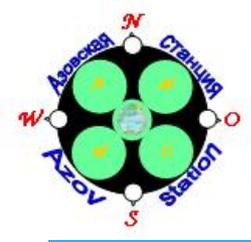


Azov Scientific Research Station and the biogas project

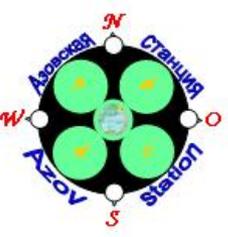
Khaskov M.A., Ryazantsev G.B.



Organization overview

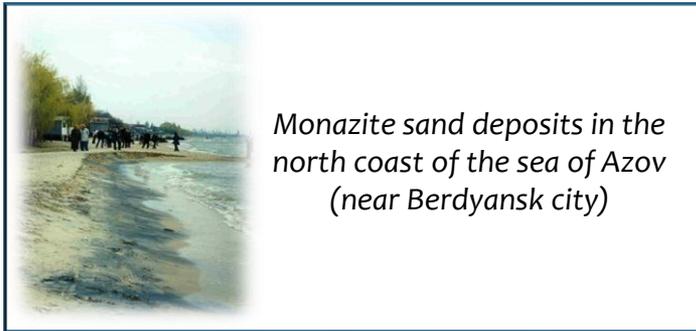
Azov Scientific Research Station (ASRS) was founded in 1996 by Lomonosov Moscow State University and Pryazovskiy State Technical University as an international joint scientific organization in the field of the radioecology of the sea of Azov.

Now the ASRS conducts their research in the Black sea, White sea and the sea of Azov with the assistance of the specialists from the different fields of knowledge: chemistry, geology, geography, biology and so on. The ASRS works with specialists from the universities of Russia and Ukraine (Lomonosov Moscow State University, Donetsk National University and Pryazovskiy State Technical University)



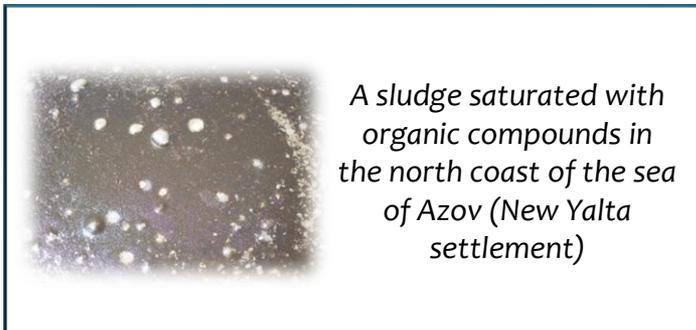
The main research projects

Radioecology of the sea of Azov, Black and White seas



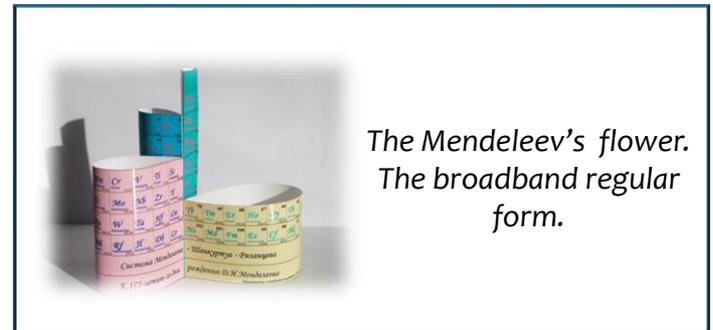
Monazite sand deposits in the north coast of the sea of Azov (near Berdyansk city)

Biogas project of the sea of Azov

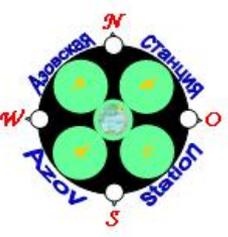


A sludge saturated with organic compounds in the north coast of the sea of Azov (New Yalta settlement)

Innovations in the field of the chemistry education



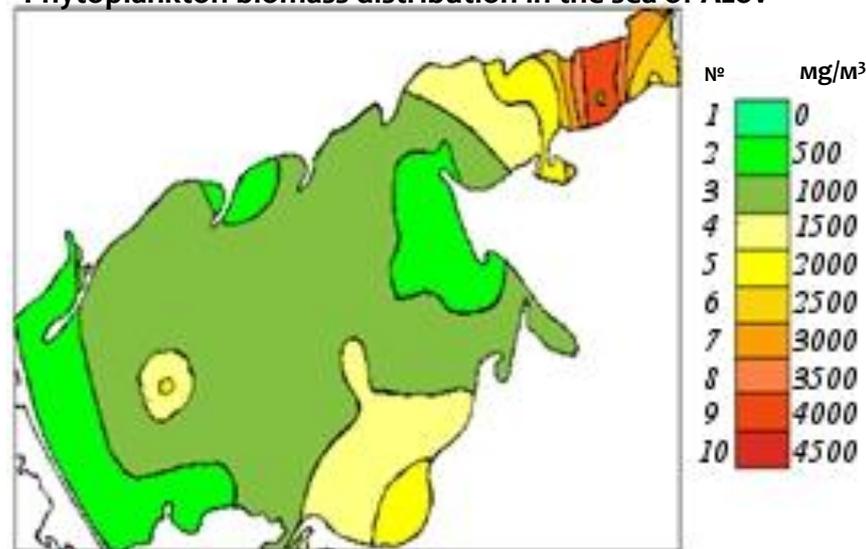
The Mendeleev's flower. The broadband regular form.



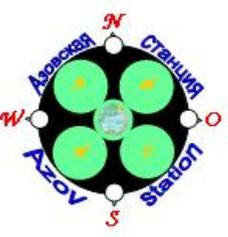
The biogas project of the ASRS

The sea of Azov has the lowest depth among other seas and as a consequence is very homogeneously heated. This causes comfortable natural conditions for microorganisms such as methanogens, which convert the biomass to biogas (methane, carbon dioxide).

Phytoplankton biomass distribution in the sea of Azov



According to the approximate estimations the quantity of seabed sludge in the sea of the Azov can evolve as much as 200 million m³ of methane per year



The benefits

High-energy
density fuel



There is a tendency in the world to toughen the environmental standards for motor fuels and **the replacement of oil-based fuels** with methane, ethanol and so on. *Among alternative fuels (gasoline, diesel fuel, propane-butane) methane has **the lowest cost with higher energy density**. Moreover among alternative fuels methane is **the safest** (highest ignition temperature and the highest limit of fire-risk concentration).*

Energy
independence



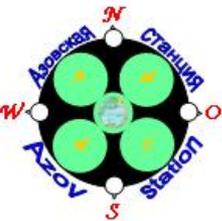
The project probably allows to provide **a stable and reliable gas supply** to regions regardless political and economical reasons. *For economic independence, the development of **own potential reservoirs of natural gas** becomes the actual problem even if they have only local significance.*

Global
warming

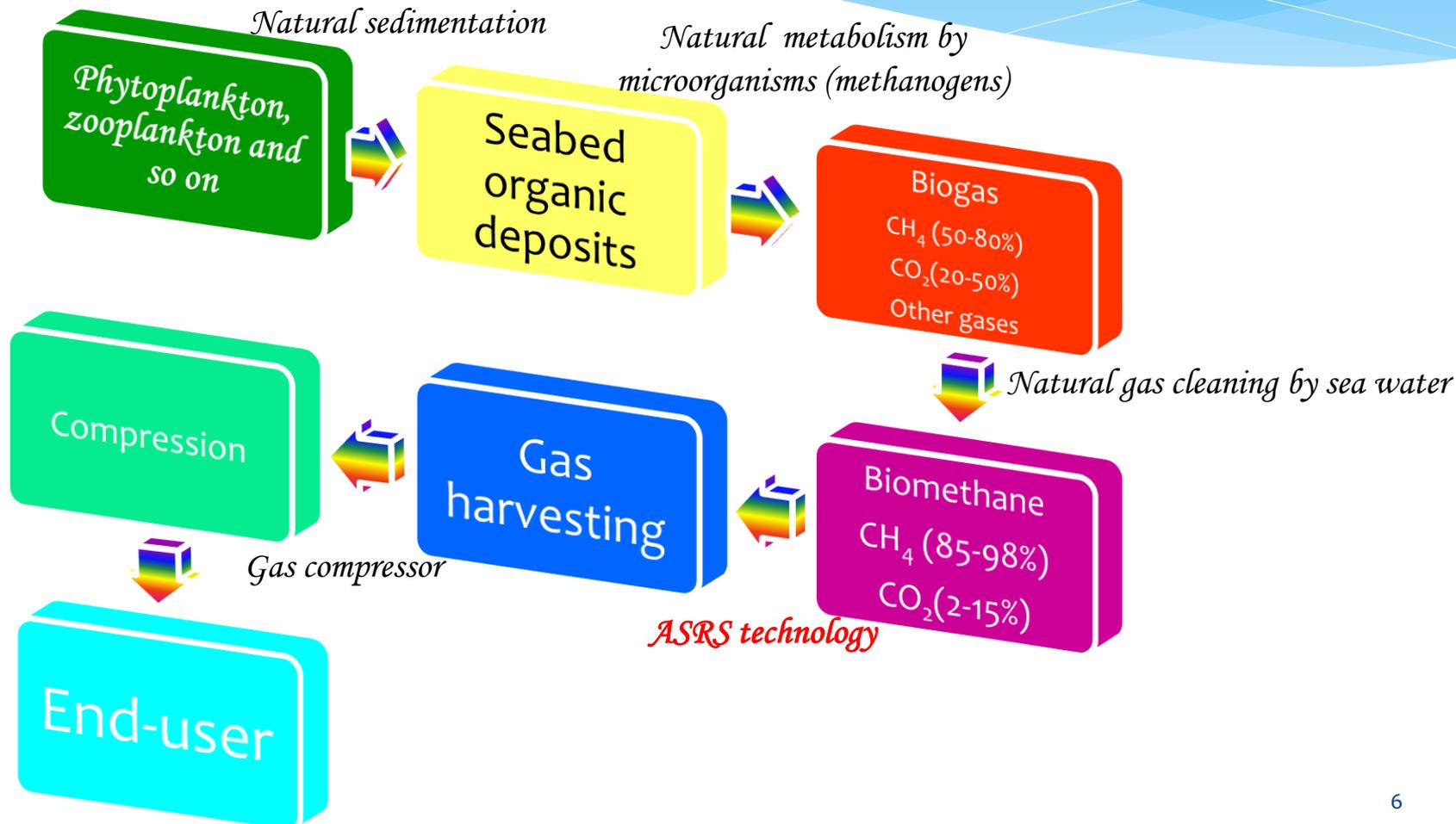


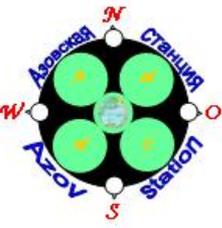
Methane warms the atmosphere **21 times** more than carbon dioxide and has a net lifetime of about 10 years.

Methane capture - is the best short-term way to prevent global warming.



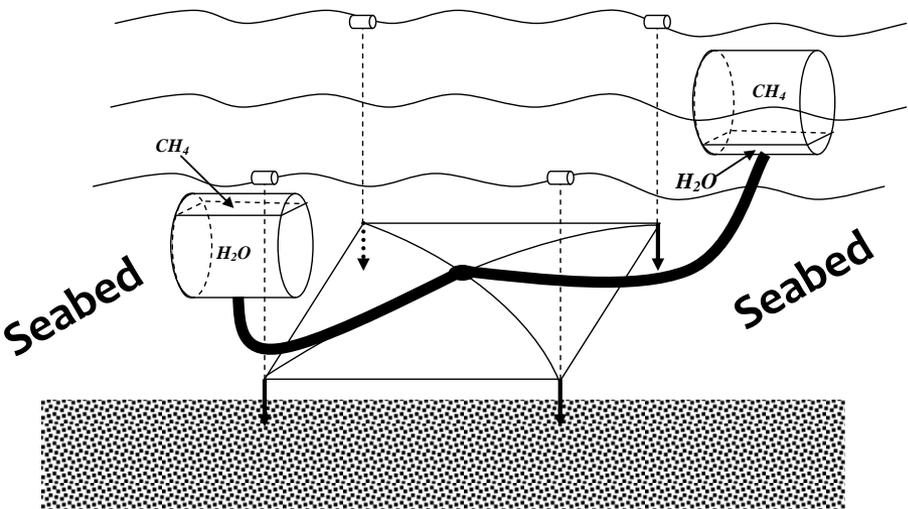
The idea of the project





ASRS technology. Static version

Steps of development



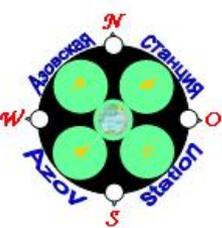
1. "Basin" step



2. "Film" step



3. "Benthic trap" step



Development and the payback

First investments:

Gas compressor, gasholder and so on

Product:

Compressed biomethane in the gas bottles, electricity, automobile fuel, heating

Product promotion:

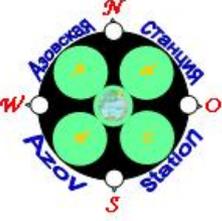
There are a well developed network of Gas Stations in Ukraine, that greatly facilitate the promotion of the product to the market. In Russia, the product, perhaps, will be popular among rural and summer residents (who do not have access to piped gas supply and need the electricity and heating) s

Potential clients:

Transport (gas stations, CNG filling stations), communal - domestic sector, for example, residential consumers of gas or electricity (rural, gardeners, etc.), refueling points, group capacitor installation, the storage of liquefied methane gas station and exchange domestic gas cylinders (retail unit)

Payback of the project:

*It can be claimed that **the payback** of the project will be **4-5 years** and the following **annual profit** will be **400000 rubles (12900 USD)** without taxes from one hectare (for the gas price 10 rubles per m^3 (0,3 USD per m^3) and the productivity of $15 m^3/m^2$)*



Risks, advantages and disadvantages of the project

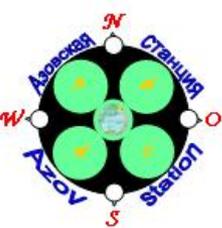


Lack of a market in the Russian Federation due to excess supply of centralized gas supply (proposed solutions paths) → The extension of the market to the territories without centralized gas supply system (housing estate, rural residents and others), as well as the expansion of the market in the Ukraine, where there is an extensive network of gas stations and CNG filling stations.



Our weaknesses: seasonal harvesting (end of March - beginning of December), for the realization of the project it is necessary to monitor constantly the area to identify more productive accumulation of seabed deposits evolving methane. (proposed solutions paths) → The necessity for constant research with experts from various disciplines and the ASRS experience suggests about the competitiveness of the project.





Investments

First investments for start-up of the project (per 1 hectare)

Name	Price, USD
Gas compressor (2 m ³ /min, 43 kW)	27002
Gasholder fabric – 100 m ²	323
Pontoon (barge)	3226
Gas bottles (40 l, 40 pcs)	5161
Steel gasholder (30 m ³)	5323
Gas meter	323
Wages for personal	7030
In total	48387

Plans

Plans of development

R&D: Mapping of biogas storage on the north coast of the sea of Azov

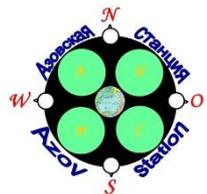
The assembly of the rig with the covering area 100 M²

The assembly of the rig for the compression of biogas obtained

The sales market development

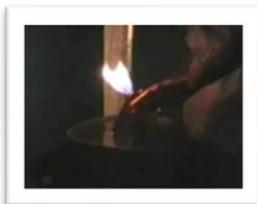
The extension of biogas harvesting up to 1 hectare

The output to the declared payback figures

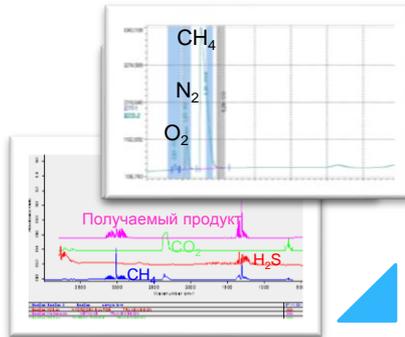


ASRS foundation: **may 1996**

The beginning of research for gas project: **summer 2009**



The phenomenon discovery and qualitative analysis of gases



Quantitate analysis of gas by modern physical chemical methods of analysis

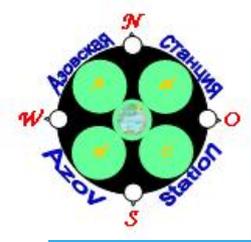


The assembly of the rig with the covering area 10 M²

Nº sample	nl.	el.	Ash, %	Organics, %
1	46*56.549	37*13.171	85.71	14
2	46*57.046	37*14.501	93.23	7
3	46*56.900	37*15.159	93.00	7
4	46*56.617	37*16.041	89.70	10
5	46*56.401	37*16.589	90.17	10

Mapping of organic content in seabed deposits in the north coast of the sea of Azov

Done



Thank you for attention!!!