

US Department of Energy's Grid Tech Team *hosts*

# Applications for High-Voltage Direct Current Transmission Technologies

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April 22, 2013

NRECA Conference Center

4301 Wilson Blvd.

Arlington, VA 22203

## Objective

This workshop is aimed at developing a better understanding of the potential for High Voltage Direct Current (HVdc) transmission technologies and its application in the North American electric grid. Through a series of case studies and group discussions, DOE would like to identify the state-of-the-art for HVdc transmission technologies, including performance and benefits. The workshop will also discuss technical and institutional barriers to greater deployment and possible opportunities to address those barriers.

## Background

The advantages of HVdc transmission over conventional High Voltage Alternating Current (HVac) technologies are well known for long distance, point-to-point power transfers. HVdc has also been deployed in subterranean and submarine applications where overhead lines are impractical and HVac is too lossy. A unique capability of HVdc that may have more value in the future grid is its ability to connect asynchronous grids. HVdc technologies provide extremely fast response times, the potential to control power flows, and the ability to segment parts of the power system, all of which can enhance the flexibility, reliability, and resiliency of the grid.

Although HVdc transmission is a fairly mature technology, recent technological improvements have expanded the capabilities and applicability of HVdc on the grid. New commercial applications for HVdc may open up as market conditions change in the U.S. electric power sector. Some of those conditions could include changing generation portfolios and load profiles, expectations for higher reliability and resiliency, and persistent challenges to siting transmission. Applications such as submarine HVdc networks can open new possibilities for power management and provide a practical way to access large amounts of offshore wind.

Currently, advanced HVdc transmission projects are being proposed, designed, and built around the world – especially in Europe and Asia. Thus far, HVdc deployment activity within the US has been limited. DOE would like to assess the current landscape and identify ways to address barriers to deployment that would improve prospects for realizing the benefits of HVdc technologies.

## Agenda

- Prior to 8:30am**      **Breakfast (on your own)**  
Please see list of local restaurants
- 8:30am – 8:40am**      **Opening Remarks**  
Anjan Bose, GTT Chair
- 8:40am – 9:00am**      **Keynote Speaker: HVdc Overview**
- **Nari Hingorani**, Consultant
- 9:00am – 9:40am**      **Panel: State of HVdc Technologies**  
Vendors will present the state-of-the-art for HVdc technologies and highlight deployment of their products in existing projects (preferably international) as well as discussing potential future applications.
- **Peter Kohnstam**, HVDC Business Development Manager, Siemens
  - **Neil Kirby**, HVDC & FACTS Business Development Manager, Alstom
  - **Le Tang**, VP and Head of US Corporate Research Center, ABB
- 9:40am – 11:00am**      **Panel: US Project Case Studies**  
This panel will describe existing and proposed projects in the US that employ HVdc technologies. The presentations will each address: (a) the transmission challenge that led to the proposed HVdc solution, (b) the basic project configuration and technology choice, (c) the reasoning behind the decision, (d) key challenges encountered, and (e) lessons learned.
- **Stephen Conant**, Senior VP, Anbaric Northeast Transmission Development Company
  - **Wayne Galli**, Executive VP – Transmission and Technical Services, Clean Line Energy Partners
  - **Mohamed El Gasseir**, Principal, Atlantic Wind Connection
  - **Jack McCall**, Managing Director – Business Development, American Superconductor
- 11:00am – 11:40am**      **Moderated Panel Discussion and Q&A**  
Moderator: Kerry Cheung  
Future Applications and Opportunities  
Open Q&A
- 11:40am – 1:00pm**      **Lunch Break (on your own)**  
Please see list of local restaurants  
*[We will resume promptly at 1pm]*

- 1:00pm – 2:45pm**      **Group Discussion: Key Challenges**  
Facilitator: Rich Scheer  
Participants will discuss the following questions:
- What challenges are being encountered in existing efforts?
  - What challenges are there for new applications?
  - What are the key institutional challenges to deployment?
  - Are there fundamental technical limitations?
- 2:45pm – 3:00pm**      **Break**
- 3:00pm – 4:45pm**      **Group Discussion: Opportunities to Address Challenges**  
Facilitator: Rich Scheer  
Participants will discuss the following questions:
- What opportunities are there to address some of the challenges identified?
  - What conditions would stimulate more investment in innovation for HVdc technologies?
  - For the opportunities identified, who are the appropriate entities to carry them through?
- 4:45pm – 5:00pm**      **Wrap-Up and Adjourn**  
Anjan Bose, GTT Chair