

Can Shimla Become A Smart City: A Comparative Study With The Swedish Smart City Project.

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Abstract: A developed urban area that creates sustainable economic development and high quality of life by excelling in multiple key areas; economy, mobility, environment, people, living and government .Excelling in these key areas can be done so through strong human capital, social capital and ICT infrastructure. The smart cities is a collaboration of technology into strategic approach of sustainability. The programme will provide the city where information technology is the principal infrastructure and the basis for providing the essential services to the residents. This article is focused on the comparison of success stories of the Swedish government in stepping forwards as the pioneers of giving smart city solutions to the world and comparing with an entirely different setting. The major focus of the article is on the solid waste management of Sweden and its comparison with the settings of a developing country such as India. In India, our prime focus is on finding out solutions for making Shimla as a smart city because waste generation is an inevitable consequence of industrialization and urbanization. Shimla has ample amount of land which can be utilized for managing solid waste. MC Shimla is currently dumping the waste in the outskirts of the city in the sanitary landfills. The state government along with the National Green Tribunal are formulating a plan for the appropriate reuse and recycle of the municipal waste. The plan of the Swedish waste management can be adopted provided that there is a desirable community participation, inter- sectoral collaboration and the availability of sufficient funds for provision of appropriate technology. The will of the political leaders is the urgent need of the hour so that the city progresses in one direction, a direction of success.

Keywords: Shimla Smart city, Swedish waste management, Comparative analysis.

I. INTRODUCTION

A developed urban area that creates sustainable economic development and high quality of life by excelling in multiple key areas; economy, mobility, environment, people, living and government .Excelling in these key areas can be done so through strong human capital, social capital and ICT infrastructure. The concept of the smart city means differently to the different people. A smart city have different view point in India, to any other country such as Europe. As such no new way of fully defining the smart city is available. The imaginary picture of smart city consists of a long wish list of development with huge infrastructural facilities. A proper guidance across from every sphere would render a notable helping hand to the success of the mission of smart city. To live up to the aspiration of each individual, the proper growth is required at physical, social, institutional and economical grounds. The overall growth aims at the developing the entire ecosystem that stands on the four aspects as stated above. Although this in fact is a long term program, which aims at improving the core infrastructure of the city providing convenient and clean life style to life. It ensured the safeguard of the nature and avoiding any harm on environmental aspect. The objective of the smart city is to provide the improved life with sustainable environment. The focus of the program lies in providing the better infrastructure, with the commendable "SMART SOLUTIONS." The idea of the smart cities revolve around the compact areas, creating reliable plans as a source of aspiration to the people. The concept of smart city is indeed an appreciable idea of the government. The success of this project would be source of employment as well can be set as a example to create more smart cities.

The land used is promoted in accordance to area based developments as per 'unplanned areas' used up as per a range of compatible activities and land uses close to one another in the way utilizing the unused land. The smart city ensured some flexibility in land use and adopting the laws to provide protection as well. The plan includes walkable localities with less congestion, air pollution and proper local economy, promote interactions and ensure security. The road safety will be a topmost priority with the network created not only for vehicles and public transport, but also ensuring safety of pedestrians and cyclists and accessibility of necessary administrative services within walking or cycling distance.

Parks, playgrounds and recreational spaces are preserving and developing open spaces, to enhance the quality of life of citizens, reduce the urban heat effects in areas and generally promote eco-balance. - Increasingly rely on online services to bring about accountability and transparency, especially using mobiles to reduce cost of services and providing services without having to go to municipal offices form e-groups to listen

to people and obtain feedback and use online monitoring of programs and activities with the aid of cyber tour of worksites thus making governance citizen-friendly and cost effective.

Developing smart city requires many types of information, including geospatial information. Several method can be used to develop useful geospatial information. Several method can be used to develop useful geospatial information, i.e. terrestrial survey, photogrammetry, remote sensing using very high resolution satellite imagery. Green open space is the most important factor to be consider in the smart city. The population growth trend to the reduction of open space in the urban area both green open space and non-green open space. Increased urbanization lead to depletion of high percentage of natural resources consumption and waste generation, various initiatives proposing different framework approaches for Smart City concept that focus on the need for smart infrastructures, including smart energy grids and smart mobility systems. Taken this into consideration, project “Sus City” project takes an integrated and application oriented research. The importance of an intelligent transportation system in smart cities, the present studies propose that there is an urgent need to assemble, disseminate all the available information and academic and commercial ICT proposals to improve urban mobility, to make an active and exciting attempts to revitalize the city. The movement of pedestrians on carriage way of road cause traffic hindrance and increase the journey time, wastage of fuel and impact on traffic flow. Inadequate/unspecified pedestrians crossing cause traffic hazards leads to many accident. As per traffic police Shimla information about 149 minor/major accidents occurred during year 2016.

However, many scientists opine that success story of a smart city begins with the management of solid waste. The thought of Smart City Sweden began in 2016, with the aim to export solutions within environmental technology. In 2019, the project expanded to focus on Urban Planning, Digitalisation and Social Sustainability, in addition to the previous areas: Mobility, Climate, Energy and Environment. This article is focused on the comparison of success stories of the Swedish government in stepping forwards as the pioneers of giving smart city solutions to the world and comparing with an entirely different setting. The major focus of the article is on the solid waste management of Sweden and its comparison with the settings of a developing country such as India. In India, our prime focus is on finding out solutions for making Shimla as a smart city because waste generation is an inevitable consequence of industrialization and urbanization.

The Environmental Protection Agency is responsible to reduce the amount of waste and focuses on four waste streams that have a major environmental impact. Textiles, food, electronics and construction and removal of waste. Targets was set by the EPE of Sweden is the quantity of waste going to landfill, not including mining waste, must be reduced by at least 50 % by 2005 along with Zero waste vision. Some Interim targets was set by the EPE of Sweden such as the quantity of waste going to landfill, not including mining waste, must be reduced by at least 50 % by 2005, as compared with 1994 and a long-term vision of “Zero Waste”. Confidence is essential if the progress achieved is to be maintained. The total quantity of waste must not increase, and maximum possible use must be made of the resource that waste represents, while at the same time minimizing the impact on, and risk to, health and the environment. Reduced landfilling and increased recovery and recycling can largely be achieved by household sorting of waste at source.

Facilitating the prevention and reuse work of the municipalities. European Week for Waste Reduction”, which is also supported by the Swedish Environmental Protection Agency. The municipalities to collaborate on reuse at recycling centers with various charity organizations with aim at runs a project for one week in November when activities, aimed at reducing the amount of waste and the quantity of hazardous substances in waste are arranged all over Europe. . The project runs till 2016.

Material recycling plays a key role in a sustainable society. Waste must be viewed as a resource and handled carefully. Material recycling means that separated materials can replace other production or construction materials. That leads to energy savings. Interim targets was set such as 50 % of household waste is to be recycled by recovery of materials, including biological treatment at least by year 2010. Secondly, food waste from households, restaurants, institutional catering and shops which contributes about 35 % is to be recycled by biological treatment by 2010. Thirdly, by 2010 food and similar waste from food manufacturing facilities etc are to be recycled by biological treatment. This target applies to waste arising without being mixed with other waste, whose quality renders it suitable for use as fertilizer after treatment.

Sweden has one of the best recycling rates in the world, with an almost 50 % material recycling rate. The result is that less than 2 percent of waste ends up in landfills, and the remaining 48 % is converted into energy. Material recovery comprises recycling whereby other manufacturing or construction materials are substituted. Kinds of waste, such as ash and excavated materials, may be suitable for use as ballast in road building, where it can replace gravel and crushed rock. The quantity of household waste undergoing materials recovery is increasing for all types of material except refrigerators and freezers. Scrap, recycled paper and recycled plastics can replace a certain amount of new raw materials in manufacture.

The efficient waste management in Sweden, the vast majority of this household waste can be recovered or reused. Over two millions ton of household waste is treated by waste to energy in Swedish plants every year. These plants incinerate a similar quantity of waste from industries as well. Waste incineration provides heat corresponding to the needs of 810,000 homes, around 20 per cent of all the district-heating produced. It also provides electricity corresponding to the needs of almost 250,000 homes. Waste to energy is a well-established source of energy in Sweden. The first incineration plant started operation in during the later part of the 1940s, the district-heating network was expanded in connection with the extensive construction of new buildings following the Second World War.

Waste should be managed based on its properties, and this means that there is no standard solution for choosing the treatment method. The different methods material recycling, biological treatment, and waste to energy must be combined to achieve the best results. The choice of treatment method varies based on type of waste, local and geographical conditions and how well the waste is source separated. When all the factors are considered, the objective is the optimum environmental and social benefit. The waste generated by households, industries and other activities reflects our consumption habits. Hazardous substances found in commodities and products persist when the products become waste. This places tough demands on all waste management, so that harmful substances are not spread. During incineration, many harmful substances break down and the residual substances are bound in ash, which makes them easier to control, handle and recycle. Waste incineration in Sweden produced as much energy in 2007 as 1.1 million m³ of oil, which reduces CO₂ emissions by 2.2 million ton per year, as much as 680,000 petrol-powered cars emit in a year. The waste sector will reduce its emissions of greenhouse gases by 76 % during the years 1990 - 2020, according to the Climate Committee's forecast. Despite waste incineration increasing, emissions have fallen. For example, emissions of heavy metals from waste incineration into the air have fallen by almost 99 % since 1985. In addition, the total emissions of dioxins from all of the country's waste incineration plants have fallen from around 100 g to less than 1 g during the same period.

Shimla is India's one of the most popular and biggest hill-stations, is located in the northwest Himalayas in Himachal Pradesh. It is located at latitude of 21° 13 'N and longitude of 81° 26' E, having an altitude of 2130 - 2205 meters above mean sea level. For devising an appropriate solid waste management system in a town, it is important to know the quantity and characteristics of solid waste generated. For quantifying MSW generation in Shimla, per capita waste generation factor was arrived through following steps:

a) Solid Waste management Manual prepared by Ministry of Urban Development, Govt. of India was referred and per capita generation factor corresponding to the present population of Shimla was identified. This corresponds to approximately 0.61 Kg/ day as the population of the city is more than 5,00,000.

b) Based on the total quantity of waste reaching the existing waste processing site (year 2015)

According to MC Shimla about 134 ton waste quantity per day reaches the existing waste processing site. Based on the discussion with various NGOs working in Shimla and MC, Shimla officials, it has been concluded that the existing waste collection is only 65 %. The total waste generation then can be estimated as (134 /0.65 t/day) or 206 t/day. Per capita waste generation factor = $206000/343053 = 0.6004$ kg/capita/day

For design purpose, higher per capita waste generation factor has been considered. As per capita generation factor of 0.65 kg/day is considered here. Based on this factor, the projected waste generation for the year 2021, 2026, 2031 and 2036 in Shimla is estimated to be 271, 313,360 and 413 tonnes per day respectively.

Shimla generates about 206 tons of MSW per day. At present, MC, Shimla is managing MSW generated from MC area and SADA areas of Dhalli, Kasumpti and Tutu only. Total waste generation from these areas is around 60 tons per day. Out of which tons per day (65 %) is collected and processed at the existing waste processing site in Darni ka Bagicha. For collection of waste, MC, Shimla has provided dustbins and dumper placer containers at different places in the city. However, only the Mall and the Ridge areas appear cleaner. Remaining areas predominantly residential and commercial localities namely, Subzi Mandi, Lower Bazaar, Jakhu, Kaithu, Sanjauli, Kasumpti, Boileauganj and Summer Hill witness acute solid waste problem.. As more than 80 % areas are not accessible by vehicles, therefore it is imperative to enforce the Door-to-Door collection scheme strictly.

Presently, in Shimla door-to-door waste collection system is operational in only 2300 houses out of a total of around 40,000 households in Shimla. This accounts for around 8 % of the total number of houses. In remaining 92 % of the area, residents directly place their waste in nearest concrete dustbins or dumper placer bins placed by MC, Shimla. Door to door waste collection is being carried out by three NGOs in Shimla, namely, Green Carpet, Sulabh International, Pragati Sudhar. Green Carpet also collects waste from commercial areas like Mall road, Subzi Mandi.the green carpet vehicle picking up waste from commercial area.

Currently, waste collected by NGOs through door step collection system is either placed in the nearest concrete dustbin or nearest dumper container. Similarly, waste collected through street sweeping is placed in these dustbins. There are about 206 dumper placer container placed in Shimla. Out of the total, 142 containers are

placed in MC area and 64 dumper containers in SADA areas. In addition to the above there are 93 small dustbins placed for disposal of waste by residents in Shimla.

There are seven Health Care centres and 39 nursing homes, dispensaries and clinics in Shimla. The biomedical waste generated from these Health Care centres is stored separately in different colour coded bags and domestic waste is stored in buckets. The domestic waste is placed in the nearest dumper container by safai karamchari of the health Care Centre. A NGO called 'Green Carpet' is engaged by MC, Shimla to collect and transport Bio-medical waste in covered Cargo-Maruti Van to the centralized Incinerator facility in Shimla.

Shimla has ample amount of land which can be utilized for managing solid waste. MC Shimla is currently dumping the waste in the outskirts of the city in the sanitary landfills. The state government along with the National Green Tribunal are formulating a plan for the appropriate reuse and recycle of the municipal waste. The plan of the Swedish waste management can be adopted provided that there is a desirable community participation, inter- sectoral collaboration and the availability of sufficient funds for provision of appropriate technology. The will of the political leaders is the urgent need of the hour so that the city progresses in one direction, a direction of success. However, due to tough terrain it may be difficult to improvise and implement the smart city project. The people may not be willing for a big change as 80% of the population is tribal and they may not welcome this change. Hence, it becomes imperative for the local political leaders to involve them and make them understand that this change is necessary.

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