

A MORE CIRCULAR SOUTH AFRICAN ECONOMY

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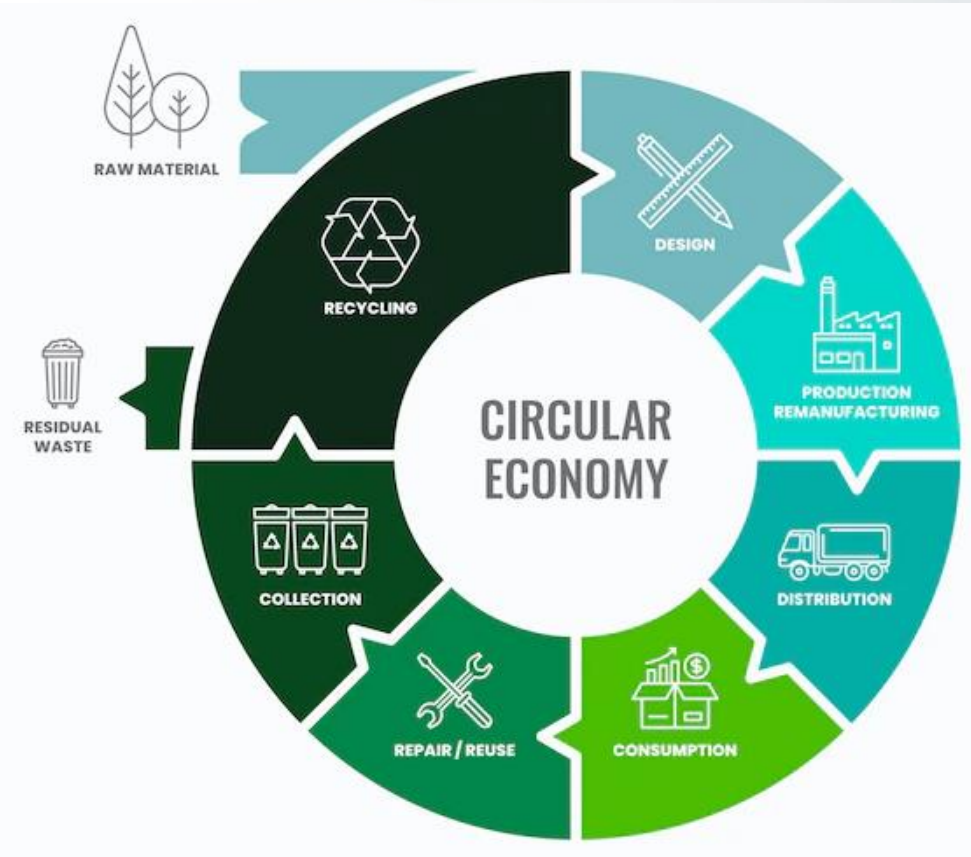


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Touching lives through innovation

What is the circular economy?

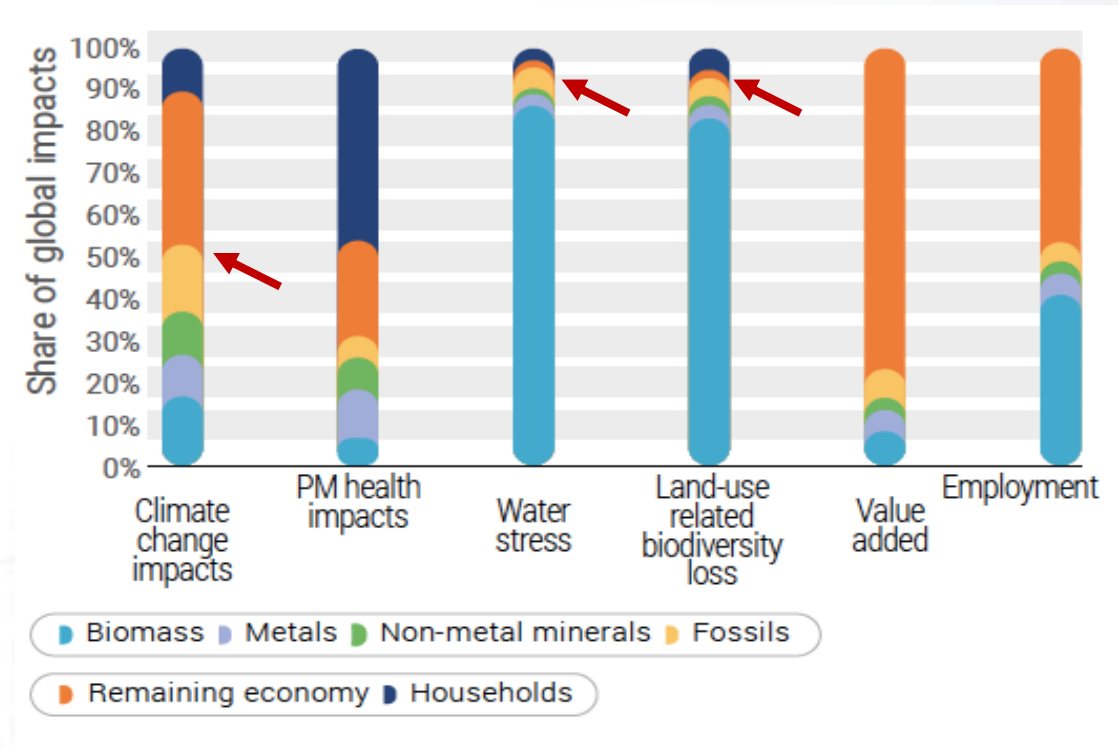
- The circular economy is not about waste, it is about **sustainable resource management**
- It aims to **decouple** economic growth from the use of resources by using resources more effectively
- The circular economy is about **national resource-security** in support of socio-economic development – through sustainable resource utilisation



Why should South Africa consider the circular economy?

- Over the past few years we've seen **three drivers** for a circular economy transition emerge –
 1. **Resource scarcity**
 2. **Climate mitigation**
 3. **Economic recovery**
 4. **Socio-economic development**

- Resource extraction and processing is responsible for ~50% of **climate impacts**, 90% of **water stress**, and 90% of **biodiversity loss** due to land use (IRP, 2019)

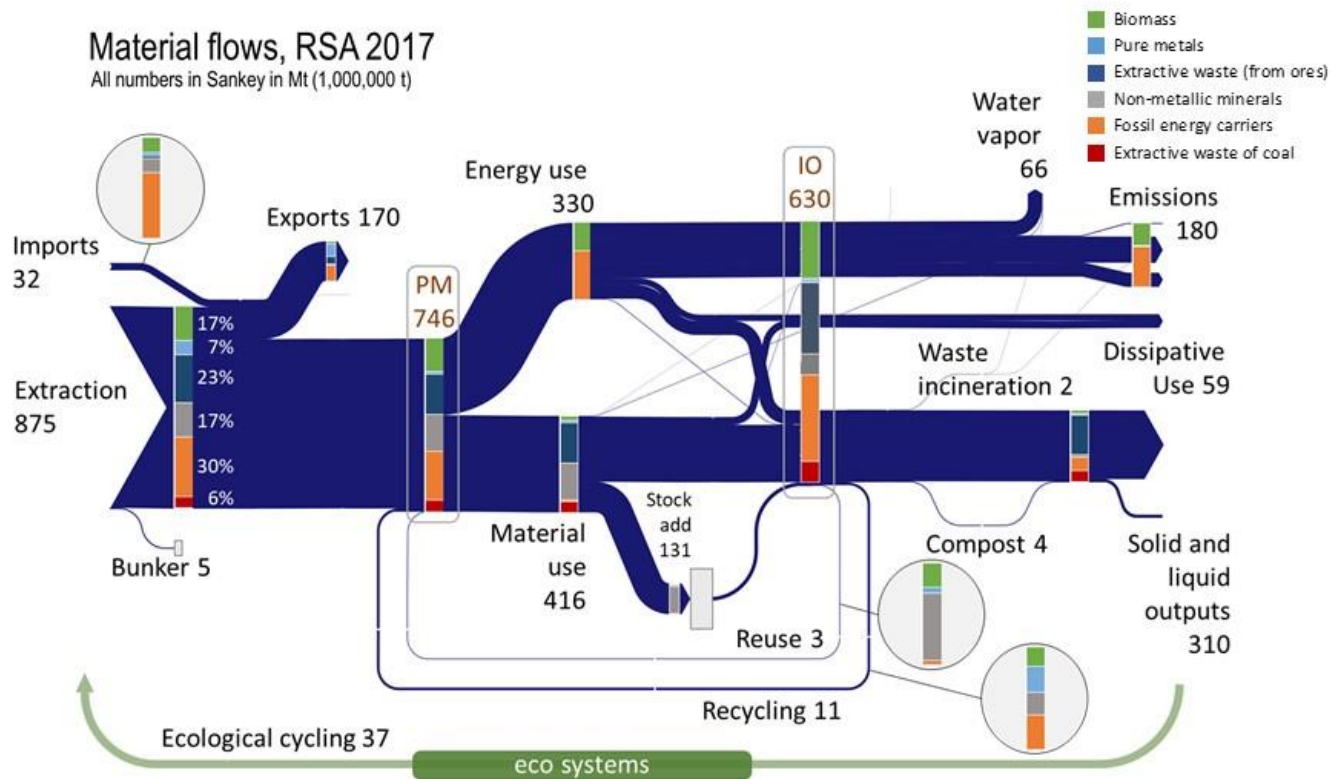


<https://www.resourcepanel.org/reports/global-resources-outlook>

How is South Africa currently faring?



Material flows, RSA 2017
All numbers in Sankey in Mt (1,000,000 t)



SUMMARY OF KEY FINDINGS

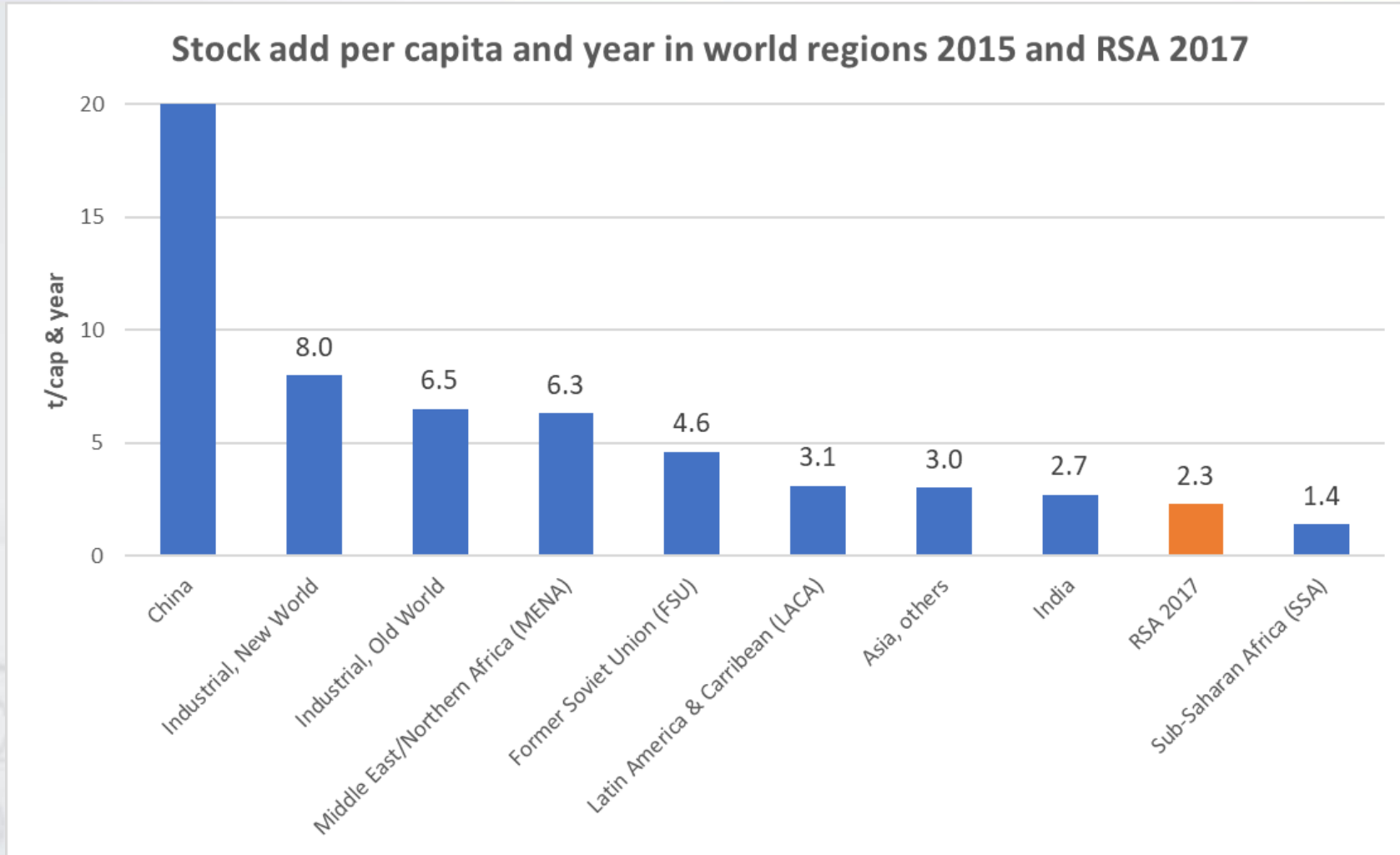
- Finding 1:** An economy materially dominated by export-oriented extractives
- Finding 2:** An economy energetically dominated by fossil fuels, notably domestic coal supported by imported oil
- Finding 3:** A sizeable footprint of bio-based activities, with some attention to ecological cycling but also with significant concerns
- Finding 4:** Low rate of domestic stock building
- Finding 5:** Pockets of high circularity and significant informal activity around cascade use, reuse and recycling

- The South African economy is estimated to be **only 7% circular** (most of that due to ecological cycling)

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How is South Africa currently faring?



Low rate of domestic stock building

RSA (2017): 2.3 t stock add/cap

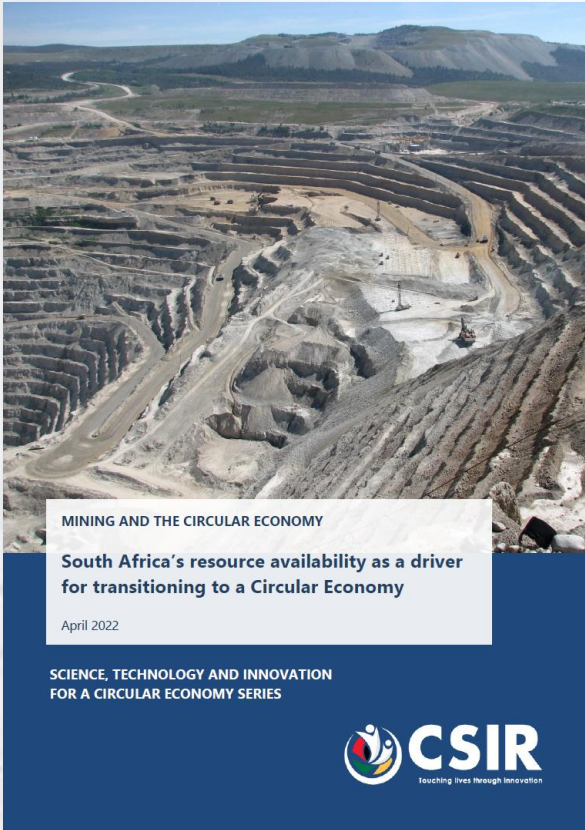
EU28 (2014): 8.0 t stock add/cap

China (1995): 6.7 t stock add/cap

China (2015): 20.8 t stock add/cap

Q1: Is resource scarcity a driver for South Africa to transition to a more circular economy?

Is resource scarcity a driver for South Africa to transition to a circular economy?

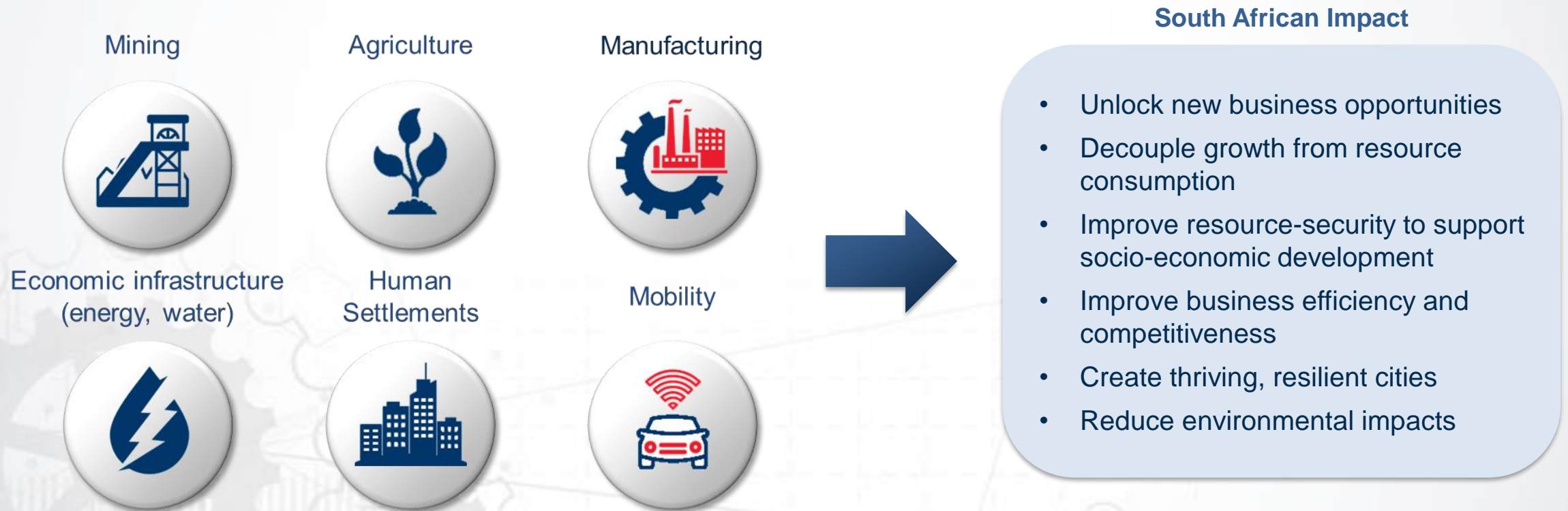


- Yes, **resource scarcity** may in fact be a driver for South Africa
 - 18 minerals were identified as **critical / strategic** for South Africa due to their economic importance and supply risk
 - 5 minerals have <50 years of economically viable mining remaining (assuming no new major reserves are found, and demand, supply and economic value remains unchanged) – iron ore, lead, manganese (<20), cobalt, gold (20-50)
 - These minerals, however, are **mostly exported**, suggesting that South Africa may have little control over their downstream circularity
- The circular economy also provides **new opportunities** (and risks) for the mining sector.
 - For example, as we decarbonize the economy it can rapidly increase the demand for metals, e.g., alternative energy technologies, new mobility solutions, etc.

Where are the circular economy opportunities for SA?

The opportunity for a more circular SA economy

- Which sectors are **strategic** for South Africa's development?
- Which sectors have the greatest **resource demands** (energy, water, materials)?
- Which sectors (and regions) are facing **resource insecurity**?



The opportunity for a more circular SA economy

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<https://www.circulareconomy.co.za/csir/>








The following eight, short CSIR think-pieces suggest that transitioning to a more circular economy has the potential to create value across all sectors of the South African economy – opportunities to decouple development from resource consumption and in so doing, improve local and global competitiveness of our manufacturing sector; improve food security through regenerative agriculture; create more sustainable, liveable cities; improve economic development through efficient mobility systems; and decouple economic development from the demands placed on our energy and water systems, already under considerable strain in South Africa.



- 8 x short Briefing Notes or “think pieces” published in November 2021 on –
 - overview, and what the circular economy means
 - mining, agriculture, manufacturing, human settlements, mobility, energy and water


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The opportunity for a more circular SA economy

| Sectors | Design out waste and pollution | Keep products and materials in use | Regenerate natural systems |
|---|--|---|--|
|  Mining | Redesign mining processes and value chains to be more resource efficient | Reduce, reuse and recycle various waste streams, including end-of-life equipment | Renewable energy, restoring mining landscapes |
|  Agriculture | Precision farming ; peri-urban and urban farming (bringing food production and consumption closer); the sharing economy | Returning nutrients to the agricultural system; biorefinery ; value-add of waste products | Crop rotation; intercropping; mixed farming, reduced or zero till |
|  Manufacturing | Redesign manufacturing processes and products to enhance resource efficiency , coupled with sharing economy business models | Remanufacture, refurbish, repair and recycle materials and products across value chains | Transition to green energy (solar, wind, hydrogen) and decouple resource utilization |
|  Human Settlements | Green, energy-efficient buildings , more compact cities, pedestrian-friendly neighbourhoods | Circular construction value chains, circular organics, waste management | Urban agriculture , renewable energy, green roofs, green open spaces |
|  Mobility | Shared, and multi-modal mobility ; increased use of zero-emission mobility; encouraging remote and flexible working | Scaling up vehicle remanufacturing ; recycling; vehicle and infrastructure design for circularity | Mobility systems based on renewable energy; climate resilient transport infrastructure |
|  Energy | Energy efficiency , waste and emissions prevention, reducing materials-use in manufacturing energy technologies, increasing energy technology lifespans | Waste gas and heat valorisation; carbon capture use and storage; repair and recycling of energy technologies; fly-ash to building materials; WtE | Renewable energy, green hydrogen |
|  Water | Reducing water use and wastewater generation, improved water use efficiency | Reuse and recycling of wastewater (return flows), reclamation and recovery of resources from water-based waste | Controlling invasive alien plants; rehabilitating and protecting wetlands and riparian systems |



The opportunity for a more circular SA economy

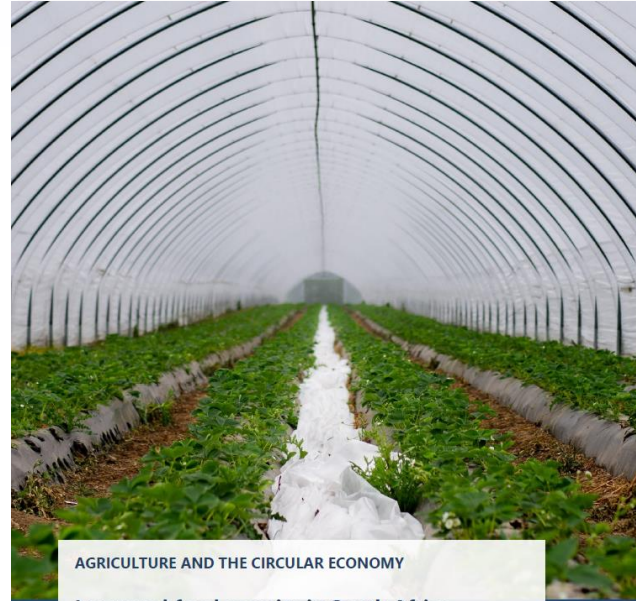



MINING AND THE CIRCULAR ECONOMY

South Africa's resource availability as a driver for transitioning to a Circular Economy

April 2022

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AGRICULTURE AND THE CIRCULAR ECONOMY

Improved food security in South Africa through a more circular agricultural sector

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MANUFACTURING AND THE CIRCULAR ECONOMY

A more competitive South African manufacturing sector through a circular economy

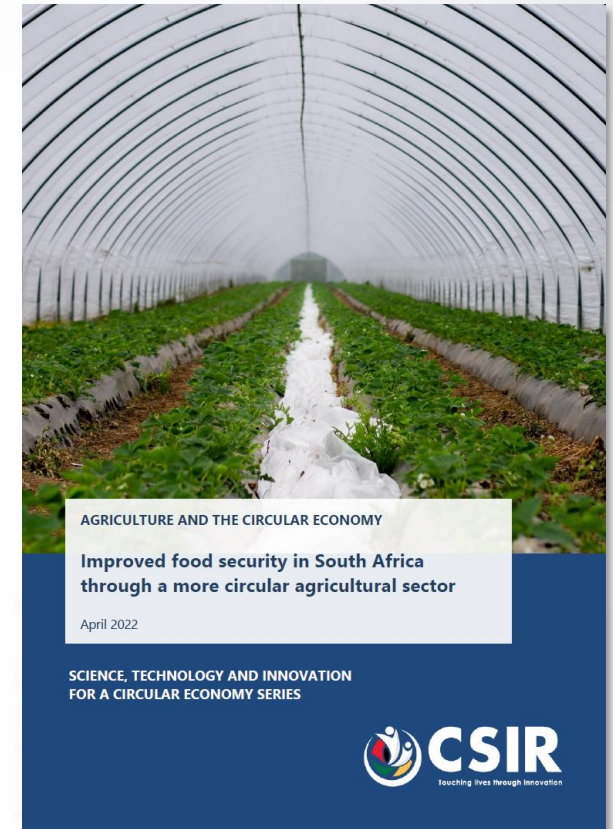
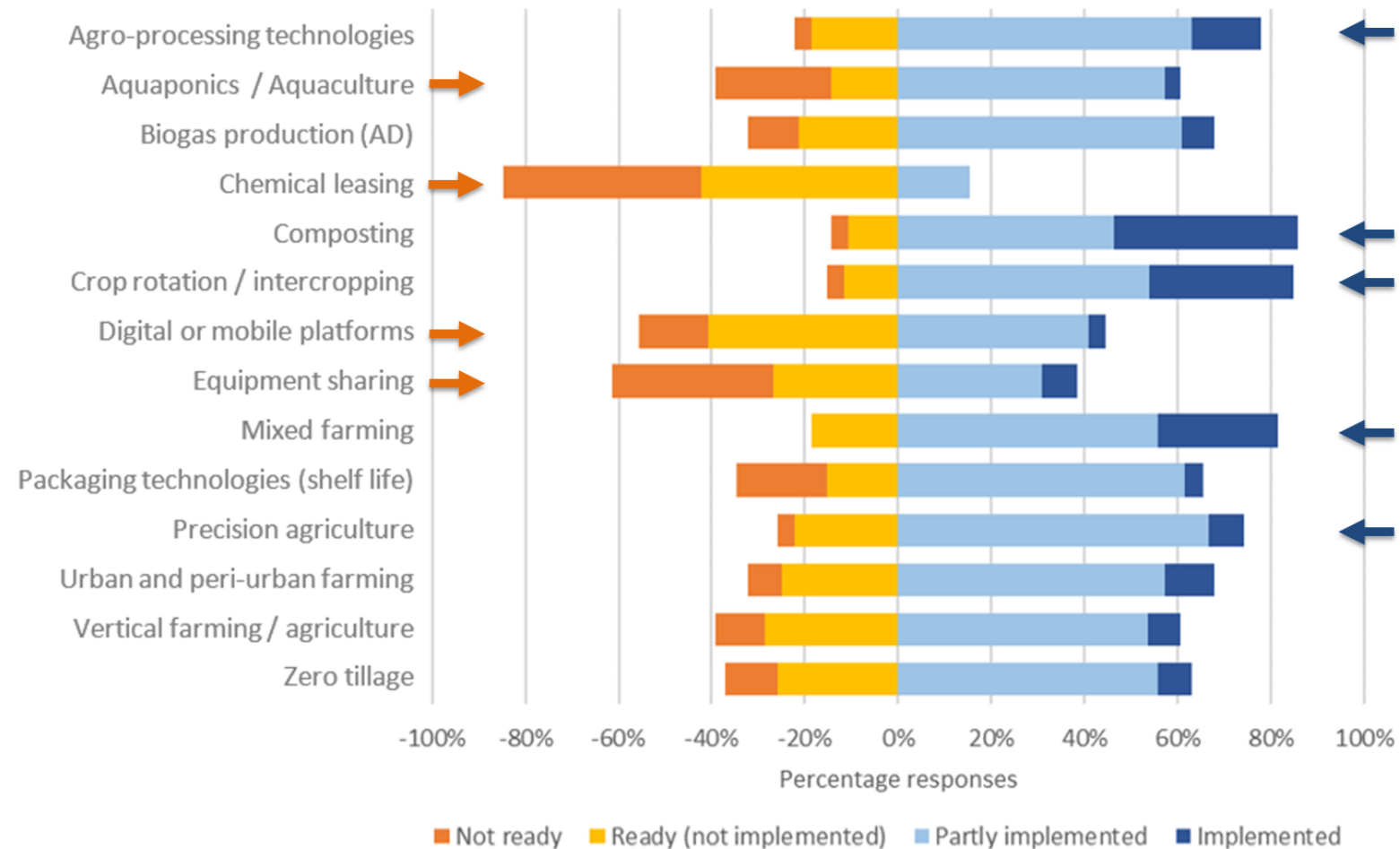
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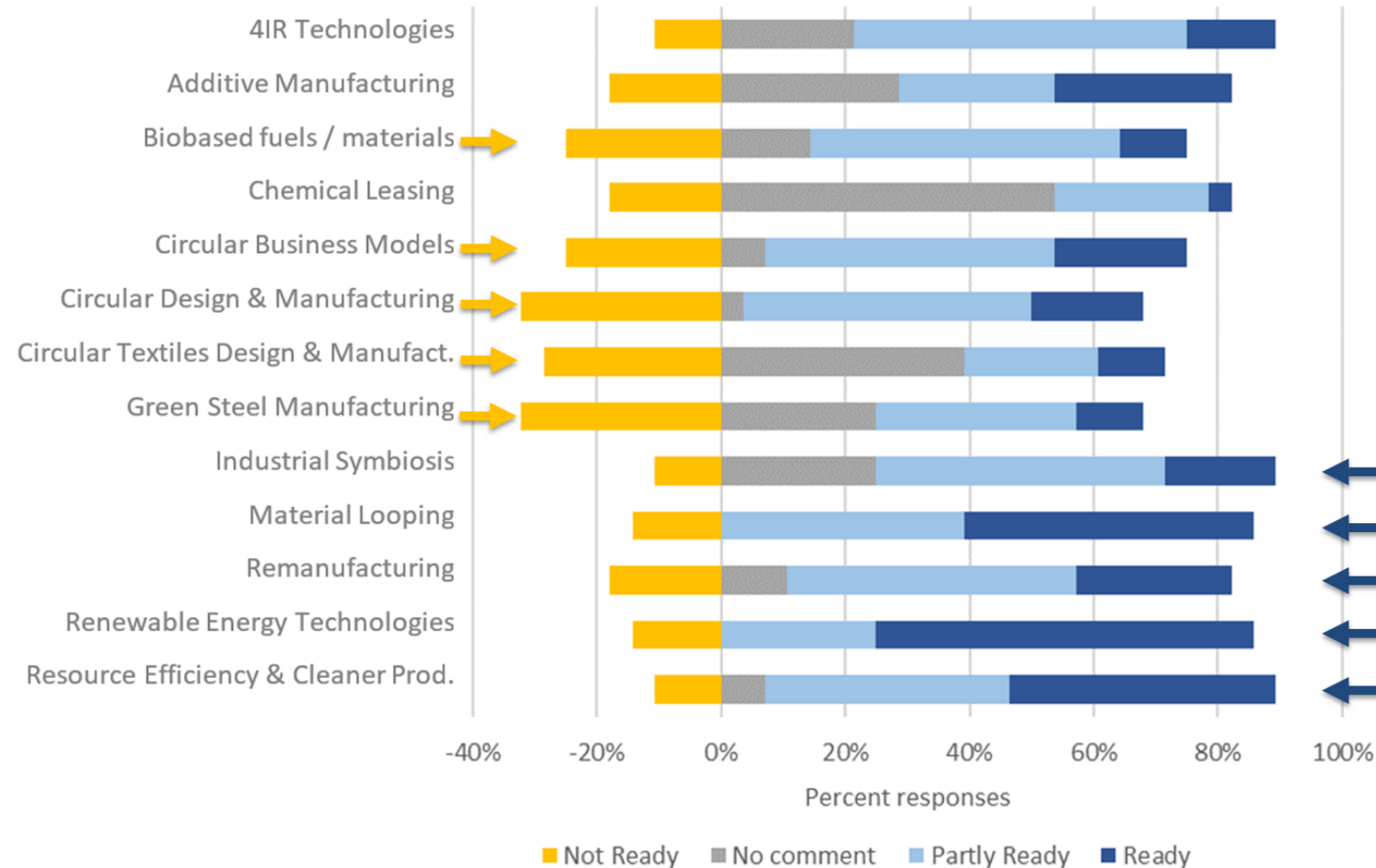


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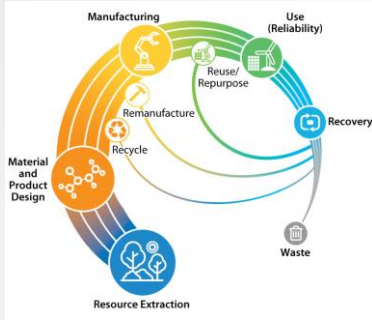
State of readiness and level of implementation of circular economy interventions in agriculture sector



State of readiness of circular economy interventions in South African manufacturing sector

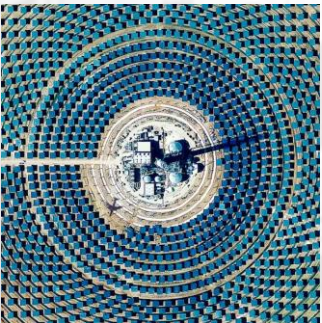
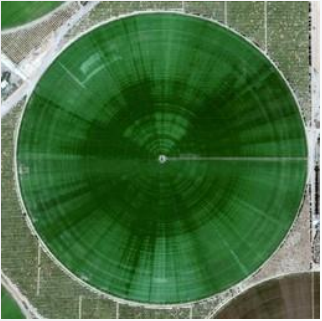


Next steps



- Started Phase 2 of the project
- Assess the 2nd driver –
 - Is **climate mitigation** a driver for South Africa to transition to a more circular economy?
- 2 further deep-dive studies (Oct 22 – Mar 23) –
 - Energy, Water
 - Both of which are currently constraining the South African economy

Concluding thoughts



- The circular economy is not about waste management but about **sustainable resource management**
- The circular economy provides the opportunity for South Africa (and Africa) to **rethink how it uses its resources**
- Transitioning South Africa to a more circular economy creates **opportunities** for new businesses and new business models
- And provides us with an opportunity to address major **social challenges** facing the country

Thank you

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