

ACE Hub Metrics Working Group

Principles for Circular Economy Metrics

The Metrics Working Group of the Australian Circular Economy Hub proposes a set of principles for circular economy metrics for Australia and its states and territories, businesses, and communities.

Metrics, data, and indicators play an important role to inform planning and decision making in policy and businesses. They can include headline indicators, sector and product specific information, and transition indicators. They enable decision makers to agree on ambitious targets and allow the monitoring of the success and the efficacy of policies and investment decisions.

Metrics are based on a sound conceptual framework

The conceptual basis for metrics of the circular economy is the notion of industrial metabolism¹ operationalised by material flow accounts and material balances^{2,3,4}. Circular economy metrics are measured in volumes of materials, need to be able to assess the value and quality of materials and the environmental impacts that occur at every step of the material supply chains. Australian metrics for circular economy need to embrace the work undertaken internationally at the UN, OECD and the European Commission and build on the conceptual frameworks and methods available internationally.

Metrics are aligned with accepted data standards

Circular economy metrics need to be compatible with the System of National Accounts, the System of Integrated Environmental and Economic Accounts (SEEA) and the standards and methodological requirements of material flow accounts. Metrics include information about the physical and monetary economy. They are satellite accounts to the economic accounts thereby enabling a link between economic decisions and their material management and waste consequences. Metrics also need to relate to a broader set of social, behavioural and governance data and indicators to enable a whole of sustainability perspective across environmental, economic, social and governance domains.

Metrics cover the whole life cycle

Australian circular economy metrics need to cover all stages of the material life cycle from raw material extraction, material transformation, manufacturing, use, refurbishment, reuse, and disposal – cradle to grave – and be able to report on circularity opportunities across whole

¹Robert U. Ayres and Udo E. Simonis (1994) Industrial Metabolism: Restructuring for Sustainable Development. United Nations University Press, Japan.

² UNEP (2021). The use of natural resources in the economy: A Global Manual on Economy Wide Material Flow Accounting. Nairobi, Kenya.

³ OECD (2008). Measuring material flows and resource productivity. Synthesis report. Paris, France.

⁴ EUROSTAT (2018). Economy wide material flow accounts. Handbook. Luxembourg.

supply chains. They need to also include international supply chains and report on material use and waste generation beyond the border that are caused by Australian consumption behaviours.

Metrics cover all aspects of the circular economy

Circular economy metrics need to include the different elements of the circular economy to encompass material efficiency improvements (increased resource productivity, improved asset utilisation and changes in consumer preferences), slowing of material loops (increased product lifespan achieved through eco-design, reuse, repair and remanufacturing) and closing of material loops (increased materials sorting, treatment and recovery).

Metrics and data follow a nested structure

Circular economy metrics capture the nested structure of the economy and report data for the national economy, economic sectors, product groups, activities and for individual businesses. They also report for different political and geographical units from national, state, to local authority. Metrics adhere to the functional characteristics of the economy and the geographical characteristics of the political responsibilities resulting in a matrix structure for data sets and indicators. This allows to link top-down with bottom-up information. In doing so metrics can relate economic activities and the place where they occur to their material and waste implications. The nested structure can inform all levels of government, the business community and the general public about Australia's progress in circularity.

Metrics cover the production and consumption perspective

Circular economy metrics and data capture domestic processes (territorial or production perspective) and processes that occur outside a geographical area (footprint or consumption perspective). This is especially important for an economy that provides primary materials to the global market and sources many commodities from international suppliers. The Australian metrics need be able to distinguish Australia's global impact and identify the impact primary materials export-oriented sectors have at home.

Metrics provide a service to data providers and data users

Metrics and data can be more than just a reporting requirement and a burden for businesses and local authorities but provide a service and important business and planning insights for data providers. Reporting requirements are important in the short-term to establish an evidence base of current materials management and associated economic, social, and environmental outcomes. In the future, the Australian data architecture and reporting system should engage the business community as a recipient of data services in exchange for their data contribution.

Metrics permit the establishment of indicators

Metrics and datasets allow for a set of indicators to be derived from the data set which includes headline indicators as well as sector and regional specific indicators. The headline

indicators allow target setting and measure progress whilst more detailed indicators can address specific issues related to the circular economy and can inform strategies, programs and policies of government and businesses. Headline indicators can drive policy ambition, but detailed datasets can inform about priorities and specific problems that need to be addressed to enable greater circularity.

Metrics permit the measurement of change and inform policy ambition

Fully developed circular economy metrics support impact driven policy approaches and can inform a theory of change by linking inputs to activities, outputs and outcomes and impacts. They can be used to monitor and evaluate the efficacy, efficiency and effectiveness of current strategies, programs, and policies.

Metrics need to communicate to a broad set of stakeholders

Reporting and data organisation can employ novel digital, analytical and data visualisation approaches that allow data providers and data users to tap into a multitude of valuable information without breaching the privacy of data providers. Metrics, data and indicators can become important assets for planning and decision making, enabled through digital platforms and cloud based analytical tools that support data interpretation. A general user interface to the Australian metrics and data for circular economy makes metrics and data a public good resource.

Metrics and data need to be affordable and timely

Australian circular economy metrics, datasets and indicators need to be up to date, reflect the most current situation and established at a reasonable cost. This is best achieved when modern digital approaches are connected to a systematic data architecture and a community approach to data provision where businesses and local authorities contribute a real time data stream.