

# Circular Economy powered by Smart Industry (CESI)



Provincie Gelderland

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# Circulaire maakindustrie Gelderland

80.900  
werkzame  
personen

Bedrijfsopbrengsten 25,7 miljard,  
toegevoegde waarde Gelderland 7,0 miljard per jaar

5.225  
bedrijven

## Circulair potentieel

### Vergroten toegevoegde waarde

422 miljoen euro meer toegevoegde  
waarde per jaar (6% extra)

1. Machine-industrie
2. Reparatie en installatie van machines
3. Metaalproductenindustrie
4. Rubber- en kunststofproductindustrie

### Verminderen materiaalstromen, vergroten voorzieningszekerheid

31,9 miljoen ton materialen  
per jaar (totaal)

#### belangrijkste sectoren

1. Transportmiddelenindustrie
2. Afvalbehandeling en recycling
3. Bouwmaterialenindustrie
4. Basismetaalindustrie

### Verlagen milieudruk

304 duizend ton CO<sub>2</sub>-reductie  
per jaar (10% minder)

1. Afvalbehandeling en recycling
2. Basismetaalindustrie
3. Chemische industrie



CIRCULAR BUSINESS

FOCUS ON A CIRCULAR SMART INDUSTRY IN GELDERLAND (NL)

**TNO** innovation  
for life

## Smart and Circular Manufacturing Industry

### A survey in The Netherlands revealing the circular nature of the manufacturing industry

Circular economy  
May 2019

#### Smart industry in the province of Gelderland in circular perspective

The transition to a (more) circular economy can make an important contribution to reducing the environmental footprint and the use of raw materials in our economy. The province of Gelderland strives for a «smart and clean industry» without waste. The manufacturing industry, which is traditionally strongly anchored in Gelderland, is an important user of (critical) raw materials and therefore plays an important role in the transition to a more resource-efficient economy. Against this background, 20 companies in the province were interviewed, focusing on how these companies use circular perspectives in their daily practice. Particular attention was paid to the role that ICT increasingly plays in that primary process and to the way in which it influences «circularity».



# TNO survey reveals

- The manufacturing industry, plays an **important role** in the transition to a more resource-efficient economy
- By economic rationales industry is already moving towards **circular business models**
- **ICT**, data and new technologies are important enablers for growing “circularity”
- **5 innovations** and business models:
  - 1. circular design
  - 2. more efficient production
  - 3. lifetime extension of components and products
  - 4. asset sharing
  - 5. keep control over goods by retaining ownership (**servitization**)

# 3 Illustrative examples

**24/7 TailorSteel** (custom-cut metal plates, tubes and bent products) has fully automated order placement ensuring that materials can be used much **more efficiently**





The 3D metal printer at **Kaak Terborg** (industrial bakery equipment) can produce up to 600 small components at a time. The 3D printer delivers up to **50 % reduction in material use.**



The rapid developments and switch to e-bikes mean that **Van Raam** (adapted tricycles) can switch to **circular business models**. Batteries for e-bikes are leased making purchasing a tricycle much cheaper and at the same time creating excellent return logistics for batteries.



# ≡ Policy implications

1. CESI: Integral approach digital and circular
2. In policy, funds, and instruments
3. Demonstrate best practices/create awareness



Circo Circular Business Track

**CIRCO**

“creating business through circular design”