# Energy Security and Strategy

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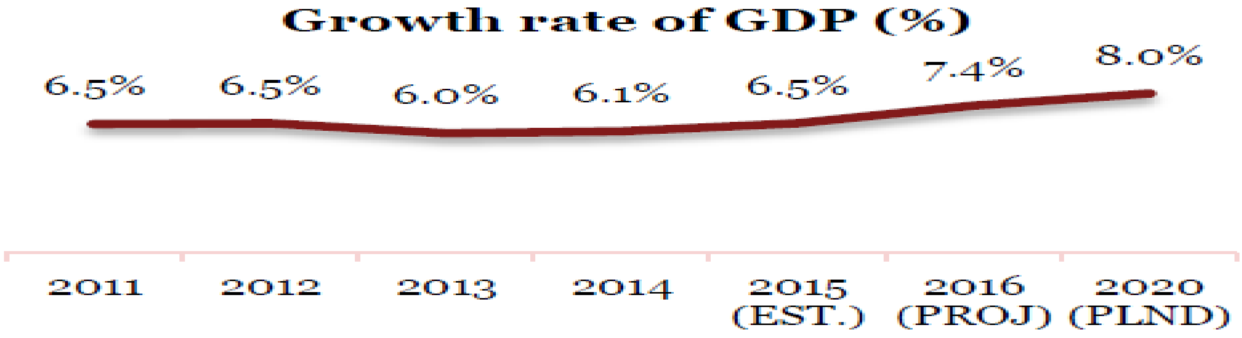
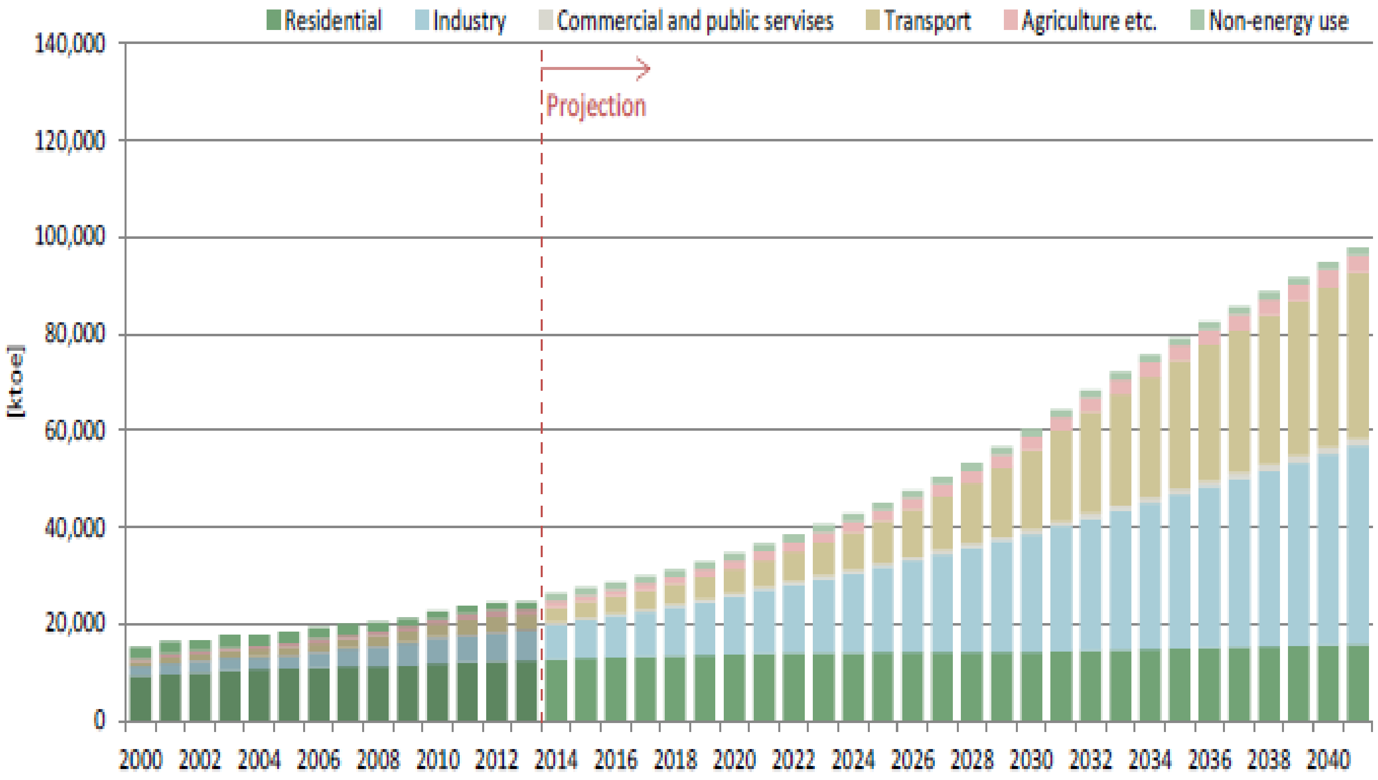
BIDS CRITICAL CONVERSATIONS | 2017

# Introduction

- Bangladesh economy has grown at a rate of 6.4 percent in the last five years and expected to expand in the coming years as envisaged in the SFYP
- Growth acceleration efforts witnessed rising electricity demand by 8-9 percent in the same period
- Energy demand and consumption is due to increase with expansion of economic activities




Source: Seventh Five Year Plan

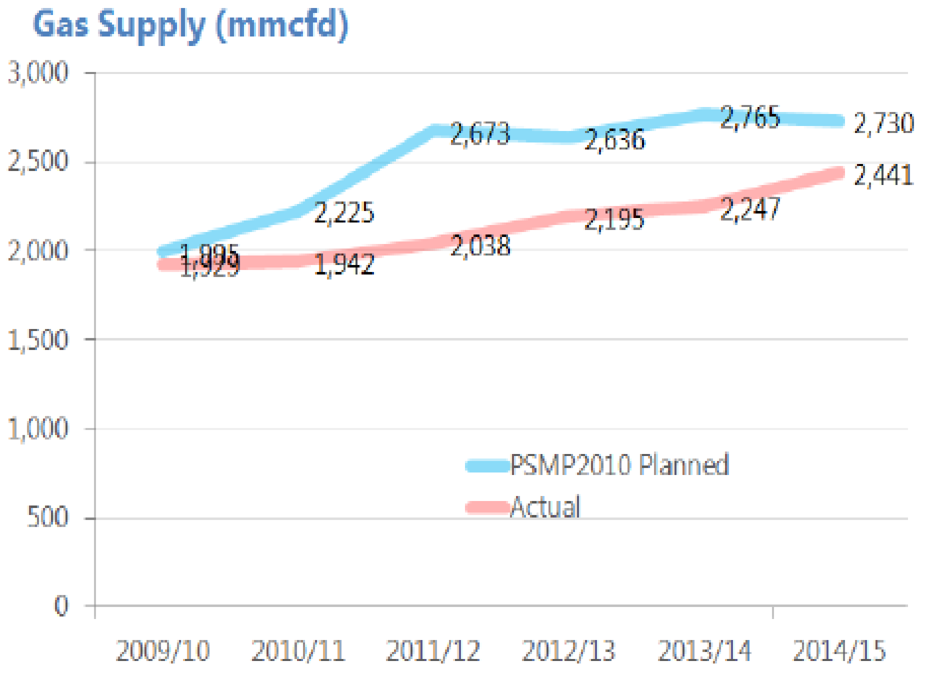



Source: JICA Survey Team

Figure: Projection of Energy Consumption Scenario( BAU), PSPM 2016

# Rationale for Energy Security

- Natural gas dependence – 75% of total primary energy consumption
- Domestic gas production could not match gas demand of growing economy
  - Gas demand increased with expansion of economy and development
  - 5% growth in gas production last decade
  - Natural gas consumption has grown 6% over last 10 years
- With inadequate gas supply and expanding economy- the composition of demand will change in the longer term

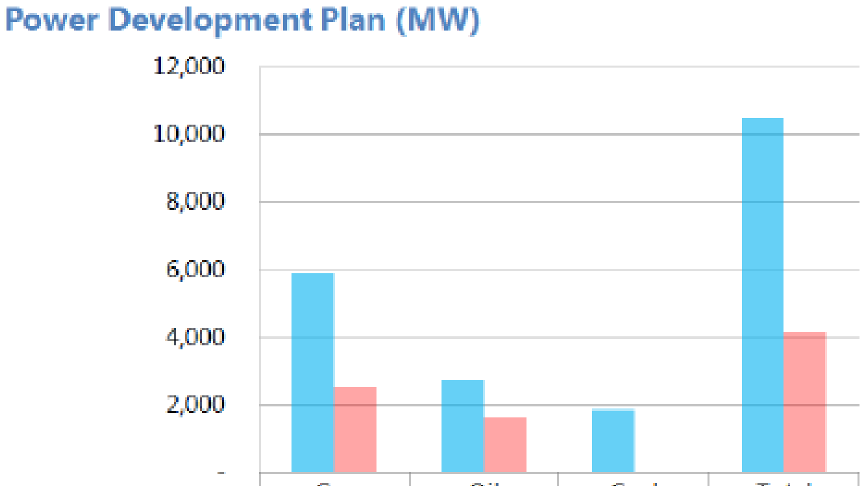



Source: JICA Survey Team, based on the HCU and Petrobangla data

**Figure 1-5 PSMP2010 Review (Gas Supply)**

# Rationale for Energy Security

- Although percentage share of gas based generation capacity of power has reduced from 85% in 2005 to 62 % in 2014, it still remains vital as fuel
- The current installed capacity of gas based power plants is 7628 MW of which 2300 MW was added in the last five years and 4031 MW was planned in next five years.
- Industrial growth is set to increase in coming years
  - The current reserve of 14.09 TCF not adequate to meet the growing energy demand in the longer run
  - Already some part of power generation capacity remain stranded- widening demand supply gap
    - 800-1000 MW of generation capacity shut down in 2015
    - Economic loss amounting to 1.7 % of GDP in 2014 for power outage
    - Rise in use of Furness oil and diesel – increase cost of generation as well as subsidy burden
  - Energy mix diversification

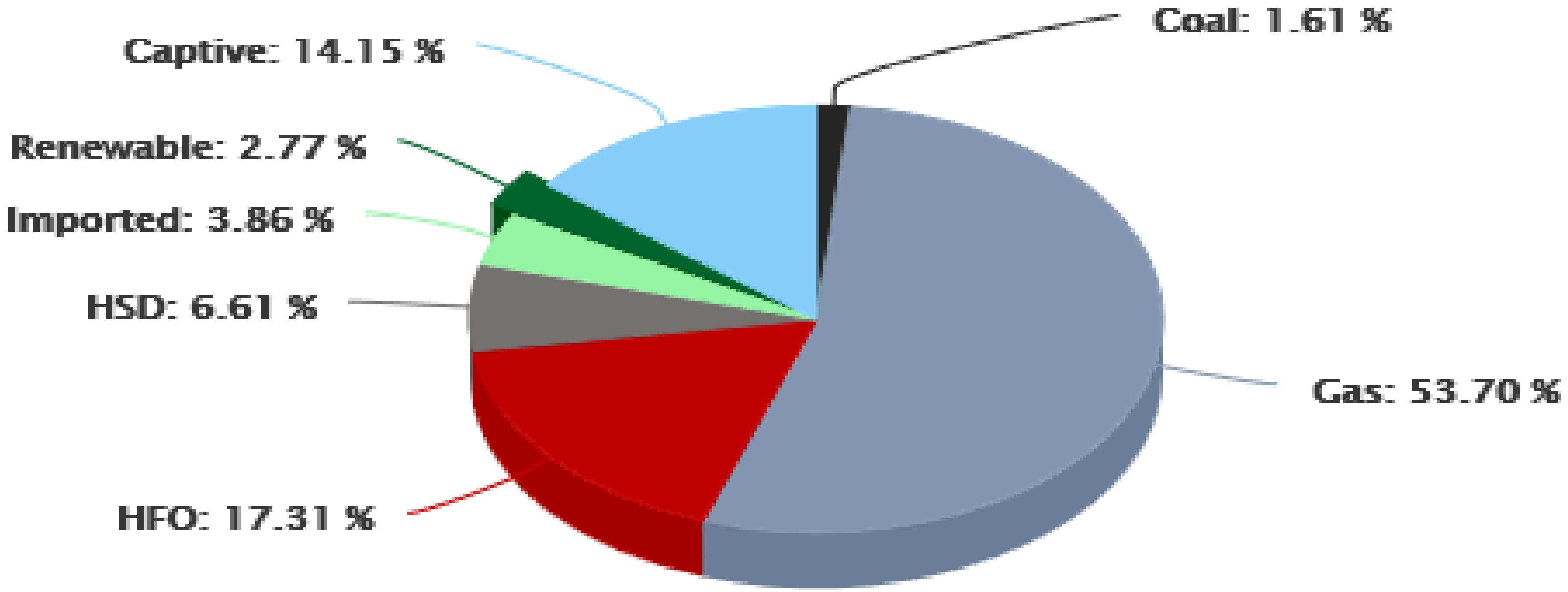



| | Gas | Oil | Coal | Total |
|---|---|---|---|---|
| PSMP2010 Planned | 5,893 | 2,743 | 1,850 | 10,486 |
| Actual | 2,546 | 1,598 | - | 4,144 |

Source: JICA Survey Team

Data Source: ADB(2016)

# Electricity Generation by Fuel Type




Total Power Generation Capacity = 15,551.77 MW (Including Off-Grid RE)
Renewable Energy Share = 2.77%

Adapted from :
http://www.sreda.gov.bd/

# Energy Security & Sustainable Development Goals

- SDG7. Clean Energy for everyone
  - Affordable
    - Indicative price of energy sources
    - Electricity generated per unit from different sources
  - Reliable
    - Supply disruptions
    - Facilities, outage frequency
  - Sustainable
    - Environmental and social concerns
  - Modern
- SDG9 Industrial and Technological Innovation and Social Infrastructure
  - By developing robust infrastructure promote inclusive and sustainable industrialization and expand technological innovation
- SDG13 Urgent handling of climate change
  - Take urgent countermeasures for climate change and its impact

# Energy Scenario : Alternatives

- Gas Exploration and production
- Liquefied Natural Gas(LNG)
- Liquefied Petroleum Gas(LPG)
- Coal based alternative
- Renewable Alternative
- Import of electricity
- Nuclear based alternative

# Gas Exploration and production

- Exploration and production
  - International oil companies- production sharing contracts- terns and conditions, incentives
  - National oil companies – capacity and constraints

# Liquefied Natural Gas(LNG)

- Setting up of Floating Storage Regasification Unit( FSRU) to import LNG from 2013
  - Initial setback
  - New agreement with US based Excelerate with capacity of 5 MMTPA and 138000 storage capacity of 500 MMSCFD
  - Regasification capacity to increase eventually
  - Import is expected by 2018
  - Deal to import 4 million tons LNG from Qatar ( MOU in 2011) on way
- Building two onshore-LNG terminal at Matarbari (Moheskhali) and Payra(Patuakhali)
  - Matarbari with handling capacity of 3.5 million tons of LNG per year
- Reliance Power to set up 5 MMTPA capacity LNG storage with regasification capacity of 500 MMSCFD in southern part of the country

Short and Medium Term: Small scale LNG using exiting ports perhaps at a lower cost than liquid fuels but higher cost than local gas price; Logistics is crucial for reliability

- Affordability
  - Conventional LNG is less expensive than imported liquid but higher than domestic gas price
  - Final price USD 10-11 /MMBTU
- Reliability
  - Global export capacity is to rise substantially with reduction in import demand from of other countries- buyers market
  - Opportunity to diversify sourcing locations
- Accessibility or adequacy: infrastructure, land, facility in deep sea ports development, pipeline networks

Data Source: ADB(2016)

# Liquefied  Petroleum Gas (LPG)

- LPG demand is estimated  500000 tones with actual consumption 150000 tones
- Demand supply gap is huge (while demand grown 60% in the last 3 years, the consumption has not ( only 13% in 5 years)
  - High ( 87%) import dependence
  - BPC and other private entities  supply LPG
  - Demand is to shoot up with policies of gas tariff increase- CNG price ( 70 % rise), new gas connection stopped
  - Plan to convert consumers( 2.3 million NG users) to LPG, environmental awareness will increase demand for LPG more
- Coverage is uneven and low ranging 10-30% across districts
- Supply Infrastructure is inadequate and problematic
- LPG is costlier than its alternatives ( LPG USD 36/MMBTU, while domestic gas ( 1-3 USD, HSD is 24/MMBTU, KEROSENE 25/MMBTU)
- Not affordable for many particularly in rural areas( bio-mass based fuel popular)
- Need to augment supply and distribution infrastructure
- Clean energy – lead free and low in sulphur, less frequent refilling needed than CNG for autos

Data Source: ADB(2016)

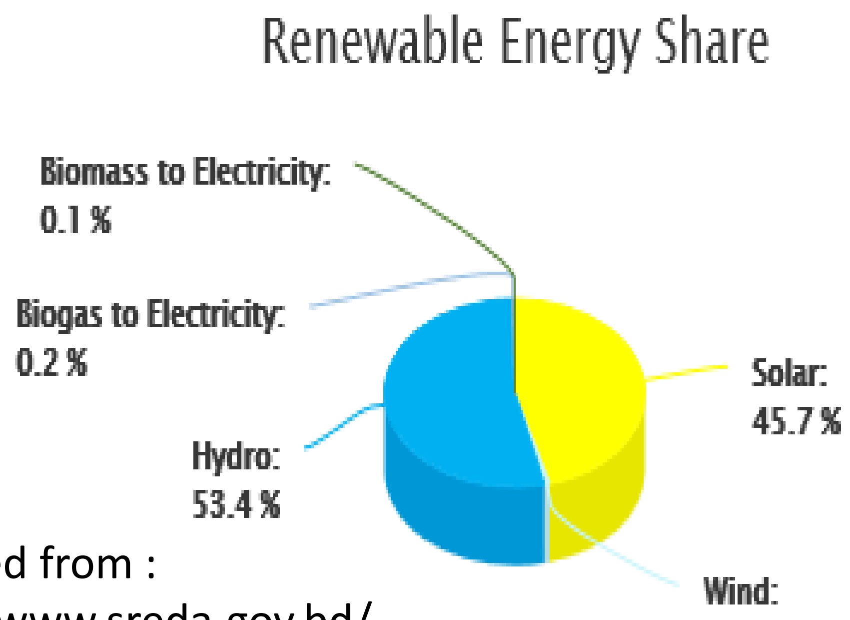
# Coal Based Alternative

- Coal based power plant
  - Estimated 3,100 million tonnes of high quality domestic coal reserve of which 13% under 'proved' category
  - Gas shortage has made coal attractive?
  - National coal policy on domestic mining- expedite production, joint venture with foreign companies
- PSMP envisaged 16.5 GW of imported coal based power plants
  - Imported coal based power plant are less costlier (2 cents/ kwh less) for electricity generation than domestic coal based power plant
- Lot of concerns
  - Lack of Infrastructural and logistics for imported coal based facility
  - Environmental and social concern, social protection, risk mitigation , long term commercial viability
  - Policy , planning and regulatory issues extremely important

Data Source: ADB(2016)

# Renewable Energy

- Off grid supply to remote areas
- Currently over 1800 MW of renewable energy projects are underway- various stages of development
- Sustainable and renewable energy development authority ( regular updates available – very dynamic website)
- Challenges
  - Ground mounted solar energy projects for lack of land space
  - Grid connected rooftop solar or other hybrid sources of energy?
  - High project cost  and cost of generation compared to coal or gas- requires lot of incentives
  - Pricing and technical issues
- Renewable energy Policy 2008 – on revision (?)

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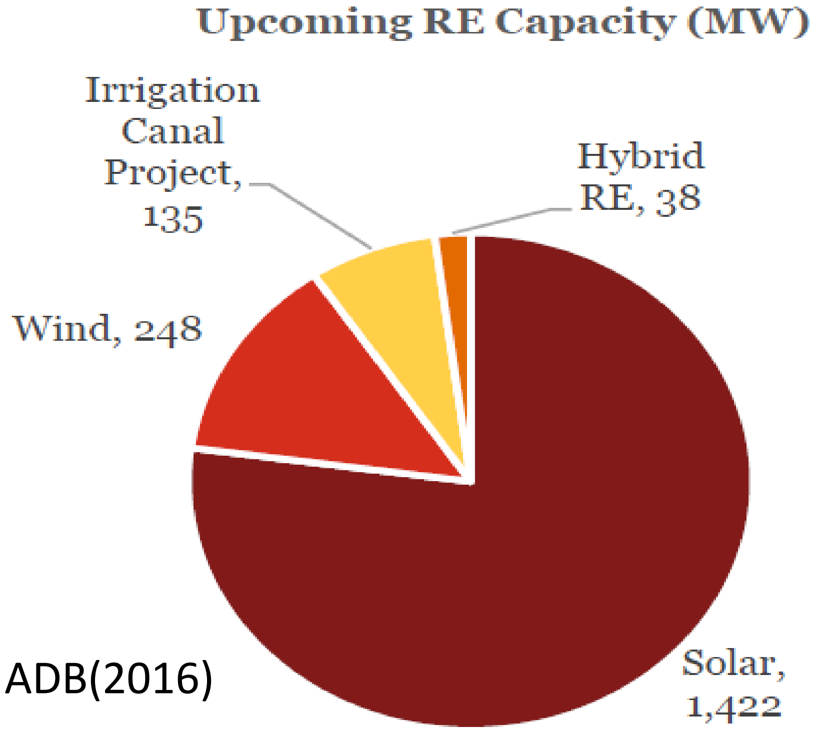



Source: ADB(2016)

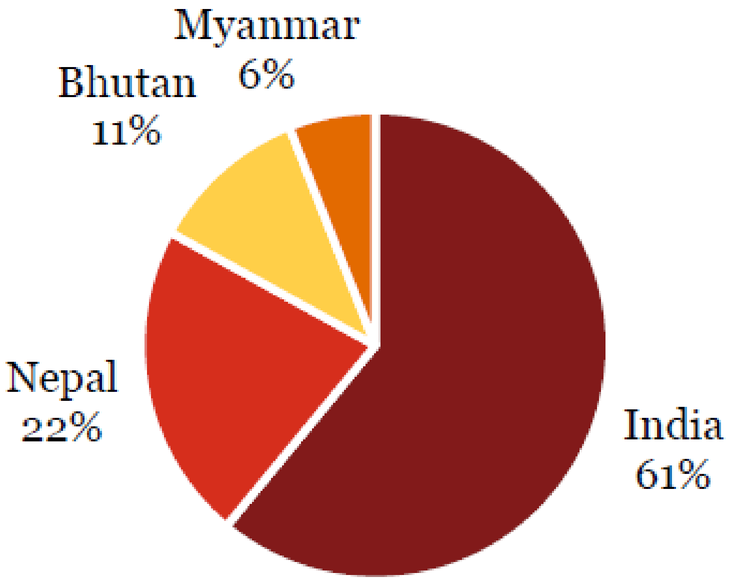
# Cross border Power Import

- Power Sector Master Plan(PSPM): 15-20 % ( 8.5 GW) of power supply import by 2040
  - Current import from India 600MW
    - Another 500 MW planned
  - Import plan from Nepal and Bhutan underway

**Issues?**

- **More than one countries involvement may result in delays and challenging particularly with respect to incentive involved in case of the intermediary country**
- **SAARC agreement for regional energy cooperation Regulatory issues, commercial arrangements, operating procedure**
- **Other regional initiatives?**

**Import Plan 2040**




Source: ADB(2016)

# Discussions:
# What is the way forward to Energy Security ? Strategies?

- **Energy demand supply imbalance; Increased dependence on diesel and furnace oil - exhaustion of domestic natural gas- diversification of energy mix**
- **Short and Medium term option? Long term option(s)? What is the global trend?**
  - **Reliability issue**
  - **Problem of pricing**
  - **Environmental and social concerns**
  - **Other issues**
- **Priority Setting Agenda?**
  - **Domestic gas (Coal) extraction and renewables?**
  - **LNG(Import)**
  - **LPG prospect**
  - **Cross border import**
  - **Renewable alternatives**