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Developing Bhopal Smart City as a Sustainable and Circular Economy Ensuring Good Growth for Bhopal City

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ABSTRACT

The Circular Economy is defined as "A circular economy that entails markets that give incentives to reusing products, rather than scrapping them and then extracting new resources. In such an economy, all forms of waste, such as clothes, scrap metal, and obsolete electronics, are returned to the economy or used more efficiently." [9]

In circular economy, materials are retained in use at their highest value for as long as possible and are then reused or recycled, leaving a minimum of residual waste.

It is a new economic model that moves away from this current linear economy, where materials are mined, manufactured, used, and thrown away, to a more circular economy where resources are kept in use and their value is retained.

Ensuring Good Growth for Bhopal City Bhopal can only achieve Good Growth through the circular economy. The climate emergency has moved from scientists' forecasts to present reality.

I. INTRODUCTION

Today, Bhopal is seeing global heating and an unstable climate. These are just a few aspects of a broader environmental breakdown that threatens to make the world inhospitable to us, as it already is to the 150 species that become extinct every day.

We can no longer ignore the impact our individual and collective behaviours have on our environment or society. We are now seeing the consequences of our economic system, whether that is record high temperatures, fuel poverty, or air pollution in our city. This is a call to action for everyone in the design, construction, and property sectors to embrace circular economy principles as standard practice. The built environment sector uses more resources and throws away more waste than any other sector, But where is 'away'? We only have this one earth.

The developed world has prospered through the use of the take, make and throw away economy – a linear economy that is blind to its harmful consequences. It has led to amazing growth but of a kind that increasingly looks like the opposite of the Good Growth that we want for Bhopal.

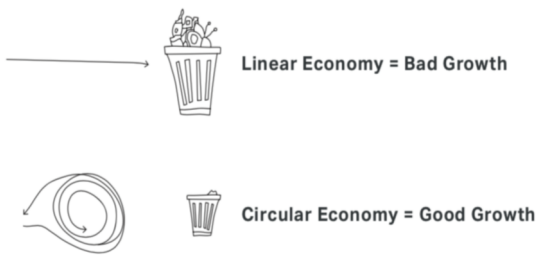

Figure 1: Linear Vs Circular Economy

The circular economy as an idea is easy to understand, and the parallel with nature makes it very compelling. However, genuinely rethinking the use of the thousands of different materials of an industrial economy is a massively complex task.

Many modern construction products are composites of different materials – reusing and recycling these presents additional challenges. Many synthetic materials are difficult to recycle, let alone reuse. Recycling can be so energy-intensive as to defeat its purpose. Yet people are finding ingenious ways. Innovation abounds in the circular economy.

Figure 2: Benefits of Circular Economy

In contrast to a linear economy, the circular economy creates and maintains value by using materials for much longer and then reusing, repurposing, or recycling them, just as nature does. There is no real waste in nature because waste products become the basis of new materials and life.[9]

Figure 3: Waste to Energy through on-site Home composting units at various locations of the city

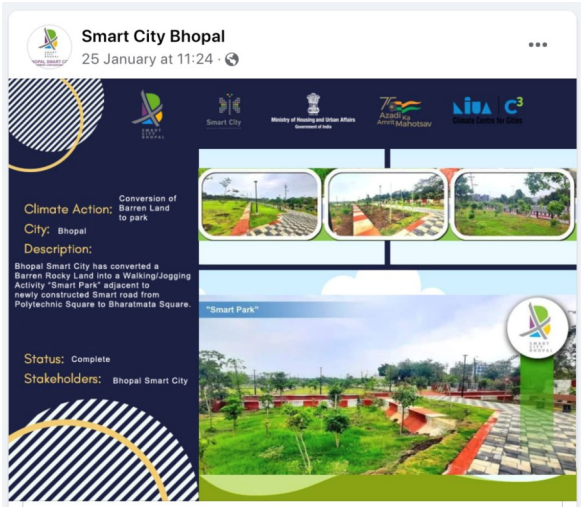

Figure 4: Urban forestation

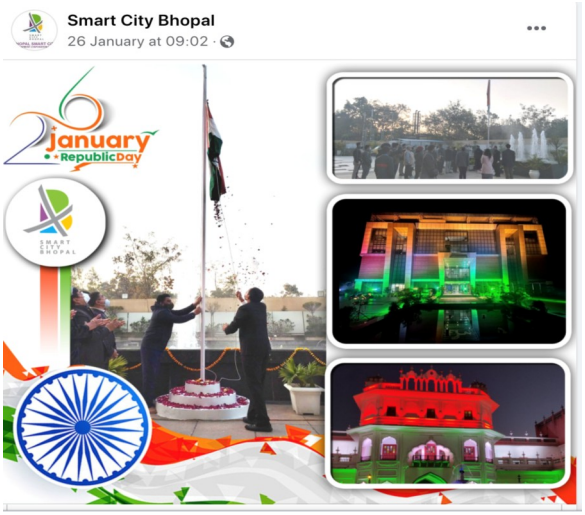

Figure 5: Smart City Retrofitting Project

Figure 6: Ground recovered from land fill

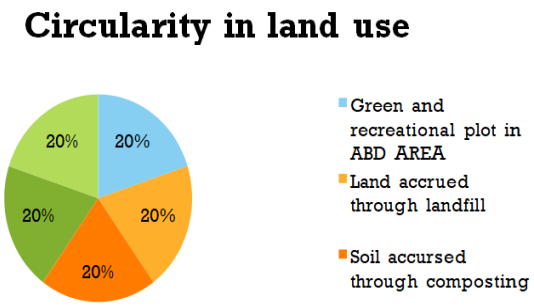

Figure 6: Circularity in land use

"255 Billions Square meter of construction building exists across the globe, figure that may double very soon. This is equal to building cities the size of Paris every week. Tall Buildings are inherently unsustainable, skyscrapers require extra resource for foundational and structural support namely cement. "Cement use is extremely emission-intensive but demands continues to rise.

When material, mostly minerals and ores are invested in the form of buildings Infrastructure and heavy machine, they become embodied and unavailable as secondary materials for as long as they remain stored and in use. It is therefore paramount that Virgin Resources are not Extracted to continue building up the stock but rather that we design, produce, maintain and reuse buildings roads and machinery in a circular manner to cycle flows" [3]

The built environment has a significant role in addressing the challenge of climate change. An effective way to do that is to transition to a circular economy and radically change the way we think about new construction, equipment, infrastructure, maintenance, alteration, and renovation of our built environment.

As the Bhopal Smart City team, we believe that such a model is the only way we can achieve Good Growth. We need to establish a plan that sets the city on the course of circularity and sustainability.

For buildings, this means creating a regenerative built environment that prioritises retention and refurbishment over demolition and rebuilding. It means designing buildings that can be adapted, reconstructed, and deconstructed to extend their life and that allows components and materials to be salvaged for reuse or recycling.

Designing buildings for a circular economy can increase their value by avoiding depreciation and can help in delaying obsolescence. It can even secure a positive residual value at end-of-life.

In a circular economy, built environment assets are designed so that whole buildings, materials, components, and parts can be continually and easily recycled.

II. Bhopal Built Environment

One of the elements of the Bhopal Built Environment is Land Monetization Policy. Total 340.23 HA land is divided predominantly into four categories-

1. The Green & recreational space is 19%
2. The commercial space is 26 %
3. Residential space is 17 %
4. Others Categories (PSP, Utility & Roads) – 38%

One of the critical aspects of the Land monetization of the ABD area is to attain sustainable development of the ABD area.

A few Observations from sustainability standpoint -

Green Cover (UN sustainable development goals [SDG]11, SDG 8, & SDG 13) –

Policy needs to be strengthened to increase the green cover and ensure the sustainable development of Bhopal. Green & recreation space is only 19% while Residential & Commercial Space is 43%. The impact of green cover in terms of increasing the number of trees and saving the soil will impact in reversing climate change.

The Earth's soils contain about 2,500 gigatons of carbon—that's more than three times the amount of carbon in the atmosphere and four times the amount stored in all living plants and animals.[10]

The policy works well on socio-economic factors by relocating vendors and shops. However, there is an opportunity to increase the green cover with depleting green cover in no time, Bhopal city lungs will be significantly impacted.

A more Inclusive Participatory Approach to Relocation (SDG 8 & SDG 17)

While BSCDL can decide to dispose of property without the consent of the people of Bhopal, the following initiative should make more inclusive and participatory by educating the vendors and shops that are being relocated. They can be made aware of the following things

- Economic dimension
- Ecology dimension
- Social dimension
- Administrators should take the time to educate and help the shop owners make an informed decision.

Preparing for Future (SDG 9, SDG 11, SDG 12 & SDG 13):

The possibility of future infrastructural changes as the city grows has not been considered. If we need to develop a water tank or any other infrastructural requirement, we may not have enough land for that purpose in the future. The over construction in housing and commercial infrastructure will limit the options to use open spaces for bridges, open gardens, public spaces, roads, & pathways, etc.

III. MONETIZATION

- The policy can be made more inclusive by taking the consent of people who are using the land or are in the vicinity of the land.
- In generating maximum value realization in terms of land use, natural wealth, & Goodwill, in the future, BSCDCL should not dilute the focus on circular and sustainable development of Bhopal City.
- Auction is a transparent and effective method of monetization. However, focusing on sustainability is not given a due chance. As we pursue a parameter for the highest bidder similarly, we should have guidelines for Highly sustainable and intelligent solutions.

- Bhopal Smart City Development Corporation Limited should consider revising the general term for least transaction to a smaller duration. 60 and 30 years duration is fairly long-time to intervene and take corrective action.
- Maintenance Fund needs to take sustainable and circularity requirements into consideration.

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