Chapter 4
Increase of Transportation Efficiencies and Emission Reduction within a City

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ABSTRACT

On a worldwide scale population is increasing, necessitating efficiencies in transportation essential for a modern and healthy environment. Most cities have already reached their limitations on population and vehicle movement. Street layouts and cycling lanes, which were initially planned for a certain number of inhabitants, are now not able to cope with increasing demand. The same applies for fresh water supply and effluent treatment which have limitations also. With an increasing population in urban areas, restriction levels in these regions can be reached very quickly, creating a problem which needs to be addressed. A smarter city can only be developed when there is pre-planning on all of these issues, when there is an understanding of newly developed human behaviours, and when new inventions and technologies in urban areas can adapt to these changes.

INTRODUCTION

In order to develop a good eco-society, there are a number of elements that need to be in place before a city can be labelled as a “smart city”. Refuse collection, recycling infrastructure and recycling amenities, low smog concentration, traffic flow of
vehicles and people, substantial investment in renewables, and energy efficiencies will all have a major influence in achieving a smart city status.

Industrially developed cities are fighting against pollution by increased decarbonisation programmes. Supporting energy efficient systems with the help of renewable energy technologies, while at the same time carefully targeting the spending of those investments, is a key part of this strategy. This chapter will focus mainly on methods and technologies in the transportation sector which until now have been ignored but which play a major role in the pollution of cities. Transportation emissions are a major contributor to smog levels and therefore need to be addressed in any assessment of this problem.

In order to have a modern eco-society, planners and engineers have to reassess their city in every area, evaluate required steps and take critical action against those problems identified. This chapter will highlight potential pitfalls and will demonstrate state of the art developments across the globe, enhancing a city’s lifestyle and associated environmental management system accordingly.

**BACKGROUND**

Urban population is increasing at an alarming rate which, over time, will result in traffic flow problems, increased pollution density, crowded public transport, exhaustion of land availability for future property developments, and consequently a reduction of available social parks and woodlands. Reduced green zones in built-up areas result in a subsequent increase in CO₂ emissions, particles measured in parts per million (PPM), and noise levels.

According to the “Bevölkerungsfonds der Vereinten Nationen”, the world population is predicted to reach 9.6 billion people by 2050, by which time more than two thirds of this population (approximately 6.4 billion inhabitants) will be residing within urban areas and cities (Malte Laub, 2015). This shocking prediction highlights the urgent need for more efficiency in cities, smarter traffic planning and innovative living accommodation.

In India, 30 people currently move from a rural area to a city every minute. This growth trend is expected to continue for the next 20 years. Experts are predicting that there will be a development of approximately 500 new cities within India in the next two decades (Heckel, 2015). This movement of people from rural to urban will result in enormous lifestyle changes, with a much greater proportion of people’s lifestyle requirements having to be met in a smaller living space.

- **Issues:** With the constant growth of cities on a global scale, ownership of properties is becoming more limited and requires more land area. This de-
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