MINUTES
ARKANSAS TEACHER RETIREMENT SYSTEM
BOARD OF TRUSTEES-CALLED TELEPHONIC

Wednesday, August 22, 2018
4:00 p.m.
1400 West Third Street
Little Rock, AR 72201

ATTENDEES

Board Members Present
Jeff Stubblefield, Chair*
Dr. Richard Abernathy*
Anita Bell*
Lloyd Black*
Kathy Clayton*
Kelly Davis*
Bobby G. Lester*
Robin Nichols*
Janet Watson*

ATRS Staff Present
George Hopkins, Executive Director
Rod Graves, Deputy Director
Rett Hatcher, Deputy Director
Manju, Director, Information Systems
Jerry Meyer, Manager, Real Assets
Tammy Porter, Executive Assistant
Clint Rhoden, Director of Operations
Leslie Ward, Manager, Private Equity

Board Members Absent
Danny Knight
Deborah Thompson
Candace Franks, Bank Commissioner
Johnny Key, Education Commissioner
Hon. Andrea Lea, Auditor
Hon. Dennis Milligan, Treasurer

Guest Present
Sean Barron, Simmons Bank

Reporters Present
David Smith, AR DemGaz

**** via telephone***

I. Call to Order/Roll Call. Mr. Jeff Stubblefield, Chair, called the Board of Trustee meeting to order at 4:21 p.m. Voice roll call was taken. Mr. Knight, Ms. Thompson, Ms. Franks, Mr. Key, Hon. Lea, and Hon. Milligan were absent.

II. Adoption of Agenda

Ms. Nichols *moved* for *adoption* of the Agenda. Ms. Clayton *seconded* the *motion,* and the Board *unanimously approved the motion.*

III. Executive Summary. The Executive Summary was provided for reference with no questions or expansions on the written summary.

IV. Investment Committee Report. Ms. Robin Nichols**,** Chair, gave a report on the Investment Committee Meeting.

A. Recommendation to Commit up to $30 Million Dollars in GTLA Holdings, LP, Owner of GTL Americas, LP (GTLA). A Proposed 3.7 Billion Dollar Natural Gas-to-Liquids (GTL) Facility Designed to Convert Natural Gas to Refined High Quality, Ultra Clean Liquid Fuels Including Diesel Which is Expected to be 70% of the Plant's Output, Naphtha (Gel Used by the Chemical and Plastic Industries to Manufacture Several Products) Which is Expected to be 30% of the Plant's Output, and Electricity, to be Developed near Pine Bluff, Arkansas, with Imminent Need. The Recommendation Includes an Initial Investment of up to $20 Million Dollars to an Equity Investment in GTLA and up to an Additional $10 Million Dollar Reserve for Potential Add-on Investments in the Overall Project Through Special Opportunities Within the Project Such as Additional Equity, Debt Investments, Project Infrastructure Investments, and Investment Opportunities that May Occur as the Project Develops.

Rod Graves, Deputy Director, gave the committee a report on the recommendation. Land owners, developers, and others that buy, sell, or transport natural gas are struggling with an oversupply of natural gas in the United States. The oversupply of natural gas is projected to exist for at least 50 years. The abundance of natural gas reserves is due to increased drilling and improving technologies that make the extraction of natural gas more efficient. The oversupply of natural gas presents several issues including lower natural gas prices and storage constraints as the production of natural gas is much greater than the expected demand for several decades. As the US continues to produce oil and natural gas domestically, the oversupply is expected to increase.

One use for the abundance of natural gas is to convert the natural gas into liquid forms of fuel that burn cleaner than traditional petroleum based fuels commonly used today. This is different than the process of converting natural gas into a liquid form of natural gas to make it easier to transport as natural gas. Using GTLA technology the natural gas can be converted into common petroleum products such as diesel fuel. Natural gas converted into liquid fuels provides ultra clean burning forms of diesel and jet fuel. The need for cleaner burning fuels is increasing globally as more countries strive to reduce carbon emissions and become more environmentally friendly by replacing

traditional petroleum based fuels with alternative fuels as a means of powering transportation and producing electricity.

Another product of the natural gas conversion process is naphtha. Naphtha has many uses and is primarily used for chemical and plastic manufacturing. The three main uses of naphtha are industrial, as a solvent, and as a fuel (naphtha can be converted into gasoline). Plastic factories use naphtha commonly as the raw material for their products. Naphtha is also commonly used as a solvent and is found in various cleaning supplies. The third main use of naphtha is as a fuel or fuel additive. The relatively clean burning naphtha can also be added to other fuels to reduce emissions. Another use of naphtha is to decrease the viscosity of thicker crude oil delivered through pipelines using a mixing process to thin the crude oil and increase flows.

The thermal catalytic process to convert natural gas into clean burning diesel and naphtha generates material amounts of heat and requires cooling. The cooling is accomplished by using water to cool the equipment housing the chemical reactions. The cooling process results in the cooling water boiling and producing steam. The ability to capture the resulting steam from the cooling process is expected to produce 265 megawatts of electricity. This is greater than the plant's electrical needs of 50 megawatts and the excess 215 megawatts will be made available to sell on the local electrical grid. Electricity produced by the natural gas conversion process is a byproduct and is more environmentally friendly than electricity produced by more traditional steam plants.

ATRS staff has followed this project for several years and has worked over the past several months to analyze a potential investment in GTLA. Simmons Bank (Simmons) was also hired to perform due diligence on GTLA. The recommendation of Simmons and ATRS staff is a commitment in an initial investment of up to $20 million dollars in an equity investment in GTLA to be located near Pine Bluff, Arkansas, and hold up to $10 million dollars in reserve for special opportunities that may occur as the project develops. Final closing remains subject to final due diligence and negotiations of final terms. The special opportunities for the reserve could include additional equity related to long lead time items or debt investments, infrastructure investments, or other special opportunity investments in GTLA or the project's development group ESP, subject to affirmative notice with the ATRS Board Chair.

The oversupply of natural gas and the existing pipeline infrastructure in the US means a US based GTL production facility in the right location can take advantage of abundant, low cost natural gas supplies with minimal delivery costs. The proposed location for this facility has major natural gas pipeline facilities that provide ample supplies of natural gas for this size and type of facility.

GTLA's products include clean burning diesel, naphtha, and electricity. At completion, the plant is expected to produce over 23 thousand barrels of diesel per day, almost 10 thousand barrels per day of naphtha, and 215 megawatts of electricity that is available for sale. After plant completion and commissioning, the plant's revenue stream is expected to consist of approximately 70% from clean diesel, 20% from naphtha, and 10% from the sale of electricity.

The GTL plant to be constructed near Pine Bluff will use tried and true decades old technology to convert relatively low cost natural gas into higher value, clean burning fuels, fuel additives, and electricity. The process starts with the conversion of natural gas into synthesis gas (syngas). The syngas is distributed into a Fischer-Tropsch (FT) chamber to produce a liquid paraffin that is further refined in the facility into diesel and naphtha. The FT technology used for the conversion was first developed over 90 years ago and has evolved and improved over time. The FT process uses certain metal catalysts to create the chemical reactions needed and is widely known and used throughout the world to convert mixtures of carbon monoxide and hydrogen into liquid hydrocarbons. With the FT process widely known and used, the efficiency and profitability of a GTL facility depends in part on the particular technology, process, and catalyst used in the chemical reaction.

The first step in the conversion process is changing natural gas into syngas. Syngas is a fuel mixture consisting primarily of carbon monoxide and hydrogen. Syngas can be created through a chemical reaction process using natural gas, biomass, or other hydrocarbon compounds as the initial fuel or feedstock for the reaction. The development team for this project, ESP, has procured contracts with Haldor Topsoe of Denmark to use their proven processes and industry leading catalysts. Haldor Topsoe was founded over 75 years ago and has been well known for decades in the industry for maximizing the feedstock used in syngas conversion processes with lower energy requirements allowing this plant to get the most out of the conversion process using the least amount of energy and resources. The Haldor Topsoe technology, process, and catalysts used in the creation of

syngas have been applied successfully around the world for similar facilities including natural gas to liquids plants in Qatar and Nigeria. The plants in Qatar and Nigeria are of essentially the same size and capacity of the projected GTLA facility for Jefferson County.

Once the syngas has been created, additional chemical reactions are required to reach the final GTLA products of clean fuels and electricity. The next step involves technology, chemical processes, and catalysts provided through a licensing agreement with Axens and its parent company, the French Institute of Petroleum (IFP). Axens is a leading global provider of technologies, catalysts, services, and equipment for petrochemical and gas processing. Axens was created in 2001 through a merger of Procatalyse and IFP and is backed by strong research and development teams at IFP. IFP was created in 1944 and has over 1,150 researchers dedicated to creating and improving technologies in the fields of energy, transportation, and environment. The company's work produced a Nobel Prize in chemistry. A major goal of IFP is to apply the research and development group's extensive experience and IFP's collection of over 11,000 active patents to industrial projects such as GTLA. IFP has been very successful in their goal of bringing their research from the development stage to the industrial application stage with over 300 of their new technologies being used in the commercial production of various products globally.

This next step in the conversion of natural gas to clean diesel, naphtha, and electricity is to use technology and catalysts provided by Axens and IFP to convert the syngas into a liquid wax or paraffin that contains long chains of hydrocarbon molecules. This paraffin is created by using Axens' highly efficient catalyst of alumina embedded with cobalt to create the chemical reaction. At GTLA this process will initially use approximately 800 tons of catalyst in the conversion chamber. The paraffin then undergoes additional chemical reactions to break the long chain of hydrocarbon molecules into shorter chain hydrocarbon molecules for sulfur free, clean diesel and naphtha.

The chemical reactions are all exothermic or heat producing and require water to cool the equipment housing the chemical reactions. As heat is transferred from the chamber into the water, steam is produced and GTLA intends to convert that steam into electricity with use of steam turbines manufactured by Man Diesel and Turbo (Man). Man is based in Germany and has a long corporate history of over 250 years. Man is a global leader in the manufacturing and engineering of steam turbines. GTLA plans to use the steam created through the GTL reactions to spin the Man steam turbines that in turn drive

electrical generators that create electricity using the heat which is a natural byproduct of the cooling process.

Technip has been selected as the contractor to build and commission GTLA. Technip was founded in 1958 and has approximately 38,000 employees operating in 48 countries including a major office and facilities in Texas. Technip has built numerous petrochemical facilities in the United States. Technip is a company that specializes in project management, engineering, and construction for the energy industry and has successfully completed many large scale natural gas related facilities all over the world, including in the US. Technip built and completed the plant in Qatar mentioned above, and designed a GTL facility currently under construction in Uzbekistan. The facility in Qatar is a very similar sized natural gas to liquids facility to the GTLA plant to be located near Pine Bluff, while the one in Uzbekistan is even larger. These plants are also of a similar scope of GTLA and use the same Haldor Topsoe produced syngas that GTLA will use.

The completion of the plant in Qatar gives Technip unique experience in the engineering, construction, and commissioning of GTL plants that can be applied to GTLA for better results and efficiency of operation.

Mr. Graves stated that due diligence conducted by Simmons has shown that the proposed site near Pine Bluff, Arkansas, has the needed supply of natural gas, transportation, and infrastructure to meet and exceed the requirements of this project. The location has major advantages over both the Qatar and Nigeria facilities. GTLA will sell diesel and naphtha locally and globally. The plant's site design includes four ways to transport material from the plant: road, rail, pipeline, and barge. The plant is strategically located with Highway 365, Interstate 530, a quality Union Pacific rail, major pipelines, and the Arkansas River in close proximity. The ability to use barges will allow much of the plant's equipment to be shipped as large components for easier and less expensive installation.

Large high voltage power lines are also located near the plant site and excess power could be sold through these existing power lines with little infrastructure costs.

Mr. Graves explained the project is now poised for an initial equity investment (Series A) that is expected to be between $80 million dollars and $100 million dollars. Series A will provide financing for the project to complete the engineering and permitting phase. In addition Series A may be used to order some long lead time to manufacture

equipment near the end of the Series A investment period. After preliminary work on the project is complete another round of equity and debt financing will be needed to complete the project (Series B). At financial close of Series B, Series A investors can cash out their initial investment plus a preferred return of 15% per year or have the opportunity to participate in Series B. Series A investors that elect to participate in Series B will be able to cash out their 15% preferred return (expected to be $6 million dollars for a $20 million dollar investment) and use their initial investment plus an expected multiple of approximately 4.7 times on the initial investment as their investment in Series B. The initial $20 million dollar investment in Series A would also provide ATRS the ability to invest additional equity in Series B based upon the percentage of Series A that ATRS would ultimately acquire.

The Series B equity tranche will be approximately $1.4 billion dollars and will be used during the construction and start-up phases. Finally a debt offering of approximately $2.2 billion dollars will be issued to complete the required capital to finalize the project. After the financing structure, revenue streams, and cost of operation are figured, the projected equity return is expected to range from 25% to 32% for Series A investors.

ATRS staff has met with the major technology providers and left with great confidence in the technology providers. ATRS staff also met with KfW Bank on raising the amount of debt needed for Series B closing. KfW believes there will be no trouble in raising the debt needed to complete the project. KfW has been working on the debt component of this project about two years. The contractor has the resources, experience, and incentives to complete the project on time and on budget. The company has experienced management available and can obtain construction trades talent for the needed onsite construction tasks.

ATRS staff and Simmons recommend a commitment of up to $30 million dollars in GTLA Holdings, LP, owner of GTL Americas, LP. The recommendation includes an initial investment of up to $20 million dollars in an equity investment in GTLA and a reserve fund of up to $10 million dollars for special opportunities that may occur as the project develops. This reserve could not be released without the affirmative notice process that ATRS uses for other investments. The special opportunities could include additional equity or debt investments, infrastructure investments, or other special opportunity investments in GTLA or the project's development group ESP, subject

to affirmative notice. Other investments of this type allow for distributions from the investment to be reinvested or recalled by the investment. For clarity, the proposed Resolution for GTLA allows recallable distributions for this investment. Since the only close for the initial equity investment opportunity is expected to take place before the next scheduled meeting of the ALC, Imminent Need is also requested. As with all investments, any funding of this investment is subject to final due diligence and closing.

Mr. Hopkins asked Mr. Sean Barron, if there was anything additional that needed to be added. Mr. Barron stated that Mr. Graves explained everything and nothing else needed to be added.

Mr. Graves stated staff concurs with the recommendation.

Ms. Nichols *moved* to *adopt* Resolution 2018-33, to Commit up to $30 Million Dollars in GTLA Holdings, LP, Owner of GTL Americas, LP (GTLA). A Proposed 3.7 Billion Dollar Natural Gas-to-Liquids (GTL) Facility Designed to Convert Natural Gas to Refined High Quality, Ultra Clean Liquid Fuels Including Diesel Which is Expected to be 70% of the Plant's Output, Naphtha (Gel Used by the Chemical and Plastic Industries to Manufacture Several Products) Which is Expected to be 30% of the Plant's Output, and Electricity, to be Developed near Pine Bluff, Arkansas, with Imminent Need. The Recommendation Includes an Initial Investment of up to $20 Million Dollars to an Equity Investment in GTLA and up to an Additional $10 Million Dollar Reserve for Potential Add-on Investments in the Overall Project Through Special Opportunities Within the Project Such as Additional Equity, Debt Investments, Project Infrastructure Investments, and Investment Opportunities that May Occur as the Project Develops. The Board *unanimously adopted the Resolution*.

V. Adjourn.

Mr. Lester moved to *adjourn* the Board Meeting. Mr. Black *seconded* the *motion*, and the Board *unanimously approved the motion.*

Meeting adjourned at 4:26 p.m.

George Hopkins, Executive Director	Mr. Jeff Stubblefield, Chair Board of Trustees
Tammy Porter, Recorder	Date Approved