

# Technical Assistance Closure Report Template

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## Objective of the technical assistance (TA) Closure Report:

- To communicate publicly in one document a summary of progress made and lessons learned during the TA towards the anticipated impact (sections 1-4).
- To document qualitative and quantitative data collected during TA, for use in donor and UN reporting (Annex 1).

## Steps for completing the TA Closure report:

1. The lead TA implementer submits the closure report at the end of the technical assistance as a final deliverable. The TA closure report will capture outputs, outcomes and impacts of all activities conducted under the TA. Please copy and summarize relevant material from previous TA outputs/deliverables and the Response Plan, as relevant.
2. A CTCN Manager will review and revise the closure report before final approval by the CTCN Deputy Director.

## Important note on public and internal use of the closure report:

Once approved by the CTCN Deputy Director, the TA closure report will be a public document available on the CTCN website [www.ctc-n.org](http://www.ctc-n.org). Selected content will be used for targeted communication activities. Annex 2 is for internal use only and will not be publicly available.

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## Closure Report for CTCN Technical Assistance

### 1. Basic information

Title of response plan	Development of an STI-led cross-sectoral Circular Economy Roadmap for abating GHG emissions in South Africa:  "STI4CE Strategy for South Africa"
Technical assistance reference number	2021000036
Country / countries	South Africa
NDE focal point and organisation	Department of Science and Innovation (DSI)  Henry J. Roman Linda Godfrey (CSIR)
Proponent focal point and organisation	CE Sectors and economically relevant priority sectors that align with the public agenda, e.g. Decadal Plan. All economically relevant sectors will be considered in a broader sector assessment. Based on the findings, five sectors will be prioritized that the Strategy will focus on.
Designer of the response plan	CTCN and beneficiary (Department of Science and Innovation South Africa)

Implementer(s) of technical assistance	Trinomics and ACEN Foundation
Beneficiaries	<p>The primary beneficiaries are Government Departments driving Circular Economy uptake in South Africa, these are:</p> <ul style="list-style-type: none"> <li>- Department of Science &amp; Innovation (DSI), and</li> <li>- Department of Forestry, Fisheries &amp; Environment (DFFE)</li> </ul> <p>The Strategy will ultimately benefit all economic sectors in CE and GHG abatement.</p>
Sector(s) addressed	Economically relevant priority sectors that align with the focus areas highlighted in the Decadal Plan have been selected, which are mining, manufacturing and agriculture as well as water and energy as cross-cutting sectors. All possibly relevant economic sectors were analyzed and considered beforehand, based on the project teams' findings and client input.
Technologies supported	Although no specific technologies were promoted during the development of the Strategy, future pilot projects will consider Technology Readiness Level above 4. A Guideline (D5) was developed for the selection of suitable future pilot projects.
Implementation period and total duration in months	The initial project period of 10 months (March 2023 – December 2023) was extended to 12 months (March 2023 – March 2024) as per the Application for extension to CTCN of 8 November 2023.
Total Budget	USD 231 130
Description of delivered outputs and products as well as the activities undertaken to achieve them. (Refer to Annexure 1)	<p>Output 1: Development of work plan and related communication documents</p> <p>Output 2: Diagnosis of Circular Economy Landscape</p> <p>Output 3: Identification of circular economy priority areas and activities for STI in South Africa</p> <p>Output 4: Development of an STI4CE Roadmap (Subsequently referred to as Strategy not Roadmap)</p> <p>Output 5: Identification and preparation of Circular Economy Pilot Project</p> <p>Output 6: Capacity Building &amp; Closure</p>
Methodologies applied to produce outputs and products	<ul style="list-style-type: none"> <li>• Literature review</li> <li>• Desk research</li> <li>• Survey</li> <li>• Material flow analysis</li> <li>• Focussed specialised workshops with specific stakeholder groups</li> <li>• Specialist in-person Hackathon: Team/DSI specialist working session</li> <li>• Specialist structured 1 on 1 interviews</li> </ul>
Deviations	<p>The following deviations occurred:</p> <p><b>Project title:</b> On request from the client (DSI) the project titles was change from development of a STI4CE Roadmap to development of a STI4CE Strategy.</p> <p><b>Project champion change:</b> The DSI project Director and champion who was instrumental in the development of this EOI resigned from his position at DSI during the early course of the project, leading to a handover of PM to his successor.</p> <p><b>Timeframe extension:</b> Project timeframe was extended from closure in December 2023, to closure in March (May) 2024.</p>

	<p><b>Demonstration project (D5):</b> The deliverable linked to development of a pilot project were changed by DSI to the development of a step-by-step guideline for selection of suitable pilot projects, integrating different existing methodologies.</p> <p><b>Capacity Building workshop (D6):</b> Originally, it was planned to hold a final workshop to present the approved (by the Executive Council) and final version of the STI4CE Strategy (incl. adjustments/edits from DSI side), and execute a capacity training for the DSI officials to equip them with the knowledge, skills and tools to implement the Strategy. However, considering that:</p> <p>(1) the project has reached its maximum timeframe,</p> <p>(2) the project team has executed additional activities that justify the budget for D6: the team has held an additional team workshop (“hackathon”) to align the project outcomes to the revised scope and two additional online stakeholder workshops (for the research community and cross-departmental government officials) and with that has indirectly contributed to capacity building through the workshops and interviews,</p> <p>(3) DSI has not secured the approval of the Executive Council yet (and subsequently integrated their adjustments in the Strategy),</p> <p>during the closure meeting, all parties agreed to cancel this workshop and approve the closure of the project as per contract. Respectively, the adoption of the Strategy by the Executive Council, additional stakeholder consultation and future workshops will be driven by the DSI.</p> <p>The client expressed gratitude for the many hours of work done beyond and above the original scope. The proof of the additional activities are forwarded together with this report. (Attachments referring to Workshop 3 and 4, and Interview Guide)</p>
<p>Anticipated follow-up activities and next steps</p>	<p>The following next steps are anticipated:</p> <ol style="list-style-type: none"> <li>i. Adoption of STI4CE Strategy by Executive Council – DSI</li> <li>ii. Consultation and workshops on draft reports (incl. integration of minor changes) – DSI</li> <li>iii. Share final STI4CE Strategy with CTCN – DSI</li> <li>iv. Communication of STI4CE through internal and external channels – DSI</li> <li>v. Identification of Demonstration Projects under upcoming DSI sector consultation initiatives, based on D5 – DSI</li> <li>vi. Finalise Closure report (this report) – ACEN Foundation</li> <li>vii. Final invoicing – ACEN Foundation</li> </ol>

## 2. Lessons learned

	Lessons learned	Recommendations
<p>Lessons learned from the CTCN TA process</p>	<ol style="list-style-type: none"> <li>1. Importance of creating realistic expectations of the timelines and delays which may occur when</li> </ol>	<ol style="list-style-type: none"> <li>1. Develop clear and realistic timeframes at the onset of the application process and obtain</li> </ol>

	<p>working in complex Government driven projects.</p> <ol style="list-style-type: none"> <li>2. Importance to engage all governmental and non-governmental stakeholders from the onset of the project to secure engagement and support.</li> <li>3. Importance of identifying the correct/ mandated official in the various government departments and to clarify at the onset of the project how project information will be communicated (email, WhatsApp, workshops) and what the expectations are on their involvement and inputs.</li> <li>4. Importance to foresee sufficient time to receive feedback on draft documents from public authorities and key stakeholder. Try to increase the quality and quantity of the inputs.</li> <li>5. Importance to ensure continued and ongoing project ownership by</li> </ol>	<p>input and buy-in from all parties to timeframes and possible delays at the onset of the project – establish a project management team as well as project management plan and processes, developed and owned by both client and consultant.</p> <ol style="list-style-type: none"> <li>2. Conduct extensive stakeholder analysis, mapping stakeholder and engagement plan, co-developed by client and consultants. Maintain frequent communication to stakeholders engaged and involved (even if it is just a small progress update, but thereby people will feel appreciated, the project/topic will remain on their radar and it might also stimulate more collaboration).</li> <li>3. Ensuring project proponent engagement and ownership before and from the outset of the project. Show the added value for them and overall importance to get engaged in this project.</li> <li>4. Ensuring all relevant stakeholders are involved in initial stakeholder outreach activities, with special focus on the kick-off meeting (when they feel engaged, they might be more inclined to respond). Find innovative and interesting ways to consult and collect feedback (this however might need more workshop/consultation budget).</li> <li>5. Consider use of existing Government communication platforms to communicate project</li> </ol>
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	<p>Government representatives, regardless of change in project lead (thereby avoiding delays, misunderstandings and change of expectations).</p> <p>6. Issues on internal alignment within sectors in the departments where mining, manufacturing and agriculture were developing their own strategies with independent consultants at the same time. This was not communicated, information/findings were not shared and they were not linked timeously to this project.</p> <p>7. Importance to keep up the ownership, engagement and communication in (lead) departments, regardless of internal changes.</p>	<p>information to all departments (internal servers/websites/notice boards, intergovernmental department meetings).</p> <p>6. This connects to recommendation no. 2 and 3. Identifying and involving counterparts of other relevant departments might encourage the information flow.</p> <p>7. Request clear contingency planning/succession planning of project lead/client champion on both client and consultant side to mitigate any risks of key roles changing during the contract.</p> <p>Others:</p> <ul style="list-style-type: none"> <li>• If local stakeholders do not respond via email, WhatsApp is a means of communication more commonly used.</li> </ul>
<p>Lessons learned related to climate technology transfer</p>	<p>N/A (DSI did not want technology-specific recommendations or project developments, rather specified methodologies and systems to assist selection)</p>	<p>N/A</p>

### 3. Illustration of the TA and photos

The predominantly South African-based project team, composed of experts from Trinomics, ACEN Foundation and ICLEI worked closely with the Department of Science and Innovation (DSI) and the Climate Technology Centre Network (CTCN) to develop a Science, Technology and Innovation Strategy to support an inclusive, just, climate resilient Circular Economy Transition in South Africa (STI4CE Strategy).

## Introduction: Project team





*The project team: Predominantly local South African consultants (8/11)*

The Strategy aims to guide government in its strategic direction and investment in CE-related STI activities and encourage coordination and collaboration between the public and private sectors and the national system of innovation (NSI) over the 10-year period 2024 to 2034. Arriving at the final version of the STI4CE Strategy (D4) included the following intermediate outputs: D2 and D3 as comprehensive status quo analysis on CE in South Africa (including sector analysis) and on STI CE, based on desk research, analysis, a workshop and a survey. Another output under this project has been D5: a step-by-step methodology for identifying and choosing demonstration projects under the upcoming consultation initiatives of DSI (having started in June for the mining sector), facilitating the transition from theoretical opportunities to practicable and scalable demonstration projects with a high potential for circularity and greenhouse gas emission reduction. The final deliverable (D6: Capacity building) has been executed alongside with the previous deliverable, especially during the development process of D4. Four multi-sectoral workshops (1 in-person, 2 online) have been organised to inform, engage and consult diverse stakeholders as well as multiple 1-o-1 interviews with government staff (incl. building understanding and capacity building on CE and STI, and the Strategy before collecting their feedback/inputs).



The following slides outline key discussion points that have been investigated throughout the project's consultations.

## Discussion points




For ease of preparation please note that our discussion will be guided by the following questions:

1. **Understanding STI:** Name any initiatives in your department/business which may be linked to STI
2. **Understanding CE:** Can you think of an example of how you could introduce circular economy into your department/organisation/business?
3. **Risks:** Are there any risks to the implementation of this project that you are aware off (organisations, resources, priorities ) What can be done to mitigate the risks?
4. **Low hanging fruit:** Are there any contact, projects, or initiative that you would like to bring to our attention? ( who and what have we missed)






The following slides were extracted from the various Power Point presentations developed in this project, highlighting key components of this TA:

## Background: CE a & STI


Trinomics 

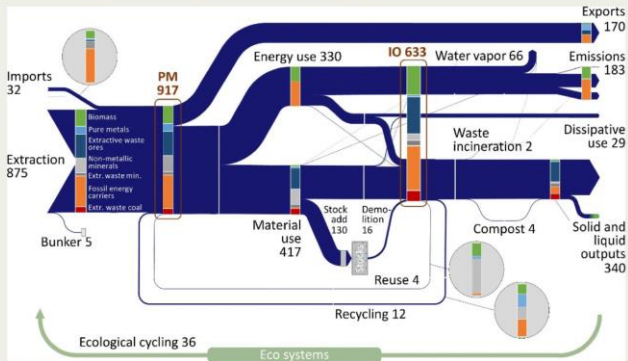
- South Africa has a multitude of plans, strategies and agencies all pointing to the fact that a transition to sustainable economic growth through circular economy principles holds the future success of the country in its hands.
- Circular economy synergises well with economic diversification as well as industrialisation policies that are high on Africa's political agenda.
- It also provides a paradigm for the development of new economic activities which ultimately promises the creation of new jobs, while it simultaneously addresses some urgent environmental and social problems in the continent, such as the growing problem of plastic waste pollution
- Science, technology and innovation are the keys to unlocking this path and holds the promise of sustainable economic transformation and diversification in those very sectors that currently have the greatest impact on GHG emissions.






## Material Flow Analysis

Trinomics 



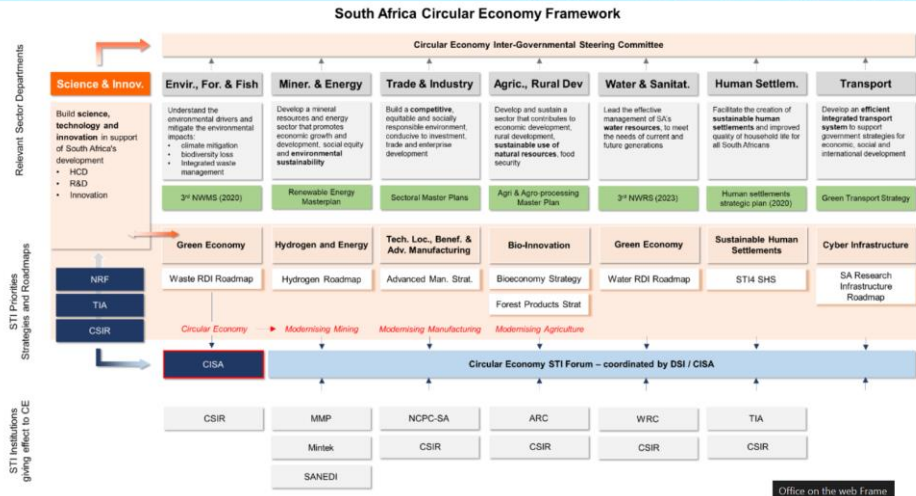
- South Africa's economy is materially dominated by export-oriented extractives: coal, iron ore and other ores needed for steelmaking.
- The energy system is dominated by fossil fuels.
- Pockets of high circularity in the domestic economy exist.
- Bio-based flows are sizeable at 17% of domestic extraction.



## Strategic objectives

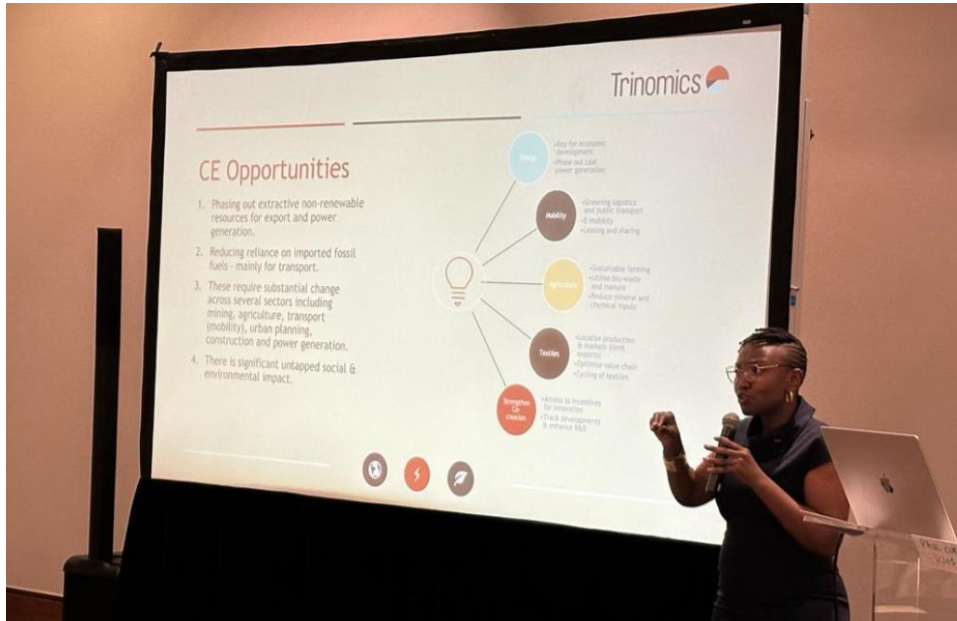
Strategic Objective 1. Enhance inter-governmental, inter-sectoral and multistakeholder collaboration	Strategic Objective 2. [Re-] Direct finance flows toward CE STI activities	Strategic Objective 3. Integrate CE into higher education and training	Strategic Objective 4. Build and use an evidence base for CE	Strategic Objective 5. Enable implementation of CE through business support, capacity building and demonstration
<ol style="list-style-type: none"> <li>1. Improve collaboration, shared learning, and communication between government departments</li> <li>2. Improve collaboration and communication between the NSI and the private and public sectors for greater uptake and impact of STI4CE across economic sectors</li> <li>3. Facilitate international collaboration for STI4CE production and uptake in South Africa</li> </ol>	<ol style="list-style-type: none"> <li>1. Mobilise and streamline funding for R&amp;D through alignment and collaboration between government departments</li> <li>2. De-risk CE through the allocation of catalytic funding for demonstration projects and implementation programmes</li> <li>3. Empower and enable entrepreneurs, particularly SMMEs, to produce new innovations and attract funding</li> <li>4. Leverage industry funding for STI development and uptake</li> <li>5. Attract and secure international funding through leveraging STI4CE</li> </ol>	<ol style="list-style-type: none"> <li>1. Embed CE in higher educational programmes</li> <li>2. Ensure that businesses of all sizes are aware of, and can access, upskilling opportunities related to, STI in the CE</li> </ol>	<ol style="list-style-type: none"> <li>1. Strengthen the evidence base with unbiased, verifiable data</li> <li>2. Promote interdisciplinary and trans-disciplinary research as well as cross-university collaboration</li> <li>3. Identify and prioritise research needs related to the CE with public and private actors.</li> <li>4. Develop processes that ensure that research outcomes are fed into practice</li> </ol>	<ol style="list-style-type: none"> <li>1. Mainstream STI4CE in South African policy and practice</li> <li>2. De-risk small business practices through partnership with business incubators and the deployment of knowledge for building more robust business models through STI</li> <li>3. Promote the uptake of STI4CE by local governments and support innovation through practice.</li> <li>4. Reduce barriers for entrepreneurs and businesses to utilise and apply for new Patents and IPs</li> </ol>

# Implementation



Selected photos:





#### 4. Impact Statement

The information in the table below will be used to communicate results and anticipated impacts of this technical assistance publicly. Please copy information from impact statement developed in the M&E Plan and update as relevant.

Impact Statement	
Challenge	<p>South Africa (SA) still operates in the linear economy, with the biggest and still growing resource heavy industries of mining, agriculture, human settlements, manufacturing, and transport still heavily dependent on fossil fuels for energy. High levels of mineral resources extraction and its export still dominates mining activities, use of chemical fertilizers still dominates in agriculture, heavy reliance on virgin materials and their disposal at the end of life is the order of the day.</p> <p>The overarching and interconnected challenges occurring in SA that could be mitigated by the mainstreaming of Circular Economy (CE) include:</p> <ul style="list-style-type: none"> <li>• Insufficient waste management (e.g. 10.2 million tons of food waste are generated every year), causing environmental pollution and costs while leaving unexplored economic opportunities;</li> <li>• Slow progress in mitigating GHG emissions, decelerated by environmental pollution, through improper (organic) waste management (increased Methan contribution from 11.9% to 12.7% between 2000 and 2020) as well as the direct discharge of the extractive and producing industry (IPPU, incl. metal, mineral and chemical industry as well as AFOLU, incl. livestock industry);</li> <li>• Social and socio-economic shortcomings, like inequality (Gini Coefficient of only 63), unemployment (33.9%) and poverty (50% of the population)</li> </ul>

	<p>enhanced through water scarcity and food insecurity, with an increasing number of informal settlements (from 300 to 2225 between 2002 and 2016).</p> <p>These challenges are reinforced by several barriers present in the South African context:</p> <ul style="list-style-type: none"> <li>• Lack of enabling policy, policy coherence and enforcement – no overarching policy dedicated to implementing circular economy in SA;</li> <li>• Lack of planning and coordination of initiatives and policies;</li> <li>• Structural limitations;</li> <li>• Lack of a holistic understanding of circular economy principles, strategies and opportunities as well as related economic, environmental and social opportunities;</li> <li>• Lack of awareness in the public and private sectors as well as on the consumer level;</li> <li>• Lack of funding;</li> <li>• Lack of inclusivity of small-scale producers and businesses;</li> <li>• Technology gap and access to technologies;</li> <li>• Lack of skills and capacity, present throughout the public, private and educational sectors → need for re-skilling;</li> <li>• Lack of waste separation at source as well as the overall waste management infrastructure.</li> </ul> <p>However, a slow but steady change towards a circular economy is noticeable in SA. This, for instance, includes the rise in number of recycling companies (300+) in sectors such as e-waste, agriculture and waste, as well as overall an incline in urban mining activities. Innovation and ICT-driven solutions have been identified as enablers, but these are largely dependent on access, finance and skills.</p>
<p>CTCN assistance</p>	<p>In order to turn around present challenges and shortcomings that the country faces and reap the opportunities under the circular economy, it is necessary to develop an overarching national circular economy policy strategy that (1) clearly lays out the transformational journey until 2030, (2) encourage coordination and collaboration amongst the government departments and its major stakeholders, including the private sector, (3) embraces the catalytical role of Science, Technology and Innovation (STI) and (4) includes a pilot project. This will enable South Africa to make fast and effective progress in a structured and inclusive way in order to reach its larger national effort to transition towards circular economy.</p> <p>This Technical assistance aimed to contribute to the transformation from a primarily linear economy to a more circular economy in SA. The following elements have been developed under this assignment:</p> <ul style="list-style-type: none"> <li>• A comprehensive diagnosis of the circular economy landscape in South Africa;</li> <li>• the identification of circular economy priority areas and activities for Science, Technology and Innovation (STI) in South Africa;</li> <li>• the development of a national STI4CE Strategy;</li> <li>• the identification and preparation of a circular economy pilot project selection criteria.</li> </ul>
<p>Anticipated impact</p>	<p>With this Technical assistance, it is aimed to produce a national strategy that guides SA on its way towards circular economy, which is based on evidence-led and knowledge-based policy making. It will have science, technology and innovation (STI)</p>

	<p>at its very center and the contribution to reaching GHG abatement goals faster as one of its key objectives. Ultimately, it will support the Department of Science and Innovation (DSI) in coordination and collaboration amongst the government departments and its major stakeholders, including the private sector, and their activities/initiatives.</p> <p>While developing this document, a crucial component was alignment with existing policies and regulation, ensuring a reinforcing and supportive relationship. This relates to the indicator <i>Total number of policies, strategies, plans, laws, agreements or regulations supported by the assistance.</i></p> <p>At the same time, the stimulation of R&amp;D and the integration of STI will be a key component in the identification of guidelines to choose future pilot projects, leveraging on available and ‘ready’ technologies. Hence, the indicator <i>Anticipated number of technologies transferred or deployed as a result of CTCN support</i> could be of relevant during future use of this framework.</p> <p>Finally, additional impacts – as listed in the Response Plan – are anticipated resulting from the implementation of this project, which are:</p> <ul style="list-style-type: none"> <li>• <i>Reduction of waste material and of virgin resource utilization through R&amp;D and innovation to close material loops;</i></li> <li>• <i>Increase of renewable energies share through R&amp;D and innovation on CE concepts;</i></li> <li>• <i>Reduction of GHG emissions through RE increase and reduction of virgin resource utilization.</i></li> </ul> <p>However, these impacts will occur, and thus only be measurable, after the extended implementation of this project, which is why their development and progress will be included in the M&amp;E of STI4CE Strategy.</p>
<p>Anticipated co-benefits from the TA</p>	<p>As a result of the technical assistance, there are several co-benefits expected, which are primarily related to the empowerment of women, youth and other vulnerable groups as well as to longer-term resilience and improvement of life quality:</p> <ul style="list-style-type: none"> <li>• Ongoing capacity building and skills enhancement was provided to women in sectors linked to the circular economy, especially in the context of R&amp;D and innovation activities;</li> <li>• Opportunities for marginalized and rural communities are envisaged to build a stronger connection between rural, per-urban and urban area;</li> <li>• Increasing the life quality of the population in the long-run through proper waste management and (potentially) a reduction of harmful processes of raw material extraction;</li> <li>• Supporting the diversification of the economy and the local value creation through actions that might prolong the value chain on SA ground.</li> <li>• Profiling of DSI as STI4CE thought woman leaders in Science in Government– see Prof Linda Godfrey’s award (<a href="https://www.linkedin.com/posts/prof-linda-godfrey-4656616_what-a-night-thank-you-to-the-national-science-activity-7217286311299149825-81SL?utm_source=share&amp;utm_medium=member_desktop">https://www.linkedin.com/posts/prof-linda-godfrey-4656616_what-a-night-thank-you-to-the-national-science-activity-7217286311299149825-81SL?utm_source=share&amp;utm_medium=member_desktop</a> )</li> <li>• Profiling the of Excellence in Science through project team member Prof Tebogo Mashifana - <a href="https://mg.co.za/partner-feature/2024-07-12-the-environmental-chemist/">https://mg.co.za/partner-feature/2024-07-12-the-environmental-chemist/</a></li> </ul>

<p>Gender aspects of the TA</p>	<p>The project aims to promote inclusivity and actively involve women at each stage of its implementation and ensure that their participation is brought in at all levels of decision making. This technical assistance will facilitate women’s participation in the following ways:</p> <ul style="list-style-type: none"> <li>• Project team diversification: The professional consulting team involved in the development of this strategy included 8 local professional consultants including 2 black female engineers, one black female gender expert from ICLEI and 2 professional women in the Foundation team</li> <li>• The DSI/CSIR project team predominantly consisted of women, predominantly of colour</li> <li>• Decision making: Female professionals within the various institutions participating in stakeholder workshops, strategy development and departmental sector management were dominant throughout</li> <li>• Capacity building: all workshops and capacity building included women participants on an equitable basis</li> <li>• Gender perspective in outputs: All activities and outputs under this technical assistance were developed integrating a gender perspective. This refers to the market assessment, identification of best practices, development of the STI4CE strategy and necessary actions, and the pilot project selection criteria.</li> <li>• Given the STI lens on circular economy approaches, special attention to implementing the gender lens will be paid to the political, social and economic environments which block or enable uptake of STI professions by women.</li> </ul> <p>Key responsibility to ensure gender intentions were ensured by the Gender expert from ICLEI Africa, who was part of the team.</p>
<p>Anticipated contribution to NDC</p>	<p>The updated NDCs set more stringent targets in terms of GHG reductions for South Africa up until 2030. Key mitigation areas include mining, manufacturing and agriculture, which are all linked to circular economy concepts.</p> <p>This assignment’s outcome will directly contribute to reducing SA’s overall GHG emissions contingent. Concrete actions enhancing circularity in focus areas and sectors, will directly contribute to a faster and structured reduction of GHG emissions in chosen sectors – 45% of all emissions can be linked to the production and management of materials.</p>
<p>The narrative story</p>	<p>South Africa is ranked as the 36th largest economy in the world yet ranked 89<sup>th</sup> in terms of GDP per capita, underpinning the fact that the country is ranked with the lowest level of income equality in the world, and currently locked into unsustainable linear economic models and primary resource extraction. At the same time, South Africa is ranked as the 11<sup>th</sup> largest emitter of plastic waste into the environment and one of the world’s worst air quality locations, specific to the Mpumalanga province with its many coal-fired power stations and petrochemical industries. From such rankings, one would expect a thriving industrialised nation. On the contrary, SA’s economy is strangled by constant loadshedding (electricity blackouts) and marked by high unemployment rates, exacerbating the worst global ranking hovering at around 33% currently.</p> <p>However, SA is somewhat unique on the African continent with a highly diversified economy, illustrating intense linear lock-ins, specifically in energy and petrochemicals, agriculture, transport, mining, water and infrastructure – all of</p>

	<p>which are the highest ranked sectors in GHG emissions. This is globally recognised and now supported by international efforts to remediate the situation, such as the recent pledges to transform via financial commitment like the €8.4 billion allocation to a Just Energy Transition Partnership (JETP) from northern trade allies.</p> <p>SA has a multitude of plans, strategies and agencies all pointing to the fact that a transition to sustainable economic growth through CE principles holds the future success of the country in its hands. Science, technology and innovation (STI) are the keys to unlocking this path in a manner that is not only just, but holds the promise of sustainable economic transformation and diversification in those very sectors that currently have the greatest impact on GHG emissions. Appropriate skills development and job-creation are directives and impacts that can be realised through such a circular transition.</p> <p>Selected industries, such as energy, agriculture, manufacturing and mining, are primed for a transition to a CE and principles of circularity and resource re-utilisation are on the rise. Recorded decreases in agricultural productivity, forestry and fisheries are attributed to linear economic models (as well as political indifference, corruption and trade issues) that are under increasing additional vulnerability due to climate change. Ongoing water scarcity, land reform policies, unsustainable farming practices and climate change related impacts have all contributed to a decline in the country's GDP and investment grade.</p> <p>The rest of Africa looks to SA as the leader in economic development and prosperity, and the international community recognises this. Targeting viable and prosperous interventions in SA is the key to transforming all of Africa and thus essential that this project will lead the sustainable path forward to our African counterparts. As much as the principles of circularity show the path, STI are the keys to drive this change.</p> <p>There are multiple barriers to this change that need to be addressed in this intervention from politics to vested interests, corruption, regulation and legislation or certification and compliance. However, the focus needs to be on practically illustrating exactly how STI can realistically, and economically viably, make the changes so desperately needed in SA.</p> <p>There are already a multitude of innovation and technology-based approaches based in SA, through SA scientists, that struggle to get traction in this country and yet find fertile grounds internationally. This project has drilled through the sectors to highlight these opportunities and unpack the financial, environmental and social benefits that they offer. SA has this unique opportunity to be the agent of change for Africa, and this project through CTCN offers massive scope for GHG abatement and climate change mitigation with sterling partnerships through the Department of Science and Innovation (DSI) and the Council for Scientific and Industrial Research (CSIR).</p>
<p>Contribution to SDGs</p>	<p>Under this project, several SDGs will be tackled with a direct relation. These are:</p> <ul style="list-style-type: none"> <li>• <i>SDG 6 Clean water and sanitation:</i> The water and energy sectors were dealt with together as cross cutting. The project will build upon existing works related to circularity in the water sector.</li> <li>• <i>SDG 8 Decent work and economic growth:</i> By developing actions to strengthen circularity in different priority sectors, it will inherently be contributed to diversify the economic landscape, support local value creation and enhance economic resilience.</li> </ul>

	<ul style="list-style-type: none"> <li>• <i>SDG 9 Industry, innovation and infrastructure:</i> Industry and infrastructure are important enablers to facilitate the circular economy. STI is a core element in this project, therefore, innovation will have an important focus, from the scientific perspective. The guidelines developed for the selection of future pilot projects focus on innovation elaborated as pilot project.</li> <li>• <i>SDG 11 Sustainable cities and communities:</i> Any kind of settlements are important sub-systems to test and implement circularity. Thereby, different kind of settlements, such as urban, peri-urban and rural, representing different kind of income classes and (in)formality categories, will be considered in the development of this project, so that actions and recommendations can be applied to different kind of geographic levels. It will also be ensured that local and national policymaking will be aligned to any extent possible.</li> <li>• <i>SDG 12 Sustainable consumption and production:</i> While this project won't neglect the consumer perspective, it will have a stronger focus on changes and improvements in production. However, the scope of this project also covers community-based solutions as well as building awareness and capacity on different levels, aiming to influence consumer behavior.</li> <li>• <i>SDG 5 Gender equality:</i> All our recommendations and actions have been reflected through the gender lens. Every solution proposed under this project entails an opportunity for vulnerable and marginalised groups.</li> </ul> <p>SDGs with a rather indirect relation, are:</p> <ul style="list-style-type: none"> <li>• <i>SDG 13 Climate action;</i></li> <li>• <i>SDG 14 Life under water;</i></li> <li>• <i>SDG 15 Life on land.</i></li> </ul>
Reference to knowledge products	<p>Link to TEC knowledge database: <a href="https://unfccc.int/ttclear/tec/documents.html">https://unfccc.int/ttclear/tec/documents.html</a></p> <p>Which knowledge products do you envisage to use? Please list:</p> <ul style="list-style-type: none"> <li>• <a href="#">Feasibility Study on introducing a hybrid GHG Reduction Technology for the Cement Sector Using Green Climate Fund (GCF) in South Africa</a></li> <li>• <a href="#">South–South cooperation and triangular cooperation on technologies for adaptation in the water and agriculture sectors</a></li> <li>• <a href="#">POTENTIAL OF South-South and triangular cooperation on climate technologies for advancing implementation of nationally determined contributions and national adaptation plans</a></li> <li>• <a href="#">Draft paper on mapping barriers and enabling environments in Technology Needs Assessments, Nationally Determined Contributions, and Technical Assistance of the Climate Technology Centre and Network</a></li> <li>• <a href="#">Innovative approaches to accelerating and scaling up implementation of mature climate technologies</a></li> <li>• <a href="#">TEC: Summary of the thematic dialogue on industrial energy efficiency and material substitution in carbon intensive sectors</a></li> <li>• <a href="#">Promoting climate technology entrepreneurship through incubators and accelerators</a></li> </ul>

## Annex 1 Technical assistance data collection

Please add quantitative and qualitative values for the indicators selected in the M&E plan and monitored throughout the technical assistance in the tables below. Indicators which have been monitored in addition to the proposed indicators below may be added at the end of table A. Non-relevant indicators should be left blank.

### A. Output and outcome indicators

<b>Indicator</b>	<b>Quantitative value</b>	<b>Qualitative description</b>
Please note indicators below highlighted as <b>anticipated</b>	<i>Numerals only; disaggregates must sum to the total</i>	<i>List the various elements corresponding to the quantitative value as well as timelines and responsible institutions</i>
Total number of events organized by proponents and implementing partners	8	<ol style="list-style-type: none"> <li>1. Kick off meeting</li> <li>2. Survey</li> <li>3. Interviews</li> <li>4. Workshop 1- Government</li> <li>5. Workshop 2 – Multi stakeholder</li> <li>6. Workshop 3 – Research Community</li> <li>7. Workshop 4 – Government</li> <li>8. Project Team Hackathon (2 days)</li> </ol>
Number of participants in events organized by proponents and implementing partners	197 Participants	12 Interviews 1 Survey (23 replies) 4 Workshop (152 participants)
Number of men	54	
Number of women	143	
Number of climate technology RD&D related events	1	Specialist Research Community Workshop
Number of participants in climate technology RD&D events	66	
Number of men	31	
Number of women	35	
Number of training organized by proponents and implementing partners	12	<i>12 One on one capacity building presentations and interviews with Government officials</i>
Number of participants in trainings organized by proponents and implementing partners	<i>12 One on one interviews</i>	<i>Government officials from various departments</i>

Number of men	4	
Number of women	8	
Total number of institutions trained	1	
Governmental (national or subnational)	At least 4 relevant departments	<p><i>Various departments in national government associated with circular economy:</i></p> <ul style="list-style-type: none"> <li>• <i>Department of Science, Technology &amp; Innovation</i></li> <li>• <i>Department of Forestry, Fisheries and Environment</i></li> <li>• <i>Department of Agriculture</i></li> <li>• <i>Department of Health</i></li> </ul>
Private sector (bank, corporation, etc.)		<i>n/a</i>
Non-governmental (NGO, University, etc.)		<i>n/a</i>
Percentage of participants reporting satisfaction with CTCN training (from CTCN training feedback form)	No training just capacity building slides	<i>Satisfied= 4+ on 5-pt scale</i>
Percentage of participants reporting increased knowledge, capacity and/or understanding as a result of CTCN training (from CTCN training feedback form)	<i>n/a</i>	<i>Increased knowledge, capacity and/or understanding= 4+ on 5-pt scale</i>
a) Percentage of men	<i>n/a</i>	
b) Percentage of women	<i>n/a</i>	
Total number of deliverables produced during the assistance (excluding mission, progress and internal reports)	6	<p>Output 1: Development of work plan and related communication documents</p> <p>Output 2: Diagnosis of Circular Economy Landscape</p> <p>Output 3: Identification of circular economy priority areas and activities for STI in South Africa</p> <p>Output 4: Development of an STI4CE Strategy</p> <p>Output 5: Step-by-step Guideline for identifying Demonstration Projects</p> <p>Output 6: Capacity building workshop to be planned and executed by DSI – guided by team input (see “Deviations”)</p>
Number of communication materials, including news releases, newsletters, articles, presentations, social media postings, etc.	4 – Workshop presentations 20 – Project progress presentations	<p><i>4 Project Power point presentations for project update</i></p> <p><i>20 Project Power point presentations for project meetings feedback</i></p>

Number of tools and technical documents strengthened, revised or developed	6 new	<ol style="list-style-type: none"> <li>1. <i>STI Diagnostics report</i></li> <li>2. <i>STI Analysis Report – Ecosystems &amp; opportunities</i></li> <li>3. <i>STI4CE Strategy</i></li> <li>4. <i>STI4CE Action Plan and sector actions</i></li> <li>5. <i>Supportive documents for sector actions</i></li> <li>6. <i>Step by step methodology to develop STI4CE Demonstration projects</i></li> </ol>
Number of other information materials strengthened, revised or created (For example training and workshop reports, Power Points, exercise docs etc.)	20 Project-related power point presentations	<i>Various power point presentations used in 4 workshops and 1on 1 engagement with Government officials</i>
Total number of policies, strategies, plans, laws, agreements or regulations supported by the assistance	1	STI4CE Strategy: A strategy to produce and use Science Technology and Innovation to support an inclusive, just, climate resilient circular economy transition in South Africa
a) Adaptation related		
b) Mitigation related		
c) Both adaptation- and mitigation related		<i>STI4CE Strategy</i>
<b>Anticipated</b> number of policies, strategies, plans, laws, agreements or regulations proposed, adopted or implemented as a result of the TA	1	STI4CE Strategy: A strategy to produce and use Science Technology and Innovation to support an inclusive, just, climate resilient circular economy transition in South Africa
a) Adaptation related		
b) Mitigation related		
c) Both adaptation- and mitigation related		STI4CE Strategy: A strategy to produce and use Science Technology and Innovation to support an inclusive, just, climate resilient circular economy transition in South Africa
<b>Anticipated</b> number of technologies transferred or deployed as a result of CTCN support	<i>n/a</i>	<i>n/a</i>

<b>Anticipated</b> number of collaborations facilitated or enabled as a result of technical assistance	<i>n/a</i>	<i>n/a</i>
Number of South-South collaborations	<i>n/a</i>	<i>n/a</i>
Number of RD&D collaborations	<i>n/a</i>	<i>n/a</i>
Number of private sector collaborations	<i>n/a</i>	<i>n/a</i>
Number of countries with strengthened National System of Innovation as a result of CTCN support	1	<i>South Africa</i>
<b>Additional indicators</b>		
Number of strengths identified	10	<p>Industrial and technological infrastructure for provision of basic services and industrial development</p> <p>Research and development for innovation and CE</p> <p>Innovation support for CE solutions</p> <p>Uptake of CE principles in policy / regulation</p> <p>Governance and leadership in CE</p>
Number of weaknesses identified	10	<p>Lack of business readiness in terms of CE</p> <p>Gaps in knowledge, data and understanding of CE</p> <p>Missing regulation and governance for CE</p> <p>No mainstreamed entrepreneurial support</p> <p>Gaps and financing and capital</p> <p>Weak industrial and technological research and innovation patenting</p>
Number of STI related member state initiatives identified in Africa		<p>46 International member state policies were identified</p> <p>Angola 10</p> <p>Botswana 8</p> <p>Eswatini 6</p> <p>Lesotho 1</p> <p>Malawi 4</p> <p>Mozambique 6</p>

		Namibia 6 Zambia 5
Number of Universities/Tertiary Institutions engaged in the project	12	Cape Peninsula University of Technology (CPUT), University of Manchester, University of Johannesburg Walter Sisulu University, University of Limpopo, Stellenbosch University, North West University, University of Pretoria, Tswane University, University of Western Cape, University of Kwa-Zulu Natal, University of Cape Town
Number of newly identified policies, stakeholders and initiatives	40 Policies 152 Stakeholders 16 Initiatives	Policy: 40 SA policies were identified related to sustainability, waste, water, energy, environmental protection, STI, CE, and climate.  Stakeholders: 152 Stakeholders were engaged during the process  Initiates: 16 High Level CE related initiatives were identified by key stakeholders
STI4CE Strategy:  Number of objectives and goals formulated by priority sector	5	5 Strategic Objectives were developed: <ol style="list-style-type: none"> <li>1. Enhance intergovernmental collaboration</li> <li>2. Direct Finance flows to STI for CE activities</li> <li>3. Integrate CE into Higher education basic education and training</li> <li>4. Build and use an evidence base for CE</li> <li>5. Enable implementation of CE through business support, capacity</li> </ol>

Number of activities and actions identified		<p>building and demonstration</p> <p>Each Strategic Objective has Strategic responses. There are <b>18 Strategic responses</b>, each with their unique action</p>
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**B. Core impact indicators**

Please fill in the tables for anticipated impacts of the CTCN assistance. Every technical assistance should contribute to at least one of the indicators below. For guidance on how to report on core indicators see the [‘M&E Guidance Document for TA Implementers’](#).

Largely “Not Applicable” considering this CTCN assistance was for the development of a national strategy, rather than specific project impacts and outcomes

Core indicator 1	Anticipated metric tons of CO <sub>2</sub> equivalent (CO <sub>2</sub> e) emissions reduced or avoided as a result of CTCN TA	
	Anticipated metric tons of CO <sub>2</sub> , equivalent emissions reduced or avoided as a result of the TA <b>on annual basis</b>	Anticipated metric tons of CO <sub>2</sub> , equivalent emissions reduced or avoided as a result of the TA <b>in total</b>
Quantitative value	n/a	n/a
Unit		
<p><b>Methodology</b></p> <p>Explain the method or process of verifying the indicator and how data was gathered</p>	n/a	n/a
<p><b>GHG assessment boundary</b></p> <p>Identify expected post-TA activities, associated effects and assess boundary for quantification of GHG emission reductions</p>	n/a	n/a
<p><b>Baseline candidates</b></p> <p>Define alternative technologies or practises used in baseline calculation to represent possible alternatives to the project activities</p>	<i>Future pilot projects need to develop baseline data</i>	<i>Future pilot projects need to develop baseline data</i>
<b>Baseline emissions</b>	<i>Future pilot projects need to develop baseline data</i>	<i>Future pilot projects need to develop baseline data</i>

Describe baseline scenario and emissions calculated		
<b>Assumptions</b> Describe assumptions made during calculation and quantification of GHG reductions	<i>Future pilot projects need to develop baseline data</i>	<i>Future pilot projects need to develop baseline data</i>

<b>Core indicator 2</b>	<b>Anticipated increased economic, health, well-being, infrastructure and built environment, and ecosystems resilience to climate change impacts as a result of technical assistance</b>  <i>Please provide a <b>qualitative</b> description of the anticipated impacts on the categories below</i>
<b>Infrastructure and built environment</b> Anticipated increased infrastructure resilience (avoided/mitigated climate induced damages and strengthened physical assets)	Guidelines for development of future pilot projects includes the assess feasibility, impact, and alignment with strategic objectives. Selection can be done using voting, scoring or a combination of both. Vote for demonstration projects that participants value most. The following high-level criteria to support with the voting or scoring for selection of demonstration projects: <ul style="list-style-type: none"> <li>- Potential to improve circularity;</li> <li>- Economic opportunity and impacts;</li> <li>- Feasibility;</li> <li>- Priorities/ interest for stakeholders and partners.</li> </ul>
<b>Ecosystems and biodiversity</b> Anticipated increased ecosystem resilience (areas with increased resistance to climate-induced disturbances and with improved recovery rates)	See high level criteria above
<b>Economic</b> Anticipated increased economic resilience (e.g. less reliance on vulnerable economic sectors or diversification of livelihood)	See high level criteria above
<b>Health and wellbeing</b> Anticipated increased health and wellbeing of target group (e.g. improved basic health, water and food security)	See high level criteria above

<b>Core indicator 3</b>	<b>Anticipated number of direct and indirect beneficiaries as a result of the TA</b>		
	<b>Direct beneficiaries</b>	<b>Indirect beneficiaries</b>	<b>Means of verification</b>
Adaptation related			<i>Describe calculation methods and assumptions made</i>
Mitigation related			<i>Describe calculation methods and assumptions made</i>

Both adaptation-and mitigation related			<i>Describe calculation methods and assumptions made</i>
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<b>Core indicator 4</b>	<b>Amount of funding/investment leveraged (USD) as a result of TA (disaggregated by public, private, national, and international sources, as well as between anticipated/confirmed funding)</b>		
	<b>Quantitative value</b> Value and currency	<b>Qualitative description</b> List the various elements corresponding to the quantitative value as well as expected timelines and responsible institutions	<b>Methods</b> Describe method use for quantification of funds leveraged including assumptions made and attention paid to causality, attribution and avoidance of double-counting
<b>Total</b> anticipated amount of funding/investment mobilised or leveraged (USD) as a result of the TA			
Anticipated amount of <b>public funding</b> mobilised from <b>national sources</b> (USD)			
Anticipated amount of <b>public funding</b> mobilised from <b>international and regional sources</b> as a result of the TA			
Anticipated amount of <b>private investment</b> mobilised (in USD) from <b>national sources</b> as a result of the TA			
Anticipated amount of <b>private investment</b> mobilised (in USD) from <b>international and regional sources</b> as a result of the TA			

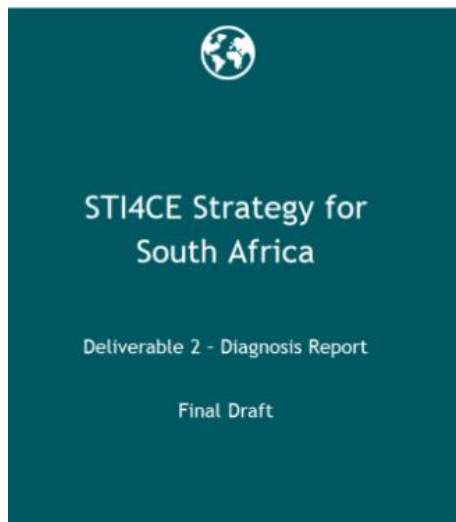
## **Annex 2 (for internal use – to be filled in by the CTCN)**

### **CTCN evaluation**

This section will be completed by the relevant CTCN Technology Manager.

- Evaluation of the timeliness of the TA implementation as measured against the timeline included in the response plan;
- Evaluation of TA quality as defined in the response plan;
- Overall performance of the Implementers;
- Overall engagement of the NDE and Proponent;
- Lessons learned on the CTCN process and steps taken by the CTCN to improve.

## **Annex 3: Summary of technical and strategic documents developed**



# Science Technology and Innovation for a Circular Economy Strategy

A strategy to produce and use Science, Technology and Innovation to support an inclusive, just, climate resilient circular economy transition in South Africa

**Annex 1 – Action Plan and Sector Actions**



# Science Technology and Innovation for a Circular Economy Strategy

A strategy to produce and use Science, Technology and Innovation to support an inclusive, just, climate resilient circular economy transition in South Africa

**Annex 2 – Supportive documents for sector initiatives**



# Science Technology and Innovation for a Circular Economy

Step-by-step methodology to develop STI CE  
Demonstration Projects

May 2024