



**GTE**

# **CIRCULAR ECONOMY CONCEPT AND ITS INTERPRETATION PROCESS IN TURKEY**

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# Outline



- Brief explanation of «circular economy»
- Milestones of circular economy in EU and Turkey
- Circular economy practices in Turkey
- Future potential

# About GTE



- GTE Carbon has extensive local and interdisciplinary experience in **climate change mitigation & adaptation, and risk assessment**, with the main focus on **carbon and water footprint and efficiency assessments** at corporate-, industry- and city-levels.
- GTE Carbon has a pool of associate consultants who have been actively involved in nearly all **circular economy, industrial symbiosis and cleaner production** related projects in Turkey.
- GTE Carbon is amongst firms that have highest carbon project portfolios in Turkey. We have worked with +50 institutions from different sectors (public & private institutions, NGOs & local authorities) in +80 projects.

We believe in the potential and necessity of circular economy and symbiotic industrial relationships. We always look issues through this lens.



# International Cooperation

We are open for **international cooperation** opportunities that fall within our areas of interest.

We have been taking part/leading & creating added value in **strong consortiums** and looking forward for new opportunities.



# Circular Economy



Circular economy and waste management relationship :

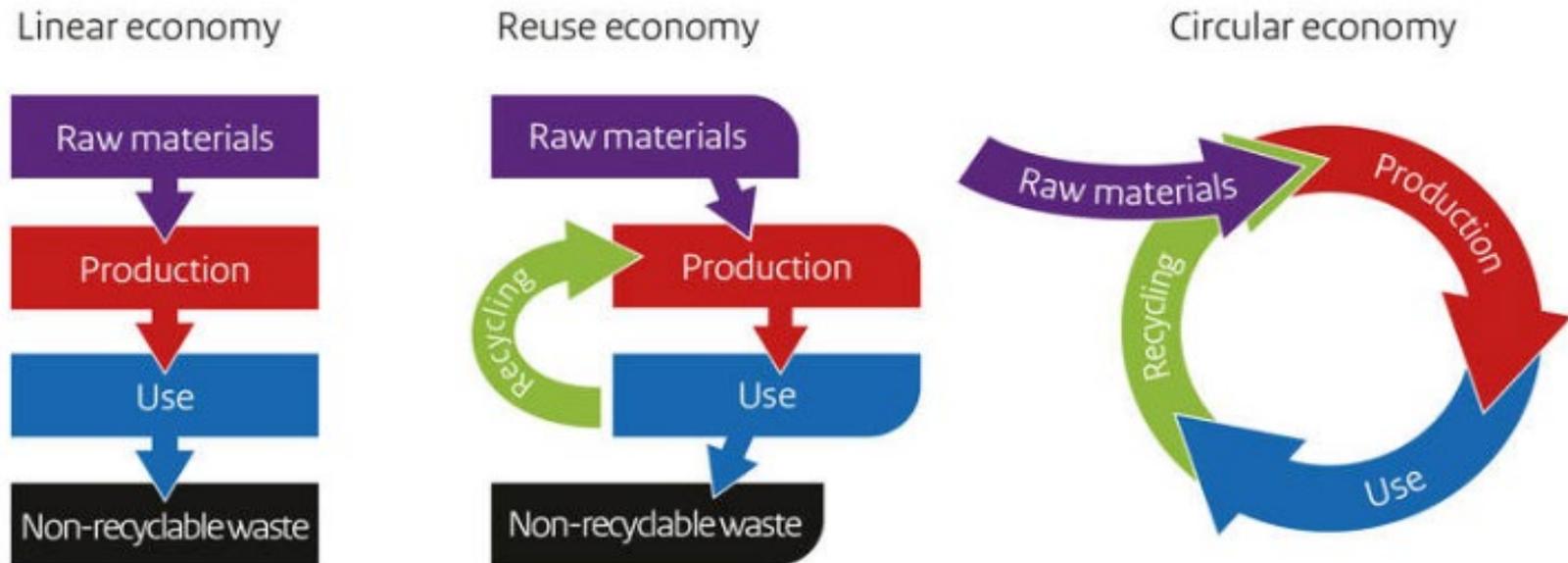
Waste can be

- recycled/re-used in the same production process in which the waste is generated, or
- used as a raw material for the production of another product after physical and chemical pre-treatment applications, if necessary.

# Linear Economy & Circular Economy



- The linear economy uses raw materials and energy that are transformed through a particular process into “outputs”. Most commonly treatment techniques applied on wastes.
- All possible wastes are considered as secondary raw materials in circular economy.



**Figure 1.** A brief representation for the difference between linear, reuse/recycle and circular economy

# Related Concepts with Circular Economy



- Recycling and re-use of waste materials in the same production process is a well-known waste management option with many successful applications under the umbrella of “**reuse economy**”.
- The use of waste, wastewater and excess energy as a raw material for the production of another product is actually called “**industrial symbiosis**” in the waste management literature. However, the keys to industrial symbiosis are collaboration and the synergistic possibilities offered by geographic proximity (Martin et al., 2015, Mattila et al., 2012).
- Conserving goods in supply chain systems effectively among the stakeholders is called Sustainable Supply Chain Management (SSCM). When circularity of wastes is considered through the supply chain route the new concept is named as **Circular Sustainable (Close-Loop) Supply Chain Management (CS/CL-SCM)**.

# Milestones of Circular Economy in EU



In 2015, the European Commission adopted a Circular Economy Action Plan (EU Commission, 2015) in which EU industrial policy strategy was renewed to meet the objectives of the 2030 Agenda for Sustainable Development Goals declared.

In this first plan,

- municipal solid wastes,
- food wastes, and
- construction, and demolitions selected as priority waste types to deal with.

In 2017, the Commission prepared a strategy for plastics in a circular economy and in January 2018, Parliament adopted a resolution on this strategy during its September 2018 plenary session.

Within strategies launched in 2015 and 2017, wastes that are high in amount were mostly considered to deal with.

# Milestones of Circular Economy in EU



During the period between 2015-2019,

- 54 sector specific actions,
- a monitoring framework and,
- indicators

were delivered/developed by the Commission and subordinate committees on the implementation of the circular economy (EU Commission, 2019).

In 11 March 2020, EU adopted a new Circular Economy Action Plan and decided to launch concrete actions on

- batteries and vehicles,
- textile,
- electronics and ICT,
- construction and buildings

# Milestones of Circular Economy in Turkey

- To encourage companies to reduce waste, in 2015 the European Bank for Reconstruction and Development (EBRD) launched the Near Zero Waste (NØW) program
- Establishment of the Turkish Materials Marketplace (TMM, an EBRD Initiative), a first-of-its-kind business-to-business marketplace in Turkey built on the concept of a circular economy (November 2016).
- TMM and EoW co-operations led the NØW program to outperform its planned targets. As of 2019, it had achieved annual direct and indirect savings of 500,000 tons of CO2 per annum, five times the target set at the beginning of the program at 100,000 tons of CO2 per annum

# Example Study - 1

# Eskişehir

## INDUSTRIAL SYMBIOSIS PROJECT

1 Data from key stakeholders collected and analyzed.



2 24 prominent sectors were identified.



3 In the prominent sectors, 464 potential IS opportunities were identified through database analysis.



4 Surveys were conducted with 50 companies.



5 IS opportunities were investigated through visits to 50 companies and 5 institutions.



6 A synergy workshop was held with 71 participants representing 43 different institutions and companies.



7 5 opportunities were selected among the 55 high priority IS opportunities.

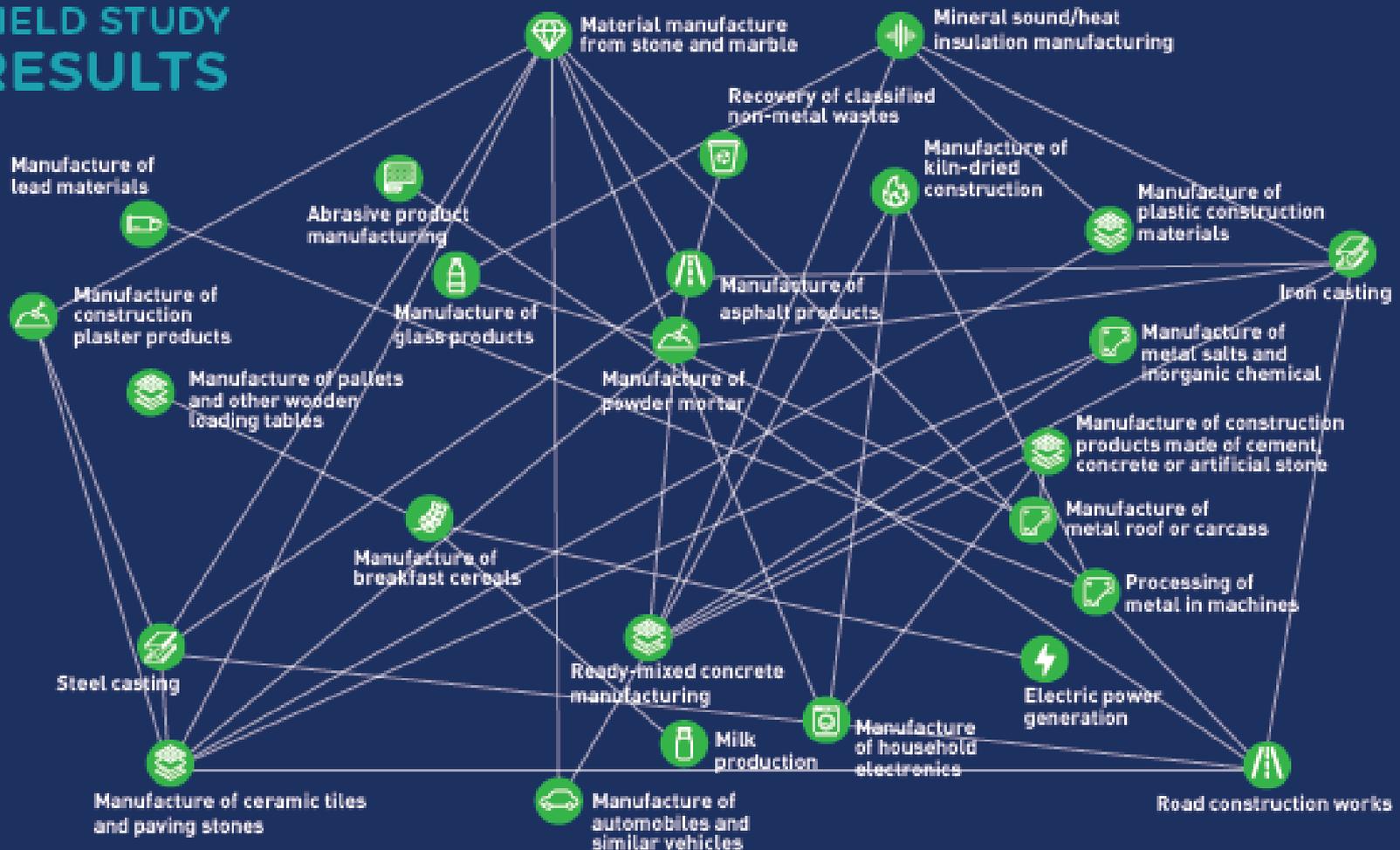


8 Detailed feasibility concept notes were prepared for these 5 selected opportunities.



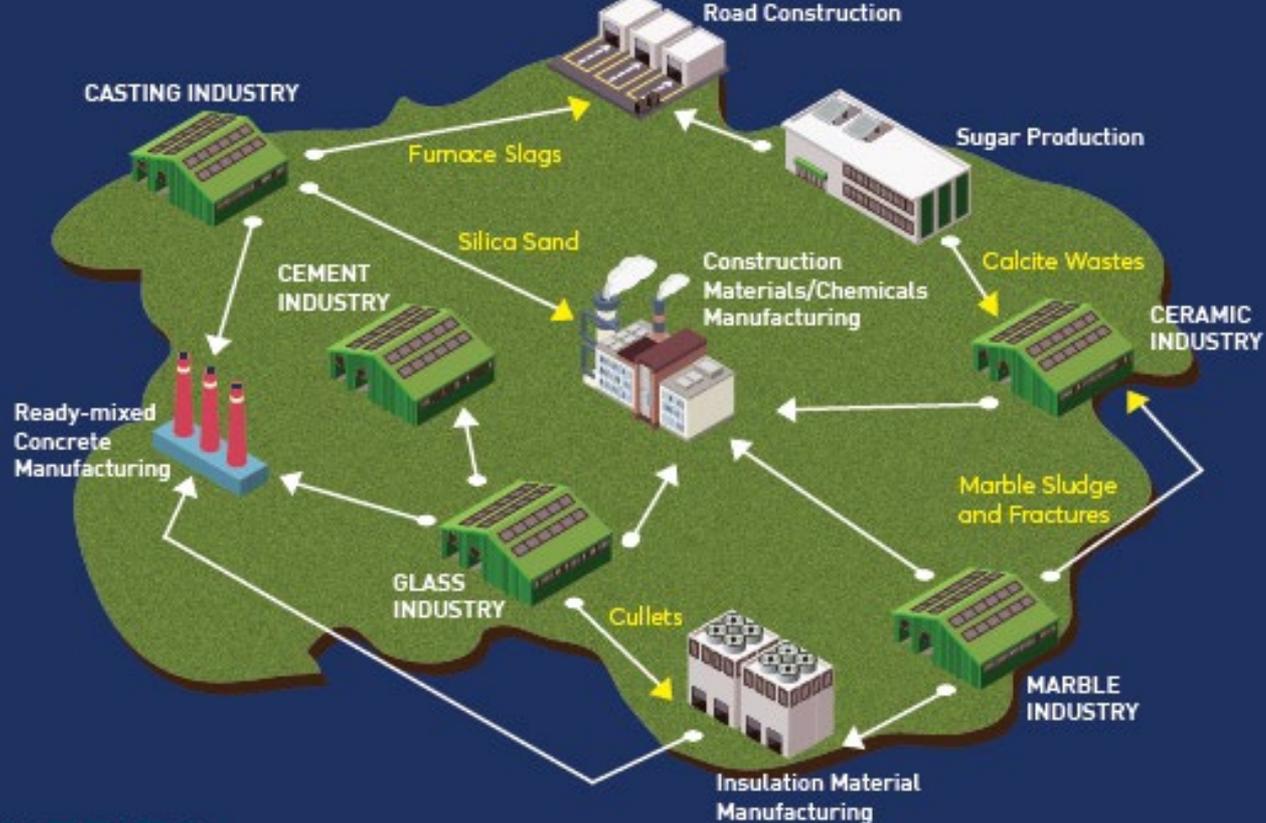
SCOPE

# FIELD STUDY RESULTS



## PROMINENT OPPORTUNITIES

- ✓ The use of cullet waste in the production of glass wool
- ✓ The use of marble sludge and fractures in the ceramic industry and construction chemicals production
- ✓ Manufacture of ceramic products from calcite wastes arising from sugar production
- ✓ Production of construction materials from waste silica sand arising from the casting industry
- ✓ The use of foundry furnace slags in road construction



## BENEFITS

Summary of annual benefits to be provided by 5 prioritized opportunities

Environmental 	Economic 
Raw Material Saving (Waste Reduction)	Reduction in Production Cost
<b>%10-38</b> 87.870 ton	<b>%20-30</b> 2.150.000 TL
Energy Saving	Reduction in Transportation Cost
<b>%3-30</b>	<b>%70-90</b> 1.439.000 TL
CO <sub>2</sub> Emission Reduction	INVESTMENT COST
<b>%13-38</b>	PAYBACK PERIOD
	<b>2.150.000 TL</b>
	<b>&lt;1 YEAR</b>

# Example Study – 2 – R&D



- **Name of project:** Investigating potential for using waste iron powder from metal processing in biogas plant for hydrogen sulphide ( $H_2S$ ) removal
- **Sector:** Renewable Energy and Metal Industry
- **Year:** 2018-2019
- **Location:** Bursa, Turkey
- **Client:** Turkey Materials Marketplace, European Bank for Reconstruction and Development (EBRD)
- **Main project features:** Iron oxide waste will be investigated to replace  $FeCl_3$  for  $H_2S$  removal in biogas digester which is belonged to Süttaş Süt Ürünleri A.Ş in Karacabey, Bursa.
- **Future Potential:** 324 tons of iron oxide waste could be used annually. with a net annual savings of €78,450 and payback period of 3.4 years. There are 85 biogas plants operating in Turkey and considering the rapidly growing biogas market, the demand for biogas remedial chemicals is expected to increase further in the near future.

# Example Study – 3 – R&D



- **Name of project:** Utilization of metal etching wastes for production of high-value coagulating agents
- **Sector:** Packaging Materials
- **Year:** 2020
- **Client:** SAUERESSIG Group in Izmir, Turkey, Turkey Materials Marketplace, European Bank for Reconstruction and Development (EBRD)
- **Location:** Izmir, Turkey
- **Activities performed:** Investigation of the regeneration feasibility of rotogravure cylinder production wastes (e.g.  $\text{FeCl}_3$ ) to develop high performance coagulating agents to be used commercially in various sectors.

# Future Potential in Turkey



- The “Grow” countries, where Turkey can be assessed under this profile, are stated as responsible for 47% of global emissions and 51% of global resource extraction from a consumption perspective.
- By mapping the materials flow in the economy, the vast majority (70%) of the greenhouse gas emissions are associated with material processing and use.
- Energy policies alone will not be enough to reduce emissions and the critical role of the circular economy is undeniable.
- Circular economy has the power to deliver the same or better outputs by reducing global greenhouse gas emissions by 39% and raw material usage as a resource by 28%.



Thank you for listening.

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