

ME265: Thermal Engineering & Heat Transfer

Chapters
1. Energy Scenario
2. Thermodynamics
3. Mechanical Devices & Systems
4. Heat Transfer

1.1	Global Energy Scenario
1.2	Energy Scenario of Bangladesh

1.2 Energy Scenario of Bangladesh

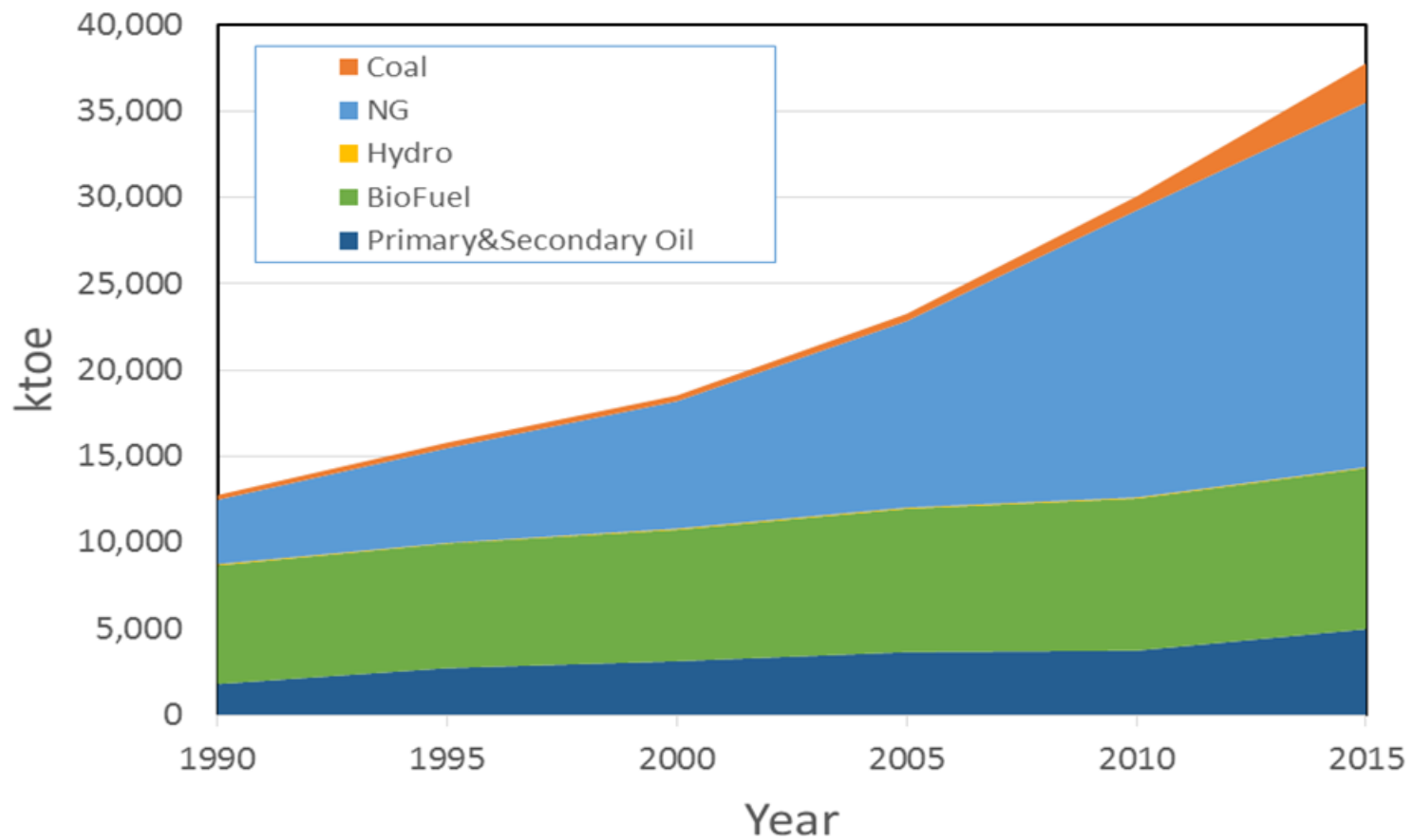
Selected Indicators for 2016¹

Country	Population (Million)	TPES (MTOE)	TPES/Pop (TOE/Capita)	Electricity Cons/pop (kWh/capita)	CO ₂ Cons/pop (tCO ₂ /Capita)
Asia (excl China)	2470	1816	0.74	1040	1.61
China	1386	2973	2.14	4290	6.57
Bangladesh	163	39.6	0.24	353	0.45
India	1324	862.4	0.65	918	1.57
Nepal	29	12.8	0.44	172	0.29
Pakistan	193	95.7	0.50	500	0.80
Srilanka	21	11.7	0.55	627	0.99
United States	323	2167	6.70	12825	14.95
Saudi Arabia	32	210.4	6.52	9818	16.34

[1] <https://www.iea.org/newsroom/news/2018/june/weo-2018.html>

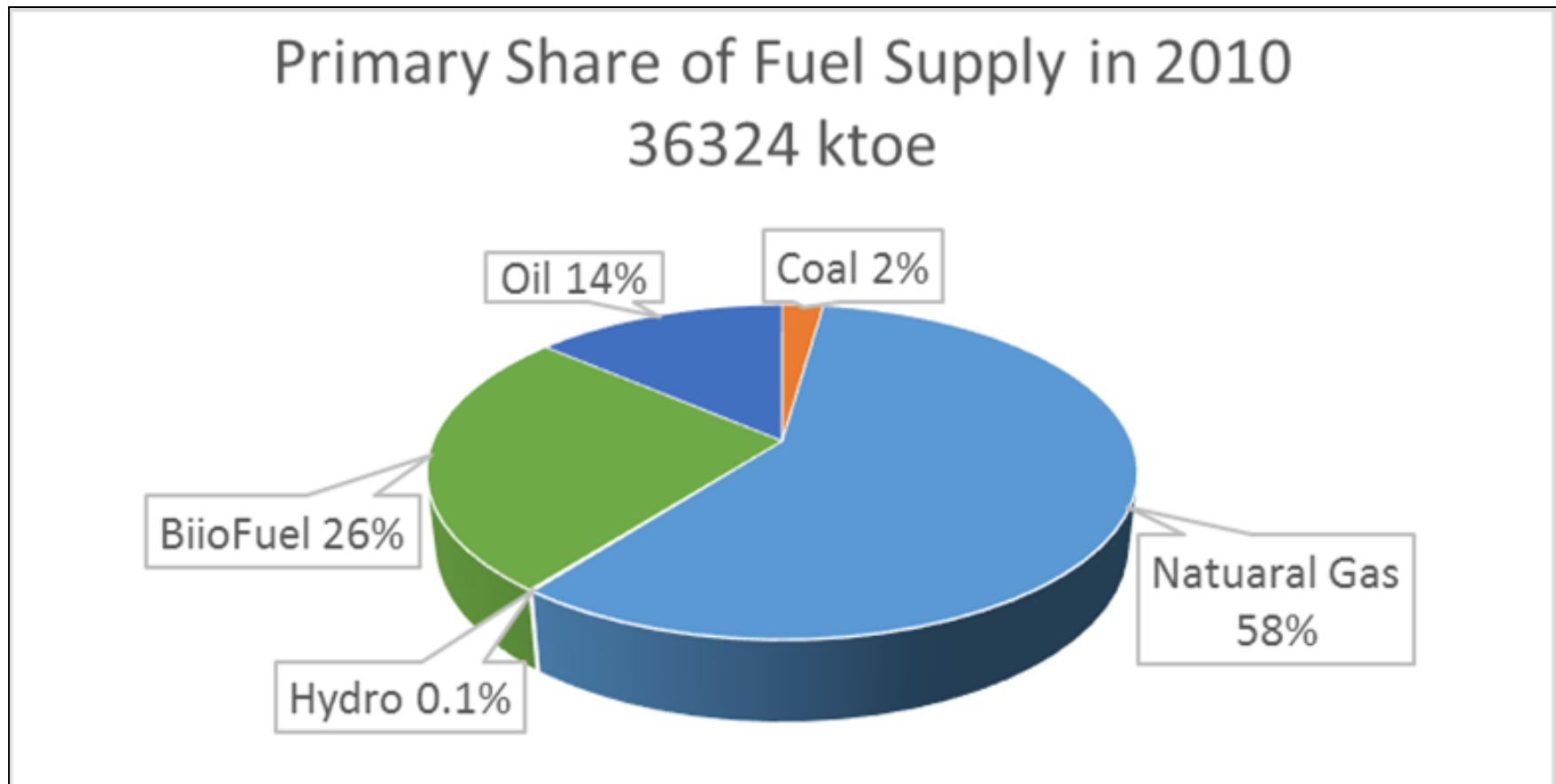
1.2 Energy Scenario of Bangladesh

□ Growth of Primary Fuel Supply



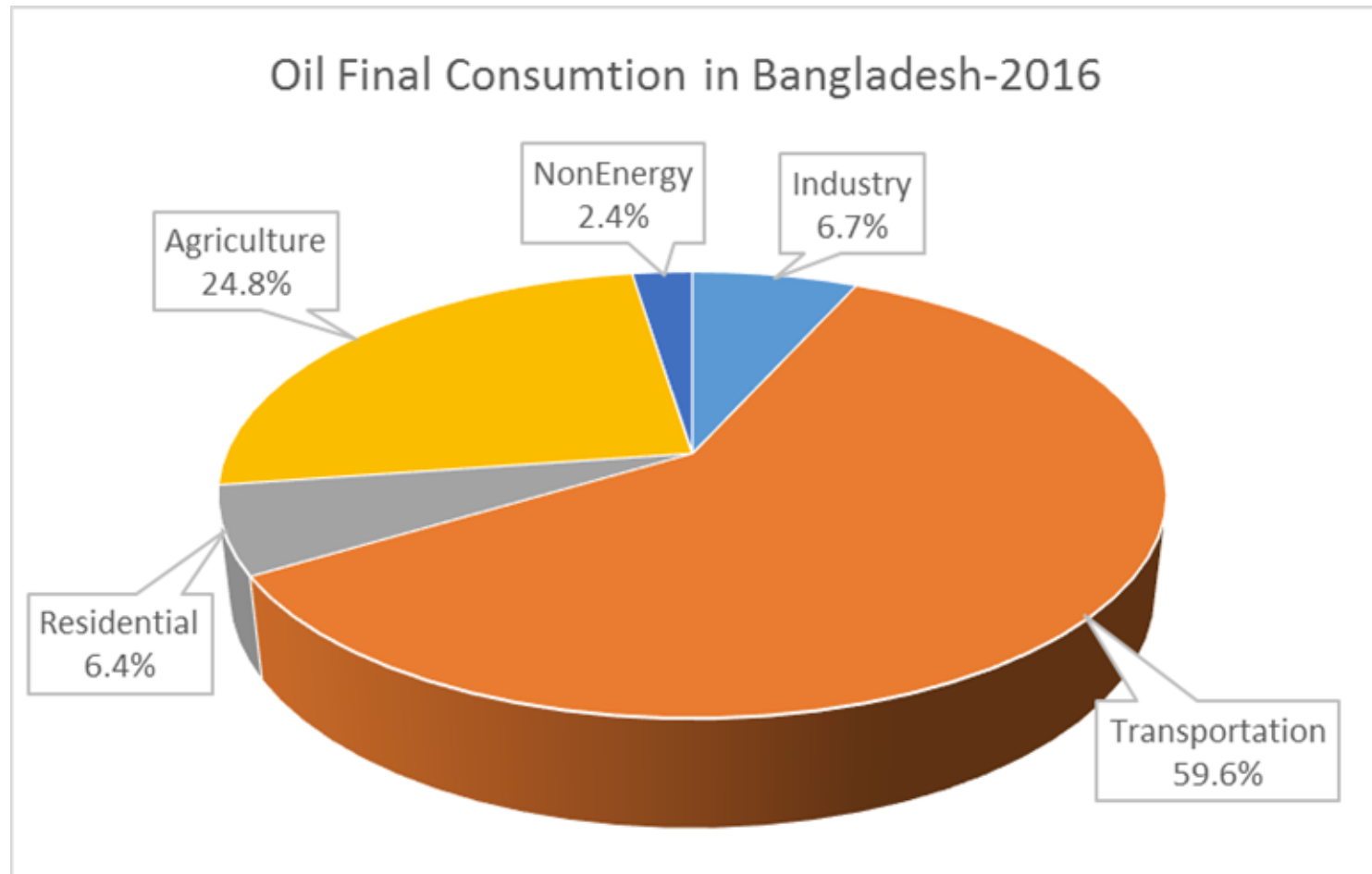
<https://www.iea.org/countries/Bangladesh/>

1.2 Energy Scenario of Bangladesh



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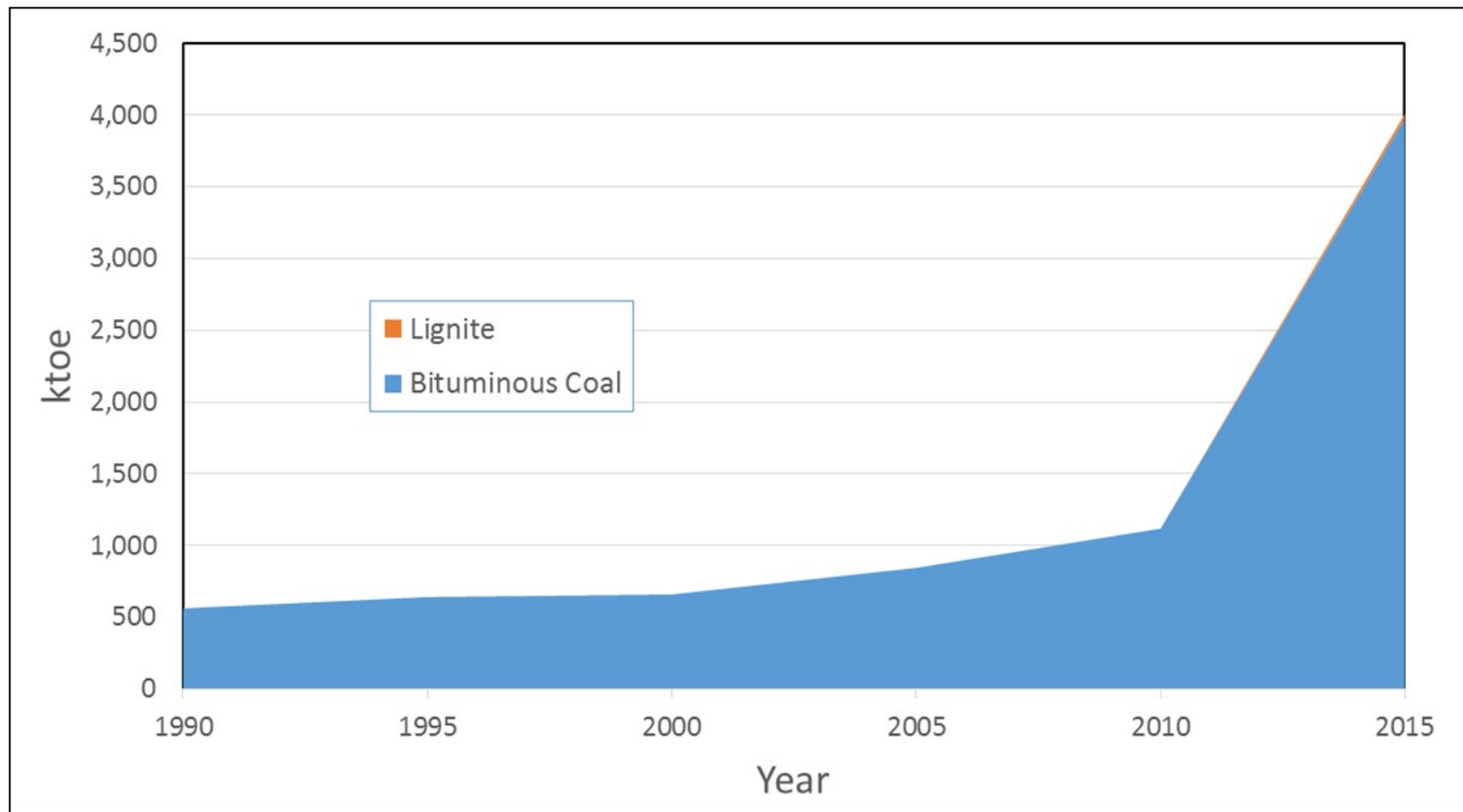
1.2 Energy Scenario of Bangladesh

□ Estimated Coal Resources of Bangladesh

Location/ Field	Year of Discovery	Depth (Meter)	Estimated coal resources (Million Tonnes)
Barapukuria Dinajpur	1985-87	118-509	390
Khalashpir Rangpur	1989-90	257-483	685
Phulbari Dinajpur	1997	150-240	572
Jamalganj, Joypurhat	1962	640-1158	1053
Dighipara, Dinajpur	1994-95	328-407	600
Total:			3300

1.2 Energy Scenario of Bangladesh

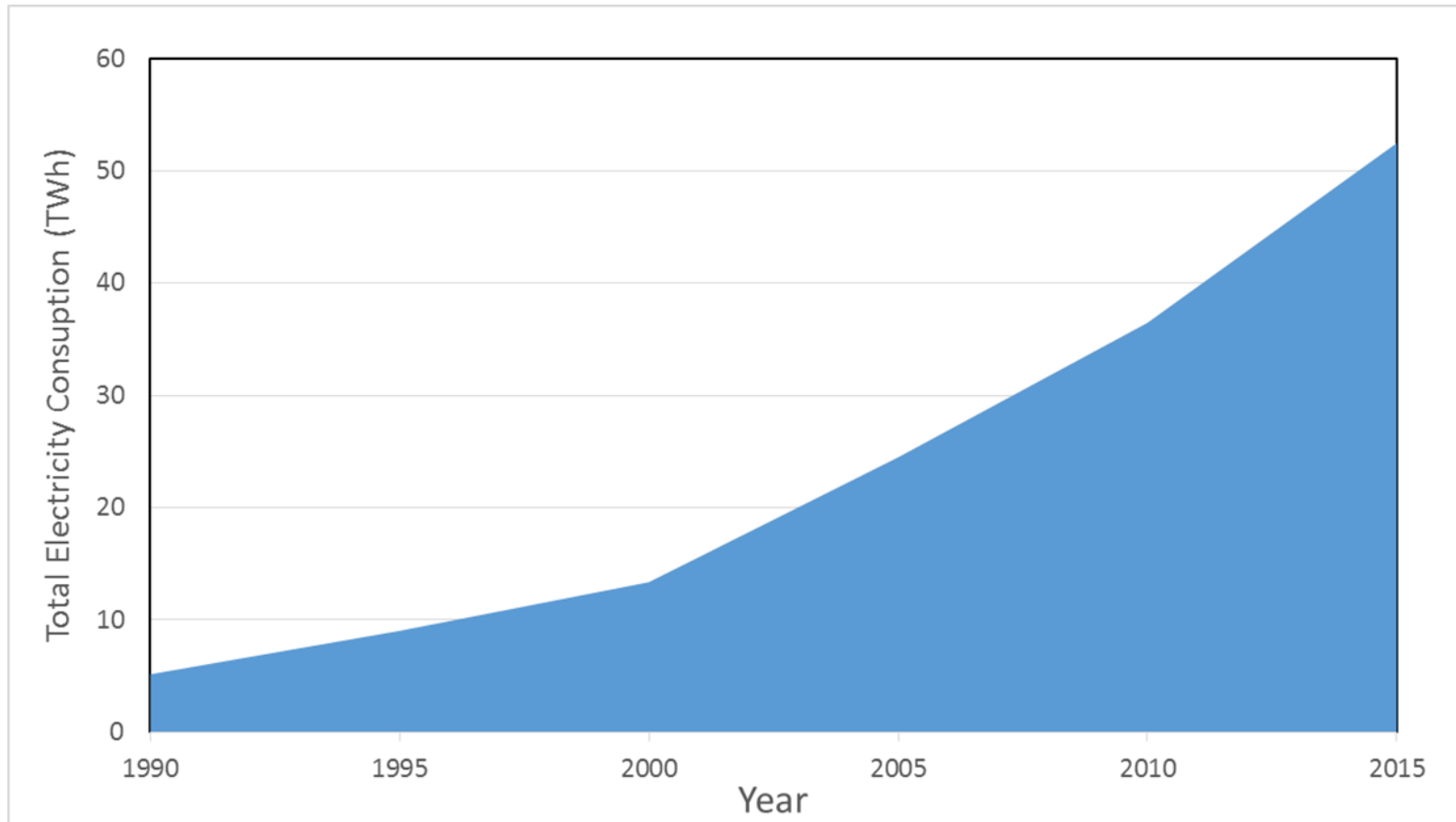
□ Coal Consumption Pattern



<https://www.iea.org/countries/Bangladesh/>

1.2 Energy Scenario of Bangladesh

□ Growth of Electricity in Bangladesh



<https://www.iea.org/countries/Bangladesh/>

1.2 Energy Scenario of Bangladesh

□ History Electricity in Bangladesh

Milestone	Achievements
1901	<ul style="list-style-type: none">➤ Electricity utilization in this region (Bangladesh) started by installing a private generator at the residence of the then Nawab of Dhaka.➤ Mr. Bolton, British citizen, switched on the first electricity in Ahsan Monjil on 7 December 1901.
1930s	<ul style="list-style-type: none">➤ Electricity distribution system under private ownership was begun by DEVCO, a subsidiary of Octttavian Steel Company➤ Dhanmondi power house was setup for commercial distribution of power.

1.2 Energy Scenario of Bangladesh

□ History...

Milestone	Achievements
1947	<ul style="list-style-type: none">➤ The power supply to then 17 provincial districts was within the township in a limited way. The generation voltage was 400 volts. Power used to be supplied to most of the districts during nighttime only.➤ Power generation and distribution systems were owned by private companies.➤ Dhaka City where power used to be supplied by two 1500 kW generators and the generation voltage was 6.6 kV (highest of that time).➤ There was no long distance transmission lines.➤ In aggregate, the generation capacity of the country was 21 MW.

1.2 Energy Scenario of Bangladesh

□ History...

Milestone	Achievements
1948	Electricity Directorate was created in order to plan and improve power supply situation.
1959	Water and Power Development Authority (WAPDA) was created and the power sector really started working satisfactorily.
1960	<ul style="list-style-type: none">➤ Electricity Directorate was merged with WAPDA. The basic philosophy was to give more autonomy to an organization for development of this basic infrastructure.➤ Relatively higher capacity plants were built at Siddhirganj, Chittagong and Khulna (highest plant size was only 10 MW Steam Turbine at Siddirganj).

1.2 Energy Scenario of Bangladesh

□ History...

Milestone	Achievements
1960	<ul style="list-style-type: none">➤ At the same time, Kaptai dam was under construction under Irrigation department. Unit size of Kaptai was 40 MW, which for that time was considered to be a large power plant.➤ Side by side construction of Dhaka-Chittagong 132 KV transmission line was in progress.

1.2 Energy Scenario of Bangladesh

□ History...

Milestone	Achievements
1972	In 1972, Bangladesh Power Development Board (BPDB) was created to boost the power sector.
1977	A different approach and a new model was considered for undertaking a comprehensive scheme. Thus the Government created Rural Electrification Board (REB)
1991	Dhaka Electric Supply Authority (DESA) was created basically to operate and develop distribution system in and around Dhaka (including the metropolitan city) and bring about improvement of customer service, collection of revenue and lessen the administrative burden of BPDB.

Present Structure of Power Sector

➤ Apex Institution

Power Division, Ministry of Power, Energy & Mineral Resources (MPEMR)

➤ Regulator

Bangladesh Energy Regulatory Commission (BERC)

➤ Generation

- Bangladesh Power Development Board (BPDB)
- Ashuganj Power Station Company Ltd. (APSCL)
- Electricity Generation Company of Bangladesh (EGCB)
- North West Power Generation Company Ltd. (NWPGL)
- Independent Power Producers (IPPs)

➤ Transmission

➤ Distribution

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➤ Generation

➤ Transmission

Power Grid Company of Bangladesh

➤ Distribution

- Dhaka Power Distribution Company (DPDC)
- Dhaka Electric Supply Company (DESCO)
- West Zone Power Distribution Company Ltd. (WZPDCL)
- Rural Electrification (REB)

1.2 Energy Scenario of Bangladesh

Installed Capacity of BPDB Power Plants as on October 2018		
Fuel Type	Capacity(Unit)	Total(%)
	280.00 MW	1.65 %
Coal	524.00 MW	3.09 %
Gas	10001.00 MW	58.89 %
HFO	3597.00 MW	21.18 %
HSD	1690.00 MW	9.95 %
Hydro	230.00 MW	1.35 %
Imported	660.00 MW	3.89 %
Total	16982.00 MW	100 %

<http://www.bpdb.gov.bd/bpdb/>

1.2 Energy Scenario of Bangladesh

□ Growth of Electricity Generation

Maximum generation in 2018 : 11387.00 MW as on 18/07/2018

Maximum generation in 2017 : 9507.00 MW as on 18/10/2017

Maximum generation in 2016 : 9036.00 MW as on 30/06/2016

Maximum generation in 2015 : 5791.00 MW as on 29/08/2015

Maximum generation in 2014 : 5754.00 MW as on 13/07/2014

Maximum generation in 2013 : 4711.00 MW as on 12/07/2013

Maximum generation in 2012 : 4737.00 MW as on 01/08/2012

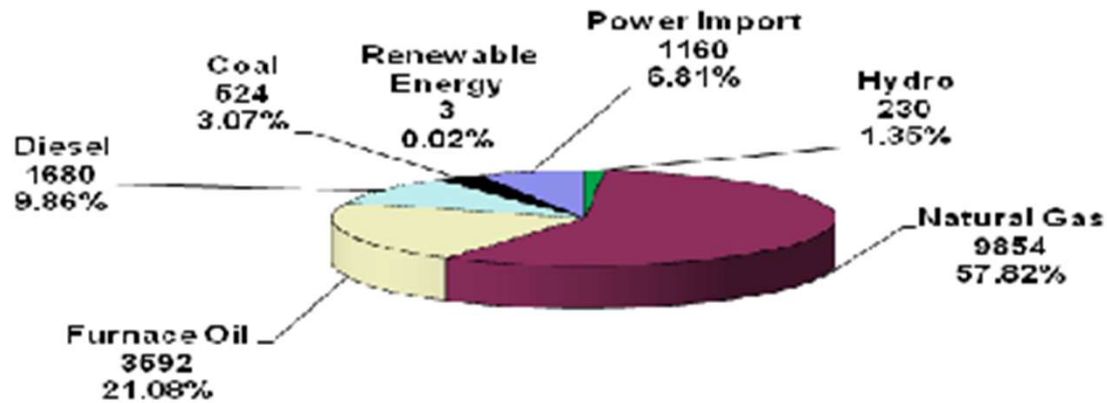
Maximum generation in 2011 : 3825.50 MW as on 21/12/2011

Maximum generation in 2010 : 4698.5 MW as on 20/08/2010

<http://www.bpdb.gov.bd/bpdb/>

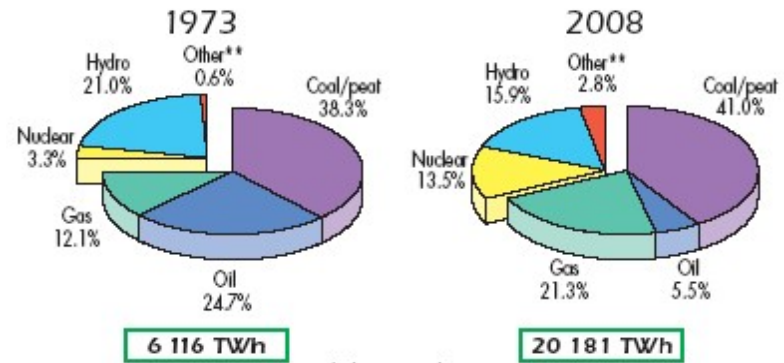
1.2 Energy Scenario of Bangladesh

Installed Capacity as on Sept, 2018
(By Fuel Type)



Total Installed Capacity: 17,043 MW

1973 and 2008 fuel shares of electricity generation*



*Excludes pumped storage.

**Other includes geothermal, solar, wind, combustible renewables and waste, and heat.

Energy Scenario

□ Weekly Summary

- Introduced World's Energy Sources:
 - Types
 - Top producers, exporters & consumers
 - Energy Efficiency & CO₂ Emissions
- Outlined Bangladesh's Energy Scenario
 - Growth of primary fuel supply
 - Shares of final fuel consumption
 - Growth of electricity generation
 - Fuel share of electricity generation

□ Next Class

- Modes of Heat Transfer