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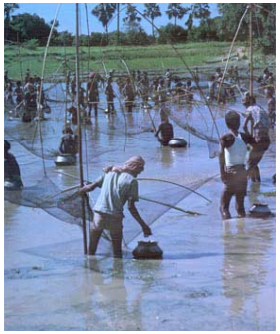
SARI/Energy Executive Peer Exchange
European Union Electricity Market

Power Sector of Bangladesh

Status and Refom towards Development

Presented by

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Bangladesh Power Development Board

1st June 2007, Cologne, Germany

Presentation Outline

- Country Profile
- Vision of the Power Sector
- Power Structure of Bangladesh
- Present Power Scenario
- Economy and Electricity
- Future Projection
- Status of Power Sector Reform
- Regional Power Scenario
- Electricity Market & Bangladesh
- Concluding Remarks

Country Profile : Bangladesh

Bangladesh is a riverine country located in South Asia. The country is fenced by India on the West, North and the Northeast, Myanmar on the Southeast and the Bay of Bengal on the South.

- **Total Area : 1,47,570 Km²**
- **Forest Area : 20,700 Km²**
- **Water Area : 10,090 Km²**
- **Capital : Dhaka**
- **Population : 144 Million**
- **GDP Growth Rate : 6.7% (FY 2006)**
- **Per Capita Income : US$ 470 (FY 2006)**
- **Major Natural Resources : Gas, Coal**

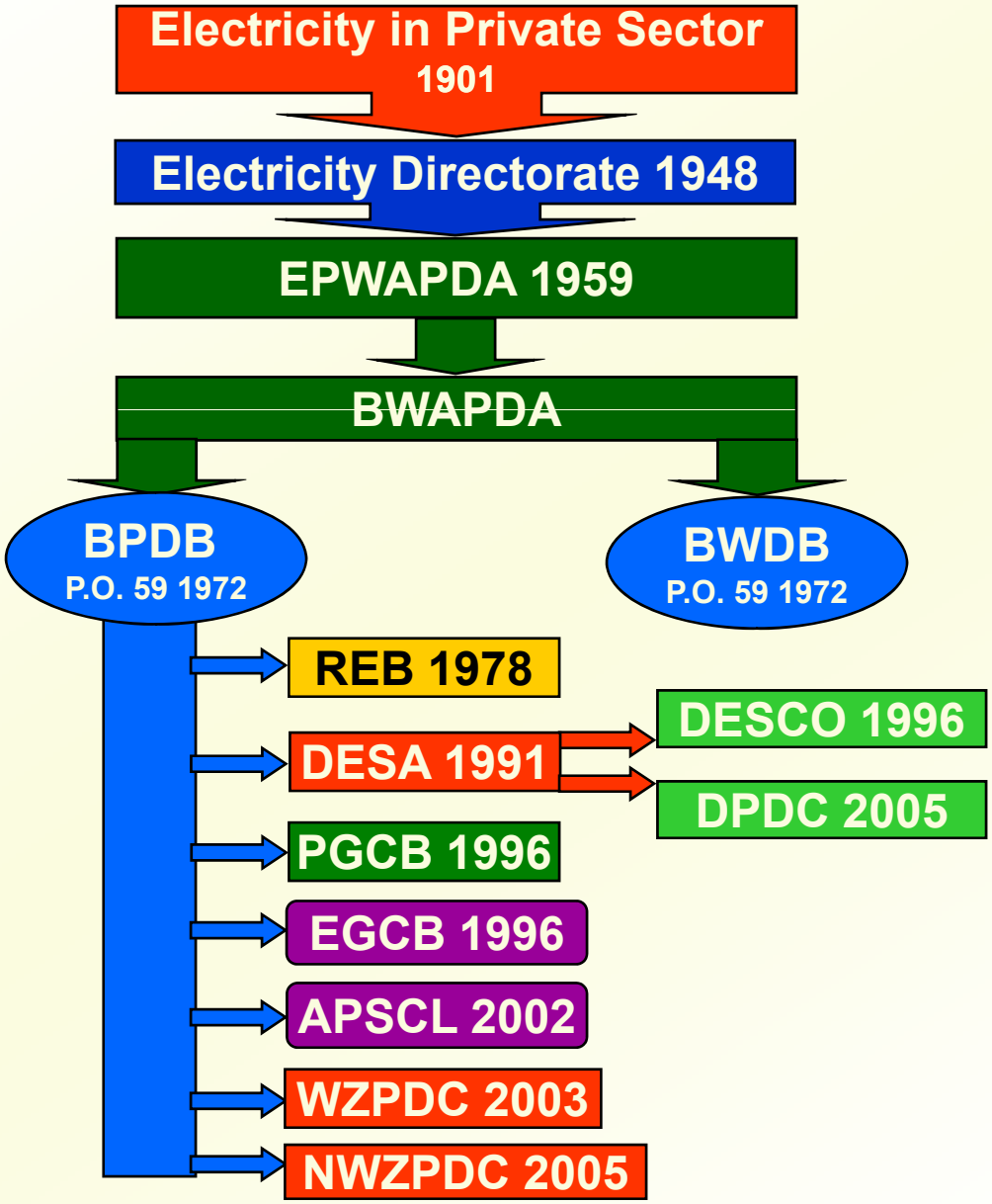
Vision for Power Sector

To make Electricity available for All by 2020

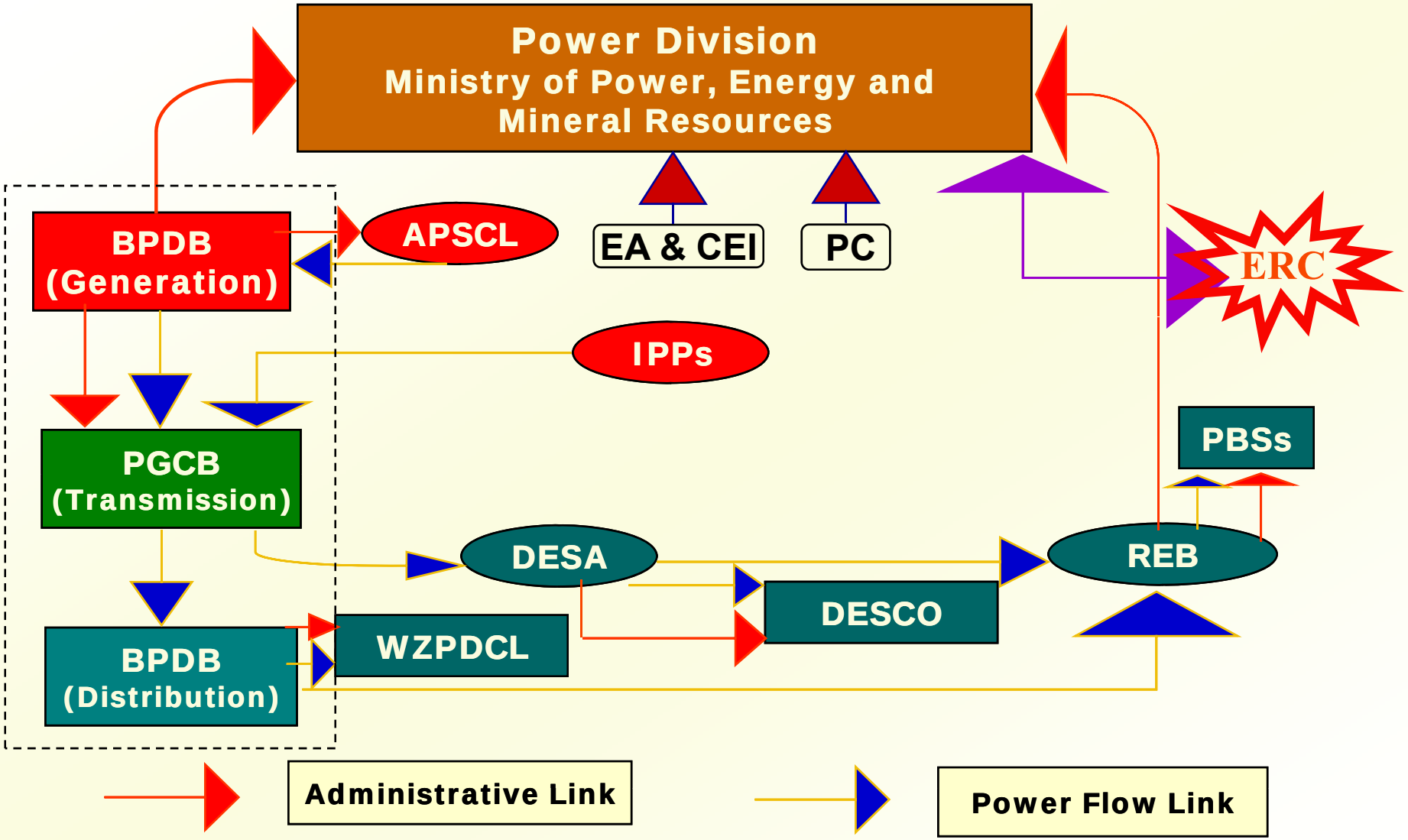
To ensure Reliable and Quality supply of Electricity

To provide Electricity at a Reasonable and Affordable Price

Historical Background of Power Sector



Present Structure of Power Sector



EA & CEI – Electrical Advisor & Chief Electrical Inspector ; PC- Power Cell
ERC- Energy Regulatory Commission

Present Power Scenario (FY 2006)

Generation

- So Far Maximum Generation : 3812 MW (30/10/05)
- Installed Generation Capacity : 5275 MW + Captive
- BPDB's Inst. Generation Capacity : 3985 MW (76%)
- IPPs Inst. Generation Capacity : 1290 MW (24%)
- Dependable Generation Capacity : 3400~3600 MW
- Demand : 3400~4800 MW
- Net Generation : 22,978 GWh

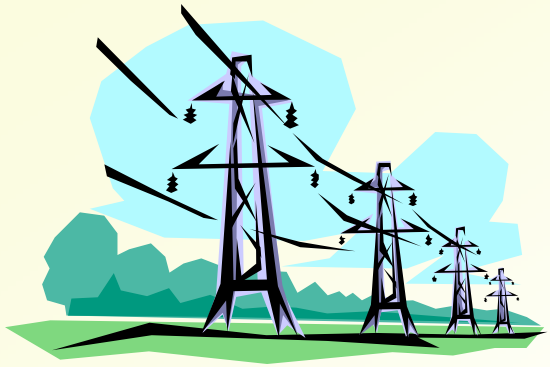
Transmission

- Transmission Line (230 kV & 132 kV Lines) : 6,844 Km
- Grid S/S Capacity (132/33 kV) : 8,259 MVA

Present Power Scenario (FY 2006)

Distribution

► Distribution Line (33 kV, 11 kV & 0.4 kV)	:	2,63,384 Km.
► Total no. of Consumers	:	9.753 Million
► Total no. of Village Electrified	:	49,424
► Access to Electricity	:	42%
► Per Capita Generation per Annum	:	165 KWh
► System Loss (T&D)	:	21.80%



Major Load Centre

North Zone 14%

West Zone 13%

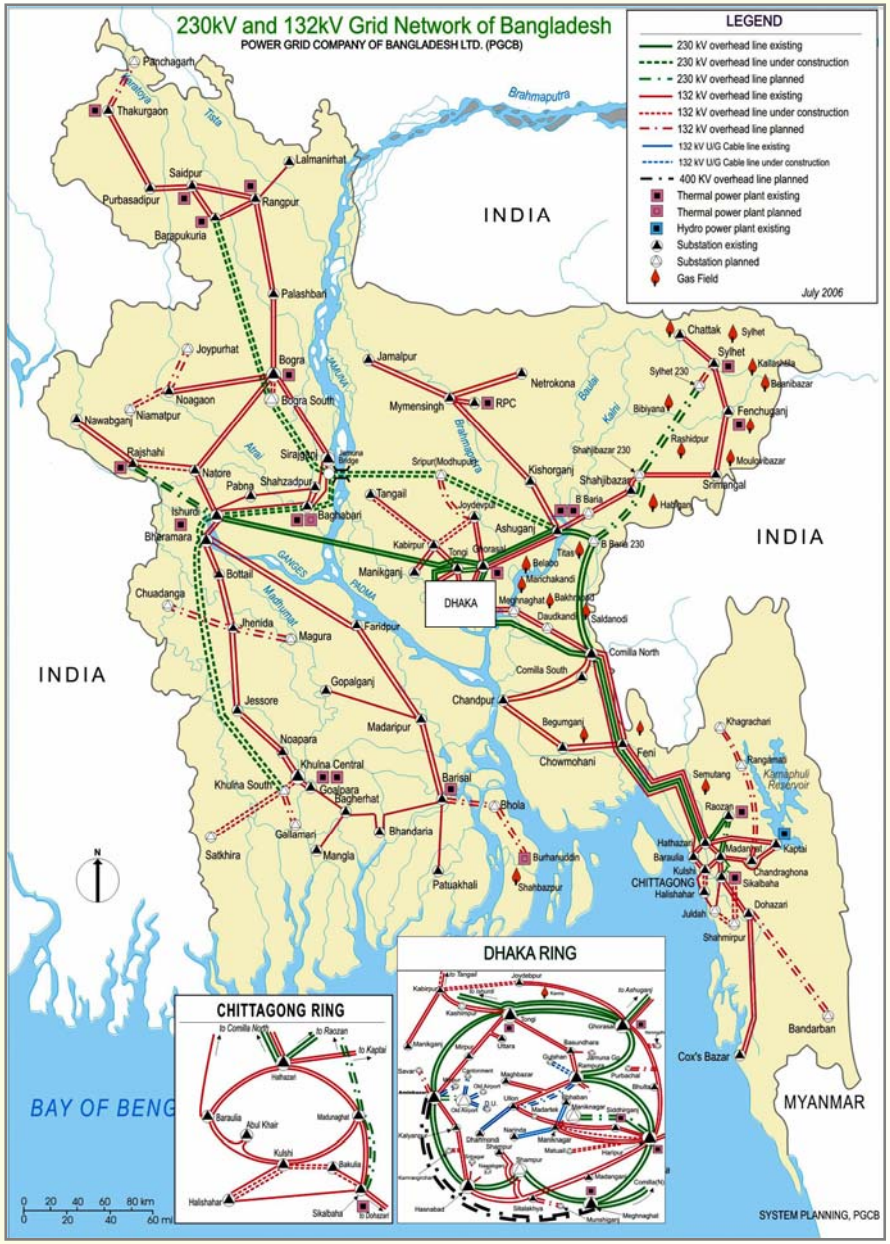
Major Load Centre Dhaka 41%

Central Zone 11%

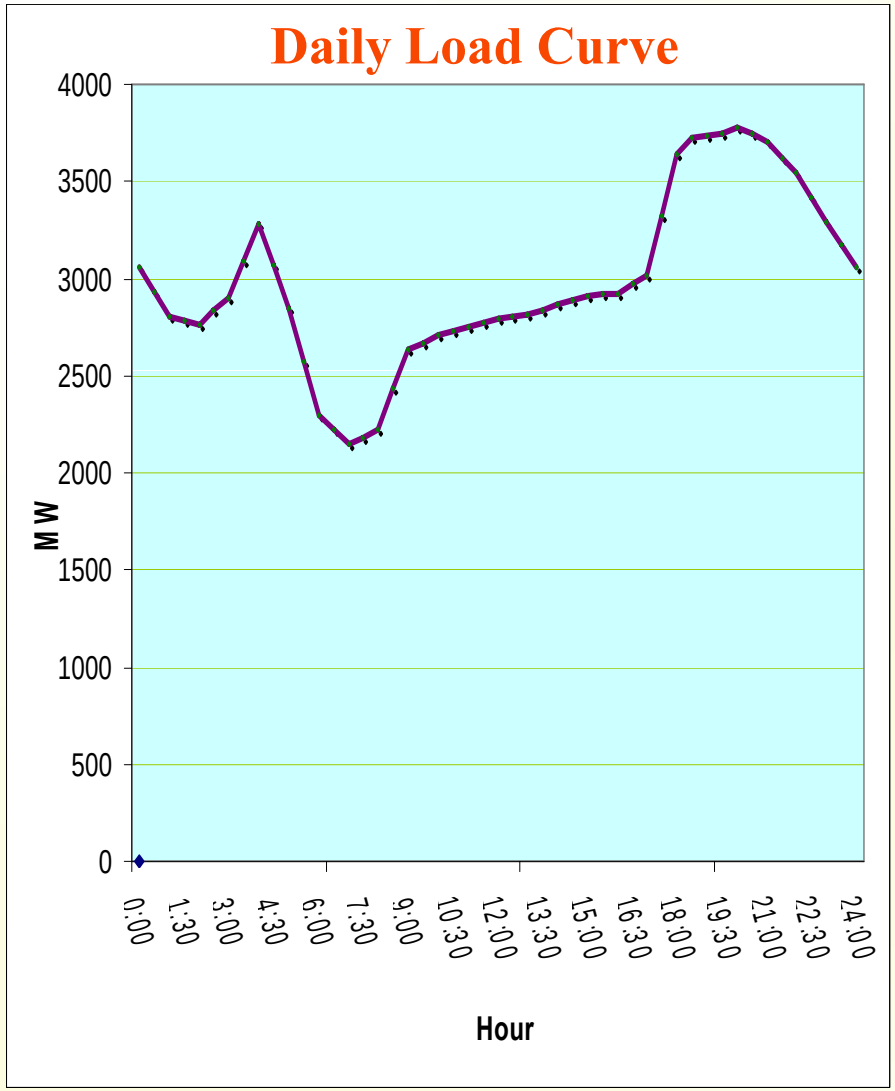
Comilla Zone 7%

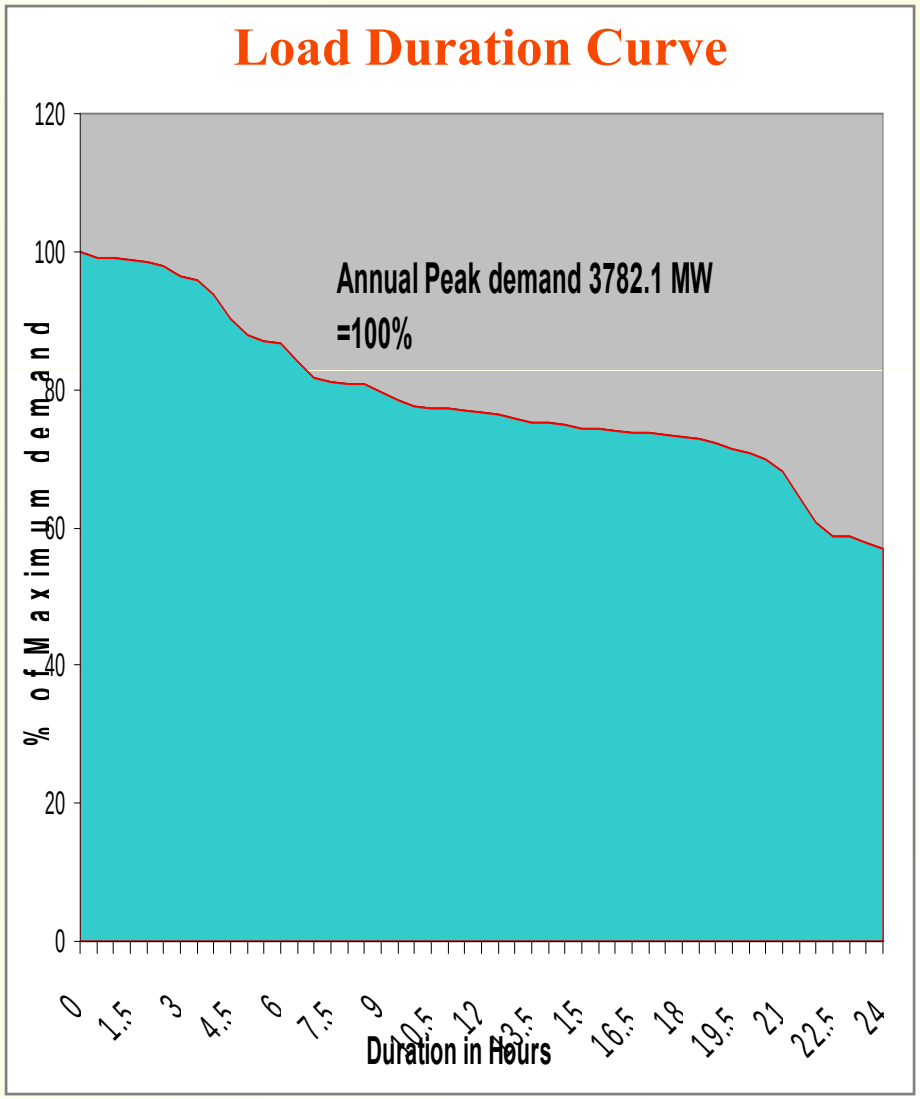
Chittagong 14%

Power Grid Map of Bangladesh

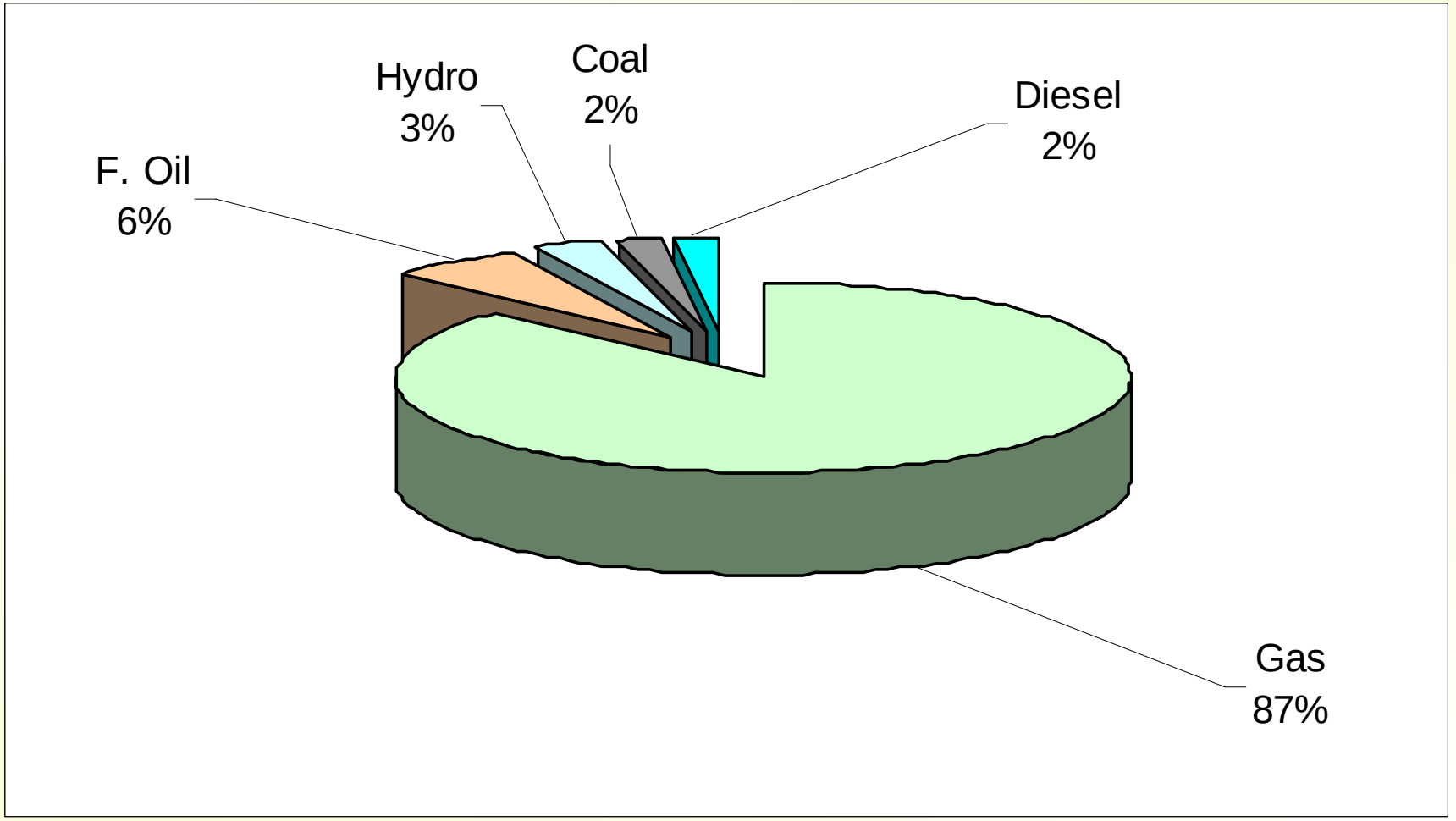


Time Based Demand (Typical)





Fuel Mix.



Impact of Rural Electrification

Electrified Households Reports	
Fuel Cost Decrease	94%
Working Hour Increase	78%
Household Income Increase	62%
Reading Habit Increase	81%
Children Study Time Increase	94%
Standard of Living Increase	92%
Improvement of Security	95%

Major Statistics of the Power Sector

Item	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006
Installed Capacity; MW	4,005	4,260	4,710	4,710	5,025	5,275
Energy Generated; MKWh	16,255	17,445	18,458	20,302	21,408	22,992
No. of Consumers; Million	5.53	6.333	7.064	7.96	8.847	9.753
No. of Village Electrified	35,797	39,028	41,814	44,546	47,612	49,424
Access to Electricity	25%	30%	32%	35%	38%	42%
Per Capita Elec. Generation; KWh	129	136	144	155	158	165
System Loss (T&D)	28.43%	27.97%	25.69%	24.49%	22.06%	21.80%

Comparison of Electricity Price & GPI

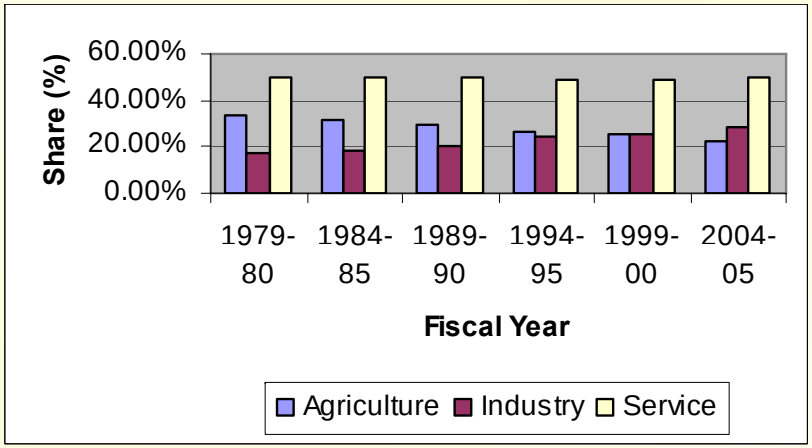
FY	Billings M Tk	Sales GWh	Yield		GPI
			Tk / kWh	Increase %	Increase %
1996	8 070	3 363	2.40		
1997	8 714	3 361	2.59	8.04	3.96
1998	9 764	3 485	2.80	8.06	8.66
1999	10 586	3 726	2.84	1.41	7.06
2000	12 026	4 041	2.98	4.75	2.79
2001	13 505	4 420	3.06	2.67	1.94
2002	14 777	4 736	3.12	2.12	2.79
2003	15 905	4 813	3.30	5.91	4.38
2004	16 827	4 918	3.42	3.54	5.83
2005	16 530	4 795	3.45	0.75	6.48
Cumulative increase 1997-2005				43.66	53.22

The GPI increased 22% more than the average revenue per KWh.

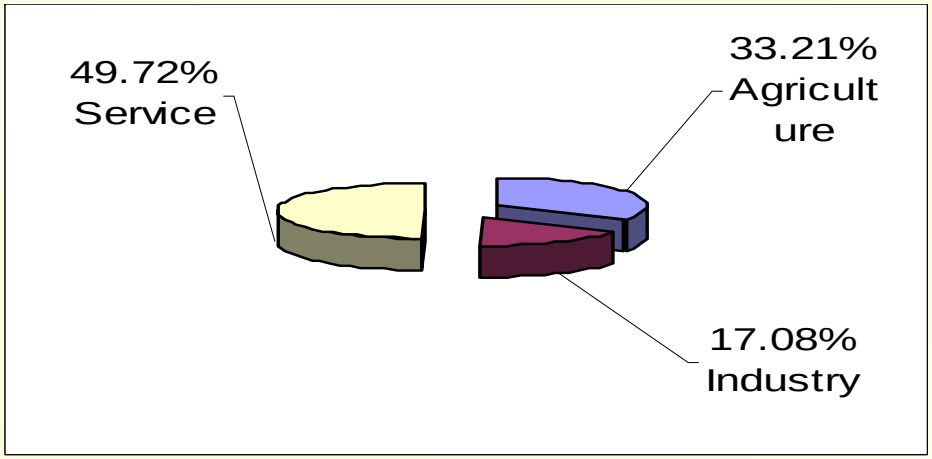
Sectoral Contribution to GDP

- Relative share of Agriculture sector is decreasing.
- Share of Industry is gradually increasing, which reflects the positive trend of Industrialization.
- Growth of Agriculture, Industry and Service sector for FY 2004-05 was -0.73%, 8.55% & 6.63% respectively.
- Infrastructure support is important for rapid growth in Industry and Service sector.

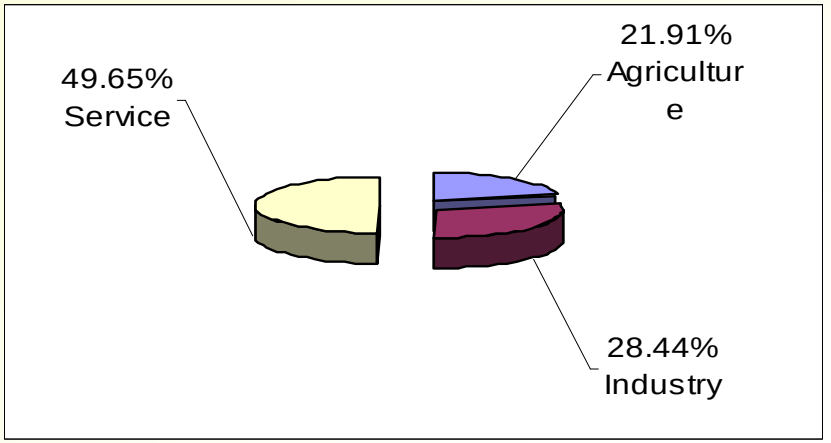
The Trend of Structural Transformation of Broad Sectoral Share in GDP at Constant Prices (Base Year: 1995-96)



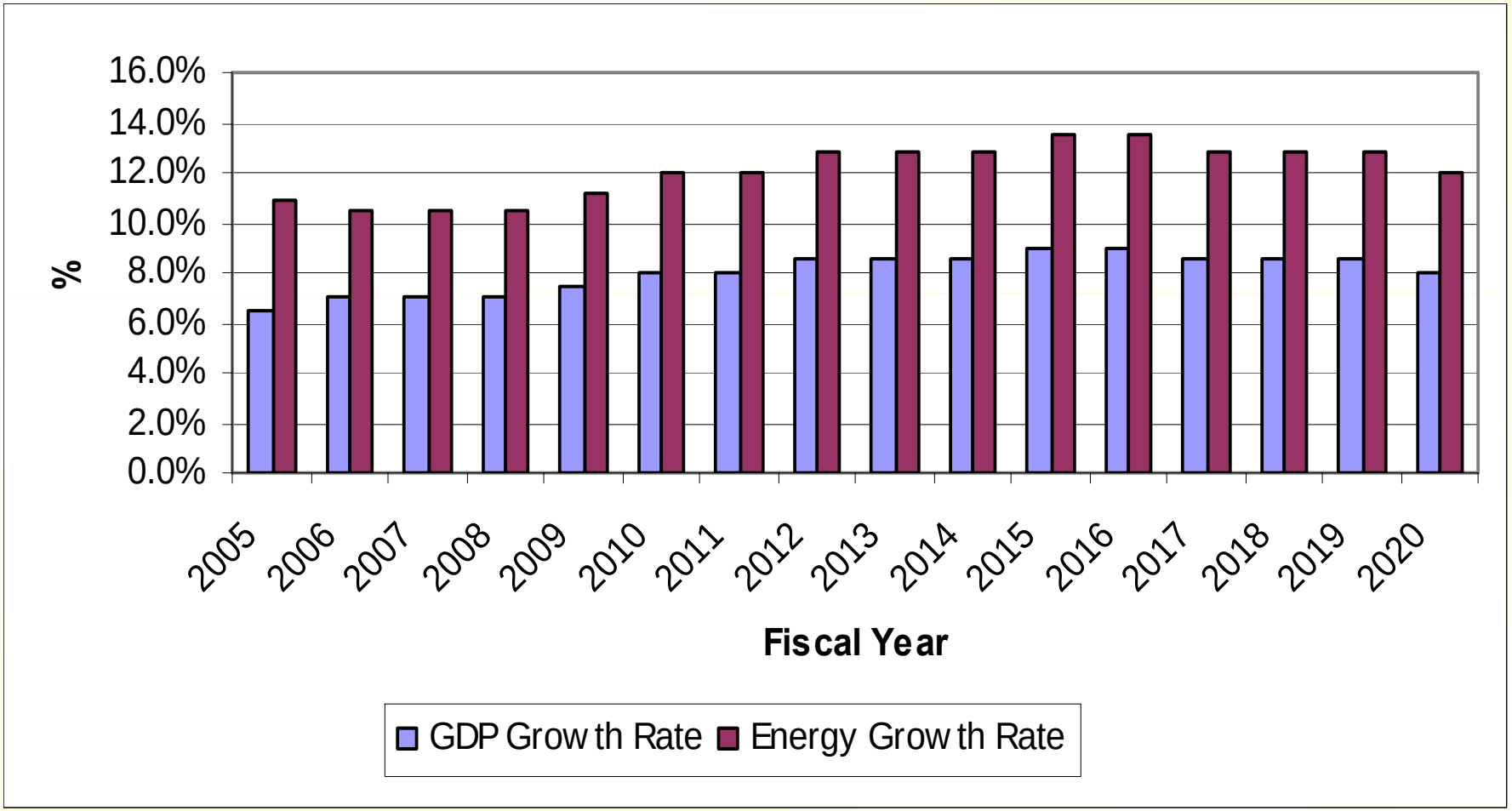
Contribution of Broad Sectors in GDP of 1979-80



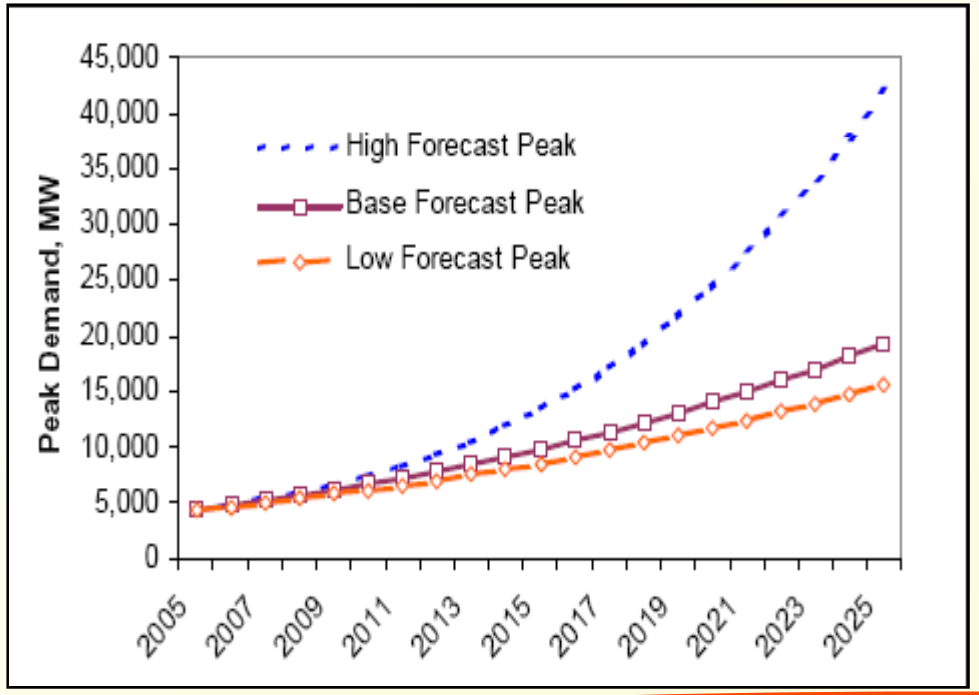
Contribution of Broad Sectors in GDP of 2004-05



GDP Growth VS Electricity Growth



Electricity Demand Forecast



Fiscal Year	Generation GWh (Base)	Demand MW (Base)
2007	26,106	5,112
2010	33,828	6,608
2015	50,306	9,786
2020	72,222	13,993
2025	100,083	19,312

High: Compound Growth Rate 2005 – 2025 GDP 8% , Energy and Peak 12%

Base: Compound Growth Rate 2005 – 2025 GDP 5.2 %, Energy 7.9%, Peak 7.8%

Low: Compound Growth 2005 – 2025 GDP 4.5% , Energy and Peak 6.7%

Electricity Demand Forecast

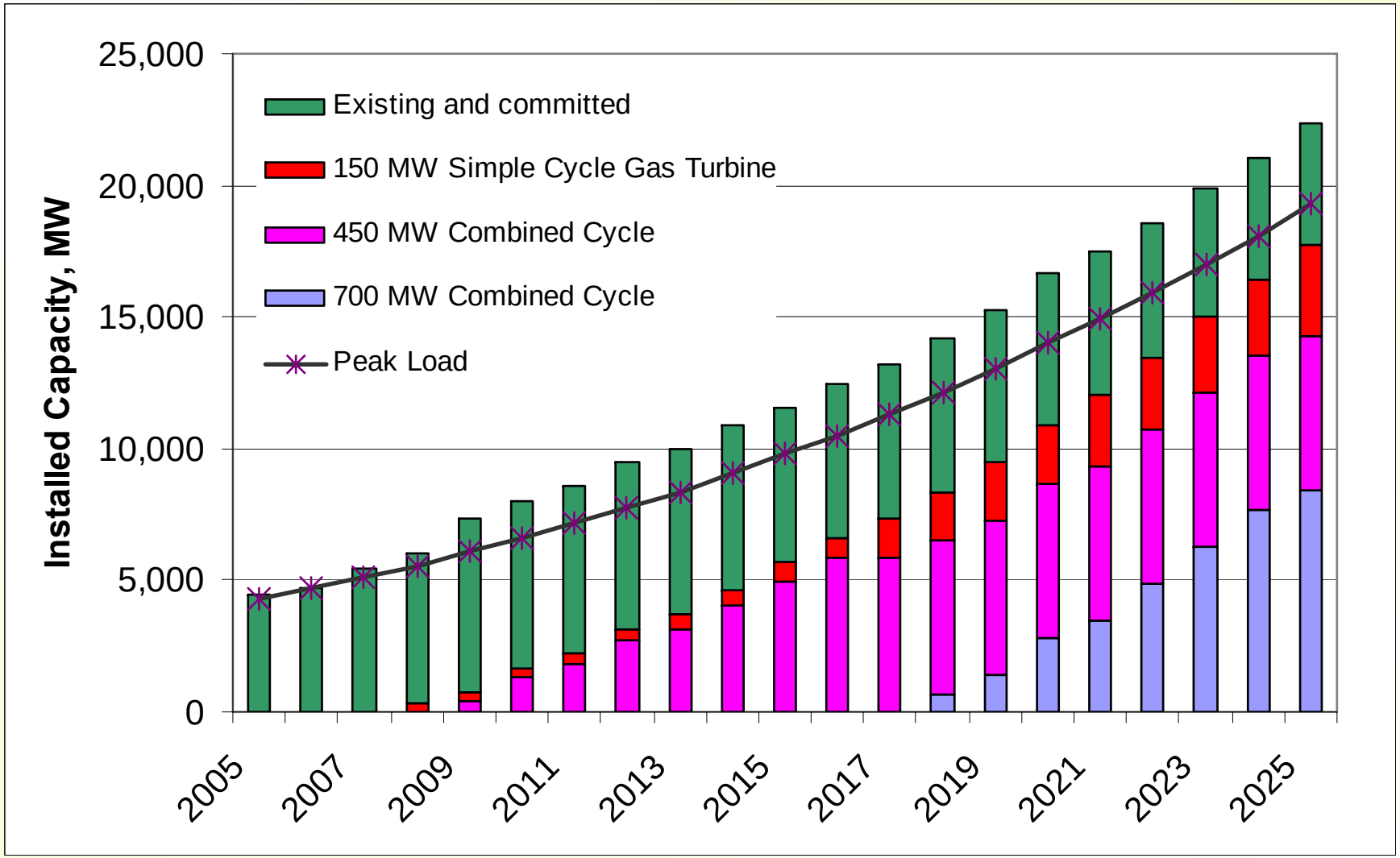
	Base Case		High Case		Low Case		
Fiscal Year	Net Generation (GWh)	Net Peak Load (MW)	Net Generation (GWh)	Net Peak Load (MW)	Net Generation (GWh)	Net Peak Load (MW)	Projected Load Factor
2005	21,964	4,308	22,336	4,381	21,964	4,308	58.2%
2006	23,945	4,693	24,692	4,839	23,611	4,627	58.2%
2007	26,106	5,112	27,297	5,345	25,382	4,970	58.3%
2008	28,461	5,569	30,177	5,904	27,286	5,339	58.3%
2009	31,028	6,066	33,592	6,567	29,333	5,734	58.4%
2010	33,828	6,608	37,652	7,355	31,533	6,160	58.4%
2011	36,622	7,148	42,202	8,237	33,659	6,569	58.5%
2012	39,647	7,732	47,627	9,288	35,928	7,007	58.5%
2013	42,922	8,364	53,749	10,473	38,351	7,473	58.6%
2014	46,467	9,047	60,659	11,810	40,937	7,970	58.6%
2015	50,306	9,786	68,924	13,408	43,697	8,501	58.7%
2016	54,079	10,512	78,316	15,223	46,643	9,066	58.7%
2017	58,135	11,291	88,384	17,166	49,788	9,670	58.8%
2018	62,496	12,128	99,746	19,357	53,145	10,313	58.8%
2019	67,183	13,027	112,568	21,827	56,728	11,000	58.9%
2020	72,222	13,993	126,172	24,445	60,553	11,732	58.9%
2021	77,092	14,924	141,419	27,377	64,178	12,424	59.0%
2022	82,290	15,917	158,510	30,661	68,020	13,157	59.0%
2023	87,839	16,977	176,448	34,103	72,092	13,934	59.1%
2024	93,761	18,107	196,415	37,931	76,408	14,756	59.1%
2025	100,083	19,312	217,137	41,899	80,982	15,626	59.2%

High: Compound Growth Rate 2005 – 2025 GDP 8% , Energy and Peak 12%

Base: Compound Growth Rate 2005 – 2025 GDP 5.2 %, Energy 7.9%, Peak 7.8%

Low: Compound Growth 2005 – 2025 GDP 4.5% , Energy and Peak 6.7%

Base Case Generation Plan



Primary Fuel Resources

- Recoverable Gas Reserve is 15.11 Tcf (as on 2003);
- Coal Reserve is about 2500 Million Tons (except Digipara, Dinajpur- no estimate is available);
- Hydro Resource is limited;
- No Nuclear Fuel is available;

Major Events towards Power Sector Reform

- Electricity Act 1910 has been Amended.
- Bangladesh Energy Regulatory Commission Act 2003 passed in the Parliament in March 2003.
- Creation of Small Power Generation Policy (SPGP) in 1998 and updated in 2001.
- Formulation of Vision and Policy Statement in 2000.
- Formulation of Private Power Generation Policy in 1996.
- National Energy Policy (NEP) in 1995.
- Revision of NEP is in process.
- DESCO & PGCB floated 25% Share in the Stock Market.
- Power Pricing Policy has been formulated.
- Financial Restructuring and Recovery Plan for Utilities has been developed.
- Captive Power Policy has been formulated.
- PSMP 2005 has been developed.

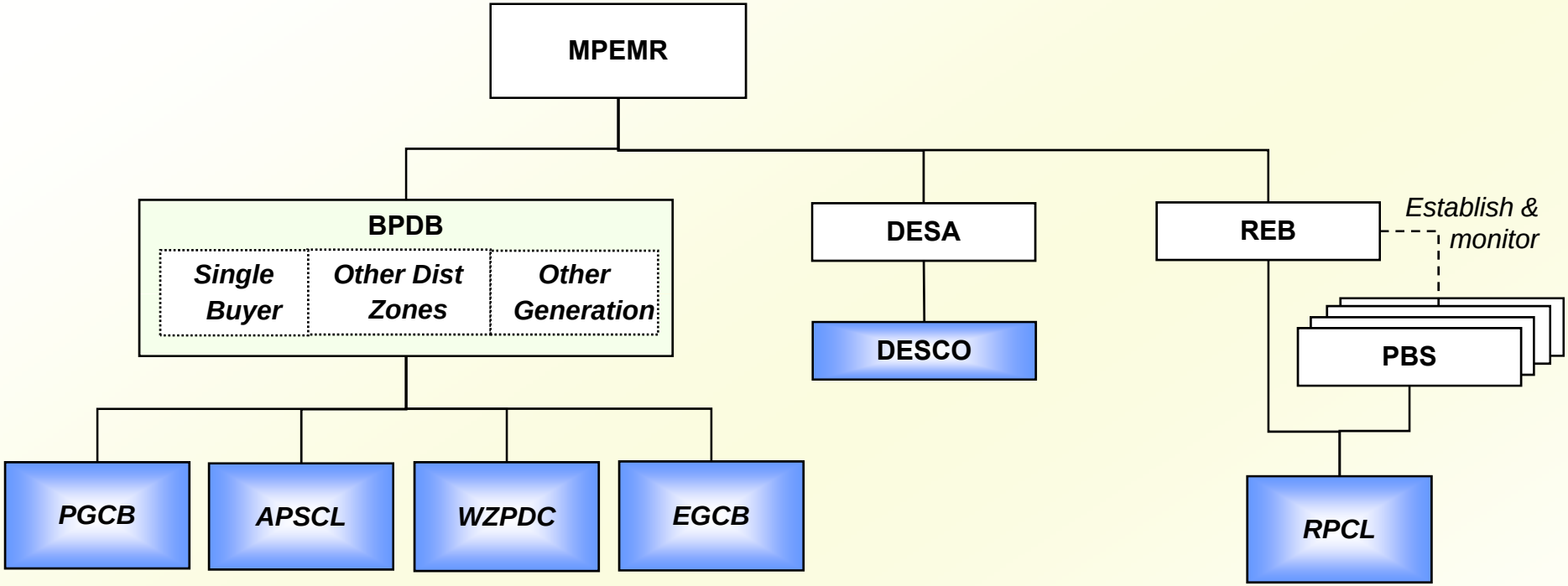
Basic Functions of ERC

- Regulate Electricity, Gas and Petroleum sector.
- Licensing for Energy Business & Energy Auditing.
- Scheme Approval of the Licencee.
- Collect, Review, Maintain & Publish Statistics of Energy.
- Frame Code & Standards to Ensure Quality.
- Create congenial atmosphere to promote competition amongst the licencees.
- Ensure Environmental Standard under existing laws.
- Tariff setting in consultation with the Government.
- Perform any incidental functions if considered appropriate by the Commission.

Steps Toward Power Sector Reform

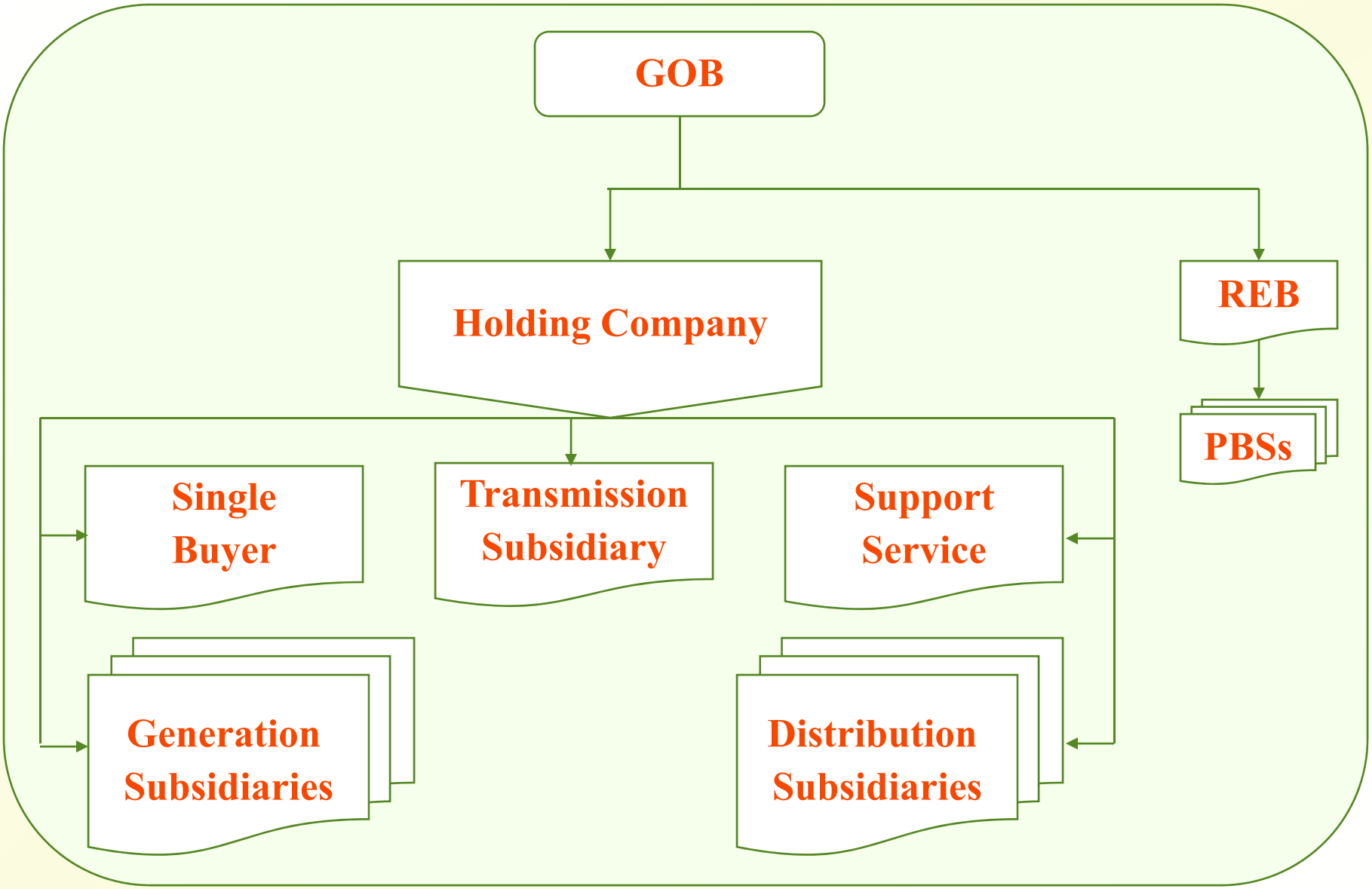
Government has taken initiatives to Reform the Power Sector. The aim of the Reform is to make Electricity Sector Commercially Viable through Vertical Segregation and ultimately Commercialization.

Current State Ownership Structure



BPDB is a statutory authority under the Ministry

Expected Future Structure of Power Sector

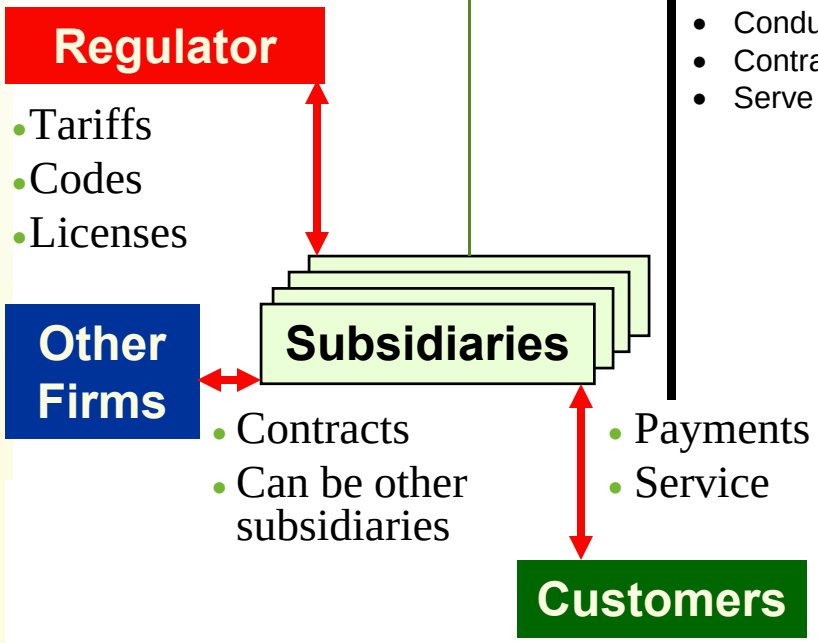


Functions of Holding Company

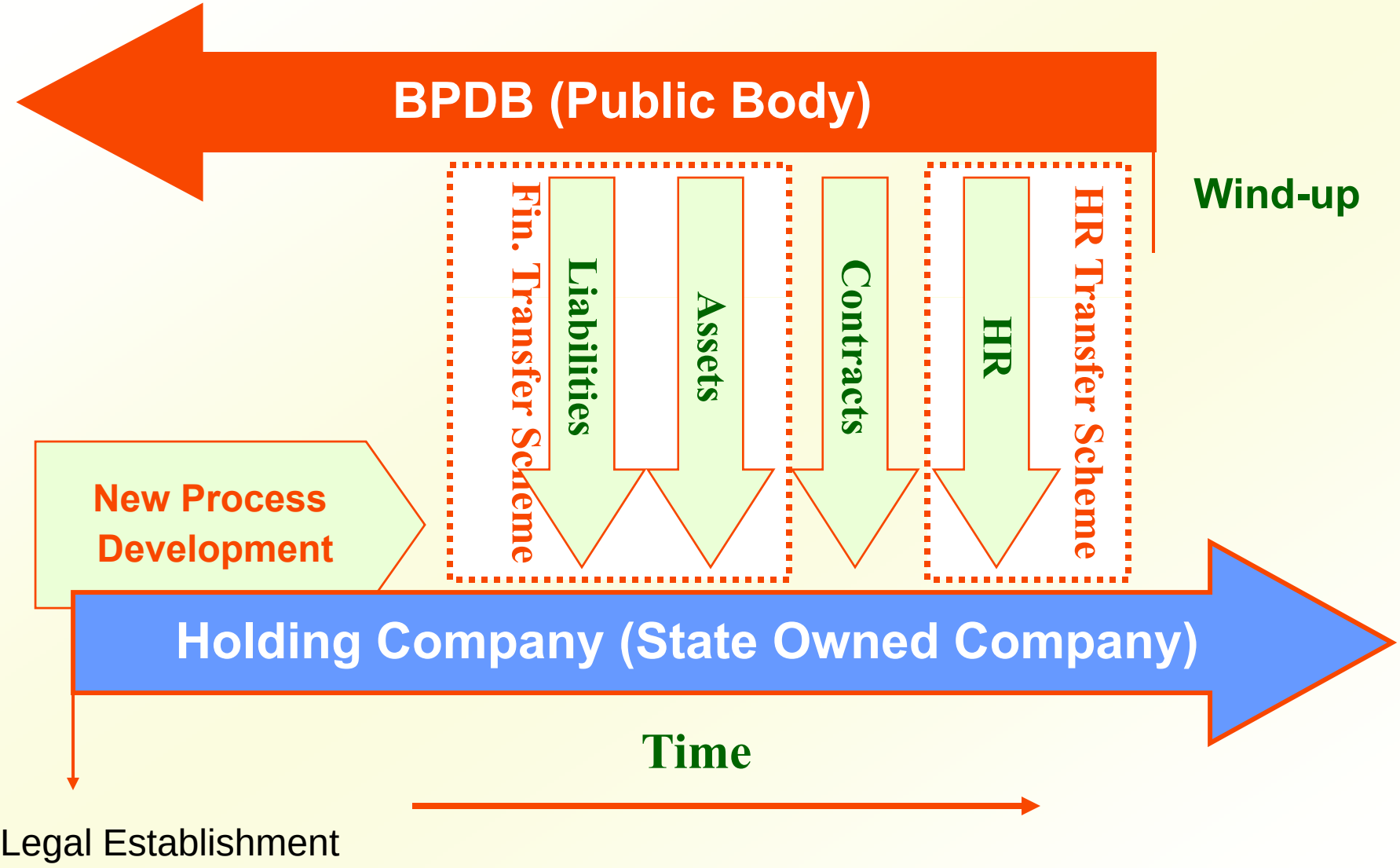
- Own subsidiary companies
  - Provide strategic guidance and coordination for operations
    - Approve subsidiaries corporate strategies & plans
    - Appoint subsidiaries' directors
    - Provide group treasury & financial planning functions
  - Drive accountability
    - Monitor subsidiaries' performance
    - Ensure competent internal & external audits
    - Report group performance to shareholders against agreed objectives
- May also include other services or operations
  - Operating vs. non-operating holding company
  - Balance need for transparency (e.g. accountability, legal requirements etc) in operations with cost (e.g. organizational disruption, establishment costs, etc.)

Relationship in a Holding Company Structure

LEVEL	ROLE	ISSUES
Government	***Shareholder*** • Appoints Board • Monitors Board performance against targets	• Appointment, removal & composition of Board • Performance improvement mechanisms • Owner's representative
Holding Company	***Holding Company*** • Shareholder of Subsidiaries • Insulates against government interference • Drives commercial performance	• Performance improvement mechanisms • Operating vs. non-operating • Planning, coordination, support and Single Buyer functions • Financial role
Subsidiaries	***Subsidiary Companies*** • Conduct operations • Contract with other firms • Serve customers	• Autonomy and boundaries of authority & responsibility • Performance management mechanisms • Commercial arrangements with outside entities



Corporatization Process



Mitigation approach

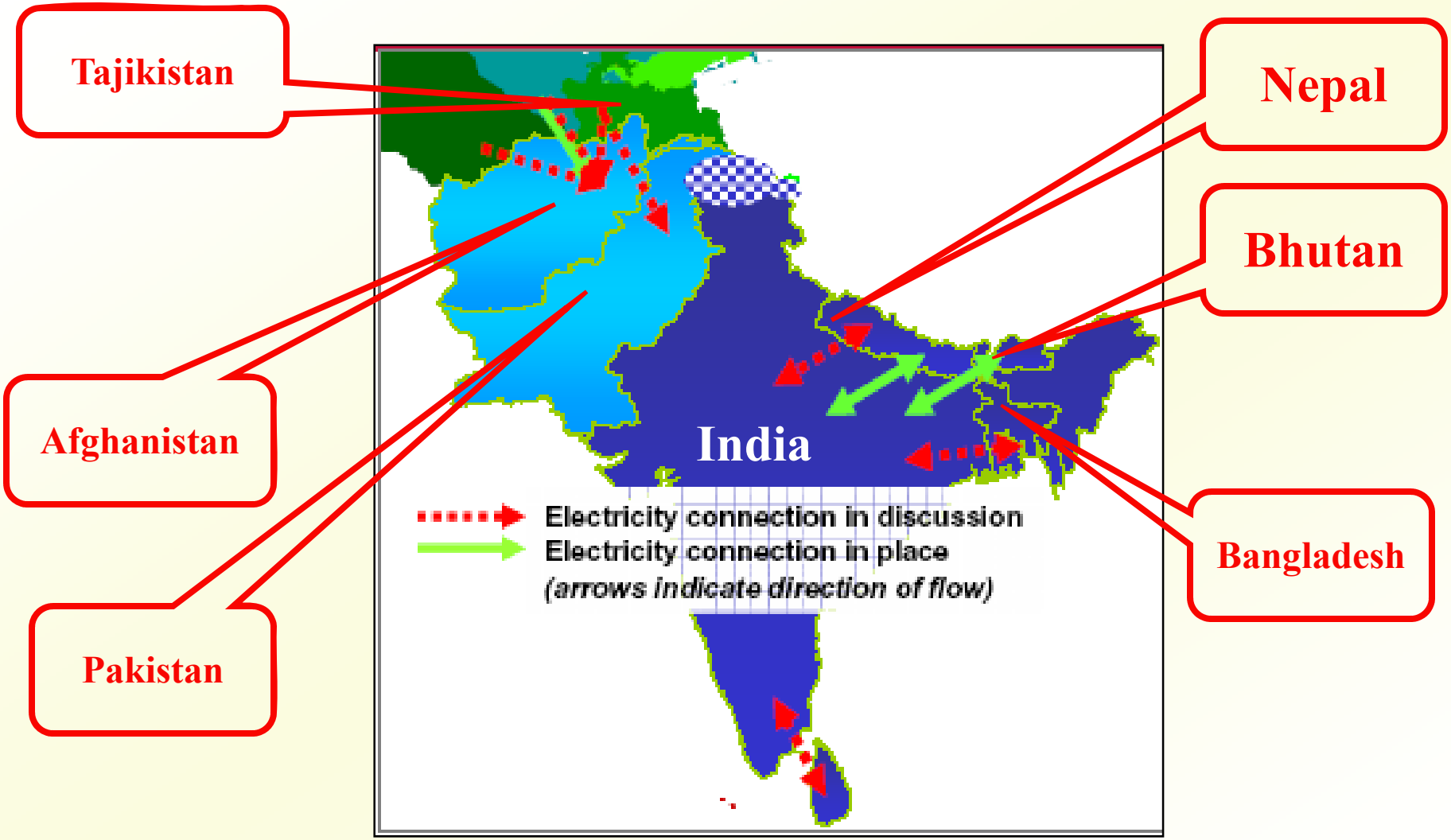
- **How to get from here to there? Two options:**
  - First create operating holding company and transfer all people, assets, liabilities and contracts into it, then transfer operations into subsidiaries and separate Single Buyer.
  - Or first create non-operating holding company, then transfer BPDB operations as they are corporatized to become subsidiaries. Residual BPDB remains the Single Buyer, which can later be corporatized.

Regional Power Scenario : South Asia

Parameter	Bangladesh	Bhutan	India	Nepal	Pakistan	Sri Lanka	Afghanistan
Installed Capacity (GW)	5.3	0.46	128	0.61	19	2.4	
Private Generation	25%	0%	10%	25%	31%	39%	
Fuel Preference	Gas	Hydro	Coal	Hydro	Gas, F.Oil	Hydro, F.Oil	Hydro
Generation capacity addition before FY 2020 (GW)	12.8	2.7	100	2.2	26	8	
Investment Requirements in USD billion	17	3.5	150	3	30	11	

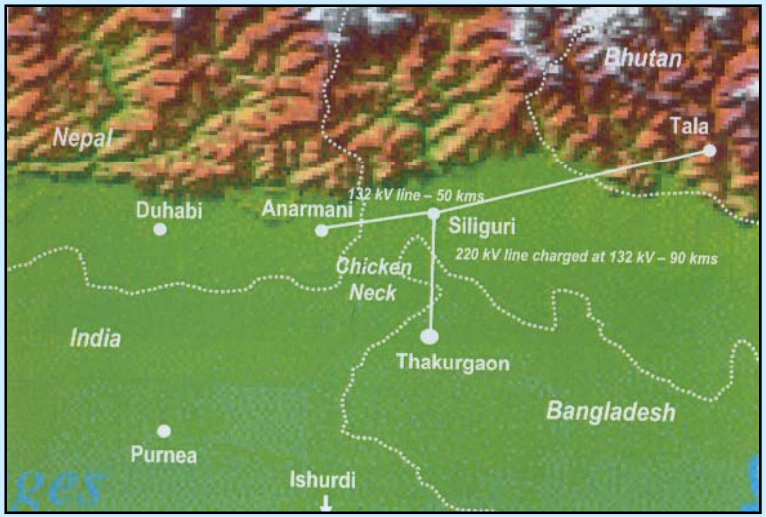
Source : Inv. in South Asia – Kuljit Singh

Regional Power Exchange : South Asia

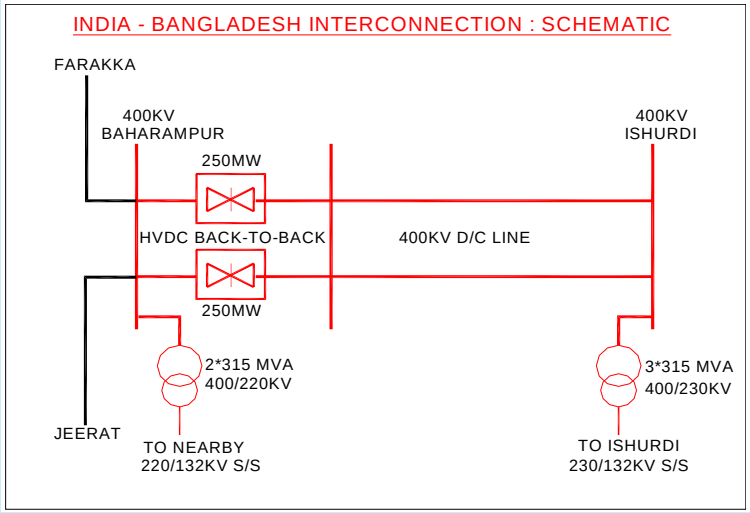


Regional Power Exchange: Recent Study

- **Pre Feasibility Study on Four Border Electricity Interconnection conducted by USAID in 2000**



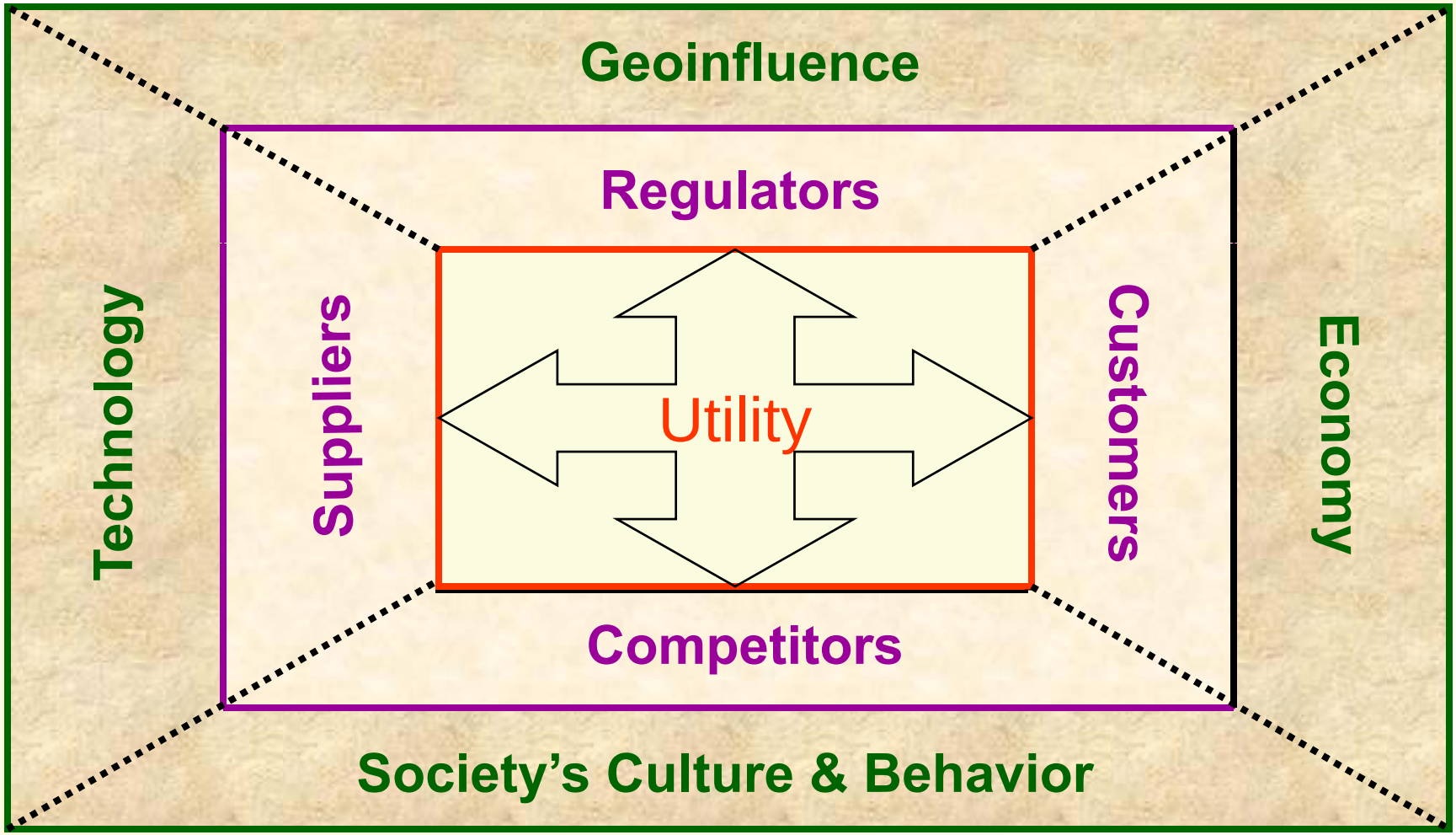
- **Pre Feasibility Study on Power Transmission Interconnection between India-Bangladesh and India-Sri Lanka conducted by USAID in 2006.**



Electricity Market & Bangladesh

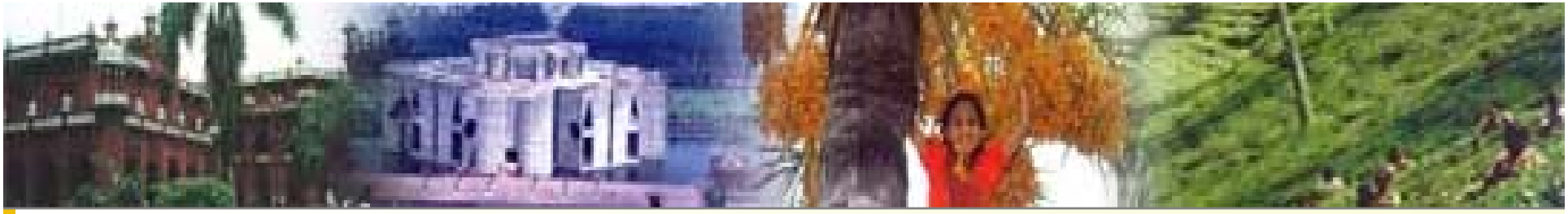
- Generators Black Start.
- Open Access in Transmission.
- Market Driven Tariff Structure.
- Full Functioning of ERC.
- Backbone for Electricity Market.
- Mindset for Electricity Market.

Key Environmental Forces for Power Sector



Concluding Remarks

- In the globalized world, local actions are always influenced by Global Essence.
- To harness the benefit of Reform in the power sector, Reform should consider ground reality.
- Comparative advantages of regional resources should be utilized in a win-win manner where regional cooperation can flourish.
- Effective and modern energy market will promote energy security & economic stability to the benefit of all SAARC country.
- Teeming millions in South Asia are looking for their better future through regional cooperation.



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