

BACKGROUND NOTE

Estimating Employment Effects of the Circular Economy

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Introduction

This note summarizes some of the definitions of the term “circular economy” and the baselines that have been used for projections on job impacts and growth. It introduces some of the targets for European countries that are championing the transformation from a linear to a circular economy. The report also outlines the current literature’s understanding of job sectors that might change in the future.

The process of defining the circular economy is still evolving. Its most common characteristic entails shifting away from the predominate linear economic—take, make, waste—approach to a closed-loop model that includes zero-waste as well as cleaner growth targets. Actual definitions vary within and between countries, organizations and companies. However, most refer to classifications set out by the Finnish Innovation Fund (Sitra) and the Ellen MacArthur Foundation.

Some common elements of circular economy classifications (International Labour Organization [ILO], 2018)¹ include a focus on improving material and resource efficiency (including reducing waste through material reuse and recycling); broader resource efficiency and industrial ecology approaches; renewable energy; increased energy efficiency; and elements of the shared economy. An important additional consideration of circular economy jobs is reference to the ILO (2018) definition of green jobs (of which circular economy jobs is a sub-category), which focuses on decent work.

The definition of circular economy is important in framing the scope of economic analysis used to calculate the net job effects of the circular economy. Most economic research related to job effects is Europe-focused, and some examples are provided below. Analysis is expanding to assess global or multi-country effects, including through the

¹ A circular economy is one in which materials constantly flow around a “closed-loop” system, rather than being used once and then discarded. The value of materials is therefore not lost when they are thrown away and the cost of waste management and disposal is avoided. This system decouples resource use from waste and shifts to greater reusing, restoring and recycling where the main interest of customers will be high-quality services rather than owning products.

The Club of Rome suggests that the concept of the circular economy is restorative by intention and by design, and that it is part of the emergence of a performance economy. The circular economy is differentiated from many other environment-only agendas because its focus is on consumer (durable) goods, as opposed to industrial processes. The Finnish Innovation Fund (Sitra) explains that, in a circular economy, production and consumption create the smallest possible amount of loss and waste. Material efficiency lessens overconsumption and leads to environmental benefits and sustainable development.

work of the ILO, the Organisation for Economic Co-operation and Development, UN Environment, the Partnership for Action on the Green Economy, The Club of Rome and others. Analysis has also focused on potential effects on global supply chains in light of leading companies like Unilever, Apple, Ikea and others adopting circular economy commitments. The World Economic Forum (WEF), the World Business Council on Sustainable Development and others continue to work in this space.

Interest in estimating circular economy jobs is taking place—particularly in Europe—among broader concerns about total factor productivity and wage stagnation. A circular economy is thus framed as a means to weave together opportunities related to innovation, competitiveness, productivity, wage stabilization and industrial strategy together with environmental and climate objectives. For example, a joint study by the Ellen MacArthur Foundation and the McKinsey Center for Business and Environment (2015), *Growth Within: A Circular Economy Vision for a Competitive Europe*, suggests that resource productivity is an underexploited source of possible future wealth and competitiveness. The report predicts that there are many opportunities in recycling, producing longer-lasting products and offering maintenance services from the manufacturer. According to calculations in the report, only about 5 per cent of the remaining value of most material goods is captured and used when the products are disposed of (The Club of Rome, 2016, p. 21).

A 2015 report by WRAP and the Green Alliance describes the role of the circular economy in alleviating sluggish job markets in the United Kingdom as an example of how circular economy policies can alleviate unemployment and regional inequalities. The report uses different public policy scenarios to 2030, and estimates that, with no policy change, 200,000 new jobs will be created, reducing unemployment by 54,000. Under a more aggressive policy scenario, the report estimates that a circular economy could create 500,000 new jobs and permanently reduce unemployment by 102,000.

Measuring the Circular Economy

Differences in classifying the circular economy in turn affect how it is measured, based on which assumptions are used. The European Statistical Agency (Eurostat) has set out both the key sectors most affected by circular economy changes and the public policy drivers that will accelerate that shift. The framework below from Eurostat underscores the importance of public policies—notably procurement—in this regard.

Circular economy monitoring framework



Figure 1. Circular economy monitoring framework

Source: European Commission [EC], 2018

Examples of Job Estimates at the Economy-Wide, Sectoral and City Levels

This analysis of the net job effects of the circular economy is focused on three main levels: economy-wide, sectoral and city.

In 2014, the EC (2018) estimated that jobs directly associated with the circular economy employed 3.9 million people. Looking ahead, the EC has been upbeat about the growth in new jobs as a consequence of the circular economy.

According to ILO projections, “under the circular economy scenario, worldwide employment would grow by 0.1 per cent by 2030 in comparison with a business-as-usual scenario” (ILO, 2018a, p. 52). Employment would grow in the services and waste management sectors by roughly 50 million and 45 million jobs respectively (ILO, 2018a, p. 52). The Growth Within report estimates as much as a 7 per cent net addition to GDP by 2030 provided the EC and its members adopt stringent targets for material/resource efficiency (Ellen MacArthur Foundation & McKinsey Center for Business and Environment, 2015).

The May 2018 report by Cambridge Econometrics, Trinomics and ICF, *Impact of Circular Economy Policies on Labour Markets*, concludes that the circular economy could add 0.5 per cent to Europe’s GDP and a net increase of 700,000 jobs—mainly located in central and eastern European member countries—by shifting labour away from current resource extraction activities and into more labour-intensive recycling plants and repair services. Indirect rebound effects will also contribute to the economy (using an energy–environment–economy model) as consumer savings spur additional expenditures in circular economy-related goods.

Other analyses reach similar although more modest and nuanced conclusions. For example, the 2015 The Club of Rome study by Wijkman and Skanberg of potential gains in Sweden related to the circular economy runs three different scenarios:

- Renewable energy as a part of the circular economy creates 5,000 new jobs and adds one per cent of GDP.
- Energy efficiency adds 20,000 jobs and 0.2 per cent additional GDP.
- Material efficiency adds 50,000 new jobs and 2 per cent additional GDP.

A 2017 report by Circle Economy and Ehero estimates that 8 per cent of the Dutch workforce is currently employed in circular economy jobs. It observes that there has been a sharp drop in circular economy jobs following the 2008 global financial crisis, especially in what they classify as indirect circular economy jobs in education and the public sector. The biggest concentration of circular economy jobs today, according to the 2017 report, are in activities that preserve and extend what is already made (reuse, recycling), comprising 42 per cent of total Dutch circular economy jobs (and aligns well with the Eurostat classification above), and circular economy jobs that incorporate digital technology, comprising 24 per cent (which does not easily align, although it can be pushed into the broad Eurostat innovation category).

Two studies by The Club of Rome indicate that the circular economy could create more than 100,000 jobs in Sweden, 75,000 jobs in Finland, 200,000 jobs in the Netherlands, 500,000 jobs in France, 400,000 jobs in Spain and 150,000 jobs in Czech Republic. Four main assumptions of this analysis are: enhancing energy efficiency by 25 per cent; increasing renewable energy; increasing material efficiency comprised of a 25 per cent increase in material efficiency; and reducing all virgin materials by 50 per cent, coupled with the doubling of product life (The Club of Rome, 2016; Wijkman & Skanberg, 2015).

Sectors

Both Eurostat and the ILO have identified those sectors most likely to be affected by circular economy shifts. The ILO summary of areas of expansion and contraction are noted in Table 1.

Table 1. Sectors most affected by the transition to a circular economy

Sectors most affected by the transition to a circular economy			
Industries set to experience the highest job demand growth (absolute)		Industries set to experience the strongest job demand decline (absolute)	
Sector	Jobs (millions)	Sector	Jobs (millions)
Reprocessing of secondary steel into new steel	30.8	Manufacture of basic iron and steel and of ferro-alloys and first products thereof	-28.2
Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	21.5	Mining of copper ores and concentrates	-20.8
Production of electricity by solar photovoltaics	14.7	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	-10.2
Wholesale trade and commission trade, except of motor vehicles and motorcycles	12.2	Mining of iron ores	-8.0
Reprocessing of secondary wood material into new wood material	5.0	Manufacture of glass and glass products	-7.6
Sale, maintenance, repair of motor vehicles, motor vehicles parts, motorcycles, motor cycles parts and accessories	4.7	Mining of coal and lignite; peat extraction	-4.9
Research and development	3.5	Mining of nickel ores and concentrates	-4.3
Industries set to experience the highest job demand growth (percentage)		Industries set to experience the strongest job demand decline (percentage)	
Sector	Jobs (percentage)	Sector	Jobs (percentage)
Reprocessing of secondary lead into new lead, zinc and tin	15.0	Production of electricity by coal	-0.9
Reprocessing of secondary precious metals into new precious metals	11.2	Extraction of crude petroleum and services related to crude oil extraction, excluding surveying	-0.9
Production of electricity by solar photovoltaics	4.9	Extraction, liquefaction, and regasification of other petroleum and gaseous materials	-0.9
Reprocessing of secondary copper into new copper	4.3	Petroleum refinery	-0.8
Reprocessing of secondary wood material into new wood material	4.2	Manufacture of gas; distribution of gaseous fuels through mains	-0.8
Reprocessing of secondary steel into new steel	3.1	Mining of coal and lignite; peat extraction	-0.8
Reprocessing of secondary aluminium into new aluminium	2.7	Extraction of natural gas and services related to natural gas extraction, excluding surveying	-0.8

Source: ILO, 2018b

The ILO projects the net creation of 18 million green jobs by 2030. Of 163 economic sectors analyzed by the ILO, “only 14 show employment losses of more than 10,000 jobs worldwide, and only two (petroleum refinery and extraction of crude petroleum) show losses of 1 million or more jobs” (ILO, 2018, p. 43).

In the renewable energy sector (hydro, biomass, solar thermal, solar photovoltaic, tide and wave, and geothermal), job creation is expected to be higher by around 11 per cent in the 2°C scenario compared to the business-as-usual scenario (ILO, 2018, p. 42). Net job growth is also expected in manufacturing (0.5 per cent) and construction (1.7 per cent). This growth is equivalent to around 4 million jobs in manufacturing and 9 million in renewables and construction combined (ILO, 2018, p. 42).

Cities

To illustrate, the City of London estimated that the uptake of its circular economy route map would create 12,000 new jobs (London Waste and Recycling Board, 2017). The City of Amsterdam estimated that the adoption of its circular economy plan would create 2,000 new jobs—including 700 in the building sector and 1,200 in agriculture and food processing (Circular Amsterdam, 2016). This difference roughly reflects the proportional size in populations between London and Amsterdam. Yet the variance in projected additional revenue is not explained by population differences: while the London plan is expected to generate an additional EUR 7 billion per year as a result of the circular economy, Amsterdam’s plan is expected to generate EUR 235 million per annum.

One of the early aspects of the circular economy is its link to the shared economy. With the increase in speed and use of broadband, platforms to share resources such as homes, cars, clothing, books and other belongings are creating tremendous economic opportunities. The platforms connect prospective guests or clients to hosts or vendors while also providing a system to verify the legitimacy and rate both parties. The mayor of Seoul set up a program in 2012 to support sharing initiatives and to promote public participation in these forms, transforming and branding Seoul into a leading “sharing city” (WEF, 2016, p. 11). These new ways to share resources decrease material resources that would otherwise have to be used in order to meet the demand. A study by the WEF and the Massachusetts Institute of Technology found that, during the 2016 Olympics in Rio, the city was spared from building 257 average-sized hotels because the platform Airbnb housed 85,000 of the city’s estimated 500,000 visitors (WEF, 2016, p. 6).

Implications for Canada

Little analysis has yet been done estimating circular economy-related employment in Canada, drawing on either international classifications (such as the ILO sector analysis in Table 1 above) or Eurostat classifications. However, Statistics Canada (2017a) recently published employment data for what it calls the “environmental and clean technology” sector.

In several ways, the Statistics Canada classification of a Canadian environmental sector coincide with some of the criteria used in defining the circular economy elsewhere: protection of air and climate; wastewater treatment; management of non-hazardous wastes; protection and remediation of soil, sediment, sludge, groundwater, surface water and leachate; other environmental protection activities; sustainable resource activities related to energy, water, agriculture/forestry/biodiversity and minerals; and adaptation of goods to make them more resource efficient (Statistics Canada, 2017b).

According to Statistics Canada, approximately 274,000 Canadians were employed in these activities in 2016, accounting for 1.5 per cent of jobs in the Canadian economy. It is worth noting that the Canadian estimate is lower than the 8.5 per cent noted for the Dutch economy above but falls between lower bound estimates of Statistics Finland—which estimates that 0.2 per cent of its total workforce is employed primarily in green activities—and the U.S. Bureau of Labor Statistics estimate that 2.4 per cent of its total workforce is employed in green activities.

The average annual labour compensation per job in Canada, including benefits, was CAD 92,000 in 2016, compared with an economy-wide average of CAD 59,900, suggesting that these jobs require skills that are more highly valued than typically. Employment in 2016 was 4.5 per cent higher than in 2007, while employment in the total economy rose 8.4 per cent over the same period, suggesting that growth in the sector lags behind that of other parts of the economy. An important area of work entails how this gap can be closed, drawing upon both international lessons and opportunities from the 2016 Barton Reports, with emphasis on aligning productivity, innovation, jobs skills and global markets (Advisory Council on Economic Growth , 2016).

Table 2 highlights the significant concentration of Canadian circular economy jobs in industries related to electric power production, owing to Canada’s large hydro and nuclear power industries and its growing renewable power sector. The waste management industry also accounts for a large share of jobs. “Other” (undefined) industries make up the largest share, however, suggesting that these jobs are widely distributed across the economy and not restricted to a handful of specialized companies.

Of the industries set to experience highest absolute job growth, Canada is well positioned on reprocessing of secondary metals (for example steel) but anticipates more sluggish results in areas like solar electricity. More statistical work is needed to assess the effects in the retail and consumer goods sector.

Table 2. Employment in the environmental protection and clean technology sector, Canada, 2007, 2014–2016

Industry	2007	2014	2015	2016
Electric power generation, transmission and distribution	54,101	56,167	56,536	56,260
Electric power engineering construction	43,436	47,503	47,190	47,024
Electrical equipment manufacturing	4,177	4,523	4,641	4,055
Waste management and remediation services	35,128	36,991	37,195	37,791
Other professional, scientific and technical services including scientific research and development	6,207	6,558	6,807	6,877
Water, sewage and other systems	559	405	371	361
Other industries	118,746	121,401	120,500	121,735
Total, all industries	262,354	273,548	273,240	274,103

Source: Statistics Canada, 2018.

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