

***Course on Issues in Realizing Wholesale Electric Power Competition
Through Private Sector Ownership – Zambia
July 15-20, 2001***

CORE International, Inc. conducted a course on " Issues in Realizing Wholesale Electric Power Competition Through Private Sector Ownership" in Zambia during the period July 15-20, 2001. The Energy Regulations Board (ERB), Zambia acted as the local sponsor of the course. A total of 23 participants from a variety of entities in Zambia participated in the course for the entire period. The course was conducted at the Lake Safari Lodge in Siavonga, Zambia, located at Lake Kariba. The following organizations were represented in the course:

1. The Energy Regulation Board (ZRB)
2. Zambia Electricity Supply Company (ZESCO)
3. Kariba North Bank Company (KNBC)
4. Copperbelt Energy Corporation
5. Zambia Privatization Agency (ZPA)
6. Office of Private Power Promotion Initiative (OPPPI)
7. Ministry of Energy and Water Development (MEWD)
8. Zambia Competition Commission (ZCC)

In addition, Dr. Kevin Warr, Global Bureau, USAID, Washington, D.C. and Mr. Likando Mukumbuta, USAID Mission, Lusaka, Zambia, participated in the entire course. A complete list of participants is included as Annex I.

The training course was provided over a five-day period with specific training modules. The primary objective of the course was to provide training to key decision makers in ERB and other Zambian entities that would enhance their ability to analyze the financial and economic consequences of introducing different levels of market competition into the existing power sector in, especially the generation subsector. Such analysis will allow the estimation of market-determined wholesale electricity prices for specific electricity demand levels. It will also facilitate the predication of the financial performance of specific private sector owned generating companies. Furthermore, the training focused on a discussion of different models for introducing competition in the power sector and the methods to estimate any capture of economic rent by private sector generating station owners. Finally, during the training, the instructors reviewed international experience with designing, implementing, operating, and regulating wholesale electricity markets in other countries. It discussed "lessons learned" and the identification of the main issues related to implementing wholesale competition in Zambia.

The specific topics covered as part of the course included the following:

I. Status of Power Sector in Zambia

1. Zambia's Current Power Sector
2. The Lessons from Existing Experience for Zambia

II. Competition In Electricity Supply

1. Economic Theory of Competition -- Wholesale Electricity Prices in a Competitive Market and Pricing Models
2. Implications for Hydro-dominated Power Systems
3. Replacement of Monopoly with Contract Markets & Contract Types
4. Practical Requirements for Competitive Electricity Markets
5. Wholesale Markets Entry & Exit Issues
6. Dealing with Electricity Exports & Imports
7. Generation Competition Regulation

III. Key Issues with Wholesale Electricity Markets

1. Overview
2. Single Buyer Model and Retail Competition
3. Transition from a Single Buyer to Competitive Market
4. Wholesale Market Organization

IV. Wholesale Electricity Markets Examples and Lessons Learned

1. The UK Power Pool
2. The Nordic Power Pool
3. The Balkan Electricity Market
4. The SAPP Wholesale Market
5. The California Case - The World Bank Perspective
6. Other Relevant Information

V. Issues in Wholesale Market Implementation

1. Development of Market Rules
2. Role of IPPs
3. Power Purchase Agreements (PPAs)
4. Settlements System Design & Implementation
5. Development of Market Members Agreement
6. Generator Licensing
7. Overview of Grid Code Requirements
8. Establishment of the Wholesale Market Operator
9. Pricing of System Availability and Ancillary Services
10. Regulatory Requirements
11. Dealing with Social Policy Obligations Under a Wholesale Market
12. Estimating Wholesale Market Implementation Costs
13. Considerations in Formation of Generating Companies & New Market Entrants
14. Market Issues Associated with Privatizing Zambia Generation

15. Approaches to Valuing Existing Generating Assets
16. Assessing Generating Companies Financial Viability
17. Overview of the International Generation Market
18. Determining of the Transmission System Operator (TSO)
19. Open Access Requirement
20. Overview of Metering Requirements
21. Overview of Transmission Pricing Approaches with Wholesale Markets
22. Managing Transmission Constraints
23. Considerations in Privatizing Transmission
24. Regulatory Requirements

VI. Role Playing/Gaming Exercise

VII. Implications for Zambia

1. The Lessons from Existing Experience for Zambia
2. Considerations for Stimulating a Wholesale Electricity Market in Zambia
3. Relationship between Electricity Market/Prices and Overall Economic Growth in Zambia
4. Market Issues Associated with Privatizing Generation in Zambia
5. Relationship of a Wholesale market in Zambia to SAPP Wholesale Market

The instructors discussed a number of case studies that included a number of power pools from different parts of the world. The course also included an extensive role-playing exercise during which the group participated in negotiations on a major IPP proposal from an outside consortium.

ANNEX I: LIST OF PARTICIPANTS

*Course on Issues in Realizing Wholesale Electric Power Competition
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| <u>Organization</u> | <u>Name of Participant</u> |
|----------------------------------------------|-----------------------------------|
| Zambia Privatization Agency | Mr. Brian K. Tembo |
| Department of Energy | Mrs. Langiwe H. Chandi |
| Kariba North Bank Company, Ltd. | Mr. M. Lindunda |
| Kariba North Bank Company, Ltd. | Mr. C. Mwenda |
| OPPPI | Mr. Steven Phiri |
| ZESCO Limited | Mr. Chris Kasanda |
| ZESCO Limited | Mr. Chris Nthala |
| U.S. Agency for International Development | Mr. Likando Mukumbuta |
| Copperbelt Energy Corporation | Mr. R. Lwiindi |
| Copperbelt Energy Corporation | Mr. H. Sindowe |
| Zambia Competition Commission | Mr. Hapenga M. Kabeta |
| <i>Energy Regulation Board</i> | |
| Commissioner | Mr. Peter C. Munthali |
| Commissioner | Col. Nkunga C. Mulenga |
| Executive Director | Mr. Moses K. Zama |
| Technical Director | Mr. Silvester H. Hibajene |

Energy Regulation Board (continued)

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|-------------------------|-------------------------|
| Manager - REFA | Mr. Andrew N. Kamanga |
| Legal Counsel | Ms. Mwape Mondoloka |
| Economic Analyst (1) | Mr. L. Shantebe Chiinda |
| Economic Analyst (2) | Mr. Mukanda |
| Financial Analyst | Ms. Mutumboi Mundia |
| Inspector - Electricity | Mr. James Manda |

Observer:

Mr. Kevin Warr
U.S. Agency for International Development
Global Bureau
Office of Energy and Environment
Washington, D.C.

Trainers:

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|--------------------------|---------------------------------------------------------------------------------------------|
| Dr. Donald Hertzmark | Chief Economist CORE International, Inc. Washington, D.C. 20016 |
| Mr. Vinod K. Shrivastava | President and Chief Executive Officer CORE International, Inc. Washington, D.C. 20016 |