

# AT A GLANCE



## HVDC Cable and HVAC Submarine Cable Systems

Program 36, Project 36.008

### Research Value

This research produces new understanding, methods, and tools that can assist engineers and designers in applying, operating, and maintaining HVDC transmission cable as well as HVAC submarine cable systems. For example:

- The use of the reference books, design tools, and other investigative results may lead to more effective designs and applications for power grid integration and interconnection.
- Effective inspection and monitoring of assets could lead to increased asset utilization, rapid maintenance intervention, improved reliability, and reduced repair costs.
- Better understanding of failure mechanisms and prevention procedures may result in longer asset life, reduced customer outages, and lower operating costs.

### Member Benefits

- Use the tools and methods developed in this project to effectively apply, operate, and maintain transmission cable systems.
- Use improved understanding to achieve effective and economical system designs and determine system ratings.
- Deploy new fault location methods and tools to locate faults more efficiently, especially for long distance cables.

Significant trends are developing in applications of High Voltage Direct Current (HVDC) cable systems for power grid integration and interconnections. Increasingly, HVDC cable and HVAC submarine cable systems are being used for power transmission from remote renewable energy generation to power grids. Research is needed to:

- Understand needs, trends, and technologies for HVDC system integration with existing power grids.
- Develop tools for effective designs and implementations.
- Understand failure mechanisms and demonstrate inspection, diagnostic, monitoring, and fault location methods.
- Provide guidance, develop strategies, and share practices for effective operation, inspection, and maintenance.

This project investigates and develops methods and tools for effective applications of HVDC cable and HVAC submarine cable technologies for system integration and interconnection:

- Investigate and evaluate design tools for utility engineers to prepare feasibility studies and verify proposals and implementations.
- Evaluate cable insulation materials and aging characteristics to optimize designs and extend the life of cable systems.
- Evaluate operational practices in application of cable technologies, based on technical and economic benefits and increased power transfer capability requirements.
- Evaluate condition assessment, maintenance, inspection, and fault location technologies to meet operation and maintenance requirements.

#### EPRI Technical Contact

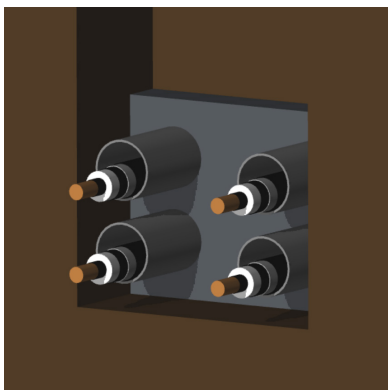
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## Research Highlights



### EPRI High Voltage Direct Current (HVDC) Transmission Reference Book (The Olive Book)

- The EPRI Olive Book is a state-of-the-art guidebook and comprehensive source of technical information for designing, building, operating, and extending the life of HVDC transmission systems.
- The project team continuously updates the Olive Book.



### Underground Transmission Workstation—DC Ampacity

- This task is to enhance the standalone Underground Transmission Workstation (UTW) DC ampacity calculation software tool for HVDC transmission cables.
- The calculation procedures are based on previous EPRI studies.



### Guide on HVAC and HVDC Array and Export Power Cables for Offshore Wind Farms

- This task is a multi-year effort to address technical challenges for exporting a large amount of energy from offshore wind collectors to land based grid connections.
- Both HVAC and HVDC technologies are investigated.
- The task is to evaluate best practices and state-of-technology from design to operation and maintenance.

For more information, contact:

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