The OECD Inventory of Circular Economy indicators
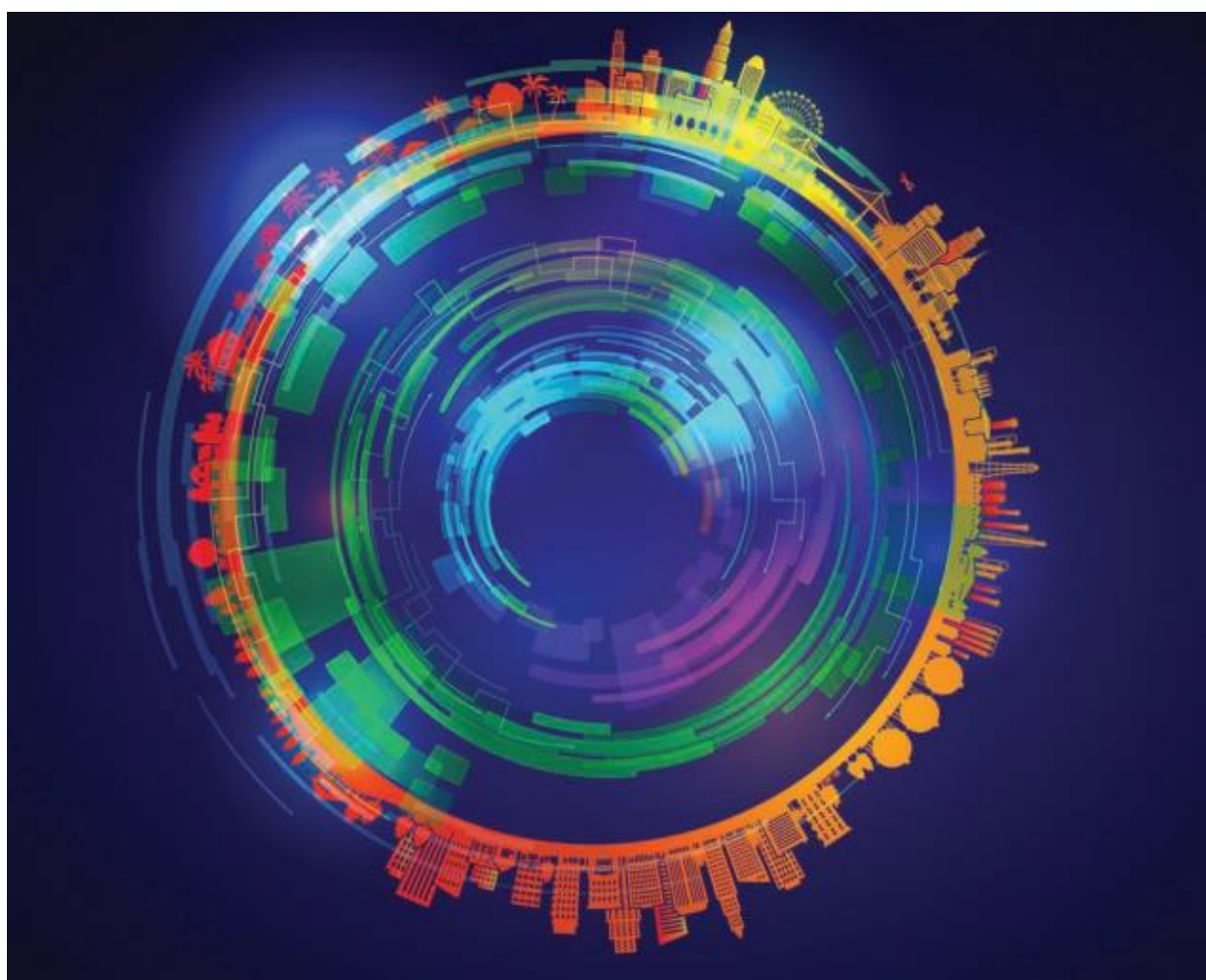
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The Inventory collects 474 indicators and draws from Chapter 5 of the OECD 2020 report: The Circular Economy in Cities and Regions. The Inventory is intended to be a dynamic tool that will be updated, following the progress cities, regions and national governments are making in measuring advancements towards the circular economy.

What the Inventory is about

The OECD Inventory of Circular Economy Indicators collects 474 circular-economy-related indicators, between 2018 and 2020. Collected indicators belong to 29 circular economy studies of which 8 are applied at the national level, 8 at the regional level and 11 at the local level (Annex A). The OECD inventory
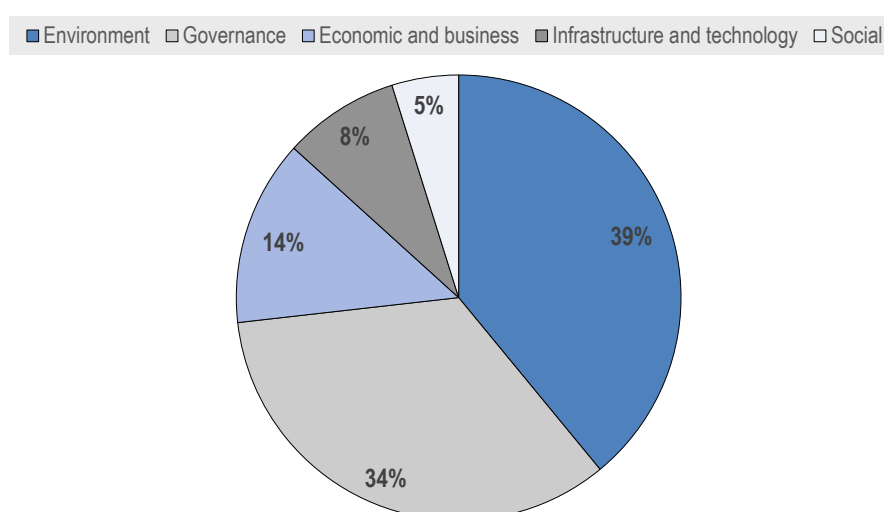
includes indicators signalled by respondents of the *OECD Survey on the Circular Economy in Cities and Regions* (OECD, 2020[1]). As per the geographical scope, most of the indicators are from European sources but the inventory also includes available sources from North and South America (Canada, Chile and Colombia).

The OECD inventory gathers input, process and output indicators employed by governments at different levels, in particular to monitor and evaluate the progress of existing circular economy strategies. The inventory provides an overview of circular economy measurement frameworks. It helps identify measurement gaps and can be a source of inspiration for governments wishing to develop or use indicators to improve circular-economy-related policies.

The inventory is intended to be a dynamic tool to be frequently and regularly updated given the progress made by countries, regions and cities in developing circular economy strategies and related measurement frameworks.

The inventory classifies circular economy indicators into five main categories (Figure 1):

Figure 1. Categories of circular economy indicators

Note: The graph refers to the 474 indicators belonging to 1 of the 5 categories.
Source: OECD (2020), The Circular Economy in Cities and Regions: Synthesis Report, OECD Urban Studies, OECD Publishing, Paris, https://doi.org/10.1787/10ac6ae4-en.

- **Environment** (39%): Collects indicators with a direct impact on the ecosystem, such as emissions, output material process and production and consumption.
- **Governance** (34%): Focuses on indicators related to education, capacity building and regulation, among others.
- **Economic and business** (14%): Includes those indicators expressed in monetary units such as the value-added of the circular economy and the public investment in circular economy projects, as well as those indicators specifically focusing on activities performed by and within companies.
- **Infrastructure and technology** (8%): Covers all the indicators that aim to measure the existence of tools, technologies and spaces that boost the circular economy.
- **Jobs** (5%): Gathers indicators associated with employment and human resources.

In order to provide a clear reading of the scope of the collected indicators, they have been classified into five main categories (economy and business; environment; governance; infrastructure and technology; and jobs), 33 sub-categories and 11 sectors (Table 1Table 1.).

Regarding the scale, the literature refers to three main scales at which measurements are carried out: micro (such as a product or company), meso (such as eco-industrial parks and industrial symbiosis) and macro (such as a city, province, region, or nation) levels (Moraga et al., 2019[6]; Ekins et al., 2019[7]; Alaerts et al., 2018[8]). The OECD Inventory of Circular Economy Indicators collects macro-level indicators.
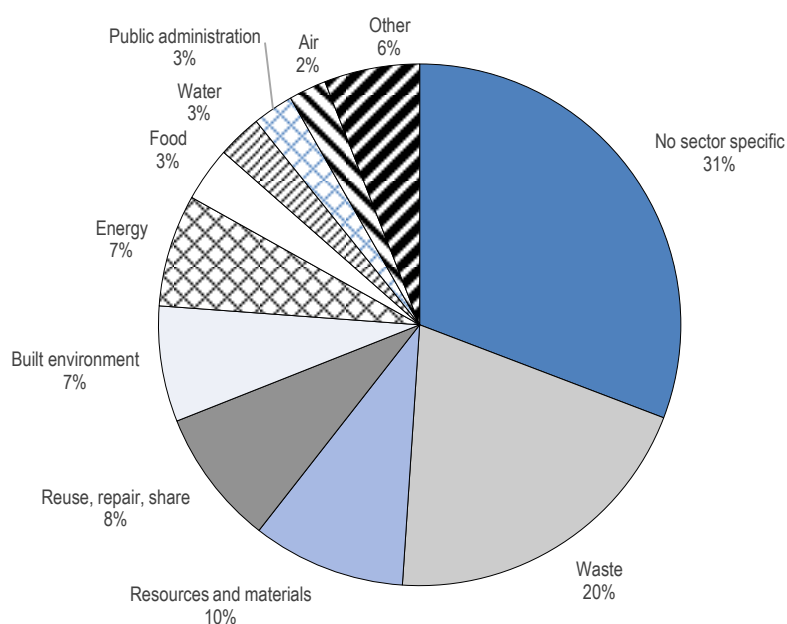
Table 1. Categories and sub-categories of indicators from the OECD Inventory

Category	Sub-category
Economy and business	• Added value • Business • Economic efficiency • Economic structure • Gains and revenues • Investments • Productivity • Savings
Environment	• Efficiency • Emissions • Output material process • Production and consumption • Savings • Use • Other
Governance	• Awareness-raising • Capacity building • Collaboration • Education • Financing • Innovation, pilots and experiments • Monitoring and evaluation • Public procurement • Regulation • Stakeholder engagement • Strategy and initiatives • Other
Infrastructure and technology	• Area • Equipment • Facilities • Products and services • Other
Jobs	• Jobs and human resources

In addition to categories and sub-categories, indicators are categorised according to the sector to which they belong. However, when indicators do not relate to a specific sector or relate to the "circular economy" in general, they have been categorised as "not sector-specific". Sectors with representation equal or below 1% of the OECD inventory have been included in the "Other" category. The 11 sectors are the following: air; built environment; energy; food; public administration; resources and materials; reuse, repair, share; waste; water; not sector-specific; and other (agriculture, culture, forest, industry, land use, mobility, textile and tourism).

The OECD inventory distinguishes 11 sectors. Mostly, indicators from the inventory do not refer to any specific sector (not sector-specific, 31% of the OECD inventory) but rather to the circular economy in the broadest sense of the term. Contrary to other indicators, they may be objective-driven rather than data-driven, as they have been created specifically to measure the progress of circular economy initiatives. Examples of these indicators are: the number of companies that received financial assistance related to the circular economy; and the number of city contracts evaluated using circular economy principles. The remaining sectors are the following (Figure 2):

Figure 2. Indicators by sector

Note: Data refer to 474 collected indicators.
Source: OECD (2020[2]), The Circular Economy in Cities and Regions: Synthesis Report, OECD Urban Studies, OECD Publishing, Paris, https://doi.org/10.1787/10ac6ae4-en .

- The **waste** sector represents 20% of the inventory. Mostly, indicators are related to the environment category (71%; Figure 3). Indicators concern both waste generation and management. Waste indicators also distinguish across categories of waste, such as bio-waste, plastics waste and electrical waste. Waste treatment differentiates between landfill, incinerated waste, recycled waste and the number of composting plants created.

- Indicators on **resources and materials** represent 9% of the framework, measuring material flows (exports and imports), the self-sufficiency of materials and the recovery of materials. These indicators are prevalently included in the environmental category (78%).

- A total of 8% of the sample refer to **repair, reuse and share**, which mainly covers the categories of infrastructure and technology (35%), environment (28%) and governance (20%). This sector includes indicators on impacts and results from the reuse and repair of several objects and materials (e.g. objects redirected/repaired from recycling centres; the number of goods reused internally in the local administration; and the ratio of products repaired to new products sold). Additionally, it addresses the infrastructure that promotes and enables repair and reuse. Examples of the latter are: the number of reuse centres in the city; the number of recycling centres organised; and collaborative spaces equipped with materials and equipment to encourage repair. Other indicators cover the governance approach of the sector, including indicators such as the number
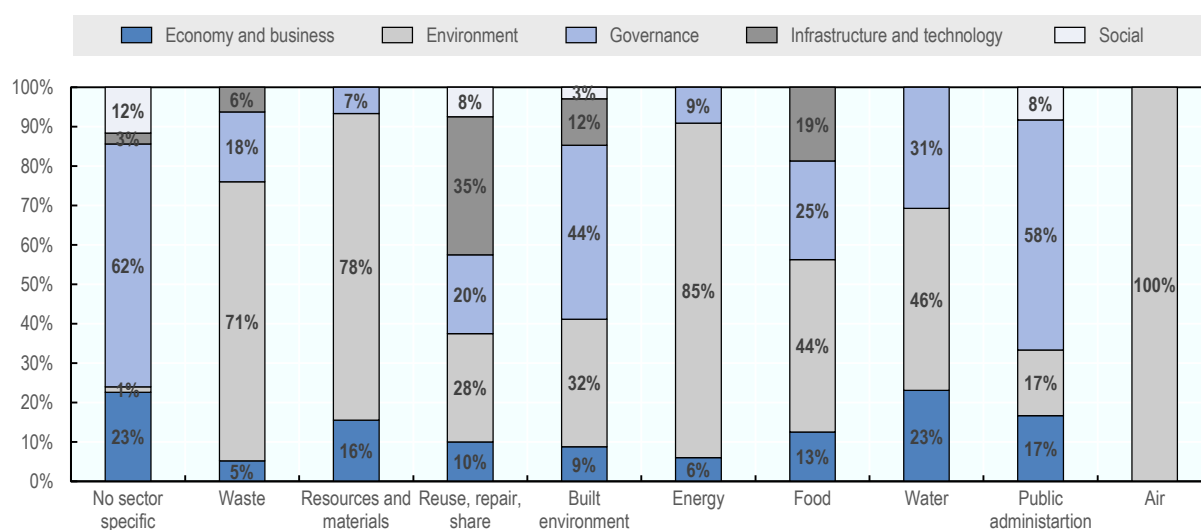
of meetings of a working group to boost sharing or the number of projects realised for the sharing economy.

- A total of 7% of indicators are devoted to the **built environment**, of which 44% belongs to the governance category (Figure 3Figure 3.). Indicators cover the whole life cycle of buildings, from the design (e.g. construction works with circular design and projects incorporating smart design) to end of life (e.g. recovery rate of construction and demolition waste). Other indicators refer to the use and consumption of materials (e.g. construction and demolition waste usage rate, the recovery rate of construction and demolition waste, the recovery rate of construction waste as material). Several indicators also address the existence of circular-economy-related certifications for buildings (e.g. number of companies with certification based on life cycle or eco-design, percentage of construction projects applying to certification programmes and the inclusion of eco-designed products).

- There is a small number of **energy**-related indicators (7%), most of them classified in the environmental category (85%). The existing indicators mostly relate to energy consumption levels (e.g. biofuel consumption; energy efficiency in buildings and homes; and electrical energy consumption), energy recovery (e.g. percentage of used lubricant oils collected and treated for energy recovery) and energy valorisation (e.g. the number of projects implemented for the valorisation of energy).

- **Food** (7%) is another relevant sector for measuring circularity, especially in terms of waste: the amount of food waste generated, the number of food recovery-redistribution actions and food waste avoided through a circular consumption.

- **Water**-related indicators (3%) mainly focus on water regeneration and wastewater, mainly belonging to the environmental category (46%). Some examples from the inventory are: regenerated water used as a source of water supply; the percentage of urban wastewater treated/total wastewater generated; and the number of approved water reuse projects per year.

- Few measurement frameworks have started to monitor the role of the **public administration** as a driver for the circular economy (3%). Governance is the primary category within this sector (58%). Some examples of the indicators are: the number of municipal staff trained on the circular economy; the economic savings from the reuse of furniture and equipment of the local administration; and the number of municipal staff actively working on the development of a circular vision.

- Indicators related to the sub-category **air** (2%) refers to emissions of CO_2 and GHG, and are all included in the environmental category (100%). However, according to the OECD survey, cities and regions tend to have difficulties in the collection of reliable data for measuring emissions.

- **Other** sectors (6%): this group encompasses the sectors with few additional indicators (with representation equal or below 1% of the OECD inventory) and includes the following sectors, ordered by their share in the inventory: land use (e.g. new districts incorporating the principles of the circular economy); textile (e.g. clothing recycled per year and savings made by not replacing items of clothing); culture (e.g. collected materials and objects in pilot projects within cultural facilities and Identification of pilot operations in the cultural sector); industry (e.g. working group meetings with major industry players for better regulatory alignment as a boost to the circular economy); agriculture (seed banks and agro-ecological initiatives); mobility (car sharing and use of private vehicles in cities); forestry (direct jobs associated with the forest/wood sector); and tourism (number of tourism enterprises and productivity of the sustainable tourism sector).

Figure 3 shows the distribution of the sectors across the categories. Energy (85%), resources and materials (78%) and waste (71%) are predominantly included in the "environment" category. Indicators not sector-specific (62%), public administration (58%) and built environment (44%) belongs to the "governance" category. Regarding the category "infrastructure and technology", indicators refer to reuse, repair and

share (35%), food (19%) and built environment (12%). Finally, the "job" category is composed of indicators referring to not sector-specific (12%), public administration (8%) and repair, reuse and share (8%) indicators.

Figure 3. Composition of sector indicators by category

Note: The graph refers to the 474 indicators.
Source: OECD (2020[2]), The Circular Economy in Cities and Regions: Synthesis Report, OECD Urban Studies, OECD Publishing, Paris, https://doi.org/10.1787/10ac6ae4-en.

Environmental-related indicators

According to the sample collected within the OECD Inventory of Circular Economy Indicators, environmental indicators prevail (39%) (Table 2). Environmental indicators have been divided into sub-categories, following the categorisation applied by the European Commission (EC) (2018[3]) and the European Environment Agency (EEA) (2016[4]) as much as possible:

- **Output material process** indicators prevail (36% of all the environmental indicators). This sub-category includes indicators measuring the various phases of waste and material that can be reused and transformed into resources (e.g. material collected for the reuse of building materials and collection of plastics; objects recovered in reuse centres and materials and waste recovered).

- **Production and consumption** (27%) cover materials and resources that have been used in the economy, mostly in the generation of waste measured in several sectors (e.g. construction waste, food waste, waste generation from commerce and industry, municipal waste). The consumption of resources is also included within this sub-category: energy consumption, domestic material consumption, consumption of virgin materials and water consumption.

- The sub-category of **use** (14%) describes those indicators on the utilisation and reuse of resources (e.g. amount of resources used and put back into the system; direct resource use; and direct land use), as well as several use rates (e.g. circular material use rate and reuse of packaging waste).

- **Savings** (12%) refers to indicators mentioning the consumption avoidance and savings of different resources such as energy, food, raw materials and clothing (e.g. food waste avoided through a circular consumption and energy saved by energy efficiency programmes).

- **Emissions indicators** (9%), mainly measure the generation of greenhouse gases including CO_2 emissions from different activities. In some cases, these indicators concern the circular economy

in a broad sense and do not refer to specific sectors (e.g. CO_2 emissions per capita), while other indicators are associated to specific activities and areas (e.g. emissions related with the consumption of materials; CO_2 savings as a result of procurement activities the carbon impact of waste generation).

- Other indicators from this category analyse **efficiency** (2%), which measures the achievement of the maximum output from a given level of resources used to carry out an activity (OECD, 2013[5]). Efficiency-related indicators in the sample focus on the energy sector (e.g. energy efficiency, energy intensity and energy efficiency in buildings and homes).

Table 2. Environmental indicators

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Efficiency	Energy	Amount of renewable electricity available to each household	NA	2018	Measuring the Circular Economy Developing an indicator set for Opportunity Peterborough
Efficiency	Energy	Electricity from renewable sources (gross production)	GWh	2018	Extremadura 2030. Green and Circular Economy Strategy
Efficiency	Energy	Energy efficiency	NA	2017	Towards a Model of Circular Economy for Italy - Overview and Strategic Framework
Efficiency	Energy	Energy efficiency in buildings and homes	NA	2015	Promoting the Green and Circular Economy in Catalonia
Efficiency	Energy	Energy from renewable sources	NA	2017	Towards a Model of Circular Economy for Italy - Overview and Strategic Framework
Efficiency	Energy	Energy intensity	TJ	2019	National Strategy for the Circular Economy
Efficiency	Energy	Final energy intensity	Tonne of oil equivalent (toe)	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Efficiency	Energy	Installed MW of biomass generation	MW	2019	National Strategy for the Circular Economy
Efficiency	Energy	MW installed from renewable sources	MW	2019	National Strategy for the Circular Economy
Efficiency	Energy	Renewable energy	% of energy use	2018	Circular economy: what we want to know and can measure

Efficiency	Energy	The share of renewable energy in district heating	%	NA	Strategic programme of competitiveness and sustainable growth
Emissions	Air	Carbon impact of waste	NA	2016	Making Things Last A Circular Economy Strategy for Scotland
Emissions	Air	CO2 avoided as a consequence of recovery and reuse of materials	NA	2017	1st Roadmap Paris Circular Economy Plan
Emissions	Air	CO2 consumption footprint	Billion kg	2018	Circular economy: what we want to know and can measure
Emissions	Air	CO2 emissions	Tonnes	2019	Contatore ambientale
Emissions	Air	CO2 emissions per capita	Tonnes/capita	2018	Measuring the Circular Economy Developing an indicator set for Opportunity Peterborough
Emissions	Air	CO2 emissions reduction	ktons	2016	Circular Amsterdam – A Vision and Action Agenda for the City and Metropolitan Area
Emissions	Air	CO2 emissions, direct	Billion kg	2018	Circular economy: what we want to know and can measure
Emissions	Air	CO2 savings as a result of procurement activities	NA	2018	Circular Economy Procurement implementation Plan and Framework
Emissions	Air	Contribution of greenhouse gases in the waste sector	CO_{2eq} (kt)	2020	Spanish Strategy for Circular Economy: España Circular 2030
Emissions	Air	GHG Emissions	t CO2/year	2019	The Green and Circular Economy of Barcelona City Council
Emissions	Air	Greenhouse gas emissions per capita	NA	2015	Resource wisdom roadmap
Emissions	Air	Greenhouse gas reduction	%	2019	National Strategy for the Circular Economy
Emissions	Air	Reduced emissions through green public procurement	NA	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Emissions	Air	Reduction of CO2 emissions due to the	NA	2018	2nd Roadmap Paris Circular Economy Plan

		implementation of a Green IT strategy in the local administration			
Emissions	Air	Saving of CO2 emitted	Tonnes	2018	Extremadura 2030. Green and Circular Economy Strategy
Emissions	Air	Total Greenhouse Gas Emissions	Thousand tonnes/year	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Emissions	Energy	Energy consumption avoidance through the reduction of the digital impact in the local administration	Number	2018	2nd Roadmap Paris Circular Economy Plan
Emissions	Resources, materials, waste	Reduction of carbon emissions associated with material consumption	% (In relation to a base year)	2019	Basque Country Circular Economy Strategy 2030
Other	No sector specific	Environmental impact	NA	2017	Towards a Model of Circular Economy for Italy - Overview and Strategic Framework
Other	No sector specific	Environmental quality	NA	2015	Promoting the Green and Circular Economy in Catalonia
Other	Resources, materials, waste	Material footprint per GDP	NA	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Output material process	Resources, materials, waste	Materials from renewable sources	NA	2017	Towards a Model of Circular Economy for Italy - Overview and Strategic Framework
Output material process	Resources, materials, waste	Materials recovered through reuse and recycling	Tonnes	2017	1st Roadmap Paris Circular Economy Plan
Output material process	Resources, materials, waste	Percentage increase in materials recovery (t) and organic recovery (t)	%	2017	Paris Circular Economy Plan: 2017-2020
Output material process	Resources, materials, waste	Percentage of recycled content used in materials	%	2018	Circular Economy Procurement implementation Plan and Framework

Output material process	Resources, materials, waste	Percentage reduction of incoming / outgoing flows	%	2017	Paris Circular Economy Plan: 2017-2020
Output material process	Resources, materials, waste	Raw materials avoided/displacement factor	NA	2018	Circular Economy Procurement implementation Plan and Framework
Output material process	Reuse, repair, share	Cyclical use rate	secondary application as % of total	2018	Circular economy: what we want to know and can measure
Output material process	Reuse, repair, share	Number of goods reused internally in the local administration	Number	2018	2nd Roadmap Paris Circular Economy Plan
Output material process	Reuse, repair, share	Objects collected and diverted for reuse	Tonnes / number	2018	2nd Roadmap Paris Circular Economy Plan
Output material process	Reuse, repair, share	Objects recovered in reuse centres	Tonnes	2017	1st Roadmap Paris Circular Economy Plan
Output material process	Reuse, repair, share	Objects redirected/repaired from recycling centres	Tonnes	2017	1st Roadmap Paris Circular Economy Plan
Output material process	Reuse, repair, share	Objects repaired at Repair Cafés	Tonnes	2017	1st Roadmap Paris Circular Economy Plan
Output material process	Reuse, repair, share	Percentage of household assets at the end of their administrative life that are donated or resold	%	2018	2nd Roadmap Paris Circular Economy Plan
Output material process	Reuse, repair, share	Ratio of products repaired to new products sold (including reused vs. new schoolbooks)	Ratio	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Output material process	Reuse, repair, share	Repair and reuse of materials	Tonnes	2019	Galician Strategy of Circular Economy 2019-2030
Output material process	Textile	Clothing recycled per year	Tonnes	2017	1st Roadmap Paris Circular Economy Plan

Output material process	Textile	Number of items of clothing repaired per year	Number	2017	1st Roadmap Paris Circular Economy Plan
Output material process	Waste	Amount of recovered material through an inclusive recycling programme	NA	2013	Inclusive Recycling Programme
Output material process	Waste	Evolution of the tonnage of plastics collected in the city	Tonnes	2018	2nd Roadmap Paris Circular Economy Plan
Output material process	Waste	Evolution of the tonnage of plastics recycled in the city	Tonnes	2018	2nd Roadmap Paris Circular Economy Plan
Output material process	Waste	Evolution of the tonnage of plastics used in the city	Tonnes	2018	2nd Roadmap Paris Circular Economy Plan
Output material process	Waste	Recovery of fisheries waste	%	2019	Galician Strategy of Circular Economy 2019-2030
Output material process	Waste	Recycling of biowaste per capita	Kg/capita	2019	Monitoring framework for the circular economy
Output material process	Waste	Tons of materials recovered and recycled from 100 000 replaced refrigerators.	Tonnes	2019	National Strategy for the Circular Economy
Output material process	Built environment	Construction waste	NA	2017	Roadmap of the circular economy of North Karelia
Output material process	Built environment	Total amount of waste produced by construction and demolition	NA	2016	Making Things Last A Circular Economy Strategy for Scotland
Output material process	Food	Total amount of food waste generated per year	kg/inhabitant	2019	Basque Country Circular Economy Strategy 2030
Output material process	Food	Food waste	Million tonnes	2019	Monitoring framework for the circular economy

Output material process	Food	Food Waste	kg/capita per year	2017	10 Key Indicators for Monitoring the Circular Economy
Output material process	Food	Volume of food waste (biomass) generated	Tonnes	2019	Galician Strategy of Circular Economy 2019-2030
Output material process	Waste	% reduction of the generated household waste from 2010	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Output material process	Waste	Change in the volume of household waste	NA	2018	2nd Roadmap Paris Circular Economy Plan
Output material process	Waste	Generation of municipal waste per capita	Kg/capita	2019	Monitoring framework for the circular economy
Output material process	Waste	Generation of waste excluding major mineral waste per domestic material consumption unit	%	2019	Monitoring framework for the circular economy
Output material process	Waste	Illegal dumping	Number	2018	2nd Roadmap Paris Circular Economy Plan
Output material process	Waste	Mixed waste	kg/person/year	NA	NA
Output material process	Waste	Percentage of waste diversion as a result of procurement activities	%	2018	Circular Economy Procurement implementation Plan and Framework
Output material process	Waste	Residual waste	kg/person/year	NA	NA
Output material process	Waste	Solid waste generated	Tonnes	2018	Circular Bilbao and Bizkaia
Output material process	Waste	Tons of waste avoided	Tonnes	2017	Paris Circular Economy Plan: 2017-2020

Output material process	Waste	Total amount of waste produced by commerce and industry	NA	2016	Making Things Last A Circular Economy Strategy for Scotland
Output material process	Waste	Total amount of waste produced by households	NA	2016	Making Things Last A Circular Economy Strategy for Scotland
Output material process	Waste	Use of packaging waste articulated to extended producer responsibility	NA	2019	National Strategy for the Circular Economy
Output material process	Waste	Waste produced by commerce and industry per unit of GVA	NA	2016	Making Things Last A Circular Economy Strategy for Scotland
Output material process	Waste	Waste produced by construction and demolition per unit of GVA	NA	2016	Making Things Last A Circular Economy Strategy for Scotland
Output material process	Waste	Waste produced by households per unit of GVA	NA	2016	Making Things Last A Circular Economy Strategy for Scotland
Output material process	Waste	Waste production	Billion Kg	2018	Circular economy: what we want to know and can measure
Output material process	Waste	Waste production per kilogram of product produced	kg waste/kg product	2018	Circular economy: what we want to know and can measure
Output material process	Built environment	Construction and demolition waste usage rate	%	2019	National Strategy for the Circular Economy
Output material process	Built environment	Recovery rate of construction and demolition waste	%	2019	Monitoring framework for the circular economy
Output material process	Built environment	Recycling rate of construction waste	%	2017	Roadmap of the circular economy of North Karelia
Output material process	Built environment	Separate collection rate of construction waste	%	2017	Roadmap of the circular economy of North Karelia

Output material process	Resources, materials, waste	Circular material use rate (ratio recycled material / (recycled material + CDM)	%	2019	Basque Country Circular Economy Strategy 2030
Output material process	Resources, materials, waste	End-of-life recycling input rates	%	2019	Monitoring framework for the circular economy
Output material process	Resources, materials, waste	Recycled materials	NA	2017	Towards a Model of Circular Economy for Italy - Overview and Strategic Framework
Output material process	Resources, materials, waste	Reduced waste through green public procurement	NA	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Output material process	Reuse, repair, share	Objects exchanged and diverted from the waste stream in the city	Tonnes	2018	2nd Roadmap Paris Circular Economy Plan
Output material process	Reuse, repair, share	Reuse waste	% of available waste	2018	Circular economy: what we want to know and can measure
Output material process	Waste	Exporting landfill waste	NA	2015	NA wisdom roadmap
Output material process	Waste	Household waste recycled	%	2018	Measuring the Circular Economy Developing an indicator set for Opportunity Peterborough
Output material process	Waste	Non household waste recycled	%	2018	Measuring the Circular Economy Developing an indicator set for Opportunity Peterborough
Output material process	Waste	Percentage of recovered waste over generated (batteries and accumulators)	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Output material process	Waste	Percentage of recovered waste over generated (electrical and electronic equipment waste)	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030

Output material process	Waste	Percentage of recovered waste over generated (End of life tyres)	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Output material process	Waste	Percentage of recovered waste over generated (End of life vehicles)	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Output material process	Waste	Percentage of recovered waste over generated (Extracted natural resources)	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Output material process	Waste	Percentage of recovered waste over generated (Household and commercial)	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Output material process	Waste	Percentage of recovered waste over generated (Used oils)	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Output material process	Waste	Percentage of recovered waste over generated (Water treatment sludge)	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Output material process	Waste	Percentage of recyclable plastic packaging placed on the market	%	2019	Basque Country Circular Economy Strategy 2030
Output material process	Waste	Quantities of waste sent to landfill	Proportion of municipal waste sent to landfill (%)	2017	10 Key Indicators for Monitoring the Circular Economy
Output material process	Waste	Quantity of bio-waste managed by on-site composting	% of total biowaste	2019	Galician Strategy of Circular Economy 2019-2030
Output material process	Waste	Quantity of waste avoided by waste reduction schemes	Number	2017	1st Roadmap Paris Circular Economy Plan
Output material process	Waste	Recycled amount	Tonnes	NA	NA
Output material process	Waste	Recycling rate	%	NA	Circular Economy framework Monitoring report

Output material process	Waste	Recycling rate	%	2019	National Strategy for the Circular Economy
Output material process	Waste	Recycling rate of all waste excluding major mineral waste	%	2019	Monitoring framework for the circular economy
Output material process	Waste	Recycling rate of electrical and electronic waste (e-waste)	%	2019	Monitoring framework for the circular economy
Output material process	Waste	Recycling rate of municipal waste	%	2019	Monitoring framework for the circular economy
Output material process	Waste	Recycling rate of overall packaging	%	2019	Monitoring framework for the circular economy
Output material process	Waste	Recycling rate of plastic packaging waste	%	2019	Monitoring framework for the circular economy
Output material process	Waste	Recycling rate of wooden packaging	%	2019	Monitoring framework for the circular economy
Output material process	Waste	Reuse of packaging waste (%)	%	2019	National Strategy for the Circular Economy
Output material process	Waste	Separate waste collection	%	2019	The Green and Circular Economy of Barcelona City Council
Output material process	Waste	Tonnage of waste diverted via repair, reuse, recovery and upcycling activities (recycling centres, artisans, second-hand goods stores, fab labs, etc.)	Tonnes	2017	Paris Circular Economy Plan: 2017-2020
Output material process	Waste	Tons of waste avoided through the donation and reselling scheme to the city	Tonnes	2018	2nd Roadmap Paris Circular Economy Plan

Output material process	Waste	Tons of waste collected and managed from computers and peripherals, fluorescent lamps, batteries and accumulators, used lead-acid batteries, expired pesticide and drug containers	Tonnes	2019	National Strategy for the Circular Economy
Output material process	Waste	Total waste treatment: Incineration	t/inhabitant	2019	Basque Country Circular Economy Strategy 2030
Output material process	Waste	Total waste treatment: Landfill	t/inhabitant	2019	Basque Country Circular Economy Strategy 2030
Output material process	Waste	Total waste treatment: Recycling	t/inhabitant	2019	Basque Country Circular Economy Strategy 2030
Output material process	Waste	Urban waste collected separately by conducting pilot experiments.	%	2019	Galician Strategy of Circular Economy 2019-2030
Output material process	Waste	Waste avoided through collection and recovery of objects	Tonnes	2017	1st Roadmap Paris Circular Economy Plan
Output material process	Waste	Waste recovery through an Inclusive Recycling Program	NA	2013	Inclusive Recycling Programme
Output material process	Waste	Waste separation	%	NA	NA
Output material process	Waste	Waste streams to landfills	NA	2015	NA
Output material process	Waste	Waste to landfill	Tonnes	2019	Contatore ambientale
Output material process	Waste	Waste value recovery	%	2018	Circular Bilbao and Bizkaia

Output material process	Water	Percentage of urban wastewater treated / total wastewater generated	%	2019	National Strategy for the Circular Economy
Production	Energy	Gross electricity production	GWh	2018	Extremadura 2030. Green and Circular Economy Strategy
Production and consumption	Energy	Biofuels (consumption)	Ktoe	2018	Extremadura 2030. Green and Circular Economy Strategy
Production and consumption	Energy	Diesel consumption (transport sector)	ktoe	2018	Extremadura 2030. Green and Circular Economy Strategy
Production and consumption	Energy	Electrical energy (consumption) in power plant bars	GWh	2018	Extremadura 2030. Green and Circular Economy Strategy
Production and consumption	Energy	Electrical energy consumption	MW	2019	Contatore ambientale
Production and consumption	Energy	Electricity from renewable sources in the consumption of power plant bars	%	2018	Extremadura 2030. Green and Circular Economy Strategy
Production and consumption	Energy	Energy consumption (final)	toe/inhabitant	2018	Extremadura 2030. Green and Circular Economy Strategy
Production and consumption	Energy	Energy consumption (primary)	toe/inhabitant	2018	Extremadura 2030. Green and Circular Economy Strategy
Production and consumption	Energy	Energy consumption avoidance from solutions from energy and water resources recovery	kWh	2018	2nd Roadmap Paris Circular Economy Plan
Production and consumption	Energy	Energy from renewable sources in gross final energy consumption	%	2018	Extremadura 2030. Green and Circular Economy Strategy

Production and consumption	Energy	Gasoline consumption	ktoe	2018	Extremadura 2030. Green and Circular Economy Strategy
Production and consumption	Energy	Share of Renewable Energies in the final energy consumption in transit	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Production and consumption	Energy	Share of Renewable Energies in the gross final consumption of energy	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Production and consumption	Energy	Share of Renewable Energy in Gross Final Energy Consumption	%	2017	Roadmap towards the circular economy in Slovenia
Production and consumption	Food	Consumption of fossil plastic in the food sector	Tonnes	2019	Galician Strategy of Circular Economy 2019-2030
Production and consumption	Food	Consumption of non-recyclable plastic in the food sector	Tonnes	2019	Galician Strategy of Circular Economy 2019-2030
Production and consumption	Food	Food waste avoided through a circular consumption	Tonnes	2017	1st Roadmap Paris Circular Economy Plan
Production and consumption	Resources, materials, waste	Consumption of secondary materials	Tonnes	2019	Contatore ambientale
Production and consumption	Resources, materials, waste	Consumption of virgin materials	Tonnes	2019	Contatore ambientale
Production and consumption	Resources, materials, waste	Domestic Material Consumption (CDM)	t/inhabitant	2019	Basque Country Circular Economy Strategy 2030
Production and consumption	Resources, materials, waste	Resource consumption chain (RMC)	Billion kg	2018	Circular economy: what we want to know and can measure

Production and consumption	Water	Water consumption	million m³	2019	Contatore ambientale
Production and consumption	Water	Water consumption	NA	2017	Towards a Model of Circular Economy for Italy - Overview and Strategic Framework
Production and consumption	Resources, materials, waste	EU self-sufficiency for raw materials	%	2018	Monitoring framework for the circular economy
Production and consumption	Resources, materials, waste	Recyclable & non-renewable material burning	NA	2015	Resource wisdom roadmap
Production and consumption	Resources, materials, waste	Recyclable raw materials exports to non-EU countries	Tonnes	2019	Monitoring framework for the circular economy
Production and consumption	Resources, materials, waste	Recyclable raw materials Imports from non-EU countries	Tonnes	2019	Monitoring framework for the circular economy
Production and consumption	Resources, materials, waste	Recyclable raw materials Intra EU trade	Tonnes	2019	Monitoring framework for the circular economy
Production and consumption	Resources, materials, waste	Self-sufficiency resources	kg extracted/kg DMI resource	2018	Circular economy: what we want to know and can measure
Production and consumption	Resources, materials, waste	Use of recycled raw materials in production processes	cyclical material use rate	2017	10 Key Indicators for Monitoring the Circular Economy
Production and consumption	Water	Regenerated water used as a source of water supply	%	2019	Galician Strategy of Circular Economy 2019-2030
Production and consumption	Water	Water extraction, direct	million m3	2018	Circular economy: what we want to know and can measure
Production and consumption	Land use	Land use, direct	% cultured land	2018	Circular economy: what we want to know and can measure

Production and consumption	Built environment	Reused materials and products from construction and demolition waste	% of construction and demolition waste generated	2019	Galician Strategy of Circular Economy 2019-2030
Production and consumption	Built environment	Material collected in a workshop for the reuse of building materials	Tonnes	2017	1st Roadmap Paris Circular Economy Plan
Production and consumption	Built environment	Materials reused in a workshop for the reuse of building materials	Tonnes	2017	1st Roadmap Paris Circular Economy Plan
Production and consumption	Built environment	Rate of compliance with the obligation to use at least 5% of recycled materials in construction contracts	Rate	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Production and consumption	Built environment	Recovery rate of construction waste as material	%	2017	Roadmap of the circular economy of North Karelia
Production and consumption	Energy	Percentage (%) of used lubricant oils collected and treated for energy recovery	%	2019	National Strategy for the Circular Economy
Production and consumption	Energy	Energy saved by energy efficiency programmes in the following sectors: transport, industry, tertiary and residential	Tj	2019	National Strategy for the Circular Economy
Production and consumption	Energy	Energy savings	KWh/year	2019	The Green and Circular Economy of Barcelona City Council
Production and consumption	Resources, materials, waste	Material flows per capita EXP	t/inhabitant	2019	Basque Country Circular Economy Strategy 2030
Production and consumption	Resources, materials, waste	Material flows per capita IMP	t/inhabitant	2019	Basque Country Circular Economy Strategy 2030
Savings	Resources, materials, waste	Material savings	ktons	2016	Circular Amsterdam – A Vision and Action Agenda for the City and Metropolitan Area

Savings	Water	Drinking water savings	m3/year	2019	The Green and Circular Economy of Barcelona City Council
Use	Resources, materials, waste	Circular material use rate	%	2019	Monitoring framework for the circular economy
Use	Resources, materials, waste	Direct material use	Billion kg	2018	Circular economy: what we want to know and can measure
Use	Resources, materials, waste	Direct resource use	Billion kg	2018	Circular economy: what we want to know and can measure
Use	Resources, materials, waste	Resource use, chain (RMI resource)	Billion kg	2018	Circular economy: what we want to know and can measure
Use	Resources, materials, waste	Amount of resources used and put back into the system	NA	2017	Towards a Model of Circular Economy for Italy - Overview and Strategic Framework
Use	Resources, materials, waste	Contribution of recycled materials to the demand for raw materials	NA	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Use	Resources, materials, waste	Environmental impact of the resources used and put back into the system	NA	2017	Towards a Model of Circular Economy for Italy - Overview and Strategic Framework
Use	Waste	Tons of waste biomass used	Tonnes	2019	National Strategy for the Circular Economy
Use	Mobility	Use of private vehicle in cities	%	2019	Galician Strategy of Circular Economy 2019-2030

Governance related indicators

Governance indicators represent approximately one-third of the sample, with the sub-categories of awareness-raising, as well as innovation, pilots and experiments being those with the highest representation (14% each) (Table 3):

- **Awareness-raising** indicators mainly refer to the number of awareness-raising campaigns and events organised for different areas (e.g. food waste reduction, plastic use reduction and water reuse). However, indicators account also for other ways of raising awareness and disseminating circular economy principles in the format of workshops, events, publications, guidelines and platforms**.**

- Regarding **innovation, pilots and experiments**, these indicators primarily include indicators related to the implementation of research and development (R&D) pilots and projects: e.g. the creation of an innovation platform for the circular economy, the number of experimental and pilot projects, the number of circular-economy-related R&D projects and the number of actors involved in experimental projects.

- **Strategy and initiatives** (12%) indicators generally monitor the number of initiatives adopted (e.g. agro-ecological initiatives, projects incorporating smart design, green and circular initiatives and number of water reuse projects). Furthermore, they analyse the different circular initiatives adopted by local authorities, as well as the steps for their adoption, the level of implementation and the number of documents created.

- **Public procurement** (11%): This category includes indicators linked to the inclusion of circular and green criteria in the purchasing of goods, services and works by governments. Several indicators account for the volume of public procurement that includes circular and/or ecological criteria (measured as a percentage of total procurement, number of tenders or total amount in euros). Other indicators address the number of identified legal barriers for the implementation of green public procurement (GPP), or the number of companies informed about circular-economy-related public procurement opportunities.

- **Capacity building** (9%) indicators address the number of training courses on the circular economy, and the different activities to build knowledge of the circular economy. Indicators distinguish the training courses aimed at municipal staff (e.g. city staff trained in circular economy and circular procurement principles; and the number of training modules created for municipal staff). Other examples of this sub-category are: training courses and their level of implementation in the circular economy, conferences and seminars for improving skills, support programmes and guides.

- **Regulation** (9%): Indicators within this category focus on the creation and update of the existing regulation to boost the circular economy and the identification and removal of identified regulatory barriers. Indicators not only focus on the results and achievements (e.g. new laws and updates to boost the circular economy; removed regulatory barriers the number of legislative obstacles identified and resolved laws and regulation for the adaptation of the private sector to the circular economy) but also on the entire process (e.g. number of working group meetings to work on better legislation and the number of circular policy advisers developing circular regulations).

- **Education** (8%) indicators measure to what extend the circular economy is included in educational policies and curriculum. Examples of this sub-sector are: the number of students trained in the circular economy fields of activity; mainstreaming education for sustainable development into regional education policies; and the number of schools and universities that responded to the call for projects on circular economy education.

- **Stakeholder engagement** (8%) indicators mainly focus on actions to engage with key actors involved in all phases of the circular economy initiative (design, implementation and monitoring). Some examples include: the number of the circular economy vision-forming meetings, the number of actors mobilised, the number of collaborative projects implemented by circular economy networks and the number of meetings for circular projects.

- The inventory also collects indicators on **collaboration** (6%) activities, involving all actions related to co-operation among different actors (e.g. institutions) for synergies, projects and workshops to boost a circular economy. Indicators measure the way collaboration frameworks are built, by monitoring the number of meetings of working groups to boost the circular economy. Other indicators aim to measure the implementation of the collaboration frameworks such as the number of collaborative projects implemented, or the implementation of identified synergies.

- Few indicators deal with the **monitoring and evaluation** (5%) of circular economy initiatives and actions (e.g. follow-up and monitoring of the results of circular economy programmes and studies of the establishment of charges and life-cycle and cost-benefit studies).
- **Financing** (4%) indicators refer to all the economic support provided by governments to conduct a circular initiative (e.g. financial resources mobilised for experiments, the budget amount assigned to calls for projects and budget of pilot public contracts in the circular economy).

Table 3. Governance indicators

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Awareness raising	Built environment	Opening of a workshop for the reuse of building materials	YES/NO	2017	1st Roadmap Paris Circular Economy Plan
Awareness raising	Education and knowledge	Publications on the circular economy	Number	2018	Circular economy: what we want to know and can measure
Awareness raising	Education and knowledge	Number of users actively involved in a platform of good practices and relevant stakeholders	Number	2019	Galician Strategy of Circular Economy 2019-2030
Awareness raising	Education and knowledge	Awareness actions on search and innovation on the circular economy and their respective impact	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Awareness raising	Food	Awareness campaigns to reduce food waste	Number	2019	Galician Strategy of Circular Economy 2019-2030
Awareness raising	Food	Restaurants involved in wareness campaigns to reduce food waste	Number	2019	Galician Strategy of Circular Economy 2019-2030
Awareness raising	Industry	Number of events held in collaboration with the social entrepreneurship community	Number	2017	1st Roadmap Paris Circular Economy Plan
Awareness raising	Industry	Number of companies that publish sustainability reports	Number	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Awareness raising	No sector specific	Number of international delegations and events hosted for the promotion of the circular economy	Number	2017	1st Roadmap Paris Circular Economy Plan
Awareness raising	No sector specific	Number of participating people on awareness raising activities	Number	2017	1st Roadmap Paris Circular Economy Plan
Awareness raising	No sector specific	Number of publications on actors of the circular and solidarity economy	Number	2017	1st Roadmap Paris Circular Economy Plan
Awareness raising	No sector specific	Actions to divulge a long-term R&I agenda for speeding up the circular economy in the country	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Awareness raising	No sector specific	No. of awareness-raising actions and their respective impact	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Awareness raising	No sector specific	Awareness campaigns	Number	2018	Circular economy: what we want to know and can measure
Awareness raising	Public administartion	Creation of a municipal or regional web platform for information on the the circular economy	YES/NO	2017	1st Roadmap Paris Circular Economy Plan
Awareness raising	Public administartion	Level of traffic on the web platform for information on the the circular economy	NA	2017	1st Roadmap Paris Circular Economy Plan
Awareness raising	Resources, materials, waste	Number of awareness-raising activities carried out for plastic use reduction	Number	2018	2nd Roadmap Paris Circular Economy Plan
Awareness raising	Resources, materials, waste	Number of awareness-raising activities for waste prevention carried out	Number	2018	2nd Roadmap Paris Circular Economy Plan

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Awareness raising	Resources, materials, waste	Awareness campaigns on marine litter	Number	2019	Galician Strategy of Circular Economy 2019-2030
Awareness raising	Reuse, repair, share	Number of offers on and visitors to the platform for the sharing economy	Number	2017	1st Roadmap Paris Circular Economy Plan
Awareness raising	Textile	Conferences about circular and responsible fashion	Number	2018	2nd Roadmap Paris Circular Economy Plan
Awareness raising	Water	Actions taken to disseminate water efficiency guides	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Awareness raising	Water	Awareness actions for water reuse and their respective impact	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Capacity building	Built environment	Operation of a workshop for the reuse of building materials	NA	2017	1st Roadmap Paris Circular Economy Plan
Capacity building	Built environment	Guides developed on greater efficiency and material productivity for the built environment	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Capacity building	Energy	Training courses in renewable energies	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Capacity building	Food	Training initiatives for local government staff on food waste reduction	Number	2019	Galician Strategy of Circular Economy 2019-2030
Capacity building	No sector specific	Training courses on the circular economy	Number	2018	Circular economy: what we want to know and can measure
Capacity building	No sector specific	People trained in the circular economy fields of activity	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Capacity building	No sector specific	Seminars organized on circular economy within the framework of the PREC (Programme Régional en Economie Circulaire)	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Capacity building	No sector specific	Number of start-ups supported by an innovation platform	Number	2017	1st Roadmap Paris Circular Economy Plan
Capacity building	No sector specific	Level of implementation of Training plan on the circular economy	NA	NA	Circular Economy framework Monitoring report
Capacity building	Public administartion	Number of conferences organized for training of municipal staff	Number	2018	2nd Roadmap Paris Circular Economy Plan
Capacity building	Public administartion	Number of training modules created for municipal staff	Number	2018	2nd Roadmap Paris Circular Economy Plan
Capacity building	Public administartion	Number of staff trained on the circular economy	Number	2018	2nd Roadmap Paris Circular Economy Plan
Capacity building	Public administartion	Number of City staff trained on Circular Economy procurement principles	Number	2018	Circular Economy Procurement implementation Plan and Framework
Capacity building	Reuse, repair, share	Existence of a support programme and toolbox for the sharing economy	YES/NO	2017	1st Roadmap Paris Circular Economy Plan
Collaboration	No sector specific	No. of partnerships with municipalities/distribution	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Collaboration	No sector specific	Financial institutions willing to collaborate on a circular economy initiative	%	NA	NA
Collaboration	No sector specific	Implementation of an innovation platform for the circular economy	YES/NO	2017	1st Roadmap Paris Circular Economy Plan

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Collaboration	No sector specific	Number of synergies identified / implemented by economic actors	Number	2017	1st Roadmap Paris Circular Economy Plan
Collaboration	No sector specific	Collaborative projects implemented by the Galician network of Circular Economy	Number	2019	Galician Strategy of Circular Economy 2019-2030
Collaboration	Public administartion	Institutions willing to collaborate on a circular economy initiative	%	NA	NA
Collaboration	Resources, materials, waste	Number of meetings of the commission to develop alternatives to single-use plastic	Number	2018	2nd Roadmap Paris Circular Economy Plan
Collaboration	Resources, materials, waste	International agreements established for acceptance of by-product and materials with end-of-waste status and countries covered	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Collaboration	Reuse, repair, share	Number of meetings of a working group to boost sharing	Number	2017	1st Roadmap Paris Circular Economy Plan
Collaboration	Reuse, repair, share	Number of workshops held to to link up supply and demand and boost the sharing economy	Number	2017	1st Roadmap Paris Circular Economy Plan
Education	Energy	Students trained in renewable energies	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Education	No sector specific	Online launch of the MOOC "implementation of the circular economy in a city".	YES/NO	2018	2nd Roadmap Paris Circular Economy Plan
Education	No sector specific	Number of students who took the MOOC "implementation of the circular economy in a city".	Number	2018	2nd Roadmap Paris Circular Economy Plan

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Education	No sector specific	Number of schools and universities that responded to the call for projects on the circular economy education	Number	2018	2nd Roadmap Paris Circular Economy Plan
Education	No sector specific	Meeting time of the working group for the creation of a pedagogical toolbox for the circular economy	NA	2018	2nd Roadmap Paris Circular Economy Plan
Education	No sector specific	Creation of the booklet and action sheets on the circular economy	YES/NO	2018	2nd Roadmap Paris Circular Economy Plan
Education	No sector specific	Number of children reached by pedagogical circular economy activities	Number	2018	2nd Roadmap Paris Circular Economy Plan
Education	No sector specific	Number of events organised in relation with pedagogical circular economy activities	Number	2018	2nd Roadmap Paris Circular Economy Plan
Education	No sector specific	Mainstreaming education for sustainable development into regional education policies	NA	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Education	No sector specific	Mainstreaming education for sustainable development into the curriculum	NA	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Education	No sector specific	Inclusion of education for sustainable development in teacher training	NA	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Education	No sector specific	Circular economy researchers	Number	2018	Circular economy: what we want to know and can measure

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Education	No sector specific	Students trained in the circular economy fields of activity	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Financing	Built environment	Financial resources mobilised for experiments on the building sector	NA	2017	1st Roadmap Paris Circular Economy Plan
Financing	No sector specific	Companies benefiting from public grants for the creation of new circular business models.	Number	2019	Galician Strategy of Circular Economy 2019-2030
Financing	No sector specific	Companies that have received financial assistance related to the circular economy	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Financing	No sector specific	Financial assistance granted to companies related to the circular economy	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Financing	No sector specific	Budget amount assigned to calls for projects/living labs carried out/implemented and number of companies that have benefited from them.	NA	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Financing	No sector specific	Number and investment in circular-economy-related R&I projects	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Financing	No sector specific	Budget of pilot public contracts in circular economy developed in the Brussels-Capital Region	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Innovation, pilots and experiments	Built environment	Capitalisation of experiments on the building sector	NA	2017	1st Roadmap Paris Circular Economy Plan

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Innovation, pilots and experiments	Built environment	Duration of experiments on the building sector	NA	2017	1st Roadmap Paris Circular Economy Plan
Innovation, pilots and experiments	Built environment	Number of experimental projects on the building sector	Number	2017	1st Roadmap Paris Circular Economy Plan
Innovation, pilots and experiments	Built environment	Resources exchanged in experimental areas for the recovery and reuse of building materials	Tonnes	2017	1st Roadmap Paris Circular Economy Plan
Innovation, pilots and experiments	Built environment	Initiatives on reuse for the building sector	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Innovation, pilots and experiments	Built environment	Protocols developed to incentivise reuse of components, recovered or recycled materials, development and/or use of material passports, promotion of the use of "empty" built space	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Innovation, pilots and experiments	Culture	Creation of the working group to identify pilot actions to be implemented in the cultural sector	YES/NO	2018	2nd Roadmap Paris Circular Economy Plan
Innovation, pilots and experiments	Culture	Identification of pilot operations in the cultural sector	YES/NO	2018	2nd Roadmap Paris Circular Economy Plan
Innovation, pilots and experiments	Culture	Collected materials and objects in pilot projects within cultural facilities of the city	Tonnes	2018	2nd Roadmap Paris Circular Economy Plan
Innovation, pilots and experiments	Culture	Reused materials and objects in pilot projects within cultural facilities of the city	Tonnes	2018	2nd Roadmap Paris Circular Economy Plan

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Innovation, pilots and experiments	No sector specific	Number of actors involved in experimental projects	Number	2017	1st Roadmap Paris Circular Economy Plan
Innovation, pilots and experiments	No sector specific	Number of experimental projects initiated	Number	2017	1st Roadmap Paris Circular Economy Plan
Innovation, pilots and experiments	No sector specific	Number of pilot projects initiated for the development of territorial synergies between economic actors	Number	2017	1st Roadmap Paris Circular Economy Plan
Innovation, pilots and experiments	No sector specific	Launch and completion of feasibility studies for a Re-manufacturing in Paris cluster	YES/NO	2017	1st Roadmap Paris Circular Economy Plan
Innovation, pilots and experiments	No sector specific	Patents (technology, product design)	Number	2018	Circular economy: what we want to know and can measure
Innovation, pilots and experiments	No sector specific	Patent requests in relation to new sustainable processes presented by public bodies (research centres, universities and public bodies) and companies.	Number	2019	Galician Strategy of Circular Economy 2019-2030
Innovation, pilots and experiments	No sector specific	Definition of criteria to accredit knowledge-intensive service providers specialized in circular economy.	YES/NO	2019	Galician Strategy of Circular Economy 2019-2030
Innovation, pilots and experiments	No sector specific	Accredited Knowledge Intensive Service Providers specialized in circular economy	Number	2019	Galician Strategy of Circular Economy 2019-2030
Innovation, pilots and experiments	No sector specific	Transferring the pilot experiences of the programme for the adoption of good	NA	2019	Galician Strategy of Circular Economy 2019-2030

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
		practices to the different sectors			
Innovation, pilots and experiments	No sector specific	Experiences registered (green economy and circular economy)	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Innovation, pilots and experiments	No sector specific	Increase in the number of projects that contribute to the implementation of innovative and sustainable initiatives	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Innovation, pilots and experiments	No sector specific	Pilot cases implemented via calls for projects/living lab	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Innovation, pilots and experiments	Resources, materials, waste	Number of patents related to recycling and secondary raw materials	Number	2019	Monitoring framework for the circular economy
Monitoring and evaluation	Built environment	Products and construction techniques covered by life cycle analysis studies	Number	2019	Galician Strategy of Circular Economy 2019-2030
Monitoring and evaluation	Resources, materials, waste	Maps of local resources	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Monitoring and evaluation	Resources, materials, waste	Life cycle and cost-benefit studies in waste management	Number	2019	Galician Strategy of Circular Economy 2019-2030
Monitoring and evaluation	Waste	Study of the establishment of waste disposal charges or other types of financial instruments	YES/NO	2019	Galician Strategy of Circular Economy 2019-2030
Monitoring and evaluation	Waste	Follow-up and monitoring of the results of an Inclusive Recycling Program	NA	2013	Programa de Reciclaje Inclusivo

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Monitoring and evaluation	Waste	Tracking the sale of materials from an Inclusive Recycling Program	NA	2013	Programa de Reciclaje Inclusivo
Other	No sector specific	Ecolabel Holders	Number	2017	10 Key Indicators for Monitoring the Circular Economy
Public procurement	Built environment	Products/services covered by circularity criteria in the public procurement	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Public procurement	Built environment	Good practices on public procurement identified and disseminated	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Public procurement	No sector specific	Share of public procurement contracts that include environmental elements above the EU thresholds	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Public procurement	No sector specific	Number of City contracts evaluated using Circular Economy principles	Number	2018	Circular Economy Procurement implementation Plan and Framework
Public procurement	No sector specific	Public procurement contracts that plan for end-of-life recovery	%	2017	1st Roadmap Paris Circular Economy Plan
Public procurement	No sector specific	Public procurement contracts with a circular economy dimension	%	2017	1st Roadmap Paris Circular Economy Plan
Public procurement	No sector specific	Public procurement contracts with an environmental clause and/or criteria	%	2017	1st Roadmap Paris Circular Economy Plan
Public procurement	No sector specific	Number of tender books with circular criteria (production and consumption)	Number	NA	Circular Economy framework Monitoring report

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Public procurement	No sector specific	Market volume of public circular procurement	NA	2018	Circular economy: what we want to know and can measure
Public procurement	No sector specific	Identified legal barriers for the Green Public Procurement	Number	2019	Galician Strategy of Circular Economy 2019-2030
Public procurement	No sector specific	Public procurement procedures including ecological and circular criteria	%	2019	Galician Strategy of Circular Economy 2019-2030
Public procurement	No sector specific	Purchases of products that are reusable or include recycled material.	EUR	2019	Galician Strategy of Circular Economy 2019-2030
Public procurement	No sector specific	Circular Public Procurement over the total of Innovative Public Procurement	%	2019	Galician Strategy of Circular Economy 2019-2030
Public procurement	No sector specific	Green public procurement	%	2018	Monitoring framework for the circular economy
Public procurement	No sector specific	Circular procurement	% of total	NA	NA
Public procurement	No sector specific	Pilot public contracts in circular economy developed in the Brussels-Capital Region	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Public procurement	No sector specific	Companies informed/aware of Brussels public procurement opportunities	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Public procurement	Resources, materials, waste	Public procurement contracts involving eco-materials	%	2017	1st Roadmap Paris Circular Economy Plan
Regulation	No sector specific	Number of circular policy advisers developing circular regulations and	Number	2018	Circular economy: what we want to know and can measure

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
		change 'linear' regulations			
Regulation	No sector specific	Number of circular advisers in branch organisations developing circular regulations and change 'linear' regulations	Number	2018	Circular economy: what we want to know and can measure
Regulation	No sector specific	Policy process for new circular laws and regulations	NA	2018	Circular economy: what we want to know and can measure
Regulation	No sector specific	Negotiations for circular standards	NA	2018	Circular economy: what we want to know and can measure
Regulation	No sector specific	Development of new laws and regulations that discourage linear practices	NA	2018	Circular economy: what we want to know and can measure
Regulation	No sector specific	Legal and regulatory barriers to the circular economy removed	Number	2018	Circular economy: what we want to know and can measure
Regulation	No sector specific	New laws and regulations that discourage linear practices (e.g. resource tax, public circular procurement, resource passport)	Number	2018	Circular economy: what we want to know and can measure
Regulation	No sector specific	Working group meetings with major industry players for better regulatory and legislative alignment as a boost to the circular economy	Number	2019	Galician Strategy of Circular Economy 2019-2030
Regulation	No sector specific	Directives adopted for research and innovation on the circular economy	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Regulation	No sector specific	Legislative and normative obstacles identified and resolved	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Regulation	No sector specific	Legislative and normative incentives created	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Regulation	Resources, materials, waste	Updates to the waste law in the region	Number	2019	Galician Strategy of Circular Economy 2019-2030
Regulation	Waste	New types of waste classified as byproducts and with end-of-waste status	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Regulation	Water	Directives adopted to improve water efficiency and water reuse	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Stakeholder engagement	No sector specific	Number of economic actors mobilised for the development of territorial synergies between economic actors	Number	2017	1st Roadmap Paris Circular Economy Plan
Stakeholder engagement	No sector specific	Number of economic actors mobilised in an innovation platform for the circular economy	Number	2017	1st Roadmap Paris Circular Economy Plan
Stakeholder engagement	No sector specific	Network meetings for circular projects	Number	2018	Circular economy: what we want to know and can measure
Stakeholder engagement	No sector specific	Circular economy vision-forming meetings	Number	2018	Circular economy: what we want to know and can measure
Stakeholder engagement	No sector specific	Number of members belonging to the Galician network of Circular Economy	Number	2019	Galician Strategy of Circular Economy 2019-2030
Stakeholder engagement	No sector specific	Community-driven associations	Number	2019	Galician Strategy of Circular Economy 2019-2030

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Stakeholder engagement	No sector specific	Number of people using community services	Number	2019	Galician Strategy of Circular Economy 2019-2030
Stakeholder engagement	Resources, materials, waste	Participants enrolled in the different programs for waste prevention	Number	2018	2nd Roadmap Paris Circular Economy Plan
Stakeholder engagement	Reuse, repair, share	Number of participants at Repair Cafés	Number	2017	1st Roadmap Paris Circular Economy Plan
Stakeholder engagement	Reuse, repair, share	Participants in laboratory of ideas	Number	2019	Galician Strategy of Circular Economy 2019-2030
Stakeholder engagement	Textile	Number of stakeholders signing a joint commitment for an ethical, social and circular fashion	Number	2018	2nd Roadmap Paris Circular Economy Plan
Stakeholder engagement	Waste	Citizen participation in an Inclusive Recycling Program	NA	2013	Programa de Reciclaje Inclusivo
Strategy and initiatives	Agriculture	Agro-ecological initiatives (municipal)	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Strategy and initiatives	Built environment	Voluntary agreements signed reuse of building components and sectors covered	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Strategy and initiatives	Built environment	Projects incorporating smart design	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Strategy and initiatives	Culture	Increase in initiatives to enhance the cultural and natural heritage	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Strategy and initiatives	Energy	Number of projects implemented for the valorisation of energy and recovered water resources	Number	2018	2nd Roadmap Paris Circular Economy Plan

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Strategy and initiatives	Food	Number of food recovery-redistribution actions	Number	2017	1st Roadmap Paris Circular Economy Plan
Strategy and initiatives	Industry	Number of industrial and territorial ecology projects	Number	2017	10 Key Indicators for Monitoring the Circular Economy
Strategy and initiatives	Mobility	Car-sharing	Frequency of car-sharing	2017	10 Key Indicators for Monitoring the Circular Economy
Strategy and initiatives	No sector specific	Circular innovation projects	Number	2018	Circular economy: what we want to know and can measure
Strategy and initiatives	No sector specific	Circular projects in total number of innovation projects	%	2018	Circular economy: what we want to know and can measure
Strategy and initiatives	No sector specific	Level of implementation of Environmental Action Plan	NA	NA	Circular Economy framework Monitoring report
Strategy and initiatives	No sector specific	Circular economy vision documents	Number	2018	Circular economy: what we want to know and can measure
Strategy and initiatives	No sector specific	Increase in initiatives for a green and circular economy, in terms of renewable energies, sustainable mobility and energy efficiency, distinguishing between companies, administrations and households	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Strategy and initiatives	Resources, materials, waste	Measures in the distribution industry to reduce waste	Number	2019	Galician Strategy of Circular Economy 2019-2030
Strategy and initiatives	Resources, materials, waste	Number of innovative projects for the use of residual biomass.	Number	2019	National Strategy for the Circular Economy

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Strategy and initiatives	Resources, materials, waste	Adequate environmental management of plastic packaging waste	NA	2019	National Strategy for the Circular Economy
Strategy and initiatives	Reuse, repair, share	Number of projects realised through a platform for the sharing economy	Number	2017	1st Roadmap Paris Circular Economy Plan
Strategy and initiatives	Reuse, repair, share	Laboratory of ideas and collective projects related to the "maker" movement	Number	2019	Galician Strategy of Circular Economy 2019-2030
Strategy and initiatives	Waste	Level of implmentation of Biowaste strategy	NA	NA	Circular Economy framework Monitoring report
Strategy and initiatives	Water	Total number of approved water reuse projects / year	Number	2019	National Strategy for the Circular Economy

Economy and business indicators

Economy and business indicators specifically tailored to the circular economy represent 14% of the share and include 8 specific sub-indicators (Table 4):

- The sub-category of **business** (30%) encompasses those indicators that specifically refer to the performance of companies and the introduction of business models such as new revenue models related to the circular economy and the number of companies implementing product-as-a-service business models.

- The sub-category indicator of **investments** (16%) covers the public and private investment in R&D, goods and projects related to the circular economy. Some examples include: public expenditure on R&D related to the circular economy and the amount invested in circular economy projects.

- **Savings** (12%) measures all financial resources saved in certain circular actions (e.g. money saved, in comparison with purchasing new) through the reuse of building materials; reduced costs through the implementation of green procurement; and the economic savings due to the reuse of furniture of the local administration and waste reduction.

- **Productivity** (12%) measures the amount of economic output generated per unit of material.

- **Added value** (11%) incorporates indicators related to the value generation created by the circular economy and circular activities (e.g. the economic value of the resources used and gross value added [GVA] generated).

- **Economic efficiency** (8%) includes materials and energy intensity, measured in monetary terms.

- **Gains and revenues** (6%) measure revenues obtained through performing actions closely related to the circular economy (e.g. turnover on circular products and economic gains of the reduction of the digital impact in the public administration).

- **Economic structure** (5%) includes indicators such as the weight of the green economy in gross domestic product (GDP) and GDP per total greenhouse gas (GHG) emissions.

Table 4. Economy and business related indicators

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Added value	No sector specific	Net added value of the circular economy	EUR	2016	Circular Amsterdam – A Vision and Action Agenda for the City and Metropolitan Area
Added value	No sector specific	Economic value generated	NA	2018	Circular Bilbao and Bizkaia
Added value	No sector specific	Value creation (€) thanks to the growth of circular economy models	EUR	2017	Paris Circular Economy Plan: 2017-2020
Added value	No sector specific	Added value of the circular economy	billion EUR (2010 price level)	2018	Circular economy: what we want to know and can measure
Added value	No sector specific	Gross value added generated	EUR	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Added value	No sector specific	Value added at factor cost	percentage of gross domestic product (GDP) at current prices	2019	Monitoring framework for the circular economy
Added value	Resources, materials, waste	Economic value of the resources used and the value at the time they are reintroduced into the system	NA	2017	Towards a Model of Circular Economy for Italy - Overview and Strategic Framework
Business	Built environment	Turnover of construction companies with Eco-labelling that prioritises the use of sustainable local raw materials adapted to the requirements of the Circular Economy.	% of total sector	2019	Galician Strategy of Circular Economy 2019-2030

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Business	Built environment	Number of companies with certification based on life cycle or eco-design	Number	2019	Galician Strategy of Circular Economy 2019-2030
Business	Industry	Companies implementing product-as-a-service business models	Number	2019	Galician Strategy of Circular Economy 2019-2030
Business	Industry	Improvement of the competitive positioning of the entire business fabric in the green and circular economy	NA	2018	Extremadura 2030. Green and Circular Economy Strategy
Business	Industry	Increase in the number of enterprises and productivity, by productive subsectors of the green and circular economy	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Business	Industry	Number of companies or products with tax benefits to incentivise the circular economy	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Business	Industry	Circular business	% of total	2018	Measuring the Circular Economy Developing an indicator set for Opportunity Peterborough
Business	Industry	Circular companies by total number of companies	Number	NA	NA
Business	Industry	Economic operators supported in circular economies	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Business	Industry	Economic operators aware of the circular economy	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Business	Industry	Circular start-ups	Number	2018	Circular economy: what we want to know and can measure

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Business	Industry	Percentage of companies innovating for circular reasons	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Business	No sector specific	Improvement of the strategic positioning of the territory and its green economy in the global market	NA	2018	Extremadura 2030. Green and Circular Economy Strategy
Business	No sector specific	Increase in the number of green and circular projects contributing to economic diversification	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Business	No sector specific	New revenue models related to the circular economy	Number	2018	Circular economy: what we want to know and can measure
business	Reuse, repair, share	Business activities involved in repair	Number	2019	Galician Strategy of Circular Economy 2019-2030
Business	Textile	Opening of repair workshops on several easy-to-access sites	YES/NO	2017	1st Roadmap Paris Circular Economy Plan
Business	Tourism	Increase in the number of tourism enterprises and in the productivity of the sustainable tourism sector	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Business	Waste	Number of businesses that have adopted locally standardized containers	Number	2018	2nd Roadmap Paris Circular Economy Plan
Business	Waste	Number of waste streams or subcategories of regulated electronic appliances under the responsibility extended to the producer.	Number	2019	National Strategy for the Circular Economy
Economic efficiency	Energy	Energy intensity (final)	toe/Million EUR	2018	Extremadura 2030. Green and Circular Economy Strategy

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Economic efficiency	Energy	Energy intensity (primary)	toe/Million EUR	2018	Extremadura 2030. Green and Circular Economy Strategy
Economic efficiency	No sector specific	Material intensity	Kg/EUR	2018	Circular Bilbao and Bizkaia
Economic efficiency	Resources, materials, waste	Domestic Material Consumption per capita	EUR/kg	2017	10 Key Indicators for Monitoring the Circular Economy
Economic efficiency	Resources, materials, waste	Generation of waste excluding major mineral wastes per GDP unit	Kg/Thous and EUR	2019	Monitoring framework for the circular economy
Economic efficiency	Resources, materials, waste	Total amount of waste generated, excluding the main mining waste, per unit of GDP in thousands of euros	Kg/Thous and EUR	2019	Basque Country Circular Economy Strategy 2030
Economic efficiency	No sector specific	Economic growth of the circular economy	% GDP	2018	Circular economy: what we want to know and can measure
Economic structure	No sector specific	GDP per Total Greenhouse Gas Emissions	PPP/kg CO2 equivalent	2018	Roadmap towards the circular economy in Slovenia
Economic structure	No sector specific	Weight of the green economy in GDP	NA	2015	Promoting the Green and Circular Economy in Catalonia
Gains and revenues	Food	Sales of organic products and local food products	NA	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Gains and revenues	Industry	Industry turnover in more circular products	Thousand million EUR	2019	Basque Country Circular Economy Strategy 2030
Gains and revenues	Public administartion	Economic gains of the reduction of the digital impact in the local administration	NA	2018	2nd Roadmap Paris Circular Economy Plan
Gains and revenues	Reuse, repair, share	Euros recovered through the donation and reselling scheme to the city	EUR	2018	2nd Roadmap Paris Circular Economy Plan

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Investments	Reuse, repair, share	Household spending on product repair and maintenance	EUR/capita/year	2017	10 Key Indicators for Monitoring the Circular Economy
Investments	Public administartion	Public expenditure on R&D related to EC	NA	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Investments	Education	Investment in research for increasing circular knowledge and expertise	EUR	2018	Circular economy: what we want to know and can measure
Investments	Food	Impact on the primary sector of investments in the processing and marketing of local agricultural products for healthy eating and responsible consumption	NA	2018	Extremadura 2030. Green and Circular Economy Strategy
Investments	No sector specific	Amount invested in circular economy projects	NA	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Investments	No sector specific	Gross investment in tangible goods	percentage of gross domestic product (GDP) at current prices	2019	Monitoring framework for the circular economy
Investments	No sector specific	Private investment	Thousand EUR	2018	Extremadura 2030. Green and Circular Economy Strategy
Investments	No sector specific	Investment in R&D over the GDP	%	2019	Galician Strategy of Circular Economy 2019-2030
Investments	Public administartion	Public investment	Thousand EUR	2018	Extremadura 2030. Green and Circular Economy Strategy
Investments	Water	Funding to enhance the implementation of projects for the reuse of regenerated water from wastewater	EUR	2019	Galician Strategy of Circular Economy 2019-2030
Productivity	No sector specific	Degree of productivity	NA	2018	Circular Economy Procurement implementation Plan and Framework

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Productivity	Resources, materials, waste	Resource Productivity	EUR/kg	2017	10 Key Indicators for Monitoring the Circular Economy
Productivity	Resources, materials, waste	Material Productivity	EUR GDP/kg DMC	2018	Circular economy: what we want to know and can measure
Productivity	Resources, materials, waste	Material Productivity	PPP/kg	2017	Roadmap towards the circular economy in Slovenia
Productivity	Resources, materials, waste	Material Productivity	EUR/kg	2019	Basque Country Circular Economy Strategy 2030
Productivity	Resources, materials, waste	Efficiency in resource productivity	NA	2015	Promoting the Green and Circular Economy in Catalonia
Productivity	Water	Water productivity	USD	2019	National Strategy for the Circular Economy
Savings	Built environment	Money saved (in comparison with purchasing new) thorugh the reuse of building materials	NA	2017	1st Roadmap Paris Circular Economy Plan
Savings	Education	Saving per student on the price of a basket of school books for each school year	NA	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Savings	No sector specific	Cost savings	NA	2018	Circular Economy Procurement implementation Plan and Framework
Savings	Public administartion	Reduced costs through green public procurement vs. the traditional option	NA	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Savings	Public administartion	Economic savings due to the reuse of furniture and equipment of the local administration	EUR	2018	2nd Roadmap Paris Circular Economy Plan

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Savings	Resources, materials, waste	Waste reduction economic savings	NA	2018	Circular Economy Procurement implementation Plan and Framework
Savings	Reuse, repair, share	Money saved as a consequence of recovery and reuse of materials	EUR	2017	1st Roadmap Paris Circular Economy Plan
Savings	Textile	Savings made by not replacing items of clothing	NA	2017	1st Roadmap Paris Circular Economy Plan

Infrastructure and technology indicators

Infrastructure and technology indicators correspond to 8% of the inventory (Table 5). *Facilities* (61%) includes all indicators linked to centres mainly dedicated to reuse, repair and share activities. Some examples include: the number of reuse centres in the city; the number of repair cafés; the number of donation and sharing spaces; and the number of repair and reuse centres created. The *area* sub-category (18%) aims to measure the space within cities that have adopted any kind of circular initiative or criteria. Examples include the share of the city covered by experimental areas, the districts incorporating circular economy principles and the public space recovered for sustainable models. The primary measurement unit for this sub-category is the share of space in terms of total local space. *Equipment* (13%) covers all the devices and bins installed in cities for sustainable waste management (e.g. number of bins allocated, water dispensers installed in the city and waste collection devices). Finally, the remaining indicators address *products and services* (8%) (e.g. new circular products and share of circular products in the total number).

Table 5. Infrastructure and technology indicators

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Area	Food	Number of food processing areas (kitchens, vegetable processing workshops)	Number	2017	1st Roadmap Paris Circular Economy Plan
Area	Land use	Area of public space recovered for sustainable models	ha/year	2019	The Green and Circular Economy of Barcelona City Council
Area	Land use	New districts incorporating the principles of the circular economy	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Area	Reuse, repair, share	Number of recycling centres organised to supply repair actors	Number	2017	1st Roadmap Paris Circular Economy Plan
Area	Reuse, repair, share	Number of reuse centres in the city	Number	2017	1st Roadmap Paris Circular Economy Plan
Area	Reuse, repair, share	Objects collected in reuse centres	Tonnes	2017	1st Roadmap Paris Circular Economy Plan
Area	Reuse, repair, share	Amount of positive externalities from the installed spaces for the sharing economy and donation	NA	2018	2nd Roadmap Paris Circular Economy Plan
Area	Reuse, repair, share	Number of collection points for reuse of materials	Number	2018	2nd Roadmap Paris Circular Economy Plan
Area	Reuse, repair, share	Number of waste disposal sites with a reuse area.	Number	2018	2nd Roadmap Paris Circular Economy Plan
Area	Reuse, repair, share	Preparation for reuse	%	2020	Spanish Strategy for Circular Economy: España Circular 2030
Area	Reuse, repair, share	Collaborative spaces equipped with material and equipment to encourage repair	Number	2019	Galician Strategy of Circular Economy 2019-2030
Area	Reuse, repair, share	Number of places devoted to repair	Number	2017	1st Roadmap Paris Circular Economy Plan
Area	Reuse, repair, share	Number of Repair Cafés organised per year and per arrondissement	Number	2017	1st Roadmap Paris Circular Economy Plan
Area	Reuse, repair, share	Mapping of existing sites for reuse and recycling and needs	YES/NO	2018	2nd Roadmap Paris Circular Economy Plan
Area	Reuse, repair, share	Ratio of shops offering repair services to total number of shops	Ratio	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Area	Reuse, repair, share	Repair cafés and/or local actions realised	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]
Area	Reuse, repair, share	Number of donation and sharing spaces in the city	Number	2018	2nd Roadmap Paris Circular Economy Plan
Area	Reuse, repair, share	Repair and reuse centers created	Number	2019	Galician Strategy of Circular Economy 2019-2030
Area	Textile	Setting up of collection of old occupational clothing points accessible to all members of staff concerned	YES/NO	2017	1st Roadmap Paris Circular Economy Plan
Area	Textile	Number of ethical and eco-responsible fashion sales points in the city	Number	2018	2nd Roadmap Paris Circular Economy Plan
Area	Waste	Local composting plants created	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Certificates	Built environment	Products and services with any kind of eco-label	Number	2019	Galician Strategy of Circular Economy 2019-2030
Certificates	Food	Number of restaurants with the ZERO plastic label	Number	2018	2nd Roadmap Paris Circular Economy Plan
Design	Built environment	Construction works with circular design (%).	%	2019	Galician Strategy of Circular Economy 2019-2030
Design	Built environment	Eco-designed products and services included in the regional catalogue	Number	2019	Galician Strategy of Circular Economy 2019-2030
Equipment	Resources, materials, waste	Number of bento boxes distributed to reduce disposable packaging use	Number	2017	1st Roadmap Paris Circular Economy Plan
Equipment	Resources, materials, waste	Number of mug-sensor coffee machines and	Number	2018	2nd Roadmap Paris Circular Economy Plan

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
		water dispensers installed in the city			
Equipment	Resources, materials, waste	Number of waste collection devices installed	Number	2018	2nd Roadmap Paris Circular Economy Plan
Equipment	Waste	Change in the amount of bins allocated	NA	2018	2nd Roadmap Paris Circular Economy Plan
Facilities	Agriculture	Seed banks (municipal)	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Facilities	Land use	Land banks created (municipal)	Number	2018	Extremadura 2030. Green and Circular Economy Strategy
Facilities	Land use	Increase or improvement of cultural, technological, welfare and healthy and quality leisure facilities and services	NA	2018	Extremadura 2030. Green and Circular Economy Strategy
Facilities	Land use	Empty houses	Number	2019	Galician Strategy of Circular Economy 2019-2030
Facilities	Land use	Properties declared in ruin	Number	2019	Galician Strategy of Circular Economy 2019-2030
Facilities	No sector specific	Facilities with circular economy criteria	Number	2019	Galician Strategy of Circular Economy 2019-2030
Facilities	No sector specific	Sectors/facilities assessed as subject to IAC (Integrated Environmental Assessment)	Number	2019	Galician Strategy of Circular Economy 2019-2030
Materials reuse	Built environment	Construction works with a minimum level of materials reuse (%).	%	2019	Galician Strategy of Circular Economy 2019-2030
Organic production	Food	Percentage of cultivated area under organic production	%	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Products	Production	New circular products	Number	2018	Circular economy: what we want to know and can measure

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Products	Production	Share of circular products in total number of products	%	2018	Circular economy: what we want to know and can measure
Testing	Built environment	Percentage of Paris' territory covered by experimental areas for the recovery and reuse of building materials	%	2017	1st Roadmap Paris Circular Economy Plan
Testing	Resources, materials, waste	Number of collection devices tested	Number	2018	2nd Roadmap Paris Circular Economy Plan

Societal indicators

Indicators related to jobs represent 5% of the sample (Table 6). These indicators mainly relate to **employment and human resources**. Indicators distinguish between employment within circular economy generic activities and job creation in specific circular economy sectors such as the sharing economy, the reuse and repair sector and the forestry sector. Most indicators specifically relate to jobs and some examples include: the number of green jobs created and secured, the net circular job growth, and the number of jobseekers having been employed as a result of circular economy training. A few indicators also refer to human resources: human resources mobilised for experiments in the building sector; the number of people actively working on the development of a circular vision; and the number of local co-ordinators recruited for the development of territorial synergies.

Table 6. Societal indicators

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Jobs and human resources	Built environment	Human resources mobilised for experiments on the building sector	NA	2017	1st Roadmap Paris Circular Economy Plan
Jobs and human resources	Education and knowledge	PhD and post-PhD grants and contracts in	Number	2017	Leading the transition [Action plan for circular economy in Portugal: 2017-2020]

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
		scientific employment			
Jobs and human resources	Education and knowledge	Jobseekers who have been employed as a result of training developed under the PREC (Programme Régional en Economie Circulaire)	Number	2016	Regional Programme for the Circular Economy 2016 – 2020 (PREC)
Jobs and human resources	Forest	Direct jobs associated with the forest/wood sector	Number	2019	Galician Strategy of Circular Economy 2019-2030
Jobs and human resources	No sector specific	Employment in the Circular Economy	Number	2017	10 Key Indicators for Monitoring the Circular Economy
Jobs and human resources	No sector specific	Number of local coordinators recruited for the development of territorial synergies between economic actors	Number	2017	1st Roadmap Paris Circular Economy Plan
Jobs and human resources	No sector specific	Number of jobs created by promoting circular consumption in the city	Number	2017	1st Roadmap Paris Circular Economy Plan

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Jobs and human resources	No sector specific	Green jobs	Number	2019	Agenda for the Development of the Circular Economy in Navarra 2019-2030
Jobs and human resources	No sector specific	Net circular job growth	Number in FTE	2016	Circular Amsterdam – A Vision and Action Agenda for the City and Metropolitan Area
Jobs and human resources	No sector specific	Jobs	Number	2018	Circular Bilbao and Bizkaia
Jobs and human resources	No sector specific	Number of green jobs created and secured	Number	2018	Circular Economy Procurement implementation Plan and Framework
Jobs and human resources	No sector specific	Circular economy employment	% of total employment	2018	Circular economy: what we want to know and can measure
Jobs and human resources	No sector specific	Number of new jobs in the circular economy sectors	Number	2019	Basque Country Circular Economy Strategy 2030
Jobs and human resources	No sector specific	Greater impact of training on the increase or improvement of green jobs, white jobs and other jobs	NA	2018	Extremadura 2030. Green and Circular Economy Strategy
Jobs and human resources	No sector specific	Circular jobs	% of total employment	2018	Measuring the Circular Economy Developing an indicator set for Opportunity Peterborough
Jobs and human resources	No sector specific	Persons employed	percentage of total employment	2019	Monitoring framework for the circular economy

Subcategory	Sector	Indicator	Unit	Year	Name of the Study
Jobs and human resources	No sector specific	Turnover and workforce of organisations working in the circular economy	NA	2017	Paris Circular Economy Plan: 2017-2020
Jobs and human resources	No sector specific	Number of jobs created	Number	2017	Paris Circular Economy Plan: 2017-2020
Jobs and human resources	No sector specific	Green employment rate	%	2015	Promoting the Green and Circular Economy in Catalonia
Jobs and human resources	Public administartion	Number of people actively working on the development of a circular vision	Number	2018	Circular economy: what we want to know and can measure
Jobs and human resources	Reuse, repair, share	Job creation from the sharing economy in the city	Number	2018	2nd Roadmap Paris Circular Economy Plan
Jobs and human resources	Reuse, repair, share	Number of jobs created from reuse activities	Number	2018	2nd Roadmap Paris Circular Economy Plan

References

EC (2018), *EU Monitoring Framework for the Circular Economy*, European Commission, https://ec.europa.eu/eurostat/web/circular-economy/indicators (accessed on 7 November 2019). [3]

EEA (2016), *Circular Economy in Europe*, European Environment Agency, https://www.eea.europa.eu/publications/circular-economy-in-europe (accessed on [4]

7 November 2019).

OECD (2020), *OECD Survey on Circular Economy in Cities and Regions*, OECD, Paris.   [1]

OECD (2020), *The Circular Economy in Cities and Regions: Synthesis Report*, OECD Urban   [2]
    Studies, OECD Publishing, Paris, https://dx.doi.org/10.1787/10ac6ae4-en.

OECD (2013), *OECD Glossary of Statistical Terms - Efficiency Definition*, OECD, Paris,   [5]
    https://stats.oecd.org (accessed on 3 August 2020).

Annex A. List of monitoring frameworks included in the OECD Inventory of Circular Economy Indicators

Table A A.1. List of monitoring frameworks included in the OECD Inventory of Circular Economy Indicators

Scale	Author	Monitoring framework
Country	Colombia	National Strategy for the Circular Economy (2019)
	European Union	Monitoring Framework for the Circular Economy (2019)
	France	10 Key Indicators for Monitoring the Circular Economy (2017)
	Italy	Towards a Model of Circular Economy for Italy - Overview and Strategic Framework (2017)
	Netherlands	Circular Economy: What We Want to Know and Can Measure (2018)
	Portugal	Leading the Transition [Action Plan for a Circular Economy in Portugal: 2017-2020] (2017)
	Slovenia	Roadmap Towards the Circular Economy in Slovenia (2018)
	Spain	Spanish Strategy for Circular Economy: España Circular 2030 (2020)
Region	Basque Country (Spain)	Basque Country Circular Economy Strategy 2030 (2019)
	Brussels-Capital Region (Belgium)	Regional Programme for the Circular Economy 2016 – 2020 (PREC) (2016)
	Catalonia (Spain)	Promoting the Green and Circular Economy in Catalonia (2015)
	Extremadura (Spain)	Extremadura 2030. Green and Circular Economy Strategy (2018)
	Galicia (Spain)	Galician Strategy of Circular Economy 2019-2030 (2019)
	Navarre (Spain)	Agenda for the Development of the Circular Economy in Navarra 2019-2030 (2019)
	North Karelia (Finland)	Roadmap of the Circular Economy of North Karelia (2018)
	Scotland (United Kingdom)	Making Things Last A Circular Economy Strategy for Scotland (2016)
City	Amsterdam (Netherlands)	Circular Amsterdam – A Vision and Action Agenda for the City and Metropolitan Area (2016)
	Barcelona (Spain)	The Green and Circular Economy of Barcelona City Council (2019)
	Bilbao (Spain)	Circular Bilbao and Bizkaia (2018)
	Greater Porto Area (Portugal)	Circular Economy Framework Monitoring Report (NA)
	Paris (France)	Paris Circular Economy Plan: 2017-2020 (2017)
		1st Roadmap Paris Circular Economy Plan (2017)
		2nd Roadmap Paris Circular Economy Plan (2018)
	Peñalolén (Chile)	Inclusive Recycling Programme (2013)
	Peterborough (United Kingdom)	Measuring the Circular Economy: Developing an Indicator Set for Opportunity (2018)
	Toronto (Canada)	Circular Economy Procurement Implementation Plan and Framework (2018)
	Turku (Finland)	Resource Wisdom Roadmap

Note: The cities of Milan (Italy), Munich (Germany), Quillota (Chile) and Tilburg (Netherlands) provided circular economy indicators through the *OECD Survey on the Circular Economy in Cities and Regions* (2020[1]). However, indicators are not included in specific strategies/initiatives.