

**Bill Powers**

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**From:** CTC Global Corporation <info@ctcglobal.com>  
**Sent:** Wednesday, October 14, 2015 7:38 AM  
**To:** Bill Powers  
**Cc:** Matt Hutchison; Jeffrey Townsend  
**Subject:** RE: examples/cost of 161 kV line retrofits with ACCC conductor  
**Attachments:** ACCC Engineering Manual.pdf

Hi Bill,

Thanks for connecting. We would be very happy to help. The AEP project you mentioned was about 12 miles in length and used about 38 miles of conductor. AEP is currently completing their 9<sup>th</sup> ACCC installation (also in Texas). This project is about 240 miles long and using over 1,440 miles of conductor. To date we have completed nearly 375 project in more than 30 countries with about 20,000 miles of conductor. I have attached a copy of our Engineering Manual. You may also be interested in our Conductor Comparison Program software. You can download a copy at:

[http://www.ctcglobal.com/ftp/CCP4\\_0.msi](http://www.ctcglobal.com/ftp/CCP4_0.msi)

The password is 202620011054 It is an excel program that uses macros. You must enable the macros. This might 'scare' your computer but the program is totally safe. Please let us know how we can be of further assistance.

Thanks,

Dave Bryant  
 Director Technology  
 CTC Global  
 2026 McGaw Avenue  
 Irvine, CA 92614  
[www.ctcglobal.com](http://www.ctcglobal.com)  
 Phone: 949.428.8500  
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**From:** Bill Powers [<mailto:powers.engineering@att.net>]  
**Sent:** Tuesday, October 13, 2015 6:41 PM  
**To:** CTC Global Corporation <[info@ctcglobal.com](mailto:info@ctcglobal.com)>  
**Subject:** examples/cost of 161 kV line retrofits with ACCC conductor

CTC Global:

I have been asked to compile examples of 161 kV line retrofits using ACCC conductor. Attached are a couple of photos of the 161 kV lines in question. There is a need to substantially increase the capacity of three 161 kV line segments in the Midwest, ranging in length from 30 -60 miles, to accommodate wind power development in the immediate vicinity. Attached are a couple of photos of the 161 kV lines in question.

I am particularly interested in the CTC Cable Corporation (CTC Cable) projects done about a decade ago for American Electric Power (AEP), as they are very similar to the proposed projects. One of these AEP projects, an existing 161 KV line that runs from Chamber Springs to Tontitown, Arkansas, is 38 miles long. The quoted cost of ACCC conductor and related hardware was \$1.5 million: <http://www.prnewswire.com/news-releases/composite-technology-receives-third-order-from-general-cable-for-accc-conductor-for-american-electric-power-57180992.html>.

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**Sent:** Wednesday, October 14, 2015 7:49 AM  
**To:** Bill Powers  
**Cc:** Jeffrey Townsend; Matt Hutchison  
**Subject:** RE: examples/cost of 161 kV line retrofits with ACCC conductor

Bill,

I noticed your office is located in San Diego. CTC is only about a one hour drive north in Irvine, CA. If you have the opportunity, please visit us some time. In the meantime, here is a list of 161 kV projects we completed in the US:

AEP	Chamber Springs Substation	Rogers, AR	161	Drake	2006
AEP	Chamber Springs - Tonitown	Rogers, AR	161	Drake	2006
KAMO	Springfield - Brookline	Springfield, MO	161	Cardinal	2007
Flour Alliance - Tapoco APGI	Santeetlah Bus Upgrade	Robbinville, NC	161	Bittern	2009
Entergy	Ano - Russellville North Rebuild	Russellville, AR	161	Cardinal	2009
Entergy	Dardanelle Dam - Russellville South 161kV	Russellville, AR	161	Munich	2011
Entergy	Ano - Russellville North Rebuild	Russellville, AR	161	Cardinal	2012

This only represents about 100 km of wire, but we have done similar installations at a wide range of voltages. If you have a minute, you might be interested in watching Jim Lehan of NV Energy share his experience using ACCC conductor on their H-Frame structures. The video was taken at an IEEE conference about 4 years ago. I believe NV Energy has completed four additional projects since then.

<https://www.youtube.com/watch?v=9QBhU49PVzo>

Thanks,

Dave Bryant  
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 2026 McGaw Avenue  
 Irvine, CA 92614  
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**Bill Powers**

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**From:** Dave Bryant <dbryant@ctcglobal.com>  
**Sent:** Wednesday, October 14, 2015 1:10 PM  
**To:** Bill Powers  
**Cc:** Matt Hutchison  
**Subject:** Re: two questions RE: examples/cost of 161 kV line retrofits with ACCC conductor

Thanks Bill, generally you can assume ACCC of the same diameter and weight will double the amps. The conductor is about 2.5 x ACSR. I will try to get you more regarding installation cost

*Sent from my Verizon Wireless 4G LTE DROID*

On Oct 14, 2015 1:05 PM, Bill Powers <powers.engineering@att.net> wrote:  
 Hello Matt and Dave,

Thank you for the quick turnaround on the response. The 2006 press release for the 12-mile 161 kV Arkansas reconductoring project indicated a CTC equipment sale price of \$1.5 million.

Two questions: 1) Does CTC have a rule-of-thumb equipment/installed price estimate for reconductoring a single three-phase 161 kV line segment, in cost per mile?

2) Is there is an expected range of amperage increase, for example 50 – 100 percent compared to ACSR conductor (depending on site-specific situation). My interest is in the minimum expected increase in amperage when replacing ACSR conductor with ACCC conductor of the same conductor size.

I need to confirm whether the 161 kV line segments in question are Drake or Cardinal ACSR conductor size.

Regards,

Bill Powers  
 619-917-2941

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**From:** Matt Hutchison [mailto:mhutchison@ctcglobal.com]  
**Sent:** Wednesday, October 14, 2015 7:49 AM  
**To:** Dave Bryant  
**Cc:** Bill Powers  
**Subject:** Re: examples/cost of 161 kV line retrofits with ACCC conductor

Bill,  
 If you need any thing else just let us know I would like to send you our latest cable comparison program and design manual . I will need your contact information and mailing address.

Kind Regards  
 Matthew Hutchison  
 VP North America  
 949-232-4014

On Oct 14, 2015, at 7:38 AM, CTC Global Corporation <[info@ctcglobal.com](mailto:info@ctcglobal.com)> wrote:

Hi Bill,

Thanks for connecting. We would be very happy to help. The AEP project you mentioned was about 12 miles in length and used about 38 miles of conductor. AEP is currently completing their 9<sup>th</sup> ACCC installation (also in Texas). This project is about 240 miles long and using over 1,440 miles of conductor.

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<http://www.prnewswire.com/news-releases/composite-technology-receives-third-order-from-general-cable-for-acc-conductor-for-american-electric-power-57180992.html>.

Regards,

Bill Powers, P.E.  
Powers Engineering  
4452 Park Blvd., Suite 209  
San Diego, CA 92116

619-295-2072 (o)  
619-917-2941 (c)

<ACCC Engineering Manual.pdf>

## PE-20

IRVINE, Calif., Sept. 27 /PRNewswire-FirstCall/ -- Composite Technology Corporation (CTC) (OTC Bulletin Board: CPTC) is pleased to announce that its subsidiary, CTC Cable Corporation (CTC Cable) has received its third order from General Cable Corporation (General Cable) to provide for the delivery of ACCC conductor to American Electric Power (AEP). This third reconductoring project will use 38 linear miles of ACCC conductor to upgrade an existing 161 KV line that runs from Chamber Springs to Tontitown, Arkansas. The General Cable order has a value of nearly \$1.5 million, which includes conductor, hardware, product warranty, and CTC Cable technical support.

This is the third order of ACCC conductor destined for AEP and underscores their confidence in CTC Cable's technology and the benefit of using ACCC conductors to increase capacity on constrained transmission lines. As in previous orders, AEP has chosen a General Cable TransPower ACCC Drake 1020 kcmil conductor, which uses CTC Cable's proprietary composite core. Installation is slated for the first quarter of 2007. The ACCC light weight, high strength composite core allows for more conductive aluminum in the same diameter conductor with the same overall weight as a conventional steel core conductor, which allows ACCC conductors to carry more electricity more efficiently. The AEP line can take advantage of the reduced sag characteristics of ACCC conductors and the ability to operate at much higher temperatures than traditional conductors, thereby providing reserve capacity for crisis situations and future growth.

"A third order from American Electric Power, one of the leading power companies in our home market, is a great statement of confidence in ACCC conductors and we are very excited about the growing adoption of ACCC conductors both in the US and around the world," noted Benton Wilcoxon, CTC's Chairman and CEO.

About CTC:

Composite Technology Corporation, based in Irvine, California, USA develops, manufactures and sells high performance electrical transmission and renewable energy generation products through its two principal subsidiaries:

\* CTC Cable Corporation produces composite rod for use in its proprietary ACCC aluminum conductor composite core. ACCC conductors virtually eliminate the sag in power lines caused by high current and high line temperatures. ACCC conductors also reduce electricity line losses, and have demonstrated significant savings in capital and operating expenses when substituted for other conductors. ACCC conductors enable grid operators to eliminate blackouts and brownouts, providing a 'reserve electrical capacity' by operating at higher temperatures. ACCC conductors are an innovative solution for reconductoring power lines, constructing new lines and crossing large spans. ACCC composite rod is delivered to qualified conductor manufacturers worldwide for local ACCC conductor production and resale into local markets.

\* EU Energy Inc., and EU Energy Ltd., produce, sell, and license the

## PE-20

DeWind series of wind energy turbines including the 50Hz D6 rated at 1.25 megawatts (MW) and the 50Hz D8 rated at 2MW, both noted for their reliability. In 2007, the new 2MW D8.2 is planned to be delivered to North American customers from assembly operations in Lubeck, Germany. The D8.2 utilizes the advanced WinDrive(R) hydrodynamic torque converter developed by Voith AG with a synchronous AC generator that is able to connect directly to the grid without the use of power conversion electronics. The DeWind 8.2 will be available in both a 60Hz and 50Hz version.

For further information visit our websites: [www.compositetechcorp.com](http://www.compositetechcorp.com) & [www.eunrg.com](http://www.eunrg.com)

For Investor Relations Contact: James Carswell, +1-949-428-8500

This press release may contain forward-looking statements, as defined in the Securities Reform Act of 1995 (the "Reform Act"). The safe harbor for forward-looking statements provided to companies by the Reform Act does not apply to Composite Technology Corporation (Company). However, actual events or results may differ from the Company's expectations on a negative or positive basis and are subject to a number of known and unknown risks and uncertainties including, but not limited to, competition with larger companies, development of and demand for a new technology, risks associated with a startup company, risks associated with international transactions, general economic conditions, availability of funds for capital expenditure by customers, availability of timely financing, cash flow, timely delivery by suppliers, successful integration of the EU Energy acquisition, ability to produce the turbines and its components, ability to maintain quality control, collection-related risks from international transactions, or the Company's ability to manage growth. Other risk factors attributable to the Company's business may affect the actual results achieved by the Company including those that are found in the Company's Annual Report filed with the SEC on Form 10-K for fiscal year ended September 30, 2005 and subsequent Quarterly Reports on Form 10-Q and subsequent Current Reports filed on Form 8-K and including those pertaining to EU Energy that will be included with or prior to the filing of the Company's next Quarterly or Annual Report.

SOURCE Composite Technology Corporation

### Find this article at:

<http://www.prnewswire.com/news-releases/composite-technology-receives-third-order-from-general-cable-for-accc-conductor-for-american-electric-power-57180992.html>