

URBAN AND INDUSTRIAL AIR POLLUTION:
ENGINEERING AND STRATEGIC PLANNING FOR
ENVIRONMENTAL SECURITY

By

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CERTIFICATE

This is to certify that the thesis entitled “***Urban and Industrial Air Pollution: Engineering and Strategic Planning for Environmental Security***” being submitted by ***Mr. Suhail Mubarak Al Ghufli***, to the Indian Institute of Technology Delhi for the award of ‘Doctor of Philosophy’ in Civil Engineering is a record of the bonafied research work carried out by him under my supervision and guidance. He has fulfilled the requirements for the submission of this thesis, which to the best of my knowledge has reached the requisite standard.

The material contained in the thesis has not been submitted in part or full to any other university or institute for the award of any degree or diploma.

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ABSTRACT

This research focuses on issues related to environmental security and strategic level planning to assure a secured plan to protect the human health. The air quality parameters and emissions sources were used to evaluate the air quality status. Two models (WRF and AERMOD) have been used to simulate pollutants concentrations and GIS used to display the dispersion of those pollutants on the UAE map to provide better image to analyze the results. AERMOD is used to demonstrate four scenarios includes the current situation which is called Business As Usual (BAU) option, besides other options based on 25%, 50% and 75% of emission reduction options from power generation plants in respect of reducing the fossil fuel and replacing it by nuclear substance. Automobiles are the most prominent air pollution emission sources. The means of transportation needed to be replaced with environmental friendly transportation systems. Mass transportation system like metros, trains, public buses, may help reducing the pollution level. Also alternate fuel can be used for individual transportation.

The study showed the meteorological conditions are influencing the air quality which can be seen through urban heat island issue by comparing two cities in the UAE, Abu Dhabi and Dubai. The study highlights that the transportation sector is the most significant air pollution sources that affect the human health, followed by industrial activities and power generation sites. Alternative solutions aiming at 25% to 75% emission reductions in 30 years can be strategically implemented in different sectors. SEA implementation has been discussed to illustrate its dimensions to be applied to draw the environmental future aspects and to create strategic environmental vision for a country to minimize and reduce the consequences of environmental problems and devise an environmental security strategy that can improve and manage the related issues in local, regional and global levels. The study emphasizes the importance of the environmental security for our future generations and the need to include the environmental issues in the grand strategy to assure the environmental integration in the country.

Keywords: Air Pollution; Environmental Security; Geographical Information System; Air Quality Modeling; Strategic Planning.

LIST OF CONTENTS

	Page No.
List of Contents	I
List of Figures	IV
List of Tables	VI
Chapter 1:	
Introduction	1
1.1 Motivations for the Study	1
1.2 Objectives and Scope	2
1.3 Assumptions	3
1.4 Organization of the Thesis	4
Chapter 2:	
Literature Review	5
2.1 Ambient Air Quality Assessment	5
2.2 Air quality modeling	8
2.3 GIS as a tool for mapping predicted air pollutants concentration	12
2.4 Alternates for power generation-Nuclear facility	14
2.5 Health Impacts due to Air Pollution	14
2.6 Strategic Environmental Assessment	16
Chapter 3:	
Approach and Methodology	22
3.1 Defining the Study Area	23
3.2 Data Collection	23

3.3 Data Processing	24
3.4 Modeling and Simulation	24
3.5 Processing and Mapping of the Outputs using Geospatial Information System (GIS)	27
3.6 Strategic Planning and Decision Making	27
Chapter 4: Description of the Study Area, its Climate and Sources of Air Pollution	28
4.1 Brief Description of the Study Area	28
4.1.1 Geographical location of the Study Area	28
4.1.2 Political and Socio-Economic Setting of the Study Area	29
4.2 Seasons and Weather Patterns of the UAE	31
4.3 Pattern in the Climate Parameters	34
4.3.1 Temperature Profile	34
4.3.2 Precipitation Pattern	37
4.3.3 Wind Pattern	39
4.4 Urban and Industrial Sources of Air Pollution in UAE	42
4.4.1 The UAE's Population Growth	42
4.4.2 The UAE's Oil Production	43
4.4.3 Automobiles' Population in UAE	44
4.4.4 Power Generation in UAE	46
4.4.5 Other Industrial Sectors	49

	4.4.6 Alternates to the Fossil Fuel	51
Chapter 5	Assessment of Air Quality in UAE	52
	5.1 Data Quality	53
	5.2 Interpretation of Statistical Analysis Results	58
	5.3 Analysis of the Meteorological Data for UAE	59
	5.4 Analysis of Air Quality Data for Abu Dhabi	69
	5.5 Analysis of Air Quality Data for Fujairah	83
	5.6 Analysis of Air Quality Data for Dubai	89
Chapter 6	Modelling and Simulation with GIS Application	99
	6.1 Emission Data Sources and Application of WRF	99
	6.2 Local data sources collection and preparation	106
	6.3 Validation of Emission Inventory	107
	6.4 Application of AERMOD for Air Quality Modeling	114
	6.5 Input Data for Air Quality Modeling	115
	6.6 AERMOD Initialization	115
	6.6.1 Emissions Inputs	116
	6.6.2 Meteorological Inputs	117
	6.6.3 Elevation Inputs	117
	6.7 Background Concentrations	117
	6.8 Model Evaluation	118
	6.9 Monitoring Data	118

	6.10 Air Quality Background Values and Standards	125
	6.11 Mapping of the Air Quality Modeling Results on GIS	126
Chapter 7:	Nuclear Facility Site Security	140
	7.1 Why the UAE is building nuclear power plants?	140
	7.2 SEA and SSA	142
	7.3 Aims and Objective	146
	7.4 Hypothesis	150
	7.5 Original Contributions of Knowledge	151
	7.6 Methodology and Approaches	153
	7.7 Conclusion	161
Chapter 8:	Strategies for Environmental Security	162
	8.1 The Population	163
	8.2 The Environmental Co-Operative and Stability	164
	8.3 Sustainable Development and Management	164
	8.4 The National Instrument of Powers (IOPs)	164
	8.5 Education	165
	8.6 Technology	165
	8.7 Strategic Environmental Assessment (SEA) and Environmental Policy Integration (EPI)	166
	8.8 National Environmental Policy (NEP)	166
	8.9 The UAE Supreme Environmental Council.....	167
	8.10 Modeling As Planning Too	170

Chapter 9:	Summary and Conclusions	171
References		
Annexure-A	Site Descriptions	174
Annexure-B	Details of Air Quality Model Run	
Annexure-C	Carbon Monoxide AERMOD Output Summary	