

However, the marginalization of NMT continues to be evident from the metro development plans that they share with the public.

This necessitates a change in the way transportation is planned for future years. The city policy makers are in a dilemma on whether to focus on the provision of good-quality travel service or aim to control local and noise pollution or target the low carbon pathways to control carbon emissions. The present book has evolved from this “policy makers’ dilemma.”

Started off with the regional research initiative on energy, environment, and climate change by Sida (Swedish International Development Cooperation Agency) about 15 years ago, our research work on the transportation sector has been long and covered various important aspects including greenhouse gas mitigation; evaluation of alternative and cleaner options in transportation; barrier analysis; identification of appropriate policy measures to implement the alternatives; means to promote NMT; prioritization of alternatives, barriers, and policy measures using multi-criteria framework and AHP; integration of environmental concerns into long-term transportation planning; and incremental cost analysis to find the carbon competitiveness of the sector and sustainable mobility and its link to sustainable development goals (SDGs). These works, published by various agencies and journals, form the core material for this book. They have been cited at appropriate places along the text of this book. Although we are benefitted from the support of various international agencies such as Sida, the United Nations Development Program (UNDP), and the Institute for Global Environmental Strategies (IGES), Japan, at various stages in conducting the research, the opinions contained in this book are those of the author and should not be attributed to any of these agencies or its associates.

The material presented in this book has been developed over 15 years of research. The research work has evolved over time and followed closely the transformation of urban transportation. While this could address the issues as they evolved, some of the earlier works dated early 2000 may appear outdated for the sake of numbers. In the case of simple statistics, they have been updated with the most recent available information. However, if they represent an analysis aiming at comparative presentation of alternatives/scenarios, they have been left intact as the old dated information would not make any difference in the interpretation.

This book addresses the problems of urban transportation comprehensively by identifying potential alternatives, barriers for their implementation, policies for the implementation, and comparative analysis of different approaches of planning such as local pollution mitigation approach and global emission control approach. It considers the environmental dimension of sustainability and proposes a new and more effective policy framework. Such a framework would be of immense help to city and transportation planners and policy makers.

This book, in its attempt to develop a policy framework that is more effective, presents three different methodologies for prioritizing alternatives (barriers and policy measures), viz., analytic hierarchy process (AHP), multi-criteria group decision making with multi-stakeholder consultative process, and multi-criteria

analysis with supra user and differentiated weights based on potential contribution toward the objective. Case studies are included for these three approaches which could help the reader in comprehending the methodology.

Starting with the basic planning and the need to look at sustainability principles (Chap. 1), this book goes on exploring the trends in urban transportation (Chap. 2). Difficulties in service provision owing to the changing urban dynamics are analyzed, and the environmental and climate implications of urban transportation are presented in Chap. 3. Chapter 4 presents all alternative options for environmental inclusion in transport and proposes a methodology for a comprehensive assessment of the same by means of energy-saving potential, emission reduction potential, and economic viability on life cycle operation. Chapter 5 identifies the problems in promoting NMT which can make commendable contributions toward environmental sustainability and social equity. Chapter 6 identifies barriers for NMT implementation and other cleaner alternatives such as clean fuels and alternative technologies. Such barriers have been prioritized using the popular analytic hierarchy process (AHP) so that the policy maker can easily pick a set of barriers that need to be addressed.

Chapter 7 identifies policy measures that are essential for the removal of barriers for the implementation of NMT and other cleaner alternatives in transport. These policy measures have been prioritized using two distinct methods of multi-criteria analysis. Chapter 8 presents all the regulatory and economic instruments that can be applied for the sustainability of urban transportation. Such a presentation is further augmented by various examples from all over the world. Means to integrate environmental concerns into urban transportation planning are attempted by developing a dynamic optimization model with environmental and carbon emission constraints. Chapter 9 applies the optimization model to analyze the co-benefits and carbon abatement costs of local emission control strategies and global emission control strategies.

This book aims to help the policy makers by suggesting and demonstrating a new policy framework to integrate sustainability and climate change mitigation into urban planning.

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