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Envisioning adaptations towards a zero-carbon well-integrated urban transport network for Johannesburg communities: the case study of Orange grove

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Abstract

Since the dawn of the industrial revolution, intensive use of fossil fuels has caused high levels of greenhouse gases to build up in earth's atmosphere; this in turn has triggered global warming and changing climatic patterns. Scientists have linked climate change to adverse weather patterns like unpredictable rainfall, drought, rising global temperatures, melting glaciers, and changes in ocean salinity. South Africa has experienced severe droughts in different parts of the country in recent times where it has been speculated that climate change could be the cause. South Africa is also experiencing other issues like rapid urbanization, poverty, unemployment, food and energy insecurity, and inequality. In recent post-apartheid years, South Africa has aimed to address these issues and reconnect previously disadvantaged areas to better economic and social opportunities. The Corridors of Freedom is one such initiative which has taken up the task of re-imagining the City of Johannesburg through spatial transformation and transit-oriented development. The intention of the initiative was to be inherently sustainable, aiming to reduce urban sprawl through densification, promotion of public transport, cycling and walking and reduction of private vehicle use. However, being largely fossil fuel dependent, the current and planned transit systems are unsustainable both in terms of climate change impacts and the depletion of fossil fuel resources.

This study investigates the potential of suburban neighborhoods to be transformed through retrofitting with interventions that mitigate climate change. The purpose of such transformation would be to create Eco-Cities and reduce fossil fuel dependency. At a social level, this explorative study examines the benefits and challenges of effecting transitions towards sustainable human behavior and lifestyles including racial and economic integration. At an environmental and economic level, the requirements of retrofitting a suburban neighborhood for such a change is provided. As part of the research strategy, scenario planning is used to envision a zero carbon, well-integrated transit lifestyle by 2050. Global zero carbon transport interventions were explored and through a process of elimination the most appropriate interventions were selected for Orange Grove. This process was assisted through site observations, secondary data analysis and semi structured interviews. This report informs the interested reader, City of Johannesburg municipal officials and Orange Grove residents on alternative energy options for providing clean and efficient transport. It is hoped that insights gathered from this study can contribute not only to the adaptation towards zero-carbon and well-integrated lifestyles in suburban Orange Grove but could be applied to similar communities in Johannesburg and beyond.