

## Africa's Economic Renaissance Gathers Momentum

Tom Hammons, and Pat Naidoo

*Working Group African Electricity Infrastructure*

2009 IEEE PES General Meeting, July 26-30 2009, Calgary, Alberta, Canada

**Sponsored by: International Practices for Energy Development and Power Generation**

Chairs: Tom Hammons, University of Glasgow, Scotland, UK  
Pat Naidoo, Western Power Corridor (PTY) LTD.

Track 1: Transmission Capacity Enhancements in the 21<sup>st</sup> Century

### INTRODUCTION

On behalf of the Energy Development and Power Generation Committee, welcome to this Panel Session on Africa's Economic Renaissance; presenting for the first time new and innovative simple engineering solutions for an otherwise complex development.

With primary energy source from the natural, renewable hydroelectric source of the Congo River, the power system expansion plans for Continental Africa gathers momentum. The river is the world's number two in capacity and capability and can deliver 100,000's MW; virtually limitless given innovative methods of harnessing the energy flow of the river. Given large scale power production virtually in one space geographically; large scale and innovative power transmission designs are being prepared to evacuate the bulk power.

This project will evolve to become the world's biggest engineering assignment and it has all the complexities of global business, local and regional politics, local, regional and international financing, and project and country risks. Amongst all the thorns, simple and innovative engineering solutions continue to pave the way forward and contribute to the development of the project.

With a general background of the project, the new and innovative engineering solutions are prepared for panel discussion and expert contributions. The field covers bulk hydro power generation without any damming of the river; world class environmental care and strategic assessments; HVAC and HVDC transmission technology including EHVDC at 800 kV and 1200 kV; HVAC versus HVDC choices; Power System Performance Management including self healing for transient disturbances and concluding with

Power System Control and Operations on a wide area scale such as Continental Africa.

The power scheme being developed will eventually overlap with Europe and the Middle East to create the World's next generation power system with energy trading that will go beyond the present state of the art.

Welcome to the Natural Renewable Energy Source of the Congo River; naturally the world's benchmark for lowest cost electrical energy.

The Panelists and Titles of their Presentations are:

1. Lawrence Musaba (Southern African Power Pool, Harare, Zimbabwe) and Pat Naidoo (Western Power Corridor Company, Gaborone, Botswana). ***"Power Supply Challenges in Southern Africa"*** (Invited Panel Presentation Summary 09GM0847)
2. Dhevan Pillay and Herman Claassen (Eskom, South Africa). ***Proposed Principles for the Evaluation and Funding of DSM Projects*** (Invited Panel Presentation Summary 09GM891).
3. Pat Naidoo (The Western Power Corridor Company (PTY) Ltd, Gaborone, Botswana), ***"New Strategies for Harvesting Large Scale Bulk Energy from the Congo River without a Conventional Dam."*** (Invited Panel Presentation Summary 09GM1103)
4. Li Wang, D. J. Lee, L. Y. Chen, J. Y. Yu, S. R. Jan, S. J. Chen, W. J. Lee, Ming-Hua Tsai, Wei-Taw Lin, Yuan-Chung Li and B. K. Blyden. ***A Micro Hydro Power Generation System for Sustainable Microgrid Development in Rural Electrification of Africa*** (Invited Panel Presentation Summary 09GM0 1424)

5. P. V. Preckel, F T Sparrow, Brian Bowen, Z. Yu and D.J. Gotham (Purdue University, USA). **"Preserving Low Cost Electricity while Improving The Riverine Environment; Part Two; Model Results"** (Invited Panel Presentation Summary 09GM1114)
6. Invited Discussers.

Each Panelist will speak for approximately 20 minutes. Each presentation will be discussed immediately following the respective presentation. There will be a further opportunity for discussion of the presentations following the final presentation.

The Panel Session has been organized by Tom Hammons (Chair of International Practices for Energy Development and Power Generation IEEE, University of Glasgow, UK) and Pat Naidoo (Chief Executive, Western Power Corridor Company, Gaborone, Botswana).

Tom Hammons and Pat Naidoo will moderate the Panel Session.

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## BIOGRAPHIES



**Thomas James Hammons** (F'96) received the degree of ACGI from City and Guilds College, London, U.K. and the B.Sc. degree in Engineering (1st Class Honors), and the DIC, and Ph.D. degrees from Imperial College, London University. He is a member of the teaching faculty of the Faculty of Engineering, University of Glasgow, Scotland, U.K. Prior to this he was employed as an Engineer in the Systems Engineering Department of Associated Electrical Industries, Manchester, UK. He was Professor of Electrical and Computer Engineering at McMaster University, Hamilton, Ontario, Canada in 1978-1979. He was a Visiting Professor at the Silesian Polytechnic University, Poland in 1978, a Visiting Professor at the Czechoslovakian Academy of Sciences, Prague in 1982, 1985 and 1988, and a Visiting Professor at the Polytechnic University of Grenoble, France in 1984. He is the author/co-author of over 400 scientific articles and papers on electrical power engineering. He has lectured extensively in North America, Africa, Asia, and both in Eastern and Western Europe.

Dr. Hammons is Chair of International Practices for Energy Development and Power Generation of IEEE, and Past Chair of United Kingdom and Republic of Ireland (UKRI) Section IEEE. He received the IEEE Power Engineering Society 2003 Outstanding Large Chapter Award as Chair of the United Kingdom and Republic of Ireland Section Power Engineering Chapter (1994~2003) in 2004; and the IEEE Power Engineering Society Energy Development and Power Generation Award in Recognition of Distinguished Service to the Committee in 1996. He also received two higher honorary Doctorates in Engineering. He is a Founder Member of the International Universities Power Engineering Conference (UPEC) (Convener 1967). He is currently Permanent Secretary of UPEC. He is a registered European Engineer in the Federation of National Engineering Associations in Europe.



**Pat Naidoo** (SM 06; Pr Eng; SMSAIEEE RSA, MIET UK) is a registered professional engineer in South Africa, a graduate in Electrical Engineering from the University of Durban Westville (KwaZulu Natal) in South Africa, a postgraduate with an MBA from Samford University, USA and a PhD from the DaVinci Institute for Technology Management in association with Warwick University (UK). In 1994, Dr. Naidoo received the South African Institute of Electrical Engineers Young Achievers Award. In 2006, he gained Senior Membership of his institute and he jointly co-chairs IEEE Power and Energy Society POWERAFRICA activities in Africa.

Upon graduation in 1985, Dr Naidoo joined the Electricity Supply Commission of South Africa as an engineer in training. In 1988 he was registered as a professional engineer and was appointed the Distribution Regional Planning and Design Engineer. In 1989 he was appointed Senior Engineer to lead a newly created portfolio of Quality of Supply in the Regional Engineering Department. In, 1990 he was promoted to Principle Engineer of Regional Engineering. In 1991 he was transferred to the newly created national group of Transmission and later appointed as Chief Engineer in the Operating and Maintenance Division. Here his work covered the hands on operating and maintenance of the 22 000 km Eskom National Grid having voltages 765 kV, 400 kV, 275 kV and 533 kV DC. In 1995, he was promoted to Senior Manager in charge of the Operating and Maintenance of the Kwa -Zulu Natal and Free State Area of the Eskom National Grid. Sterling business results were the order of the day. Some of the key customers included the deep underground gold mines, major South African cities, continuous process large aluminum smelters, open arc titanium furnaces, chemical refineries, paper making plants and large single phase railway traction loads hauling coal for export.

In 1998, Dr. Naidoo was appointed to the Transmission Group Executive Management and the Eskom Management Board Operations Committee. The accountability was for South and Southern Africa's Electricity Transport and Delivery; including the management of National System Operations, the Eskom Power Pool Operations including the management and dispatch of all Eskom's thermal, hydro and nuclear power stations, Eskom's National Control and the Southern African Power Pool Area Control. He was part of the SAPP team that led the establishment of the Southern African Power Pool Co-Ordination Center in Harare, Zimbabwe and later chaired the Competitive Markets Working Group to deliver the Short Term Energy Market for the SADC region.

In 1999, Dr Naidoo was promoted to Senior General Manager of Eskom's Transmission Division. He successfully led the Eskom and SAPP power system control preparation for the Y2K changeover. In 2001, Energy Trading was added to his accountabilities. In

2002, he was appointed as Technical Director on the board of Motraco, the Mozambique Transmission Company, a joint venture initiative between South Africa, Mozambique and Swaziland established to interconnect the three countries and supply the new aluminum smelters in Maputo.

In 2003, Dr. Naidoo participated in the Chief Executive co-coordinated working group for the planning for the Western Power Corridor; a joint venture between Eskom of South Africa, BPC of Botswana, Nampower of Namibia, ENE of Angola and SNEL of the Democratic Republic of Congo. In 2005 he was appointed to the Westcor Board of Directors and in 2007, as the Chief Executive for Westcor; a posting that he manages across Southern Africa from headquarters in Gaborone, Botswana. The world's biggest engineering assignment emerges from the most fragile environment to deliver in bulk and at worlds lowest cost affordable, natural, renewable energy for all of continental Africa and with time, onto the Middle East and Europe.