विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY

Development Alternatives
People | Planet | Prosperity

innocsr

TARA

Background Note

Nano Joule Bricks

Helping to keep our skies clear

The buildings and construction sector are by far the largest emitter of greenhouse gases, accounting for a staggering 37% of global emissions. One of the major construction materials used predominantly in Asia and Africa are fired clay bricks. With rapidly accelerating urbanisation at an average rate of 6% per year this growth is driving increasing demand for bricks. Solid, fired clay bricks are among the most widely used building materials.

According to a World Bank statement in 2020, approximately 1500 billion bricks are produced each year globally, of which 1,300 billion bricks (or 87%) are from Asia. Globally, brick kilns **release over 1,072 million tonnes of CO_2** emissions annually, accounting for 2.7% of total emissions. Additionally, the industry consumes 375,000,000 tonnes of coal annually, alongside other highly polluting fuels. The environmental impact extends beyond production. For instance, the water footprint for producing **one brick is 10.48 litres, and the embodied carbon per cubic meter of clay brick is approximately 345kg**.

The situation in India is also similar to other Asian countries. A 200-300% increase in demand of bricks has been projected in India by 2030. This will significantly increase the country's current annual brick production of 250-300 billion bricks per year to 750-1,000 billion per annum. Brick sector in India is one of the largest industrial sources of CO_2, responsible for global warming. About 66-84 million tonnes of CO_2 is generated from brick sector annually. This industry has also been identified as the largest stationary source of atmospheric black carbon in South Asia contributing to 100,000 tonnes every year. Therefore, it is necessary to continue research in this area to reduce the emission and improve the efficiency, scalability and affordability.

In association with InnoCSR, TARA introduces the **"Nano Joule Brick" (NJB)** similar to Good Bricks of Nepal. NJB uses soil stabilizers to achieve desired properties in bricks. The soil stabilizers use mineral salts including sodium chloride and magnesium chloride to create a pozzolanic reaction, which break the chemical bonds of the organic matter in the soil mixture. They create an ionic bond effect that stiffens and consolidate the organic matter in soils. Cement and soil can then bind together and secure an optimal strength and other properties. Since it does not need any firing, this technology significantly reduces air pollution and increases the productivity, delivering better quality bricks to the end consumers and higher profits to entrepreneurs.

Nano Joule Bricks

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Date: 17th May 2024 (Friday)

Venue: Conference Room, Development Alternatives Headquarters, India

Time	Agenda
11:00 AM	Registration and *Tea*
11:15 AM	**Welcome Address** Shrashtant Patara, CEO, Development Alternatives
11:25 AM	**Introduction to Good Bricks Technology** Sam Yoonsuk Lee, CEO, InnoCSR Co. Ltd.
11:40 AM	**Special Address (Virtual)** S. Chandrasekar, Member Secretary, Bihar State Pollution Control Board (BSPCB)
11:55 AM	**TARA's intervention in Low Carbon Technologies** Dr. Soumen Maity, Chief Technology Officer, TARA
12:10 PM	**Waste-based Brick Technology (TBF) (Virtual)** Prof. Piyush Chaunsali, Indian Institute of Technology Madras
12:25 PM	**MoU Signing (TARA and InnoCSR Co. Ltd.)**
12:30 PM	**Discussion / Interaction**
01:00 PM	**Vote of Thanks** Maj. Gen. Rahul Bhardwaj (Retd.), COO, TARA
01:05 PM	*Lunch*