BEFORE THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS

In the Matter of the Application of Grain Belt Express Clean Line LLC for a Limited Certificate of Public Convenience to Transact the Business of a Public Utility in the State of Kansas	)))))	**Docket No. 11-~~GBEE~~624-COC**

DIRECT TESTIMONY OF

ANTHONY WAYNE GALLI, Ph.D., P.E.

ON BEHALF OF

GRAIN BELT EXPRESS CLEAN LINE LLC

I. WITNESS INTRODUCTION AND PURPOSE OF TESTIMONY

Q. Please state your name, present position and business address.

A. My name is Anthony Wayne Galli. I am Vice President – Transmission and Technical Services of Clean Line Energy Partners LLC ("Clean Line Energy Partners"). Clean Line Energy Partners is the ultimate parent company of Grain Belt Express LLC ("Clean Line"), the Applicant in this proceeding. My business address is 1001 McKinney Street, Suite 700, Houston, Texas 77002.

Q, What are your duties and responsibilities as Vice President – Transmission and Technical Services of Clean Line Energy Partners?

A. I oversee and am responsible for the planning, engineering, design and other technical activities of Clean Line Energy Partners and its subsidiaries with respect to their transmission projects.

Q. Please describe your education and professional background.

A. I received Bachelor of Science and Master of Science degrees from Louisiana Tech University and a Doctor of Philosophy degree from Purdue University, all in electrical engineering. I am a Senior Member of the Institute of Electrical and Electronics Engineers and a registered Professional Engineer in the Commonwealth of Virginia.

I have over 12 years of experience in the electric transmission industry, in both technical and managerial roles, ranging from power system planning and operations to regulatory matters and project development. Most recently, I served as Director of Transmission Development for NextEra Energy Resources, a subsidiary of NextEra Energy, Inc. (formerly FPL Group, Inc.), where I developed transmission projects under the Competitive Renewable Energy Zones ("CREZ") initiative in Texas. In this position,

I focused on, among other topics, the development of High Voltage Direct Current ("HVDC") transmission solutions in the CREZ, and led all efforts in routing, siting and engineering transmission lines in the CREZ. Previously, I spent six years at the Southwest Power Pool ("SPP"), where I led the implementation of several components of the SPP market and grew the SPP Operations Engineering Group over fourfold to help ensure reliable operations of the SPP grid under the new market paradigm. As the Supervisor of Operations Engineering at SPP, my group was responsible for the real-time and short-term engineering support of the SPP's Regional Transmission Organization ("RTO") functions. These duties included activities primarily directed toward maintaining real-time system reliability through engineering support for the SPP Reliability Coordinator and Market Operations, performing short-term tariff studies, operational planning activities (e.g., processing outage requests), and engineering analysis support of the SPP Energy Imbalance Services Market. Additionally, my group was responsible for leading the implementation of several facets of the SPP market system and performing factory acceptance testing of various software systems.

My background also includes system planning experience with Southern Company Services, a subsidiary of Southern Company, where I analyzed expansion plans for 500 kV transmission facilities, and commercial power systems experience with Siemens Westinghouse Technical Services. Additionally, I have held academic positions at the university level and have helped design shipboard power systems for the U.S. Department of Defense.

Q. Have you testified previously before regulatory commissions?

A. Yes, I have provided testimony in proceedings before the Federal Energy Regulatory Commission ("FERC"), the Public Utility Commission of Texas, the Oklahoma Corporation Commission, and the Arkansas Public Service Commission.

Q. What is the purpose of your direct testimony?

A. I am testifying in support of Clean Line's request to be issued a Certificate of Public Convenience and Necessity pursuant to K.S.A. 66-131 to operate as a public utility in the State of Kansas. Specifically, I will address Clean Line's managerial and technical capabilities to be certificated as a public utility providing only transmission services. I will also describe the benefits of Clean Line's proposed use of HVDC technology for the Grain Belt Express transmission project.

Q. In addition to your prepared testimony are you presenting any exhibits?

A. Yes, I am. I have attached to my testimony Exhibits AWG-1 through AWG-7, which are identified and discussed below. Additionally, to facilitate discovery, I have provided footnote references to several technical documents that I reviewed in connection with the preparation of the portion of my testimony that discusses Clean Line Energy Partners' decision to use HVDC technology for its transmission projects. I have also provided footnote references to several web sites that provide additional information on certain firms that have been contracted to provide services for the Grain Belt Express project.

II. OVERVIEW OF GRAIN BELT EXPRESS PROJECT

Q. Please describe the transmission facilities that Clean Line proposes to build.

A. Clean Line is planning to build the Grain Belt Express transmission line and to provide open access transmission service using this facility. The Grain Belt Express will run

from a point to be located in western Kansas to the Midwest Independent System Operator ("MISO") extra high voltage ("EHV") transmission system in Missouri. The Grain Belt Express will be an approximately 550-mile-long, ±500 kilovolt ("kV") or ±600 kV HVDC transmission line that will be capable of delivering approximately 3,500 MW of power, and delivering approximately 15 million MWh of energy per year, from its western end to its eastern end. The intended use of the Grain Belt Express will be to transmit electricity produced by wind generation facilities located in the areas around the western end of the transmission line into high population centers farther east. In addition to the transmission line itself, associated facilities will include converter stations at the western and eastern ends of the line for, respectively, converting alternating current ("AC") electricity delivered to the Grain Belt Express into direct current ("DC"), and converting DC electricity transmitted by the line into AC for delivery back into the grid. Associated facilities will also include AC lines from the wind farms to the western converter station and related substation equipment. The AC lines are needed to gather the generation and deliver it to the Grain Belt Express for transmission farther east.

The most significant (by length) portions of the Grain Belt Express will run through Kansas. Although the precise route of the transmission line has not yet been determined, we anticipate that the Grain Belt Express will cross the state of Kansas, enter Missouri and then run eastward to its interconnection point with the MISO system likely at the Ameren 345 kV St. Francois substation located in St. Francois, Missouri.

In developing the specific route of the Grain Belt Express, Clean Line will work hand-in-hand with land use and routing experts and will gather input from landowners, local government officials, state and federal agencies, and other stakeholders in the area

of interest through which the line may pass, to determine specific potential routes for the transmission line. Further, subject matter experts on topics such as threatened and endangered species, archaeology and cultural resources will be engaged to ensure all appropriate considerations are taken into account in the routing decisions.

I note that in this proceeding, Clean Line is seeking only a Certificate of Public Convenience and Necessity under K.S.A. 66-131 to operate as a public utility in Kansas, and not any other authorizations or approvals specific to construction of the Grain Belt Express. Clean Line will make a subsequent, separate filing or filings submitted under the Kansas Electric Transmission Siting Act or pursuant to the National Environmental Policy Act of 1969 ("NEPA") when the location of the line becomes more defined. The subsequent filing or filings will include detailed information on the proposed route of the Grain Belt Express and the processes that Clean Line and its consultants followed to determine the proposed route. Clean Line will be presenting more detailed information on these topics when it files for a siting permit or when it proceeds under NEPA.

Q. Has an interconnection request for the Grain Belt Express been submitted to MISO?

A. Yes. On February, 11, 2010, Clean Line submitted a request to MISO to interconnect the Grain Belt Express with the MISO EHV network in Missouri. Exhibit AWG-1 is a copy of the interconnection request.

Q. Has Grain Belt Express been working with the Southwest Power Pool in regards to the Project?

A. Yes. Clean Line personnel have met with SPP staff and stakeholders on several occasions to discuss the Project and how to ensure a reliable interconnection. The project

was initially presented to SPP Staff in June 2010. The project was subsequently introduced to SPP stakeholders at the August 4-5, 2010 SPP Transmission Working Group (TWG) meeting. Exhibits AWG-2 through AWG-7 contain, respectively, correspondence, to date, between SPP and Clean Line regarding the project and the initial project white paper to the SPP TWG regarding the Grain Belt Express project. Per the November 17, 2010 letter (Exhibit AWG-5) received from SPP, it is our understanding that the project will be studied by SPP as an "expanded Transmission to Transmission" interconnection. In my opinion, this proposed process closely follows the SPP Criteria 3.5 process, which Clean Line originally proposed to the SPP in letters dated August 19, 2010 and October 14, 2010 (see Exhibits AWG-2 and AWG-4) as the appropriate means of assessing the reliability impacts and determining necessary mitigation. The only additional study proposed by SPP was one to assess any impact of harmonics on the SPP system. SPP and Clean Line are currently working to refine the scope of the studies and process for execution of the studies. It is anticipated that the studies will begin no later than the third quarter of 2011 and take four to six months to complete.

Clean Line is committed to working with SPP and ensuring a reliable interconnection that meets or exceeds all applicable North American Electric Reliability Corporation ("NERC") Standards and SPP Criteria.

III. MANAGERIAL AND TECHNICAL CAPABILITIES

Q. Will Clean Line and its parent company, Clean Line Energy Partners, have the managerial and technical capabilities to develop, construct and operate the Grain Belt Express?

A. Yes, they will. Clean Line Energy Partners has established a management and technical team that has significant experience and ability in the relevant developmental, technical and regulatory arenas for projects such as the Grain Belt Express. The testimony of Michael Skelly, the Chief Executive Officer and President of Clean Line Energy Partners and President of Clean Line, provides detailed information on the backgrounds and experience of the members of the Clean Line Energy Partners/Clean Line management team.

The Clean Line Energy Partners/Clean Line management and technical team will supervise and oversee the contractors who will perform the detailed development, project management, engineering/design, construction, and operating and maintenance functions for the Grain Belt Express. Clean Line Energy Partners and Clean Line will contract with and rely on experienced, qualified companies to perform these functions. We will select vendors, contractors and consultants with strong and suitable expertise in all areas relevant to the Grain Belt Express project. Specifically, Clean Line will contract with a firm or firms experienced in land acquisition activities in the areas where the project will be constructed to assist in contacting and negotiating with landowners to secure necessary rights-of-way. Clean Line will also contract with an experienced, qualified engineering/design firm or firms to perform the detailed engineering and design of the Grain Belt Express and to provide engineering and design services during construction. We will also contract with a firm or firms experienced in routing, permitting and construction of electric transmission facilities to erect the Grain Belt Express.

Louis Berger Group, Inc. ("Louis Berger") has been engaged as the principal consultant to assist with route selection, permitting, environmental, land use, and public

outreach activities for the project. Louis Berger is an internationally recognized consulting firm with over 60 years of experience in providing engineering, architecture, construction management, and environmental planning services. Louis Berger's experience and recognized success in the electric power industry has established them as a leader in high profile projects. The project management team for Louis Berger is a Kansas City based team who is very familiar with the areas of interest.[1]

POWER Engineers ("POWER") has been engaged in providing preliminary transmission line design services for Clean Line. POWER is a recognized engineering consulting firm founded in 1976. Their primary practice focuses on the electric power industry and they have performed work in all parts of the country including Kansas and Missouri.

For operations, it is premature to determine exactly how the line will be physically controlled as part of the system; however, Clean Line expects to be required to turn over functional control of the Grain Belt Express to an RTO. With respect to maintenance of the line, Clean Line will contract with a firm or firms experienced in electric transmission maintenance and operations to provide maintenance services and also capital replacements and upgrades as necessary. This contract could be with a utility or utilities, or with a firm that performs transmission line maintenance and construction services. Additionally, to ensure coordinated operations, Clean Line will work closely with the interconnected utilities, relevant RTOs and other entities in the region, so that appropriate agreements, per NERC reliability standards, which ensure coordinated operations, are in place.

[1] Additional information about Louis Berger's qualifications, experience, capabilities and scope of services is available at www.louisberger.com.

Q. Will the Grain Belt Express be the first transmission line project developed by Clean Line Energy Partners?

A. No. Clean Line Energy Partners and its subsidiaries are also developing the Plains & Eastern Clean Line transmission project, the Centennial West Clean Line transmission project and the Rock Island Clean Line transmission project. The Plains & Eastern Clean Line transmission project will bring electricity from wind generation sources in western Oklahoma, western Kansas, and the northern panhandle of Texas, to the Tennessee Valley Authority, Arkansas and the southeastern U.S. The Centennial West Clean Line transmission project will run from New Mexico to southern Nevada or California and possibly into other western states. The Rock Island Clean Line transmission project will bring electricity from wind generation sources in eastern South Dakota, eastern Nebraska and western Iowa to the Illinois electricity market. All of these projects have a similar rationale to the Grain Belt Express – connecting the country's strongest renewable resources to load centers via long-distance HVDC transmission facilities.

At the present time, the developmental, engineering, and licensing and permitting work for the Plains & Eastern Clean Line and the Rock Island Clean Line is somewhat more advanced than the developmental, licensing and permitting work for the Grain Belt Express, and in terms of timing, we expect the Plains & Eastern Clean Line will reach commercial operation before the Grain Belt Express. In developing, designing and constructing the Grain Belt Express, Clean Line Energy Partners and Clean Line will benefit from the experience gained and lessons learned in developing, designing and constructing the Plains & Eastern Clean Line project.

Q. Do Clean Line Energy Partners and Clean Line plan to open and maintain an office or offices in Kansas in connection with the construction and the operation and maintenance of the Grain Belt Express?

A. There will be temporary construction offices opened at various points along the route of the Grain Belt Express during its construction. These offices may be facilities of Clean Line or facilities of one or more of the project contractor(s). After the transmission line is placed into service, Clean Line anticipates that there will be one or more facilities opened along the route of the line as the base(s) of operations for operating and maintenance personnel. These facilities also may be facilities of Clean Line or facilities of the contractor or contractors retained to provide operating and maintenance services for the Grain Belt Express. The facility or facilities will be located in order to provide the ability to quickly allocate resources to any point on the transmission line where maintenance or restoration services may be needed.

Q. Will Clean Line Energy Partners and Clean Line be prepared to comply with applicable regulations of the Commission in the development, design, construction and operation of the Grain Belt Express?

A. Yes. Clean Line Energy Partners and Clean Line recognize that there are Commission regulations that may be applicable to these activities. These include the Kansas Electric Transmission Line Siting Act and the Commission's wire stringing rules. Clean Line will engage in its land acquisition activities in Kansas, and will design, construct and maintain the Grain Belt Express in accordance with Kansas law.

Q. Will Clean Line Energy Partners and Clean Line be prepared to comply with applicable NERC reliability standards in operating the Grain Belt Express?

A. Yes. NERC reliability standards became mandatory and enforceable (through the imposition of monetary penalties or other sanctions) in June 2007, pursuant to Section 215 of the Federal Power Act and regulations and orders of the FERC. Compliance with these standards is important to ensure the reliability of the bulk power system. Clean Line expects to be registered on the NERC Compliance Registry for the reliability functions of a "Transmission Owner" and possibly "Transmission Operator" (depending on the nature of its arrangements with a third party or parties to operate the Grain Belt Express, which could result in the Transmission Operator function being assigned to the third party). This means that Clean Line may be subject to applicable requirements of NERC reliability standards in some or all of the following categories: Resource and Balancing; Critical Infrastructure Protection; Communications; Emergency Preparedness and Operations Procedures; Facilities Design, Connections and Maintenance; Interchange Scheduling and Coordination; Interconnection Reliability Operations and Coordination; Modeling, Data, and Analysis; Personnel Performance, Training, and Qualifications; Protection and Control; Transmission Operations; Transmission Planning; and Voltage and Reactive. Clean Line will be prepared to comply with the requirements of the reliability standards that are applicable to its activities.

IV. CLEAN LINE'S USE OF HVDC TECHNOLOGY

Q. Why has Clean Line decided to use HVDC technology for the Grain Belt Express transmission project?

A. HVDC is a more efficient technology for long haul transmission of large amounts of electric power because substantially more power can be transmitted with lower losses, more narrow right-of-way, shorter transmission towers and fewer conductors than with an

equivalent high voltage AC ("HVAC") system. In general, when considering distance effects, long haul HVAC transmission lines require intermediate switching or substations approximately every 200 miles in order to segment the line to handle issues attendant with voltage support, transient over voltages, and transient recovery voltages. Additionally, HVAC lines used for long haul applications exhibit angular and voltage stability limitations have a higher requirement of reactive power dependent upon loading and have higher charging currents at light load. In essence, it takes more lines (and thus more right-of-way) to move large amounts of power long distances with AC than it does with DC. The current school of thought is that at distances beyond approximately 300 miles, HVDC is the most efficient means to move more power. Yet HVDC and HVAC facilities can be quite complementary when considering the integration of large amounts of renewable power into the electric transmission grid.

The use of HVDC technology is the particularly appropriate solution for the Grain Belt Express (and Clean Line Energy Partners' three other transmission projects), specifically, for moving large amounts of power from variable generation sources (such as wind farms) over long distances, primarily or exclusively in one direction. In this application, DC lines result in a lower cost of transmission than AC lines. The use of HVDC technology has a number of distinct benefits, including the following:

(1) HVDC lines can transfer significantly more power with lower line losses over long distances than comparable AC lines.

(2) HVDC lines complement AC networks without contribution to short circuit current power or additional reactive power requirements.

(3) HVDC lines can dampen power oscillations in an AC grid through fast modulation of the AC-to-DC converter stations, and thus improve system stability.

(4) HVDC technology gives the operators complete control of energy flows, which makes HVDC particularly well-suited to managing the injection of variable wind generation.

(5) HVDC lines, unlike AC lines, will not become overloaded by unrelated outages, since the amount of power delivered is strictly limited by the DC converters at each end of the HVDC line, thereby reducing the likelihood that outages will propagate from one region to another.

(6) HVDC lines utilize narrower rights-of-way, shorter towers and fewer conductors than comparable AC lines, thereby making more efficient use of transmission corridors and minimizing visual and land use impacts.

Q. You say that HVDC can be complementary to the AC network. Does this mean that the project's use of HVDC technology will not supplant or render un-needed the SPP Priority Projects which are underway?

A. Our project will in no way jeopardize the usefulness or the need for the SPP Priority Projects. The SPP Priority projects are intended to meet a need within the SPP region and not to directly facilitate export. The Grain Belt Express Project seeks to add strong inter-regional ties on the system, which will facilitate wind growth beyond what the SPP regional plans allow for as well as provide strong interregional ties for reliability purposes.

Q. Is there an additional benefit specific to Kansas as a result of using HVDC technology?

A. Yes. There has been some disagreement in Kansas about whether wind farms should be located in the Flint Hills, an area attractive to wind developers because of its abundant wind. The utilization of HVDC technology minimizes the environmental impact of such a large build-out of wind. Due to technical and economic reasons, there will be only one converter station in Kansas that will concentrate wind development for this project in western Kansas – an area more suitable for wind development. This will drive wind farms connected to this project away from sensitive areas like the Flint Hills. In addition, the relatively smaller transmission structures will require less land use compared to transmitting similar levels of energy on AC lines. The aforementioned system benefits showing that HVDC technology is fully controllable means that the line becomes something of an "intelligent link" that can be used in emergency operations via appropriate emergency operating agreements.

Q. Is the HVDC technology that Clean Line plans to use for the Grain Belt Express an experimental or recently-introduced technology?

A. Absolutely not. The HVDC technology has been tried and proven for several decades. In North America, there are over 30 HVDC installations, dating back as far as 1968.[2] Worldwide, HVDC applications are commonplace and continue to increase in applications similar to what Clean Line plans to use for the Grain Belt Express its three other transmission projects. For example, in India and China, there have been over 16

[2] DC and Flexible AC Transmission Subcommittee of the IEEE Transmission and Distribution Committee by the Working Group on HVDC and FACTS, HVDC Projects Listing (July 2009); available at: http://www.ece.uidaho.edu/hvdcfacts/Projects/HVDCProjectsListingJuly2009-existing.pdf.

major applications of the technology since the early 1990s. Australia, New Zealand, Brazil, Japan and Europe have each installed significant HVDC transmission projects since the late 1960s.[3]

Q. Can you give some examples of significant HVDC transmission installations in North America?

A. Yes. The Pacific Intertie project is an 846 mile ±500 kV HVDC line that transmits 3,100 MW of power from the Pacific Northwest, with its vast hydro resources, to the Los Angeles area. This intertie originally went into service in 1970 and was upgraded to its current capacity in 1989.

The Intermountain Power Project ("IPP") has an HVDC transmission system, operated by the Los Angeles Department of Water and Power, that moves 1,920 MW of power from south of Salt Lake City, Utah into the Los Angeles Basin. In 2008, approval was obtained to upgrade the IPP HVDC line to a capacity of 2,400 MW and upgrades have since been completed and trial operation at this new capacity is expected to be complete by mid-January, 2011.

Another example is in Canada where the Nelson River Bipole connects good hydro resources in Northern Manitoba to the population centers in the South of Manitoba. The Nelson River projects have over 3,800 MW of capacity and cover over 550 miles. The Quebec-New England project, which delivers 2,000 MW over 932 miles from the southern Hudson Bay in Quebec to near Boston, Massachusetts, was commissioned in 1990-1992.

[3] Kim, Chan-Ki, et al., HVDC Transmission: Power Conversion Applications in Power Systems. Singapore: John Wiley & Sons, 2009.

The most recent additions in the United States include the Neptune project which transmits 660 MW over 65 miles, with nearly 50 miles underwater, and connects Long Island and New Jersey; and, the Trans Bay Cable, a 53 mile, 400 MW project that brings power underneath the bay into the San Francisco area and currently is being commissioned .

Q. Can power flow in both directions on an HVDC line; that is, could power flow from MISO to SPP?

A. Yes, it can. As previously described, the HVDC facilities will have an AC interconnection to the existing grid in Kansas. This interconnection would allow for operators to direct flow from MISO into SPP.

Q. What do you mean when you state "operators could direct flow?"

A. I previously indicated that one of the benefits of HVDC technology was that the flow is completely controllable. That is, if you want to control the flow on the HVDC facilities to 3000 MW, you schedule that as the input to the controls of the converter station and a steady 3000 MW will flow from the sending end to the receiving end. If needed the operators can, very quickly, reverse the flow on the line.

Q. How much power could you inject into the SPP system if so directed?

A. The amount of power one could inject into the SPP system would be dependent upon the configuration of the grid at the given point in time power was required. Our current business plan is such that we are expecting there to be zero interchange between our AC bus and the SPP grid. The HVDC converter will control this interchange. Should power need to be injected into the SPP grid, for example, in emergency circumstances and under the direction of SPP or other appropriate entity, the amount would be determined by SPP.

Studies to understand the limits of injection in this direction would need to be performed. The current studies that are being scoped with SPP and affected parties under SPP Criteria 3.5 will look at this, at least, implicitly during contingency scenarios of the HVDC system.

Q. Does this conclude your prepared direct testimony?

A. Yes, it does.

Sargent & Lundy LLC

Robert E. O'Hara
Senior Project Manager
Phone: (312)269-3869
FAX: (312)269-4924
E-mail: robert.e.ohara@sargentlundy.com

February 11, 2010

Midwest ISO

Mr. Eric Laverty
Director, Generator Interconnection
Midwest ISO
720 City Center Drive
Carmel, IN 46032

Dear Eric:

Enclosed is the interconnection request application (Appendix 1 to GIP) for 3,500 MW at Ameren's St. Francois Substation on the 345 kV bus. This generation interconnection request is for a +/- 500 kV HVDC link for the purpose of transferring wind generation located in western Kansas and Oklahoma to eastern Missouri. Based on our recent phone conversation, we are submitting a simplified HVDC transmission line model that can be used with PSS/E software to conduct the feasibility study.

On the sending end (generation side) of the HVDC link, a tie to the AC transmission system is required for providing a stable voltage and frequency reference to the AC to DC conversion equipment. Therefore, we are planning to tap the Holcomb-Spearville 345 kV line as shown on the attached one-line diagram. We are currently in discussions with SPP regarding system requirements and impacts of this interconnection.

The following items will be sent directly to MISO from Clean Line Energy Partners:

- Attachment B (Interconnection Study Agreement)
- Attachment C (Confidentiality Agreement)
- Deposit Fee

If you need any additional information, please call me at (312) 269-3869 or Wayne Galli at (713)979-9541.

Sincerely,

Robert E. O'Hara

Robert E. O'Hara
Senior Project Manager

cc: Michael Skelly – Clean Line Energy
Wayne Galli – Clean Line Energy

APPENDIX 1 TO GIP
INTERCONNECTION REQUEST FOR A GENERATING FACILITY

1. The undersigned Interconnection Customer submits this request to interconnect its Generating Facility with the Transmission System pursuant to a Tariff.

2. * This Interconnection Request is for (check one):

- (•) A proposed new Generating Facility.
- ( ) An increase in the generating capacity or a Material Modification of an existing Generating Facility.
- ( ) An Interconnection Request made in connection with a Generating Facility proposed for inclusion in a resource solicitation process.

3. * The type of interconnection service requested (check one as appropriate):

- ( ) Energy Resource Interconnection Service
- (•) Network Resource Interconnection Service
- ( ) Network Resource Interconnection Service in connection with a resource solicitation process

4. The Interconnection Customer provides the following information:

a * Address or location or the proposed new Generating Facility site (to the extent known) or, in the case of an existing Generating Facility, the name and specific location of the existing Generating Facility;
HVDC terminal to be located in close proximity to Ameren's St. Francois Substation.(Farmington, Mo)

b * For new Generating Facility, maximum MW (Megawatt)/ MVAR (Megavar) electrical output:

Summer (net) 3,500 MW 1,750 MVAR at N/A degrees C
Winter (net) 3,500 MW 1,750 MVAR at N/A degrees C

For increase in capacity maximum megawatt/megavar electrical output; _____
MW_____ MVAR of an existing Generating Facility:

Maximum electric output before increase
Summer (net) increase of _____ MW _____ MVAR at _____ degrees C
Winter (net) increase of _____ MW _____ MVAR at _____ degrees C;

c. * General description of the equipment configuration;

See attached single-line diagram.

d. * Generating Facility Commercial Operation Date June, 2015 , synchronization date May 1, 2015 and required Interconnection Facilities In-Service Date by day, month, and year; March 1, 2015

e. Name, address, telephone number, and e-mail address of the Interconnection Customer's and its agent's contact person;

* Name: Michael Skelly / Wayne Galli

* Address: 1001 McKinney, Suite 1900

* City: Houston * State: TX * Zip: 77002

* Phone: (713)979-9541 * Email: MSkelly@CleanLineEnergy.com

* Agent's contact person: Bob O'Hara (Sargent & Lundy) - (312)269-3869

f. * Approximate location of the proposed Point of Interconnection including township and range (optional); and

St. Francois Substation (345 kV bus) in Farmington, Missouri. (St. Francois County)

g. Interconnection Customer Data (set forth in Attachment A)

h. Primary and secondary fuel sources.

Wind * Primary fuel source

_____ Secondary fuel source

i. Qualifying Facility status including an indication of state and / or federal qualifications met (optional).

j. If this Interconnection Request is made in connection with a resource solicitation process, attach a copy of a written agreement assigning the Interconnection Customer's rights under the GIP to the solicitor of the process and granting the solicitor the right to act as the Interconnection Customer's agent for all purposes in the GIP.

5. Applicable deposit amount as specified in the GIP

6. * Evidence of Site Control as specified in the GIP:

○ Is attached to this Interconnection Request

◉ Will be provided at a later date in accordance with the GIP

7. This Interconnection Request shall be submitted to the representative indicated below:

USPS mailing address:
Midwest ISO
Attn: Manager Interconnection Planning
P.O. Box 4202
Carmel, IN 46082-4202

Overnight address:
Midwest ISO
Attn: Manager Interconnection Planning
720 City Center Drive
Carmel, IN 46032

8. Representative of the Interconnection Customer to contact:

* Name: Robert O'Hara
* Address: 55 East Monroe
* City: Chicago * State: IL * Zip: 60603
* Phone: 312-269-3869 * Email: robert.e.ohara@sargentlundy.com

9. This Interconnection Request is submitted by:
* By (signature): Robt E. O'Hara
* Name (type or print): Robert E. O'Hara
* Title: Senior Project Manager
* Date: 2/11/2010

CDC4T

Two-terminal dc Line Model

This is dc line #_____ I,
This model uses CONs starting with #_____ J,
and STATEs starting with #_____ K,
and VARs starting with #_____ L,
and ICONs starting with #_____ M.

CONs	#	Value	Description
J		5	ALFDY, minimum alpha for dynamics (degrees)
J+1		15	GAMDY*, minimum gamma for dynamics (degrees)
J+2		.05	TVDC, dc voltage transducer time constant (sec)
J+3		.05	TIDC, dc current transducer time constant (sec)
J+4		.6	VBLOCK, rectifier ac blocking voltage (pu)
J+5		.65	VUNBL, rectifier ac unblocking voltage (pu)
J+6		.1	TBLOCK, minimum blocking time (sec)
J+7		.6	VBYPAS, inverter dc bypassing voltage (kV)
J+8		.65	VUNBY, inverter ac unbypassing voltage (pu)
J+9		.1	TBYPAS, minimum bypassing time (sec)
J+10		200	RSVOLT, minimum dc voltage following block (kV)
J+11		500	RSCUR, minimum dc current following block (amps)
J+12		5	VRAMP, voltage recovery rate (pu/sec)
J+13		5	CRAMP, current recovery rate (pu/sec)
J+14		400	C0, minimum current demand (amps)
J+15		300	V1, voltage limit point 1 (kV)
J+16		1000	C1, Current limit point 1 (amps); ≥C0
J+17		500	V2, voltage limit point 2 (kV)
J+18		3000	C2, current limit point 2 (amps)
J+19		500	V3, voltage limit point 3 (kV)
J+20		3500	C3, current limit point 3 (amps)
J+21		.1	TCMODE, minimum time stays in switched mode (sec)

*Ignored if in gamma control (i.e., GAMMAX = GAMMIN in load flow).

STATEs	#	Description
K		Measured inverter dc voltage (V)
K+1		Measured inverter dc current (amps)

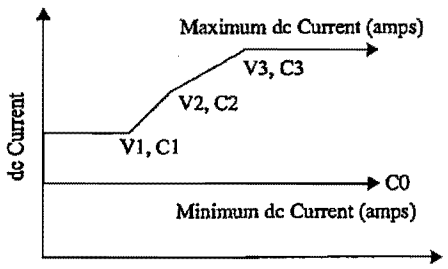
VARs	#	Description
L		Other signals, MW [DC2SIG(1,I)]
L+1		RESTR, time unblocks or unbypasses (sec)
L+2		VRF, voltage ramping factor
L+3		CRF, current ramping factor
L+4		VCOMP, compensating dc voltage (V)
L+5		PACR, rectifier ac real power (pu)
L+6		QACR, rectifier ac reactive power (pu)
L+7		PACI, inverter ac real power (pu)
L+8		QACI, inverter ac reactive power (pu)
L+9		VDCI, inverter dc voltage (V)
L+10		VDCR, rectifier dc voltage (V)
L+11		DC, dc current (amps)
L+12		ALFA, alpha (degrees)
L+13		GAMA, gamma (degrees)
L+14		TIME, reswitches mode

Note: This model uses auxiliary signal output stored in DC2SIG(1,I) (i.e., auxiliary signal index 1).

ICONs	#	Description
M		Bypass control flag*: 0 = Not bypassed 1 = Bypassed 2 = Unbypass
M+1		Blocking control flag*: 0 = Not blocked 1 = Blocked 2 = Unblocked
M+2		Switched mode control flag*: 0 = Normal 1 = Mode switched

*Not intended to be changed by the user.

I, 'CDC4T', ALFDY, GAMDY, TVDC, TIDC, VBLOCK, VUNBL, TBLOCK, VBYPAS, VUNBY, TBYPAS, RSVOLT, RSCUR, VRAMP, CRAMP, C0, V1, C1, V2, C2, V3, C3, TCMODE/



Voltage-Dependent Upper Current Limit

CLEAN LINE
ENERGY PARTNERS
1001 MCKINNEY, SUITE 700
HOUSTON, TX 77002

August 19, 2010

Ms. Katherine Prewitt
Director, Engineering and Planning
Southwest Power Pool
415 North McKinley, Suite 140
Little Rock, AR 72205-3020

Dear Ms. Prewitt:

We would like to thank you and Keith Tynes for taking the time to meet with our team back on June 17, 2010 in Little Rock. As you know, after our meeting, we also met with John Mills and Steve Purdy to discuss our recently announced Grain Belt Express project.

Clean Line Energy Partners ("Clean Line") announced at the August 3-4, 2010 SPP TWG meeting, the development of a High Voltage Direct Current ("HVDC") transmission line to move up to 3500 MW of renewable energy from western Kansas. The Project consists of one ±500 or ±600 kV HVDC bipole with 3500 MW of transmission capacity. The western terminus of the line and its DC converter station will be connected at or near the 345 kV Spearville substation. The eastern DC converter station will interconnect at or near the 345 kV St. Francois substation within the Ameren service territory in southeastern Missouri.

Clean Line has entered the generator interconnection queue with MISO at the St. Francois substation and paid the appropriate deposits to begin that process. Clean Line has been in discussions with public utility commissioners and staff as well as political leaders in Kansas and Missouri. We have also met with representatives of utilities and electric cooperatives serving those states and will continue to reach out to affected parties.

Based on our meeting and prior discussions, it is Clean Line's understanding that in order to facilitate the interconnection, our project needs to be studied as a transmission interconnection under the auspices SPP Criteria 3.5. Clean Line will seek to coordinate the parameters for the study with the Transmission Working Group (TWG), all affected parties, and the staff of SPP. We wish to emphasize that Clean Line is not seeking recovery of development expenditures and is fully at risk for development expenditures for this project.

This letter is to formalize our request to enter the system planning process. In conjunction with input from affected parties, we will look for guidance on data submission requirements and what the SPP needs from Clean Line to assist in properly studying this request to ensure system security and reliability.

We fully understand that the Grain Belt Express project and the Plains & Eastern project we are proposing are without precedent in the United States, and that projects of this scale and

complexity will require careful study and the close collaboration of many different companies and organizations. We greatly appreciate your assistance as we move forward on the development of these exciting projects.

Finally, we ask that you acknowledge your receipt of this letter by signing below and returning a copy to the address above. If you have any questions or requests for us, please do not hesitate to give us a call or send me an email at wgalli@cleanlineenergy.com

Sincerely,

Wayne Galli
Vice President, Transmission and Technical Services
Clean Line Energy Partners LLC

Receipt Acknowledged by: _____

Cc: Bruce Rew
[redacted]
Steve Purdy

SPP Southwest Power Pool

HELPING OUR MEMBERS WORK TOGETHER
TO KEEP THE LIGHTS ON... TODAY AND IN THE FUTURE

September 21, 2010

Wayne Galli
Clean Line Energy Partners
1001 McKinney, Suite 700
Houston, TX 77002

Dear Mr. Galli:

Thank you for your letter announcing the western Kansas Grain Belt Express project. Before SPP can fully assess the extent of the requirements of such an interconnection with SPP we would request the following additional information:

1) For generation that is contemplated to be interconnected into a Grain Belt bus (345kV or otherwise), please explain the procedures that will be used to process your generation interconnection customers?
2) What reactive power support requirements as well as source impedance requirements that will be necessary for the DC tie interconnection to SPP and to the other end location?
3) How will the DC tie be interconnected to the Spearville substation?
4) Provide SPP with the anticipated design parameters including but not limited to:
   a. Short circuit support
   b. Harmonics
   c. The type of DC tie and the performance of the proposed device
5) Will the DC tie ever be used as to transmit energy in both directions, both importing into and exporting from SPP?
6) Does Clean Line anticipate the generation interconnection customers to interconnect at a bus other than at the Clean Line 345 kV bus?
7) Please provide a one line diagram of the interconnection of the Clean Line system and how it interconnects to the existing Spearville substation.

Once we have received your responses we believe we will have enough information to determine if the transmission interconnection process is appropriate.

Sincerely,

Katherine Prewitt
Director, Planning
Phone (501) 614-3518 • Fax: (501) 821-3245 • kprewitt@spp.org

cc: Bruce Rew, Steve Purdy, John Mills

CLEAN LINE
ENERGY PARTNERS

1001 MCKINNEY, SUITE 700
HOUSTON, TX 77002

August 19, 2010

Ms. Katherine Prewitt
Director, Engineering and Planning
Southwest Power Pool
415 North McKinley, Suite 140
Little Rock, AR 72205-3020

Dear Ms. Prewitt:

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Sincerely,

Wayne Galli
Vice President, Transmission and Technical Services
Clean Line Energy Partners LLC

Receipt Acknowledged by: _____

Cc: Bruce Rew
John Mills
Steve Purdy

CLEAN LINE
ENERGY PARTNERS

October 14, 2010

Katherine Prewitt
Director, Engineering Planning
Southwest Power Pool
415 N. McKinley Street, Suite 140
Little Rock, AR 72205

Dear Ms. Prewitt:

Thank you for taking time on October 5th to meet with my colleagues and me to discuss next steps in ensuring the reliable implementation of our Grain Belt Express Clean Line project. By developing a series of high-voltage direct current (HVDC) transmission projects, Clean Line will connect the most robust renewable resources to areas that have a strong appetite for clean, reliable energy. Clean Line appreciates the continuing dialogue and the working relationship with Southwest Power Pool, its members, and other entities in the Eastern Interconnection since it began discussing the Grain Belt Express project in February 2010 when Clean Line filed an interconnection request with the Midwest ISO.

Per our discussion in our recent meeting, I am supplying this letter in response to your letter of September 21, 2010. The information contained herein and the attached references should help to confirm that our project does indeed fall under the "Interconnection Review Process" as defined under SPP Criteria. The Grain Belt Express project meets the test set forth in Criterion 3.5; it "creates a non-radial, non-generation interconnection at 69 kV or above." Clean Line believes that SPP's transmission interconnection process is the appropriate process for studying the Project and its interconnection to the SPP system. Though the project may have a single point of interconnection with SPP at the Spearville substation (or nearby), it is not radial in the sense of, for example, a generation tie line which connects to SPP. On the contrary, the Grain Belt Express project is a networked part of the Eastern Interconnection. That one endpoint of the line is outside of SPP territory should not affect its study process; in fact, the interregional nature of this project gives further credence to the fact that it should be studied as a transmission interconnection. The reliability issues raised in studying the line will be the same for a regional and interregional line. Any contingency concerns will be addressed by the studies required under Criterion 3.5.

In our meeting on October 5th, there was an interest expressed in some of the simulations we have done to date. In our letter of October 14th, regarding the Plains & Eastern Clean Line project, we included some studies performed by Siemens and Dennis Brandt. These studies are applicable in concept to the Grain Belt Express project. Clean Line is pleased to discuss these studies in more detail if requested.

1001 MCKINNEY, SUITE 700 HOUSTON, TX 77002 TEL 832-319-6310 FAX 832-319-6311
CLEANLINEENERGY.COM

Background

This project was first introduced to the SPP Staff on June 16, 2010 when we also discussed next steps on the Plains & Eastern Clean Line project. This project was then presented for information to the SPP TWG at the August 4-5, 2010 meeting per requirements of Criteria 3.5. At both the August 2010 TWG meetings, Clean Line invited comments and discussion from the attendees and responded to their questions. We have prepared the studies in accordance with that guidance and feedback from the TWG and SPP staff.

It is our understanding that recently you have received correspondence from Southwestern Power Administration regarding our 1222 application. I have already sent a copy of this application under separate cover via our TrueShare file sharing system and have provided a copy on the enclosed USB drive as Attachment 1. The data and information in this application should be useful in your determination of this project as a transmission interconnection and includes several of the studies we have performed in support of this project.

Responses to SPP Questions

1. Clean Line's FERC-approved open access transmission tariff (OATT) will provide a non-discriminatory process through which generators will interconnect with our transmission line. Clean Line does not yet have an anticipated date on which we will file an OATT with FERC; however, consistent with FERC requirements, we expect to file a tariff at least one year prior to operations. Clean Line anticipates that it will administer the obligations pursuant to said OATT and does not anticipate this to be a function of SPP.

2. This question is answered in two parts. Part (a) addresses the "reactive power support requirements" and part (b) addresses the "source impedance requirements."

    a. Our connection to the SPP facilities will be designed to be essentially neutral from a reactive power flow perspective. The amount of reactive power consumed by an HVDC converter station is relative to the amount of power being converted. HVDC converter stations are typically designed such that the reactive power required by the conversion process is supplied by shunt capacitors and the harmonic filters that are inherent in HVDC converters. The AC filter design for the SPP 'end' of one of the proposed 3,500 MW converter stations will include approximately 1500MVar of reactive support as well as a potential for a static var compensator (SVC). There will be a level of exchange of reactive power between the converter station and the SPP grid as filter banks are switched in or out; however, allowable levels will be determined by interconnection requirements imposed by the incumbent utility (e.g., Sunflower Electric Cooperative). Additionally, the HVDC converter station can, if needed, supply reactive power to the bulk grid through control and though use

of static and dynamic reactive equipment inherent to HVDC converter stations. Such equipment will be specified in the final design of the station, in accordance with NERC, SPP and other guidance as determined by the appropriate studies and operating criteria.

b. Based on our understanding of system characteristics, including the priority projects, the source impedance characteristics are sufficient. There is no specific requirement, per se, on source impedance as every application is unique. In general, lower source impedances are better for HVDC applications as they result in "stiffer" systems and higher short circuit capabilities. The design of HVDC applications takes into account the ratio of the short-circuit level at 1.0 per-unit AC voltage relative to the DC power, and define this as the short circuit ratio (SCR). With the SPP Priority Projects in place, it is anticipated that the short-circuit level around the Spearville substation will be on the order of 8,000 MVA or greater. This results in a SCR of approximately 2.3 which is easily within engineering constraints for reliable conversion. (Since the western end of the project is only intended to serve as a rectifier, it can operate at lower SCR than if it were to be used as an inverter). Various measures will be taken during the engineering of the project to ensure the robustness of the commutation process. These measures include, but are not limited to, the addition of synchronous condensers and/or the use of a Capacitor Commutated Converter (CCC) or a Controlled Series Capacitor Converter (CSCC), which are specifically designed for weak AC system applications. Such equipment will be specified in the final design of the station, in accordance with NERC, SPP and other guidance as determined by the appropriate studies and operating criteria.

3. The DC tie will be connected to the Spearville 345 kV substation (or some nearby point which is electrically "close") via one or two 345 kV lines as indicated in the one line diagram in Attachment 2 (provided on the enclosed USB Drive). Further study will help refine the required robustness of this connection.

4. Design parameters of any HVDC project are highly dependent upon the existing AC grid at all points of interconnection between the HVDC line and the AC grid. In addition, design parameters will be dependent upon appropriate transmission interconnection requirements and standards required by incumbent utilities. For the three parameters that you mentioned, I can offer the following information:

   a. Short circuit support: Please see the discussion above in 2(b).

   b. Harmonics: The presence of harmonics due to HVDC converter stations is a well-studied condition. We anticipate addressing this through a series of studies used to design the project specific filter banks (which also provide

reactive support for the converter and interconnected AC system). Harmonic filters will be tuned such that, at all levels of transfer, appropriate limits are maintained at the point of common coupling between the project and interconnections to the bulk grid. There are two published standards by which harmonic limits are generally judged, namely, IEC 61000-3-6 and ANSI/IEEE 519. In addition, Clean Line will work with the appropriate entities (e.g., Sunflower Electric Cooperatives and Westar Energy) to determine the appropriate limits to which we will design.

c. Clean Line will deploy a Line Commutated Converter (HVDC "classic"). We may also apply Static Var Compensators (SVC) or series capacitors in either a CCC or CSCC configuration (see 2b above) if system conditions so dictate.

5. Clean Line does not currently anticipate that the Grain Belt Express project will be used to move power into SPP during normal operations. The purpose of the project is to move wind energy from western Kansas to the population centers in the eastern Midwest and points further east. Production cost models performed by ICF International (which is provided in Appendix 3 of Clean Line's 1222 application for the Grain Belt Express project) did not permit power to flow from East to West. Even if the model assumption was changed, higher prices on the eastern end of the line suggest that East-to-West transfers would be uneconomic. From a power flow perspective, HVDC is completely controllable and our business model dictates that flow will be controlled to be injected into the St. Francois substation and MISO from new generation sources in western Kansas. Technically, the project will be capable of reversing power flow, if requested; however, this will be subject to studies outside the scope of the current transmission interconnection. Clean Line reiterates that it is not contemplating and not requesting the right to inject power into the SPP system.

6. Our base case assumption is that all generators utilizing capacity on our facility will be connected as radial facilities to Clean Line's AC bus and will be subject to Clean Line's interconnection requirements. Thus, in this scenario, our connection to SPP is neutral from a power flow perspective. In the case where a generator interconnected elsewhere on the SPP system will desire service across our project, that generator will be required to get transmission service from its point of interconnection to our AC bus. This is similar to the way that the ERCOT ties are managed today. SPP will manage this type of request for service through a separate study process. Clean Line is not requesting that SPP study any intra-SPP transfers to our interconnection. If such transfers are requested in the future and do not meet requirements under SPP's OATT, they will be disallowed.

7. Please see Attachment 2. Clean Line does not have one line diagrams of the Spearville substation at this time. Therefore we cannot provide detailed design drawings of the interconnection. We anticipate that the line will be tied into an existing empty breaker

bay, or Clean Line will provide an appropriate expansion to the substation. Alternatively, Clean Line may work with Sunflower Electric Cooperative, Westar, ITC Great Plains or others to connect at an alternative site near Spearville 345 kV substation.

I hope you find these answers responsive to your questions. We will be able to provide additional technical information regarding final design parameters once we have gathered all the necessary inputs for the AC portion of the studies. Part of the process under Criteria 3.5 will help us to gather much of this data so that we can ensure a complete and reliable transmission interconnection.

Thank you again for your time on this and for meeting with us on September 5th. I look forward to working with SPP on this exciting project.

Sincerely,

Wayne Galli
Vice President Transmission, Clean Line Energy Partners
tel 832-319-6337
wgalli@cleanlineenergy.com

Attachments (provided on enclosed USB Drive):

1. Grain Belt Express Clean Line 1222 Application
2. One Line Diagram of Grain Belt Express Clean Line

November 17, 2010

Wayne Galli
Clean Line Energy Partners
1001 McKinney, Suite 700
Houston, TX 77002

Dear Mr. Galli:

Thank you for your letters dated October 14, 2010 containing background details on your Grain Belt Express and Plains & Eastern Clean Line projects and responses to questions previously submitted by SPP. SPP has determined that these projects should be studied under an expanded Transmission to Transmission interconnection process. SPP expects that an inter-regional study will also be required, including coordination with intermediate and adjoining systems.

The magnitude of these interconnections mandates a comprehensive analysis to insure reliable operation of the grid and to assess the impact of this project on the SPP Transmission System. Therefore, the anticipation that the single points of interconnection to SPP facilities will be designed to be essentially neutral from a reactive power flow perspective, as well as zero MW flow into the SPP system during normal operation, requires detailed studies for confirmation.

SPP will require the following studies to identify the affected parties and impact on the SPP Transmission System:

- Steady state analysis
- Short circuit analysis
- Stability analysis including (as necessary):
  - Angular stability analysis
  - Voltage stability analysis
  - Small signal stability analysis
  - Frequency stability analysis
- Single pole tripping with delayed clearance analysis

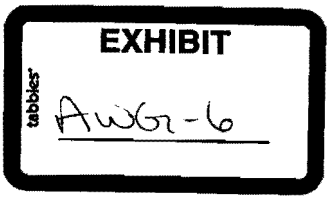
One additional study will also be required to evaluate the impact of harmonics and its mitigation plan. SPP consultants will likely perform all or part of the studies listed above. SPP estimates the cost of performing the studies to be approximately $150,000. Clean Line will be responsible for all costs associated with the studies.

Keith Tynes will be the contact person for SPP. Please contact him to discuss the development of a study agreement and study scope. Keith may be reached at via email at ktynes@spp.org or by phone at (501)614-3252.

Sincerely,

Katherine Prewitt
Director, Planning
501-614-3518• Fax: (501) 664-9553 • kprewitt@spp.org

cc: Kathy Patton, Mario Hurtado, Carl Monroe, Les Dillahunty, Bruce Rew, Matt Harward, Jim McDonald



From: Katherine Prewitt [kprewitt@spp.org]
Sent: Tuesday, March 01, 2011 11:01 AM
To: Wayne Galli
Cc: Keith Tynes; Matthew Harward; Hassan Shah; John Mills; Mario Hurtado;
Deral Danis
Subject: RE: Re-cap of yesterday's call

Wayne,

Per our conversation last Friday, SPP has committed to provide you, Clean Line, with an SPP Study
Agreement which would outline the required studies and expected costs recovery necessary for the
review of those studies prior to signing an interconnection agreement. We are hopeful we can have a
draft agreement to you within the next two weeks. If you would like to start the scope development
process in parallel with the study agreement development, please let us know so we can get a
meeting scheduled with the appropriate representatives.

Please don't hesitate to give me a call if you have any questions or concerns.

Thanks,
Katherine Prewitt
Director, Planning
Southwest Power Pool
415 N. McKinley
Suite 140 Plaza West
Little Rock, AR 72205
(501)614-3518 Office
(501)697-4002 Cell
(501)280-9446 Fax

From: Wayne Galli [mailto:wgalli@cleanlineenergy.com]
Sent: Tuesday, February 15, 2011 10:31 AM
To: Hassan Shah; Keith Tynes; Matthew Harward
Cc: Kathy Patton; Mario Hurtado; Katherine Prewitt; Danis, Deral
Subject: RE: Re-cap of yesterday's call

Hey, folks -

Just touching base to see where we were on this.

Thanks,

wg

From: Wayne Galli
Sent: Thursday, February 03, 2011 8:45 AM
To: 'Hassan Shah'; Keith Tynes; Matthew Harward

Cc: Kathy Patton; Mario Hurtado
Subject: Re-cap of yesterday's call

Keith, Hassan, and Matt -

Thanks again for your time yesterday to help us work toward better clarification of the process. We understand how big this is and how critical it is to be sure we are all on the same page. In terms of next steps, I wanted to follow-up and make sure the action items were documented:

1. SPP will generate a follow-up letter to Clean Line stating that working through SPP TWG and Criteria 3.5 is the appropriate process.
2. Clean Line and SPP will review the letter from SWPA to determine the best approach for answering SWPA's request to SPP in support of SWPA's role in Clean Line's 1222 application.

If I missed something, please let me know.

Thanks,

wg

Wayne Galli

CLEAN LINE ENERGY PARTNERS LLC
1001 MCKINNEY, SUITE 700
HOUSTON, TX 77002

TEL 832-319-6337
CELL 713-569-4069
FAX 832-319-6311
wgalli@cleanlineenergy.com
CLEANLINEENERGY.COM

CLEAN LINE

ENERGY PARTNERS

Grain Belt Express

Clean Line

Project Description

Presented to the Transmission Working Group

August 5, 2010

Contents

Notice

The development of a major infrastructure project like the Grain Belt Express Clean Line is a long term undertaking. During the development process the Project will be modified and refined to reflect the progress of activities in the areas of permitting, public outreach, engineering, commercial and others. Therefore, this Project Description is a living document and will be updated from time to time to reflect these adjustments and improvements.

(The remainder of this page is intentionally left blank.)

1. Introduction

Clean Line Energy Partners LLC ("Clean Line") is developing the Grain Belt Express Clean Line ("Grain Belt Express" or the "Project") to deliver wind generated electricity from western Kansas to southeastern Missouri and points farther east. The Grain Belt Express will consist of one parallel circuit ±500/600 kilovolt ("kV") overhead High Voltage Direct Current ("HVDC") transmission line, which will deliver up to 3,500 MW of renewable energy beginning in late 2016. The wind speeds in western Kansas are among the highest in the United States. Development of this new line will meet the needs of generators and utilities for new transmission capacity, and enable the construction of thousands of megawatts of new, cost-effective renewable electric generation capacity. This additional generation capacity will create new jobs, stimulate domestic manufacturing, and lead to reductions in greenhouse gas emissions.

2. The Challenge

The most vexing challenge blocking continued growth in the renewable energy industry is the expansion of the US electric transmission grid. The existing transmission system was primarily built as a result of local utility planning – connecting population centers with nearby fossil fuel power plants. In the last decade, the nation has expressed the desire to move away from fossil fuels and towards a clean energy economy. While the United States has the best renewable resources in the industrialized world, the transmission infrastructure does not yet exist to connect the bulk of these resources, predominantly located in remote areas, to distant load. New long-haul transmission lines must be built to fully capture the potential of America's vast renewable resources and further the development of a clean energy economy.

3. The Solution

An effective transmission solution requires appropriate technology, a flexible business model, a methodical approach to development, and most importantly, the right project. The best wind resources in the United States are found in the central plains region, stretching from the Dakotas to the panhandles of Oklahoma and Texas. Western Kansas lies at the heart of that region, and the Grain Belt Express Clean Line will connect the wind resources of Kansas to southeastern Missouri and points farther east, delivering up to 3,500 MW of low-cost, renewable energy.

Due to its lower losses and more efficient use of right of way, HVDC is the most economic technology to move large amounts of power over long distances. By selling transmission capacity to renewable generators or the buyers of their power, the Project will avoid difficult cost allocation proceedings. Clean Line's independence from existing or planned generation and from load-serving utilities permits a single-minded focus on meeting the needs of the Project's many stakeholders through a transparent development effort.

Clean Line estimates that the Project will make possible some $6 billion of renewable energy projects that otherwise cannot be built due to limitations of the existing grid. These projects will create approximately 70,000 construction jobs and 3,000 permanent jobs,[1] and they will reduce carbon

[1]Calculated via the NREL Jobs and Economic Development Impact Model ("JEDI"); assumed 100% local share for all inputs, so as to grasp total economic impacts for the entire project; however, this estimate does not take into account economic impacts due to the construction and operation of transmission of the Grain Belt Express Clean Line. http://www.nrel.gov/analysis/jedi/.

emissions by more than 10 million tons annually, equivalent to removing approximately one million cars from the road each year. The Project will increase competition in wholesale power markets and improve the diversity and security of America's energy supply.

4. Company Background

Clean Line Energy Partners is an independent developer of long-haul HVDC transmission lines. The Company focuses exclusively on connecting the best renewable resources in North America with large population centers. Clean Line is not in the business of developing generation projects, but rather focuses on providing transmission solutions to generators and load-serving utilities in order to efficiently provide consumers with clean energy.

In addition to the Grain Belt Express, Clean Line is developing three other projects elsewhere in the United States. All of the Clean Line projects are similar in conception to the Grain Belt Express—moving thousands of megawatts of renewable energy from resource-rich areas to major load centers via HVDC lines. The other project originating in SPP is the Plains & Eastern Clean Line which will move up to 7,000 MW of wind and solar power from the Oklahoma Panhandle to Memphis, Tennessee.

Clean Line was established by Michael Skelly, co-founder of Horizon Wind Energy. During Skelly's tenure from 1999 to 2008, Horizon developed and constructed nearly 2,000 MW of wind energy projects and amassed a development portfolio of over 10,000 MW in over a dozen states. Clean Line's team includes highly regarded energy professionals who have successfully developed and implemented large scale utility and energy infrastructure throughout the world. Among those on the Clean Line team are professionals who have managed, built and financed ambitious projects in the renewable and traditional energy sectors, as well as senior policy professionals who have shaped energy policy and advanced the renewable energy agenda at the local, state and national levels. Members of the Clean Line team have financed billions of dollars of projects and managed the development and construction of thousands of megawatts. See section 13 for team member biographies.

5. Project Description and Status

Clean Line is developing and plans to build and operate the Grain Belt Express Clean Line transmission project. The Project will be developed in one phase consisting of one ±500/600 kV HVDC transmission line capable of transmitting up to 3,500 MW of power from renewable projects in western Kansas (the "Resource Area") to load centers in southeastern Missouri and points farther east.

The Project will consist of HVDC converter stations in the Resource Area, which will be fed by AC transmission lines originating at the various generating projects. The converter station will connect to an HVDC line with a conductor(s) and a ground line(s). The lines will be supported by monopole or bipole transmission structures designed to meet all appropriate regulations and may consist of several basic designs, depending on the site characteristics on which each structure will be constructed. At the eastern end of the HVDC line will be a receiving inverter station adjacent to or near the chosen substation.

Clean Line's team has advanced the development of the Grain Belt Express Clean Line on a number of fronts but understands that the successful development of the Project requires substantial and widespread participation from a diverse group of other entities and stakeholders. It is Clean Line's responsibility to work collaboratively with landowners, towns, counties, factories and businesses most affected by the Grain Belt Express.

The company has engaged in dialogue with and solicited input from organizations and individuals concerned about how new infrastructure may affect land use. In order to understand and avoid sensitive areas, Clean Line is consulting with the Kansas Field Office of The Nature Conservancy, the Missouri Department of Conservation and the Sierra Club and will continue in these efforts with other environmental and natural resource groups.

To ensure that qualified local suppliers and contractors can participate in the construction and operation of the Project, Clean Line intends to work closely with the economic development offices and state Chambers of Commerce in both Kansas and Missouri. With the help of these offices, Clean Line is working to maximize the involvement of local businesses in the Project area.

Clean Line launched its efforts to determine the route of the Grain Belt Express Clean Line by engaging Ecology and Environment, Inc. ("E&E") to perform a Phase I Corridor Identification study. E&E is identifying potential corridors within which one or more possible transmission routes could be located. E&E will act as lead environmental consultant for the Project's state permitting and National Environmental Policy Act ("NEPA") permitting processes. They will assist Clean Line in routing the Project so as to minimize land use and environmental impacts.

To support the routing process, Clean Line engaged Power Engineers to perform preliminary transmission line engineering for the Grain Belt Express. The analysis will determine conductor sizing, design criteria, right of way requirements and the family of structures to be used in constructing the line. Clean Line is working with leading HVDC equipment manufacturers to present the benefits of the technology to planning engineers, operators and others active in the Project area.

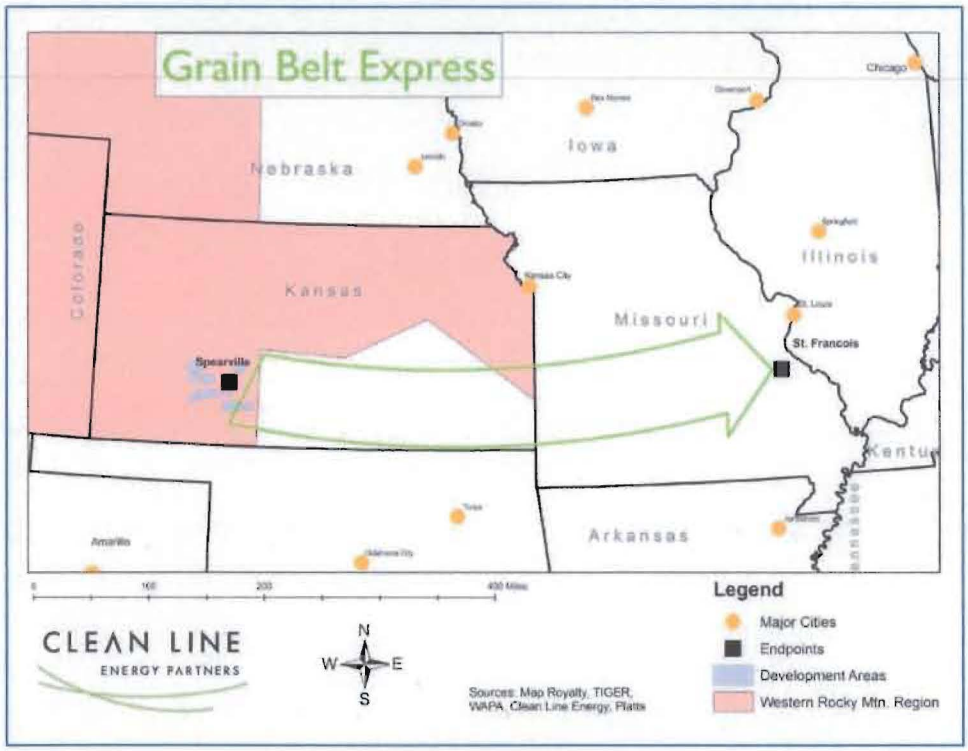
Though Clean Line will not enter into transmission service agreements until the Project reaches a more advanced stage of development, many parties have demonstrated their interest in the Project. Clean Line is also working with several major wind developers in the US that have wind farms under development in western Kansas. These developers are potential capacity customers on the line. Alternatively, the same developers can sell renewable power to load serving entities that purchase transmission capacity on the Grain Belt Express.

Construction of the Project is anticipated to take place in segments and proceed for about 36 months. The exact construction schedule will be determined as development progresses. The Project is estimated to be placed into service no earlier than 2016.

6. Project Location

The Grain Belt Express Clean Line transmission project will consist of one ±500/600 kV HVDC transmission line capable of transmitting up to 3,500 MW of power from renewable projects in western Kansas to southeastern Missouri and points farther east. Converter stations are being considered in Spearville, Kansas and at the St. Francois substation in southeastern Missouri.

Figure 3
Grain Belt Express Clean Line Project Area Map



Source: Clean Line Energy

New permanent and temporary land rights for the proposed substations, terminals and transmission line rights of way, work areas, and access roads will be needed. The proposed substations and terminals will be placed on land acquired by Clean Line and may range in size from approximately 80 acres for substations to 100 acres for terminals. Clean Line estimates that he right of way for the transmission line will be 100 to 200 feet-wide. The exact dimensions for rights of way will be determined by additional engineering, environmental and economic studies.

Rights of way for transmission line facilities on private lands will be obtained as perpetual easements. All reasonable commercial efforts will be made to purchase the land and/or obtain easements on private lands through direct negotiations with the landowners.

Depending on the location of the proposed alternative, the Project may require crossing other electrical transmission lines, US and State Highways and railroads. The location of existing transmission and other

linear facilities relative to final transmission routing, topographical constraints, and any utility corridor boundary constraints that may exist would dictate the number and location of crossings. The required crossings will be coordinated with each owner/manager, as appropriate, and Clean Line will obtain the required licenses, letters of agreement or permits for such crossings. Clean Line will also meet with applicable state, county, and local governments and obtain any permits and/or approvals required by these entities.

7. Renewable Resources and Generation Projects in Western Kansas

Grain Belt Express will draw from some of the richest renewable resources in the country. According to a report issued by the meteorological firm AWS Truepower ("AWS") and the National Renewable Energy Laboratory ("NREL"), who ranked wind capacity potential by state at a 40% gross capacity factor, Kansas ranks fourth in the US for wind energy potential with approximately 760,300 MW of installed capacity. [2]

Table 1
Wind Capacity Potential by State

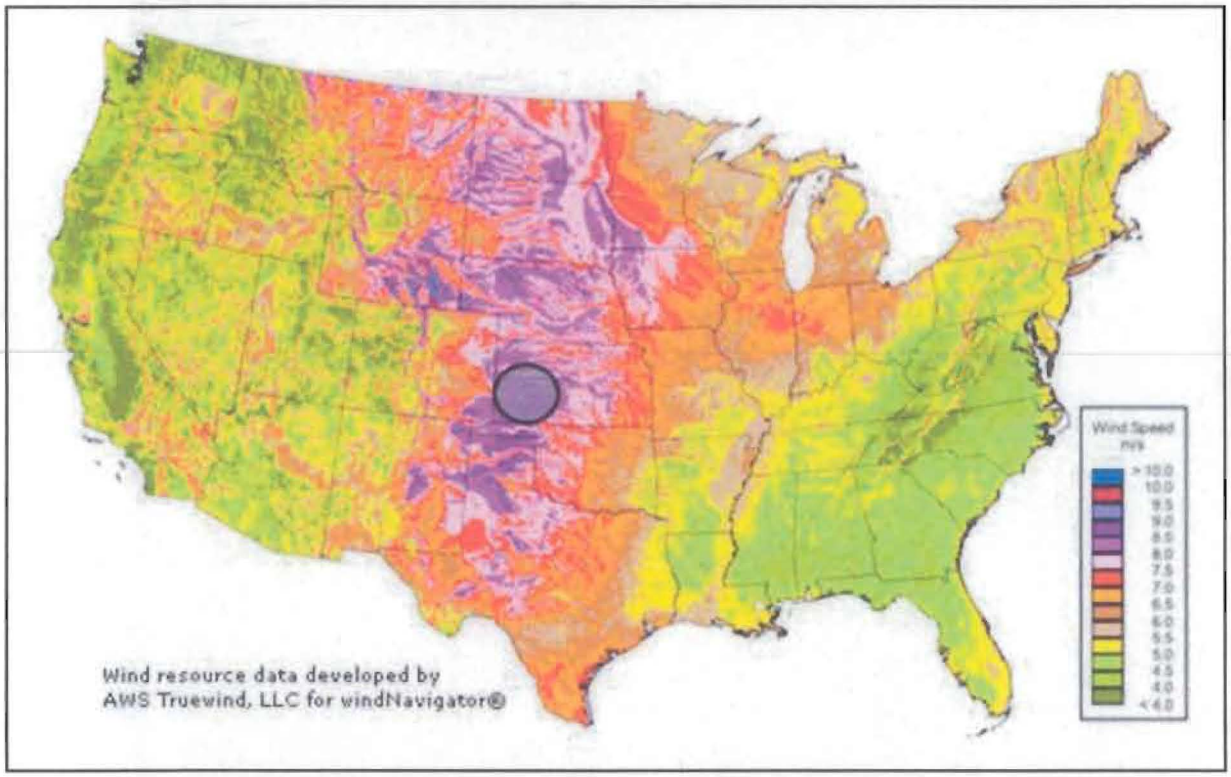
Windy Land Area >= 40% Gross Capacity							
		Factor at 80m				Wind Energy Potential	
Ranking (by Capacity Potential)	State	Total (km^2)	Excluded (km^2)	Available (km^2)	Available % of State	Installed Capacity (MW)	Annual Generation (GWh)
1	Texas	180,822	15,426	165,397	24%	826,983	3,240,930
2	Nebraska	165,445	10,012	155,433	78%	777,165	3,084,090
3	South Dakota	163,281	10,004	153,277	77%	766,383	3,039,460
4	**Kansas**	**163,170**	**11,105**	**152,065**	**71%**	**760,324**	**3,024,280**
5	North Dakota	160,497	21,932	138,564	76%	692,821	2,728,620
6	Montana	98,309	18,737	79,571	21%	397,857	1,529,560
7	Iowa	72,119	8,400	63,719	44%	318,595	1,232,860
8	Wyoming	70,268	17,787	52,482	21%	262,410	1,043,890
9	Oklahoma	55,593	6,038	49,555	27%	247,773	952,678
10	New Mexico	39,573.80	2,424.70	37,149.10	11.80%	185,745.30	712,877

Source: US Department of Energy, National Renewable Energy Laboratory

Figure 4 shows average wind speeds at 80 meters, the hub height of a modern wind turbine. The Grain Belt Express Clean Line will deliver wind energy from the Resource Area (shown in gray below), which has average wind speeds of 9.0 meters per second (about 20 miles per hour) or greater at 80 meter hub heights. In contrast, the Project's target delivery market in southeastern Missouri and points farther east has maximum average wind speeds of 6.5 meters per second (about 14 miles per hour) or less. At such low speeds, utility-scale wind projects are rarely economical.

[2] US Department of Energy, National Renewable Energy Laboratory and AWS Truewind, Estimates of Windy Land Area and Wind Energy Potential by State, Feb. 4, 2010.

Figure 4
USA Wind Speeds at 80 M Hub Height



Source: US Department of Energy, National Renewable Energy Laboratory

In addition to high capacity wind, the Resource Area has compatible land use with wind farm development. Much of western Kansas consists of highly fragmented agriculture grounds, which provide little natural habitat for wildlife. As a result, few environmental or land use concerns exist with large-scale wind development. This sparsely-populated area has little topographical relief and very few trees which allow for even more intense winds.

The Grain Belt Express will provide reliable, low cost, renewable energy from western Kansas to distant load centers. Assuming the wind industry continues to see the same technological improvements witnessed in the last several years, wind projects from the Resource Area should reasonably reach capacity factors of close to 50%.

In general, the development and construction timeframe for wind farms in the Resource Area is approximately three to five years—considerably shorter than the timeframe for a transmission line. The wind industry has already demonstrated that it can install thousands of megawatts of new projects in a short timeframe. From 2008 to 2009, over 6000 MW of new wind projects were installed in Texas, Kansas and Oklahoma.[3]

[3]American Wind Energy Association, AWEA Year End 2009 Market Report, January 2010. http://www.awea.org/publications/reports/4Q09.pdf; American Wind Energy Association, American Wind Energy Association

Wind development projects sufficient to fill the transmission capacity of the Grain Belt Express Clean Line can be completed on a schedule consistent with a transmission line on-line date of 2016. Table 2 shows projects in the Southwest Power Pool ("SPP") Interconnection Queue within approximately 50 miles of the Grain Belt Express converter station. The total capacity of the wind projects below, approximately 3,200 MW, have scheduled commercial online dates on or before 2016. In addition to the projects in the Interconnection Queue, other projects are under development in the Resource Area.

Table 2
SPP Interconnections Queue
(Wind Projects within 50 miles of proposed converter station)

Generation Interconnection Number	Nearest Town or County	State	CA	In-Service Date	Capacity	Type	Status
GEN-2007-025	Barber County	KS	WERE	12/31/2009	300	Wind	FACILITY STUDY STAGE
GEN-2009-059	Clark County	KS	SUNC	12/31/2011	100.5	Wind	DISIS STAGE
GEN-2008-018	Finney County	KS	SWPS	12/31/2012	405	Wind	FACILITY STUDY STAGE
GEN-2004-014	Ford County	KS	MIDW	11/15/2005	154.5	Wind	IA FULLY EXECUTED/ON SCHEDULE
GEN-2006-006	Ford County	KS	MKEC	12/1/2008	205.5	Wind	FACILITY STUDY STAGE
GEN-2005-012	Ford County	KS	WPEK	12/1/2008	250	Wind	IA FULLY EXECUTED/ON SUSPENSION
GEN-2007-038	Ford County	KS	SUNC	10/1/2012	200	Wind	FACILITY STUDY STAGE
GEN-2008-124	Ford County	KS	MKEC	11/30/2011	200.1	Wind	FACILITY STUDY STAGE
GEN-2010-029	Ford County	KS	SUNC	12/31/2013	450	Wind	FEASIBILITY STUDY STAGE
GEN-2007-040	Gray County	KS	SUNC	12/15/2010	200.1	Wind	FACILITY STUDY STAGE
GEN-2008-079	Gray County	KS	MKEC	12/1/2010	100.5	Wind	FACILITY STUDY STAGE
GEN-2010-009	Gray County	KS	SUNC	12/1/2011	165.6	Wind	DISIS STAGE
GEN-2010-015	Hodgeman County	KS	SUNC	1/1/2013	200.1	Wind	DISIS STAGE
GEN-2001-039A	Kiowa County	KS	WPEK	12/31/2009	105	Wind	IA FULLY EXECUTED/ON SUSPENSION
GEN-2009-008	Ness County	KS	SUNC	9/1/2011	199.5	Wind	DISIS STAGE
GEN-2006-022	Pratt County	KS	WPEK	5/31/2008	150	Wind	IA FULLY EXECUTED/ON SUSPENSION
GEN-2009-020	Rush County	KS	MIDW	12/31/2011	49.5	Wind	DISIS STAGE
GEN-2010-016	Rush County	KS	MIDW	12/31/2015	199.8	Wind	DISIS STAGE

Source: Southwest Power Pool

Clean Line has engaged various wind developers in the Resource Area and several of them agreed to share wind data so that Clean Line can optimally design the Project to take advantage of the best wind resources and most efficiently use the line capacity. These developers are potential transmission service customers; alternatively, they may sell power to load-serving entities, who may purchase capacity on the Grain Belt Express Clean Line.

Annual Wind Industry Report, 2008. http://www.awea.org/publications/reports/AWEA-Annual-Wind-Report-2009.pdf; US Department of Energy—Wind Powering America, "U.S. Installed Wind Capacity and Wind Project Locations," Updated: March 2010. http://www.windpoweringamerica.gov/wind_installed_capacity.asp.

8. Project Benefits

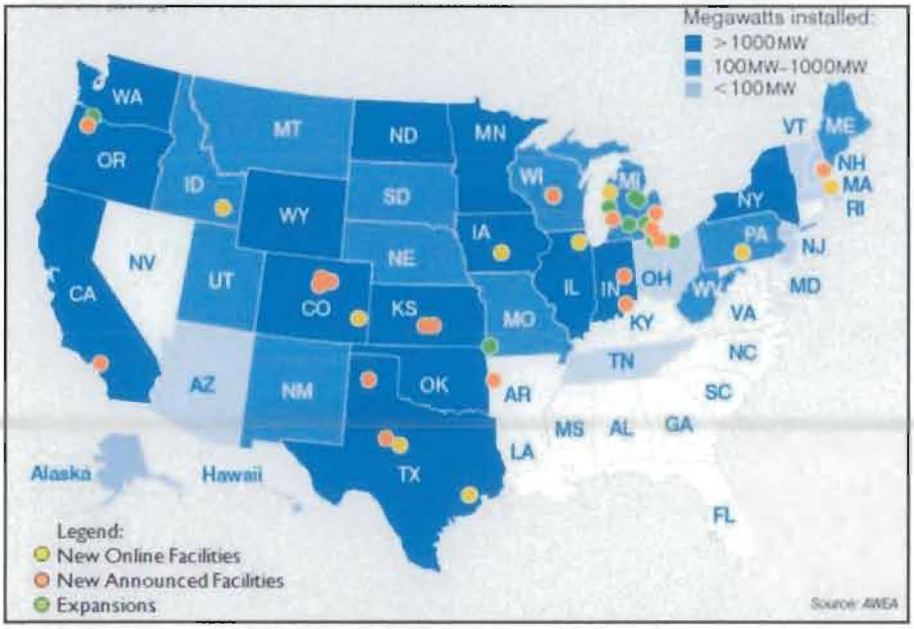
8.1 Economic Benefits

The Grain Belt Express Clean Line will provide a tremendous stimulus to the US economy creating thousands of jobs and facilitating billions of dollars of investment in renewable energy projects that would not be possible if the Project did not occur. The Project will result in many short- and long-term economic benefits to Kansas, Missouri, and the surrounding region, including:

- Construction of over 3,500 MW of wind energy projects representing a capital investment in excess of $6 billion;
- Over 70,000 construction jobs and roughly 3,000 permanent jobs to operate and maintain wind farms constructed as a result of the Grain Belt Express;
- Increases in income and sales tax base;
- Tens of millions of dollars to local communities through property taxes (or payments in lieu of taxes) and landowner royalties;
- Access to abundant renewable resources in a least-cost manner, reducing exposure to volatile fuel prices;
- New manufacturing jobs in the region, as the current trend is to locate factories near new wind projects.

The increased development of wind projects will attract additional manufacturing investment. Figure 5 shows the expansion of manufacturing facilities in 2009. Note the trend that manufacturing tends to be located near the sites where wind turbines are installed.

Figure 5
Expansion of Manufacturing Facilities in 2009



Source: American Wind Energy Association

Also noteworthy is that as the US wind industry is expanding, the domestic content of turbines is increasing. According to the American Wind Energy Association ("AWEA"), "With supportive policies in place since 2004 and a rapidly growing market, US domestic manufacturing of wind turbines and their components has increased 12-fold with domestic content increasing from less than 25% to 50% even with a much larger market."[4]

8.2 Environmental Benefits

Energy delivered by the Grain Belt Express Clean Line will allow for significant reductions in pollution because renewable power creates environmental benefits by replacing generation from thermal plants powered by fossil fuels like coal, oil and natural gas. Reduced emissions include greenhouse gases (principally carbon dioxide), particulates (such as SO_X and NO_X) and heavy metals (including mercury). Displacing thermal generation also saves the large amounts of water needed to cool power plants. According to the Institute of Electrical and Electronics Engineers Spectrum, approximately 39% of freshwater withdrawn from rivers, lakes and aquifers in the United States is used to cool thermoelectric power plants.[5]

As part of its efforts to employ best practices in siting the Project, Clean Line is meeting with hundreds of stakeholders in an extensive outreach effort. In order to understand and avoid sensitive areas, Clean Line is working closely with various environmental groups, and is presenting the Project to local or regional offices of Sierra Club, The Nature Conservancy, The Missouri Department of Conservation and many more. Clean Line is committed to working with these organizations to find optimal routes for the Project.

The Project will result in many environmental benefits to Kansas, Missouri, and the surrounding region, including:

- Displace pollution from thermal generation, about 10 million tons of carbon dioxide per year, SO_X and NO_X emissions, and heavy metals such as mercury;
- Save millions of gallons of water that would be needed to power thermal generation;
- Bring about substantial public health benefits from cleaner air and water.

9. High Voltage Direct Current Transmission Advantages

The Grain Belt Express Clean Line will utilize DC technology, which is as old as the electric utility industry. HVDC technology has been implemented consistently over many years as an effective supplement to the main AC transmission systems. Large-scale HVDC has been successfully deployed both in the United States and throughout the world. In North America alone there are more than 30 HVDC installations dating back to 1968.[6]

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[4] American Wind Energy Association, Windpower Outlook 2010. http://www.awea.org/pubs/documents/Outlook_2010.pdf.
[5] The Coming Clash Between Water and Energy. IEEE Spectrum Staff, IEEE Spectrum, June 2010, 26-27.
[6] DC and Flexible AC Transmission Subcommittee of the IEEE Transmission and Distribution Committee by the Working Group on HVDC and FACTS, HVDC Projects Listing, July 2009.
http://www.ece.uidaho.edu/hvdcfacts/Projects/HVDCProjectsListingJuly2009-existing.pdf.

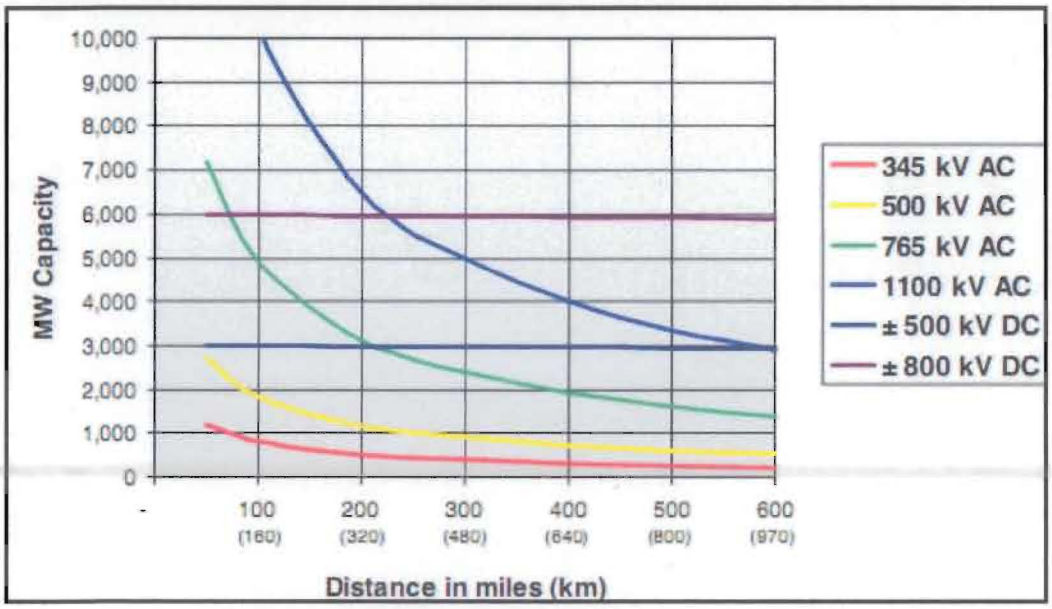
As demand to move large amounts of renewable energy to distant load centers has increased, HVDC solutions have moved to the forefront as the most efficient option. Until recently, the notion of using HVDC to move renewable energy was not feasible because utilities, transmission planners and developers were not concerned with developing inter-regional transmission lines for movement of remote resources to load. HVDC technology is primarily cost effective when constructed over long distances.

Proper deployment of an HVDC solution can:

- Result in lower line losses over long distances than comparable AC lines;
- Complement AC networks without contribution to short circuit power or reactive power requirements;
- Dampen power oscillations in an AC grid through fast modulation of DC transmission power and thus improve system stability;
- Give the operator complete control of energy flow, making it particularly well-suited to managing the injection of variable wind generation; and
- Allow the operator to control reactive power loading.

There are many factors that limit extra high voltage ("EHV") AC transmission capacity including: thermal considerations, steady-state stability, transient stability and voltage concerns. For EHV AC transmission lines, the maximum load capability of the line decreases as the length of the line increases. Figure 6 shows that at increasing distances, the ability to load the line, or "loadability" of EHV AC transmission lines diminishes, while the loadability of HVDC diminishes only slightly with distance.

Figure 6
Line Loadability vs. Distance without series compensation



Source: Fleeman, J.A.; Gutman, R.; Heyeck, M.; Bahrman, M.; Normark, B.; , "EHV AC and HVDC transmission working together to integrate renewable power," *Integration of Wide-Scale Renewable Resources Into the Power Delivery System, 2009 CIGRE/IEEE PES Joint Symposium* , vol., no., pp.1-1, July 2009, 29-31..

Figure 6 shows a comparison of losses for various configurations that could be applied to move 3,000 MW of power over 250, 500 and 750 miles. The 345 kV and 500 kV lines in this analysis were assumed to be series compensated in order to load them to twice their surge impedance loading ("SIL") levels.[7]

Table 3 provides the assumptions used in the analysis to develop Figure 7

[7] The SIL of a transmission line is the megawatt loading level of a line at which a natural reactive power balance occurs; that is, the line neither produces nor consumes reactive power. For a 345 kV line, the typical SIL is around 450 MW.

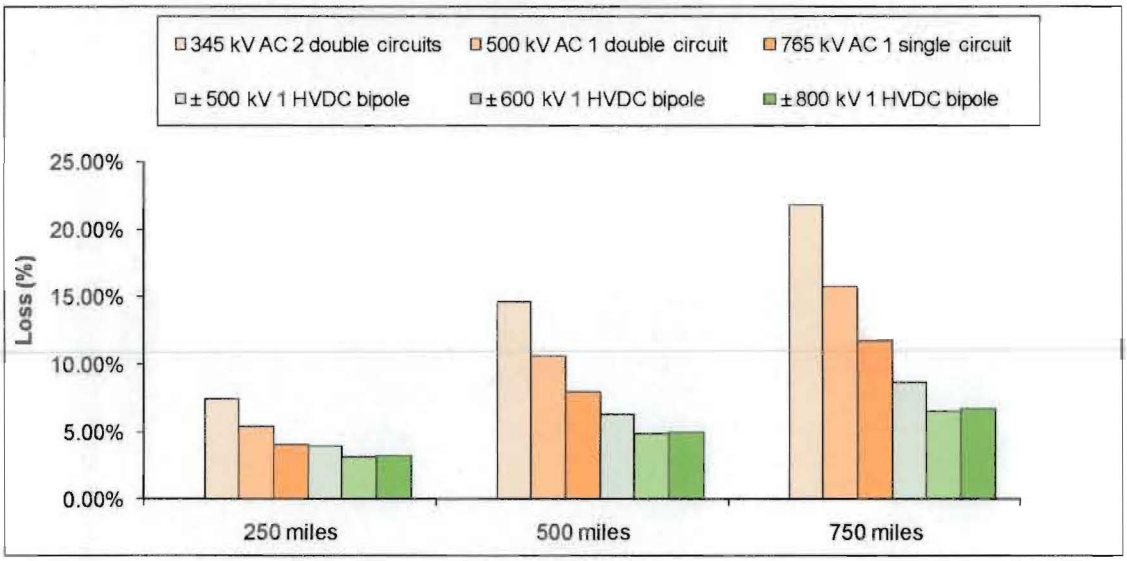
Figure . In this table, the first column indicates the operating voltage of the line in thousands of volts (kilovolts). The second column is the number of lines that are required (i.e., how many rights of way would be required). The third column indicates the number of circuits per structure (e.g., in the first row, for the 345 kV option, there would be two sets of structures (lines), each with two circuits). This is equivalent to having four physical transmission lines. The fourth column indicates the estimated right of way width for the assumed configuration. The fifth, sixth and seventh columns indicate the requirements for reactive support needed to achieve appropriate loading of the line. The last three columns indicate the type, configuration and bundling of the assumed conductors. In this case, all conductors are assumed to be Aluminum Conductor Steel Reinforced, which is an industry standard. Bundling refers to how many conductors are needed for each phase (for AC) or each bi-pole (for DC). Conductor sizes are measured in thousands of circular mils (kcmil). In the cases below, a 1590 kcmil conductor has a diameter of 1.545 inches, a 2312 kcmil conductor has a diameter of 1.802 inches, and a 795 kcmil conductor has a diameter of 1.108 inches.

Table 3
Assumptions in Loss Comparison

Voltage (kV)	Configuration			Reactive Support			Conductor		
	Lines	Circuits per Tower	Est. ROW (ft)	Series Compensation	Shunt Reactors	Shunt Capacitors	Type	Bundle	Size (kcmil)
345 AC	2	2	300	Yes	No	Yes	ACSR	2	1590
500 AC	1	2	200	Yes	Yes	Yes	ACSR	2	2312
765 AC	1	1	200	No	Yes	Yes	ACSR	6	795
±500 DC	1	2	150	N/A (terminal reactive support designed as part of filter bank and system requirements)			ACSR	3	2515
±600 DC	1	2	150				ACSR	3	2515
±800 DC	1	2	250				ACSR	5	795

Source: Clean Line Energy

Figure 7
Loss Comparison for 3,500 MW



Source: Clean Line Energy

Figure 6 demonstrates that although DC always results in lower losses than AC, the relative advantage of DC in terms of lower losses increases at longer distances. The efficiencies of the AC options could be increased if the series compensation were removed from this analysis; however, this would be at the expense of additional circuits, thus increasing costs, right of way requirements and overall environmental impact.

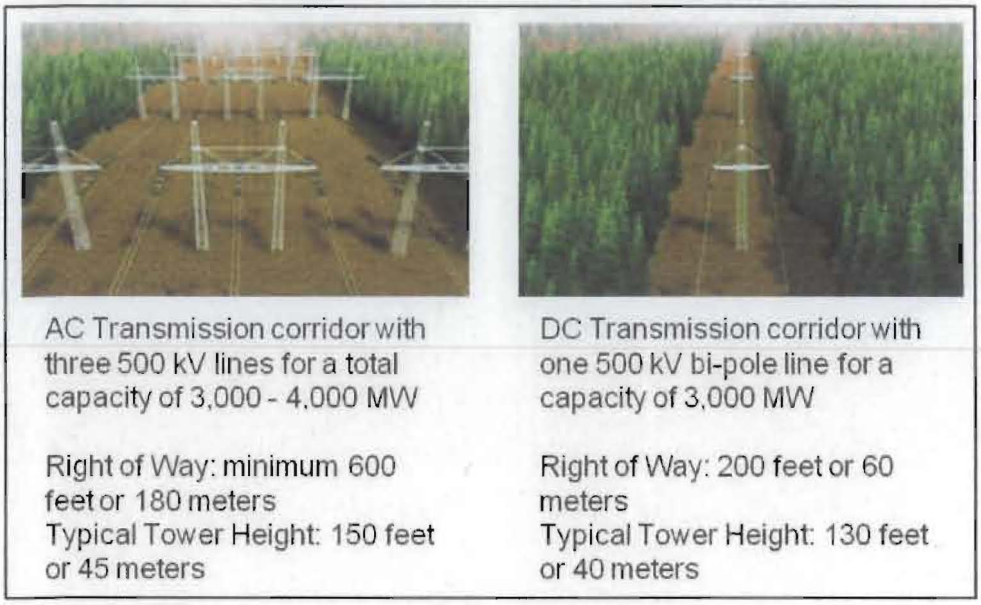
In general, when considering distance effects, long-haul EHV AC transmission lines:

- Require intermediate switching stations approximately every 200 – 250 miles (i.e., segmenting the lines) in order to handle issues associated with voltage profile, transient overvoltages and transient recovery voltages;
- Exhibit lower angular and voltage stability limitations;
- Have a higher requirement of reactive power dependent upon loading and higher charging currents at light load; and
- Present more parallel flow issues.

The analysis presented above, and in the relevant academic and industry literature, dictate that HVDC quickly becomes the most economic, efficient and environmentally friendly option for transmission of greater than 2,000 MW over distances greater than 250 miles.

As indicated in Figure 8, HVDC lines can transfer approximately twice as much power, accommodate narrower structures and thus require narrower rights of way than comparable EHV AC lines. By making more efficient use of transmission corridors and reducing land impact, public acceptance of the Project will be greater and total land acquisition costs will be lower.

Figure 8
Typical Transmission Line Structures for 3000-4000 MW



Source: ABB

10. HVDC Transmission to Support the Growth of Wind Power

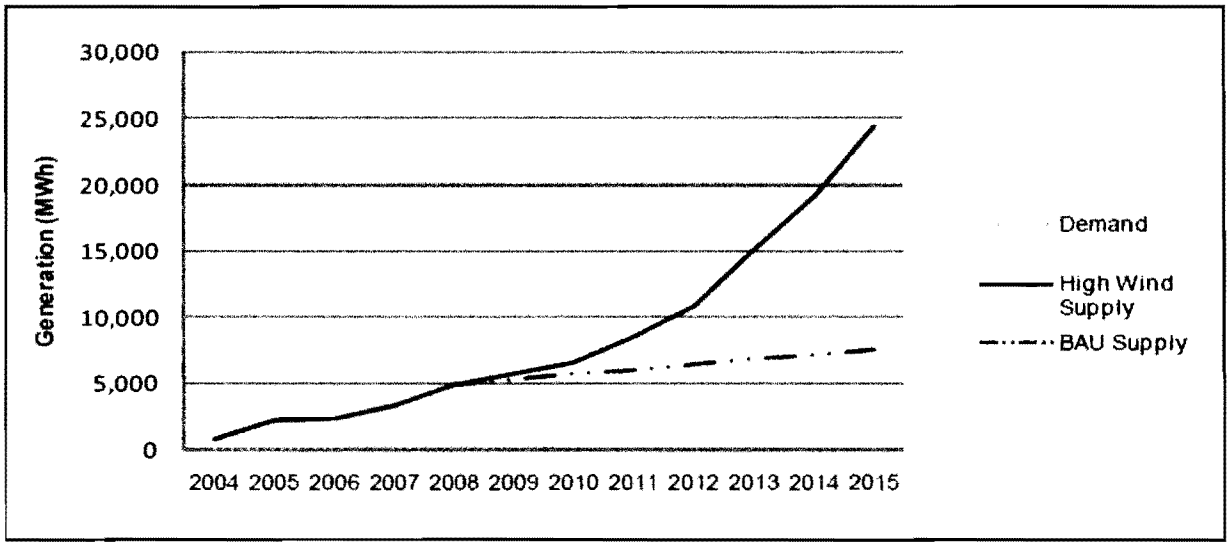
In recent years, the U.S. wind industry has enjoyed record growth; in both 2008 and 2009 the US led the world in new wind installations. Nevertheless, industry executives and experts expect that the wind industry will actually shrink in terms of new installations in 2010—which will mark the first time this has happened since 2004. During the first quarter of 2010, the US saw only 539 MW of new projects installed, less than half of the number of MW installed over the same period in 2009.

The reason for the declining growth of the wind industry is twofold. First, because of the recession, the country finds itself in a new environment of lower power prices and lower electricity demand. The trend toward lower prices has been exacerbated by the discovery and development of non-traditional sources, such as shale gas. Consequently, wind farms have had trouble selling their power at a price which supports their construction.

Second, the existing transmission grid is already strained in its ability to support new development in windy areas. The top two states in the country in installed wind power, Texas and Iowa, have both seen negative locational marginal prices ("LMP") and substantial curtailments of wind farms as a result of an inadequate electrical grid. New growth in these states will be very limited until new transmission is built.

Similarly, there are a number of states like Kansas which have excellent wind resources but lack enough native electrical load to use the majority of these resources in-state. According to an NREL study on renewable energy supply and demand, the annual demand for electricity is far exceeded by the potential supply of wind power in the "Heartland" region of the US (Kansas and Oklahoma), and the gap is forecasted to increase year after year, as shown in Figure 9.

Figure 9
Supply and demand projections in the Heartland, 2004-2015 (MWh)



Source: NREL

Kansas alone has almost 760,300 MW of installed wind potential above a 40% gross capacity factor, a multiple of its in-state load.[8] Such evidence shows that there is more than enough wind power to fulfill in-state demand. The current AC grid is not built for the long-distance exports needed to allow new wind projects to sell their power in a suitably large market. The Grain Belt Express will be the conduit to harness the rich resources available in Kansas and bring that power to areas where it is needed the most.

Because of its economic and environmental benefits, wind power enjoys broad support across states and political parties. A recent independent poll sponsored by AWEA found that 89% of American voters believe the US should develop more wind energy.[9] However, urgent action and cooperation between the private and public sectors is needed to prevent a major decline in the growth of the wind industry.

Transmission developments like Grain Belt Express directly address the most important challenges facing the wind industry. The Project connects some of the most powerful wind resources in the country to an area of high electricity demand, allowing a large number of buyers to purchase wind energy from Kansas. The Grain Belt Express will dramatically improve the ability of Kansas wind developers to sign long-term power purchase agreements or sell in a sufficiently liquid power market.

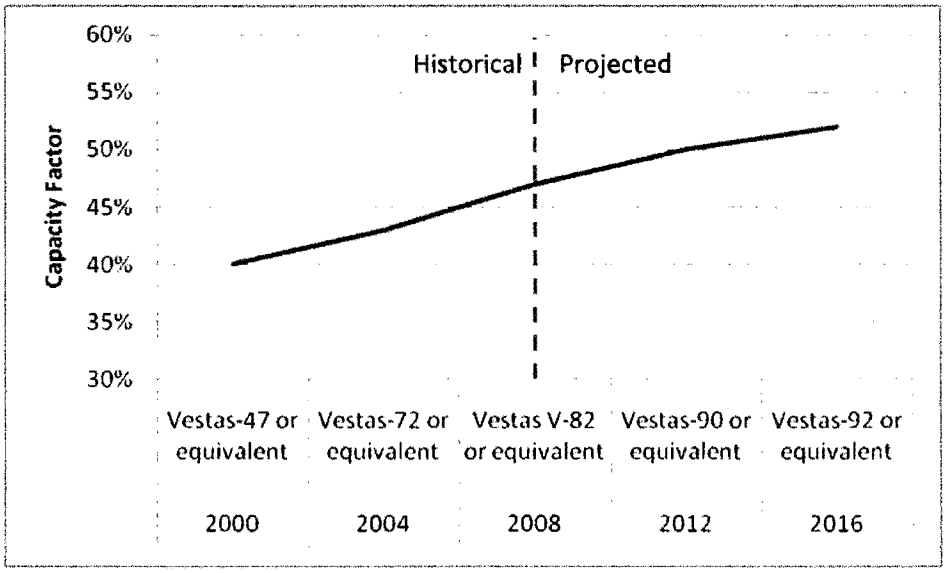
Improvements in wind turbine technology will also facilitate the economics of wind-dedicated HVDC lines. Just eight years ago, wind turbines in the best wind resources in the country would reach capacity factors of approximately 40%. Turbine manufacturers have subsequently improved the performance of their turbines. Based on both recent and expected future advances in turbine technology, Clean Line

[8] US Department of Energy, National Renewable Energy Laboratory and AWS Truewind, Estimates of Windy Land Area and Wind Energy Potential by State, Feb. 4, 2010.
[9] American Wind Energy Association, AWEA National Survey, March 27-28, 2010, 11. http://www.awea.org/newsroom/pdf/10205-AWEA-National-Brief.pdf.

anticipates that turbines available in 2016 will enjoy a capacity factor over 50% when drawing on the same resources that were producing at 40% capacity factors eight years ago.

Figure 10 highlights the improvements based on the Vestas product line. Other manufacturers are following a similar course of increased capacity factors.

Figure 10
Technical Improvements in Wind Turbines



Source: Clean Line Energy

The economics of transmission lines built primarily for bulk movement of energy are highly sensitive to capacity utilization. The principal challenge for a project dedicated primarily to wind will be how to "fill up" a line given wind's sometimes low capacity factors. The capacity utilization of a transmission line is inversely related to the cost over the energy delivered. In other words, a higher capacity factor not only provides more affordable wind energy, it lowers the cost of transmission.

11. Clean Line Energy Partners – Biographies

Management Team

Michael Skelly – Chief Executive Officer

Mr. Skelly has been in the energy business for more than 15 years, and he led the development efforts of Horizon Wind Energy. During Mr. Skelly's tenure at Horizon, the company grew from a two-person operation to one of the largest renewable energy companies in the country. Under his leadership, Horizon developed and constructed nearly 2,000 MW of wind energy projects and amassed a development portfolio of almost 10,000 MW in over a dozen states. Before Horizon, Mr. Skelly developed thermal, hydroelectric, biomass and wind energy projects in Central America with Energia Global. In 2008 Mr. Skelly ran for the US Congress as the Democratic nominee in the 7th Congressional District of Texas.

Mr. Skelly has a Bachelor of Arts degree in Economics from the University of Notre Dame and a Master of Business Administration from Harvard Business School.

Jimmy Glotfelty – Executive Vice President

Mr. Glotfelty brings a wealth of public and private sector transmission experience to Clean Line. Mr. Glotfelty is a well-known expert in electric transmission and distribution, generation, energy policy and energy security. He most recently held the position of Vice President, Energy Markets, for ICF Consulting. Mr. Glotfelty served in the US Department of Energy where he was the Founder and Director of the Office of Electric Transmission and Distribution, a $100 million per year electricity transmission and distribution research and development program. Mr. Glotfelty also was the lead US representative to the joint US-Canadian Power System Outage Task Force investigating the Blackout of August 2003. While at the Department of Energy, Mr. Glotfelty worked extensively with utility chief executive officers and senior management in the electric power and energy sectors. He led teams that focused on researching transmission and distribution technologies, gaining Presidential permits for cross-border transmission lines, studying the impacts of Regional Transmission Organizations, identifying major transmission bottlenecks, and securing the critical energy infrastructure of the United States.

Jayshree Desai – Executive Vice President

Prior to joining Clean Line, Ms. Desai was Chief Financial Officer of Horizon Wind Energy, where she was responsible for corporate and project finance, accounting, tax and IT. As CFO, Ms. Desai oversaw the company's balance sheet as it grew from $8 million to more than $5 billion and was a key member of the deal teams responsible for the sale of Horizon Wind Energy to Goldman Sachs in 2005, the subsequent sale to EDP in mid-2007, and the initial public offering of the EDP renewable energy subsidiary in 2008. Before joining Horizon, Ms. Desai was a director at Enron responsible for mergers and acquisitions.

Ms. Desai earned a Bachelor's degree from the University of Texas at Austin and a Master of Business Administration from Wharton Business School at the University of Pennsylvania.

Kathryn Patton – General Counsel

Ms. Patton previously served as Deputy General Counsel for Allegheny Energy, Inc., where she oversaw legal matters for Allegheny's regulated electric utilities and transmission companies and served as the company's Chief Compliance Officer. She led the effort to obtain regulatory approval for construction of the TrAIL transmission project and provided legal advice for the construction and financing of the project. The TrAIL project consists of a 500 kV transmission line extending from southwestern Pennsylvania, through West Virginia and into northern Virginia.

Prior to Allegheny, Ms. Patton worked at Dynegy, serving as Senior Vice President, General Counsel and Secretary for Dynegy subsidiaries Illinois Power Company and Northern Natural Gas Company, and she also served as Vice President and Assistant General Counsel for Dynegy Inc. While at Illinois Power, she was responsible for the legal and regulatory affairs of the company, as well as advising on corporate strategy. She is a Certified Public Accountant and is a member of the State Bar of Texas, the District of Columbia Bar and the Commonwealth of Pennsylvania Bar.

Development Team

Wayne Galli

Dr. Galli's background in electric power systems includes more than 12 years of experience in technical and managerial roles. Dr. Galli's experience runs the gamut from system studies and operations to regulatory matters to project development. Most recently, he served as Director of Transmission Development for NextEra Energy Resources where he was instrumental in developing transmission projects under the CREZ initiative in Texas. In this capacity, Dr. Galli championed HVDC solutions for the CREZ and was an instrumental part of the team that obtained a successful award of over $500 million in transmission assets (approximately 300 miles of the most critical CREZ transmission lines) under the CREZ Transmission Service Provider docket. He then led all efforts in routing, siting and engineering of the transmission lines. At SPP, Dr. Galli led the implementation of several components of the SPP market and grew the Operations Engineering group over fourfold to ensure reliable operations of the SPP grid under the new market paradigm. His duties at SPP primarily included overseeing all real-time and short-term operational engineering aspects of the SPP transmission system to ensure system reliability. Dr. Galli's background also includes long-term system planning experience with Southern Company Services, where he analyzed 500 kV expansion plans primarily focused on planning and strengthening Southern Company's 500 kV backbone system from its southwestern quadrant to the major load centers within Southern. Additionally, he gained commercial power systems experience from Siemens Westinghouse Technical Services, taught at the university level, and helped design shipboard power systems for the Department of Defense.

Dr. Galli holds Bachelor and Master of Science degrees from Louisiana Tech University and a Doctor of Philosophy degree from Purdue University, all in electrical engineering. He is a Senior Member of the Institute of Electrical and Electronics Engineers and is a registered Professional Engineer in the Commonwealth of Virginia.

Dave Berry

David Berry is responsible for Clean Line's financing efforts, deal structuring, and strategic analysis. Mr. Berry also serves as Clean Line's lead contact with renewable generators whose projects need transmission to reach a market. Mr. Berry's prior employment was with Horizon Wind Energy, where he led over $2 billion in project finance transactions and was responsible for investment analysis and acquisitions. In particular, Mr. Berry worked on the Blue Canyon II and Maple Ridge non-recourse debt financing, which was named 2006 North American Renewables Deal of the Year by Project Finance, as well as numerous structured tax financings and development acquisitions. Mr. Berry graduated from Rice University with a Bachelor of Arts degree with a double major in economics and history.

Mark Lawlor

Mr. Lawlor is responsible for all development aspects of Grain Belt Express. Mr. Lawlor has extensive experience in wind development, transmission policy and legislative matters. Mr. Lawlor managed a team of developers for over three years at Horizon Wind Energy. He developed projects in the Kansas market and managed legislative and regulatory affairs in the SPP states. While at Horizon, Mr. Lawlor developed a 201 MW wind farm and a pipeline of projects exceeding 1,000 MW. In 2008, Mr. Lawlor was appointed to the Kansas Wind Working Group by the governor. Mr. Lawlor serves as the Chair of the SPP Committee within The Wind Coalition, a trade organization that covers the ERCOT and SPP

regions. He has been managing a team of lobbyists in the SPP states and directing consultants involved in SPP's transmission planning and market development for the region. Prior to his involvement in developing wind and transmission projects, Mr. Lawlor was a founding partner in a law firm specializing in renewable energy law.

Mr. Lawlor has a J.D. from Washburn University School of Law with a Certificate in Environmental Law, a B.A. in Environmental Studies and a B.A. in Political Science from the University of Kansas.

Diana Coggin

Diana Coggin is the Project Development Manager dedicated to the Grain Belt Express. Prior to joining Clean Line, Ms. Coggin worked at General Electric and Horizon Wind Energy. As a member of the Operations Management Leadership Program at GE Aviation, she held four positions such as Manufacturing Quality Engineer and Lean Leader at various aircraft engine manufacturing and assembly plants. Ms. Coggin transitioned to GE Energy as a Six Sigma Black Belt in the aero-derivative gas turbines business, where she reduced costs for the global supply chain by introducing new sourcing and inventory management processes.

Ms. Coggin obtained a Bachelor of Science degree in Operations Research & Industrial Engineering from Cornell University and a Master of Business Administration from Harvard Business School. While at Harvard, she focused her elective studies on energy and energy efficiency, and she worked at Horizon Wind Energy as a Development Intern.

Charlie Ary

Charlie Ary is a Development Analyst supporting the Grain Belt Express. His work includes prospecting routes, preparing regulatory filings, supporting public outreach efforts, and running financial models. In addition, Mr. Ary has recently undertaken statistical analysis and cartography.

Mr. Ary is a graduate of Rice University with a Bachelor of Science degree in Ecology and Evolutionary Biology.

12. Contact Information

For further information about Clean Line Energy Partners or the Grain Belt Express, please contact Wayne Galli or Mark Lawlor:

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