

# Circular economy - new practical guide- lines for industry

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Circular economy is one of the new buzz words that everybody has heard about, but only few know exactly how to deal with it. Most industrial enterprises have not yet evaluated whether they can see a potential advantage from circular economy or how they can start working with it.

Professor Tim McAloone from DTU Mechanical Engineering is head of several research projects focusing on how to introduce circular economy into industry. All projects run in close cooperation between the researchers and industry companies. The aim is to make the results directly applicable for companies.

One of the projects is named MATChE - Making the Transition to Circular Economy.

"The purpose of this project is to develop a method to make it possible for companies in a simple way to find out if they are ready for circular economy, and if they are - to give them the right tools to get started with the transition," says Tim McAloone.

## Ready for circular economy

Part of the project is to develop a "readiness app" with 30 different questions, which can be answered in around 15 minutes. By answering the questions, the company will be able to gauge which areas of its organisation, its business and its product development activities that should be boosted, to ease the transition to circular economy.

"The test also gives the companies a possibility to benchmark their readiness for circular economy with other companies of similar size or in the same line of business. The more people from each company and the more companies that use the readiness app, the richer the benchmark

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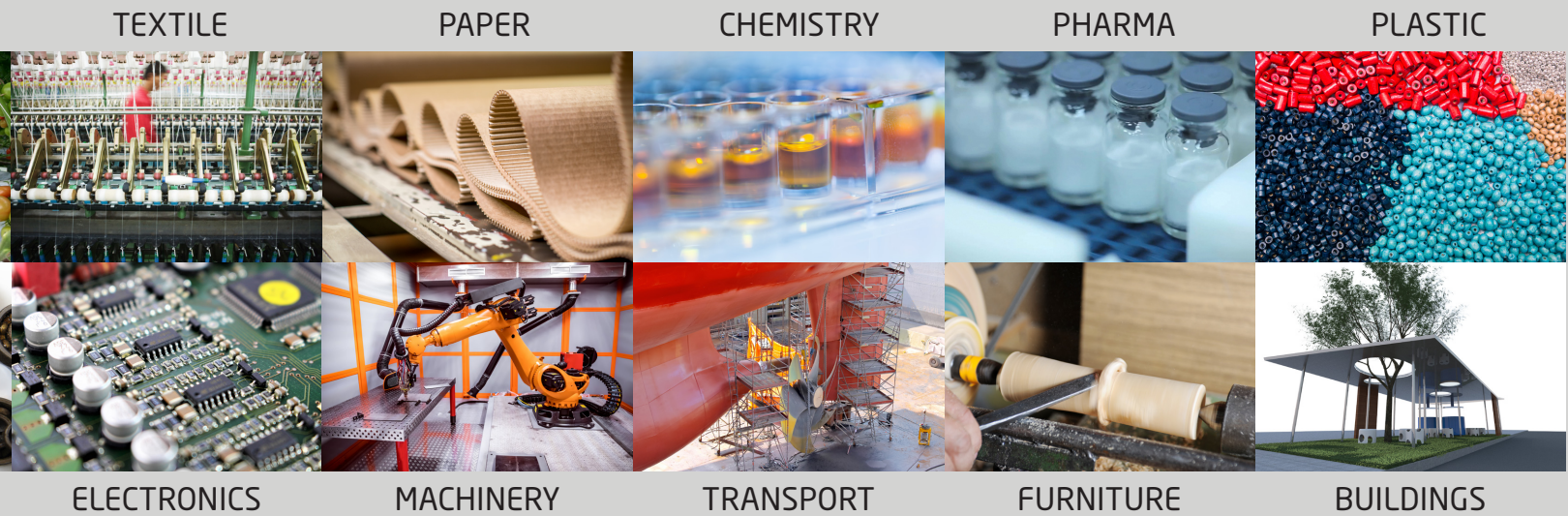
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will become. A selection of companies will be offered assistance to start or continue their circular economy transition. We will develop different paths that companies can follow to pick up the low hanging fruits and develop long term goals for circular economy", explains Tim McAloone.

The methods developed together with the companies will be based on the suitability of the products, the degree of sustainability and economic potential, the organisation and the value chain of each company. The aim is that at least 100 Danish enterprises have used the app and at least 500 industry representatives have been involved in MATChE, when the project finishes in 2020.

"In this way, we will achieve the primary goal of the project, which is to decrease the use of raw materials, disposal and CO2 footprint of Danish industry, whilst at the same time increase the global market position of the companies working with circular economy," says Tim McAloone.



Circular economy is in focus in many industry sectors. Photos: Colourbox.

### Close collaboration with companies

Tim McAloone and his team of researchers have a very close collaboration with companies and industry associations, such as the Confederation of Danish Industry (DI). The collaboration is essential for this kind of research, where the results have to be applicable for companies.

“The questions in the readiness app and the development of different paths for transition to circular economy have been developed in collaboration with two Danish industry networks. So far, we’ve pre-tested the app within 40 companies. Their experience and knowledge about the practical implications of a transition to circular economy are vital for the success of the instruments we develop”, says Tim McAloone.

Tina Sternest is environmental adviser in The Confederation of Danish Industry (DI) and part of MATChE. She explains:

“We know that many Danish companies are interested in circular economy but they need an instrument to help them work in a systematic way. It is important that it is a simple tool like the app being developed in the project, which can help a company to realize how ready it is for circular economy. In addition, the tool has to make it possible for the staff to discuss how to work with circular economy. We have previously been involved in other projects with Tim McAloone and know that he and his team are able to develop instruments which can

make a difference for a company because they are relevant and based on real life experiences. So we hope and believe that the same results can be obtained with MATChE and Danish companies’ engagement in circular economy.”



The CE-readiness app is a new tool for companies to ease their transition to circular economy.

# The CIRCit project consortium



## CIRCit - a new Nordic project

The team is also head of another ongoing project called CIRCit - Circular Economy Integration in the Nordic Industry. CIRCit is a Nordic research project between Denmark, Sweden, Norway, Iceland, and Finland with the aim of supporting the Nordic industry with circular economy methods and tools throughout the whole life cycle of products and systems.

"In this project, we research into new tools to be used by companies, when innovating, developing, operating, and recirculating technical products and systems. At the same time, we are developing a method to help assess the sustainability potential of new circular economy-driven concepts, with respect to social, economic and environmental sustainability perspectives," says Tim McAlloone.

As in all other projects in which Tim McAlloone and his research team are involved, CIRCit is based on a close collaboration with companies in the Nordic countries. Companies - large and small, and from a range of industry sectors - are invited to participate in workshops and deeper research partnerships to give their input and achieve new knowledge about circular economy. The aim is to support sustainability by increasing resource productivity, enhancing energy efficiency, lowering resource consumption, and decreasing waste.

CIRCit will develop a number of new tools, e.g. a dynamic decision-making tool for circular business model creation and a tool to evaluate the sustainability performance of technical products for circularity. Or a design tool to aid the design for monitoring, upgrade, remanufacture, reuse, and so forth. Some of the tools will also regard closed-loop operations, focusing on selection of end-of-use strategies, reverse logistics and closed-loop materials and components.

"We have great expectations to the new tools developed across different kinds of industries, including new technological opportunities like Internet of Things (IoT). Through the use of sensory technology, we will analyse product data together with our company partners to help them understand where they can benefit from keeping their product in use for longer, or when to carry out an upgrade, for example. CIRCit's tools will incorporate experience from a range of industries relevant to the Nordic region, which will make it possible to learn across both industry sectors and country boundaries," says Tim McAlloone.

The expectations to the project are very high. CIRCit will involve 15 companies - and their value chain partners - in action research projects of 2-6 months in scope. In addition, 50 other companies will try and test the methods and tools developed in CIRCit, before the toolbox is finally released for general application.

CIRCit is part of the Nordic Green Growth Research and Innovation Programme funded by NordForsk, Nordic Energy Research, and Nordic Innovation.

**"I am very proud of the work we have done on this project, which has given rise to several success stories and new spin-out activities for the companies involved."**

## Researchers with lots of experience

The two projects, MATCHe and CIRCit, are far from the first practical guidelines and tools that Tim McAlloone has developed for industry.

Since 2012, his team has acted as the main consultants on a large project regarding Eco-Innovation for UN Environment. This project, which is part-funded by the United Nations and part-funded by the European Commission, has developed guidelines and educated advisers from over 76 developing and transition economies to work with new business models and eco-innovation strategies within small and medium-sized enterprises. McAlloone and team have been responsible for creating the entire eco-innovation methodology, the toolbox for practitioners, and the training of the advisers and consultants within the participating countries. Eco-innovation promotes sustainability throughout the entire life cycle of a product or system, whilst also boosting the companies' performance and competitiveness.

"I am very proud of the work we have done on this project, which has given rise to several success stories and new spin-out activities for the companies involved. The knowledge obtained from developing the tools to the UN project can to a great extent also be used in our current work within the Danish and Nordic industries - the principles for "circular products" are the same everywhere in the world," says Tim McAlloone.



One of the CIRCit project's many company engaging workshops helping to create circular economy priorities.

### Facts about MATChE

The MATChE project, MAKING the Transition To Circular Economy, began 1 February 2017 and will run until May 2020. The project is supported by The Danish Industry Foundation with a total budget of DKK 4.27 million; DKK 3.5 million from the foundation.

#### Partners

DTU Mechanical Engineering, Confederation of Danish Industry, The Danish Ministry of Environment and Food, and Chora Connection.

#### Researchers at DTU Mechanical Engineering

Principal Investigator, Professor Tim C. McAloone, Senior Researcher Daniela C. A. Pigosso and Scientific Assistant Lærke Sofie Spaabæk Perrild.

<http://www.matche.dk>



### Facts about CIRCit

The CIRCit project, Circular Economy Integration in the Nordic Industry, began 1 February 2017 and will run until June 2020. This project is part of the Nordic Green Growth Research and Innovation Programme funded by NordForsk, Nordic Energy Research, and Nordic Innovation with a total budget of DKK 16.4 million; DKK 11.8 million is funded by NordForsk.

CIRCit is a research project with operations in Denmark, Sweden, Norway, Iceland, and Finland which supports the Nordic industry to discover the opportunities within circular economy.

#### Partners

DTU Mechanical Engineering, Technology Industries of Finland (TIF), Innovation Center Iceland (ICI), NTNU Department of Computer Science, and Swerea IVF.

#### Researchers at DTU Mechanical Engineering

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<http://circuitnord.com>

