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20 Sept 2019

Recycling Data – Measuring circular economy activity in Finland

1 Introduction

In this paper we present preliminary findings on measuring circular economy activity in Finland. We tackle this issue in a project of Finnish Environmental Institute (SYKE) called CIRCWASTE. The project is funded e.g. by EU LIFE IP. Our aim is to examine the size of circular economy business in different sectors and how it changes over the years. Circular economy indicators can be monetary, physical or a combination of these. We use existing statistics and data in order to avoid unnecessary surveys. We focus on national level data but also search for possibilities to produce regional indicators. Moreover, our target is that results are comparable with the EU's circular economy indicators as well as UN SDG indicators. The goal is to build indicators which can be compiled regularly.

Creating indicators for circular economy business is impossible without a definition. Public discussion mostly focuses on recycling and waste, but there are many other dimensions as well. Many definitions include the 'three R's': recycle, reuse and reduce. Innovation is another concept repeatedly mentioned. While these definitions may sound simple, it is not so easy to convert them into indicators – for example 'reduce' can mean various things. Some aspects of circular economy can be found in nearly every business. In order to define what to measure with the indicators, we have studied publications, conducted a survey to stakeholders and organized expert workshops. As the project is still ongoing, our final definitions are yet to be decided.

2 Definitions of circular economy

Circular economy aims at reducing the amount of waste by maximizing the material circulation in economy. This would require long-lasting products as well as developing recycling systems. Also, this requires designing products at early stage to maximize their recyclability.

An essential concept in circular economy is so called “cascade” use. In other words, to prioritize the use of raw material, e.g. using wood primarily to industrial products and recycling instead of to the production of energy. The goal is to generate more value with less input. Circular economy aims at using new technology and recycling to minimize the amount of waste and, on the other hand, to optimize the reclamation of recycled material.

According to European Environment Agency (EEA) (2016) circular economy aims at maintaining material usability. It minimizes the need for new material and energy inputs to reduce the burden to the environment from both raw material and waste viewpoints. As its purest, circular economy would mean a full alternative to take-produce-consume-dispose – model. The idea is to minimize waste and the use of raw material by ecological planning, recycling and reusing goods.

The Finnish Innovation Fund Sitra (2016) define circular economy as a system where the consumption is based on sharing, renting and recycling in order to minimize the possession of goods. This definition also touches on sharing economy, that is, another popular concept in the field. Circular economy aims at maximizing the circulation of products, components and materials as well as their value in the economy to minimize the waste generated in production and consumption. These are seen to promote sustainable economic growth.

According to European Commission (2015) in circular economy the values of products, material and resources are maintained in the economy as long as possible. This way it minimizes the amount of waste while it encourages to new business ideas and innovations in the field.

3 Materials and methods

As the aim is to produce circular economy indicators using existing statistics and data, we first went through sources which might be useful. Most of the data and statistics come from Statistics Finland (Appendix I). For the moment we have excluded primary production but intend to

include it later. Next, we carried out a Webropol-survey for the stakeholders (businesses, authorities and research institutes) on measuring circular economy. We received 23 answers out of 152 (Appendix II). Waste, innovations, consumption and materials were the four most common concepts in how the stakeholders see circular economy. One particular issue emerged in the answers, namely the non-existence or unclear definition of circular economy. Combining the survey results and existing data and statistics, we decided on the first tentative set of indicators presented in this paper.

4 Circular economy indicators

So far, we have built six preliminary indicators describing circular economy activity in Finland. First one is the circular material use rate (CMU) average of 2013-2017 (see Figure 1). This indicator measures the circular use of materials as a share of overall material use. The circular use of materials is calculated using domestic waste recycled adjusted by net imports of waste destined for recovery. Overall material use is the sum of circular use of materials and domestic material consumption.



Figure 1. Circular material use rate in Finland

Figure 2 illustrates the Recycling Rate of Municipal Waste in Finland and the other EU countries in 2017. This indicator measures the tonnage recycled from municipal waste divided by the total municipal waste arising. Recycling includes material recycling, composting and anaerobic digestion.

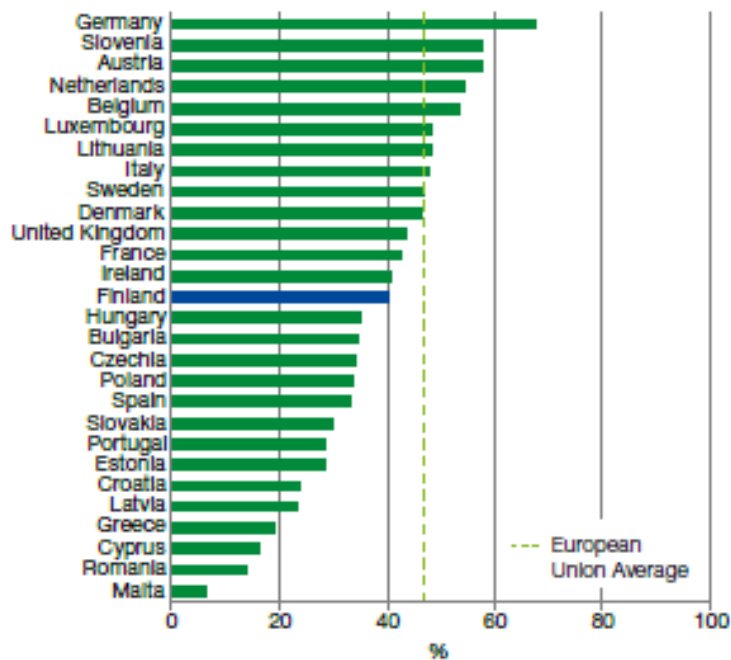


Figure 2. Recycling Rate of Municipal Waste in the EU

Third indicator describes the number of staff in circular economy industries 2013-2018 (Figure 3). The industries selected here are repair and reuse, recycling and several others. These are defined by the EU (see Appendix III).

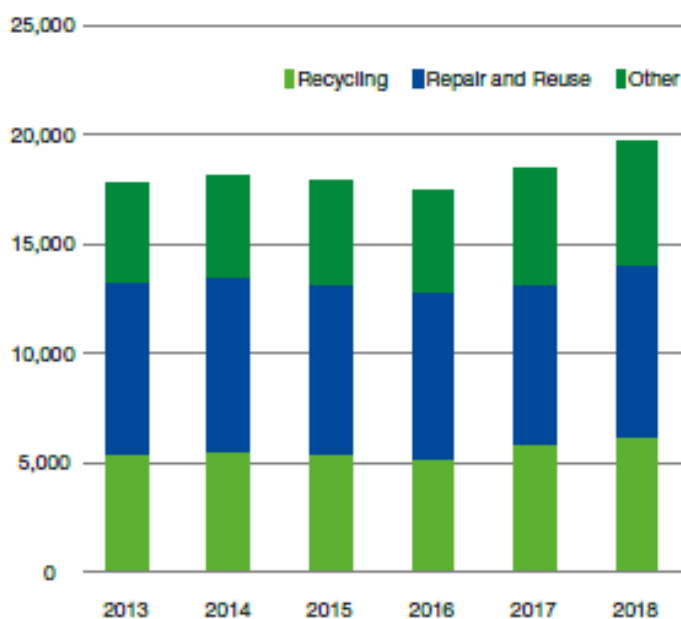


Figure 3. Staff in Circular Economy Industries in Finland

In Figure 4 we show the share of renewable energy of the aggregate electricity production in Finland 2013-2017. This includes hydro and wind power as well as biomass excluding peat.

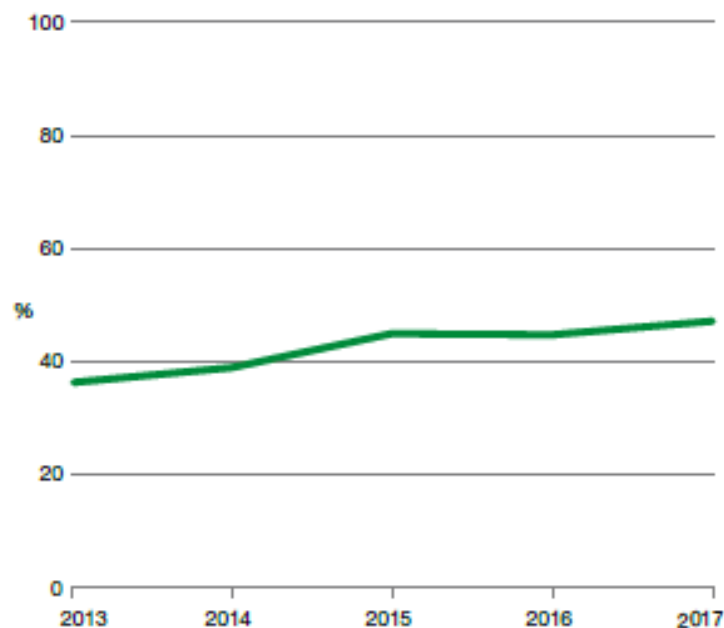


Figure 4. Share of Renewable Energy in Electricity Production in Finland

Last two figures describe regional circular economy business in Finland. Figure 5 illustrates regional employment in 2018 and Figure 6 shows regional turnover in the same year. The employment indicator measures the median staff of circular economy business units, defined as in Figure 3, compared with all business units. The same applies to the turnover indicator but now with median turnover.

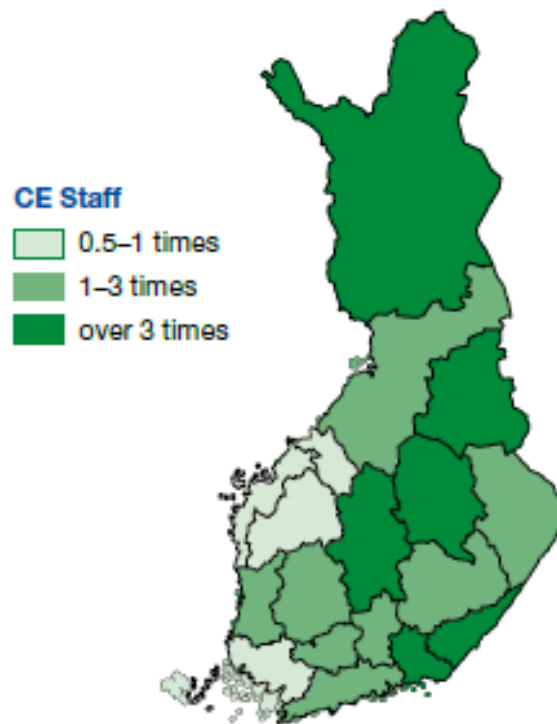


Figure 5. Regional Employment in Circular Economy Business in Finland

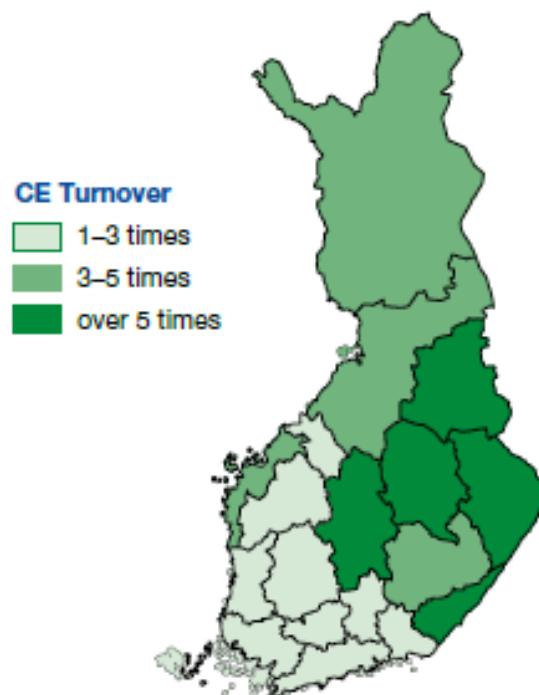


Figure 6. Regional Turnover from Circular Economy Business in Finland

5 Conclusions

We started a project in the spring of 2019 to find indicators to describe circular economy activity in Finland. Now, almost at a half stage, we have built some preliminary indicators presented in this paper. By the end of the project our aim is to have around ten indicators describing circular activity in Finland. Whether some of the indicators presented here are included in that final set remains to be seen. The next phase is to arrange a meeting with stakeholders to sharpen the view on the indicators. However, the indicators should make up a comprehensive set, they should tell a story and they should be useful for the decision makers.

References

EEA (2016a). More from less – material resource efficiency in Europe.

<https://www.eea.europa.eu/publications/more-from-less>

EEA (2016b). Circular economy in Europe – Developing the knowledge base.

<https://www.eea.europa.eu/publications/circular-economy-in-europe>

Ellen MacArthur Foundation (2019). What is the circular economy?

<https://www.ellenmacarthurfoundation.org/circular-economy/what-is-the-circular-economy>

European Commission (2019). Circular economy. https://ec.europa.eu/growth/industry/sustainability/circular-economy_en

Eurostat (2019). Circular economy indicators. <https://ec.europa.eu/eurostat/web/circular-economy/indicators>

The Finnish Innovation Fund Sitra (2019). The critical move. Finland's road map to the circular economy 2.0.

<https://www.sitra.fi/en/projects/critical-move-finnish-road-map-circular-economy-2-0/>

VTT Technical Research Centre of Finland (2018). Going beyond a circular economy – A vision of a sustainable economy in which material, value and information are integrated and circulated together.

https://www.vtt.fi/inf/pdf/visions/2018/Going_beyond_a_circular_economy.pdf

Appendix I. Statistics considered for building circular economy indicators

Statistics Finland

Environmental Goods and Services Sector

Environmental Protection Expenditures Accounts

Waste Statistics

Environmental and energy taxes

Economy-wide material flow accounts

Air Emissions Accounts

Energy Accounts

Energy Consumption in Households

Energy Supply and Consumption

Production of Electricity and Heat

Energy Use in Manufacturing

National Accounts

Structural Business Statistics

Industrial Output

Natural Resources Institute Finland (LUKE)

Several statistics on agriculture, forests and fisheries

Appendix II. Webropol-survey questions

Webropol-survey on circular economy in March 2019. 28/152 answers.

Questions

1. What is or what kind of activity is circular economy from your perspective?
2. What kind of circular economy related initiatives, studies or other development activities you have carried out?
3. What kind of information would you need on circular economy and for what purpose?
4. How would you measure circular economy?

Appendix III. Eurostat NACE codes for recycling and repair and reuse

Proxy NACE Rev. 2 codes for recycling
E 38.11 Collection of non-hazardous waste
E 38.12 Collection of hazardous waste
E 38.31 Dismantling of wrecks
E 38.32 Recovery of sorted materials
G 46.77 Wholesale of waste and scrap
G 47.79 Retail sale of second-hand goods in stores
Proxy NACE Rev. 2 codes for repair and reuse
C 33.11 Repair of fabricated metal products
C 33.12 Repair of machinery
C 33.13 Repair of electronic and optical equipment
C 33.14 Repair of electrical equipment
C 33.15 Repair and maintenance of ships and boats
C 33.16 Repair and maintenance of aircraft and spacecraft
C 33.17 Repair and maintenance of other transport equipment
C 33.19 Repair of other equipment
G 45.20 Maintenance and repair of motor vehicles
G 45.40 Sale, maintenance and repair of motorcycles and related parts and accessories
S 95.11 Repair of computers and peripheral equipment
S 95.12 Repair of communication equipment
S 95.21 Repair of consumer electronics
S 95.22 Repair of household appliances and home and garden equipment
S 95.23 Repair of footwear and leather goods
S 95.24 Repair of furniture and home furnishings
S 95.25 Repair of watches, clocks and jewellery
S 95.29 Repair of other personal and household goods

