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From Sustainable Consumption and Production to Circular Economy in the Plastics and Building Sectors

Analysis of SWITCH-Asia Grant Projects

Acknowledgements

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The SWITCH-Asia Programme

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ABBREVIATIONS

AI	Artificial Intelligence
CDW	Construction Demolition Waste
CE	Circular Economy
EE	Energy Efficiency
EPR	Extended Producer Responsibility
EU	European Union
GHG	Greenhouse Gas
MSMEs	Micro-, Small- and Medium-sized Enterprises
R&D	Research and Development
RECP	Resource Efficiency and Cleaner Production
SCP	Sustainable Consumption and Production
SMEs	Small and Medium-sized Enterprises
SUP	Single Use Plastic

EXECUTIVE SUMMARY

The current linear model of take-make-waste is not sustainable in the long term, as pressures from the triple planetary crisis (pollution, climate change, biodiversity loss) and natural resource use continue to mount. A new and circular model is needed for the thriving of current and future generations. The concept of a circular economy implies the adoption of a regenerative model, which uses processes that restore, renew or revitalise their own sources of energy and materials and creates as little waste as possible. The transformation of a sector towards circularity requires suitable materials and processes, using design and technologies that enable resource efficiency and do not cause negative impacts on the environment, ecosystems and human life. Innovation in new business models, enabled by incentives and legislative frameworks that aim at circularity are just as important.[1]

SWITCH-Asia is the largest and longest-running programme of the European Union in Asia on Sustainable Consumption and Production (SCP) in the region. Inter alia, the programme supports grant projects in several sectors including plastics, buildings and construction, agrifood, and tourism. Circular economy approaches are a key strategy which SCP endeavours target. As a part of efforts in assessing the types of strategies and business models used by grant projects from different sectors, this circular economy assessment was conducted on two sectors: plastics and buildings.

This report presents an overview of selected grant projects impacts, and analyses important implementation aspects as well as proposes recommendations on future projects enabling a circular economy.

For the plastics sector, assessed grant projects still largely revolve around “end-of-life” solutions of plastics, mainly packaging and other single-use plastics. They focus on the “product use” and “post-consumption” stages, typically waste management, i.e., plastic collection, sorting and recycling, mostly downcycling. The projects mainly target Micro-, Small- and Medium-sized Enterprises (MSMEs), as well as consumers and retailers through capacity building activities. Some projects develop alternatives to plastic products, including eco-friendly packaging materials by working with packaging MSMEs.

The observations based on this analysis emphasise the need to address the entire life cycle of plastics, and suggest product-as-service business models, collaborations and partnerships. Equally important, yet, outside of the direct influence of the grant projects, is the development of appropriate legislative frameworks and incentives to strengthen business cases aiming to replace single-use plastics.

The majority of building sector projects analysed focused on alternative materials, energy efficient construction, and targeted capacity building about the benefits of “green” buildings. The analysis found that high-impact projects often aligned with Circular Economy strategies, principles and practices versus those that addressed only singular life cycle stages or enabling instruments. Projects addressed a wide range of issues, from sustainable building materials production to creating guidelines for energy efficient design, yet very few focused on post-demolition waste or recycling of buildings or building components.

The analysis process for both sectors showed the importance of a meaningful, results-based monitoring and reporting mechanism and feedback loops to assure project impacts. Recommendations regarding the conceptualisation of future projects in both sectors included a stronger integration of systemic transformation, including legislation, to promote and strengthen the validity of circular business models.

1 https://www.resourcepanel.org/reports/global-resources-outlook-2024

1. OBJECTIVES, SCOPE AND METHODOLOGY OF THE ASSESSMENT

1.1. Objectives and scope of the assessment

Circular Economy (CE) is a key building block of the European Union's (EU) Green Deal. CE and associated strategies aim to reduce the pressure on natural resources while at the same time creating sustainable growth and more jobs. They contribute to the shift from unsustainable to sustainable consumption and production (SCP) patterns. Especially in Asia and the Pacific, with support from SWITCH-Asia – the largest technical assistance SCP programme supported by the EU in the region – many grant projects have targeted the circularity of different sectors. Their targets have covered a wide range of sectors – plastics, buildings, textile, and tourism, to name a few. Assessing the types of circular economy strategies and business models used by the projects for achieving SCP results can inform future sector-specific strategies and projects.

This assessment reviews the experience of selected SWITCH-Asia grant projects implemented in two key sectors -- plastics and buildings. It provides an overview of the projects and highlights the main circular economy issues that became evident during their implementation. It further draws insights into how sustainable consumption and production (SCP)-related business practices have supported circularity and offers reflections on how these experiences can inform future interventions. The findings are intended to guide SWITCH-Asia stakeholders, policymakers, and other development practitioners interested in scaling circular economy initiatives across the region.

1.2. Methodology

A methodology was developed to capture all required assessment aspects from the selected grant projects. At the centre of the methodology is the mapping, which was built upon a CE framework developed by adelphi (Annex 1). The mapping highlights the connection between SCP and CE and how the projects contribute to a circular economy.

The developed mapping matrix covers basic information of the grant project: title, implementation duration, total budget, and targeted country or countries. The project innovation aspects are a part of the mapping matrix and provided expert's evaluation. These aspects show how the approach and activities of the project are new or different compared to other grant projects. Another important component of the matrix is the overarching CE strategies and business models assessment, grouped into six main areas of opportunities, developed as a possible generic framework for all projects. The six opportunities proposed are:

1) Shift to alternative supplies
2) Resource recovery
3) Increase resource efficiency
4) Extend the lifetime of products
5) Shift in business models
6) Facilitate demand for circular products and services

The strategies and business models are sector-specific, based on relevance and compatibility. For example, the "shift in business models" could mean provide plastic-based "products as a service" for grants working in the area of plastics, whereas it could mean "rethink building concepts" for buildings. To identify prerequisites for mainstreaming CE activities, CE "enablers" are also analysed, first and foremost, policy instruments. Other enabling factors, from research and development (R&D), technologies, financial services to capacity building are mapped separately. The life cycle stages of the assessed sector, which are targeted by the project and its activities, are also outlined in the matrix.

Information sources included grants and finance review results, grants review master table, project information on SWITCH-Asia's website and project websites, in project impact factsheets, briefs, project publications and in other relevant documents. To complement this, interviews were conducted with implementing organisations and SWITCH-Asia partners regarding implementation experience, project results and sustainability and to provide informed recommendations for future work.

2. CIRCULAR ECONOMY ANALYSIS OF THE PLASTICS SECTOR

2.1. Overview of plastics sector grant projects

The overview of assessed grant projects in the plastics sector is presented in Table 1. The table provides the project titles, expected implementation duration, the total project budget and the contribution from the EU. It also summarises the main objectives of the project and some additional information on project targets.

Table 1. Overview of assessed SWITCH-Asia grant projects in the plastics sector

Country/No.	Project name & budget	Description
Cambodia 1	**Reducing plastic bag waste in major cities of Cambodia** *(2014-2017; EUR 1,341,033.46; EU contribution: 90%)*	The project promotes sustainable growth and environmental sustainability in major Cambodian cities through adopting SCP practices. It aims to reduce plastic-bag use and waste.[2]
Cambodia 2	**Plastic Smart Cambodia** *(2024-2027; EUR 1,666,666; EU:90 %)*	The project reduces plastic waste by promoting sustainable food packaging and circular waste management, expanding access to green finance for food vendors, and supporting MSMEs (shopkeepers and street vendors) to adopt environmentally and economically sustainable packaging models while strengthening waste management systems.[3]
India 3	**Promoting socio-economic transformation by empowering informal waste-pickers for production of 3D printing filaments in Pune (PROTOPRINT)** *(2020-2024; EUR 1,416,348; EU: 80%)*	The project supports a collaborative partnership aiming to transform the informal recycling sector through the gradual implementation of a systematic and self-sustaining (circular) model for waste plastic recycling. It targets urban waste-pickers, informal waste management MSMEs in Pune, India, and plastic upcycling into high-value products. One goal is to ensure a standardised and rigorous recycled product certification for 3D filaments in both the Indian and European markets.[4]
India, Maldives, Sri Lanka 4	**Prevention of marine litter in the Lakshadweep Sea (PROMISE)** *(2020-2024; EUR 3,709,882.6; EU: 80%)*	The project promotes source-to-sea solutions to reduce marine littering in tourism clusters along the Lakshadweep shorelines of the Maldives, Sri Lanka and India. It targets explicitly MSMEs in the tourism sector to support them in waste minimisation.[5]
Laos 5	**Luang Prabang handle with care** *(2016-2019; EUR 1,800,000; EU: 90%)*	The project promotes sustainable tourism in Luang Prabang, Lao PDR, through increased provision and consumption of sustainable tourism products. It aims to benefit the private sector in the tourism industry, help them responsibly utilise natural resources and protect cultural heritage.[6]

2 https://www.switch-asia.eu/project/reducing-plastic-bag-waste/
3 https://switch-asia.eu/project/plastic-smart-cambodia/
4 https://www.switch-asia.eu/project/protoprint/
5 https://www.switch-asia.eu/project/promise/
6 https://www.switch-asia.eu/project/luang-prabang-handle-with-care/

Country/No.	Project name & budget	Description
Laos 6	**Empowering to Act for Circular Transition in Plastics in Lao PDR (EMP-ACT)** *(2025-2028; 1,497,200 EUR; EU: 90%)*	The project uses targeted campaigns and capacity building to inform consumers about plastic waste impacts and reduce reliance on singleuse items. It seeks to engage consumers to participate in recycling and circular waste management, thereby supporting market demand for recycled materials.[7]
Mongolia 7	**Sustainable plastic recycling in Mongolia** *(2020-2024; EUR 1,993,334.94; EU: 80%)*	The project supports the development of a green economy and the transition towards a low-carbon, resource efficient and circular economy in Mongolia. It promotes SCP through adopting SCP practices and providing access to finance for MSMEs, creating an enabling environment for SCP, a plastic waste sustainable supply chain management, and raising consumer awareness.[8]
Mongolia 8	**The 3Rs for a sustainable use of natural resources in Ulaanbaatar (3R4UB)** *(2020-2024; EUR 3,513,601.10; EU: 80%)*	The project aims at waste reduction and reuse through pilot demonstration of a robust model of separate collection managed by MSMEs and the City of Ulaanbaatar, Mongolia. It facilitates MSMEs' in accessing finance for SPC investments, collaboration among companies in waste management, and capacity development for line ministries and sub-national agencies in SCP.[9]
Myanmar 9	**Prevent Plastics** *(2020-2024; EUR 2,070,000; EU: 90%)*	The project promotes SCP in Myanmar through awareness raising and best practices in waste management. It aims to adopt sustainable waste management practices in industrial zones, increase availability of eco-friendly packaging by working with MSMEs in collaboration with retailers' association, and raise consumer awareness on plastic reduction and prevention.[10]
Myanmar 10	**Prevent Plastics +** *(2024 – 2027; EUR 1,661,136; EU: 90%)*	The project focuses on the manufacturing and agri-food sectors, addressing plastic reduction, waste management, and product circularity. Extending product lifespans through reuse and repair, it advocates for reuse models in fast-moving consumer goods (FMCG) and emphasises second-hand goods. It also supports circular start-ups by providing market access, financial knowledge, and guidance to secure funding, while promoting green business cases to investors. It also addresses behaviour change and circular lifestyles by raising consumer awareness.[11]
Sri Lanka 11	**Promoting long-term approaches for a sustainable, transformative and inclusive circular economy in Sri Lanka** *(2022-2026; EUR 3,125,000; EU: 80%)*	The project facilitates sustainable and innovative plastic minimisation and management in Sri Lanka through greener value and supply chains (V/SC). It targets SMEs of the plastic V/SC by resource efficiency, circular innovation, green finance and sustainable waste management frameworks in Sri Lanka's Western Province.[12]

7 https://switch-asia.eu/project/empowering-to-act-for-circular-transition-in-plastics-in-lao-pdr-emp-act/
8 https://www.switch-asia.eu/project/sustainable-plastic-recycling-in-mongolia/
9 https://www.switch-asia.eu/project/3r4ub/
10 https://www.switch-asia.eu/project/prevent-plastics/
11 https://switch-asia.eu/project/prevent-plastics-pp/
12 https://www.switch-asia.eu/project/plastics/

2.2. Impact assessment of the plastics sector grant projects

In this section, impacts of the grant projects are discussed in several groups by following the mapping matrix. This provides an overview over specific aspects targeted by projects. The analysis reflects the actual project activities and outputs or, in the case of recently launched projects, projected impact of the proposed activities.

In addition to aspects directly connected to CE (CE strategies and practices, CE enablers and life cycle stages), projects were also assessed on innovation aspects. Four projects (Cambodia and Myanmar/numbers 1, 2 and 9, 10) focus on alternatives to plastic packaging materials. Four projects (India, 3, regional, 4, Mongolia, 7, Myanmar, 9) set goals for recycling of plastic waste as part of their project objectives and beyond. For example, PROTOPRINT targets standardised and rigorous recycled ("upcycled") product certification for 3D filaments in both the Indian and European markets. Other projects aim at changing consumption patterns (Laos, 5,6), targeting women-led enterprises (Sri Lanka, 11), collaborating with retailers' association (Myanmar, 9), providing incentives for vendors and small businesses (Cambodia, 1,2), and several projects support access to green finance (including Sri Lanka, 11; Myanmar, 10).

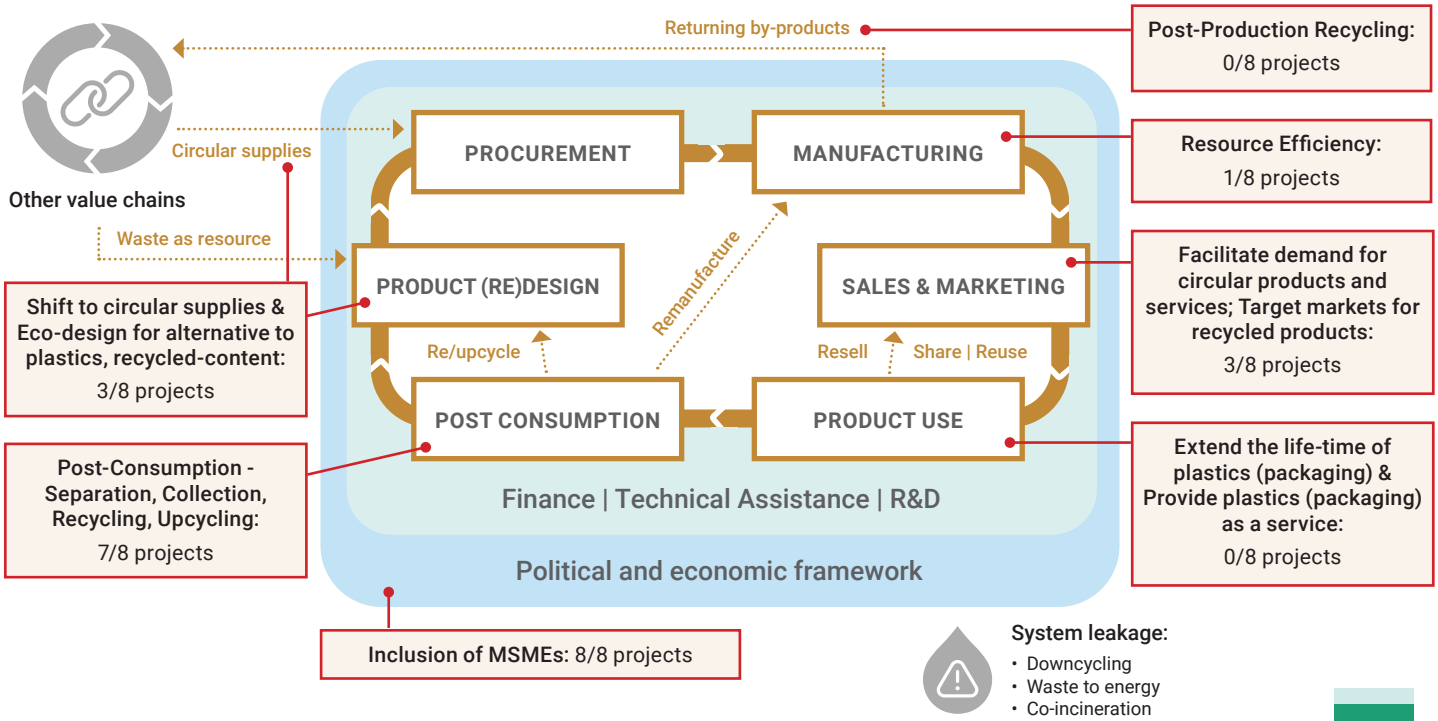
All projects contribute to circularising material flows and production systems through diverse interventions. Plastic reduction, collection, sorting, and recycling constitute the core of most initiatives, complemented by actions promoting alternatives to plastic packaging materials and by the development of regulatory instruments, such as policy briefs and recommendations, proposing the introduction or strengthening of Extended Producer Responsibility (EPR) and other policy measures that enable circularity.

2.2.1. CE strategies and practices

All assessed grant projects involve Micro-, Small- and Medium-sized Enterprises (MSMEs). Most targeted MSMEs are plastic consumers, and project activities aim at improving waste management practices. These take the form of waste collection or clean-up activities, as well as sorting and recycling; in most cases, this is in fact the downcycling of plastic products, as plastic products' economic value is not retained but lowered. Of the projects assessed, two (India, 3, regional, 4) aimed for closed-loop recycling or upcycling.

Three projects (regional, 4, Myanmar, 9, Sri Lanka, 11) seek to upgrade the plastic value chain by innovative and circular economy approaches. The project in Sri Lanka (11) uses almost all CE strategies and practices, namely, shift to circular supplies, recover after disposal, reduce plastics and extend the lifetime of plastics. It also aims at reducing plastic input in manufacturing, thereby aiming at increased resource efficiency.

Figure 1. Distribution of CE strategies and business models in the plastics sector



Five projects (Cambodia, 1,2; Laos, 6 and Myanmar, 9,10) work on of "shift to circular supplies" by developing alternative or eco-friendly solutions to packaging materials. Five projects (3, 5, 7, 9, 11) include activities to target markets for recycled plastic products, set up upstream and downstream supply chains for purchasing recycled plastic materials and selling recycled products, and cooperating with retailers' association for more sustainable options for packaging.

None of the projects seeks to provide plastics as a service, though one Myanmar project (10) aims to closely work with vendors on refill and take-back schemes.

Figure 1 summarises the findings from assessed grant projects in relation to CE strategies and business models in the plastics sector.

2.2.2. Enabling policy instruments for CE and CE enablers

The majority (10 out of 11) of the grant projects addressed policy instruments. Among those, nine projects target regulatory instruments via policy analysis, dialogues, and recommendations. Several include the strengthening of frameworks for waste management in general, and some seek to develop quality standards for recycled plastic products. One project (4, PROMISE, regional project covering, India, Maldives, Sri Lanka) targets policy and transnational action plans for marine litter prevention along Lakshadweep Sea shorelines.

A voluntary instrument for MSMEs was prepared as part of the Myanmar (9) project in support of a Public-Private dialogue. One project in Cambodia (1) carried out activities to introduce an incentives scheme for consumers, vendors and SMEs related to plastic bags, while the one recently launched there (2) targets food packaging, including plastic sachets and bags.

In terms of enabling interventions beyond policy, five integrate R&D activities: The regional PROMISE project aimed at establishing a monitoring system for waste prevention, whereas the Mongolian sustainable plastic recycling project supports health, safety and quality standards for products. The "Reducing plastic bag waste in major cities of Cambodia" project conducted market research for plastic bags and focused on the conception of alternative packaging products. The Plastic Smart Cambodia project seeks to combine an upgradation of plastics waste management with corresponding plastic products that can be recycled; the EMP-ACT project in Laos seeks to bolster demand for recycled products, by engaging consumers through campaigns and capacity building.

Five projects involve advanced and innovative technologies for MSMEs linked to plastic packaging and plastic waste (e.g., recycling technologies), or imply a change in technologies, e.g., scaling-up production capacity or producing new packaging materials and products. One project (Sri Lanka, 11) targets technical skills upgrade for SMEs.

Seven of the eleven projects support access of MSMEs to financing for investment in plastic recycling, waste management, SCP practice demonstration, or offer guidelines for MSMEs on how to access green loans.

In terms of capacity building, all projects have proposed activities relevant to knowledge exchange, partnership and collaboration, awareness raising and information. All projects highlight the importance of partnership and collaboration. Nine of the eleven projects have designated activities related to information sharing, such as guidelines, knowledge sharing or a learning platform, and many of the projects carry out knowledge exchange through training, workshops, seminars, site visits and on-site coaching.

2.2.3. Targeted life cycle stages

Project activities were also analysed according to life cycle stages – *product (re)design, procurement or input materials, manufacturing, sales and marketing, product use, and end-of-life*.

Most projects target one or two life cycle stages, with "end-of-life" solutions, like waste collection, sorting, reuse and recycling, being addressed by nine projects; only one project covers all life cycle stages (Sri Lanka, 11).

At the "product (re)design" stage, four projects (Cambodia, 1, India, 3, Myanmar, 9, Sri Lanka, 11) focus on alternative packing materials, new eco-friendly packaging products (non-plastic products), newly (re) designed plastic recycled products (recycled plastic flakes, and 3D printing filaments from recycled plastics), while two of the recently launched projects include activities on alternative materials (Cambodia, 2, Myanmar, 10).

In the case of plastics, it is important to differentiate the "manufacturing" stage between the use of plastics-based products (like packaging) as part of manufacturing, and the production of (virgin) plastics; the latter is not targeted by any projects, except indirectly; as some projects seek to either replace plastic as a material, or reduce its use in the manufacturing/production stage.

Two projects clearly address plastics in their "product use" or "midstream" stage and both link to the tourism sector (Regional, 4, Laos, 5). They target MSMEs in tourism clusters, and tourism MSMEs (hotels, guest houses) and their guests. The "product use" stage is aimed at by two projects (Myanmar, 10, Sri Lanka, 11).

2.2.4 Relevance to Circular Economy approaches and international initiatives

All projects promote collaboration between local partners and international good practice, organisations, or financing. In some specific projects, access to new technologies is facilitated (Cambodia, 1, 2, Myanmar, 9,10, India, 3, Sri Lanka, 11) and many projects seek to support MSMEs in receiving financing (inter alia, India, 3, Mongolia, 7, 8, Myanmar, 9, 10, Sri Lanka, 11). One project (India, 3) sets targets for its recycled products, the 3D printing filaments, to meet the EU standards. Another project (Sri Lanka, 11) includes activities to upgrade technical skills for SMEs involved in recycling, which is in line with the EU Skills Agenda.

Some projects connect with international civil society initiatives and NGOs; none of them are explicitly linking with their governments on international governance issues, like the proposed Global Agreement on Plastics; whereas the regional project in India, Maldives, Sri Lanka sought to align national policies for the marine region it covered. The EU Green Deal[13] is indirectly of relevance to all assessed grant projects. Project activities, outputs and outcomes contribute to either one or more of its components; for example, to the EU Circular Economy Action Plan, one of its main building blocks, or by reflecting the objectives of the EU Plastics Strategy.

2.3. Observations for Plastic-related projects: reflections

The majority of assessed projects concentrate on waste management and recycling. This focus is important, as globally less than 10 percent of plastics are currently recycled. However, while better waste management is a valid objective, it is not sufficient on its own, particularly from the perspective of CE. Recycling faces fundamental limitations: material quality degrades even after the first cycle, scaling remains difficult and costly, and recycled plastics can still pose environmental and health risks. It is clear that the unchecked growth of plastics production itself needs to be urgently addressed.

The analysed projects mainly target plastic waste from packaging and other single-use plastic (SUP) products. A sectoral perspective (plastic use and alternatives in the health sector, building sector, for food packaging, as part of electronics) may add value here, especially if a life cycle approach is adopted. The EU Plastics Strategy, including the phase-out of specific SUP products, and the EU Sustainable Products Initiative may offer entry points relevant for projects in Asian countries as well.

2.3.1. CE strategies and practices

Shift to alternative supplies: The information collected during the interviews and from desk research showed that alternatives to plastic packaging products and other SUP need to be developed and deployed at scale. In parallel, policy frameworks need to disincentivise plastics, which is currently often the cheapest and most profitable material option. It is up to policymakers to narrow the space of plastics proliferation. When

13 The European Green Deal includes key policies aimed at cutting emissions, preserving Europe's natural environment and investing in cutting-edge research and innovation to tackle climate change. https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

plastics supply is limited (e.g., by banning materials or making them costlier), the demand for alternatives goes up, and non-plastic-based solutions become available, as they become comparatively cheaper and more profitable.

Thus, future projects should include more activities to (1) increase awareness about the existence and advantages of plastic alternatives at policymaker and consumer levels, (2) build momentum for non-plastic-based or reduced plastic products through legislation, incentives and information, (3) involve and promote co-creation processes between buyers/consumers and producers for alternatives so that they are suitable in the local contexts, such as, in terms of raw material supply, technical readiness, aesthetics, and (4) plan for achieving tangible results in the long term (can be more than a year).

Increase resource efficiency (reduce plastic in product design and manufacturing): Comprehensive life cycle approaches are oftentimes missing. Current projects mainly focus on "end-of-life" solutions, some involving waste-collectors and recyclers. Manufacturers, who take roles in product design, procurement and production, and thereby in the use of plastics, have not been targeted by these projects. Thus, future projects could include manufacturers as a key stakeholder group.

Extend the lifetime of plastics: Several points need to be highlighted in order to extend the lifetime of plastics. Plastics need to be designed in a way that allows them to be repaired, reused and recycled. A summary document for a circular economy for plastics by the Ellen MacArthur Foundation[14] provides further ideas: (1) promoting plastic reuse and reduce models, for example, refill bottles at home or on the go, take-back system, deposit system, (2) supporting new plastic-waste management frameworks including new collection, sorting and chemical recycling technologies, (3) technical, informational and financial support for setting up reuse and reduce model pilots, (4) applications of innovative solutions linked to plastic tracking (e.g., tracking plastic materials with barcodes for better reuse, collection, sorting and recycling), and (5) developing successful case studies for further replication.

Shift in business models (providing plastics as a service): A new type of business model, the so-called "product-as-service" or "servitisation" model, is considered as a crucial requirement for moving towards CE. Supporting activities for this model are innovation, partnership and collaboration, and new ways of regulating resource use. However, among the projects mapped, none aims at providing or replacing plastic by servitisation. This is also due to the fact that service-based models require policy frameworks that render the current virgin-plastics-based linear model unprofitable.

Subsequent projects could facilitate this new business model by (1) analysing successful cases from around the world, (2) selecting producers interested in this business model, especially producers of alternatives for SUPs, (3) building capacity on how to develop product-service orientation, (4) working on implementing conducive policy frameworks, (5) supporting demonstration cases, and (6) developing successful case studies for further replication.

Facilitate demand for circular products and services: Three of the assessed projects promote recycled products, and explore market opportunities and access to markets for these products. However, so far, plastic recyclers and their customers are the only addressees. This scope can be extended to plastic producers by legislation, for example, regarding recyclate quality standards, public procurement procedures and mandatory quotas for recycled products. Other actions could be research and development of new (sorting, recycling) technologies, and recycled plastic product labels and certificates. Some suggestions for future projects are: (1) new policies favouring circular plastic goods and services, and considering options at different governance levels for producers (e.g., tax, subsidies, bans), (2) combination of several factors (e.g., economic factors, needs and offers, information, social factors, consumer preferences) to create and resonate positive impacts on consumer behaviour, and (3) involving and supporting (though finance, connecting to potential buyers) entrepreneurs and start-ups in new circular technologies and services.

14 https://archive.ellenmacarthurfoundation.org/explore/plastics-and-the-circular-economy

2.3.2. Enabling policy instruments for CE and CE enablers

Comprehensive policy frameworks to enable CE transformation are lacking. One reason could be the lack of CE knowledge among policymakers, which results in unclear incentives, overlapping legislative framework and missing governmental support to CE (Uusitalo et al., 2020[15]). Thus, available knowledge of policy instruments and incentives and their effects is necessary, and knowledge of how to implement them to foster CE is required. Policy instruments can be categorised into several areas: production and manufacturing (e.g., policies for eco-design, RECP, bans, EPR), consumption (e.g., policies for consumer protection, public procurement, deposit-refund schemes), waste management (laws on environmental protection, waste management, water management), among others. Incentives can also be grouped into several categories, such as technological, educational, institutional, social, fiscal, etc. (ibid.).

Current and recently closed grant projects advise on regulatory instruments, for example, on action plans, policy dialogues, policy briefs and recommendations. Incentives schemes for consumers and vendors/SMEs (economic instruments) were considered or introduced in several projects.

From the above analysis, future projects would benefit from integrating work on policy instruments and incentive enablers and harmonise these CE enablers with the existing legislative framework. This can be achieved through (1) specific awareness-raising activities for political decisionmakers on CE policy instruments, incentives and enforcement (through training, guidance documents, coaching by international policy experts), (2) data collection, regular updates and monitoring for baselines, and target setting, (3) roadmap for enabling CE policy instruments and incentives to transform the plastics economy to CE, and (4) support for implementing and re-evaluating CE policy instruments and incentives.

R&D, technologies, financial services: Innovations and advancement across all digital, physical and biological technologies have the potential to enable CE business models and new processes by improving resource efficiency while reducing waste, and increasing operational efficiencies with modern information technologies. This is not only relevant to plastics but also to those linked to developing alternatives to plastics, especially plastic packaging and SUPs, and others, to facilitate new CE business models.

For R&D and new technologies, investments in CE innovations, technologies and new business models are essential. Alternatives to plastics already exist, as even 15 years ago plastic was not used for many, now staple, SUP products. In some cases, hygiene and food regulations need to be changed at the policy level, for they have created a path-dependency for the continued use of virgin plastics[16].

Investments in plastic treatment and alternatives are still considered to be high risk. Initial investments in CE infrastructure, for waste collection and recycling as an example, pose considerable challenges (Schröder & Raes, 2021[17]). To create more enabling conditions, future projects could: (1) recommend and facilitate appropriate and strong policy instruments and frameworks, and CE incentives (e.g., national action plans, CE roadmaps, recycling targets, public funds) to de-risk investment in CE, incentivise financial investment, and attract private investment, including by closely following developments at the global governance level; (2) work with both governmental entities and (local) commercial banks for CE investment insurance and guarantees; (3) find potential and suitable financing schemes for CE investment (blended finance, foreign direct investment, public-private collaboration and financing); (4) support adopting new ideas and incentives from other economies for applicability in the local context; and (5) work with entrepreneurs and start-ups for new technologies and business ideas.

Capacity building: Many capacity building activities have been done in the assessed projects and must be maintained in future projects. Some additional information collected during interviews revealed that training does not always translate when put into practice. As a result, more targeted interventions are needed to minimise mistakes and risks at the implementation stage. There are possibilities of overlapping activities

15 Uusitalo T., Huttunen-Saarivirta E., Hanski J., Lima-Toivanen M., Myllyoja J, and Valkokari P. 2020, Policy instruments and incentives for Circular Economy - Final report. European Institute of Innovation and Technology (EIT). https://eitrawmaterials.eu/wp-content/uploads/2020/07/EIT-RawMaterials-project-POLICE-Final-report.pdf

16 https://www.weforum.org/agenda/2022/03/are-we-replacing-plastic-with-more-energy-intensive-alternatives/

17 Schröder P. and Raes J. 2021. Financing an inclusive circular economy: De-risking investments for circular business models and the SDGs, Environment and Society Programme, Chatham House, London.. https://www.chathamhouse.org/sites/default/files/2021-07/2021-07-16-inclusive-circular-economy-schroder-raes_0.pdf

among projects from different grants and donors. Consequently, resources may be utilised inefficiently, and training might become less attractive to participants. Some suggestions for new projects are: (1) more targeted capacity building approaches that integrate previous experiences and local knowledge of trainers and participants; (2) focusing more on coaching activities with assistance from experts; (3) collaborating with other ongoing projects for effective resource utilisation; and (4) innovative training-course delivery and regular updating of course content.

2.3.3. Targeted life cycle stages of plastics

An approach targeting all life cycle stages of plastics reflects the complexity of the plastics challenge . It would analyse impacts on economy, environment (climate, ecosystem, hazards) and society (jobs, gender) by each stage of plastic products (and relevant services) along the life cycle. Different and appropriate interventions could then be proposed.

SWITCH-Asia grant projects and other projects currently mainly focus on “end-of-life” solutions. The “manufacturing” and “sales and marketing” stages are also associated with recycling of plastic waste and how to promote the recycled products in the markets. Yet of equal relevance would be a focus on reducing and eliminating plastics. Interventions aimed at reduction of plastic use (“product use” stage) are mostly targeting the tourism sector as well as the food sector. Further “upstream”, alternatives to plastics as part of the product design phase need to be developed.

Future initiatives could add the following points into the development and implementation phases: (1) supporting national/regional action plans for plastics with the involvement of stakeholders in the plastics value chain. This could include dialogues to assess needs, challenges and ideas for future processes across the value chain; (2) Combining various instruments and incentives to create an enabling environment for CE, including cooperation to enable financing; (3) Assuring compliance with waste management rules; co-developing sanctioning mechanisms and other types of implementation enforcing processes with pioneers of the packaging industry; (4) capacity building for policymakers and increasing consumer education; and (5) integrating finance and investment for CE and plastics, ESG and risk minimisation considerations.

3. CIRCULAR ECONOMY ANALYSIS OF THE BUILDING SECTOR GRANT PROJECTS

3.1. Overview of the building sector grant projects

The overview of assessed grant projects in the building sector is presented in Table 2. The table provides the project titles, expected implementation duration, the total project budget and contribution from the EU. It also summarises the main objectives of the project and some additional information on project targets.

Table 2. Overview of assessed SWITCH-Asia grant projects in the building sector

Country	Project name & budget	Description
Afghanistan	**Scaling up Green Homes in Kabul towards sustainable energy consumption and low emission development** *(1/2016 – 11/2020; EUR 2,007,990; EU: 90%)*	Tackling the lack of access to finance for sustainable development in Afghanistan, this project strengthened emerging energy saving value changes and engaged a network of stakeholders.[18]
Bangladesh	**Promoting sustainable building in Bangladesh (SUSBUILD Bangladesh)** *(1/2016 – 6/2019; EUR 2,000,000; EU: 90%)*	Brick makers in Bangladesh were capacitated in diversifying production inputs to save natural resources, reduce GHG emissions, and increase energy efficiency.[19]
China	**Train the Trainers: Training Chinese construction sector SMEs in energy saving techniques and technologies** *(2/2009 – 7/2013; EUR 2,979,198; EU: 80%)*	In the Greater Shanghai region of China, this project empowered construction sector stakeholders to incorporate energy efficiency measures in the design and construction of buildings.[20]
China	**SUS BIRD: Sustainable building interior renovation and decoration initiative in China** *(12/2009 – 11/2013; EUR 2,122,828; EU: 80%)*	Through reducing energy consumption and environmental impact related to the building interior renovation and decoration (BIRD) practices and production in China, this project helped to improve health of both workers and inhabitants.[21]
China	**Eco-Friendly Bamboo Production: Creating green jobs for the earthquake affected population in Sichuan** *(01/2010 - 01/2014; EUR 2,467,869; EU: 80%)*	In order to contribute to economic growth in the wake of the earthquake that hit the Sichuan province of China in 2008, this project contributed to increasing livelihood opportunities through sustainable production of bamboo building materials for reconstruction.[22]

18 https://www.switch-asia.eu/project/kabul-green-homes/
19 https://www.switch-asia.eu/project/bangladesh-susbuild/
20 https://www.switch-asia.eu/project/train-the-trainers/
21 https://www.switch-asia.eu/project/sus-bird/
22 https://www.switch-asia.eu/project/eco-friendly-bamboo-production/

Country	Project name & budget	Description
China	**Low Energy Housing: Mainstreaming energy-efficient buildings in Chinese cities through raising minimum energy performance standard** *(02/2012 - 01/2015; EUR 1,488,255; EU: 80%)*	Two large-scale construction case studies in the Shenzhen and Sichuan provinces of China were used as best practices to promote sustainable use of resources in the building sector while at the same time improving the quality of life and mitigating climate change.[23]
China	**SusBuild: Up-scaling and mainstreaming sustainable building practices in western China** *(1/2016 – 12/2019; EUR 2,800,000; EU: 80%)*	Supporting SMEs and key stakeholders to switch to resource efficient practices in China's construction sector by promoting the management of construction and demolition waste. Testing, verification, and approval of a construction and demolition waste product.[24]
China	**RurEnergy: Promoting sustainable residential energy** *(2022 – 2025; EUR 2,300,000 EU: 80%)*	In the Henan and Gansu provinces of China, adoption of cost-effective retrofitting as well as awareness raising for behavioural change are encouraged to promote energy efficiency in housing.[25]
Malaysia	**SUBUMA: Environmental declaration scheme for construction and building materials** *(12/2012 – 12/2015; EUR 2,043,229.41; EU: 80%)*	By developing tools, guidelines and support mechanisms for product footprints and labelling in Malaysia, this project created recognition and preference for sustainable products from SMEs in the construction and building sector.[26]
Mongolia	**Greener Construction Project: Supporting a greener and more energy efficient construction industry in Mongolia** *(1/2012 – 8/2016; EUR 1,690,341; EU: 80%)*	Promotion of SCP in Mongolia's construction industry through mobilisation of both public and private sector stakeholders to develop new green construction products and practices.[27]
Mongolia	**Sheep Wool for Building Material (SWBM); Turning sheep wool into environmentally friendly building material, integrated approach for supply chain development** *(1/2013 – 5/2016; EUR 891,412; EU: 80%)*	Development of sustainable supply chain of sheep-wool building insulation in Mongolia and knowledge transfer to the construction sector.[28]

23 https://www.switch-asia.eu/project/low-energy-housing/
24 https://www.switch-asia.eu/project/western-china-susbuild/
25 https://www.switch-asia.eu/project/promoting-sustainable-residential-energy-consumption-in-rural-china/
26 https://www.switch-asia.eu/project/mysubuma/
27 https://www.switch-asia.eu/project/greener-construction-project/
28 https://www.switch-asia.eu/project/sheep-wool-for-building-material-swbm/

Country	Project name & budget	Description
Mongolia	**Improving resource-efficiency and cleaner production in the Mongolian construction sector through materials recovery: Recycling building materials** *(3/2016 – 7/2020; EUR 1,562,500; EU: 80%)*	Promoting transition to a low-carbon housing sector in Mongolia through the uptake of more resource efficient offerings. The project focuses on construction and retrofitting in the *ger* (residential) districts.[29]
Mongolia	**Switch off Air Pollution (SOAP)** *(2018-2021; EUR 2,191,896.24; EU: 80%)*	Promotion of SCP practices and behaviours in the single unit housing in Mongolia's *ger* districts through energy efficiency advisory, awareness raising, technical assistance, and support to MSMEs and households.[30]
Mongolia	**Switch-off Air Pollution in Mongolia's Cities (SOAP II)** *(2022 – 2026; EUR 2,874,937; EU: 80%)*	By leveraging technologies and finance in addition to raising awareness among a large variety of stakeholders in Mongolia, a transition to a low-carbon housing sector is being promoted.[31]
Nepal	**VSBK: Vertical shaft brick kilns and sustainable construction practice in Nepal** (1/2012 – 7/2015; EUR 2,146,750; EU: 90%)	Awareness raising among both the private sector and households was used to promote and create demand for clean energy and energy-saving building material in Nepal's brick-making industry.[32]
Nepal	**Green Homes: Promoting sustainable housing in Nepal** (1/2013 – 12/2015; EUR 1,015,525; EU: 85%)	An enabling policy environment to promote sustainable housing was created in Nepal through capacitating SMEs to deliver green technologies and services for households and creating a market demand for sustainable housing.[33]
Nepal	**Building Energy Efficiency in Nepal (BEEN)** (2022 – 2026; EUR 2,715,000; EU: 90%)	Climate responsive building design and construction, including building materials and fuel sources, are being promoted among a variety of stakeholder groups in Nepal.[34]
South Asia (regional)	**METABUILD: Resource-efficient supply chain for metal products in buildings sector in South Asia** (3/2016 – 2/2020; EUR 2,713,497.53; EU: 90%)	Four-hundred SMEs in Sri Lanka, Bangladesh and Nepal have implemented the project's resource efficient cleaner production measures, improving environmental and economic performance in the production of metal construction materials.[35]

29 https://www.switch-asia.eu/project/recycling-building-materials/
30 https://www.switch-asia.eu/project/switch-off-air-pollution/
31 https://www.switch-asia.eu/project/switch-off-air-pollution-in-mongolias-cities/
32 https://www.switch-asia.eu/project/vsbk/
33 https://www.switch-asia.eu/project/green-homes/
34 https://www.switch-asia.eu/project/building-energy-efficiency-in-nepal-been/
35 https://www.switch-asia.eu/project/metabuild/

3.2. Impact assessment of the building sector grant projects

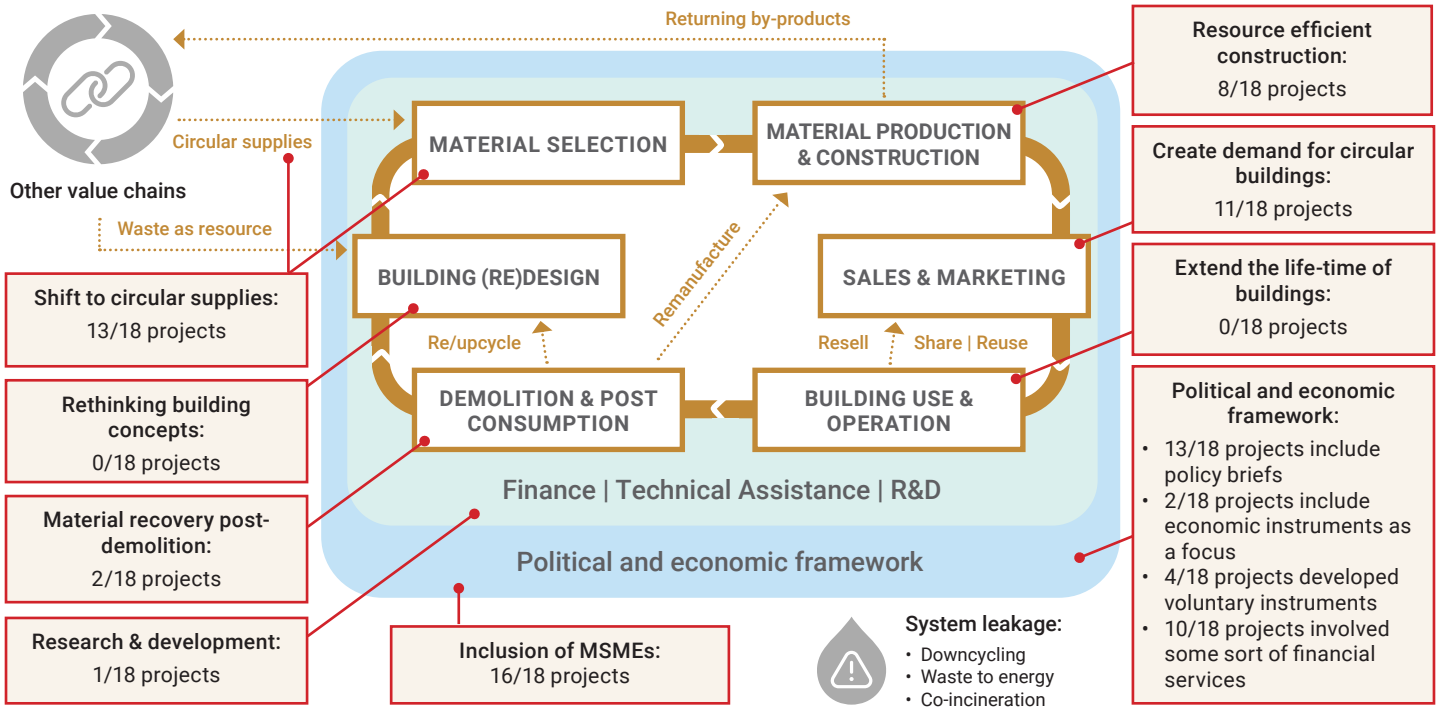
3.2.1. CE strategies and practices

MSMEs play an important role in economic development in Asia, and make up a large proportion of businesses in the construction sector. Of the 18 building and housing grant projects assessed, only two do not involve MSMEs, which means the MSMEs were the key beneficiaries for most of the mapped grant projects. For the most part, the projects included some training for the MSMEs on sustainable construction practices, especially with regard to cleaner production in the manufacture of building materials; for example, demonstration on how to produce building materials in a more sustainable way, such as in the *METABUILD* project. A large proportion of the assessed projects involved shifting to the use of circular or alternative supplies. Thirteen projects, for example, helped in reducing the use of low-quality materials that create toxic waste or GHG emissions, creating platforms for the promotion of new green products, or introducing more sustainable supply and procurement standards.

About half the projects had some relation to creating a demand for circular buildings, resource efficient buildings or increasing resource efficiency. Close to two thirds facilitated market demand for sustainable buildings through the promotion of new technologies or products, preparing stakeholders for new practices, informing consumers, or creating new market linkages. At the same time, less than half of the assessed projects helped stakeholders to adopt CE or energy efficient (EE) strategies during construction. This involved, for example, the implementation of courses on Green Construction Practices at vocational training schools, and the development of technical standards and manuals for building associations.

Two projects were involved in the recovery of building materials post demolition and creating a demand for circular products and services. "Improving resource-efficiency and cleaner production in the Mongolian construction sector through materials recovery: Recycling building materials" was the only project analysed to consider construction demolition waste (CDW), whereas Switch-off Air Pollution in Mongolia's Cities (SOAP) considered the use of reusable materials during construction, to allow reuse after (future) demolition. While improving the longevity of buildings through durable materials played a role in several projects, extending the lifespan of buildings, rethinking building concepts, or shifting business models in building or construction were not expressly targeted by the projects.

Figure 2: Distribution of CE strategies and business models in the building sector in assessed grant projects



3.2.2. Enabling policy instruments for CE and CE enablers

Regarding enabling policy instruments for CE in the building sector, 13 projects presented results in the form of policy briefs or recommendations. These predominantly focused on creating more conducive legal frameworks for sustainable construction management, introducing policy instruments, promoting incentives for sustainable construction, or promoting international building codes and standards as a basis for new regulatory instruments to be developed.

Very few projects focused on other types of policy instruments. Four projects involved the creation of voluntary instruments, such as standards, rating systems or certifications for sustainable buildings or housing. In one project, the project consortium and real estate developers signed a Memorandum of Understanding (MoU) about government subsidies to implement financial services for more sustainable housing. Three projects developed informational instruments such as technical packages, design tools, design guidelines or similar documents or informational brochures for the general consumer. Only two projects involved economic instruments in the form of facilitating the development of and access to EE-friendly policy incentives in collaboration with municipalities to promote the construction of energy efficient buildings.

The most common CE enabler, knowledge exchange and capacity building, was covered by 16 of the analysed projects, often in the form of training on SCP principles for MSMEs. Topics included the switching to alternative materials, the strengthening of value chains targeting small-scale businesses, as well as establishing training centres to replicate and scale up pilot projects. In addition, trainings on standards and certifications, and training of stakeholders along the value chain to utilise measures developed in the projects, including policymakers, were also used by projects. Similarly, 11 projects involved awareness raising, such as EE campaigns among citizens to stimulate new consumer groups and among builders and developers, for example, on the topic of new materials. Only three projects explicitly mentioned the development of information material, but all projects completed some sort of documentation that could be used for dissemination.

Another frequently used CE enabler was partnership and collaboration, which usually took place between the public sector or other governmental bodies and private sector stakeholders, or through linking different actors in the value chain, such as connecting retailers with wholesalers and suppliers of environmentally friendly building materials. Collaborations took place in the form of symposiums, finance intermediation, conferences, exhibitions, media outreach and seminars. In the outstanding case of SUS BIRD, an institutional network of SMEs was established to promote and support sustainable building interior renovation and decoration. In total, 15 projects used partnerships and collaboration to improve coordination in the building sector.

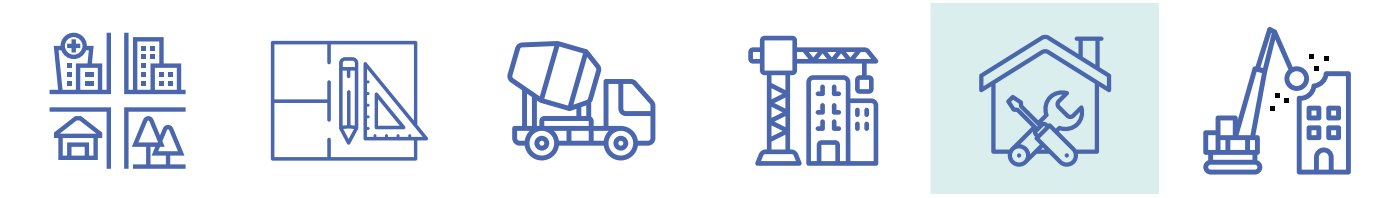
Eleven projects either introduced new technologies or supported green technologies or product innovation. Most of these focused on new construction technologies such as new formats of brick-making, use of natural aggregates, retrofitting solutions, or energy efficiency solutions. About half (i.e., 10 of 18) the projects also included financial services, either in the form of assisting MSMEs to access policy incentives or loans, or by facilitating financing and improving financing schemes.

With the lowest frequency of only one among the mapped projects, research and development (of materials, building methods, or other topics) is a neglected enabler.

3.2.3. Targeted lifecycle stages

From a lifecycle standpoint, there are six stages distinguishable in the sector; each stage presents opportunities and challenges, yet they are closely interconnected; decisions made in the initial phases significantly influence the circular potential achievable at the conclusion of a building's life.

Figure 3: lifecycle stages



Urban and Rural Planning and Zoning (why, what, where)	Planning and Design of engineered structures	Material extraction, manufacturing, R&D	Construction works including logistics	Use phase - maintenance and facility management	Deconstruction and Demolition

About half the projects focused on the construction phase itself. This included topics of embodied energy and using building techniques that use less resources such as water or energy. The use phase, too, was addressed by less than half the projects. They ran energy campaigns for homeowners to promote energy efficiency in the household.

The following steps are relevant from the standpoint of SMEs, being they developers, construction companies, manufacturing, maintenance and material recovery:

Only four projects focused on building re-design, of which just one project addressed guidelines for passive design, and another focused on the demolition and waste phase.

Most commonly, projects in the building sector focused on materials selection, as part of procurement for construction. Of the 18 projects, 13 covered this life cycle stage, mainly in the form of introducing new sustainable materials, or building capacities of MSMEs to produce sustainable materials. For example, the innovative project "Recycling Building Materials" in Mongolia helped stakeholders to test, verify, approve and prepare a circular, CDW product for commercial production.

3.3. Observations for building-sector projects: reflections

Based on the analysis in the previous section from the mapping matrix of grant projects in the buildings sector, it can be seen that some topics relevant for upscaling CE have been well addressed. These include involving MSMEs, capacity building activities, introducing new sustainable building materials and production methods for them, and helping to create a market demand for sustainable buildings. The following observations could be helpful for drawing on the grants analysis for designing projects that consider the entire value chain and integrate circular economy considerations.

3.3.1. CE strategies and practices

Shift to circular supplies: Continuing grant projects that promote a shift to circular supplies is recommended. Such projects have a potential for up-scaling and replication, and can easily be adjusted to the local and regional needs.

Materials recovery post-demolition: Recovering materials post-demolition through de-construction is a strategy that largely remains unexplored among the mapped grant projects. Projects could further focus on preparing construction and demolition waste (CDW) for reuse or recycling, or on selective demolition, which can enable removal of parts of buildings in order to better facilitate re-use of high-quality materials.[36] In addition, relocation of buildings and infrastructure could be further explored; this would include modular, flexible ways to construct.

Resource efficient construction: By and large, the assessed projects included many strategies for increasing resource efficiency through cleaner production (METABUILD), use of natural local materials (SWBM) and pollution prevention (SUSBUILD Bangladesh). Further opportunities diving deeper into circularity can be

36 European Commission (EC). 2018. Construction and demolition waste. https://environment.ec.europa.eu/topics/waste-and-recycling/construction-and-demolition-waste_en

explored. It is recommended that future grant projects focus more on designing for zero waste production. Designing for zero waste building construction considers not only waste during construction but also waste throughout the life cycle of a building and waste created in the manufacturing of building materials. Zero waste in the buildings sector, for example, could be demonstrated through the testing of take-back schemes for building materials, introducing new materials with recycled content, reducing the quantity of materials used in a building, designing for deconstruction and post-use, to name a few.[37]

Extending the lifetime of buildings: An important opportunity exists to work in this area. Extending the service life of buildings and building components is most often achieved through re-use and recycling. This can also be achieved for building components or whole buildings,[38] by designing for de-construction, renovation, or re-using of certain parts of buildings.

Shift in business models (e.g., providing buildings a service): Although there are already various business models existing for the building sector (leasing, renting whole or partial buildings, purchase, rent-to-own, etc.), there is still an opportunity to re-think the way buildings can be used as a service, rather than a commodity. For example, this might include leasing of building components such prefabricated houses or interior equipment, or, as a business to business service, improved schemes for renting of construction equipment. In addition, community-based strategies for housing could be further promoted, for example by enabling intergenerational living and ownership.

Creating market demand for circular buildings and services: A considerable opportunity also exists for creating market demand for circular buildings and services among the grant projects. Some projects carried out activities that helped to build market demand for specific circular or resource efficient building materials. Market demand can also be developed for the building concept as a whole, for example, by introducing building and construction services that use take-back models or better utilise CDW.

3.3.2. Enabling policy instruments for CE and CE enablers

The grant projects mapped typically explore practical on-the ground implementation solutions for CE components within the building sector. At the same time, many directly result in the development, testing or verification of policy instruments. By building on lessons learnt from previous grant projects with regard to regulatory and planning, economic or fiscal, voluntary, or informational instruments in the building sector, could act as a basis for future work.

Research & development: Future projects in the building sector could also bring more attention on research and development. These types of projects could include components that focus on innovation of new materials, modernisation of vernacular structures, or innovation of new business models for buildings, to name a few. A 2022 study by Oluleyea et al. states the largest opportunities for future research related to CE in the buildings sector as being, "Lifecycle assessment indicators for building CDW, minimization in a CE, application of advanced technologies for CE, and intelligent decision support tools for CE adoption in the BCDW management."[39]

Technology: Integration of technological and digitised components into projects can also be extremely beneficial for CE in the building sector. For example, Information & Communication Technology (ICT) provides potential support to CE-oriented decision-making in the building sector and can also be used to manage construction, map resource flows, digitise product information, and more.[40] Integrating technological solutions in the work of future grant projects could further advance new technologies for CE.

37 The Center for Architecture. 2017. Zero waste design guidelines. https://www.zerowastedesign.org/wp-content/uploads/2017/10/ZeroWasteDesignGuidelines2017_Web.pdf

38 Erkelens P.A. 2002. Extending service life of buildings and building components through re-use. Eindhoven University of Technology. https://www.irbnet.de/daten/iconda/CIB9159.pdf

39 Oluleye, B.I., D.W.M. Chan, A.B. Saka and T.O. Olawumi. 2022. Circular economy research on building construction and demolition waste: A review of current trends and future research directions. Journal of Cleaner Production, Volume 357. https://doi.org/10.1016/j.jclepro.2022.131927

40 Yifei Yu, D.M. Yazan, V. Junjan and M-E. Iacob. 2022. Circular economy in the construction industry: A review of decision support tools based on Information & Communication Technologies. Journal of Cleaner Production, Volume 349. https://doi.org/10.1016/j.jclepro.2022.131335

Financial services: Financial barriers are often cited as a key challenge to transitioning to CE practices. These barriers include lack of support from financial institutions (FIs), lack of effective economic policy, or high upfront costs for CE building materials.[41] Providing support to key stakeholders, ranging from MSMEs to FIs, on the development and use of financial incentives and services including through networking events and workshops, could be beneficial in future grant projects in the building sector.

Capacity building: Continuing knowledge exchange, training and other forms of capacity building is highly needed and recommended for future grant projects in the building sector.

3.3.3. Targeted life cycle stages of buildings

Use phase of buildings: While not many of the mapped projects had actions taking place in this life cycle phase, there is a huge potential as the energy and resources used in the operational phase of a building account for most of the energy used in a building's life cycle. This can be done in the form of awareness raising among citizens to consider circular products for their homes and workplaces, and promoting innovation in energy efficiency building technologies. Influencing behaviour when it comes to waste management in buildings can also be explored. Evidence-based research is needed in order to develop effective projects targeting solutions for the use phase.

(Re)design, demolition and waste phase: Regarding CE principles, (re)design of buildings, demolition and waste, and how used resources are dealt with are of high importance. With so few grant projects focusing on designing for circularity, demolition or reuse of building components, it is highly recommended that further work in this regard be carried out in the building sector.

41 Stockholm Environment Institute. 2021. https://cdn.sei.org/wp-content/uploads/2021/11/barriers-drivers-enterprises-circular-economy-sei-brief.pdf

4. CONCLUSIONS AND OUTLOOK

Circular economy concepts pose a unique opportunity to address planetary boundaries while keeping or even improving living standards, and contributing to a transformation towards sustainable consumption and production. SWITCH-Asia has been among the key support programmes in Asia for more than 15 years. This analysis of circular economy aspects for projects targeting plastics and in the buildings sector sought to take a circular economy perspective in order to guide future projects in their project conceptualisation.

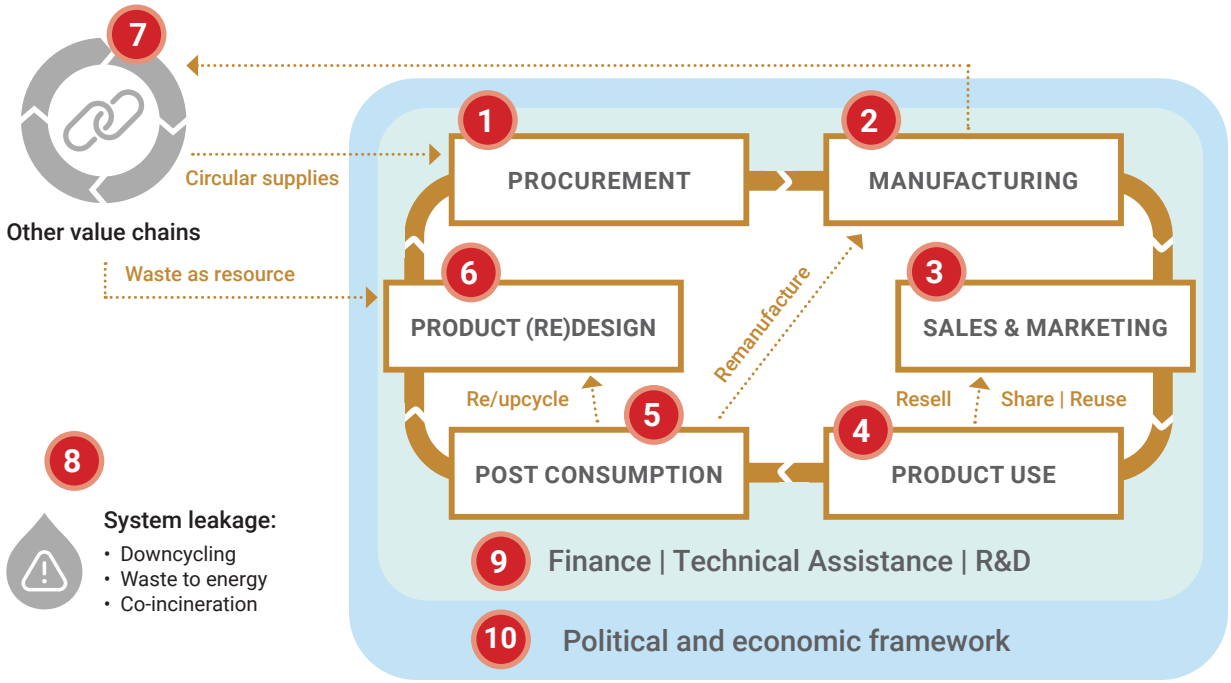
The analyses of eleven ongoing and recently concluded SWITCH-Asia grant projects in the plastics sector has shown that the interventions mainly focus on "end-of-life" solutions. "Upstream" life cycle stages, especially design, procurement and manufacturing would be important to integrate into future project concepts. Sector-specific approaches seem to show promising results; projects so far have targeted the tourism and food sector. Buildings, healthcare, e-waste and business to business plastics use (e.g., for textiles) are yet to be addressed.

The evaluation of the eighteen grant projects in the building sector also showed that certain stages of the CE framework were not addressed. Stages to be addressed by future projects could be the rethinking building concepts at the urban planning level, as well as extending the lifetime of buildings, and materials recovery post-demolition – which also requires rethinking at the conceptual stage.

Providing more comprehensive circular solutions, as recommended in this assessment report, could lead projects towards the development of circular material, sector-specific approaches, and business cases that are adapted to the local context. To move towards a circular economy, project development would profit from a holistic approach that combines different CE instruments and enablers, and an understanding of the multi-faceted interventions required to bring innovative products and services to market.

ANNEXES

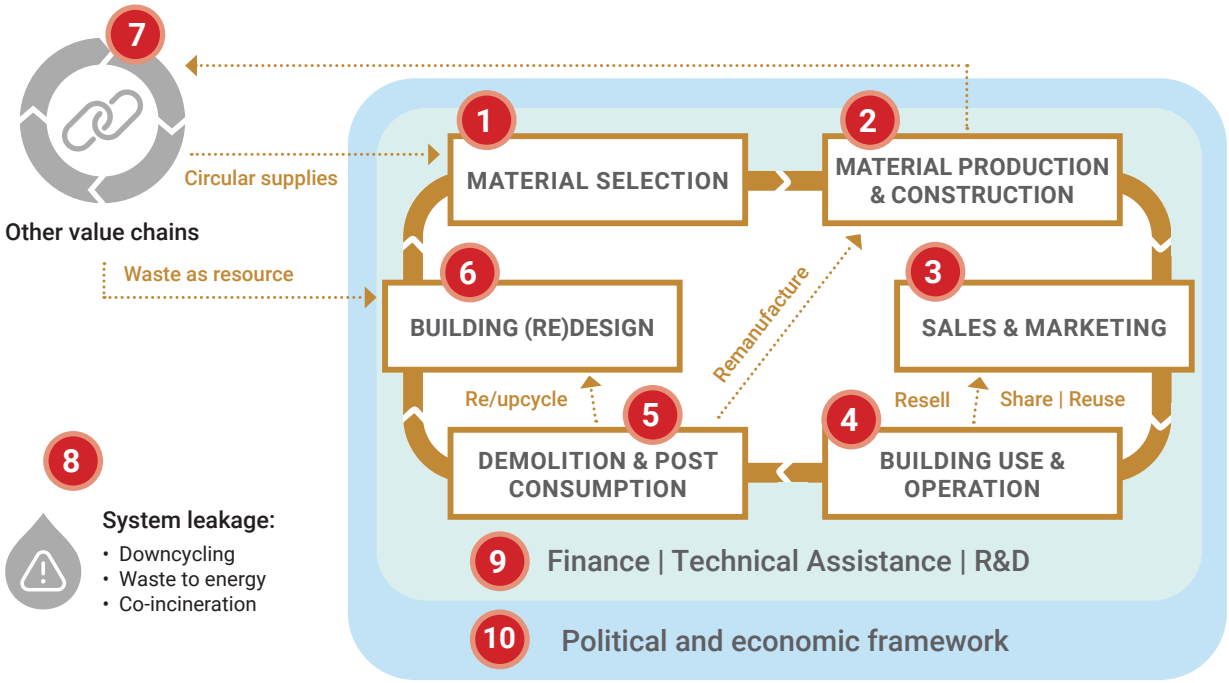
Annex 1. CE strategies and enabling policy instruments for Circular Plastics



1 2 5 6 7 9	3 9	5 6 7 10
Shift to circular supplies	**Providing plastics (packaging) as a service**	**Recover after disposal**
• Reconstruct value chains with alternative, low-impact and recycled (packaging) material • Rethink the product chain (water fountains)	• Develop new models of ownership for higher material value retention • Adapt subscription model (rental, leasing, servitisation)	• Separation, collection and recycling • Design for disassembly, reassembly or recycling • Upcycling

1 4 5 6 8	1 4 5 6	1 3 10
Increase resource efficiency	**Facilitate demand for circular plastics economy**	**Extend the life-time of plastics (packaging)**
• Cleaner production and pollution prevention • Design Zero Waste Production	• Acceptance and information need • Availability and reliability of post-consumer recycled plastic	• Design for durability and modularity • Repairing and upgrading • Reuse/repurpose plastic packaging

Annex 2. CE strategies and enabling policy instruments for Circular Buildings



1 2 4 6 7	2 6	3 4 5 6
Shift to circular supplies	**Rethink building concepts**	**Material recover post-demolition**
• Reconstruct value chains with regenerative, low-impact, local and recycled material • Develop partner networks	• Use of locally adapted architecture • New models of ownership resulting in higher material value retention • Specify recyclable materials • Reduce resource consumption during use of the building	• Selective demolition • Enable reuse of building components through collection and recycling/remanufacturing • Design for disassembly, reassembly or open- or closed-loop recycling
2 6	**3**	**2 4 5 6**
Resource efficient construction: enabling legislation and innovation	**Create demand for circularity**	**Extend the life-time of buildings**
• Resource-efficient/zero waste construction and use phases and prolonged lifespan • Limit hazardous materials • Take-back schemes for unused construction materials & packaging and integrating into other sectors/value chains • Mainstream circularity through GPP, infrastructure investments	• Raise awareness among consumers • Support uptake through programmes and incentives • Champion industry pioneers	• Design for adaptability, reuse, durability and modularity • Repairing and upgrading

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