REGIONAL ENERGY COOPERATION – SOUTH ASIA AND OTHER REGIONS

April 23, 2008

John Hammond, Program Manager

U. S. ENERGY ASSOCIATION
Cross Border Energy Trade is A Common Practice Around the World

**BENEFITS**

- Increases available power
- Reduces energy costs
- Increases system reliability and efficiency
- Provides new revenue source
- Encourages investment
SOUTH ASIA REGIONAL INITIATIVE FOR ENERGY (SARIE)

SARIE countries:
- Afghanistan
- Bangladesh
- Bhutan
- India
- Maldives
- Nepal
- Pakistan
- Sri Lanka
SARIE PURPOSE

To promote energy security and increase access to energy in South Asia through:

• Cross border energy trade
• Energy market development
• Clean energy development
SARIE ACTIVITIES

• Technical Assistance – studies on energy security, cross-border energy trade, clean energy/renewables, and increasing the role of the private sector.

• Training/Workshops – in the areas of energy markets, cross-border trade, and clean energy

• Regional Partnerships – in transmission, energy markets, energy policy, and renewable energy
South Asia Energy Cooperation
RECENT SARIE ACTIVITIES

- Wind and solar maps for Afghanistan, Bhutan, Pakistan, & Sri Lanka
- Guidelines for a Nepal Hydro Equity Fund
- Establishment of a Regional Centre for Excellence in Energy Efficient Lighting in Sri Lanka
- Indian Energy Market Workshops
- Executive exchanges on renewables, policies, Bhutan-India trade and Sri Lanka-India interconnection
SRI LANKA – INDIA SUBMARINE INTERCONNECTION & ENERGY TRADING
Overview of the France to England Interconnection

PRESENTATION DE L'OUVRAGE

<table>
<thead>
<tr>
<th>BIPOLE N°</th>
<th>ROUTE N°</th>
<th>LONGUEUR DES ROUTES (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Câbles terrestres Anglais</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>18,5</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>18,5</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>18,5</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>18,5</td>
</tr>
</tbody>
</table>
Southern Africa Power Pool

Primarily 220 kV, some 330, and one 400Kv (Matraco; SA, Swaziland, Mozambique)
SOUTHERN AFRICA POWER POOL

KEY ISSUES

• Operating sophisticated control systems

• Utility regulation

• Power pool membership rules

• Wheeling charges
West Africa Power Pool

Interconnections in service
Interconnections in service 2004-11
Possible future interconnections by 2020

OMVG = Gambia River countries operator
OMVS = Senegal River countries operator

Primarily 330 kV transmission lines
West Africa Power Pool

KEY ISSUES

• Financial structure & membership fees

• Legal framework for an international pool

• Rules of operation

• Regional regulation

• Membership rules of participation
Central America Energy Interconnection - SIEPAC

Symbols:
- NATIONS CAPITALS
- SUB-STATIONS
- INTERCONNECTION LINES

Pending Section Honduras - El Salvador (For 2001)

Primarily 230 kV lines in Central America
CENTRAL AMERICA
SIEPAC

KEY ISSUES

• Increased efficiency in supplying regional energy

• Increase competence and safety of electrical energy supplies

• Standardized operational quality and safety criteria
European Electricity Market

7 Electricity Regional Energy Markets

- CENTRAL WEST
- NORTHERN
- UK & IRELAND
- SOUTH WEST
- CENTRAL SOUTH
- CENTRAL EAST
- BALTIC
European Grid

KEY ISSUES

• Creation of a single European grid and market for electricity and gas based on common rules and standards

• Removing remaining barriers to cross-border trade

• Legally defining obligations and duties of various countries, generators, transmission operators, distribution companies and
NORTHWEST US – CANADA INTERCONNECTIONED GRID
NW US – CANADA GRID

KEY ISSUES

• Coordinating planning & system improvement

• Determining adequate level of reserved power capacity

• Accommodating short term and long term power trading

• Balancing hydro and thermal production
REGIONAL ENERGY COOPERATION
Thank you!

John Hammond

JHammond@usea.org
Tel: 202 312 1230
Fax: 202 682 1682

US Energy Association
1300 Pennsylvania Ave., NW
Suite 55, Mailbox 142
Washington, DC 20004-3022

WEBSITE: WWW.USEA.ORG