

O.T3.2 FIVE FEASIBILITY STUDIES FOR AS MANY REEF 2W DEMONSTRATION PILOTS

Conducted by ZCH

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OUTPUT FACT SHEET

Pilot actions (including investment, if applicable)

Version 2

Project index number and acronym	REEF 2W
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Summary description of the pilot action (including investment, if applicable) explaining its experimental nature and demonstration character

In Croatia it is necessary to encourage the construction of sewage treatment plants involving production of renewable energy as well as the sustainable treatment of produced sludge. Zagreb Urban Agglomeration has been found in 2016 and includes the City of Zagreb as the seat of the Agglomeration and parts of the Zagreb and Krapina-Zagorje county and encompasses a total of 30 local government units (11 cities and 19 municipalities).

The agglomeration have 1.1 mil of inhabitants where 790.000 live in the City of Zagreb.

The location of the pilot site is in the north part of Agglomeration (WTP Zabok) and it is owned by the public company Zagorski vodovod Ltd. This company has been found by 26 local self-government units, is engaged in public water supply and public drainage, operates in the urban agglomeration of Zagreb and supplies water to 90,000 residents in more than 31,000 terminals.

Zagorski vodovod Ltd. Is planning to build WTP Zabok with the capacity of 36.940 PE, and will be consisted of these stages: prior purification with separation of particles, second stage consists of temporarily holding the sewage in a basin, and third stage for the removal of suspended biological matter, as well as dehydration of the sludge. The WTP Zabok in its full capacity will be producing 1.117,5 tonnes of dehydrated sludge.

The proposed REEF2W solution is focused on following aspects: i) usage of biowaste fraction from municipal waste, ii) anaerobic co-digestion of sludge and biowaste, iii) energy utilization of biogas, and iv) usage of digestate as a soil improver.

The usage of biowaste is part of the sustainable waste management and anaerobic digestion and biogas production is most efficient way to treat biowaste. Moreover, agriculture is considered to be natural way of sludge disposal, as it contains similar amounts of organic matter, nitrogen, and phosphorus.

NUTS region(s) concerned by the pilot action (relevant NUTS level)

NUTS:HR, NUTS 1 - Republic of Croatia, NUTS 2 - North-western Croatia

Investment costs (EUR), if applicable

-

Expected impact and benefits of the pilot action for the concerned territory and target groups and leverage of additional funds (if applicable)

Considering the experience so far as well as the targets for biodegradable municipal waste landfilling, the introduction of and improvements in separate collection of biowaste in the Zagreb agglomeration is a priority.

Total expected amounts of potential biowaste in Zagreb agglomeration is 35,325 t/y, where 2,326 t/y is potential of Krapina-Zagorje county. The energy potential of the expected biowaste amounts for the Zagreb Agglomeration is more than mil 3.5 m³/y, where biogas potential of Krapina-Zagorje county is 232,600 m³/y.

The WTP Zabok has energy potential of 67,050 m³/y, which is 152.9 MWh/y of electricity and 169.0 MWh/y of heat energy.

Besides its energy potential, one of the options for sludge treatment is application in the agriculture, usually as a soil improver for the usage on non-food land. The amount of agricultural and forest land, and grassland in urban agglomeration Zagreb is 225,857 ha, where 39,433 is located in the same county as the WTP Zabok. Having in mind that the WTP Zabok in its full capacity will be producing 1.117,5 tonnes of dehydrated sludge, the size of the required land for sustainable sludge utilization is 361.4 ha.

Due to the fact that the principles of sustainable development are becoming primary aim in the target location, the proposed solution indicates that waste water treatment is sustainable and can be combined with the utilization of separately collected biowaste. This approach could have not only positive environmental, but also financial impact on the investigated location.

Sustainability of the pilot action results and transferability to other territories and stakeholders.

The sustainability of proposed solution is visible in many ways. The benefits of the renewable energy production is clear and also the application of sludge in agriculture. This is already part of practice in many EU regions, and its implementation could be a solution for waste water treatment plants. New regulations of the sludge application and its monitoring of the environmental condition are assuring its safe application in agricultural production. This will be especially interested for larger capacity plants (with already constructed anaerobic digestion) from their economic and technological point of view due to the lack of thermal processing in the area. Also, this is much easier to perform because NIMBY (not in my backyard) effect in the local community is avoided.

Considering the comprehensive environmental, social, economic and technical analysis, the REEF 2W technology is beneficial for the selected WWTP and has better composite index in all categories, which means, that implementation of proposed REEF 2W solution could bring additional benefits in these fields.

Lessons learned and added value of transnational cooperation of the pilot action implementation (including investment, if applicable)

In EU a sustainable waste management and energy farming is encouraged to promote sustainable development. Therefore, it is required not to have any deleterious effects on food safety and security for future generations and if possible energy crops should be rotated with food and other industrial crops without lowering production capacity. Nevertheless, there should be no disturbance to the soil and landscape characteristics, the ecology of the production area should not be disturbed unduly and the production process should be in line with urban environmental aims. In order to reach these goals, some restrictive rules and regulations must be adhered to waste management sector and energy crops production management. Some of the good examples were using during the development of proposed solution, mostly from Austria and Sweden.

Contribution to/ compliance with:

- relevant regulatory requirements
- sustainable development - environmental effects. In case of risk of negative effects, mitigation measures introduced
- horizontal principles such as equal opportunities and non-discrimination

The proposed solution is in line with all relevant regulatory requirements and presents concrete actions towards the sustainability in the target region.

Regarding the biowaste, main directives that regulate waste management sector in EU are Landfill directive and Waste Framework Directive. The Landfill directive is defining biodegradable waste as a type of waste capable of ongoing anaerobic or aerobic composition, such as food and garden waste or paper. The WFD sets definitions for several waste-related terms and lays general principles for the organisation of waste management. In this directive biowaste is defined as a “biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants”.

The EU needs to implement energy strategy in order to secure energy supply, ensure low cost and to protect climate and environment. In this sense, one of the largest potentials lies in the renewable energy production from organic matter, such as biowaste. Its usage is very versatile: biogas for electric and heat energy production, or upgrade to biomethane and utilization as a biofuel. The main focus is on energy utilization of organic matter and the production of renewable energy. In this case, biogas is being produced. Biogas is a mixture of methane and carbon dioxide produced when organic material decomposes. Today, the majority of biogas produced in Europe is utilized in cogeneration plants, where electricity and heat are produced simultaneously. Hence, the profitability of these plants is directly dependent on a continuous disposal of the heat produced.

The sludge treatment and disposal processes are monitored by a number of EU directives that prescribe principles, targets, limitations, as well as monitoring the impact of sludge disposal on all environmental constituents. Wastewater and purification equipment are covered by the European Council Directive on the treatment of urban wastewater (91/271/EC) and the European Parliament and Council Directive on establishing a framework for Community action in the field of water policy (2000/60/EC). The purpose of their Directive is the establishment of a framework for the protection of surface water, trans-boundary, coastal waters, and groundwater. The directive requires management of the water price policy on the principle of cost recovery from water services, what has an impact on the water price which should also cover the cost of handling sludge from the wastewater treatment plants.

References to relevant deliverables (e.g. pilot action report, studies), investment factsheet and web-links
If applicable, additional documentation, pictures or images to be provided as annex

The O.T3.1 is closely related to five Feasibility studies described in D.T3.3.1 - D.T3.3.5 conducted in each project partner's country.