

DOE/EIS - 0427

Final Environmental Impact Statement

Grapevine Canyon Wind Project

May 2012

Volume I



Lead Agency:

**U.S. Department of Energy,
Western Area Power Administration**

Cooperating Agencies:

**U.S. Department of Agriculture,
Forest Service, Coconino National Forest**

Arizona State Land Department



DOCUMENT CONTENTS

VOLUME I

Cover Sheet	
Front Matter:	Table of Contents, List of Figures and Tables, Index, Acronyms and Units of Measure
Executive Summary	
Chapter 1:	Purpose and Need
Chapter 2:	Proposed Action and Alternatives
Chapter 3:	Affected Environment and Environmental Consequences
Chapter 4:	Cumulative Effects
Chapter 5:	List of Agencies, Organizations, and Individuals Provided Draft EIS
Chapter 6:	List of Preparers
Chapter 7:	Disclosure Statement
Chapter 8:	References
Chapter 9:	Glossary
Chapter 10:	Public Comments and Responses
Attachment A	Visual Resources – Photographic Simulations

VOLUME II

Appendix A:	Western Area Power Administration’s Standards and Regulations
A.1	Western Area Power Administration’s Construction Standard 13
Appendix B:	Scoping
B.1	Scoping Summary Report
Appendix C:	Best Management Practices
C.1	Forest Service’s Best Management Practices for Watershed Protection
C.2	Design Features, Best Management Practices, Required Measures, and Mitigation Measures for Invasive Species Control
Appendix D:	Biological Resources
D.1	Site Characterization Report
D.2	Wildlife and Botanical Report
D.3	Avian and Bat Studies for the Grapevine Canyon Wind Energy Project
D.4	U.S. Fish and Wildlife Service Correspondence

COVER SHEET

LEAD FEDERAL AGENCY: U.S. Department of Energy (DOE), Western Area Power Administration (Western)

COOPERATING AGENCIES: U.S. Department of Agriculture, Forest Service (Forest Service), Coconino National Forest and Arizona State Land Department

TITLE: Final Environmental Impact Statement for the Grapevine Canyon Wind Project, DOE/EIS-0427

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CONTACT: For additional information on this Final Environmental Impact Statement (EIS) contact:
Mr. Matt Blevins
Western Area Power Administration
P.O. Box 281213
Lakewood, CO 80228-8213
Telephone: (800) 336-7288
Fax: (720) 962-7263
E-mail: GrapevineWindEIS@wapa.gov

For additional information on DOE National Environmental Policy Act (NEPA) activities please contact Carol M. Borgstrom, Director of NEPA Policy and Compliance, GC-20, U.S. Department of Energy, 1000 Independence Avenue SW., Washington, DC 20585, phone: (800) 472-2756, or visit the DOE NEPA Web site at <http://nepa.energy.gov/>.

ABSTRACT: The Grapevine Canyon Wind Project proposed by Foresight Flying M, LLC (Foresight) would include: 1) a wind energy generating facility up to 500 megawatts; 2) a 345-kilovolt (kV) electrical transmission tie-line; and 3) a 345-kV electrical interconnection switchyard that would be owned and operated by Western. The wind energy generating facility would be located on private land and trust land administered by the Arizona State Land Department. The electrical transmission tie-line would be located on private and State trust lands, as well as Federal lands administered by the Forest Service. The interconnection switchyard would be located entirely on Forest Service-managed lands. The project is located about 28 miles south and east of Flagstaff, Arizona in Coconino County, extending from the proposed wind generating facility south of Meteor Crater to the proposed switchyard just east of Mormon Lake, Arizona. Foresight has applied to Western to interconnect the proposed wind energy generating facility to Western's power transmission system on its Glen Canyon-Pinnacle Peak 345-kV No. 1 and No. 2 transmission lines. Additionally, Foresight has applied to the Forest Service for a special use permit authorizing the use of a 200-foot-wide right-of-way for a minimum period of 50 years to accommodate the construction and operation of the proposed 345-kV electrical transmission tie-line. The EIS includes a description of Western's and the Forest Service's proposed Federal actions and a no action alternative and an analysis of their environmental impacts.

The Final EIS is comprised of the previously published Draft EIS with additions and revisions added in response to comments on the Draft EIS and a comment and response chapter. Additions and revisions to the EIS are delineated with a vertical line in the left margin. Western's Record of Decision will be published no sooner than 30 days from the publication in the Federal Register of the U.S. Environmental Protection Agency's Notice of Availability for this Final EIS. The Forest Service will publish its Record of Decision directly before the 30-day Notice of Availability to coincide with its 45-day administrative review period.

TABLE OF CONTENTS: VOLUME 1

Executive Summary xiv

ES.1 Introduction..... xiv

ES.2 Purpose and Need for Agency Action..... xvi

 ES.2.1 Foresight’s Purpose and Need..... xvi

 ES.2.2 Federal Agency Purpose and Need..... xvi

ES.3 Proposed Action and Alternatives xvii

 ES.3.1 Federal Agency Proposed Actions xvii

 ES.3.2 Foresight’s Proposed Project..... xvii

 ES.3.3 Alternative Transmission Tie-line Corridor xxv

 ES.3.4 No Action Alternative xxvii

 ES.3.5 Alternatives Considered but Eliminated from Consideration..... xxvi

ES.4 Public Involvement, Consultation, and Coordination xxvi

ES.5 Summary of Resource Protection Measures and Potential Impacts..... xxviii

Chapter 1: Purpose and Need..... 1

 1.1 Introduction..... 1

 1.2 Purpose and Need 1

 1.2.1 Foresight’s Purpose and Need..... 1

 1.2.2 Federal Agencies Purpose and Need 4

 1.2.2.1 Western Area Power Administration..... 4

 1.2.2.2 U.S. Department of Agriculture, Forest Service, Coconino National Forest..... 5

 1.3 Statutory, Regulatory, and Policy Authority..... 5

 1.3.1 Conformance with Forest Service Land and Resource Management Plan..... 5

 1.3.2 Federal and State Authorities 6

 1.3.2.1 Arizona Corporation Commission 6

 1.3.2.2 Migratory Bird Treaty Act..... 6

 1.3.2.3 Bald and Golden Eagle Protection Act and Eagle Conservation Plans 6

 1.4 Summary of Public and Agency Scoping and Draft EIS comments..... 8

 1.4.2 Summary of Public, Agency, and Tribal Review of the Draft EIS 9

 1.4.3 Summary of Tribal Consultation 11

Chapter 2: Proposed Action and Alternatives..... 13

 2.1 Federal Agency Proposed Actions..... 13

 2.1.1 Western System Modifications..... 13

 2.2 Foresight’s Proposed Project 14

 2.2.1 Wind Park..... 19

 2.2.1.1 Engineering Surveys for the Wind Park 22

 2.2.1.2 Construction of the Wind Park 22

 Wind Park Mobilization, Staging, and Access 23

 Construction of Wind Turbine Generators..... 29

 Construction of Electrical Collection System..... 30

 Construction of Communications System..... 31

 Construction of the Step-Up Substations..... 31

 Construction of the Operations and Maintenance Building..... 31

 Meteorological Towers 32

 Security During Wind Park Construction 33

 2.2.1.3 Operation and Maintenance of the Wind Park..... 33

 Wind Park Start-Up..... 33

Wind Park Operating Requirements and Staffing.....	33
Fencing and Security.....	34
Wind Park Power.....	34
Operation of the Step-up Substations.....	34
Operation of the Communication System.....	34
Operation of the WTGs.....	34
Operations and Maintenance Building.....	35
Operation of the Meteorological Towers.....	35
2.2.1.4 Summary of Wind Park and Ground Disturbance and Reclamation Activities.....	35
Reclamation of Disturbed Areas.....	36
2.2.1.5 Wind Park Decommissioning.....	36
2.2.2 Transmission and Extension Tie-lines.....	37
2.2.2.1 Engineering Surveys for the Transmission and Extension Tie-lines.....	39
2.2.2.2 Construction of Transmission and Extension Tie-lines.....	39
Tie-line Mobilization and Staging.....	39
Construction of Tie-line Access Roads.....	40
Construction of Tie-line and Temporary Use Areas.....	41
Structure Installation.....	42
Installation of Conductors, Insulators, Hardware, and Shield Wires.....	43
2.2.2.3 Operations and Maintenance of the Tie-line.....	44
2.2.2.4 Summary of the Tie-line and Ground Disturbance and Reclamation Activities.....	44
Reclamation of Disturbed Areas.....	45
2.2.2.5 Transmission Tie-line Decommissioning.....	45
2.2.3 Western’s Switchyard.....	45
2.2.3.1 Engineering Surveys for the Switchyard.....	47
2.2.3.2 Construction of the Switchyard.....	47
Switchyard Mobilization and Staging.....	48
Construction of Switchyard Access Roads.....	48
Switchyard Site Grading and Preparation.....	48
Installation of Components.....	48
Communication Facilities.....	48
2.2.3.3 Construction of the Transmission Interconnection.....	49
2.2.3.4 Operations and Maintenance of the Switchyard.....	49
Switchyard Start-Up.....	49
Operation and Maintenance Activities.....	49
Operation and Maintenance Access.....	49
Communication Facilities.....	49
2.2.3.5 Summary of the Switchyard and Ground Disturbance and Reclamation Activities.....	49
2.2.3.6 Switchyard Decommissioning.....	50
2.3 Alternative Transmission Tie-line Corridor.....	50
2.4 No Action Alternative.....	51
2.5 Comparison of Alternatives.....	52
2.6 Alternatives Considered but Eliminated from Consideration.....	58
2.7 Foresight and Agency Resource Protection Measures.....	61
Chapter 3: Affected Environment and Environmental Consequences.....	76
3.1 Land Use.....	77
3.1.1 Affected Environment.....	77

3.1.1.1	Resource Evaluation Area.....	77
3.1.1.2	Characterization	77
	Land Ownership and Jurisdiction	77
	Existing Land Use.....	79
	Agriculture and Grazing	82
	Recreation	82
	Zoning.....	86
	Applicable Land Use Plans.....	86
	Proposed Land Use	88
3.1.2	Environmental Consequences	90
3.1.2.1	Standards of Significance	90
3.1.2.2	Foresight’s Proposed Project and Proposed Federal Actions	90
	Wind Park	90
	Transmission Tie-line	92
	Western’s Switchyard	93
3.1.2.3	Alternative Transmission Tie-line Corridor.....	94
3.1.2.4	No Action Alternative.....	94
3.2	Biological Resources	94
3.2.1	Affected Environment	95
3.2.1.1	Resource Evaluation Area.....	95
3.2.1.2	Characterization	95
	Environmental Setting	95
	Land Cover	98
	Wetlands and Riparian Areas.....	98
	Invasive and Non-native Plant Species.....	99
	Special Status Species.....	99
3.2.2	Environmental Consequences	119
3.2.2.1	Standards of Significance	119
3.2.2.2	Foresight’s Proposed Project and Proposed Federal Actions	119
	Impacts to Special Status Species	119
3.2.2.3	Alternative Transmission Tie-line Corridor.....	134
3.2.2.4	No Action Alternative.....	134
3.3	Cultural Resources	134
3.3.1	Affected Environment	135
3.3.1.1	Resource Evaluation Area.....	135
3.3.1.2	Characterization	135
	Regulatory Background	135
	Cultural History	136
	Previous Sites and Surveys	139
3.3.2	Environmental Consequences	140
3.3.2.1	Standards of Significance	140
3.3.2.2	Foresight’s Proposed Project and Proposed Federal Actions	141
3.3.2.3	Alternative Transmission Tie-line Corridor.....	142
3.3.2.4	No Action Alternative.....	142
3.4	Geology and Soils.....	142
3.4.1	Affected Environment	142
3.4.1.1	Resource Evaluation Area.....	142

3.4.1.2	Characterization	142
	Geomorphology and Geology	142
	Mineral Resources	142
	Geologic Hazards	143
	Soils	143
3.4.2	Environmental Consequences	148
3.4.2.1	Standards of Significance	148
3.4.2.2	Foresight’s Proposed Project and Proposed Federal Actions	148
	Wind Park	148
	Transmission Tie-line	149
	Western’s Switchyard	150
3.4.2.3	Alternative Transmission Tie-line Corridor.....	150
3.4.2.4	No Action Alternative.....	150
3.5	Air Quality	151
3.5.1	Affected Environment	151
3.5.1.1	Resource Evaluation Area.....	151
3.5.1.2	Characterization	151
	Air Quality Standards and Existing Air Quality	151
	Hazardous Air Pollutants	152
	Climate Change/Greenhouse Gas	152
3.5.2	Environmental Consequences	153
3.5.2.1	Standards of Significance	153
3.5.2.2	Foresight’s Proposed Project and Proposed Federal Actions	154
	Construction.....	155
	Operation	156
3.5.2.3	Alternative Transmission Tie-line Corridor.....	157
3.5.2.4	No Action Alternative.....	157
3.6	Water Resources	158
3.6.1	Affected Environment.....	158
3.6.1.1	Resource Evaluation Area.....	158
3.6.1.2	Characterization	158
	Climate.....	158
	Groundwater	159
	Surface Water	163
3.6.2	Environmental Consequences	167
3.6.2.1	Standards of Significance	167
3.6.2.2	Foresight’s Proposed Project and Proposed Federal Actions	167
	Degradation or Contamination of Surface Water Quality.....	168
	Degradation or Depletion Groundwater Quantity.....	168
	Degradation or Elimination of Wetlands or Waters of the U.S.	169
	Alteration of Surface Drainage Patterns or Stream Channel Morphology.....	171
	Alteration of Flows Within a Flood Hazard Area.....	171
3.6.2.3	Alternative Transmission Tie-line Corridor.....	171
3.6.2.4	No Action Alternative.....	172
3.7	Socioeconomics	172
3.7.1	Affected Environment	172
3.7.1.1	Resource Evaluation Area.....	172

3.7.1.2	Characterization	172
Population	172	
Economic Base, Employment, and Income	172	
Housing Market and Property Values.....	173	
Public Services and Facilities	174	
3.7.2	Environmental Consequences	175
3.7.2.1	Standards of Significance	175
3.7.2.2	Foresight’s Proposed Project and Proposed Federal Actions	175
3.7.2.3	Alternative Transmission Tie-line Corridor.....	176
3.7.2.4	No Action Alternative.....	176
3.8	Environmental Justice.....	177
3.8.1	Affected Environment	177
3.8.1.1	Resource Evaluation Area.....	177
3.8.1.2	Characterization	177
3.8.2	Environmental Consequences	178
3.8.2.1	Standards of Significance	179
3.8.2.2	Foresight’s Proposed Project and Proposed Federal Actions	179
3.8.2.3	Alternative Transmission Tie-line Corridor.....	179
3.8.2.4	No Action Alternative.....	179
3.9	Transportation.....	179
3.9.1	Affected Environment	179
3.9.1.1	Resource Evaluation Area.....	179
3.9.1.2	Characterization	180
3.9.2	Environmental Consequences	183
3.9.2.1	Standards of Significance	183
3.9.2.2	Foresight’s Proposed Project and Proposed Federal Actions	183
Construction.....	183	
Operation and Maintenance	185	
3.9.2.3	Alternative Transmission Tie-line Corridor.....	186
3.9.2.4	No Action Alternative.....	186
3.10	Health, Safety, and Security.....	186
3.10.1	Affected Environment	186
3.10.1.1	Resource Evaluation Area.....	186
3.10.1.2	Characterization	186
Wildfire Hazard	187	
High-Voltage Transmission Lines	187	
3.10.2	Environmental Consequences	188
3.10.2.1	Standards of Significance	188
3.10.2.2	Foresight’s Proposed Project and Proposed Federal Actions	188
Occupational Hazards	188	
Public Safety and Site Security	189	
Environmental Hazards.....	192	
3.10.2.3	Alternative Transmission Tie-line Corridor.....	192
3.10.2.4	No Action Alternative.....	192
3.11	Noise.....	192
3.11.1	Affected Environment	192
3.11.1.1	Resource Evaluation Area.....	192

3.11.1.2	Characterization	192
	Fundamentals of Sound and Noise	192
	Noise Standards	193
	Noise Sensitive Receptors and Background Conditions	193
3.11.2	Environmental Consequences	194
3.11.2.1	Standards of Significance	194
3.11.2.2	Foresight’s Proposed Project and Proposed Federal Actions	194
	Construction.....	194
	Operation and Maintenance	197
3.11.2.3	Alternative Transmission Tie-line Corridor.....	199
3.11.2.4	No Action Alternative.....	199
3.12	Visual Resources.....	199
3.12.1	Affected Environment	199
3.12.1.1	Resource Evaluation Area.....	199
3.12.1.2	Characterization	201
	Management Guidelines	201
	Regional Landscape Character	204
	Visual Resource Evaluation Area Landscape Character.....	204
	Key Observation Points	206
3.12.2	Environmental Consequences	210
3.12.2.1	Standards of Significance	210
	Visibility Analysis	210
3.12.2.2	Foresight’s Proposed Project and Proposed Federal Actions	212
	Wind Park (as viewed from private and State trust lands).....	212
	Wind Park (as viewed from Coconino National Forest).....	214
	Transmission Tie-line	214
	Western’s Switchyard.....	215
	Temporary Impacts	215
	Light and Glare	215
3.12.2.3	Alternative Transmission Tie-line Corridor.....	216
3.12.2.4	No Action Alternative.....	216
3.13	Unavoidable Adverse Impacts	216
3.13.1	Wind Park.....	216
3.13.2	Transmission Tie-line and Switchyard.....	217
3.14	Short-term Use and Long-Term Productivity	217
3.15	Irreversible and Irretrievable Commitments of Resources	218
Chapter 4:	Cumulative Effects.....	220
4.1	Introduction.....	220
4.2	Cumulative Effects Analysis and Methodology	220
4.2.1	Identify Past, Present, and Reasonably Foreseeable Future Actions.....	220
4.2.2	Identify the Cumulative Effects of Other Past, Present, and Reasonably Foreseeable Future Actions	223
4.2.3	Cumulative Effects of the Proposed and Alternative Actions when Added to Past, Present, and Reasonably Foreseeable Future Actions	230
4.2.3.1	Land Use	230
4.2.3.2	Biological Resources	230
4.2.3.3	Cultural Resources.....	232

4.2.3.4	Geology and Soils.....	232
4.2.3.5	Water Resources	233
4.2.3.6	Transportation.....	234
4.2.3.7	Visual Resources.....	234
Chapter 5:	List of Agencies, Organizations, and Individuals Provided Draft EIS.....	235
5.1	Federal Agencies.....	235
5.2	State Agencies.....	235
5.3	Local Agencies	235
5.4	Native American Tribes and Communities.....	235
5.5	Organizations	236
5.6	Individuals	236
Chapter 6:	List of Preparers	237
Chapter 7:	Disclosure Statement.....	240
Chapter 8:	References	241
Chapter 9:	Glossary.....	257
Chapter 10:	Public Comment and Response.....	269
10.1	Introduction and Comment Document Index.....	269
10.1.1	Process for Notification and Comment	269
10.1.2	Process for Tracking Comments and Responding.....	269
10.1.3	Finding Comments and Responses.....	269
10.2	Comment Response Tables.....	276
10.3	Comment Documents.....	316

Attachment A Visual Resources – Photographic Simulations

LIST OF FIGURES

Figure 1.1-1	Map – Project Vicinity.....	2
Figure 1.2-1	Graph – 2007 U.S. Electricity Production (TWh/yr) by Energy Source	3
Figure 1.4-1	Graph – Summary of Scoping Comments Received	8
Figure 1.4-2	Graph – Summary of Public, Agency and Tribal Comments Received on the Draft EIS	10
Figure 2.2-1	Map – Foresight’s Proposed Project.....	16
Figure 2.2-2	Map – Proposed Wind Park Study Area	17
Figure 2.2-3	Map – Preliminary Wind Park Layout Plan.....	18
Figure 2.2-4	Simulation – Typical Wind Turbine Generator	21
Figure 2.2-5	Simulation – Wind Turbine Generator Details	21
Figure 2.2-6	Simulation – Typical Portable Batch Plant.....	25
Figure 2.2-7	Illustration – Cross-Section Illustration of Typical Primary Site Access Road.....	27
Figure 2.2-8	Map – Primary Site Access Road Alignment	28
Figure 2.2-9	Illustration – Illustration of Typical Service Road to Accommodate Large Crane	29
Figure 2.2-10	Photographs – Typical WTG Construction Stages	29
Figure 2.2-11	Photograph – Typical Step-Up Substation.....	32
Figure 2.2-12	Photograph – Typical Long-Term Met Tower.....	32
Figure 2.2-13	Map – Foresight’s Proposed 345-kV Tie-Line and Western’s Proposed Interconnection Switchyard	38
Figure 2.2-14	Photograph – Typical Single-Circuit 345-kV Pole Structure	39
Figure 2.2-15	Illustration – Typical Access Associated with the Proposed Tie-Line	40

Figure 2.2-16	Illustration – Permanent and Temporary Use Areas for Turning Structures	41
Figure 2.2-17	Illustration – Typical 345-kV Steel Monopole Installation	42
Figure 2.2-18	Illustration – Conductor and Ground Wire Stringing Activities	43
Figure 2.2-19	Photograph – Western’s Proposed Switchyard Location.....	46
Figure 2.2-20	Photograph – Typical 345-kV Switchyard	47
Figure 2.3-1	Map – Alternative 345-kV Tie-Line	51
Figure 2.6-1	Map – Alternatives Considered but Eliminated from Consideration.....	60
Figure 3.1-1	Map – Land Ownership and Jusisdiction.....	78
Figure 3.1-2	Photograph – Open range land on Anderson Mesa within the land use evaluation area ..	80
Figure 3.1-3	Photograph – Meteor Crater located north and east of the wind park study area	80
Figure 3.1-4	Map – Existing Land Use	81
Figure 3.1-5	Map – Grazing Leases and Allotments.....	83
Figure 3.1-6	Photograph – Anderson Mesa, located within the land use evaluation area, on the Coconino National Forest	84
Figure 3.1-7	Photograph – Jack’s Canyon located just south of the wind park study area	84
Figure 3.1-8	Map – Arizona Game and Fish Department Game Management Units	85
Figure 3.1-9	Map – Coconino National Forest Resource Management Areas.....	87
Figure 3.1-10	Map – Diablo Canyon Rural Planning Area	89
Figure 3.2-1	Map – Biological Resources Evaluation Area	97
Figure 3.2-2	Map – Raptor Use in Relation to Prairie Dog Colonies – Sub-study Area A.....	110
Figure 3.2-3	Map – Prairie Dog Towns – Status.....	111
Figure 3.2-4	Graph – Mean Bird Use by Season for Major Bird Types and Golden Eagle at the Grapevine Canyon Wind Park Sub-study Area A	117
Figure 3.4-1	Map – Earthquake Probability Area	144
Figure 3.4-2	Map – Soils –Wind Park Study Area.....	146
Figure 3.4-3	Map – Soils – Tie-line and Switchyard.....	147
Figure 3.6-1	Map – Groundwater Conditions and Well Locations	162
Figure 3.6-2	Map – Surface Water Conditions.....	165
Figure 3.6-3	Map – Potential Jurisdictional Waters	166
Figure 3.9-1	Map – Transportation.....	181
Figure 3.12-1	Worksheet – SIL and VMS Comparison	201
Figure 3.12-2	Map – Coconino National Forest Visual Quality Objectives	203
Figure 3.12-3	Photograph – Meteor Crater Rim, looking west	205
Figure 3.12-4	Photograph – Anderson Mesa, looking north	205
Figure 3.12-5	Photograph – Typical higher elevations above Anderson Mesa.....	206
Figure 3.12-6	Map – Viewing Direction from Key Observation Points	207
Figure 3.12-7	Map – Project Visibility.....	211
Figure 3.12-8	Illustration – Distance Zones	212
Figure 4.2-1	Map – Sunshine Wind and Grapevine Canyon Wind Projects.....	231

LIST OF TABLES

Table 1.2-1	Summary of Renewable Energy Portfolio by State	3
Table 1.3-1	Summary of Key Authorizations and Approvals.....	7
Table 1.4-1	Summary of Public and Agency Scoping Conducted for the Draft EIS.....	8
Table 1.4-2	Summary of Public, Agency and Tribal Comments by Theme	11
Table 1.4-3	Tribal Consultation Milestones.....	12

Table 2.2-1	Legal Description by Land Ownership for Study Area	19
Table 2.2-2	Estimated Type, Number and Duration of Project Construction Equipment for a Typical 250 MW Phase.....	23
Table 2.2-3	Typical Wind Park Operation and Maintenance Staffing.....	33
Table 2.2-4	Estimated Permanent and Temporary Ground Disturbance Associated with a 500 MW Wind Park	36
Table 2.2-5	Typical 345-kV Structure Characteristics.....	37
Table 2.2-6	Ground Disturbance Estimates for Transmission Tie-Line	45
Table 2.2-7	Permanent and Temporary Ground Disturbance Associated with the Switchyard.....	50
Table 2.5-1	Comparison of Effects to Resources for Alternatives.....	52
Table 2.6-1	Alternatives Considered but Eliminated from Consideration	58
Table 2.7-1	Project Resource Protection Measures.....	62
Table 3.1-1	Summary of the Effects of the 500 MW Wind Park on Grazing.....	91
Table 3.2-1	Threatened, Endangered, and Sensitive Wildlife Species that may Occur in the Biological Resources Evaluation Area	101
Table 3.2-2	Coconino National Forest Management Indicator Species with the Potential to Occur in the Transmission Tie-Line and Switchyard Portion of the Project.....	107
Table 3.2-3	Bird Species of Conservation Concern within the Southern Rockies/Colorado Plateau Bird Conservation Region.....	113
Table 3.2-4	Arizona Partners in Flight Priority Avian Species with Potential to Occur along the Transmission Tie-Line and within the Wind Park Study Area.....	114
Table 3.3-1	Newly Recorded Archaeological Sites	140
Table 3.4-1	Mapped Soils	144
Table 3.5-1	Arizona Electric Power Industry GHG Emissions by Energy Source, 2009	153
Table 3.5-2	Estimated Project Criteria Pollutant Emissions	154
Table 3.6-1	Historical Climate Statistics for Winslow, Arizona.....	158
Table 3.6-2	Summary of Records for Registered Wells in the Water Resources Evaluation Area ...	160
Table 3.6-3	Estimated Extent of Jurisdictional Waters, Up-to-500MW Project Study Area.....	164
Table 3.6-4	Potential Impacts to Jurisdictional Waters, Initial Phase Study Area.....	170
Table 3.7-1	Population Trends.....	172
Table 3.7-2	Labor Force, 2006–2008.....	173
Table 3.7-3	Housing Data, 2006–2008	174
Table 3.8-1	Minority and Low-Income Characteristics of Environmental Justice Evaluation Area, 2006–2008	177
Table 3.9-1	Summary of Roads within the Transportaion Evaluation Area	182
Table 3.9-2	Traffic Volume on Highways and Roads in Transportation Evaluation Area	182
Table 3.11-1	Common Noise Sources and Levels	194
Table 3.11-2	Noise Levels from Potential Construction Equipment at Various Distances	195
Table 4.2-1	Summary of Past, Present and Reasonably Foreseeable Future Actions	221
Table 4.2-2	Summary of Cumulative Effects of Past, Present, and Reasonably Foreseeable Future Actions and the Incremental Effects of the Proposed Project.....	224
Table 6.1-1	List of Preparers.....	237
Table 6.1-2	Foresight’s Consultant	238
Table 10.1-1	Comment Document Index	271
Table 10.2-1	Comment Responses – Proposed Project.....	276
Table 10.2-2	Comment Responses – Resource Protection Measures	286
Table 10.2-3	Comment Responses – Resource Analysis	301

ACRONYMS AND UNITS OF MEASURE

ACRONYMS

ABPP	Avian and Bat Protection Plan
ACCAG	Arizona Climate Change Advisory Group
ACC	Arizona Corporation Commission
ACHP	Advisory Council on Historic Preservation
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
ADT	Average daily traffic
AGFD	Arizona Game and Fish Department
AIRFA	American Indian Religious Freedom Act
APE	Area of Potential Effect
APLIC	Avian Power Line Interaction Committee
APIF	Arizona working group of Partners in Flight
Foresight	Foresight Flying M, LLC
APWRA	Altamont Pass Wind Resource Area
ARS	Arizona Revised Statute
ASLD	Arizona State Land Department
ATVs	All-terrain vehicles
AU	Animal Unit
AUM	Animal Unit Month
AZPDES	Arizona Pollutant and Discharge Elimination System
BA	Biological Assessment
BBS	Breeding Bird Survey
BGEPA	Bald and Golden Eagle Protection Act
BLM	U.S. Department of the Interior, Bureau of Land Management
BMP	Best Management Practice
CAA	Clean Air Act
CEC	Certificate of Environmental Compatibility
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
DOE	U.S. Department of Energy
ECP	Eagle Conservation Plans
EIS	Environmental Impact Statement
EMF	Electric and Magnetic Fields
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
F	Fahrenheit
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
Foresight	Foresight Flying M, LLC
Forest	Coconino National Forest
Forest Plan	Coconino National Forest Land and Resource Management Plan
Forest Service	U.S. Department of Agriculture, Forest Service
FS #	Forest Service Road/Route Number
FSH	Forest Service Handbook

GHG	Greenhouse Gas
GIS	Geographic Information Systems
HAP	Hazardous Air Pollutants
I-40	Interstate 40
IBA	Important Bird Area
ID	Interdisciplinary
KOP	Key Observation Point
LED	Light-emitting diode
LGIP	Large Generator Interconnection Procedures
MBTA	Migratory Bird Treaty Act
Met	Meteorological
MIS	Management Indicator Species
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves and Repatriation Act
NEMA	National Electrical Manufacturer's Association
NESC	National Electric Safety Code
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NO ₂	Nitrogen Dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO _x	Nitrogen Oxide
NPS	National Park Service
NRCS	U.S. Department of Agriculture, Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTIA	National Telecommunication Information Administration
NWI	National Wetlands Inventory
O&M	Operation and Maintenance
O ₃	Ozone
OHV	Off-highway Vehicle
OSHA	Occupational Health and Safety Administration
PA	Programmatic Agreement
Pb	Lead
PM	Particulate Matter
PSD	Prevent Significant Deterioration
ROD	Record of Decision
RPA	Rural Planning Area
RPM	Resource Protection Measure
RV	Recreational Vehicle
SCADA	Supervisory Control and Data Acquisition
SF ₆	Sulfur Hexafluoride
SHPO	State Historic Preservation Office
SIL	Scenic Integrity Level
SMS	Scenery Management System
SO ₂	Sulfur Dioxide
SPCC	Spill Prevention, Control and Countermeasure Plan
SR	State Route
SWPPP	Stormwater Pollution Prevention Plan

Tariff	Open Access Transmission Service Tariff
TCP	Traditional Cultural Property
TMR	Travel Management Rule
Transcon	Transcon Environmental, Inc.
USACE	U.S. Army Corps of Engineers
USC	United States Code
USD	Unified School District
USDA	United States Department of Agriculture
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service
VMS	Visual Management System
VQO	Visual Quality Objective
WEST	Western Ecosystems Technology, Inc.
Western	Western Area Power Administration
WMAs	Wildlife Management Areas
WRCC	Western Regional Climate Center
WTG	Wind Turbine Generator
ZHHPA	Zuni Heritage and Historic Preservation Office

UNITS OF MEASURE

A	Amperes
AADT	Annual Average Daily Traffic volume estimate (bi-directional)
AU	Animal Unit
AUM	Animal Unit Month
bls	Below Land Surface
dB	Decibel
dBA	A-weighted decibel
ft bls	Feet Below Land Surface
Hz	Hertz
kV	Kilovolt
G	Guass
gpd	Gallons per Day
gpd/ft	Gallons per Day per Foot
gpm	Gallons per Minute
Ldn	Day-night Noise Level
Leq	Equivalent Sound Level
mph	Miles per Hour
MW	Megawatt
MWh	Megawatt Hour
NEG	Annual Average Daily Traffic volume estimate, decreasing highway milepost numbers
POS	Annual Average Daily Traffic volume estimate, increasing highway milepost numbers
tpy	Tons per Year
TWh/yr	Terawatt-hours per Year
V	Volts
μ/m	Micrometer

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

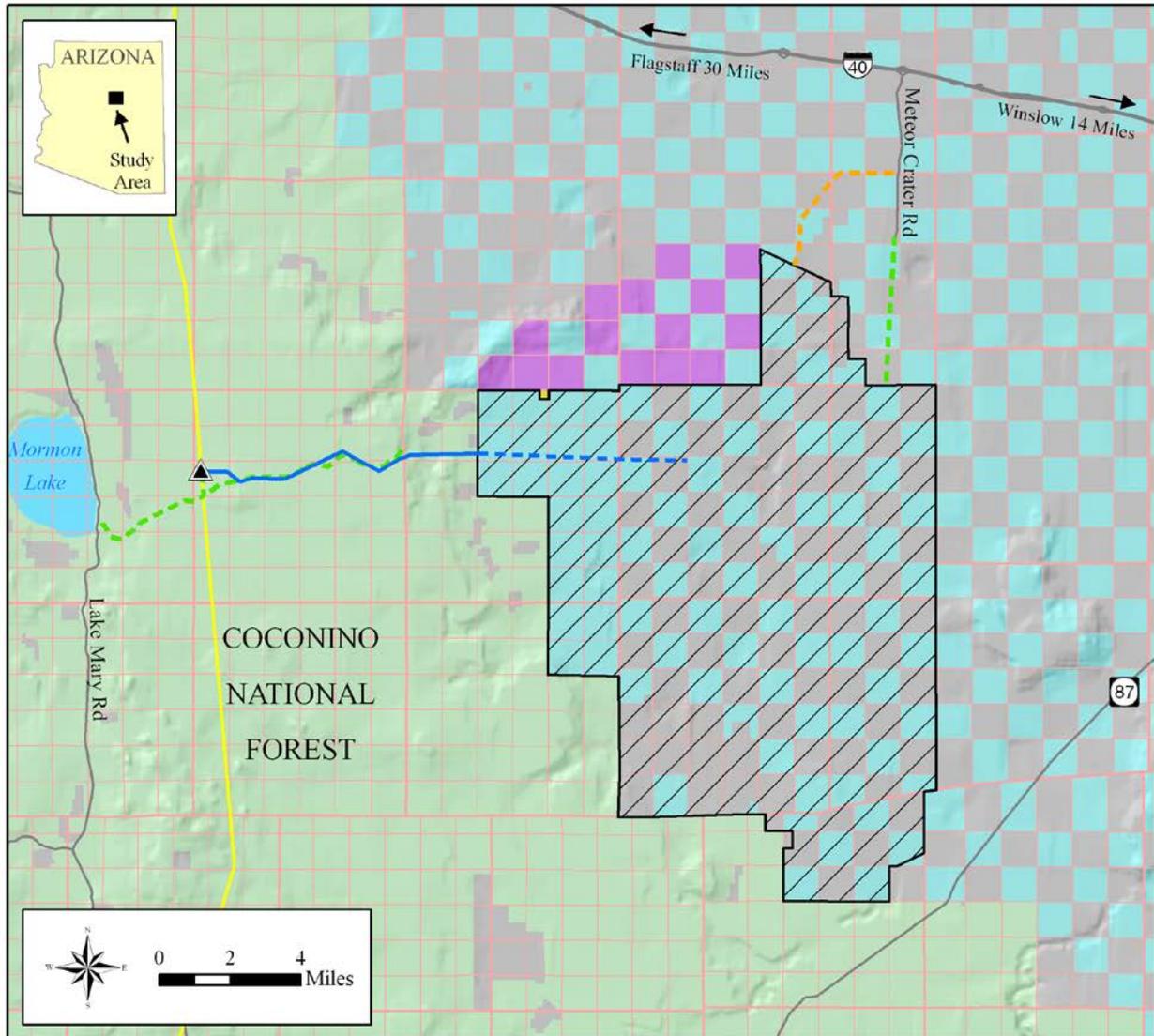
Foresight Flying M, LLC (Foresight) proposes the development of the Grapevine Canyon Wind Project in Coconino County, Arizona. The project is located approximately 18 miles southwest of Winslow and 28 miles southeast of Flagstaff (Figure ES.1-1).

The project would include three main components: 1) a wind energy generating facility up to 500 megawatts (MW); 2) a 345-kilovolt (kV) electrical transmission tie-line; and 3) a 345-kV electrical interconnection switchyard and facilities that would be owned and operated by Western Area Power Administration (Western). The wind energy generation component would be located on private land and trust land administered by the Arizona State Land Department (ASLD). The electrical transmission tie-line would be located on private and State trust lands as well as Federal lands administered by the U.S. Department of Agriculture, Forest Service (Forest Service). The interconnection switchyard would be located entirely on Forest Service-managed lands.

The wind energy generating facility may be built in two or more phases over a period of years with an initial construction schedule for the first phase between 12 to 18 months. Construction is expected to begin in 2012.

Foresight has applied to Western to interconnect the proposed wind energy generating facility to Western's power transmission system on its Glen Canyon-Pinnacle Peak 345-kV No. 1 and No. 2 transmission lines. Additionally, Foresight has applied to the Forest Service for a special use permit authorizing the use of a 200-foot-wide right-of-way for a minimum period of 50 years to accommodate the construction and operation of the proposed 345-kV electrical transmission tie-line.

Western would seek approval and authorization from the Forest Service to construct and operate the proposed interconnection switchyard on an approximately 15-acre parcel beneath the Glen Canyon-Pinnacle Peak transmission lines, if the interconnection request is approved.



Legend

-  Wind Park Study Area
-  Proposed 345-kV Tie-line Alignment
-  Proposed 345-kV Tie-line Alignment (Alignment to Be Determined)
-  Proposed New Site Access Road
-  Existing Site Access Road
-  Proposed Interconnection Switchyard
-  Existing Western 345-kV Transmission Lines

-  Bureau of Land Management
-  Forest Service
-  Arizona Game and Fish Department
-  Private
-  State Trust

Applicant's Proposed Project

Grapevine Canyon Wind Project

FIGURE ES.1-1

ES.2 PURPOSE AND NEED FOR AGENCY ACTION

ES.2.1 Foresight's Purpose and Need

Most electricity produced in the U.S. comes from fossil fuels. However, in recent years, the majority of states in the southwestern U.S. have passed regulations or guidelines that require utilities to generate a specific percentage of their energy portfolio from renewable resources such as wind, solar, biomass, and geothermal. The State of Arizona adopted new Renewable Energy Standard and Tariff rules in 2006 requiring public utilities to provide 15 percent of their retail electricity from renewable energy sources by 2025.

Foresight's goal is to construct and operate a utility scale wind energy generating facility that is tied into the regional grid so that the energy produced can be marketed to utility companies in Arizona and other western states to help meet their State portfolio standards and energy requirements. Foresight's objectives include the following:

- To construct, own, operate, and maintain an efficient, economic, and reliable, utility scale wind generating facility that would help achieve State and/or regional renewable energy standards.
- To develop the wind energy generating facility on a site with an excellent wind resource.
- To interconnect to an electrical transmission system with available capacity that ties into the regional electric grid.
- To be consistent with the goals of the American Recovery and Reinvestment Act of 2009 that seeks to support home-grown renewable energy for economic recovery.
- To be consistent with Federal, Western Governors' Association, State, and local goals for clean renewable energy and sustainable economic development.

ES.2.2 Federal Agency Purpose and Need

Western Area Power Administration

Foresight has requested an interconnection with Western's electrical transmission system. Western is required to approve or deny the interconnection request in accordance with Western's Open Access Transmission Service Tariff (Tariff). Western's Tariff provides open access to its transmission system. If there is available capacity in the transmission system, Western provides transmission services through an interconnection. This interconnection request requires Federal action which triggers a review under the National Environmental Policy Act of 1969 (NEPA). The scope of the review for this Environmental Impact Statement (EIS) includes all proposed project components of the up to 500-megawatt (MW) wind project and related infrastructure.

U.S. Department of Agriculture, Forest Service, Coconino National Forest (Forest Service)

In addition to the request for interconnection, Foresight has applied to the Forest Service for a special use permit authorizing a 200-foot-wide right-of-way for a minimum period of 50 years to accommodate an electrical transmission tie-line on Forest Service-managed lands. Western would apply to the Forest Service for authorization to construct and operate an electrical switchyard if the interconnection request is approved. The Forest Service is authorized to issue special use permits under the Federal Land Policy and Management Act. Consideration of special use requests is based on direction contained in 36 Code of Federal Regulations (CFR) 251, Subpart B, including screening criteria that address consistency with policies and land management plans.

In order to provide an interconnection with Western's electrical transmission system, the switchyard and the transmission tie-line would be located on Forest Service-managed lands because the existing Western Glen Canyon-Pinnacle Peak 345-kV transmission lines are located on Forest Service-managed lands. The

special use permits would authorize Foresight and Western to construct, operate, and maintain the transmission tie-line and switchyard on Forest Service-managed lands.

ES.3 PROPOSED ACTION AND ALTERNATIVES

ES.3.1 Federal Agency Proposed Actions

The proposed Federal actions evaluated in this EIS by each of the involved Federal agencies are as follows:

- **Western:** To approve Foresight’s interconnection to Western’s transmission system on the Glen Canyon-Pinnacle Peak 345-kV transmission lines, an action which would also require a new Western switchyard on Forest Service-managed lands.
- **Forest Service:** To approve Foresight’s special use permit authorizing a 200-foot-wide right-of-way for a minimum period of 50 years to accommodate the construction, operation, and maintenance of a new 345-kV electrical transmission tie-line corridor across approximately 8.5 miles of Forest Service-managed lands. In addition, the Forest Service would authorize Western to construct, operate, and maintain a new switchyard on an approximately 15-acre parcel.

Western’s preferred alternative is to approve Foresight’s interconnection to Western’s transmission system, including constructing the new switchyard to accommodate the interconnection. The Forest Service preferred alternative is Foresight’s proposed project.

ES.3.2 Foresight’s Proposed Project

Foresight proposes to construct and operate a utility scale wind energy generating facility on private and State trust land. The wind energy generating facility would generate up to 500 MW of electricity from wind turbine generators (WTGs).

The proposed project includes three main components: 1) a wind energy generating facility (wind park); 2) a 345-kV transmission tie-line (transmission tie-line); and 3) a 345-kV interconnection switchyard (switchyard) constructed, owned, and operated by Western.

Wind Park

The proposed wind park would be built in one or more phases, dependent on one or more power sale contracts. The proposed wind park would include improved and new access and service roads, WTGs, an electrical collection system, up to two step-up substations, communications system, operations and maintenance building, and meteorological monitoring towers. A preliminary layout plan is included in the Final EIS to depict potential location of these facilities for the project area for the up to 500 MW project as well as the initial and subsequent phases. Final (construction level) design and construction of all project infrastructure would be based on the following: 1) the estimated maximum disturbance and impact evaluations that are reflected in the Final EIS, including the preliminary layout plan provided in the Final EIS; and 2) micro-siting resource information from the pre-construction surveys. To the extent that pre-construction surveys provide information that minor adjustments in turbine siting or infrastructure would avoid or further reduce the impacts identified in the Final EIS, feasible adjustments would be made to further avoid or reduce impacts to resources.

Based on final design and micro-siting, all wind park facilities would be located within the wind park study area of the EIS and would not exceed the disturbance limits identified in the EIS. The study area for the wind park encompasses almost 100,000 acres of private and State trust lands and substantially exceeds lands anticipated to be disturbed for the various wind park facilities. Construction of the up to

500 MW wind park is expected to temporarily disturb 2,050 to 2,193 acres and permanently disturb 555 to 570 acres of land.

The number and model of WTGs are typically determined by one or more power sale contracts, the wind resource, and turbine availability and cost. The proposed wind park would generate electricity from WTGs rated at 1.5 to 3.0 MW. For purposes of this EIS, specifications for the Vestas V100 1.8-MW WTG are used to evaluate potential effects of the wind park. This 1.8-MW WTG is a tubular steel tower, 263 feet in height and 14 feet in maximum diameter. Three blades, each 161 feet in length, extend from the nacelle, located at the top of the tower; the turbine structure would be up to approximately 500 feet high when a blade is in the 12 o'clock position.

Engineering Surveys for the Wind Park

Geotechnical or geophysical investigations, soil resistivity and thermal conductivity tests, and a Worst-Case Fresnel Zone Study would be performed to aid in the final design of the wind park. A pre-construction engineering site survey would be performed to stake out the exact location of the WTGs, service roads, electrical collection system, access entryways from public roads, step-up substations, operations and maintenance building, and other project features prior to land disturbance.

Construction of the Wind Park

Construction activities would be temporary and would involve the use of heavy equipment including bulldozers, graders, trenching machines, concrete trucks, tractor-trailer trucks, and large cranes. Prior to beginning construction activities, the exact location of wind park facilities would be determined. The initial steps in the construction of the wind park would include constructing or improving access roads, developing a temporary power and water source, establishing borrow pits and setting up a rock crusher and batch plant, and establishing a project staging area. These activities would be followed by the construction of WTGs, the electrical collection system and communications system, the step-up substations, operations and maintenance building, and long-term meteorological towers.

Wind Park Primary Access and Service Roads

The primary site access road would be constructed for the initial project phase and originate from Meteor Crater Road and would extend to the west across Canyon Diablo and then south into the wind park study area across private and State trust lands. The access road would be approximately 16-foot wide and 8 miles in length. The roadway would be cleared of vegetation and excavated to a depth of up to 12 inches and covered with aggregate. The road surface would then be graded and compacted, and berms and other drainage features would be constructed as required.

The primary site access road would require a crossing of Canyon Diablo. This crossing would require a bridge-type structure with a span of up to 80 feet and a roadway of approximately 16 to 18 feet. Design and construction of the roads and crossing would be in accordance with Foresight's proposed Resource Protection Measures (RPMs) reflected in the Final EIS and Section 404 permit for the initial phase and subsequent phase(s) and compliance with County and other applicable road and crossing standards. These permits would be obtained prior to construction and based on final engineering design for the initial and subsequent phases.

In addition to the primary access road, Chavez Pass Road, an existing road located between Meteor Crater Road to the north and State Route 87 to the south, may also be used for site access for subsequent wind park phases. Chavez Pass Road is a primitive local road not maintained regularly by the County. Some improvements may be required, but it is anticipated the road would not need to be re-contoured or upgraded outside of the existing roadway.

Once primary access has been established, service roads to each WTG site and other wind park facilities would be constructed. Approximately 143 miles of service roads would be expected within the wind park study area if the project is fully built out to 500 MW. Service roads would be sited to minimize disturbance and maximize transportation efficiency. Existing roads, ranch roads, and two-track trails would be used to the extent possible. Service roads would generally be constructed to the same specifications and standards as the primary site access road, but would include a 10-foot shoulder on either side to accommodate a large crane. The wind park perimeter would not be fenced, and access to public land would not be gated. Primary access to the wind project on private land and trust lands administered by the ASLD would be via a newly constructed access road for which the ASLD anticipates issuing a non-exclusive right-of-way for the project, grazing lessees, and private landowners. Access to certain portions of the wind park on Federal, State, and private land may be restricted for public safety and project security.

Temporary Water and Power

Water would be required for construction activities during each project phase, including dust control and preparation of concrete. Water would be sourced from one or more privately owned wells located on private land within the wind park study area. Approximately 30 to 50 million gallons of water would be required for a 250 MW phase of construction, with 60 to 100 million gallons of total water required for full wind park build-out to 500 MW.

Potable water would also be sourced from within the wind park study area from a private landowner and would be available at the wind park staging area during construction.

There are currently no sources of electricity within the wind park study area. A temporary source of electricity would be required for construction. Two options are under consideration: 1) on-site generation, or 2) extending an electrical distribution line along Meteor Crater Road into the wind park study area across private and State trust lands.

Borrow Pits, Rock Crusher, and Batch Plant

Base material and aggregate required for construction activities including roads, staging areas, WTG foundations, transmission tie-line structure foundations, operations and maintenance building foundation, and up to two step-up substations are expected to be sourced from borrow pits located within the wind park study area on private land. One or more borrow pits would be used; each would be approximately two to four acres in size.

Materials quarried from each borrow pit would be processed through a portable rock crusher located at each borrow pit.

One or more portable concrete batch plants would be located within the wind park study area. Each batch plant would require an area approximately 0.1 acre in size, including an area for the batch plant and stockpiling of materials such as sand, cement, and water. Batch plants would be used to mix concrete for use in the WTG foundations, transmission tie-line structure foundations, and other facilities that would require the use of concrete.

Staging Areas for the Wind Park

Staging areas are typical of construction sites and are temporary use areas used to store and assemble materials, host office trailers and sanitation stations, and conduct safety meetings. A temporary wind park staging area would be developed on approximately 8 to 12 acres located within the wind park study area per project phase. An additional staging area, four to six acres in size, located within the wind park study

area would be used during access road construction for equipment and employee parking. Staging areas would be prepared by clearing and grading as needed. The areas would then be leveled with four to six inches of gravel.

Construction of Wind Turbine Generators

The construction of each WTG would require an area approximately 2.2 acres in size, each of which would be located within the wind park study area on private and/or State trust lands. This area would be cleared with a grader and excavated with a backhoe to prepare for each concrete foundation and to accommodate the WTG, temporary work areas, and a crane pad.

The components of each WTG would arrive via semi-trailers. If one crane is used at the site, 10 to 13 semi-trailer loads of wind facility components would be transported and offloaded at the project site per equipment delivery day; if two cranes are used at the site, 20 to 26 trailer loads would be transported and offloaded per equipment delivery day.

WTG assembly would involve connecting the anchor bolts to the concrete foundation, erecting the tower and nacelle, assembling and erecting the rotor, connecting the internal cables, and inspecting and testing the electrical system prior to operation. WTG assembly would be completed using a large crane.

Construction of Electrical Collection System and Communications System

The electrical collection system and communications system would be co-located within the wind park study area adjacent to the WTG service roads to the extent possible. Up to approximately 241 miles of 34.5-kV collection lines and fiber optic cables are estimated if the project is built out to 500 MW. The majority of the lines would be underground. The underground lines would be constructed by excavating trenches to a minimum depth of four feet and a width of one to two feet. If utilized, the overhead lines would be supported by wooden poles approximately 25 to 30 feet tall and spaced approximately 150 feet apart. In addition to the fiber optic cables, the communication system may include a microwave tower to transmit data.

Construction of the Step-Up Substation and Operations and Maintenance Building

Up to two step-up substations would be constructed within the wind park study area, located on an approximately four-acre parcel with an additional two acres disturbed during construction activities. The expected location of the step-up substations and operations and maintenance building is depicted on the preliminary layout plan.

The electricity generated by the wind park would be gathered at the step-up substation where the voltage would be transformed from 34.5-kV to 345-kV. Construction would involve site grading, installing gravel material within the fenced area of the substation, constructing concrete foundations for the transformers and other components within the substation, installing substation equipment, and erecting a chain-link fence around the substation perimeter for public safety and project security.

The operations and maintenance facility would be constructed within the wind park study area on private or State trust land, located on an approximately 2.1-acre parcel. Construction of the facility would include foundation preparation and pouring, framing the structure and roof trusses, installing the outer siding, installing plumbing and electrical work, and finishing the interior carpentry. Once complete, the facility would have the appearance of a typical prefabricated steel building.

Meteorological Towers

Several temporary meteorological (met) towers have been constructed over the past several years to gather wind data indicating the feasibility of the wind park. These existing towers would remain in place until construction of the wind park is complete. In addition, up to five additional temporary met towers could be installed prior to construction to further analyze the wind resource across the wind park study area. Temporary towers would be decommissioned and removed during the construction process for wind park phases. Up to 12 long-term or permanent met towers would be used to monitor wind conditions at the site if the wind park is built out to 500 MW. These met towers would be free-standing structures, approximately 263 feet tall, and constructed of steel lattice. The permanent towers would be connected to the facility's central Supervisory Control and Data Acquisition (SCADA) system. These towers would be lighted according to Federal Aviation Administration (FAA) requirements for structures over 200 feet, similar to the WTGs.

Operation and Maintenance of the Wind Park

Wind Park Start-Up

Plant commissioning would follow mechanical completion of the wind park, transmission tie-line, and switchyard and would begin with a detailed plan for testing and energizing the electrical collection system, step-up substations, transmission tie-line, and interconnection switchyard in a defined sequence with lock and tags on breakers to ensure safety and allow for fault detection prior to energizing any component of the system. Once the step-up substation is energized, feeder lines would be brought on line. Individual turbines would then be tested extensively and brought on line, one by one.

Wind Park Operating Requirements and Staffing

The wind park would be designed to be in operation 24 hours per day, 365 days per year. The wind park would be staffed as necessary to provide operational maintenance and environmental compliance support during core operating hours. The wind park's central SCADA system would stay online 24 hours per day, 365 days per year. Operational modifications could be implemented as part of the adaptive management plan of an Avian and Bat Protection Plan in coordination with U.S. Fish and Wildlife Service (USFWS) and Arizona Game and Fish Department (AGFD).

Fencing and Security

The wind park perimeter would not be fenced, and access to public land would not be gated. Access to certain portions of the wind park might be limited for public safety and project security in consultation with ASLD and the Forest Service. Wind park service roads that do not access public lands might be gated. A lockable steel door at the base of each WTG would restrict access to authorized personnel only. If the selected WTG requires a pad-mount transformer, these would be locked. The step-up substations would be fenced and gated and access would be limited to authorized personnel. Access to the operations and maintenance facility, met towers, and communications tower would be limited to authorized personnel.

Wind Park Power

During the operating life of the wind park, electricity for the operations and maintenance facility would be needed. Once Western's interconnection switchyard and the wind park's transmission tie-line and step-up substation are complete and energized, station power to the wind park facilities would be fed via a dedicated circuit from the step-up substation.

Operation of the Communication System

Each turbine would be connected to the SCADA system. The SCADA system would allow for remote control and monitoring of individual turbines and the wind park as a whole from either the central host computer or from a remote computer. Any abnormalities or emergencies detected by the system would initiate a callout sequence, and a maintenance person would be alerted and, if required, dispatched to the WTG immediately to implement corrective action.

Operation of the WTGs

The wind turbines would be equipped with sophisticated computer control systems to monitor variables such as wind speed and direction, air and machine temperatures, electrical voltages, currents, vibrations, blade pitch and yaw angles, etc. The main functions of the control system would include nacelle and power operations. Aerodynamic brakes and mechanical disk brakes would be installed as security measures in each WTG. The braking system is designed to be fail-safe, allowing the rotor to shut down during high wind conditions or in less than five seconds in case of electric power failure. Emergency stops would be located in the nacelle and in the bottom of the tower.

Typical chemicals would be used during operation and maintenance of WTGs, including anti-freeze liquid to prevent freezing, gear oil for lubricating the gearbox, hydraulic oil to pitch the blades and operate the brake, grease to lubricate bearings, and various cleaning agents and chemicals for maintenance of the turbine.

WTGs would be lighted according to FAA requirements for structures over 200 feet and, if approved, the FAA would issue a Notice of Determination of No Hazard to Air Navigation per structure. The FAA would provide an approved lighting plan for perimeter WTGs and select internal WTGs for the final project layout, per phase, prior to construction. Typically the FAA requires that approximately one-third of all WTGs in a wind park are lighted. Industry standard lighting is a medium intensity red synchronized flashing light-emitting diode (LED) obstruction light with a horizontal beam pattern.

Operations and Maintenance Building

The operations and maintenance facility would be located within the wind park study area on private land or State trust land and would include a main building with an employee work area, spare parts storage, restrooms, a shop area, outdoor parking facilities, a turn-around area for larger vehicles, and outdoor lighting. The facility is expected to be fenced and access would be limited to authorized personnel. During operations and maintenance, water to the facility would be provided by either an existing well or a new well. Domestic sewage would be treated through a closed septic system. The septic system would be leach field design, typical to the region and permitted through Coconino County. Facility exterior lighting would be in conformance with the Coconino County Lighting Ordinance.

Transmission and Extension Tie-lines

The electricity generated by the wind park would be gathered at the step-up substations located within the wind park where the voltage would be transformed from 34.5-kV to 345-kV. A new 345-kV single-circuit electrical transmission tie-line would be constructed between the initial wind park step-up substation and Western's existing Glen Canyon-Pinnacle Peak No. 1 and No. 2 345-kV transmission lines. The transmission tie-line would be approximately 15 miles in length, extending 8.5 miles across Forest Service-managed lands and up to approximately 6.5 miles across State trust and private lands. The Glen Canyon-Pinnacle Peak 345-kV transmission lines are part of the regional electrical grid. Connecting into this existing electrical transmission system would allow electricity produced at the wind park to be sold and used by Arizona and regional utilities.

The transmission tie-line would include monopole structures, conductors (power lines), and associated access roads. Structures are expected to be neutral light-grey or off-white steel structures with non-reflective finishes and would be approximately 120 feet in height and spaced approximately every 1,000 feet. Approximately 80 steel monopole structures would be erected. A minimum 50-year right-of-way from the Forest Service and ASLD, 200 feet in width, would be acquired for construction, operation, access, and maintenance. Details of the right-of-way lease and duration would be discussed with landowners prior to final design. Construction of the transmission tie-line is expected to temporarily disturb 345 to 413 acres and permanently disturb 19 to 25 acres of land.

An extension tie-line approximately seven miles in length, ranging between 138-kV and 230-kV, would connect the two step-up substations within the wind park. Pole structures for the extension tie-line would be 100 to 180 feet in height.

Engineering Surveys for the Transmission and Extension Tie-lines

Pre-construction engineering surveys would be conducted to locate the transmission and extension tie-line rights-of-way, to identify property boundaries, to provide accurate ground profiles along the transmission and extension tie-line centerlines, to locate existing structures, and to determine the locations and rough ground profiles for new service roads. Soils would be tested to determine physical properties, including the ability to support the proposed structures.

Construction of the Transmission and Extension Tie-lines

Transmission and Extension Tie-lines Mobilization and Staging

Up to three staging areas are planned for the construction of the transmission tie-line with one located near the switchyard (on Forest Service-managed lands) and one located within the wind park study area near the step-up substation (on private or State trust land). The staging area near the step-up substation would also be used for the extension tie-line. A third staging area would be located at a central point along the transmission tie-line route (on Forest Service-managed lands). Each staging area would be approximately four acres in size, located adjacent to the tie-line route. Staging areas would be sited to minimize land disturbance for the transmission tie-line construction.

Construction of Transmission and Extension Tie-line Access Roads

Primary construction and maintenance access to the transmission tie-line would be from either Lake Mary Road to Forest Service Route (FS) 125 or from the wind park through the primary site access road. Construction access to the extension tie-line would be from the primary site access road. Access to each structure location would be required. In order to minimize ground disturbance, existing roads would be used when possible with new spur roads constructed to the structure sites. When existing roads are distant from the transmission tie-line, a new access road or spur-road would be established adjacent to the transmission tie-line within the right-of-way. Typically the roads would be between 12 and 16 feet in width with a surface that is bladed, compacted, and lightly graveled.

Construction of Transmission and Extension Tie-lines and Temporary Use Areas

A right-of-way, 200 feet in width and extending the length of the tie-line, would be required. The right-of-way would extend 100 feet to either side of the transmission tie-line structures. An authorization, which would include use of existing and newly constructed roadways outside of the right-of-way, would be obtained from the Forest Service and ASLD. If additional areas are needed, they would be identified, discussed with the appropriate landowner, and all necessary environmental clearances would be performed. All land rights would be acquired in accordance with applicable laws and regulations governing acquisition of property rights.

Structure Installation

Each structure location would be determined and access to the site would be constructed as necessary. Structures would generally be spaced 1,000 feet apart; however this distance may vary depending on topography. A foundation would be prepared at each structure site. Each foundation would be excavated using a power auger or drill. Once the hole is bored, a reinforcing steel cage would be inserted and then the hole would be filled with concrete to form the foundation. Sections of the new structures and associated hardware would then be delivered to each structure site by flatbed truck. Erection crews would use a large crane to position the base section. The base would be secured to the concrete foundation. The remaining sections of the structure would be lifted into place by the crane and secured.

Installation of Conductors, Insulators, Hardware, and Shield Wires

The conductor is the wire cable strung between the structures on the transmission tie-line through which the electric current flows. Once all the structures have been erected, the conductor would be put in place through a process known as “stringing.” Pulling and tensioning sites to conduct this stringing would be located at each end of the transmission tie-line alignment and at turning structures.

Operation and Maintenance of the Transmission and Extension Tie-lines

The transmission and extension tie-lines would be operated from a remote power control center. Although the proposed transmission tie-line system would operate at 345-kV, the amount of power transferred along the conductors would vary depending on seasonal and time-of-day loads, as well as other system demands. The proposed transmission system would be maintained by monitoring, testing, and repairing equipment.

Western’s Switchyard

Western’s proposed 345-kV interconnection switchyard would be constructed on an approximately 15-acre parcel entirely on Forest Service-managed lands, located about three-quarter mile north of FS 125 and generally within the existing rights-of-way of Western’s two 345-kV transmission lines. The switchyard is expected to be approximately 650 feet wide by 1,000 feet long. The switchyard for this project would contain power circuit breakers, disconnect switches, steel busses, steel poles, cables, metering equipment, communication equipment, AC/DC batteries, and other equipment. The switchyard facilities would be constructed, owned, and operated by Western through an agreement with the Forest Service.

Pre-construction aerial and/or ground engineering surveys would locate the switchyard property lines and corners, provide accurate ground profiles, locate structures, and determine the exact locations and rough ground profiles for new access roads.

The 345-kV switchyard would temporarily require approximately 24 acres during construction and would permanently disturb about 15 acres. Construction vehicles and equipment that would be needed for the construction of the switchyard include large cranes, heavy backhoes and earthmovers, large forklifts, and various power tools. Construction of the switchyard and interconnection facilities would involve several stages of work including access road construction and/or improvement; grading of the switchyard area; and construction of foundations for transformers, steel work, breakers, control houses, and other outdoor equipment.

A temporary staging area would be developed on approximately three to four acres adjacent to the switchyard site. The staging area would be used for construction safety meetings, to host office trailers, temporary sanitation stations, parking for equipment, vehicle parking for equipment operators and construction workers, and staging for limited project components. The staging area would be prepared by

clearing and grading as needed. The area would then be covered with four to six inches of gravel to provide a level ground surface.

Primary construction and maintenance access to the switchyard site would come from Lake Mary Road to FS 125. From FS 125, the switchyard would be accessed via Western's current easement. An existing access road within this easement would be improved to allow movement of construction vehicles. Improvements of Western's access road would involve vegetation clearing, excavating current groundcover to a depth of up to 12 inches, and covering the surface with approximately 4 to 6 inches of aggregate from off-site sources or the borrow pits located in the wind park study area.

Western requires dual and redundant communication with its switchyards. A microwave communication tower would be installed within the new switchyard to deliver signals to operate switchyard equipment from control centers and other remote locations and to report metering. A microwave communication tower approximately 60 feet high would be constructed at the switchyard with a microwave antenna aimed toward an existing communication link on Mount Elden approximately 25 miles northwest of the proposed switchyard site.

Western would install four new in-lead dead-end structures to provide a tie with the new switchyard and the existing Glen Canyon-Pinnacle Peak transmission lines. Each dead-end structure would be a heavy-duty, galvanized steel monopole structure and provide a tie into the new switchyard. It is envisioned that the new structures would be located within the existing Glen Canyon-Pinnacle Peak transmission lines rights-of-way.

Switchyard start-up would follow a detailed plan for testing and energizing the step-up substation, transmission tie-line, and interconnection switchyard in a defined sequence with lock and tags on breakers to ensure safety and allow for fault detection prior to energizing any component of the system. Switchyard start-up would not require any heavy machinery to complete.

During operation of the new switchyard, authorized Western personnel would conduct periodic inspections and service equipment as needed. Properly trained maintenance personnel would monitor and manage the use, storage, and replacement of gas-filled breakers to minimize any releases to the environment. During inspections, equipment would be monitored for detection of leaks and repairs would be made as appropriate. The switchyard would be designed to operate from a remote location, and no permanent employees would be required.

ES.3.3 Alternative Transmission Tie-line Corridor

Foresight, in coordination with the Forest Service, has proposed a route for the transmission tie-line to address potential effects to visual resources and avoid or minimize impacts to other resources. The alternative tie-line would deviate from Foresight's proposed tie-line route by approximately one-half mile to avoid the intersection of FS 125 and FS 82 on Forest Service-managed lands. The wind park and interconnection switchyard would be located in the same location and constructed in the same manner as described at Section ES.3.2.

Similar to Foresight's proposed transmission tie-line, the alternative transmission tie-line would require approximately 80 structures and would be approximately 15 miles long, extending 8.5 miles across Forest Service-managed lands and 6.5 miles across State trust and private lands. The alternative action would result in slightly more ground disturbance than the transmission tie-line associated with Foresight's proposed transmission tie-line because it uses fewer existing roads. Ground disturbance for the alternative action is estimated to be 346 to 414 acres of temporary disturbance (approximately one acre

more than Foresight's proposed transmission tie-line) and 20 to 26 acres of permanent disturbance (approximately one acre more than Foresight's proposed transmission tie-line).

ES.3.4 No Action Alternative

Under the No Action Alternative, Western would deny the interconnection request and the Forest Service would not permit facilities to be placed on Forest Service-managed lands. For the purpose of impact analysis and comparison in this EIS, it assumed that the proposed wind park would not be built and the environmental impacts, both positive and negative, associated with construction and operation would not occur.

ES.3.5 Alternatives Considered but Eliminated from Consideration

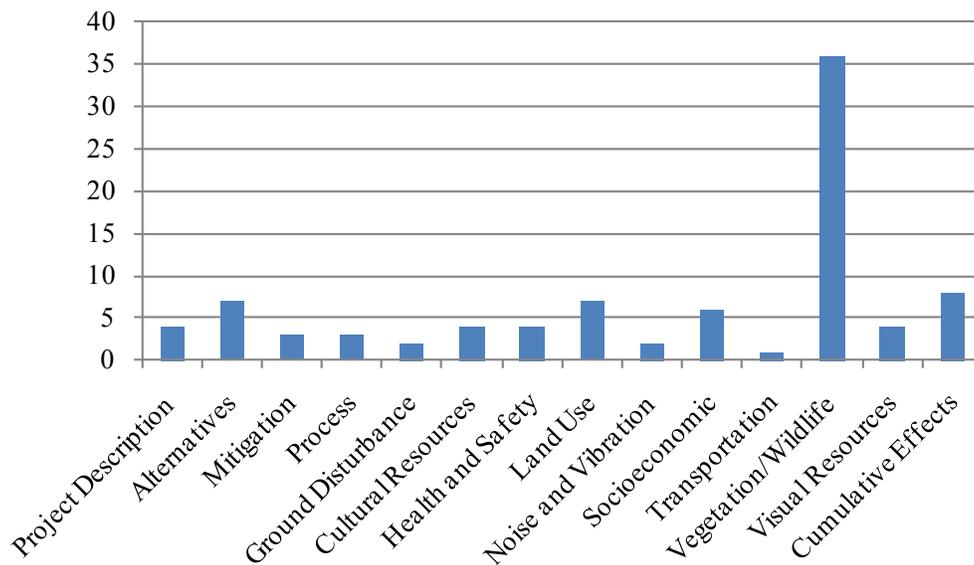
Five alternatives to the location of the proposed transmission tie-line and switchyard were considered during scoping. Additionally, an alternative addressing burying the transmission tie-line was considered. None of the transmission tie-line alternatives were carried forward for consideration based on criteria including cost, construction feasibility, environmental resource sensitivities, and conformance with applicable land use plans. Western considered the alternative wind park locations suggested during the public comment period and determined that the EIS will not fully analyze them because Western's authority is whether to interconnect Foresight's proposed wind park.

ES.4 PUBLIC INVOLVEMENT, CONSULTATION, AND COORDINATION

Interested parties were notified of the proposed project and the public comment opportunity through a Notice of Intent (NOI) published in the Federal Register on July 24, 2009 (Vol. 74, No. 141, page 36689). The NOI announced the scoping meetings held in Mormon Lake and Flagstaff, Arizona and the deadline for submitting comments as August 28, 2009. It included a description of proposed facilities, project location, how to submit comments and why they are important, and how to contact the lead agency. A packet of similar information was mailed directly to nearly 400 members of the public on July 20, 2009. A press release, radio announcements, flyers, newspaper advertisements, an e-mail notice, and Western's website provided additional notice and instruction for submitting comments beginning July 22, 2009.

A total of 27 parties submitted 91 specific comments. The issues, concerns, questions, and opportunities that were identified have shaped development of the EIS. A summary of the issues of concern to participants is depicted in Figure ES.4-1.

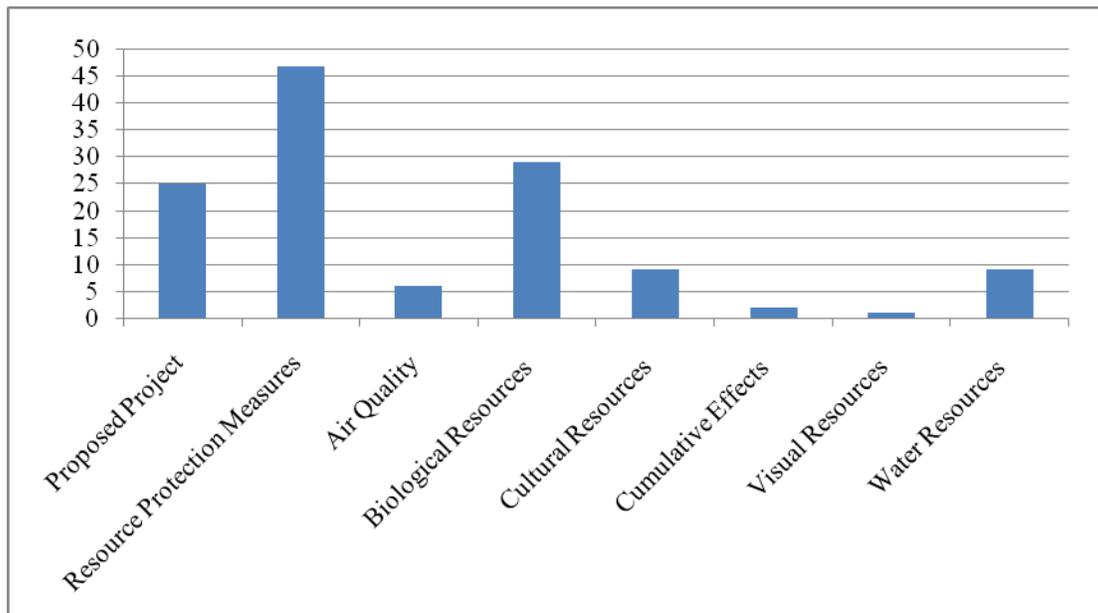
FIGURE ES.4-1
SUMMARY OF SCOPING COMMENTS RECEIVED



The Draft EIS was issued in July 2010. The U.S. Environmental Protection Agency (EPA) published a Notice of Availability (NOA) in the Federal Register on July 23, 2010 (Vol. 75, No. 141, page 43161). The NOA also announced a 45-day comment period for receipt of comments on the Draft EIS. Locally, Western published a display ad and Coconino National Forest (Forest) published a legal notice in the Arizona Daily Sun with the NOA information and announcements of two public hearings held in Mormon Lake and Flagstaff. Western also provided notification of the issuance of the Draft EIS and the hearings to entities with email addresses.

Western provided compact discs and/or hard copies of the Draft EIS to 108 agencies, Tribes, organizations, and individuals. Copies of the Draft EIS were available at the Forest Supervisor's Office in Flagstaff, the Flagstaff and Winslow Public Libraries, and Western's Desert Southwest Regional Office in Phoenix, Arizona. The Draft EIS was also posted on Western and Forest websites. In response, Western received 18 comment documents as of September 13, 2010 from which it identified 126 substantive comments related to the proposed project, RPMs, and biological resources, including avian and bat protection (Figure ES.4-2). Many comments resulted in changes to the Draft EIS in terms of factual content or analysis.

FIGURE ES.4-2
SUMMARY OF PUBLIC COMMENTS RECEIVED



Western initiated consultation with tribal governments by letter in October of 2009. Tribes responding to the request for participation included the Hopi, Zuni, White Mountain Apache, and Tonto Apache tribes and the Navajo Nation. Tribes provided assistance in evaluating Traditional Cultural Properties (TCPs), conducting cultural resource surveys, and developing ethnographic studies. The Zuni Historic Preservation Office produced a report titled *Zuni Traditional Cultural Property Assessment and Cultural Issues Associated with the Proposed Wind Project, Coconino County, Arizona* and submitted the report to Western in June 2010. Consultation efforts will continue into the construction stages of the proposed project.

A Programmatic Agreement (PA) was prepared by Western and executed by Western, the Forest Service, Arizona State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation. In addition, Foresight and Tonto Apache Tribe signed as concurring parties. The PA establishes the area of potential effect for the proposed project, describes the Class III survey methodology to be used prior to final engineering design, proposes a treatment plan for identified resources that cannot be avoided, describes procedures for unanticipated discoveries, sets forth procedures for tribal consultation, and suggests general mitigation measures.

ES.5 SUMMARY OF RESOURCE PROTECTION MEASURES AND POTENTIAL IMPACTS

Construction, operation, and maintenance of the proposed project would have certain impacts, both beneficial and adverse.

Foresight and agencies have proposed RPMs for each resource area to minimize impacts associated with construction, operation, and maintenance. Foresight and agencies have committed to these RPMs, and they are included in the evaluation of environmental impacts. Foresight would follow standard construction practices, Best Management Practices (BMPs), and RPMs during the construction, operation, and maintenance of the proposed wind park and transmission tie-line facilities. Some RPMs have been designed to address the direct and indirect impacts to birds and bats during construction and operation

based on additional impact assessments and data acquired during actual construction and operation. To implement the RPMs, an Avian and Bat Protection Plan (ABPP) is being voluntarily developed with USFWS and AGFD. The ABPP includes components such as additional pre-construction and post-construction wildlife studies to inform final micro-siting of the initial project phase and monitor operational impact levels that are based on the Wind Turbine Guidelines Advisory Committee (WTAC) Tier 4 framework (USFWS 2010). An Adaptive Management protocol would be implemented within the ABPP whereby iterative decision-making (evaluating results and adjusting actions on the basis of what has been learned) would be undertaken to reduce or avoid impacts to biological resources if post-construction monitoring demonstrates that impacts are greater than anticipated.

Western and the Forest Service do not have jurisdiction over the siting, construction, or operation of the proposed wind park, so their proposed RPMs apply to the proposed switchyard (Western) and the proposed switchyard and transmission tie-line (Forest Service). The Forest Service has proposed certain measures that would be binding on Foresight for the proposed transmission tie-line and on Western for its proposed switchyard, if adopted by the Forest Service. In addition, Western requires its construction contractors to implement standard environmental protection provisions. These provisions are provided in Western’s Construction Standard 13 (Appendix A.1) and would be applied to the proposed switchyard. Specific BMPs that the Forest would require address soil and water resources and invasive species management for the proposed transmission tie-line and switchyard.

Western, the Forest Service, and Foresight are among the signatories to the PA and are required to comply with the National Historic Preservation Act and thus would abide by the provisions in the PA addressing effects to properties on or eligible for listing to the National Register of Historic Places (NRHP).

Table ES.5-1 summarizes the environmental resources components evaluated and the environmental impacts of the proposed project, alternative transmission tie-line, and no action alternative.

TABLE ES.5-1 COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES			
Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western’s Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie- line Corridor, and Western’s Proposed Switchyard	No Action Alternative
Land Use	Development of the up to 500 MW wind project would result in a permanent conversion of 591–627 acres of land from grazing to other use. Approximately 97 percent of the wind park site area would remain available for grazing per phase.	Development of the up to 500 MW wind project would result in a permanent conversion of 592–628 acres of land from grazing to other use, slightly more than under the proposed wind park, tie-line, and Western’s proposed switchyard. Impacts would not be noticeably different than those described under the proposed wind park, transmission tie-line, and Western’s proposed switchyard.	Would result in no change to existing land uses.

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western’s Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie- line Corridor, and Western’s Proposed Switchyard	No Action Alternative
Biological Resources	Construction of the wind park is expected to temporarily disturb 2,050–2,193 acres and permanently disturb 555–570 acres of scrub-shrub, grassland, and a small amount (less than 2 percent) of evergreen forest. Construction of the transmission tie-line and switchyard is expected to temporarily disturb 345–413 acres and permanently disturb 19–25 acres of grassland, pinyon-juniper woodland, and a small amount (less than 3 percent) of ponderosa pine forest. Landcover types and habitats found within the wind park study area and adjacent to the transmission tie-line and switchyard are not unique to the surrounding landscape or region.	Construction of the wind park is expected to temporarily disturb 2,050–2,193 acres and permanently disturb 555–570 acres of scrub-shrub, grassland, and a small amount (less than 2 percent) of evergreen forest. Construction of the alternative tie-line and switchyard is expected to temporarily disturb 346–414 acres (approximately 1 acre more than Foresight’s proposed transmission tie-line alignment) and 20–26 acres of permanent disturbance (less than 1 acre more than Foresight’s proposed tie-line alignment). The alternative tie-line route would affect open grassland. Impacts to special status species; birds, raptors, and bats; and big game would not be noticeably different than those under the proposed wind park, transmission tie-line, and Western’s proposed switchyard.	Would have no effect to biological resources.

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western’s Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie- line Corridor, and Western’s Proposed Switchyard	No Action Alternative
Biological Resources (continued)	<p>Special status plant species have highly restricted distributions and very specific habitat requirements and are not expected to occur within the wind park study area based on either an absence of habitat, range, or distribution. Canyon bottoms containing riparian areas, deciduous woodlands, wetlands, or waterbodies may support wetland and mesic plant species would be mostly avoided by wind park facilities. Federally-listed Mexican spotted owls are known to occur in the Forest in the vicinity of the transmission tie-line, and while the species move through the area, suitable nesting habitat is not present within or immediately adjacent to the proposed transmission tie-line evaluation area. The USFWS provided comments to the Draft EIS stating that the Federally-listed Mexican gartersnake and Chrichahua leopard frog are not believed to occur or be affected by the project.</p> <p>Implementation of these RPMs during construction and operation of the wind park facilities would minimize impacts to these species.</p> <p>Construction and operation of the proposed project may result in direct impacts to the birds, raptors, and bats through collision and/or electrocution with the wind turbines and power lines. RPMs include additional pre-construction surveys, preparation of an ABPP, constructing outside of bird nesting season or nest area avoidance, adherence to the Avian Power Line Interaction Committee suggested practices for avian protection on power lines, and formal post-construction monitoring study designed to estimate and address avian and bat mortality.</p>		

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western’s Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie- line Corridor, and Western’s Proposed Switchyard	No Action Alternative
Biological Resources (continued)	Construction activities may cause short-term impacts to big game such as antelope, mule deer, and elk populations. Big game behavior and movement throughout the area of potential disturbance may be affected, but operation of project facilities is not expected to have long-term impacts on big game behavior or movement patterns. Population trends and habitat viability associated with these species would not be impacted by construction and operation of the wind park, transmission tie-line, and switchyard.		
Cultural Resources	Would directly disturb between 2,419–2,630 acres of land within areas known to have been used prehistorically and historically. Research identified 678 previously recorded cultural resources within the cultural resources evaluation area for the proposed project facilities. Twenty-four of the sites potentially occur within 100 feet of the wind park study area, transmission tie-line, and/or switchyard. Of the 24 sites identified during the background research, 4 of these are recommended as eligible for listing on the NRHP. The preliminary layout plan for the primary access road was prepared to avoid impact to these sites. Western would consult with the signatories to the PA to determine the NRHP eligibility for 12 newly recorded sites and seven rock cairns based on the Class III pedestrian surveys completed for the proposed project. Of the 12 newly recorded sites, 9 are associated with the proposed transmission tie-line and 3 sites and rock cairns are associated with the proposed primary site access road. The preliminary layout plan for the proposed access road was prepared to avoid impacts to those sites and rock cairns.	Would directly disturb between 2,420–2,631 acres of land within areas known to have been used prehistorically and historically, slightly more than the proposed wind park, transmission tie-line, and Western’s proposed switchyard. Impacts would not be noticeably different than those under the proposed wind park, transmission tie-line, and Western’s proposed switchyard.	Would have no effect on cultural resources.

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western’s Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie- line Corridor, and Western’s Proposed Switchyard	No Action Alternative
Cultural Resources (continued)	The development of wind park and transmission tie-line facilities may also indirectly impact areas of interest to Native Americans such as sacred areas, or areas used for collecting traditional resources such as birds and medicinal plants. Visual impacts on significant cultural resources such as sacred landscapes, historic trails, and viewsheds from other types of historic properties (e.g., homes and bridges) may also occur. In addition, there may be visual impacts on TCPs because the visible wind turbines may be perceived as an intrusion on a sacred or historic landscape that could result in a significant adverse effect to these TCPs.		
Geology and Soils	Would temporarily disturb between 2,419–2,630 acres of land and would permanently remove vegetation from and alter the surface of 591–627 acres of land. This would result in increased erosion and the permanent loss of soils.	Would temporarily disturb between 2,420–2,631 acres of land and would permanently remove vegetation from and alter the surface of 592–628 acres of land. Impacts would be slightly greater than those described under the proposed wind park, transmission tie-line, and Western’s proposed switchyard because the transmission tie-line associated with the alternative action requires a new access road across moderately erosive soils that are difficult to revegetate.	Would have no effect on geology and soils.

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western’s Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie- line Corridor, and Western’s Proposed Switchyard	No Action Alternative
Air Quality	<p>Air quality impacts would be minimal, generally resulting from emissions and fugitive dust from equipment and vehicle operations during construction. Air quality impacts would be greatest during the construction period with fugitive dust emissions primarily from earthmoving, construction vehicle exhaust emission, and fugitive and point sources associated with the concrete batch plant. Operational impacts would be minimal because WTGs do not have emissions. There are emissions and dust associated with maintenance vehicle traffic.</p> <p>RPMs have been identified to further reduce the effects to air quality and there would be no measurable impact.</p>	<p>Would be the same as the proposed wind park, transmission tie-line, and Western’s proposed switchyard.</p>	<p>Would have no effect on air quality.</p>
Water Resources	<p>Construction would require approximately 307 acre-feet of groundwater if the wind park is built out to 500 MW. Operations would require a negligible amount of water. Soil erosion and sedimentation would increase as a result of the temporary disturbance of between 2,419–2,630 acres of land as would the permanent disturbance and removal of vegetation from 591–627 acres of land. Potential impacts to waters of the U.S. or wetlands identified by the Forest Service could result from construction, operation, and maintenance of the proposed wind park and transmission tie-line. Potential impacts include placement of fill or removal of materials and vegetation; altered flows or sediment transport; spills of contaminating materials; increased scour and erosion downstream; and construction of diversions, culverts, and below grade utility structures.</p>	<p>Construction and operations would require the same amount of water as the proposed wind park, transmission tie-line, and Western’s proposed switchyard. Between 2,420–2,631 acres of land would be disturbed temporarily and 592–628 acres of land would be permanently disturbed resulting in erosion and sedimentation. Impacts to preliminary jurisdictional washes would not be noticeably different than those described under the proposed wind park, transmission tie-line, and Western’s proposed switchyard.</p>	<p>Would have no effect on water resources.</p>

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western’s Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie- line Corridor, and Western’s Proposed Switchyard	No Action Alternative
Water Resources (continued)	Approximately 262 miles of potential jurisdictional waters have been observed in the up to 500 MW wind project study area. The impact of the initial phase is expected to affect approximately one-half acre for the initial phase study area, subject to USACE determination. Preliminarily, a similar impact for the build-out phase(s) study area is anticipated, also subject to USACE determination. It is expected through avoidance of features identified as jurisdictional waters of the U.S. to the extent practicable and through implementation of RPMs and other best management practices, to reduce impacts to jurisdictional features to the least environmentally damaging approach that can be achieved as required through the Clean Water Act Section 404 permitting process.		
Socioeconomics	Would result in the employment of approximately 400 workers directly, or through local or regional construction and service contract firms, during construction and between 17–40 workers during regular operations for a typical 500 MW wind park. This would lead to a slightly greater demand on public facilities, including schools. Vacancy rates in housing units in the region suggest capacity is available for this level of employment. In addition, the project would create a supplemental source of revenue to ranchers and State trust land beneficiaries and provide new tax revenues to the County and State.	Would be the same as the proposed wind park, transmission tie-line, and Western’s proposed switchyard.	Would not realize the economic objectives of the Diablo Canyon Rural Planning Area since no similar economic development proposals are currently under consideration.
Environmental Justice	Would result in additional employment opportunities and tax revenue that would benefit directly or indirectly persons living below the Federal poverty level.	Would be the same as the proposed wind park, transmission tie-line, and Western’s proposed switchyard.	Would have no effect on environmental justice, beneficial or otherwise.

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western’s Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western’s Proposed Switchyard	No Action Alternative
Transportation	Would result in a short-term (12–18 months per wind park phase) increase in construction related traffic of over 400 two-way vehicle trips each day during peak construction activity on I-40 and Meteor Crater Road and approximately 25 two-way vehicle trips each day on Lake Mary Road and FS 125. It would result in a minimal long-term increase in vehicular traffic on I-40 and Meteor Crater Road. Impacts would be proportionally reduced for project phases.	Would be the same as the proposed wind park, transmission tie-line, and Western’s proposed switchyard. Impacts would be proportionally reduced for project phases.	Would have no effect on transportation.
Health, Safety, and Security	Would create minimal occupational hazards, public safety, and environmental hazards during construction and operations.	Would be the same as the proposed wind park, transmission tie-line, and Western’s proposed switchyard.	Would have no effect on health and safety.
Noise	Construction equipment would elevate ambient noise levels substantially over the short-term (12–18 months per wind park phase) during certain construction activities, but operations would result in a minimal increase in ambient noise levels that would dissipate over a short distance.	Would be the same as the proposed wind park, transmission tie-line, and Western’s proposed switchyard.	Would have no effect on noise.
Visual Resources	Would result in a visual contrast by introducing contrasting elements of form, line, and color. In addition, the proposed transmission tie-line would result in a Visual Quality Objective of Modification within an area on Forest System-managed lands for a Visual Quality Objective of Partial Retention.	Effects would generally be the same as those described under proposed wind park, transmission tie-line, and Western’s proposed switchyard except the tie-line would be routed to avoid the more sensitive area (Partial Retention) on Forest System-managed lands.	Would have no effect on visual resources.