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GREEN PLANET

Industrial Division:
"Facilities Hard Services"
Energy and Environmental Services Line

OIL & GAS USA



Integral Engineering and Consulting Solutions for Oil & Gas projects: Treatment System to Manage Produced Water by Frac / Flowback / Drilling & Well Services

TLBS 2020
MAGAZINE

DIGITAL TRENDS
TLBS 2020 MAGAZINE

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GLOBAL WARMING

Today, more than ever, the international community agrees that one of the greatest challenges the planet is facing is the preservation of life; it seeks to mitigate what threatens the planet and humanity. The model of production along with the industrial development that has prevailed in the last 100 years, has brought serious environmental consequences due to bad practices in the exploitation area (use and exploitation of hydrocarbon resources), altering ecosystems in extensive regions and even affecting the thermodynamic balance in the oceans and in the atmosphere. This allows for the generation of great distortions in the global climate, affecting biodiversity and compromising the existence of life.

United States of America, aware of the great role it has as a world power country and co-responsible for these climate changes, in accordance with its founding principles based on freedom, progress and protection of all citizens residing in the country, has set guidelines in its policies for economic development, which seek to mitigate the harmful effects of industrial activity with emphasis on the Oil & Gas sector, which is at the top of the list, because it is one of the most offensive activities of the environment, being then responsible for air and water pollution on a large scale.

The public policies and incentives set by the Federal Government are motivating the productive forces of society to seek economically sustainable solutions that promote the preservation of the environment. Reducing the environmental impact in a more



Credits: Wallpaper Flare

BUSINESS MANAGEMENT SYSTEM (BMS)

effective way should be one of the objectives of Oil & Gas production and processing activity.

The environmental contamination derived from oil and gas activity is conditioned by three variables:

1. High costs, that is, operating companies do not risk investing in environmental projects due to the high economic-financial risk represented by the construction of an adequate infrastructure. This type of project presents a very low or no return on investment.

2. Governments have developed as a measure of pressure through laws and decrees economically aggressive sanctions to counteract the environmental impact generated by this industrial sector.

3. Insurance companies increase policies according to the environmental impact generated by energy extraction activities.

In this sense, TLBS Corporation, as an engineering company and general contractor, has integrated the environmental and sustainable development trend since 2019 with the promotion of the project called "Green Planet Oil & Gas" (GPOG). This project consists of the creation of service lines for the oil industry that help prevent environmental accidents and preserve the environmental balance.
For this purpose, a proprietary Business Management System (BMS) was created, controlled through a software called "Essential-ITS". This system offers integral and technological solutions, which allow processing operational data extracted in the field for its follow-up, development and control by means of computational models managed from mobile devices through the Apps, and real time monitoring (at a distance) to achieve a global positioning.



Credits: Fracttal

As a second technological tool, the project uses a software called: (CMMS) Computerized Maintenance Management System, for gas leak control in industrial plants. These tools will allow the integration of emerging technologies such as Artificial Intelligence (AI), Internet of Things (IoT), industrial robotics and unmanned aerial vehicles (drones). Additionally, nanotechnology and biotechnology converge in a single system that will be able to provide the results of inspection and sanitation of facilities. The information captured from the operational activity will allow evaluating facilities, processes and equipment that are related to the activity of hydrocarbon production and its consequences. Consequently, preventive and corrective action plans are created in response to the environmental impact generated by these activities, in order to reduce the greenhouse effect, the contamination of water sources and the cleaning of industrial facilities.

TLBS GPOG Project. “GREEN PLANET OIL&GAS” from the Business Management System (BMS) offers technical-economic feasibility studies and integral solutions (technical, operational and economic) from three (AD) Areas of Development of engineering and projects, these areas of development are:

- **Venting Reduction and Use / Burning Gases**
- **Treatment and Reuse of Connate Water from Hydraulic Fracture**
- **Artificial Intelligence for Asset and Facility Maintenance Management**

Each area has as its main objective to develop the service lines for energy, environmental and maintenance projects as part of the goods and services offered in a portfolio of tangible products related to air, climate change, water, oil and natural gas for potential customers and beneficiaries. These lines of services are:

- **Flowback Gas** “Burn & Vent Control and Recovery”
- **Outflow Gas** “Capture & Sealing Leak”
- **Artificial Intelligence** “AI” for Maintenance Management
- **Flowback Fracking** “Produced Water Treatment and Reuse”

The work segments of the GPOG Project and our Business Management System (BMS), are governed by the concepts and software tools located in the different Development Areas (DA), which in turn, aim at establishing the service lines, being these the final measurable product of the project. The following Figure 1 and 2 shows the diagram.

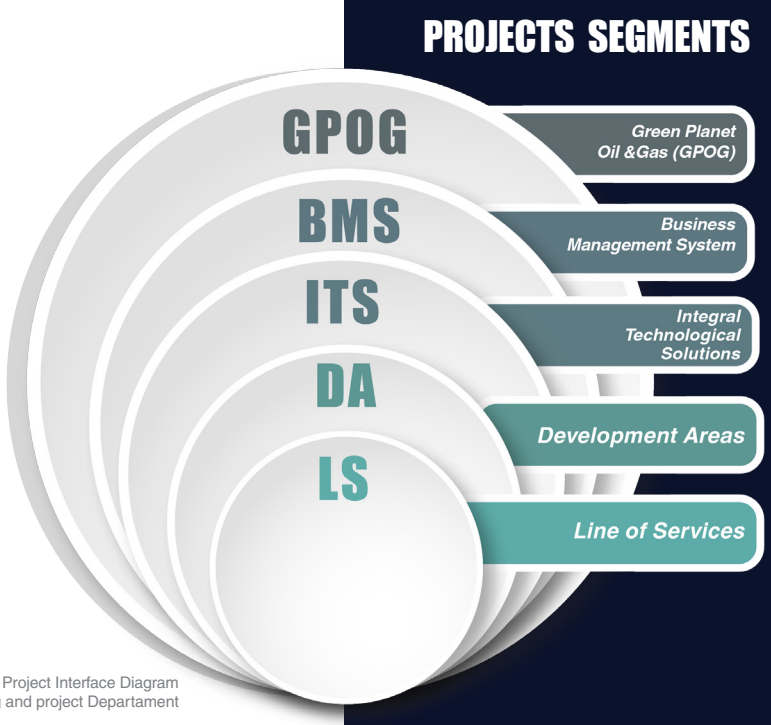


Figure 1 . GPOG Project Interface Diagram
Source: TLBS Corporatopn Engineering and project Departament

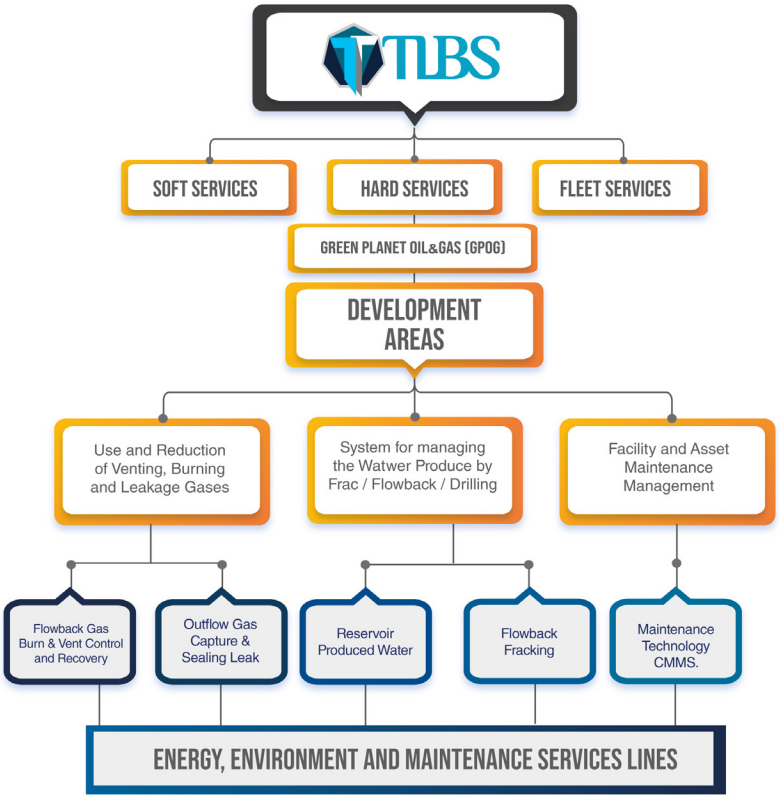


Figure 2 . Development Areas.
Green Planet Oil & Gas Project (GPOG).
TLBS Corporation

Integral & Technological Solutions (Essential-ITS); is a high-end software developed by TLBS CORPORATION's multidisciplinary team of engineers and technicians.

GPOG GOALS

- To determine the behavior of the flow through pipelines oriented to the prevention and correction of failures, leaks and consequently environmental damage.
- Develop strategies to improve the quality of Natural Gas handling processes and facilities.
- Establish controlled plans of preventive and corrective actions to mitigate the environmental impact caused by the burning and leakage of Natural Gas and Methane Gas.
- Process the data extracted from the field obtained from a chromatographic analysis of the gas technology laboratory to determine its value or power as an energy source.
- To process the data extracted from the field to analyze the quality of the water coming from the hydraulic fracture to determine its value as an energy source.

To determine the technical and economic feasibility of adapting the infrastructure and installations that allow the use of natural gas according to the operational, environmental and geographical conditions that apply. That is to say, to implement a Business Management System integrated to the processes that will allow a better handling, using and exploitation of Natural Gas as a resource, becoming a “Green Energy” main source for National interest.

Execute best practices for the handling and processing of Natural Gas, treatment and final disposal of fracture water under the monitoring of a technological system such as: Essential-ITS, which will show through automatic alerts the possible technical failures and human errors that directly affect the environment.

The project is technologically supported by modern concepts for handling and processing information for industrial use. The usefulness of some emerging technologies such as the “Internet of Things” (IoT) will allow the use, in its maximum expression, of resources, equipment, tools and processes, which in turn are interconnected with “Artificial Intelligence” (AI) to limit human error and maximize the chances of success in tasks and/or applications of industrial robotics.



Credits: bIGSTOCK

BURNING, VENTING AND LEAKING NATURAL GAS

A Potencial Evil or an Energy Resource?



BURNING,
VENTING AND LEAKING NATURAL GAS

A Potencial Evil or an Energy Resource?

VENTING, BURNING AND LEAKAGE GASES



The development area for the reduction of Burning, Venting and Leakage, is a concrete response to the problem of gas emissions into the atmosphere, in the first place because it seeks to reduce gas emissions; secondly, best management and processing practices must be applied to optimize the use of the resource, its rational, controlled and commercially monetized exploitation; thirdly, risk premiums (financial insurance) and tax or penalty payments by governments due to greenhouse gas emissions pollution must be reduced.

The project includes the incorporation into the MIDSTREAM System (Processing plants - processes - storage facilities - transport - collection lines) of the latest generation tools to reduce and control CH_4 methane leaks associated with pipelines and compressors. Additionally, pipeline inspection, external monitoring and real-time leak detection technologies are included.

Environment in numbers.
"Natural Gas in the United States"

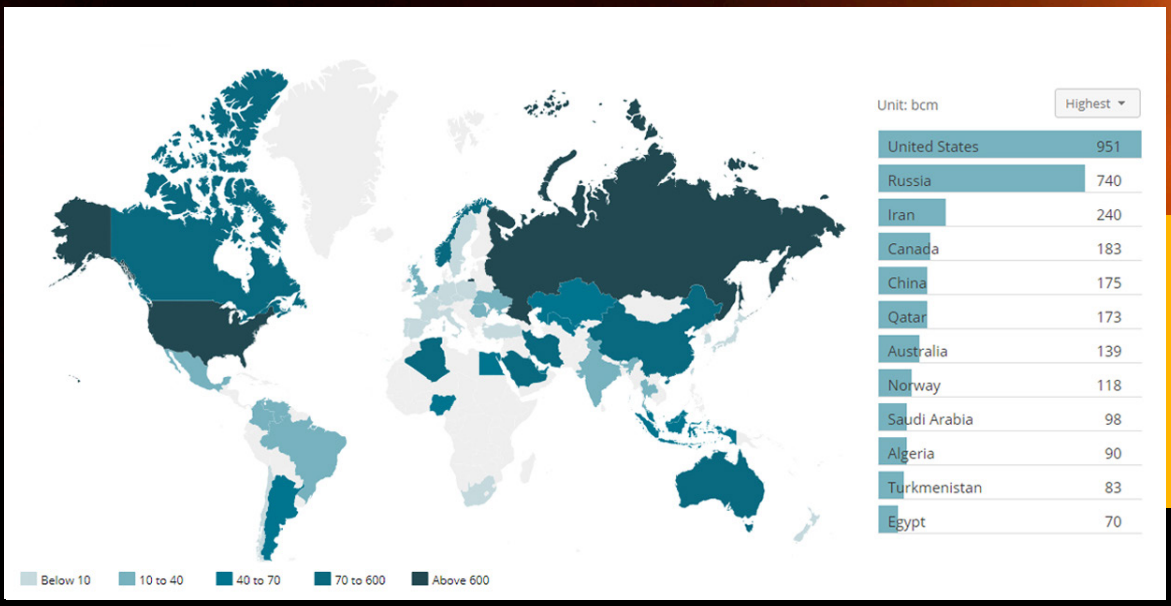


Figure 3. Volume of CO_2 emissions by country.
Source: Enterdata, Global Energy Statistical Yearbook 2020

According to ENERDATA's annual report, Global Energy Statistical Yearbook 2020, in its latest energy industry trend report, the United States of America ranks second with approximately 4,920 $MtCO_2$, million metric tons of carbon dioxide, followed by China as the country generating the largest volume of CO_2 emissions with approximately 9,729 $MtCO_2$, from fuel combustion. See figure 3.



Credits: Getty Images

If we consider that in natural gas production, United States of America occupies the first position with a volume of approximately 951 BCM "Billion Cubic Meters", followed by Russia with approximately 740 BCM "Billion Cubic Meters", this will represent 40% of the additional gas production in the world in the year 2022, thanks to the remarkable growth of its national shale industry. By 2022, USA will overtake Australia and Qatar in world gas exports, according to the analysis of the International Energy Agency (IEA). In addition, the average gas flaring in USA by 2019 was approximately 600 billion Cubic Feet, or 1. 643.83 million Cubic Feet per day, according to World Energy Trade and 4.92 billion tons of CO_2 ($MtCO_2$) were generated by carbon dioxide (CO_2) emissions, with oil contributing 43% (2,115.6 $MtCO_2$), gas 34% (1,672.8 $MtCO_2$) and coal 23% (1,131.6 $MtCO_2$).

The burning of 1,643.83 million Cubic Feet per day represents a monetaryloss for the US energy sector of US$ 2.9 million per day, for a total of US$ 1,067 million per year. See Figure 4.

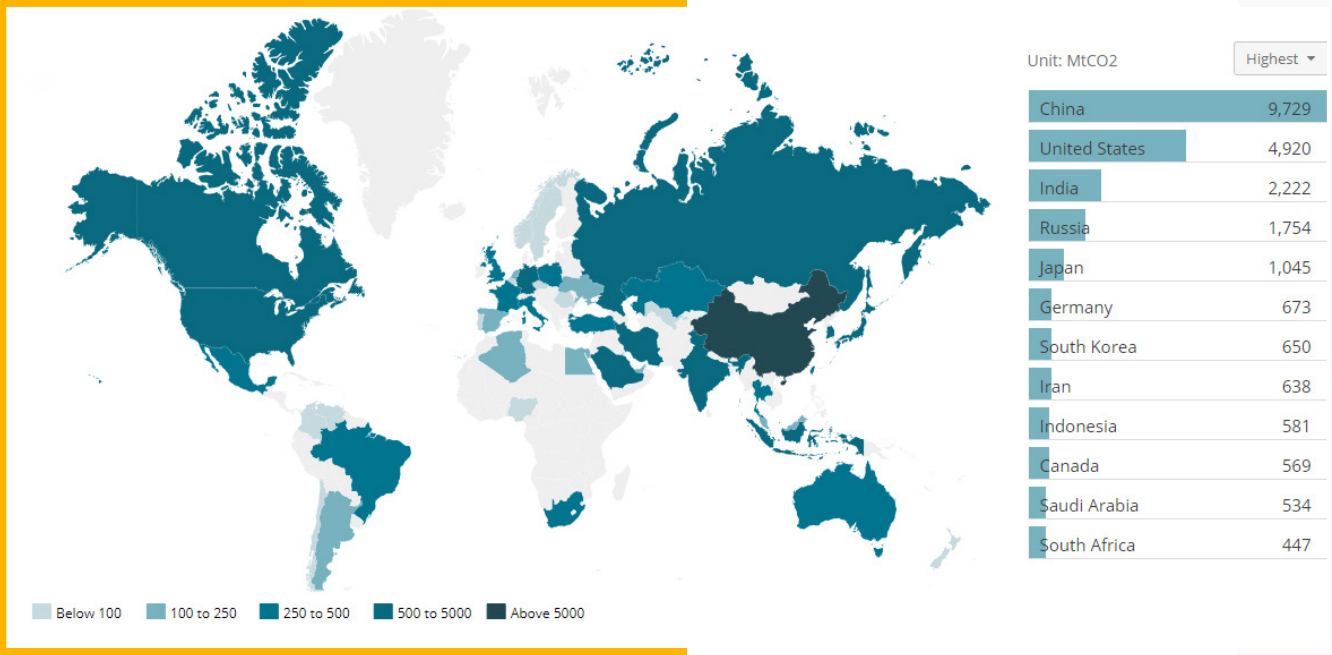


Figure 4 . Natural Gas Production by Country.
Source: Enterdata, Global Energy Statistical Yearbook 2020

Similarly, Methane (CH_4) is a powerful "GHG" greenhouse gas, its life span in the atmosphere is much shorter than that of Carbon Dioxide (CO_2), however, it traps more radiation.

Methane's impact on climate change is more than 20 times greater than Carbon Dioxide over a 100-year period and about 86 times greater over a 20-year period. The Environmental Protection Agency's (EPA) National Greenhouse Gas Inventory estimates that in 2012 Methane contributed approximately 10% of gross greenhouse gas (GHG) emissions (on a CO_2 equivalent basis) from anthropogenic sources in the United States. According to the "Science" study that analyzed methane emissions, approximately 2.3% of natural gas produced in the U.S. escapes directly into the atmosphere due to leaking equipment or intentional discharges (some of these discharges are legally permitted). Methane gas leaks by 2019 are 2,564.73 Million Cubic Feet per day, which represents about US$ 4.5 million dollars lost in Methane Gas daily.

In general, the production of rich gas is associated with crude oil production, field conditions, economic variables, characteristics and composition of the field. The lack of infrastructure for its capture, transport and processing leads to the unfortunate decision to burn it, thus misses out on its commercial and strategic value.

For example, North Dakota by itself burned approximately 30% of all the gas produced in the state, with the national average being less than 1% of marketed production. Flaring of gas associated with oil production is often permitted in the initial phase of well development; exploitable gas volumes can be counted for which the gas infrastructure (collection lines, processing plants and compressors) must be optimized or construction of operational facilities must be planned if these do not exist. If the Rich Gas is collected and sent to processing plants to extract the Liquids from the Natural Gas (based on gas richness - heavier hydrocarbons - GPM (1-4) number of gallons of liquid per 1000 cubic feet of natural gas), then fractionate them and finally transport them for use in the electric, industrial, domestic, petrochemical and oil sectors, we would then be contributing to minimize the impacts on the environment, product of the burning and venting of Gas, at the same time we would reduce the enormous waste of raw material.

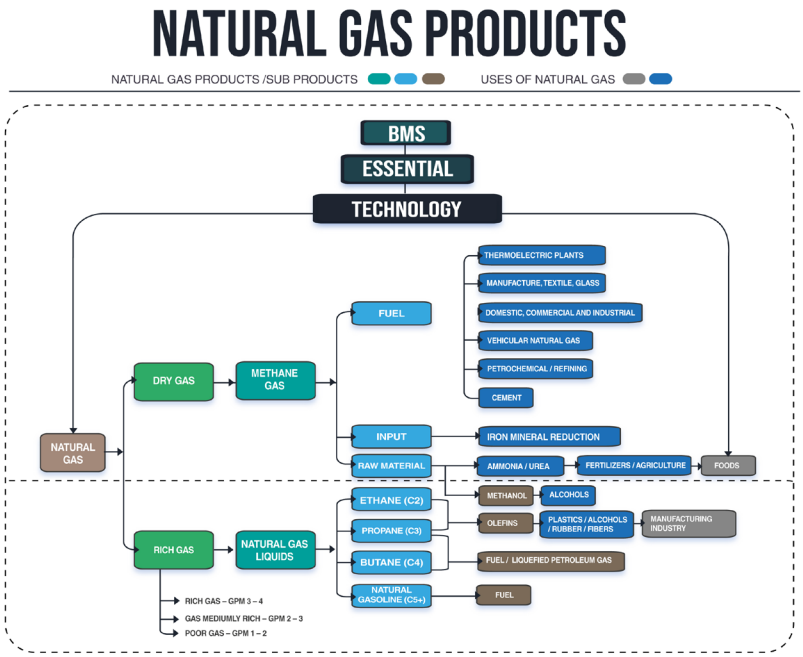
Additionally, the recovered gas, according to its composition and level of richness and its processing, has diverse uses and once processed, it generates products, by-products of high commercial value of national and international interest for export:

1.- Dry Gas, it has Methane Gas, this is used for reinjection in the deposits to maintain the energy and increase the recovery of crude, it is also used as Fuel for thermoelectric plants, displacing the use of coal that contributes significantly to the emissions of Carbon Dioxide CO_2. In addition, it has domestic, commercial and industrial use, and is also used in Petrochemical and Refining, in Cement Processing Plants, as Natural Gas for Vehicles and as an input for iron ore reduction and as a raw material for the production of Ammonia/Urea (Agricultural Fertilizers - Food) and Methanol (Alcohols).

2. - Rich Gas or Poor Gas, contain high or low richness in heavier hydrocarbons (GPM 1 - 4), which when submitted to an Extraction Process we obtain the Natural Gas Liquids (NGL), which are later fractionated and submitted to cryogenic processes to obtain products: Ethane (C_2), Propane (C_3), Butanes (C_4), Pentane (C_5), Natural Gasoline (C_6) and Residual Naphtha (C_7), which are products with a high commercial and export value. They are also raw materials for petrochemical processes to produce Olefins (Plastics, Alcohols, Rubber, Fibers), which are used as Fuel and Liquid Petroleum Gas.

VALUE CHAIN FOR THE HANDLING AND TREATMENT OF NATURAL GAS (BURNING / VENTING / LEAKAGE)

The first objective is to achieve results and methodology obtained from best practices in applied engineering sciences that will allow the identification of the type of gas to be flared or vented from its capture, data processing in the field and classification based on its composition and physical-chemical analysis [Heavy components - rich gas and light components - dry gas]. Figure 5 shows the value chain of gas for analysis, and by-products from production, processing, transportation, distribution and marketing for onshore and offshore projects at oil facilities.



GPM: NUMBER OF GALLONS OF LIQUID THAT CAN BE EXTRACTED FROM EVERY 1000 CUBIC FEET OF NATURAL GAS

VALUE CHAIN OF GAS

Figure 5. Natural gas classification. "Value chain"
Source: TLBS Corporation Engineering and Project Department

The second objective forms the basis of economic engineering aimed at checking the chemical composition and energy power of the study gas for its monetization. That is to say, to determine and define the commercial value based on the physicochemical and energy performance of the natural gas sub-products, such as: Ethane, Propane, Butane, Pentane, Natural Gasoline, Naphtha and Residual Gas classified as the main raw material of inputs for other processes that have a high commercial value to monetize through the following sectors: Petrochemicals, Thermoelectric, Manufacturing, Domestic, Commercial, Cement and Metallurgical, Industrial and Vehicle.

The investigations initiated for the project in development since 2019, have as only purpose to control through a system of integral management as it is the: Essential ITS, the burning and venting of natural gas and the leakage of methane gas. It will be addressed with pilot tests and implementation with a short term contribution of (5%), medium term (12%), and long term (25%) in a period of 10 years projected in table 1.

Projected burn reduction and gas venting (MMCF) Day/Year			
Projection in years of reduced burning and venting	Projected contribution (%)	Average production (MMCFD)	Average production (MMCFA)
Short Term 1-3 years	5 %	82,19	29.999,50
Medium Term 3-5 years	12 %	197,26	71.998,80
Long Term 5-10 years	25 %	410,95	149.997,49

Table 1. Volume Projection of Flaring Reduction and Gas Venting
Source: TLBS Corporation Engineering and Project Department

The expected result of this line of project services is to achieve a recovery of between 5% and 25% of the Gas Flaring and Venting in oil facilities, which translates into 82.2 - 411.0 Million Cubic Feet of Gas per day that would stop being flared and vented to the environment.

For every Million Cubic Feet of Gas per day that is recovered, we help reduce the emission of 0.0082 Million Tons of (CO_2) per day, which in terms of (5% - 25%) of the gas to be recovered would represent between 0. 67 - 3.37 Million Tons of (CO_2), ($MtCO_2$) per day and that would translate into 246.0 - 1,2 29.98 Million Tons of (CO_2), ($MtCO_2$) no longer impacting the environment as a greenhouse gas. Likewise, it will reduce the environmental penalties for companies in the Oil & Gas sector.

Each Million Cubic Feet per day recovered has an average value of US$ 1778.37 which in absolute terms (5 - 25%) would represent a monetization between US$ 53.35 - US$ 266.75 Million Dollars per year. See Table 2.

Reduction of volume from Gas Emission (GHG) Greenhouse Gas ($MtCO_2$) Millions			**Projected savings from unburned or vented recovered gas (US$ x $MtCO_2$)**	
Projection in years of reduced burning and venting	$MtCO_2$/Day	$MtCO_2$/Year	Millions of (US$) Dollars/Day (MMCFD)	Millions of (US$) Dollars/Year (MMCFY)
Short Term 1-3 years	0,67	246,00	$ 0,15	$ 53,35
Medium Term 3-5 years	1,62	590,39	$ 0,35	$ 128,04
Long Term 5-10 years	3,37	1229,98	$ 0,73	$ 266,75

Table 2. Monetization - Savings from Recovered Gas
Source: TLBS Corporation Engineering and Project Department

RECOVERY OF GAS FLARING AND VENTING IN OIL FACILITIES



Credits: Getty Images



Credits: GTGrafics

SHORT TERM: 1-3 YEARS

The estimated contribution is about (5%), which represents a volume of burn reduction and venting of: (82.2 Million cubic feet/Day). With a reduction of greenhouse gas emissions of: (0.67 $MTCO_2$/Day). Millions of tons of CO_2 per day. This represents about (246 $MTCO_2$/Year). Monetization is projected at an average of (0.15) Million ($) Dollars/Day. (53.35) Millions of ($) Dollars/Year.

MEDIUM TERM: 3-5 YEARS

The estimated Contribution is over (12%), which represents a reduction volume of burning and venting of (197.3 Million cubic feet/Day). With a mitigation of greenhouse gas emissions of: (1.62 $MTCO_2$/Day). Millions of tons of CO_2 per day. This represents about (590.39 $MTCO_2$/Year). Monetization: (0.35) Millions of ($) Dollars/Day. (128.04) Million ($) Dollars /Year.



Credits: Wallpaper Abyss



Credits: Raconteur by Felicia Jackson

LONG TERM: 5-10 YEARS

Estimated Contribution is over (25%), which represents a reduction volume of burning and venting of (411.0 Million cubic feet/Day). With a mitigation of greenhouse gas emissions of: (3.37 $MTCO_2$/Day). Millions of tons of CO_2 per day. This represents some (1,229.98 $MTCO_2$/Year). Monetization: (0.73) Millions of ($) Dollars/Day. (266.75) Millions of ($) Dollars/Year. Tax reduction for gas emission or environmental penalties (12%) represented in (16.85) Million ($) Dollars/Day. (6,149.98) Millions of ($) Dollars/Year.

Source of estimates and calculation applied to the project:

The reduction of taxes for gas emissions or environmental penalties proposed by the project in its first estimates based on the long term (25%) represents some (13.82) Millions of ($) Dollars/Day (5,042.92 Millions of ($) Dollars/Year. Estimation based on the Regional Greenhouse Gas Initiative - published in The New York Times, April 04, 2019 - Carbon, Emissions, Prices) Price per ton of CO_2 (5 US$), percentage of covered emissions 18%, based on nine US states that have established a maximum level of emissions allowed to the energy sector on which the calculation was applied to project the preliminary reduction estimates.

METHANE LEAKAGE AND MONETIZATION DEVELOPMENT AREA

This is a concrete response to the problem of gas emissions into the atmosphere from leaks detected in oil facilities in natural gas extraction and processing areas. The aim is to reduce gas emissions (into the atmosphere) and reduce the high risk of explosions, applying the best handling and processing practices for greater use of the resource.

Its rational exploitation controlled by artificial technology for maintenance management, also seeks to reduce insurance risk premiums and payment of taxes or penalties by governments, as a result of pollution by greenhouse gas emissions; addressed from the beginning of the pilot tests and inspections in industrial facilities with short, medium and long term projections projected in table 3.

Reduction in Methane Gas Leakage Volume (MMCF)				Projected savings from non-emitted/leaking gas (US$ x MMCF)	
Projection in yearsof reduction of Methane Emissions	Projected contribution (%)	Leaks - Methane Gas Emissions/Day (MMCFD)	Leaks - Methane Gas Emissions/Year (MMCFY)	Millones de US$ Dólares / Día (MMCFD)	Millions of US$ Dollars/Year (MMCFY)
Short Term 1-3 years	5 %	128,24	46.806,32	$ 0,23	$ 83,24
Medium Term 3-5 years	12 %	307,77	112.335,17	$ 0,55	$ 199,77
Long Term 5-10 years	25 %	641,18	234.031.61	$ 1,14	$ 416,20

Table 3. Methane Leaks and Monetization
Source: TLBS Corporation Engineering and Project Department



Credits: AFP

LEAKS DETECTED IN OIL FACILITIES

FUGITIVE GAS

SHORT TERM: 1-3 YEARS

Estimated Contribution is about (5%), which represents a volume of reduction of leaks and methane gas emissions: (128.24 Million cubic feet/Day). This constitutes a 46,806.32 Million cubic feet/year). Monetization is projected at an average of (0.23) Million ($) Dollars/Day. (83.24) Millions of ($) Dollars/Year

MEDIUM TERM: 3-5 YEARS

The estimated contribution is about (12%), which represents a reduction volume of leaks and methane gas emissions: (307.77 Million cubic feet/Day). This constitutes 112,335.17 Million cubic feet/year). Monetization is projected at an average of (0.55) Million ($) Dollars/Day. (199.77) Millions of ($) Dollars/Year

LONG TERM: 5-10 YEARS

The estimated contribution is about (25%), which represents a reduction volume of leaks and methane gas emissions: (641.18 Million cubic feet/Day). This constitutes 234,031.61 Million cubic feet/year). Monetization is projected at an average of (1.14) Million ($) Dollars/Day. (416.20) Millions of ($) Dollars/Year

Source: Estimates and calculation applied to the project according to the study by Science (latercera/pulse-trader/news/leaking-threatening-image-of-natural-gas), which analyzed methane emissions, approximately 2.3% of natural gas produced in the United States escapes directly into the atmosphere due in part to leaking equipment or intentional discharges.

RECOVERED GAS MONETIZATION

The production of Natural Gas Liquids (NGL) of USA for 2019 according to the U.S. Energy Information Administration (EIA) was 1,756,753 thousand barrels (22) that is to say 4,813 thousand barrels per day, which represented an approximate income for 2019 of US$ 70,000 Million Dollars.

Through this project, it will be possible to quantify up to 60% of the recovered gas that is flared and vented between 49.32- 256.57 Million Cubic Feet of Gas per day and that has the characteristics and composition of rich, medium-rich and poor gas, which through extraction and fractionation infrastructure would be obtained on average from Natural Gas in the order of 3,522. 56 - 17,612.82 Barrels per day of NGL, would generate products and sub-products of high commercial and export value for an amount of US$ 0.17 - 0.85 Million Dollars per day, which would generate an average income for the energy sector in the USA of between US$ 62.38 - 311.91 Million Dollars per year.



Credits: IStock

The intention is to redirect and store a large part of the gas recovered to reduce the emission of gases into the atmosphere, for a better use of the resource. Its controlled rational exploitation, in spite of avoiding high contamination, which impacts the planet's climate change, is processed to convert it into a source of economic income for the main operating companies, from the extraction of liquids or products derived from recovered natural gas. The operational essence of the project starts from the inspections in industrial facilities, offering engineering based on the high standard of regulations and the control from technological solutions with short, medium and long term projection projected in Table 4.

	Gas Volume (MMPCD)	Type of GAS based on its composition	GAS Quality	Level of Richness (GPM)	Volume obtained per million cubic feet recovered (Barrels of LGN)	Fractionated products with high commercial value (BLS)		Monetization (MMUS$ / BLS DAY)	Monetization (MMUS$ / BLS YEAR)	Total MMUS$ DAY	Total MMUS$ YEAR
Short Term (5%)	49,31	Rich Gas - Medium Rich Gas - Poor Gas	High Richness (GPM: 3 - 4) Medium Richness (GPM: 2 - 3) Low Richness (GPM: 1 - 2)	4	4.696,75	2.113,54	Propane (C_3)	0,084	30,74	0,23	83,18
						704,51	Regular Butane (NC_4)	0,034	12,31		
						610,58	ISO Butane (IC_4)	0,030	10,89		
						516,64	Pentane (C_5)	0,033	11,87		
						422,71	Natural Gasoline (C_6)	0,027	9,76		
						328,77	Residual Naphtha (C_7)	0,021	7,61		
				3	3.522,56	1.585,15	Propane (C_3)	0,063	23,06	0,17	62,38
						528,38	Regular Butane (NC_4)	0,025	9,23		
						457,93	ISO Butane (IC_4)	0,022	8,17		
						387,48	Pentane (C_5)	0,024	8,90		
						317,03	Natural Gasoline (C_6)	0,020	7,32		
						246,58	Residual Naphtha (C_7)	0,016	5,71		
				2	2.348,38	1.056,77	Propane (C_3)	0,042	15,37	0,11	41,59
						352,26	Regular Butane (NC_4)	0,017	6,15		
						305,29	ISO Butane (IC_4)	0,015	5,44		
						258,32	Pentane (C_5)	0,016	5,93		
						211,35	Natural Gasoline (C_6)	0,013	4,88		
						164,39	Residual Naphtha (C_7)	0,010	3,81		
				1	1.174,19	528,38	Propane (C_3)	0,021	7,69	0,06	20,79
						176,13	Regular Butane (NC_4)	0,008	3,08		
						152,64	ISO Butane (IC_4)	0,007	2,72		
						129,16	Pentane (C_5)	0,008	2,97		
						105,68	Natural Gasoline (C_6)	0,007	2,44		
						82,19	Residual Naphtha (C_7)	0,005	1,90		

Table 4. Natural Gas Liquids / Fractionated Products / Monetization). Short Term.
Source: TLBS Corporation Engineering and Project Department

SHORT TERM: 1-3 YEARS

Estimated contribution is about (5%). The Rich Gas recovered represents a volume of 49.31 million cubic feet / day, which depending on the level of gas richeness and its composition, we would have a gas with Medium richnees (GPM 3-4), High richness (GPM 2-3) or Low richness (GPM 1-2), which defines the amount of liquid that can be extracted per million cubic feet of natural gas, and the subsequent fractionated products that would be obtained: Propane, Butane, Pentane, Natural Gasoline, Residual Naphtha. Thus, for a GPM 3, a volume of 3,522.56 Barrels of Natural Gas Liquids (NGL) would be obtained, which when fractionated generate products whose monetization amounts to 0.171 Million ($) Dollars/Day and represents 62.38 Million ($) Dollars/Year).

Project: Flowback Gas - Burn & Vent Control and Recovery / Outflow Gas - Capture & Sealing Leaks.
(Natural Gas Liquids/Fractionated Products/Monetization). Medium Term.

	Gas Volume (MMPCD)	Type of GAS based on its composition	GAS Quality	Level of Richness (GPM)	Volume obtained per million cubic feet recovered (Barrels of LGN)	Fractionated products with high commercial value (BLS)		Monetization (MMUS$ / BLS DAY)	Monetization (MMUS$ / BLS YEAR)	Total MMUS$ DAY	Total MMUS$ YEAR
Medium Term (12%)	118,36	Rich Gas - Medium Rich Gas - Poor Gas	High Richness (GPM: 3 - 4) Medium Richness (GPM: 2 - 3) Low Richness (GPM: 1 - 2)	4	11.272,20	5.072,49	Propane (C_3)	0,202	73,78	73,98	199,62
						1.690,83	Regular Butane (NC_4)	0,081	29,54	29,62	
						1.465,39	ISO Butane (IC_4)	0,072	26,13	26,20	
						1.239,94	Pentane (C_5)	0,078	28,48	28,55	
						1.014,50	Natural Gasoline (C_6)	0,064	23,42	23,49	
						789,05	Residual Naphtha (C_7)	0,050	18,27	18,32	
				3	8.454,15	3.804,37	Propane (C_3)	0,152	55,34		149,72
						1.268,12	Regular Butane (NC_4)	0,061	22,15		
						1.099,04	ISO Butane (IC_4)	0,054	19,60		
						929,96	Pentane (C_5)	0,059	21,36		
						760,87	Natural Gasoline (C_6)	0,048	17,57		
						591,79	Residual Naphtha (C_7)	0,038	13,71		
				2	5.636,10	2.536,25	Propane (C_3)	0,101	36,89		99,81
						845,42	Regular Butane (NC_4)	0,040	14,77		
						732,69	ISO Butane (IC_4)	0,036	13,06		
						619,97	Pentane (C_5)	0,039	14,24		
						507,25	Natural Gasoline (C_6)	0,032	11,71		
						394,53	Residual Naphtha (C_7)	0,025	9,14		
				1	2.818,05	1.268,12	Propane (C_3)	0,051	18,45		49,91
						422,71	Regular Butane (NC_4)	0,020	7,38		
						366,35	ISO Butane (IC_4)	0,018	6,53		
						309,99	Pentane (C_5)	0,020	7,12		
						253,62	Natural Gasoline (C_6)	0,016	5,86		
						197,26	Residual Naphtha (C_7)	0,013	4,57		

Table 5. Natural Gas Liquids/Fractionated Products/Monetization). Medium Term.
Source: TLBS Corporation Engineering and Project Department

MEDIUM TERM: 3-5 YEARS

Estimated contribution is about (12%) The rich gas recovered represents a volume of 118.36 million cubic feet/ day, which, depending on the level of gas richness and its composition, would be a gas with high richness (GPM 3-4), medium richness (GPM 2-3) or low richness (GPM 1-2), which defines the amount of liquid that can be extracted for each million cubic feet of natural gas, and the subsequent fractionated products that would be obtained: Propane, Butane, Pentane, Natural Gasoline, Residual Naphtha. Thus, for a GPM 3, a volume of 8,454.15 Barrels of Natural Gas (NGL) liquid would be obtained, which when fractionated generates products whose monetization amounts to 0.410 Million ($) Dollars/Day and represents 149.72 Million ($) Dollars/Year. See Table 6.

	Gas Volume (MMPCD)	Type of GAS based on its composition	GAS Quality	Level of Richness (GPM)	Volume obtained per million cubic feet recovered (Barrels of LGN)	Fractionated products with high commercial value (BLS)		Monetization (MMUS$ / BLS DAY)	Monetization (MMUS$ / BLS YEAR)	Total MMUS$ DAY	Total MMUS$ YEAR
Long Term (25%)	246,57	Rich Gas - Medium Rich Gas - Poor Gas	High Richness (GPM: 3 - 4) Medium Richness (GPM: 2 - 3) Low Richness (GPM: 1 - 2)	4	23.483,76	10.567,69	Propane (C_3)	0,421	153,71		415,88
						3.522,56	Regular Butane (NC_4)	0,169	61,54		
						3.052,89	ISO Butane (IC_4)	0,149	54,43		
						2.583,21	Pentane (C_5)	0,163	59,33		
						2.113,54	Natural Gasoline (C_6)	0,134	48,80		
						1.643,86	Residual Naphtha (C_7)	0,104	38,07		
				3	17.612,82	7.925,77	Propane (C_3)	0,316	115,28		311,91
						2.641,92	Regular Butane (NC_4)	0,126	46,15		
						2.289,67	ISO Butane (IC_4)	0,112	40,83		
						1.937,41	Pentane (C_5)	0,122	44,49		
						1.585,15	Natural Gasoline (C_6)	0,100	36,60		
						1.232,90	Residual Naphtha (C_7)	0,078	28,55		
				2	11.741,88	5.283,84	Propane (C_3)	0,211	76,85		207,94
						1.761,28	Regular Butane (NC_4)	0,084	30,77		
						1.526,44	ISO Butane (IC_4)	0,075	27,22		
						1.291,61	Pentane (C_5)	0,081	29,66		
						1.056,77	Natural Gasoline (C_6)	0,067	24,40		
						821,93	Residual Naphtha (C_7)	0,052	19,04		
				1	5.870,94	2.641,92	Propane (C_3)	0,105	38,43		103,97
						880,64	Regular Butane (NC_4)	0,042	15,38		
						763,22	ISO Butane (IC_4)	0,037	13,61		
						645,80	Pentane (C_5)	0,041	14,83		
						528,38	Natural Gasoline (C_6)	0,033	12,20		
						410,97	Residual Naphtha (C_7)	0,026	9,52		

Table 6. Natural Gas Liquids/Fractionated Products/Monetization). Long Term.
Source: TLBS Corporation Engineering and Project Department

LONG TERM: 5-10 YEARS

Estimated contribution is about (25%). The Rich Gas recovered represents a volume of 118.36 million cubic feet / day, which depending on the level of gas richness and its composition, we would have a gas with high richness (GPM 3-4), Medium Richness (GPM 2-3) or Low Richness (GPM 1-2), which defines the amount of liquid that can be extracted per million cubic feet of natural gas, and the subsequent fractionated products that would be obtained: Propane, Butane, Pentane, Gasoline, Waste Gasoline. Thus, for a GPM 3, a volume of 8,454.15 Barrels of Natural Gas Liquids (NGL) would be obtained, which when fractionated generate products whose monetization amounts to 0.410 Million ($) Dollars/Day and represents 149.72 Million ($) Dollars/Year).

The bases of the engineering sciences applied by the company allow the development of the use of new technologies and applications for natural gas from the Internet of Things (IoT) and the Artificial Intelligence to (AI), technology of drones and industrial robotics in order to be able to operate from the services for the remote control of variables on the handling and processing of the natural gas, one works in the creation of programs and mechanisms to show behaviors considered intelligent of the systems of gas handling and systems of computational simulation for the analysis of the behavior of the flow of Gas by the pipes and irregular surfaces; to develop methodological strategies that include quality, safety and environmental impact studies, as well as feasibility studies for the use and adaptation of existing infrastructure, projects to expand gas processing infrastructure and agreements to optimize the use and commercialization of this energy resource. To take advantage of it, this gas must be collected by pipes, separated, sent to compression plants to increase its pressure, in the processing plants to extract the Natural Gas Liquids (based on gas richness), and finally be transported for its use in the electric, industrial, domestic, petrochemical and oil sectors.



PRODUCED WATER OIL & GAS

AS A WATER RESOURCE

THE ACHILLES HEEL OF THE OIL INDUSTRY



Credit: Alex Wong/Getty Images

PRODUCED WATER OIL & GAS

AS A WATER RESOURCE

THE ACHILLES HEEL OF THE OIL INDUSTRY



Credits:Trent Jacobs,
JPT Digital Editor/Evolution
Well Services

FRAC & FLOWBACK

DRILLING & WELL SERVICES

As a country, United States of America has the #1 place in the application of hydraulic fracturing of non-conventional deposits, as it can be seen in Figure 6.

During the last decade it solved its energy problem with this practice of gas and oil extraction, in fact, it became the country that invests more money in this technique. In view of the environmental impact that this activity causes, it established numerous controls on the subject of fracking, given that this practice is associated with the contamination of water bodies with hundreds of chemical additives and methane leaks.

Another large producer is South America, led by Argentina and its considerable resources of this gas, occupying the second place in the world in terms of exploitation capacity, followed by China and Canada.

The first four countries that do fracking. Unconventional oil and gas operations "UOG"



EEUU 1



ARGENTINA 2

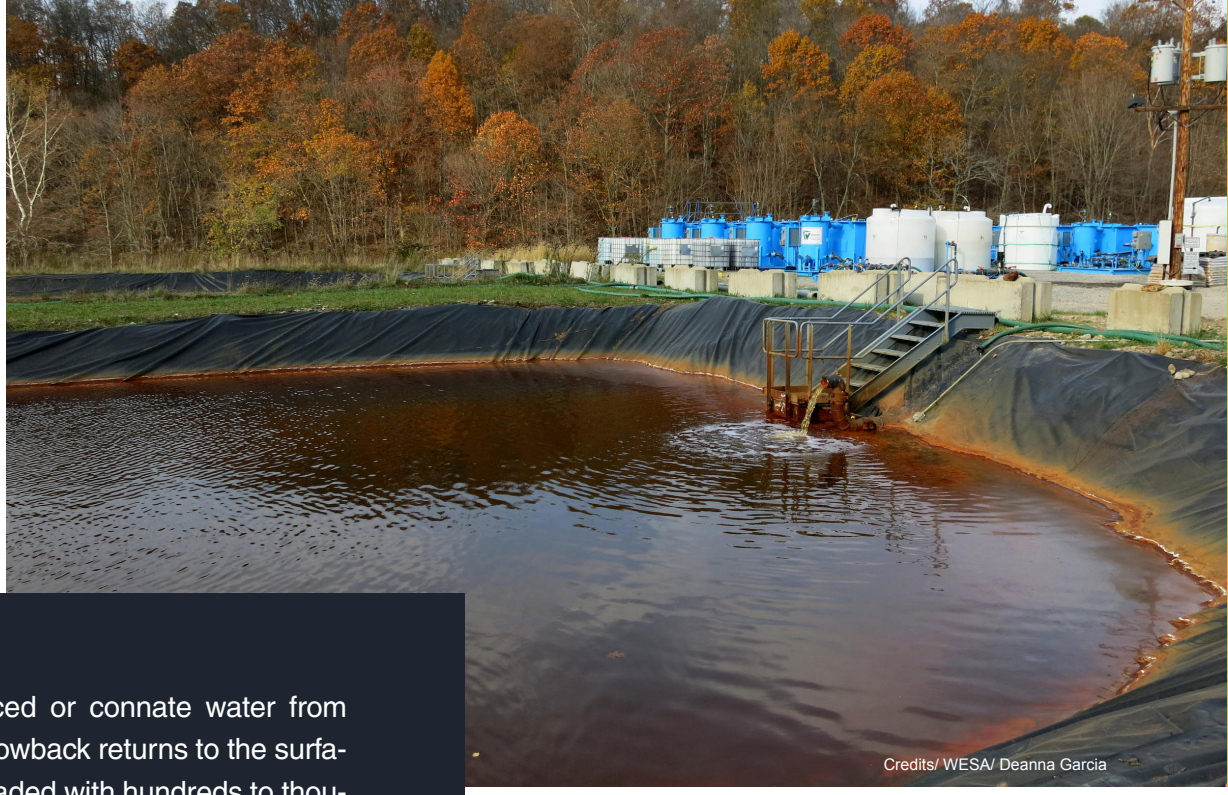


CHINA 3



CANADA 4

Figure 6. First 4 countries that do fracking.
Unconventional Oil & Gas operations "UOG"
Source: EIA Energy Information Administration USA.



Credits/ WESA/ Deanna Garcia

Produced or connate water from the flowback returns to the surface loaded with hundreds to thousands of chemical compounds, which because of their high concentrations, these waters become an active pollutant. The United States is noted for the environmental consequences of fracking operations in unconventional oil fields. These deposits characterized as non-conventional must be worked by means of Unconventional Oil & Gas Operations “UOG” due to their low or null permeability to be able to extract the hydrocarbons present; consequently it causes damage to millions of liters of water and natural effluents contaminated with toxic substances.

There is a global concern with respect to the development of UOG’s is related to the impacts on water quality, ecosystems and the welfare of the population. In United Kingdom, the Royal Society said that the practice of fracking can be used as long as oil and gas wells are built to strict standards at a certain depth and with proper wastewater management.

The Environmental Protection Agency through its report EPA-600-R-16-236ES (Hydraulic Fracturing for Oil & Gas: Impacts of the Hydraulic Fracture Water Cycle on Drinking Water Resources in United States, Dec 2016) states that produced water may contain many constituents, depending on the composition of the injected hydraulic fracturing fluid and the type of hydraulically fractured rock. Knowledge of the chemical composition of produced water comes from sample collection and analysis, which often requires advanced laboratory equipment and techniques that can detect and quantify chemicals in this water. In general, produced water has been found to contain:

- Salts, including those composed of chloride, bromide, sulphate, sodium, magnesium and calcium.
- Metals included such as aluminum, arsenic, barium, manganese, strontium iron.
- Naturally occurring organic compounds including benzene, toluene, ethylbenzene, xylenes (BTEX) and oil and grease.
- Radioactive materials, including radium.
- Hydraulic fracturing chemicals and their chemical transformation products.

Water is the major component of almost all hydraulic fracture fluids, typically accounting for 90-97% of the total volume of fluid injected into a well. The average volume of water used, per well, for hydraulic fracturing was approximately 1.5 million gallons (5.7 million liters) between January 2011 and February 2013, as reported in (***Analysis of Hydraulic Fracturing Fluid Data from the FracFocus Chemical Disclosure Log EPA Report).*** There was a wide variation in water volumes reported per well, with 10th and 90th percentiles of 74,000 gallons and 6 million gallons per well, respectively.

Tzahi Cath in the ***(Quadrennial Technology Review 2015)*** stated that: "About 335 billion gallons of water per day are withdrawn for use in the United States and data indicates that most of it is for thermoelectric cooling, followed by irrigation for agricultural activities. In further differentiating these uses by state and region, I note that in the west, water is used primarily for irrigation while in the east it is used primarily for thermoelectric cooling. In terms of States, both California and Texas are large producers and users of water".



Credits: Wallpaper Images

The local impacts on the quantity of drinking water occurred in areas with greater hydraulic fracturing activity. In 2011, for example, drinking water wells in an area covering the Haylesville Shale ran out of water due to higher than normal groundwater with entrainment and drought (Louisiana Ground Water Resources Commission, 2012).
Water withdrawals by hydraulic fracturing contributed to these conditions, along with other water users and lack of precipitation. Impacts on groundwater in Texas have also been reported. In a detailed case study, (Scanlon et al. (2014) estimated that groundwater levels in approximately 6% of the study area decreased by 100 feet (31 meters) to 200 feet (61 meters) or more after hydraulic fracturing activity increased in 2009.

The most recent report from the Environmental Protection Agency (Oil & Gas Hydraulic Fracturing: Impacts of the Water Fracturing Cycle on Drinking Water Resources in the United States, Dec 2016) presents volumes of produced water that may vary by well, rock formation and time after hydraulic fracturing.



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It further announces that large volumes of water used for hydraulic fracturing, about 4 million gallons per well in Marcellus Shale and Barnett Shale, must be collected and handled from hundreds of thousands to millions of gallons of produced water at the site.

The volume of water produced per day generally decreases over time, so volumes handled at the site immediately following hydraulic fracturing may be much greater than volumes handled when the well produces oil and/or gas. EPA was also able to identify chronic oral toxicity values from selected data sources for 98 of the 1,084 chemicals reported to have been used in hydraulic fracturing fluids between 2005 and 2013.

Potential human health hazards associated with chronic oral exposure to these chemicals in colon cancer, immune system effects, body weight changes, blood chemistry changes, cardiotoxicity, neurotoxicity, liver and kidney toxicity, and reproductive and developmental toxicity.

Several spills of fluids or additives from hydraulic fracturing have been documented in a state-managed database. The data collected in these studies showed that the primary causes of these spills were caused by equipment failure and human error. For example, an EPA analysis of spill reports involving nine state agencies, nine oil and gas well operators, and nine water fracturing service companies characterized 151 fluid spills, at or near well sites, in 11 states between January 2006 and April 2012 (US EPA, 2015). These spills were caused primarily by equipment failure (34% of spills) or human error (25%), and over 30% of the spills were from fluid storage units (e.g., tanks, containers and trailers). Similarly, a study of spills reported to the Colorado Oil & Gas Conservation Commission identified 125 spills during well stimulation (i.e. a portion of the life of an oil and gas well that often, but not always, includes hydraulic fracturing) between January 2010 and August 2013 (Colorado Oil & Gas Conservation Commission 2014). Of these spills, 51% were caused by human error and 46% were due to equipment failure.



Development Area for the treatment, reuse and final disposal of Produced Waters from Hydraulic Fracture (FLOWBACK) is focused on developing technological processes Produced waters biological treatment of these waters, including:

- Filtration
- Coagulation
- Absorption
- Disinfection
- Biologically active filtration
- Batch sequencing membrane bioreactor processes together with ultrafiltration and nanofiltration.



Credits: Filtomat Water

The project starts from the economic feasibility, taking into account the energy consumption according to the water treatment to be used and the generation of waste products (resulting from the treatment of produced water) in relation to current treatment technologies. To treat water produced with a fresh water quality, there are currently three main processes: Reverse Osmosis (RO, once above 50,000 milligrams of total dissolved solids "TDS" per liter, RO becomes economically inefficient). Vacuum distillation/mechanical vapour recompression Crystallization to achieve freshwater quality of produced water and silver shield technology as the highest filtration capacity.

The emergence of possible solutions to this problem addresses the practice of hydraulic fracturing in non-conventional deposits. The production of oil and gas foreseen for the next 10 years in the United States of America will bring greater consequences at the level of environmental impacts. TLBS Corporation is currently developing a project with the application of state-of-the-art technologies to reuse water in hydraulic fracturing through the "Flowback" service line.

The main objective of this development area is to reuse connate water for injection into new wells, or to guarantee a better final disposal after a filtering technology process, which allows for the control of the 1084 chemical components that, according to ***Chemical Abstracts Service Record (CASRN)***, could be present in produced water. The scope is to achieve the use of filter technology according to the value chain to achieve the highest purity of water and re-inject or reuse it.

PRODUCED OR CONNATE WATER



Credits: Green School

VALUE CHAIN FOR MANAGEMENT AND TREATMENT OF PRODUCED WATER BY FRAC /FLOWBACK / DRILLING (SEPARATION/PURIFICATION/FINAL DISPOSAL)

The engineering applied to this integral solution proposed by the company starts from the most recent advances in biotechnology and nanotechnology, which up to now have allowed it to select the methods of Reverse Osmosis, Vacuum Distillation/Mechanical Vapor Compression and Crystallization to achieve fresh water quality of the produced water. The “Silver Shield” technology developed by NASA is also being studied to evaluate the costs and feasibility of the project as part of the contribution to environmental damage. See figure 7.

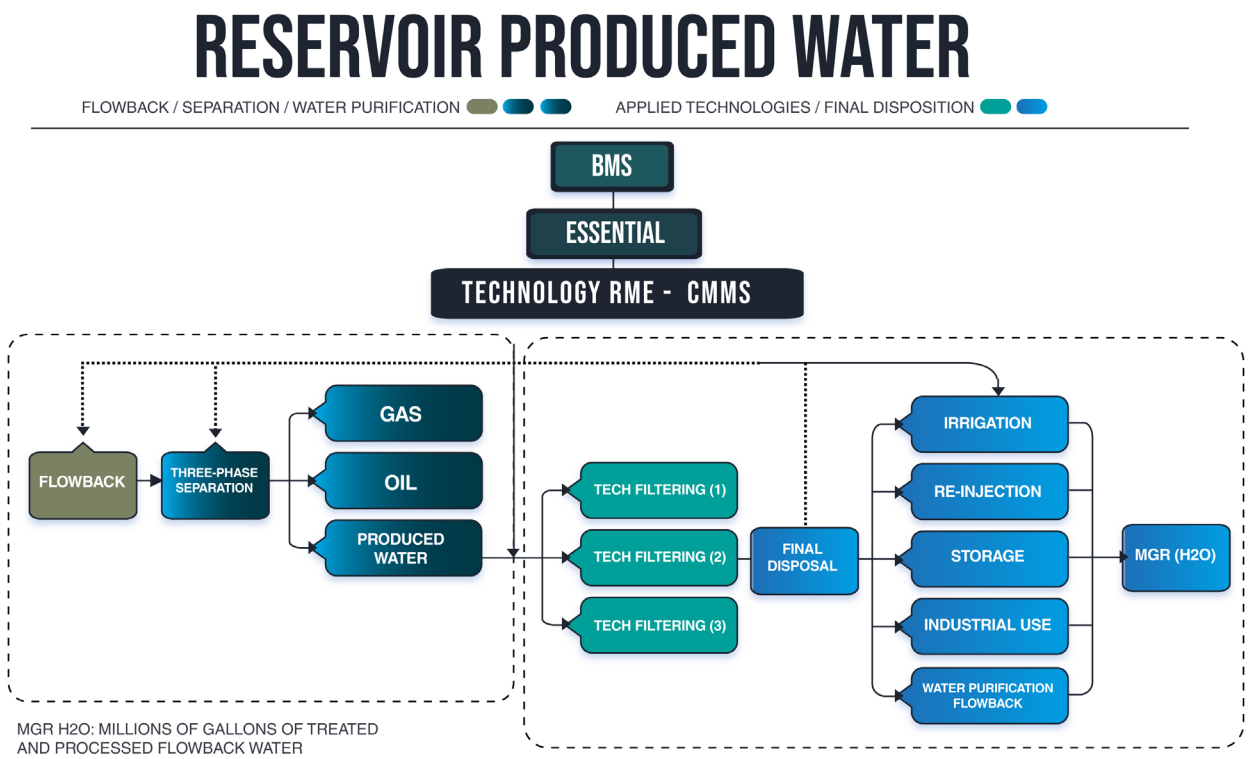


Figure 7. BMS Technology Bussines Management System CMMS / EAM for Total Productive Maintenance
Source: TLBS Corporation Engineering and Project Departament

SILVER SHIELD

TECHNOLOGY CMMS FOR MAINTENANCE MANAGEMENT OF OIL & GAS FACILITIES

BEST PRACTICES



Credits: IFS Blog

The Technology Development Area focuses on CMMS software for Oil & Gas Facility Maintenance Management. TLBS Corporation basically aims at solving operational and maintenance problems from engineering, consulting and industrial project execution services.

The operations will be developed from the reliability engineering and industrial maintenance “RME”. The best operational maintenance practices will be applied under world class standards. Furthermore, the aim is to automate and digitalize the processes from the Artificial Intelligence (AI) technology and the Internet of Things (IoT).

These intelligent systems related to high-end technological tools such as: Software/Hardware CMMS, are used from enterprise resource planning “ERP” to budget and expense control in enterprise asset management “EAM”. The maintenance engineering of the project is based on the philosophy of TPM: Total Productive Maintenance, supported by quality assurance through regulations to optimize the management of facilities and assets in order to reduce human failure and equipment failure; this seeks to improve three resulting indicators: Operational Availability, Reliability and Maintainability, in facilities that operate with hydraulic fractured water and the handling or processing of natural gas.

The purpose, without a doubt, is to reduce serious environmental damage. It seeks to prevent and minimize leaks and emissions of methane gas (Fugitive -Gas) or spills caused by human failure or equipment defects in Oil & Gas facilities. Other technologies that accelerate this type of project would be: industrial robotics and the unmanned aerial vehicle (Drone) used in the inspection phase for maintenance control. See Figure 8.

MAINTENANCE MANAGEMENT

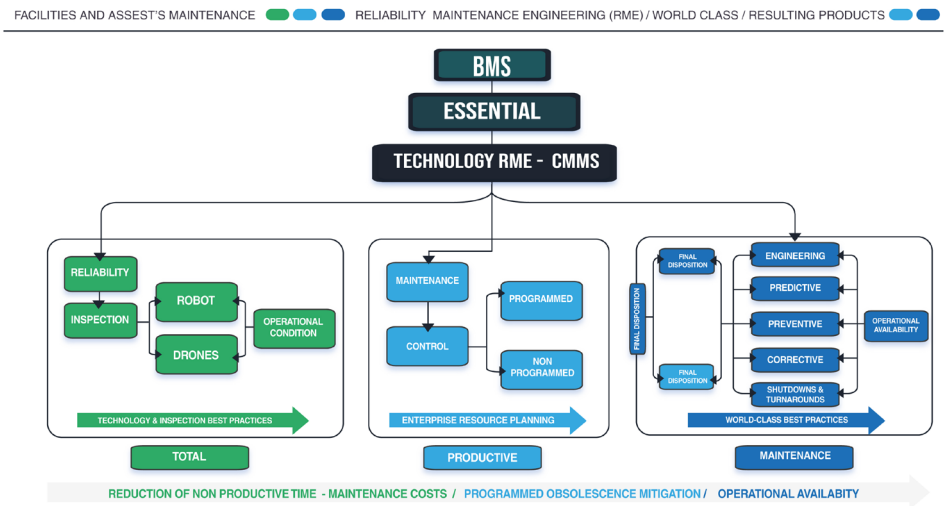


Figure 8. SGE Technology Business Management System CMMS / EAM for Total Productive Maintenance
Note: ISED Infrastructure - Systems - Equipment - Devices

HUMAN TALENT

THAT IS PART OF THE HIGH PERFORMANCE TEAM

The project (GPOG) is made up of a multidisciplinary team of experts with high competence in various branches of engineering, among which the following stand out: Ph.D. Javier Agostini (Executive Director), MSc Nemrod Contreras (Project Director), Eng. Nelson Sanoja (Special Projects Manager), Lic.Sc. Enderson Velásquez (Environmental Disaster Specialist) and MSc. Ninett Vielma Piña (Advisor for Integrated Oil & Gas Field Studies). For the development of the Software "Essential ITS" the team of Engineer Developers work conformed by, Luis González (Leader Developer of the Essential ITS System) and Adrián Araviche (Leader Developer of Essential ITS System), who take to the ideal programming language the task to process all the mathematical calculations and physical integration, thermodynamics and behavior of flow of fluids developed by the experts to the computational modeling, with the conceptual application of the "Internet of the Things" (IoT) and the Artificial Intelligence (AI) for the industrial robotics.

TLBS Corporation

TLBS has implemented recruitment strategies and work schemes that have made available to the U.S. a highly competent, experienced and achievement-oriented human talent that will bring great benefits to the development and sustainability of the economy, within the framework of this pandemic crisis that affects the economy of the United States of America to contribute to the needs of problems of national interest that limit the import of resources required for industrial revival and the country as the first power in the world.

Finally, the preliminary calculations and simulations with budget estimates were initiated, projecting the consolidation of this proposal for the next 18 to 24 months. 2021-2022. General progress of the GPOG project is 7%, started from the end of 2019, it has a life cycle with projection for the next 10 years in the United States of America (2020 -2030). It is built from the company's Industrial division: "Facilities Hard Services" and its development phases are as follows: Phase: 1 Visualization: 75%; Phase 2 Conceptualization: 80%; Phase 3 Definition: 80%' Phase Four 4: Implementation: 0%; Phase 5: Operation: 0%.



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(Executive Director)



MSc. Nemrod Contreras
(Project Director)



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MSc. Ninett Vielma Piña
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TLBS Corporation

We are Your Company



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