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**GREEN SOLVENT: IMPLEMENTATION OF THE CIRCULAR ECONOMY MODEL  
IN PLASTIC CONTAINERS FOR HAZARDOUS WASTE**

**(DR-T1253 / DR-G0009)**

**DONORS MEMORANDUM**

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## PROJECT SUMMARY

In the Dominican Republic there are no technological processes in place for treating containers that have been used in connection with hazardous substances. Each year, the country generates 97,288 tons of plastic packaging waste (postconsumer polyethylene), and estimates indicate that 10% of this waste contained hazardous substances, such as disinfectants, chemicals, paint, oils, and lubricants. Of this amount, 90% ends up in landfills or is dumped into rivers, streams, and gullies, which will ultimately make its way to the ocean and wash up on beaches, endangering health and polluting the air, water, and soil. Each year, about 750 accidents affecting health are caused by exposure to and the use of chemical substances. And yet, it is estimated that only half of the accidents reported become official statistics.

To address this problem, Nueva Vida para los Residuos [“New Life for Waste”] (NUVI) and the Association of Industry of the Dominican Republic (AIRD) have proposed developing a model for hazardous waste recovery that entails creating a system for waste separation, storage, treatment, and recycling. Accordingly, “green solvent” technology (supercritical carbon dioxide) would be applied to reduce the environmental risks posed by this waste, which also represents an opportunity for reducing CO<sub>2</sub>-equivalent emissions by recycling plastic in accordance with circular economy logic.

The actions will be aligned with the Dominican Republic’s General Law on Integrated Management and Coprocessing of Solid Waste (Law 225-20), which establishes a legal framework for waste management, specifically as regards the obligations of entities generating different types of waste and establishes the principle of extended responsibility for the producers, importers, and/or marketers of products that will become waste, including plastic containers and packaging.

The safe collection of these disposable containers will be ensured by implementing an integrated management system (IMS) organized by NUVI. The proposed system will set up collection points for depositing postconsumer material and will get informal recyclers involved in the recovery chain, creating sources of income for vulnerable population segments. Similarly, the collection route defined for the IMS will involve the participation of organizations directly responsible for generating postindustrial material that can be recovered and added to the value chain.

The initiative seeks to impact a group of 30 large and medium-sized companies that produce, import, and/or market product containers and packaging used in connection with hazardous substances; 50 informal recyclers; and 100 organizations in the industrial sector that could contribute to the system for collecting the plastic waste in question. Small and medium-sized hazardous waste management companies will also benefit, as they will have more waste to manage and will require more workers.

This proposal is aligned with the IDB Group Country Strategy with the Dominican Republic 2021-2024, in the crosscutting area related to climate change adaptation, because working in conjunction with the private and industrial sectors, it makes productive and social infrastructure more resilient and sustainable, which contributes to the proper management of water and marine resources by preventing polluting waste from ending up in these areas.

## **ABBREVIATIONS**

ADIPLAST	Asociación Dominicana de la Industria de Plásticos [Dominican Association of the Plastics Industry]
AIRD	Asociación de Industrias de la República Dominicana Asociación de Industrias de la República Dominicana [Association of Industries of the Dominican Republic]
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
ECORED	Red Nacional de Apoyo Empresarial a la Protección Ambiental [National Network of Business Support for Environmental Protection]
FEDOMU	Federación Dominicana de Municipios [Dominican Federation of Municipios]
GEF	Global Environment Facility
iDELTA	Development Effectiveness Learning, Tracking, and Assessment in Innovation tool
IMS	Integrated management system
LMD	Liga Municipal Dominicana [Dominican Municipal League]
MMARN	Ministerio de Medio Ambiente y Recursos Naturales [Ministry of the Environment and Natural Resources]
NUVI	Nueva Vida para los Residuos [executing agency]
PET	Polyethylene terephthalate [plastic]
SDGs	Sustainable Development Goals

**PROJECT INFORMATION**

**GREEN SOLVENT: IMPLEMENTATION OF THE CIRCULAR ECONOMY MODEL  
IN PLASTIC CONTAINERS FOR HAZARDOUS WASTE**

<b>Country and geographic location:</b>	Dominican Republic. In the National District and the municipios comprising the province of Santo Domingo (Santo Domingo North, Santo Domingo East, and Santo Domingo West).		
<b>Executing agency:</b>	Nueva Vida para Residuos (NUVI)		
<b>Focus area:</b>	Inclusive cities		
<b>Coordination with other donors/Bank operations:</b>	<p>The Global Environment Facility (GEF) is financing this operation with nonreimbursable investment financing provided through the “Blue-Tech 4 Waste Challenge” carried out by IDB Lab.</p> <p>This call for proposals was organized under operation RG-O1674, Islands-Caribbean Incubator Facility, led by the Water and Sanitation Division (INE/WSA) and created to support the sustainable management of chemicals and hazardous waste with funding from the GEF.</p>		
<b>Project beneficiaries:</b>	<p>The project’s direct beneficiaries include 30 companies (producers, importers, and/or marketers that produce or handle postindustrial hazardous plastic waste) that will benefit from direct technical advisory services for the implementation of best practices in waste management. General training on the subject will also benefit 100 organizations in the industrial sector, and 50 informal recyclers will be trained and equipped.</p> <p>The project’s indirect beneficiaries include 1,200 members of a variety of organizations (e.g. businesses, schools, beauty salons, hotels, and the public sector) who will benefit from presentations and webinars, and approximately 5,000 individuals who will benefit from communication campaigns targeting the general public.</p>		
<b>Financing:</b>	Nonreimbursable technical cooperation funding (IDB Lab)	US\$100,000	7%
	<b>Total IDB Lab financing for DR-T1253</b>	<b>US\$100,000<sup>1</sup></b>	
	GEF Nonreimbursable investment financing for DR-G0009/RG-O1674 <sup>2</sup>	US\$550,000 <sup>3</sup>	41%
	Counterpart:	US\$700,300	52%
	<b>Total project budget:</b>	<b>US\$1,350,300</b>	<b>100%</b>
<b>Execution and disbursement period:</b>	36 months for execution and disbursement.		

<sup>1</sup> To be approved by the Donors Committee.

<sup>2</sup> GEF funds for this operation will come from operation RG-O1674, Islands-Caribbean Incubator Facility, approved by the Board of Executive Directors (AT-1558) on 2 September 2021.

<sup>3</sup> To be approved by the delegation’s chief executive.

## I. THE PROBLEM

### A. Problem description

- 1.1 **Exposure to toxic substances.** In Latin America, over 18% of industrial accident fatalities are caused by exposure to toxic substances. In addition to those 220,000 annual deaths in the industrial sector, there are also cases of workers who suffer temporary or permanent harm to their health.<sup>4</sup> Each year in the Dominican Republic approximately 750 accidents affecting health are caused by exposure to or the use of chemical substances. Even so, it is estimated that only half of the accidents reported (among the population with social security coverage for occupational risks) are registered, such that official data only account for a very small percentage of these incidents.<sup>5</sup> At the household level (house cleaners, homemakers, and children) and in the waste picking sector of collection by informal recyclers, many accidents occur due to a lack of knowledge regarding different types of hazardous waste and the improper use or handling of packaging contaminated with hazardous substances. Estimates indicate that in the Dominican Republic there are about 5,000 informal recyclers working in open-air dumps, performing a dangerous and little-acknowledged job.
- 1.2 In addition to health problems, this mismanagement of waste also causes environmental problems due to the exposure of hazardous compounds in open-air dumps, rivers, and the ocean—the places where contaminated plastic waste ends up, transmitting its pollutant load to other waste and to the environment in general.
- 1.3 **Processing and treatment of packaging contaminated with toxic substances.** According to the Dominican Republic's recently approved General Law on Integrated Management and Coprocessing of Solid Waste (Law 225-20), waste is classified according to type, as: (1) urban solid waste, (2) waste requiring special handling, or (3) hazardous waste. The latter is waste that can be defined in one or more of the following ways: corrosive, reactive, explosive, toxic, flammable, or biologically infectious, also known by its Spanish acronym "CRETIB," and includes product packaging, receptacles, or containers that have been contaminated by hazardous waste.
- 1.4 At this time, no technological processes are in place in the country for treating the plastic containers used for hazardous substances. In the Dominican Republic, 97,288 tons of postconsumer polyethylene plastic waste are generated annually, and estimates indicate that 10% of this waste contains hazardous substances, such as disinfectants, chemicals, paint, oils, and lubricants.<sup>6</sup> Of this amount, 90% ends up in landfills or is dumped into rivers, streams, and gullies, which will ultimately make

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<sup>4</sup> [International Labour Organization](#).

<sup>5</sup> *Sustancias químicas en la República Dominicana. Principales riesgos por sector, normativa e impacto en los trabajadores y el ambiente*, [Chemical Substances in the Dominican Republic: Main Risks by Sector, Regulatory Framework, and Impact of Workers and the Environment] and the National Report, Quick Start Programme Fund of the Strategic Approach to International Chemicals Management (SAICM).

<sup>6</sup> Serviguide, AIRD, IDB Lab, study "*Diagnóstico de las cadenas de producción, importación y comercialización de envases y embalajes y materiales de construcción para identificar oportunidades hacia la economía circular (extender, reusar y/o reintroducir residuos)*," Innovation and Remanufacturing Program in the Plastics and Construction Sectors (ATN/ME-16600-DR), Dominican Republic, March 2020.

its way to the ocean and wash up on beaches, endangering health and polluting the air, water, and soil.

- 1.5 The low percentage of recovery is due to a lack of initiatives for adopting the appropriate technology for waste recovery, treatment, or processing; a lack of education about or unfamiliarity with waste recovery; and the inadequate handling of hazardous substances and their packaging, especially during the disposal stages.
- 1.6 Law 225-20 contains circular economy elements and defines extended producer responsibility as one of its general principles,<sup>7</sup> specifying that it be applied to the priority waste types set out in that law, which include hazardous product containers and packaging in general.
- 1.7 Implementing extended producer responsibility requires formal management systems, therefore the country's recent passage of this regulatory framework creates significant opportunities to push for and establish appropriate management systems for waste requiring special handling. Plastic containers contaminated with hazardous substances are considered hazardous waste according to Law 225-20. However, by safely and appropriately treating these waste items, it is possible to decontaminate and convert them into simple plastic waste, with a reclassification as priority waste according to Law 225-20, and as such, subject to extended producer responsibility. When the waste is no longer hazardous, it can be recycled, thus closing the circular economy loop. Applying this important principle has many environmental advantages, because, in addition to the safe elimination of hazardous waste, it is also possible to convert the waste into a resource.
- 1.8 Low local supply of polyethylene resin. The Dominican Republic currently imports 100% of the resin used to produce any type of plastic in the country. Virgin resins are a petroleum byproduct and recycled resins are products of industrial recycling processes; therefore, as long as the country produces no oil and has no recycling plants producing sufficient plastic resin, it will depend on imports. Because local producers depend entirely on the international market to supply this raw material and given that the prices are linked to the price of oil, these producers are subjected to all of the variations in cost and availability of supply on the international market. This dependence causes local production instability, since prices can vary between US\$800 and US\$1,500 per ton of resin.
- 1.9 This represents a development opportunity for the industrial sector. By applying circular economy principles and implementing adequate processes, it would be possible to convert certain types of plastic into secondary raw material, through its transformation into locally produced resin. This would represent a source of more affordable raw material for local companies currently forced to import, and therefore creates an opportunity for the growth of a variety of sector-related businesses. The amount of resin purchased on the international market would decrease as local resin production increases, thus helping to reduce dependence on virgin raw materials.

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<sup>7</sup> Extended producer, importer, and marketer responsibility: Producers, importers, and marketers will be responsible for the product during its entire life cycle, including during the postindustrial and postconsumer phases. Law 225-20, Article 3, Section 3.

## II. THE INNOVATION PROPOSAL

### A. Project description

- 2.1 The **project's objective** is to develop a hazardous waste recovery model, creating a system for hazardous waste separation, collection, storage, treatment, and recycling by applying green solvent (supercritical CO<sub>2</sub><sup>8</sup>) in order to reduce the environmental risks posed by this waste. The **specific objective** is to reduce CO<sub>2</sub>-equivalent emissions by recycling plastic in accordance with circular economy logic.
- 2.2 In order to achieve this objective, nonprofit NUVI, in partnership with the AIRD, has proposed modeling a pilot project for the recovery and reuse of plastic waste containing hazardous substances, implementing innovative technology that could eventually become a nationwide solution for addressing the following challenges: (i) the special handling or treatment of waste classified as hazardous; and (ii) the absence of local production of the raw material polyethylene resin.
- 2.3 This project seeks to establish the principles and methodologies for changing the value chain, from informal recyclers to industry, creating sources of secondary raw materials that guarantee the sustainability of the value chain of plastic containers and packaging for hazardous substances. The initiative will facilitate compliance by producers, importers, and marketers in relation to their extended responsibility pursuant to Law 225-20.
- 2.4 The project also promotes the social and economic inclusion of informal recyclers (waste pickers) who are collecting these plastic containers for recovery. Special focus will be placed on improving the working conditions of informal recyclers, by means of technical assistance, training, equipping, and capacity building. Moreover, the project will help reduce the volume of plastic that ends up as marine waste, thereby jeopardizing other sectors, such as tourism.
- 2.5 Intervention model. The proposed solution would take three years to implement and focuses on promoting the recovery of plastic containers for hazardous substances so they can be safely put to use, while aiming to reduce the number of containers disposed of without any type of treatment. Supercritical CO<sub>2</sub> or "green solvent" is the technology that will be used to decontaminate the containers.<sup>9</sup>
- 2.6 The safe collection of these disposable containers will be ensured by implementing an integrated management system (IMS) organized by NUVI. The proposed IMS will set up collection points for depositing postconsumer material and will include informal recyclers in the recovery chain, which will create income sources for vulnerable population segments. The collection route defined by the IMS will also

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<sup>8</sup> Supercritical CO<sub>2</sub> technology involves taking carbon dioxide (CO<sub>2</sub>) as a gas and subjecting it to the highest temperature and pressure at which it can exist as a vapor and a fluid in equilibrium, and in this supercritical state it can act both as a gas that can diffuse through solids, as well as a liquid that can dissolve materials. ([GreenFacts.org](https://www.greenfacts.org)). This is known as "green solvent."

<sup>9</sup> This technology has been used in Spain, with the support of the European Union, and has shown positive results in the recycling industry and the manufacturing of plastics for hazardous substances. For a summary of the implementation process, see [Life ExtruCleen: Removal of hazardous substances in polyethylene packages using supercritical carbon dioxide \(SC-CO<sub>2</sub>\) in recycling process](#).



enlist the participation of organizations that are direct generators of postindustrial material that can be recovered and added to the value chain.

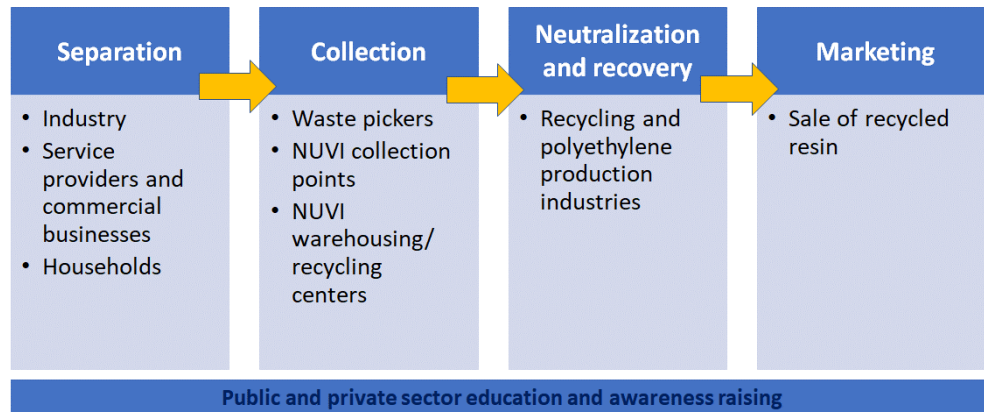
- 2.7 The plastic containers will be processed and recovered in the supercritical CO<sub>2</sub> plants, which will be installed under the supervision of a company that will operate the IMS for this type of plastic. There, as part of the treatment, green solvent will be applied to the containers at the extrusion stage in order to produce clean, residue-free, recycled plastic material in the form of pellets or resin.
- 2.8 During the first stage of the treatment process in the plants, the plastic containers are washed, which produces contaminated wastewater. This effluent will undergo a treatment process to ensure the elimination or reduction (meeting discharge parameters) of contaminants present in the wastewater. For the treatment of effluents resulting from washing and from applying supercritical CO<sub>2</sub>, different treatment alternatives will be evaluated, performing a comparison between the best option offered by the country's existing hazardous waste managers and coprocessing at cement plants.<sup>10</sup>
- 2.9 The resulting resin or pellets will serve as raw material for local polyethylene production companies and will be placed on the market in order to meet the demand for this type of locally generated raw material with the support of the NUVI Marketplace digital platform. This is a platform for exchanging and selling waste that has been operating since 2021. It was created by NUVI and the AIRD with the support of IDB Lab and has over 100 users.<sup>11</sup>
- 2.10 Over the course of its implementation, the model will be accompanied by actions to advise companies in the industrial sector, and efforts to educate specific sectors of the population whose livelihood involves handling containers with hazardous substances, as well as a campaign to raise awareness among the general population regarding the proper handling of these plastic containers and the existence of the IMS.

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<sup>10</sup> Funds have been allocated in the budget to engage a consulting firm that will help with the provisions for final disposal.

<sup>11</sup> NUVI Marketplace can be used for trading waste that cannot be used in the productive processes of some companies generating said waste but can be used by other companies or can be sent to recycling processes with waste management companies. Read: [\*BID Lab y la AIRD lanzan una plataforma virtual para facilitar la reutilización de residuos entre empresas.\*](#)

## Stages of the value chain



- 2.11 **Innovation.** The adoption of technology and incentives for innovation are key to addressing the critical environmental and health problems associated with hazardous plastic waste. Implementing supercritical CO<sub>2</sub> or green solvent technology has been proposed as a solution to ensure the cleanliness and decontamination of high- and low-density polyethylene product containers used for hazardous substances so that they can be properly recycled.
- 2.12 This technique takes carbon dioxide (CO<sub>2</sub>), a completely harmless gas, to a supercritical state, applying pressure and temperature above its critical point, by first cooling the gas and then raising the pressure to 73 bar and the temperature to 31.1° Celsius. This turns it into a very powerful solvent that acts as an effective and completely clean separator. The prewashed and dried contaminated containers are decontaminated when mixed with supercritical CO<sub>2</sub> in the extruder that produces recycled resin.
- 2.13 When supercritical CO<sub>2</sub> is applied, any hazardous substance or odor associated with the plastic containers is neutralized. It is 70% more effective at removing contaminants than the traditional triple-wash treatment, and is also more efficient, since two of the three washing cycles are eliminated, resulting in a 56% reduction in water consumption, energy, and wastewater compared to the traditional method.<sup>12</sup>
- 2.14 The main advantages of using supercritical CO<sub>2</sub> to clean plastic containers are: it allows for the easy separation of substances; the relatively low temperatures used for the process do not damage the plastic; it is not flammable, corrosive, toxic, or carcinogenic. CO<sub>2</sub> is available on the market at affordable prices and recirculates during the process.
- 2.15 This technology has been shown to be a viable solution for treating and recycling containers and packaging contaminated with hazardous substances based on the experience of the Life ExtruClea project, implemented in Spain with support from

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<sup>12</sup> In accordance with the results obtained by the [Life ExtruClea](#) project, financed by the European Union LIFE instrument and implemented in Spain between 2014 and 2017.



- 2.18 The main outputs expected from the implementation of this component are: (i) a document detailing the diagnostic assessment on the generation of hazardous waste and stakeholder mapping; (ii) two documents with guidelines for the safe and sustainable management of hazardous substances for the industrial and household sectors; and (iii) a research study on ecodesign and recovery alternatives.
- 2.19 **Component II. Implementation of the business model (GEF/IDB Lab: US\$317,800; Counterpart: US\$345,000).** The objective of this component is to define and implement the business model, such that hazardous waste can be recovered through an integrated management system (IMS), including: the safe collection of waste, the implementation of supercritical CO<sub>2</sub> treatment technology, the recycling of containers, and making the raw material that is produced (polyethylene pellets/resin) commercially available.
- 2.20 The main activities to be implemented by the executing agency are to: (i) develop the business model for processing hazardous waste containers; (ii) design the waste collection route and carry out other activities related to its operation; (iii) select the site, physically install equipment, and launch operations for the supercritical CO<sub>2</sub> technology and the system for treating the effluents resulting from the process; (iv) add new features to the NUVI Marketplace digital tool; (v) train and equip informal recyclers; (vi) provide technical advisory services to companies with the aim of implementing best practices in the handling of contaminated plastic containers; and (vii) design and launch a system for tracking statistics and monitoring.
- 2.21 The main outputs expected of this component are: (i) a report on the business model used to implement the IMS; (ii) 50 NUVI separation and collection points up and running; (iii) supercritical CO<sub>2</sub> technology being used in polyethylene plastic recycling plants; (iv) 50 equipped informal recyclers (transportation and biosafety); (v) 30 companies implementing best practices for handling hazardous waste containers in the postindustrial stage; and (vi) a fully operational system for tracking statistics and monitoring.
- 2.22 **Component III. Communication and general outreach (GEF/IDB Lab: US\$85,100; Counterpart: US\$94,400).** The objective of this component is to spread information on the proper management of plastic hazardous waste containers among various productive sectors, and more broadly among the general population, raising awareness of the important impacts on health and the environment in order to achieve broader understanding and widespread participation in the IMS. This component also aims to generate knowledge with the aim of replicating the intervention model.
- 2.23 The executing agency will implement the following activities under this component: (i) design and conduct a communication campaign targeting the general public; (ii) organize specific training sessions for organizations in the industrial sector and for informal recyclers, as well as organize presentations and webinars for a wider audience of people whose livelihood requires handling hazardous substances; (iii) organize events to launch and close the project; and (iv) prepare an audiovisual report and a case study to document and disseminate this intervention model.
- 2.24 The main outputs expected from the implementation of this component are: (i) 100 organizations and 50 informal recyclers who have received training; (ii) 1,200 participants in presentations and webinars at the postconsumer level

- (e.g. schools, beauty salons, and hotels); (iii) 5,000 people reached through the communication campaign designed to raise awareness among the general population; and (iv) two knowledge products (a case study and an audiovisual report).
- 2.25 Target population and characteristics. The target population for this project is diverse, ranging from the owners of well-established companies of different sizes in various sectors and their employees, to informal recyclers. It also includes people who perform specific jobs in both the formal and informal sectors, as well as the population at large.
- 2.26 The project seeks to have a direct impact on a group of 30 large and medium-sized companies responsible for producing, importing, and/or marketing plastic containers with hazardous substances.
- 2.27 The project also seeks to impact 50 informal recyclers who are socially and economically marginalized and work in critically unsafe conditions that jeopardize their health and that of their families. It is likely that most of the recyclers who are recruited will be men; however, emphasis will be placed on identifying and involving women among this group of beneficiaries.
- 2.28 The project further seeks to impact 100 organizations in the industrial sector that can contribute to the system for collecting the plastic containers in question.
- 2.29 Small and medium-sized hazardous waste management companies will also benefit, as they will see an increase in the flow of waste and more workers will be hired.
- 2.30 Groups of people who regularly handle products such as disinfectants or chemicals in their workplace will also receive pertinent information. A significant number of women are expected to benefit, since most cleaning tasks are performed by women; for example, homemakers; hotel housekeeping staff; support staff in schools, public institutions, and offices; stylists who use chemical products in beauty salons, etc.
- 2.31 The general population will benefit as hazardous waste that affects ecosystems and impacts the consumption chain is removed from the environment. Benefits will also come from being the target audience for communication campaigns to raise awareness about this subject on mainstream and social media.

## **B. Project results, measurement, monitoring, and evaluation**

- 2.32 **Project outcomes.** The main project outcomes are: (i) an IMS for hazardous substance plastic container waste implemented; (ii) 897 tons of hazardous substance plastic container waste recycled; (iii) 807 tons of pellets/resin from recycled waste produced; (iv) 75% of the pellets/resin produced are sold; and (v) 1,193 tons of CO<sub>2</sub> equivalent avoided by recycling hazardous substance plastic container waste.
- 2.33 **Measuring, monitoring, and evaluation.** A monitoring and tracking system for the project will be developed. Information will be disaggregated, for example, by company type and by sector. While a final independent evaluation of the project will not be conducted, its results will be thoroughly analyzed by the project's technical team and presented in the seminars and technical publications listed in the itemized budget. The knowledge products created from the project results should be able to answer the following questions: How are toxic effluents resulting from the supercritical CO<sub>2</sub> or green solvent cleaning process treated? To what degree have

companies embraced incorporating practices to manufacture recyclable plastic containers? How well does the green solvent technology work? What aspects of the project could be improved for similar interventions going forward? Was the business model successful in terms of gaining a solid footing in the market?

### **III. ALIGNMENT WITH THE IDB GROUP, SCALABILITY, AND RISKS**

#### **A. Alignment with the IDB Group**

- 3.1 This proposal is aligned with the IDB Group Country Strategy with the Dominican Republic 2021-2024, in the crosscutting area related to climate change adaptation, because, working in conjunction with the private and industrial sectors, it makes productive and social infrastructure more resilient and sustainable, which contributes to the proper management of water and marine resources by preventing polluting waste from ending up in these areas.
- 3.2 This project complements the Bank's investment loan operation DR-L1156, Greater Santo Domingo Sustainable Comprehensive Solid Waste Management Program,<sup>15</sup> since it helps minimize the flow of plastic waste to landfills, and in particular because it establishes a waste recovery mechanism, in this case plastic waste, which could be a scalable model within the framework of that investment loan project's Component II activities, set to finance the design and installation of recovery plants.
- 3.3 This project is also consistent with the Water and Sanitation Sector Framework document, in furthering line of action 2, related to designing policies and programs that incorporate disaster and climate change risk management and that promote water security. More specifically, the project helps companies and industries incorporate methodologies so that their processes of transformation lead to developing products that can be more easily recycled, thus lengthening their useful life, in line with circular economy logic.
- 3.4 This project is also consistent with the [Climate Change Sector Framework document](#), which promotes sustainable development by incorporating adaptation and mitigation measures in operations and underscores the importance of adopting an integrated approach to waste management.
- 3.5 This operation invests 100% of its resources in activities to mitigate climate change, according to the joint methodology of the multilateral development banks. These resources contribute to the IDB Group target for climate finance (30% of the volume of annual approvals).
- 3.6 The project is aligned with several of the Sustainable Development Goals (SDGs), including: SDG 8, *Decent work and economic growth* (Target 8.1) and SDG 9, *Industry, Innovation and Infrastructure* (Target 9.2), since the project contributes to economic growth by pioneering local production of a new product; SDG 10, *Reduce inequality within and among countries* (Target 10.b), since the project benefits a small country; SDG 12, *Responsible consumption and production* (Target 12.4) since the project improves the hazardous waste management practices of

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<sup>15</sup> [DR-L1156: Greater Santo Domingo Sustainable Comprehensive Solid Waste Management Program.](#)

Dominican companies; and SDG 13, *Climate action* (Target 13.1), since the project promotes actions to mitigate climate change.

## **B. Scalability**

- 3.7 NUVI will facilitate the creation of an IMS by starting an association made up of a group of companies subject to mandatory collection of polyethylene containers pursuant to Law 225-20 and that form part of NUVI within the municipios of Greater Santo Domingo. The IMS will then determine where and how to install the supercritical CO<sub>2</sub> treatment technology. It will be scaled nationally, thereby ensuring its continuity after three years of project implementation.
- 3.8 As the executing agency, NUVI will coordinate activities, receive and administer funds, carry out procurement processes, and deliver the relevant reports to IDB Lab. It will work in conjunction with the AIRD, its main partner in terms of implementing project actions. The AIRD will use its power to convene members and key players and will provide the counterpart funds. Other stakeholders will be involved in the implementation process, in order to secure their active participation in such a way that the knowledge acquired throughout the process will ensure that the model can be scaled up, both in terms of the amount of waste recovered and geographic coverage.
- 3.9 Through the Waste Law regulation process and the development of the National Plan for Extended Responsibility of producers, importers, and marketers,<sup>16</sup> which mandates that companies take responsibility for the containers and packaging they make available on the market, there is a short-term expectation that 10% of plastic containers containing hazardous substances will be recovered during the project execution period; however, over the medium term this percentage will progressively increase until it reaches a 25% rate of recovery.
- 3.10 Financial support from the companies and the Public-Private Trust Fund for the Integrated Management of Solid Waste<sup>17</sup> will play a key role in promoting these models nationwide and replicating them in other sectors or with other types of materials.
- 3.11 In the replicability and scale-up processes, knowledge products become vital. Accordingly, a case study of the experience will be required in order to document the project's impact and systematize the initiative.
- 3.12 The project includes developing a detailed business model that calculates all of the financial indicators on its investments and operating costs. In the business model previously developed by NUVI for the collection and recovery of polyethylene terephthalate (PET) plastics, under the Innovation and Remanufacturing Program in the Plastics and Construction Sectors (technical-cooperation operation ATN/ME-16600-DR), the model was determined to be sustainable in the medium term, with a five-year investment return. In this proposed project, since there are similarities in the collection plan and the type of plastic materials, the financial indicators are expected to behave similarly. Importantly, the collection of postconsumer waste for subsequent export to the international market is not a sustainable process due to the low sales price of the material, which is less than the

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<sup>16</sup> Law 225-20, Article 57.

<sup>17</sup> Law 225-20, Articles 37 through 42.

logistics costs of collection and stockpiling. Once a recovery process is operating locally and resin is being produced, the sales price of the final product rises considerably, and although investments are required, the margin will increase to cover all the logistics costs of collection, which is the most expensive stage of the process. The good news is that these types of initiatives will benefit from the financial incentives provided under the Waste Law, which enhance the business models.

- 3.13 Companies of the Dominican Republic's plastics industry have committed to investing in the project's business model as part of the practices set forth in Law 225-20 on the extended responsibility of the producer, importer and/or marketer and the obligations assumed by those who generate hazardous waste. The law also establishes a system of tax incentives and subsidies for investments in waste recovery and treatment.
- 3.14 The plastics industry will incorporate these methodologies into their service offerings, as a model of good practices that will help facilitate the creation of IMSs for handling other types of hazardous waste.
- 3.15 The media will be used as a platform to promote and replicate activities carried out under the project and a replicability strategy will be designed for future processes related to extended producer responsibility plans.

#### **C. Project and institutional risks**

- 3.16 **Decrease in international price of virgin resin.** If the international price of resin were to drop significantly, this could affect demand for locally produced resin and, by extension, affect the project's business model. In order to mitigate this risk, the executing agency, through the AIRD, will pursue both the subsidies established in Law 225-20 as well as agreements with IMS member countries regarding a commitment to purchase recycled material at a negotiated, set price.
- 3.17 **Absence of a national integrated solid waste management plan.** The current lack of a national integrated solid waste management plan and a national extended producer responsibility plan could lead to changes in project management once these plans are approved (expected in 2023). In order to mitigate this risk, the executing agency will be sure to remain a constant and active participant in the working groups established by the Ministry of the Environment and Natural Resources (MMARN) to develop these plans and exchange experiences with other countries.
- 3.18 **Resistance on the part of groups of recyclers to be trained and formally integrated into the value chain.** This could pose a risk to the effectiveness of the IMS when it comes to collecting postconsumer plastic containers, in other words, plastic waste unrelated to big companies or industries. In order to mitigate this risk, the executing agency will promote processes to formalize the work of recyclers.
- 3.19 **Low levels of stockpiled materials.** There is a risk that generators of the type of waste to be processed, due to a lack of awareness, will not separate and stockpile the amounts of materials necessary to ensure the most cost-effective conditions for their treatment and subsequent recycling processes. In order to mitigate this risk, the project includes a variety of awareness raising, educational, and outreach activities in the hope that more knowledge will lead people to help with separation, which is the first step of the process.



#### IV. INSTRUMENT AND BUDGET PROPOSAL

- 4.1 The total cost of the project is US\$1,350,300, of which US\$100,000 (7%) will be provided by IDB Lab, US\$550,000 (41%) by the Global Environment Facility (GEF), and US\$700,300 (52%) by the counterpart. The GEF financing comes from the ISLANDS-Caribbean Incubator Facility (operation RG-O1674), which financed the “BlueTech 4 Waste Challenge.”
- 4.2 In order to finance activities, a combination of GEF investment grant instruments will be used procure and implement the technology, accounting for more than 35% of the total GEF funding, while the technical-cooperation funding provided by IDB Lab will be used for activities such as the hiring of consulting firms for technology implementation.

The summarized project budget follows:

Project components	IDB Lab	IDB GEF	Counterpart	Total
Component I	US\$21,000	US\$81,000	US\$94,800	US\$196,800
Component II	US\$47,400	US\$270,400	US\$345,000	US\$662,800
Component III	US\$1,000	US\$84,100	US\$94,400	US\$179,500
Project administration	US\$30,600	US\$69,500	US\$136,100	US\$236,200
Ex post review*		US\$15,000		US\$15,000
Contingencies		US\$30,000	US\$30,000	US\$60,000
Total	US\$100,000	US\$550,000	US\$700,300	US\$1,350,300
% of financing	7%	41%	52%	100%

\* Indicates the funds that can be disbursed and used by the Bank without requiring a disbursement request from the executing agency.

#### V. EXECUTING AGENCY AND IMPLEMENTATION STRUCTURE

##### A. Description of the executing agency

- 5.1 Nueva Vida para los Residuos (NUVI) will be the executing agency for this project and will sign the agreement with the Bank; however, the project will be implemented through a partnership between NUVI and the Association of Industries of the Dominican Republic (AIRD), both of which are nonprofit organizations. This partnership will be formalized through an agreement to collaborate in project execution.
- 5.2 NUVI is a nonprofit association established in the Dominican Republic, currently made up of five business associations and dozens of companies that ensure its sustainability through their membership fees. Its mission and purpose are to champion circular economy programs in Dominican society and to promote and support the formation and strengthening of integrated waste management systems for recovery in the Dominican Republic in order to benefit its members and the general public, fulfilling the essential purpose of acting as a pillar to reinforce shared responsibility in solid waste management. NUVI supports local collection initiatives, promoting chains that generate a sufficient volume of collection for developing the circular economy, thereby ensuring its financial sustainability and the participation of society.

- 5.3 NUVI also works to bring together stakeholders in supply chains and society, including public and private institutions, in order to define common goals, improve the quality of collaboration, and together create and build value and opportunities for the Dominican Republic. It does this according to a waste management model based on shared responsibility and extended producer responsibility, both of which are principles established in the General Law on Integrated Waste Management and Coprocessing of Solid Waste (Law 225-20).
- 5.4 In business for 60 years, the AIRD is the largest and most representative business organization of the industrial sector in the Dominican Republic, with more than a thousand member companies and regional and industry sector associations across the country. As an institution, it has developed different programs with the cooperation of the IDB, the latest being the Innovation and Remanufacturing Program in the Plastics and Construction Sectors (technical-cooperation operation ATN/ME-16600-DR). In fact, NUVI was created under the framework of that initiative, the first IMS in the country for plastic PET waste was developed, and the experience was also systematized with the aim of replicating the process for other materials. This is where the proposal to pursue this intervention with other types of plastics originated. This experience of pioneering an initiative involving companies coming together for the common goal of recovering their waste generated some lessons learned, including:
- a. A legal framework that mandates the adoption of a circular economy model accelerates the process of change and the search for solutions, whether on an individual or collective basis;
  - b. Changes in the culture are consolidated when solutions are sought and decisions are implemented collectively; and
  - c. The commitment of corporate leadership at the highest level is essential, as it enables processes to move forward faster and becomes a driving force behind companies aligning themselves with project commitments and adopting circular economy principles.
- 5.5 The intervention will be executed with other institutions and groups that are strategic partners of NUVI/AIRD, such as: the National Network of Business Support for Environmental Protection (ECORED), the Dominican Association of the Plastics Industry (ADIPLAST), the Ministry of the Environment and Natural Resources, the Dominican Municipal League (LMD), the Dominican Federation of Municipios (FEDOMU), the Public-Private Trust for Waste Management, and informal recyclers. These partners will have different roles in channeling member support for carrying out project activities.

**B. Implementation structure and mechanism**

- 5.6 NUVI will establish a project coordination unit and the necessary structure to implement project activities and manage project resources effectively and efficiently. NUVI will also be responsible for submitting progress reports on the status of project implementation. Details on the structure of executing agency and the requirements for progress reports can be found in Annex V and in the project's technical files.
- 5.7 A project management unit will be created within the structure of NUVI, consisting of: (i) a project coordinator, and (ii) an administrator/accounting specialist. The

project coordinator will report directly to the executive vice president of NUVI. The AIRD will provide the physical structure and logistical support required for effectively and efficiently executing the operation. NUVI will be responsible for administering the counterpart funds and the grant funds for the execution of activities, and will submit progress reports on the status of project implementation every six months, using IDB Lab tools.

- 5.8 As part of the project's governance, an advisory committee will be formed, consisting of one representative from each of the following institutions or groups: ECORED; ADIPLAST; MMARN; LMD; FEDOMU; the Public-Private Trust Fund for Waste Management; and informal recyclers. Both IDB Lab and the project coordinator will participate in the meetings of the advisory committee. NUVI's administrator/accountant will serve as the secretary of the advisory committee.
- 5.9 Coordination meetings will be held periodically in order to chart the course of action and implementation strategies. IDB Lab will support the executing agency in developing the project and will participate in the decision-making process as strategies are planned.

## **VI. COMPLIANCE WITH MILESTONES AND SPECIAL FIDUCIARY AGREEMENTS**

- 6.1 **Results-based disbursements and fiduciary agreements.** The executing agency will agree to comply with IDB Lab's standard arrangements for results-based disbursements and with the Bank's procurement<sup>18</sup> and financial management<sup>19</sup> policies, as specified in Annexes V and VI.

## **VII. ACCESS TO INFORMATION AND INTELLECTUAL PROPERTY**

- 7.1 **Access to information.** The information contained herein is classified as public upon approval under the Bank's Access to Information Policy.
- 7.2 **Intellectual property.** The executing agency shall own the intellectual property rights to all works produced or results obtained under the project. The executing agency will grant the Bank a free, nonexclusive, noncommercial license to use, copy, distribute, reproduce, publicly display and perform any and all project-related works or results. The Bank may disclose, reproduce, and publish any project-related information and include in that information the name and logo of the executing agency.

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<sup>18</sup> [Policies for the Procurement of Goods and Works financed by the Inter-American Development Bank.](#)

<sup>19</sup> [Financial Management Guidelines for IDB-financed Projects.](#)