

Future scope of FaL-G:

This is the unique technology, complying with the features of Sustainable Development, resulting in massive spin off in economic activity and empowerment as indicated by the chart below:

Sustainable Development is the development that meets the needs of the present mankind without compromising the ability of future generations to meet their own needs.

Indicators of Sustainable Development	Impact (At an average annual capacity of 3 mn bricks per plant)			
	At present level of 12,000 plants	Economic spin off Rs. billons	At target level of 100,000 plants	
Conservation of top soil for replacing clay bricks	126 mn tons	@ Rs. 200/-	25.20	1050 mn tons
Prevention of denudation of fertile land	10,500 acres	@ Rs. 0.50 mn/-	5.25	87,600 mn tons
Utilisation of fly ash for abating ground and air pollution (0.5 kg/brick)	18 mn tons	@ Rs. 200/-	3.60	150 mn tons
Conservation of fuel in terms of coal	7.2 mn tons	@ Rs.2000/-	14.40	60 mn tons
Abatement of CO ₂ emission after considering leakages and project emissions	8.7 mn tons	@ € 12/-	6.26	72.6 mn tons
Annual production of bricks	36 billons	@ Rs 3 /-	108.00	300 billons
Turnover: Rs. 3.00 per brick (average)	Rs. 108 billons			Rs. 900 billons
Empowerment:				
Entrepreneurial Development	12,000	@ Rs. 0.3 mn	3.60	
Employment potential - Workforce	144, 000 for 300 days	@ Rs. 200/-	8.64	1,200,000
Total			174.95	

Note: The Economic Spin off for 100,000 plants would be Rs. 1458 billion or even more based on the prices prevailed at the time of accomplishing the target.

The fabric of entrepreneurs in FaL-G activity is woven with masons, farmers, self-employed youth, technocrats and industrialists, for its scope with wide range of capital deployment. This has encouraged ECPL & INSWAREB to envision proliferation of 100,000 FaL-G units. To accomplish this task, ECPL has embarked upon for initiating large clusters of FaL-G plants at various states of India, providing incentive mechanism through CDM-Program of Activities (CDM-PoA) for their sustenance.

In addition, ECPL and INSWAREB are willing to extend cooperation, technology and training to coal based power plants as well as coal-rich countries like Indonesia, China, South Africa, Australia etc., in order to encourage proliferation of FaL-G brick/block units rapidly at global level.

In order to widen the base of complementary raw materials such as lime and gypsum, INSWAREB has developed FaL-G process by using FGD gypsum, generated during combustion of pet-coke in association with lime. This byproduct, christened as GLL (Gypsum Laden Lime) ash is likely to be generated in a big way in refineries and other industries where boilers use pet-coke.

Economic Sustainability stresses the need to change from old sector-centred ways of doing business to new approaches that involve cross-sectoral co-ordination and the integration of environmental and social concerns into all development processes. (Source: Agenda 21)

AWARD FOR DEMONSTRATING ALTERNATE TO FaL-G WITH HOLISTIC PERFORMANCE

In order to substantiate the uniqueness of FaL-G as E⁴ technology, upon a perusal of current technology scenario in CDM, Eco Carbon Pvt. Ltd (ECPL) is enthused to declare the award of Rs. One million to the first Contestant who can demonstrate a parallel or better technology anywhere in the world complying in a holistic manner with the indicators of Sustainable Development, economic activity and employment potential as good as that of FaL-G.

What eminent personalities said:



Bhanumathidas and Kalidas at the Institute for Solid Waste Research & Ecological Balance, Visakhapatnam, southern India, have developed the technology to make fly ash-lime-gypsum or fly ash-Portland cement bricks and blocks. By disregarding the standard chemical and physical requirements for use of fly ash in the cement and concrete industries, the authors found that tailor-made blends of even nonstandard fly ashes with lime and gypsum or with Portland cement produced adequate strength on normal curing. With hundreds of small units in operation and hundreds more on the way, it is obvious that this type of entrepreneurship is vital for making a dent in the fly ash disposal problem while conserving energy and top soil, which are the base materials used in the manufacture of fired-clay bricks."

- Prof PK Mehta

Professor Emeritus of Civil & Environmental Engg. University of California, Berkeley, USA
Ref: Sixth CANMET/ACI International Conference on fly ash, silica fume, slag & Natural Pozzolans in Concrete (Bangkok, 1999)

FaL-G is one of the technological marvels of the century in the field of construction to answer the multiple needs of the globe on ecological welfare. With all these accomplishments, the product is stronger, durable and, at the same time, cost effective. What more is expected for a technology to be successful.

- V Suresh,

ex. Chairman & Managing Director, HUDCO, Govt. of India, New Delhi



FaL-G: THE CLEAN CDM PROJECT



The Unique Holistic E⁴ Technology - Having no Parallel in the World
(Ecology - Environment - Economy- Empowerment)

The first contestant who demonstrates in contrary gets Rs. One million award

History of FaL-G Technology:

The outcome of research for imparting water resistance to gypsum lead to the innovation of FaL-G technology by the scientist-technocrat couple, Dr N Bhanumathidas and N Kalidas in 1990. The first structural slab (2000 sft) was cast with FaL-G in lime route, containing not even a gram of cement in concrete, configured with critical structural elements such as tie beams (18ft beam over 15 ft beam).



FaL-G Mansion 1991

In order to increase the scope of raw materials FaL-G is developed in cement route also, using Portland cement (OPC) as the source of lime for pozzolanic chemistry. There upon, in order to demonstrate, two more storeys were cast in 1994 on FaL-G Mansion with Portland: FaL-G concrete. Subsequently, assimilating the research findings, the inventors patented their technology in 1996. For their accomplishment the FaL-G inventors have been conferred with the prestigious **CANMET/ACI International award** in 2001 for Sustained and outstanding contributions in the area of fly ash in bricks and concrete in india.



FaL-G Mansion 1994

Development of No-Aggregate Concrete (NAC) in FaL-G Technology is the ultimate. Fly ash is availed both as complementary cement input as well as micro-aggregate, replacing totally sand and chips used as aggregate in conventional concrete. The micro structure properties indicate at least 1000 years of durability to the concrete; and the impermeability indicates the matrix as close as that of ceramic, giving opportunity to recover steel, intact, even after couple of centuries.



FaL-G Mansion 2010



Dome with NAC at eastern face lift of FaL-G Mansion

The FaL-G Brick/Block Technology

The FaL-G brick technology was released for commercialization at a workshop on 23rd July 1990 and the same was commemorated by dedicating the technology to the Nation over the hands of HUDCO, Govt. of India. Initially bricks were cast by hand deploying both moulder and mould from clay brick industry. There upon different types of machines were identified/got developed suiting to the engineering need of the process. Nowadays this technology is practiced right from road side activity up to an organized industry.

The researchers uphold that, in FaL-G, bonding through hydration-chemistry is of paramount significance for engineering properties rather than vibrations and compaction forces of machinery.



Casting of FaL-G bricks in the lines of clay bricks



Production of FaL-G bricks as Road side activity in a massive housing colony under construction



Production in Vibro - Table attached to roller mixer with single engine



Production in Egg-laying machine (Vibro -compactor)



High capacity (30-100 thousand/Shift) mechanised plant



Low capacity (10-20 thousand /Shift) hydraulic compression

FaL-G for Infrastructure

Due to its wide range of strength right from 6 to 40 MPa, FaL-G bricks and blocks not only replace clay brick for walling, but also find their way to infrastructure applications. Hence the scope of growth potential is immense in a country like India with everlasting infrastructure needs such as pavements, water bodies and bridges. In contrast to concrete roads, khadanza (Brick-on-edge) pavements are resistive to expansive forces and resultant cracks attaining centuries of durability.



High strength FaL-G (30 MPa) blocks used in laying khadanza (brick-on-edge) pavement (entrance of INSWAREB Building Centre, Visakhapatnam, A.P)



High strength FaL-G (20 MPa) blocks used in replacing concrete for construction of a culvert at the entrance of a market yard with traffic of over 2000 trucks a day (Vijayawada-A.P., India)



Overhead water tank built by Pantchayat Raj Dept., Govt. of A.P. using FaL-G concrete (Nagayalanka, Krishna Dist., A.P., India)

Tie up with the World Bank:

Due to decimal penetration by FaL-G bricks and blocks in to the massive clay brick market, in order to facilitate rapid proliferation, CDM is availed as an opportunity in inspiring passive entrepreneurs. ECPL as Project Entity signed LOI with the Community Development Carbon Fund (CDCF), The World Bank, in 2004 and signed ERPA in 2006, offering to transfer 600,000 ERs by contractual tie up and 200,000 ERs by call option. For this purpose 'Bundling' was judged as the right tool and, over eight bundles were envisaged to complete the Project. In addition to taking care of entrepreneurs' benefit, this project has earmarked over \$ 0.57 million out of the carbon revenue for the welfare of workers and community development program.



FaL-G for Women empowerment



Some of the Lady Entrepreneurs receiving Cheques for Carbon credits from the Dignitaries at the Workshops in 2009 and 2010

