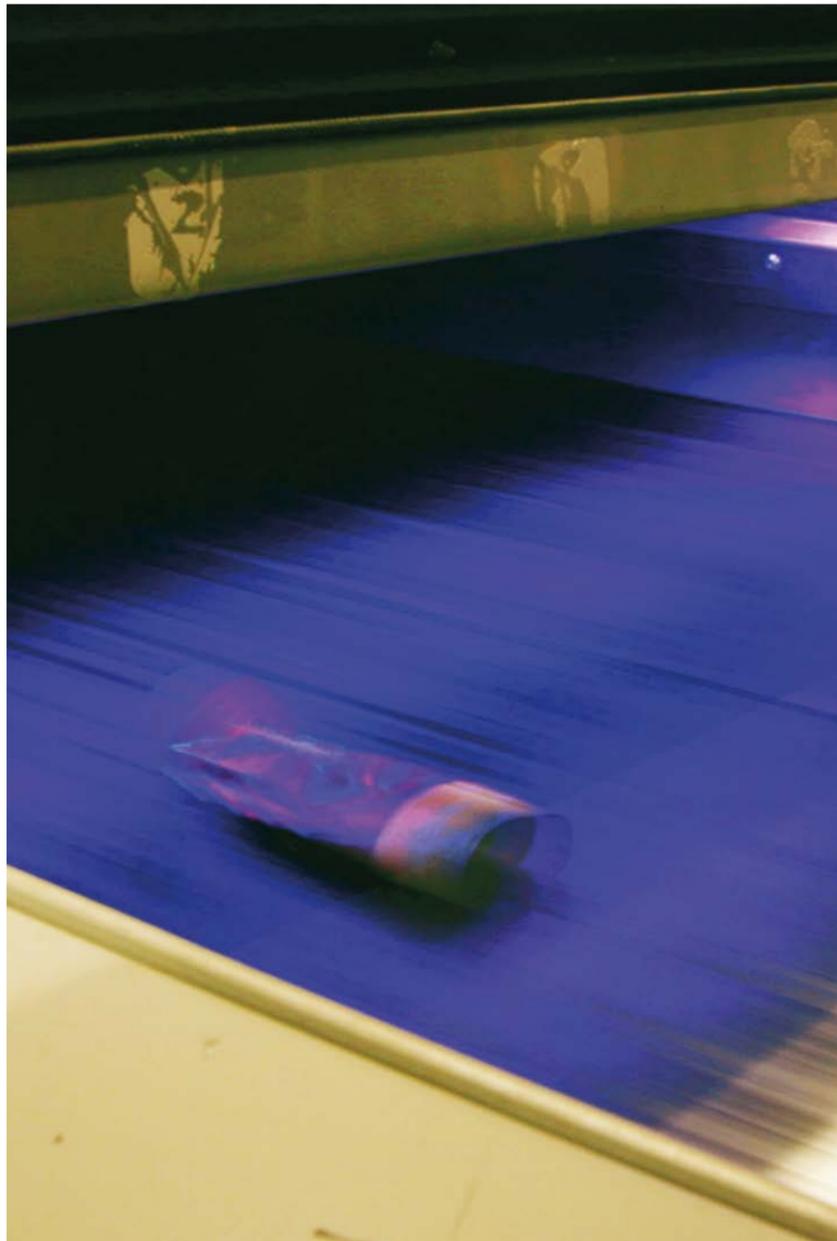
Data collected includes information on municipal solid waste generation, plastic waste generation, and waste management facilities, as well as managed and unmanaged landfills, local population sizes, and socioeconomic data. Emphasis will be given to compiling details for plastic consumption, collection, leakage, waste management, and recycling options.

The Alliance also partnered with The Circulate Initiative in late 2021 to run the Closing the Data Gap Challenge, seeking proposals to address a lack of data available for selected locations in India, Malaysia, and the Philippines.



Global: PRISM helps key stakeholders visualise the plastic waste problem, helping them design impactful solutions to solve real-world needs.





Copenhagen, Denmark: HolyGrail 2.0 is currently being tested at the iconic Amager Resource Center (ARC).

PROJECT: HolyGrail 2.0
LOCATION: Copenhagen, Denmark

Digital watermarks— the future of waste sorting

In September 2021, the European Brands Association, AIM, and the Alliance announced a partnership to drive the next stage of development for intelligent waste sorting under the Digital Watermarks Initiative, HolyGrail 2.0. Together, we are working with the City of Copenhagen to conduct semi-industrial trials.

HolyGrail 2.0 brings developers one step closer to precision identification and sorting of plastic packaging waste through digital watermarks. With this process comes the potential to revolutionise the sorting and recycling of plastic packaging.

The pioneering HolyGrail 1.0 was facilitated by the Ellen MacArthur Foundation to explore the potential role of chemical and digital watermarks in advancing a circular economy.

Trialling the system

In this phase of testing, a prototype sorting detection unit installed at the Amager Resource Centre in Copenhagen ran trials with 125,000 coded plastic packaging samples, including bottles, flexibles, and pots representing around 260 different stock-keeping units (SKUs), provided by HolyGrail 2.0 members. Engineers will test several parameters, including the speed and accuracy of the system to detect digitally watermarked samples mixed with general waste to ensure it can withstand the pressures of full-scale industrial operations. If successful, digitally watermarked products could be introduced to store shelves in Denmark, France, and Germany in the first half of 2022 for in-market demonstrations and industrial-scale trials.

How it works

Digital watermarks are invisible codes, each the size of a postage stamp. They cover the surface of consumer goods packaging and can carry a wide range of information, such as packaging type, material, and usage.

Used packaging is collected and scanned on the sorting line with a high-resolution camera, which detects and decodes the digital watermark. The packaging is then sorted into corresponding streams, based on specified attributes, including food, non-food, or polymer types. This will result in better, more accurate sorting streams and consequently in higher-quality recyclates, benefitting the complete packaging value chain.





PROJECT: Creating value for hard-to-recycle plastic waste
LOCATION: Pennsylvania, US, and Costa Rica

Scaling up value for hard-to-recycle plastic waste

In September 2021, the Alliance and the Center for Regenerative Design and Collaboration (CRDC Global) announced a partnership to scale solutions for converting hard-to-recycle plastic waste into a concrete additive for building and construction applications.

Through the collaboration, CRDC Global will expand its operational capacity in North America with the development of a 1,300 square metre production plant in York, Pennsylvania. The company will also grow its existing production plant in Costa Rica to a capacity of 90 metric tons per day when fully operational by mid-2022. The 2 facilities, combined, will be able to process up to 24,000 metric tons of plastic waste per year.

collaboration with regional concrete manufacturer Pedregal and Dow Industrial, used concrete bricks made with up to 10% RESIN8™.

In addition to the 2 facilities that will be expanded as part of the partnership, CRDC Global is in the process of either scaling up or establishing pilot plants in a number of countries around the world, including South Africa, the UK, Hong Kong, Australia, Mexico, and New Zealand.

Repurposing mixed plastics

The facilities will accept all types of mixed plastic waste that would otherwise be sent to landfill or incinerated. Using CRDC's proprietary process, a second life will be given to these materials as they are converted to RESIN8™, a concrete additive. The product is suitable for numerous applications, including concrete blocks and pavers, pre-cast concrete, and poured-in-place concrete. The resultant material is up to 15% lighter or stronger depending on its usage, and provides up to 20% better insulation than traditional concrete. It has already been used by Habitat for Humanity in Costa Rica to build over 100 houses for low-income families. The project, carried out in



Costa Rica: Over 90 metric tons of plastic waste was recently used to build over 100 homes for low-income households, in partnership with Habitat for Humanity.

PROJECT: End Plastic Waste Innovation Platform
LOCATION: California, Johannesburg, Paris, São Paulo, Shanghai, and Singapore

Enabling partnerships for innovation

The End Plastic Waste Innovation Platform was created to develop a pipeline of innovations and provide support to promising startups developing solutions to end plastic waste. The platform is a collaboration between the Alliance and Plug and Play, an organisation devoted to catalysing partnerships for progress.

Innovations are sourced through various locations, or 'hubs', around the world. In 2021, the programme doubled its number of hubs to 6, to cover Silicon Valley, Paris, Singapore, Shanghai, São Paulo, and Johannesburg.

Through these hubs, we have assessed more than 3,000 startups. Over 100 companies have progressed through a 12-week structured curriculum designed to accelerate high-potential startups.

As of October 1, the accelerated startups had attracted more than US\$50 million in capital investment. This comprised a majority mix of private equity and government grants.

In addition, over 100 commercial pilots have commenced. Several were in partnership with Alliance member companies. Here are a few examples.

PLUGANDPLAY

Oceanworks
 Oceanworks is collaborating with resin manufacturer Avient Corporation to launch several materials with recycled content for use in consumer goods. End uses include personal care products, garden tools, outdoor goods, office supplies, footwear, and houseware durables.

Recycleye
 Recycleye uses artificial intelligence, image recognition and recycling robotics in automated turnkey solutions in the waste management industry. The Europe-based company recently partnered with Total Energies to automatically identify, categorise, and separate food grade from non-food grade plastic packaging. Total's teams will leverage their industrial capability and R&D expertise to improve the recyclability of plastics derived from household waste, turning it into high-performance recycled polymers suitable for food applications.



Oceanworks



Courtesy of Recycleye



Jonathan Tostevin, CEO of Muuse, making his pitch to investors at the inaugural Alliance ALL_SUMMIT Investor Day in Singapore. Muuse previously participated in the End Plastic Waste Innovation Platform.

PROJECT: Robotic sorting to improve recycling
LOCATION: Evansville, Indiana, US

Closing the plastic waste loop in Evansville

Making sure that innovations can be applied as practical solutions on the ground is a crucial step in the development of new solutions. Alliance member Berry Global worked with AMP Robotics, an alumnus of the End Plastic Waste Innovation Platform, to develop a closed loop recycling system and divert plastic waste from landfill.

Berry Global identified the opportunity and worked with Tri-State Resource Recovery, the operator for the materials recovery facility serving Evansville, Indiana, from project conceptualisation to implementation. This included donating US\$150,000 for the recycling system, which was matched by the Indiana Department of Environmental Management.

Recyclable plastic waste streams include items like drink cups or yoghurt cups and other containers. These in turn are used by Berry in its products, thus creating a circular economy.

In the first 4 months of operation, the system diverted over 10 metric tons of polypropylene plastic that would otherwise have been sent to landfill.

The specialised equipment uses artificial intelligence to accurately identify and sort various plastic waste materials at high speed. This allows for the sortation of polypropylene (PP), which was previously being landfilled. The system also augments manual sortation of polyethylene terephthalate (PET) and high-density polyethylene (HDPE) bottles, improving the overall efficiency of the sorting line. The state-of-the-art system was designed by AMP Robotics.



PROJECT: Aviral—Reducing Plastic Waste in the Ganga
LOCATION: Haridwar and Rishikesh, Uttarakhand, India

Helping to implement better waste management along the Ganga

Aviral is a partnership between German development agency GIZ and the Alliance. It aims to reduce plastic waste reaching the Ganga (the Ganges) by using sustainable and replicable solutions.

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the Alliance are piloting a waste management system in the cities of Haridwar and Rishikesh, with the aim of creating a circular economy for plastic waste to prevent leakage into the environment. Throughout 2021, the project team continued detailed studies to assess the feasibility of implementing circular systems to prevent plastic waste pollution in both cities.

In Haridwar, March 2021 marked the start of the design stage for a new material recovery facility. A similar facility is also being planned for Rishikesh.

Important progress was made to enable a collective commitment to cleaning up the Ganga. For example, several events to raise awareness on source segregation and cleanup activities were conducted with members of the public. These ongoing activities can help to prepare the community for new waste management infrastructure that is planned for commissioning in 2022.

Laying the groundwork for change

Working collaboratively with local stakeholders has been key to the project. We aim to optimise end results by:

- Conducting baseline assessments for each city to understand the current waste management challenges, with findings shared with municipal governments across India.

- Creating city-specific Plastic Waste Management Action Plans to propose standardised frameworks for the implementation of holistic plastic waste management.
- Capability-building for municipal officials through training, workshops, and knowledge exchange visits, while also building capacity of waste workers.
- Organising a 6-part virtual seminar for over 400 students and teachers across both cities to learn about waste segregation, its importance in an integrated waste management system, and its impact on the environment.

Supporting local entrepreneurs with innovative solutions

As part of the project, the Aviral Plastic Waste Innovation Challenge was launched to spur sustainable technology and solutions to better address waste management in Haridwar and Rishikesh. Businesses could showcase their innovative solutions in the field of plastic waste management.

Indian startups Trashcon (in Rishikesh) and 21 Century Polymers (in Haridwar) were awarded grants in the inaugural competition for their solutions to address hard-to-recycle plastic waste.



Kamna Swami
 Project Lead, GIZ

"Through Aviral—Reducing Plastic Waste in the Ganga, I have the opportunity to work hand in hand with the Alliance, and together contribute to an improved waste management system for Rishikesh and Haridwar."



PROJECT: Rayong Less-Waste
LOCATION: Rayong, Thailand

Reducing waste in Rayong

Rayong Less-Waste was established to improve waste management literacy and recycling rates across Rayong Province, Thailand. It is the result of a public-private collaboration between PPP Plastics, Plastic Industry Club, the Federation of Thai Industries, and Rayong Province—with support from the Alliance.

In September 2021, the Governor of Rayong Province announced the expansion of the initiative to cover a total of 68 municipalities in the province, located in the eastern region of Thailand. Rayong Less-Waste will help establish a community-based waste management system that encourages the collection and sorting of recyclables, including plastic waste, to improve recycling rates in the province and help to create jobs.



Rayong Less-Waste supports the government's sustainability agenda to reduce plastic waste by 50% by 2030. The project aims to process and recycle up to 1,000 metric tons of plastic waste annually, when fully operational.

The project builds on a successful pilot in 2019 run across 18 municipalities, where the *Wang Wa* model—a waste management framework that enables communities with little to no waste management experience to quickly ramp up their collection and processing of household waste—was developed.



Advancing waste literacy

A key part of the project is to elevate waste management and recycling literacy through community engagement and education in community learning centres, temples, and primary schools. The syllabus includes waste and plastics management in line with the circular economy concept, and acts as an entry point to foster discussions with locals about their challenges and concerns, and developing joint solutions.

A guidebook, *Advancing Community Waste Management With Circular Economy* (above), was developed to facilitate community outreach and education. It was distributed to 20 municipalities and 190 primary schools. An e-book in Thai and English is also available.

Working together to solve local problems

Building on its success of reaching 35 municipalities between 2019 and 2021, the Rayong Less-Waste project will ramp up to an additional 33 municipalities in 2022.

"We help connect the dots," says programme manager Somchit Nilthanom. "As some (municipalities) need help learning about plastic circularity and waste separation, some need to be connected to recyclers to buy the offtake, and others need guidance on how best to reach out to the community. For all these, we are there to help them overcome these challenges with different ways on how to approach circularity and sustainability."



PROJECT: Clean Our World
LOCATION: Nigeria

Raising waste management literacy for a healthier environment

Nigeria generates an estimated 9 million tons of plastic waste annually. Most of this is improperly disposed of and leaks into the environment, resulting in clogged drainage systems that can lead to floods and contribute to water-borne or mosquito-borne diseases.

The Clean Our World (COW) project is an initiative launched by Oando Foundation in Nigeria to promote environmental education and responsibility in the country. The aim is to raise awareness and empower children and teachers in primary schools and their communities with the knowledge of plastic recycling and waste management.

To date, more than 7,900 people have been engaged in this initiative—children and teachers, as well as government education managers and community members, in 7 schools and 3 communities in Lagos State and its neighbouring regions, located at the mouth of the Niger River.



In 2021, Sumitomo Chemical announced a US\$50,000 donation to support the initiative.



PROJECT: Clean4Change
LOCATION: Singapore

Improving recycling literacy, one cleanup at a time

The first step towards proper waste management and recycling is a simple one: ensure that litter is collected and disposed of properly, and that plastic waste is collected for recycling. By engaging communities in cleanup activities, we encourage them to get involved in keeping their environments litter-free. Clean4Change is the programme that the Alliance runs to realise this strategic pillar.

Clean4Change aims to build a movement where everyone can participate and understand why and how every community can have access to a cleaner environment. The programme provides simple entry points through which members of the public can be engaged, educated, and enabled towards doing their part for a cleaner environment.

A joint effort

In the first 6 months after April, when the programme was launched, members of the public, schoolchildren and staff from companies in Singapore and overseas were encouraged to take part in Clean4Change cleanup activities. Those who participated could also access educational resources, including guides on how to reduce plastic waste, recycling tips, and how to activate their own local cleanups.

Participants were also offered the use of Litterati, a mobile application developed in 2020 with backing from the End Plastic Waste Innovation Platform. The application allows users to log where they have collected waste and the type of litter it was. Over time, entries can be used to build a global map of the plastic waste problem, with geo-tagged images used to create a picture of the litter challenge across different regions.



The aim is to provide policymakers with data so they can establish more effective waste management programmes and systems.

Many member companies and partners activated their staff and volunteers across the globe, collectively removing over 1.4 million pieces of litter from the environment.



PROJECT: Beach cleaning technology
LOCATION: Sri Lanka

Stepping up to help clean Sri Lanka's coast

Over 240 kilometres of shoreline was polluted by lentil-sized plastic pellets, or nurdles, in the aftermath of a cargo ship fire that happened off the coast of Colombo, Sri Lanka, in May 2021. The ecological disaster is deemed to be one of the worst in the country's history, and experts say recovery could take years. The Alliance stepped in to help with a donation of specialised equipment to shore up efforts.

We worked closely with the Sri Lanka Marine Environmental Protection Authority (MEPA) to identify solutions that addressed their needs. This resulted in the sourcing and donation of 8 BeachTech Sweepee Hydro machines to the Sri Lankan Government in August.

The German-designed machines were specially adapted to suit local conditions. Each unit could separate nurdles from 4,000 square metres, or 6 football fields, of sand every hour. This significantly sped up the cleanup process, requiring fewer people to clean the same stretch of beach and reducing the risk of COVID-19 infection.

In addition, the machines also decreased the need for the cleaners to have physical contact with potentially harmful debris that might have washed ashore from the fire, making cleanup work safer. Since they started operating, each machine has collected up to 250,000 nurdles per day.

A timely response to a pressing issue

Initial cleanup efforts focused on nurdles that remained on the surface of the beach and were easy to spot and collect. Challenges arose when the pellets became more deeply embedded, in up to 11 layers of sand. Removing these buried nurdles required a more efficient approach. This was particularly important as September typically marked the beginning of the monsoon season in the area. The change in weather meant that uncollected debris could be swept back to sea, polluting other shorelines.

The BeachTech machines were equipped with screens of different mesh sizes that could be adapted to sift in various conditions, including wet and dry sand.



Dharshani Lahandapura
Chairperson of MEPA

"I would like to thank the Alliance for their help. They understood the responsibility each of us has when a crisis of this nature happens, because it can be a transboundary issue."



PROJECT: Basisa Bazaruto
LOCATION: Bazaruto, Mozambique

Protecting Mozambique’s marine ecosystems

Home to the last viable population of dugongs, the Bazaruto Archipelago National Park plays an important role in the region’s biodiversity. Spread across various islands, we helped to build a system to capture and collect plastic waste washing up on its shores, helping to protect fragile ecosystems along the way.

The Bazaruto Archipelago comprises a group of islands in Mozambique. Marine litter that is brought in by the currents presents a significant issue for residents and their environment. Together, we developed the Basisa Bazaruto, or Clean Bazaruto, initiative, which included purchasing a boat called *Lundo*—or parrotfish, a colourful fish that helps to clean the local reefs—to ferry waste collected from newly constructed collection points on the islands to the mainland for processing. In addition, some 50 jobs were created to employ waste pickers to go from island to island to collect plastic waste.

Preventing plastic waste from returning to the ocean
The small but mighty crew of waste workers are on track to collect about 100 metric tons of plastic waste by the end of 2021. However, recycling this ocean waste has proved a challenge, as the plastic waste is often contaminated, making it hard to sell to conventional recyclers. To address this issue, the team is hard at work designing plans to recycle the waste themselves, developing planks or bricks that the park can use to build necessary infrastructure, such as pavements or lodges for park visitors.



Judite Huo
Waste Collector

Meet Judite Huo, one of the waste collectors hired through Basisa Bazaruto. With this new job, she not only is able to have a stable income stream, but can also help protect her home.

“In the past, there was a lot of waste on the island. But now, things are changing. My perspective on waste has changed. Through sorting and recycling, I can turn waste into a resource.”

PROJECT: The Great Lakes Plastic Cleanup
LOCATION: Ontario, Canada

Protecting the Great Lakes

The Great Lakes are the largest freshwater system in the world, representing a wealth of biodiversity—including a variety of ecosystems that support over 3,500 species of plants and animals. Ensuring the health of this region is therefore vital. The Great Lakes Plastic Cleanup was launched to rally communities across Canada, and soon the 8 Great Lakes states, to address plastic litter in the region.

Since its launch in August 2020, the initiative has grown to include 26 marinas along Ontario’s Great Lakes shoreline and surrounding waterways. Canadian-based NOVA Chemicals is the programme’s lead corporate sponsor in Canada.

The programme uses innovative technology to remove plastic waste and other debris from water bodies. Plastic waste that can be recycled is processed and channelled back into a circular economy. In addition, data on the litter collected is analysed to glean insights on plastic waste management and develop more effective community engagement programmes. Plans are underway to expand the initiative into the US.

Piloting litter capture technologies

By enabling the deployment and piloting of innovative capture and cleanup technologies, the Great Lakes Plastic Cleanup is creating a network of devices that capture plastic before it enters the lakes (LittaTrap™) or to clean up plastic that has already found its way there (Seabin).

Together with community-led cleanup activities, the initiative collected over 700,000 pieces of plastic waste in 2021, much of it microplastics.

Increasing the availability of data related to plastic sources and pathways

Studies on plastic pollution in the Great Lakes remain limited and there is a clear need for more data, particularly related to the amount, location, and types of plastic found across the lakes. By collecting information about the types and amount of plastic found in the Seabins and LittaTraps™, along with where they are found, the Great Lakes Plastic Cleanup is building a better understanding and contributing to addressing data gaps specific to the Great Lakes. This, in turn, can help to inform decision-makers about effective solutions to prevent litter and to aid in the development of locally relevant mitigation strategies.



Rick Layzell, CEO, Boating Ontario Association

“The launch of the Great Lakes Plastic Cleanup has brought a new level of industry and consumer awareness to the importance of addressing plastic waste pollution. The innovation of the Seabin and LittaTrap™ technologies pack a powerful punch in creating cleaner waterways at participating marinas, and we have watched with pride as marina managers and local media have taken a strong interest in this project. The commitments of Pollution Probe and the Council of the Great Lakes Region, backed by the passion of the waste characterisation network and other collaborators, have made short-term goals achievable, and the corporate support of companies like NOVA Chemicals give us great hope for our future.”





About us

Our Officers

Our Officers guide our strategic direction. Each one represents a key sector of the plastics value chain.



*to September 30, 2021
**wef October 1, 2021

- David S. Taylor**
Executive Chairman,
The Procter & Gamble
Company
Chairperson
- Bob Patel**
Chief Executive
Officer, LyondellBasell
Industries
Vice-chairperson
- Jean-Marc Bousier**
Chief Operating Officer,
SUEZ Group
Treasurer*
- Tom Salmon**
Chairman and CEO,
Berry Global Group
Treasurer**

Our leadership team

Our leadership team sets in place and implements the strategic approach to fulfil our mission to end plastic waste in the environment.



- Jacob Duer**
President and CEO
- Sophia Porcelli**
CFO and Vice President
of Operations
- Steve Sikra**
Vice President and
Head of the Americas
- Nicholas Kolesch**
Vice President
of Projects
- Allison Lim**
Vice President of
Corporate and
Public Affairs
- Justin Wood**
Vice President of
Strategic Partnerships

Our Board Committees

The Alliance is committed to best practice in governance, accountability, and transparency. Our Officers, Executive Committee (ExCom), and Board of Directors (Board) provide insights into our strategic approach as well as enable different layers of checks and balances. The following 3 Standing Committees support this oversight.

Audit Committee

The Audit Committee reports to the ExCom and oversees the organisation's financial governance, risk management, and internal control practices. It reviews each of these items and, with endorsement from the ExCom, provides the Board with advice regarding the adequacy and effectiveness of policies in these areas. The Committee provides an open avenue for communication between independent auditors, Alliance management, internal auditors, and the ExCom.

Compensation Committee

The Compensation Committee is appointed by the ExCom and reports to the Officers. It oversees the evaluation and approval of all compensation packages, benefit plans, policies, and programmes for Alliance senior leadership. The Committee reviews and makes recommendations on all compensation and benefits-related decisions for Officer approval.

Membership Committee

The Membership Committee supports efforts to recruit, engage, and retain members. It is also responsible for developing and implementing orientation programmes for new members, as well as resources for ongoing development of existing partners. It advises the Board and the ExCom on any issues regarding member services, including recruitment and training of Alliance representatives in membership-related activities.

Our Advisory Council

In 2021, the Advisory Council—comprising leaders from the public sector, civil society, academia, and international organisations—was established. The Council provides expert advice to the President and CEO on strategy, priorities, and work.



- Yvonne Aki-Sawyer, OBE**
Mayor of Freetown,
Sierra Leone
- Navneet Chadha**
Regional Circular
Economy Lead,
International Finance
Corporation, World
Bank Group
- Professor Linda Godfrey**
Manager: Waste
RDI Roadmap;
Principal Scientist,
Council for Scientific
and Industrial
Research
- Keefe Harrison**
Founder and Chief
Executive Officer,
The Recycling
Partnership
- Shigemoto Kajihara**
President,
Japan Waste Research
Foundation
- Dr Leah Karrer**
Senior Environment
Officer,
Global Environment
Facility



- Professor Daoji Li**
Director of Plastic
Marine Debris Research
Centre, East China
Normal University
- Carlos Silva Filho**
President,
International Solid
Waste Association
- Juan Miguel Cuna**
Undersecretary for
Field Operations
and Environment,
Department of
Environment and
Natural Resources,
Philippines

Our Network



Strategic Partners



Supported by





**You can be part of the solution.
To find out more, visit endplasticwaste.org**

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