

## TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
<b>1</b>	<b>INTRODUCTION</b>	
	Executive Summary .....	S-1
1.1	Preface .....	1-1
1.2	Findings and Conclusions .....	1-19
1.3	Energy Policy Objectives and Recommendations .....	1-33
<b>2</b>	<b>ISSUE REPORTS</b>	
2.1	Promoting Energy Industry Competition .....	2-1
2.2	Energy and Economic Development .....	2-15
2.3	Energy and the Environment .....	2-38
2.4	Energy and Transportation .....	2-60
2.5	Preserving Energy-Related Public Benefits Programs .....	2-98
<b>3</b>	<b>ENERGY RESOURCE ASSESSMENTS</b>	
3.1	Forecast Summary .....	3-1
3.2	Energy Efficiency .....	3-10
3.3	Renewable Energy .....	3-40
3.4	Electricity .....	3-80
3.5	Natural Gas .....	3-153
3.6	Petroleum .....	3-182
3.7	Coal .....	3-208
<b>4</b>	<b>COMPLIANCE WITH THE STATE ENVIRONMENTAL QUALITY REVIEW ACT .....</b>	<b>4-1</b>

(Appendices available upon request)

## TABLES

<b><u>Table Number</u></b>	<b><u>Title</u></b>	<b><u>Page</u></b>
<b>SECTION 1.1</b>		
1	New York Energy Prices .....	1-9
<b>SECTION 1.3</b>		
A-1	Participants in Interest Group Meetings During Energy Plan Development .	1-45
A-2	Commentors to Draft State Energy Plan .....	1-46
<b>SECTION 2.3</b>		
1	Ozone Level Exceedance in New York .....	2-41
<b>SECTION 2.4</b>		
1	Energy Benefits of ITS Projects. ....	2-82
2	Possible Transportation Actions to Reduce Emissions .....	2-91
3	Potential Ozone Precursor Emission Reductions .....	2-92
4	Potential Energy Reductions .....	2-93
5	New York TEA-21 New Start Projects with Funding Authorizations .....	2-94
<b>SECTION 2.5</b>		
1	New York State’s Public Benefits Program Goals .....	2-100
2	Public and Private Utility Sponsored Public Benefits Programs in NYS ..	2-104
3	Summary of New York Energy \$mart Program Results .....	2-108
4	WAP Savings Summary .....	2-112
<b>SECTION 3.1</b>		
1	Annual Average U.S. EIA Growth Rates of Economic Variables .....	3-2
2	New York State Forecasts .....	3-4
3	Energy Demand in New York State .....	3-5
4	Energy Prices in New York State .....	3-8
<b>SECTION 3.2</b>		
1	Energy Efficiency Spending in New York State .....	3-13
2	Utility DSM/SBC Spending with Actual and Projected Achievements ....	3-15
3	Select Utility Energy Efficiency Activities .....	3-16
4	NYSERDA-Administered SBC Energy Efficiency Spending with Projected and Actual Achievements .....	3-17
5	Major New York Energy \$mart <sup>SM</sup> Commercial and Industrial Energy Efficiency Programs .....	3-18
6	Major New York Energy \$mart <sup>SM</sup> Residential and Low-Income Energy Efficiency Programs .....	3-19
7	LIPA Clean Energy Initiative Actual and Projected Spending and Achievements for Energy Efficiency Programs .....	3-20
8	Major LIPA Clean Energy Initiative Energy Efficiency Programs .....	3-21
9	NYPA Energy Efficiency Programs Actual and Projected Investment and Results .....	3-22
10	Major NYPA Energy Efficiency Programs .....	3-23

<b><u>Table Number</u></b>	<b><u>Title</u></b>	<b><u>Page</u></b>
11	Expected Annual Energy Savings & Air Emission Reductions from Energy Code Amendments .....	3-26
12	List of Key Barriers to Energy Efficiency .....	3-34
13	Statewide Cumulative Electric and Summer Peak Demand Reductions ....	3-35
14	Cumulative Air Quality and Economic Benefits from Statewide Electricity Savings .....	3-36
15	Preliminary Technical Potential Results by Sector .....	3-37

### **SECTION 3.3**

1	Primary Energy Use in 1999 in New York State and in the U.S. ....	3-43
2	Contribution of Renewable Energy Sources to New York State Electricity Supply .....	3-44
3	2001-2006 New York System Benefits Charge Funding for Renewable Energy .....	3-49
4	Technical Potential for Windpower in 2022 .....	3-60
5	Technical Potential for Hydropower in 2022 .....	3-63
6	Biomass Energy Resources .....	3-64
7	Biopower Technologies .....	3-65
8	Technical Potential for Biopower in 2022 .....	3-66
9	Technical Potential LFG-to-Electricity in 2022 .....	3-69
10	Technical Potential for PV in 2022 .....	3-71
11	Technical Potential for Low-Temperature Solar in 2022 .....	3-72
12	Technical Potential for Fuel Cells in 2022 .....	3-74
A	Summary of Selected State-Level Initiatives .....	3-78
B	Hydroelectric Relicensing Schedule in New York State .....	3-79

### **SECTION 3.4**

1	Retail Access Penetration in New York State .....	3-81
2	Wholesale Price Changes in New York State .....	3-91
3	Article X Project Status .....	3-95
4	Existing Transmission Line Voltages and Circuit Miles .....	3-101
5	Major Interface Limits .....	3-101
6	Interpool Transfer Capabilities .....	3-103
7	Fuel Mix Based on Capacity of NYS Installed Units .....	3-105
8	Fuel Mix Based on Energy Produced for the New York Electricity System	3-105
9	Operating Nuclear Power Plants in New York State .....	3-109
10	Projected Reserve Margins with No Additional Resources .....	3-120
11	Fuel Mix Changes Based on Capacity of Installed Units .....	3-121
12	Generation Changes by Fuel Type .....	3-121
13	Relative Projected Wholesale Energy Price Index Changes .....	3-122
14	Projected Emission Changes/Emission Index Changes (Construction) ....	3-123
15	Projected Reserve Margins .....	3-126
16	Installed Capacity .....	3-126
17	Projected Peak Loads .....	3-127
18	Percent of Load Covered by Local Generation .....	3-127
19	Fuel Mix Changes Based on Capacity of Installed Units .....	3-129
20	Generation Changes by Fuel Type .....	3-129
21	Relative Projected Wholesale Price Index Changes .....	3-130
22	Projected Emission Changes/Index Changes (Reference Resource) .....	3-131

<b><u>Table Number</u></b>	<b><u>Title</u></b>	<b><u>Page</u></b>
23	Renewable Energy Scenario Cumulative Capacity . . . . .	3-133
24	Comparison of Generation Mix Based on Energy Produced between Renewable Energy and Reference Resource Scenarios . . . . .	3-135
25	Premium Cost for Renewable Energy . . . . .	3-137
26	Comparison of NO <sub>x</sub> and SO <sub>x</sub> Emissions . . . . .	3-140
27	Comparison of Generation Mix Changes Based on Installed Capacity between the Nuclear License Retirement and Reference Resource Scenarios . . . . .	3-143
28	Comparison of Generation Mix Based on Energy Produced between the Nuclear License Retirement and Reference Resource Scenarios . . . . .	3-143
 <b>SECTION 3.5</b>		
1	Changes in Annual Maximum Gas and Corresponding Oil Consumption for Electricity Generation . . . . .	3-175
2	Percentage of Annual Electric Generation Requirements that Could be Met by Gas - Downstate Area . . . . .	3-176
 <b>SECTION 3.6</b>		
1	Article X Projects Petroleum Profile. . . . .	3-203
2	New York State Petroleum Demand and Price Forecast . . . . .	3-205
 <b>SECTION 3.7</b>		
1	2000 United States Coal Production, Use, and Prices . . . . .	3-208
2	2000 United States Coal Production by Coal-Producing State . . . . .	3-209
3	United States Coal Production, 2000. . . . .	3-210
4	Estimate of Recoverable Reserves of Coal in United States . . . . .	3-211
5	United States Coal Mining Statistics. . . . .	3-212
6	Coal-Fired Generating Units in New York State . . . . .	3-214
7	Average Delivered Cost of Coal to New York State Electric Utility Plants	3-215
8	2000 Average Delivered Cost of Coal to New York State Electric Utility Plants . . . . .	3-215
9	Origin of Domestic Coal Delivered to New York State by Method of Transportation, 1999 . . . . .	3-215
10	Emission Rates for Electric Generation Plants. . . . .	3-218
11	New York State Coal Demand and Price Forecast . . . . .	3-221

## FIGURES

<b><u>Figure Number</u></b>	<b><u>Title</u></b>	<b><u>Page</u></b>
<b>SECTION 1.1</b>		
1	New York State Primary Energy Use per Unit of Gross State Product . . . . .	1-6
2	New York State Primary Energy Use and Gross State Product . . . . .	1-7
3	New York State Primary Energy Use . . . . .	1-7
4	New York State Energy-Related CO <sub>2</sub> Emissions . . . . .	1-8
5	New York State Electric Generation & Sales . . . . .	1-8
<b>SECTION 2.2</b>		
1	End-Use Energy Prices for Selected Fuels . . . . .	2-25
2	Changes in Price for Selected Fuels . . . . .	2-26
3	All-Sector Electricity Price . . . . .	2-27
4	NYS Average Revenue per Kilowatthour . . . . .	2-29
5	Residential Natural Gas Price Components for Selected States . . . . .	2-31
6	Commercial Natural Gas Price Components for Selected States . . . . .	2-32
7	Home Heating Oil Components for Selected States . . . . .	2-33
8	Components of Commercial #2 Distillate for Selected States . . . . .	2-34
9	Components of Gasoline Price for Selected States . . . . .	2-35
10	Components of Diesel Fuel Price for Selected States . . . . .	2-36
<b>SECTION 2.4</b>		
1	New York State Existing & Forecasted Daily Vehicle Miles . . . . .	2-61
2	New York Metro Region Existing & Forecasted Daily Vehicle Miles . . . . .	2-61
3	ROS Existing & Forecasted Daily Vehicle Miles . . . . .	2-62
4	Daily Person Trips, 1995 Nationwide Personal Transportation Survey . . . . .	2-62
5	Journey-to-Work: 2000 Census, NYC and NYS . . . . .	2-63
6	Journey-to-Work, 2000 Census, NYS and National . . . . .	2-64
7	Comparison of 1993 and 1997 Commodity Flow Survey . . . . .	2-66
8	State Energy Consumption Per Capita . . . . .	2-74
9	Statewide Mass Transportation Operating Assistance (STOA) Funding . . . . .	2-75
10	STOA Program - Statewide Ridership . . . . .	2-76
11	STOA Program - Projected Ridership . . . . .	2-76
12	1997 Shipment Characteristics by Mode from NYS to All Other States . . . . .	2-79
13	New York E-Z Pass Tag Holder Trend . . . . .	2-81
14	AFV Acquisition Plan . . . . .	2-86
<b>SECTION 2.5</b>		
1	Aligning and Balancing the Goals of Energy Customers . . . . .	2-101
<b>SECTION 3.3</b>		
1	Grid-Connected Electricity Generation from Renewable Sources . . . . .	3-45
2	Federal R&D Spending in 1999 Dollars . . . . .	3-47

<b>Figure Number</b>	<b>Title</b>	<b>Page</b>
<b>SECTION 3.4</b>		
1	Peak Demand . . . . .	3-116
2	Total Electricity Requirements . . . . .	3-116
3	Average Retail Electricity Prices, 2000-2006 . . . . .	3-117
4	Average Retail Electricity Prices, 2000-2021 . . . . .	3-117
5	Renewable Resource Scenario vs. Reference Resource Scenario (Indexed) . . . . .	3-136
6	Renewable Resource Scenario vs. Reference Resource Scenario (SO <sub>2</sub> ) . . . . .	3-138
7	Renewable Resource Scenario vs. Reference Resource Scenario (NO <sub>x</sub> ) . . . . .	3-138
8	Renewable Resource Scenario vs. Reference Resource Scenario (CO <sub>2</sub> ) . . . . .	3-139
9	Nuclear License Retirement Scenario vs. Reference Resource Scenario (Reserve) . . . . .	3-142
10	Nuclear License Retirement Scenario vs. Reference Resource Scenario (Index) . . . . .	3-144
11	Nuclear License Retirement Scenario vs. Reference Resource Scenario (SO <sub>2</sub> ) . . . . .	3-145
12	Nuclear License Retirement Scenario vs. Reference Resource Scenario (NO <sub>x</sub> ) . . . . .	3-145
13	Nuclear License Retirement Scenario vs. Reference Resource Scenario (CO <sub>2</sub> ) . . . . .	3-146
<b>SECTION 3.5</b>		
1	U.S. Natural Gas Consumption . . . . .	3-158
2	NYMEX Average Bid Week Prices . . . . .	3-160
3	U.S. Gas Production . . . . .	3-161
4	Gas Rotary Rigs in Operation . . . . .	3-161
5	LNG Imports . . . . .	3-163
6	Projected Total NYS Gas Demand . . . . .	3-173
7	NYS Outlook Case Natural Gas Demand . . . . .	3-173
8	Projected NYS Core Market Gas Demand . . . . .	3-174
9	Projected NYS Electric Generation Market Gas . . . . .	3-178
10	Projected U.S. Natural Gas Wellhead Prices . . . . .	3-179
11	Projected NYS Residential Gas Prices . . . . .	3-179
12	Projected NYS Commercial Gas Prices . . . . .	3-180
13	Projected NYS Industrial Gas Prices . . . . .	3-180
14	Projected NYS Power Generation Prices . . . . .	3-181
<b>SECTION 3.6</b>		
1	Crude Oil Reserves . . . . .	3-183
2	World Crude Oil Production . . . . .	3-183
3	Major Crude Oil Producers . . . . .	3-184
4	U.S. Crude Oil Refiner Acquisition Cost . . . . .	3-185
5	U.S. Petroleum Supply & Demand . . . . .	3-186
6	U.S. Refinery Statistics . . . . .	3-187
7	U.S. Rotary Rigs . . . . .	3-188
8	NYS Distillate Storage . . . . .	3-190
9	Gasoline & Resid Storage . . . . .	3-191
10	NYS Crude Oil Production . . . . .	3-192

<b><u>Figure Number</u></b>	<b><u>Title</u></b>	<b><u>Page</u></b>
11	Petroleum Share of New York Energy Demand .....	3-194
12	U.S. Distillate Production & Supply .....	3-195
13	Distillate Inventories .....	3-196
14	U.S. Distillate Imports .....	3-197
15	U.S. Gasoline Production & Supply .....	3-198
16	Gasoline Inventories .....	3-199
17	U.S. Gasoline Imports .....	3-199
18	NYS Annual Propane Demand .....	3-201
19	U.S. Propane Supply .....	3-201