

---

**CALIFORNIA ENERGY COMMISSION**

---

Juanita Loyola, *Principal Author*  
Michael Smith, *Manager*

**RESEARCH & DEVELOPMENT OFFICE**

Nancy Deller, *Deputy Director*

**ENERGY TECHNOLOGY  
DEVELOPMENT DIVISION**

## NOTICE

---

This document is prepared pursuant to Wind Project Performance Reporting System regulations (California Administrative Code, Title 20, Chapter 2, Subchapter 3, Article 4) and to support California Energy Commission (Commission) staff analyses. Neither the Commission, State of California, any officer or employee thereof, nor any of its contractors or subcontractors intend that the information herein is to be used for any other purpose and make no warranty, express or implied, or assume any legal liability whatsoever for the contents of this document.

## ACKNOWLEDGEMENTS

Special acknowledgements are due to all who helped establish the Wind Performance Reporting System (WPRS). The program was developed by the California Energy Commission in conjunction with the state's wind industry and the American Wind Energy Association (AWEA) and is under the direction of Pramod Kulkarni, Acting Technology Assessments Manager. Data management and production assistance were provided by Kristen Brajkovich. The cover layout and design were provided by the Commission's Media and Public Communications Office.

# TABLE OF CONTENTS

1.	Introduction .....	1
2.	WPRS Background .....	2
3.	WPRS Implementation Issues .....	5
4.	California Wind Resource Areas .....	6
5.	Staff Summary .....	7
	A. Industry Performance .....	7
	B. Industry Production and Capacity Trends .....	10
	<i>Statewide</i> .....	10
	<i>Resource Areas</i> .....	12
	<i>Turbine Size</i> .....	14
	<i>Turbine Type</i> .....	15
	<i>Domestic and Foreign Turbines</i> .....	16
	<i>Ten Largest Wind Turbine Manufacturers</i> .....	19
	<i>Five Largest Wind Project Operators</i> .....	21
6.	WPRS Annual Summary Tables .....	23
7.	WPRS Data .....	31
	Alphabetical List of Operators and Other Participants .....	32
	Wind Data Section Notes .....	33
	<i>Altamont</i> .....	35
	<i>Pacheco</i> .....	54
	<i>San Geronio</i> .....	56
	<i>Solano</i> .....	73
	<i>Tehachapi</i> .....	74
<i>Appendices</i>		
	A. Operator Comments .....	103
	B. Wind Turbine Manufacturers .....	107
	C. Sources of Wind Energy Technical Assistance .....	113
	D. WPRS Regulations .....	114

## 1. INTRODUCTION

California is recognized as a world leader in the development of wind energy. Early wind industry growth in California was supported by the availability of federal and state tax credits and long-term interim standard offer (ISO4) contracts with favorable rates. These economic incentives provided the impetus for significant growth from about 500 MW installed capacity at the beginning of 1985 to a high of 1,679 MW installed capacity at the end of 1991.

After dominating worldwide development in the 1980s, California's share of installed capacity is now slowly diminishing due to continued attrition of older turbines and low levels of industry expansion. Only 16 MW of new capacity was installed during 1992 and only 9 MW during 1993. The decline in new turbine installations appears to reflect the expiration of long-term interim standard offer contracts (ISO4's) with favorable rates. As a result, with 1,608 MW of installed capacity at the close of 1993, California now accounts for only about 53 percent of the world's grid-connected wind energy capacity.<sup>1</sup>

---

<sup>1</sup> Calculated from "Estimated Installed, Grid-Connected Wind Energy Capacity By Country/Region", Energy Research Center, The Netherlands, 1994/AWEA

Although the wind industry profile is changing, California wind industry performance continues to be impressive. The more than 2.8 billion kilowatt-hours (kWh) of electricity produced by California wind operators during 1993 provided enough output to meet the annual electricity needs of more than 450,000 typical California homes.

Wind energy continues to be an important renewable energy technology, representing one of the most cost effective alternative generation technologies.<sup>2</sup> As a result, the California Energy Commission has designated wind energy as an "opportunity" technology for electric generation, one in the state's best interest to achieve a cleaner, cheaper and more secure energy future while contributing to economic development.<sup>3</sup>

---

<sup>2</sup> California Energy Commission, *Energy Technology Status Report*, December 1992.

<sup>3</sup> California Energy Commission, *Energy Development Report*, December 1992.

## 2. WPRS BACKGROUND

### **What Commission Efforts Led to the Wind Project Performance Reporting System?**

The California Energy Commission (Commission) Wind Program was initiated in 1977 and later expanded in 1978 with the passage of California Assembly Bill 2976 authored by Assemblyman Henry Mello. The Mello bill required the Commission to implement a state wind energy program to expedite the commercialization of utility-scale wind turbines. The Commission was responsible for: assessing wind resources throughout California; operating a public wind information center; testing wind-electric turbines; and conducting research to support development of large-scale prototype wind turbines.

When the industry began exponential growth in 1981, the Commission and the American Wind Energy Association (AWEA) recognized the need for performance and other technology-related information. Subsequent efforts by these two organizations led to adoption of Wind Project Performance Reporting System (WPRS) regulations in 1984.

### **What is the WPRS Program?**

California law requires the California Energy Commission to serve as a central repository in

state government for the collection and dissemination of information on energy supplies. Starting in January 1985, WPRS regulations required all California wind operators with projects rated at 100 kW or more to provide quarterly wind performance reports if they sold electricity to a power purchaser (utility). WPRS reports filed by operators include actual energy production and related project information. In addition, all California power purchasers are required to file quarterly reports documenting power purchases from wind operators. The Commission compiles and evaluates this data and documents findings in quarterly and annual reports on wind industry performance in California.

### **Why Were WPRS Regulations Developed?**

WPRS regulations were instituted for several reasons. First, the industry, investors, financial community, and government agencies needed actual performance data to better evaluate the status of wind technology. Second, information that would help minimize tax abuse would benefit everyone involved in wind development: the industry would generate less "bad press" and more favorable public opinion; investors would be better able to make informed investments; and government and public monies would be allocated to projects with optimal performance. WPRS regulations were intended to provide performance data useful for improved government tracking of energy

supplies and better planning of the state's energy needs.

Before federal tax credits expired in 1985, project financing was primarily venture capital from private investors willing to take a substantial risk on the technology due to available tax benefits. Since the tax credits expired, wind projects have focused on revenues from power sales and placed greater reliance on conventional financing from institutional lenders and foreign investors. WPRS data also is needed to establish performance credibility with these new sources of financing.

#### **What Information Do WPRS Reports Provide?**

The WPRS Quarterly Report includes the following information for all wind projects in California rated at 100 kW or more that sell electricity to a power purchaser: turbine manufacturers, model numbers, rotor diameters and kW ratings; the number of cumulative and new turbines installed; the projected output per turbine; the output for each turbine model; and the output for the entire project. The WPRS Annual Report is a compilation of quarterly data provided by project operators and public utilities. Commission staff use this data to analyze wind project performance and industry production and capacity trends. The Annual Report also contains data summary tables reflecting performance statewide and by resource area; turbine size, type and origin; manufacturer;

and project operator. Note that totals expressed in tables and figures may not equal 100 percent due to rounding.

Since 1985, the Commission has documented and evaluated data submitted by operators and utilities in WPRS quarterly and annual reports. The extensive empirical data collected and disseminated by the Commission is used by industry, utility, investor, manufacturer, government, and research and development groups to measure the performance and relative benefits of wind technology.

#### **What Information Is Not Found in WPRS Reports?**

WPRS reports do not provide information on every wind energy project in California. Non-operating wind projects are not required to report to the Commission. The absence of a project from WPRS reports typically indicates that the project is not selling any power or is rated less than 100 kW. Other unreported capacity includes turbines that do not produce electricity for sale, such as turbines installed by utilities, government organizations and research facilities. Additional unreported capacity results when operators fail to file. Installed capacity for these operators cannot be confirmed and only kWh production verified from utility reports is included in WPRS reports.

WPRS reports cannot always account for the impact turbine age has on performance because turbines are often reported in groups combining old and new machines. To track improvements in technology, new turbine performance has been analyzed separately where possible.

The limited number of developers installing new capacity precluded adequate confidentiality of cost data. Therefore, aggregate cost data has not been included in the 1993 Annual Report.

#### **What Limitations Should Be Considered Before Using WPRS Data?**

Although many valuable observations about California's wind industry can be drawn from WPRS data, it is important to recognize four major limitations:

1) While the Commission collects and reports WPRS wind data in quarterly and annual reports, a complete industry evaluation requires consideration of collective data from several years. This is because the available wind resource varies from year to year depending on weather conditions.

2) Much of the data reported is not directly comparable because the wind industry still does not employ a standardized turbine rating system. Turbines are tested under different conditions and rated at widely varying miles per hour specifications.

3) Operator or manufacturer performance may not be accurately represented in the report when old and new turbine data are grouped together. Analysis of wind data reported since 1985 confirms that newer equipment typically performs more efficiently and reliably than older equipment.

4) Performance data contained in WPRS reports does not reflect other important variables that should be considered. These variables include: cost per kilowatt, operation and maintenance costs, durability of the system and quality of the site's wind resource.

### 3. WPRS IMPLEMENTATION ISSUES

WPRS implementation issues encountered and resolved are further discussed in this section.

**Validating performance data.** It was originally intended that utility quarterly reports be used to validate operator output data; however, numerous problems occurred. Some utilities did not provide data according to calendar quarters or provided data for only those operators who filed a power sales agreement. In many cases, more than one project was reported under a single utility contract making it difficult to verify individual project output figures.

To establish a more reliable validation procedure, Commission staff allowed operators to voluntarily submit utility receipts with quarterly reports. When output figures provided by operators agree with either submitted utility receipts or utility reported data, output figures are recorded as "validated."

**Operators who fail to file.** Utility quarterly reports inform Commission staff of all wind farm operators with projects rated 100 kW or more who sell power. These operators are required to submit WPRS reports. Operators who sell power but do not submit reports are noted as "failed to file." By the end of 1993, four

operators had failed to file. Depending on the circumstances, Commission staff consider various options for resolving filing issues.

**Operators who file reports with missing data.** Some operators filed WPRS reports with one or more data items missing. The predominant missing data item was projected quarterly output per turbine. It also appears that some wind projects were sold with only annual output estimates. In such cases, no value has been assigned. Commission staff continue to assist project operators with reporting so that data submitted will be complete.

#### 4. CALIFORNIA WIND RESOURCE AREAS

The wind resource map on this page includes the geographical location of, and quality associated with, major wind resource areas in California. During 1993, wind performance data was received from operators with projects located in the following five resource areas:

**Shown:**

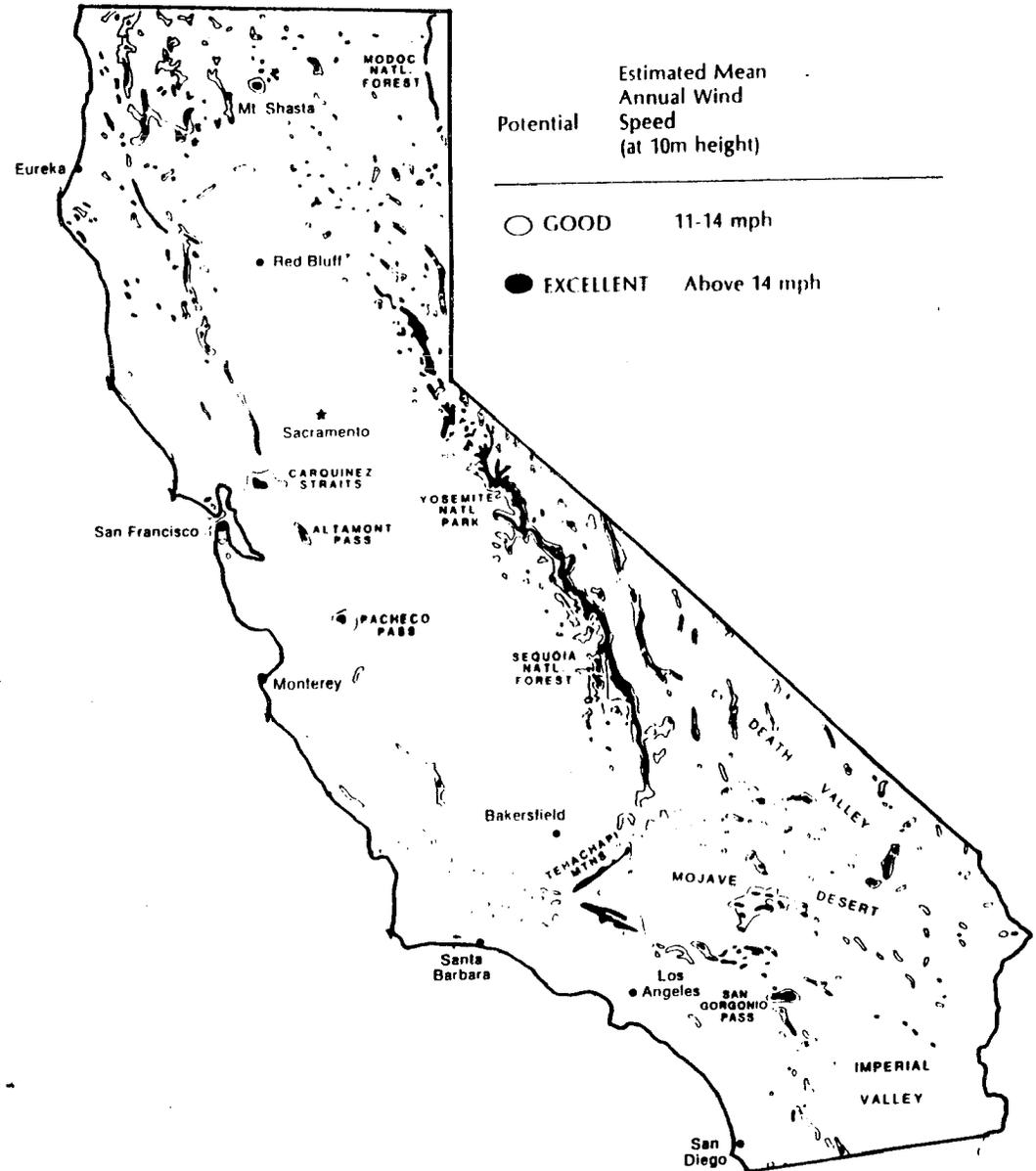
- Altamont Pass
- Pacheco Pass
- San Geronio Pass
- Tehachapi Pass

**Not Shown:**

- Solano (Solano County)

Areas designated "good" are roughly equivalent to an estimated mean annual power, at 10 meter height, of 200 to 300 Watts per square meter ( $W/m^2$ ), and "excellent" if more than 300  $W/m^2$ .

Source: A. Miller and R. Simon, "Wind Power Potential in California," San Jose State University, prepared for the California Energy Commission, May 1978.



## 5. STAFF SUMMARY

### 5.A INDUSTRY PERFORMANCE

**Total Capacity.** A cumulative capacity of more than 1,608 megawatts was reported operational during the fourth quarter of 1993. As anticipated, the rate of industry growth measured by new turbine installations was significantly reduced due to the expiration of long-term interim standard offer (ISO4) contracts with favorable rates. Attrition of older turbines continues to reduce total installed capacity. During 1993, turbines representing more than 50 MW of capacity were removed from service.

**Electricity Output.** In 1993, the California wind industry produced more than 2.8 billion kWh of electricity, enough power to meet the annual electricity needs of almost 450,000 typical California homes.

**Electricity Production Percent of Projected.** Although California wind projects generate a substantial amount of electricity, the industry as a whole produced only 76 percent of the total output projected for 1993. This figure, however, compares favorably to the 64 percent of total projected output attained in 1992 and is a significant improvement from the 45 percent of total projected output attained in 1985. Because

many wind developers overstated output capabilities during the tax credit era, a number of older turbines with overstated projections lower the total average statewide percent of output. When turbines installed since 1985 are isolated, the percent of projected output for 1993 rises to 89 percent.

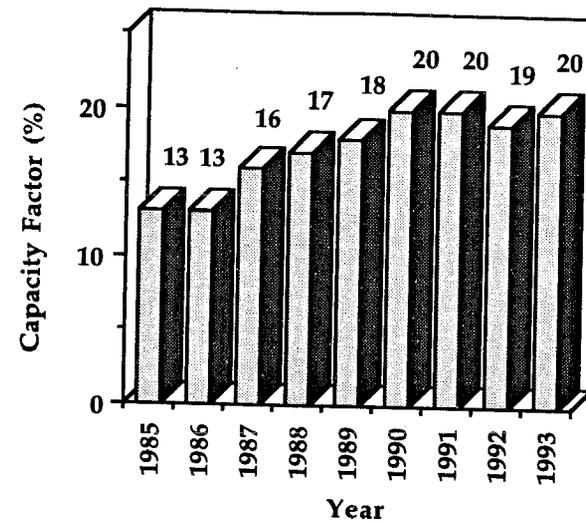
**Capacity Factor.** Capacity factor is defined as the ratio of actual energy output to the amount of energy a project would produce if it operated at full rated power for 24 hours per day within a given time period. As indicated previously, there should be standardized testing of all wind turbines for capacity factors to be truly comparable. With no such program, wind turbine ratings currently are based on widely varying test conditions and miles per hour specifications. Voluntary standards for testing wind turbines, however, have been developed by the American Wind Energy Association (AWEA).

Despite testing limitations, the capacity factor is still considered a strong indicator of wind project performance. The annual capacity factor is computed as the average of quarterly capacity factors calculated for each group of turbines reported. Only operating turbines are used to calculate capacity factors so that performance results are not skewed by non-operational capacity. For projects with new turbines, only one-half of new capacity is included in the

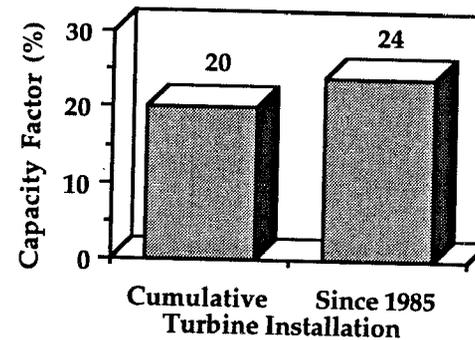
capacity factor calculation during the quarter of installation because new turbines are not likely to operate for the entire quarter in which they are installed and new equipment typically needs a "debugging" period before operating at fully rated power.

The resulting statewide capacity factor for 1993 is 20 percent, representing a nearly 54 percent increase from the 13 percent capacity factors for 1985 and 1986 (Figure 1). The upper limit capacity factor achieved by California wind projects continues to exceed 30 percent. In particular, one project has consistently reached this upper limit, including an annual capacity factor of 32 percent in 1993.

Note that statewide average performance is adversely affected by a substantial number of older turbines that are less reliable and efficient than those currently being installed. When wind turbines installed since 1985 are isolated, the capacity factor rises to 24 percent (Figure 2).



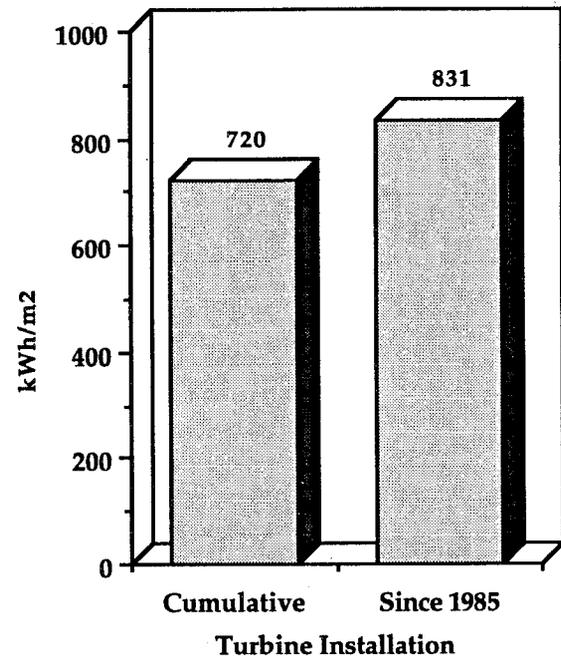
**FIGURE 1: Statewide Capacity Factors 1985-1993**



**FIGURE 2: Capacity Factors for Turbine Stock**

**kWh Per Square Meter.** Annual kWh per square meter calculations are another wind technology performance indicator. The advantage of this indicator is that it is based on blade-swept area, a wind turbine specification determined by standard measurements rather than non-standardized kW ratings used to determine capacity factors. Unfortunately, it is still difficult to develop directly comparable kWh per square meter results because data reported for some turbine models include new turbines that have not had the benefit of a full operational year. When any kWh per square meter calculation does not include a full operational year for all turbines, an asterisk has been placed next to the value on all summary tables in Section 6.

Average kWh per square meter annual production for 1993 was 720, more than a 5 percent increase from the 683 kWh per square meter recorded for 1992. When turbines installed since 1985 are isolated, however, the resulting kWh per square meter annual production figure increases to 831 (Figure 3).



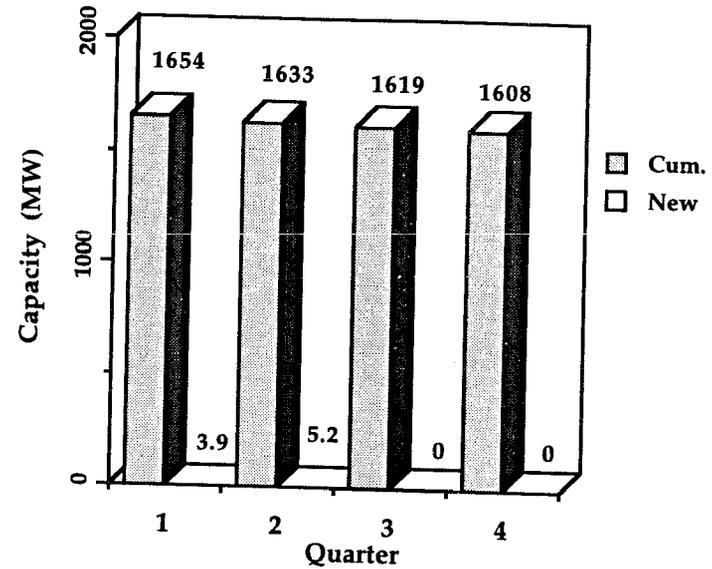
**FIGURE 3: kWh Per Square Meter Production of Turbine Stock**

## 5.B PRODUCTION AND CAPACITY TRENDS

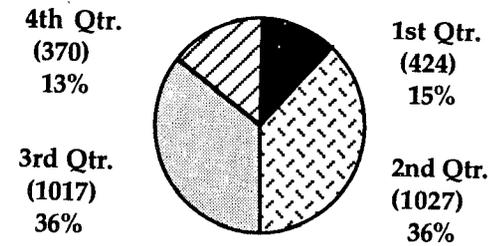
### Statewide

As anticipated, qualifying facility wind development has dropped to minimal levels because of prohibitively low power sales options. Only 9 MW of new capacity was installed in 1993, compared with 16 MW in 1992, 192 MW in 1991 and 161 MW in 1990. The total cumulative capacity of approximately 1,608 MW at the end of 1993 (*Figure 4*) appears to reflect minimal industry growth and the permanent retirement of some older wind turbines.

Wind output during 1993 was consistent with the typical California wind resource profile: low winds at the beginning and end of the year and high winds during spring and summer when the heating season creates a natural draw of cool coastal air into hot valleys and deserts. WPRS data indicates that 72 percent of all annual output was produced in the second and third quarters of 1993 (*Figure 5*). This is a good seasonal match to California's peak demand for electricity during summer months. Quarterly capacity factors were consistent with the California wind resource profile previously discussed. The statewide capacity factors for 1993 were 12, 29, 28 and 11 percent respectively for the first, second, third and fourth quarters.

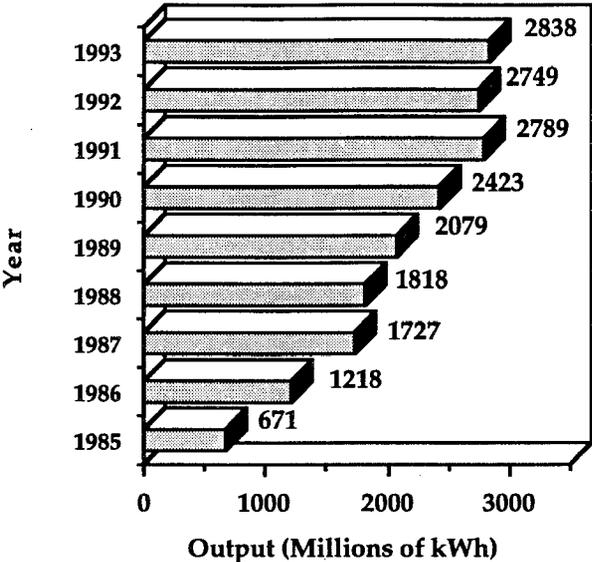


**FIGURE 4: Statewide Wind Capacity**



**FIGURE 5: Statewide Wind Output  
(Millions of kWh)**

The amount of electricity produced by California wind farm operators during 1993 exceeded all previous years, including 1991 and 1992 when reported installed capacity was higher (Figure 6). Increased production at lower installed capacity during 1993 may result from high availability of the wind resource and/or improved turbine performance.

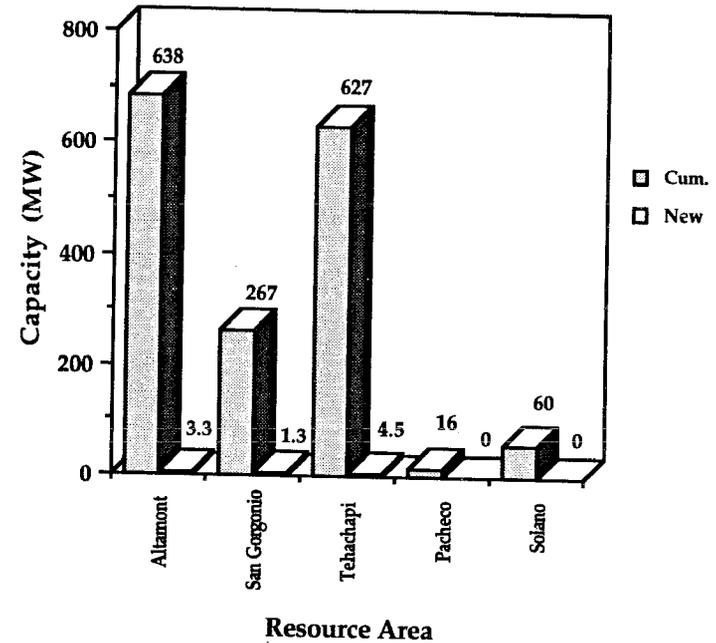


**FIGURE 6: Statewide Wind Output 1985-1993**

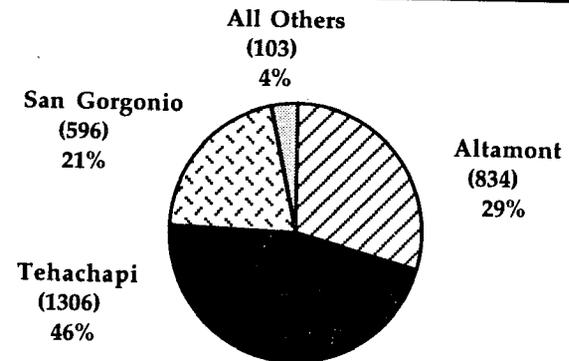
## Resource Areas

Although wind project operators from five different resource areas in California reported to WPRS, more than 95 percent of all California capacity and output is generated in only three resource areas: Altamont, San Geronio and Tehachapi. All three of these areas are narrow mountain passes leading into hot and dry valley or desert regions. Among these three resource areas, 40 percent of all capacity is found in Altamont, 39 percent in Tehachapi and 17 percent in San Geronio resource areas (*Figure 7*).

When resource area capacity (*Figure 7*) and percent of total statewide output (*Figure 8*) for the three primary resource areas are compared, Tehachapi (46 percent output at 39 percent capacity) and San Geronio (21 percent output at 17 percent capacity) produced more than their share, and Altamont (29 percent output at 40 percent capacity) produced less than its share. Pacheco and Solano resource areas produced almost exactly their shares.



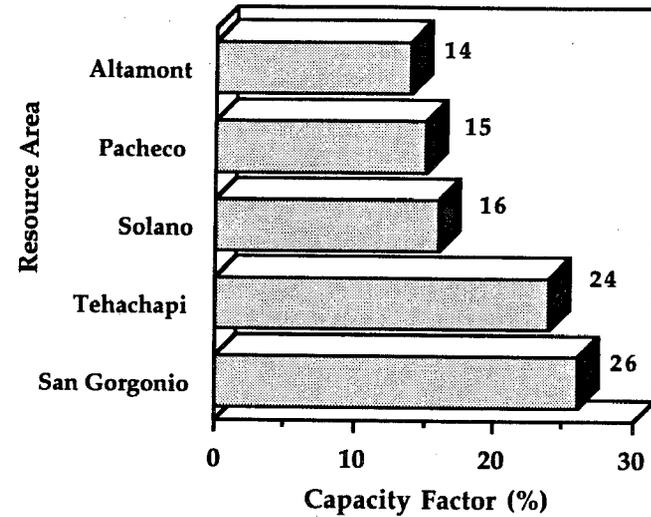
**FIGURE 7: Resource Area Capacity**



**FIGURE 8: Resource Area Output (Millions of kWh)**

Of the three largest resource areas, San Gorgonio had the highest capacity factor (26 percent), followed by Tehachapi (24 percent) and Altamont (14 percent). Solano and Pacheco, two smaller resource areas, had capacity factors of 16 percent and 15 percent respectively (Figure 9).

When comparing resource area performance, many factors should be considered. For example, age of equipment appears to be a significant factor affecting the performance difference between San Gorgonio and Altamont. This is because San Gorgonio equipment is newer since wind developers met substantial delays getting local government approval for their projects during early wind development years. By contrast, the Altamont resource area includes two large developers with about 138 MW of very old capacity and only a 3 percent average capacity factor, significantly lowering Altamont's overall performance.



**FIGURE 9: Capacity Factor by Resource Area**

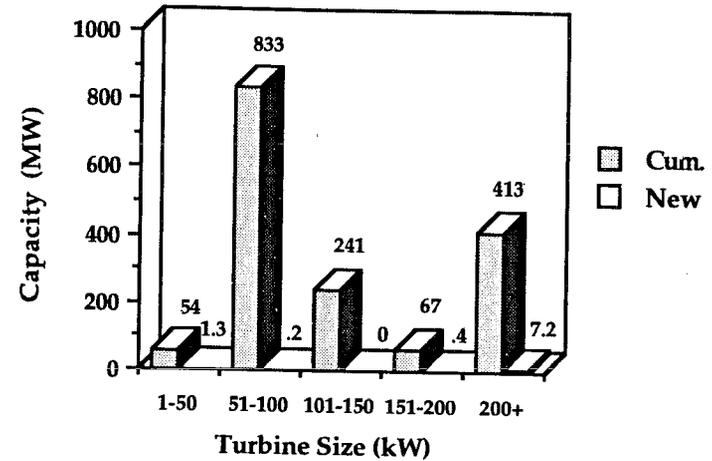
## Turbine Size

Since the early 1980's, many industry specialists have predicted that larger turbines, including those in the 300 kW size range, would be the trend for future wind development. This trend is reflected by new turbine installations during 1993. About 79 percent of all new capacity installed in 1993 was in the the 200+ kW size category (*Figure 10*). Although the 51-100 kW turbine size still accounts for slightly more than one-half of all cumulative capacity, this percentage share may decrease over time as smaller, older turbines are permanently retired from service.

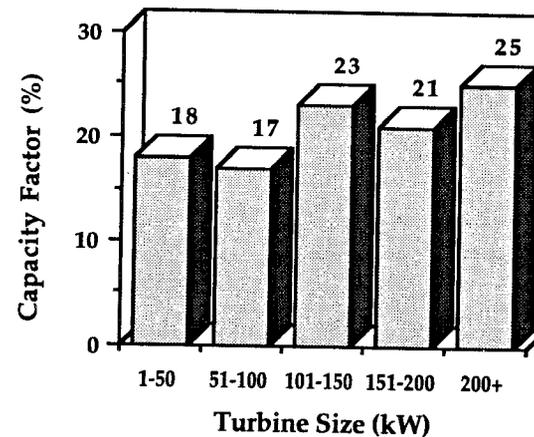
Capacity factor performance for 1993 is highest for turbines in the 200+ kW size range (*Figure 11*). Further, a comparison of cumulative capacity and percent share of kWh output reveals that larger turbines in the 200+ kW range produced more than their share at 31 percent output and 26 percent capacity (*Table 1*).

**TABLE 1**  
1993 CAPACITY AND OUTPUT BY TURBINE SIZE

Size (kW)	Cum. Capacity (% of Total)	New Capacity (% of Total)	kWh Output (% of Total)
1-50	3%	15%	3%
51-100	52%	2%	45%
101-150	15%	0%	17%
151-200	4%	4%	4%
200+	26%	79%	31%



**FIGURE 10: Capacity by Turbine Size**



**FIGURE 11: Capacity Factor by Turbine Size**

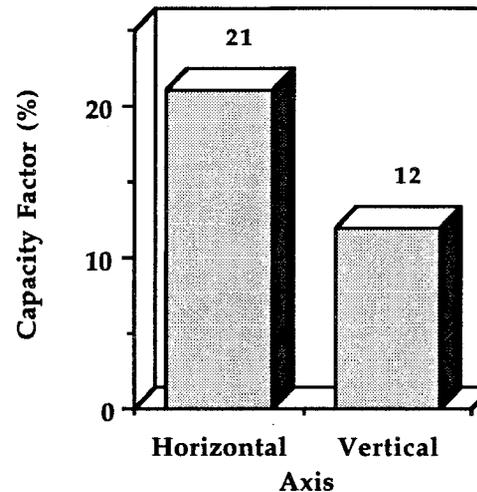
## Turbine Type

WPRS performance results also have been categorized by horizontal or vertical axis machines. When comparing performance of horizontal and vertical turbines, it should be recognized that vertical axis turbines represent relatively old technology since they have not been installed in California since 1986.

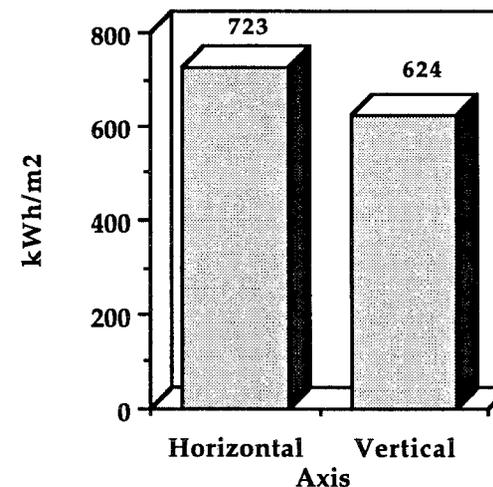
The California wind industry continues to be dominated by horizontal axis machines accounting for approximately 94 percent of all capacity and 100 percent of new capacity. Comparison of performance indicates a 21 percent capacity factor for horizontal axis turbines compared to a 12 percent capacity factor for vertical axis turbines (*Figure 12*).

Performance by kWh per square meter was 723 for horizontal axis turbines compared to 624 for vertical axis turbines (*Figure 13*). WPRS data does not explain why the variation in kWh per square meter performance between horizontal and vertical axis turbines is so much less than the difference in capacity factor performance.

Note that other important turbine characteristics such as downwind and upwind configurations, number of blades, fixed or variable pitch blades, and braking devices are not tracked in WPRS reports.



**FIGURE 12: Capacity Factors by Turbine Axis**



**FIGURE 13: kWh Per Square Meter Production by Turbine Axis**

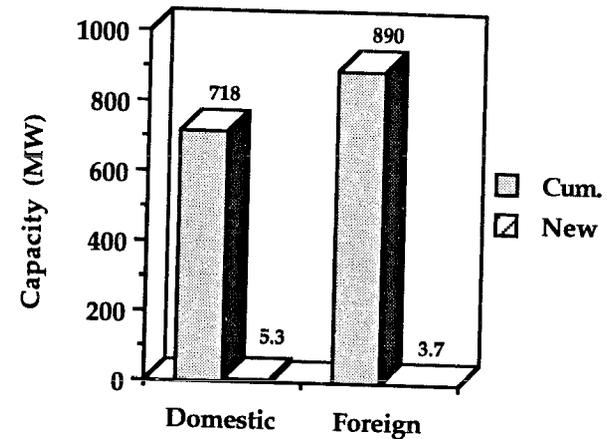
## Domestic and Foreign Turbines

By the end of 1993, foreign turbine capacity was 890 MW, compared to almost 718 MW of domestic turbine capacity. During 1993, 5.3 MW of domestic and 3.7 MW of foreign turbine capacity was installed (*Figure 14*).

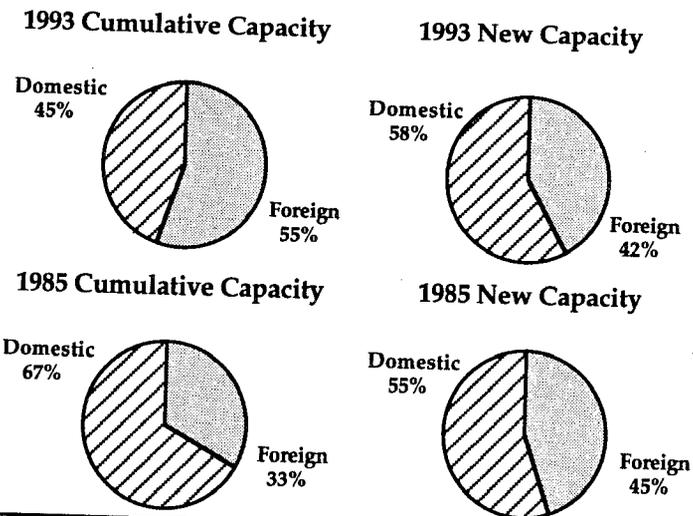
A comparison of capacity distribution by origin for domestic and foreign turbines in 1985 and 1993 is shown in *Figure 15*. For a more complete historical perspective, cumulative and new capacity for domestic and foreign turbines is shown in *Table 2*. It should be noted that although new domestic turbine capacity was added during 1993, domestic cumulative capacity declined slightly. It appears that the domestic turbine capacity added in 1993 did not offset capacity lost through the retirement of older domestic turbines.

**TABLE 2**  
1985-1993 CAPACITY DISTRIBUTION  
BY TURBINE ORIGIN

Year	Domestic (%)		Foreign (%)	
	Cum.	New	Cum.	New
1985	67	55	33	45
1986	55	25	45	75
1987	56	49	44	51
1988	58	87	42	13
1989	52	17	48	83
1990	53	45	47	55
1991	46	4	54	96
1992	47	39	53	61
1993	45	58	55	42



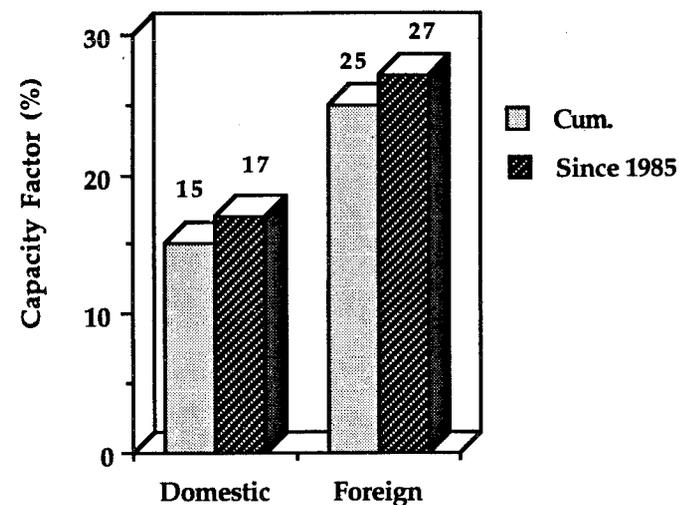
**FIGURE 14: Capacity by Turbine Origin**



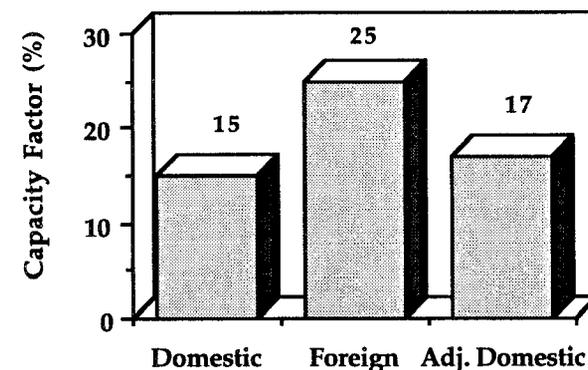
**FIGURE 15: Capacity Distribution by Origin  
1985 and 1993**

Capacity factor results indicate that overall performance of foreign turbines (25 percent) exceeds domestic turbines (15 percent). Both domestic and foreign turbine bases benefit from the inclusion of newer, more efficient machines. Historically, however, the domestic turbine base has been more adversely affected by older, less efficient turbines. For example, the 1992 cumulative capacity factors were 16 percent for domestic turbines and 22 percent for foreign turbines. This performance gap narrowed when turbines installed since 1985 were isolated; the domestic capacity factor rose from 16 to 21 percent compared to an increase from 22 percent to 23 percent for foreign capacity factor. In 1993, however, when domestic turbines installed since 1985 were isolated, the capacity factor increased much less, rising from 15 percent to 17 percent. This may result from the retirement of some older, inefficient turbines from the domestic turbine base (Figure 16).

The impact of other variables on domestic turbine performance is demonstrated by two large projects in the Altamont resource area with more than 184 MW of turbine capacity and an average capacity factor of only seven percent. Domestic turbines account for almost 140 MW of the 184 MW capacity with only a four percent capacity factor. When these two projects are eliminated from the domestic turbine base, the adjusted capacity factor increases to 17 percent (Figure 17).



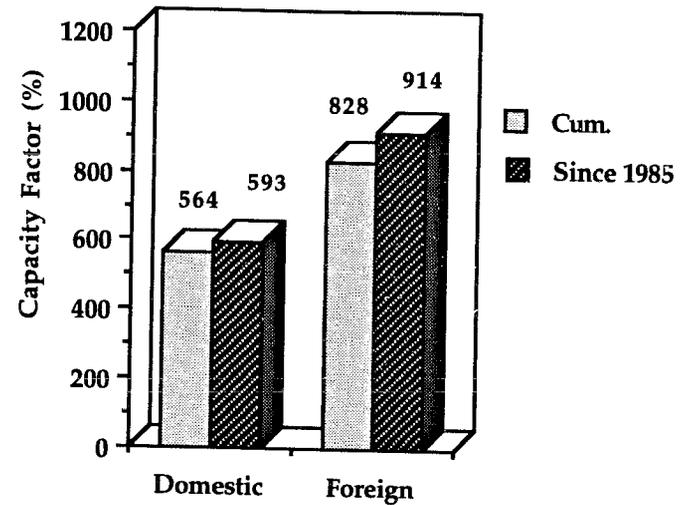
**FIGURE 16: Capacity Factor by Origin**



**FIGURE 17: Adjusted Capacity Factor for Domestic Turbines**

Analysis of kWh per square meter performance data indicates that foreign turbine performance (828) is about 46 percent higher than domestic turbines (564) without any adjustments. When newer turbines installed since 1985 are isolated, the performance gap for domestic turbine kWh per square meter production increases only slightly from 564 to 593 kWh per square meter. Historically, this performance gap has been much greater. The narrowing performance gap in 1993 may result from the retirement of some older turbines from the domestic turbine base (Figure 18).

It should be noted that when evaluating performance for domestic turbines, the kWh per square meter measure is comparatively better than the capacity factor measure because overstated capacity ratings for older domestic turbine stock appear to significantly reduce capacity factor performance.

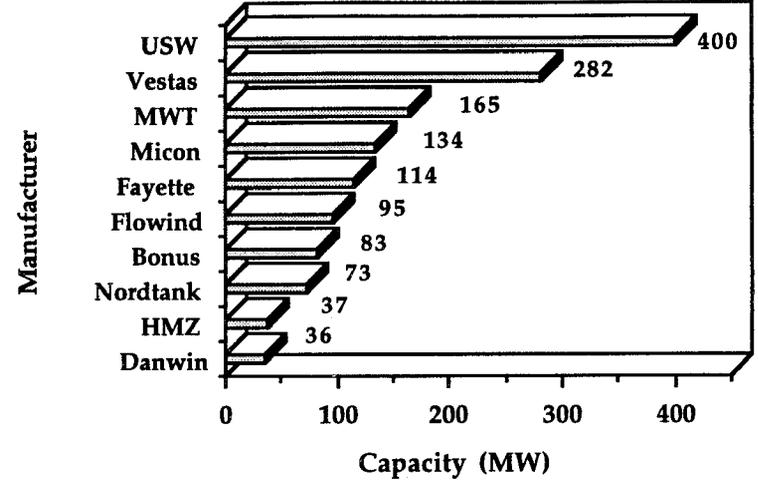


**FIGURE 18: kWh Per Square Meter Production by Turbine Origin**

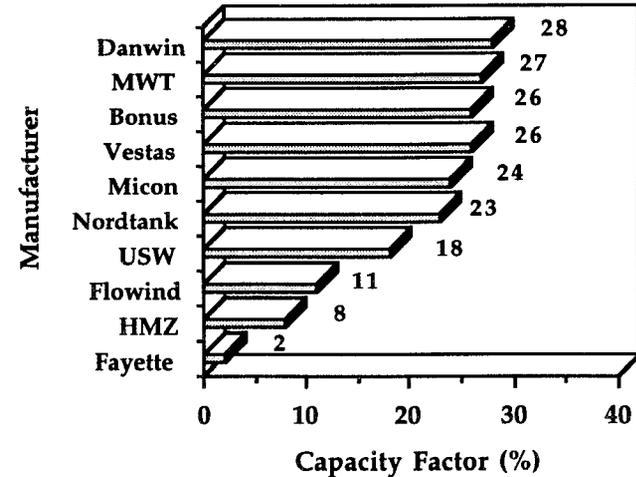
### The 10 Largest Wind Turbine Manufacturers

The 10 largest wind turbine manufacturers represent more than 88 percent of California's wind generating capacity. The five largest manufacturers alone (U. S. Windpower, Vestas, MWT, Micon and Fayette) account for more than 68 percent of all capacity. The 10 largest manufacturers and their individual generating capacities are shown in *Figure 19*. A wide range of capacity factors exist among these manufacturers (*Figure 20*). Manufacturers with the highest capacity factors are Danwin (28 percent), MWT (27 percent), Bonus and Vestas (26 percent), Micon (24 percent), and Nordtank (23 percent).

Both equipment and siting variables should be considered when evaluating turbine manufacturer data. Manufacturers with older turbine bases are more adversely affected relative to their total performance. The overall quality of a particular resource area also has considerable impact on reported performance of turbines sited in that area. Higher capacity factors for some specific turbine types may result from their concentration at particularly good sites within high quality resource areas.

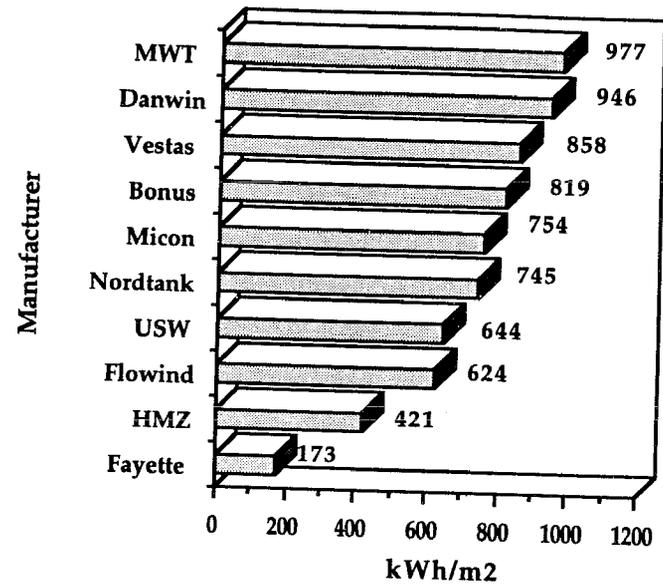


**FIGURE 19: Cumulative Capacity for 10 Largest Turbine Manufacturers**



**FIGURE 20: Capacity Factors for 10 Largest Turbine Manufacturers**

Annual kWh per square meter results are shown for the ten largest manufacturers in Figure 21. Manufacturers with the highest kWh per square meter production are MWT (977), Danwin (946), Vestas (858) and Bonus (819).

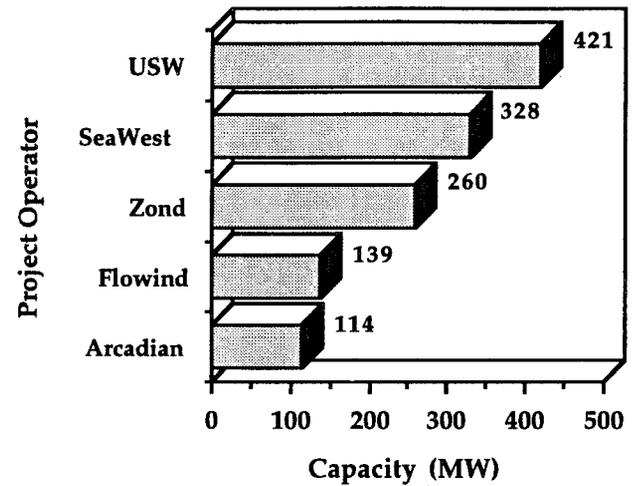


**FIGURE 21: kWh Per Square Meter Production for 10 Largest Manufacturers**

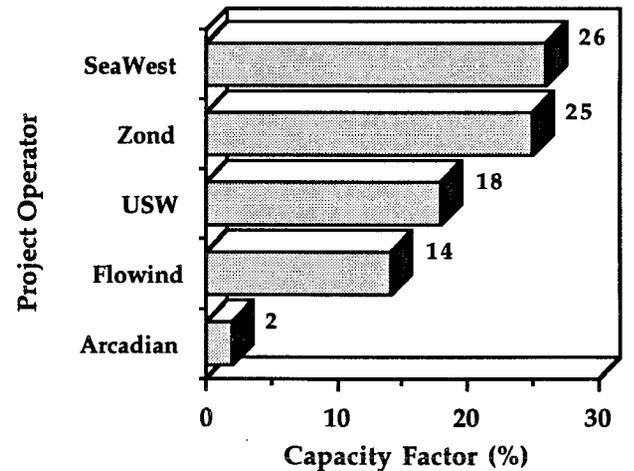
### The Five Largest Wind Project Operators

The 1993 Annual Report continues to focus on the five largest wind project operators due to industry consolidation and growth primarily limited to major developers. The five largest wind project operators include U.S. Windpower, SeaWest, Zond, Flowind and Arcadian (formerly Fayette). These five operators account for 1,262 MW, representing more than 78 percent of total California wind generating capacity (Figure 22).

Capacity factors for the largest wind project operators are quite varied (Figure 23). Operators with the highest capacity factors are SeaWest (26 percent) and Zond (25 percent). It should be noted that one smaller operator, San Gorgonio Farms (not shown in Figures 22 and 23), has consistently produced the highest capacity factors for every year WPRS data has been compiled and published, including a 32 percent capacity factor for 1993. This project is significant because it consistently demonstrates the impressive potential for wind technology performance when developers combine quality machines and maintenance programs with a good wind resource site.

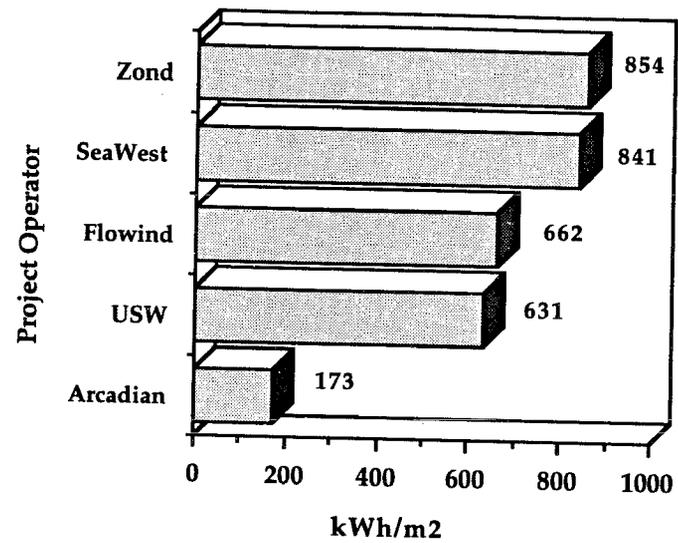


**FIGURE 22: Cumulative Capacity for 5 Largest Operators**



**FIGURE 23: Capacity Factors for 5 Largest Operators**

Annual kWh per square meter results for the five largest operators are shown in *Figure 24*. Among these operators, Zond (854) and SeaWest (841) had the best performance. It should also be noted that three smaller wind farm operators (not included in Figure 24) also had high kWh per square meter production during 1993. These operators are EUI Management (1,379), San Gorgonio Farms (1,170), and AB Energy (1,067).



**FIGURE 24: kWh Per Square Meter Production for 5 Largest Operators**

## 6. WPRS ANNUAL SUMMARY TABLES

Summary tables on the following pages include aggregate data for all wind projects submitting 1993 quarterly reports to the California Energy Commission as part of the WPRS program. The data, extracted from project operator quarterly reports compiled in Section 7, includes information about specific resource areas, turbine sizes, turbine types, turbine manufacturers, turbine operators, and turbine origins (domestic or foreign).

Note that some operators filed reports with missing data; therefore, totals for the various subcategories may not always equal statewide totals. Also note that kWh per square meter results include an asterisk if some portion of the cumulative turbine capacity being considered includes new turbines that did not operate for a full year. Unless the new turbine capacity represents a significant percentage of cumulative capacity, however, the negative impact on performance for most turbine groups will be minimal.

## 1993 WPRS DATA SUMMARY TABLE

Data Category	Cumulative Capacity (kW)	New Capacity (kW)	Output (kWh)	Actual / Projected Output (%)	Actual Capacity Factor (%)	kWh/ Square Meter	Cumulative Turbines	New Turbines
<b>STATEWIDE</b>								
1st Quarter	1,654,174	3,875	424,257,112	68	12	107 *	15,797	17
2nd Quarter	1,632,839	5,200	1,027,481,166	67	29	261 *	15,587	46
3rd Quarter	1,619,311	0	1,017,147,799	83	28	256	15,427	0
4th Quarter	1,608,042	0	370,018,755	84	11	96	15,310	0
<b>1993 Totals</b>	<b>1,608,042</b>	<b>9,075</b>	<b>2,838,904,832</b>	<b>76</b>	<b>20</b>	<b>720</b>	<b>15,310</b>	<b>63</b>
<b>RESOURCE AREA</b>								
<b>Altamont</b>								
1st Quarter	683,176	0	86,670,152	55	6	56	6,451	0
2nd Quarter	659,176	3,300	256,599,005	36	17	173 *	6,189	11
3rd Quarter	645,516	0	421,378,383	66	29	287	6,029	0
4th Quarter	637,591	0	69,687,494	39	5	48	5,952	0
<b>1993 Totals</b>	<b>637,591</b>	<b>3,300</b>	<b>834,335,034</b>	<b>49</b>	<b>14</b>	<b>564</b>	<b>5,952</b>	<b>11</b>
<b>San Geronio</b>								
1st Quarter	264,882	0	94,454,040	67	16	131	3,644	0
2nd Quarter	266,967	1,320	224,122,869	67	39	306 *	3,691	30
3rd Quarter	267,099	0	184,808,391	80	32	252	3,691	0
4th Quarter	266,955	0	92,448,200	141	17	134	3,683	0
<b>1993 Totals</b>	<b>266,955</b>	<b>1,320</b>	<b>595,833,500</b>	<b>89</b>	<b>26</b>	<b>823</b>	<b>3,683</b>	<b>30</b>
<b>Tehachapi</b>								
1st Quarter	630,111	3,875	233,645,920	74	17	150 *	4,935	17
2nd Quarter	630,691	580	518,007,785	85	38	333 *	4,940	5
3rd Quarter	630,691	0	356,652,150	94	26	229	4,940	0
4th Quarter	627,491	0	198,153,621	66	14	127	4,908	0
<b>1993 Totals</b>	<b>627,491</b>	<b>4,455</b>	<b>1,306,459,476</b>	<b>80</b>	<b>24</b>	<b>839</b>	<b>4,908</b>	<b>22</b>

## 1993 WPRS DATA SUMMARY TABLE

Data Category	Cumulative Capacity (kW)	New Capacity (kW)	Output (kWh)	Actual/ Projected Output (%)	Actual Capacity Factor (%)	kWh/ Square Meter	Cumulative Turbines	New Turbines
<b>RESOURCE AREA</b>								
<b>Pacheco</b>								
1st Quarter	16,005	0	2,066,200	93	6	40	167	0
2nd Quarter	16,005	0	5,562,300	76	16	107	167	0
3rd Quarter	16,005	0	10,696,074	95	31	205	167	0
4th Quarter	16,005	0	2,292,728	101	7	44	167	0
<b>1993 Totals</b>	<b>16,005</b>	<b>0</b>	<b>20,617,302</b>	<b>91</b>	<b>15</b>	<b>396</b>	<b>167</b>	<b>0</b>
<b>Solano</b>								
1st Quarter	60,000	0	7,420,800	59	6	50	600	0
2nd Quarter	60,000	0	23,189,207	47	18	156	600	0
3rd Quarter	60,000	0	43,612,801	84	33	294	600	0
4th Quarter	60,000	0	7,436,712	59	6	50	600	0
<b>1993 Totals</b>	<b>60,000</b>	<b>0</b>	<b>81,659,520</b>	<b>62</b>	<b>16</b>	<b>550</b>	<b>600</b>	<b>0</b>

## 1993 WPRS DATA SUMMARY TABLE

Data Category	Cumulative Capacity (kW)	New Capacity (kW)	Output (kWh)	Actual / Projected Output (%)	Actual Capacity Factor (%)	kWh/ Square Meter	Cumulative Turbines	New Turbines
<b>TURBINE SIZE</b>								
<b>1-50 kw</b>								
1st Quarter	52,625	0	12,290,388	46	11	75	1,660	0
2nd Quarter	54,049	1,320	30,174,346	46	28	178 *	1,690	30
3rd Quarter	54,049	0	26,934,126	58	23	159	1,690	0
4th Quarter	53,905	0	8,902,605	39	8	55	1,682	0
<b>1993 Totals</b>	<b>53,905</b>	<b>1,320</b>	<b>78,301,465</b>	<b>47</b>	<b>18</b>	<b>467</b>	<b>1,682</b>	<b>30</b>
<b>51-100 kw</b>								
1st Quarter	883,201	0	173,435,353	66	9	82	10,169	0
2nd Quarter	856,742	180	424,227,774	69	23	205 *	9,916	3
3rd Quarter	843,214	0	509,639,027	84	28	248	9,756	0
4th Quarter	832,889	0	140,025,896	72	8	69	9,649	0
<b>1993 Totals</b>	<b>832,889</b>	<b>180</b>	<b>1,247,328,050</b>	<b>73</b>	<b>17</b>	<b>604</b>	<b>9,649</b>	<b>3</b>
<b>101-150 kw</b>								
1st Quarter	241,046	0	66,454,395	70	13	114	1,984	0
2nd Quarter	241,046	0	175,598,950	71	34	306	1,984	0
3rd Quarter	241,046	0	153,212,358	95	30	267	1,984	0
4th Quarter	241,046	0	68,595,826	182	13	119	1,984	0
<b>1993 Totals</b>	<b>241,046</b>	<b>0</b>	<b>463,861,529</b>	<b>105</b>	<b>23</b>	<b>806</b>	<b>1,984</b>	<b>0</b>
<b>151-200 kw</b>								
1st Quarter	66,680	0	19,308,486	87	13	128	373	0
2nd Quarter	66,680	400	44,241,253	66	30	291 *	375	2
3rd Quarter	66,680	0	40,625,121	79	28	267	375	0
4th Quarter	66,680	0	16,242,193	62	11	155	375	0
<b>1993 Totals</b>	<b>66,680</b>	<b>400</b>	<b>120,417,053</b>	<b>74</b>	<b>21</b>	<b>841</b>	<b>375</b>	<b>2</b>

## 1993 WPRS DATA SUMMARY TABLE

Data Category	Cumulative Capacity (kW)	New Capacity (kW)	Output (kWh)	Actual / Projected Output (%)	Actual Capacity Factor (%)	kWh/ Square Meter	Cumulative Turbines	New Turbines
<b>TURBINE SIZE</b>								
<b>200+ kw</b>								
1st Quarter	411,022	3,875	146,188,663	77	17	163 *	1,611	17
2nd Quarter	414,322	3,300	335,508,095	72	39	369 *	1,622	11
3rd Quarter	414,322	0	263,131,353	85	29	285	1,622	0
4th Quarter	413,522	0	131,340,860	72	15	143	1,620	0
<b>1993 Totals</b>	<b>413,522</b>	<b>7,175</b>	<b>876,168,971</b>	<b>77</b>	<b>25</b>	<b>960</b>	<b>1,620</b>	<b>28</b>
<b>TURBINE AXIS</b>								
<b>Horizontal</b>								
1st Quarter	1,559,374	3,875	401,513,472	69	12	107 *	15,285	17
2nd Quarter	1,538,039	5,200	973,511,634	68	30	261 *	15,075	46
3rd Quarter	1,524,511	0	964,992,199	82	29	259	14,915	0
4th Quarter	1,513,242	0	353,455,003	86	11	96	14,798	0
<b>1993 Totals</b>	<b>1,513,242</b>	<b>9,075</b>	<b>2,693,472,308</b>	<b>76</b>	<b>21</b>	<b>723</b>	<b>14,798</b>	<b>63</b>
<b>Vertical</b>								
1st Quarter	94,800	0	16,163,813	50	8	109	512	0
2nd Quarter	94,800	0	36,338,784	55	18	245	512	0
3rd Quarter	94,800	0	28,549,786	99	14	192	512	0
4th Quarter	94,800	0	11,652,377	49	6	78	512	0
<b>1993 Totals</b>	<b>94,800</b>	<b>0</b>	<b>92,704,760</b>	<b>63</b>	<b>12</b>	<b>624</b>	<b>512</b>	<b>0</b>

## 1993 WPRS DATA SUMMARY TABLE

Data Category	Cumulative Capacity (kW)	New Capacity (kW)	Output (kWh)	Actual / Projected Output (%)	Actual Capacity Factor (%)	kWh/ Square Meter	Cumulative Turbines	New Turbines
<b>DOMESTIC TURBINES</b>								
1st Quarter	764,003	500	104,708,799	53	7	64 *	8,263	2
2nd Quarter	742,517	4,800	292,135,719	50	19	183 *	8,051	44
3rd Quarter	728,857	0	419,176,603	72	27	263	7,891	0
4th Quarter	717,588	0	82,859,428	50	6	54	7,774	0
<b>1993 Totals</b>	<b>717,588</b>	<b>5,300</b>	<b>898,880,549</b>	<b>56</b>	<b>15</b>	<b>564</b>	<b>7,774</b>	<b>46</b>
<b>FOREIGN TURBINES</b>								
1st Quarter	890,171	3,375	312,968,486	75	16	137 *	7,534	15
2nd Quarter	890,322	400	717,714,699	75	37	315 *	7,536	2
3rd Quarter	890,454	0	574,365,382	88	30	252	7,536	0
4th Quarter	890,454	0	282,247,952	99	15	124	7,536	0
<b>1993 Totals</b>	<b>890,454</b>	<b>3,775</b>	<b>1,887,296,519</b>	<b>84</b>	<b>25</b>	<b>828</b>	<b>7,536</b>	<b>17</b>

### 1993 WPRS DATA SUMMARY TABLE

Data Category		Cumulative Capacity (kW)	New Capacity (kW)	Output (kWh)	Actual / Projected Output (%)	Actual Capacity Factor (%)	kWh/ Square Meter	Cumulative Turbines	New Turbines
<b>TURBINE MANUFACTURER</b>									
Aeroman	(Germany)	11,320	0	20,145,318	—	20	579	283	0
Blue Max	(USA)	4,000	0	2,078,004	33	6	268	80	0
Bonus	(Denmark)	82,980	0	180,954,567	104	26	819	838	0
Bouma	(Netherlands)	3,780	0	596,871	—	7	68	28	0
Cannon	(USA)	500	500	778,700	—	24	733 *	2	2
Carter	(USA)	5,975	0	7,155,062	43	14	534	140	0
Century (CT)	(USA)	0	0	0	—	—	—	0	0
Danwin	(Denmark)	36,030	0	89,095,388	67	28	946	233	0
Delta	(Unknown)	150	0	1,417,089	462	108	4,692	1	0
ESI	(USA)	24,705	180	16,269,760	34	8	218 *	365	3
Enertech	(USA)	19,000	720	36,723,136	65	24	556 *	469	18
Fayette	(USA)	113,880	0	20,500,914	9	2	173	1,114	0
Floda	(Austria)	1,500	0	669,040	20	5	219	3	0
FloWind	(USA)	94,800	0	92,704,760	63	11	624	512	0
HMZ	(Belgium)	37,300	0	27,208,292	63	8	421	174	0
Howden	(Scotland)	28,290	0	35,548,944	34	14	547	91	0
Jacobs	(USA)	11,665	0	11,180,447	29	13	391	622	0
MWT	(Japan)	165,000	0	390,845,126	73	27	977	660	0
Micon	(Denmark)	134,235	0	286,239,643	71	24	754	1,494	0
Nordtank	(Denmark)	73,151	0	148,861,338	78	23	745	864	0
Oak	(USA)	20,620	0	32,887,601	74	18	467	312	0
Polenko	(Netherlands)	1,200	0	785,507	45	7	217	12	0
Storm Master	(USA)	1,000	600	882,995	66	13	390 *	22	12
Sumitomo	(Japan)	200	0	222,436	—	13	613	1	0
US Windpower	(USA)	399,700	3,300	642,149,980	76	18	644 *	3,931	11
Vestas	(Denmark)	281,735	3,775	629,953,360	86	26	858 *	2,612	17
WEG	(England)	5,300	0	3,294,000	—	8	335	21	0
Wincon	(USA)	21,368	0	35,569,190	85	19	552	200	0
Windane	(Denmark)	14,000	0	50,109,200	134	41	1,577	35	0
Windmatic	(Denmark)	14,283	0	21,350,400	92	17	573	186	0
Windtech	(USA)	375	0	0	—	—	—	5	0

## 1993 WPRS DATA SUMMARY TABLE

Data Category	Cumulative Capacity (kW)	New Capacity (kW)	Output (kWh)	Actual / Projected Output (%)	Actual Capacity Factor (%)	kWh/ Square Meter	Cumulative Turbines	New Turbines
<b>PROJECT OPERATOR</b>								
AB Energy, Inc.	6,975	3,375	18,953,809	----	35	1,067 *	31	15
Altamont Energy Corporation	----	----	13,418,168	----	----	----	----	----
American Power Systems, Inc.	3,705	0	4,097,362	33	13	385	204	0
Arbutus	15,260	0	28,768,800	62	22	556	234	0
Arcadian Renewable Power Corporation	113,880	0	20,500,914	9	2	173	1,114	0
Calwind Resources, Inc.	8,710	0	15,542,417	90	20	577	134	0
Cannon Energy Corporation	63,894	500	130,238,367	----	24	812 *	665	2
Coram Energy Group	11,320	0	20,145,318	----	20	586	283	0
Difko Administration (US), Inc.	24,675	0	55,618,660	103	26	817	244	0
EUI Management	14,681	0	52,710,940	224	41	1,379	153	0
FDIC/Thompson Engineering	0	0	160,000	----	----	----	0	0
Flowind Corporation	139,440	0	170,499,699	59	14	662	862	0
Howden Wind Parks, Inc.	28,290	0	35,548,944	34	14	547	91	0
International Turbine Research	16,005	0	20,617,302	91	15	395	167	0
LFC Power Systems Corporation	----	----	34,343,596	----	----	----	----	----
Los Vaqueros	2,890	0	1,965,771	52	10	258	38	0
Mogul Energy Corporation	4,000	0	2,078,004	33	6	268	80	0
Oak Creek Energy Systems	0	0	19,641,599	----	----	----	0	0
Renewable Energy Ventures	0	0	4,060,800	----	----	----	0	0
Riverview Ventures	4,360	0	258,753	4	1	37	218	0
San Gorgonio Farms	31,685	0	89,649,538	79	32	1,170	227	0
San Gorgonio Wind Associates	2,550	600	1,808,999	54	11	235 *	42	12
SeaWest Energy Group	328,297	720	707,060,968	66	26	841 *	2,652	18
Southern California Sunbelt	12,593	0	20,010,136	102	18	602	160	0
Tera Corporation	8,555	0	2,438,205	6	3	80	145	0
U.S. Windpower	421,150	3,300	659,130,726	72	18	631 *	4,308	11
Westwind Association	16,207	0	32,304,000	78	23	716	172	0
Windfarms Management	----	----	1,428,000	----	----	----	----	----
Windland, Inc.	17,200	580	33,611,208	78	23	821 *	141	5
WindMaster	37,300	0	27,208,292	63	9	421	174	0
Windridge	----	----	3,538,000	----	----	----	----	----
Wintec, Ltd.	14,615	0	33,374,847	72	26	737	282	0
Zond Systems, Inc.	259,805	0	578,172,690	84	25	854	2,489	0

## 7. WPRS DATA

This section of the WPRS 1993 Annual Report contains performance data as submitted by wind project operators for four quarters. Wind data is organized by individual resource area with operators listed alphabetically within each resource area.

Project operators are numbered sequentially throughout the WPRS performance data section. For quick access to specific wind industry data, an alphabetical list of wind project operators and participants keyed to these sequential numbers follows.

Section Notes immediately precede performance report data. These notes describe how WPRS data is reported and calculated. Points of clarification and limitations of the data are also discussed.

Appendix A contains comments received from project operators during 1993. For easy reference, the project name and corresponding number in Section 7 has been noted. Appendix B contains a list of turbine manufacturers and distributors keyed to sequential numbers assigned to operators and participants. Appendix C provides sources of wind energy technical assistance available to California

project proponents. Appendix D contains WPRS Regulations which provide definitions for most wind categories used in this report.

Data contained in the WPRS 1993 Annual Report represents project performance results for only a single year. As mentioned previously, data from any one year should not be used as the sole basis for evaluating overall wind project performance.

### Alphabetical List of Wind Project Operators and Participants

The following alphabetical list includes all operators and other participants involved in California wind projects reporting 1993 performance data to the WPRS program. The number in parentheses following each operator and other participant refers to the sequential number location in this section.

AB Energy	(28A)	Phoenix Energy, Ltd.	(14A) (21C)
Alta Mesa	(21D)	Renewable Energy Ventures	(17A)
Altamont Energy Corp.	(1A)	Riverview Ventures	(18A-B)
Altech Energy Ltd.	(8A)	San Gorgonio Farms	(19A)
Altech Energy Ltd., II	(21A)	San Gorgonio Wind Associates VI	(20A)
Altech Energy Ltd., III	(21B)	San Gorgonio Wind	(25C)
Amer. Diversified Wind Partners	(3A) (7A)	Seawest Energy Group	(8A-F) (21A-E) (36A-D)
American Power Systems	(14A)	Southern California Sunbelt	(22A) (37A)
Arbutus	(29A)	TaxVest Wind Farms	(8D)
Arcadian (formerly Fayette)	(2A-D) (7A)	TERA Corp.	(9A)
Cal. Wind Energy Systems, CWES	(8B)	Toyo Power Corporation	(36B-C)
Calwind Resources, Inc.	(30A-B)	U.S. Windpower	(10A-E) (23A-B) (27A)
Cannon Energy Group	(31A-D)	Viking-Energy 83 Ltd.	(8E)
CTV Marketing Group	(32C)	Westwind Association	(24A)
Coram Energy Group	(32A-D)	Western Windfarms	(8F)
Difko Administration (US), Inc.	(4A-C) (15A-C)	Whitewater Ventures Inc.	(18B)
EUI Management PH, Inc.	(16A)	Windfarms Management	(38A)
Energy Conversion Technology	(32A,D)	Windland, Inc.	(39A-B)
FDIC/Thompson Engineering	(3A)	WindMaster	(11A)
FloWind Corp.	(4A-D) (33A-B)	Windridge, Inc.	(40A)
Grant Line Energy Corp.	(1A)	Wintec, Ltd.	(20A) (25A-D)
Howden Wind Parks, Inc.	(5A)	Zond Systems, Inc.	(12A) (26A-B) (41A-W)
International Turbine Research	(13A)		
LFC No. 51 Corporation	(6A)		
LFC Power Systems Corporation	(6A)		
Los Vaqueros Power Corporation	(7A)		
Mogul Energy Corp.	(34A)		
Natural Resource Ventures	(30A)		
Oak Creek Energy Systems	(35A)		
PanAero Corp.	(26B)		

## WIND DATA SECTION NOTES

The following notes explain methods used to report and calculate performance data. Definitions for most wind data categories used in this section are contained in WPRS regulations (*Appendix D*).

**Data missing.** Some operators submitted incomplete reporting forms. Items not completed are designated by a dash (----) to distinguish missing data from values of "0". It should be noted that operators who submit reports with missing data are in violation of WPRS regulations.

**Failed to File.** Commission staff identified wind project operators who did not submit performance data but according to utility reports should have participated in the WPRS program. Subsequently, Commission staff notified non-reporting operators by mail of the WPRS requirements. Non-reporting operators who were notified but did not respond or provide an explanation of why they should be exempted were noted as "failed to file."

**Electricity Produced.** Individual turbine model outputs submitted by wind operators are included for each quarter along with an annual total. An annual total for the entire project follows. Individual turbine model outputs may not always equal total project output because

individual turbine production is usually read from meters owned by project operators, while total project output is measured from utility substation meters. Line losses and calibration differences between meters should account for these differences.

The validation status of output data submitted by operators is noted in parentheses next to the quarterly output reported for each turbine model. The designation "V" indicates operator data has been validated either by a match to utility billings submitted by the operator or output reported to the Commission by the utility; "NV" indicates operator data has not been validated because it does not match utility billings submitted by the operator or output reported by the utility; and "UD" indicates output data has been derived solely from reports to the Commission by the utility in the absence of any reported data from the operator.

**Other Participant(s).** In some cases, participants in addition to the listed project operator may be involved in a project. These participants could include project managers, joint venture partners, wind developers using another developer's site, etc.

**Projected Quarterly Production Per Turbine.** The total quarterly projected production for a specific turbine model is determined by multiplying the "Projected Quarterly Production

Per Turbine" times the "Cumulative Number of Turbines" for that turbine model. The total quarterly projected production for an entire project is calculated by adding the projected production totals for all turbine models in a project. A comparison of total projected production with total project "Electricity Produced" can indicate how closely a specific project came to achieving projected output. When making this comparison, note that any new capacity would not benefit from a full operational quarter during the quarter it was installed.

**Rotor (M<sup>2</sup>).** The diameter of the rotor-swept area for each wind turbine allows different wind systems to be compared independently of wind resource area. Theoretically, the power available for any wind turbine is proportional to the square of the diameter of the rotor-swept area. Thus, doubling the size of the rotor diameter should increase the power output by a factor of four.

**Size (kW).** For each turbine model listed, the kW size rating is followed by a miles per hour (mph) specification. Because there is no standardized rating method, these mph specifications vary widely for different turbine models.

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected	Turbines		Electricity
		Model	Axis	Rotor	Size		Prod./Turbine	Installed	Produced	
						(kWh)	New	Cum.	(kWh)	
<b><u>ALTAMONT PASS (Alameda &amp; Contra Costa)</u></b>										
1 ALTAMONT ENERGY CORP. 5625 Brisa St., Suite F Livermore, CA 94550										
	A. Jess and Souza Ranches					1			1,558,162 (UD)	
						2			4,091,465 (UD)	
Other Participant:						3			6,503,158 (UD)	
Grant Line Energy						4			1,265,383 (UD)	
<b>PROJECT TOTAL</b>									<b>13,418,168</b>	
2 ARCADIAN RENEWABLE POWER CORP. 5990 Stoneridge Dr., Suite 119 Pleasanton, CA 94588										
	A. Fayette Wind Farms	Fayette 400	(H)	374	400 kW@ 44 mph	1	30,000	0	2	0 (V)
						2	276,000	0	2	0 (V)
						3	264,000	0	2	0 (V)
						4	30,000	0	0	0 (V)
						Annual	600,000			0
		Fayette 75IIS	(H)	85	75 kW@ 40 mph	1	6,000	0	132	0 (V)
						2	55,200	0	132	308,876 (V)
						3	52,800	0	55	720,358 (V)
						4	6,000	0	55	68,202 (V)
						Annual	120,000			1,097,436

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis (M2)	Rotor (kW)	Size (kW)		New	Cum.	

ALTAMONT PASS (Alameda & Contra Costa)

2 ARCADIAN RENEWABLE POWER CORP. (Cont'd)

	A. Fayette Wind Farms (Cont'd)	Fayette 95IIS	(H)	95	95 kW@ 37 mph						
						1	7,000	0	1,135	142,164	(V)
						2	64,400	0	1,135	4,868,575	(V)
Operator Comment: See Appendix A Comment 1						3	61,600	0	1,052	12,670,186	(V)
						4	7,000	0	977	1,063,938	(V)
						Annual	140,000			18,744,863	

**PROJECT TOTAL** 19,842,299

	B. WETA I	Fayette 400	(H)	374	400 kW@ 44 mph						
						1	30,000	0	7	0	(V)
						2	276,000	0	7	0	(V)
						3	264,000	0	7	0	(V)
						4	30,000	0	7	0	(V)
						Annual	600,000			0	

**PROJECT TOTAL** 0

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor Size (M2) (kW)	Speed		New	Cum.		
<i>ALTAMONT PASS (Alameda &amp; Contra Costa)</i>										
2 ARCADIAN RENEWABLE POWER CORP. (Cont'd)										
	C. WETA II	Fayette 400	(H)	374	400 kW@ 44 mph	1	30,000	0	23	0 (V)
						2	276,000	0	23	0 (V)
						3	264,000	0	23	19,568 (V)
						4	30,000	0	23	0 (V)
						Annual	600,000			19,568
		Fayette 95IIS	(H)	95	95 kW@ 37 mph	1	7,000	0	33	9,187 (V)
						2	64,400	0	33	115,783 (V)
						3	61,600	0	33	274,343 (V)
						4	7,000	0	33	31,020 (V)
						Annual	140,000			430,333
<b>PROJECT TOTAL</b>										
									<b>449,901</b>	
	D. WETA III	Fayette 95IIS	(H)	95	95 kW@ 37 mph	1	7,000	0	19	0 (V)
						2	64,400	0	19	56,878 (V)
						3	61,600	0	19	134,943 (V)
						4	7,000	0	19	16,893 (V)
						Annual	140,000			208,714
<b>PROJECT TOTAL</b>										
									<b>208,714</b>	

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor Size (M2)	Size (kW)		New	Cum.		
<b><u>ALTAMONT PASS (Alameda &amp; Contra Costa)</u></b>										
3	F.D.I.C./THOMPSON ENGINEERING 410 Ericwood Court Manteca, CA 95336									
	A. Wind Farm I	Polenko	(H)	302	100 kW@ 29 mph	1	7,900	0	12	46,200 (V)
	Other Participant:					2	----			----
	American Diversified					3	----			----
	Wind Partners					4	----			----
	Operator Comment:					Annual	----- 7,900			----- 46,200
	See Appendix A									
	Comment 2	Windmatic	(H)	154	65 kW@ 35 mph	1	6,090	0	26	113,800 (V)
						2	----			----
						3	----			----
						4	----			----
						Annual	----- 6,090			----- 113,800
<b>PROJECT TOTAL</b>										<b>160,000</b>

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor Size (M2)	Size (kW)			New	Cum.	

**ALTAMONT PASS (Alameda & Contra Costa)**

**4 FLOWIND CORPORATION**

990 A Street, Suite 300

San Rafael, CA 94901

A. FloWind I (Dyer Road)	Flowind 17	(V)	260	143	kW@ 44 mph	1	17,357	0	75	807,983 (V)
						2	68,169	0	75	1,971,240 (V)
						3	51,808	0	75	2,902,341 (V)
						4	15,447	0	75	381,133 (V)
						Annual	152,781			6,062,697
	Flowind 19	(V)	340	250	kW@ 38 mph	1	30,717	0	1	28,518 (V)
						2	120,642	0	1	61,709 (V)
						3	91,688	0	1	143,065 (V)
						4	27,338	0	1	15,445 (V)
						Annual	270,385			248,737

<b>PROJECT TOTAL</b>	<b>6,311,434</b>
----------------------	------------------

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification					Projected	Turbines		Electricity	
		Model	Axis	Rotor	Size		Qtr. Prod./Turbine	Installed	Produced		
						(kWh)	New	Cum.	(kWh)		
<u>ALTAMONT PASS (Alameda &amp; Contra Costa)</u>											
4 FLOWIND CORPORATION (Cont'd)											
B. FloWind II (Elworthy)											
		Danwin H19	(H)	284	110 kW@	30 mph	1	31,325	0	25	493,627 (V)
							2	108,504	0	25	1,491,653 (V)
							3	120,401	0	25	1,966,079 (V)
							4	32,207	0	25	425,722 (V)
							Annual	292,437			4,377,081
		Flowind F17	(V)	260	142 kW@	44 mph	1	23,957	0	73	721,375 (V)
							2	107,527	0	73	2,525,352 (V)
							3	113,070	0	73	4,834,413 (V)
							4	24,342	0	73	751,462 (V)
							Annual	268,896			8,832,602
		Flowind F19	(V)	340	250 kW@	38 mph	1	39,619	0	19	315,136 (V)
							2	187,009	0	19	1,147,144 (V)
							3	190,559	0	19	2,524,126 (V)
							4	40,134	0	19	340,343 (V)
							Annual	457,321			4,326,749
<b>PROJECT TOTAL</b>											<b>17,536,432</b>

Operator Comment:  
See Appendix A  
Comment 3

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)		
		Model	Axis	Rotor Size (M2)	Size (kW)		New	Cum.			
<i>ALTAMONT PASS (Alameda &amp; Contra Costa)</i>											
4 FLOWIND CORPORATION (Cont'd)											
	C. DifWind VII	Bonus Mark II	(H)	302	119 kW@	29 mph	1	37,854	0	200	4,380,926 (V)
							2	126,459	0	200	13,391,539 (V)
Other Participant:							3	138,986	0	200	22,715,516 (V)
Difko (US) Inc.							4	37,486	0	200	4,479,201 (V)
							Annual	340,785			44,967,182
							<b>PROJECT TOTAL</b>				<b>44,967,182</b>
	D. DifWind IX	Bonus Mark III	(H)	415	150 kW@	29 mph	1	54,224	0	100	3,182,428 (V)
							2	171,710	0	100	8,512,028 (V)
Other Participant:							3	176,229	0	100	13,607,442 (V)
Difko (US) Inc.							4	49,705	0	100	3,020,335 (V)
							Annual	451,868			28,322,233
		Bonus Mark II	(H)	302	119 kW@	29 mph	1	0	0	25	0 (V)
							2	0	0	25	0 (V)
							3	0	0	25	0 (V)
							4	0	0	25	0 (V)
							Annual	0			0
							<b>PROJECT TOTAL</b>				<b>28,322,233</b>

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)		
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.			
<u>ALTAMONT PASS (Alameda &amp; Contra Costa)</u>											
5	HOWDEN WIND PARKS, INC. 6400 Village Parkway Dublin, CA 94549	A. Howden Wind Park I									
		Howden 330/33	(H)	756	330 kW@	34 mph	1	7,242,000	0	82	3,529,776 (V)
							2	16,524,000	0	82	11,094,739 (V)
							3	19,941,000	0	82	17,253,341 (V)
							4	7,293,000	0	82	2,700,720 (V)
							Annual	51,000,000			34,578,576
		Howden 60/15	(H)	177	60 kW@	34 mph	1	14,796	0	8	42,288 (V)
							2	40,284	0	8	78,000 (V)
							3	30,845	0	8	244,608 (V)
							4	11,491	0	8	42,672 (V)
							Annual	97,416			407,568
		Howden 750/45	(H)	1,590	750 kW@	34 mph	1	161,660	0	1	83,160 (V)
							2	440,140	0	1	84,735 (V)
							3	421,260	0	1	315,630 (V)
							4	156,940	0	1	79,275 (V)
							Annual	1,180,000			562,800
Operator Comment: See Appendix A Comment 4											
<b>PROJECT TOTAL</b>											
33,548,944											

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis Rotor	Size (M2) (kW)		New	Cum.	

ALTAMONT PASS (Alameda & Contra Costa)

6 LFC POWER SYSTEMS CORPORATION

14680 Patterson Pass Rd.  
Tracy, CA 95376

A. Fields Ranch Wind Farm	FAILED TO FILE	1						4,047,665 (UD)
	FAILED TO FILE	2						11,755,283 (UD)
	FAILED TO FILE	3						15,580,656 (UD)
	FAILED TO FILE	4						2,959,992 (UD)

Other Participant:  
LFC No. 51 Corporation -----  
34,343,596

**PROJECT TOTAL** -----  
34,343,596

7 LOS VAQUEROS POWER CORPORATION

c/o Arcadian Power Corporation  
5990 Stoneridge Dr., Suite 119  
Pleasanton, CA 94588

A. Los Vaqueros Wind Park	Polenko	(H)	302	100	kW@ 29 mph	1				
Other Participant:						2	50,800	0	12	156,080 (V)
American Diversified Wind Partners						3	53,600	0	12	563,249 (V)
						4	8,700	0	12	19,978 (V)

Annual -----  
113,100 -----  
739,307

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)		
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.			
<i>ALTAMONT PASS (Alameda &amp; Contra Costa)</i>											
7 LOS VAQUEROS POWER CORPORATION (Cont'd)											
A. Los Vaqueros Wind Park (Cont'd)											
		Windmatic	(H)	154	65	kW@ 35 mph	1	-----	-----		
Operator Comment:							2	31,125	0	26	399,920 (V)
See Appendix A							3	33,375	0	26	746,634 (V)
Comment 5							4	6,840	0	26	79,910 (V)
							Annual	----- 71,340			----- 1,226,464
<b>PROJECT TOTAL</b>									<b>1,965,771</b>		

8 SEAWEST ENERGY GROUP  
 1455 Frazee Road, 9th Fl.  
 San Diego, CA 92108

A. Altech Energy, Ltd.											
Other Participant:		Enertech 44/40	(H)	140	40	kW@ 30 mph	1	9,700	0	144	428,362 (V)
Altech Energy, Ltd.							2	30,900	0	144	1,521,548 (V)
							3	30,300	0	144	3,016,085 (V)
							4	9,100	0	144	162,830 (V)
							Annual	----- 80,000			----- 5,128,825
<b>PROJECT TOTAL</b>									<b>5,128,825</b>		

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis Rotor (M2)	Size (kW)			New	Cum.	

ALTAMONT PASS (Alameda & Contra Costa)

8 SEAWEST ENERGY GROUP (Cont'd)

	B. C.W.E.S.	ESI 54	(H)	211	50 kW@ 30 mph	1	9,800	0	30	169,280 (V)
Other Participant:						2	31,300	0	30	353,841 (V)
C.W.E.S.						3	30,700	0	30	900,626 (V)
						4	9,200	0	30	52,645 (V)
						-----				
						Annual	81,000			----- 1,476,392

<b>PROJECT TOTAL</b>	<b>1,476,392</b>
----------------------	------------------

	C. SeaWest Energy Group, Inc.	Micon 60/13	(H)	200	60 kW@ 30 mph	1	15,100	0	1	5,563 (V)
						2	47,800	0	1	24,957 (V)
						3	47,000	0	1	51,904 (V)
						4	14,100	0	1	3,702 (V)
						-----				
						Annual	124,000			----- 86,126

<b>PROJECT TOTAL</b>	<b>86,126</b>
----------------------	---------------

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.		
<i>ALTAMONT PASS (Alameda &amp; Contra Costa)</i>										
8 SEAWEST ENERGY GROUP (Cont'd)										
	D. SeaWest Windfarms, Inc.	Micon 60/13	(H)	200	60 kW@ 30 mph	1	13,700	0	178	1,502,767 (V)
Other Participant:						2	43,600	0	178	4,180,858 (V)
Tax Vest Wind Farms						3	42,900	0	178	7,035,030 (V)
						4	12,800	0	178	1,103,681 (V)
						Annual	----- 113,000			----- 13,822,336
						<b>PROJECT TOTAL</b>				<b>13,822,336</b>
	E. Viking -Energy 83	Micon 60/13	(H)	200	60 kW@ 30 mph	1	14,300	0	26	102,789 (V)
						2	45,500	0	26	449,708 (V)
						3	44,800	0	26	916,577 (V)
						4	13,400	0	26	86,642 (V)
						Annual	----- 118,000			----- 1,555,716
						<b>PROJECT TOTAL</b>				<b>1,555,716</b>
	F. SeaWest Energy Group, Inc.	Micon 60/13	(H)	200	60 kW@ 30 mph	1	13,700	0	15	105,087 (V)
Other Participant:						2	43,600	0	15	292,575 (V)
Western Windfarms						3	42,900	0	15	429,057 (V)
						4	12,800	0	15	67,391 (V)
						Annual	----- 113,000			----- 894,110
						<b>PROJECT TOTAL</b>				<b>894,110</b>

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)			
		Model	Axis	Rotor (M2)	Size (kW)						
<b><u>ALTAMONT PASS (Alameda &amp; Contra Costa)</u></b>											
9 TERA CORPORATION 177 Bovet Rd., Suite 520 San Mateo, CA 94402											
	A. Delta Energy Project I - III	ESI 54	(H)	211	50 kW@	30 mph	1	42,400	0	58	1,750 (NV)
							2	63,600	0	58	91,093 (NV)
Operator Comment:							3	63,600	0	58	234,589 (NV)
See Appendix A							4	42,400	0	58	22,214 (NV)
Comment 6							Annual	----- 212,000			----- 349,646
		ESI 54S	(H)	211	65 kW@	30 mph	1	46,400	0	87	17,165 (NV)
							30	69,600	0	87	615,035 (NV)
							39	69,600	0	87	1,305,426 (NV)
							4	46,400	0	87	150,933 (NV)
							Annual	----- 232,000			----- 2,088,559
<b>PROJECT TOTAL</b>											<b>2,438,205</b>

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.	

ALTAMONT PASS (Alameda & Contra Costa)

10 U.S. WINDPOWER  
6952 Preston Ave.  
Livermore, CA 94550

A. Dyer Road	USW 56-100	(H)	247	100 kW@	29 mph							
						1	21,000	0	454	9,380,000	(V)	
						2	81,900	0	454	22,711,844	(V)	
						3	86,000	0	454	38,382,401	(V)	
						4	21,000	0	454	5,261,200	(V)	
						Annual	----- 209,900			----- 75,735,445		

**PROJECT TOTAL** 75,735,445

B. Frick	USW 56-100	(H)	247	100 kW@	29 mph							
						1	21,000	0	100	2,469,447	(V)	
						2	81,900	0	100	4,824,445	(V)	
						3	86,000	0	100	6,554,986	(V)	
						4	21,000	0	100	1,670,666	(V)	
						Annual	----- 209,900			----- 15,519,544		

**PROJECT TOTAL** 15,519,544

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor Size (M2)	Size (kW)			New	Cum.	

ALTAMONT PASS (Alameda & Contra Costa)

10 U.S. WINDPOWER (Cont'd)

C. Midway/ Patterson Pass	USW 56-100	(H)	247	100 kW@	29 mph	1	21,000	0	1,401	24,508,555 (V)
						2	81,900	0	1,401	72,612,611 (V)
						3	86,100	0	1,401	100,849,692 (V)
						4	21,000	0	1,401	18,568,410 (V)
						Annual	210,000			216,539,268
	WEG MS-2	(H)	491	250 kW@	33 mph	1	62,454	0	20	59,576 (V)
						2	256,065	0	20	747,937 (V)
						3	237,329	0	20	1,873,442 (V)
						4	68,700	0	20	613,045 (V)
						Annual	624,548			3,294,000
	WEG MS-3	(H)	855	300 kW@	26 mph	1	70,000	0	1	0 (V)
						2	301,000	0	1	0 (V)
						3	336,000	0	1	0 (V)
4						84,000	0	1	0 (V)	
Annual						791,000			0	

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis (M2)	Rotor Size (kW)		New	Cum.	

ALTAMONT PASS (Alameda & Contra Costa)

10 U.S. WINDPOWER (Cont'd)

C. Midway/ Patterson Pass (Cont'd)	USW 33M-VS	(H)	855	300	kW@ variable					
						1	---	---	---	---
						2	0	11	11	3,463,536 (V)
						3	0	0	11	3,408,804 (V)
						4	0	0	11	1,248,421 (V)
						Annual	----- 0			----- 8,120,761

**PROJECT TOTAL** 227,954,029

D. Ralph	USW 56-100	(H)	247	100	kW@ 29 mph					
						1	21,000	0	815	13,430,246 (V)
						2	81,900	0	815	40,691,477 (V)
						3	86,100	0	815	69,590,301 (V)
						4	21,000	0	815	10,815,623 (V)
						Annual	----- 210,000			----- 134,527,647

	USW 33M-VS	(H)	855	300	kW@ variable					
						1	0	0	2	22,519 (V)
						2	0	0	2	78,695 (V)
						3	0	0	2	82,846 (V)
						4	0	0	2	89,499 (V)
						Annual	----- 0			----- 273,559

**PROJECT TOTAL** 134,801,206

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.		
<i>ALTAMONT PASS (Alameda &amp; Contra Costa)</i>										
10 U.S. WINDPOWER (Cont'd)										
	E. Jackson/Vasco Road	USW 56-100	(H)	247	100 kW@ 29 mph	1	21,000	0	727	9,108,616 (V)
						2	81,900	0	454	22,733,592 (V)
						3	86,000	0	454	49,614,415 (V)
						4	21,000	0	454	5,835,743 (V)
						Annual	209,900			87,292,366
		USW 33M-VS	(H)	855	300 kW@ variable	1	0	0	20	110,983 (V)
						2	0	0	20	3,463,536 (V)
						3	0	0	20	6,073,985 (V)
						4	0	0	20	943,057 (V)
						Annual	0			10,591,561
<b>PROJECT TOTAL</b>										<b>97,883,927</b>

11 WINDMASTER  
P.O. Box 669  
Byron, CA 94514

A. WindMaster	HMZ 200/83	(H)	373	200 kW@ 33 mph	1	13,775	0	51	702,518 (V)
					2	108,409	0	51	2,815,154 (V)
					3	114,787	0	51	4,508,736 (V)
					4	26,950	0	51	755,907 (V)
					Annual	263,921			8,782,315

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.	

ALTAMONT PASS (Alameda & Contra Costa)

11 WINDMASTER (Cont'd)

A. WindMaster (Cont'd)

	HMZ 200/84	(H)	373	200 kW@	33 mph	1	16,482	0	58	955,964 (V)
						2	108,409	0	58	2,974,114 (V)
						3	114,787	0	58	4,738,522 (V)
						4	26,950	0	58	799,411 (V)
						Annual	----- 266,628			----- 9,468,011
	HMZ 200/85	(H)	373	200 kW@	33 mph	1	13,871	0	30	416,116 (V)
						2	108,409	0	30	1,581,686 (V)
						3	114,787	0	30	2,569,745 (V)
						4	26,950	0	30	406,327 (V)
						Annual	----- 264,017			----- 4,973,874
	HMZ 250	(H)	415	250 kW@	33 mph	1	20,987	0	20	419,737 (V)
						2	140,698	0	20	72,687 (V)
						3	148,977	0	20	2,670,783 (V)
						4	34,977	0	20	348,903 (V)
						Annual	----- 345,639			----- 3,512,110
	HMZ 300	(H)	483	300 kW@	33 mph	1	0	0	15	0 (V)
						2	168,838	0	15	0 (V)
						3	178,772	0	15	197,861 (V)
						4	41,973	0	15	274,121 (V)
						Annual	----- 389,583			----- 471,982

<b>PROJECT TOTAL</b>	<b>27,208,292</b>
----------------------	-------------------

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected	Turbines		Electricity
		Model	Axis	Rotor	Size		Prod./Turbine	Installed	Produced	
				(M2)	(kW)		(kWh)	New	Cum.	(kWh)
<i><u>ALTAMONT PASS (Alameda &amp; Contra Costa)</u></i>										
12	ZOND SYSTEMS, INC. 13000 Jameson Rd. Tehachapi, CA 93581									
	A. 1985 Zond Windsystem Partners Series 85C	Vestas 17	(H)	227	90 kW@ 35 mph	1	23,228	0	200	3,250,717 (V)
						2	84,810	0	200	8,187,077 (V)
						3	99,163	0	200	12,652,914 (V)
						4	25,792	0	200	2,665,499 (V)
						Annual	232,993			26,756,207
<b>PROJECT TOTAL</b>										<b>26,756,207</b>

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)
		Model	Axis	Rotor Size (M2)	Size (kW)			

PACHECO PASS (Merced County)

13 INTERNATIONAL TURBINE RESEARCH

2300 Technology Parkway, Suite 2

P.O. Box 96

Hollister, CA 95023

A. ITR

	Wincon W200	(H)	452	200 kW@	29 mph	1	34,000	0	4	115,100 (V)
						2	146,000	0	4	384,900 (V)
						3	198,000	0	4	712,074 (V)
						4	40,000	0	4	155,428 (V)
						Annual	418,000			1,367,502
	Wincon W99XT	(H)	346	100 kW@	27 mph	1	13,000	0	96	1,230,500 (V)
						2	44,000	0	96	2,958,100 (V)
						3	60,000	0	96	5,931,500 (V)
						4	12,500	0	96	1,266,000 (V)
						Annual	129,500			11,386,100
	Vestas 17E	(H)	283	100 kW@	33 mph	1	18,000	0	20	319,000 (V)
						2	68,000	0	20	878,500 (V)
						3	94,000	0	20	1,566,500 (V)
						4	19,000	0	20	340,500 (V)
						Annual	199,000			3,104,500

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor Size (M2)	Size (kW)		New	Cum.		
<u>PACHECO PASS (Merced County)</u>										
13 INTERNATIONAL TURBINE RESEARCH (Cont'd)										
	A. ITR (Cont'd)	Vestas V17	(H)	277	90 kW@ 33 mph	1	10,000	0	22	206,600 (V)
						2	27,000	0	22	540,000 (V)
						3	52,000	0	22	990,000 (V)
						4	9,000	0	22	186,000 (V)
						Annual	98,000			1,922,600
		Nordtank NKT65	(H)	216	65 kW@ 31 mph	1	8,000	0	25	195,000 (V)
						2	36,000	0	25	800,800 (V)
						3	54,000	0	25	1,496,000 (V)
						4	11,500	0	25	344,800 (V)
						Annual	109,500			2,836,600
<b>PROJECT TOTAL</b>										<b>20,617,302</b>

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)
		Model	Axis	Rotor (M2)	Size (kW)			
<i>SAN GORGONIO PASS (Riverside)</i>								
14 AMERICAN POWER SYSTEMS, INC.								
P.O. Box 2007								
Rancho Mirage, CA 92270								
A. WECS 33								
Jacoby-Kerr Wind Park								
	Jacobs 26	(H)	49	18 kW@	27 mph	1	10,346	0 16 55,380 (NV)
	17.5 @ 120'					2	20,777	0 16 125,776 (V)
						3	16,416	0 16 104,576 (V)
						4	8,037	0 16 39,411 (V)
						Annual	55,576	325,143
	Jacobs 26	(H)	49	18 kW@	27 mph	1	9,491	0 134 488,156 (NV)
	17.5 @ 80'					2	19,836	0 134 1,105,201 (V)
						3	15,646	0 134 923,938 (V)
						4	7,182	0 134 329,360 (V)
						Annual	52,155	2,846,655
	Jacobs 29-20	(H)	61	20 kW@	27 mph	1	12,277	0 54 197,369 (NV)
						2	25,565	0 54 350,933 (V)
						3	19,323	0 54 291,914 (V)
						4	9,662	0 54 85,348 (V)
						Annual	66,827	925,564
<b>PROJECT TOTAL</b>								<b>4,097,362</b>

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Qtr.	Projected	Turbines		Electricity		
		Model	Axis	Rotor Size		Prod./Turbine	Installed	Produced			
					(kWh)	New	Cum.	(kWh)			
<b><u>SAN GORGONIO PASS (Riverside)</u></b>											
15 DIFKO ADMINISTRATION (US), INC. 19020 N. Indian Ave. Suite 2A P. O. Box 177 N. Palm Springs, CA 92258											
	A. Difwind Farms, Ltd.	V Section 20	Micon 108	(H)	294	108 kW@ 30 mph	1	41,500	0	16	760,890 (V)
							2	122,000	0	16	1,934,250 (V)
	Other Participant:						3	79,000	0	16	1,731,520 (V)
	Phoenix Energy Ltd.						4	32,500	0	16	582,005 (V)
							Annual	275,000			5,008,665
								<b>PROJECT TOTAL</b>			5,008,665
	B. Difwind Partners		Micon 65	(H)	201	65 kW@ 30 mph	1	0	0	39	453,848 (V)
							2	0	0	39	1,723,705 (V)
							3	0	0	39	1,416,158 (V)
							4	0	0	39	389,732 (V)
							Annual	0			3,983,443
			Micon 108	(H)	294	108 kW@ 30 mph	1	0	0	116	2,930,152 (V)
							2	0	0	116	11,776,292 (V)
							3	0	0	116	9,707,841 (V)
							4	0	0	116	2,796,267 (V)
							Annual	0			27,210,552
								<b>PROJECT TOTAL</b>			31,193,995

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)
		Model	Axis	Rotor (M2)	Size (kW)			
<u>SAN GORGONIO PASS (Riverside)</u>								
15 DIFKO ADMINISTRATION (US), INC. (Cont'd)								
	C. Difwind Farms Ltd.V	Micon 108	(H)	294	108 kW@	30 mph		
	Other Participant:						1	41,500
	Section 22 Partners, Ltd.						2	122,000
							3	79,000
							4	32,500
							Annual	----- 275,000
								----- 19,416,000
<b>PROJECT TOTAL</b>								<b>19,416,000</b>

16 EUI MANAGEMENT PH, INC.

1 Aldwyn Center  
Villanova, PA 19085

A. Mountain Pass '85 Ltd. & Management Program 85	Bonus 120	(H)	302	120 kW@	40 mph			
							1	46,300
							2	108,800
							3	70,300
							4	29,500
							Annual	----- 254,900
								----- 29,639,132
	Bonus 65	(H)	181	65 kW@	40 mph			
							1	20,500
							2	72,000
							3	43,000
							4	24,500
							Annual	----- 160,000
								----- 14,388,513

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor (M2)	Size (kW)			New	Cum.	
<b><u>SAN GORGONIO PASS (Riverside)</u></b>										
16 EUI MANAGEMENT PH, INC. (Cont'd)										
A. Mountain Pass '85 Ltd. & Management Program 85 (Cont'd)	Delta 150	(H)	302	150 kW@	34 mph	1	86,400	0	1	23,698 (V)
						34	201,000	0	1	185,212 (V)
						40	127,500	0	1	368,286 (V)
						34	58,300	0	1	839,893 (V)
						Annual	473,200			1,417,089
	Micon 108	(H)	284	108 kW@	32 mph	1	63,100	0	22	1,104,782 (V)
						2	148,100	0	22	2,288,063 (V)
						3	95,600	0	22	2,289,798 (V)
						4	40,100	0	22	967,214 (V)
						Annual	346,900			6,649,857
	Bonus 250	(H)	573	250 kW@	32 mph	1	108,800	0	1	72,594 (V)
						2	255,500	0	1	262,462 (V)
						3	165,000	0	1	207,809 (V)
						4	69,100	0	1	73,484 (V)
						Annual	598,400			616,349
	<b>PROJECT TOTAL</b>									<b>52,710,940</b>

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)			
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.				
<u>SAN GORGONIO PASS (Riverside)</u>												
17 RENEWABLE ENERGY VENTURES												
P.O. Box 742												
North Palm Springs, CA 92258												
A. REV Wind Power Partners												
		ESI 54-S	(H)	216	80 kW@	40 mph	1	38,200	0	168	2,746,085 (NV)	
Operator Comment: See Appendix A Comment 7								2	-----	-----	-----	-----
								3	-----	-----	-----	-----
								4	-----	-----	-----	-----
								Annual	-----	-----	-----	-----
								Annual	38,200	-----	-----	2,746,085
		Jacobs 26-17.5	(H)	49	18 kW@	27 mph	1	9,500	0	208	1,314,715 (NV)	
								2	-----	-----	-----	-----
								3	-----	-----	-----	-----
								4	-----	-----	-----	-----
								Annual	-----	-----	-----	-----
								Annual	9,500	-----	-----	1,314,715
<b>PROJECT TOTAL</b>												
4,060,800												

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor (M2)			Size (kW)	New		Cum.
<b><u>SAN GORGONIO PASS (Riverside)</u></b>										
<b>18 RIVERVIEW VENTURES</b>										
19020 North Indian Avenue										
P. O. Box 457										
North Palm Springs, CA 92258										
	A. RVI Windpark	Jacobs 20	(H)	50	20 kW@ 27 mph	1	8,634	0	177	84,155 (V)
						2	16,166	0	177	105,445 (V)
						3	12,394	0	177	69,153 (V)
						4	2,806	0	177	0 (V)
					Annual		40,000			258,753
							<b>PROJECT TOTAL</b>			<b>258,753</b>
	B. WVI Windpark	Jacobs 20	(H)	50	20 kW@ 27 mph	1	8,634	0	41	0 (V)
						2	16,166	0	41	0 (V)
	Other Participant:					3	12,394	0	41	0 (V)
	Whitewater Ventures, Inc.					4	2,806	0	41	0 (V)
					Annual		40,000			0
							<b>PROJECT TOTAL</b>			<b>0</b>

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.		
<u>SAN GORGONIO PASS (Riverside)</u>										
19 SAN GORGONIO FARMS										
21515 Hawthorne Blvd., Suite 1059										
Torrance, CA 90503										
A. San Gorgonio Farms										
Wind Park										
	Bonus 100	(H)	294	100 kW@	28 mph	1	62,400	0	55	3,526,390 (V)
						2	146,520	0	55	7,708,371 (V)
						3	141,160	0	55	3,491,225 (V)
						4	49,920	0	55	2,374,079 (V)
						Annual	400,000			17,100,065
	Bonus 120	(H)	294	120 kW@	40 mph	1	68,640	0	1	67,791 (V)
						2	161,172	0	1	96,629 (V)
						3	155,276	0	1	71,143 (V)
						4	54,912	0	1	58,040 (V)
						Annual	440,000			293,603
	Bonus 450	(H)	961	450 kW@	30 mph	1	187,200	0	1	116,800 (V)
						2	439,560	0	1	116,800 (V)
						3	423,480	0	1	474,460 (V)
						4	149,760	0	1	177,760 (V)
						Annual	1,200,000			885,820
	Bonus 65	(H)	177	65 kW@	33 mph	1	43,680	0	81	2,415,817 (V)
						2	102,564	0	81	5,507,587 (V)
						3	98,812	0	81	2,419,825 (V)
						4	34,944	0	81	1,721,922
						Annual	280,000			12,065,151

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification					Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor (M2)	Size (kW)			New	Cum.		
<u>SAN GORGONIO PASS (Riverside)</u>											
19 SAN GORGONIO FARMS (Cont'd)											
Operator Comment: See Appendix A Comment 8	A. San Gorgonio Farms Wind Park (Cont'd)	Micon 65	(H)	177	65 kW@	33 mph	1	43,680	0	50	809,450 (V)
							2	102,564	0	50	3,325,473 (V)
							3	98,812	0	50	1,542,008 (V)
							4	34,944	0	50	1,071,008 (V)
							Annual	280,000			6,747,939
		Windane 34	(H)	908	400 kW@	30 mph	1	171,600	0	35	8,985,680 (V)
							2	402,930	0	35	18,992,000 (V)
							3	388,190	0	35	15,576,160 (V)
							4	137,280	0	35	6,555,360 (V)
							Annual	1,100,000			50,109,200
		Floda 500	(H)	1,018	500 kW@	31 mph	1	218,400	0	3	307,322 (V)
							2	512,820	0	3	213,840 (V)
							3	494,060	0	3	76,599 (V)
							4	174,720	0	3	71,279 (V)
							Annual	1,400,000			669,040
		Vestas V39	(H)	1,195	500 kW@	30 mph	1	214,500	0	1	306,040 (V)
							2	503,660	0	1	629,160 (V)
							3	485,240	0	1	588,360 (V)
							4	171,600	0	1	255,160 (V)
							Annual	1,375,000			1,778,720
<b>PROJECT TOTAL</b>										<b>89,649,538</b>	

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.	
<b><u>SAN GORGONIO PASS (Riverside)</u></b>									
20	SAN GORGONIO WIND ASSOCIATES VI 19020 N. Indian Ave. P.O. Box 357 N. Palm Springs, CA 92258								
	A. SGWA VI Windpark	ESI 54s -	(H)	211	65 kW@ 30 mph	1			
	Other Participant: Wintec, Ltd.					2	60,825	0	30 381,947 (V)
						3	47,625	0	30 592,616 (V)
						4	21,225	0	30 274,450 (V)
	Operator Comment: See Appendix A Comment 9					Annual	129,675		1,249,013
		Storm Master	(H)	113	50 kW@ 40 mph	1			
						2	42,259	12	12 155,052 (V)
						3	33,089	0	12 298,384 (V)
						4	14,747	0	12 106,550 (V)
						Annual	90,095		559,986
						<b>PROJECT TOTAL</b>		<b>1,808,999</b>	
21	SEAWEST ENERGY GROUP 1455 Frazee Rd. ,Suite 900 San Diego, CA 92108								
	A. Altech Energy Ltd. II	Enertech 44/40	(H)	141	40 kW@ 30 mph	1	24,300	0	85 980,212 (V)
						2	56,100	0	85 3,401,066 (V)
						3	38,200	0	85 2,739,000 (V)
						4	15,500	0	85 706,800 (V)
						Annual	134,100		7,827,078
						<b>PROJECT TOTAL</b>		<b>7,827,078</b>	

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)		
		Model	Axis Rotor Size (M2) (kW)	Size	30 mph						
<b><u>SAN GORGONIO PASS (Riverside)</u></b>											
21 SEAWEST ENERGY GROUP (Cont'd)											
	B. Altech Energy Ltd. III	Micon 100/US	(H)	283	108 kW@	30 mph	1	53,500	0	268	7,411,041 (V)
							2	160,200	0	268	25,228,965 (V)
							3	108,900	0	268	20,256,347 (V)
							4	41,400	0	268	5,915,173 (V)
							Annual	----- 364,000			----- 58,811,526
		Micon 60	(H)	201	60 kW@	30 mph	1	32,200	0	53	700,982 (V)
							2	79,900	0	53	2,794,736 (V)
							3	52,700	0	53	2,255,653 (V)
							4	22,200	0	53	660,827 (V)
							Annual	----- 187,000			----- 6,412,198
							<b>PROJECT TOTAL</b>				<b>65,223,724</b>
	C. Phoenix Energy Associates	Enertech 44/40	(H)	140	40 kW@	30 mph	1	27,283	0	90	1,334,370 (V)
Other Participant:							2	59,388	0	90	3,354,013 (V)
Phoenix Energy, Ltd.							3	42,998	0	90	2,579,708 (V)
							4	17,331	0	90	921,833 (V)
							Annual	----- 147,000			----- 8,189,924
		Micon 60/13	(H)	200	60 kW@	30 mph	1	41,574	0	130	3,213,319 (V)
							2	90,496	0	130	8,746,680 (V)
							3	65,520	0	130	7,409,172 (V)
							4	26,410	0	130	2,462,162 (V)
							Annual	----- 224,000			----- 21,831,333
							<b>PROJECT TOTAL</b>				<b>30,021,257</b>

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)			
		Model	Axis	Rotor (M2)	Size (kW)						
<u>SAN GORGONIO PASS (Riverside)</u>											
21 SEAWEST ENERGY GROUP (Cont'd)											
Other Participant: Alta Mesa	D. Swanmill Farms I/Farms II	Danwin 23	(H)	415	160 kW@	29 mph	1	110,440	0	117	9,937,329 (V)
							2	170,680	0	117	18,664,843 (V)
							3	125,500	0	117	14,880,000 (V)
							4	95,380	0	117	7,536,000 (V)
							Annual	502,000			51,018,172
<b>PROJECT TOTAL</b>											
51,018,172											
E. SWWF II, Inc.	E. SWWF II, Inc.	Enertech 44/40	(H)	141	40 kW@	30 mph	1	17,000	0	120	2,282,900 (V)
							2	48,200	18	138	6,602,700 (V)
							3	38,200	0	138	5,922,000 (V)
							4	17,700	0	138	67,391 (V)
							Annual	121,100			14,874,991
<b>PROJECT TOTAL</b>											
14,874,991											
22 SOUTHERN CALIFORNIA SUNBELT											
4501 East La Palma Ave. #200											
Anaheim, CA 92807											
Operator Comment: See Appendix A Comment 10	A. Palm Springs Wind Park (Edom Hill)	Windmatic 15S	(H)	189	65 kW@	32 mph	1	16,378	0	83	1,359,360 (NV)
							2	57,244	0	79	4,751,285 (NV)
							3	46,842	0	79	3,700,509 (V)
							4	12,300	0	79	942,476 (V)
							Annual	132,764			10,753,630

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor Size (M2)	Size (kW)			New	Cum.		
<b><u>SAN GORGONIO PASS (Riverside)</u></b>											
22 SOUTHERN CALIFORNIA SUNBELT (Cont'd)											
	A. Palm Springs Wind Park (Edom Hill) (Cont'd)	Windmatic 17S	(H)	227	95 kW@	34 mph	1	16,183	0	56	906,240 (NV)
							2	56,563	0	60	3,167,523 (NV)
							3	30,733	0	60	1,843,943 (V)
							4	13,100	0	60	984,432 (V)
							-----	-----			-----
						Annual		116,579			6,902,138
<b>PROJECT TOTAL</b>										17,655,768	
23 U.S. WINDPOWER											
6952 Preston Ave. Livermore, CA 94550											
	A. Aldrich/BLM	USW 56-100	(H)	247	100 kW@	29 mph	1	21,000	0	74	591,600 (V)
							2	81,900	0	74	2,382,000 (V)
							3	86,100	0	74	6,686,672 (V)
							4	21,000	0	74	2,230,037 (V)
							-----	-----			-----
						Annual		210,000			11,890,309
		Bonus	(H)	415	150 kW@	34 mph	1	51,755	0	1	0 (V)
							2	169,380	0	1	0 (V)
							3	197,610	0	1	0 (V)
							4	51,775	0	1	58,363 (V)
							-----	-----			-----
						Annual		470,520			58,363
<b>PROJECT TOTAL</b>										11,948,672	

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis (M2)	Rotor (kW)	Size (kW)		New	Cum.		
<u>SAN GORGONIO PASS (Riverside)</u>										
23 U.S. WINDPOWER (Cont'd)										
B. USWC										
ESI 54S										
(H) 213 80 kW@ 36 mph										
						1	---	---	---	
Operator Comment:						2	0	0	155	2,754,412 (V)
See Appendix A						3	0	0	155	5,364,354 (V)
Comment 11						4	0	0	155	0 (V)
						Annual	-----	-----	-----	-----
						0	0	0	155	8,118,766
Jacobs 26-17.5										
(H) 61 18 kW@ 27 mph										
						1	---	---	---	---
						2	0	0	208	1,039,022 (V)
						3	0	0	208	1,946,995 (V)
						4	0	0	200	2,523,600 (V)
						Annual	-----	-----	-----	-----
						0	0	0	200	5,509,617
<b>PROJECT TOTAL</b>									<b>13,628,383</b>	

24 WESTWIND ASSOCIATION  
P.O. Box 457  
19020 North Indian Avenue  
North Palm Springs, CA 92258

A. Westwind Assn. Windpark										
Micon 108										
(H) 293 108 kW@ 33 mph										
						1	50,893	0	13	162,907 (V)
						2	112,031	0	13	618,884 (V)
						3	91,002	0	13	663,183 (V)
						4	7,450	0	13	281,598 (V)
						Annual	-----	-----	-----	-----
						261,376	0	0	13	1,726,572

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected	Turbines		Electricity	
		Model	Axis	Rotor	Size		Prod./Turbine	New	Cum.	Produced	
							(kWh)			(kWh)	
<b><u>SAN GORGONIO PASS (Riverside)</u></b>											
<b>24. WESTWIND ASSOCIATION (Cont'd)</b>											
A. Westwind Assn. Windpark (Cont'd)	Micon 65	(H)	200	65 kW@	33 mph	1	38,170	0	46	1,029,005	(V)
						2	84,023	0	46	2,467,844	(V)
						3	68,252	0	46	2,006,759	(V)
						4	19,555	0	46	839,819	(V)
						Annual	210,000			6,343,427	
	Nordtank 65	(H)	201	65 kW@	34 mph	1	38,170	0	13	254,916	(V)
						2	84,023	0	13	563,226	(V)
						3	68,252	0	13	426,367	(V)
						4	19,555	0	13	173,904	(V)
						Annual	210,000			1,418,413	
	Wincon 108	(H)	293	108 kW@	33 mph	1	47,940	0	16	616,683	(V)
						2	124,080	0	16	1,397,412	(V)
						3	64,860	0	16	999,999	(V)
						4	45,120	0	16	472,075	(V)
						Annual	282,000			3,486,169	
	Wincon 110	(H)	295	110 kW @	33 mph	1	47,940	0	84	3,204,489	(V)
						2	124,080	0	84	7,948,634	(V)
3						64,860	0	84	5,551,692	(V)	
4						45,120	0	84	2,624,604	(V)	
Annual						282,000			19,329,419		
<b>PROJECT TOTAL</b>									<b>32,304,000</b>		

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)
		Model	Axis	Rotor Size (M2) (kW)			

SAN GORGONIO PASS (Riverside)

25 WINTEC, LTD.  
 19020 N. Indian Ave.  
 P.O. Box 457  
 N. Palm Springs, CA 92258

A. Wintec Cahuilla Windpark	Nordtank 65	(H)	201	65 kW @ 34 mph	1	45,326	0	72	1,785,800 (V)
					2	84,871	0	72	4,255,783 (V)
					3	65,071	0	72	4,030,331 (V)
					4	14,732	0	72	1,309,140 (V)
					Annual	210,000			11,381,054

**PROJECT TOTAL** 11,381,054

B. Wintec I Windpark	Carter 25	(H)	75	25 kW @ 26 mph	1	17,267	0	90	692,082 (V)
					2	32,332	0	90	1,880,632 (V)
					3	24,789	0	90	1,514,163 (V)
					4	5,612	0	90	594,000 (V)
					Annual	80,000			4,680,877

Operator Comment:  
 See Appendix A  
 Comment 12

Micon 60/13	(H)	200	60 kW @ 33 mph	1	45,326	0	23	491,718 (V)
				2	84,871	0	23	1,201,568 (V)
				3	65,071	0	23	1,022,037 (V)
				4	14,732	0	23	360,000 (V)
				Annual	210,000			3,075,323

**PROJECT TOTAL** 7,756,200

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected	Turbines		Electricity
		Model	Axis	Rotor Size	(M2) (kW)		Prod./Turbine	Installed	Produced	
						(kWh)	New	Cum.	(kWh)	
<b><u>SAN GORGONIO PASS (Riverside)</u></b>										
25 WINTEC, LTD. (Cont'd)										
	C. Wintec II (Whitewater)	Nordtank 65/13	(H)	201	65 kW @ 35 mph	1	45,326	0	63	1,441,045 (V)
						2	84,871	0	63	3,618,755 (V)
Other Participant:						3	65,071	0	63	3,582,448 (V)
San Gorgonio Wind						4	14,732	0	63	1,220,400 (V)
						Annual	210,000			9,862,648
									<b>PROJECT TOTAL</b>	<b>9,862,648</b>
	D. Wintec Palm Windpark	Micon 65	(H)	200	65 kW @ 33 mph	1	45,326	0	30	754,204 (V)
						2	84,871	0	30	1,520,156 (V)
						3	65,071	0	30	1,231,286 (V)
						4	14,732	0	30	434,647 (V)
						Annual	210,000			3,940,293
		Nordtank 65	(H)	201	65 kW @ 34 mph	1	45,326	0	4	87,996 (V)
						2	84,871	0	4	218,060 (V)
						3	65,071	0	4	96,383 (V)
						4	14,732	0	4	32,213 (V)
						Annual	210,000			434,652
									<b>PROJECT TOTAL</b>	<b>4,374,943</b>

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)
		Model	Axis	Rotor Size (M2) (kW)			
<b><u>SAN GORGONIO PASS (Riverside)</u></b>							
26 ZOND SYSTEMS, INC. 13000 Jameson Rd. Tehachapi, CA 93581							
A. Painted Hills "B" & "C"							
	Vestas 15	(H)	184	65 kW @ 35 mph	1	32,281	0 61 1,553,242 (V)
					2	88,550	0 61 3,486,491 (V)
					3	58,304	0 61 2,707,972 (V)
					4	27,419	0 61 1,057,591 (V)
					Annual	206,554	8,805,296
	Vestas 17	(H)	227	90 kW @ 35 mph	1	45,079	0 170 5,893,177 (V)
					2	104,275	0 170 12,074,324 (V)
					3	68,658	0 170 8,946,360 (V)
					4	32,288	0 170 3,707,565 (V)
					Annual	250,300	30,621,426
<b>PROJECT TOTAL</b>							<b>39,426,722</b>
B. Zond-PanAero Windsystems							
	Vestas 15	(H)	184	65 kW @ 35 mph	1	46,865	0 460 14,256,983 (V)
					2	95,316	0 460 25,370,595 (V)
					3	67,697	0 460 20,600,777 (V)
					4	37,823	0 460 10,096,479 (V)
					Annual	247,701	70,324,834
<b>PROJECT TOTAL</b>							<b>70,324,834</b>

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.		
<u>SOLANO (Solano)</u>										
27 U.S. WINDPOWER										
6952 Preston Ave.										
Livermore, CA 94550										
	A. Russell	USW 56-100	(H)	247	100 kW@ 29 mph	1	21,000	0	600	7,420,800 (V)
						2	81,900	0	600	23,189,207 (V)
						3	86,100	0	600	43,612,801 (V)
						4	21,000	0	600	7,436,712 (V)
						Annual	210,000			81,659,520
<b>PROJECT TOTAL</b>										<b>81,659,520</b>

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)	
		Model	Axis	Rotor (M2)	Size (kW)				
<b><u>TEHACHAPI PASS (Kern)</u></b>									
28 AB ENERGY, INC. 10 Mission Bay Dr. Corona Del Mar, CA 92625									
A. AB Energy		Vestas V27	(H)	573	225 kW @	35 mph			
						1	0	15 31	2,190,322 (V)
						2	0	0 31	7,275,726 (V)
						3	0	0 31	6,212,161 (V)
						4	0	0 31	3,275,600 (V)
						Annual	0	-----	18,953,809
<b>PROJECT TOTAL</b>								<b>18,953,809</b>	
29 ARBUTUS 2691 Richter Ave., #114 Irvine, CA 92714									
A. Pajuela Peak Wind Park		Bonus 65	(H)	225	65 kW @	45 mph			
						1	40,500	0 229	6,264,000 (V)
						2	60,750	0 229	10,836,000 (V)
						3	45,600	0 229	6,852,000 (V)
						4	55,650	0 229	4,816,800 (V)
						Annual	202,500	-----	28,768,800
		Windtech 75	(H)	250	75 kW @	55 mph			
						1	0	0 5	0 (V)
						2	0	0 5	0 (V)
						3	0	0 5	0 (V)
						4	0	0 5	0 (V)
						Annual	0	-----	0
<b>PROJECT TOTAL</b>								<b>28,768,800</b>	

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor Size (M2)			(kW)	New		Cum.
<b><u>TEHACHAPI PASS (Kern)</u></b>										
30 CALWIND RESOURCES, INC. 2659 Townsgate Rd. #122 Westlake Village, CA 91361										
	A. Natural Resource Ventures (Wind Resource I)	Nordtank 65/13	(H)	201	65 kW @ 35 mph	1	24,500	0	20	297,953 (V)
						2	36,500	0	20	708,278 (V)
						3	21,200	0	20	426,529 (V)
						4	17,800	0	20	230,210 (V)
						Annual	100,000			1,662,970
							<b>PROJECT TOTAL</b>			1,662,970
	B. Calwind Resources Inc. (Wind Resource I)	Nordtank 65/13	(H)	201	65 kW @ 35 mph	1	28,440	0	114	2,666,047 (V)
						2	41,760	0	114	5,487,722 (V)
						3	28,320	0	114	3,570,478 (V)
						4	21,480	0	114	2,155,200 (V)
						Annual	120,000			13,879,447
							<b>PROJECT TOTAL</b>			13,879,447

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor Size (M2) (kW)		New	Cum.	
<u>TEHACHAPI PASS (Kern)</u>								
31 CANNON ENERGY CORPORATION P.O. Box 1457 Tehachapi, CA 93581								
	A. Cameron Ridge Windpark Phase 3, 4A, 4B	Bouma 200	(H)	314 135 kW @ 40 mph	1	0	0	28 596,871 (NV)
					2	0	0	0 (V)
					3	0	0	0 (V)
					4	0	0	0 (V)
					Annual	0		596,871
Operator Comment: See Appendix A Comment 13		CT-9000	(H)	117 100 kW @ 37 mph	1	0	0	32 0 (NV)
					2	0	0	32 0 (V)
					3	0	0	32 0 (V)
					4	0	0	0 0 (V)
					Annual	0		0
		Micon 108	(H)	283 108 kW @ 33 mph	1	0	0	3 236,694 (NV)
					2	0	0	3 473,676 (V)
					3	0	0	3 343,332 (V)
					4	0	0	3 177,829 (V)
					Annual	0		1,231,531

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)		
		Model	Axis	Rotor (M2)	Size (kW)					
<u>TEHACHAPI PASS (Kern)</u>										
31 CANNON ENERGY CORPORATION (Cont'd)										
A. Cameron Ridge Windpark Phase 3, 4A, 4B (Cont'd)	Nordtank 150	(H)	330	150	kW @ 42 mph	1	0	0	102	6,964,276 (NV)
						2	0	0	102	14,228,137 (V)
						3	0	0	102	9,268,222 (V)
						4	0	0	102	5,179,045 (V)
						Annual	0	0	408	35,639,680
	Nordtank 65	(H)	201	65	kW @ 35 mph	1	0	0	50	1,063,685 (NV)
						2	0	0	50	2,262,981 (V)
						3	0	0	50	1,260,386 (V)
						4	0	0	50	760,633 (V)
						Annual	0	0	200	5,347,685
	Nordtank 90/16.6	(H)	215	74	kW @ 42 mph	1	0	0	339	8,750,651 (NV)
						2	0	0	339	19,957,893 (V)
						3	0	0	339	12,400,406 (V)
						4	0	0	339	6,993,636 (V)
						Annual	0	0	1356	48,102,586
	Micon 250	(H)	452	250	kW @ 33 mph	1	0	0	3	409,190 (NV)
						2	0	0	3	764,368 (V)
3						0	0	3	570,330 (V)	
4						0	0	3	305,110 (V)	
Annual						0	0	12	2,048,998	

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)	
		Model	Axis	Rotor (M2)	Size (kW)				
<u>TEHACHAPI PASS (Kern)</u>									
31 CANNON ENERGY CORPORATION (Cont'd)									
A. Cameron Ridge Windpark Phase 3, 4A, 4B (Cont'd)		Cannon CEC-250	(H)	531	250	kW @ 32 mph			
						1	0	2	0 (NV)
						2	0	2	134,369 (V)
						3	0	2	417,478 (V)
						4	0	2	226,853 (V)
						Annual	0	---	778,700
<b>PROJECT TOTAL</b>								93,746,051	
B. Cannon Phase V		Micon 108	(H)	283	108	kW @ 33 mph			
						1	0	0	6,666,526 (NV)
						2	0	138	14,850,494 (V)
						3	0	138	9,988,195 (V)
						4	0	138	4,987,101 (V)
						Annual	0	---	36,492,316
<b>PROJECT TOTAL</b>								36,492,316	
32 CORAM ENERGY GROUP									
25500 Hawthorne Blvd., Suite 2120 Torrance, CA 90505									
A. Coram TaxVest Windfarms		Aeroman 12.5 Series II	(H)	123	40	kW @ 27 mph			
						1	0	0	1,325,552 (V)
						2	0	100	3,148,800 (V)
						3	0	100	2,132,586 (V)
						4	0	100	1,042,277 (V)
						Annual	0	---	7,649,215
<b>PROJECT TOTAL</b>								7,649,215	

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor Size (M2)	Size (kW)			New	Cum.	
<b><u>TEHACHAPI PASS (Kern)</u></b>										
32 CORAM ENERGY GROUP (Cont'd)										
	B. Coram TaxVest Windfarms	Aeroman 12.5	(H)	123	40 kW @ 27 mph	1	0	0	47	565,845 (V)
		Series II				2	0	0	47	1,363,701 (V)
Other Participant:						3	0	0	47	852,623 (V)
Coram Energy Group						4	0	0	47	442,671 (V)
						Annual	0			3,224,840
						<b>PROJECT TOTAL</b>				3,224,840
	C. Coram TaxVest Windfarms	Aeroman 12.5	(H)	123	40 kW @ 27 mph	1	0	0	109	1,362,597 (V)
		Series II				2	0	0	109	2,969,072 (V)
Other Participant:						3	0	0	109	1,830,955 (V)
CTV Marketing Group						4	0	0	109	996,932 (V)
						Annual	0			7,159,556
						<b>PROJECT TOTAL</b>				7,159,556
	D. Coram Energy Group	Aeroman 12.5	(H)	123	40 kW @ 27 mph	1	0	0	27	370,955 (V)
		Series I				2	0	0	27	865,048 (V)
Other Participant:						3	0	0	27	588,965 (V)
Energy Conversion Technology, Inc.						4	0	0	27	286,739 (V)
						Annual	0			2,111,707
						<b>PROJECT TOTAL</b>				2,111,707

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Model	Axis	Rotor	Size	Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		(M2)	(kW)	New						Cum.		
<u>TEHACHAPI PASS (Kern)</u>												
33 FLOWIND CORPORATION												
900 A Street, Suite 300												
Pleasanton, CA 94901												
A. FloWind Cameron Ridge												
Flowind 17												
(V) 260 142 kW @ 44 mph												
1 59,841 0 161 5,709,781 (V)												
2 90,175 0 161 10,767,938 (V)												
3 46,249 0 161 6,439,089 (V)												
4 55,297 0 161 3,696,528 (V)												
Annual ----- 251,562 ----- 26,613,336												
Flowind 19												
(V) 340 250 kW @ 38 mph												
1 115,641 0 122 6,012,966 (V)												
2 182,951 0 122 12,949,964 (V)												
3 90,982 0 122 8,315,809 (V)												
4 103,621 0 122 4,371,065 (V)												
Annual ----- 493,195 ----- 31,649,804												
Flowind 25												
(V) 515 381 kW @ 44 mph												
1 0 0 2 0 (V)												
2 0 0 2 0 (V)												
3 0 0 2 0 (V)												
4 0 0 2 0 (V)												
Annual ----- 0 ----- 0												

Operator Comment:  
See Appendix A  
Comment 14

**1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA**

Location/Operator	Project	Turbine Specification			Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)
		Model	Axis Rotor (M2)	Size (kW)			
<b><u>TEHACHAPI PASS (Kern)</u></b>							
33 FLOWIND CORPORATION (Cont'd)							
	A. FloWind Cameron Ridge (Cont'd)	Sumitomo H22	(H)	363	200 kW @ 30 mph	1	0 (V)
						2	114,024 (V)
						3	91,502 (V)
						4	16,910 (V)
					Annual	0	222,436
						<b>PROJECT TOTAL</b>	
							58,485,576
	B. FloWind IV	Flowind 19	(V)	340	250 kW @ 38 mph	1	2,564,328 (V)
						2	6,882,941 (V)
						3	3,348,000 (V)
						4	2,081,573 (V)
					Annual	429,428	14,876,842
						<b>PROJECT TOTAL</b>	
							14,876,842

Operator Comment:  
See Appendix A  
Comment 15

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.	

TEHACHAPI PASS (Kern)

34 MOGUL ENERGY CORPORATION

5204 Lansdale  
Bakersfield, CA 93306

A. Liberty Wind Park	Blue Max	(H)	97	50 kW@ 35 mph	1	11,300	0	80	280,656 (V)
					2	32,800	0	80	1,062,766 (V)
					3	21,124	0	80	490,088 (V)
					4	9,276	0	80	244,494 (V)
					Annual	74,500			2,078,004

<b>PROJECT TOTAL</b>	<b>2,078,004</b>
----------------------	------------------

35 OAK CREEK ENERGY SYSTEMS

P.O. Box 1670  
14633 Willow Springs Rd.  
Tehachapi, CA 93581

A. Oak Creek Energy Systems	Flowind 17	(V)	260	85 kW @ 27 mph	1	24,000	0	1	3,726 (V)
					2	40,000	0	1	32,496 (V)
					3	----	----	----	----
					4	----	----	----	----
					Annual	64,000			36,222

Operator Comment:  
See Appendix A  
Comment 16

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Qtr.	Projected	Turbines		Electricity
		Model	Axis Rotor	Size		Prod./Turbine	Installed	Produced	
						(kWh)	New	Cum.	(kWh)
<b><u>TEHACHAPI PASS (Kern)</u></b>									
35 OAK CREEK ENERGY SYSTEMS (Cont'd)									
A. Oak Creek Energy Systems (Cont'd)	Oak 5	(H)	80	15 kW @ 27 mph	1	9,000	0	1	3,531 (V)
					2	15,000	0	1	0 (V)
					3	-----	-----	-----	-----
					4	-----	-----	-----	-----
					Annual	24,000	-----	-----	3,531
	Oak 7A	(H)	184	55 kW @ 27 mph	1	21,000	0	79	755,387 (V)
					2	35,000	0	79	2,637,043 (V)
					3	-----	-----	-----	-----
					4	-----	-----	-----	-----
					Annual	56,000	-----	-----	3,392,430
	Oak 7B	(H)	199	55 kW @ 27 mph	1	23,000	0	132	1,399,864 (V)
					2	39,000	0	132	4,801,779 (V)
					3	-----	-----	-----	-----
					4	-----	-----	-----	-----
					Annual	62,000	-----	-----	6,201,643
	Oak 9	(H)	296	90 kW @ 27 mph	1	45,000	0	100	2,320,691 (V)
					2	75,000	0	100	7,687,082 (V)
3					-----	-----	-----	-----	
4					-----	-----	-----	-----	
Annual					120,000	-----	-----	10,007,773	
<b>PROJECT TOTAL</b>								<b>19,641,599</b>	

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor Size (M2) (kW)			New	Cum.	

TEHACHAPI PASS (Kern)

36 SEAWEST ENERGY GROUP

1455 Frazee Road, 9th Fl.  
San Diego, CA 92108

A. Difwind VI/Viking I/Viking II  
ToyoWest

	Danwin 23/160	(H)	423	160	kW @ 34 mph	1	120,000	0	91	4,849,487 (V)
						2	204,000	0	91	13,664,748 (V)
						3	162,000	0	91	10,489,338 (V)
						4	114,000	0	91	4,696,562 (V)
						Annual	600,000			33,700,135
	Micon 110	(H)	300	108	kW @ 30 mph	1	70,700	0	251	8,141,622 (V)
						2	137,800	0	251	24,852,026 (V)
						3	85,700	0	251	18,235,873 (V)
						4	78,200	0	251	7,721,861 (V)
						Annual	372,400			58,951,382
	MWT-250	(H)	491	250	kW @ 29 mph	1	130,000	0	20	1,372,472 (V)
						2	240,500	0	20	4,384,456 (V)
						3	149,500	0	20	1,597,372 (V)
						4	130,000	0	20	1,396,597 (V)
						Annual	650,000			8,750,897

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor (M2)	Size (kW)			New	Cum.	
<b><u>TEHACHAPI PASS (Kern)</u></b>										
36 SEAWEST ENERGY GROUP (Cont'd)										
A. Difwind VI/Viking I/Viking II										
	Toyo West (Cont'd)	Nordtank 150S	(H)	330	150 kW @ 35 mph	1	77,300	0	62	2,592,416 (V)
						2	150,400	0	62	7,514,769 (V)
						3	93,500	0	62	5,677,438 (V)
						4	85,400	0	62	2,510,980 (V)
						Annual	406,600			18,295,603
<b>PROJECT TOTAL</b>										<b>119,698,017</b>
B. Seawest 17, Inc./Toyo Power										
	Mojave 17/16/18	MWT-250	(H)	610	250 kW @ 29 mph	1	156,450	0	340	23,115,408 (V)
						2	260,750	0	340	70,770,520 (V)
						3	178,800	0	340	48,828,960 (V)
						4	149,000	0	340	20,755,716 (V)
						Annual	745,000			163,470,604
<b>PROJECT TOTAL</b>										<b>163,470,604</b>
C. Seawest 4, Inc./Toyo Power										
	Mojave 4/3/5	MWT-250	(H)	610	250 kW @ 29 mph	1	156,450	0	300	32,469,375 (V)
						2	260,750	0	300	86,812,779 (V)
						3	178,800	0	300	69,321,321 (V)
						4	149,000	0	300	30,020,150 (V)
						Annual	745,000			218,623,625
<b>PROJECT TOTAL</b>										<b>218,623,625</b>

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)
		Model	Axis	Rotor Size (M2) (kW)			

TEHACHAPI PASS (Kern)

36 SEAWEST ENERGY GROUP (Cont'd)

	D. Oak Creek Energy Systems	FloWind 17	(V)	260	85 kW@ 27 mph	1				
Operator Comment: See Appendix A Comment 17							-----	-----	-----	-----
						2	-----	-----	-----	-----
						3	21,000	0	1	42,943 (V)
						4	15,000	0	1	14,828 (V)
						Annual	----- 36,000			----- 57,771
		Oak 5	(H)	80	15 kW@ 27 mph	1	-----	-----	-----	-----
						2	-----	-----	-----	-----
						3	8,000	0	1	0 (V)
						4	5,000	0	1	0 (V)
						Annual	----- 13,000			----- 0
		Oak 7A	(H)	184	55 kW@ 27 mph	1	-----	-----	-----	-----
						2	-----	-----	-----	-----
						3	18,000	0	79	1,510,205 (V)
						4	15,000	0	79	691,319 (V)
						Annual	----- 33,000			----- 2,201,524
		Oak 7B	(H)	199	55 kW@ 27 mph	1	-----	-----	-----	-----
						2	-----	-----	-----	-----
						3	20,000	0	132	2,512,001 (V)
						4	15,000	0	132	1,300,177 (V)
						Annual	----- 35,000			----- 3,812,178

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.	

TEHACHAPI PASS (Kern)

36 SEAWEST ENERGY GROUP (Cont'd)

D. Oak Creek Energy (Cont'd)	Oak 9	(H)	296	90	kW@ 27 mph	1	----	----	----	----
						2	----	----	----	----
						3	39,000	0	100	4,925,251 (V)
						4	28,000	0	100	2,343,271 (V)
						Annual	----- 67,000			----- 7,268,522

<b>PROJECT TOTAL</b>	13,339,995
----------------------	------------

37 SOUTHERN CALIFORNIA SUNBELT

4501 East La Palma Ave. #200  
Anaheim, CA 92807

A. Mojave Wind Park	Windmatic 17S	(H)	227	95	kW @ 34 mph	1	18,857	0	21	396,000 (V)
						2	52,173	0	21	1,095,630 (NV)
						3	27,368	0	21	574,738 (V)
						4	13,800	0	21	288,000 (V)
						Annual	----- 112,198			----- 2,354,368

<b>PROJECT TOTAL</b>	2,354,368
----------------------	-----------

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor Size (M2) (kW)		New	Cum.	
<u>TEHACHAPI PASS (Kern)</u>								
38 WINDFARMS MANAGEMENT 2509 Thousand Oaks Blvd., Suite 197 Thousand Oaks, CA 91362								
A. Cache Creek Wind Farm								
					1			218,000 (UD)
					2			498,000 (UD)
					3			524,000 (UD)
					4			188,000 (UD)
<b>PROJECT TOTAL</b>								<b>1,428,000</b>

39 WINDLAND, INC.  
10448 Garverdale Ct., Suite 606  
Boise, Idaho 83704

A. Windland Wind Park (Boxcar I)									
Bonus 120/20		(H)	296	120 kW @ 40 mph	1	56,000	0	11	660,814 (V)
					2	98,000	0	11	1,272,416 (V)
					3	70,000	0	11	854,822 (V)
					4	56,000	0	11	543,951 (V)
					Annual	----- 280,000			----- 3,332,003
Carter 25		(H)	77	25 kW @ 30 mph	1	10,000	0	39	280,116 (V)
					2	17,500	0	39	645,255 (V)
					3	12,500	0	39	427,314 (V)
					4	10,000	0	39	230,752 (V)
					Annual	----- 50,000			----- 1,583,437

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor (M2)	Size (kW)			New	Cum.	
<b><u>TEHACHAPI PASS (Kern)</u></b>										
39 WINDLAND, INC. (Cont'd)										
A. Windland Wind Park (Boxcar I) (Cont'd)	Carter 250	(H)	332	250	kW @ 38 mph	1	80,000	0	11	122,148 (V)
						2	140,000	0	11	321,436 (V)
						3	100,000	0	11	306,772 (V)
						4	80,000	0	11	140,392 (V)
						Annual	400,000			890,748
	Storm Master 12	(H)	113	40	kW @ 42 mph	1	9,000	0	10	72,405 (V)
						2	15,750	0	10	133,382 (V)
						3	11,250	0	10	70,464 (V)
						4	9,000	0	10	46,758 (V)
						Annual	45,000			323,009
	Bonus 65/13	(H)	181	65	kW @ 40 mph	1	24,000	0	4	97,019 (V)
						2	42,000	0	4	205,852 (V)
						3	30,000	0	4	128,566 (V)
						4	24,000	0	4	85,916 (V)
						Annual	120,000			517,353
	Vestas 27	(H)	573	225	kW @ 30 mph	1	126,000	0	12	1,363,010 (V)
						2	220,500	0	12	2,495,572 (V)
3						157,500	0	12	1,723,707 (V)	
4						126,000	0	12	1,058,939 (V)	
Annual						630,000			6,641,228	

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.		
<b><u>TEHACHAPI PASS (Kern)</u></b>										
39 WINDLAND, INC. (Cont'd)										
A. Windland Wind Park (Boxcar I) (Cont'd)										
		ESI 54-S	(H)	211	60 kW@ 35 mph	1	18,000	0	2	27,690 (V)
						2	31,500	3	5	51,046 (V)
						3	22,500	0	5	106,120 (V)
						4	18,000	0	5	56,443 (V)
						Annual	90,000			241,299
		Vestas 25	(H)	491	200 kW@ 30 mph	1	-----	-----	-----	-----
						2	175,000	2	2	51,842 (V)
						3	125,000	0	2	151,038 (V)
						4	100,000	0	2	123,250 (V)
						Annual	400,000			326,130
<b>PROJECT TOTAL</b>										
									13,855,207	
B. Windland Wind Park (Boxcar II)										
		Vestas 27	(H)	573	225 kW@ 30 mph	1	126,000	0	15	1,750,027 (V)
						2	220,500	0	15	3,300,510 (V)
						3	157,500	0	15	2,246,258 (V)
						4	126,000	0	15	1,411,111 (V)
						Annual	630,000			8,707,906

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor (M2)	Size (kW)		New	Cum.		
<b><u>TEHACHAPI PASS (Kern)</u></b>										
39 WINDLAND, INC. (Cont'd)										
	B. Windland Wind Park (Boxcar II)	Enertech 44/60	(H)	180	60 kW @ 35 mph	1	14,000	0	12	129,628 (V)
						2	24,500	0	12	294,960 (V)
						3	17,500	0	12	186,031 (V)
						4	14,000	0	12	91,699 (V)
						Annual	70,000			702,318
		Vestas 25	(H)	491	200 kW @ 30 mph	1	100,000	0	20	2,278,346 (V)
						2	175,000	0	20	3,894,529 (V)
						3	125,000	0	20	2,443,711 (V)
						4	100,000	0	20	1,729,191 (V)
						Annual	500,000			10,345,777
<b>PROJECT TOTAL</b>										<b>19,756,001</b>
40 WINDRIDGE										
406 East Tehachapi Blvd.										
Tehachapi, CA 93561										
	A. Willowind	FAILED TO FILE				1				756,000 (UD)
		FAILED TO FILE				2				1,286,000 (UD)
		FAILED TO FILE				3				998,000 (UD)
		FAILED TO FILE				4				498,000 (UD)
<b>PROJECT TOTAL</b>										<b>3,538,000</b>

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor Size (M2) (kW)			New	Cum.		
<u>TEHACHAPI PASS (Kern)</u>										
41 ZOND SYSTEMS, INC. 13000 Jameson Rd. Tehachapi, CA 93581										
	A. Project '82 Pool PO1, 1983 Pool PO2	Polenko	(H)	254	100 kW @ 35 mph	1	0	0	0	0 (V)
						2	---	---	---	---
						3	---	---	---	---
						4	---	---	---	---
						Annual	0	---	---	0
						<b>PROJECT TOTAL</b>				0
	B. Project '82 Pool VO1, 1983 Pool VO2	Vestas 15	(H)	184	65 kW @ 35 mph	1	3,303	0	66	94,316 (V)
						2	5,108	0	66	191,987 (V)
						3	2,821	0	66	119,051 (V)
						4	2,558	0	66	72,224 (V)
						Annual	13,790	---	---	477,578
						<b>PROJECT TOTAL</b>				477,578
	C. Project '82 Pool WO1, 1983 Pool WO2	Windmatic 14S	(H)	165	65 kW @ 35 mph	1	0	0	0	0 (V)
						2	0	0	0	0 (V)
						3	---	---	---	---
						4	---	---	---	---
						Annual	0	---	---	0
						<b>PROJECT TOTAL</b>				0

Operator Comment:  
See Appendix A  
Comment 18

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis Rotor Size (M2)	Size (kW)			New	Cum.		
<b><u>TEHACHAPI PASS (Kern)</u></b>										
41 ZOND SYSTEMS, INC. (Cont'd)										
	D. Project '83 Pool VO2, ZO1, ZO2, '84 Pool VO4	Vestas 15	(H)	184	65 kW @ 35 mph	1	50,751	0	96	1,856,274 (V)
						2	77,560	0	96	3,509,198 (V)
						3	42,842	0	96	1,904,187 (V)
						4	38,843	0	96	1,277,765 (V)
						Annual	209,996			8,547,424
						<b>PROJECT TOTAL</b>				<b>8,547,424</b>
	E. Project '84 Pool VO4, '85 Pool VZ1	Vestas 15	(H)	184	65 kW @ 35 mph	1	47,408	0	97	2,013,476 (V)
						2	73,320	0	97	4,059,015 (V)
						3	40,500	0	97	2,294,103 (V)
						4	36,719	0	97	1,367,812 (V)
						Annual	197,947			9,734,406
						<b>PROJECT TOTAL</b>				<b>9,734,406</b>
	F. Project '84 Pool VO4, VO5, '85 Pool VO7, '85 VZ1	Vestas 15	(H)	184	65 kW @ 35 mph	1	44,856	0	86	1,894,164 (V)
						2	69,373	0	86	3,678,377 (V)
						3	38,319	0	86	2,014,515 (V)
						4	37,742	0	86	1,308,473 (V)
						Annual	190,290			8,895,529
						<b>PROJECT TOTAL</b>				<b>8,895,529</b>

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)
		Model	Axis (M2)	Rotor Size (kW)			

TEHACHAPI PASS (Kern)

41 ZOND SYSTEMS, INC. (Cont'd)

G. Project '84 Pool VO6	Vestas 17	(H)	227	90 kW @ 35 mph					
					1	58,675	0	4	146,156 (V)
					2	90,745	0	4	234,713 (V)
					3	50,124	0	4	157,349 (V)
					4	45,445	0	4	104,362 (V)
					Annual	244,989			642,580

**PROJECT TOTAL** 642,580

H. Project '84 Pool WO3 '84 Pool WO4	Windmatic 15S	(H)	184	65 kW @ 35 mph					
					1	0	0	0	0 (V)
					2	---	---	---	---
					3	---	---	---	---
					4	---	---	---	---
					Annual	0			0

**PROJECT TOTAL** 0

I. Project '84 Pool WO4	Windmatic 15S	(H)	184	65 kW @ 35 mph					
					1	0	0	0	0 (V)
					2	---	---	---	---
					3	---	---	---	---
					4	---	---	---	---
					Annual	0			0

**PROJECT TOTAL** 0

Operator Comment:  
See Appendix A  
Comment 18

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor Size (M2) (kW)			New	Cum.		
<u>TEHACHAPI PASS (Kern)</u>										
41 ZOND SYSTEMS, INC. (Cont'd)										
	J. Project '85 Pool V13	Vestas 15	(H)	184	65 kW @ 35 mph	1	16,709	0	8	126,821 (V)
						2	27,286	0	8	295,145 (V)
						3	14,623	0	8	171,330 (V)
						4	14,829	0	8	98,494 (V)
						Annual	73,447			691,790
							<b>PROJECT TOTAL</b>			<b>691,790</b>
	K. Project '85 Pool V14, V18, V20	Vestas 15	(H)	184	65 kW @ 35 mph	1	34,732	0	41	901,448 (V)
						2	55,718	0	41	1,745,508 (V)
						3	31,186	0	41	1,035,778 (V)
						4	28,587	0	41	628,737 (V)
						Annual	150,223			4,311,471
							<b>PROJECT TOTAL</b>			<b>4,311,471</b>
	L. Project '85 Pool V19, V21, V26	Vestas 17	(H)	227	90 kW @ 35 mph	1	45,355	0	41	1,579,676 (V)
						2	72,761	0	41	2,947,311 (V)
						3	40,725	0	41	1,802,559 (V)
						4	37,331	0	41	1,105,309 (V)
						Annual	196,172			7,434,855
							<b>PROJECT TOTAL</b>			<b>7,434,855</b>

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor Size (M2) (kW)			New	Cum.	

TEHACHAPI PASS (Kern)

41 ZOND SYSTEMS, INC. (Cont'd)

M. Project '85 Pool V22 '86 Pool V25, '87 Pool V26	Vestas 17	(H)	227	90 kW @ 35 mph	1	53,039	0	34	1,342,948 (V)
					2	82,030	0	34	2,632,241 (V)
					3	45,310	0	34	1,583,537 (V)
					4	41,080	0	34	962,644 (V)
					Annual	221,459			6,521,370

**PROJECT TOTAL** 6,521,370

N. Project '85 Windsystems Partners, "A" and "B"	Vestas 17/6043	(H)	227	90 kW @ 35 mph	1	54,258	0	165	4,808,421 (V)
					2	88,601	0	165	9,515,637 (V)
					3	47,484	0	165	5,915,091 (V)
					4	48,152	0	165	3,744,861 (V)
					Annual	238,495			23,984,010

Vestas 17/6044	(H)	227	90 kW @ 35 mph	1	54,258	0	235	7,730,157 (V)
				2	88,601	0	235	13,277,485 (V)
				3	47,484	0	235	7,792,130 (V)
				4	48,152	0	235	5,819,002 (V)
				Annual	238,495			34,618,774

**PROJECT TOTAL** 58,602,784

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor Size (M2) (kW)		New	Cum.	

TEHACHAPI PASS (Kern)

41 ZOND SYSTEMS, INC. (Cont'd)

O. Project '86 Pool V23	Vestas 23	(H)	415	200	kW @ 35 mph	1	67,688	0	1	53,626 (V)
						2	104,684	0	1	95,413 (V)
						3	57,823	0	1	40,455 (V)
						4	52,426	0	1	23,207 (V)
						Annual	282,621			212,701

<b>PROJECT TOTAL</b>	<b>212,701</b>
----------------------	----------------

P. Project '87 Pool V26	Vestas 17E	(H)	260	90	kW @ 35 mph	1	47,254	0	1	52,329 (V)
						2	75,807	0	1	93,941 (V)
						3	42,430	0	1	66,028 (V)
						4	38,895	0	1	44,305 (V)
						Annual	204,386			256,603

<b>PROJECT TOTAL</b>	<b>256,603</b>
----------------------	----------------

Q. Project Victory Garden Phase IV	Vestas 27/6102	(H)	572	225	kW @ 35 mph	1	109,779	0	31	4,446,105 (V)
						2	216,090	0	31	7,179,130 (V)
						3	113,640	0	31	4,810,781 (V)
						4	120,018	0	31	3,501,311 (V)
						Annual	559,527			19,937,327

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				1	2	3	4	Annual	Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)	
		Model	Axis	Rotor (M2)	Size (kW)							New	Cum.		
<u>TEHACHAPI PASS (Kern)</u>															
41 ZOND SYSTEMS, INC. (Cont'd)															
Q. Project Victory Garden Phase IV (Cont'd)															
		Vestas 27/6103	(H)	572	225	kW @ 35 mph	1	104,090	0	31	3,268,341	(V)			
								2	204,891	0	31	5,410,537	(V)		
								3	107,750	0	31	3,381,357	(V)		
								4	113,798	0	31	2,861,210	(V)		
								Annual	530,529			14,921,445			
		Vestas 27/6104	(H)	572	225	kW @ 35 mph	1	111,612	0	31	3,576,331	(V)			
								2	219,699	0	31	6,513,746	(V)		
								3	115,537	0	31	4,487,500	(V)		
								4	122,022	0	31	3,036,906	(V)		
								Annual	568,870			17,614,483			
		Vestas 27/6107	(H)	572	225	kW @ 35 mph	1	111,057	0	5	657,856	(V)			
								2	218,606	0	5	1,163,063	(V)		
								3	114,963	0	5	799,680	(V)		
								4	121,416	0	5	546,723	(V)		
								Annual	566,042			3,167,322			
<b>PROJECT TOTAL</b>											<b>55,640,577</b>				

**1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA**

Location/Operator	Project	Turbine Specification			Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)
		Model	Axis Rotor Size (M2) (kW)				
<u>TEHACHAPI PASS (Kern)</u>							
41 ZOND SYSTEMS, INC. (Cont'd)							
	R. Project Zond '87 Pool V26	Vestas 15	(H) 184 65 kW @ 35 mph	1	40,243	0 2	61,413 (V)
				2	72,149	0 2	124,529 (V)
				3	48,582	0 2	85,704 (V)
				4	43,412	0 2	44,231 (V)
				Annual	204,386		315,877
		Vestas 17	(H) 227 90 kW @ 35 mph	1	40,847	0 56	2,186,732 (V)
				2	73,231	0 56	4,153,910 (V)
				3	49,311	0 56	2,461,825 (V)
				4	44,063	0 56	1,608,219 (V)
				Annual	207,452		10,410,686
				<b>PROJECT TOTAL</b>			<b>10,726,563</b>
	S. Project Zond '87 (H&S 20) V27	Vestas 17	(H) 227 90 kW @ 35 mph	1	41,703	0 54	2,547,689 (V)
				2	74,767	0 54	4,792,551 (V)
				3	50,345	0 54	3,266,056 (V)
				4	44,987	0 54	1,981,246 (V)
				Annual	211,802		12,587,542
				<b>PROJECT TOTAL</b>			<b>12,587,542</b>

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Projected Qtr. Prod./Turbine (kWh)	Turbines Installed New Cum.	Electricity Produced (kWh)
		Model	Axis	Rotor Size (M2) (kW)			
<u>TEHACHAPI PASS (Kern)</u>							
41 ZOND SYSTEMS, INC. (Cont'd)							
	T. Project Zond '87 Pool V26	Vestas 15	(H)	184 65 kW @ 35 mph	1	40,243	0 3 89,633 (V)
					2	72,149	0 3 176,474 (V)
					3	48,582	0 3 125,227 (V)
					4	43,412	0 3 65,401 (V)
					Annual	204,386	456,735
		Vestas 17	(H)	227 90 kW @ 35 mph	1	40,243	0 47 2,069,356 (V)
					2	72,149	0 47 3,899,023 (V)
					3	48,582	0 47 2,644,178 (V)
					4	43,412	0 47 1,685,752 (V)
					Annual	204,386	10,298,309
		Vestas 17E	(H)	260 90 kW @ 35 mph	1	40,243	0 13 665,347 (V)
					2	72,149	0 13 1,044,550 (V)
					3	48,582	0 13 770,850 (V)
					4	43,312	0 13 549,964 (V)
					Annual	204,286	3,030,711
<b>PROJECT TOTAL</b>							<b>13,785,755</b>

## 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Qtr.	Projected	Turbines		Electricity	
		Model	Axis Rotor	Size		Prod./Turbine	Installed	Produced		
						(kWh)	New	Cum.	(kWh)	
<u>TEHACHAPI PASS (Kern)</u>										
41 ZOND SYSTEMS, INC. (Cont'd)										
	U. Project Zond '87 Pool V26	Vestas 17	(H)	227	90 kW @ 35 mph	1	40,243	0	62	2,358,502 (V)
						2	72,149	0	62	4,574,039 (V)
						3	48,582	0	62	3,014,927 (V)
						4	43,312	0	62	2,071,929 (V)
						-----	Annual	-----	-----	12,019,397
							204,286			
							<b>PROJECT TOTAL</b>			12,019,397
	V. Project Zond '84, Pool V04 1985 Pool V07	Vestas 15	(H)	184	65 kW @ 35 mph	1	42,306	0	45	1,131,783 (V)
						2	65,430	0	45	2,172,238 (V)
						3	36,141	0	45	1,349,547 (V)
						4	32,767	0	45	846,733 (V)
						-----	Annual	-----	-----	5,500,301
							176,644			
							<b>PROJECT TOTAL</b>			5,500,301

# 1993 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification					Projected Qtr. Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)
		Model	Axis	Rotor (M2)	Size (kW)			New	Cum.	
<u>TEHACHAPI PASS (Kern)</u>										
41 ZOND SYSTEMS, INC. (Cont'd)										
	W. Sky River	Vestas 27/6067	(H)	573	225 kW@ 35 mph	1	126,404	0	93	13,828,092 (V)
						2	199,770	0	93	19,655,851 (V)
						3	131,585	0	93	12,548,904 (V)
						4	105,290	0	93	13,106,268 (V)
						Annual	----- 563,049			----- 59,139,115
		Vestas 27/6066	(H)	573	225 kW@ 35 mph	1	136,375	0	88	11,705,889 (V)
						2	215,528	0	88	19,989,908 (V)
						3	141,964	0	88	14,135,632 (V)
						4	113,595	0	88	10,402,433 (V)
						Annual	----- 607,462			----- 56,233,862
		Vestas 27/6065	(H)	573	225 kW@ 35 mph	1	148,526	0	161	22,651,573 (V)
						2	234,731	0	161	38,588,256 (V)
						3	154,613	0	161	28,221,493 (V)
						4	123,716	0	161	18,772,963 (V)
						Annual	----- 661,586			----- 108,234,285
		Vestas 39	(H)	1,195	500 kW@ 35 mph	1	323,577	0	1	327,389 (V)
						2	511,382	0	1	485,983 (V)
						3	336,837	0	1	370,999 (V)
						4	269,527	0	1	284,068 (V)
						Annual	----- 1,441,323			----- 1,468,439
<b>PROJECT TOTAL</b>										<b>225,075,701</b>

## APPENDIX A: OPERATOR COMMENTS

Comment Number	Operator/Project Number	Project	Comment
1.	Arcadian Renewable Power Corporation (2A)	Fayette Windfarms	During third quarter, 77 Fayette 7511S and 83 Fayette 9511S turbines were permanently retired. During fourth quarter, 75 Fayette 95IIS turbines and 2 Fayette 400 turbines were permanently retired.
2.	FDIC/Thompson Engineering (3A)	Wind Farm I	As of April 15, 1993, the FDIC/Thompson Engineering Wind Farm I project was acquired by Los Vaqueros Power Corporation.
3.	FloWind Corporation (4B) (4C) (4D)	FloWind II (Elworthy) Difwind VII Difwind IX	Turbines which were previously part of the FloWind II (Elworthy) project were reassigned during 1992. Two hundred Bonus Mark II turbines are now part of Difwind VII. One hundred Bonus Mark III turbines and 25 Bonus Mark II turbines have been reassigned to Difwind IX. Projected and actual production shown for Difwind VII includes production for Bonus Mark IIs assigned to Difwind IX.
4.	Howden Wind Parks (5A)	Howden Wind Park I	Wind park is in full operation.
5.	Los Vaqueros Power (7A)	Los Vaqueros Wind Park	As of April 15, 1993, the FDIC/Thompson Engineering Wind Farm I project was acquired by Los Vaqueros Power Corporation.
6.	Tera Corporation (9A)	Delta Energy Project I-III	Machine vendor (ESI, Inc.) filed for protection under Chapter 11 in January 1986. Service being provided by Tera Power Corporation since first quarter 1986. Projected quarterly production is based on an average annual site wind speed of 18.6 mph.

Comment Number	Operator/Project Number	Project	Comment
7.	Renewable Energy Ventures (17A)	REV Wind Partners	Turbines now operated by U.S. Windpower (See USWC 23B).
8.	San Gorgonio Farms (19A)	San Gorgonio Farms Wind Park	In fourth quarter, three Floda/Villas 500 kW WTGs were decommissioned and disassembled.
9.	San Gorgonio Wind Associates VI (20A)	SGWA VI Windpark	On April 1, 1993, San Gorgonio Wind Associates VI became the operator of the Triad II Windpark located in the San Gorgonio Pass, Riverside County, California. SGWA VI lowered 60 of the 90 ESI 54S wind turbines which are scheduled for retrofit in 1994. SGWA VI plans to operate the remaining 20-30 ESI 54S turbines which are still standing for the remainder of 1993. In late April 1993, Alaska Applied Sciences, Inc. installed 12 StormMaster 50kW wind turbines on the SGWA VI Windpark.
10.	S. California Sunbelt (22A)	Palm Springs Wind Park	As of second quarter 1993, there were a total of 139 turbines: 83 Windmatic 15s turbines and 56 Windmatic 17s turbines. During third quarter, four 15s turbines were retrofitted to 17s turbines. Therefore, at the end of third quarter there were 79 Windmatic 15s and 60 Windmatic 17s turbines for a total of 139 turbines.
11.	U.S. Windpower (23B)	USWC	Turbines were formerly operated by Renewable Energy Ventures.
12.	Wintec, Ltd. (25B)	Wintec I Windpark	Ninety-five (95) Carter 25kW turbines have been removed for retrofit.

Comment Number	Operator/Project Number	Project	Comment																		
13.	Cannon Energy Corp. (31A)	Cameron Ridge Windpark Phase 3, 4A, 4B	In first quarter, Phase 4B Bouma 200 turbines were reduced to 28. Century CT-9000 turbines were reduced to 32. In fourth quarter, 32 Century CT-9000 turbines were permanently retired.																		
14.	FloWind Corporation (33A)	FloWind Cameron Ridge	<p>Curtailed hours are included in the energy-produced figures as follows:</p> <table border="1"> <thead> <tr> <th></th> <th>17M</th> <th>19M</th> </tr> </thead> <tbody> <tr> <td>1st Qtr.</td> <td>419,947</td> <td>970,800</td> </tr> <tr> <td>2nd Qtr,</td> <td>1,579,297</td> <td>2,697,429</td> </tr> <tr> <td>3rd Qtr.</td> <td>-0-</td> <td>-0-</td> </tr> <tr> <td>4th Qtr.</td> <td>438,556</td> <td>273,147</td> </tr> <tr> <td></td> <td><u>2,437,800</u></td> <td><u>3,941,376</u></td> </tr> </tbody> </table> <p>FloWind 25 and Sumitomo H22 are test turbines which ran intermittently; no projections have been provided.</p>		17M	19M	1st Qtr.	419,947	970,800	2nd Qtr,	1,579,297	2,697,429	3rd Qtr.	-0-	-0-	4th Qtr.	438,556	273,147		<u>2,437,800</u>	<u>3,941,376</u>
	17M	19M																			
1st Qtr.	419,947	970,800																			
2nd Qtr,	1,579,297	2,697,429																			
3rd Qtr.	-0-	-0-																			
4th Qtr.	438,556	273,147																			
	<u>2,437,800</u>	<u>3,941,376</u>																			
15.	FloWind Corporation (33B)	FloWind IV	<p>Curtailed hours are included in the energy-produced figures for 19M turbines as follows:</p> <table border="1"> <thead> <tr> <th></th> <th>19M</th> </tr> </thead> <tbody> <tr> <td>1st Qtr.</td> <td>824,328</td> </tr> <tr> <td>2nd Qtr.</td> <td>2,922,941</td> </tr> <tr> <td>3rd Qtr.</td> <td>-0-</td> </tr> <tr> <td>4th Qtr.</td> <td>548,402</td> </tr> <tr> <td></td> <td><u>4,295,671</u></td> </tr> </tbody> </table>		19M	1st Qtr.	824,328	2nd Qtr.	2,922,941	3rd Qtr.	-0-	4th Qtr.	548,402		<u>4,295,671</u>						
	19M																				
1st Qtr.	824,328																				
2nd Qtr.	2,922,941																				
3rd Qtr.	-0-																				
4th Qtr.	548,402																				
	<u>4,295,671</u>																				

Comment Number	Operator/Project Number	Project	Comment
16.	Oak Creek Energy (35A)	Oak Creek Energy Systems	During third quarter, turbines were acquired by SeaWest Energy Group.
17.	SeaWest Energy (36D)	Oak Creek Energy Systems	Effective August 1, 1993, SeaWest took over operation of the Oak Creek Wind Project in Tehachapi.
18.	Zond Systems, Inc. (41A)	Project '82 Pool PO1, '83 Pool PO2	Polenko and Windmatic turbines have been decommissioned.
	(41C)	Project '82 Pool WO1, '83 Pool WO2	
	(41H)	Project '84 Pool WO3, '84 Pool WO4	
	(41I)	Project '84 Pool WO4	

**APPENDIX B: WIND TURBINE MANUFACTURERS/DISTRIBUTORS**

<b>TURBINE BRAND NAMES</b>	<b>COUNTRY OF ORIGIN</b>	<b>MANUFACTURER/DISTRIBUTOR</b>	<b>PROJECT(S) WHERE TURBINE IS INSTALLED</b>
1. Aeroman	West Germany	American M.A.N. West Coast Office 303 Hegenberger Rd., Suite 402 Oakland, CA 94621	(32A-D)
2. Blue Max	U.S.	Hall Machinery 1401 Airport Drive Bakersfield, CA 93308 "No Longer Active"	(34A)
3. Bonus	Denmark	Bonus Wind Turbines, Inc. Danregn Vindkraft Fabriksvej 4 DK 7330, Brande Denmark  Bonus California 1300 Dove St., Suite 200 Newport Beach, CA 92660	(4C-D) (16A) (19A) (23A) (29A) (39A)
4. Bouma	Holland	Bouma Wind Turbines P.O. Box 79483 Houston, TX 77024	(31A)
5. Carter	U.S.	Carter Wind Systems, Inc. Route 1, Box 405A Burkburnett, TX 76354	(25B) (39A)

TURBINE BRAND NAMES	COUNTRY OF ORIGIN	MANUFACTURER/DISTRIBUTOR	PROJECT(S) WHERE TURBINE IS INSTALLED
6. Cannon	U.S.	Cannon Energy Corporation 10315 Oak Creek Rd. Mojave, CA 93501	(31A)
7. Century (CT)	U.S.	Century Design, Inc. 3635 Afton Road San Diego, CA 92123 "No Longer Active"	(31A)
8. Danwin	Denmark	Danwin A/S Industrivej 12 DK-3000, Helsingor Denmark	(4B) (21D) (36A)
9. Delta	Unknown	Delta Address Unknown "No Longer Active"	(16A)
10. Enertech	U.S.	Enertech Corporation P.O. Box 1085 Norwich, VT 05055 "No Longer Active"	(8A) (21A,C,E) (39B)
11. ESI	U.S.	Energy Sciences, Inc. 7791 Fitch Irvine, CA 92714 "No Longer Active"	(8B) (9A) (17A) (20A) (23B) (39A)
12. Fayette	U.S.	Fayette Energy Corporation "No Longer Active"	(2A-D)

For information, contact:  
 Arcadian Renewable Power Corporation  
 5990 Stoneridge Dr., Suite 119  
 Pleasanton, Ca 94588

TURBINE BRAND NAMES	COUNTRY OF ORIGIN	MANUFACTURER/DISTRIBUTOR	PROJECT(S) WHERE TURBINE IS INSTALLED
13. Floda	Austria	Villas Styria Grossfolz 1-A 8790 Eisenerz Austria  Dr. Eckhart Pehr Villas Construction Gesellschaft m.b.h. PO Box 181 A-9500 Villach Austria	(19A)
14. FloWind	U.S.	FloWind Corporation 900 A Street, Suite 300 San Rafael, CA 94901	(4A-B) (33A-B) (35A) (36D)
15. HMZ	Belgium	HMZ Belgium N.V. Rellestraat 3 Industrie Zone 5 3800 Sint-Truiden Belgium	(11A)
16. Howden	Scotland	James Howden and Company Old Govan Rd. Renfrew Scotland UK PA48JX	(5A)
17. Jacobs	U.S.	Wind Turbine Industries Corporation 16801 Industrial Circle, S.E. Prior Lake, MN 55372  Earth Energy Systems, Inc. PO Box 742 North Palm Springs, CA 92258	(14A) (17A) (18A-B) (23B)

TURBINE BRAND NAMES	COUNTRY OF ORIGIN	MANUFACTURER/DISTRIBUTOR	PROJECT(S) WHERE TURBINE IS INSTALLED
18. Micon	Denmark	Micon Wind Turbines, Inc. 2352 Research Drive Livermore, CA 94556	(8 C-F) (15A-C) (16A) (19A) (21 B-C) (24A) (25B,D) (31A-B) (36A)
		Moerup Manufacturing Co. Micon A/S Milskovvej 8, Helstrup DK-8900 Randers Denmark	
19. MWT	Japan	Mitsubishi c/o SeaWest Industries, Inc. 1455 Frazee Road, Suite 300 San Diego, CA 92108	(36A-C)
20. Nordtank	Denmark	Nordtank Energy Group Nyballevej 8 DK-8444 Balle Denmark	(13A) (24A) (25A,C,D) (30A-B) (31A) (36A)
21. Oak	U.S.	Oak Creek Energy Systems, Inc. P.O. Box 1670 Tehachapi, CA 93581	(35A) (36D)
22. Polenko	Netherlands	Holec Power Systems, Inc. P.O. Box 2227 Livermore, CA 94550	(3A) (7A) (41A)
		Holec Group Polenko/Windmatic PO Box 258-7550AG Hengelo Holland	

TURBINE BRAND NAMES	COUNTRY OF ORIGIN	MANUFACTURER/DISTRIBUTOR	PROJECT(S) WHERE TURBINE IS INSTALLED
23. Storm Master	U.S.	Wind Power Systems 9279 Cabot Drive San Diego, CA 92126 "No Longer Active"	(20A) (39A)
		Alaska Applied Sciences PO Box 020993 Juneau, AK 99802	
24. Sumitomo	Japan	Sumitomo Machinery Corporation 2143 E. "D" Street Ontario, CA 91764	(33A)
25. U.S. Windpower (USW)	U.S.	U.S. Windpower 6952 Preston Ave. Livermore, CA 94550	(10A-E) (23A) (27A)
26. Vestas	Denmark	Vestas Wind Systems A/S P.O. Box 42 Smed Hansens, Vej 27 DK 6940, Lem Denmark	(12A) (13A) (19A) (26A-B) (28A) (39A-B) (41B, D-G, J-W)
27. Wincon	U.S.	Wincon Energy Systems 3942 Valley Ave. Pleasanton, CA 94566	(13A) (24A)
		Wincon Energy Systems Hagenstrupvej 38 8860 Ulstrup Denmark	

TURBINE BRAND NAMES	COUNTRY OF ORIGIN	MANUFACTURER/DISTRIBUTOR	PROJECT(S) WHERE TURBINE IS INSTALLED
28. Windane	Denmark	Danish Wind Technology Marsk Stiysvey 4 DK 8800, Viborg Denmark	(19A)
		Vestas-Danish Wind Tech A/S Smed Hansens Vej 27 DK-6940 Lem Denmark	
29. Wind Energy Group (WEG)	England	Wind Energy Group, Ltd. 345 Ruislip Rd. Southall, Middlesex, UB1 2QX England	(10C)
30. Windmatic	Denmark	Windmatic 17900 Sky Park Circle Suite 106 Irvine, CA 92714	(3A) (7A) (22A) (37A) (41 C,H,I)
		Windmatic Industrivej nord 15 Bir. 7400 herring Denmark	
		Holec Group Polenko/Windmatic PO Box 258-7550 AG Hengelo Holland	
31. Windtech	U.S.	Windtech Inc. P.O. Box 837 Glastonbury, CT 06033	(29A)

## APPENDIX C: SOURCES OF WIND ENERGY TECHNICAL ASSISTANCE

---

### *California Energy Commission:*

Juanita Loyola  
WPRS Program Manager  
California Energy Commission  
Energy Technology Assessments  
1516 9th St. MS-43  
Sacramento, CA 95814  
(916) 654-5164

Dick Anderson  
Technical Coordinator, Avian Mortality  
California Energy Commission  
Energy Facilities Siting & Environ. Protection  
1516 9th St. MS-40  
Sacramento, CA 95814  
(916) 654-4166

Tim Olson  
International Program Manager  
California Energy Commission  
Energy Technology Export Program  
1516 9th St. MS-45  
Sacramento, CA 95814  
(916) 654-4528

---

### *Electric Power Research Institute:*

Earl Davis  
Manager, Wind Power Integration  
Electric Power Research Institute (EPRI)  
3412 Hillview Avenue  
P.O. Box 10412  
Palo Alto, CA 94303  
(415) 855-2256

### *American Wind Energy Association:*

American Wind Energy Association (AWEA)  
122 C Street NW 4th Fl.  
Washington, DC 20001  
Main: (202) 383-2500  
Publications: (202) 383-2520

---

**APPENDIX D: WPRS REGULATIONS**

---

**REGULATIONS  
CALIFORNIA ADMINISTRATIVE CODE  
TITLE 20, CHAPTER 2, SUBCHAPTER 3, ARTICLE 4**

**WIND PROJECT PERFORMANCE REPORTING SYSTEM**

**Adopted  
November 28, 1984**

### 1381 Title and Purpose

The purpose of this article is to specify performance reporting requirements for operators of specified wind energy projects and for entities which purchase electricity from the projects and to identify requirements for the Commission to publish the information.

*Authority cited: Sections 25213 and 25218 (e), Public Resources Code Reference: Sections 25216.5 (d), 25601 (c), and 25605, Public Resources Code.*

### 1382 Definitions

For the purposes of this article, the following definitions shall apply unless the Commission has clearly indicated otherwise in these regulations:

- (a) "Contingency Costs": the costs which may be paid by investors after the initial investment, but which are not paid out of project revenues. Contingency costs may include such costs as turbine repairs or annual insurance fees paid during the reporting year.
- (b) "Cumulative Number of Turbines Installed": the cumulative total number of turbines of a given model installed by the end of the reporting period.
- (c) "Electricity Produced (kWh)": the total kilowatt hours actually produced by all of the turbines of a particular turbine model contained within the wind project where the electricity is delivered to a wind power purchaser for sale during the reporting period.
- (d) "Name of Wind Project": the name used for the project in any prospectus, offering memorandum, or sales literature.
- (e) "Number of Turbines Installed During Reporting Period": the number of additional turbines installed during the calendar quarter of the reporting period.
- (f) "Project Cost": the total cost of the turbines installed during the reporting period. Project cost includes all debt and equity investment in the project (including nonrecourse notes) and should be comparable to the project cost shown in the offering memorandum, prospectus or sales literature published by the developer.
- (g) "Projected Annual Production Per Turbine (kWh)": the annual average kWh production, by model, predicted by the developer in its prospectus, offering memorandum, or sales literature. This figure may be revised annually prior to the first reporting quarter of each year and shall be based upon average site specific wind distributions and the wind turbine power curves.
- (h) "Projected Quarterly Production Per Turbines (kWh)": the quarterly breakdown of the Projected Annual Production Per Turbine.

- (i) "Rotor (M<sup>2</sup>)": The rotor swept area in square meters for each turbine model.
- (j) "Size (kW)": the turbine manufacturer's published kW rating at a specific miles per hour (mph) with wind speed shown in parentheses.
- (k) "Turbine Model": the common or manufacturer's name for the turbine if that is a commonly used term for the model of a specific rotor (M<sup>2</sup>) and size (kW).
- (l) "Wind Power Purchaser": any electricity utility or other entity which purchases electricity from a wind project, as defined in this section.
- (m) "Wind Project": one or more wind turbine generators installed in California with a combined rated capacity of 100 kW or more, the electricity from which is sold to another party.
- (n) "Wind Project Operator": any developer or operator who directly receives payments for electricity from the wind power purchaser.

*Authority cited: Sections 25213 and 25218 (e), Public Resources Code Reference: Sections 25216.5 (d), 25601 (c), and 25605, Public Resources Code.*

### **1383 Reporting Period**

For the purpose of this article, and unless otherwise indicated, the reporting period shall be each calendar quarter, beginning with the first quarter following the effective date of this article. Quarterly reports filed pursuant to this article shall be submitted not later than the forty-fifth day following the close of each reporting period. Reports shall be deemed submitted as of the date of postmark, provided that the report is properly and legibly completed.

*Authority cited: Sections 25213 and 25218 (e), Public Resources Code Reference: Sections 25216.5 (d), 25601 (c), and 25605, Public Resources Code.*

### **1384 Requirements to File**

The information required by this article shall be submitted to the Commission by wind project operators and wind power purchasers. Reports shall be made on forms prescribed by order of the Commission and according to instructions accompanying the forms. A copy of the wind project prospectus, offering memorandum, and other sales literature shall accompany the initial report. All reports must be verified by a responsible official of the firm filing the report. Requests for confidentiality may be filed pursuant to 20 Cal. Admin. Code section 2501 et. seq.

*Authority cited: Sections 25213 and 25218 (e), Public Resources Code Reference: Sections 25216.5 (d), 25601 (c), and 25605, Public Resources Code.*

### **1385 Information Requirements: Wind Project Operators**

Each operator firm submitting information pursuant to the provisions of the article shall include the following:

- (1) Name of wind project
- (2) Name and address of operator
- (3) Name and phone number of contact person at operator's firm
- (4) Operator's name as shown on power purchase contract (if different than 2 above)
- (5) Name of wind power purchaser
- (6) Purchase contract number
- (7) Resource area and county
- (8) Dates of reporting period
- (9) Turbine model
- (10) Cumulative number of turbines installed
- (11) Number of turbines installed during reporting period
- (12) Rotor ( $M^2$ )
- (13) Size (kW) at stated wind speed
- (14) Project cost
- (15) Additional project contingency costs for which investors may be responsible
- (16) Projected quarterly production per turbine (kWh)
- (17) Projected annual production per turbine (kWh)
- (18) Electricity produced (kWh)
- (19) Turbine manufacturer's name and address
- (20) Operator comments, if any

*Authority cited: Sections 25213 and 25218 (e), Public Resources Code Reference: Sections 25216.5 (d), 25601 (c), and 25605, Public Resources Code.*

### **1386 Information Requirement: Wind Power Purchase**

Each wind power purchaser submitting information pursuant to the provisions of this article shall include the following:

- (1) Name of purchaser's firm
- (2) Name and phone number of contact person at purchaser's firm
- (3) Date of report
- (4) Name of wind project operator
- (5) Number of contract with wind project operator
- (6) kWh's produced during reporting period
- (7) Dates of reporting period
- (8) The maximum MW's which the operator can deliver to the purchaser as specified in the power sales agreement
- (9) Purchaser comments, if any

*Authority cited: Sections 25213 and 25218 (e), Public Resources Code Reference: Sections 25216.5 (d), 25601 (c), and 25605, Public Resources Code.*

### **1387 Publication of Data**

The Commission staff shall compile and distribute, on a quarterly basis, the information reported by wind project operators and purchasers. Cost data will be published by the Commission in an aggregated form to the extent necessary to assure confidentiality. The final publication of each year shall combine the performance data for that year. The publication shall designate the name of any wind project operator from whom performance data is not

received.

*Authority cited: Sections 25213 and 25218 (e), Public Resources Code Reference: Sections 25216.5 (d), 25601 (c), and 25605, Public Resources Code.*

### **1388 Failure to Provide Information**

The Commission may, after notifying any person of the failure to provide information pursuant to this article, take such action to secure the information as is authorized by any provision of law, including, but not limited to, Public Resources Code section 25900.

*Authority cited: Sections 25213 and 25218 (e), Public Resources Code Reference: Sections 25216.5 (d), 25601 (c), and 25605 (e), and 25900, Public Resources Code.*

### **1389 Exemptions**

Operators of wind projects of less than 100 kW rated capacity or operators who do not offer electricity for sale are exempt from this article.

*Authority cited: Sections 25213 and 25218 (e), Public Resources Code Reference: Sections 25216.5 (d), 25601 (c), and 25605, Public Resources Code.*