August 2022

ValuCred
Standard Process Model

Handbook

ValuCred Handbook
Standard Process Model

Founding partners

Supporting partners

Acknowledgements

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Executive Summary

This handbook provides instructions to understand the concept of plastic credit financing mechanisms with the reference to environmental and social impact, the transfer into a standard process model (SPM) with the overall objective of enhancing global comparability and quality of information on plastic credits as well as transparency and accountability within the plastic credit market and also the technical and implementation background of the digital solution enabling the pilot testing involving the informal sector.

The ValuCred consortium consisting of Yunus Environment Hub, Nehlsen AG & Rodiek and BlackForest Solutions was initiated under the umbrella of a wider working group on plastic credits of the PREVENT Waste Alliance. Launched in 2019 by the German Federal Ministry for Economic Cooperation and Development (BMZ), the PREVENT Waste Alliance serves as a platform for exchange and international cooperation considering waste minimization, the elimination of pollutants and the maximization of resource reuse in the economy. All members of the ValuCred consortium express their gratitude to the continuous support of the PREVENT Waste Alliance over the last 18 months as well as to all the Alliance's member organizations for their relevant input.[1]

Starting from spring 2021, the ValuCred consortium has thoroughly analyzed stakeholders, roles and responsibilities including process dynamics of plastic credit schemes and markets. Hereby, the consortium has come to the conclusion that a common understanding of processes, participants and responsibilities is needed for plastic credits to be able to serve as an intermediate solution on the way to the establishment of holistic systems of extended producer responsibility (EPR). The SPM that ValuCred has developed thus aims at contributing to filling the current gap of lacking EPR systems in many national contexts by providing substantial input, a clear terminology and common understanding by supporting the standardization of interaction processes between different stakeholders of the plastic waste value chain.

ValuCred's SPM therefore aligns and connects different entities involved in the exchange and acquisition of plastic credits as a means to finance the environmental service of the workers in the waste value chain and the supporting processes. It specifically focuses on building trustworthy and transparent systems around the generation of plastic credits. While particularly considering the interests, needs and well-being of (informal) service providers involved in waste collection and recovery at the lower end of the plastic waste value chain, the ValuCred's work and recommendations simultaneously acknowledge the perspective of international companies and organizations by being fully integrable into existing management systems such as ISO 9001 or 14001.

First, the handbook gives definitions for a number of terms that are relevant within plastic credit schemes with the aim of fostering a common understanding of all stakeholders involved.

Second, after giving a brief overview over the dynamics of today's plastic credit market and the different stakeholder categories acting in it, the handbook introduces the core frameworks that

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[1] For more information on the PREVENT Waste Alliance visit Home - PREVENT Waste Alliance (prevent-waste.net). For more information on the Alliance's projects on plastic credits visit Plastic Credits for inclusive & transparent circularity - PREVENT Waste Alliance (prevent-waste.net).

constituted the foundation of the SPM. These include the Sustainable Development Goals (SDGs) and their specific sub-targets as well as relevant ISO and GRI standards.

Third, as its technical element, the handbook provides a detailed overview of the process steps of the SPM and gives a detailed guideline on how the SPM may be used by service providers involved in waste collection activities including the digital user interface and the pilot testing. The ValuCred consortium would like to acknowledge that the equally important validation at the upward waste value chain involving the sponsoring companies is a crucial next step in the advancement of the SPM as applicable solution in the plastic credit market.

Disclaimer:

ValuCred works on the development of an international Standard Process Model (SPM) that aligns and connects interdependent stakeholders in the 'Plastic Credits' market with focus on building a trustworthy and transparent system to underpin the generation and use of Plastic Credits.

Our SPM shall be adaptable to existing management systems such as ISO 9001 and 14001 with the goal to be fully integrated into a company's core business operations - moving away from the current approach to manage the plastic pollution arising from companies' activities through "special projects" and "task forces".

ValuCred's goal is to establish systemic, environmental and social management practices for plastic waste and to create a common language to enhance the global comparability and quality of information on plastic credits thereby, enabling greater transparency and accountability for all participants in the plastic credit market.

Whilst the implementation of the ValuCred solution can enhance an organization's sustainable management approach and support more robust CSR reporting, it does not guarantee ISO or GRI conformance.

ISO:

Claims of conformity to ISO are not acceptable unless all its requirements are incorporated into an organization's management system and fulfilled without exclusion; however, an organization may choose to use the requirements in whole or in part to systemically improve their material topics' management and performance, not claiming conformity.

GRI:

Any published materials that use the GRI Standards in this way must include a 'GRI-referenced' claim.

Terms and Definitions

Term	Definition
Collection	The transfer of post-consumer plastic waste from either domestic or non-industrial commercial establishments or from public collection stations to the point of treatment. This includes the curbside collection of recyclable materials.
Extended producer responsibility (EPR)	Environmental policy approach in which a producer's responsibility for a product is extended to the waste stage of that product's life cycle. In practice, EPR involves producers taking responsibility for the management of products after becoming waste including: collection; pre-treatment, e.g. sorting, dismantling or de-pollution; (preparation for) reuse; recovery (including recycling and energy recovery) or final disposal. EPR systems can allow producers to exercise their responsibility either by providing the financial resources required and/or by taking over the operational aspects of the process from municipalities. They assume the responsibility voluntarily or mandatorily; EPR systems can be implemented individually or collectively.
EPR system (Prevent EPR Standard)	Any system set up by one or several producers to implement the EPR principle. It can be an individual system (or individual compliance system) where a producer organizes its own system, or a collective system (collective compliance system) where several producers decide to collaborate and thus fulfil their responsibility in a collective way through a specific organization.
Living Wage	Living wage is defined following the principles of the Global Living Wage Coalition (GLWC).
Management System	Set of policies, processes and procedures used by an organization to ensure that it can fulfill the tasks required to achieve its objectives. These objectives cover many aspects of the organization's operations (including financial success, safe operation, product quality, client relationships, legislative and regulatory conformance and worker management). In the context of the ValuCred SPM the focus lies on an organization's environmental management system.
Material Flow Tracking	Material flow tracking as applied in ValuCred is based on the application of the SPM and the manual or electronic documentation of any or all information collected during operations (e.g., transportation, storage, delays and quality). Material flow tracking shall support a complete collection and aggregation of this (digital) data to allow a transparent and

coherent documentation of quantities and types of physical materials.

Plastic Credit (WWF)	A transferable unit representing a specific quantity of plastic that has been collected and possibly recycled from the environment.
Service	Output of an organization with at least one activity necessarily performed between the organization and the customer. In the context of ValuCred SPM, it is the realization of the operations of a service provider.
Service Provider	A service provider is an individual or entity that provides services to another party. The provision of services between a service provider and a company is typically governed by a service agreement. In the context of ValuCred and the SPM respectively, this term refers to waste collectors (formal and informal), recyclers, transportation companies, and other specialized actors.
Solid Waste Management (SWM) (Prevent EPR Standard)	The storage, collection, transportation, and disposal of solid waste. Also describes a practice whereby multiple waste management techniques are used to manage and dispose of specific components of solid waste. Such waste management techniques include waste prevention, reduction, reuse, recycling, recovery, and disposal.
Sponsoring Companies	Include brands, FMCG companies, plastic polymer producers, packaging producers, importers, distributors and manufacturers who release plastic materials in the respective markets.
Stakeholders (GRI reference)	Entity or individual that can reasonably be expected to be significantly affected by organization's activities, products and services, or whose actions can reasonably be expected to affect the ability of the organization to successfully implement its strategies and achieve its objectives.
Standard Process Model (SPM)	A defined procedure that is intended to produce a specific result or output. It consists of a series of activities, ideally all of which are geared to producing the output. A standard process model uses defined conventions to ensure readability, comparability and uniformity of process documentation independent of the user. It consists of four levels process beginning with the overarching main processes. Each main process has a maximum of three further levels: Sub-process, business process and sub-process.
Recycling (Ocean Bound Plastic Standard)	Process used to reuse the material constituents of a discarded product to fabricate other products or eventually the same product. Recycling implies the destruction of the initial product

and the transformation of its constituents through industrial processes into recycled raw materials.

Vulnerable Group

(GRI reference)

Set or subset of persons with some specific physical, social, political, or economic condition or characteristic that places the group at a higher risk of suffering a burden, or at a risk of suffering a disproportionate burden of the social, economic, or environmental impacts of the organization's operations. Vulnerabilities and impacts can differ by gender.

Abbreviations

GRI	Global Reporting Initiative
SDGs	UN Sustainable Development Goals
ISO	International Organization for Standardization
CSR	Corporate Social Responsibility
ESG	Environmental Social Governance
EPR	Extended Producer Responsibility
MP	Main-Process
PP	Part-Process
BP	Business-Process
SP	Sub-Process
HLS	High Level Structure

1. Introduction to the International Plastic Credit Market and the Role of ValuCred

The informal sector fighting the global plastic waste crisis

The world is facing a global plastic waste crisis. This crisis touches environmental aspects in terms of ever-increasing plastic waste leakage and pollution as well as social aspects as most countries of the Global South lack adequate waste management infrastructures. Thus, while the world today produces twice as much plastic waste as only two decades ago[2], more than 3 billion people don't have access to proper waste management services[3].

With the international community still waiting for a legally binding agreement on the treatment of plastic waste to be implemented[4], the management and treatment of plastic waste so far remains in the hands of national and regional governments. While national systems of Extended Producer Responsibility (EPR) constitute an effective framework for the financial viability of national solid waste management systems, the lack of a holistic implementation marks a significant obstacle in many countries of the Global South.

The resulting lack of waste management infrastructure and adequate financial resources for the establishment of holistic waste management systems poses a multitude of environmental, social, and economic challenges. With no alternative systems in place, in most countries of the Global South, the collection and processing of plastic waste therefore depends almost entirely on the informal sector and its stakeholders. However, despite their significant contribution, waste workers are amongst society's most marginalized groups with no recognition of their valuable services, often being deprived of access to sustainable income sources and basic social services.

Plastic credits emerging as an innovative financing approach to waste management

With regards to the increasing pressure the global plastic waste crisis is putting on national governments as well as the private sector, innovative and sustainable financing approaches are desperately needed to bridge today's gap in plastic waste collection in most countries of the global South. In recent years, so-called plastic credits have evolved as a frequently discussed innovative financing approach to plastic waste management.

While the basic idea behind plastic credits appears relatively simple at first sight, the current discourse and stakeholder landscape are characterized by different perspectives and arguments as well as unclear and intransparent roles and responsibilities underlining the argument for much-needed transparency and standardization, which ValuCred aims to bring to the plastic credit market.

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[2] Plastic pollution is growing relentlessly as waste management and recycling fall short, says OECD

[3] The Mounting Problem: World's Cities Produce up to 10 Billion Tonnes of Waste Each Year, UN Study Estimates (unep.org)

[4] Historic day in the campaign to beat plastic pollution: Nations commit to develop a legally binding agreement (unep.org)

In alignment with WWF (2021), plastic credits can be defined as transferable units representing a specific quantity of plastic that has been collected from the environment and for which collection has been funded by a third party. Plastic credits are sold either directly by project developers and initiatives or via intermediary platforms and marketplaces to the producers of plastic waste, usually companies, manufacturers or brands from the consumer goods sector.

The equivalent value of one plastic credit is defined by a project-dependent amount and composition of collected plastic waste. The financial sum that the buyers pay for the plastic credits flows back into organizations that carry out or coordinate the local collection and disposal of plastic waste, usually in countries of the Global South. The mediation of this exchange between local collection organizations on the one hand, and the buyers of plastic credits on the other hand, is (ideally) based on independent standards or guidelines. While plastic producers, corporations or brands compensate and offset their own plastic consumption by buying plastic credit in order to claim "plastic neutrality", this exchange can be a valuable source of funding for local collection organizations or waste management systems in countries of the Global South that don't have established EPR systems.

A variety of actors operating in the plastic credit market

The roles, responsibilities and activities of different actors in the global plastic credit market are rarely as clear-cut and transparent as outlined above and portrayed in Figure 1. For example, some actors that develop and publish independent standards for the allocation of plastic credits simultaneously act as registers or even marketers for plastic credits, while organizations that act as marketers for plastic credits often carry out plastic waste collection themselves.

In stark contrast to the strictly regulated market for CO_2 certificate trading, which is oftentimes (wrongfully) cited as a reference for upcoming plastic credit schemes, the global plastic credit market is thus characterized by unclear dynamics and a fragmented landscape of actors. Based on the thorough analysis carried out over the course of the ValuCred project, however, an initial categorization of relevant actors and roles can nevertheless be attempted:
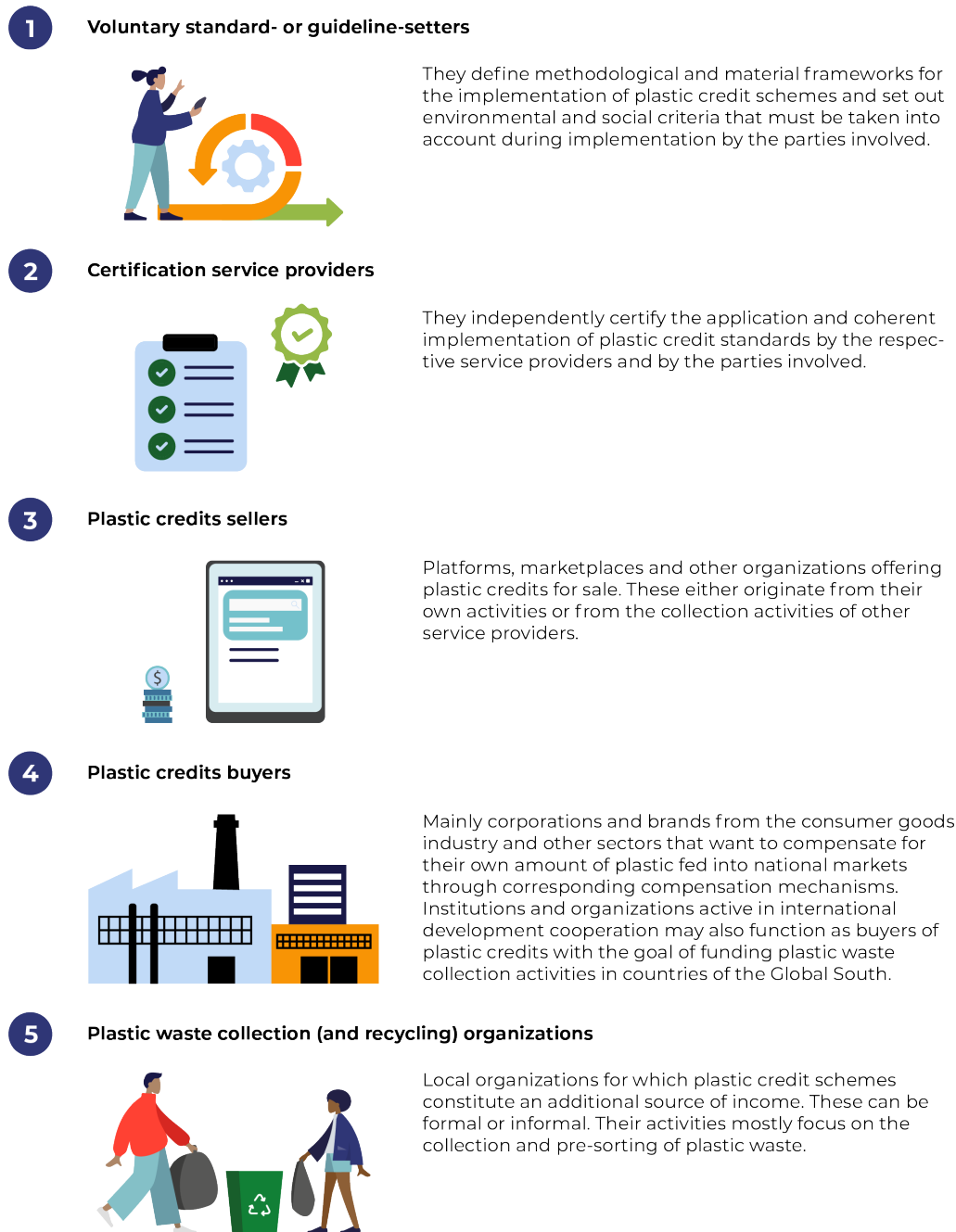
1 **Voluntary standard- or guideline-setters**

They define methodological and material frameworks for the implementation of plastic credit schemes and set out environmental and social criteria that must be taken into account during implementation by the parties involved.

2 **Certification service providers**

They independently certify the application and coherent implementation of plastic credit standards by the respective service providers and by the parties involved.

3 **Plastic credits sellers**

Platforms, marketplaces and other organizations offering plastic credits for sale. These either originate from their own activities or from the collection activities of other service providers.

4 **Plastic credits buyers**

Mainly corporations and brands from the consumer goods industry and other sectors that want to compensate for their own amount of plastic fed into national markets through corresponding compensation mechanisms. Institutions and organizations active in international development cooperation may also function as buyers of plastic credits with the goal of funding plastic waste collection activities in countries of the Global South.

5 **Plastic waste collection (and recycling) organizations**

Local organizations for which plastic credit schemes constitute an additional source of income. These can be formal or informal. Their activities mostly focus on the collection and pre-sorting of plastic waste.

Figure 1: Main actors in the global plastic credit market

Gaps and pitfalls of the plastic credit market

With internationally binding guidelines on the trade in plastic credits still lacking, it comes as no surprise that the existing standards and guidelines that have been developed for plastic credit trading so far all are of voluntary nature. Our research has shown that these voluntary standards, which are supposed to make the global trade of plastic credits transparent through the application of universal criteria, thus lack comparability among themselves as well as uniform socio-environmental criteria.

Additionally, existing certification service providers that independently assess the various actors, standards, and stakeholders involved in the trade of plastic credits lack globally uniform guidelines or a recognized accreditation for plastic credit standards. The resulting multiverse of certifications, criteria and certified plastic credit projects does not provide much clarity but rather brings more confusion and intransparency to an already fractured stakeholder landscape.

With more than 60 identified platforms, marketplaces and comparable organizations offering plastic credits for sale, in many cases the outside observer is hardly able to get a thorough understanding of the relationship between those platforms and marketplaces and the actual waste collection organizations they promote.[5]

Lastly, regarding the (potential) buyers of plastic credits such as corporations and brands from the consumer goods industry, there is a significant lack of clarity and information as to which companies have actually purchased plastic credits so far. And even if indications are given about the purchase of plastic credits and the amount of plastic waste being "compensated" therewith, the outsider rarely finds information on the criteria, standards and material types underlying these transactions. In this context, it seems as if the fragmented stakeholder landscape and the lacking international standardization of the plastic credit market lead to a great reluctance on the side of sponsoring companies as potential plastic credit buyers. Due to the lack of legal frameworks and established market mechanisms, companies still lack guarantees that their investments in plastic credit schemes will be effectively used for the recovery of waste and the establishment of long-term waste management infrastructures under consideration of social and environmental criteria. With no standardized market mechanisms in place and the dual role of many actors of the plastic credit landscape, the resulting high potential for various forms of greenwashing (and the respective fear of such accusations) appear to hinder a more outspoken and long-term engagement of companies and brands.

The ValuCred consortium engaging to harmonize the international plastic credit market

In light of the outlined lack of transparency and standardization of the plastic credit market in its current state, the ValuCred consortium was initiated. It consists of *Yunus Environment Hub, Nehlsen AG & Rodiek* and *BlackForest Solutions*. The consortium is part of the pilot project "Plastics for Inclusive and Transparent Circularity" of the *PREVENT Waste Alliance*. Initiated by the *German Federal Ministry for Economic Cooperation and Development (BMZ)*, the PREVENT Waste Alliance serves as a platform for exchange and international cooperation. Organizations from the private sector, academia, civil society and public institutions jointly engage for a circular economy.

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[5] Over the course of its project timespan, the ValuCred consortium carried out an in-depth analysis of existing plastic credit platforms, marketplaces and comparable entities that offer plastic credits for sale. More details and findings of this analysis are presented in the ValuCred report "Plastic credits – Friend or foe? Retrospective of recent market dynamics" which was published in September 2021 and is available via the PREVENT Waste Alliance (click here to get to the download page).

As member of the PREVENT Waste Alliance, the ValuCred consortium actively engages with other stakeholders on the development and implementation of plastic credits under the consideration of relevant social and environmental aspects. Furthermore, the ValuCred consortium contributes to the ongoing discussion on the alignment of plastic credits with EPR schemes.

Over the course of the last two years, the ValuCred consortium has thoroughly analysed the international plastic credit market and has engaged with a variety of stakeholders operating within it. While key aspects of this analysis have been published within the ValuCred report of September 2021 as well as additional position papers[6], ValuCred's most applied contribution is the development of a standard process model (SPM).

Aiming to align the interests of global stakeholders and promoting collaboration among existing plastic credit initiatives, ValuCred's SPM offers fully transparent and criteria-based processes for the establishment and operation of a plastic credit scheme for both stakeholder groups, downwards and upwards along the plastic waste value chain. Giving clear step-by-step instructions for both sides of the plastic waste value chain (local waste collection service providers in countries of the Global South on one side and international companies or brands on the other), the SPM serves as an internationally applicable blueprint for the exchange of collection services in return for financial compensation.

The ValuCred SPM incorporates the relevant metrics and indicators of the United Nation's Sustainable Development Goals (SDGs) and refers to relevant international regulatory frameworks such as the Basel Convention. Furthermore, the SPM incorporates the High Level Structure (HLS) of ISO management systems such as ISO 9001 and ISO 14001. The incorporation of relevant GRI standard allows a full integration of the SPM into a company's core business operations and management systems already established in the company (see Figure 2). With the outlined features, ValuCred's SPM aims to:

1. Bring radical transparency to the generation and valorization of plastic credits;

2. Empower informal waste workers in countries of the Global South;

3. Ensure that all stakeholders from the waste value chain receive a payment to ensure adequate compensation according to living wage guidelines;

4. Support global action on plastic leakage;

5. Enable companies, brands and manufacturers to integrate the management of plastic waste pollution into the core of their management systems, thereby moving away from plastic pollution being tackled via isolated projects and corporate social responsibility (CSR) activities.

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[6] Both the ValuCred report ("Plastic Credits – Friend or Foe?") as well as the position paper on the remuneration of labour in the waste value chain are available for download under ValuCred - Yunus Environment Hub.

EPR principles: Polluter pays & financing infrastructure and human resource

Basel Convention: Plastic Waste Amendments & environmentally sound management (ESM) of plastic wastes

ISO 14001: Top Management responsibility and accountability

Integration into core business processes

2030 Agenda for Sustainable Development

ESG criteria / GRI reporting

Strengthening regulations

Systemic Management Systems approach

Verifiable contribution to applicable **SDG targets and goals**

Supporting **transparency** and **comparability** at global level

Strengthening balanced reporting globally, inspired by new CSRD (in EU)
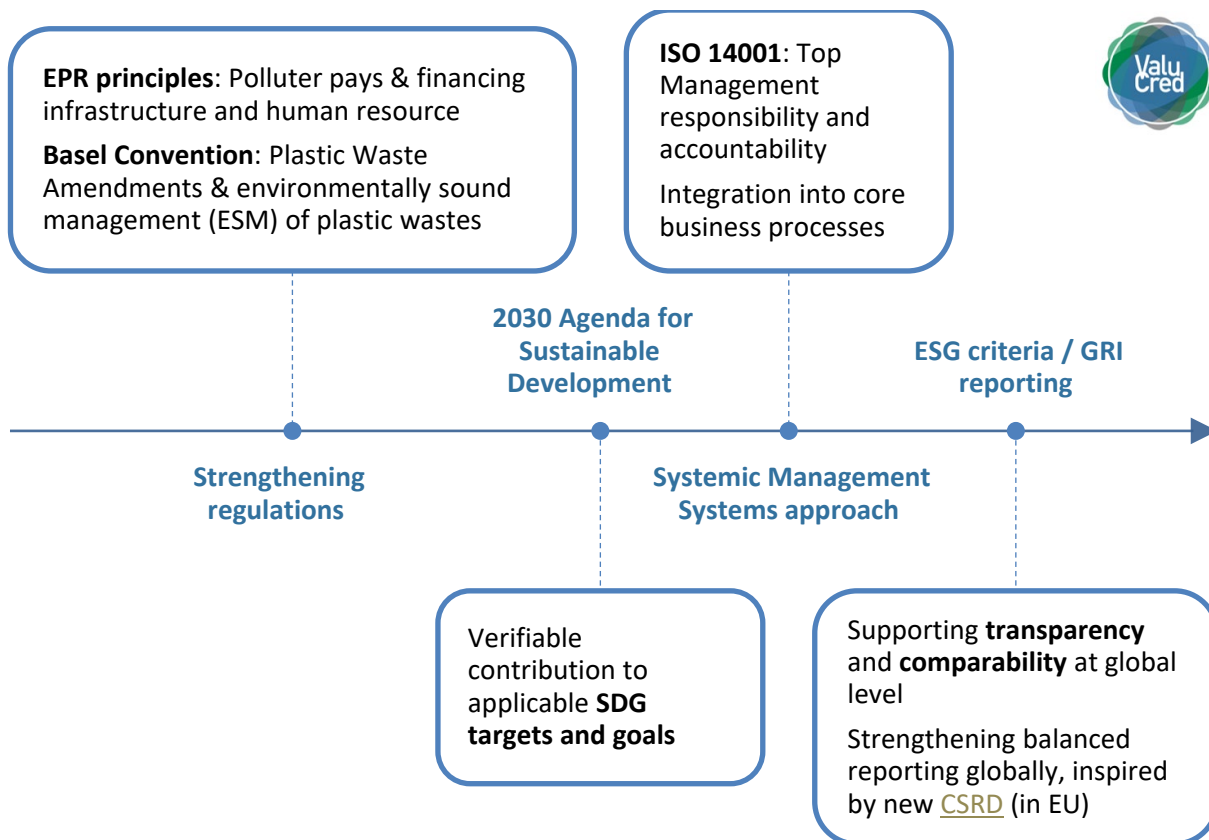
Figure 2: Global schemes incorporated in ValuCred's SPM

2. Sustainable Development Goals

Set up by the United Nations in 2015, the Sustainable Development Goals (SDGs) constitute the "blueprint to achieve a better and more sustainable future for all."[7] Addressing today's most pressing global challenges such as poverty, war, hunger, climate change, and social injustice, the SDGs have become the most important framework for the assessment of sustainability contributions of non-profit organizations, for-profit companies, national governments, international institutions, and others.

Implementing the Sustainable Development Goals and in particular their respective targets and indicators into its work has been crucial for the ValuCred consortium.

ValuCred's contribution to the SDGs

Following a thorough analysis of its own activities against the backdrop of the specific targets and indicators of the 17 SDGs, ValuCred can potentially capture data to demonstrate a contribution to 15 out 17 SDGs including a total of 43 out of 169 target indicators. Graphic Figure 3 presents an overview of the 15 SDGs ValuCred is contributing to including a selected indication which specific target of each SDG ValuCred is hereby addressed.

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[7] Take Action for the Sustainable Development Goals - United Nations Sustainable Development

Figure 3: Overview on ValuCred's contribution to the SDGs

3. Global Reporting Initiative (or GRI Reporting)

With its headquarter in Amsterdam, Netherlands, the Global Reporting Initiative (GRI) is an independent international organization that helps businesses take responsibility for their impacts by providing standards to evaluate these. The GRI is by far the most common reporting standard used globally to report on sustainability impacts in a consistent and credible way.

The initiative's aim is to create a common language for organizations and stakeholders, with which the economic, environmental and social impacts of organizations can be communicated and understood. The standards are designed to enhance the global comparability and quality of information on these impacts, thereby enabling greater transparency and accountability of organizations.[8]

Why GRI Reporting?

By incorporating GRI criteria, organizations make use of existing standards in terms of process documentation and reporting, thereby significantly increasing the accountability and transparency of relevant external documentation such as sustainability reports.

Service providers involved in solid waste management by definition already pursue environment-related goals and contribute to the overall increase in controlled disposal and recycling of waste. Reporting on these activities in a standardized format and in accordance with GRI reporting criteria

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[8] https://www.globalreporting.org/

may significantly increase the trust of existing and future customers, potential investors, as well as of the organization's employees.

In addition, standardized reporting and documentation about an organization's core waste management activities and the underlying processes may serve as baseline for the continuous improvement of management processes (including goal setting as well as definition and monitoring of relevant KPIs).

GRI reporting may thus not only enhance an organization involved in waste management services to build accountability and trustworthiness in front of relevant external stakeholders but to get an in-depth understanding of its own management processes and how to assess and improve them over time.

Three core benefits:

1. Performance Management
2. Creation of transparency and trust among suppliers, customers and potential investors
3. Basis for reporting of defined key performance indicators (KPI's)

A contribution to GRI Reporting

ValuCred identified GRI Standards, or parts of it, that are relevant to waste management and recycling value chains. Without preparing a full report according to the Standards, Service Providers and Sponsoring Companies report on specific information that deliver relevant information. This information will be claimed as "GRI-referenced", which increases credibility as a widely recognized standard has been used. ValuCred applies 12 out of 23 GRI Standards (see Figure 4).

GRI 101 **Foundation (Reporting Principles)**	- Principles of defining report content - Principles of defining report quality

GRI 102 **Requirements on contextual information**	- Overview of organizations size, geographic location, activities

GRI 103 **Management approach**	- Define economic, environmental and social impact - How is the impact managed and evaluated

GRI 301 **Materials**	- Total weight or volume of used materials - Renewable/non-renewable materials; recycled/reclaimed materials

GRI 306 **Waste**	- Waste generation - Waste management

GRI 307 **Environmental compliance**	- Compliance with environmental laws/regulations (international declarations/conventions; national, regional, local regulations)

GRI 403 **Occupational health and safety**	- Health and safety work conditions applied to all workers of an organization (employees, workers in control of organization, workers directly linked to operation, service and product of an organization)

GRI 405 **Diversity and equal opportunity**	- Percentage of individuals in managerial positions/ total employees (gender, age group, minorities, vulnerable groups)

GRI 407 **Freedom of association and collective bargaining**	- Policies to safeguard rights of workers (including suppliers) to exercise freedom of association and collective bargaining

GRI 408 **Child labor**	- Reporting on significant risks of child labor - Measures to eliminate forced or compulsory labor

GRI 409 **Forced or compulsory work**	- Reporting on significant risks of forced or compulsory labor - Measures to eliminate child labor

GRI 413 **Local communities**	- Vulnerability and negative effects on local communities as result of business activities - Community engagement, development programs, etc. as positive impact for local communities

Figure 4: Core elements of relevant GRI Standards

4. International Organization for Standardization (or ISO Certification)

The International Organization for Standardization (ISO) is an independent, non-governmental organization composed of representatives from national standards bodies. Founded in 1947, the organization has 167 member states, through which it brings together experts to share knowledge and develop consensus-based, market relevant International Standards that support innovation and provide solutions to global challenges. The published standardizations exist in many areas of industry, services and systems from energy management and social responsibility to medical devices. The three official languages of the ISO are English, French, and Russian.[9]

Why ISO Certification is relevant for ValuCred?

ISO certification verifies that a management system, manufacturing process, service, or documentation procedure meets all the defined requirements for standardization and quality assurance. In line with adapting the internal recognized voluntary approaches of standardization of SDGs and GRI, the ISO certification, which has the greatest global leverage, should not be neglected. An essential foundation for the development of ValuCred is ISO 14001:2015 "Environmental management systems – Requirements with guidance for use" (details see chapter 0).

ISO 14001:2015 sets the baseline for an environmental management system that an organization can use to improve its environmental performance. The norm is intended for small or large organizations in any industry that want to carry out their environmental responsibilities in a systematic way to contribute to sustainability. It does not set specific requirements for environmental performance and can therefore be used at any stage of a company's environmental management. The most important elements for companies to consider when certifying to ISO 14001 is the commitment to continuous improvement, regulatory compliance and support from the director-level. By certifying and maintaining a management system accordingly, the organization demonstrate commitment to reducing environmental impact by applying best practice. This ensures that environmental management systems operate efficiently, increases effectiveness and protects the environment in the long term.
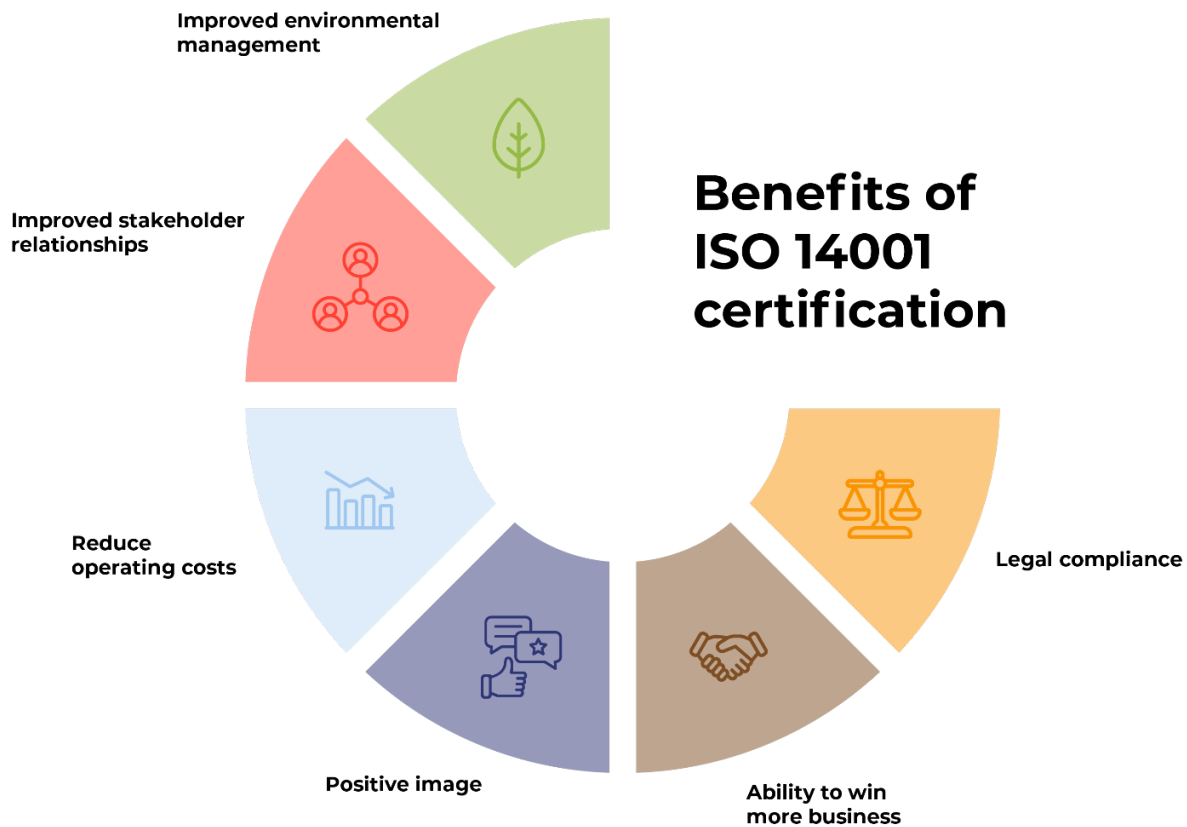
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[9] https://www.iso.org/about-us.html

Figure 5: Benefits of ISO 14001 certification (ISO.org)

The benefits of an ISO 14001 for businesses are:

1. Improved Environmental Management: Ensure that management systematically takes measures to control the company's environmental impact;

2. Improved stakeholder relationships: If you are attempting to expand your business, certifications are a great way to show potential customers, partners or funders that you are taking proactive steps to be responsible

3. Reduce operating costs: Increase energy efficiency and productivity while costs are reduced;

4. Positive image: The company's reputation in the field of environmental protection is attractive

5. Ability to win more business: Encourage better environmental performance by integrating suppliers into business systems

6. Legal compliance: Understand how statutory and regulatory requirements impact the organization and customers.

5. Standard Process Model (SPM)

ValuCred's goal is to establish systemic environmental and social management practices for plastic waste and to create a common language to enhance the global comparability and quality of information on plastic credits thereby, enabling greater transparency and accountability for all participants in the plastic credit market. The key elements of the Standard Process Model (SPM) contain therefore Accounting, Tracking and Documentation, for both, sponsoring companies and service providers.

Accounting	• Measurement of plastic footprint by companies: from assessment to accounting including scope definition • Definition and documentation of the intended short, medium and long-term impacts (social, environmental or economical) • Collection and/or recycling amounts are quantified for a specific service
Tracking	• Financial streams at all levels of the process chain • Traceability of material streams at all levels of the process chain • Clear social, environmental, and economic impact monitoring
Documentation	• Management system approach to ensure that it can maintain its compliance with the requirements of a certain standard • Continuous documentation to prove conformity on collected quantities • Clear social, environmental, and economic outcomes according to SDG monitoring

ValuCred`s SPM defines and connects different voluntary circular activities in one framework that supports the transition to EPR systems (see also Prevent documents: Closing plastic cycles - PREVENT Waste Alliance) and serves as a blueprint to develop further common methodologies and standards in the identified process elements (see Figure 6).
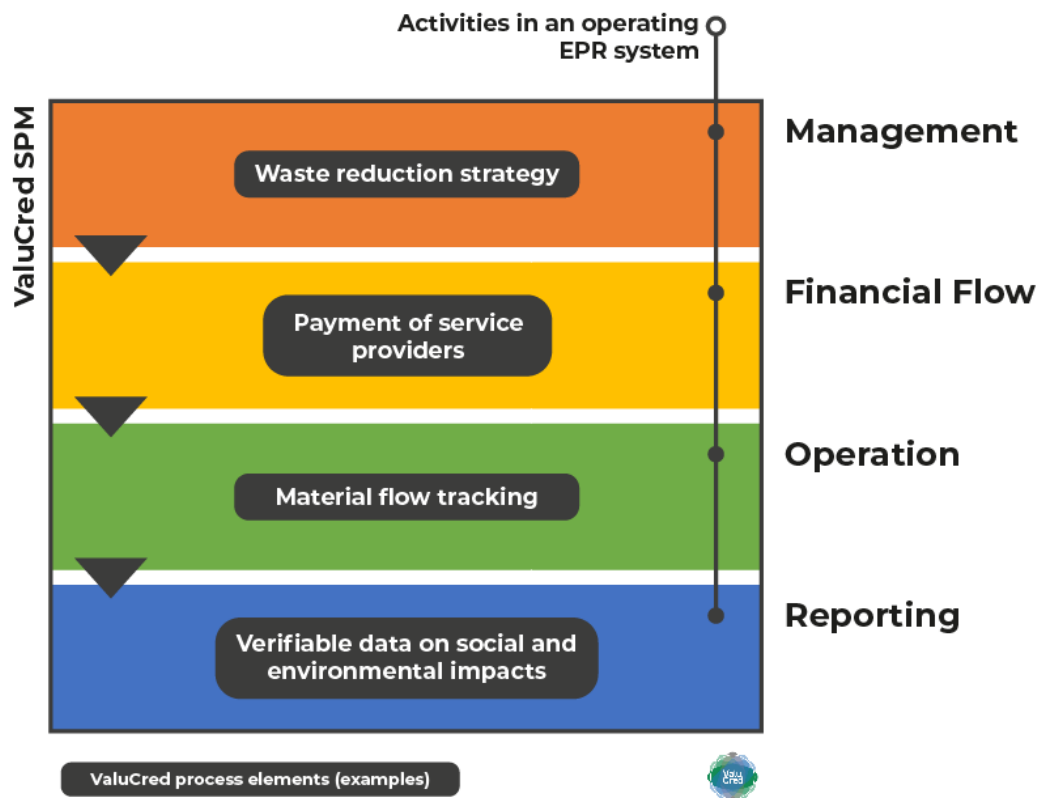
Figure 6: ValuCred SPM as connector between different circular economy activities towards an EPR system

Applying ValuCred's SPM and its integrated internationally recognized global reporting schemes ensures a minimum quality level of the activities in the current plastic credit market. Further benefits are primarily:

- Independency and transparency
- Aligns and connects sponsoring companies and service providers
- Warrants a certain quality level or grade for stakeholders applying the ValuCred SPM
- Includes internationally recognized reporting standards
- Matches HLS of ISO-Standards
- ValuCred translates parts of the SPM into a digital solution

Process Structure

During the development of the Standard Process Model (SPM), four process levels were initially established. Process levels are part of the process model and represent a process hierarchy. Within process levels, similar processes are grouped together and linked to form process chains. The process model represents the overarching main processes in a coherent manner. Each main process has a maximum of three further levels: Part-Processes, Business Processes and Sub-Processes.

The first two levels are understood as a "graphical table of contents", which can be used to allocate through the detailed descriptions within the sub-processes.

Main Process (MP)

Main processes are located in the first and highest process level and represent the overarching thematic areas of a ValuCred project. ValuCred sets out five main processes:

Part Process (PP)

Each main process contains at least one part-process, which is located in the second process level. Part-processes map the next level of detail at the content level.

Business Process (BP)

Each part-process contains at least one business process, which is located in the third process level. At this level, the ValuCred standard defines concrete requirements and tasks that are linked to the HLS under ISO.

Sub Process (SP)

Each business process can contain sub-processes, which are located in the fourth process level. At this level, individual steps of the BP are described, requirements are further specified and the use of the ValuCred digital interface is described.

Aligning the SPM with ISO Standard High-Level Structure

The SPM is basically embedded in the HLS of the ISO management standards, which is used in the ISO standards ISO 9001, ISO 14001, ISO 45001, and ISO 50001. The HLS contains ten common elements:

1. Scope
2. Normative References
3. Terms and Definitions
4. Context of the Organization
5. Leadership
6. Planning
7. Support
8. Operation
9. Performance Evaluation
10. Improvement

It solves the problem of potential redundancy in basic structure for companies wishing to deploy multiple standards. The time and effort saving common structure is used for recurring quality management standard elements. It also allows more specifics to be added for a given area of expertise, i.e., environmental, health, safety. The ValuCred SPM contains specifications for each section of the HLS (see Figure 7).

This allows companies which are already certified against one of the mentioned ISO standards to integrate the SPM in their existing management systems. It enables a central management of the company's sustainability activities in the area of circular economy, as well as the generation of uniform ESG data from different service providers from a variety of countries and regions. For service providers which are mainly covering the operations as collection, treatment and recycling of waste and are not ISO certified, the SPM serves as an orientation guide to the specifications of such a certification. In order to return collected material to the brands' supply chains, compliance with certain standards is mandatory. Compliance with corporate guidelines and international standards also plays an important role in the due diligence process and monitoring of the funds awarded. The SPM can be integrated in existing processes of the service provider, in this way, quality, traceability and transparency can be ensured on the side of sponsoring companies.

Figure 7: Intersecting the SPM with the HLS of ISO Standards

Form Sheets

Form sheets are documents which are assigned to individual process elements at business or sub-process level and build the basis for information and data collection in ValuCred. A process can have several form sheets addressing different topics. They specify the function of a process and contain ValuCred requirements and criteria from GRI, ISO and queries on the SDGs.

The content in the form sheets is implemented in the digital solution of ValuCred (see chapter 7) as data queries directed at different stakeholders and enables the generation of data either by brands or service providers.

SPM Visualization

From chapter 6 onwards, the individual process elements are explained in more detail. Figure 8 shows how the SPM structure, divided into Part-Processes (PP), Business Processes (BP) and Sub-Processes (SP) is visualized and connected with respective requirements of the different standards and the HLS of ISO. This type of visualization is designed for integration into management systems. The sequence of the individual process steps can also be taken from it. In addition, the software-support used in the sub-processes, is also graphically marked. The documentation of criteria in the form sheets is pointed out as well. The main processes can be found in the respective headings of the chapter.
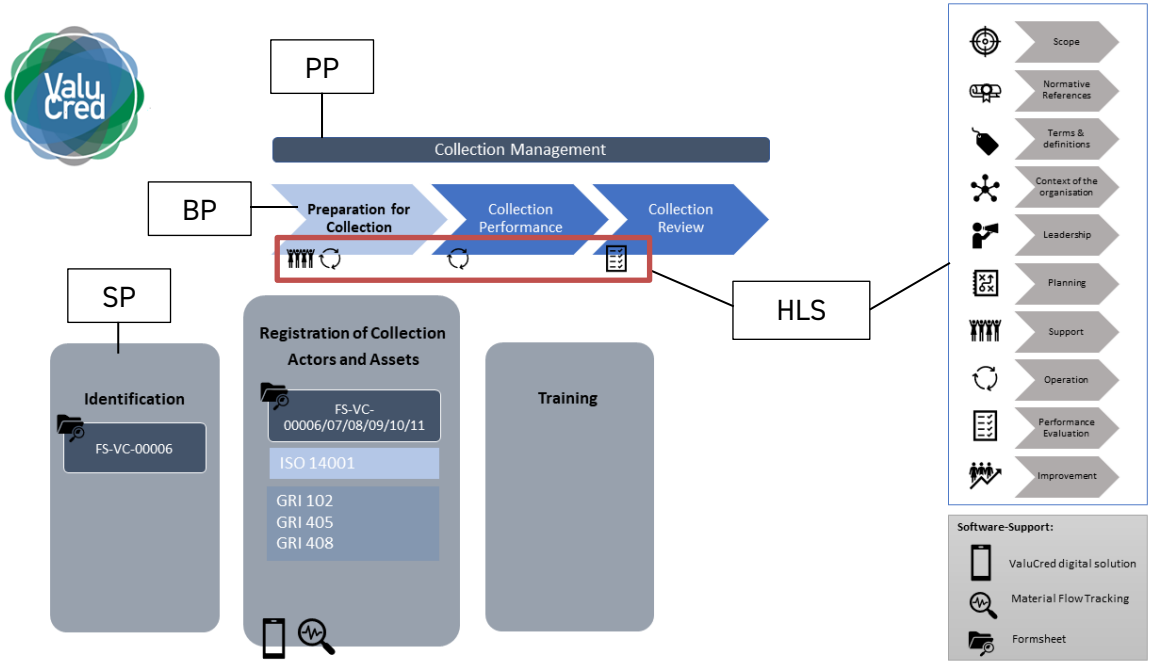

Figure 8: Example of the visualization of ValuCred SPM with its process levels, HLS, digital support systems, form sheets (FS-VC-0000x) and embedded criteria from ISO and GRI with a special level of detail in "BP Preparation for Collection"

The overall SPM divided into different process levels and assigned to the digital solution and form sheets is presented in the appendix.

Another form of visualization of the SPM are the Flow Charts which can be downloaded via Prevent.

6. SPM for Service Providers

Waste management around the world requires sustainable financing and organization. However, in many regions, especially in low- and middle-income countries, both requirements are often inadequately met. As plastic pollution is being recognized as a global problem, many countries have

mandated environment ministries and specialized authorities to work on waste management and therefore implement EPR schemes.

At the same time, increasing public pressure on consumer goods companies which release plastic packaging and products into markets around the world without taking responsibility for its disposal leads to a rising demand from these companies for solutions.

As described in the previous chapters, the emerging voluntary plastic credit market has not yet proven to serve as an impactful tool to improve collection and recycling/recovery of plastic material fractions or create a reliable market for secondary raw materials.

Consequently, to deal effectively with the world's growing waste management challenge, it makes sense to support the transition period towards implemented EPR to reduce the environmental and human health threats and include the informal sector as it plays an active and important role in waste management.

The SPM for service providers serves as a guide for their operations in countries without a functioning EPR system in place. The application of the ValuCred SPM aims to support the acquisition of financing for plastic waste management organizations and their services through the creation of greater transparency and the collection of data on social and environmental impact.

Applying the SPM to individual service provider activities depends on the organization of the existing recycling value chain, its stakeholders and available collection and treatment infrastructure. To ensure accessibility for a wide range of users with differently pronounced technical and organization preconditions, care was taken in the development of the SPM to define universally applicable orientation processes. A part of the SPM is covered in a digital solution (see chapter 7).

The following chapters are structured according to the chronological order of the process steps of the SPM for service provider by MP, PP, BP, SP and contain more information on the design and content.

MP Tendering

Investments in waste management operations and infrastructure should be supported through a tendering process to match the waste reduction targets of sponsoring companies with a service of waste collection and treatment in a country without existing EPR scheme. The sponsoring companies plan and provide a certain budget for taking responsibility of a specific amount of plastic material that is released into a market. This approach does not generate Plastic Credits as transferable units because the sponsoring companies take responsibility for the collection and safe disposal/recycling of a certain amount of waste, which they can use for their sustainability reporting.

Service providers offer their services specifying information about their organization, current operations and under indication of the service price for handling packaging waste (see chapter 0). The service should prioritize to return the collected material into the recycling value chain (locally or internationally). If this option is not available locally, the final disposal at managed landfilling sites is also possible. Cleanups, as individual actions, are not services considered in the tender process because only continuous waste management operation has a systemic impact on the environment.

For a sustainable waste management system, it is important to ensure that ongoing costs are covered continuously. Therefore, sponsoring companies commit to a contractual binding to a service of minimum 1 year as the SDGs assessment is repeated every 6 months and requires at least two loops to evaluate the outcome.

PP Service Provider Set-Up

The registration as service provider, its services stating the costs incurred for the tendering entity, serves to participate in the tender. The information that is provided is the basis for the tendering entity to decide which service is most aligned with the targeted sustainability goals to be eligible for funding.

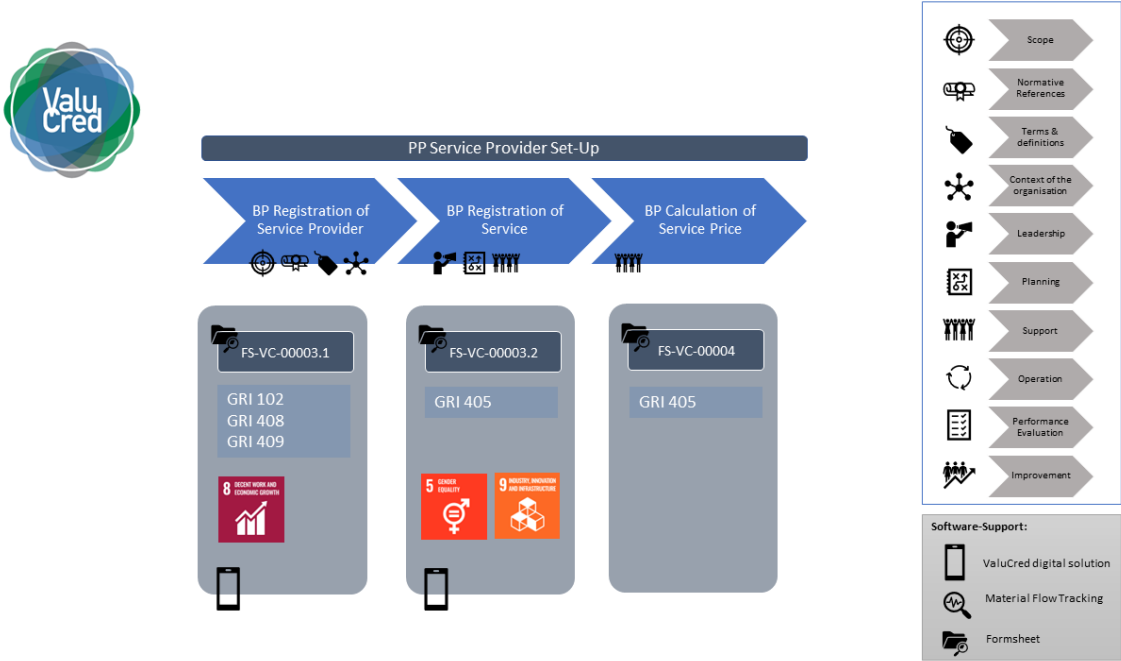*Figure 9: PP Service Provider Set-Up*

BP Registration of Service Provider

The ValuCred registry supports its participants in providing context of the organization and therefore visibility and transparency about their scope of work. It is part of the ValuCred digital solution and contains the query of general information as well as statements to labor rights and living wages.

BP Registration of Service

The service provider can register several services, for example, if they focus on different material flows or take place in different locations. For potential sponsoring companies, the information given by service providers through the form sheets or the digital solution provides details about:

- Operational activities
- Plastic waste quantities and composition differentiated according to polymer types:

    1. *PET*
    2. *HDPE*
    3. *LDPE*
    4. *PP*
    5. *PE*
    6. *PVC*
    7. *Multi-layered plastic (MLP) like Tetra Pak*
    8. *Rubber*
    9. *Resins*
    10. *e-plastics*
    11. *Tyres*
    12. *Others, please specify (if this option is selected, have an option to enter text)"*

- Plastic waste collection and treatment
- External funding
- Monitoring and documentation
- Environmental and social impacts

This ties to "Registration of Service Provider" and enables companies to provide visibility on their circular economy activities, and to substantiate any claims they make on this matter in a fully transparent way.

BP Calculation of Service Price (Tender Price)

Service providers must transparently outline their price calculation (on demand) for the required services according to the VC guiding principles for price calculation (see Figure 10).

The price calculation should refer to the amount of plastic waste that is recovered over a specific period of time through the service. The price can either cover all or specific levels of the value chain, such as collection, transport or treatment and recycling, depending on the location and facilities of the service provider. In case the value chain is split up between several service providers, the sum of the individual prices constitutes the overall price for the complete service.

Any cost for the safe disposal of sorting residues and eliminating other impurities should be included in the overall cost, as well as various overhead costs.

Any revenue generated from sales of treatment or recycling products must be included in the calculation and subtracted from the overall cost.

Required investments into new facilities and machinery are reflected in the tender price through the incurred annual depreciation divided by the degree to which the capacity is utilized to provide the offered service.

The service providers may add a reasonable profit margin on their cost of goods sold to allow company growth.

Payment milestones over the service period should be selected in a way that allows to retain funds in case the services were not provided to the full extend.

Price estimation based on service cost types

Service period		[months]
Material quantity per period		[t]

Collection	Cost type	Total	Note
	Direct material cost		quantity of input materials [t] x cost [€/t]
+	Primary transport cost		specific transport cost [€/km or €/t] x quantity [km or t]
+	Disposal cost		quantity of input material [t] x waste [%] x specific disposal cost [€/t]+transport cost to landfill €/to
+	Material overheads		cost of collection supervisors, documentation tools, etc. x degree of utilization in €/period
=	Cost of materials	- €	

Transport			
+	Secondary transport cost		specific transport cost [€/km or €/t] x quantity [km or t] per period

Treatment			
+	Treatment labour cost		*hours x labour cost €/h or quantity x labour cost €/t*
+	Treatment additives & consumables		*Quantity of additives x additive cost €/t (e.g. binding wire, packaging, etc.)*
+	Disposal treatment residues		*input quantity x %waste x specific disposal cost*
+	Utilities		*quantity of water, electricity, diesel, etc. [n] x cost [€/n] per treated input quantity*
+	Machinery and equipment cost		*total cost (depreciation) per period / total capacity per period x (quantity in period / capacity per period)*
+	Repair and maintainance		*hours [h] x cost [€/h]*
+	Treatment overheads		*supplies, rent, leasing, supervisors, insurance etc.*
+	Special direct cost of treatment		
=	Cost of treatment	- €	

Overhead			
+	Sales/Distribution overheads surcharge		*distribution staff, equipment, others per period*
+	Special direct cost of sales/distribution		*e.g. special provisions per quantity*
+	Administrative overheads surcharge		*admin staff, office cost, licenses, fees, marketing,*

Cost of goods sold			
-	Revenues from sales of recovered material		
=	Cost of goods sold	- €	*Sum of all cost positions*

Profit			
+	Profit margin		e.g. as % from total cost
=	Tender price	- €	
=	Tender price per ton	€/t	

Figure 10: ValuCred Tender Price sheet for Service Providers

MP Operation

The main process *Operation* covers the realization of the tendered service by the service provider and the associated value chain. The entry of valuable data on collection, treatment and recycling as well as on SDG indicators takes place in this process element.

PP Impact Management

BP SDG Assessment

Based on a thorough analysis of the process steps indicated in ValuCred's SPM against the backdrop of the specific targets and indicators of the 17 SDGs, when fully implementing the SPM adhering to its social and environmental criteria, service providers will be able to capture data that allows for a demonstration of contribution to 10 SDGs including a total of 20 target indicators. This potential contribution to the SDGs was validated within the pilot project testing of the SPM with local waste management service providers in five countries.

Figure 11 presents an overview of the 10 SDGs that service providers that apply the ValuCred SPM can contribute to.

Figure 11: BP SDG Assessment

The following overview indicates which specific target of each SDG ValuCred hereby addresses:

1 NO POVERTY — By adhering to the baseline criteria of the SPM, service providers contribute to the eradication of extreme poverty, including access to essential healthcare and basic services. (Target 2 and 4)

4 QUALITY EDUCATION — By applying the SPM, service providers register the proportion of youth and adults with information and communications technology (ICT) skills and access to trainings/education. (Target 3 and 4)

5 GENDER EQUALITY — By applying the SPM, service providers actively enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women. (Target 1 and 5)

6 CLEAN WATER AND SANITATION — Target 2: Under the framework of ValuCred's SPM, service providers foster the access to safely managed sanitation services, including a hand-washing facility with soap and water. (Target 2, 4 and 5)

7 AFFORDABLE AND CLEAN ENERGY — Service providers provide data on the energy supply for their waste processing activities, thereby gathering important baseline data. (Target 2)

8 DECENT WORK AND ECONOMIC GROWTH — Applying the SPM enables service providers to reduce the proportion of informal employment and foster decent working conditions. (Target 6, 7 and 10)

Figure 12: SDG contribution of Service Providers applying the PP "Impact Management" of the ValuCred SPM

BP Preparation for Collection

In order to ensure the quality of the collection and information about the operating value chain, ValuCred implements a preparation phase which incorporates the identification of collection sites, registration of collection actors and assets and training of the stakeholders involved.
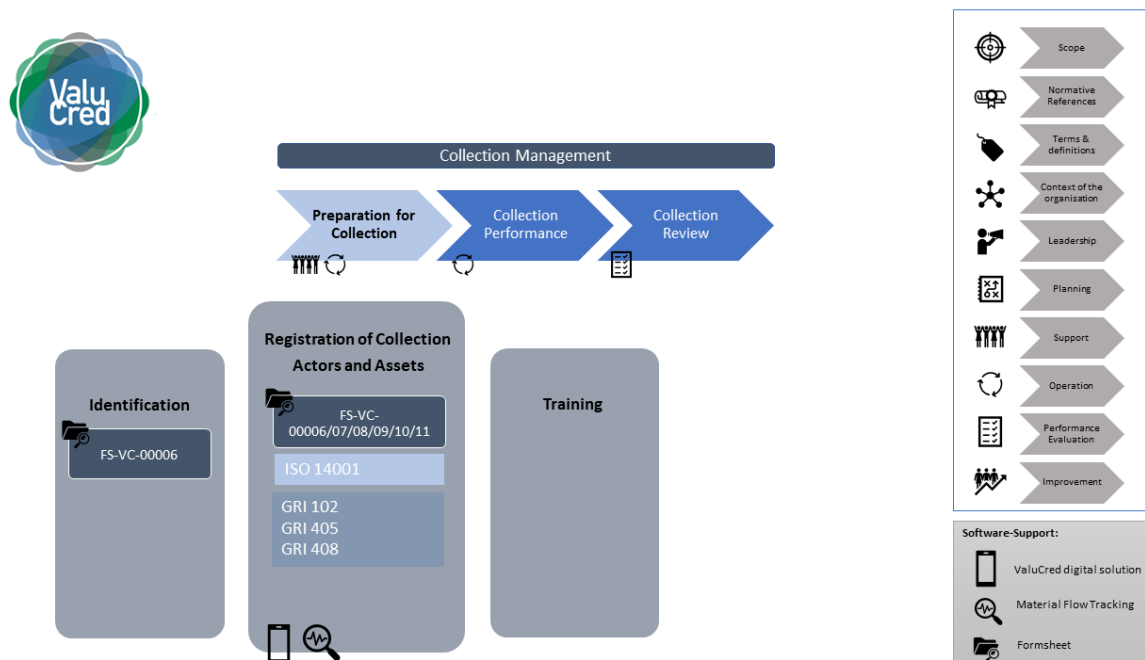

Figure 13: BP Preparation of Collection

SP Identification of Collection Sites

To ensure efficient collection and the greatest possible social and environmental impact, possible collection sites should be evaluated by the service provider. The amount of plastic waste generated should be estimated. Additional criteria are

- Number of waste pickers active in the collection area

- Accessibility of site for collection vehicles

- Distance to next delivery point

- Availability of secure storage facilities for the material

- Collection site approved by local municipality

SP Registration of Collection Actors and Assets

After selecting suitable collection points to source the appropriate material in sufficient quantity[10], the registration takes place. Details about the location as well as the conditions of the current waste management system are requested. Further collection assets that need to be registered are transport vehicles and delivery points/scrap shops. The registry of collection actors includes individual collectors and sub-contractors. The registration of this data takes place via the ValuCred digital solution. The information given in this process step follows criteria from ISO 14001 and GRI standards 102/405/408.

SP Training

To increase the efficacy and efficiency of the local recycling value chain active participation and continuous interaction between the actors involved is significant. Trainings play an important role to ensure that specific challenges and opportunities in the local waste management sector and value chain are addressed. Service providers should make sure that trainings are organized and are appropriate and relevant to the target group. Working with the informal sector puts a special emphasize on accessibility when conveying the content. The costs for training should be included as overhead costs in the calculation of service costs (see chapter 0). Content priorities for a planned training program can be:

- Support in the establishment of the collection system and the technical and operational planning

    1. Assistance in setting up the collection system

    2. Quality characteristics of material

    3. Machine/equipment handling

    4. Health/safety measures

    5. Monitoring and optimization of collection

- Training to use ValuCred digital solution for all actors in value chain and integration of others like Material Flow Tracking solutions

- Development of service-specific awareness programs for waste generators

The trainings can also be commissioned externally.

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[10] Defined through local circumstances
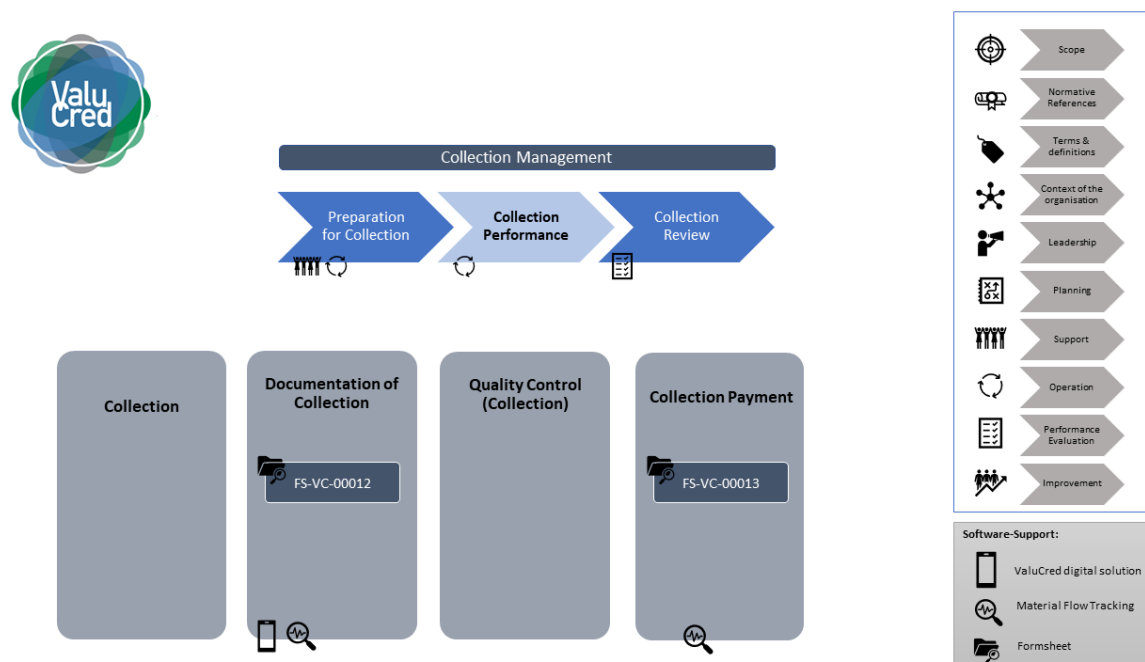
BP Collection Performance

Figure 14: BP Collection Performance

SP Collection

The collection of plastic waste is the core activity to generate environmental and social impact and receive funding from sponsoring companies. The organization and realization of the collection is the responsibility of the service provider. Attention is to be paid to provide employees with appropriate protective clothing and to conduct trainings in the safe handling of large/heavy containers for example, by using sack-barrows, pallet trucks and fork-lift trucks. The service should prioritize to return the collected material into the recycling value chain (locally or internationally). If this option is not available locally, the final disposal at managed landfilling sites is also possible.

SP Documentation of Collection

The service provider needs to record operational data for the purpose to demonstrate the quantity of material being processed by the offered service of plastic recovery. This can be done analog e.g., through book-keeping and/or digitally in tools like Excel or material tracking apps. This provides a transparent record for the service provider, but also for the sponsoring companies and enables analytics about the progress. The data which is collected by service providers needs to be standardized to enable a consistent evaluation for sponsoring companies. Form sheet FS-VC-00012 of the SPM defines following minimum data dimensions for the documentation of the collection:

- Name of collector / sub-contractor
- Collector ID number
- Date *(XXXX.MM.DD)*
- Delivery point name
- Collection site

- Material type

- Weight of material in kg

- Verifiable documentation of material type and weight

SP Quality Control (Collection)

If the collection is carried out by the service provider and its own employees or by sub-contractors and informal waste pickers, care must be taken to inform the collectors in advance in detail about the quality requirements. To verify that the delivered quantities meet the quality requirements of the service provider, they must be checked on receipt of material. Particular attention must be paid to the proportion of impurities as non-recyclable plastic types and products as well as compliance with other quality agreements between the service provider and the collector.

SP Collection Payment

Enabling sponsoring companies to integrate the management of plastic waste pollution into the core of their management systems, thereby moving away from plastic pollution being tackled via isolated projects and corporate social responsibility (CSR) activities is the core purpose of the SPM. Funding plastic waste collection and treatment activities on a larger scale requires not only radical transparency to the generation and valorization of service prices (see chapter 0) but also the documentation of distributed funds (analog, via banking receipts, use of mobile money, use of digital solution which registers collected material and have mobile money function integrated) to ensure that all stakeholders from the plastic value chain receive a payment to ensure living wage based on GLWC.

Including informal collectors requires special engagement from the side of the service provider to pay directly upon delivery of the material and document each transaction of payments. The captured information of payments should include:

- Name of collector / sub-contractor

- Collector ID number

- Date *(XXXX.MM.DD)*

- Payment period

- Material type

- Weight of material in kg

- Purchase price of material (cost per kg)

- Amount to be paid

- Documentation of payment (e.g., picture of receipt with consecutive numbering, mobile money transaction, etc.)
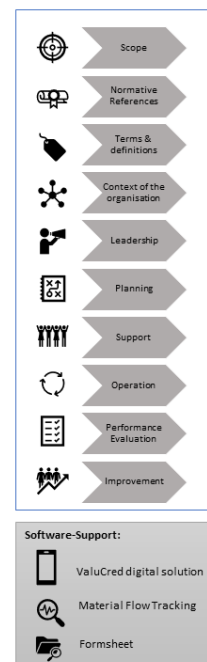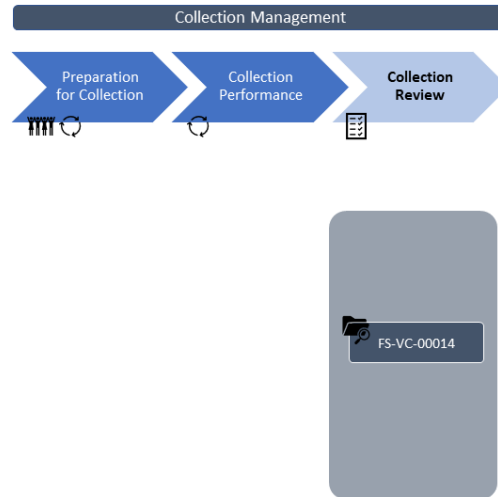
BP Collection Review

Figure 15: BP Collection Review

The process „Collection Review" is a repetitive monitoring process for service providers to check the quality of the collection and determine areas for improvement. This may include, for example, increasing efficiency by changing pickup routes and times or the expansion of the collection area to increase the quantities.

To measure the effectiveness of the collection, real data on operations is required (see *SP Documentation of collection*).

PP Treatment Management
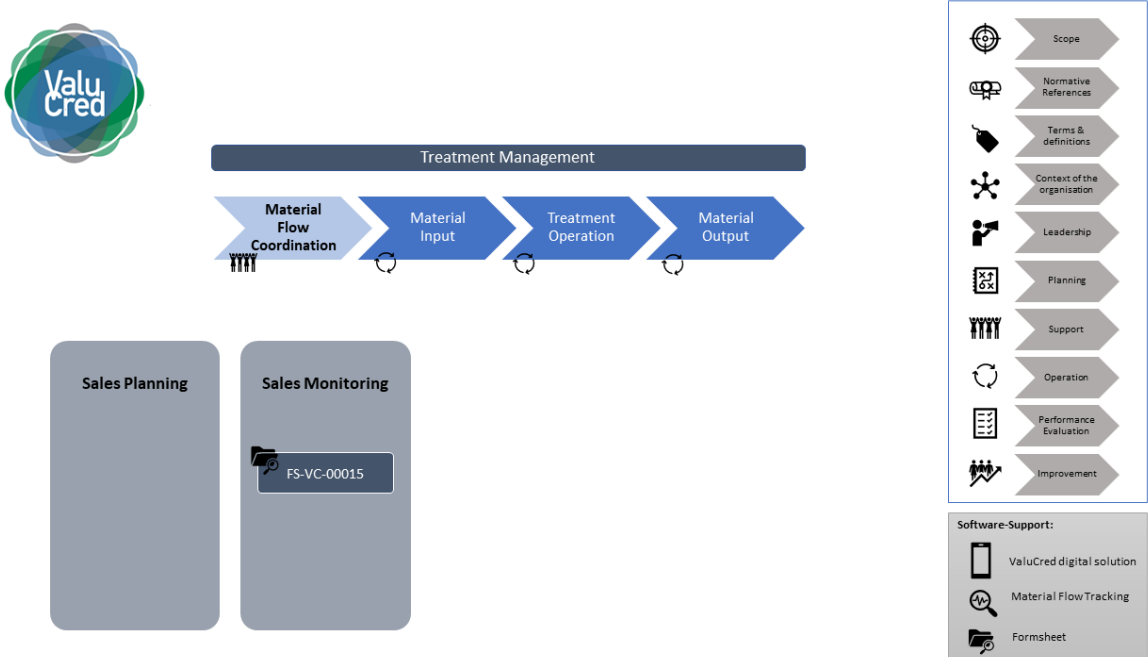
BP Material Flow Coordination

Figure 16: BP Material Flow Coordination

SP Sales Planning

The process "Sales Planning" is an essential process element to establish sustainable supply chains for the collected material. This can be achieved by setting up either contracts or framework agreements covering quality and traded amounts of a specific type of plastic material in a commonly agreed period of time. Both partners should also check if they are complying with local/national standards or applicable legislation for the trading. If required, they should also check if certification of the trading partner is needed.

Online marketplaces and apps designed specifically for trading recycled materials such as recycled plastics can be a helpful support tool for service providers to offer their collected or already treated/recycled materials locally and internationally.

SP Sales Monitoring

The process "Sales Monitoring" is a repetitive process ensuring the transparent and correct documentation of the traded material amount in the value chain. The documentation of the traded amount should be, in case of transboundary shipment, in line with the requirements specified in the Basel convention "Plastic Waste Amendment" and supporting documents.

The documentation of national/locally traded material has to provide the same type of data and have to use an unique identifier tracking system that avoids double counting of materials. The buyer of the material should work in line with the applicable recycling standards for the type of material.
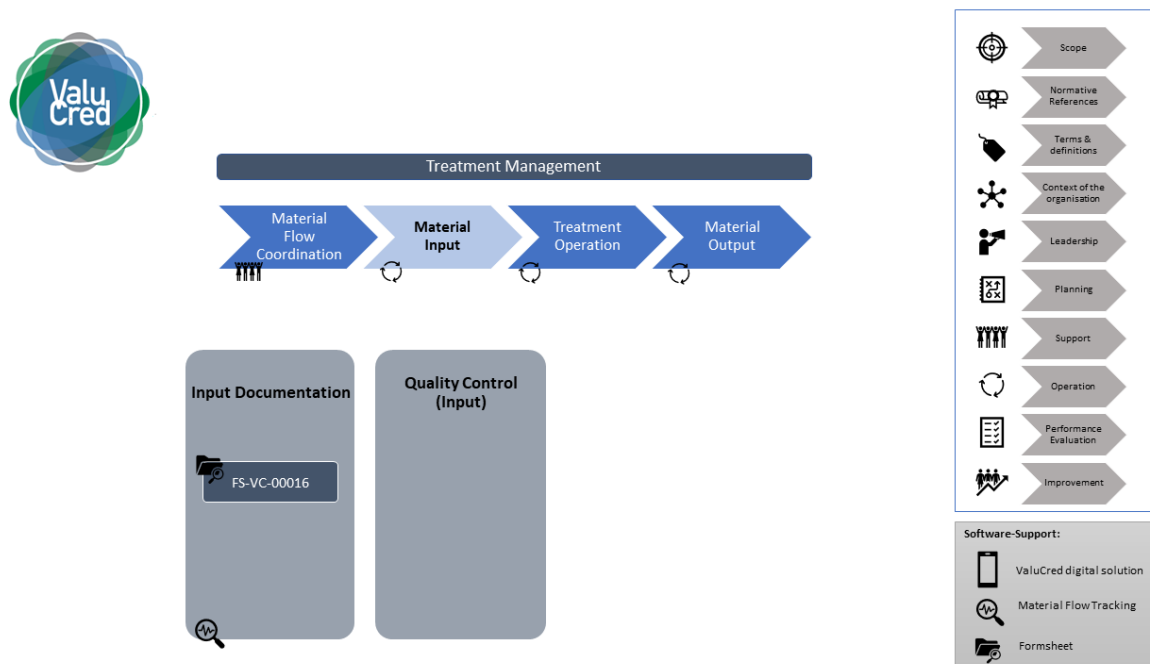
BP Material Input

Figure 17: BP Material Input

SP Input Documentation

The participants and their scope of work in the value chain can be executed quite differently. For example, if the material is processed elsewhere than at the first delivery point where the collected material has already been registered, the material must be recorded and documented again. The procedure is similar as in *SP Documentation of Collection*.

SP Quality Control (Input)

Before the treatment of the plastic waste, a quality control of the material should be carried out. This can also be seen as a smooth transition into sorting with identification and separation of impurities such as

- Non-plastic material
- Non-recyclable plastics
- Contaminated plastics

For the respective subsequent treatment processes, it may also be important to separate by color in addition to separation by plastic type (e.g., PP, PE, PET, PS, PA, MLA…)
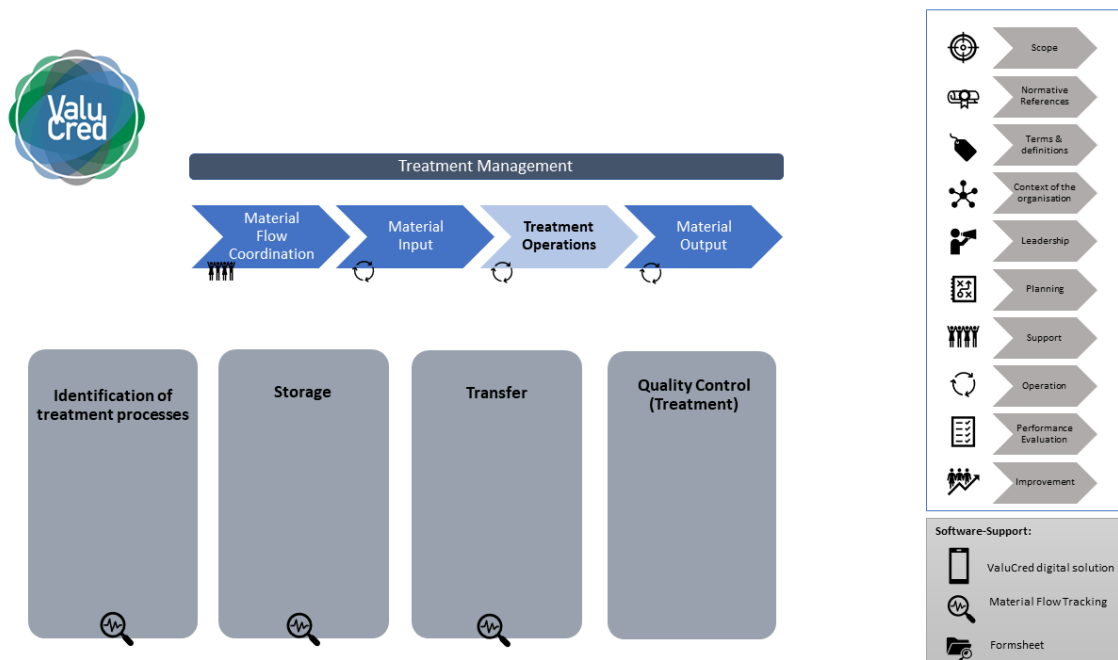
BP Treatment Operation

Figure 18: BP Treatment Operation

SP Identification of treatment processes

The common steps for mechanical recycling involve material sorting, washing, cleaning, size reduction, drying, thermal melt-extrusion and pelletizing. However, the process selection results from availability of machinery and equipment, operational costs compared to the increase in the recoverable selling price and agreements with the next stakeholder in the recycling process chain about material qualities.

SP Storage

After the treatment process, plastic material in shredded or baled form should be stored on clean concrete floors. In addition, care should be taken to ensure that there is sufficient space for handling equipment and exit paths. Storage, indoor or outdoor requires a fire-prevention system. If plastic waste is stored outdoors, it should be protected from weather damage, contamination as dust and dirt, which can be avoided by using pallets and other protection. The exposure to ultraviolet light causes deterioration of the recycling properties of the plastic material. A covered outdoor storage area or other UV-protective material is therefore necessary. To reduce the risk of bales moving or falling, stacking should be strictly limited in height (e.g., no more than 3 bales high for standard bale dimension) (Basel Convention, Technical guidelines).

SP Transfer

In direct collection, the waste is taken directly from the point of collection to the final destination. This is typically the case with roll-off containers or with compaction trucks, where bins are emptied into the truck, until it is full. Then the truck directly takes the material to the final destination.

In multi-stage collection, the waste is typically picked up by a smaller vehicle, e.g., a tricycle. These vehicles have the advantage of increased maneuverability in narrow and densely populated areas. However, their capacity is low. Therefore, to minimize transport costs, the material can be loaded into a vehicle with a larger capacity. Once this vehicle is completely full, it can then transport the waste over a greater distance, thereby minimizing the transport time and cost per unit of material. The stages might also be split between daytime and nighttime collection to avoid the most severe traffic congestions.

SP Quality Control (Output)

Before selling the material, the employee should visually inspect the quality and release it for weighing.

If the employee detects a poor quality (e.g. due to a high proportion of impurities), the management of the treatment facility should be informed. It could lead to a correction of the waste type and recording of interfering substances with subsequent consultation with the buyer.

If the inspection shows no quality deviations, the material may be weighed and prepared for sales.
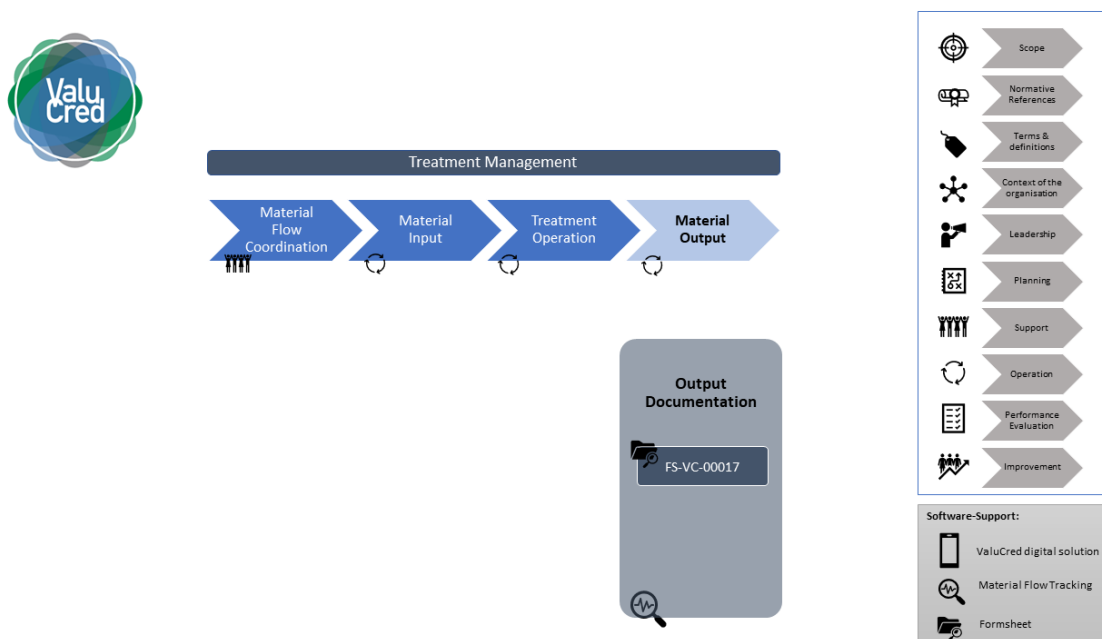
BP Material Output

Figure 19: BP Material Output

SP Output Documentation

Weighing of material output after treatment and quality control is the last step before selling it further upstream along the recycling value chain.

The captured information of Output Documentation should include:

- Name of Service Provider Organization/Treatment facility

- Material type

- Weight of material in kg

- Transport vehicle license plate

- Date *(XXXX.MM.DD)*

- Name of purchaser/recipient of material

Material that is not recyclable and therefore not sold to the next stakeholder in the value chain but transported to its final disposal site needs to be documented as well.

MP Reporting

While the MP Operation is mainly carried out by the service provider, the MP Reporting is another connector between the service provider and the sponsoring company. According to the SPM, the sponsoring company sets its own collection and recycling quotas starting from the measurement of its own plastic footprint in a specific market. Matching services are then selected in the tendering process to fulfill these targets and receive funding for its implementation.

The application of the SPM and its digital interface for service providers leads, as described in the previous chapters, to the generation of operational performance and ESG-relevant data during the realization of the service. This data can ultimately be used for reporting purposes by sponsoring companies. The ValuCred structure of the reporting information provided by service providers is shown in Figure 20.
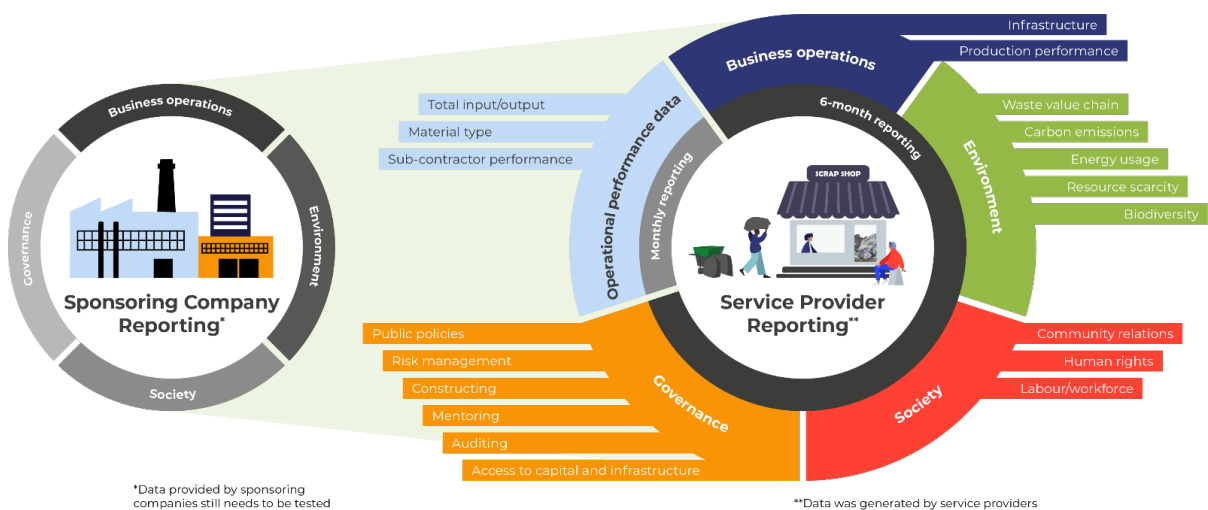

Figure 20: Service Provider Reporting Structure applying the ValuCred SPM

The full reporting structure of sponsoring companies while applying the full scope of the SPM has yet to be tested.

The part-processes about *Monitoring and Verification* and *Validation and Reporting* indicate how service providers (and sponsoring companies) should assess the data to provide reliable information before using it in the report.
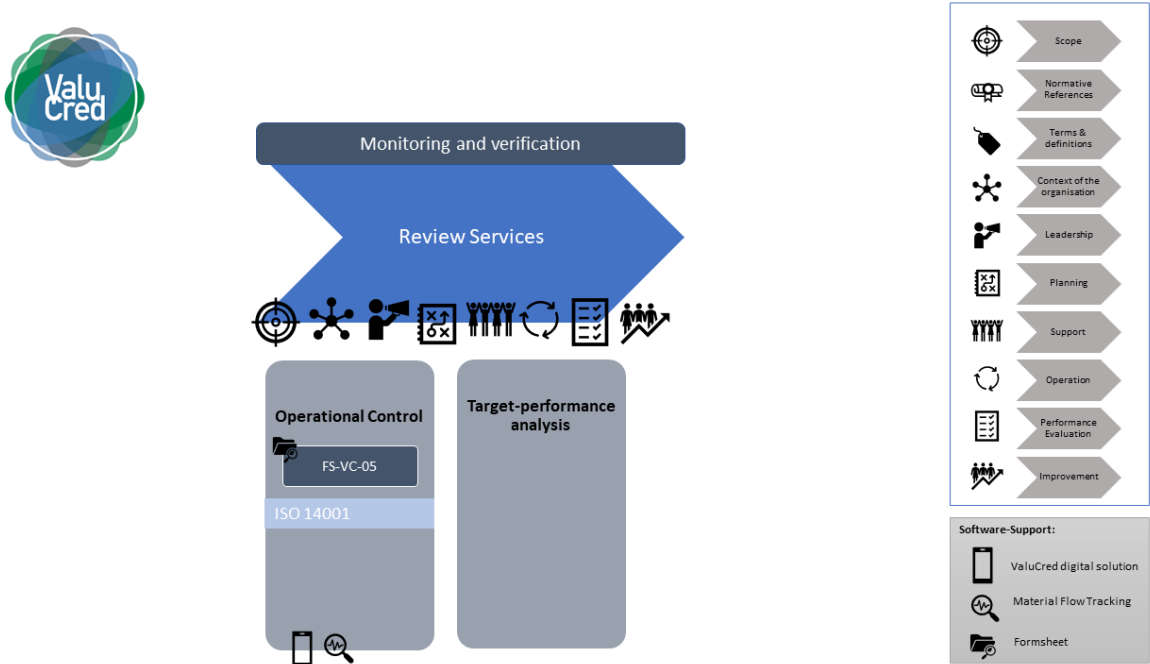
PP Monitoring and Verification

Figure 21: PP Monitoring and Verification

For reporting purposes, the service provider organization must maintain all the data records and receipts that incurred during operations. On the one hand, the service provider uses it to check and evaluate its own accounting and documentation, and on the other hand, it should be made available to the sponsoring entity for inspection. This enables both stakeholders to monitor the activities connected with the funding.

The SDG assessment (see chapter 0) has to be repeated every 6 months for monitoring purposes.

The collection of operational data takes place continuously and should be monitored by the service provider in a concurrent manner to ensure the quality of the recorded data and specifically, the quantities of plastic material collected and treated.

PP Validation and Reporting

The SPM enables service providers and sponsoring companies to seamlessly integrate activities in the areas of circular economy in their business processes and integrated management systems. When the SPM is applied as previously described, information and data is collected in a transparent manner and made available for evaluation by both stakeholders.

Figure 22: PP Validation and Reporting

The validation of operational data can be done through checking of documentation or pictures of collected material, weighting slips, loaded outgoing and incoming trucks. Using ValuCred's digital interface, the contribution to SDGs and the conformity with ISO 14001 and GRI's is captured through questionnaires, which are again queried bi-annually to evaluate the development.

The transparency improves the reliability of monitoring processes and control mechanisms and leads to more efficiency in the areas of governance, risk and compliance management on the side of sponsoring companies.

After validation of the information, gathered through the application of the SPM, it can be used for non-financial reporting.

The report for service providers contains information on:

- Business Operations
- Environment
- Social
- Governance

The service provider report by ValuCred summarizes its operations and supply chain. It helps the service provider in decision making processes and identifying potential areas of improvement. In addition, for the service provider their environmental, social and governance performance is shown, that intents to help to improve its service management and access to funding by sponsoring companies.

An exemplary report with detailed content can be downloaded via Prevent.

MP Improvement

Continual improvement is one of the most important principles in any quality management system and is listed as the tenth and last element in the HLS of ISO. Therefore, it is also included in the SPM as a main process which closes the cycle, integrating the learning generated by following the process chain, which can be used to adjust the efficiency of the value chain. Potential areas of improvement can be identified by the service provider by reviewing the operational data about collected, treated, and recycled material and the contribution to the SDGs. Improvement cycles vary from a small-scale experiment to a larger implementation plan. For effective improvement across the entire organization into the value chain basic principles of gradual improvement should be applied. This means to constantly improve the proficiency and effectiveness of all processes and therefore the service itself. It helps to establish measures and objectives to guide and track improvements through monitoring and reporting, which aims to provide data on the success and potential areas for improvement that are found throughout processes in the organization. Recognizing and acknowledging improvements within the organization and making the results public can motivate all stakeholders in the value chain for further improvements over the long-term.

7. Digital Solution

ValuCred digital solution

Content and Scope for all stakeholders

In order to the support and test the SPM, a digital solution in the form of a web-based application was developed. The purpose of the digital solution is to allow service providers to track their service-related data and socio-economic parameters based on SDGs for all involved stakeholders/users. The digital solution serves as a mechanism to track and report waste management data such as collected waste quantities, composition, processing steps, and socio-economic aspects. Furthermore, the app also requires and allows Sponsoring Companies to register providing information related to relevant GRI and ISO criteria. These criteria include socio-economic commitments, scope of EPR, Corporate Social Responsibility (CSR) implementation, and social and environmental impacts.

The digital solution has been developed in a way such that stakeholders from across the entire value chain are taken into consideration in line with the processes defined in the SPM. The digital solution aims to provide a solution to aggregate and analyze data related to Service Providers, associated stakeholders such as sub-contractors, waste collectors, transporters, aggregators, and scrap shops, and Sponsoring Companies. As shown in Figure 23, users of the ValuCred digital solution can be broadly categorized into three types: (i) primary service providers – the entity responsible for the administration of a particular service, (ii) secondary service providers – all other stakeholders, including scrap shops/delivery points, transporters, sub-contractors, individual waste collectors, and aggregators/collection points, involved in service operations, and (iii) brand owners/FMCG companies. Figure 23 illustrates the sign-up options for Service Providers and Sponsoring Companies in the digital solution. Sponsoring Companies must select the option "Looking for Service" in order to register on the app.
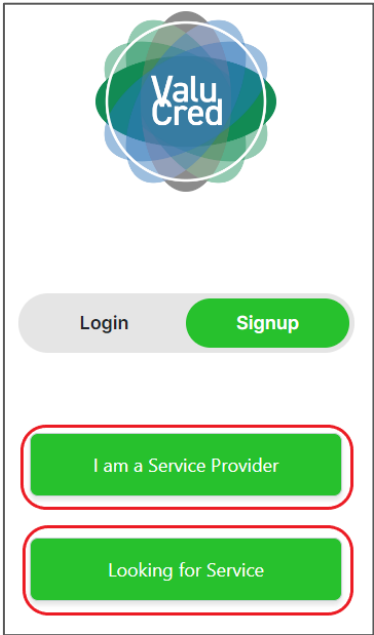

Figure 23: Sign-up options for Service Providers and Sponsoring Companies in the ValuCred digital solution.

Within the category of service providers, Figure 24 illustrates the various stakeholders involved. Waste collected by individual waste collectors and/or sub-contractors will be transported to either scrap shops or aggregators. Segregated plastics may further be transported from scrap shops to a collection point or aggregator. The Service Provider is the organization that is responsible for the operations of the entire Service.

Individual waste collectors
Transportation
Sub-contractor

Delivery point/scrap shop
Collection point/aggregator

Service provider

Figure 24: Role of stakeholders in standardized service provider value chain.

Data inputted on the ValuCred app serves as a mechanism to ensure that the SPM is being upheld and also to allow users to readily access information related to service operations. Service Providers can view and export all data related to their services including participants in service operations, registration information for these participants, material tracking or service operational data, and responses to questions on socio-economic aspects. Users involved in service operations can also view and track operational data generated by them such as collected plastic waste quantities, types, etc.

The SPM elements utilized in the development of the digital solution are shown below in Table 1.

Table 1: Linkage between SPM and digital solution in the case of Service Providers.

SPM Element	SPM – Digital Solution Linkage	Required Stakeholder	Digital Solution
Tendering	Registration of Service Provider	Service Provider	ValuCred
	Registration of Service		
	Calculation of Service Costs		
Operation	SDG Assessment	Service Provider (incl. aggregators, scrap shops, waste collectors, etc.)	
	Registration of Collection Sites/Aggregators	Collection Sites/Aggregators	ValuCred/ Material tracking app
	Registration of Delivery Points/Scrap Shops	Delivery Points/Scrap Shops	
	Registration of Transportation	Transport Vehicles	
	Registration of Sub-Contractors	Sub-Contractors	
	Registration of Individual Collectors	Waste Collectors	
	Documentation of Collection	Service Provider (incl. aggregators, scrap shops, waste collectors, etc.)	

The criteria utilized in each form sheet from the SPM was adapted in the form of a relevant question or a statement which would require a response from either the ValuCred administration, service providers, or FMCG companies depending on the context. An example is shown below in Table 2.

Table 2: Example of adaptation of form sheet to digital interface.

2.1.2 REGISTRATION OF SERVICE				
Reference	Criteria	Response required	Formsheet reference	Required stakeholder
SDG 9.1	How are your operations funded?	(Select multiple options) i. Privately funded ii. Publicly funded iii. Private and public funding iv. Foreign Direct Investment (FDI), please specify investing country (if this option is selected, have an option to enter text) v. Official Development Assistance (ODA), please specify donor country: (if this option is selected, have an option to enter text)	FS-VC-00003.2	Service provider
GRI 405 - 2	Please provide the percentage of male and female workers in your organization.	i. Male workers: Numerical value input ii. Female workers: Numerical value input	FS-VC-00003.1	Service provider
GRI 405 - 1a SDG 5.5	Please enter the percentage of individuals in a managerial position within the organization in each of the following diversity categories:	i. Gender (a) Male: Numerical value input (percentage) (b) Female: Numerical value input (percentage) ii. Age group (a) Under 30 years old: Numerical value input (percentage) (b) 30 - 50 years old: Numerical value input (percentage) (c) Over 50 years old: Numerical value input (percentage)	FS-VC-00003.1	Service provider

		iii. Other indicators of diversity where relevant (e.g., minority or vulnerable groups): Text/numerical value input		

Table 2 shows an example from the SPM-element "2.1.2 REGISTRATION OF SERVICE" which refers to the business process form sheet from which the criteria and subsequently, the questions have been extracted. Questions have been formulated based on the relevant ISO, SDG, and GRI criteria. The business and sub processes have also been indicated wherever applicable throughout the digital solution to enable users to understand to which part of the SPM they are responding to. The questions have then been further split into categories depending on which part of the interface will host the relevant questions. These categories include:

1. Registration of service provider
2. Registration of service
3. Registration of sponsoring companies
4. Baseline and outcome questions for service providers and FMCG companies
5. Registration of other stakeholders (delivery points, informal sector waste collectors, logistics providers, sub-contractors, etc.)
6. Operational data to be imported from material tracking software

Technical Details of Digital Solution

The digital solution is designed in a way such that minimal usage is required apart from registration of users and services. After registration, users can use the app only for upload of service operational data and responding biannually to socio-economic related questions. The app can work on all smartphones and offers limited offline usage capabilities. Collected data are stored securely on servers with access to data export granted only to the ValuCred administration and the primary Service Providers. Data can be exported in the form of a structured Excel file while users can view their operational data on the app itself.

Essentially, the digital solution has the potential to capture the plastic waste value chain from collection to the end user with periodic data reporting, continuous waste tracking, and verification of collected waste quantities. Figure 25 below shows the structure of the ValuCred app with respect to the different users. The baseline and outcome questions refer to questions that must be answered by users at the start of a service and then periodically every 6 months. These questions pertain to the progress of service operations and socio-economic data of Service Providers. In terms of service operations, service providers can use third-party material tracking software and upload the data in a pre-defined format to the ValuCred app.

Figure 25: Proposed structure of digital interface for ValuCred.

Overview of existing digital platforms

A total of 67 existing digital solution providers were identified and categorized based on their primary function. These functions include: (i) connecting and mapping supply chains, (ii) identification, mapping, reporting, and data collection, (iii) improving efficiency in waste management operations, (iv) plastic credits, rewards, and traceability, and (v) plastic waste collection. For each digital solution, the primary and secondary functions were also outlined. As shown below in Table3 and Figure 26 categories were identified in the category of interest "Plastic credits, rewards, and traceability." This category consisted of digital solutions (i) operating using a points system rewarding users for adopting sustainable waste management practices, (ii) offering material flow tracking provisions, (iii) selling and certifying plastic credits, and (iv) offering information on waste collection points. While several platforms offered material flow tracking capabilities and plastic credit certification, there appeared to be a lack of tracking of socio-economic data. Furthermore, only 9 of the 26 identified digital solution providers operated globally while the remainder operated only in their home countries. The ValuCred digital solution attempts to offer solutions to these issues.

Table 3: List of identified digital solution providers in the category of "Plastic credits, rewards, and traceability."

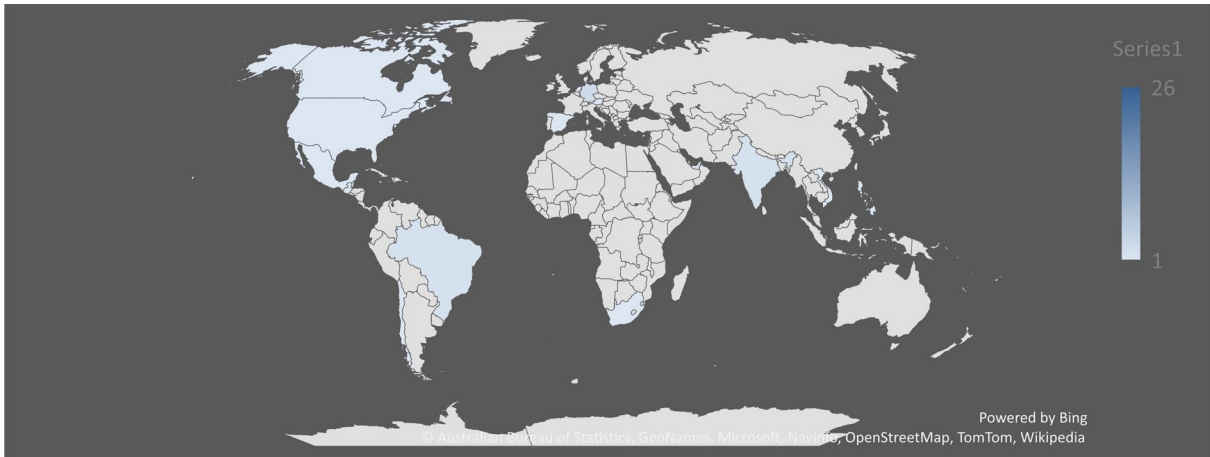|	
Austria	**1**
Recyclemich	1
Brazil	**2**
Eureciclo	1
GreenPlat (Plataforma verde)	1
Canada	**1**
Recycle Everywhere	1
Chile	**1**
Reciclapp	1
Germany	**3**
CleanHub	1
Plastic Fisher	1
The Fortunate Planet	1
Guatemala	**1**
ecoins	1
India	**2**
Recycle Rewards	1
Swachcoin	1
Mexico	**1**
Ecolana	1
Netherlands	**1**
Circularise	1
South Africa	**1**
Regenize	1
Spain	**1**
ReciclaYa	1
Vietnam	**1**
Tontoton	1
Global	**6**
Empower	1
Plastics for Change	1
plastiks	1
Recereum	1
RePurpose	1
Vastum	1
United States	**1**
Recyclebank	1
United Arab Emirates	**2**
RECAPP	1
Zeeloop	1
Philippines	**1**
Plastic Credit Exchange	1
Grand Total	**26**

Figure 26: Country-of-origin of identified digital solution providers.

8. Summary

The ValuCred SPM was developed using globally recognized and widely spread standardization for managing, reporting and impact measuring: ISO 14001, GRI reporting standards and the United Nations' SDGs. The SPM itself is a framework that values both social and environmental performance indicators. It provides an opportunity to connect different stakeholders in an international cross-sectoral environment between EPR and Plastic Credit Markets as it supports transparency of the process chain. Service provider benefit from the SPM as an orientation aid for their daily operations. Providing information and data about their organization and services as well as environmental and socio-economic impact meets the requirements of potential sponsoring companies looking for sustainable investment opportunities in local waste management. The SPM should therefore enable funding for infrastructure and payments for the services of informal, semi-formal or formal service providers in solid waste management and ensure payments to achieve living wages.

In summary, the connector function of ValuCred's SPM supplies service providers with the tools to understand the needs of sponsoring companies and the knowledge to apply global standardization. On the other hand, sponsoring companies receive accountable data already in the format of recognized norms.

Moreover, the SPM serves as a blueprint and guideline for stakeholders in the Plastic Credit market for developing common solutions and agreements on core challenges, for example by:

- Discussing terms & definitions

- Using the SPM as a "landscape" to map different platforms and digital solutions

- Developing a common understanding of

    - core elements of the value chain

    - minimum data dimensions and data points

- Supports interoperability between digital solutions

The digital solution of ValuCred, in the form of a web-based application, serves to present the SPM in a usable form to the relevant stakeholders. The primary functions of the digital solution are:

1. To allow Sponsoring Companies and Service Providers to provide information related to their respective organizations' operations based on questions deriving from globally recognized ISO, GRI, and SDG criteria.

2. To aggregate, and analyze data entered by relevant stakeholders related to relevant organizational structures, socio-economic parameters, and service operational data/material flow tracking data

3. To identify and register secondary Service Providers that are associated in the operations of a particular Service

4. To aggregate and view material flow tracking data in a pre-defined format gathered from the utilization of third-party apps by Service Providers

Data entered by stakeholders into the digital solution can be utilized to generate reports (see exemplary ValuCred ESG report for download via Prevent) and valuable insights for users.

For the SPM to be fully applicable and deploy the connector function, the SPM for sponsoring companies needs to be tested with interested brands.

9. Appendix

The overall SPM divided into different process levels and assigned to the digital solution and form sheets:

Part process (PP)	Business process (BP)	Sub process (SP)	Digital Solution	Form Sheet
MP STRATEGIC ALIGNMENT				
PP Leadership commitment / Management approach	Registration of General Information	/	ValuCred	✓
	Check Legal Context including ILO convention	/	ValuCred	✓
	Implement Corporate Social Responsibility	Commitment to EPR	ValuCred	✓
		Commitment to GLWC		✓
PP Scope of Extended Producer Responsibility	Define Packaging Material Consumption	Definition of Scope of Organization	ValuCred	✓
		Definition of material topic		✓
	Implement Waste Reduction Strategy	Set Plastic Recovery Goals		✓
		Set specific Targets		✓
	Stakeholder Engagement	Determine interested parties		✓
		Publish invitation to tender		/
MP TENDERING				
PP Service Provider Set Up	Registration of Service Provider	/	ValuCred	✓
	Registration of Service	/		✓
	Calculation of Service Price	/		✓
PP Service Matching	Tender Services	Derive tender conditions and selection criteria	/	/
		Issue tender	/	/
	Evaluate Service Providers and Services	Check offers	/	/
		Award contracts	/	/
		Publish winner	/	/
	Allocate target equivalent	/	ValuCred	✓
MP OPERATION				
PP Impact Management	Empowerment	/	/	/
	Capacity Building	/	ValuCred	✓
	SDG Assessment	/	ValuCred	✓
PP Collection Management	Preparation for Collection	Identification	/	✓
		Registration of Collection Actors and Assets	ValuCred/ External Tracking App	✓
		Training	/	/
	Collection Performance	Collection	/	/
		Documentation of Collection	External Tracking App	✓
		Quality Control (Collection)	/	/
		Collection Payment	External Tracking App	✓
	Collection Review	/	/	✓
PP Treatment Management	Material Flow Coordination	Sales Planning	/	/
		Sales Monitoring	/	✓
	Material Input	Input Documentation	External Tracking App	/
		Quality Control (Input)	/	/
	Treatment Operations	Identification of treatment processes	External Tracking App	/

Part process (PP)	Business process (BP)	Sub process (SP)	Digital Solution	Form Sheet
		Storage		/
		Transfer		/
		Quality Control (Treatment)	/	/
	Material Output	Output Documentation	External Tracking App	/
MP REPORTING				
PP Monitoring and verification	Review Services	Operational control	ValuCred/ External Tracking App	✓
		Target performance analysis	ValuCred	/
PP Validation and reporting	Annual Reporting	/	ValuCred	✓
MP IMPROVEMENT				
PP Improvement	Analyze results and check plastic footprint	/	/	/
	Analyze results and update reduction strategy			
	Increase efficiency			