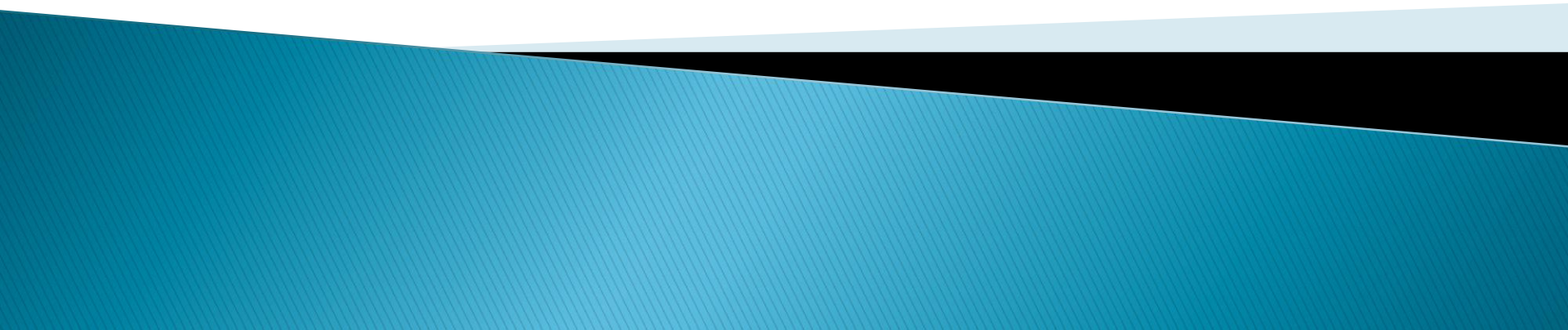


# Techno-economic evaluation of solid waste treatment technologies– An implementation in the region of Attica (Greece)

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# Waste legal framework (1)

- ▶ In order to improve waste management of each member state, EU has established a legal framework.
- ▶ This framework contains policies and quantitative targets.
- ▶ The Directive (EU) 2018/850 states that by 2035 the amount of municipal waste landfilled must be reduced to 10 % or less of the total amount of municipal waste generated (by weight).
- ▶ According to the Directive 2008/98/EC and the directive 2018/851/EU, the preparing for re-use and the recycling of municipal waste (paper, metal, plastic and glass) shall be increased by 2035, to a minimum of 65 % by weight.

# Waste legal framework (2)

- ▶ Similar objectives have been set by the Directive (EU) 2018/852 (amending Directive 94/62/EC on packaging and packaging waste). No later than 31 December 2030, materials contained in packaging waste must be recycled up to:
  - ▶ (i) 55 % of plastic;(ii) 30 % of wood;
  - ▶ (iii) 80 % of ferrous metals; (iv) 60 % of aluminium;
  - ▶ (v) 75 % of glass;(vi) 85 % of paper and cardboard.

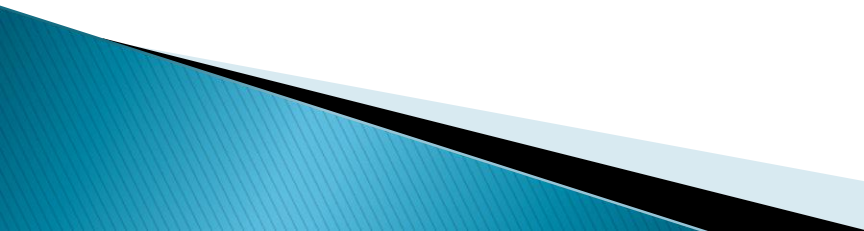
# The region of Attica

- ▶ The administrative region of Attica has an area of 3.808 km<sup>2</sup>, (about 2.9% of the surface area of Greece).
- ▶ In 2011, there were about 3.827.624 inhabitants. Newer estimations doesn't change significantly this number (more than 33% of the population of Greece).
- ▶ Is the most densely populated area in Greece (1005 inhabitants /km<sup>2</sup>).
- ▶ About 45% of the Greek Gross domestic product is produced in Attica.

# Waste management in Attica– current state

- ▶ It is estimated that about 1,9 million tones of waste are produced in 2020.
- ▶ Treatment methods are mainly recycling, composting and landfilling.
- ▶ Treatment facilities include two sorting centers of recyclable materials (total capacity 140,000 tones) and one mechanical and biological treatment plant (capacity 260.000 tones).
- ▶ Treatment facilities are inadequate for an ecologically proper management, while the participation of the population at the separation at source is low.
- ▶ About 80% of the produced quantity is deposited in landfills.

# Waste management in Attica – Proposed plan (1)

- ▶ The construction of ten waste treatment facilities is proposed as first stage of the improvement of waste management.
  - ▶ Three mechanical treatment plants / sorting centers for recyclable materials (total capacity of 220 000 t/year)
  - ▶ Three mechanical and biological treatment plants for mixed waste (total capacity 520 000 t/year)
  - ▶ Three composting plants for (selected) organic waste (total capacity 70 000t/year)
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# Waste management in Attica – Proposed plan (2)

- ▶ In addition to the aforementioned facilities, an incineration plant of 1 000 000 t/year is also calculated and can be constructed. The plant can produce energy from the residue of the other plants and/or selected waste.
- ▶ The total initial cost is 220 000 000 €
- ▶ A gate fee in landfills can be avoided (45 €/t). Recyclable materials and compost can be sold in (local) market.
- ▶ As a result, the plants can be economically viable (IRR = 6.2% in 10 years):

# Waste management in Attica – Proposed plan (3)

- ▶ In order to increase separation at source, specific measures are proposed, in cooperation with the food companies, restaurants, super markets, etc.
- ▶ The construction of the plants and the proposed measures in separation at source and reverse logistics are going to increase recycling and composting.
- ▶ The proposed plan can reduce significantly the amount of waste that dumped into landfills. (about 530000 t/year less)
- ▶ As a result, the measures are going to contribute positively to Greece achieve the EU legislation goals.



# Waste management in Attica – Proposed plan (4)

- ▶ The presented plan is the first stage of an ecologically proper waste management Attica. After the construction of the plants, and the implementation of measures, new plants can be evaluated.

# Thank you for your attention



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