



**Report to the  
Global CCS Institute**

**Building a Consortium to Develop  
A New Pulverized Coal Plant  
With Post-Combustion Carbon Capture**

May 2011

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## Abstract

The development of a complex project such as the Tenaska Trailblazer Energy Center requires the selection, relationship management and coordination of a diverse consortium, including:

- Developer – entity in charge of advancing the Project to financial close; includes obtaining all required permits and approvals, negotiating contracts for Project output and overseeing the completion of pre-construction design work;
- Equity Partner(s) – investors in the Project;
- Engineering, Procurement and Construction Contractor – entity contracted to build the Project;
- Operations and Maintenance Contractor – entity contracted to operate and maintain the Project;
- Fuel Supplier – the entity contracted to supply fuel to the Project;
- Fuel Transporter(s) – the entity(ies) contracted to transport fuel to the Project;
- Water Supplier(s) – the entity(ies) contracted to supply water to the Project;
- Power Purchaser(s) the entity(ies) contracted to purchase the electricity produced by the Project;
- Carbon Dioxide Purchaser(s) – the entity(ies) contracted to purchase the carbon dioxide;
- International Carbon Capture and Storage Community – the entities interested in the successful implementation of carbon capture technology worldwide;
- Local, State and Federal Governments – the entities whose representatives are elected by citizens to govern the populous; and
- Lenders – the entities that provide debt to the Project.

This report discusses the factors considered in Tenaska’s approach to building and managing the consortium required to develop, construct and operate the Project.

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# Building a Consortium to Develop A New Pulverized Coal Plant With Post-Combustion Carbon Capture

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## 1.0 Introduction

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The Tenaska Trailblazer Energy Center (Trailblazer or Project) is expected to be the first new-build pulverized coal-fueled power plant to incorporate a commercial-scale post combustion carbon dioxide (CO<sub>2</sub>) capture plant into its initial design. In order to successfully develop, construct and operate a project of this magnitude, a diverse group of entities must be pulled into a well-managed consortium. Designers and constructors, builders and operators, buyers and sellers, lenders and equity – all must be selected and integrated at the appropriate time in the Project’s life cycle.

This report discusses the consortium members Trailblazer believes to be the most critical to the Project’s eventual success. Since consortium members are brought in at different points in the development timeline, some consortium members have been identified or selected, while others have not. In the case of consortium members who have been selected, the report will discuss the rationale for selecting each member. For those consortium members who have not yet been selected, the report will discuss the criteria that will be used in the selection process.

## 2.0 Executive Summary

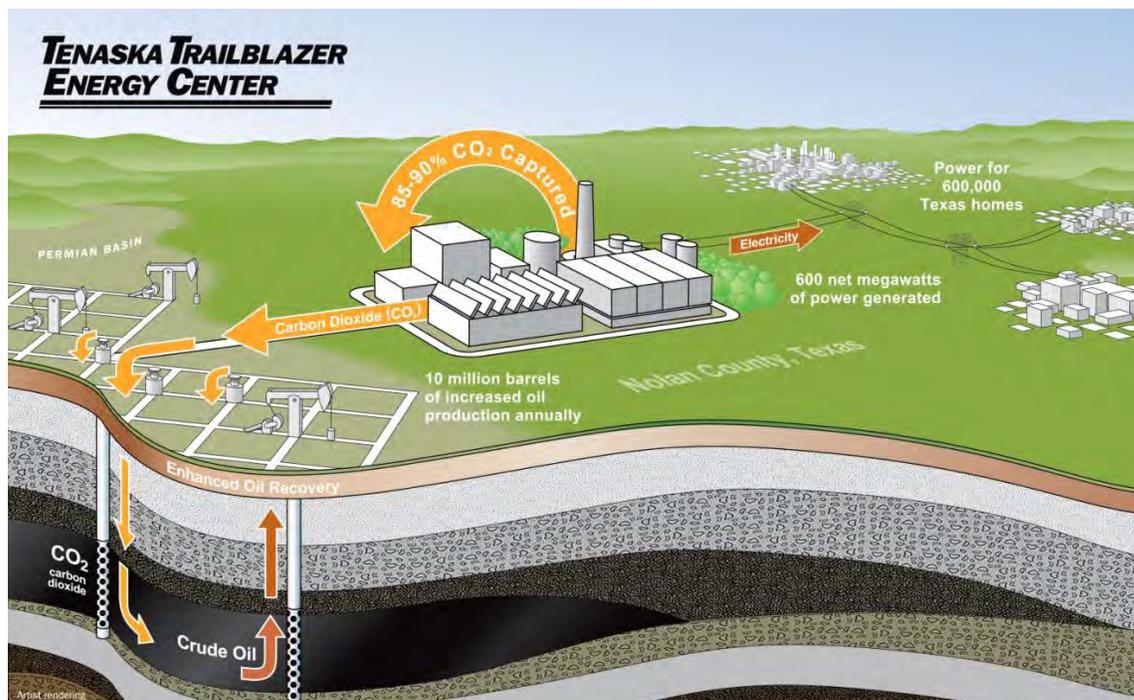
### 2.1 Project Overview

The Tenaska Trailblazer Energy Center (Trailblazer or Project) is a 760 megawatt (MW) gross, 600 MW net supercritical pulverized coal-fueled electric generating station under development in Nolan County, Texas, United States of America (USA). The Project site is located approximately nine miles east of Sweetwater, Texas, USA. The Project is expected to be the first new-build pulverized coal-fueled power plant to incorporate a commercial-scale post combustion CO<sub>2</sub> capture plant into the initial design. It also will be the first coal-fueled electric generating plant in Texas to employ water saving dry cooling technology.

The Project is being developed by Tenaska, Inc. (Tenaska), and is owned by Tenaska Trailblazer Partners, LLC (the Project Company). The Project Company is owned 65 percent by affiliates of Tenaska and 35 percent by Arch Coal Inc. For ease of reference, the term Tenaska shall be used in this report to refer collectively to Tenaska, Inc. and all of its various affiliates and subsidiaries that are not referenced directly by name in this report.

As shown in Figure 2.1, the Project will produce enough electricity to power 600,000 Texas homes and capture 85 to 90 percent of the CO<sub>2</sub> (approximately 5.75 million tons, or 5.22 million metric tons) that otherwise would be emitted into the atmosphere.

FIGURE 2.1 – Trailblazer Energy Center



Sub-bituminous coal will be delivered to the Project from the Powder River Basin (PRB) located in Montana and Wyoming via either the Union Pacific Railroad (UP) or the Burlington Northern Santa Fe Railway (BNSF). The Project site is bordered on the north by the UP and on the south by the BNSF. An existing natural gas pipeline crosses the site. The Project will interconnect to the Electric Reliability Council of Texas (ERCOT) 345 kV system, potentially at a substation about two miles from the Project site.

CO<sub>2</sub> from the Project will be sold into the robust Permian Basin CO<sub>2</sub> market, the largest CO<sub>2</sub> market in the world, where it will be used in Enhanced Oil Recovery (EOR) efforts and ultimately permanently stored underground. CO<sub>2</sub> has been safely used in the Permian Basin for more than 30 years. The Project's current plan is to sell the CO<sub>2</sub> at the fence line, so the purchaser will take ownership and responsibility for it as soon as the CO<sub>2</sub> leaves the Project property. As a result, responsibility for monitoring, measurement, and verification of injection and storage will fall to the CO<sub>2</sub> purchaser.

## 2.2 Project Developer

Tenaska is a respected energy company that has developed and constructed 15 power projects, totaling more than 9,000 MW. As managing partner of the Project Company, Tenaska draws on its 20-plus years of development expertise as it moves the Project through the development process. Its previous experience in developing large, complex electric generating facilities gives Tenaska a significant advantage as it works to make this groundbreaking project a reality.

## 2.3 Other Consortium Members

### 2.3.1 Equity Partners

Normally, Tenaska would wait at least until financial close to bring in a partner.

**However, due to the lengthy development timeline and significant expense required to develop a cutting edge project like Trailblazer, Tenaska decided to bring in a partner early in the development process.**

There are two options to consider when looking for a partner:

- 1) a strategic partner who brings specific expertise to the project in addition to equity dollars; or
- 2) a financial partner who invests in the project but doesn't bring any specific expertise to the project.

**Tenaska elected to bring in Arch Coal, a strategic partner who brings a wealth of experience in coal management to the Project.**

Arch Coal purchased a 35 percent share of the Project Company in March 2010. It is possible that other strategic or financial partners could also purchase an interest in the Project Company prior to financial close. Additional equity commitments may be required at financial close.

### 2.3.2 Owners' Engineer

The Owner's Engineer acts as an agent for the owner, essentially becoming an extension of the owner's organization. The Owner's Engineer assists the owner in the review of the Project's design, the evaluation of project options and the management of contracts. In the fall of 2008, Tenaska selected Burns & McDonnell Engineering Company (Burns & McDonnell) to be the Owner's Engineer for the Project. **Burns & McDonnell was selected due to their good historical working relationship with Tenaska, their good reputation in the industry and their significant experience in emission controls systems for coal-fueled stations.**

### 2.3.3 Engineering, Procurement and Construction (EPC) Contractor/Carbon Capture Technology Provider

#### 2.3.3.1 EPC Contractor

Tenaska selected Fluor Enterprises, a subsidiary of Fluor Corporation (collectively, Fluor) as the EPC contractor for the Project. **Fluor was selected in a competitive proposal process based on indicative plant pricing, experience, performance record, proposed schedule, commercial terms and their ability to perform.**

#### 2.3.3.2 Carbon Capture Technology Provider

Fluor also was selected to provide its Econamine FG Plus<sup>SM</sup> carbon capture technology to the Project after a separate competitive bid process. **In addition to an economic evaluation, the Project looked at technology experience, plans for technology advancement, actual performance, life cycle costs, scale-up factors, the proposed organization and the bidders' financial strength.**

### 2.3.4 Operations & Maintenance Contractor

The Project expects to use a Tenaska affiliate, Tenaska Operations, Inc. (TOI) to provide operations & maintenance (O&M) services to the Project pursuant to an industry-standard, arms-length O&M agreement. **This is consistent with the strategy Tenaska has used at its other electric generating stations with extremely positive results, due to the shared corporate culture.** TOI has received many awards for safety and facility management and operation, and in 2009 had an average on-peak availability for plants it managed of more than 98 percent.

### 2.3.5 Fuel Supplier

The Project Company has signed a 20-year fuel supply agreement with Arch Coal, who will provide low sulfur sub-bituminous coal from its mines in the PRB. **The fuel supply agreement with Arch Coal provides the Project with certainty of fuel supply from low-sulfur PRB mines served by both the UP and BNSF railroads.**

### 2.3.6 Fuel Transportation Provider

**In selecting its fuel transportation provider, Tenaska will consider pricing, reliability of delivery, and ability to perform.** As the BNSF and UP railroads serve

Arch Coal's PRB mines, the Project will have maximum flexibility in its coal transportation arrangements. Tenaska has not yet secured a fuel transportation provider.

### **2.3.7 Water Supplier**

Tenaska has not yet secured a water supply for Trailblazer. **Some of the key considerations in selecting a water supply include:**

- 1) initial and long-term costs;**
- 2) security of supply;**
- 3) water quality; and**
- 4) public concerns over availability of water.**

### **2.3.8 Power Purchaser**

Tenaska has not yet secured a power purchaser for the Project's electrical output. **Key considerations in finding a suitable purchaser include:**

- 1) creditworthiness;**
- 2) willingness to sign a long-term contract;**
- 3) suitable commercial terms; and**
- 4) delivery point in ERCOT.**

Tenaska has undertaken a detailed market analysis and has concluded that baseload resources such as Trailblazer are needed in the ERCOT market. A full discussion of the ERCOT market and Tenaska's market analysis is included in the *Bridging the Commercial Gap for Carbon Capture and Storage* report to Global CCS Institute.

### **2.3.9 CO<sub>2</sub> Purchaser**

Tenaska has not yet secured a CO<sub>2</sub> purchaser for the Project's captured CO<sub>2</sub>. **Some of the key considerations in securing a CO<sub>2</sub> purchaser include:**

- 1) creditworthiness;**
- 2) willingness to sign a long-term contract;**
- 3) suitable commercial terms; and**
- 4) willingness to assure the CO<sub>2</sub> is stored in a secure geologic formation.**

There is a ready market for the CO<sub>2</sub> produced by the Project. As discussed in the *Bridging the Commercial Gap for Carbon Capture and Storage* report, there is not enough naturally produced CO<sub>2</sub> to meet the demand in the Permian Basin.

### **2.3.10 International CCS Community**

As what is expected to be the first new-build pulverized coal-fueled power plant to incorporate a commercial-scale post combustion CO<sub>2</sub> capture plant into its initial design, Trailblazer has received significant attention in the international carbon capture and storage (CCS) community. The knowledge Tenaska gains in the development and implementation of the Project will be beneficial to other projects in the USA and around

the world. Through the Global Carbon Capture and Storage Institute (Global CCS Institute), Tenaska will share knowledge with others interested in advancing CCS technology.

### **2.3.11 Local, State and Federal Governments**

**For this first-of-its-kind project, local, state and Federal governments must be considered as members of the Project consortium, for their financial and other support is critical to overcoming the risk premium placed on the Project.**

Trailblazer has received tax abatements and other incentives from Nolan County and the State of Texas. The Project continues to evaluate whether a USA federal regulatory framework will emerge that recognizes the value of reducing CO<sub>2</sub> emissions.

### **2.3.12 Lenders**

Tenaska intends to finance the Project using non-recourse financing. The Project will be financed on its own merits with no cross default provisions, so that a default on any other Tenaska project would not impact the financing for the Project.

**Tenaska intends to implement the project financing based on a comprehensive contract structure that will include:**

- 1) the turnkey EPC contractor with Fluor;**
- 2) long-term off-take agreements with creditworthy power and CO<sub>2</sub> purchasers;**
- 3) long-term contract(s) for water supply; and**
- 4) a long-term operating and maintenance agreement with TOI.**

## **3.0 Purpose and Goals**

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The purpose of this report is to discuss the varied considerations that go into assembling a consortium to successfully build, operate and manage a new-build, coal-fueled electric generating plant with carbon capture and storage.

Explaining the rationale behind the selection of consortium members, and discussing the relationships between the Project Company and the consortium members, may assist other developers in advancing other, similar projects.

## 4.0 Trailblazer Consortium

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A project of the magnitude and complexity of Trailblazer requires a diverse and equally complex consortium. This report does not attempt to capture all of the relationships that are required to bring a project like Trailblazer to fruition. Rather, what follows is a discussion of some of the major consortium members required to successfully complete the Trailblazer project.

### 4.1 Developer/Equity

Tenaska is the Project developer, and owns a 65 percent interest in the Project Company. Arch Coal owns a 35 percent interest in the Project Company. Tenaska is the managing partner of the Project Company.

#### 4.1.1 Tenaska

In addition to developing, constructing and operating electric generating stations, Tenaska provides energy risk management services and is involved in asset acquisition and management, power marketing, fuel supply, natural gas exploration, production and transportation systems, biofuels marketing and electric transmission development.

Tenaska Capital Management, an affiliate, provides management services for standalone private equity funds, with almost \$5 billion in assets, including nine power plants and multiple natural gas midstream assets, including gas storage, gathering and processing facilities. In 2009, Tenaska and its affiliates managed approximately 34,000 MW of assets on behalf of a variety of customers and private equity investors.

An affiliate, Tenaska Marketing Ventures (TMV), is regarded as one of the top 10 natural gas marketers in North America, and provides natural gas commodity, volume management, hedging and asset management products and services. In 2009, TMV was ranked No. 1 in the United States in natural gas pipeline capacity trading according to Boston-based CapacityCenter.com, which monitors and collects capacity and operational information on all interstate pipelines. Customers responding to Mastio & Company's *Value and Loyalty Benchmarking* survey in 2009 ranked TMV No. 1 in the nation among major marketers for value and loyalty.

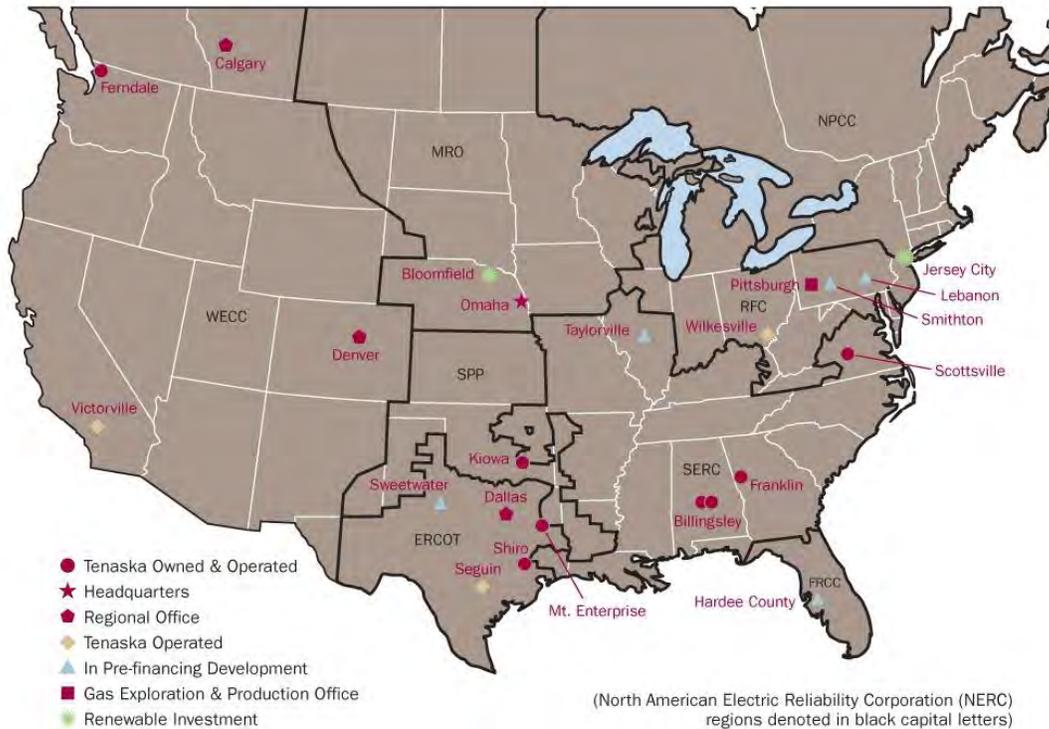
Another affiliate, Tenaska Power Services Co. (TPS), specializes in physical power marketing and electric asset management for utilities and non-utility generators, and is one of the largest marketers of physical power in the United States. TPS has developed a significant presence in the wind industry, and currently schedules about 20 percent of the wind generation in ERCOT.

In 2009, Tenaska had gross operating revenues of \$7.9 billion and assets of approximately \$2.8 billion. In 2009, *Forbes* magazine ranked Tenaska as 16<sup>th</sup> among the largest privately-held United States companies, based on 2008 revenues.

Figure 4.1.1 is a map showing the breadth of Tenaska's business enterprises.

**FIGURE 4.1.1 – Tenaska Offices and Project Locations**

Tenaska Offices & Project Locations



For further information, see: <http://www.tenaska.com>.

## 4.1.2 Other Equity

### 4.1.2.1 Rationale for Timing

Tenaska often brings partners into its projects. Typically, however, partners are not brought in until at least financial close, and often after the projects are constructed and are in operation. Given the unique nature and significant expense required to develop Trailblazer, Tenaska looked for a partner in the development phase of the Project.

There are two ways to approach selection of a development-phase partner for a large project like Trailblazer. The owner can seek a financial partner, who provides development and investment dollars but doesn't bring expertise that could be beneficial to the project. This type of partner is only seeking a required return on its financial investment. Alternatively, the owner can seek a strategic partner who brings not only development funds, but also specific expertise that can benefit the project. Due to the complexities of the Trailblazer project, Tenaska elected to search for a strategic partner.

#### 4.1.2.2 Selection of Arch Coal

In March 2010, Tenaska announced that Arch Coal had acquired a 35 percent share of the Trailblazer project company, Tenaska Trailblazer Partners, LLC.

##### 4.1.2.2.1 Considerations

As mentioned above, Tenaska wanted a partner who brought more to the Project than capital. Important qualities Tenaska considered in evaluating potential partners included:

- Strategic Value – As one of the largest suppliers of low-sulfur PRB coal, Arch Coal brought to the partnership its 40 years of experience in the energy and coal industries. This was a critical consideration to Tenaska, since Arch Coal’s expertise in coal characteristics, handling and transportation will clearly benefit the Project. In addition, Arch Coal brought a reliable supply of PRB coal to the Project.
- Performance – Even in the face of the most significant economic downturn since the Great Depression, in 2009 Arch Coal recorded revenues of almost \$2.6 billion and adjusted net income of more than \$63 million, while boosting their reserve base by 25 percent.
- Values – Headquartered in St. Louis, Missouri, Arch Coal shares Tenaska’s conservative values and belief that coal can and must continue to play a vital role in our energy future.

In the news release announcing the purchase, Arch Coal explained its considerations as follows:

*"We are enthusiastic about partnering with Tenaska - a successful and highly respected leader in power plant development - to make the Trailblazer Energy Center a reality," said David B. Peugh, Arch's vice president of business development. "Trailblazer will harness the most advanced coal-based technologies to supply secure, low-carbon production of electricity to the rapidly growing Texas marketplace. Furthermore, Trailblazer's success could set the stage for a new generation of power plants fueled with America's most abundant, reliable and cost-competitive fuel."*

Later in the release, Arch Coal said:

*"Today's announcement is consistent with Arch's ongoing strategy of making small but strategic investments in technology companies focused on making coal use cleaner. In addition to Trailblazer, Arch's technology portfolio includes an equity interest in DKRW Advanced Fuels, which is planning to convert coal into clean-burning transportation fuel on Arch reserves in southern Wyoming, and ADA-ES, a leading-edge emissions control company."*

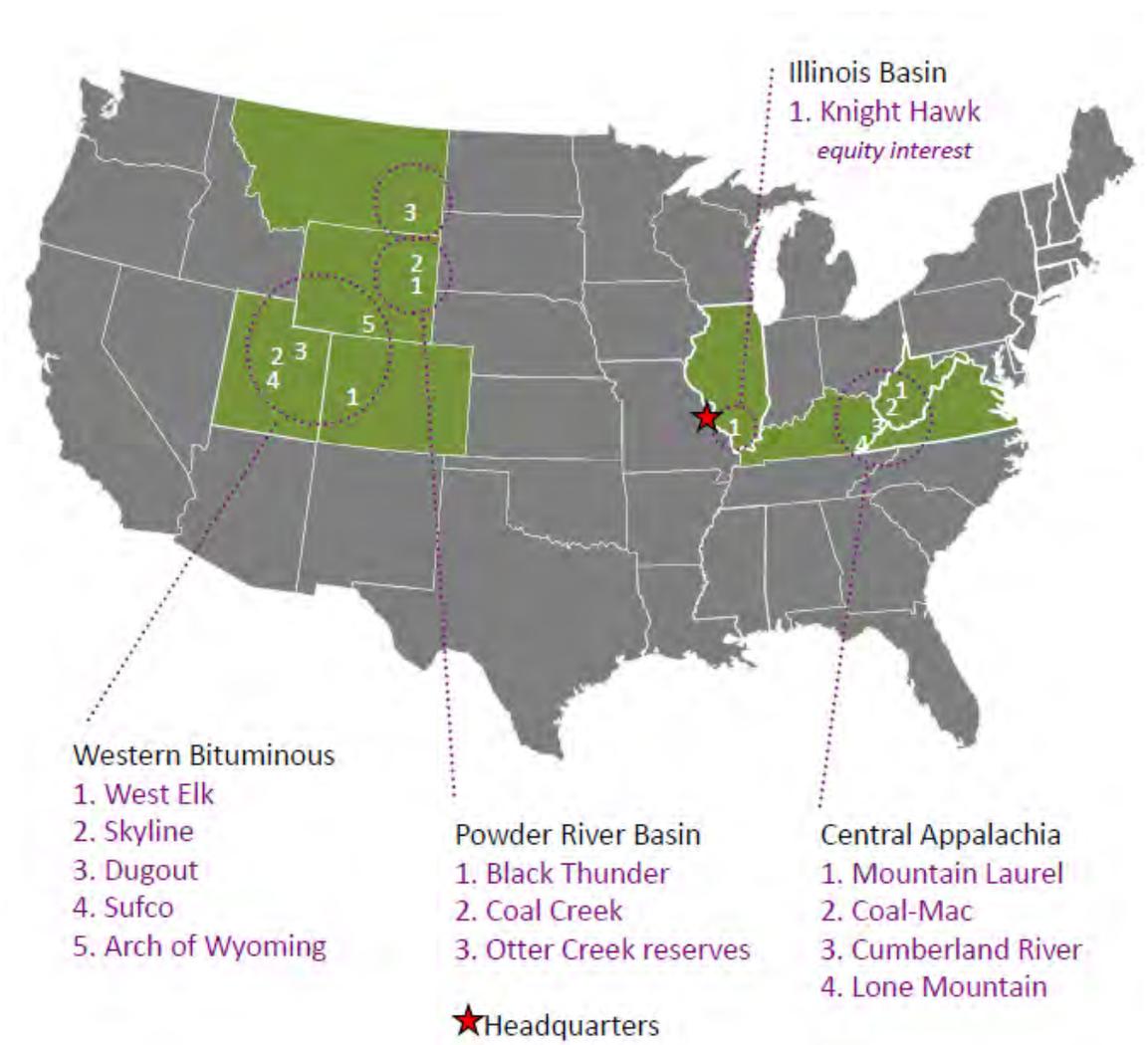
**4.1.2.2.2 Arch Coal Overview**

Arch Coal is the second largest U.S. coal producer. Through its network of mines in the PRB, Arch supplies cleaner-burning, low-sulfur coal to U.S. power producers to fuel roughly 8 percent of the nation’s electricity. The company also ships coal to domestic and international steel manufacturers as well as international power producers.

In total, Arch Coal contributes about 16 percent of the United States’ coal supply from 11 mining complexes in Wyoming, Utah, Colorado, West Virginia, Kentucky and Virginia. See Figure 4.1.2 below showing Arch Coal’s coal producing operations.

Arch Coal controls a vast domestic reserve base totaling 4.7 billion tons. Of that total, 88 percent is low in sulfur and nearly 83 percent meets the most stringent requirements of the USA federal *Clean Air Act*, without the application of expensive scrubbing technology.

**FIGURE 4.1.2 – Arch Coal’s Coal Producing Operations**



For further information, see: <http://www.archcoal.com>.

#### 4.1.2.3 Additional Partners

The Project has not ruled out bringing in additional strategic equity partners prior to financial close, using considerations similar to those used to select Arch Coal. It is anticipated that Tenaska and Arch Coal would bring in additional partners no later than financial close and will each sell an equal percentage of their ownership interest to any additional partners.

## 4.2 Owner's Engineer

Tenaska is an extremely lean organization. Excluding the power and natural gas marketing companies, its private equity interests and its power plant operations and maintenance personnel, Tenaska's corporate staff, including personnel in development, executive, public/government relations, administrative, engineering, environmental and finance roles, number less than 150 people. As a result, Tenaska generally relies upon outside consultants to supplement and assist its employees.

For almost all of its power projects, Tenaska hires an Owner's Engineer. In this role firms act as Tenaska's agent, essentially becoming an extension of Tenaska's engineering and construction organization by providing design and construction oversight. In the fall of 2008, Tenaska selected Burns & McDonnell to be the Owner's Engineer for the Project. Burns & McDonnell was selected due to their significant amount of recent experience working on coal-fueled electric generating stations, including:

- Kansas City Power & Light – **Iatan Unit 2, Platte County, Missouri, USA:** Design and permitting support for 850 MW supercritical coal-fueled electric generating station;
- Seminole – **Seminole Generating Station Unit 3, Putnam County, Florida, USA:** Detailed design, construction management, startup and commissioning for 750 MW supercritical coal-fueled electric generating station;
- MidAmerican – **Council Bluffs 4, Pottawattamie County, Iowa, USA:** Owner's engineer for 790 MW supercritical coal-fueled electric generating station;
- City Public Service (San Antonio) – **JK Spruce Unit 2, Bexar County, Texas, USA:** Owner's engineer for 750 MW supercritical coal-fueled electric generating station;
- City Water, Light & Power (Springfield, Ill.) – **Dallman Unit 4, Sangamon County, Illinois, USA:** Owner's engineer for 220 MW subcritical coal-fueled electric generating station;
- Peabody – **Prairie State, Washington County, Illinois, and Thoroughbred, Muhlenberg County, Kentucky, USA:** Owner's engineer for 2x750 MW supercritical (Prairie State), 2x750 subcritical (Thoroughbred) coal-fueled electric generating stations;
- Christian County Generation LLC – **Taylorville Energy Center, Christian County, Illinois, USA:** Detailed design for 600 MW (net output) integrated gasification combined cycle coal-fueled electric generating station;

- Western Farmers Electric Cooperative – **Hugo Unit 2, Choctaw County, Oklahoma, USA:** Owner’s engineer for 750 MW supercritical coal-fueled electric generating station;
- Luminant – **Oak Grove 1 & 2, Robertson County, Texas, USA:** Owner’s engineer for 2x860 MW supercritical lignite-fired electric generating stations.

In addition, Tenaska has considerable experience with Burns & McDonnell, having worked with the firm on its Lakeside Junction project in Trimont, Minnesota, USA. As noted above, Burns & McDonnell is concurrently working with Tenaska on the Taylorville Energy Center in Illinois, and also has supported Tenaska by providing environmental compliance manuals and engineering studies for more than 10 years.

Tenaska’s Project Manager maintains daily contact with Burns & McDonnell, adjusting their workload as needed. Burns & McDonnell participates in weekly conference calls and monthly face-to-face meetings with Fluor and Tenaska. All parties are bound to confidentiality agreements for the project. These agreements allow information to be shared and used as needed to design and develop the project.

### **4.3 EPC Contractor/Carbon Capture Technology Provider**

#### **4.3.1 Selection of EPC Contractor**

In June 2009, Tenaska selected Fluor as EPC contractor for the Project. Fluor was selected in a competitive proposal process. The evaluation was based on:

- Indicative EPC pricing for both the pulverized coal plant and the carbon capture plant – Fluor’s indicative pricing was competitive with the pricing included in other proposals;
- Experience – As shown in Table 4.3.1, the project management staff proposed by Fluor is highly experienced. In addition, Fluor has recent experience in Texas, having just completed the Oak Grove 1,600 MW supercritical coal plant in Robertson County, Texas, USA. Fluor has more than 13,000 craftsmen in its jobs database for the state of Texas, more than 5,500 of whom reside within a 100-mile radius of the Project site;
- Performance – Fluor has a proven record of completing projects on schedule and within budget. Fluor’s project management and execution practices and procedures have been demonstrated on numerous large-scale coal-fueled projects;
- Proposed schedule – Fluor had the management and craft personnel available to meet the Project’s proposed schedule;
- Commercial terms – Fluor has included provisions to protect equity and lenders in the event of non-performance; and
- Ability to perform – Fluor is one of the world’s largest publicly owned engineering, procurement, construction, maintenance and project management companies. Fluor’s creditworthiness is reflected in the company’s investment-grade ratings by both Moody’s and Standard and Poor’s.

**TABLE 4.3.1 – Fluor Experience Matrix**

Position	Industry Experience	Coal Experience
Project Director	34 Years	32 Years
Deputy Project Director	12 Years	12 Years
Site Manager	31 Years	25 Years
Project Engineer	3 Years	2 Years
Engineering Manager	32 Years	18 Years
Layout Lead	26 Years	17 Years
Mechanical Lead	20 Years	10 Years
Electrical Lead	20 Years	11 Years
CSA Lead	18 Years	9 Years
Controls Lead	25 Years	10 years
Commissioning Manager	25 Years	10 Years
Contracts Manager	25 Years	4 Years
Quality Manager	30 Years	2 Years
Project Controls Manager	26 Years	2 Years
Materials Manager	31 Years	3 Years
Air Quality Control System Specialist	28 Years	28 Years
Turbine Generator Specialist	25 Years	20 Years
Water Chemistry Specialist	25 Years	2 Years
Boiler Specialist	27 Years	10 Years
Health Safety Environmental/ Continuous Emissions Monitoring System Specialist	33 Years	17 Years

Fluor also reports to Tenaska’s Project Manager. Fluor’s work is managed through daily calls as needed, weekly conference calls and monthly face-to-face meetings. Fluor also provides a monthly status report which provides up-to-date progress and planning information.

#### **4.3.2 Selection of Carbon Capture Technology Provider**

Tenaska entered into a pre-qualification and competitive bid process to select a carbon capture technology vendor who would conduct an eight-month Front End Engineering Design (FEED) study. The process yielded four competitive bids which included estimates of performance and indicative cost of the carbon capture plant and the pulverized coal plant. The bids also included a firm, fixed price for performing a FEED study. The bid evaluation was done on a present-day indicative capital cost based on the firm FEED pricing and a 30-year life cycle cost (for performance parameters) basis.

In addition to the economic evaluation, an analysis was conducted regarding the basis of performance which included pilot and demonstration plants in service for each bidder, scale-up factors used by each bidder in the carbon capture process to date, and scale-up factors used for equipment being proposed for Trailblazer. Finally, the organization and

financial strength of the bidders were analyzed.

Based on the bid responses, Tenaska selected Fluor and its Econamine FG Plus<sup>SM</sup> technology for this important aspect of the Project. A detailed discussion of the process by which Tenaska selected Fluor and its Econamine FG Plus<sup>SM</sup> technology can be found in a separate report to the Global Carbon Capture and Storage Institute (Global CCS Institute) entitled *CO<sub>2</sub> Technology Evaluation, Methodology and Criteria*.

### 4.3.3 Fluor Overview

Ability to perform and financial strength were critical factors in Fluor’s selection as both the EPC and carbon capture technology provider, since liquidated damage provisions in the contract with Fluor are important to the Project’s equity providers and lenders. Fluor is one of the world's largest publicly owned engineering, procurement, construction, maintenance, and project management companies. Fluor has more than 36,000 global employees, and maintains offices in more than 30 countries across six continents. Fluor ranks No. 111 on the Fortune 500 list of America's largest corporations. *Engineering News-Record* magazine ranks Fluor No. 1 on its Top 100 Design-Build Firms list and No. 2 on its Top 400 Contractors list.

### 4.4 O&M Contractor

TOI, a wholly owned Tenaska subsidiary headquartered in Omaha, Nebraska, USA, is expected to provide O&M services to the Project pursuant to an industry-standard, arms-length operations and maintenance agreement. TOI will provide the skilled personnel, procedures, training, administration, management, and technical services necessary for the safe and reliable start-up, commissioning, operation and maintenance of the facility. TOI and its affiliated companies employ approximately 270 people to provide reliable operation of the approximately 12,100 MWs of natural gas-fueled generating capacity at the 17 plants under its management. TOI has received many awards for safety and its management and operation of these facilities. In 2009, those plants achieved an average on-peak availability of more than 98 percent. Table 4.4 lists the projects currently operated by TOI.

**TABLE 4.4 – Projects Operated by Tenaska Operations, Inc.**

Project	Location	MW
<b>Projects Owned in Partnership by Tenaska</b>		
Tenaska Virginia Generating Station	Scottsville Virginia, USA	885
Tenaska Kiamichi Generating Station	Kiowa, Oklahoma, USA	1,220
Tenaska Central Alabama Generating Station	Billingsley, Alabama, USA	885
Tenaska Lindsay Hill Generating Station	Billingsley, Alabama, USA	845
Tenaska Georgia Generating Station	Franklin, Georgia, USA	944
Tenaska Gateway Generating Station	Mt. Enterprise, Texas, USA	845
Tenaska Frontier Generating Station	Shiro, Texas, USA	830
Tenaska Ferndale Cogeneration Station	Ferndale, Washington, USA	270

Project	Location	MW
<b>Projects Owned by Project Equity Funds</b>		
High Desert Power Project	Victorville, California, USA	830
Rio Nogales Power Project	Seguin, Texas, USA	800
Big Sandy Peaker Plant	Kenova, West Virginia, USA	300
Wolf Hills Energy	Bristol, Virginia, USA	250
University Park Energy	University Park, Illinois, USA	300
Lincoln Generating Facility	Manhattan, Illinois USA	656
Crete Energy Venture	Crete, Illinois, USA	328
Rolling Hills Generating	Wilkesville, Ohio, USA	815
New Covert Generating Company	South Haven, Michigan, USA	1,100

#### 4.5 Fuel Supplier

At the same time Tenaska sold a 35 percent interest in the Project to Arch Coal, the Project Company signed a 20-year fuel supply agreement with Arch Coal. In 2009, Arch Coal had sales volume of 96.1 million tons of coal produced at the Black Thunder and Coal Creek mines in Wyoming. The Project Company’s fuel supply agreement with Arch Coal provides the Project with a firm fuel supply from low-sulfur PRB mines served by both the UP and BNSF railroads. Arch Coal controls approximately 2.8 billion tons of reserves in the PRB.

#### 4.6 Fuel Transportation Provider

As shown in Figure 4.6 below, the Trailblazer site is strategically located from a rail delivery perspective, being bordered on the north by the UP railroad and on the south by the BNSF railroad.

**FIGURE 4.6 – Trailblazer Location**



Tenaska believed it was critical to have access to both railroads, as competition would allow for the negotiation of more favorable rail transport terms and hedge against potential supply disruptions.

Tenaska has not yet entered into any fuel delivery contracts for the estimated 3.5 million tons per year of PRB coal that will be supplied by Arch Coal, but will consider pricing, reliability of delivery, and ability to perform in making that decision. As mentioned above, both the BNSF and UP railroads serve Arch Coals PRB mines, so the Project will have maximum flexibility in its coal transportation arrangements.

A natural gas pipeline runs through the Project site. Tenaska has not yet entered into any natural gas delivery contracts for the natural gas that will be used as a start-up fuel. The Project does not anticipate any difficulties in securing the natural gas it requires.

#### **4.7 Water Supplier**

Tenaska has not yet secured a water supply for Trailblazer. Water in West Texas is a precious resource, and it is possible that the Project may need to enter into more than one water supply agreements to secure the 2,000 acre-feet of water per year (or approximately 2.5 million kiloliters) required to satisfy the Project's water needs. Following are some of the key considerations in obtaining a water supply:

- Initial cost – Tenaska would like to minimize the up-front payments required to secure Trailblazer's water supply, since it is unclear when the Project will go to financial close.
- Long-term cost – Obviously, the Project would like to minimize the long-term cost of the water supply. These long-term costs include capital investment in pipelines and other infrastructure and ongoing operating and maintenance costs as well as payments for the water supply.
- Security of supply – Tenaska and its lenders need to know that the water required to operate the Project will be available under even the most severe drought conditions for the life of the Project.
- Water quality – The water required for boiler makeup must be extremely pure. The Project will have on-site water treatment facilities, but the quality of the water to be purified must still be taken into account. If there is more than one water source for the Project, or if the quality of the water supply potentially could change over time, it complicates the water treatment system.
- Public concerns – Water usage and availability is an emotional issue in semi-arid West Texas. Tenaska plans to use treated wastewater for some, if not all, of its water supply.

#### **4.8 Power Purchaser**

Tenaska has not yet secured a power purchase agreement for the Project's electrical output. Following are some key considerations in securing one or more power purchasers:

- Creditworthiness – In order to finance the Project, the power purchaser must be a creditworthy entity.
- Long-term contract – The Project will need to secure an electricity buyer or buyers who are willing to sign a long-term power purchase contract. Tenaska believes the contracts will need to be for a period of 20 years or more.
- Commercial terms – There will be a number of important commercial terms involving price, dispatch, maintenance and performance.
- Delivery point in ERCOT – Tenaska prefers customers whose requested delivery point is at the Project’s interconnection with ERCOT’s 345 KV transmission system, in order to avoid transmission issues and wheeling charges.

Tenaska’s power marketing subsidiary, TPS, does not take long-term price risk in the power market. Therefore, TPS is not a potential purchaser for the power from Trailblazer.

Tenaska has conducted a market analysis of the ERCOT market which shows there is a need for new baseload generating facilities like Trailblazer. That market analysis study, which is discussed in detail in the *Bridging the Commercial Gap for Carbon Capture and Storage* report to Global CCS Institute, confirms that Trailblazer would dispatch almost every hour it is available. This gives the Project’s partners confidence that they will be able to find a power purchaser that will be willing to sign a long-term power contract.

#### **4.9 CO<sub>2</sub> Purchaser**

Tenaska has not yet secured a purchaser for the Project’s CO<sub>2</sub> output. Following are some key considerations in securing one or more CO<sub>2</sub> purchasers:

- Creditworthiness – In order to finance the Project, the CO<sub>2</sub> purchaser must be a creditworthy entity.
- Long-term contract – The Project will need to secure a CO<sub>2</sub> buyer(s) who are willing to sign a long-term CO<sub>2</sub> purchase contract. Tenaska believes the contracts will need to be for a period of 20 years or more. Initial contacts with CO<sub>2</sub> buyers in the region have supported this belief. The CO<sub>2</sub> buyers must make significant investment upfront prior to an EOR CO<sub>2</sub> flood, and therefore desire long-term CO<sub>2</sub> supply contracts. Purchasers do not want to make investments in the hundreds of millions of dollars without knowing they have a secure CO<sub>2</sub> supply for many years.
- Commercial terms – There will be a number of important commercial terms involving price, maintenance and performance. Firm supply is important in EOR operations, so forced outages and scheduled maintenance issues will have to be addressed with the purchaser.
- Point of Delivery – Tenaska prefers a customer who will accept delivery of the CO<sub>2</sub> at the Project fence line or nearby. This will shift the responsibility and risk for monitoring, measurement, and verification of injection and storage to the CO<sub>2</sub> purchaser, who likely will be highly experienced in these areas.

As discussed in detail in the *Bridging the Commercial Gap for Carbon Capture and*

*Storage* report to Global CCS Institute, efforts to produce oil using CO<sub>2</sub> EOR in the Permian Basin currently are constrained by the lack of sufficient amounts of CO<sub>2</sub>. This gives the Project's partners confidence that they will be able to find a CO<sub>2</sub> purchaser that will be willing to sign a long-term CO<sub>2</sub> contract.

#### **4.10 International CCS Community**

Trailblazer's efforts to be the first new-build pulverized coal-fueled power plant to incorporate a commercial-scale post combustion CO<sub>2</sub> capture plant into the initial design are being watched carefully by the international CCS community. The knowledge Tenaska gains in the development and implementation of the Project likely will be beneficial to other projects in the USA and around the world.

In recognition of Trailblazer's importance as an early CCS project, the Project was selected by the Global CCS Institute to receive a USD \$7.7 million grant to fund the FEED study for the Project's carbon capture plant. In return for the grant, the Project agreed to share knowledge gained through the development process with the Global CCS Institute, in order to assist others in the acceleration of CCS projects throughout the world. Tenaska is producing knowledge sharing reports and participating in Global CCS Institute-sponsored events, so that the Project's experiences can be disseminated among Global CCS Institute members and the wider global CCS community.

#### **4.11 Local, State and Federal Governments**

For Trailblazer to reach financial close, there are significant challenges to overcome. Many of the more substantive challenges relate to the Project's carbon capture component. The costs of carbon capture are daunting – the capital investment alone could add as much as USD \$1 billion to the Project's cost bringing the total Project costs to the USD \$3.5 to 4.0 billion, including financing and other indirect costs. There are additional ongoing operating costs associated with the carbon capture plant as well. At Trailblazer, approximately 165 MW of electricity will be consumed in the CO<sub>2</sub> capture and compression process that otherwise would be available for sale into the ERCOT power market. The loss of revenues attributed to this reduction in electric capacity is significant over the life of the Project, which could approach 50 years.

There are other, less direct „early-adopter“ costs that will affect Trailblazer as well. New technologies carry inherent risk. Until the first commercial plant is built and operated, and the risks have been quantified, each participant in the development, construction and financing process will place a risk premium on their participation to cover unknown but real contingencies. Once there is a suitable track record for commercial utility-scale carbon capture technology, associated risks can be assumed by those most capable of mitigating them and the risk premium will be reduced.

For this first-of-its-kind Project, local, state and Federal governments must be considered as members of the Project consortium, for their financial and policy support is critical to overcoming the risk premium and additional costs placed on the Project.

#### **4.11.1 Local Government**

Nolan County, the county in which the Project will be located, has provided a significant benefit to the Project by granting it a 10-year, 75 percent abatement of County taxes beginning the first year of the Project's operation. The Nolan County Hospital District also granted the Project a 10-year, 75 percent abatement on hospital district taxes. In addition to this important monetary support, elected officials from Nolan County and the City of Sweetwater have attended public meetings and passed resolutions in support of the Project.

#### **4.11.2 State Government**

In 2007, the Texas Legislature passed House Bill (HB) 3732, which set standards for Advanced Clean Energy Projects (ACEP) and provided tax, financial and regulatory incentives to projects that could meet those standards. The House Energy Resources Report on the legislation stated: „Because ultra clean energy, including but not limited to gasification, is currently more expensive and less demonstrated than other clean energy technologies, financial incentives are necessary to ensure that ultra clean energy projects are built and maintained in Texas“. The State of Texas clearly understands its role in support of new, clean coal technologies.

To qualify as an ACEP under HB 3732, a project must:

- Reduce SO<sub>2</sub> emissions by 99 percent;
- Reduce Mercury emissions by 95 percent;
- Meet a NO<sub>x</sub> emission rate of no more than 0.05 pounds/million British Thermal Units (0.02 kilograms/giga joule);
- Render CO<sub>2</sub> capable of capture, sequestration or abatement (there was no set percentage of carbon capture required in the original 2007 legislation; in 2009 this requirement was changed to a 50 percent capture); and
- Use coal, biomass, petroleum coke, solid waste, or fuel cells using hydrogen derived from these fuels.

In 2009, the Texas Legislature passed additional legislation to provide incentives to projects that capture CO<sub>2</sub>. That legislation, HB 469, provides for:

- sales tax exemptions for ACEPs;
- the first three projects achieving a 70 percent carbon capture rate will qualify for a \$100 million franchise tax credit; and
- a 30-year, 75 percent severance tax exemption for oil recovered using CO<sub>2</sub> captured from man-made emission sources.

Senate Bill (SB) 1387 – provides a framework for regulation of CO<sub>2</sub> sequestration and storage between the Texas Railroad Commission and the Texas Commission on Environmental Quality (TCEQ), clearly outlining the responsibilities for these two core administrative bodies in Texas.

The 2007 legislation was one of the key factors in Tenaska's decision to locate Trailblazer in Texas.

### 4.11.3 USA Federal Government

Under a scenario where 1) oil prices increase significantly and oil producers develop a view that prices will stay high over the long term; and 2) natural gas prices increase significantly, it is conceivable that the Project could receive enough revenue from the long-term sale of CO<sub>2</sub> and electricity to make Trailblazer viable without any kind of support from the USA federal government. Absent such an occurrence, however, the Project will require a favorable federal regulatory framework that recognizes the value of reducing CO<sub>2</sub> emissions.

That recognition could come in the form of so-called „cap and trade“ legislation, such as the Waxman-Markey bill that passed in the United States House of Representatives in 2009, but did not pass the USA Senate. It appears that „cap and trade“ is off the table for the foreseeable future. But there are other mechanisms that also could provide that recognition of value, including tax credits, loan guarantees and/or grants.

Tenaska has been active in educating USA House and Senate members on the availability of carbon capture and storage technologies and the challenges and opportunities facing early projects. Tenaska government relations and environmental personnel participated in briefings with legislators and their staff, and Tenaska Vice President of Environmental Affairs Dr. Greg Kunkel has testified before the United States House of Representatives Natural Resources Subcommittee on Energy and Mineral Resources and the United States House of Representatives Select Committee on Energy Independence and Global Warming. Dr. Kunkel’s remarks at these hearings are included as an Exhibit to Tenaska’s *The Management of Public Engagement at the Local, State and Federal Levels for the Tenaska Trailblazer Energy Center Project* report to the Global CCS Institute.

Trailblazer has not, to date, had any discussions with the USA Department of Energy regarding loan guarantees, tax credits, or grants. The last round of funding for such programs occurred prior to Tenaska’s selection of a carbon capture technology for Trailblazer. Since the funding was highly technology based, Tenaska did qualify for funds under those programs. Now that the carbon capture technology for Trailblazer has been selected, Tenaska will continue to evaluate USA federal funding as it becomes available.

### 4.12 Lenders

All 15 of the projects developed and constructed by Tenaska have been financed using non-recourse project financing. The financing plan contemplated for the Project is similar to the method of financing Tenaska has used for its other independent power projects. In addition to Tenaska’s equity funds, equity will be provided by Arch Coal and other partners brought in prior to or at financial close. The Project will be financed on its own merits with no cross default provisions, so that a default on any other Tenaska project will not impact the financing for the Project.

Tenaska intends to implement the project financing based on a comprehensive contract structure that will include:

- 1) the turnkey EPC contractor with Fluor;
- 2) long-term off-take agreements with creditworthy power and CO<sub>2</sub> purchasers;
- 3) long-term contract(s) for water supply; and
- 4) a long-term operating and maintenance agreement with TOI.

Tenaska is well respected in international financial circles. Major international financial magazines have awarded Tenaska financings the following accolades:

### ***Project Finance International Magazine***

- *Sponsor of the Year, 2004*, based on Tenaska's completion of refinancings in Oklahoma and Virginia, as well as renewal of its \$200 million credit revolver.
- *Bond Deal of the Year, 2004*, for the Company's success and innovation in refinancing the Tenaska Kiamichi Generating Station.
- *Bond Deal of the Year, 2003*, for the Company's success in refinancing the Tenaska Central Alabama Generating Station.

### ***Euromoney's Project Finance Magazine***

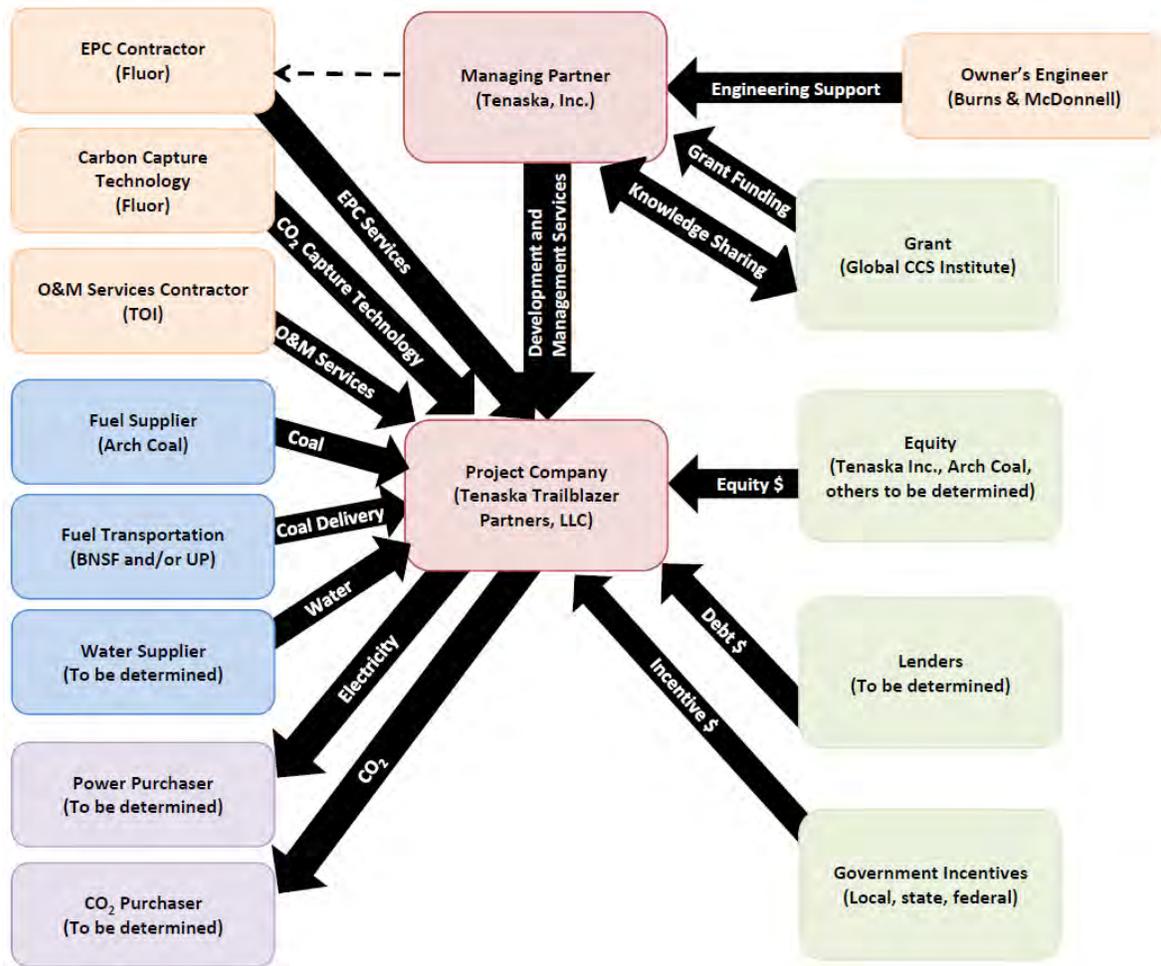
- *North American Single Asset Deal of the Year, 2003*, for the Company's success in refinancing the Tenaska Central Alabama Generating Station.
- *North American Single Asset Deal of the Year, 2002*, for the Company's financing of the Tenaska Virginia Generating Station.

In a story in the *Omaha World Herald* about Tenaska, Michael Messer of Standard & Poor's was quoted as follows: "[Tenaska] has an extraordinary attention to detail that certainly improves the credit quality of their projects. They put a lot of thought into the projects they want to develop... It's like a puzzle, and with Tenaska, there aren't any loose ends... We see that as being a real source of strength in the Tenaska deals we've looked at." Tenaska will exhibit that same attention to detail in its financing of the Project.

## **4.13 Consortium Structure**

By its very nature, a project of Trailblazer's magnitude has a complex structure. Figure 4.13 is a graphical representation of the roles of the various consortium members.

**FIGURE 4.13 – Consortium Structure**



As managing partner for the Project, Tenaska provides development support and project management services to the Project Company, as indicated in the salmon colored boxes. This is consistent with the practice the company has successfully employed to develop 15 previous electric generating stations. With the assistance of Burns & McDonnell, the owner’s engineer, Tenaska will manage the EPC contract and ensure Project construction proceeds smoothly.

Funding sources – equity, debt, grants and government-provided incentives – are shown in green boxes. As mentioned previously, Tenaska owns 65 percent of the Project Company, while Arch Coal owns 35 percent of the Project Company. The owners will provide equity for the Project in percentages equal to their ownership interests. The amount of equity to be provided has not yet been decided. As discussed above, a grant from the Global CCS Institute in the amount of USD\$7.7 million is being used to fund the FEED study for the Project’s carbon capture plant.

The Project’s major technology and service contracts are indicated in the orange boxes. Although there will be other contracts that fall under this category, the ones reflected in Figure 4.13 are the most significant.

Significant Project inputs – coal and its transportation, and water – are indicated in the blue boxes. As with technology and service contracts, there are a host of other inputs, but these are the most critical.

Finally, the purchasers of the Project’s two major products – electricity and CO<sub>2</sub> – are shown in the purple boxes.

Table 4.13 summarizes some of the key responsibilities and reporting relationships of the consortium members.

**Table 4.13 – Key Roles, Responsibilities and Reporting Relationships**

Consortium Member	Project Responsibilities	Working Relationships
Arch Coal	35 percent Project Owner	Quarterly Project Company meeting  Other Discussions as Needed
Burns & McDonnell	Owner’s Engineer  Supports Tenaska’s engineering group; provides design oversight and project management support.	Reports to Tenaska’s Project Manager  Daily contact with Project Engineer  Participates in weekly and monthly review meetings with EPC Contractor
Fluor Enterprises	EPC Contractor	Reports to Tenaska’s Project Manager, with oversight from Owner’s Engineer  Participates in weekly and monthly review meetings with Tenaska’s Project Manager and Owner’s Engineer. Produces monthly status report
Fluor Enterprises	CO <sub>2</sub> Technology Provider	Reports to the Tenaska Project Manager
Tenaska Operations, Inc.	Operations and Maintenance Contractor	Reports to Tenaska’s Engineering and Operations group
Arch Coal	Fuel Supplier	Reports to O&M Contractor
To be determined (TBD)	Fuel Transportation Provider(s)	Reports to O&M Contractor

Consortium Member	Project Responsibilities	Working Relationships
TBD	Water Supplier(s)	Works with Tenaska's corporate Engineering and Operations group, along with the O&M Contractor
TBD	Power Purchaser(s)	Works with Tenaska's corporate Engineering and Operations group
TBD	CO <sub>2</sub> Purchaser(s)	Works with Tenaska's corporate Engineering and Operations group
Global CCS Institute	<p>Knowledge sharing with the international CCS community</p> <p>Supporting first mover CCS projects</p>	<p>Provided an AUD \$8.03 million grant to support Trailblazer's carbon capture plant FEED study and to promote knowledge sharing</p> <p>Tenaska attends and presents at Global CCS Institute conferences, and provides knowledge sharing reports to benefit the Global CCS Institute's membership</p>
Nolan County	<p>Local Government</p> <p>Provides local economic incentives</p>	<p>Provided leadership support and a 75 percent, 10-year tax abatement. Will significantly benefit from taxes paid by the Project and jobs created by the Project</p>
State of Texas	<p>State Government</p> <p>Provides regulatory framework and financial incentives</p>	<p>Will reap substantial economic benefit from the Project, and from the recognition as a leader in the development of CCS projects</p>
USA Federal Government	<p>Can provide incentives or policies to support first-mover CCS projects like Trailblazer</p>	<p>Potential future collaborator. Discussions continue at the Federal level regarding carbon capture policies</p>
TBD	Lenders	Work with Tenaska's Finance group.

## 5.0 Challenges/Risk Mitigation

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There always are challenges and risks associated with building a first-of-its-kind project, such as Trailblazer. This report discusses some of the major challenges and risks that are specific to the Project consortium members, and how they are being managed.

### 5.1 Technology Risk

Although Fluor's Econamine FG Plus<sup>SM</sup> carbon capture process is similar to gas treating processes which have been practiced for many years, and uses simple, reliable equipment that is well-known in the gas treating industry, this will be the first time the technology has been applied to a large full-scale, coal-fueled, electric generating station.

As discussed in detail in Tenaska's January 2011 report to the Global CCS Institute, *CO<sub>2</sub> Technology Evaluation, Methodology and Criteria*, the Project went through a rigorous competitive bid process before selecting Fluor's technology. Fluor's Econamine FG<sup>SM</sup> process, upon which it has improved in the Econamine FG Plus<sup>SM</sup> technology, operated successfully at a natural gas-fueled power plant in Bellingham, Massachusetts, USA from 1991 to 2005, removing 365 short tons (331.1 metric tons, 325.9 long tons) of CO<sub>2</sub> per day. Fluor's previous commercial success with the Econamine FG<sup>SM</sup> technology was a key factor in its selection, and provides significant risk mitigation. The fact that Fluor is both the carbon capture technology provider and the EPC contractor for the Project is another mitigating factor, since having the same group perform both functions eliminates the need for numerous complex interfaces between different design and construction organizations which can add cost, schedule and risk to a project.

Unlike most other areas of the world, CO<sub>2</sub> has been used for EOR efforts in Texas for more than 35 years. As a result, the Project does not consider CO<sub>2</sub> transportation and storage to be significant technology risks.

### 5.2 Performance Risk

A key risk faced by the Project is that consortium participants may not perform as expected. There are several ways in which this risk will be mitigated:

- **Careful contracting** – Contracts with consortium members should be structured so that the risks of non-performance are adequately covered. Expected performance, and penalties for non-performance should be clearly specified.
- **Careful selection of consortium members** – Tenaska looks for experienced, creditworthy consortium members who have a proven ability to perform and the financial wherewithal to support payment of damages in the event of non-performance.
- **Conservative financing assumptions** – The pro forma will include a capital cost contingency that can be used to protect the Project against cost overruns and schedule delays.
- **High level of Tenaska involvement** – As managing partner of the Project Company, Tenaska will maintain a high level of involvement throughout the

development, construction and operation of the Project. Direct Tenaska involvement in project development, construction, startup and operations helps to ensure success.

### 5.3 Financing Risk

Another key risk is that Tenaska will be unable to attract financing for the Project. That risk can be mitigated in a number of ways:

- **Loan structure** - Loan documents for the Project will contain strict covenants that will bind the Project Company. The loan documents will be collateralized by all of the Project's assets, including hard assets (i.e. equipment, land, etc.) and soft assets (i.e. project contracts, permits, etc.). Some of the most material covenants include the following items:
  - The Project Company may not conduct activities other than those related to the development, construction, financing, ownership, operation and maintenance of the project.
  - The Project Company may not incur additional indebtedness other than items very narrowly defined, including hedging instruments, subordinated debt up to a certain level not deemed material by the lenders, and loans from the partners to the partnership (also deeply subordinated to the project lenders).
  - The Project Company may not permit additional liens to be placed on the project assets.
  - The Project Company may not incur any additional liabilities other than those incurred in the ordinary course of business.
  - The Project Company may not merge, consolidate, change the form of organization, liquidate, wind-up or dissolve the entity owning the project assets.
  - The Project Company may not dispose of any project assets.
  - The Project Company may not enter into transactions with an affiliate other than those provided for in the project documents (i.e. TOI).
  - The Project Company may not make distributions to the equity holders unless certain predetermined conditions are satisfied.
  - The Project Company may not amend or modify any project documents.
  - The Project Company must provide periodic certified financial statements in accordance with generally accepted accounting procedures.
  - The Project Company must comply with all laws and project documents.
- **Strong Project contracts** – Lenders will look for contracts with creditworthy counterparties that allocate risk to the parties most able to manage them and include protection against risks, including adequate performance penalties.
- **Robust financial metrics** – The Project will need to produce a pro forma that uses conservative assumptions to provide a balanced view of the Project's business prospects and resulting financial structure and credit metrics. Revenue from the sale of electricity and CO<sub>2</sub> under long-term contracts to creditworthy counterparties will be an important input to the pro forma, as will local and state

incentives and federal initiatives required to bridge the gap between the cost of the plant and the revenue that can be realized by selling the Project's electricity and CO<sub>2</sub>.

## 6.0 Lessons Learned

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Tenaska has extensive experience in building consortiums to develop, construct and operate large-scale electric generating stations. Although the Project has not yet completed its consortium building effort, it can draw on its experience so far and Tenaska's long-time experience to offer the following lessons learned:

- 1) Development of a first-of-its-kind carbon capture project can be a lengthy and expensive process. The time required to bring the consortium/project together should not be underestimated.
- 2) Bringing a partner in during the development phase can help defray costs and spread development risk.
- 3) It is extremely beneficial to have a partner who adds strategic value to the project, rather than just bringing money to the table.
- 4) In order to attract quality lenders to Trailblazer, the following fundamentals must be in place:
  - a. A well known, well respected sponsor;
  - b. Long-term contracts with creditworthy counterparties that generate enough cash to support the repayment of Project loans, combined with certain government incentives to make up any shortfall;
  - c. Well crafted contracts that assign risk to the party most able to mitigate those risks; and
  - d. A conservative pro forma that supports the financing.

## **7.0 Relevance to Carbon Capture and Storage**

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Carbon capture and storage projects are by their very nature large, complex, expensive undertakings. Assembling the right consortium to execute such a project is extremely important to the project's ultimate success.

The criteria used by Tenaska – an experienced project developer known in financial circles for its ethical reputation, its innovation and its attention to critical detail – to build the Trailblazer consortium may assist other developers as they plan and execute their carbon capture and storage development efforts. While Trailblazer is a new coal plant with integrated CCS, we believe building a consortium for an existing coal plant to incorporate a CCS retrofit could follow the same approach.

## 8.0 Acronyms and Citations

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### Acronym/Abbreviation

<b>Acronym</b>	<b>Meaning</b>
ACEP	Advanced Clean Energy Project
BNSF	Burlington Northern Santa Fe Railway
Burns & McDonnell	Burns & McDonnell Engineering Company
CCS	Carbon Capture and Storage
CO <sub>2</sub>	Carbon Dioxide
EOR	Enhanced Oil Recovery
EPC	Engineering, Procurement and Construction
ERCOT	Electric Reliability Council of Texas
Fluor	Fluor Corporation and Fluor Enterprises, collectively
Global CCS Institute	Global Carbon Capture and Storage Institute
HB	House Bill
MW	Megawatt
O&M	Operations and Maintenance
Powder River Basin	PRB
Project	Tenaska Trailblazer Energy Center
Project Company	Tenaska Trailblazer Partners, LLC
SB	Senate Bill
TCEQ	Texas Commission on Environmental Quality
Tenaska	Tenaska, Inc. and other subsidiaries and affiliates not referenced by name in this report
TMV	Tenaska Marketing Ventures
TOI	Tenaska Operations, Inc.
TPS	Tenaska Power Services Co.
Trailblazer	Tenaska Trailblazer Energy Center
UP	Union Pacific Railroad
USA	United States of America
USD	United States of America Dollars