

TOWARDS A SOUTH AFRICAN CIRCULAR ECONOMY MONITORING SYSTEM (SACEMS)

Consultation with stakeholders on draft indicators

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Project background and aims

- CE identified as key new source of economic growth and priority area for STI
- But currently no agreed upon approach to monitor the CE transition
- Need a holistic, consistent set of indicators to track SA's progress towards a CE
- Aim: To develop
 - a balanced suite of indicators for tracking SA's progress toward a CE (at national level)
 - guidance for monitoring and populating each indicator (data sources, custodians, monitoring frequency etc.).



Workplan

- Phase 1:
 - Develop framework and draft set of indicators (Nov 2023 – Dec 2024)
- Phase 2:
 - Testing of draft indicators with stakeholders
 - Final agreed set of indicators
 - Development of guideline on monitoring systems

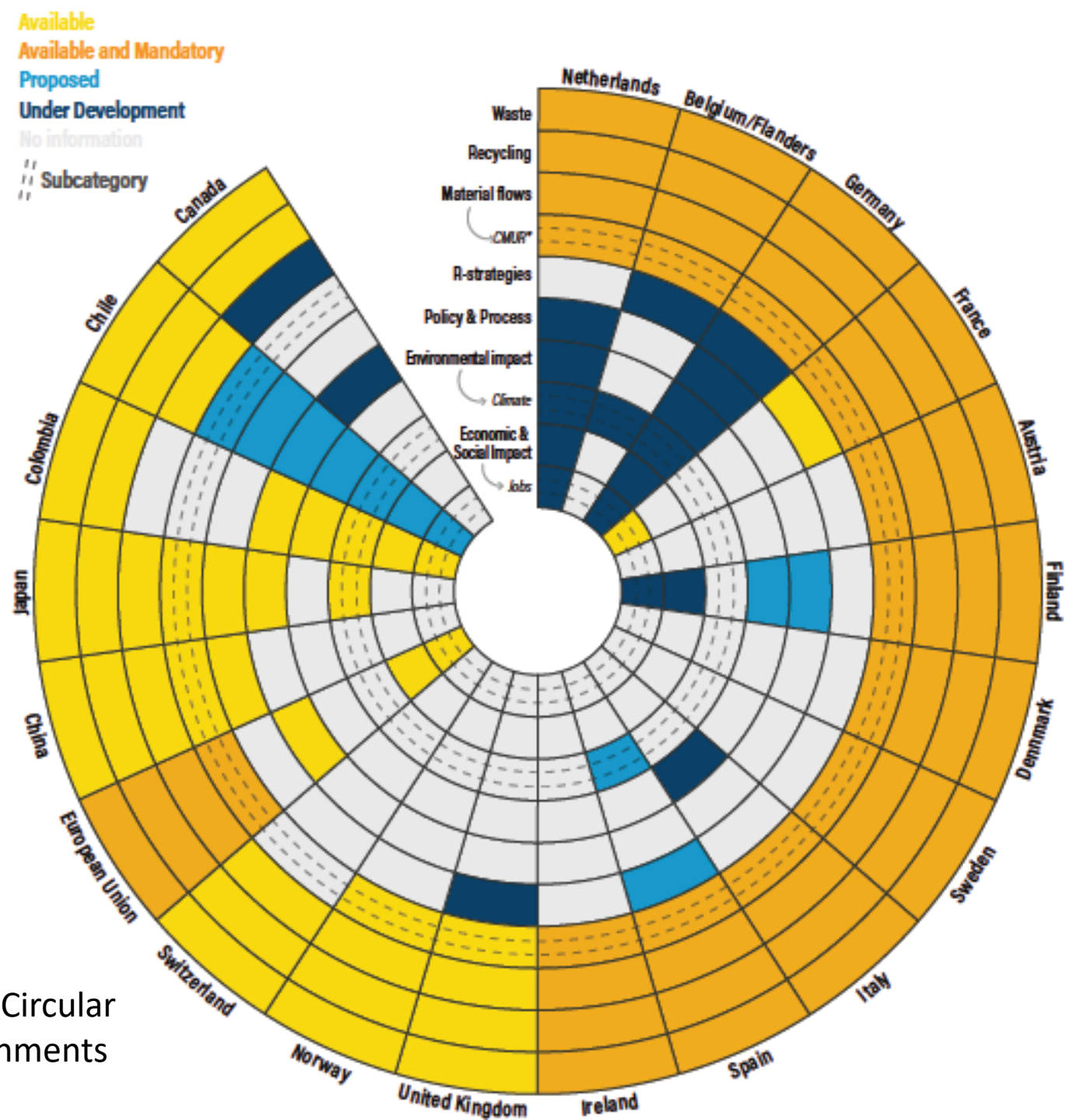
Phase 1 workplan

Activity	Timeframe	Outputs
Scoping	Nov 2023 – Feb 2024	Input / chapter in final technical report
Framework development	Jan – March 2024	CE framework (principles and criteria) section in final technical report
Indicator identification	April – September 2024	Input / chapter in final technical report
Reporting	October – December 2024	Technical report providing proposed draft set of circular economy indicators for SA

National level CE indicator initiatives

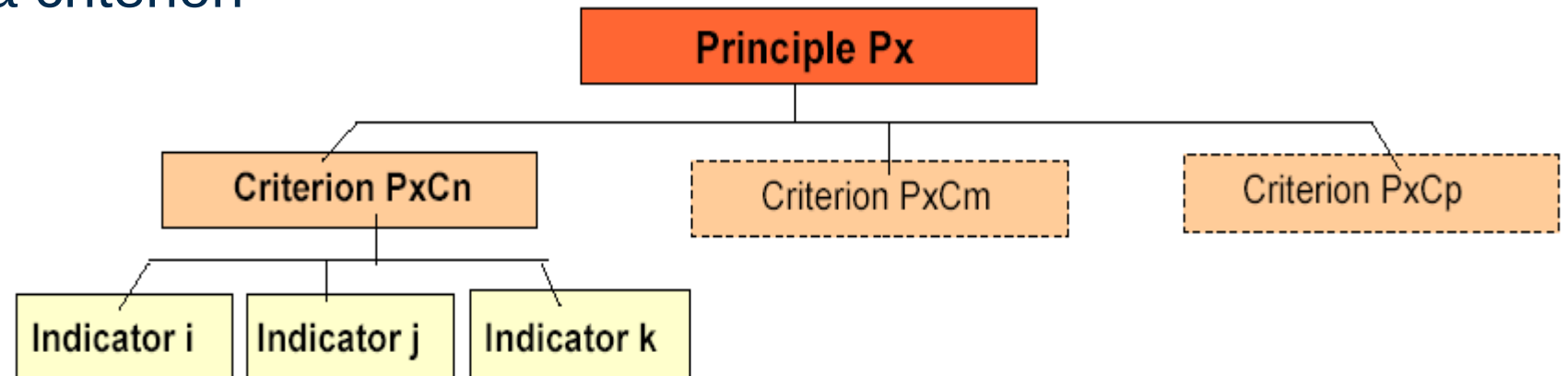
- Various regional and national level CE indicator have been developed
- Mostly in developed countries
- Most include indicators for waste, recycling and material flows; but lack indicators for the other “R-strategies”, environmental and socio-economic impacts, etc.

Source: PACE 2021: Circular indicators for governments



Approach for identifying CE indicators for SA: PCI framework

- Indicators for measuring progress toward a CE should be based on a structured framework developed on the basis of the CE principles
- PCI Framework:
 - **Principles:** fundamental laws/rules, serving as a basis for reasoning & action
 - **Criteria:** desired states of the system, which should be in place as a result of adherence to a principle
 - **Indicators:** qualitative or quantitative variable that can be assessed to check compliance with a criterion



Deriving the CE Principles & Criteria

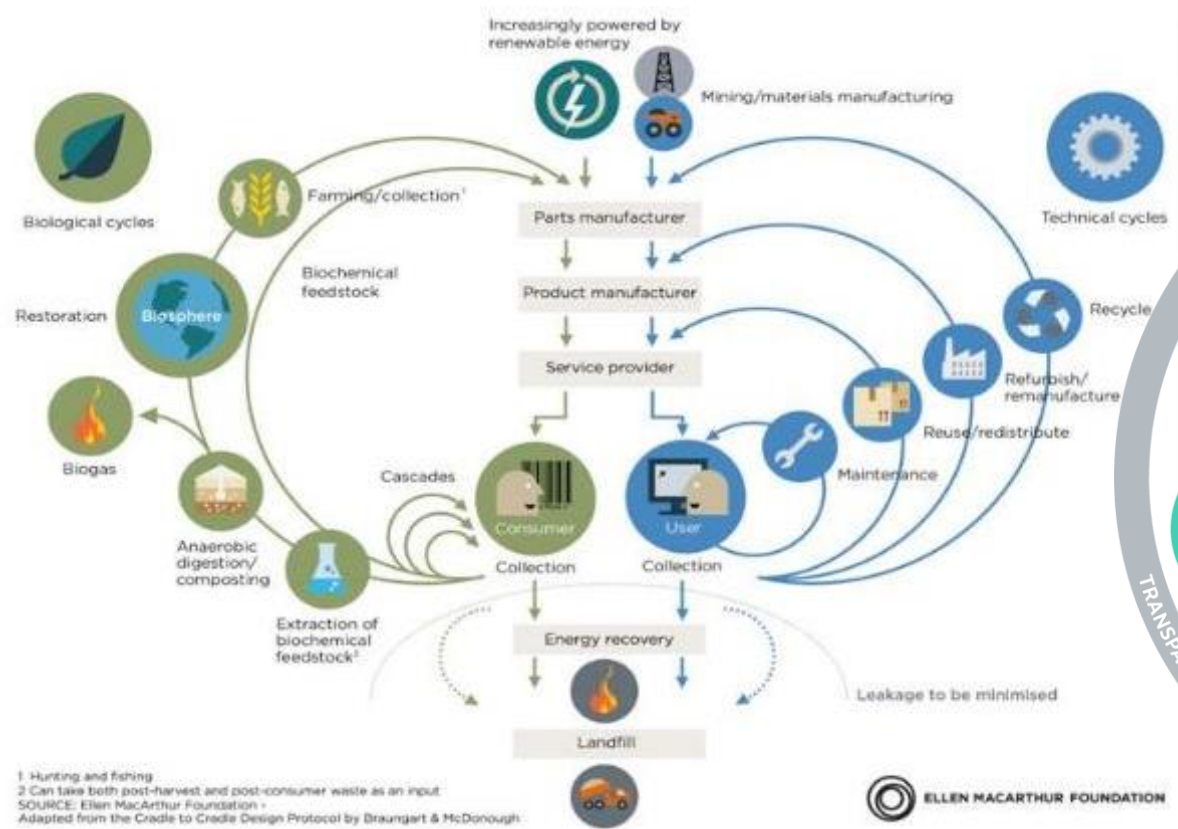


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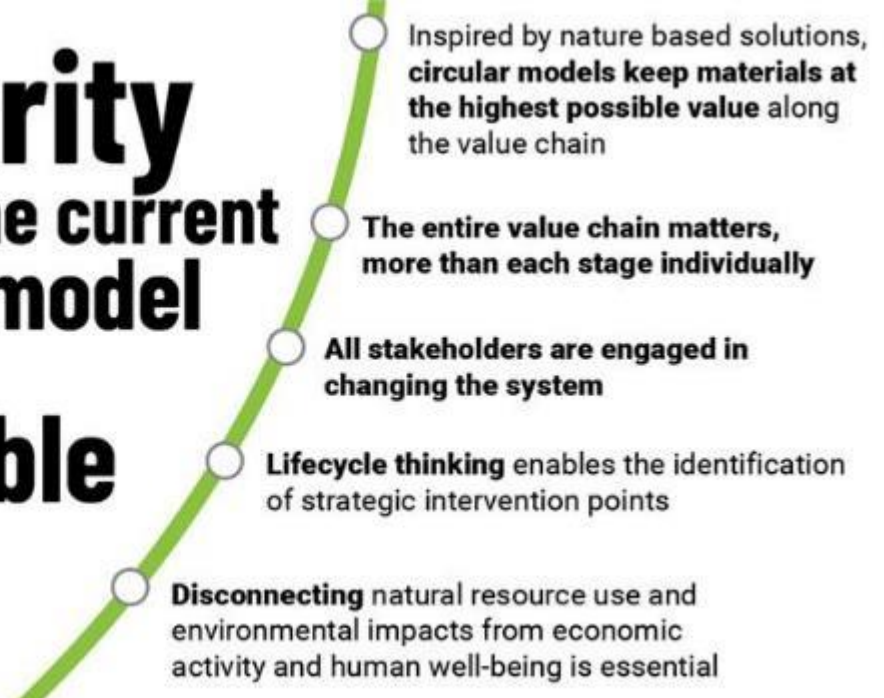
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CE Principles?



Circularity challenges the current economic model towards a sustainable future



Deriving the Principles & Criteria

- P's and C's derived by:
 - Reviewing CE literature to identify common principles
 - Engaging with local CE experts to ensure an SA perspective (workshop held in Feb 2024)
- 3 EMF principles seen as providing a good starting point
- Need 4th principle specifically speaking to social imperatives

**P1: Eliminate
waste and
pollution**

**P2: Circulate
products and
materials (at their
highest value)**

**P3: Regenerate
nature**

**P4: Leave no one
behind**

P1: Eliminate waste and pollution

C1.1: Decoupling economic activity from material use

C1.2: Reducing waste generation

C1.3: Reducing emissions to the environment

P2: Circulate products and materials (at their highest value)

C2.1: Rethinking the business model

C2.2: Extending the product lifetime

C2.3: Keeping materials in use

P3: Regenerate nature

C3.1: Using resources sustainably

C3.2: Emulating natural systems

C3.3: Rebuilding natural capital

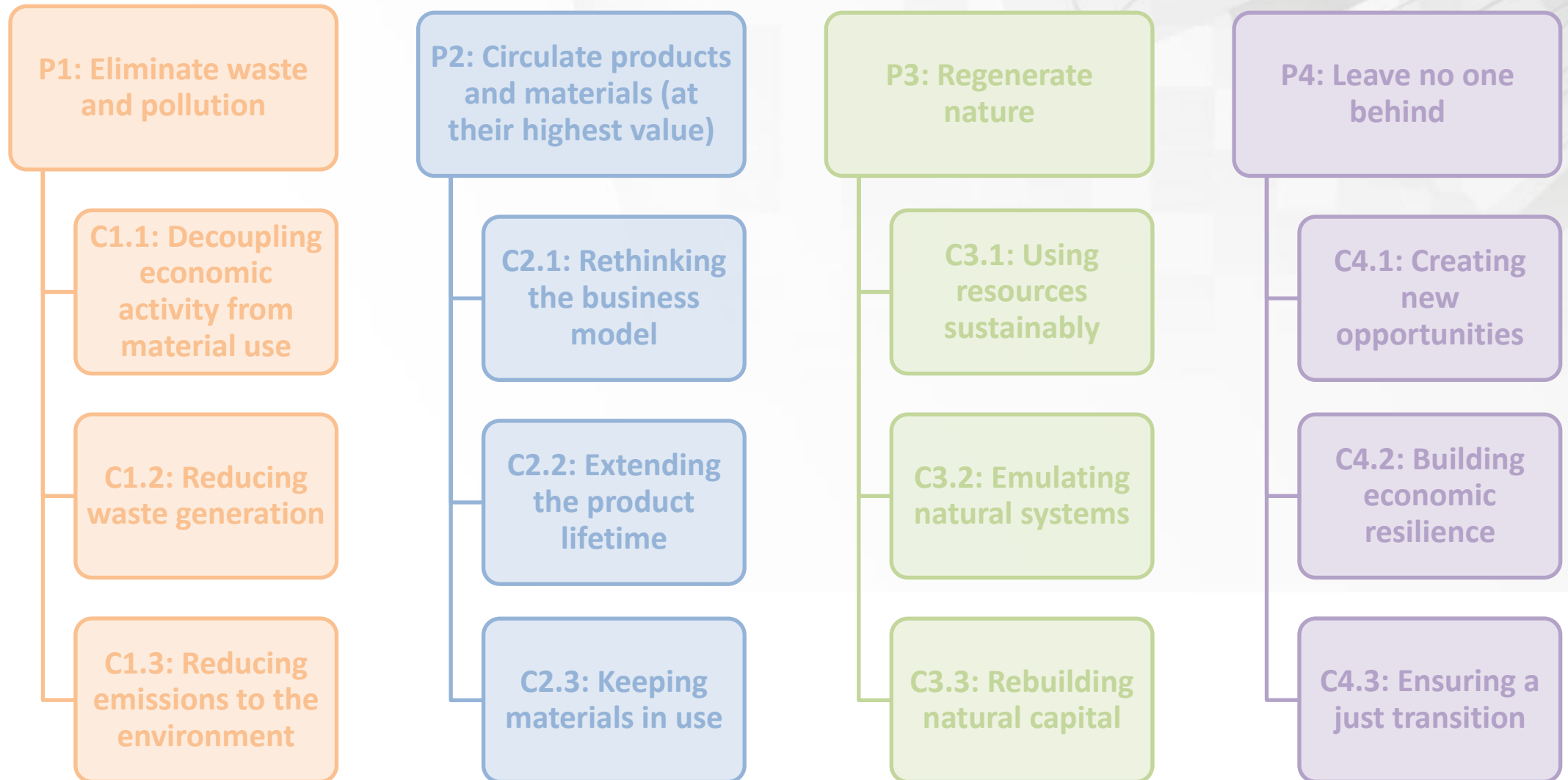
P4: Leave no one behind

C4.1: Creating new opportunities

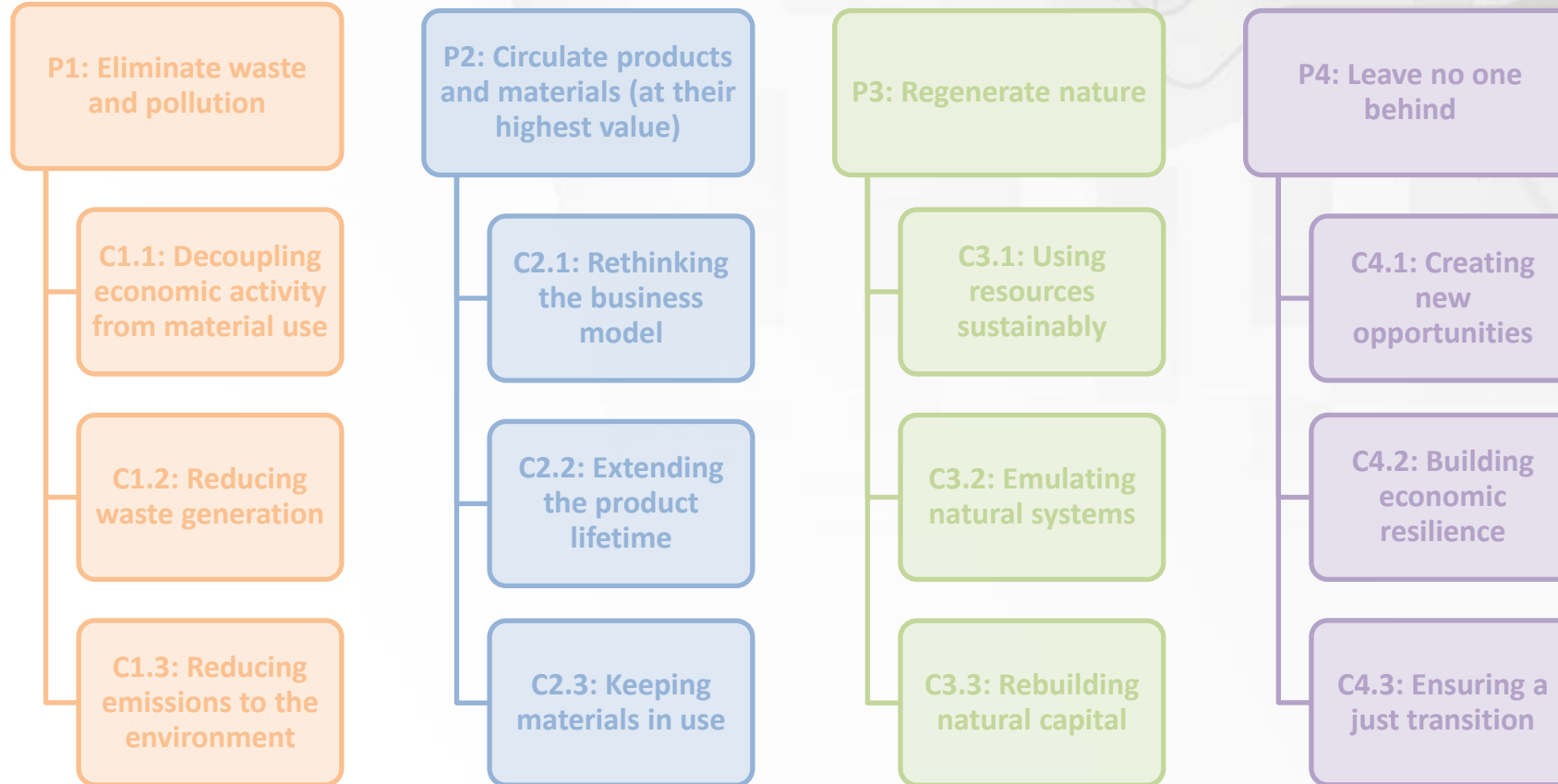
C4.2: Building economic resilience

C4.3: Ensuring a just transition

Proposed headline indicator: Total cycling rate (as per EW-MFA)



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Enabling environment:

- Policy & legislation
- Financing & investment
- STI, demonstration & pilots
- Collaboration & transparency
- Education, awareness and training

Proposed headline indicator: Total cycling rate (as per EW-MFA)

Component indicators

P1: Eliminate waste and pollution

C1.1: Decoupling economic activity from material use

C1.2: Reducing waste generation

C1.3: Reducing emissions to the environment

P2: Circulate products and materials (at their highest value)

C2.1: Rethinking the business model

C2.2: Extending the product lifetime

C2.3: Keeping materials in use

P3: Regenerate nature

C3.1: Using resources sustainably

C3.2: Emulating natural systems

C3.3: Rebuilding natural capital

P4: Leave no one behind

C4.1: Creating new opportunities

C4.2: Building economic resilience

C4.3: Ensuring a just transition

Policy and process indicators

Identifying relevant Indicators



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Sources for identifying relevant Indicators

- **Regional or national CE indicator sets developed in other regions / countries**
 - Regional: EU CEMF, Resource Efficiency Scoreboard, Raw Materials Scoreboard
 - National: France, Flanders, Australia, Japan, India, China, Colombia, Rwanda
- **Reviews and meta-analyses of CE indicators**
 - OECD Inventory, PACE Report – Circular Indicators for Governments, Saidani
- **Relevant global standards and databases**
 - ISO 59020 (2024), CE — Measuring and assessing circularity performance
 - Global Material Flows Database, SCP-HAT, Supply Chain Explorer, Exiobase etc.
- **Frameworks and initiatives from global CE think-tanks**
 - Ellen McArthur Foundation (incl. MCI, Circulytics)
 - Circle Economy (Circular Gap Reporting Initiative, Circular Jobs Framework)
 - Platform for Accelerating the Circular Economy (PACE)
 - The Circular Economy Indicators Coalition (CEIC)



- **Existing global reporting requirements and/or statistics already being reported on at national level:**

- NDP, as well as other existing national reporting:
 - DFFE reporting: State of Environment, Waste (NWMS, SoWR, SAWIS), Biodiversity (NBA), Water, Climate etc.
 - Economic reporting (StatsSA, Reserve Bank etc.)
- Existing global reporting frameworks that SA reports to:
 - SDGs (SA Country Reports)
 - UNFCCC (National GHG Inventories)
 - UNCCD, etc.

- **New reporting requirements under development:**

- AU Continental CE Action Plan,
- DSI (STI4CE) strategy (under development),
- National CE Action Plan (forthcoming)
- GBF, etc.

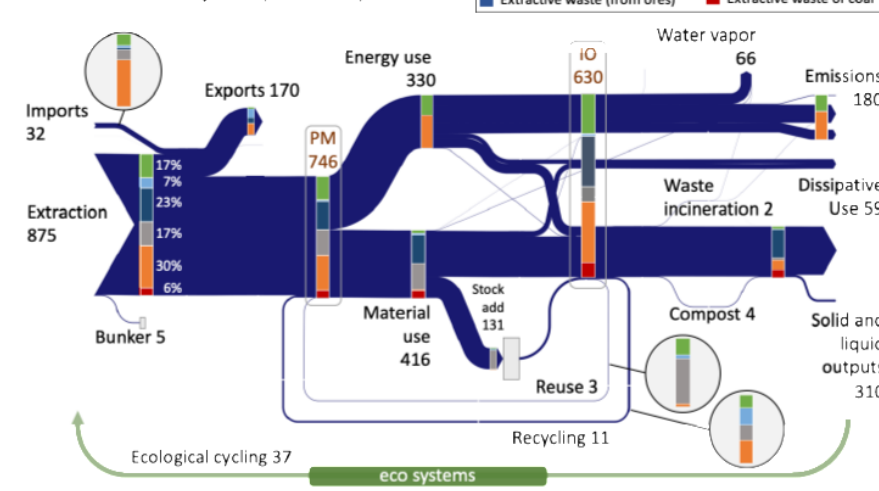
- **Existing CE monitoring initiatives in SA:**

- EW-MFA (conducted by UCT & BOKU for DSI)



Material flows, RSA 2017

All numbers in Sankey in Mt (1,000,000 t)



Selection of indicators

Over 900 potential indicators identified from the various sources across the 12 criteria

Draft set of indicators for SA were selected based on the following criteria:

- Relevance to the CE
- Relevance to the specific principle and criterion
- Relevance for reflecting progress at a national level
- Relevance to the SA context
- Data availability
- Alignment with existing (or likely future) reporting requirements

P1: Eliminate waste and pollution

C1.1: Decoupling economic activity from material use

Indicator 1.1.1:
Material footprint, material footprint per capita, and material footprint per GDP

Indicator 1.1.2:
Domestic material consumption, DMC per capita, and DMC per GDP

C1.2: Reducing waste generation

Indicator 1.2.1:
Total waste generated per year (tonnes)

C1.3: Reducing emissions to the environment

Indicator 1.3.1: Total greenhouse gas emissions per year (MtCO₂e)

Indicator 1.3.2: National Air Quality Indicator (NAQI)

Indicator 1.3.3: Proportion of bodies of water that comply to South African water quality objectives

P2: Circulate products and materials (at their highest value)

C2.1: Rethinking the business model

Potential indicators:

- *No. of circular MSMEs?*
- *GVA of circular businesses?*
- *Value of investment into new business models?*
- *No. of repair, reuse & refurbishment initiatives?*
- *No. of materials-as-a-service systems piloted?*
- *No. of product-as-service models implemented?*

C2.2: Extending the product lifetime

Potential indicators:

- *Reuse rate?*
- *No. of repair, reuse & refurbishment initiatives?*
- *Sales of 2nd hand goods?*
- *Proportion of short-lived and single use consumption relative to durable consumption (or total consumption)?*

C2.3: Keeping materials in use

Indicator 2.3.1: % of municipal waste generated that is recycled

Indicator 2.3.2: Socio-economic cycling rate (as per EW-MFA)

P3: Regenerate nature

C3.1: Using resources sustainably

Indicator 3.1.1:
Renewable energy share
in the total final energy
consumption

Indicator 3.1.2: Energy
intensity measured in
terms of primary energy
and GDP (MJ / GDP)

Indicator 3.1.3: Change in
water use efficiency over
time (USD/m³)

*To be developed: Reuse,
reclamation and recycling
of water*

C3.2: Emulating natural systems

Indicator 3.2.1:
Ecological cycling
rate (as per EW-
MFA)

Indicator 3.2.2:
Share of organic
waste diverted
from landfills

C3.3: Rebuilding natural capital

Indicator 3.3.1:
Red List Index of
ecosystems
(RLIe)

Indicator 3.3.2:
Red List Index
(RLI) (species)

P4: Leave no one behind

C4.1: Creating new opportunities

Potential Indicator:
Number of circular MSMEs

Potential indicator:
GVA of circular businesses

Potential indicator:
Number of CE jobs created / Number of circular jobs

C4.2: Building economic resilience

Indicator 4.2.1: Trade balance (goods) [R billions, year]

Indicator 4.2.2: Primary sector % contribution to GDP

Indicator 4.2.3: Rate of domestic stock building (% of domestic extraction)

C4.3: Ensuring a just transition

Indicator 4.3.1: Unemployment rate, by sex, age & persons with disabilities

Indicator 4.3.2: Fatal and non-fatal occupational injuries per 100,000 workers / Level of national compliance with labour rights

Indicator 4.3.3: Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions

Indicator 4.3.4: Gini coefficient

Indicators for the enabling environment

Category	Potential indicators	Source
Policy & legislation	Publication of National CE roadmap for South Africa / Amendment of policy and/or promulgation of new policy	DSI STI4CE Strategy (draft) (DSI, 2024).
	Circular public procurement regulation	AU Continental CE Action Plan for Africa 2024-2034
	Number of [design for circularity] standards developed and implemented	NWMS 2020
Financing and investment	Value of financial contribution to circular economy initiatives / Average interest rates proposed to CE businesses / Share of public budget spent on CE projects / Regulation on introduction of tax breaks for CE businesses	AU Continental CE Action Plan for Africa 2024-2034
	Number of SMMEs receiving funding through supported schemes to experiment with new technologies and processes that are aligned with CE principles	DSI STI4CE Strategy (draft) (DSI, 2024)

Indicators for the enabling environment

Category	Potential indicators	Source
STI, demonstration and pilots	Number of multi-institution publications around STIC4CE / Number of new patents per year / Establishment and record of 'living labs'	DSI STI4CE Strategy (draft) (DSI, 2024)
Collaboration & transparency	(a) Establishment of a common online platform to connect actors; and (b) Number of institutions and attendees participating in the platform / MOUs/MOAs/NDAs between entrepreneurs and relevant stakeholders	DSI STI4CE Strategy (draft) (DSI, 2024).
Education, awareness & training	Number of CE courses appropriate to South African contexts, consistently available for registration / participation / Number of certified course/programme completions providing training to actors in the public and private sector on how to adopt CE principles in their respective departments and businesses / Number of local government officials with accredited CE-related qualifications	DSI STI4CE Strategy (draft) (DSI, 2024).

Headline indicator: Total cycling rate (as per EW-MFA)			
P1: Eliminate waste and pollution	P2: Circulate products & materials	P3: Regenerate nature	P4: Leave no one behind
Material footprint (total, per capita & per GDP)	<i>Indicator for “Rethinking the business model”; eg</i> • <i>Value of investment into new business models</i> • <i>No. of repair, reuse & refurbishment initiatives</i> • <i>No. of product-as-service models implemented</i>	Renewable energy share in the total energy consumption	<i>Number of circular MSMEs*</i> <i>GVA of circular businesses*</i>
Dom. material consumption (total, per capita & per GDP)		Energy intensity in terms of primary energy and GDP	<i>Number of CE jobs created / Number of circular jobs (TBC)*</i>
Total waste generated per year (tonnes)		Change in water use efficiency over time	Trade balance (goods) [R billions, year]
Total GHG emissions (MtCO2e per year)	<i>Indicator(s) for “extending the product lifetime”; e.g.</i> • <i>Reuse rate</i> • <i>Sale of 2nd hand goods</i> • <i>Short lived / durable use</i>	<i>Reuse & recycling of water (to be developed)*</i>	Primary sector % contribution to GDP
National Air Quality Indicator (NAQI)		Ecological cycling rate (as per EW-MFA)	Rate of domestic stock building (as per EW-MFA)
% of waterbodies that comply to SA water quality objectives	% of municipal waste generated that is recycled	Share of organic waste diverted from landfills	Unemployment rate by sex, age & persons with disabilities
	Socio-economic cycling rate (as per EW-MFA)	Red List Index of ecosystems (RLIe)	<i>Decent work indicator (TBC)*</i>
		Red List Index (RLI) (species)	Multidimensional poverty
			Gini coefficient [for income]
Indicators for the enabling environment (<i>various, TBC*</i>).			

Headline indicator: Total cycling rate as per EW-MFA

Policy/process indicators

- Publication of CE Roadmap / policy amendments / Circular public procurement / standards
- Investment in CE initiatives
- CE publications / patents / living labs
- Platform for collaboration / MOUs etc.
- CE training courses / qualifications

Input indicators

- Material footprint
- Domestic material consumption
- Renewable energy share
- Energy intensity
- Water use efficiency

Circularity indicators

- % of MSW that is recycled
- Socio-economic cycling rate
- Ecological cycling rate
- Organic waste diverted from landfill
- Indicator(s) for reuse / repair etc.
- Water reuse & recycling

Output indicators

- Waste generated
- GHG emissions
- No. & GVA of circular businesses
- Circular jobs
- Trade balance
- Primary sector % contribution to GDP
- Rate of domestic stock building

Impact/outcome indicators

- Air quality indicator (NAQI)
- Water quality
- Red List of Ecosystems
- Red List Index (species)
- Unemployment rate
- Decent work
- Poverty
- Inequality (Gini)

Next steps

- Please send comments / suggestions to anahman@csir.co.za
- We hope to secure further funding for Phase 2 of development of the SACEMS:
 - Further validation with stakeholders
 - Final agreed set of indicators
 - Development of guideline on monitoring systems



Acknowledgements

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Experts who participated in the consultation workshop, 28 February



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**AFRICAN CIRCULAR
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**CIRCULAR
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Accelerating the Transition

Discussion



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Guiding questions

- Does the framework make sense?
- Are any of the indicators inadequate or difficult to measure? Alternative recommendations?
- Suggestions where we have gaps or a number of options to select from? Eg:
 - C2.1 (Rethinking the business model)
 - C2.2 (Extending the product lifetime)
 - C4.1 (Creating new opportunities)
 - Decent work (under C4.3)
 - Indicators for the enabling environment
- Any gaps, duplications or inconsistencies?
- Any other recommendations?





Thank you!

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