

# Energy Crunch

## 1. Introduction

*"Any great bottleneck (price rise) in the supply of energy resources to an economy. It usually refers to the shortage of oil and additionally to electricity or other natural resources. It may be referred as oil, petroleum crisis, energy shortage or electricity shortage."*

## 2. Forms of energy

- a. Kinetic energy - possessed by a body by virtue of its motion
  - i. Sound
  - ii. Wind
  - iii. Mechanical
  - iv. Electrical
  - v. Thermal
  - vi. Light, solar etc
  
- b. Potential energy - possessed by a body by virtue of its position
  - i. Gravitational
  - ii. Hydal
  - iii. Nuclear
  - iv. Chemical etc

## 3. Types of Energy shortage

- a. Supply shortage - not enough power generation capacity, Pakistan affected by it.
- b. Capacity shortage - cable/system not enough to carry

## 4. Sector wise energy consumption break up in Pakistan

- a. Household sector - 43.2%
- b. Industries - 30.1%
- c. Agriculture - 13.3%
- d. Government - 7.2%
- e. Commercial sector - 5.5%

- f. Street lights-0.7%

## 5. Energy generation and demand in Pakistan

- a. Energy generation
  - i. Hydal-6300 MW (32% of total)
  - ii. Thermal-12,132 MW (66% of total) for this oil imports are \$ 1.6 billion/year
  - iii. Nuclear-2%
  
- b. Energy Demand-24420 MW
  
- c. Gap between production and demand
  - i. 3500 MW on March 2008
  - ii. 5000 MW to the end of 2008
  
- d. Duration of load shedding
  - i. 8-10 hours in urban areas
  - ii. Up to 20 hours in rural areas
  
- e. Per Capita energy consumption in Pakistan and other countries
  - i. Pakistan-15 MBTU
  - ii. China-54 MBTU
  - iii. Malaysia-104 MBTU
  - iv. Iran-106 MBTU

## 6. Causes of energy crisis

- a. Maladministration of previous regime
  - i. Per year increasing energy demand-900 MW
  - ii. Generation capacity to increased 1999-2007—2020 MW
  - iii. Required increasing generation capacity from 1999 to 2007—7200
  - iv. 2020 MW was due to Ghazi Barotha a project started in 1990

- b. Under utilization of existing generation capacity
  - i. Hydal-normally down in winter by 60%
  - ii. Actual generation of thermal declined by 4000 MW-outdate machinery
  
- c. Circular debt-inheritance of previous regime
  - i. Didn't compensate to power companies (IPPs) for subsidy
  - ii. Forced commercial banks to lend Rs: 34 billion to companies
  - iii. More critical situation when petroleum jumped from \$ 100 to 147/barrel at that time
  
- d. Line losses in transmission and distribution system
  - i. Poorly maintained transmission system
  - ii. 30% loss as compared to 10% of other countries
  
- e. Wastage of energy by industries
  - i. Old machinery
  - ii. Less efficient system
  - iii. Lack of vision to use modern technology-China, solar units save 30% energy in industries
  
- f. Over use of energy by transport section-old and poorly tuned engines
- g. Unnecessary domestic consumption
  - i. Lights and air conditioners
  - iii. Large scale illuminations
  
- h. Large scale theft of Electricity-great difference between units generated and those paid for
- i. Over dependence on imported energy
- j. Inadequate political will
- k. Limited financial support
- l. Weak implementation capacity

## 7. Effects of energy crisis

- Standstill industrial units-trade deficit of 9.34% of GDP (2007-08)
- Unprecedented Inflation
- Negative impact on exports
- Fall of production-imports jumped about 54%, food import bill rose by about 48%
- Lack of investment
- Constraint in agricultural development
- Public turmoil
- Demonstrations, riots, agitation
- Social problems
- Growing unemployment

## 8. Strategies to overcome the energy crisis

- a. Solve circular debt issue
  - i. Settle as early as possible
  - ii. Increase generation capacity at least 12500 MW (2008-09)
  
- b. New power generation and conservation projects
  - i. New IPP thermal plants
  - ii. Quick rehabilitation of WAPDA's power plants
  - iii. Energy conservation and loss reduction measure
  
- c. Load shedding on transparent manner
  - i. Reflect transparency
  - ii. Consultation with all the stake holders
  
- d. To avoid tariffs
  - i. Further increase in tariff should be avoided
  - ii. GST should not be re-imposed
  
- e. Replacement of inefficient plants
  - i. New and more efficient combine cycle plants
  - ii. Old plants produce 60-79% as compared to new ones

- g.Reducing transmission and distribution loss
  - i.Modernize over loaded system
  - ii.Investment can be recovered through saving in transmission loss
  
- h.Construction of new Dams
  - i.Water Accord 1991, opened the way
  - ii.Kalabagh Dam-generating capacity is 3600 MW
  - iii.Bhasha Dam-4500 MW
  - iv.Neelum Jehlum-1960 MW
  - v.Tarbela forth extension-960 MW
  - vi.Suki Kinari Dam-840 MW
  - vii.Munda Dam-700 MW
  
- i.Institutional and Administrtrive Improvement
  - i.Upgrade implementation policy
  - ii.WAPDA, Gencos, Pepco, KESC-to prepare, market and construct new projects
  - iii.Best available technical expertise and competence
  
- j.Utilization of largest deposits of coal
  - i.Thar, Sind, one of the largest deposits of coal in the world
  - ii.About 20,000 MW can be generated by year 2030
  - iii.Thar coal can be cleaned and sulphur reduced
  - iv.China offered 3000 MW-5.8 cent/unit but rejected (coal)
  
- k.Regional cooperation
  - i.Building gas oil pipelines
  - ii.IPI gas pipeline
  - iii.Turkemenistan-Aghanistan-Pakistan gas pipeline
  - iv.Import of electricity from Tajikistan
  
- l.Renewable sources of energy
  - i.Solar, wind, hydal, tidal, geothermal etc

- ii. Follow research in the concerned field
- iii. Can be used for light, heating, agriculture and small scale industries
  
- m. Public Awareness
  - i. 100/60 watts incandescent bulbs replaced by 18 watt energy saving lamps-one house using 5 bulbs save 410 watts, turn in MWs to country level.
  - ii. Avoid idle use of energy
  
- n. Installation of nuclear plants
- o. Dynamic leadership and political will

## 9. Conclusion

**Note:** [Idea from sureshlasi](#)