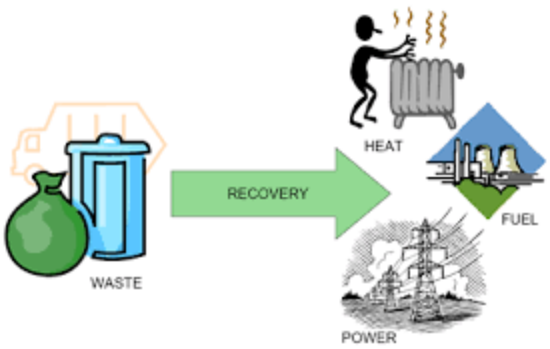
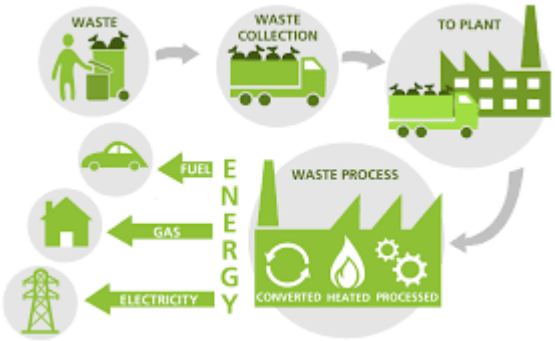




WASTE 2 ENERGY

BRIEF ON WTE PROJECTS

In this document I wish to brief you on a number of existing and potential projects held by **TRL Trade, Co.** and **InLightMe trading company** in the **W**aste **T**o **E**nergy market.

PROJECTS BY OUTCOMES

The brief will describe as deeply as possible about each project according to the "renewable outcome" it produce from the waste feedstock.

WASTE 2 ENERGY

BRIEF ON WTE PROJECTS

1. Introduction
2. General Information
3. Fish Oil and Fish Meal
4. Bio-Char and Bio-Fertilizers
5. Solid Bio-Fuels
6. Syn-Gas
7. CO_2 usage
8. Dry Pet Food
9. Other seed-level projects
10. Live projects
11. Final words

Introduction

TRL Trade Ltd is a family owned company that has two establishments since 1990s. Headquarters are located in London and its main aim is trade and marketing.

TRL Enerji ve Makina San. ve Tic.Ltd.Şti. is centered in Istanbul, its main aim is to supply technology.

Although the main areas of interest are project development, system and machinery design and system integration; also they work on a turn-key basis for their technologies as well as undertaking the construction and the operation of their systems.

TRL is a company involves into WTE projects ranging from seed ideas to running production lines all over Turkey.

TRL is at a stage where she seeks for investors to run closed-deal projects waiting for financing and immediate profit for the investors.

TRL also have some new innovated projects and ideas that just need the boost to make life on earth cleaner, greener and environmentally healthier.

TRL is looking to expand and sell her new and cost efficient technologies worldwide.

TRL can replace old and expensive WTE lines to boost one's profit and also enter 3rd world countries where money was and is always an issue.

Osman TURKMEN **Master of Science in Engineering of Electronics &Telecommunications** **Founder & CEO of TRL Trade Ltd. & TRL Enerji ve Makine Tic.ve San.Ltd.Şti.**	
15 Nov 16	**Presenter, AquaEnviro Conference 2016, Edinburg, UK** An alternate to produce energy from biosolids, Turkey Case Study
12 Oct 16	**Presenter, World Energy Congress 2016, Istanbul, Turkey** Is it possible to reduce dependency on natural gas by using low calorie local lignite? Turkey Case Study
01 Aug 16	**Advisory Board Member, PowerGen Europe**
23 Jun 16	**Award, Highly Commended, PowerGen Europe Conference 2016**
22 Jun 16	**Presenter, PowerGen Europe Conference 2016, Milan, Italy** Recycling organics, cow manure
16 Aug 13 – 01 Oct 14	**GM of Biosun Pamukova Integrated Solid Waste Management, Energy & Fertilizer Corp.** Biosun Pamukova is the first of the four plants within Hexagon Group. The plant consists 5 divisions: Waste Collection & Sorting, Electricity Generation (AD), Composting, Fertilizer Production and Packing & Logistics. The waste collection covers south of Sakarya City with a capacity of 300 tons/day. Electricity generation capacity is 1.44 MW. Compost production capacity is 9,000 tpa. Organomineral fertilizer production is 40,000 tpa. As GM and designer, the digestate is converted to organomineral fertilizer and centrate is converted to a sort of liquid fertilizer and distributed to land. The company was restructured to make 38.3% profit in 8 months of 2014 against the losses since 2011. Electricity production was taken from 0.6 MW to 1 MW. Daily fertilizer production was taken from 20 tons/day to 85 tons/day.
01 Apr 10 – 01 Aug 11	**Vice Chairman and Board Member of Desat Renewables Corp.** Desat Group is an EPC on power plants. DRC company aimed to manufacture gasification systems to convert organic waste to energy and biochar. The partnership terminated because of the Group's operations and crisis in Russia and Libya. Employing gasification technology, one of the areas were soil remediation and studied on KOC (Kuwait Oil Company) waste oil ponds and the land.
01 Dec 09 - still	**Founder of TRL Trade Ltd.** TRL established at Dec 2009 as Türkmen Energy Ltd. Now, it has been transformed to TRL and based in London, UK in order to explore the EU market. TRL has an office in Istanbul, Turkey.
01 Dec 06 – 01 Apr 10	**CEO & Board Members of ERA Mining & ET Inc.** ET Environmental Technologies Inc. has invested an aluminum scrap (Phase-I) to energy (Electricity & Steam – Phase-II) and ethanol (Phase-III) plant in Turkey worth of US$60M. The technology employed was gasification in partnership with an US firm. The Phase-I of the plant has started operation at Dec.10. ERA Mining Ltd. has invested in a coal mine with 30MMT of lignite coal. The project was to select either a UCG (underground

	coal gasification) or produce pipeline quality natural gas or synthetic natural gas, again employing gasification technology.
01 Jul 06 – 01 Dec 06	**CEO of MAKYAL Group**
01 Mar 05 – 01 Jul 06	**Managing Director & Board Member, ANELMAK Inc.** ANELMAK is a JV between ANEL & MAKYAL Groups. The main area of interest is "waste-to-energy" projects utilizing plasma technology. Plasma technology provides gasification and vitrification of organic and inorganic (especially industrial and hazardous) waste with around 5,000 °C. Technology is driven from NASA while testing the space vehicles to simulate the entry to the atmosphere at extreme temperatures. Other areas are space and satellite systems and defense projects. **CEO for Foreign Relations of MAKYAL Group** As outlined below.
01 Feb 02 – 01 Jul 06	**CEO for Foreign Relations of MAKYAL Group** The Group has 23 companies including 5 factories since 1959, with an annual turnover of US$250,000,000. Main responsibilities are the re-structuring of group companies, strategic partnership and ventures, business development for the group manufacturing factories and the specific responsibilities in the group companies are as follows: **1. VP for Operations of MOLECULE Inc.** (main area of interest is global general trading, especially Qatar, D.R.Congo and Mauritania) **2. CEO of SAVTEM Inc.** (main area of interest is representation and consultancy for more than 90 foreign defense companies) **3. Regional Director of MAKTUR Inc.** (main area of interest is representation and consultancy to foreign companies for pipeline (gas &oil) projects) **4. Regional Director of TECH-CO Inc.** (main area of interest is turn-key installation of IT projects) **5. Regional Director of KOBRA Inc.** (main area of interest is manufacturing of ammunition &composite material)
01 Feb 02	Retired as Senior Major.
01 Sep 98 - 01 Feb 02	**1. Contract negotiator** at Undersecretary of Defense Industries, Ministry of Defense. **2. Chief Instructor** for Satellite Systems at TAF Partnership for Peace Center at Ankara/Turkey. **3. Member** of the Turkish Armed Forces (TAF) Comms. Networks Sub-Committee (CNSC) at Turkish General Staff (TGS) at Ankara/Turkey. **4. Member** of the TAF Command, Control, Communications, Consultation, Intelligence, Surveillance & Reconnaissance (C4ISR) (NATO &National) Projects Steering Committee at TGS at Ankara/Turkey. **5. Member** of the TAF MILSATCOM Projects Planning Committee at TGS at Ankara/Turkey.
30 Aug 97	Promotion to be a Major.
01 Aug 97 - 01 Feb 02	**1. Branch Chief**, TAF Military Satellite Comms. (MILSATCOM) Operations at TGS CISSC (Comms &Info. Sys. Support Command) at Ankara/Turkey. **2. Director,** MILSATCOM Network Control Stations (Main and redundant HUBs; Population served : approx. 50,000 people; Responsibility area : from France to Kazakhstan (TURKSAT coverage area; Europe, Turkey, Middle East, Middle Asia as well as Northern Africa); People under command : 13 engineers & 43 technicians). **3. Turkish representative** at NATO Satellite Comms. Working Group (SCWG) at NATO HQ-Brussels/Belgium
18 Oct 87 - 01 Aug 97	**Branch Chief**, C4ISR Projects of Turkish MOD NATO Infrastructure Department
	Following major activities/projects were carried out as team leader: **1.** Terrestrial strategic C4I systems (i.e. TAFICS, 10,000 kms of fiber-optics cable and automated control systems- over 200 millions US$; Responsibility area: Turkey; Population served : appr.700,000 people). **2.** Tactical (mobile) C3I systems (i.e. CZCS, cellular based military GSM system-over 170 millions US$; Responsibility area : Turkey and abroad; Population served : appr.120,000 people). **3.** Large scale telephony (PSTN) systems (over 5 millions US$). **4.** National and NATO crypto systems and electronic key distribution systems (over 25 millions US$). **5.** Power supplies, static and dynamic UPS and generator sets (over 1,000 KVA) (over 15 millions US$). **6.** Large scale data networks (i.e. CCIS, military internet systems-over 25 millions US$). **7.** Follow-on maintenance projects (for above systems-over 50 millions US$). **8.** Identification of Friend or Foe (IFF) systems (over 10 millions US$). **9.** HF systems (military wireless comms-over 15 millions U$). **10.** TEMPEST test facilities (testing the emission security of the comms. equipment-over 2 millions US$). **11.** Satellite comms. systems (ground systems) (over 150 millions US$). **12.** Satellite spacecraft systems (X-band transponders-over 40 millions US$). **13.** Drafter, administrator and signatory for multinational agreements between Turkey and Denmark, USA, Italy. **14.** Drafter, administrator and signatory for more than 100 contracts. **15.** Arbitrator for 2 projects at NATO HQ, Belgium.
01 Sep 94 - 01 Aug 97	**Turkish representative** at NATO WG-29 Information Technologies and Automated Data Processing Experts Working Group IT&ADPWG) at NATO HQ-Brussels/Belgium
01 Sep 91 - 01 Aug 97	**Turkish representative** at NATO WG-18 Communications Systems Experts Working Group at NATO HQ-Brussels/Belgium
30 Aug 91	:Promotion to be Army Captain.
18 Nov 87 - 01 Aug 97	**Turkish representative** at NATO Southern Region Configuration Management Board (SRCMB) dealing with information technologies (IT) projects at Naples/Italy
30 Aug 86	:Promotion to be 1st Lieutenant.
09 Oct 84 - 18 Nov 87	**Masters Degree** education at Applicable Sciences Institute of Technical University of Istanbul/Turkey on electro-optics & comms. Networks
31 Jul 83 - 09 Oct 84	**Chief engineer** at Military Electronics Factory at Ankara/Turkey.
31 Jul 83	Promotion to be 2nd Lieutenant.
30 Aug 79 - 31 Jul 83	**Bachelors degree** education at Electrics &Electronics Faculty of Technical University of Istanbul/Turkey on electronics& telecommunications
1975 – 1979	High-School education at Kuleli Military High-School at Istanbul/Turkey
Language proficiency	**1.** Turkish (native language) **2.** English (very good) **3.** German (medium) **4.** Italian (fair) **5.** French (fair)

Family	**1.** Married since 1985, wife is an architect (MSc). **2.** Have two children, son is 30 years old, daughter is 28 years old; both completed their university and masters education in the UK.
Publications	**1.** Elektronik Tasarım Büyük El Kitabı, Çeviri, Eylül-1986, Yüce Yayınları (***Giant Handbook of Electronics Designer****, September-1986, Translation, Yüce Publications)* **2. Satellite Systems (An Overview for the Beginners)**, Ankara-2001, Turkish General Staff Publications. **3.** Uydu Sistemleri, Ankara-2001, Genelkurmay Basımevi (***Satellite Systems****, Ankara-2001, Turkish General Staff Publications)* **4.** TSK'nin 2023 Yılı MEBS Vizyonu Ne Olmalıdır?, Ankara-2000, Etüd ***(What Should be the C4ISR Vision of TAF for 2023?****, Ankara-2000, Study)* **5.** Geleceği Tuşla(ma)yın, Sayı : 4, 2001, K.K.K.Lojistik Dergisi ***((Un)dial the Future****, Issue : 4, 2001, Logistics Magazine of the Army*) **6.** TSK Uydu Haberleşme Sistemleri, Cilt 19, Sayı:20613, 2005/109, Savunma ve Havacılık Dergisi (***Turkish Armed Forces Satellite Communications Systems,*** *Issue:Cilt19, 20613, 2005/107, Defence & Aerospace Magazine, Mönch Group)* **7.** Atık İşlemede Plazma Çağı, Çöpten Enerjiye "YES", Sayı : Ağustos 2005/8-12, Global Enerji Dergisi(***Plasma Era at Waste Disposal, "YES" to Waste to Energy***, *Issue : August 2005/8-12, Global Energy Magazine)* **8.** Organik Çöpten Enerji Üretimi, Sayı:Temmuz-Ağustos 2005, Yıl 1, Sayı 1, Su ve Çevre Dergisi (***Energy from Organic Waste,*** *Issue : July-August 2005, Year 1, #1, Water & Environment Magazine)* **9.** Parayı Çöpte Bulma Zamanı, Sayı :2006/13, 26 Mart-1 Nisan 2006, Yeni Para Dergisi (***Time to Search Money at Waste,*** *Issue: 2006/13, 26 March-1 April 2006, New Money Magazine)*
Certificates/Diplomas	**1.** 5 each Certificate of Recognition from Hughes Network Systems, USA **2.** 2 each Certificate of Appreciation from Page Europa SpA, Italy-USA **3.** 1 each Certificate of Appreciation from Defense Information Systems Agency, Department of Defense of USA **4.** 32 each Certificate of Award from TAF, Turkey. **5.** 3 each Certificate of Appreciation from NATO HQ, Belgium. **6.** 1 each Diploma from Alcatel-Euroasiasat, Monaco-France. **7.** Various Certificate of Appreciations from various foundations /instutions.

General Information

I would like to offer you an opportunity to expand your renewable energy market into the Waste-To-Energy (WTE) section where there is a great potential – if you ask me – even bigger than renewable fuel market.

This WTE is basically taking our municipal waste and turn it into different kind of renewable energy, from gas to fuel up to oil and electricity, you name it!

Think of the business potential in taking something everyone is looking to get rid of (our own waste…) and instead of dumping it, bearing it, burning it or whatever, you take it and recycle it into energy that everyone needs.

Similar to eBay's head slogan: "Someone else's trash is ones gold".

*What is **WASTE**?*

Well definition is subjective, isn't that?!
When you throw your leftovers from last dinner, for street cat and (unfortunately) homeless its food.
When you throw the same food to **TRL** we can make numerous of products which each and one of them is renewable, recycled and potentially better than the "original" product which our outcome can substitute.

To simple our equation for Waste 2 Energy formula, **TRL** can take any hydro-carbon and transform it into a renewable material in all 3 states: Solid, Liquid and Gas.

Our waste feedstock range from paper, wood, plastic to food, municipal waste and even CO_2 which for some factories considered as a waste they have nothing to do with but we can show them they can make money out of this no-good gas.

*What is our **Renewable Outcome**?*

Our outcomes can serve multi-purposes ranging from electricity production, biodiesel feedstock to dry pet food and mobile gas cans.

What we can do?

TRL has her own designed and manufactured **TRL** systems that can produce solid bio fuel, fertilizer or industrial product from organic qualified waste (which can be used instead of coal) and in particular from animal waste (chicken manure, cow manure, horse muck and etc.) and from domestic and industrial sewage sludge.

At all farms that has between 10.000 and 1.000.000 broiler chickens, **TRL** systems can be installed that can process chicken manure and most importantly 'dead chickens' to produce chicken compost. Manure and dead chickens will be processed at site and will be converted into organic compost.

*Starting from January 2014, organic chicken compost is being produced from broiler chicken waste at Pamukova/Sakarya region. (http://you.be/cjEwlBdTYIk).

*In January 2012, solid bio fuel was produced at GATAB/Antalya region. (http://youtu.be/spSsOFDiD8I). The video is showing the first version of the system; whereas our company developed the third generation now.

*Between December 2012 and July 2013, fish oil and fish meal was produced from fish waste at Milas/Mugla region. (http://youtu.be/kq6t1T3REUQ).

*In Izmir, solid bio fuel was produced from sewage sludge (domestic waste).
(http://youtu.be/PCtTn802emA).

Fish oil & meal

TRL fish oil & meal machine is built to take any kind / grade of fish waste and produce fish oil and fish meal for animal and fish feed.

The grade of the outcomes depends on the waste income, for example waste which consists fish bone will produce fish oil with high ash level as opposed to head and tail waste which will produce much more "refined" oil.

TRL has an existing system to process 700 kg/1 ton of raw fish waste to 300 kg of fishmeal.

Our biggest advantage

This machine not like most fish oil machines worldwide use "cold stream" technology to extract the oil from the fish waste.
Similar to olive oil extraction … when you heat olives you produce more oil but with high FFA level which basically says you get more oil but it's degrade oil.
If you use the old techniques to produce olive oil you just crush and squeeze it using high pressure non-heating machines ("cold – stream") to extract extra virgin olive oil which is known for max FFA level of 0.8%.

TRL can produce better, higher grade fish oil and fish meal using ***TRL machine*** which is by far much more cost efficient from other machines used worldwide.

What we can process and what we can produce

TRL can use any kind of waste fish as a feedstock: heads, tails, meat, bones, internal organs (offal)…

If the waste is high protein, low oil (meat) and low ash (less bone), you receive a perfect fishmeal in the product; this means you don't need to target oil and you use only the fishmeal system.

If the waste is interiors (offal); this means you don't need to target fishmeal, you use oil system, remaining is already fishmeal and you can process easily this residue to be fishmeal.

You already know that in fish oil and meal system, material handling and process know-how is as important as the technology.

With our previous partnership in Turkey where we have produced >1,400 tons of fishmeal, our partner required to process the fish waste (whatever it would be heads, tails, bones, whole fish or offal) with soymeal. The reasons we have learned are;

1. Soymeal can only be digested by fish when processed by some means that we have provided. We have also observed that the fish feed FCR ratio has developed since then.

2. Also, the fishmeal becomes protein rich when you process with soymeal (because the waste might be very poor on protein in some cases)

3. Additionally, there is already a ration of soymeal in the fish feed process that they have added soymeal, by this means they get rid of this additional cost. The cost of fishmeal was almost half of the market price.

TRL has also processed the fish waste without soymeal.

You can watch the video at YouTube: https://youtu.be/dvWXxoFi5YI

TRL has a second-hand and ready system to make trials of your fish waste provided that we agree on the terms. The main issue is the place of the trials because we are unable to provide fish waste and place to make trials.

TRL can modify the machine to produce "technical" fish oil which will suit as a feedstock for biodiesel production. The modification is something needs to be learned since the parameters that are important for biodiesel like: M&I, Acid, FFA, and Phosphor … is not something you check when you make fish feed were you check ash, protein, EPA, Omega and DHA.

How we can make money

Nowadays Turkey imports most of her fish feed from other countries since the local fish price are at high level so it's cheaper to import rather than to use local fish as waste.

The local demand in Turkey is about 120,000 tons per year.

Prices range from 1200 – 1700$ per ton.

The combined factors of cheap waste + cheap machine can make high profit margin selling the fish feed at market price.

TRL can distribute that imported oil all across Turkey using her long time relationship and stand-by projects and contracts.

That is only what we can do with the Turkish market… finding similar markets where fish feed is imported and expensive will open new doors for growth and prosperity.

As to existing fish feed factories – who wouldn't want to buy a cheaper machine, cost efficient, easy maintenance and above all these produce higher grade fish feed which anyone can sell at higher price.

Bio-Char and Bio-Fertilizers

Bio-char I believe is soon to be the next renewable trend in agriculture fertilizer market.

Nowadays 95% of the farmers around the world are using chemical fertilizers to "boost" their yield, their acre per dollar rate to make more profit and to supply the growing demand for food in the world related to the descending growth areas around the world (in favor to urbanism).

Bio-fertilizers (BF) are just condensed and granulated bio-char.

A market research shows the great potential in the BF market.
https://www.linkedin.com/pulse/biofertilizers-market-expected-reach-usd-23055-million-supriya-patil

Our biggest advantage

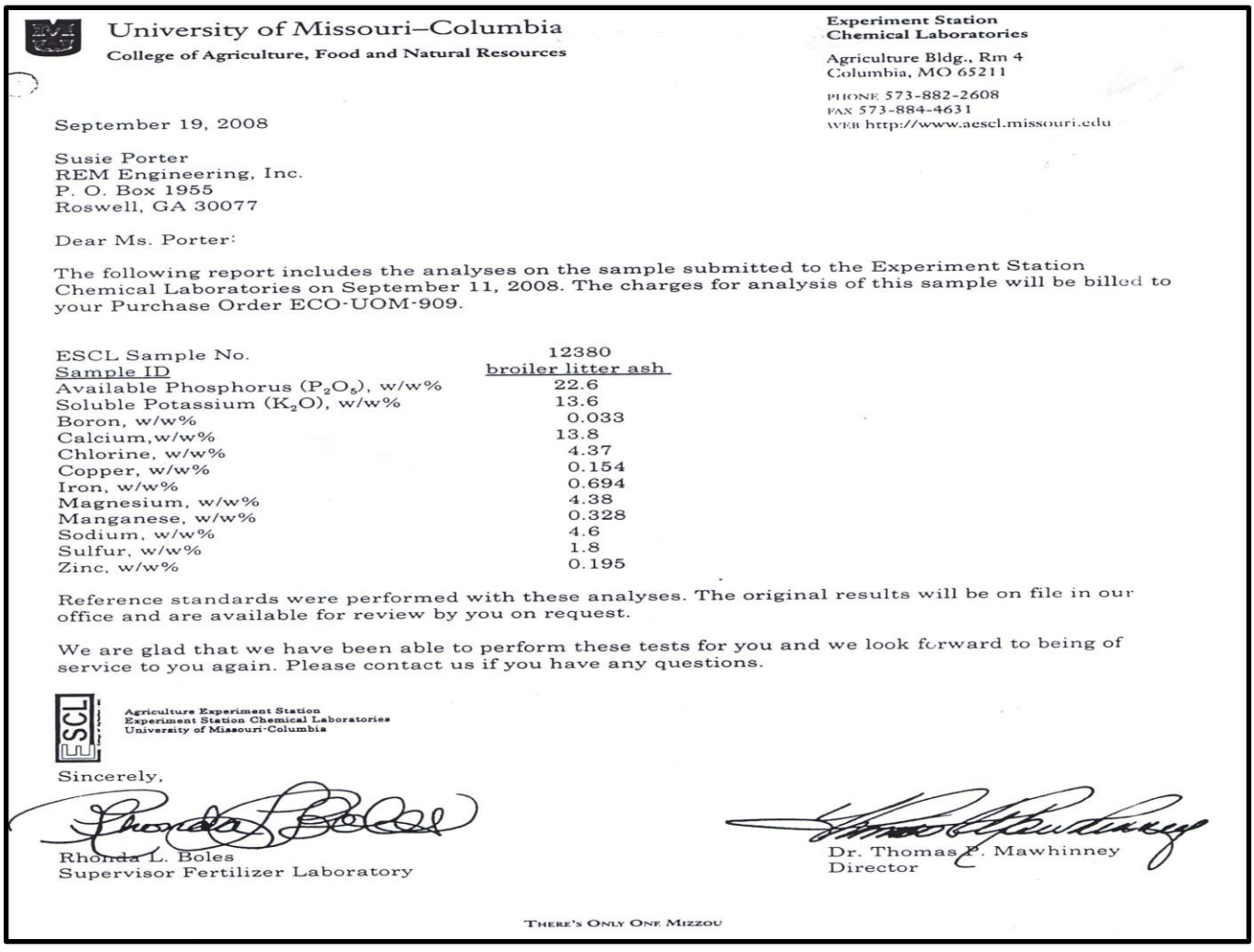
Bio char can be produced from cheap waste, cheaper than chemicals that are used to make traditional fertilizers.

Bio fertilizers can be used on any soil, for any plant, seed, flower or grass the farmer wish to grow.

Bio fertilizers are considered to be "slow dissolved fertilizing layer" –means, any plant nutrition you put on top of the BF layer including water, it is slowly dissolves into the ground which feed the ground much more efficiently and more important cost efficiently to the farmer.

Think of it as a "nutrition storage" where it absorbers the feed / water, store it inside and release it to the ground in small portions so for example you can water the soil once a week instead of any second day..

Think of the saving you make as a farmer … think about no need to by those chemical fertilizers and using your own organic fertilizers coming from your next door neighbor that grows chickens and got nothing to do with their litter.



University of Missouri–Columbia
College of Agriculture, Food and Natural Resources

Experiment Station
Chemical Laboratories
Agriculture Bldg., Rm 4
Columbia, MO 65211
PHONE 573-882-2608
FAX 573-884-4631
WEB http://www.aescl.missouri.edu

September 19, 2008

Susie Porter
REM Engineering, Inc.
P. O. Box 1955
Roswell, GA 30077

Dear Ms. Porter:

The following report includes the analyses on the sample submitted to the Experiment Station Chemical Laboratories on September 11, 2008. The charges for analysis of this sample will be billed to your Purchase Order ECO-UOM-909.

ESCL Sample No.	12380
Sample ID	broiler litter ash
Available Phosphorus (P_2O_5), w/w%	22.6
Soluble Potassium (K_2O), w/w%	13.6
Boron, w/w%	0.033
Calcium,w/w%	13.8
Chlorine, w/w%	4.37
Copper, w/w%	0.154
Iron, w/w%	0.694
Magnesium, w/w%	4.38
Manganese, w/w%	0.328
Sodium, w/w%	4.6
Sulfur, w/w%	1.8
Zinc, w/w%	0.195

Reference standards were performed with these analyses. The original results will be on file in our office and are available for review by you on request.

We are glad that we have been able to perform these tests for you and we look forward to being of service to you again. Please contact us if you have any questions.

ESCL
Agriculture Experiment Station
Experiment Station Chemical Laboratories
University of Missouri-Columbia

Sincerely,

Rhonda L. Boles
Supervisor Fertilizer Laboratory

Dr. Thomas E. Mawhinney
Director

THERE'S ONLY ONE MIZZOU

What we can process and what we can produce

To make bio-char / fertilizers we can use any farm animal manure and urine as a feedstock.
TRL systems can use: cow, chicken, horse, goose, sheep, goat, pig…

To make it cost efficient they need to be relatively large scale growers, for example chicken farms need to be above 600,000 chicks.

TRL systems can also use:
A) domestic waste water treatment sludge
B) Black liquor from MSW (Municipal solid waste)

So the productions of BF can also being done in urban areas and not just agriculture areas.

How we can make money = Existing projects

MSW + Chicken Litter to electricity and biochar project

Place: 200 Km to Istanbul (could be implemented anywhere in the World where there is 600,000 broiler chicken). There are +5 more projects of the same nature within the same vicinity. The waste capacity is 4,000 ton/day.
Installed capacity : 1.5 MW + 4,744 ton/year biochar
Waste characteristics: Broiler chicken farms usually produce 0.1 kg/day/chicken of litter and emptied at every 40 to 42 days. Also, the municipality guarantees to lease the land US$3,000/year) and the delivery of chicken litter to the door for 29 years to be renewed at least 2 times (total 87 years). Also, the municipality guarantees to deliver the MSW to the door at same terms.
Calorific value: Around 3,000 Kcal/kg
This waste is the responsibility of the municipality. But because they don't have necessary funds and the credibility, they can't perform the disposal in spite of the law.
Solution: Gasification system can receive the waste as it is and produce electricity and biochar. This is zero waste system.
Residue: Residue after gasification is biochar and can be sold to the fertilizer market as a soil amendment and raw material for fertilizer. When there will be the optional TRL Organomineral Fertilizer Plant investment, then the organomineral fertilizer can be sold at higher rates at the international market.

15 ton/day Municipal Solid Waste (MSW)+ 35 ton/day Broiler Chicken Litter (BCL)- 1.5/2 MW

INPUTS			GASIFICATION			OUTPUTS							
				€	€/kW		€/kWh	€/ton	kWh/year	ton/year	€/year	Net (€/year)	
Wet	MSW+BCL	50 ton/day	CAPEX	7.017.823	2.000	Electricity	0,1167		11.945.513		1.393.643	1.393.643	OPEX decucted
Dry	Not required		OPEX		0,0348	Biochar		263,16		4.744	1.248.632	1.248.632	
			ENVIREX		N/A	Residue	N/A						
Water		0,5 ton/day										2.642.275	
				€	€/ton								
Organomineral Fertilizer Plant (optional)			CAPEX	1.250.000									
			OPEX		250			400,00		14.232	5.692.800	2.134.800	OPEX deducted
			ENVIREX		N/A								
											General Total	*3.528.443*	
											Payback - without fertilizer plant	3,93	years
											Payback - with fertilizer plant	2,34	years

House and animal waste to electricity and biochar project

TRL manufactures the gasification system developed with their US partner in Turkey.
In USA, there are five commercially operating plants that process chicken, cow, turkey manure, household sewage sludge and other types of waste.
Currently, a project is being carried out with a metropolitan municipality to produce biochar organic fertilizer and electricity from sewage sludge.
At the same time another project is being carried out to produce biochar organic fertilizer and electricity from broiler chicken waste with a farm that has around 3.000.000 broiler chickens.
Out of the five commercially operating systems in North America, as far as we know the one in West Virginia, USA is the only system in the world that produces biochar organic waste and heat from broiler chicken waste. Its capacity is 50 tons/day.

Organic waste to biochar project

Another hot topic nowadays in Turkey is the ban of chemical fertilizers. Government encourages the use of organic based biological fertilizers.
TRL can produce compost, organ mineral and biochar organic fertilizer from organic waste.
TRL had designed and implemented an organic/organ mineral fertilizer plant that utilizes either the digested from the AD (biogas) plants or chicken litter (broiler, egg laying or others) or cow manure (beef lot or dairy) or any non-polluted organic waste as raw material; dosing on an automated system.
The capacity is 5 tons/h; however, it can be increased up to 15 tons/h if required.
The stages are explained below:

First stage: The digested is shredded by the system type breaker-grinder-dryer which eliminates the bigger particles as well as the humidity to some extent.
Second stage: The output is dried to be almost moisture free.
Third stage: Dry output is grinded to be almost dust (to a mesh grade).
Fourth stage: The output is dosed with chemicals for the desired formula. For example, 6/10/10 NPK and some trace elements for the potato fertilizer and 8/21/0 NPK and some trace elements for the wheat fertilizer etc. We have developed some 20 different kinds of fertilizers.
Fifth stage: The mixture is fed to a granulator. Output is 4-5 mm. granulated particles.
Sixth stage: Granulated fertilizer is hygiene / hardened and fed to a packing system to get 25 or 50 kg bags for sale.

Organomineral fertilizer is actually a combination formula to bring compost and the minerals together. Instead of using conventional chemical fertilizers that kill the soil; we rehabilitate the soil that has very low organic matter, humid +folic acid and organic carbon values. We analyze the soil, the crop and other parameters and we design a formula that best suit for the soil and the crop, instead of using conventional one-type fertilizer. Our formula is such that, at the end of the year, there is no left-over of the fertilizer or trace of chemicals accumulated in the soil; that is both the crop and the soil deplete the fertilizer 100%.

That brings the microbial life back in the soil, warm and bacteria grow and the soil is back to life. We use organics in the compost and the plant feed in the minerals. Soil needs less water, brings more delicious crop and yield increase etc.

Fertilizer plant is still operational. In fact, IFC bought 7% of the company at 208 M$ at 2016. Company owns total 4 plants as such, only 2 of them are operational. But I left the GM position at October 2014.

Solid Bio-Fuels

Solid bio-fuels (SBF) are commonly known as biomass for heating processes.

Burning biomass can be divided into 3 groups: fossil oil, mixed oil (fossil and renewable) and renewable oil.
In the renewable group there are also 2 sub-groups: solid bio-fuel and renewable fuel oil (liquid).

Solid bio-fuel varies from condensed wood into briquettes, wood chip from wood mills, bad old traditional coal from the mines to the renewable ones like "veg cakes" which are the solid waste from vegetable oil refining (shells, ground seeds…) and "waste based" solid fuel.

Our biggest advantage

TRL can use all kind of waste to make the SBF – both organic and MSW.

TRL can take your home waste and turn it into a renewable fuel for you to burn in your furnace, to generate heat in your country's electricity plants.

TRL can take non-common organic waste were no one thought can be used and turn it into SBF.
By that **TRL** opens new business opportunities to people with waste they didn't know what to do with.

What we can process

TRL systems can use as mentioned above 2 type of waste:

Municipal
A) Municipal solid waste (MSW)
B) Domestic waste water treatment sludge
C) Black liquor from MSW (Municipal solid waste)

Organic
A) Greenhouse products
B) Cotton waste
C) Forest debris
D) Olive and olive oil waste
E) Sunflower waste

How we can make money

Researching the market for cheap waste feedstock to compete with the fossil and renewable fuel will open us new channels to enter this market – especially in places that never knew what to do with their waste and want to know how they can make money out of it.

Syn-Gas

Syn-Gas (SG) is an outcome of waste processing much like Bio-Gas production but on a smaller and efficient scale.

Generally SG can be used for burning – the question is what does your heat up with it?
That's where the money is… and I can tell you... it's everywhere this SG is.

Our biggest advantage

TRL systems are designed to work on "domestic" scales where we can use our own personal / neighborhood / municipal / agriculture waste to make our own solid biofuel for our own use.

Instead of being fed by a huge biogas plant and buying it relatively expensive, **TRL** can install a much smaller cost efficient system that will take all the MSW from all 100 houses in your Scandinavian neighborhood and produce solid biofuel that will replace that polluting diesel you burn in order to keep your house warm in those domestic heating systems.

Why buying solid biofuel expensively when you can enjoy the benefits of making your own at low costs and also to use that MSW instead of baring it and polluting the grounds or pilling it sky high and stink the area with bad smells and toxic gases.

What we can process

TRL uses any organic waste like chicken litter, cow manure, greenhouse waste, agricultural waste (trimmings and leaves for example), forest debris etc. And we gasify this waste.
Gasification is nominated as #1 clean technology in the US especially for coal.
The product is called “syngas” which is similar to natural gas but with a different component, it is CO and H instead of CH4.
We compress this gas until it becomes the same calorific value of natural gas. It is tubed and sold.
It is renewable and cleaner than natural gas.

How we can make money = Existing projects

TRL has an astonishing project which takes any organic waste that is commonly used in house kitchens (not necessarily industrial kitchens) and produces a biogas similar to LPG used to cook your food and heat your house and water.

Just to give you numbers to see the picture, this gas is used in a "picnic gas tube" which weight about 2Kg and used in outdoor activities like a mobile gas stove (boiling pans, pots…).
This gas tube filled with LPG cost about 3$ in Turkey, same tube filled in "syngas" cost about 0.5$!!!
6 times cheaper than the common picnic gas tube. Now I won't say a word but think about the profit margin in this product... and that is one example.
Cooperatives like this one (and there are many more) are goldmine for such project.
http://www.cooppower.coop/

Hot water production from household waste

TRL produces a micro-gasification system in Turkey that was developed with their Japanese partner. With this system, hot water can be produced by processing the in-house generated wastes of housing projects with 70 and more flats/villas, hospitals, hotels and passenger ships; this system can also support Heating / ventilation / cooling systems of these establishments.
The waste processing capacity is between 1 ton/day to 5 tons/day.
Thus, natural gas savings of up to 60% can be achieved at the housing estates.
The major part of the hot water requirement in hotels can be met.
There are currently 9 commercially operating plants in Japan.

Waste paper to electricity project

Place: Thrace area, Turkey (could be implemented anywhere in the World for the paper mills that use recycled paper). There are 27 paper mills in Turkey that use recycled paper. Thrace area waste capacity is around 1,800 ton/day.
Installed capacity : 2.8 MW
Waste characteristics *:* Recycled paper using paper mills generates industrial plastics, long fibers and pulp waste during process
Calorific value: Around 6,000 Kcal/kg (with Cl content >2-3%)
This waste is highly flammable, therefore can't be landfilled. 10 years ago, this waste was sold to cement plants as additional fuel, however, because of very high Cl level, it turns to HCl acid and depletes the ovens and therefore not accepted by cement plants now. It is now an outstanding and unresolved problem for the paper plant
In Turkey, there are waste paper disposal plants, however, because of the wrong technology selection, they can only work 3 days in a week and not sustainable. Other paper plants are paying almost US$30/ton for their waste, but not satisfied because of the interruption; because they have no storage license and place.
Solution*:* Gasification system can receive the waste as it is and produce electricity. Government approved this waste as biomass. Because there is no incineration, there is no HCl formation.
Residue*:* Residue after gasification is inert and can be sent to landfills securely. Or, after the chemical analysis may be a raw material for chemical fertilizer.
Guarantees*:* Renewable Energy Law, government guarantees to buy the electricity at US$0.133/kWh for 10 years; however, you are free to sell the electricity at free market at higher rates. When the system hardware is manufactured in Turkey this rate can go up to US$0.18/kWh which we plan to do.

60 ton/day Recycled Paper Mill Pulp & Process Waste / 2.8 MW

INPUTS			GASIFICATION			OUTPUTS							
				€	€/kW		€/kWh	€/ton	kWh/year	ton/year	€/year	Net (€/year)	
Wet	Paper Waste	60 ton/day	CAPEX	7.017.823	2.000	Electricity	0,1167		23.553.585		2.747.918	2.279.202	OPEX decucted
Dry	Not required		OPEX		0,0199	Tipping Fee	14,15		21.900		309.885	309.885	
			ENVIREX		N/A	Residue	2.4 ton/day		876 ton/year			0,00	NO cost/revenue
Water	0,5 ton/day											2.589.087	
											General Total	2.589.087	
											Payback	2,71	years

CO_2 usage

CO_2 for some manufacturers is considered as a waste, so called waste gas which they have nothing to do with and more than that, it interfere with the production and degrading the outcome.

Places like wineries and breweries that produce "natural" CO_2 and some time has excessive gas which they have nothing to do with it **TRL** knows what to do since we can take the high concentrate CO2 and we can inject it directly to gasification chamber in order to increase the amount of syngas up to 30-40% more.

So basically taking grape waste or beer production waste + CO_2 allow us to produce 30% more SG than what we could have achieve using only the solid waste.

Now, think about the brewery or winery we come and offer them their own electricity from their own waste?? Isn't that a dream?

Dry Pet Food

TRL knows how to take pre-separated waste (human) food and turn it into dry highly – nutritional pet food.

Coming out of either spent or expired food (meat, poultry or any other) this dry pet food production is one application for food waste that we can use.

There was a project were **TRL** joint hotels along the Turkish Riviera to separate their waste food according to red meat, poultry and vegetables and we produced dry pet food out of low-cost waste feedstock to feed street pets (dogs and cats). It was a pilot project which has been a great success.

Other seed-level projects

- Cotton stalks and/or rice straw to tubed syngas project (developed for India)
- Brewery spent to steam and/or electricity project (for any brewery and wine installation anywhere in the World)
- Soap noodles to steam and/or electricity project (for any agricultural oil plant anywhere in the World)
- Clay recovery for agricultural oil plants (for any agricultural oil plant anywhere in the World)
- High CO2 disposal together with organic waste (i.e. Brewery spent) to steam and/or electricity (for any brewery or ethanol plant in the World)
- Bird flu spent chicken and their litter to biochar (France, Denmark, Belgium, Iran and Israel, soon in Turkey and anywhere in the World where there is a epidemic for poultry and cattle - we can built a mobile one)
- 100 TPD organomineral fertilizer plant (anywhere in the World)

Live Projects

Projects operational in the USA

1. Sanford, FL: Heat from bio-solids (to process more bio-solids)

2. Vanderville, WV: Heat and biochar from chicken litter https://youtu.be/M6EPKYp5UgI

3. Minneapolis, MN: Heat to feed hot oil system and biochar from turkey litter

4. Carterville, IL: Test system (MSW, medical waste, hazardous waste and others)

5. Ohio: Cow bed and biochar from cow manure https://youtu.be/y7RJ6otZ44U

6. Kensington, OH: Cow bed and biochar from cow manure

7. Cordele, GE: Heat and biochar from MSW

Will be operational by 2017

8. USA / The Netherlands: Heat to feed hot oil system and biochar from hog manure

9. Mead, NB: Steam and biochar from brewery waste

10. Orleans, IN: Electricity and biochar from hog manure, turkey and chicken litter.
Recently, contract negotiations for more than 20 more systems are underway.

Projects operational in Turkey

11. Fishmeal system in Bodrum, Muğla, Turkey.

12. Fishmeal & fish oil system, there are more than 50 systems all around the World.
we can demonstrate one in Ukraine (big system).

13. Organo-mineral fertilizer plant in Pamukova, Sakarya, Turkey.

14. Aluminum plant in Çerkezköy OSB, Tekirdağ, Turkey (non-operational).

Final words…

So before the brief is over I would like to say that WTE holds such big potential providing solution to any kind of waste.

TRL Trade, Co. and **InLightMe trading company** will provide you with a wide verity od solutions and most important, profitable outcomes for your waste so you can increase your income simultaneously by reducing the "waste treatment expenses" and producing new, renewable, cost efficient, innovated products from that waste and either use it and by that reduce your fixed costs or you can sell it to others how would like to have a cheap supply rather than imported one.

In a world controlled by chemicals for compost and fertilizing, deep sea / earth drilling to find natural gas, producing electricity and heat using fossil polluting fossil fuel, waste (organic and non-organic) contaminating our soil, water and air… we here give you the opportunity to make money out of this waste.
We provide you with the opportunity to take something everyone need and want to get rid of and give back renewable, environment friendly outcomes that can only help our crops, electricity, heat and others.

Please feel free to contact us

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