



# SIEMENS

PTI Consulting

## Carlos Grande-Moran

Principal Consultant



### Career Highlights

Dr. Grande-Moran is Siemens PTI's Senior Key Expert – Network Structure Development – Transmission with 40+ years of experience in analysis, development, design, functional specifications, documentation, planning, and operations problems related to electric power systems. He has worked extensively for world-renowned power systems manufacturing (GE - Power System Consulting Services and Generator Engineering, and Harris Corporation - Controls Division) and been involved in black start studies of large metropolitan and interconnected networks, torsional impact and subsynchronous resonance in industrial and large power systems, evaluation of frequency response, automatic underfrequency load shedding and automatic generation control dynamic impacts on system frequency, integration of renewable generation resources in conventional power systems, harmonic distortion in HV, distribution and industrial power systems, and the design and manufacture of large and medium size turbine-generators. This experience, when combined with his work for consulting service companies, electric utilities, as well as Universities in the United States and overseas, makes him uniquely suited to his position as Principal Consultant at Siemens PTI.

### Experience

Since joining (what is now) Siemens PTI in 2000, Dr. Grande-Moran has been a project manager and/or technical contributor on a variety of analytical consulting projects in the US, Central and South America, the Middle East and other locations. In this role, Dr. Grande-Moran has been responsible for all aspects of analysis, operation, and planning related to steady-state and dynamic performance of electric power systems. He has worked extensively in power restoration studies and black start studies. His experience covers generation, transmission and industrial power systems. He has been involved with all aspects of power systems planning and operations in both centralized and competitive wholesale markets for electricity. He is familiar with the relationship among key players in conventional and decentralized energy markets, such as independent system operators, regional transmission owners, generator owners and regulatory

agencies. He has instructed power system engineers serving the electric power system worldwide.

Early in his career, Dr. Grande-Moran was at Harris Controls Division (1988-1990), where he designed advanced power system applications for their Energy Management Systems. These included on-line load flow, security and contingency analysis, state estimation, energy accounting, unit commitment and economical generation dispatch.

Dr. Grande-Moran then joined GE's Power Systems Energy Consultants Group, as a Senior Application Engineer in their systems dynamics and controls working group. During his tenure there (1990-1996), he designed advanced power system software applications for energy management systems and power system analysis, and power systems dynamics and control. He worked in the analysis, control and mitigation of subsynchronous resonance phenomena in electric power

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systems; in the analysis of torsional mechanical responses to electrical transient events for combustion, fossil fueled and nuclear turbine-generating units; in the design and analysis of the first thyristor-controlled series capacitors damping controller; and in the application of flexible alternating current transmission systems (FACTS). Additionally, he designed software and hardware for subsynchronous resonance protective digital relays. It was during these years that he completed GE's Turbine Design Course.

Dr. Grande-Moran then moved to GE's Generator Engineering group (1996 -2000). There he was involved in the analysis and design of static excitation systems, and the design and

retrofitting of medium and large size synchronous generators. While in this group, he completed GE's Generator Design Advanced Course.

Dr. Grande-Moran has instructed power system engineering students for much of his career. He has taught at the Universidad Nacional de El Salvador, the Universidad Catolica de El Salvador, Iowa State University, and the University of Texas at El Paso. He was an instructor for GE's prestigious Power Systems & Energy Course (PSEC). Now at Siemens PTI he is an instructor for several courses in the areas of steady-state performance of power systems, and generation dynamics and controls.

### Areas of Expertise

- Power Systems Dynamics
- Power Systems Operations
- Black Start Studies
- Feasibility Impact Studies
- Reliability Impact Studies
- Generation
- Power System Restoration Studies
- Education/Training
- Small Signal Stability Analysis
- FACTS Applications
- Load Flow
- Load Forecasting
- Dynamic Model Development
- Short Circuit Analysis
- Power System Stabilizer Tuning
- Switching Surge Studies
- Subsynchronous Resonance
- System Planning
- Transmission Systems Design
- Synchronous Machine Design
- Machine Parameter Derivation
- Industrial Power Systems
- Power Quality
- Power Plant Operation

### Education

- GE's Generator Design Advanced Course  
Schenectady, NY, 1996
- GE's Turbine Design Course,  
Schenectady, NY, 1994
- PhD, Electric Power Systems, Iowa State University,  
Ames, IA, 1982
- ME, Systems Engineering, University of Virginia,  
Charlottesville, VA, 1977
- ME, Electric Power Systems, Iowa State University,  
Ames, IA, 1976
- Diploma Engineer Mechanical and Electrical  
Engineering, Universidad de El Salvador, El Salvador,  
1974

### Professional Memberships and Activities

- Senior Member of the IEEE and its Power & Energy Society
- Reviewer of Papers Submitted to IEEE Transactions on Power Delivery and IEEE Transactions on Power Systems
- Member of CIGRE

### Languages

- English
- Spanish
- Portuguese
- Italian
- French

### Publications

1. "Case Studies on Dynamic Load Modeling," 2018 Minnesota Power Systems Conference (MIPSYCON), Brooklyn Center, MN, November 2018 (co-authors: J. Feltes, D. Feltes, B. Fernandes, M. Wu and R. Wells).
2. "IEEE Task Force on Measurement, Monitoring and Reliability Issues Related to Primary Governing Frequency Response Report – Measurement, Monitoring, and Reliability to Primary Governing Frequency Response," 2017 IEEE PES General Meeting – Special Publication, Final Report, October 2017 (co-authors: members of Task Force).

3. "PJM 2014 Automatic Under-frequency Load Shedding Analysis," Siemens PTI Report R086-14, January 15, 2015 (co-author: A. Patel).
4. "An Overview of Restoration Issues and Blackstart Analysis," 2014 Minnesota Power Systems Conference (MIPSYCON), Brooklyn Center, MN, November 2014 (co-author: J. Feltes).
5. "Down but Not Out - A Brief Overview of Restoration Issues," IEEE Power & Energy Magazine, January/February 2014 (co-author: J. Feltes).
6. "IEEE Task Force Turbine-Governor Report – Dynamic Modeling for Turbine-Governors in Power System Studies," 2013 IEEE PES General Meeting – Special Publication, Final Report, January 2013 (co-authors: members of Task Force).
7. "Addressing Restoration Issues for the ISO New England System," in Proc. of 2012 IEEE PES General Meeting, Paper #PESGM2012-001080, San Diego, CA, July 2012 (co-authors: M. Henderson, E. Rappold, J.W. Feltes, D. Durbak, and O. Bileya).
8. "Study of Sub-Synchronous Control Interaction due to the Interconnection of Wind Farms to a Series Compensated Transmission System," in Proc. of 2012 IEEE PES Transmission & Distribution Conference and Exposition, November 2011 (co-author: R. Nath).
9. "Black Start Studies for System Restoration," 2008 IEEE PES General Meeting – Conversion and Delivery of Electrical Energy in the 21st Century, 24 July, 2008, pgs 1 – 8; Panel Session on Restoration Dynamics, November 2007 (co-author: J. Feltes).
10. "Some Considerations in the Development of Restoration Plans for Electric Utilities Serving Large Metropolitan Areas," IEEE Transactions on Power Systems, vol. 21, no. 2, May 2006 (co-authors: J. Feltes, P. Duggan, S. Kalinowsky, M. ZamZam, V. Kotecha, and F.P. de Mello).
11. "Voltage Stability and Short Circuit Issues when Integrating a Wind Farm with the Grid," CIGRE, Proceedings Conference on Power Systems, Montreal, Canada, October 1-4, 2006 (co-authors: Y. Kazachkov and Q. Liu).
12. "Parameter Determination for Modeling System Transients – Part IV: Rotating Machines," IEEE Transactions on Power Delivery, vol. 20, no. 3, pp. 2063-2072, July 2005 (co-authors: J.A. Martinez and B. Johnson).
13. "A Comprehensive Approach for Sub-synchronous Resonance Screening Analysis using Frequency Scanning Technique," 2003 IEEE Bologna Power Tech Conference, Bologna, Italy, June 2003, Paper BPT03-41 (co-author: M. Elfayoumy).
14. "A Conceptual Framework for Value-based Bulk Power System Reliability with Integration of Independent Power Producers," IEEE PSMC Conference, London, England, April 2002 (co-author: M Elfayoumy).
15. "Torsional System Parameter Identification of Turbine-Generator Sets," Power Engineering Society, IEEE PAS Winter Power Meeting, February 1997 (co-author: M.D. Brown).
16. "Coherency-Based Low Order Models for Shaft Systems of Turbine-Generator Sets," Power Engineering Society, IEEE PAS Winter Power Meeting, February 1997 (co-author: M.D. Brown).
17. "FACTS and SSR - Focus on TCSC Application and Mitigation of SSR Problems," in Proceedings of the Second International Conference on FACTS, EPRI, Boston, MA, 1992, vol. 2 (co-authors: C.E. Bowler and D.H. Baker).
18. "Series Faults in Six-Phase Electric Power Systems," Electric Research Journal, vol. 13, no. 2, December 1987.
19. "Computation of Sequence Capacitance of Power Transmission lines by A Capacitive Reactance Method," 19th North American Power Symposium 1987, IEEE Power Engineering Society, University of Alberta, Edmonton, Alberta, Canada, October 22-23, 1987 (co-author: A. Ghosh).
20. "On the Use of the Compensation Theorem for the Analysis of Faulted Power Systems," 11th National Engineering Symposium of the Mexican-American Engineering Society, El Paso, Texas, October 15-18, 1987.

21. "A Sensitivity Based Slow Coherency Method," in Proc. of 11th International Conference on Research, Development and Applications in Electrical and Electronic Engineering, IEEE Power Engineering Society, vol. 18, no. 10, Cuernavaca, Mexico, 1983.
22. "Reduced Order Modeling in Multimachine Power Systems," Ph.D. dissertation, Dept. Elect. Eng., Iowa State University, Ames, Iowa, 1982.

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