ACKNOWLEDGEMENTS

It is with great delight that I acknowledge my debts to those who have contributed to the success of my research work. I am deeply indebted to my research guide Dr. Prasoom Dwivedi for the continuous support of my Ph. D study and related research, for his patience, motivation, and immense knowledge. His guidance helped me in all the time of research. His rich expertise, considerate nature and valuable inputs were a real driving force to my research work. Without his able guidance this work would not be possible.

I express my gratitude to Dr. Anirban Sengupta the Dean, CoEM for his blessings and encouragement. Furthermore, I express my appreciation to my co-guide Dr. Ankur Mittal and external guide Dr. S C Bajpai. I have benefitted a lot from their critical comment, advice and constant support.

I would also like to thank Faculty Research Committee members especially Dr. Tarun Dhingra, Dr. Anil Kumar, Dr. T Bangar Raju, Dr. Neeraj Anand, Dr. Anshuman Gupta, Dr. K K Pandey and Dr. Ashish Tripathi for their insightful comments and encouragement, but also for the hard question which incented me to widen my research from various perspectives.

I am especially thankful to Sh. G K Yadav ADG, DoT, Dr. Geo Jos Fernandez and Dr. Alka Dwivedi of UPES for their continual guidance and support.

I express my gratitude and thanks to Dr. J S Sarma Ex Chair man, TRAI, Sh. P K Panigrahi, Retd. Sr. DDG DoT, Sh. Ram ji Prasad GISFI, Sh. Robert J Ravi Advisor, TRAI, Dr. Gufran Beig Scientist G, IITM ,Sh. Rajan S Mathews, Director General COAI, , Sh. Praveen Varshney Principal Chief Engineer (Electrical), BSNL, Sh. A S Chandel Ex PGM(EW) BSNL, Sh.Surabh Chaturvedi Director (EW), DoT, Sh. T R Dua, TAIPA, Sh. S Sairam Prasad Ex CTO Bharti Infratel, Sh. Ramesh Babu Guptha Paluri, Head Energy and Opex Optimization Bharti Airtel and Sh. Mrinmoy Chattaraj, Green Peace for giving profound ideas and views about energy conservation and carbon emission in telecom sector.
My sincere thanks also goes to Sh. Parag Varshneya, Director TERM Cell, DoT, Sh. Sanjay Agarwal JTO (E), Sanchar Bhawan, Sh. Lenin Ram, Sh. Sathyanarayan SDE(E) Chennai, Sh. Prakash Kumar Samantsinghar M/s Educare, Sh. Govind Bagora, Sh. Naveen Kumar BSNL to help in data collection for this study. A special word of appreciation to the SEEM intern Sh. Sachin Goyal of Delhi Technological University, staff of libraries of TERI, AIMA, UPES and IMT for their support.

I would like to express with special words of thanks to Sh. R K Pandit, Ex PGM BSNL, Sh. S K Bhalla, Director, DoT, Dr. Mohd Naved Khan, Associate Professor (Management), AMU, Dr. Vijay V Dhabarde, Nagpur and Prof. (Dr.) S Hasan Saeed, HoD, Integral University for inspiration and motivation for this research work.

I am also thankful to Dr. Sudhakar B Reddy, IGIDR, Mumbai, Dr. Bharat Bhushan Verma, IIM, Ahmedabad, Dr. R P S Tomer, Director, IPEM, Ghaziabad and Dr. Priya Gupta, Delhi University for their comments and support.

I am grateful to my officers and project team members specially Sh. G P Gupta and Sh. Rajiv Verma for facilitating to spare time for this arduous research task.

Last but not the least; I would like to thank my family: my parents and my teachers for supporting me spiritually throughout writing this thesis and my life in general.

A special thanks to my family. Words cannot express how grateful I am to, my parents for all of the sacrifices that they’ve made on my behalf. Their prayer for me was what sustained me thus far. I would also like to thank all of my friends who supported me in writing, and incented me to strive towards my goal. At the end I would like express appreciation to my beloved wife Suniti who spent sleepless nights with me and was always my support in the moments when there was no one to answer my queries. She does anything and everything to allow me to devote time for my research journey. I am greatly
indebted to my children Pragati and Utkarsh for their support for allowing me to spare time for my research pursuit.

C.S. Azad

Date: 31/03/2016
Place: Dehradun