

Teknolohiateollisuus

The Circular Economy Programme 2035 of Technology Industries of Finland: an introduction



BACKGROUND

Finland has announced a national strategic circular economy program in 2021, with the vision that "in 2035, Finland's economic success is founded on a carbon-neutral circular economy society"¹. The circular economy can strengthen Finland's export-driven economy and bring new competitive advantage, while using natural resources sustainably and enhancing well-being.

The Technology Industries of Finland wants to promote Finland's journey towards a carbon-neutral circular economy society. The Finnish technology industry plays a key role in enabling the transition, representing approximately 50 % of Finland's total exports. The value added to the economy created by the technology industry amounts to EUR 55 billion, more than 28 % of Finland's GDP². The aim of this Circular Economy Programme of Technology Industries of Finland is, firstly, to accelerate the ongoing national and global circular economy transition and, secondly, to create business benefits and strengthen the reputation and competitive advantages of the member companies of Technology Industries of Finland. The Finnish technology companies can play a key role in the global circular economy transition by developing and offering technology solutions that enable the circular economy around the world. The term "handprint" refers to how the technology industry's solutions help the industry's customers and stakeholders reduce the negative environmental impact of their operations (such as reducing emissions or improving material efficiency).

The members of the Finnish Technology Industries Association consist of a wide range of companies of different sizes (about 1,600 companies), from five main industries or sub-sectors. This Circular Economy Programme sets out common objectives and a direction for the whole industry, in order to accelerate the transition to a carbon-neutral circular economy.

PREPARATION OF THE CIRCULAR ECONOMY PROGRAMME IN AUTUMN 2021

The Circular Economy Programme of Technology Industries of Finland was compiled in cooperation with the Finnish Technology Industries Association, representatives of member companies of the Association and Deloitte, in autumn 2021. The work was carried out as so-called desktop work, which was complemented by a survey for member companies³, two large workshops of member companies⁴, expert interviews, project team working meetings and Deloitte Sounding Board⁵ meetings.

From the Finnish Technology Industries Association, Pirita Lindell was the project leader and the other project team members were Carina Wiik, Tiina Fiskaali and Noora Kuparinen. The project had a steering group that consisted of representatives of the member companies of the Finnish Technology Industries Association. Satu Kaivonen chaired the steering group and Harri Leppänen, Jarno Laitinen, Jutta Laine-Ylijoki, Kia Haring and Minna Pirilä acted as members of the steering group. Deloitte's work was led by Daniel Kaufmann and the project team members were Jenni Mattila, Ella Tolonen, Eerika Kauppinen and Pekka Pennanen. Anne-Maria Flanagan acted as the responsible partner.

IMPLEMENTATION OF THE CIRCULAR ECONOMY PROGRAMME 2022-2035

The Circular Economy Programme of Technology Industries of Finland builds on an already existing, solid foundation – the underlying concept of circular economy is not new to the industry. The Finnish technology industry has a long tradition of streamlining operations, improving material efficiency and fostering "scarcity" as well as strong expertise in service business, such as maintenance business, factory refurbishment or digital solutions – there is an excellent basis for the circular economy and strengthening competitiveness.

Achieving the objectives of the Circular Economy Programme of Technology Industries of Finland requires changes in the operating environment, at the industry level and from the perspective of an individual company, during 2022-2035. The current state of the industry, objectives of the Programme, identified opportunities and actions as well as the development needs concerning the wider operating environment are all described in more detail in this Programme and its summary.

It should be noted, however, that this Programme is a joint Programme of a very wide range of different companies and sub-sectors. It is therefore recommendable that this Programme serves as an inspiration and as a basis for different companies and individual industries to continue and deepen their work on circular economy and circular business. All efforts are needed in the journey towards a world where Finnish technology solutions and new ways of operating are key enablers of a new world, where life takes place within the limits of the earth's carrying capacity.



The Circular Economy Programme 2035 of Technology Industries of Finland

Summary

The Circular Economy Programme illustrates technology industry's path forward to a carbon-neutral circular economy by 2035



WHY?

- **Increasing demand for circular economy solutions prompts business and government to change.** The circular economy provides solutions to big global challenges – overconsumption of natural resources, climate change and biodiversity loss¹. Currently, over 90 % of resources that enter the global economy are virgin resources, and the global demand for resources keeps growing². The need for sustainable use of materials is apparent: approximately 50 % of global CO² emissions and over 90 % of global biodiversity loss stem from the extraction and processing of natural resources^{1,2}.
- **Technology Industries of Finland is well placed to respond to global demand** and to position itself as a provider of solutions that improve the state of environment and the quality of life at the same time. The handprint of the industry's solutions can play a vital role in enabling the larger global transition to circular societies and life within planetary boundaries. **Circular economy concepts can bring new business to the industry, enhance reputation and differentiate it from its competitors.**
- **Technology Industries of Finland is a key enabler for the circular economy transition in Finland.**

WHAT?

- Technology Industries of Finland shares the vision of the Finnish national strategic programme to promote circularity in Finland by 2035. The 2035 vision of the national strategic circular economy programme is: “**our economic success is founded on a carbon-neutral circular society.**”
- This document depicts the identified measures and paths that take the industry – and Finland – towards the 2035 vision. The objectives of this Circular Economy Programme **emphasize decoupling the overuse of natural resources from economic growth and increasing the industry's handprint.**
- The Circular Economy Programme gives direction and inspiration for companies towards **sustainable growth, circular business models and competitive advantage.**

HOW?

- **Achieving the vision and objectives of this Programme requires changes in the surrounding operating environment as well as at the industry and company level.**
- The transition to a circular economy requires 1) sufficient **economic incentives and finance**, 2) more strategic **cooperation models and circular ecosystems**, 3) integrating **circular thinking** holistically into the skillsets of industry professionals as well as along all stages of a product life cycle and 4) the development of a favorable operating environment.
- **The Technology Industry of Finland Association has an important role in facilitating the change towards a circular economy:** promoting a favourable operating environment for doing profitable, circular business as well as improving the circular capabilities of companies are among the key areas for success and reaching the ambitious goals of this programme.

The overall view of the Circular Economy Programme: a roadmap to the 2035 vision and objectives



VISION 2035: Our economic success is founded on a **carbon-neutral circular society.**

ROADMAP FOCUS AREAS

MEANS, OPPORTUNITIES AND ACTIONS

- 1 Sustainable material flows
- 2 Energy, product and production innovations
- 3 New service and data-based business models
- 4 Ecosystems and system level export solutions

The Finnish Technology Industries association

Ways and means to facilitate the transition to a circular economy

Main sub-sectors of the Technology Industries of Finland

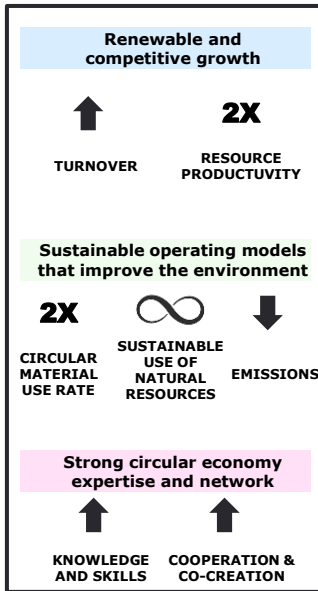
Industry-specific opportunities towards a circular economy and profitable business

Company level

Company-specific opportunities and ways to integrate circular thinking both internally and externally

OBJECTIVES 2035

WIDER IMPACT



- ECONOMIC**
- Competitiveness and revenue growth
 - GDP, exports and added economic value
- ENVIRONMENTAL**
- Use of resources
 - Carbon handprint
 - Biodiversity
- SOCIAL**
- Employment
 - Education and skills
 - Welfare

A FAVORABLE OPERATING ENVIRONMENT



Clear and consistent legislation and policies that support advancing a circular economy in the EU and globally

Well-functioning secondary materials market

Economic incentives for circular economy business



Financing the transition; improving access to finance for circular economy projects

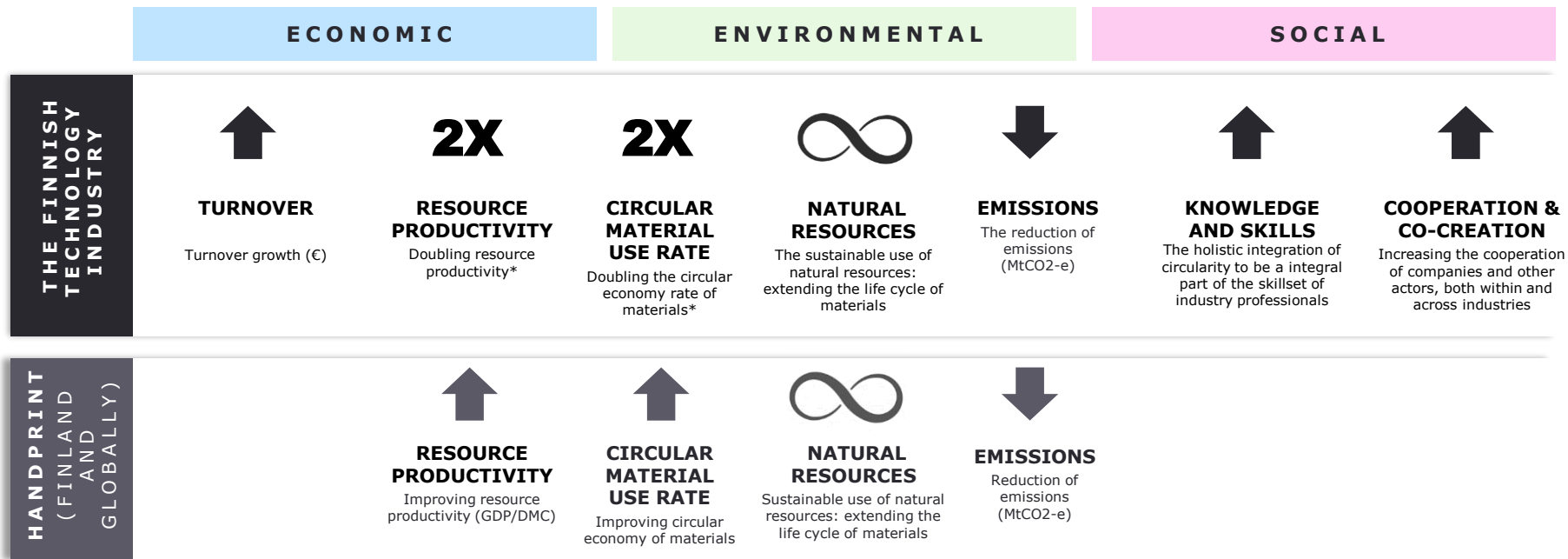


Incentives and opportunities for cross value-chain collaboration and long-term value creation

The objectives of the programme emphasize decoupling the overuse of natural resources from economic growth – and increasing the industry's handprint



KEY OBJECTIVES OF THE CIRCULAR ECONOMY PROGRAMME 2035:



Notes: The progress of the objectives at the Finnish technology industry level can be monitored by (1) industry-level statistical data and (2) by means of an annual survey for member companies, as well as additional expert assessments where appropriate. The objectives of the handprint level can be monitored at the national Finnish level from Statistics Finland's national dataset; in addition, understanding of the handprint can be supplemented with data from the annual company survey and, if necessary, expert assessments. *) For doubling resource productivity and CMU, the base year used is 2015, in accordance to the national strategic circular economy programme, which has the same two objectives and indicators.

The Circular Economy Programme of Technology Industries of Finland has vital role in advancing national circular economy objectives; data-sets for measuring progress should be improved



THE FINNISH TECHNOLOGY INDUSTRY

- **Progress of the key objectives of the Circular Economy Programme at the Finnish Technology Industry level** can be monitored and assessed through:
 - 1) Annual circular economy survey for member companies
 - 2) Industry-level statistics
 - 3) Use of expert assessments
- Data on resource productivity and circular material use rate is currently only available at national level. Year 2015 acts as the starting point for 2035 objectives.
- **Technology Industries of Finland has a significant role in advancing national circular economy objectives.**

HANDPRINT (FINLAND AND GLOBALLY

- **Handprint objectives of the Circular Economy Programme** can be monitored and assessed through:
 - 1) National-level statistics
 - 2) Use of expert views, company level data and e.g. studies on the global handprint of Finnish companies
- However, the availability and quality of statistics and data related to circular economy, service business, and material use should be improved at the international, national and company level.

The four focus areas of the roadmap depict the change needed for the transition to circular business models and a circular society

ROADMAP FOCUS AREAS

1

Sustainable material flows as the basis of a circular economy

2

Energy, product and production innovations to reduce emissions and environmental effects of our own, customers' and society's activities

3

New service and data-based business models to decouple the overuse of natural resources from economic growth

4

Ecosystems and system level export solutions to increase the industry's global handprint

KEY AREAS OF DEVELOPMENT

Circular design requires a systematic perspective and comprehensive life cycle knowledge; the need to understand the system-level impacts of solutions. Interactions between different actors as well as a strong circular mindset and capabilities across professions are key to creating effective circular solutions for unmet customer needs.

As the competition intensifies, it is important to proactively identify and invest in new circular business opportunities– aim to accelerate sustainable innovations. New opportunities are seen especially in designing and optimising new operating models for a circular economy utilising data and developing technology as well as in new sustainable material innovations. In the longer term, new scalable circular service business models have an enormous potential.

Data and technology tools play a key role in figuring out business models in a new way. Data is needed to track circulation as well as energy and material use in products and solutions throughout their life cycle. Data is also an essential part of product identification and product passports – it is the foundation that enables the circular material flows of the future. It will be important to identify and be able share essential (circularity) data – allowing the (co)creation of new data-driven circular solutions.

Future success requires more target oriented and strategic cooperation; businesses need to develop a shared and clearly understood vision and value proposition. Currently, circular business development is mainly regional and technology-driven. It is important to strengthen the role and visibility of Technology Industries in global circular economy value chains.



The annual business potential of circular economy for Finland is several billion euros by 2030

The economic and environmental impact potential of circular economy is remarkable – there is an opportunity to create economic value while lowering emissions and reducing resource use



ECONOMIC



- Implementing circularity can increase **the value of a product's lifecycle by 75 %**¹
- By 2030, **the annual economic value added of implementing circular economy in key Finnish sectors is expected to be 2-3 billion euros**²
- **Together with technological development, the circular economy is seen as an opportunity to improve resource productivity by up to 3 % per year in Europe alone**³

ENVIRONMENT

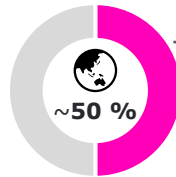


- Implementing circularity can deliver at least **60-85 % smaller product environmental footprint**⁴
- **On a global scale**, implementing circular economy strategies, doubling the current 9 % circular economy rate of goods and leveraging other resource efficient strategies, **it is possible to reduce emissions by approximately 40 %**⁵ and **reduce by 30 % the use of virgin resources**⁹
- The emission reduction potential for different sectors varies greatly from 5 % to 66 %⁶⁻⁸ depending on the sector and the ambition level of the circular scenarios

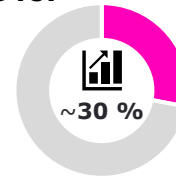


Technology companies play a vital role in the future success of Finland's sustainable growth

Technology Industries of Finland is responsible for



of Finland's entire exports¹



of Finland's GDP¹

Significant circular economy opportunities have been identified in all five sub-sectors; however, the starting point and the nature of the opportunities vary widely across sectors

The focus and size of the key circular economy opportunities in five sub-sectors of Finland's Technology Industry

Five sub-sectors and their size (turnover 2020¹)

Metals Industry

Turnover
9.9 billion. Eur

Manufacturing Industry

Turnover
32,4 billion. Eur

Electronics and the Electrotechnical Industry

Turnover
18,0 billion. Eur

Information technology

Turnover
15,3 billion. Eur

Consulting & Engineering

Turnover
6,6 billion. Eur

Indicative business potential of circular opportunities*



Very high potential*



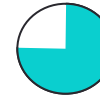
Very high potential*



Very high potential*



High potential*



Very high potential*

The focus of key circular economy opportunities:

- ❖ Circular inputs - use circular inputs for energy and production, as well as in products
- ❖ Circular design, recycling and new data-driven business models – design products that are durable and easy to repair, and, offer outcome-oriented solutions

- ❖ Enabling a circular economy for customers
- ❖ Addressing the circularity of a company's own infrastructure and equipment (for example, better utilisation of waste heat and circular electronics)

Inefficiencies exist, in particular, in the extraction, processing, manufacturing and recycling phases; hydrogen reduction is the biggest single opportunity identified

Circular economy brands and products are gaining more and more importance and recognition. Key focus areas include 1) building longer lifecycles of products and developing service business, 2) refurbishment and re-manufacturing, and 3) reusing and re-entering used resources back to circulation

Energy transition to renewable energy sources; managing the circularity of all key resources across value chains

Server and data centre energy efficiency measures; better utilisation of waste heat and enabling sharing services

Consultant companies are a necessary part of in generating a handprint which is 1300 times the size of industry's own footprint²

Notes: *) Illustrates the relative potential of industries; score from Deloitte's qualitative assessment based on background survey, workshops and research data.

Sources: ¹The technology industry, [Five main sectors | Technology industry](#), ²Afry (2021): SKOL leaving a Legacy ([draft report](#))

The operating environment supports a transition to circularity; however, the transition is financially challenging and requires new capabilities

Expected development of the operating environment

The political environment supports the transition of industries to a circular economy, perhaps more strongly than ever.

New technologies enable fixing inefficiencies, new business model development and ecosystem collaboration.

Consumer behaviour and increased environmental awareness support the transition to a circular economy in Finland and the West. In global context, social change is more neutral. Companies need more circular economy specialists and skills.

Legislation supports more and more circular economy; however the predictability and duplication of regulation as well as geographical indifferences are challenges for businesses.

Environmental factors call for a transition to a circular economy and are becoming an essential part of decision-making, to prevent future environmental disasters and their multiplier effects.

Tapping into the business potential of the circular economy requires effective economic incentives and adequate finance. From the viewpoint of individual company, the transition from a linear economy is difficult and requires investments.



Good, operating environment supports or accelerates circular economy transition



Moderate, operating environment does not in particular support or hinder circular economy transition



Bad, operating environment prevents or delays circular economy transition

Biggest challenges for circular economy¹

What are the top 3 challenges of circular economy transition?

- 1 **"Companies need a better understanding of business opportunities in the circular economy** according to 36 % of member companies"
- 2 **"Challenges related to identification and implementation of circular business models** according to 34 % of member companies"
- 3 **"Challenges related to building circular economy ecosystems and circular partnerships** according to 29 % of member companies"
- 4 **"Sales and marketing of circular business solutions** according to 27 % of member companies "

Other comments

"In addition to survey response options member companies raised **challenges related to legislation and market development**"

Sources: ¹Background survey to member companies of Technology Industries of Finland to support the work of Circular Economy Roadmap (2021; N=83)



The change is necessary but complex – effective economic incentives and mainstreaming circular thinking are needed to boost the change

Achieving the objectives of the Circular Economy Programme requires changes in the operating environment as well as at the industry and company level

A favorable operating environment



The breakthrough of the circular economy requires favorable development in the market and in the overall operating environment:

- A clear and harmonised legislation at least at the EU level, with a competitive playing field and good incentives for circularity
- Adequate funding for the development of sustainable solutions and the renewal of the technology and other industries
- Investments to enhance the capabilities and circular economy skills of companies and professionals

The five sectors



Significant circular opportunities have been identified in all of the five sectors. However, the starting point and the nature of opportunities vary widely across sectors. In general:

- In the shorter term, focus should be put especially on 1) circular product design and extending the lifecycle of products and 2) making better use of circular raw materials across operations
- In the longer term, new, scalable and data-driven circular service business models and collaboration-based, systemic circular export concepts have an enormous potential in the global market

Technology Industry of Finland Association



- There is a need to advance the development of a favorable operating environment for circularity nationally, at the EU level and internationally, as well as to help companies understand and adapt to legislative changes and the legislative future outlook
- To support the development of circular capabilities of member companies
- To gather data and information on the progress as well as the challenges and opportunities of circular economy in the Finnish Technology Industry

An individual company



- From the viewpoint of an individual company, creating a circular mindset and circular capabilities is essential. Circular thinking should be applied both internally and externally with partners
- In the longer term, for gaining a significant competitive edge, it will be essential to be able to envision new concepts, operating models and innovations that fit in and take us to a world of holistically sustainable use of resources and materials
- Successful companies of the future are able to invest significantly in change and new concepts even before it is obviously attractive

Key public sector success levers for the Programme include the areas of regulation & policies, finance, competences & skills, ecosystem collaboration as well as developing statistics and data on circularity

The public sector should enhance the incentives and opportunities for implementing circularity in the following key areas:



An internationally competitive operating environment that encourages renewal

The aim is a stable, predictable and fair operating environment that encourages renewal and promotes industrial investments. Economic instruments that encourage a truly low-carbon circular economy, increased investments in research, development & innovation and a functioning renewable materials market are essential.



National coordination and effort to land EU-level green recovery jackpots to Finland

The aim is to ensure that sufficient funding is available and allocated to large-scale reform of the industry and to support company & consortium level innovations (e.g. development of new business models and technological breakthroughs)



A national circular economy competence plan and continuous competence development in order to accelerate sustainable value creation

The aim is to achieve a strong circular economy expertise across professions and types of actors in the society, as well as to ensure the availability of skilful labour. Circularity will advance faster and at a systemic level when pushed holistically from all fronts.



Taking circular economy ecosystem activities to a new, more strategic level

The aim is to move towards scalable and data-driven circular service business models and collaboration-based, systemic circular export concepts. This requires, among other things, the facilitation of a more long-term ecosystem cooperation model that includes a diverse set of actors, and, a common vision, objectives and mutual incentives between the actors.



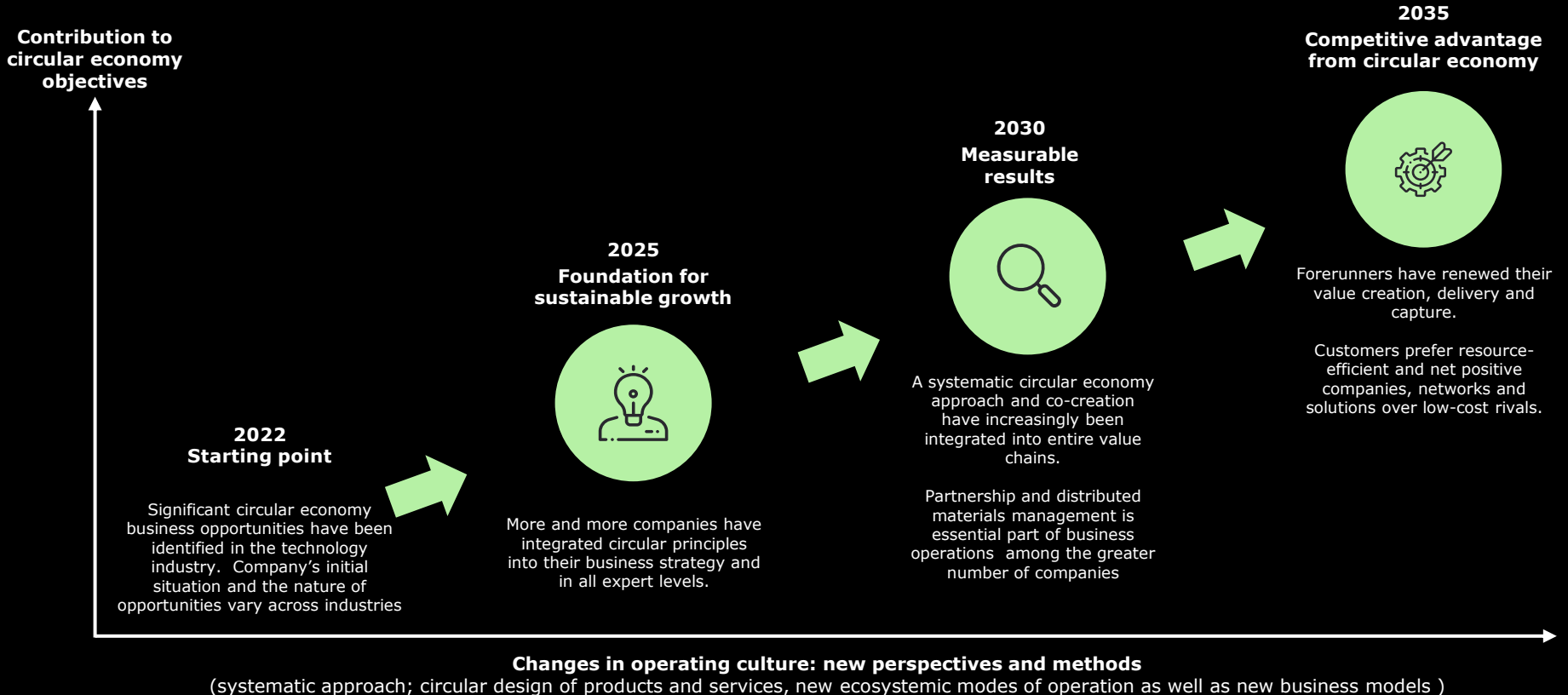
Support for the implementation and governance of the Circular Economy Programme

The aim is to not only succeed in the circular economy transition of the technology industry but also to facilitate the transition of other industries and countries. The EU's green transition will benefit greatly from the experience and insights of pioneering industries that are adapting circularity. National support for the programme and data gathering on circularity indicators is key.



The Finnish technology industry has a good opportunity to position itself as a pioneer in the European circular economy transition

Key milestones towards sustainable service business, holistic export solutions and a competitive advantage from circularity





From the viewpoint of a single company, a circular mindset is key – circular thinking should be applied both internally and with external partners

THREE TIPS TO TUNE YOUR THINKING INTO A CIRCULAR WAVELENGTH:

1

SOURCE PRODUCTS and materials from **the markets**, not from ecological reserves.

Look for suppliers providing recycled materials, or reused parts or products, rather than virgin feedstock.

2

CREATE VALUE for customers by 1) adding new value **to existing** products and materials 2) by add-on sales and new services that meet unmet customer needs.

Intend to sell outcomes rather than products or materials; use restorative technologies (like upcycling) and design processes to add value to existing materials

3

CREATE VALUABLE inputs for **businesses** beyond your customer – start developing an ecosystem lens and create new partnerships.

Avoid the situation where the product you sell has no value after your customer is done using it. Design for reuse, upcycling and recycling and enter new partnerships.

The key messages of Programme: the starting point is good but the transition to circular business requires systemic change



Starting point 2022

- **The overall development of the surrounding operating environment supports a transition to circularity, perhaps better than ever before.** Circular economy is also strongly visible in the EU green recovery programme.
- **However, rivalry over market shares and the competition for the winning circular business models is increasing.** It is important to keep up with pace of circular developments and act proactively.
- **The Finnish technology industry has a firm foundation to realize circularity – and to create winning circular business models – and differentiate from competitors in Europe and beyond.** The technology companies have a long history in being leaders in quality, efficiency and performance – optimizing the life cycle costs of machinery, for example. Moreover, more than half of the Technology Industries of Finland member companies surveyed see the circular economy as either a revolutionary or significant business opportunity. The starting point for circularity is good – a lot of good work has been done over the years.

Vision 2035

- Circular Economy has become the market-driven, primary operating model of the technology industry.** This means that:
- Circular thinking is holistically embedded in the functionalities of market logic, value chains and materials flows.
 - Circular business models bring growth, better reputation and competitiveness to the technology companies.
 - There is clear, measurable evidence on the necessity and success of circular business models. Communicating and understanding circular value creation is clear for all stakeholders. Customers prefer resource-efficient and net positive companies over low-cost rivals.
 - Circularity has become mainstream. Companies that used to operate linearly have adapted circular economy principles to their business logic. Digitalization has helped new business models and technologies spread. Optimizing material flows has become holistic and global.

Circular economy objectives 2035 & prerequisites to success

- The objectives of the Programme emphasize the sustainable use of natural resources and circular design practices, sustainable production, resource efficiency and maximizing the value add of natural resources as well as creating a large global handprint.
- New ways of operating and successful, scalable circular business models implicate investments and improvements in:
 - ✓ **Circular competences & skills** and mainstreaming circular thinking.
 - ✓ **New, vast and more strategic ways of cooperating** and the development of **circular ecosystems**.
 - ✓ **Financing** and in the availability of finance as an accelerator of change and enabler of **company level transformation**.
 - ✓ **The development of a favorable overall operating environment.** Future customers, regulators and financiers all prefer solutions and companies that enhance the state of the environment and have a net positive impact.
- The changes need to be **well coordinated, vast and fast enough for systemic change to happen** and for reaching the 2035 vision.

How to proceed?



- A flying start: invest in attracting and landing national and EU funding for speeding up the renewal and circular transition of the Finnish technology industry (and the Finnish economy)
- Engage in the long term to build a favorable operating environment, new circular ecosystems and leading circular competencies & skills
- Company level change and transformation starts from each company's own premiss
- Deepen the understanding of 1) material flows, 2) the combined impacts of the circular economy, climate change and biodiversity, and 3) further circular economy opportunities at the sectoral and company level
- Take advantage of the experiences and learnings that will be gained in the next years: the annual progress monitoring, data collection and peer learning of this Circular Economy Programme will be important ingredients in the broader systemic change towards a carbon-neutral circular society



The Finnish technology industry creates and enables success stories in the circular economy