Integrated strategic waste management planning in Volvi Municipality

Th. Valkouma, D. Kintsakis
The Municipality of Volvi is situated in the Region of Central Macedonia in Northern Greece.

It was set up in 2011 through the unification of six separate municipalities and their communities: Agios Georgios – Apollonia – Arethousa – Egnatia – Madytos – Rentina.

The municipal area is 782 km² and it has approx. 24,000 inhabitants.

The seat of the municipality is the town of Stavros, where the municipal council is also based.

It was named after Lake Volvi, which dominates the centre of the municipal territory.

One of its main characteristics is its rich natural environment which combines 20 km of sea coastline, rivers, lake Volvi and also mountainous and semi mountainous areas with dense vegetation.
Lake Volvi is the second largest lake in Greece and the biggest in northern Greece. It is about 12 miles (19 km) in length, and 6 to 8 miles (9.7 to 12.9 km) wide. The area of the lake is 68 km² and the depth is 20 m.

In the vicinity of the lake, 336 kinds of plants have been recorded, 13 of them are considered to be extremely rare. Also, 24 species of fishes, 19 amphibian species, 34 mammal species and over 200 species of birds. Lake Volvi is considered to be a stand for many migratory birds and a place to spend the winter and reproduction for some other.

The whole water system of the municipal area is extremely valuable. That’s the reason why this area is protected by several conventions and characterized as:
• Water biotope of Lakes Koronia - Volvi (Ramsar convention 1971)
• "Special Protected Area" (SPA, instruction 79/409 E.U.)
• "E.U.’s Area of Interest":
  Instruction 92/43 EU, Nature 2000- GR 1220001 & 1220003
  Instruction 2009/147 EU, Nature 2000- GR 1220009
The municipality of Volvi has a variety of religious, environmental and historical monuments, eco-touristic destinations and natural reserves. Those are touristic destinations and the municipality makes continuous efforts to enhance and promote them sustainably as they consist a major source of revenue and job creation.

The municipality of Volvi is also known for its thermal springs. The thermal city of “Nea Apollonia” is located in the serene and peaceful ecosystem of lake Volvi where health thermalism facilities are found.

The temperature of the water is 38-57°C and its characterized as: superheated Na - K - SO₄ - HCO₃ - F- Br hydrosulphide - hypotonic, slightly radioactive curative water. It is considered as highly therapeutic for a lot of diseases.
The economic development in the area of the Municipality of Volvi is distinguished in:

• the coastal areas around the Strymonikos bay, where the tourist resorts are mainly located,

• and the interior of the Municipality, where agricultural production remains dominant.

In the primary sector as a whole, 28.2% of the active population is employed, 18% in the secondary sector, and 53.8% in the tertiary sector.
The Municipality of Volvi is a developing region and is characterized as the core of cultural and environmental development.

It has the potential to become a big tourist center, covering many forms of tourism such as cultural, thermo, religious, ecological, agrotourism and wine tourism, bringing great benefits to the municipality.

The cultural resources of the region cover a wide range of historical and artistic spheres, making it possible to realize the above vision.

On the other hand, there is also the possibility of rural development, as a large part of its land is of high productivity with the provision of uses and facilities related to agriculture and livestock farming (agricultural warehouses, livestock farms, agricultural and livestock processing units).

ATHENS2017
5th International Conference on Sustainable Solid Waste Management, Athens, 21–24 June 2017
Municipality of Volvi

Strategic Development Plan

ATHENS2017
5th International Conference on Sustainable Solid Waste Management, Athens, 21–24 June 2017
**Integrated strategic waste management planning in the Municipality of Volvi**

The municipality makes continuous efforts to enhance and promote sustainability and one of its major targets is the protection and promotion of the environment. The municipality focuses on Energy – Waste – Water – Environment – Tourism – Sources.

Furthermore one of the major targets of the municipality's strategic plan is to enhance public awareness, responsibility and participation of the various stakeholders and citizens in all public issues, to strengthen initiatives and create partnerships and synergies among them and with the public authorities.
Integrated strategic waste management planning in the Municipality of Volvi

The Municipality of Volvi, in the context of its strategic planning, based on sustainable development, has developed a strategic development plan that includes the following thematic areas:

• Energy saving, energy upgrading and use of Renewable Energy Sources.
• Waste management and use of waste material as sources.
• Improvement, development and promotion of the tourist product.
• Promotion of Education, Sport and Culture and promotion of cultural heritage.
• Protection and Management of the Natural Environment.
• Exploitation of natural resources.

ATHENS2017
5th International Conference on Sustainable Solid Waste Management, Athens, 21–24 June 2017
On this basis, the Municipality has submitted more than 30 financing proposals over the past 2 years, collaborating with more than 100 European municipalities, research centres and agencies from almost all European Union countries.

This period is in the process of implementing 7 financing proposals related to eGovernment, sustainable improvement of the tourist product, reduction of carbon footprint, implementation of alternative forms of mobility, enhancement of primary health care, implementation of innovation and new technologies.

Furthermore, is in close cooperation with greek and european institutes trying to implement efficiently its strategic targets.

Finally, it tries to make its strategic plan known to the responsible ministries, in order to claim funding from national resources and programs and also to all public and private sector trying to form the appropriate synergies.
Municipality of Volvi

Integrated strategic waste management planning

ATHENS2017
5th International Conference on Sustainable Solid Waste Management, Athens, 21–24 June 2017
The municipality of Volvi has already completed the investigation of the optimal integrated management system of urban waste and it has prepared the local waste management plan. The municipality wants to manage its waste based on a circular economy model. Furthermore it focuses on energy production from waste.

The municipality aims to apply a zero waste scenario for its area and become a zero waste and a zero energy municipality.
The situation regarding waste management in the municipality till 2016 is the following:

• 11,000 tn of litter (waste) per year, produced in the area of the municipality, are transported in a distance of 90km (180km in total) in order to be buried in Mavrorahi landfill.

• In addition, 30,000 m$^3$ per year of green biowaste (branches, leaves, etc.) are buried or just deposited on land.

• The total amount of waste management costs is up to € 1,7 million Euro per year.

• The consequences are environmental, economic and technical ones.

ATHENS2017
5th International Conference on Sustainable Solid Waste Management, Athens, 21–24 June 2017
On this basis, the Municipality according to its strategic planning changed its philosophy and perception of dealing with waste management and started treating waste as a useful raw material.

Having the vision to become a zero waste municipality, the municipality of Volvi designed and adopted an integrated strategic waste management plan, involving best waste management techniques, such as:

- Reduce waste
- Separation at source
- Recycle
- Reuse
- Development of Biomass Plant for producing energy from green biowaste
- Development of Biogas Plant for producing energy from biowaste
- Establishment of environmental awareness and knowledge of waste management for citizens and interested stakeholders
Reduce – Reuse – Recycle. Separation at Source

The municipality is developing a network for the collection of recyclable materials, with separation at source. Four streams of recyclable material: paper, plastic, metal, and glass, one stream for biowaste and a separate stream for electrical and electronic devices.

The network will contribute to reduce total waste by 45%, reduce carbon footprint by 55% and increase municipal revenue (income) from the sale of the materials.
Development of Biomass Plant

The Municipality of Volvi is developing a biomass plant of 499 KW, for producing renewable energy from green biowaste. It is in the process of the Environmental Impact Assessment Study and the signing of the terms of connection of the plant to the electricity grid.

A total amount of 4.200 MWh per year will be generated to be sold to the responsible operator, 4.095 MWh per year of thermal energy will be produced and can be used to heat municipal buildings, schools, sports centers and greenhouses.

The operation of the biomass plant will contribute significantly to a 30% reduction of the total quantity of waste produced, to the reduction of the carbon footprint and to increase the revenue/income of the Municipality.

The reduction of the carbon footprint will be 4.825,8 tCO2 (electricity) and 1.093,37 tCO2 (thermal energy). 5.919,17 tCO2 in total (approximately 5.15% reduction for the Municipality as a whole).

ATHENS2017
5th International Conference on Sustainable Solid Waste Management, Athens, 21–24 June 2017
Development of Biogas Plant
The Municipality of Volvi is also developing a 150KW Biogas plant, for producing renewable energy by using the total amount of the municipal biowaste. It is in the process of the Environmental Impact Study and the signing of the terms of connection of the plant to the electricity grid. A total amount of 1,200 MWh per year will be generated to be sold to the responsible operator, 840 MWh per year of thermal energy will be produced and can be used to heat municipal buildings, schools, sports centers and greenhouses and 4,000 tn per year of soil fertiliser will be produced and distributed in agricultural areas of the Municipality.

The plant will contribute significantly to a 15% reduction of the total quantity of waste produced (urban and green) and to a 40% reduction of the amount of municipal waste produced. Additionally, it will contribute to the reduction of the carbon footprint and to increase the revenue/income of the Municipality. The reduction of the carbon footprint will be 1,378,8tCO2 (electricity) and 224,28 tCO2 (thermal energy). 1,603,08 tCO2 in total (approximately 1.4 % reduction for the Municipality as a whole).
Integrated strategic waste management planning in the Municipality of Volvi

Biomass Plant

Biogas Plant

ATHENS 2017
5th International Conference on Sustainable Solid Waste Management, Athens, 21–24 June 2017
Environmental awareness and knowledge of waste management for citizens and interested stakeholders

Raising awareness about municipal waste management is a critical component of effective waste management. It is important for citizens and also key stakeholders to be aware of the municipality's waste management activities and have a strong understanding of the benefits of proper waste management.

The Municipality of Volvi is organizing an extensive awareness raising campaign which is going to involve radio, TV, electronic and social media, printed press campaigns, door-to-door actions, etc., and also an education and motivation campaign with more interactive activities such as conferences, workshops, festivals and other events and targeted actions for school-aged students, waste producers such as catering professionals, super markets, etc. Finally, new technology features, applications for smart phones, tablets, etc. will also be used to bring about notable changes in perceptions, awareness and habits of the general public and targeted groups.
Integrated strategic waste management planning in the Municipality of Volvi

The situation before and after the implementation of “zero waste scenario”:

BEFORE ZERO WASTE SCENARIO

ATHENS2017
5th International Conference on Sustainable Solid Waste Management, Athens, 21–24 June 2017
Integrated strategic waste management planning in the Municipality of Volvi

The situation before and after the implementation of “zero waste scenario”:

AFTER ZERO WASTE SCENARIO

REUSE - RECYCLE

ENERGY PRODUCTION

LANDFILL

ATHENS 2017
5th International Conference on Sustainable Solid Waste Management, Athens, 21–24 June 2017
Financing for the full implementation of the Zero Waste Scenario will derive from co-financed EU and Greek programs, own funds and a combination of private capital and lending.

The Zero Waste Scenario will eliminate the environmental impacts, will certainly reduce the annual budget at least by 80%, will improve the citizens quality of life, the municipal services provided to them and in general the well-functioning of the municipality.

Being a Zero Waste municipality is an ethical, environmental, economical, efficient and visionary goal which will guide citizens in changing their lifestyles and practices, transform waste to resources and achieve sustainability.
Integrated strategic waste management planning in Volvi Municipality

Th. Valkouma, D. Kintsakis

Municipality of Volvi, Stavros, Thessaloniki, 57014, Greece

T +3023970 61661  F +3023970 61888  M +306948305245, +306972848394
E consultant@dimosvolvis.gr, W www.dimosvolvis.gr

ATHENS2017
5th International Conference on Sustainable Solid Waste Management,
Athens, 21–24 June 2017

Ευχαριστώ για την προσοχή σας!