An example of a typical offers level 1 - for managers and owners - start

system for economy heavy fuel oil on industrial boilers and furnaces.

1. A bit info - on 01.10. In 2016 we installed 150 such projects (some examples here). Our range of HFO direct economy **from 2.44 up to 4.1%** (1). In some cases, more (2). One year warranty. Average operating time 2-3 years, full (our experience), 2-5 years (3).

Cooperation method - equipment rent for whole working term by a single or parts payment. An unconditional replacement during the warranty period. Repair under prime cost during the life cycle. Manufacture time- 20-45 days. Delivery time- 5-15 days. Time for install- 3-5 days.

Calculating initial (direct) direct fuel economy. **(for example only)**

APPROXIMATE SAVINGS BY INSTALLING ONE TRGA UNIT				
TECHNICAL CHARACTERISTICS BOILER				
CALORIFIC POWER BOILER	25000000	BTU		
CALORIFIC POWER FUEL OIL No. 6	140000	BTU/gal		
CALORIFIC POWER REQUIRED	178.57	Gal/hr		
BOILER	100% FUEL OIL No. 6			
Price per galon Fuel Oil No. 6	$1.40	$/gal		
Working Regime	24	hours/day	30	day/month
consumption rate Fuel Oil No. 6	178.6	gal/hr	80%	Load
Working Cost	$6,000	$/day	$179,999	$/month
BOILER with TRGA SYSTEM	97.5% FUEL OIL No. 6 (2.5% Saving)			
Price per galon Fuel Oil No. 6	$1.40	$/gal	2.5%	Saving
Working Regime	24	h/d	30	days
consumption rate Fuel Oil No. 6	174.1	gal/h	80%	Load
Working Cost	$5,850	$/day	$175,499	$/month
Total 2.5% Savings on Fuel Oil #6:			$4,500	$/month
Cost One (1) TRGA System - USD:			USD 20,000	
Due to Savings Time to Recuperate the Investment on the TRGA Unit:			4.44	months

2. Other benefits :

- Reducing the amount of smoke; - reducing clogging and wear atomizers and pumps;
- Reducing the amount and sizes of solids in the fuel;
- Reducing the amount of unburned residues on heat exchangers, maintaining maximum efficiency and reducing the cost of boiler cleaning;
- Reducing fuel viscosity; - reduction in separation and settling of the fuel in the tank;
- Safe disposal of the condensate water by its safe combustion with fuel;
- You can use cheaper fuel and pay less fines for emissions.

Notes (1) for black oil type M100 or HFO No 6 and without any additives, but our systems are compatible with additives using).
(2) - in special cases requiring professional explanations.
(3) - it depends on the subject and the mode of operation.

Maximum use of local materials, labor, equipment.
Work with customers - algorithm, documentation and support.
Payback period - **no more than 6 months**.

If you want get the best price and reduced payback time for our system, please fill in our questionnaire and answer any additional questions. Perhaps we use some your existing equipment (pumps, pipes) and your staff to reduce your start-up costs. **Questionnaire for boiler here**, other (for ships, industrial generators, etc.) will be sent on request.

Please contact www.energy-saving-technology.com/en/contacts-en.html
or direct 5183898@ukr.net Andrew Ruban

level 1 - for managers and owners - end

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level 2 - for technicians - start

Some examples in pictures.

Ship fuel IFO-180 before and after treatment on our systems (comparison chart). On a more viscous fuels - the difference will be even more.

Analysis of the documents - modify the properties of heavy hydrocarbon fuels

shipboard fuel IFO-180 (INA HR)	N		formal standart	original sample	1	2	3	4	comment
density at 15 °C	1	kg/m3	<= 991	947.6	945.7	945.7	948.1	949.6	agree
kinematic viscosity at 50 °C	2	mm2/s	<= 180	138.5	117.8	117.6	129.1	136	super
aromaticity index	3	(CCAI)	<= 860	820	820	820	821	822	agree
total sulfur content	4	% m/m	<= 4.5	1.59	1.56	1.57	1.54	1.49	agree
flash-point	5	°C	>= 60	92.0	94	94	> 100	> 100	*
amount of sediment	6	% m/m	<= 0.10	0.02	0.05	0.04	0.03	0.04	**
amount of coke residue	7	% m/m	<= 15.0	14.06	8.53	8.18	8.19	7.63	super
flow point	8	°C	<= 30	+30	+24	+24	+21	+24	super
amount of water	9	% v/v	<= 0.50	0.1	0.05	0.05	3	5.6	agree
amount of ash	10	% m/m	<= 0.07	0.04	0.04	0.03	0.04	0.04	agree
amount of vanadium	11	mg/kg	<= 200	125	122	120	115	112	super
amount of sodium	12	mg/kg	<= 50	4.93	7.25	7.85	5.72	5.34	***
amount of Al + Si	13	mg/kg	<= 50	5	5	5	5	5	agree
energy value	14	MJ/kg	-	-	41.02	41.02	39.7	38.88	agree
			standart	no add	no add	no add	+3% w	+6% w	

Legend for understanding

0. A sample of the initial fuel.
1 - Fuel after the first stage of processing on the device TRGA - without any additives.
2. Fuel after the second stage of processing on the device TRGA - without any additives.
3. Fuel processed with the addition of 3% water.

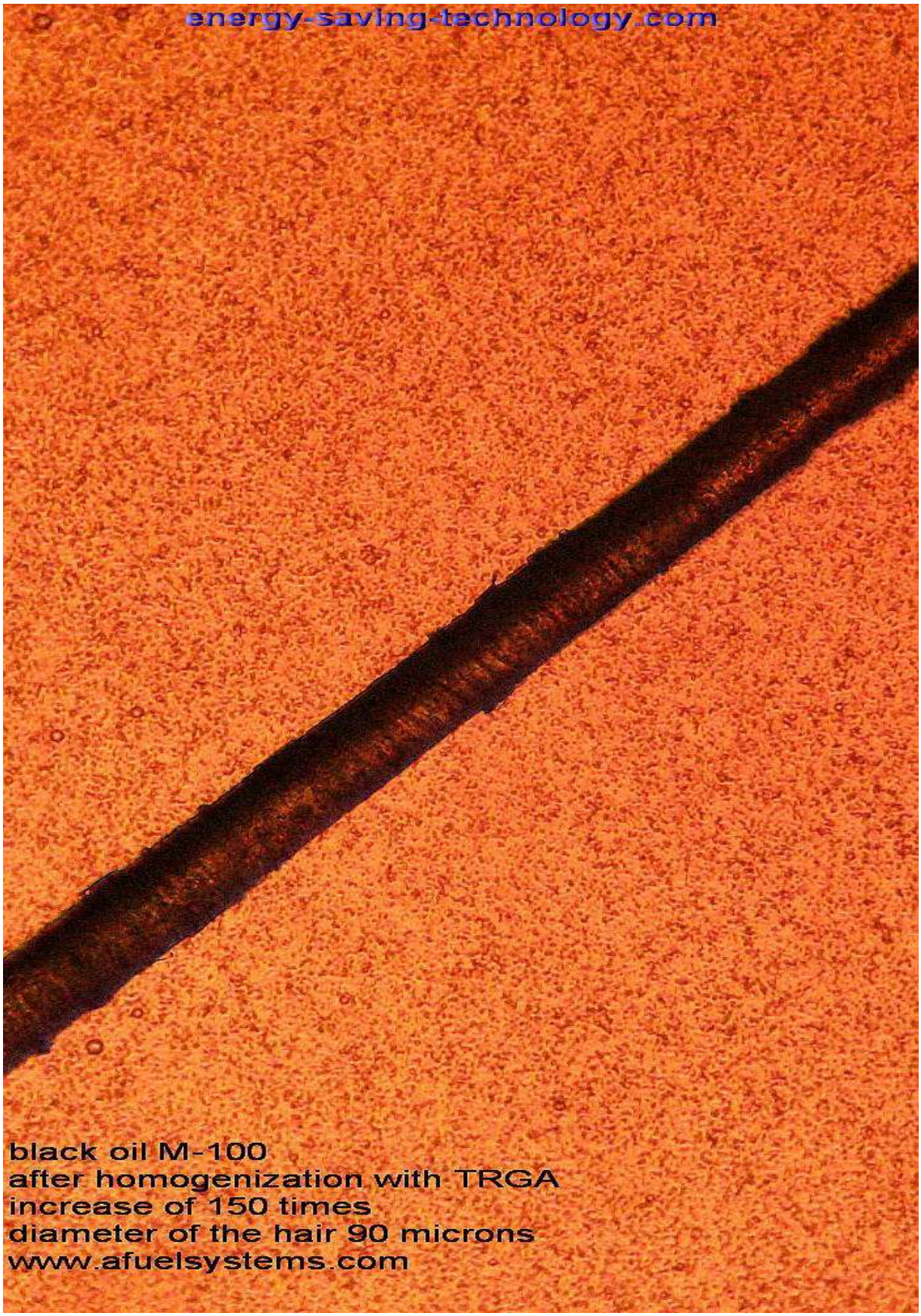
No problem if your fuel is highly viscous, we have practical experience with such fuel. Our unit reduces the viscosity. It lengthens lifetime of pumps, nozzles, requires less heating fuel fefore atomizers. Speed of clogging of heat exchangers - minimum.

Look the difference

1. **Comparative examples** burning heavy fuel oil.
2. Example - **dispersion and homogenization** of heavy fuels.
3. **Some diagrams**... It gives fuel economy **2.44-4.1%**.

Heavy viscous black oil (M100 type) high-quality, original,
water content of 4%, **prior to treatment**.

Heavy viscous black oil (M100 type) high-quality, original,
water content of 4%, **after treatment** by TRGA homogenizer.



change in the amount of carbon on the heat exchangers after 2 months of HFO burning without use of our TRGA-unit and after installed TRGA-unit

level 2 - for technicians - end

3. Information block for professionals.

3.1 Open results are summarized in the presentation, and a lot of these presentations is here.
www.energy-saving-technology.com/en/prezent-docum.html

3.2 Many examples and photos are here www.afuelsystems.com/ru/trga/trga-mz.html

3.3 We can not show major customers this review from Kazakhstan. Although the technical level of professionals in Kazakhstan is high, but "fuel savings of **18%,"** they wrote it - **it's fantastic.**

www.afuelsystems.com/ru/trga/s64.html
www.afuelsystems.com/foto/history/KAZ_USHTOBE/ot_1.gif
www.afuelsystems.com/foto/history/KAZ_USHTOBE/ot_2.gif

Another review from Kazakhstan. "Fuel savings of **20%,"** they wrote it - it's fantastic too,
www.afuelsystems.com/ru/trga/s59.html
www.afuelsystems.com/foto/history/kaz_3/kaz_30.gif

3.4 A good report from Ukraine. Professional and serious. There's nothing about the economy but there honestly describe many effects. And it is interesting for experts.
www.afuelsystems.com/ru/trga/s33.html
www.afuelsystems.com/foto/history/zp-1/zap-otziv-1.jpg

3.5 Interesting link here - www.energy-saving-technology.com/en/trga_sluge_en.html (sludge) and here - www.energy-saving-technology.com/en/hfo_burning_en.html (black oil as sludge).

3.6 It Is worth note – **fuel Savings 2.83%** - www.afuelsystems.com/ru/trga/s196.html Vladivostok,

3.7 System for utilization (and thus fuel economy) bilge water from Commercial Port of Mariupol. Feedback from 2011 and 2014.
www.afuelsystems.com/ru/trga/s41.html www.afuelsystems.com/ru/trga/s168.html

3.8 Four reliable tests that were conducted by certified companies (Institution and laboratories). Direct fuel economy. Those tests, which were conducted in the EU and Russian economies have shown a range of 2.44 - 4.1%.
Without any additives, without adding water or something else ...

1. **Croatia** - heating light oil from refinery RIJEKA (20 km.). German boilers LOSS, Italian jets, experts have done tests **Technological Institute of Rijeka,** part of which experts from the refinery.
Savings fuel is 3.7% - **report** www.afuelsystems.com/arhdoc/test-horv-rieka.pdf significant reduction CO.

2. **Serbia** - dry black oil and fuel oil with water (10%), the tests did experts from **the institute Nikola Tesla, Belgrade, profile laboratory, which serves the entire heating equipment in Serbia**. **Savings fuel is** 2.66% without addition of water, with the water still more… **report.**
www.afuelsystems.com/ru/trga/v2.html www.afuelsystems.com/info/raschet-sr-mitrovica-sr.pdf

3. **Guinea**, more specifically Alumina Plant Corporation **RUSAL**. Black oil without additives and without water, such as SLURRY, and solid particles. Duration of test 2 months with a stop, cleaning and washing heat exchangers for each test cycle. **Measurement accuracy APCS 1 gram of fuel per 1 ton of steam**.

The first test – fuel saving 4.1%. report www.energy-saving-technology.com/test/rsal-test-noname.pdf
This is the Internet version can send scans to the seals.

The second test - save 3% www.afuelsystems.com/ru/trga/s56.html

The third test - Work 2 identical boilers with fuel from one day tank. One boiler is equipped with a homogenizer TRGA, the other does not. The **difference** in the specific consumption via presence of unburnt residues on heat exchangers, 2 months later – is **9%.** www.afuelsystems.com/ru/trga/s71.html

After that this company bought our systems for their enterprises in **Krasnoyarsk** - www.afuelsystems.com/ru/trga/s57.html (German slotted furnace) and in **Jamaica** (where now work 4 homogenizer at the same time www.afuelsystems.com/ru/trga/s178.html www.afuelsystems.com/ru/trga/s147.html) Unfortunately, the technical data is forbidden to transfer or publication.

3.9 It's interesting – fuel savings of 2.83% - www.afuelsystems.com/ru/trga/s196.html Vladivostok, 2014.

3.10 System utilization of oily port waters in the commercial port of Mariupol 2010-2016 **report** 2011 and 2014. www.afuelsystems.com/ru/trga/s41.html www.afuelsystems.com/ru/trga/s168.html

3.11 Treatment of old mazut, after long storage (Polymerization, condensation) significantly improves its combustion - www.afuelsystems.com/ru/trga/s134.html and **report** www.afuelsystems.com/ru/trga/s138.html

3.12 Finally an excellent report - two years operation with 3 TRGA series homogenizers on bunker oil terminal in Odessa, Ukraine. It is very interesting.
www.energy-saving-technology.com/documentation/test_odessa_full_ru.pdf

In Odessa we got - fuel economy, complete smoke reduction, and long-term safe recycling of residues watered sludge and sediment, as this tank farm and from the trade port of Odessa. All documented, photos and movies.

In addition, four oil-fired boiler worked for two years between the heat exchanger cleaning.
Cleaning was carried out "by tapping surfaces with a hammer ", followed by removal of soot broom flown away ... It shows the degree of inhibiting the formation of a layer of unburned fuel on the surfaces of heat and the nature of deposits - fragile soot.

Treatment itself was made "tapping of a hammer surfaces", followed by removal of soot broom flown away ... It shows the degree of inhibiting formation of a layer of unburned fuel on the heat surfaces and shows the nature of deposits - fragile soot.

There are beautiful photos and movies, how the character the mazut combustion (more precisely watered mazut from the lower horizons of supply tank) with turned off and on TRGA homogenizer before the nozzle - www.afuelsystems.com/ru/trga/s99.html
As well as research, how increases cleaning interval for atomizers and reduced specific fuel consumption - www.afuelsystems.com/ru/trga/s196.html

There are many analyzes from the Russian Federation - how changing the fuel caloric (despite the fuel watering). www.afuelsystems.com/ru/trga/s144.html

And from EU - changing characteristics of ship fuel, after treatment in the homogenizer TRGA.
www.afuelsystems.com/ru/trga/s135.html here and in presentation.
www.energy-saving-technology.com/documentation/trga-univ-ru-konf.pdf

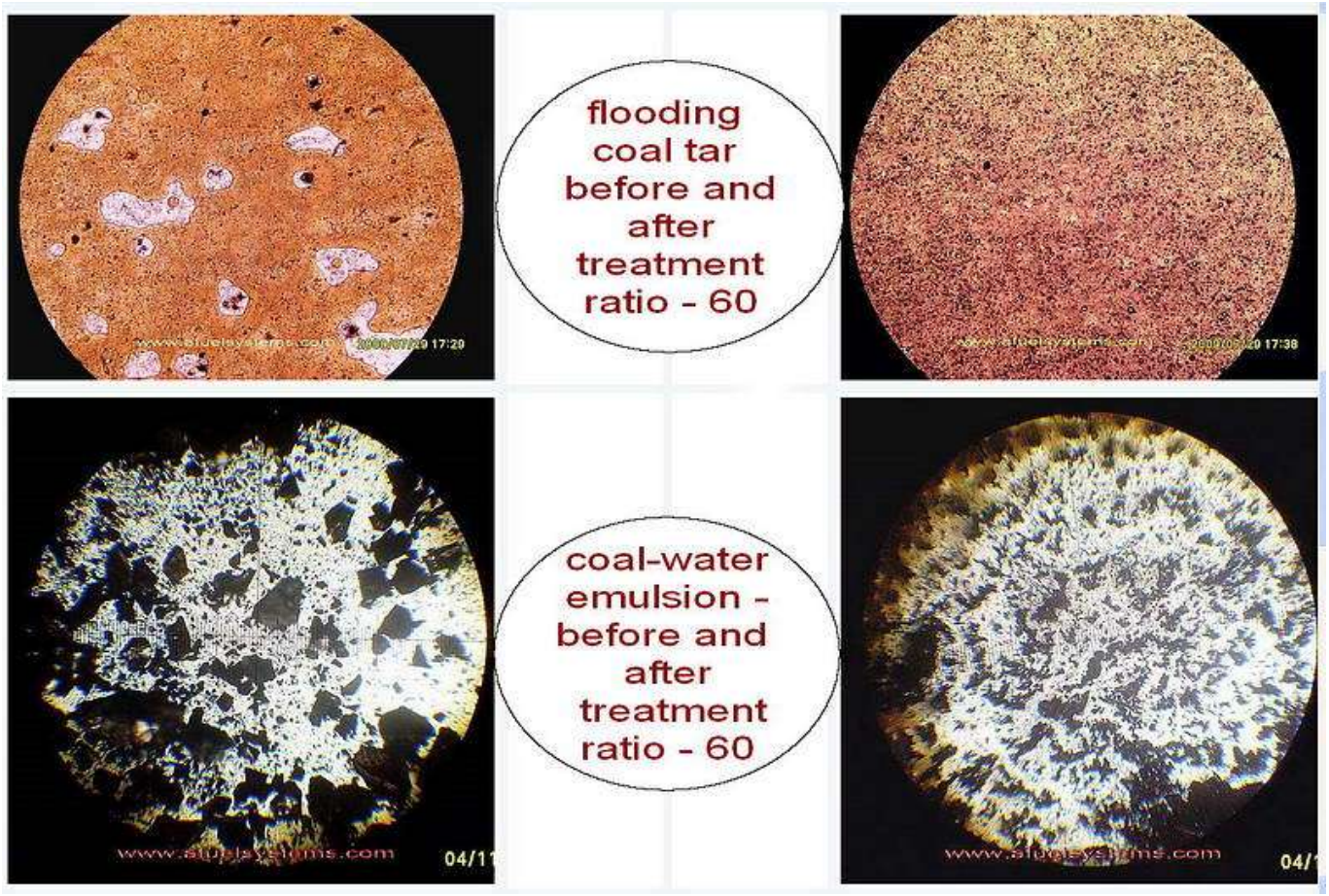
Why the black oil, after treatment with TRGA homogenizer, burn better?.

Let's start with the photo that explains a lot.
Fuel black oil M100 - before and after treatment photos.
www.afuelsystems.com/ru/trga/s20.html www.afuelsystems.com/ru/trga/s125.html

Coal tar pitch, Kazakhstan - before and after treatment photos.
www.afuelsystems.com/ru/trga/s22.html

Kazakhstan, 2010-11. Type of fuel - **coal tar pitch,** density of 1.07, increased viscosity, ash and tar. 12-24 months of operation. 4 installation.

Brief results - stable burning fuel, reduction of carbon deposits on heat exchangers, reduction nozzles clogged time, fuel economy, reducing the temperature of heating fuels, the total elimination of smoke from the chimney. Photos and reviews -
www.afuelsystems.com/ru/trga/s26.html www.afuelsystems.com/ru/trga/s59.html
www.afuelsystems.com/ru/trga/s64.html www.afuelsystems.com/ru/trga/s75.html



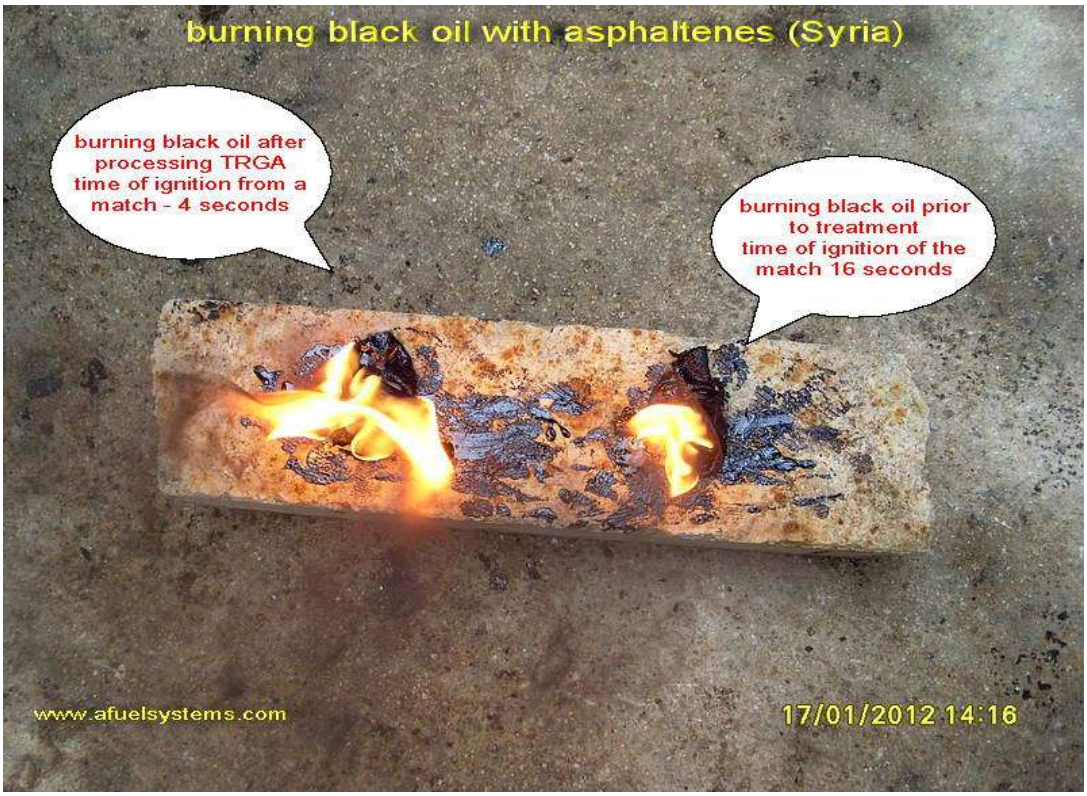
Water-coal fuel (test) - www.afuelsystems.com/ru/trga/s52.html

Sludge oil from open storage - www.afuelsystems.com/ru/trga/s198.html
www.afuelsystems.com/ru/trga/s158.html - pictures and movies ...
www.afuelsystems.com/ru/trga/s159.html

And here is **report about on the service life with work for sludge** -
after a year www.afuelsystems.com/arhdoc/trga_otziv_sp.pdf
after three years of work www.afuelsystems.com/ru/trga/s199.html

Our experience with heavy and high viscosity black oil in Syria.
www.afuelsystems.com/ru/trga/s114.html
Pay attention to the **temperature of heating mazut** before nozzles -
www.afuelsystems.com/ru/trga/s106.html
www.afuelsystems.com/ru/trga/s106_1.html

How it flared up on the brick and how it burns ....
www.afuelsystems.com/foto/sir_5/f_gor_obr_1.AVI

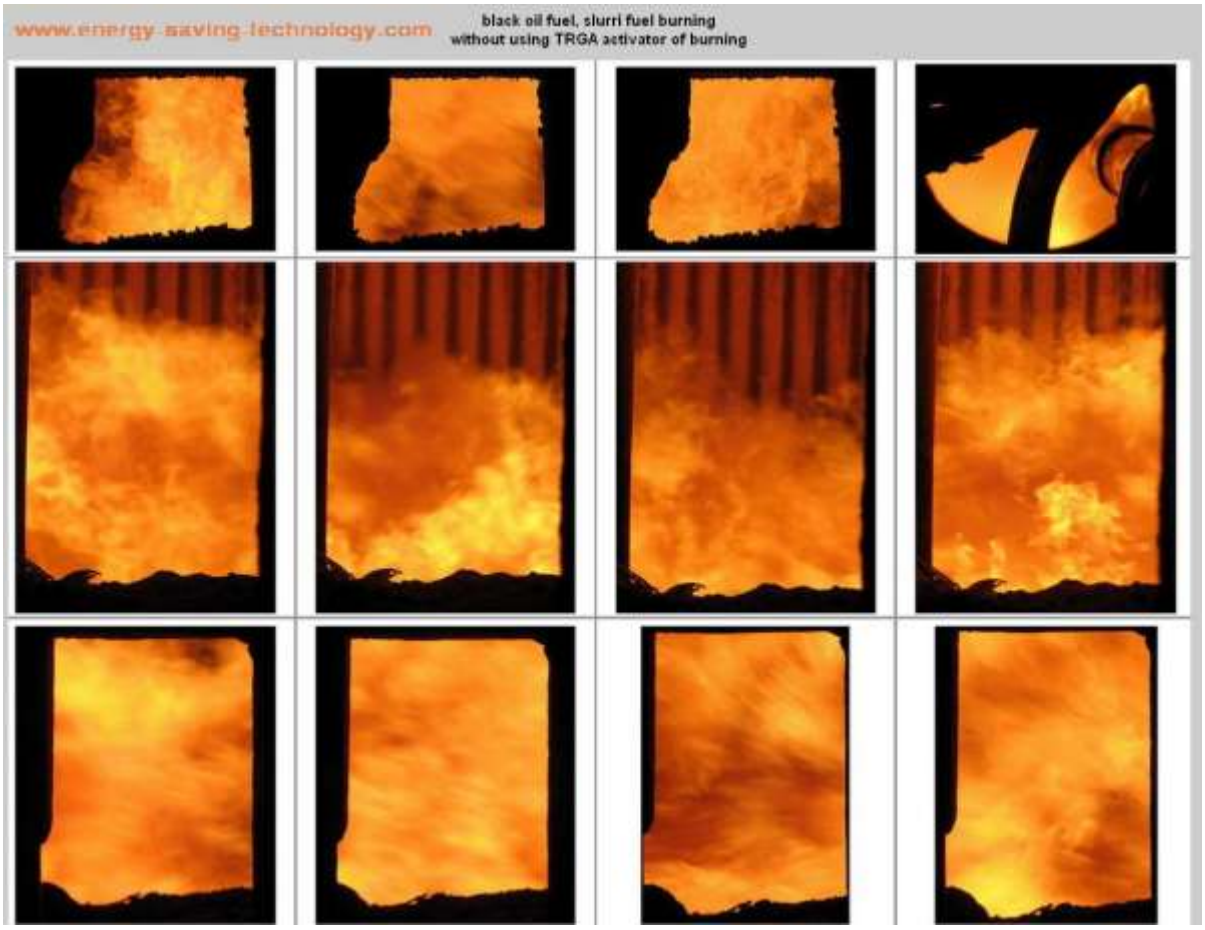


Oil sludge - before and after treatment - visually, the burning intensity

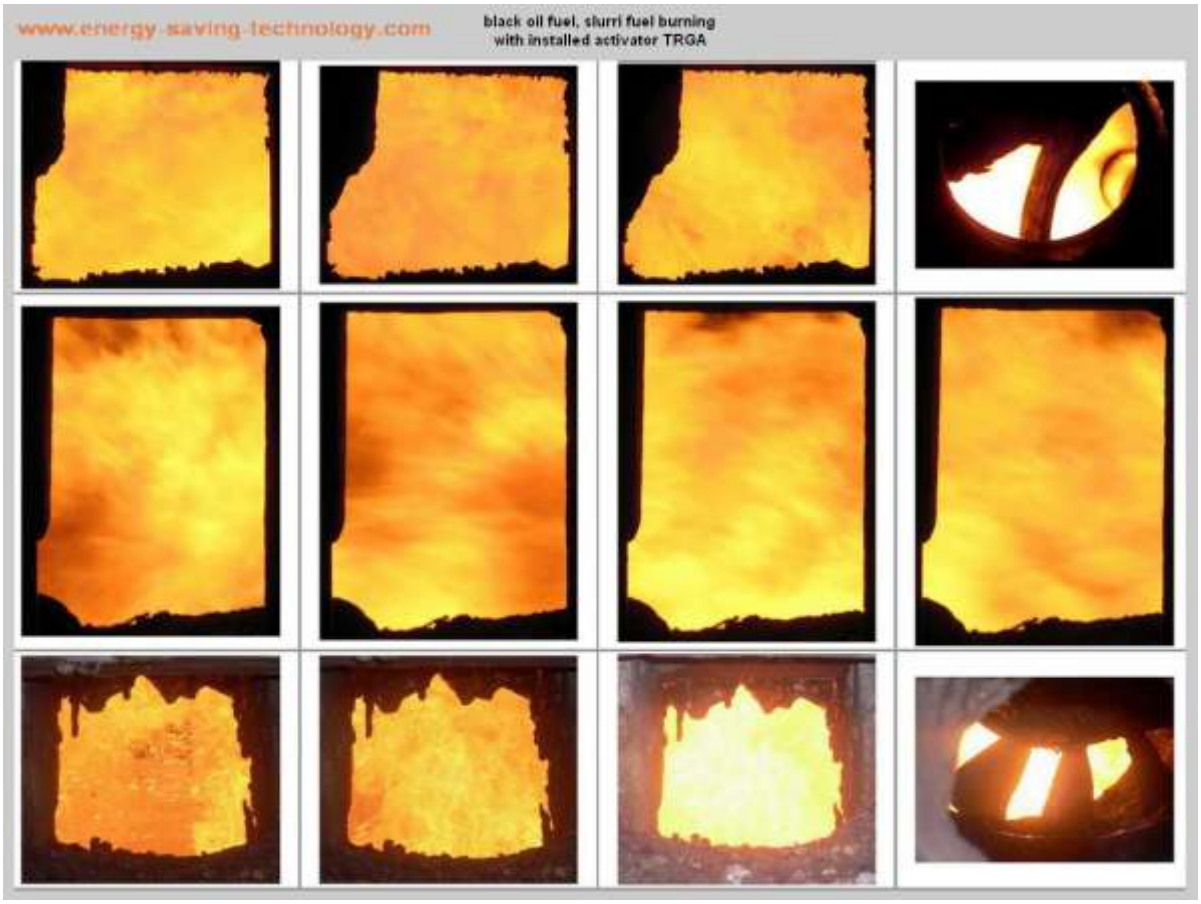
Russian oil sludge differs little from the black oil quality in Syria or Latin America ...

Now look at the difference of fuel oil burning in the boiler
(before and after using of our TRGA systems)

black oil fuel, slurri fuel burning without using TRGA activator of burning



black oil fuel, slurri fuel burning with installed activator TRGA



Comparative films changes in the mazut combustion in the boiler -
the original, after treatment, after treatment with water in the form of an emulsion.
www.energy-saving-technology.com/en/hfo_burning_en.html
This fuel - worse than tar or sludge ... but it burning.

Reducing the solids of resins, asphaltene and other impurities in the fuel oil results in a more combustion efficiency and reduces the amount of unburned residues.
The company's specialists "Saacke" together with Chinese University (Jimay) spent experimental research - "the reduction of heat loss from the mechanical incomplete combustion and an increase in boiler efficiency www.afuelsystems.com/ru/trga/s12.html

In this way, dear colleagues, we clearly - surely can guarantee a significant improvement in the combustion of heavy and / or watered mazut on your boilers or furnaces. It's just a routine, which we have done, are doing and will do well and efficiently.

The algorithm of our works - here - www.energy-saving-technology.com/en/trga-docum-alg-en.html
Questionnaire in pdf - www.energy-saving-technology.com/data-list/boiler_en/qwest_boiler_en.rar

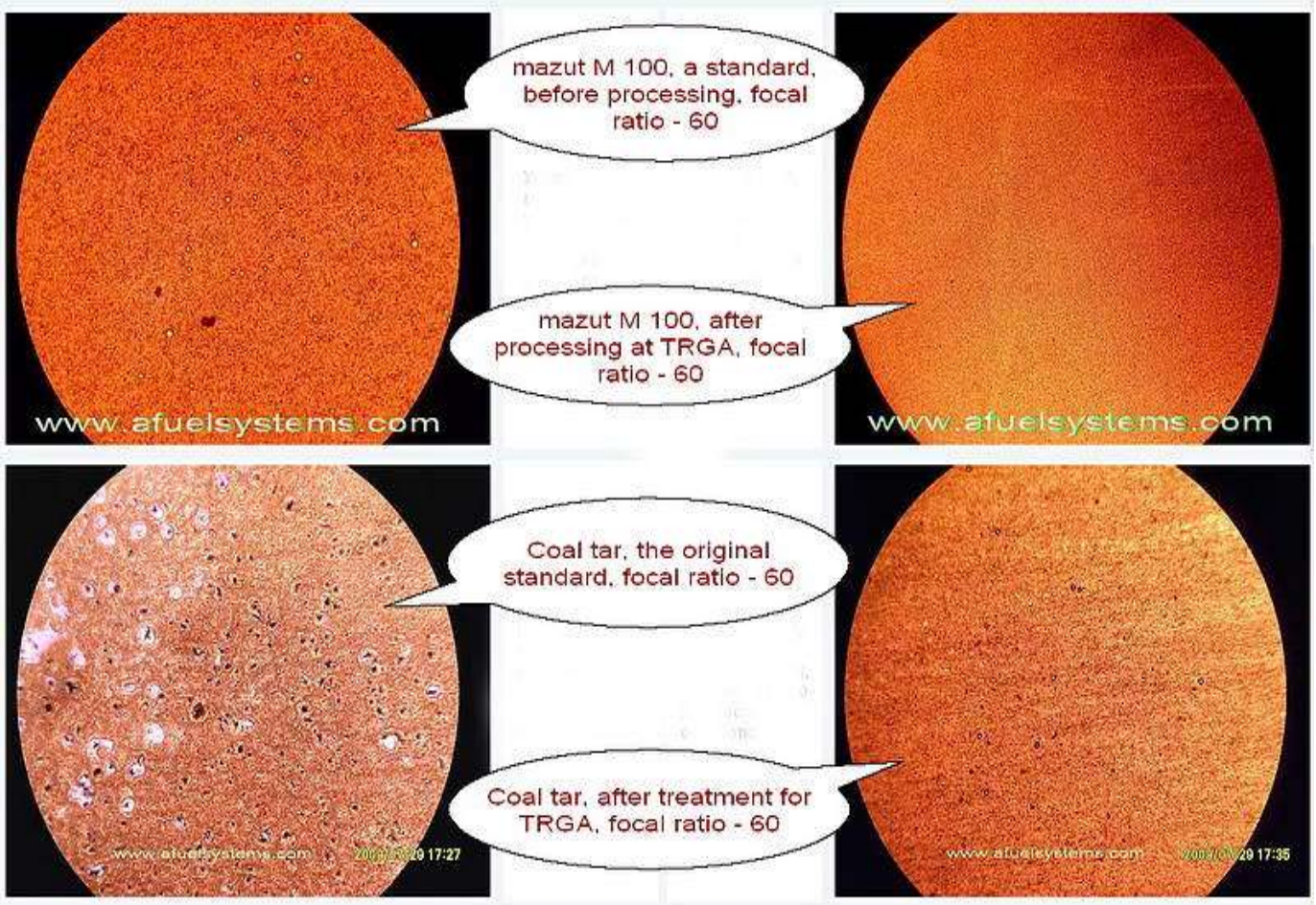
If necessary - we will send in word format. Then, will be more questions, and then we send the technical proposal for the discussion (one or more options). After approval of our technical proposal, it will determined the nomenclature and characteristics of our equipment. The equipment wich you will have to buy add (not always but sometimes - pumps, filters, piping). If you need to installation supervision o not, contract, payment, manufacture, shipping, assembly (contract supervision or step by step instructions for installation), check, start-up, distant lifetime support.

So - if you disturbs highly viscous black oil with or without a high content of asphaltenes, coke slurry or particles, condensed water, etc. ... We will surely solve this problem. Moreover – all our experience from all prior installations and exploitation (145 on 02.02.2016) will be used in your favor.

Related topic - recycling oiled water in refinery.

Problem - in any refinery has a large amount of water that is contaminated black oil, oils and other petroleum waste. Disposal of this water - a long, expensive, energy-consuming and unproductive process.
Most refineries or discard the dirty water into the river or pay huge money for the disposal of waste.

Solving the problem - adding the water to the black oil and burning in the boiler Refinery. In this case the refinery completely eliminate their own waste disposal costs. Burning water-oil emulsions, with proper of making and using will bring additional economic and environmental effects.



Add - Fuel economy and burning flooded, low-quality fuel on the asphalt.
www.energy-saving-technology.com/documentation/test/asf-rf.pdf
https://youtu.be/HkM_wdiinvg and **other films** www.youtube.com/user/andrewrubanut

Some public documents, presentations, tests and reports
http://www.energy-saving-technology.com/en/prezent-docum.html

Certificates and guarantees
http://www.energy-saving-technology.com/en/sertif-garant.html

Business philosophy
http://www.energy-saving-technology.com/en/bus-phil-en.html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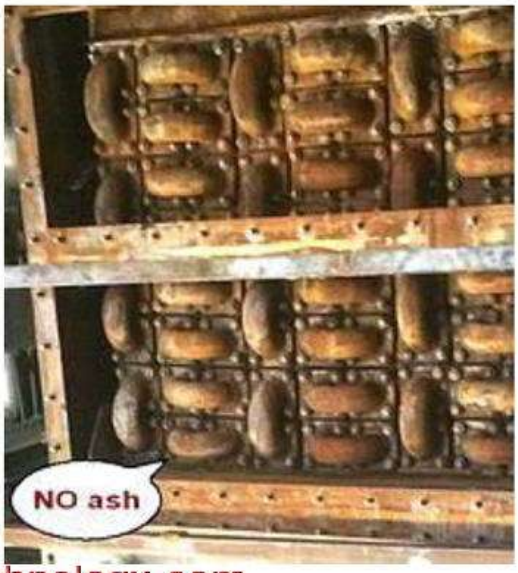

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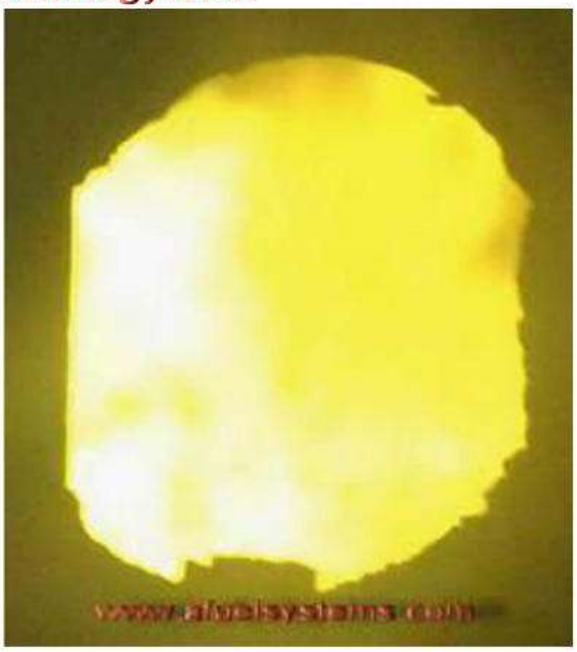

Information block for professionals – the end ----------

Note-1. All photos, films, test results, and other documents - **belong to us**, made by us or by our customers using our equipment. When you find our photos on other sites - please inform us about it.

Note-2. If, after reading this document, in your head will come an idea to write us " send us your equipment for free, we will try it a few months ..." – please do not write us anything. It will mean, that you have not boiler specialists or people who can count money.

Usefull info

- **Some our public documents, presentations, tests and reports** www.energy-saving-technology.com/en/prezent-docum.html
- [Our channel at www.youtube.com/user/andrewrubanut](www.youtube.com/user/andrewrubanut) **(more then 80 films)**
- **HFO types -** https://en.wikipedia.org/wiki/Fuel_oil

Andrw Ruban 08.02.2016