

Country Presentation of Nepal



Presented by:

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Ministry of Energy, Water Resources and Irrigation

Nepal





General Information About Nepal



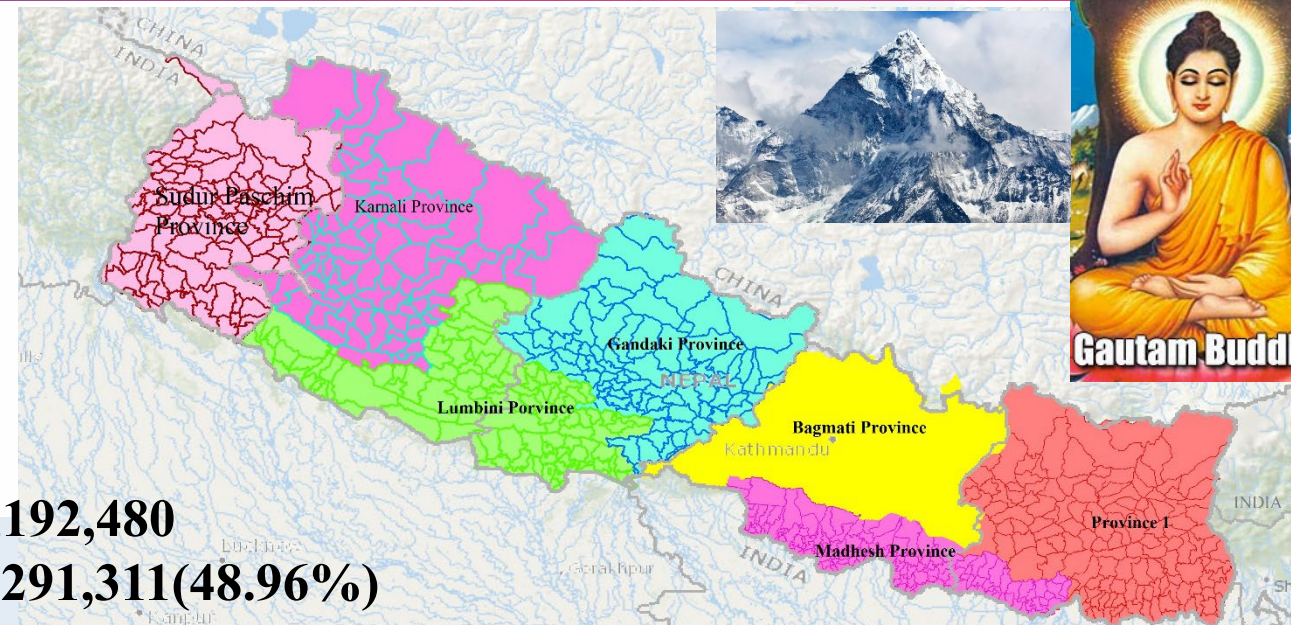
Geographical Location

Latitude : 26⁰22' N to 30⁰ 27'N

Longitude : 80⁰04' E to 88⁰12'

Area Border : North- CHINA East,
West and South- INDIA.

Area:1,47,181 Km²



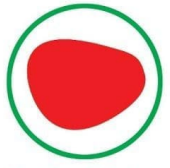
National Emblems



National Flag



National Logo



National Color
Crimson



National Animal
Cow



National Flower
Rhododendron



National Bird
Lophophorus

Total Population: 29,192,480

Male Population: 14,291,311(48.96%)

Female Population:14,901,169(51.04%)

Total Households: 67,61,059

Population Density:198 per Km²

Population Growth rate:0.93%

Gross Domestic Product (GDP):33.66 Billion \$



Nepal is a Federal Democratic Republic State situated in South Asia. It is the land of Mt. Everest, the highest peak of the world and the birth place of Lord Buddha, Lumbini. Nepal occupies 0.03 % and 0.3% land area of the World and the Asia respectively. It has diverse topography and climate. It stretches from east to west with an average length of 885 kilometers and widens from north to south with an average breadth of 193 kilometers.



General Information About Nepal



- **Electricity Access: 93%**
(Grid: 85%; Off-grid: 8%)
- **Consumption: 325 kWh/capita**
- **Installed Capacity: 2204 MW**
- **Peak Demand : 1307 MW**
- **System Loss: 16.93%**
- **Electrical energy import: 49 MWh***
- **Electrical energy export: 2524 MWh***

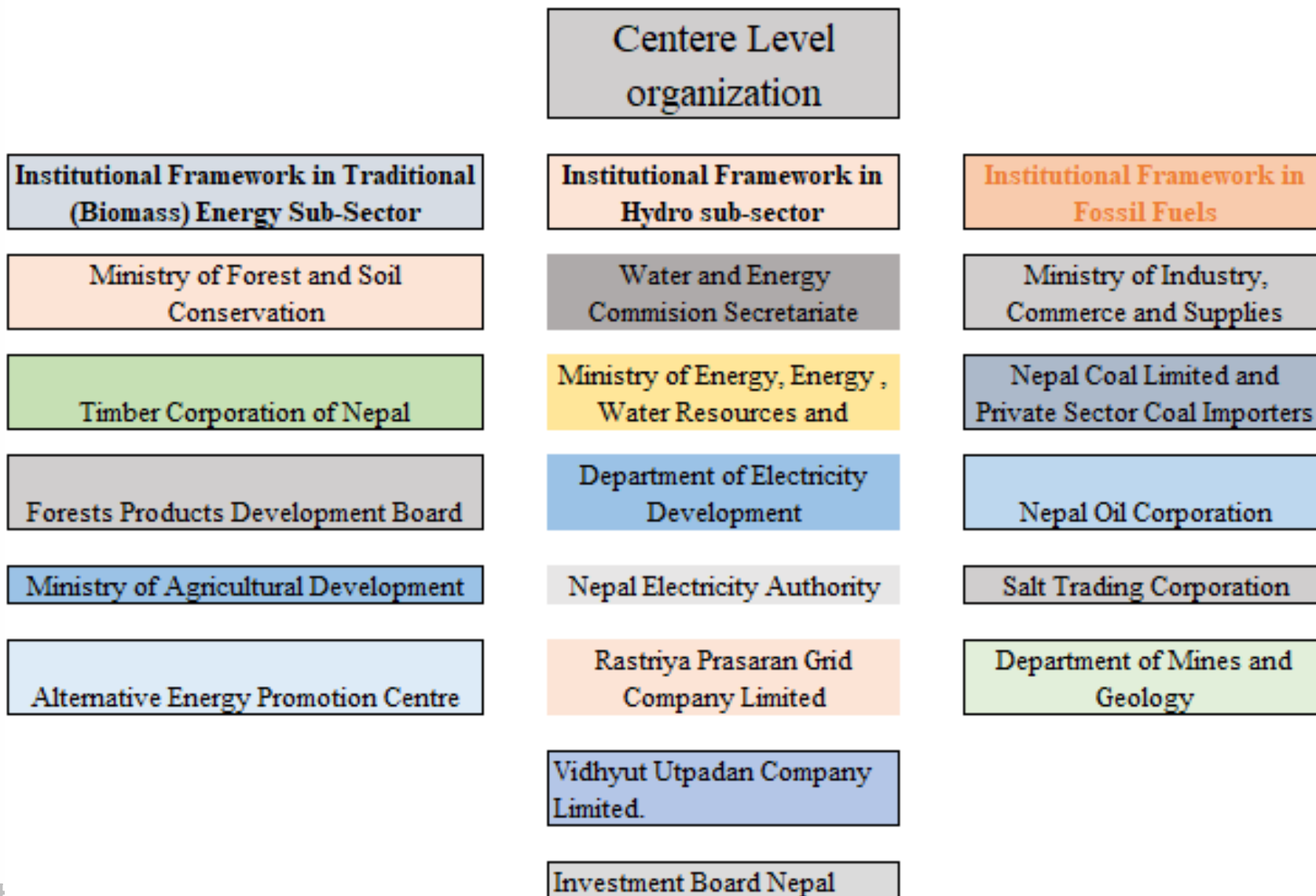
* Source: NEA Website, extraction date 2078/07/02



General Information About Nepal



Organizational Structures related Energy Sector



- There are similar type of Ministry and institution in Seven Province of Nepal and
- 753 Local government also have a office and institution related to energy sector



Reserve of Energy

- **The gross hydropower potential of Nepal is estimated as 72,544 MW. Similarly the Techno economical Hydropower potential is estimated as 32,680 MW.**
- **The solar potential in Nepal is 50,000 terawatt-hours per year, Commercial potential solar PV system in Nepal is estimated to be 2,100MW (UNEP/GEF, 2008)**
- **Wind power: More than 3,000 MW of electricity could be generated at 5 MW per sq km. The commercially viable wind potential of the country is estimated to be only about 448 MW.**
- **Fuel-wood Resources: 1,229.7 Kha. Of land is cover by forest.**
- **Animal Residues: Production Potential of Animal Dung (in '000MT) is 14913 per year**
- **Agriculture residue Total potential supply in 2008/09 was 19 million tons and potential energy supply was 243 million GJ of energy**



Past Energy Demand and supply

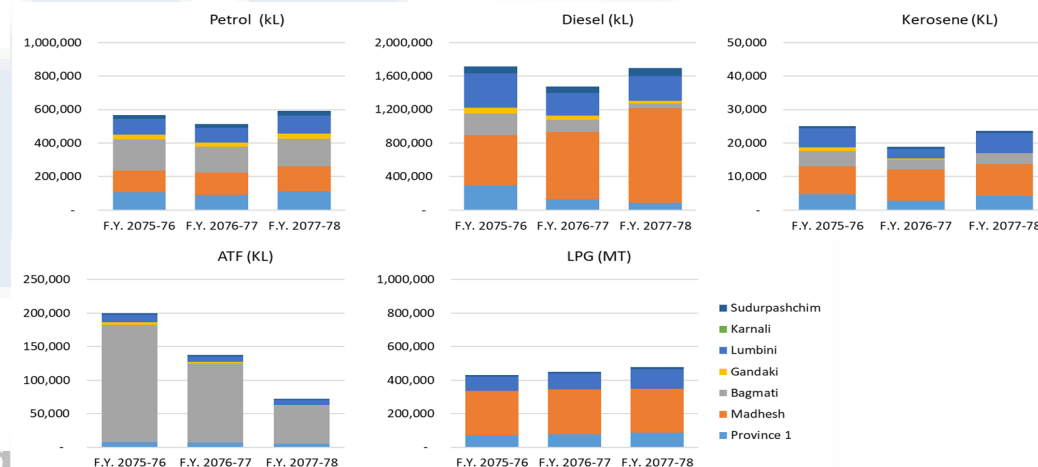


Electricity Demand supply in GWH

Fiscal Year	Domestic	Industrial	Commercial	Export	Others	Total	Loss of electricity	Generation	Generation and Imports	Peak load (MW)	Under exchange agreement	
											Imports	Exports
2011/12	1311.07	1192.06	227.06	50	384.5	3164.69	953.71	3319.03	4119.03	947	800	50
2012/13	1397.46	1141.07	237.91	0	379.56	3156	756	3430.05	4220.19	1094.62	790.14	0
2013/14	1526.84	1246.7	285.16	0	385.56	3444.26	853.83	3610.64	4681.1	1200.98	1070.46	0
2014/15	1688.5	1362.61	302.57	3.17	415.78	3772.62	1194.04	3599.01	4966.67	1291.8	1367.66	3.17
2015/16	1792.95	1205.69	286.48	3.15	430.7	3718.97	1358.21	3294.32	5077.18	1385	1782.86	3.15
2016/17	2150.21	1735.05	352.37	2.69	536.18	4776.5	966.5	3568.02	5743.06	1444.1	2175.04	2.69
2017/18	2403.63	2074.16	407.59	2.83	637.91	5526.12	1531.81	4476.13	7057.93	1508.16	2581.8	2.83
2018/19	1731.34	1553.9	301.5	1.84	474.74	4063.62	929.8	3158.55	4993.42	1307.16	1834.87	1.84
2019/20	2867	2286	488	107	781	6529	1212	6012	7741	1408	1729	107
2020/21*	2119.38	1765.17	338.43	33.85	522.81	4779.64	1022.85	4313.55	5802.49	1484	1488.94	33.85

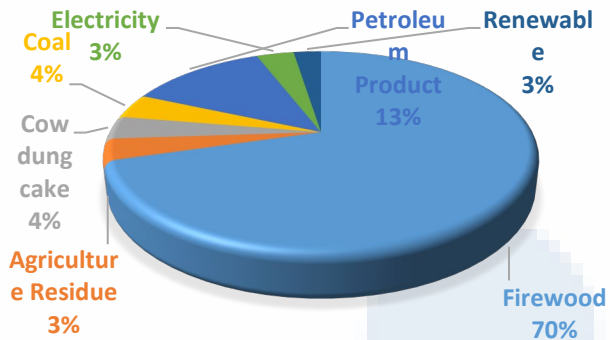
Coal demand and supply in MT

tons	2019	2020	2021
Own Production	-	7,250	10,948
Imports	1,881,635	1,479,183	2,001,611
Total	1,881,635	1,486,433	2,012,559



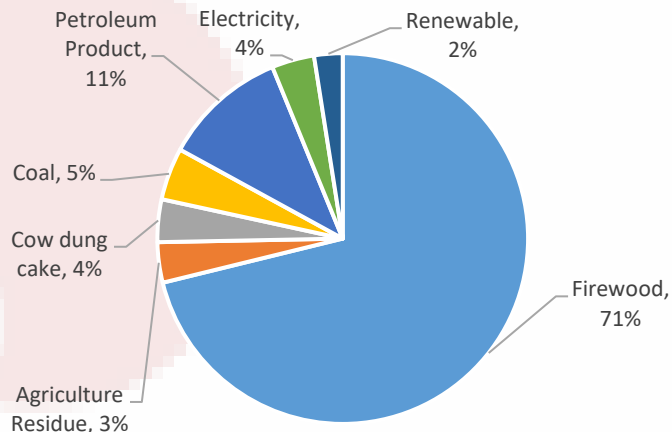


Energy consumption by Fuel type



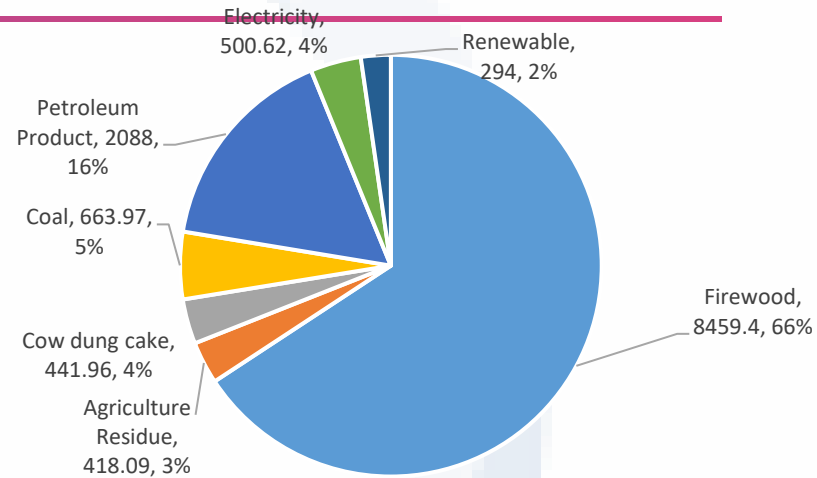
2014/15

Total Energy consumption :11727.56 Ktoe



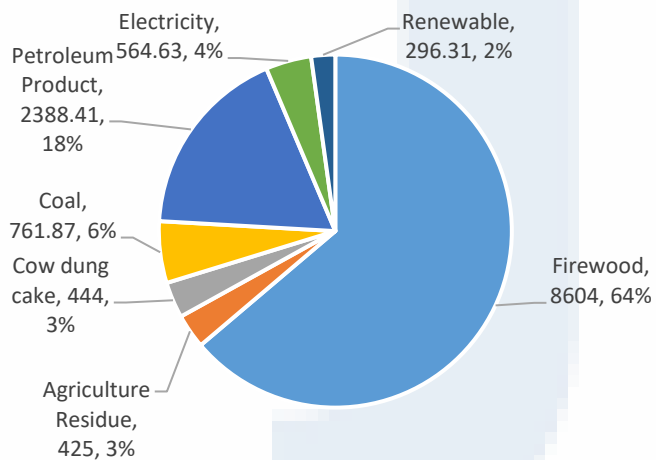
2015/16

Total Energy consumption :11767.69 Ktoe



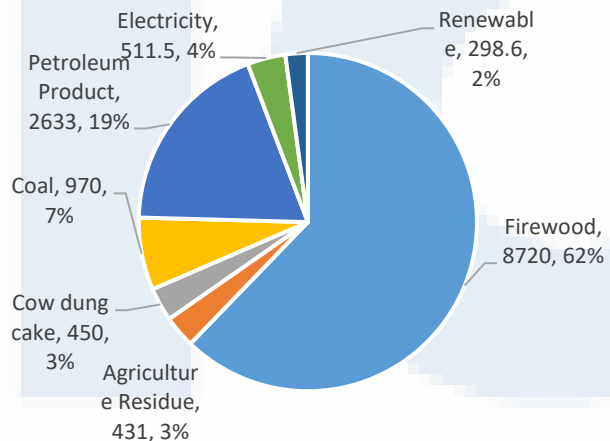
2016/17

Total Energy consumption :12866.04 Ktoe



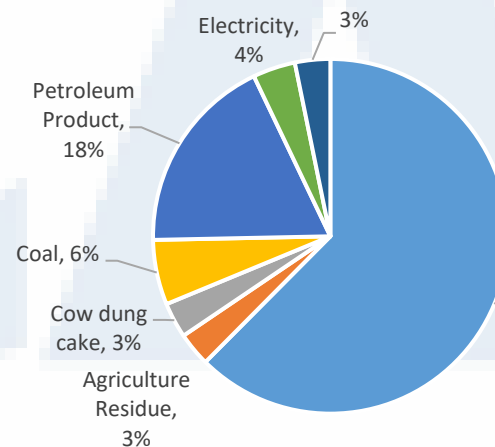
2017/18

Total Energy consumption :13483.9 Ktoe



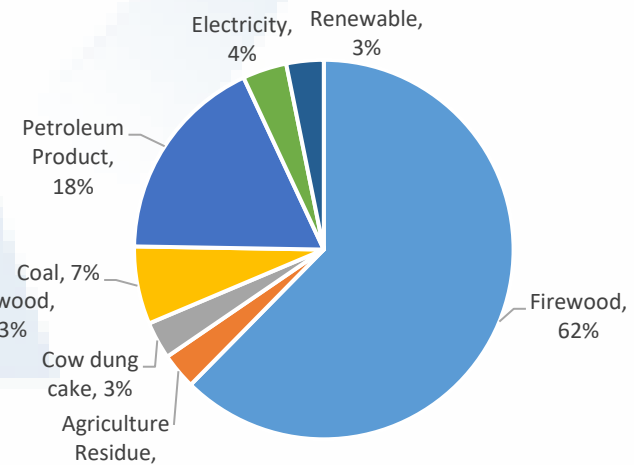
2018/19

consumption :14014.13



2019/20

consumption :9310.48 Ktoe



2020/21 by mid march

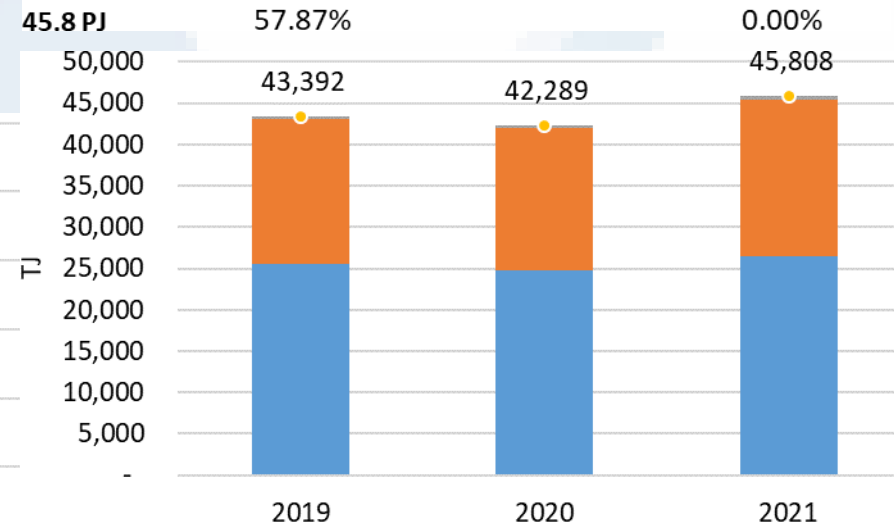
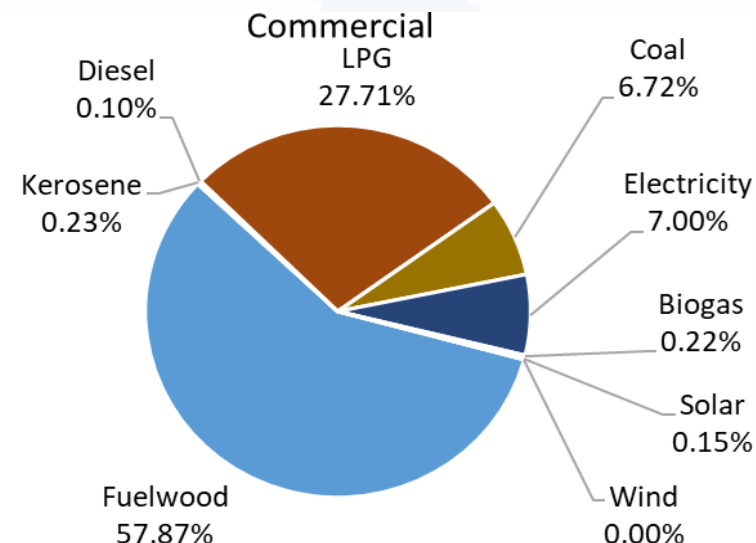
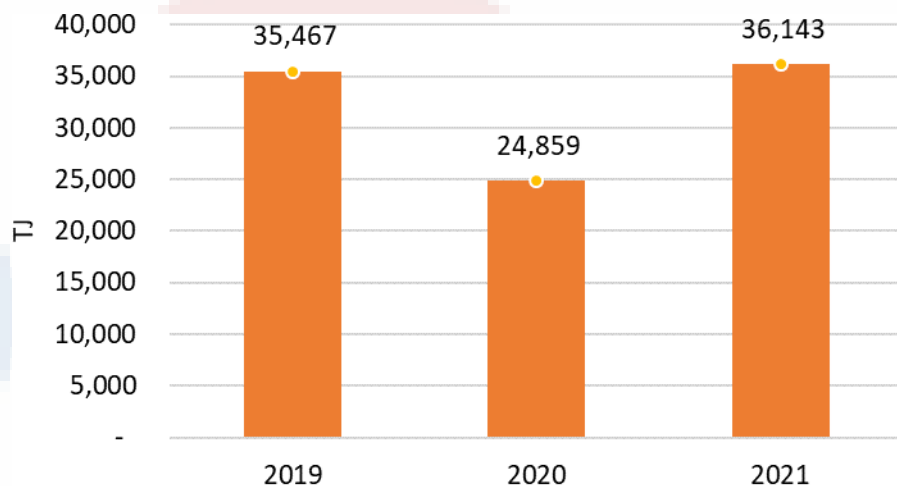
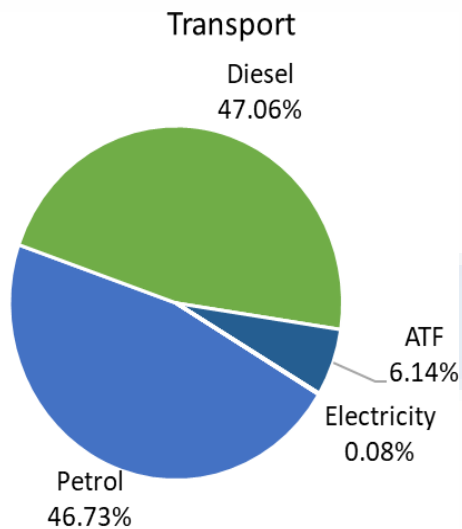
Energy consumption :9597.22Kt

Source: MoF, economic survey 2021



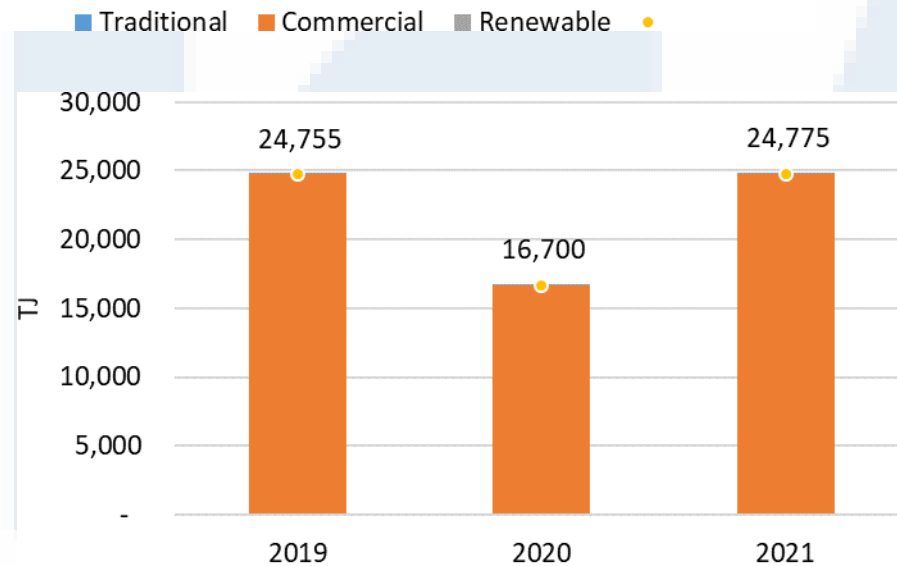
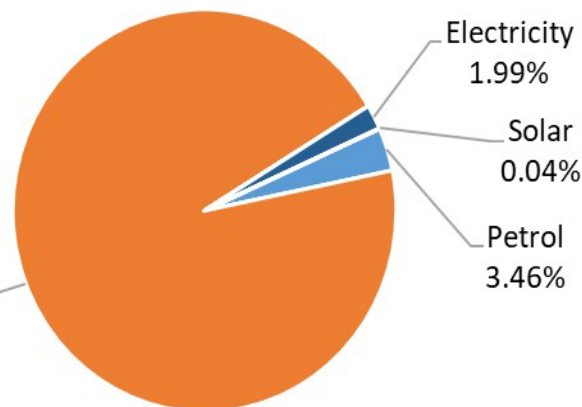
Energy consumption by Sector

1 peta jule = 23.9 ktoe



6.1 PJ

Agriculture



24.8 PJ

Traditional Commercial Renewable

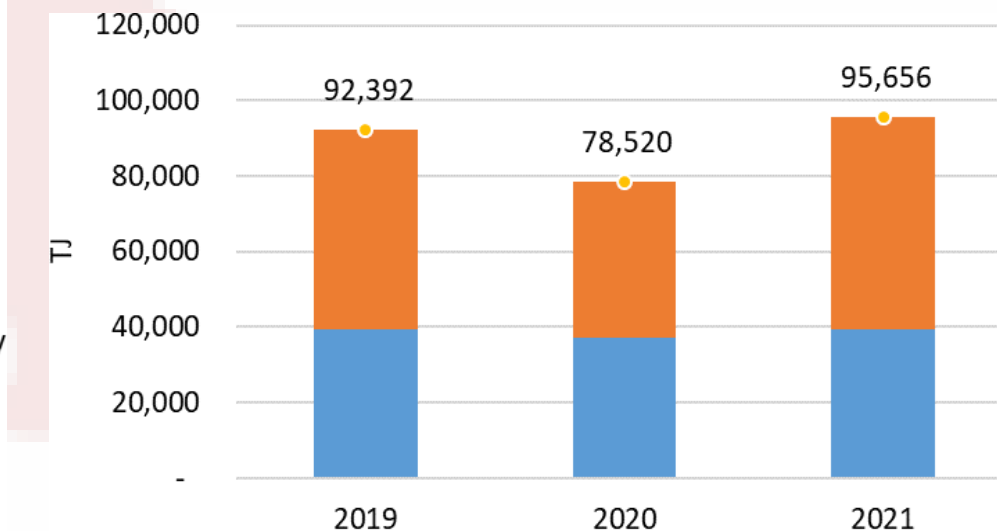
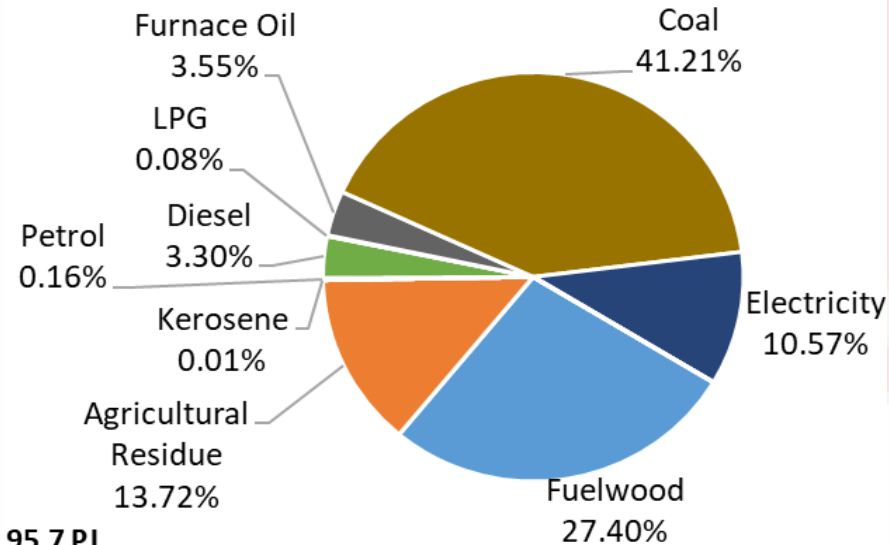
Traditional Commercial Renewable



Energy consumption by Sector

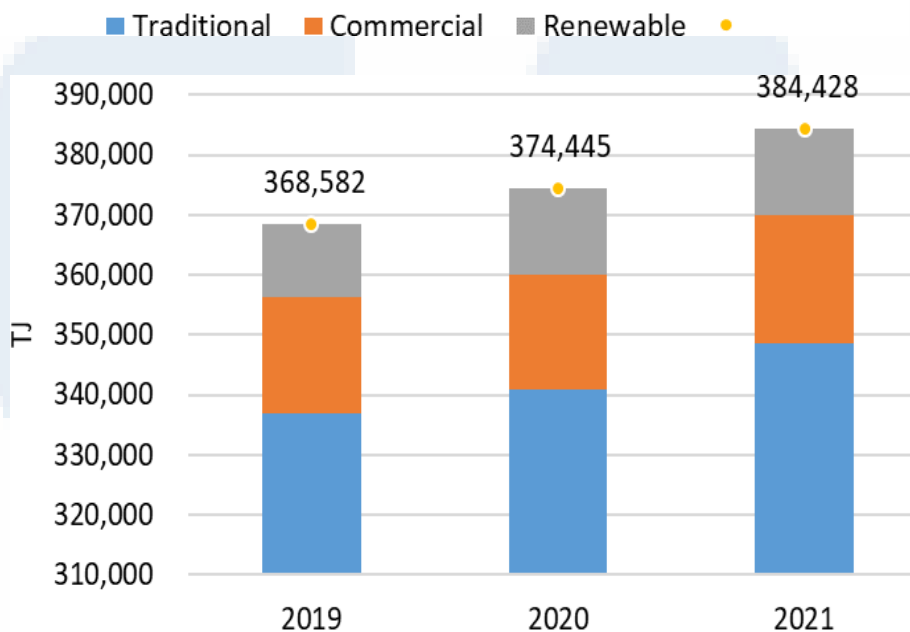
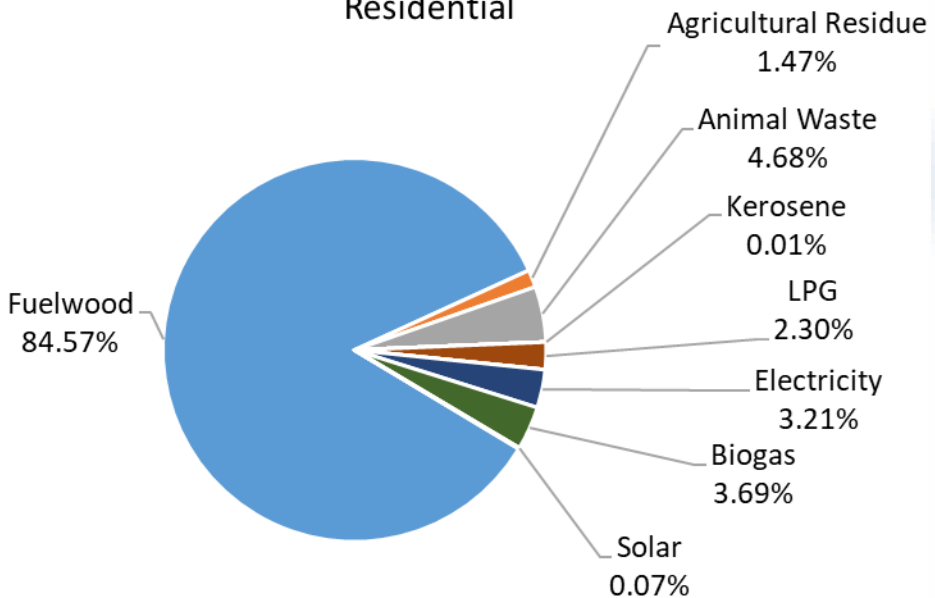


Industry



1 peta jule = 23.9 ktoe

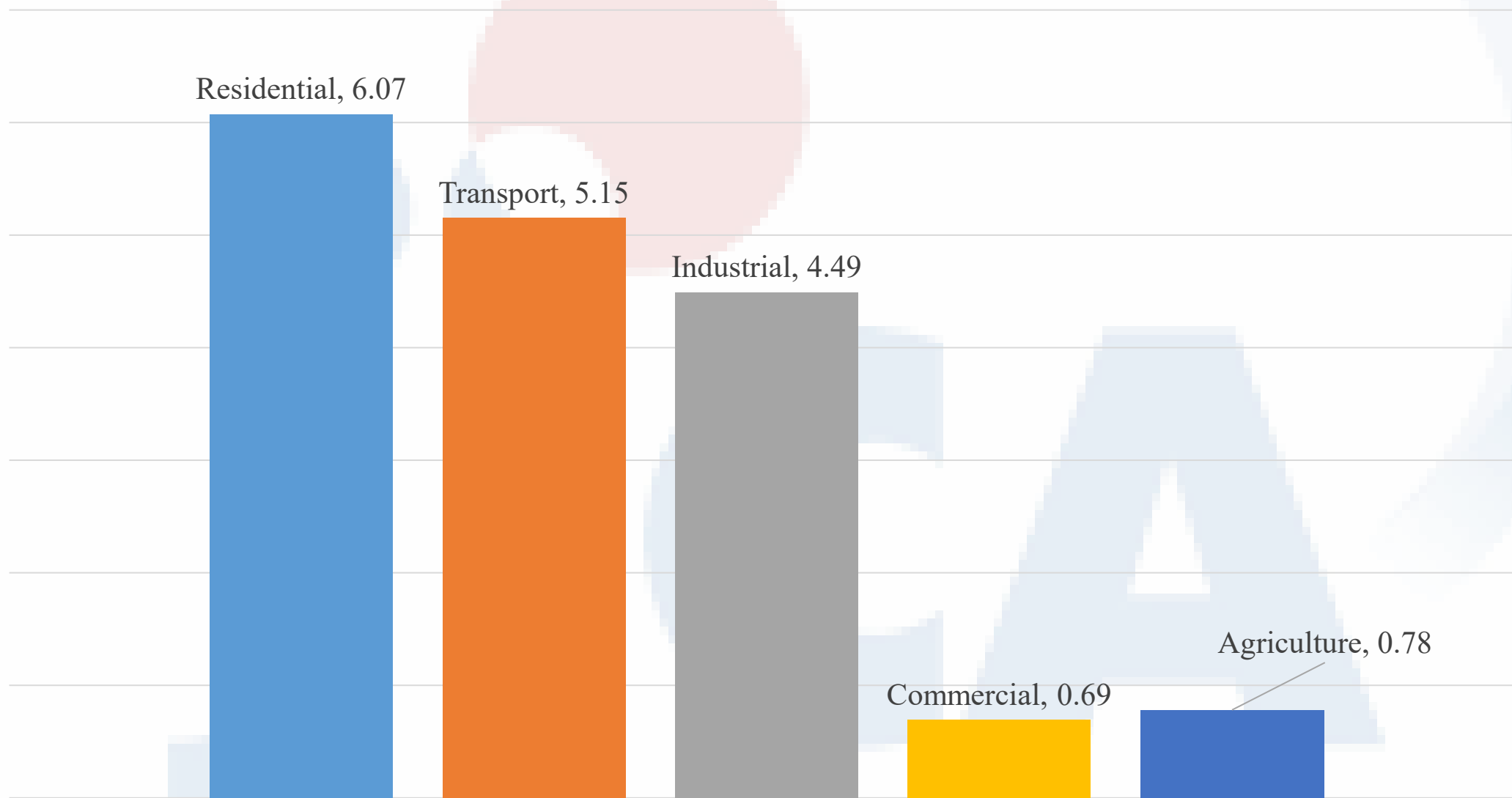
Residential



Traditional Commercial Renewable



Co2 emission by energy sector in 2019(Mt Co2)





Out Look of Energy Demand and supply

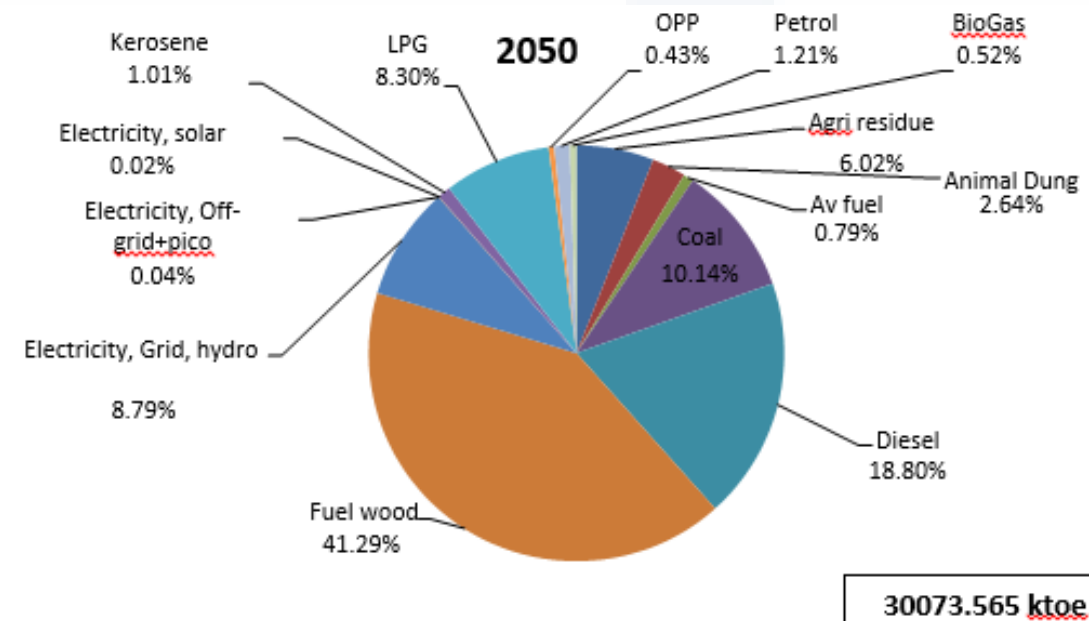


Primary Energy supply by sources

Energy supply by Source at Medium Economic growth rate Scenario

Total Energy consumption in Ktoe

Fuel	2025	2030	2040	2050
Agri residue	487.3650521	621.4053693	946.0208274	1811.455049
Animal Dung	646.1975733	678.8000382	743.4556224	794.1626063
Av fuel	155.4170249	178.7761536	205.4552403	236.0991688
Coal	592.0512086	783.4623101	1446.259673	3048.60514
Diesel	1025.054935	1379.311168	2635.210662	5655.273717
Fuel wood	8967.875227	9609.869112	10870.06783	12418.64909
Electricity, Grid, hydro	583.4288717	837.0832139	1406.324639	2644.000191
Electricity, Off-grid+pico	11.29741091	10.91525748	11.29741091	10.89137289
Electricity, solar	1.719690456	2.054074711	4.418649088	5.827839878
Kerosene	74.23330467	107.623961	171.3002771	304.480749
LPG	479.9369447	780.1901213	1333.763256	2497.038311
OPP	43.4460686	53.16709659	75.52307251	128.5707462
Petrol	163.5139008	191.8171396	263.9963695	363.3323779
BioGas	91.47797841	102.3454667	128.9051304	155.1542944
Total	13322.92	15336.844	20241.999	30073.565





Out Look of Energy Demand and supply



	Sectorial Energy Consumption (TJ)									Av. Annual growth
	Year									
	2010	2015	2020	2025	2030	2035	2040	2045	2050	
Agriculture	3,056	3,465	4,049	4,810	5,766	7,175	8,984	11,590	15,398	4.13%
Commercial	5,535	9,041	15,640	27,635	49,440	65,696	88,497	123,422	176,574	9.04%
Industrial	20,121	25,454	34,714	51,263	73,815	99,250	136,507	196,602	291,892	6.92%
Residential	357,238	378,477	400,470	423,136	446,367	470,019	493,904	517,786	531,780	1.00%
Transport	21,946	30,373	39,011	50,960	66,734	88,184	119,600	167,533	243,475	6.20%
Total	407,895	446,810	493,885	557,804	642,123	730,324	847,492	1,016,933	1,259,120	2.86%

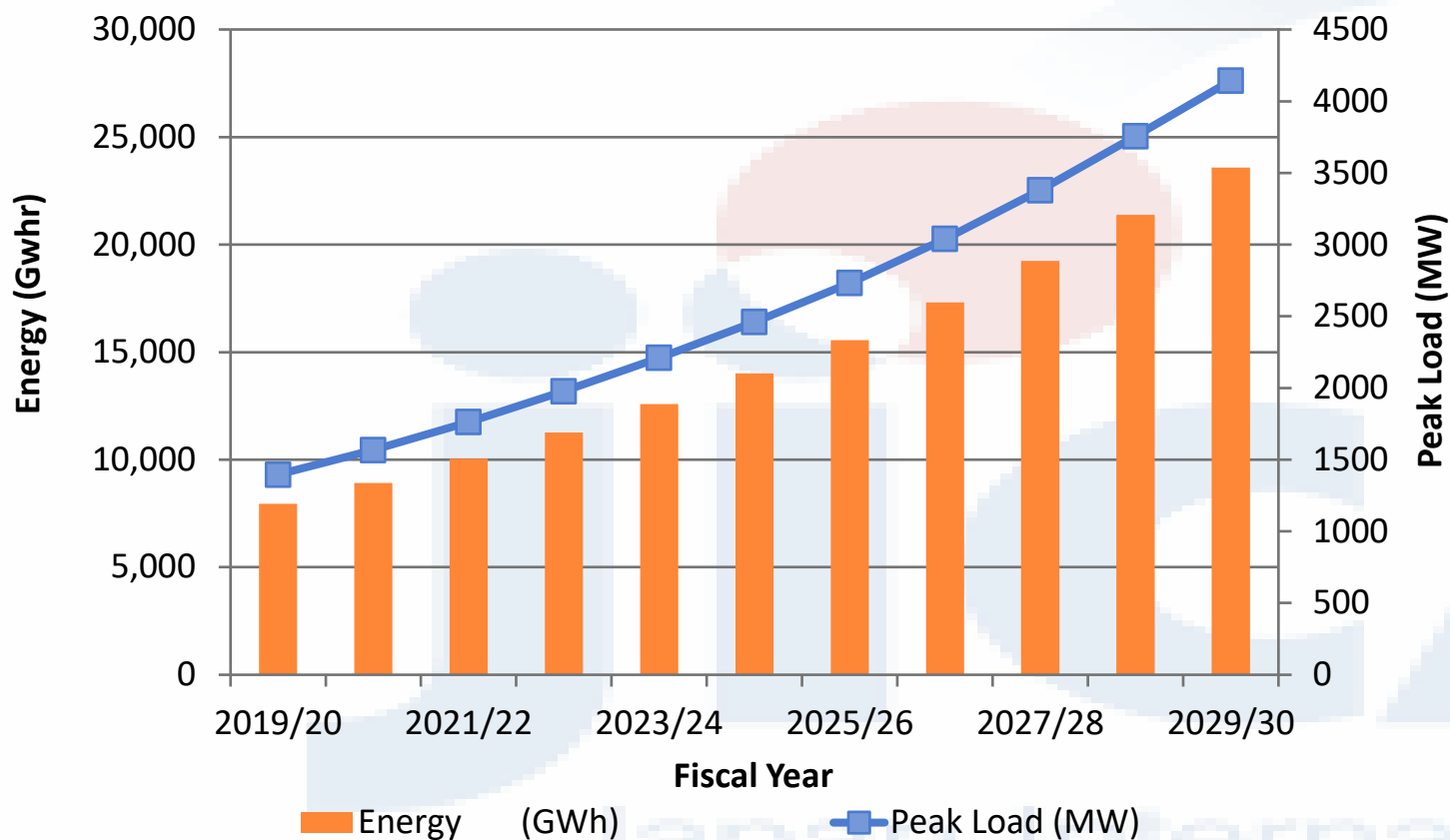
Power Plant Capacity									
	2010	2015	2020	2025	2030	2035	2040	2045	2050
Capacity (MW)	1,258	1,473	1,914	2,736	3,912	4,796	5,996	7,957	11,005
Electricity consumption per capita, kWh/capita	104	115	145	207	277	334	405	513	662



Out Look of Energy Demand and supply



PEAK LOAD AND ENERGY FORECAST



S.N.	Fiscal Years	Energy (GWh)	Peak Load (MW)
1	2019/20	7,946	1,396
2	2020/21	8,921	1,567
3	2021/22	10,038	1,763
4	2022/23	11,258	1,977
5	2023/24	12,584	2,210
6	2024/25	14,007	2,460
7	2025/26	15,557	2,732
8	2026/27	17,306	3,039
9	2027/28	19,242	3,379
10	2028/29	21,387	3,756
11	2029/30	23,590	4,143

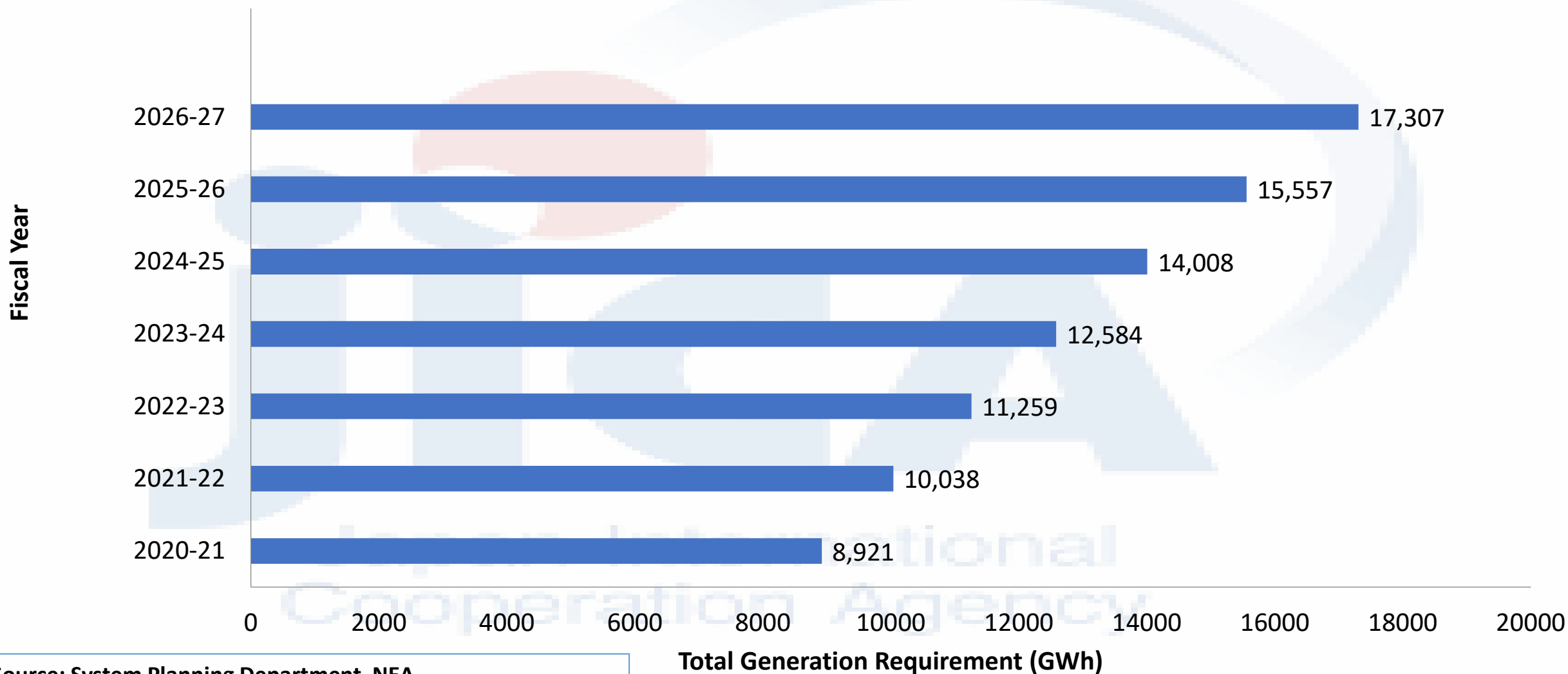
Japan International Cooperation Agency



Out Look of Energy Demand and supply



GENERATION REQUIREMENT FORECAST (WASP-III SIMULATION)

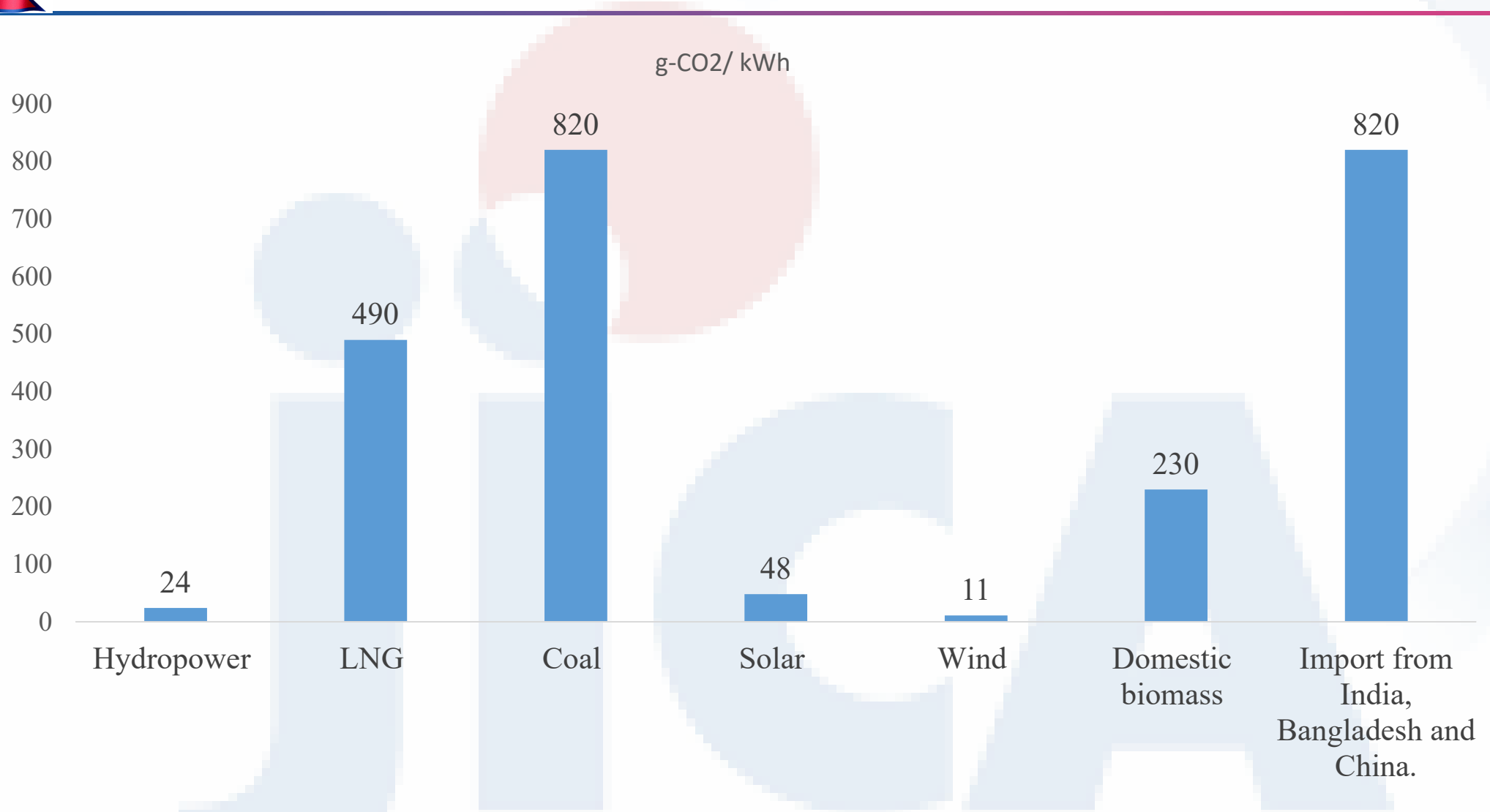


Source: System Planning Department, NEA

Total Generation Requirement (GWh)



Co2 emission calculation





- Periodic Development Plans
 - 15th Five Year Plan (2019/20 to 2023/24)**
 - Key energy sector targets: 5,000 MW installed capacity
 - 100% electrification coverage
 - 700 kWh per capita electricity consumption
 - 12% share of RE in overall energy consumption
- Hydropower Development Policies 1992 and 2001, Water Resources Act 1992 and Electricity Act 1992
- Water Resources Strategy 2002 and National Water Plan 2005
- National Electricity Crisis Resolution Action Plan 2008
- Procedures for PPA for Projects up to 25 MW (2065 BS)
- Local Self-Governance Act, 1999 (2055 BS)
- Rural Energy Policy 2006
- Forest Sector policies and Forest Act, 1992
- Petroleum, Coal and Natural Gas Sub-sector Policies
- National Transport Policy 2001



Current Energy Policy

- MoEWRI White Paper (2018):
 - ❖ Power generation of 5,000 MW
 - ❖ Power generation of 10,000 MW for domestic purpose and 5,000 MW for Export by 2028
 - ❖ 100 per cent of the population will have access to electricity
 - ❖ Increase Per capita energy consumption to 1500 kWh by 2028 kWh
 - ❖ One mega hydro/solar project in each Province with the slogan “One Province One Mega Project”.
 - ❖ Generate at least 200 MW from Solar by developing the system, required in the range of 100 to 500 kW in the all 753 local government units.



- Nepal SDGs Status & Roadmap (2016-2030)
 - Universal access to affordable, reliable and modern energy for all:
 - ❖ 99% electricity access,
 - ❖ Reduce dependency on firewood as cooking fuel to 30%,
 - ❖ Limit the use of LPG to <40%,
 - ❖ 15,000 MW installed capacity,
 - ❖ 1,500 kWh per capita electricity consumption



- Second NDC (2020):
 - Aim: to achieve net-zero green house gas emission by 2050
 - Mitigation sectors: Energy, Industrial Processes & Product Use (IPPU), Agriculture, Forestry & Other Landuse (AFOLU) & Waste
 - Energy:
 - ❖ Energy generation
 - ❑ By 2030, expand clean energy generation to 15,000 MW, of which 5-10 % will be generated from mini and micro-hydro power, solar, wind and bioenergy.
 - ❑ By 2030, ensure 15% of the total energy demand is supplied from clean energy sources.



Difficulties

- Lack of a Coordinated Approach for Development and Management of Energy Sector
- Absence of an organization for planning and coordination in the center
- Policy Making Lacks Effective Participation of Stakeholders
- Lack of Data and Reliable Information
- Lack of Clear Policy on the Use of Biomass
- Inconsistency between Policy and Law

Bottleneck

- Lack of urban planning
- Lack of energy reliability and security
- Energy sector reform, restructuring and governance



Subject like to learn from this Program

- Make a Effective Policy related various Energy sector
- Annalise the Available data to formulate the Policy
- Use the different tool (software, raw data etc.) use for formulate the policy
- Assist in Developing Energy Data base
- Energy Commodity balance
- How Collect Data annually whose energy consumption pattern is similar to our country





PPA Rate for RoR Hyrdro-electricity

Option	Season	Rate Rs/KWh (upto 100 MW project)	Min. Dry season Energy required
1 (Dry and wet season 6 months each)	Wet(Jestha 16 - Mangsir 15)	4.80	30 %
	Dry (Mangsir 16- Jestha 15)	8.40	
2 (Dry and wet season months 4 and 8 respectively)	Wet (Baisakh- Mangsir)	4.80	15 %
	Dry (Poush- Chaitra)	8.40	

PPA Rate for PRoR Hyrdro-electricity

Season	Time of Day	Daily hours required to generate at rated capacity	Rate Rs./KWh	Min. Dry season Energy required
Dry (Mangsir16- Jestha 15)	Peak hours	1 hr to less than 2 hrs	8.50	30 %
		2 hrs to less than 3 hrs	8.80	
		3 hrs to less than 4 hrs	9.40	
		4 hrs to 6 hrs	10.55	
	Non-peak hours	8.40		
Wet (Jestha 16- Mangsir 15)	All hours		4.80	

PPA Rate for Storage Hyrdro-electricity

Season	Rate Rs/KWh	Min. Dry season Energy required
Dry (Mangsir 16- Jestha 15)	12.40	35 %
Wet (Jestha 16- Mangsir 15)	7.10 (If wet season energy is more than 50%, this rate shall be decreased by the excess%)	



Domestic single Phase Consumer tariff

kWh (Monthly)	5 Ampere		15 Ampere		30 Ampere		60 Ampere	
	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)
0-10	30.00	0.00	50.00	4.00	75.00	5.00	125.00	6.00
11-20	30.00	3.00	50.00	4.00	75.00	5.00	125.00	6.00
21-30	50.00	6.50	75.00	6.50	100.00	6.50	125.00	6.50
31-50	50.00	8.00	75.00	8.00	100.00	8.00	125.00	8.00
51-100	75.00	9.50	100.00	9.50	125.00	9.50	150.00	9.50
101-150	100.00	9.50	125.00	9.50	150.00	9.50	200.00	9.50
151-250	125.00	10.00	150.00	10.00	175.00	10.00	200.00	10.00
251-400	150.00	11.00	175.00	11.00	200.00	11.00	250.00	11.00
Above 400	175.00	12.00	200.00	12.00	225.00	12.00	275.00	12.00

Domestic single Phase Consumer tariff

kWh (Monthly)	Up to 10 KVA		Above 10 KVA	
	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)
Up to 400	1100.00	11.50	1800.00	11.50
Above 400		12.00		12.00

1.3 Three phase Medium Voltage (33/11 kV)

kWh (Monthly)	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)
Up to 1000	10,000.00	11.00
Above 1001		12.00

4. Community Wholesale Consumer:

Consumer Category	Energy Charge (Nrs/kWh)
1. Medium Voltage (11KV/33KV)	
Upto (N* x 20) units	3.00
Above (N* x 20) units	6.00
2. Lower Voltage Level (230/400 Volt)	
Upto (N* x 20) units	3.00
Above (N* x 20) units	6.25

N* = Total Number of Consumers of a Community Group

Petroleum Product price per litre

Petrol	Diesel	Kerosene	LPG	ATF (DP)	ATF (DF)
178.00	165.00	165.00	1800.00	166.00	1545.00



2. Other Consumers

2.1 Low Voltage (230/400 V)

Consumer Category	Demand Charge	Energy Charge
	(Nrs. per kVA/ month)	Nrs/kWh
1. Industrial		
a) Rural and Domestic	60.00	7.80
b) Small Industry	110.00	9.60
2. Commercial	325.00	11.20
3. Non-Commercial	215.00	12.00
4. Irrigation	-	4.30
5. Water Supply		
a) Community Water Supply	-	4.20
b) Other Water Supply	160.00	7.20
6. Transportation		
a) Charging Station	200.00	5.75
b) Other Transportation	220.00	8.90
7. Religious place	-	6.10
8. Street Light		
a) Metered		7.30
b) Non-Metered	2475.00	-
9. Temporary Connection	-	19.80
10. Non-Domestic	350.00	13.00
11. Entertainment Business	350.00	14.00

2.2 High Voltage

3. Time of Day (ToD) Tariff Rate

3.1 Tariff Rate from Balshakh to Mangsir

Consumer Category	Demand Charge Nrs. per KVA/ month	Energy Charge Nrs/kWh		
		Peak Time (17.00-23.00)	Off Peak Time (23.00-5.00)	Normal time (5.00-17.00)
A. High Voltage				
1. Industrial (132 kV)	230.00	10.00	4.65	8.20
2. Industrial (66 kV)	240.00	10.10	4.75	8.30
B. Medium Voltage (33 KV)				
1. Industrial	250.00	10.20	5.25	8.40
2. Commercial	315.00	12.30	6.75	10.80
3. Non-Commercial	240.00	13.20	7.00	12.00
4. Irrigation	-	6.30	3.15	4.70
5. Water Supply				
a) Community Water Supply	-	6.20	3.10	4.60
b) Other Water Supply	150.00	10.20	5.25	8.40
6. Transportation				
a) Charging Station	230.00	7.00	3.70	5.50
b) Other Transportation	255.00	9.35	3.70	8.40
7. Street Light	80.00	8.40	3.50	4.20

Thank You!!!

