

Integrated
WATER&ORGANIC WASTE
Management



Environmental Solutions
for Smaller Municipalities
and Tourist Resorts

*Frontpage: The family hotel Bella Vista, Zakynthos Greece, a delightful villa surrounded by olive groves and 20 m above Limanaki beach.
Photo: Knut Werner Lindeberg Alsén*

Introduction

It is common knowledge that the world today is overloaded because of the unsustainable utilisation of non-renewable resources and the pollution of sensitive areas of the environment. The reason is the close link between negative consumption and the planet's ability to maintain its ecological system. To succeed in the future we need to develop cross-cutting and holistic approaches to facilitate an integrated link between human activities and the use and exploitation of the earth's resources. This applies especially to sensitive areas of the environment that serve as reservoirs for water, energy and food. Closely associated with this is the link between Integrated Water and Organic Waste Management.

Integrated Water and Organic Waste Management is rooted in the fact that everything produced today will be able to transform into something new tomorrow. This understanding makes waste a resource, that can be recycled back to nature (the large cycle) or transformed into new products (the small man-made cycle).

Integrated Water and Organic Waste Management is about the use and reuse of resources from cradle to cradle instead of cradle to grave, which is today's conventional thinking. The goal is to develop technology and knowledge that are environmentally, economically and socially beneficial. Thus, the development of new technologies that improve the living conditions of the present generation without compromising on the livelihoods of future generations is essential.

Organic vineyard. Agrar Tourism in Zakynthos, made by the Therianos Family. Photo: Knut Werner Lindeberg Alsén





*The Gerakas Peninsula has been designated as the first protected Marine Park in the whole of the Mediterranean, as it is one of the last nesting sites of the Loggerhead Sea Turtle, Caretta Caretta.
Photo: Knut Werner Lindeberg Alsén*

Integration between use and reuse

Integrated Water and Organic Waste Management is an integration of water and food consumption and the resulting waste generated. The system ensures efficient use of water and converts waste into clean water, organic fertilizer and renewable energy. This is achieved through the use of water-saving taps and showers and vacuum toilets and the collection and recycling of organic waste from kitchens and bathrooms. This happens in the so-called closed cycle (Closing the Loop). The methods and technology contribute to the conversion of toilet and organic kitchen wastes into organic fertilizer (phosphorus, nitrogen and potassium) and biogas. Waste is in this context transformed from being a major environmental problem into a valuable resource, for the benefit of agriculture and society in general. This has a positive impact for both the economy and the environment in the long term, although investment in the short term may appear high.

Source separation

Recycling is a core methodology of Integrated Water and Organic Waste Management. It is the source separation of generated waste in a cost-effective way. Therefore, waste water generated from the sink and shower (graywater) is separated from the toilet waste (blackwater). This enables the treatment of graywater, for safe discharge or reuse in gardening and washing on site. This is particularly ideal for areas experiencing water shortages. Also blackwater and the organic food waste from the kitchen is collected and converted into energy (biogas) and

plant nutrients. This solves both waste and energy problems. Biogas can also be used for electricity, cooking, heating and transport. Waste from cooking oil can easily be transformed to biodiesel.

Benefits

Integrated Water and Organic Waste Management in the closed loop is very beneficial for the overall environmental impact while providing multiple benefits to society. The combination of source separation, vacuum toilets and greywater treatment on site, can provide up to 40 percent reduction in water consumption. At the same time, it will reduce the need for water and wastewater treatment and pumping. These in combination will lower energy consumption, along the long "water and sanitation chain". The challenges of waste management is reduced by linking wastewater treatment with other organic waste from private households, commercial kitchens (e.g. restaurants and hotels) and food-industries. The system is flexible and can be used in the city, scattered houses and simple houses alone. Integrated Water and Organic Waste Management can provide beneficial economic effects for individual households, the tourism industry and municipalities and provide beneficial effects for agriculture. Several buildings in Norway and other countries have adopted the technology, and it can be easily adapted to both new and old buildings.



The Environment

25 percent of the world's fresh water is used to transport human waste through traditional gravity toilets. A typical western citizen uses 17,000 liters of water every year to flush toilets, and every time you flush you are using at least 8 liters of fresh water to transport 0,2 litres of human waste.

For the past 150 years western civilization has relied solely on a central sewerage system patented in 1775, the water closet. This is technology that has contributed to the extension of major health issues in London during the last part of the 19th century, parallel to inducing the most extensive waste of clean drinking water the world ever has witnessed. Approx. 40 percent of the world's clean drinking water is being used as means of transporting sewerage, due to the

extensive use of the water closet.

This situation derives from how waste is regarded and the fact that system advancement within this sector in reality has been at a stand still since the 19th century. Consequently new resource- and climate issues have arisen, in addition to fresh health challenges and added financial cost. Presently a lot of money and energy is spent on flushing water for the sole purpose of transporting toilet waste, at the same time cleansing the very same water when it reaches the treatment plant demands energy.

This is an unnecessary strain on local commune economy, consumers and global environment. It is also a known fact that the vital sewerage system in

Agrar Tourism in Zakynthos, made by the Therianos Family. They follow the local traditional architecture of the Zakynthian countryside outdoors and indoors. Photo: Knut Werner Lindeberg Alsén

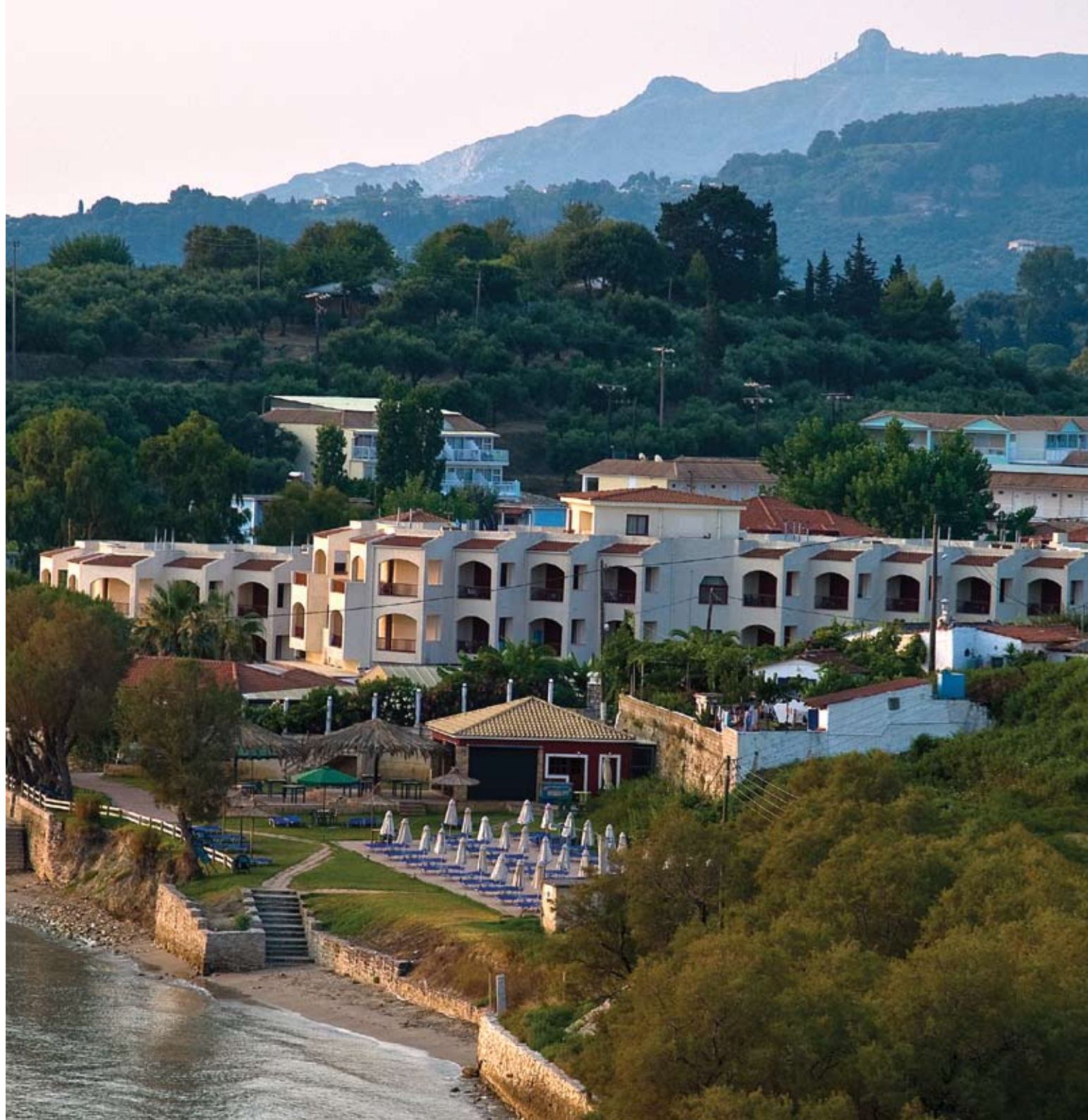
in the west represents a health hazard due to malfunction of the hygienic barriers between sewerage and drinking water.

Integrated water and organic waste management help to reduce the load on our planet's resources. Combined with source separation this systems cut water use by up to 20-40% (90% toilet waste) and reduce sewage volumes correspondingly, resulting in lower energy consumption for supplying water, and for storing and handling sewage. With Integrated water and organic waste management, the remaining volume of blackwater - or sewage - transported through a separate piping system is so small that the treatment cost goes down while efficiency increases. Energy consumption drops. These systems are even available for use with solar cells and batteries.

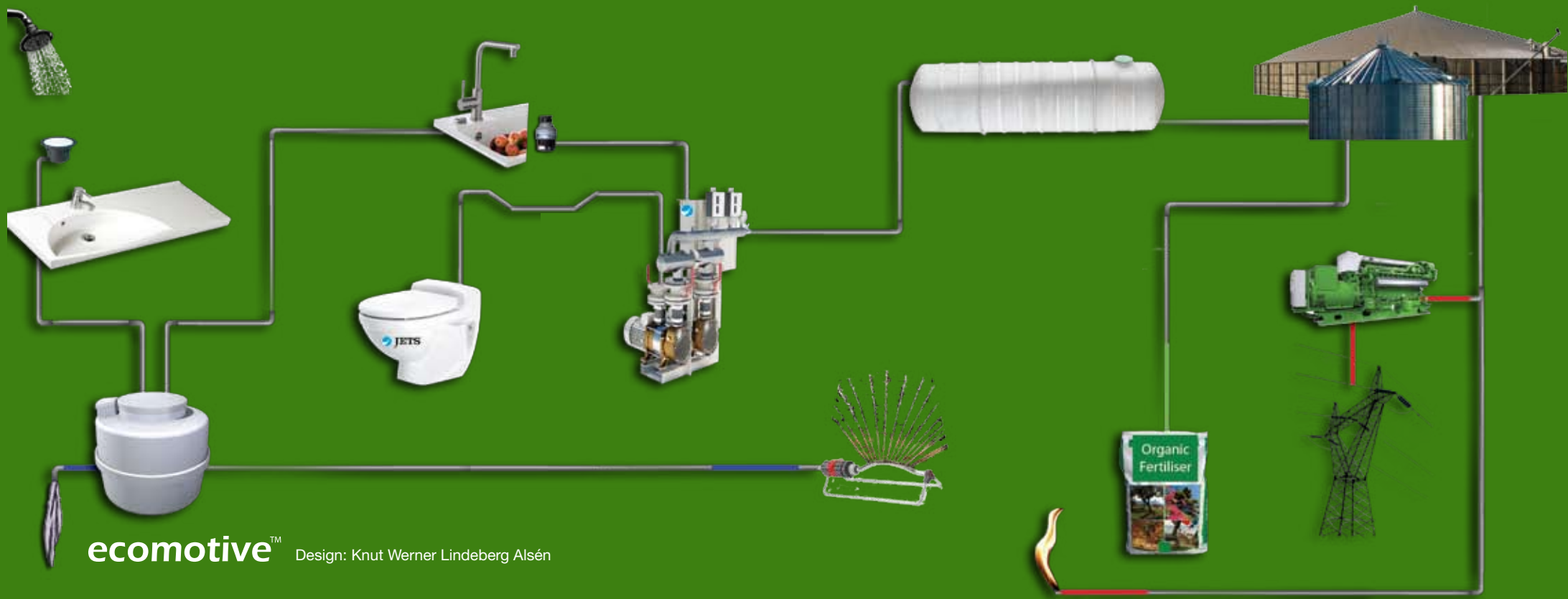
We live on a fragile planet, and are entrusted with the responsibility to keep it in good shape so our descendants can enjoy life here the way we do. The only way to accomplish this is to stop wasting our resources and thereby reducing our biological impact on the planet. Integrated water and organic waste management are designed to do just that.

Ecomotive™ cooperates with and Jets™ Group, the Norwegian University of Life Sciences (UMB) and Runde Environmental Centre to enhance and simplify the technologies used to treat sanitary wastewater from buildings and other onshore users. The greywater treatment plant, designed by UMB, Ecomotive™ and Jets™, has been developed as a biological unit that uses no chemicals. It allows users to dramatically reduce sewage volumes by separating and treating greywater to a level of purity where it can be safely released back into nature or treated to a level of purity for gardening and agriculture use.

*Hotel-complex in Zakynthos,
seen from the family hotel,
Zante Bella Vista (see also the frontpage).
Photo: Knut Werner Lindeberg Alsén*



INTEGRATED Water&Organic Waste MANAGEMENT





Vaccum toilets, a paradigm shift

Self-indulgence, pleasure and comfort in a bathroom with high standard and a good atmosphere have become a necessity and a source for quality of life. For others this only feels like a distant dream due to the fact that connection to communal sewerage systems for long has been the only option in ensuring a high sanitary standard for cabin bathrooms. This is no longer the case.

Ecomotive™ make it possible. The innovative enterprise Ecomotive™, together with Jets™, offers a sanitary solution with vacuum instead of clean drinkingwater, moreover, that operates independently from central communal sewerage systems, integrated with the familiar comfort and standard. Naturally without harming our fragile nature. This equals freedom to choose the most expedient location for the house, without any compromise in creating good bathroom solutions. With an integrated water and organic waste management even houses and commercial large buildings located without municipal wastewater treatment can have a environmentally friendly-effect and high sanitary comfort.

Jets™ vacuum toilets operates by a sanitary system that separates greywater from blackwater (see above). Blackwater is led to a closed tank for storage. The greywater is purified in a compact biological wastewater filter designed by

Guest bathroom with Jets™ sanitary system in Hotell Ivar Aasen, Norway (business-hotel). Photo: Jets™.

Ecomotive™, before being led clean back to nature or treated to a level of purity for gardening or/and agriculture use, in line with the strictest regulations. All the installations can be fitted for indoor storage. The biological greywater treatment unit is developed by the Norwegian University of Life Sciences, Ecomotive™ and Jets™.

Jets™ vacuum toilet technology is powered by a unique and robust vacuum pump (Vacuumator™). The macerated effluent reduces risk of clogging of pipes and allows small diameter (25mm) discharge pipes. This means also; no needs for trashcans in guest bathrooms anymore. The small diameter pipes and the vertical lift capacity ensures a flexible system that reduce installation work. Installation costs for vacuum toilets are therefore normally lower than traditional WC's. The watersaving vacuum toilet systems are preferred in areas where the water and energy costs are high, and are becoming increasingly popular because of increased water cost and thus short payback time.

Areas of use; Private and public buildings, tourist resorts, restaurants, food industry, building renovation, mobile units, buses and trains.



Norwegian University of Life Sciences with Jets™ sanitary system.
Photo: Knut Werner Lindeberg Alsén

Norwegian University of Life Sciences

Case: The Norwegian University of Life Sciences (UMB) is recognised as a leading international centre of knowledge, focusing on higher education and research in environment and biosciences. The University's main specialisation areas are biology, food, environment, land use, and natural resource management. In addition, there is a substantial focus on applied science and engineering. The Norwegian University of Life Sciences provides research services to both the private and the public sectors.

One of the Institute (Sørhellinga) (below) has been designed to the standards of 'green' technology, including sustainable building materials, energy efficiency and integrated water and organic waste management.



Runde Environmental Centre, Norway, with Jets™ sanitary system.
Photo: Knut Werner Lindeberg Alsén

Runde Environmental Centre

Case: Runde Environmental Centre represents a combined research station and environmental centre with facilities for seminars, courses and conferences. It is located on the island of Runde, best known for housing the most southerly seabird cliffs in Norway.

The centre's building and facilities (over) are brand new and are suitable for a large variety of meetings and gatherings. As the location on Runde is characterised by the highly sensitive natural environment and represents a protected area, the building has been designed to the most modern standards of 'green' technology, including sustainable building materials, energy efficiency, water conservation and recycling of waste materials and water. Environmental Centre has integrated water and organic waste management.

ecomotive™

The main ambition of Ecomotive™ is to create new products and implement integrated water and organic waste management concepts by linking science, environmental technology and business. Ecomotive™ is owned by Jets™ Group and the The Norwegian University of Life Sciences (UMB).



JETS®



Zakynthos, Photo: Knut Werner Lindeberg Alsén

ecomotive™

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