A Case Study on Sustainability: GIFT City

[1]Prachi Nana Wakode, [2]Reshma Raskar-Phule, [3]Kaustubh Lunawat, [4]Bhaswini Kokitkar, [5]Pravin Londhe, [6]Omeshwari Kurzekar

[1,2,3,4,5,6]Civil Engineering Department, S.P.C.E, Andheri

Abstract— Gujarat International Finance Tec-City (GIFT) is a globally bench-marked international financial service Centre (IFSC) developed by Government of Gujrat. It is an under-construction central business district between Ahmedabad and Gandhinagar in Indian state of Gujarat. It will be India's first global financial and IT hub of its kind. The master plan of this Green Field Development incorporates its planning along River Sabarmati. It features to ensure that all the services in relation with the connectivity, technology, communication, quality of life and the business environment are established and sustained. As far as sustainability is concerned, GIFT reflects a defined planning approach to ensure the amalgamation of concerns related to Environment and Green Buildings, optimum usage of energy, water, construction materials and traffic management. All these concepts can be replicated in smart cities across India.

Index Terms—environment, smart city, sustainability, urban development,GIFT

I. INTRODUCTION

GIFT is planned as a financial Central Business District (CBD) between Ahmadabad and Gandhinagar as a Greenfield development. It is designed as a hub for the global financial services sector. More particularly, state-of-the-art connectivity, infrastructure and transportation access have been integrated into the design of the city. [1]

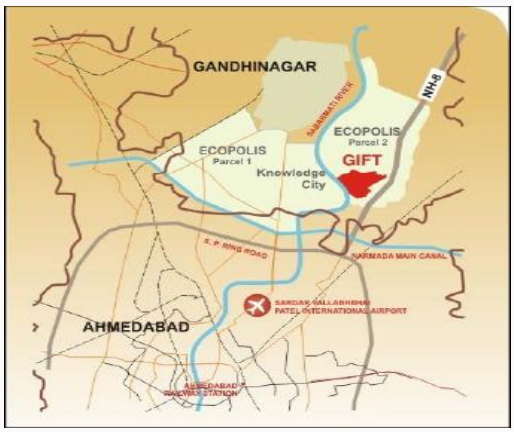

Fig. a Location of GIFT

The project regenerates the area as high-quality, mixed use district of residential, commercial and open space facilities that optimize land and real estate values.

It is characterized to be a Central Business District (CBD) developed on "Smart and Sustainable Development" principle thereby acting as a motivation for overall development of the region.

Table. I General Information of GIFT city

Features	**GIFT**
Land Area	3.58 sq.km
Construction Scale	8.5 mn sq m
Greenbelt	1183 thousand sq m
Height	410 m

II. GUJARAT INTERNATIONAL FINANCE TEC-CITY (GIFT)

Master Plan

GIFT Master Plan reflects a sophisticated planning approach that integrates the intended program into the existing context of both the site and the region.

The GIFT development is expected to become a contemporary model development in India, advancing the ideas of sustainability and ecology. GIFT, envisaged as an Eco-City, and will serve as the Vibrant Hub of Western India and as a habitat demonstrating business oriented, environmentally-sensitive growth. [2]

Fig. a Master Plan of GIFT

Development

The primary focus of the development is the commercial development. The major space is being dedicated to the offices for business segments of national and international services, retail, community center, hotels etc. The emphasis is also given towards the housing facilities for the employees working at GIFT. The services that are offered at GIFT are of highest quality and comprehensive. It is being planned with good judgment in terms of the latest technology and global sustainability.

GIFT is incorporated with the internal infrastructures such as transportation, water supply & its treatment, integrated solid waste management by advanced waste collection and transportation system, fire-fighting system information & communication technology and control center.

III. SUSTAINABILITY MEASURES

GIFT has incorporated in itself the various intelligent and green measures, which contribute to the sustainable development of this city. The different measures undertaken are elaborated.

A. Land use

It had been planned based on high density development , considering that land is scarce resource. The Global Floor Space Index of 3.65 has been implemented in the entire GIFT area to achieve the envisaged density as part of its overall development. The figures pertaining to the land use is shown. (See Table-I).

B. Green Building Initiatives

Green Building (also known as sustainable building) refers to both a structure and the using of processes that are environmentally responsible and resource efficient throughout a buildings life cycle: from design, construction, operation, maintenance, renovation, and demolition.

It also has incorporated green and sustainability measures in terms of : a) reduction of wastage of energy, which will result in reduced energy bills, b) Construction of sky gardens or roof-top gardens, c) Increase in usage of non-conventional energy sources such as solar power, and also rain water harvesting, d) Planning and design according to climate, e) Other Green Building parameters such as structural design efficiency, materials efficiency, materials efficiency, indoor environmental quality enhancement, operations & maintenance optimization and waste reduction.

Another important aspect, which GIFT has implemented is the installation of district cooling system, which is a system of distributing heat generated in a centralized location for residential and commercial heating requirements, such as space heating and water heating. The heat is obtained from burning of fossil fuels, but increasing use of biomass, geothermal heating, and central solar heating is also being done. It has also been observed that district heating with combined heat and power is the cheapest way of cutting carbon emissions, and has one of the lowest carbon footprints of all fossil fuel generation plants. [5]

C. Landscaping

Over 34% of the land area in GIFT has been utilized as green and open spaces. This has resulted in the major landscaping of those areas which is ecologically and aesthetically matured. Planting of evergreen , flowering trees, columnar spread trees, ground-cover or lawn area, and continuous shrub masses, as well as the construction of landscape terraces, has also been done to accenture views where desirable.

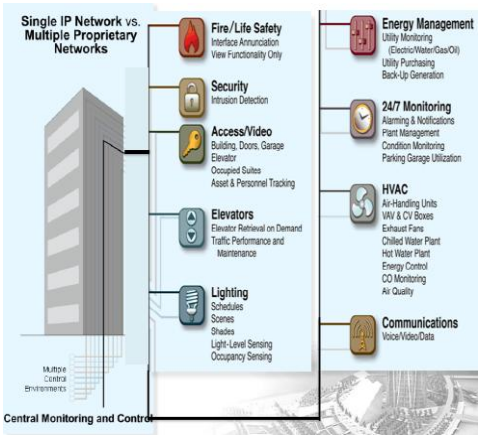

Fig. b Intelligent Building in GIFT

D. Water Supply and Sewerage Systems

The water requirement for the GIFT city is 20 MGD.The water sources from which GIFT draws its water are (a) Narmada Main Canal, (b) Recycling and reuse of waste water, and (c) Rainwater Harvesting. This has resulted in the city receiving 24x7 water supply. The concept of "zero discharge city"has been implemented, in which the waste water is treated and reused, which results in maximum utilization of water.

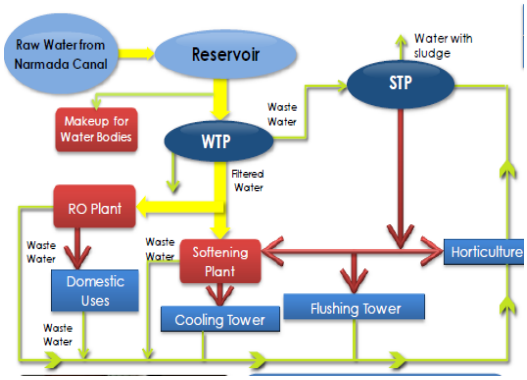

Fig. c. Smart Water Infrastructure

A perennial water front has been ensured through the construction of three barrages on the Sabarmati River, called Samruddhi Sarovar. The waterfront is 1km in length and 7m in depth, with its width varying from 82 m to 160 m. It is designed for the storage of drinking water, which can last for upto 15 days. [4]

Fig. d Samruddhi Sarovar

E. Solid Waste Management

The projected waste quantity of GIFT is 488 TPD. It aims at minimizing the impact on environment, human intervetion, space requirement, and less impact on health hazard. The GIFT city has automatic collection and transportation system. In this computer controlled system, the waste is being thrown into the disposal chute, and the waste is sucked through pipes at speed of 90 km/hr. The Plasma Gasification Technology is used for the waste treatment.

F. Transportation

The transportation is planned in such a way that it will encourage the reduction of greenhouse gas emissions from the vehicles in GIFT. It aims at zero accidents.

G. Energy efficiency

The efficiency are to be acquired by cooling systems and solar plants. The cooling systems facilitates in less energy consumption, more reliability, less impact on environment. A 10 MW solar plant has been installed within the city on pilot study. Many more plants of such capacities will be installed in near possible future as the city develops.

IV. CONCLUSIONS

As far as sustainability is concerned, GIFT reflects a sophisticated planning approach to ensure integration of Environmental concerns and Green Buildings, optimum usage of energy, water and construction materials. The project regenerates the area as high-quality, mixed use district of commercial, residential and open space facilities that optimize land and real estate values.

In this case study, we have seen the various methods and technologies which have been implemented and utilised in GIFT for the sustainable development of this project. Due to its efforts, GIFT has been presented with multiple awards and honours, such as “Smart City of the Future” b Cisco Technology Awards, 2014 and many others. GIFT stands as a model for successful sustainable development of industrial and commericial areas, and it will be seen in the future as a model, based on which the development of the other smart cities will take place.

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