Strategies for Ash Utilization

A useful bye-product ash in the form of fly ash, bottom or pond ash is available at the Coal and Lignite based thermal Power Plants. It needs to be utilized in various ways and applications. The future capacity addition will take into account the capabilities to ensure safe utilization of fly ash, bottom ash and pond ash. These have specific utilities depending upon the characteristics and Engineering properties. Based on the properties; the ash can be processed to enhance its utility. The safe Environmental concerns cannot afford to increased ash pond areas; increased heights of ash dykes; as well as the likely pollution it may have in air, surface water and the Ground water. The ash in its natural form may not be free from likely environmental hazards. The protection from environmental hazards that can be anticipated necessitate 100 percent ash utilization in a variety of ways. Ash needs to be converted into ash based products and utilized so that ash does not fly in air; it does not get washed away with surface water flow and also does not get leached to cause ground water pollution. Safe utilization of ash is essential. Ash Utilization therefore needs to be a continuous activity at all the coal and lignite based thermal power stations. Ash utilization is an industry in itself and fly ash based industry needs to be developed at the thermal power plants in the immediate vicinity and the ash dump areas. It will provide employment opportunities to many in the nearby villages. Ash utilization has corresponding benefits in reducing the requirement of ash pond areas, ash handling system, consumptive power and saves time and energy that is utilized for creating these infrastructures. Ash based product bring return to the society and therefore the effect on tariff is negligible. The expenditures on ash utilization, promotional measures and facilitation component is essential.

The targets of ash utilization are primarily governed by the MOEF Notification dated 14th September, 1999 and its amendment notification dated 27th August, 2003 as well as Hon'able High Court of Delhi directions vide its judgements dated 4th December, 2002, 10th March, 2004 as well as 5th August, 2004.

The existing thermal power plants as on September 1999 are to achieve ash utilization level of 100% in a phased manner by 2013-14 in accordance with 15 year action plan as per notification dated 14th September, 1999 and with effect from the date of publication of the notification. The new power plants subsequent to September, 1999 are to achieve ash utilization level of 100% in a phased manner as per 9 year action plan and with effect from the date of publication of the notification dated 14th September, 1999.

Besides, MOEF has also issued an amendment notification dated 27th August, 2003 and has extended the scope of ash utilization by various construction agencies by stipulating specific targets for those within 50 km & 50 to 100km radial distance of the location of thermal power plants. Construction agencies located within 50 km are to achieve ash utilization level targets of 100 percent upto August, 2005 and those located from 50 to 100km distance are to achieve ash utilization level of 100% by August, 2007

Subsequent upon nine years from September, 1999, the future strategy shall endeavor on planning for 100 percent ash utilization from the initial stage of commissioning of the projects. All power plants are expected to have well tied up program of ash utilization by user agencies, dry fly ash collection, storage and making available dry fly ash to the user agencies outside the plant boundaries round the clock; so that it forms a continuous process. Power plants are also expected to take necessary initiatives in the manufacture of bricks, blocks, tiles, etc. as convenient according to the usage anticipated either by their own efforts or by engaging private entrepreneurs to ensure ash utilization.

The efforts made by MOEF/MOP/TIFAC(FAM)/CPCB/SPCB and the various state agencies are appreciated. It is by virtue of their continuous pursuance & efforts that the overall ash utilization has increased inspite of increase in capacity addition (MW) and ash generation rate. As the awareness increased, benefits of ash utilization were realized by the power plants and it became popular and new areas were realized; the ash utilization has increased and is expected to achieve further progress.

The ash utilization has been deliberated at various different forum and at all levels at the Central, State Govts., Power Utilities, thermal power plants and all concerned user groups, agencies etc. All Power Utilities and Thermal Power Plants are to plan & implement ash utilization targets, keeping in view long term strategies on sustainable basis. The ash utilization is a priority

The ash utilization is required to be carried out at all the coal and lignite based thermal power plants that are emitting ash and it needs to be carried out by all projects that are under construction, renovation, modernization and those at the preliminary stage of investigation and infrastructure development within 100km radial distance and if necessary, ash utilization may also be carried out beyond 100km radial distance.

The important areas of ash utilization are indicated below:

i) **Building Sector for use in bricks, blocks, tiles, cement, concrete, plaster, etc.**
ii) **Land reclamation, filling low lying areas, raising ground levels.**
iii) **Roads, embankments, ash dykes, road blocks, kerb stones, etc.**
iv) **Agriculture and wasteland area development.**
v) **Hydro Sector, Irrigation, drains, water supply & drainage., lining of rivers, tributaries, canals, minors, sub-minors etc.**
vi) **Mine filling.**
vii) **Industrial applications & high value areas.**
viii) **Roller compacted dams, pavements, roads etc.**
ix) **Special use for ash e.g., collecting cenospheres from floating ash.**

All applications are primarily based on Research, design demonstration and confidence building in the use of fly ash based products. Considerable research work has been carried out A perspective plan of Research of Development has been prepared by Advisor, FAUP.

Some of the important issues envisaged are as under:

(i) The disposal of dry fly ash require technological innovations of high efficiency electrostatic precipitators, dry fly ash collection and storage facility in silos out side the plant boundary and facilities for loading into the mode of conveyance as well as transportation up to the location of user agencies / manufacturing units of cement, bricks, and ash based products etc.

(ii) The use of fly ash in dry form requires fly ash based Industries, conversion of fly ash in to fly ash based products, availability of ash based products in the markets for use by all user groups, agencies, and the people at large.

(iii) The use of fly ash and fly ash based products are based on proven technology, supported by research and development efforts, development of confidence level, dissemination of technology, and promotional measures that are in progress and have been initiated by the Power Utilities and thermal power plants.

(iv) The fly ash being used as construction materials require inclusion of the same in the technical specifications, schedule of rates, analysis of rates, tender documents by CPWD, PWD's, Construction Agencies, Bureau of Indian Standards, Roads. Transportation, Highways, Hydro Sector, Railways, Mining Sector, etc. These reforms require careful consideration.

(v) The mining Sector, require identification of abandoned mines within reasonable distance and location of the thermal power plants.

(vi) The Agriculture requires research and development, dissemination of technology and guidelines for use by all. The use of ash in wasteland area developments requires research efforts, identification of wasteland areas & dissemination of technology.

(vii) The Hydro Sector requires construction material surveys to investigate the use of ash and ash based products at initial stage itself. Roller compacted concrete dam and pavements have vast scope of ash utilization.

(viii) The use of Bottom ash , pond ash , mound ash etc. for embankments in Roads etc, requires their engineering properties and shear parameters to be tested half yearly and a data bank of Engineering properties prepared.

(ix) Data Management system on Ash generation & utilization and software developed to process the ash quality, quantity, suitability and availability of ash for various usage's.

(x) It is envisaged that there is need of an ash management agency for collection, distribution and management of ash utilization in various modes and by various organizations and construction agencies etc.

(xi) It is also envisaged that the ash utilization may be handled by a separate ash utilization division exclusively entrusted with the relevant functions including

marking aspects and sale of ash and ash based products and also to ensure their availability in the markets like other construction materials.

(xii) All ash pond, top roads, access roads, slope protection of ash dykes, lining of canals, minors, drains etc. may be provided with ash based bricks, blocks, tiles, panels etc. or roller compacted pavements.

(xiii) The ash utilization has priority over ash disposal in traditional forms. It needs to be a continuous activity at the coal/lignite based Thermal Power Plants. The provision of facilitation component of expenditure on ash utilization needs to be capitalized and passed on to the tariff. The ash utilization needs to be included as part of tariff policy.