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IEEE POWER ENGINEERING SOCIETY
ENERGY DEVELOPMENT AND POWER GENERATION COMMITTEE

PANEL SESSION: IMPACTS OF GHG PROGRAMS AND MARKETS ON THE POWER INDUSTRY

(Jim McConnach and Tom Hammons)

IEEE 2006 General Meeting, Montreal, Canada, 18-22 June 2006
Wednesday, 2-5 p.m.
Room 512g

Sponsored by: International Practices for Energy Development and Power Generation[#]

Chairs: Jim McConnach, Castle Hill Engineering Services, Canada.
Tom Hammons, University of Glasgow, Scotland, UK

Topic: Integrating New Sources of Energy in Power Systems--Global Warming

INTRODUCTION

On behalf of the Energy Development and Power Generation Committee, welcome to this Panel Session Impacts of GHG Programs and Markets on the Power Industry.

Global response to climate change is well established and growing daily due to international initiatives such as the Kyoto Accord and the recent Climate Pact which the USA and Australia have developed with a group of key Asian countries, notably China and India. There are also many programs and initiatives at national, state and regional levels to monitor, record and reduce Greenhouse Gas emissions. An effective tool or mechanism to accelerate the achievement of cost effective Greenhouse Gas targets is the concept of emissions trading or transfers among participants. Essentially this involves treating Greenhouse Gas emission allowances and reduction/removal credit units like any other commodity in the marketplace. Arrangements are made for them to be traded on national and international exchanges. The marketplace sets the value of Greenhouse Gas emission credit units. These are bought and sold by countries and companies to facilitate meeting their Greenhouse Gas targets at lowest cost.

The main established markets for trading Greenhouse Gas credits and allowances are the European Emission Trading Scheme the Chicago Exchange and the International Emissions Trading scheme established as part of the flexibility mechanisms of the Kyoto Accord. There are many other markets and programs under development such as the Carbon Trust, Canada Offsets System; the Regional Greenhouse Gas Initiative in North-east USA; and the California Climate Action Register.

[#] Document prepared and edited by T J Hammons

This panel session will provide an overview of the global responses to Climate Change and of the established and emerging Greenhouse Gas Markets and Programs arising from this. The impacts on the electrical power industry and how it is taking advantage of these programs and markets will then be discussed. This will include the impacts on policy, strategy and decision-making in major players such as governments, manufacturers, utilities, contractors and consultants and how they are leading by example within their own operations.

The Panelists and Titles of their Presentations are:

1. Ahmed F. Zobaa, Cairo University, Giza, Egypt and James McConnach, Chair of IEEE-PES WG on Climate Change, Bracebridge, Ontario, Canada. International Response to Climate Change: An Overview (Paper 06GM0027).
2. Jean Luc Allard, VP, Environment, SNC Lavalin, Canada. Impacts of Climate Change on Major Energy Projects (Invited Discusser, Paper 06GM0918).
3. Romney Duffey, Principal Scientist, Atomic Energy of Canada Ltd. The Value of Non-Carbon Power and Emissions Avoidance (Paper 06GM0914).
4. Gilles Potvin, Senior Program Office, CDM & JI Office, Foreign Affairs Canada, Canada. Canada's CDM and J I Office (paper 04GM0660).
5. James E. Platts, ISO, New England. Impact of Regional Greenhouse Initiative and Renewable Portfolio Standards on Power System Planning in New England (paper 06GM0920).

Each Panelist will speak for approximately 25 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.

Jim McConnach (Castle Hill Engineering Services, Ontario, Canada) and Tom Hammons (Chair of International Practices for Energy Development and Power Generation, University of Glasgow, UK) have organized the Panel Session.

Jim McConnach and Tom Hammons will moderate it.

The first presentation is an overview of the International Response to Climate Change. Ahmed F. Zobaa, Cairo University, Egypt and James McConnach, Chair of IEEE-PES WG on Climate Change, Ontario, Canada, have prepared it. Jim McConnach will present it.

There is a scientific consensus that increasing concentrations of GHGs in the earth's atmosphere have begun to impact our climate and may be the dominant force driving recent warming trends. International efforts to reduce GHG emissions and stabilize atmospheric GHG concentrations have grown apace since the development in 1997 of the Kyoto Protocol under the UN Framework Convention on Climate Change. There is also considerable international effort aimed at adaptation to the climate change already occurring. This presentation presents an overview of the international response for mitigation and adaptation to climate change.

Ahmed F. Zobaa is an Assistant Professor in the Department of Electrical Power & Machines, Faculty of Engineering, Cairo University, Giza, Egypt. He is an Editorial Board member for *Electric Power Components & Systems Journal*, *International Journal of Emerging Electric Power Systems*, *International Journal of Computational Intelligence*, and *WSEAS Transactions on Power Systems*. He is an Editor for *IEEE Power Engineering Letters* and *IEEE Transactions on Energy Conversion*. Also, he is an Associate Editor for *IEEE Transactions on Industrial Electronics*, *Electrical Power Quality and Utilization Journal*, *International Journal of Power and Energy Systems*, *International Journal on Modelling and Simulation*, *International Journal of Energy Technology and Policy*, and *Neuro-computing Journal*.

Dr. Zobaa is a Senior Member of the IEEE Power Engineering / Industry Applications / Industrial Electronics / Power Electronics Societies. Also, he is a member of the Institution of Electrical Engineers, the International Association of Science and Technology for Development, and the International Solar Energy Society.

James S. McConnach spent his first years in manufacturing, involved with the development and application of special transmission equipment. During this time he gained a M.Sc. in HVDC Transmission from the University of Salford, England. In 1972 he joined a UK Consultancy, working on power system projects in many developing countries. He moved to Canada in 1977 to join Ontario Hydro where he had the opportunity to work on and manage a wide range of challenging projects in HVAC and HVDC transmission, hydro, fossil and nuclear generation, and energy efficiency.

He held managerial positions from 1982 until retirement in 2000. He is vice-chair of the IEEE-PES Policy Development Coordinating Committee; Chair of the IEEE Working Group on Implementing Technology to Limit Climate Change and of the Task Force to develop a Standard (P1595) for the Quantification of CO2 Emission Credits.

The second presentation is an invited discussion on Impacts of Climate Change on Major Energy Projects. Jean Luc Allard, VP, Environment, SNC Lavalin, Canada have prepared it.

The third presentation is entitled: The Value of Non-Carbon Power and Emissions Avoidance. Romney B. Duffey, Principal Scientist, Atomic Energy of Canada Limited, Canada will present it.

It discusses the role and benefits of avoiding GHG emissions, and of deploying and promoting "emissions free" energy technologies, like nuclear, solar, wind, and carbon sequestered sources. It will examine the projected needs, market penetrations and transition strategies for non-carbon sources to stabilize atmospheric concentrations of GHGs, including estimates of the benefits and impacts on future atmospheric concentrations, climate change and energy mix. Any actual reductions or changes in emissions that are achieved will be determined by fiscal, political, economic, business, legal, societal, technological, environmental and indeed moral values.

As a result of this approach, the presenter is able to determine the value of avoiding or reducing GHGs. He will assign and define two values: a monetary value based on a market or trading of rights to emit GHGs and the associated emission avoidance costs; and a social value based on the estimates of the probabilities of mitigation, planetary, human lifestyle, migration and species change. The true "value" is therefore a composite estimate, including both the tangible and intangible costs and risks.

Gilles Potvin, Senior Program Officer, CDM & JI Office, Foreign Affairs Canada will make the penultimate presentation. He will discuss Canada's CDM and JI Office.

In December 1997, 160 countries negotiated the Kyoto Protocol. Under this agreement, industrialized countries agreed to greenhouse gas (GHG) emissions reduction targets that would result in an overall reduction of 5% from 1990 level by 2008-2012. These reductions can be achieved through both domestic and international actions. The global benefit of reducing GHG emissions is the same no matter where in the world the reduction is made, but emission reduction costs vary by location. The Kyoto Protocol became effective on February 16, 2005.

Canada's Clean Development Mechanism and Joint Implementation (CDM & JI) Office was established within the Climate Change Division of the Department of Foreign Affairs and International Trade (DFAIT) in 1998. The Office is the federal government's focal point for CDM and JI activities. It was created to enhance Canada's capacity to take advantage of the opportunities offered by the CDM and JI. The presenter will discuss the Role of Canada's CDM and JI Office, Clean Development Mechanism and Joint Implementation (JI).

Gilles Potvin is a Senior Program Officer in the CDM & JI Office of Foreign Affairs Canada since July 2004. Prior to this assignment he has occupied various positions at Foreign Affairs and International Trade Canada since 1989 including two postings in the Canadian Embassies in China and Romania.

The final presentation is on Impact of the Regional Greenhouse Gas Initiative and Renewable Portfolio Standards on Power System Planning. James E. Platts, ISO, NEW ZEALAND, will present it.

Two developments are having an impact on power system planning in the Northeastern U.S.: a seven-state regional CO2 emissions cap and the growth of renewables from Renewable Portfolio Standards The CO2 cap will increase energy costs of fossil units and could affect reliability. Renewable Portfolio Standards provides targets for renewable energy supply by the load serving entities and are resulting in mostly remote installations of small wind and biomass plants. The presentation will discuss the implications of these two developments.

James (Jim) E. Platts has worked at ISO New England since 2001 providing environment and renewable resource planning expertise in the development of the ISO's regional electric system plan. He has prepared study reports on the reliability need for generating units and administered an RFP for 80 MW of emergency resources. He has been the ISO's principal representative to a stakeholders group during the development of the Regional Greenhouse Gas Initiative, a regional CO2 cap and trade program

His prior experience includes 30 years at Northeast Utilities (CT) in generation and transmission planning, environmental issues, research and distributed and renewable generation. He served as project leader/coordinator for the company's environmental reporting, and administered the buying and selling of air emissions credits for both NU's power plants and customers. He developed strategies for the use of surplus credits and the company's response to climate change.

Panelists

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