



Cluster On Anaerobic digestion, environmental Services and nutrients removal

### 3<sup>rd</sup> COASTAL Biogas Conference

September 30<sup>th</sup>, 2020

Online



#### Partners



Universität  
Rostock



#### Funded by



European  
Regional  
Development  
Fund

*The contents of this report are the sole responsibility of the COASTAL Biogas consortium and can in no way be taken to reflect the views of the European Union, the Managing Authority or the Joint Secretariat of the Interreg South Baltic Programme 2014-2020.*

## Background and goal of the conference

As part of the COASTAL Biogas project, five conferences are organised in order to spread the knowledge of the project as well as collaborate with other projects. The third conference was scheduled to take place in Neringa, Lithuania, but was held as an online event due to the COVID-19 situation. The focus of the conference is on socio-economic benefits related to utilisation of maritime biomasses.

The presentations are available at the [conference webpage](#), just click on the title of the presentation you want to view. Information on the future conferences will be available on the COASTAL Biogas website: <https://www.coastal-biogas.eu/events/>.

### *Eutrophication in the Baltic Sea*

Eutrophication affects 97% of the Baltic Sea and is one of the major environmental problems in the Baltic Sea since it has both ecological and social consequences. Combined with other problems, such as noise, pollutants and litter it creates a dangerous 'cocktail' of negative effects, which put stress on the species living in the Baltic Sea, which are already under stress since they have to cope with the living in the brackish water.

The state of the Baltic Sea has been assessed by HELCOM (Baltic Marine Environment Protection Commission - Helsinki Commission) in a holistic way and the report gives a good overview of the status: <https://helcom.fi/wp-content/uploads/2019/06/BSEP155.pdf>

### *Projects related to the use of maritime biomasses*

There are several ongoing projects targeting utilisation of maritime biomasses. COASTAL Biogas has established collaboration with most of them and invited representatives to give presentations and be part of the conference series organised within COASTAL Biogas. During this conference five such projects were presented, Greater Bio, CONTRA, LiveLagoons, Blue Baltic Growth and AlaeService for LIFE. The overall aim of these projects is to turn a problem into a resource and at the same time address societal challenges such as eutrophication, climate change and employment opportunities.

The Interreg South Baltic project **COASTAL Biogas** revolves around co-digestion of cast seaweed collected on beaches and utilisation of the digestate as an organic fertiliser. In this way nitrogen and phosphorus are physically removed from the sea, the inconveniences with rotten seaweed are eliminated, biogas and organic fertilisers are produced, and the first step towards the circular bioeconomy is taken. The concept is implemented in industrial scale in the Solrød Biogas plant in Denmark, where cast seaweed collected in the Køge bay is co-digested with locally available industrial and agricultural wastes.

The project outputs are: Improved processes of co-digestion of seaweed, Cross-border technology guidance, and Decision support tool and training kit.

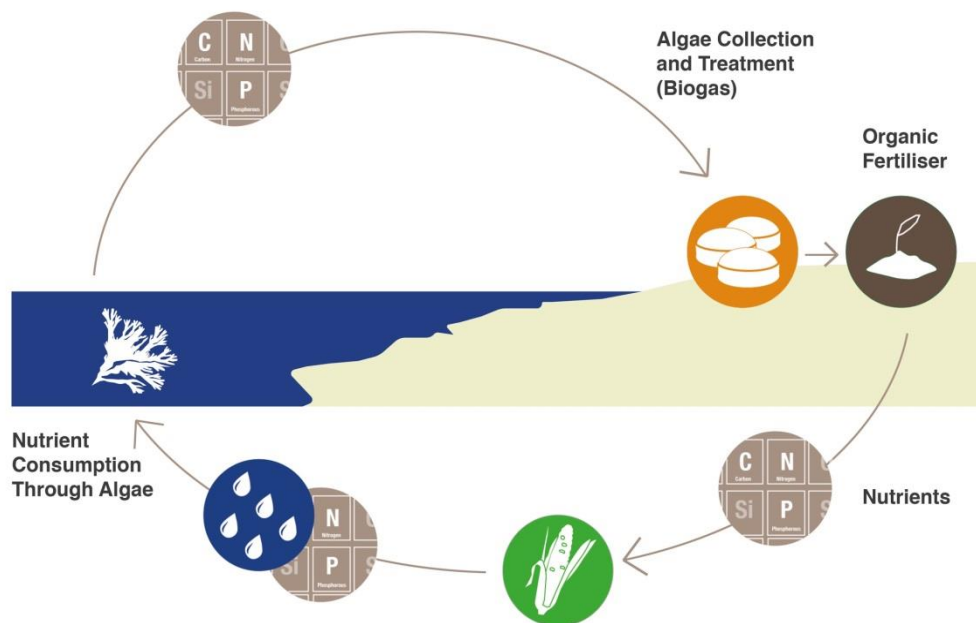


Figure 1: Overview of the COASTAL Biogas concept. Source: Presentation by Anne Warnig, FNR, available at <https://www.coastal-biogas.eu/events/conference-lithuania/>

For more information about COASTAL Biogas: [www.coastal-biogas.eu](http://www.coastal-biogas.eu)

The Interreg Öresund-Kattegat-Skagerrak project **Greater BIO** deals with increased collection and use of biomasses. The project is divided into seven cases and one of them is focused on seaweed. The purpose of the case related to seaweed is threefold:

- to identify good collection methods and clarify rules and regulations for collection,
- carry out environmental analyzes and economic analyzes to be able to compare the efficiency in different uses for cadmium-containing seaweed
- develop a concept or business model for how a municipality can attract companies to receive and use the seaweed.

Partners in the seaweed case are Gate 21, Roskilde University, Trelleborg Municipality, Odsherred Municipality, Sustainable Business Hub and Skåne Energy Agency.

For more information about Greater Bio: <https://kfsk.se/biogassyd/var-verksamhet/greater-bio/> (in Swedish).

The Interreg Baltic Sea Region project **CONTRA** is focused on utilisation of Baltic Beach Wrack to find a balance between public demand for 'clean' beaches, environmental protection and the economy.

The case studies include use of beach wrack

- as soil improvers/fertilisers (composting)
- for biocoal production
- as landfill cover (compost-layer containing bacteria that can convert methane into carbon dioxide)
- for coastal protection (beach wrack compost for dune greenery)
- for biogas production
- for wastewater treatment (beach wrack as co-composting material in wetland technology)



Figure 2: To the left composting and to the right carbonisation (biocoal production) of beach wrack. Source: Presentation by Jana Wölfel, University of Rostock, available at <https://www.coastal-biogas.eu/events/conference-lithuania/>



Figure 3: To the left compost-layer containing bacteria that can convert methane into carbon dioxide as landfill cover and to the right beach wrack compost for dune greenery. Source: Presentation by Jana Wölfel, University of Rostock, available at <https://www.coastal-biogas.eu/events/conference-lithuania/>

For more information about CONTRA: <https://www.beachwrack-contr.eu/>



The Interreg South Baltic project **LiveLagoons** is targeted at enhancement of the water quality and combat eutrophication in Baltic lagoons. Within the project, different types of floating islands are investigated.

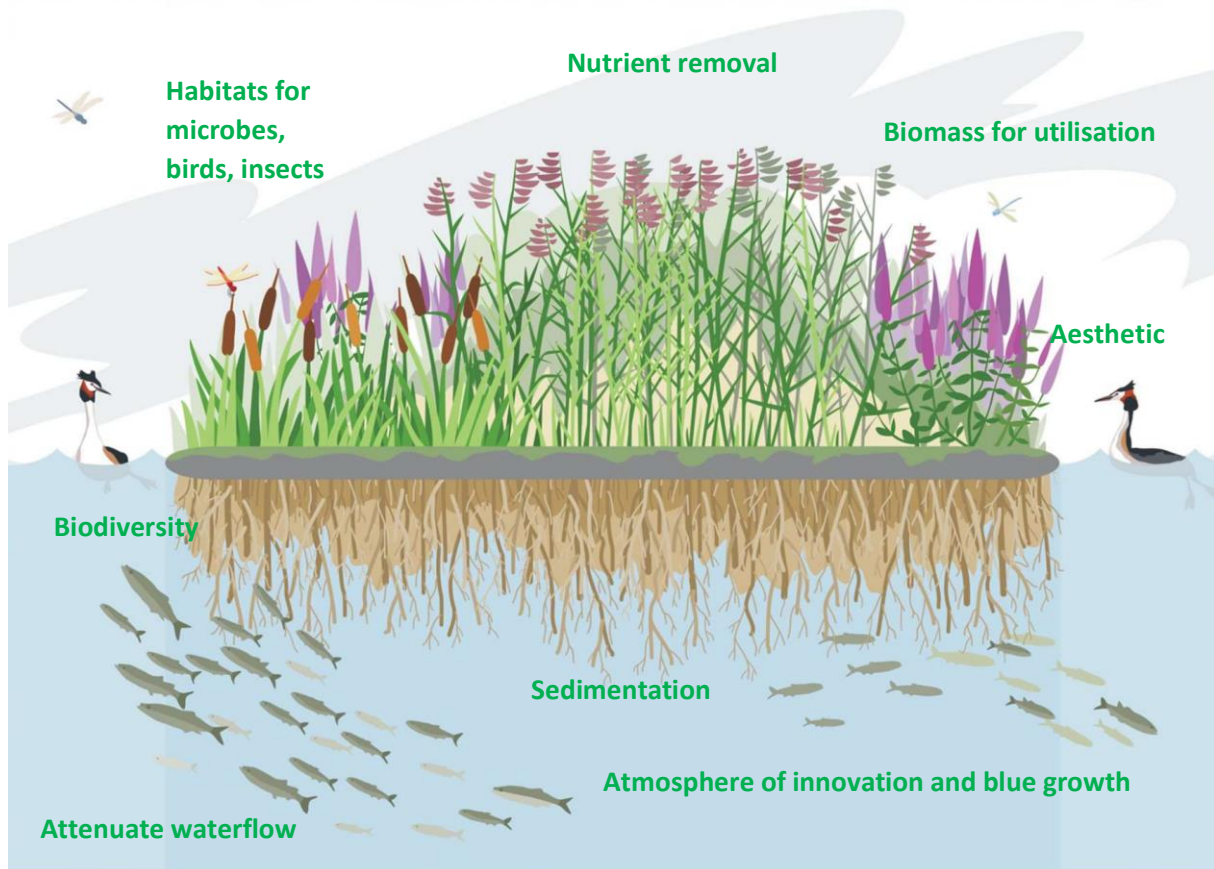


Figure 4: A floating island and some of its socio-economic benefits. Source: Presentation by Arturas Razinkovas-Baziukas, Klaipėda University, available at <https://www.coastal-biogas.eu/events/conference-lithuania/>.

For more information about LiveLagoons: <http://www.balticlagoons.net/livelagoons/>

The Interreg Baltic Sea Region project **Baltic Blue Growth** is directed towards mussel farming development in the Baltic Sea Region. By growing and harvesting mussels in the Baltic Sea nutrients are removed, a protein source for animal feed is provided and new job opportunities in fishery, aquaculture and processing are created.

A forecast of a mussel farm in Pavilosta, Latvia, estimates that 360 tons of mussels can be harvested annually corresponding to an annual removal of 2,880 kg of nitrogen and 180 kg of phosphorus.

For more information about Baltic Blue Growth: <https://www.submariner-network.eu/balticbluegrowth>

Within the European LIFE project **AlgaeService for LIFE** two prototypes of algae and cyano-bacteria harvesting machines will be tested in real-world conditions on rivers, lakes and in the Curonian Lagoon. The collected material will be used to produce biogas, fertilisers and other products on a small-scale. The project will provide a business plan for commercial development.

For more information about AlgaeService for LIFE: <https://algaeservice.gamtostyrimai.lt/>

***Issues to be addressed for the use of maritime biomasses***

In the panel discussion with **Zaiga Ozolina**, **Susanna Pflüger**, **Arturas Razinkovas-Baziukas** and **Jana Wölfel** the main topic was - which are the main barriers for the socio-economic benefits to be valorized and monetized?

- **Zaiga Ozolina** – Pointed out that market activities have shown to be key factors when developing new industry and that governmental support could help to achieve better result in for instance mussel farming.
- **Jana Wölfel** – Responded that it is a tricky question being an ecologist. She remarked that the market for beach wrack is marginal and perhaps it is better to just leave it as it is on the beach or use it to restore dunes instead of trying to use it in a big market.
- **Susanna Pflüger** – Highlighted that it is important to go away from the sort of 'silo thinking' that has dominated at European as well as national level, that environmental factors are dealt separate from energy. It would require some more commitment from policy makers to look into all different socio-economic externalities of biogas as a whole.
- **Arturas Razinkovas-Baziukas** – Emphasized that the solutions should be sustainable both ecologically and economically. If there is not enough of this biomass, it is not worth it. Then the activity stops after the pilot testing and nothing happens.

To the question directed towards Susanna Pflüger regarding the European Biogas Association's possibility to influence the European Commission in this matter (to a value on the socio-economic benefits), she answered that they are in continuous contact with the commission and have highlighted studies that have been done on the value of socio-economic benefits. They also point out weaknesses in the legislation, for instance that the value of digestate replacing mineral fertiliser is not considered.

In Germany it is not allowed to collect seaweed in the waterline and when Jana Wölfel was asked if there is hope that the regulation will be changed she answered there is too little information on the ecology of shallow water and we don't know how the environmental impact of the machinery collecting the seaweed will influence this ecology. It could open a Pandora's box if the regulation is changed as there are many questions and details to be sorted out first. How far from the beach will the collection take place, on which depth, which beaches, and which machinery will be used? Perhaps it is better if we change our view or opinion about seaweed and accept it on the beaches for the future.

Arturas Razinkovas-Baziukas commented that we should not only consider macroalgae but also reeds growing in large quantities in the lagoons connected to the Baltic Sea. It is a big problem for the biodiversity and someone has to remove it. This underused biomass brings a lot of nutrients that otherwise would end up in the Baltic Sea.

The question how much cast seaweed can be collected came up and Tyge Kjaer from Roskilde University mentioned that the annual potential in the South Baltic Sea area is estimated to 2.2 million tons. If everything is collected, it implies an annual removal of approx. 1,940 tons of nitrogen. It is a relatively small amount compared to the current reduction targets for the Baltic Sea, but in local areas, such as the Køge bay, collection of seaweed can play an important role.

### ***Lithuania***

The conference was scheduled for Nida, Neringa Municipality, on the Curonian Spit in Lithuania but due to the COVID-19 situation it was held as an online event.



*Figure 5: Aerial view of the Curonian spit and the city of Nida, Neringa Municipality. Source: Presentation by Vilma Kavaliova, Neringa Municipality, available at <https://www.coastal-biogas.eu/events/conference-lithuania/>*

The Curonian Spit is a 98 km long, thin curved sand dune spit that separates the Curonian Lagoon from the Baltic Sea coast. Since 2000, it is inscribed on UNESCO World Heritage Site and shared by two countries, Lithuania and Russia. Neringa has approx. 3,000 inhabitants and previously being dependent on fishing, it has now the status of being a resort, which is visited by approx. 500,000 visitors per annum. Nowadays tourism is the main industry and the water quality is of great importance. Fishing is still important not only for economical reasons, but also for the resort's identity.



The Lithuanian biogas history started in 1994 with an industrial biogas plant on a distillery. At present, there are 38 operating biogas plants in Lithuania with a capacity of 35 MW electricity and 10 MW heat.



*Figure 6. A biogas plant co-located with a bioethanol plant in Lithuania. Grain draff from the bioethanol plant is used as substrate in the anaerobic digester. The produced biogas is used to generate power and heat and the digestate is used as a fertiliser. Source: Presentation by Kęstutis Navickas, Vytautas Magnus University, available at <https://www.coastal-biogas.eu/events/conference-lithuania/>*

### **Virtual study tour**

The participants were taken on a virtual study tour to see the algae and cyano-bacteria harvesting prototype, developed within the AlgaeService for LIFE project, in operation.



*Figure 7. The harvesting prototype in operation. Source: Loreta Drazdiene, LTD Baltic Environment, video presentation available at <https://www.coastal-biogas.eu/events/conference-lithuania/>*



### ***Main take aways***

There are several interesting ongoing projects and solutions related to mitigation of eutrophication in the Baltic Sea area, from floating islands and mussel farming to innovative collection of algae/seaweed and utilisation of the maritime biomass. There are still open questions related to how the ecology is affected when these biomasses are collected and removed. All the projects bring numerous socio-economic benefits and the business models rely largely on these benefits being valued or that alternative solutions providing the same service are more expensive.

In case of the COASTAL Biogas concept, cast seaweed is co-digested and the digestate is used to offset the use of synthetic fertiliser on farmland. This solution is commercially implemented in full scale at Solrød Biogas plant in Denmark and the driving force is the commitment to reduce the nitrogen and phosphorus levels in the Køge bay and the local pressure from the inhabitants to keep the beaches clean from rotten seaweed.

## ACKNOWLEDGMENTS

We would like to thank our speakers and contributors to the programme:

**Anne Warnig**, *Fachagentur Nachwachsende Rohstoffe (FNR)*

**Tyge Kjær**, *Roskilde University*

**Angela Clinkscale**, *University of Rostock*

**Sonia Denkiewicz**, *Skåne Energy Agency*

**Jana Wölfel**, *University of Rostock*

**Kęstutis Navickas**, *Linnaeus University*

**Susanna Plüger**, *European Biogas Association*

**Artūras Razinkovas-Baziukas**, *Klaipėda University*

**Zaiga Ozolina**, *Kurzeme planning region*

**Vilma Kavaliova**, *Neringa Municipality*

**Loreta Drazdienė**, *JSC Baltic ENvironment*

**Judita Koreiviene**, *the Nature Research Centre*

*as well as our participants for the contributions to the discussion!*