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## ACKNOWLEDGEMENTS

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## 1. INTRODUCTION

After a decade of research and development, the California wind industry continues to grow in installed capacity and improve in performance measures. Wind energy provides more than one percent of the state's total electricity demand and up to eight percent of the instantaneously generated electricity in the state's largest utility region (PG&E) during the summer peak demand season. By the end of 1991, the California wind industry reached a generating capacity of more than 1,670 megawatts and produced more than 2.7 billion kilowatt-hours (kWh) of electricity. California continues to be a leader in utilization of wind technology with almost 70 percent of the world's generating capacity. During 1991, wind energy projects provided enough output to meet the annual electricity needs of more than 450,000 typical California homes.

When the industry began exponential growth in 1981, the California Energy 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 the adoption of Wind Performance Reporting System (WPRS) regulations in 1984. These regulations require all California wind operators with projects rated greater than 100 kW who sell electricity to a power purchaser to report quarterly performance and related project data to the Energy Commission.

The Commission has documented and evaluated data submitted by operators and utilities in WPRS quarterly and annual reports for the past seven years, tracking the installation of approximately two-thirds of all wind capacity installed in California since 1985. The Commission has compiled extensive empirical data that can be used to describe, analyze and evaluate this important renewable energy option.

Since 1985, the cost of wind energy has declined and capacity factor performance of new turbines has increased. The cost of wind energy appears to have leveled off at approximately \$1,000 per kilowatt while capacity factor performance of turbines installed since 1985 has more than doubled to 25 percent. The large worldwide audience for WPRS reports indicates that such impressive results are not going unnoticed.

The WPRS 1991 Annual Report contains a detailed compilation of data provided by project operators and public utilities. Energy Commission staff have used this data to summarize wind project performance results and industry production and capacity trends. The Annual Report also contains summary tables reflecting data organized by statewide totals, resource areas, turbine sizes, turbine types, turbine manufacturers, project operators, and origin of turbine manufacturers.

Many valuable observations about California's wind industry can be drawn from WPRS data; however, it is important to recognize four major limitations. 1) While the Commission has collected and reported WPRS wind data in quarterly and annual reports for

seven years, a complete industry evaluation requires consideration of collective data from *all* seven years. This is especially true for the wind industry because the available wind resource varies from year to year depending on weather conditions. 2) Because the wind industry does not yet employ a standardized turbine rating system, much of the data reported is not directly comparable. Turbines are tested under different conditions and rated at widely varying miles per hour specifications. Evidence of the problem is indicated by the lack of correlation between blade-swept area and turbine kW specifications. For example, one manufacturer's 400 kW turbine has only a slightly larger blade-swept area than another manufacturer's 95 kW turbine. 3) In some cases, operator or manufacturer performance may not be accurately represented in the report because 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 such as cost per kW, expected operation and maintenance costs, durability of the system and quality of the site's wind resource. Therefore, wind industry findings presented in the 1991 Annual Report should be viewed in conjunction with other variables impacting wind development.

## 2. WPRS BACKGROUND

### **What is the Wind Performance Reporting System (WPRS)?**

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. Relative to wind energy, the Commission adopted WPRS regulations on November 28, 1984. Starting in January 1985, these 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. 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 also were intended to provide performance data useful for government tracking of energy supplies, allowing for 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. With new sources of financing, WPRS data is also needed to establish performance credibility.

### **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: 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 data from all four quarters.

### **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 results from turbines that do not produce electricity for sale, including turbines installed by utilities, government organizations and research facilities.

WPRS reports do not always contain data that differentiates between old and new turbine performance. 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 reporting precluded adequate confidentiality of cost data. Therefore, aggregate cost data has not been included in the 1991 Annual Report.

### 3. WPRS IMPLEMENTATION ISSUES

WPRS implementation issues encountered and resolved are discussed below.

**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 1991, 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, the value "0" 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 1991 wind performance data was received from operators with projects located in the following five resource areas:

**Shown:**

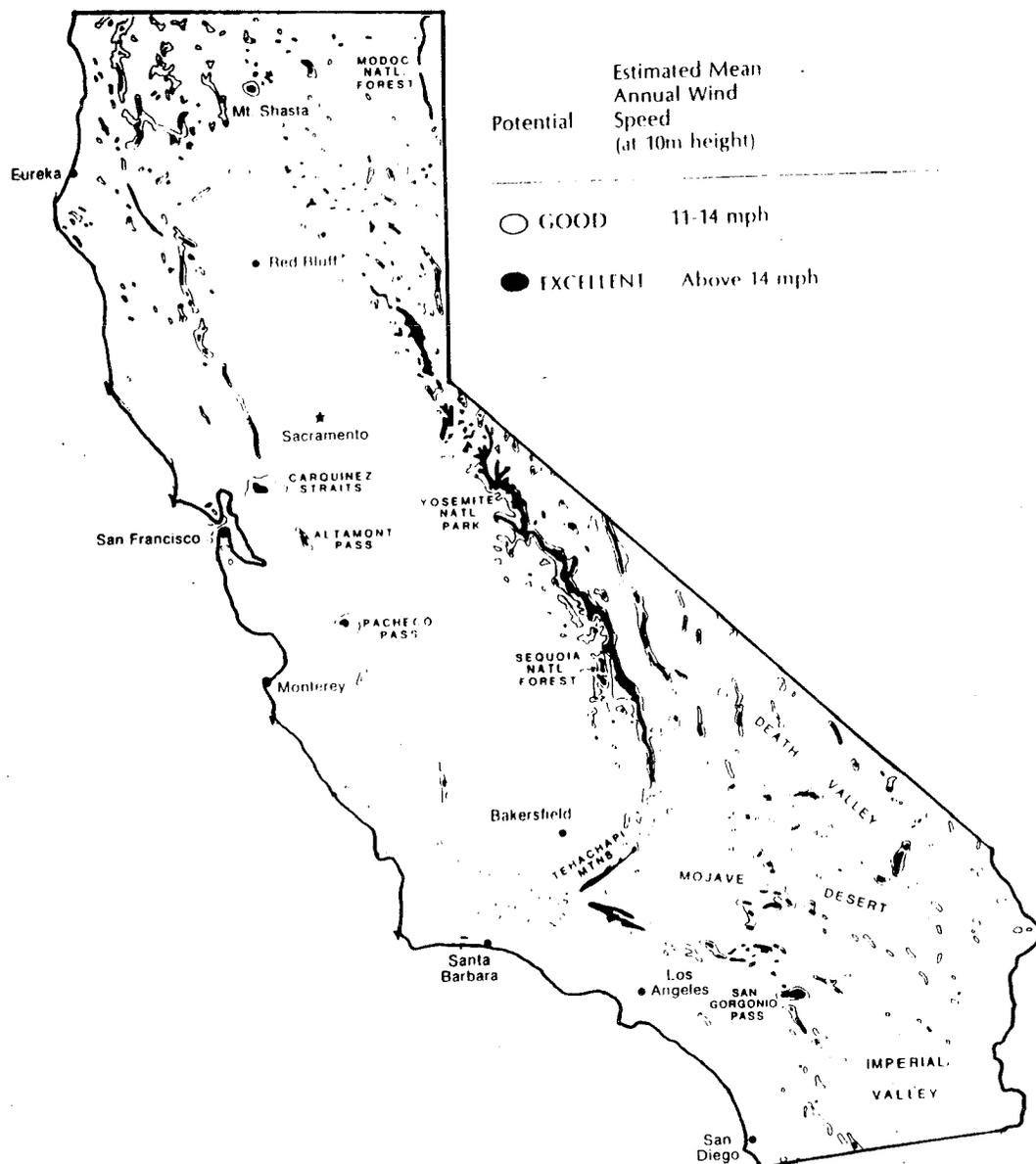
- Altamont Pass
- Pacheco Pass
- San Geronio Pass
- Tehachapi Pass

**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 CEC, May 1978.



## 5. STAFF SUMMARY

### 5.A INDUSTRY PERFORMANCE

**Total Capacity.** A cumulative capacity of 1,679 megawatts was reported operational during the fourth quarter of 1991. Total capacity for 1991 represents substantial growth since the beginning of 1985 when there was slightly more than 500 MW. Although there continues to be some attrition for older turbine stock, installed capacity increased 15 percent since 1990. More than 1,000 turbines were installed during 1991, slightly exceeding turbine installations for the previous year.

**Electricity Output.** In 1991, the California wind industry produced more than 2.7 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 65 percent of the total output projected for 1991. However, this figure compares favorably to the 45 percent of total projected output attained in 1985 and includes older turbines with overstated projections that continue to lower the total average percent of output. Both industry observers and participants agree that many wind developers overstated output capabilities during the tax credit era and provided projections that were not achievable.

When turbines installed since 1985 are isolated, the percent of projected output for 1991 rises to 74 percent.

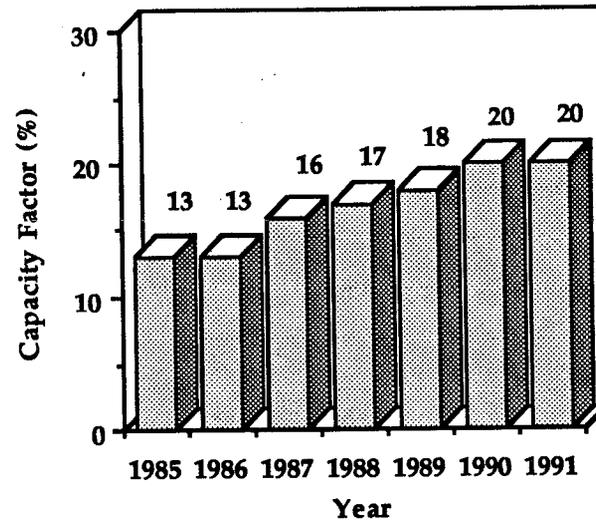
**Capacity Factor.** Capacity factor is defined as the ratio of actual energy output to the amount of energy a project would produce if it operated at full rated power for 24 hours per day within a given time period. As indicated earlier, there should be standardized testing of all wind turbines for 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 were recently developed by the American Wind Energy Association (AWEA).

Despite testing limitations, the capacity factor is still considered to be 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. In addition, new equipment typically needs a "debugging" period before operating at fully rated power.

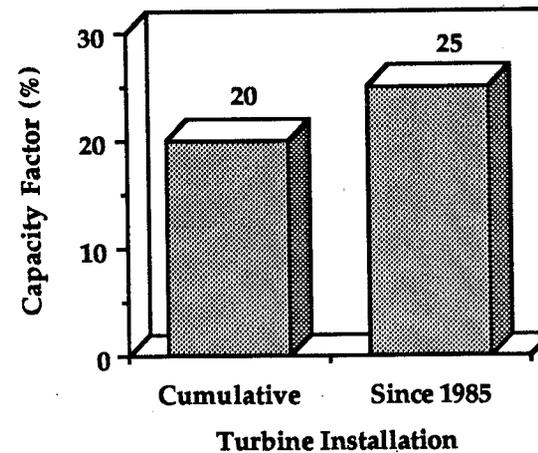
The resulting statewide capacity factor for 1991 is 20 percent, the same as for 1990. Thus, statewide capacity factor appears to have levelled off at the

bottom of the 20 to 30 percent capacity factor range typically cited for wind turbines in most technical reports. The statewide capacity factor for 1991 also represents nearly a 54 percent increase from the 13 percent capacity factors for 1985 and 1986; a 25 percent increase from the 16 percent capacity factor for 1987; an 18 percent increase from the 17 percent capacity factor for 1988; and a 12 percent increase from the 18 percent capacity factor for 1989 (*Figure 1*). The upper limit capacity factor continues to exceed 30 percent. In particular, one project has consistently reached this upper limit, including an annual capacity factor of 34 percent in 1991.

It should be noted that the 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 25 percent, 25 percent higher than the industry as a whole (*Figure 2*).



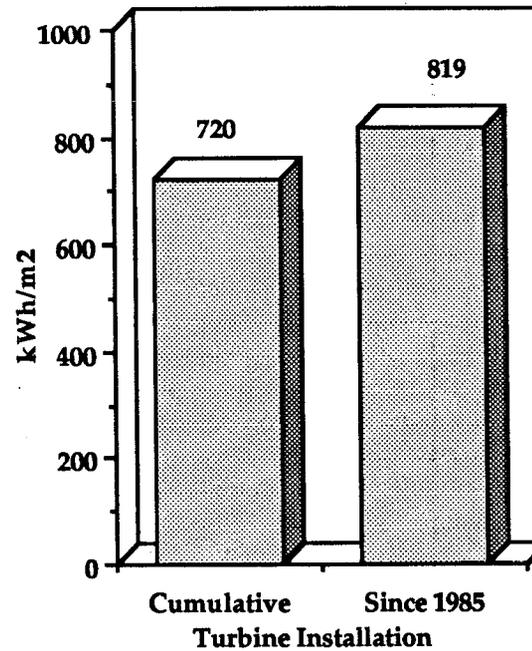
**FIGURE 1: Statewide Capacity Factors 1985-1991**



**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.

Average kWh per square meter annual production for 1991 was 720, one percent higher than the 1990 level of 713. When turbines installed since 1985 are isolated, the resulting kWh per square meter annual production figure increases almost 14 percent to 819 (Figure 3).



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

## 5.B PRODUCTION AND CAPACITY TRENDS

### Statewide

The growth rate of wind development declined substantially when federal and state tax credits expired at the end of 1985 and 1986 respectively. A small surge in growth occurred in 1991 as a few remaining developers apparently rushed in to use long-term contracts before they expired. These contracts were negotiated with utilities in 1985, but their provisions allowed five years for implementation. While project operators reported more than 192 MW of new capacity in 1991, future qualifying facility development is expected to drop to minimal levels with a less attractive, short-term contract the only option currently available.

The more than 192 MW of new capacity installed in 1991 compares to 161 MW of new capacity in 1990 and 64 MW of new capacity in 1989. The net result is that total cumulative capacity increased from 1,454 MW in 1990 to 1,679 MW in 1991 (*Figure 4*).

Wind output during 1991 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 73 percent of all annual output was produced in the second and third quarters of 1991 (*Figure 5*). This is a good seasonal match to California's peak demand for electricity during summer months.

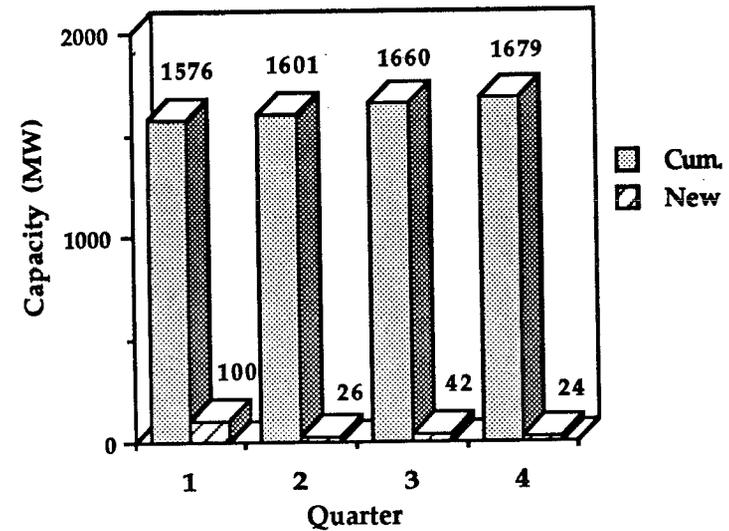


FIGURE 4: Statewide Wind Capacity

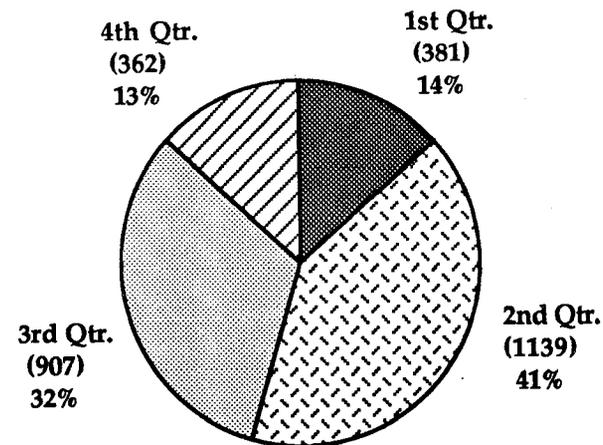
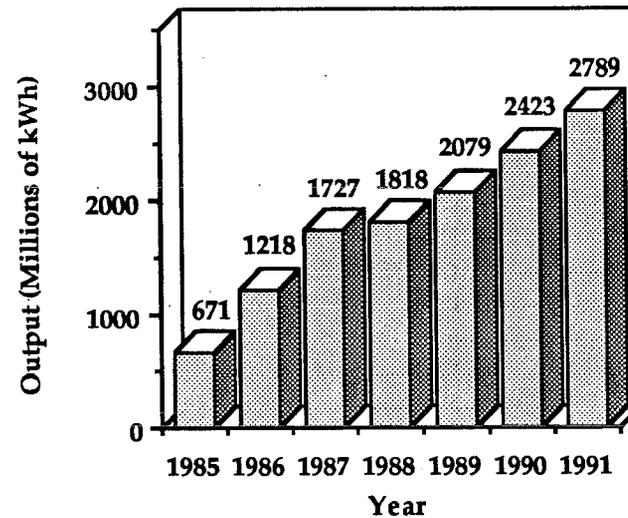


FIGURE 5: Statewide Wind Output (Millions of kWh)

The amount of electricity produced by California wind farm operators is steadily increasing. Total output in 1991 was 15 percent higher than in 1990 and more than 300 percent higher than in 1985 (*Figure 6*). Quarterly capacity factors were consistent with the California wind resource profile previously discussed. The statewide capacity factors were 12, 33, 26 and 10 percent respectively for the first, second, third and fourth quarters.

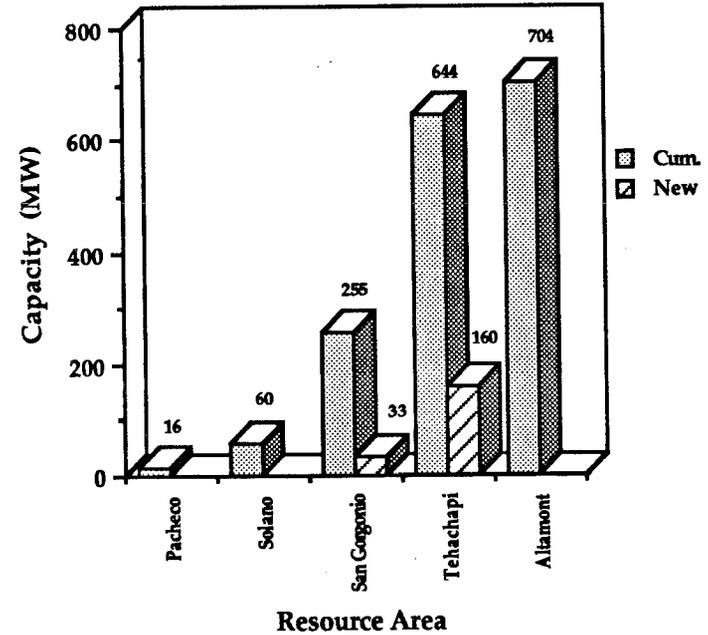


**FIGURE 6: Statewide Wind Output 1985-1991**

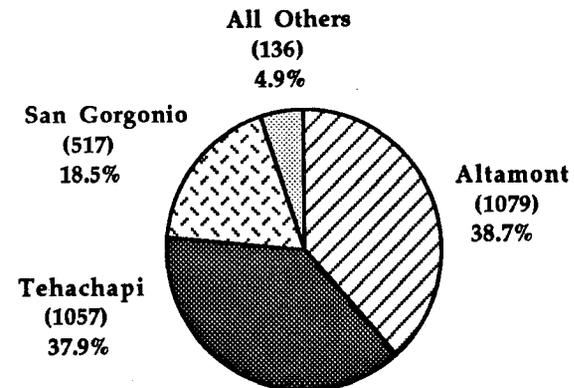
## Resource Areas

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 Gorgonio and Tehachapi. All three of these areas are narrow mountain passes leading into hot and dry valley or desert regions. In these three resource areas, 42 percent of all capacity is found in Altamont, 15 percent in San Gorgonio and 38 percent in Tehachapi resource areas (Figure 7). During 1991, wind project operators in the Altamont resource area produced 38.7 percent of all statewide output, closely followed by Tehachapi at 37.9 percent. San Gorgonio produced 18.5 percent of total output (Figure 8).

Growth as a percentage of existing capacity was highest in Tehachapi (25 percent), followed by San Gorgonio (13 percent). Quantitatively, 83 percent of all new capacity was developed in the Tehachapi Pass. When kWh output and percent of total statewide output for the three primary resource areas shown in Figure 8 are compared to their share of capacity from Figure 7, San Gorgonio (18.5 percent output at 15 percent capacity) produced more than its share, Altamont (38.7 percent output at 42 percent capacity) produced less than its share, and Tehachapi (37.9 percent output at 38 percent capacity) produced almost exactly its share.



**FIGURE 7: Resource Area Capacity**

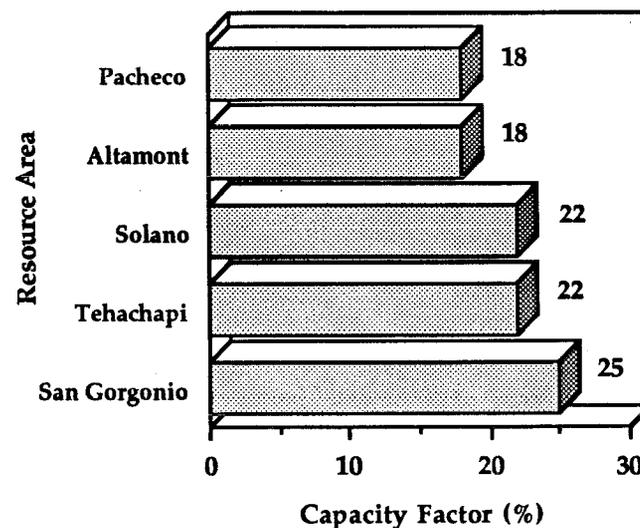


**FIGURE 8: Resource Area Output (Millions of KWh)**

Of the three largest resource areas, San Gorgonio had the highest capacity factor (25 percent), followed by Tehachapi (22 percent) and Altamont (18 percent). Solano and Pacheco, two smaller resource areas, had capacity factors of 22 percent and 18 percent respectively (Figure 9).

Many factors should be considered when comparing resource area performance. For example, age of equipment is a significant factor affecting the performance difference between San Gorgonio and Altamont. Because San Gorgonio wind developers met substantial delays getting local government approval for their projects during early wind development years, their equipment is newer. By contrast, the Altamont resource area includes two large developers with more than 280 MW of very old capacity and only a nine percent average capacity factor, significantly lowering Altamont's overall performance .

Another important factor is the relative value of each resource area's wind output. For example, Pacheco and Solano resource areas have lower capacity factors than San Gorgonio, but their production is much better matched to utility summer peak demand. For more information about time-of-use output distribution, see Section 5C.



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

### Turbine Size

More than 82 percent of all new turbine capacity for 1991 was found in the 200+ kW size category. This is consistent with the prediction by many industry specialists that turbines in the 300 kW size range would be the trend for future wind development. However, based on the large inventory of smaller and older turbines, the 51 to 100 kW turbine size remains the dominant category overall, accounting for more than 55 percent of cumulative wind capacity (Figure 10). Capacity percentages and factors for individual turbine categories follow:

Size (kW)	Capacity	New Capacity	Capacity Factor
1-50	3%	0%	16%
51-100	55%	6%	19%
101-150	14%	12%	22%
151-200	4%	0%	22%
200+	24%	82%	23%

In addition to the trend in increased capacity, the 200+ kW turbine size category has also achieved an impressive 28 percent improvement in performance since 1990, with an increase in capacity factor from 18 percent in 1990 to 23 percent in 1991 (Figure 11).

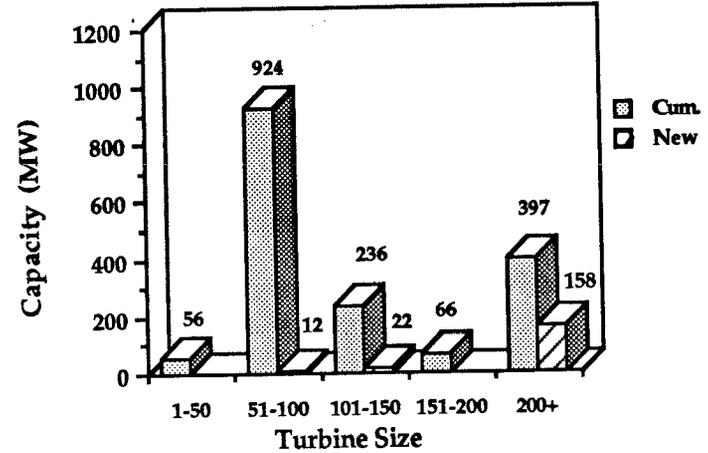


FIGURE 10: Capacity by Turbine Size

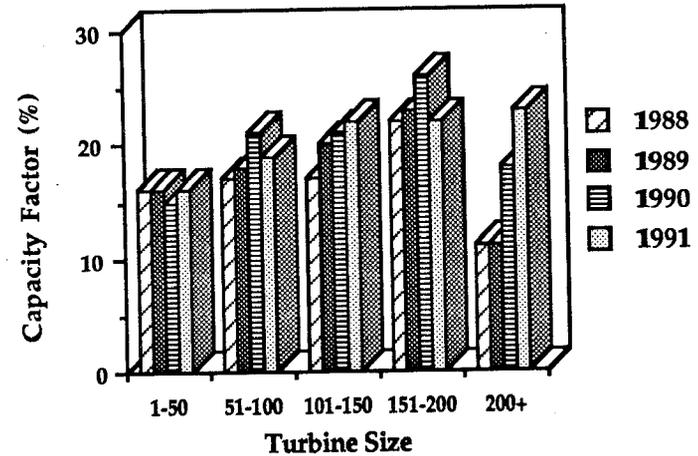


FIGURE 11: Capacity Factor by Turbine Size 1988 - 1991

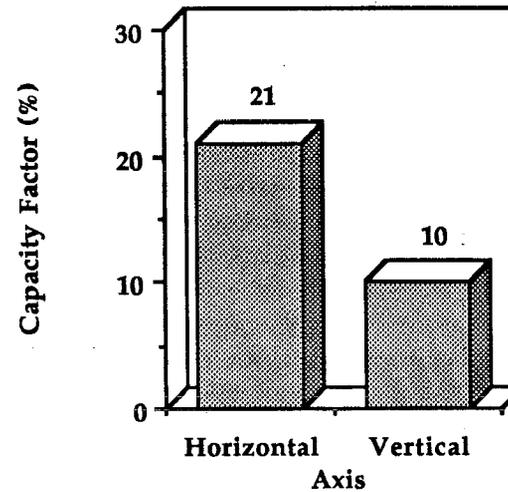
## Turbine Types

WPRS performance results also have been categorized by horizontal or vertical axis machines. Turbine axis data indicates that 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.

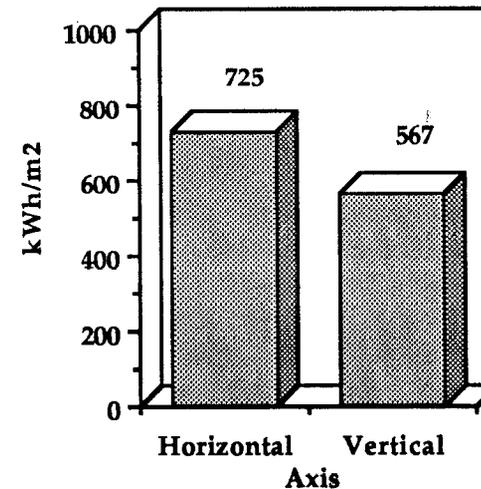
Comparison of performance indicates that the 21 percent capacity factor for horizontal axis turbines more than doubles the 10 percent capacity factor for vertical axis turbines (*Figure 12*).

Performance by kWh per square meter was more than 27 percent higher for horizontal axis turbines (725) than for vertical axis turbines (567) (*Figure 13*). The 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.

It should be noted 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.



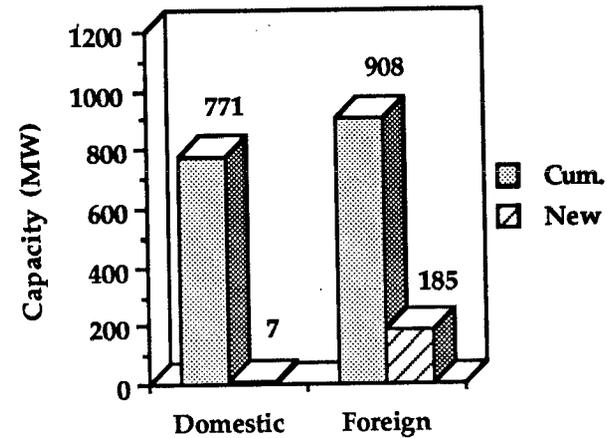
**FIGURE 12: Capacity Factors by Turbine Axis**



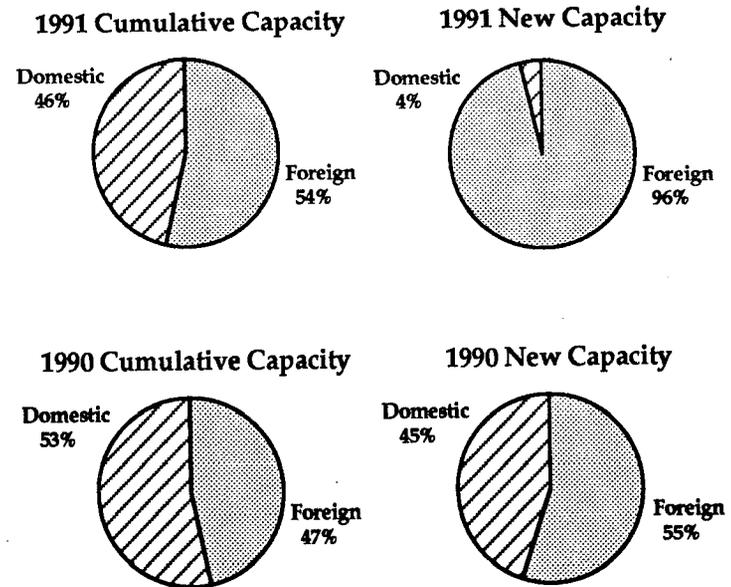
**FIGURE 13: kWh Per Square Meter Production by Turbine Axis**

## Domestic and Foreign Turbines

There is widespread interest in comparisons between domestic and foreign turbine capacities. By the end of 1991, foreign turbine capacity was 908 MW, compared to 771 MW of domestic turbine capacity. New capacity was highest for foreign turbines (185 MW), far exceeding new domestic capacity of 7 MW (Figure 14). This appears to reflect substantial consolidation of the U.S. wind industry compared to Europe and Japan. The change in capacity distribution by origin for domestic and foreign turbines between 1990 and 1991 is shown in Figure 15.



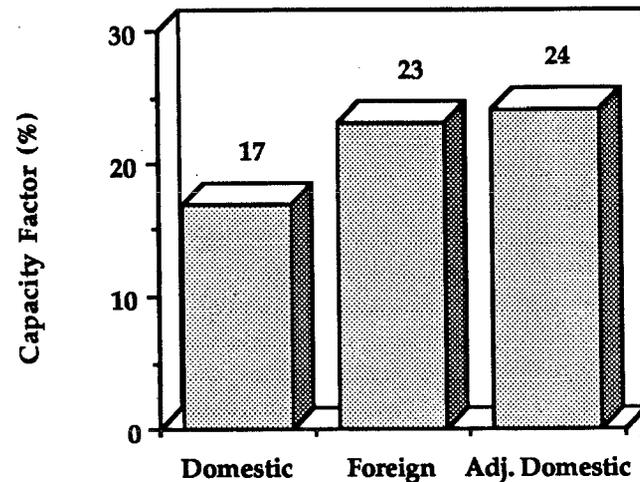
**FIGURE 14: Capacity by Turbine Origin**



**FIGURE 15: Capacity Distribution by Origin**

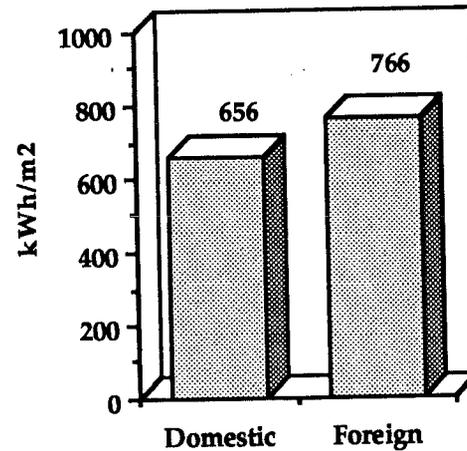
Capacity factor results indicate that overall performance of foreign turbines exceeds that of domestic turbines. The 23 percent capacity factor for foreign turbines is more than 35 percent higher than the 17 percent capacity factor for domestic turbines. Although both domestic and foreign turbine bases benefit from the inclusion of newer, more efficient machines, the domestic turbine base is more adversely influenced by older, less efficient turbines. For example, when turbines installed since 1985 are isolated, the performance gap decreases as the adjusted capacity factor for domestic turbines increases from 17 to 22 percent and the foreign turbine capacity factor increases from 23 to 25 percent. The adjustment for foreign turbines appears so much smaller because two-thirds of total foreign capacity has been installed since 1985.

The impact of other variables on domestic turbine performance is demonstrated by two large projects in the Altamont Pass resource area that account for more than 280 MW of turbine capacity with an average capacity factor of less than nine percent. Domestic turbines account for more than 230 MW of the 280 MW capacity with only a 6.5 percent capacity factor. When these two large projects are eliminated from the domestic turbine data base, adjusted domestic turbine performance (24 percent) slightly exceeds that of foreign turbines without any adjustment (*Figure 16*).



**FIGURE 16: Capacity Factor by Origin**

An analysis of kWh per square meter performance data indicates that domestic turbine performance is almost 17 percent lower than foreign turbines without any adjustments (Figure 17). When newer turbines installed since 1985 are isolated, domestic turbine kWh per square meter production is 782, about 6 percent lower than the 829 kWh per square meter adjusted performance of foreign turbines. For domestic turbines, the kWh per square meter performance measure is comparatively better than the capacity factor performance measure because particularly overstated capacity ratings for older domestic turbine stock directly reduces capacity factor performance.

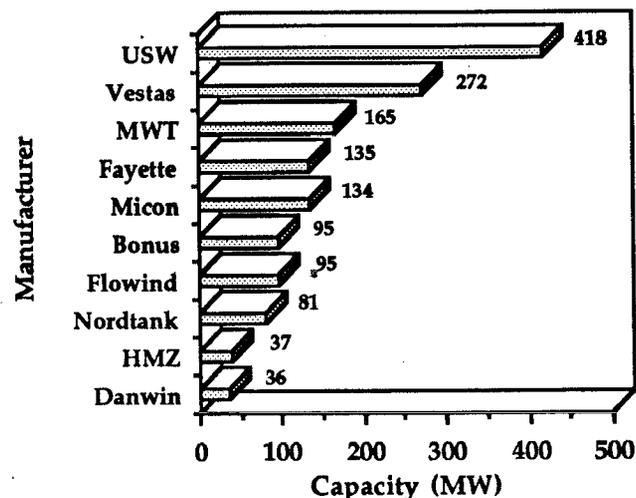


**FIGURE 17: kWh Per Square Meter Production**

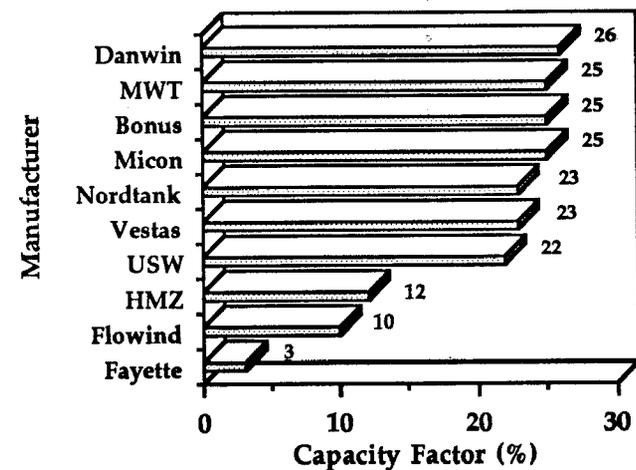
### The Ten Largest Wind Turbine Manufacturers

The 10 largest wind turbine manufacturers represent more than 87 percent of California's wind generating capacity. The five largest manufacturers alone (U. S. Windpower, Vestas, MWT, Fayette and Micon) account for 67 percent of all capacity. The 10 largest manufacturers and their individual generating capacities are shown in *Figure 18*. A wide range of capacity factors exist among these manufacturers (*Figure 19*). Manufacturers with the highest capacity factors are Danwin (26 percent), MWT, Bonus and Micon (25 percent), Nordtank and Vestas (23 percent) and U.S. Windpower (22 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.

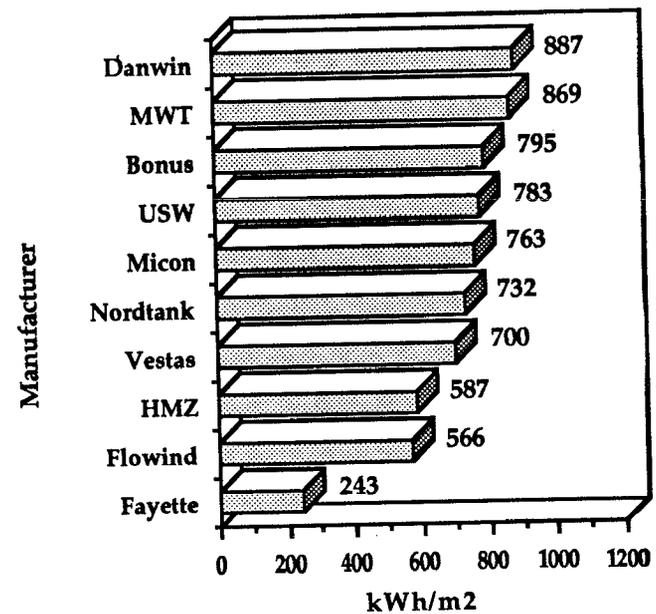


**FIGURE 18: Cumulative Capacity for 10 Largest Turbine Manufacturers**



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

Annual kWh per square meter results are shown for the ten largest manufacturers in *Figure 20*. Manufacturers with the highest kWh per square meter production are Danwin (887), MWT (869), Bonus (795), U.S. Windpower (783), Micon (763), Nordtank (732), and Vestas (700).

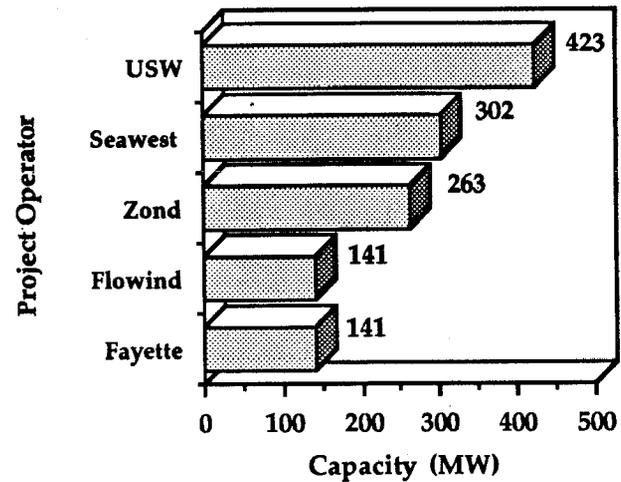


**FIGURE 20: kWh Per Square Meter Production for 10 Largest Manufacturers**

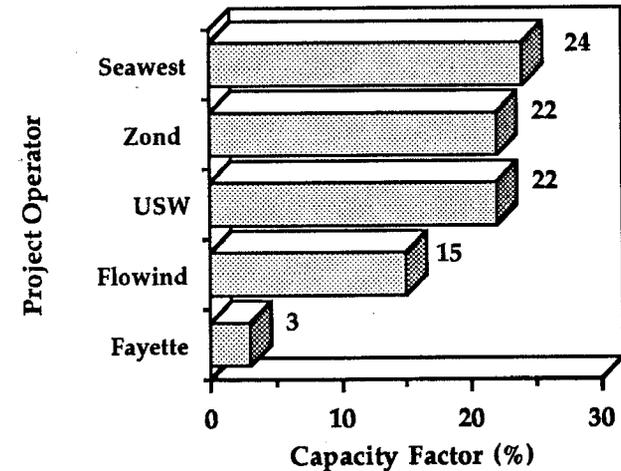
### The Five Largest Wind Project Operators

This 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 (U.S. Windpower, Seawest, Zond, Fayette and Flowind) represent more than 75 percent of total California wind generating capacity (*Figure 21*).

Capacity factors for the largest wind project operators are quite varied (*Figure 22*). Operators with the highest capacity factors are Seawest (24 percent), followed by Zond and U.S. Windpower (22 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 34 percent capacity factor for 1991. This project is significant because it consistently demonstrates the impressive potential for wind technology performance when developers combine quality machines with a good wind resource site.

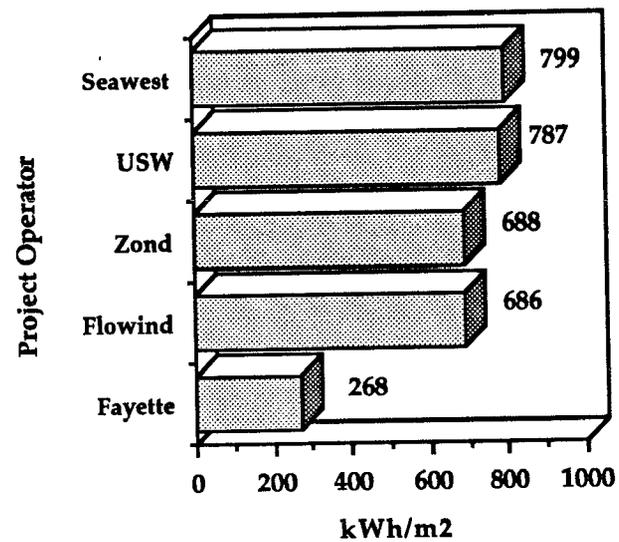


**FIGURE 21: Cumulative Capacity for 5 Largest Operators**



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

Annual kWh per square meter results for the five largest operators are shown in *Figure 23*. Among these operators, Seawest (799) and U.S. Windpower (787) had the best performance. Of all California wind project operators, San Geronio Farms (not shown on *Figure 23*) had the best performance at 1,195 kWh per square meter.



**FIGURE 23: kWh Per Square Meter Production for 5 Largest Operators**

## 5C. TIME OF USE PRODUCTION

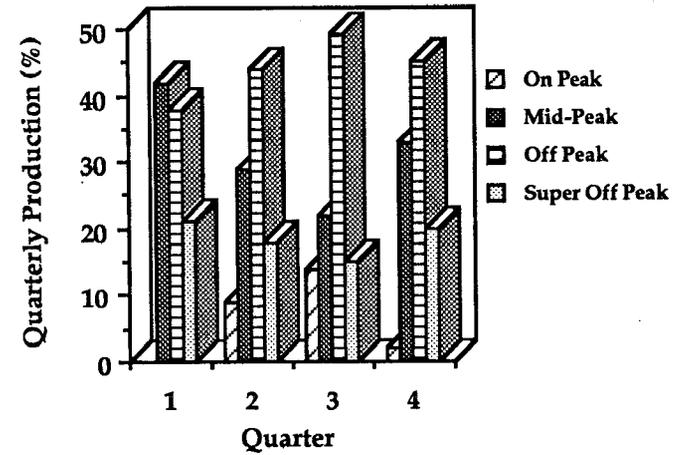
### Statewide

The distribution of wind-generated electricity during utility time-of-use demand periods is illustrated in *Figure 24*. This profile is based on tabulated utility billing data submitted by a majority of California wind operators to verify reported wind production figures.

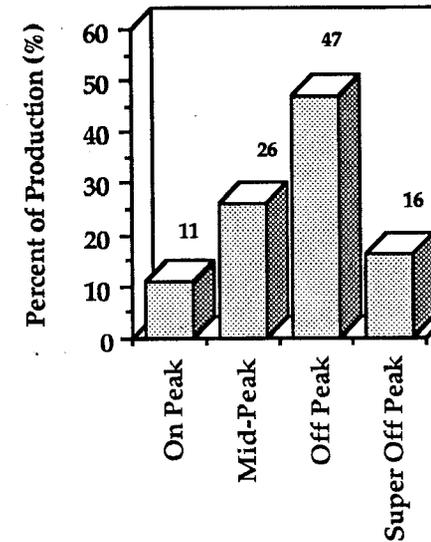
On an annual basis, wind production has an excellent match to the utility peak demand for electricity that occurs during the months of May through September. Almost 75 percent of total annual output was generated during second and third quarters (*See Figure 5*).

However, utility billing data indicates on a diurnal basis annual production is poorly matched to time-of-use needs. Only about eight percent of all electricity generated during 1991 was produced "on peak." "Mid-peak" annual production was about 29 percent, "off peak" 45 percent, and "super off peak" 18 percent.

Further, of total electricity generated during the utility peak demand period (second and third quarters), about 11 percent of output was produced "on peak," about 26 percent "mid-peak," 47 percent "off peak," and 16 percent "super off peak" (*Figure 25*). It should be noted that the match to "on peak" demand of 11 percent that occurred in 1991 is an improvement over the eight percent match in 1989.

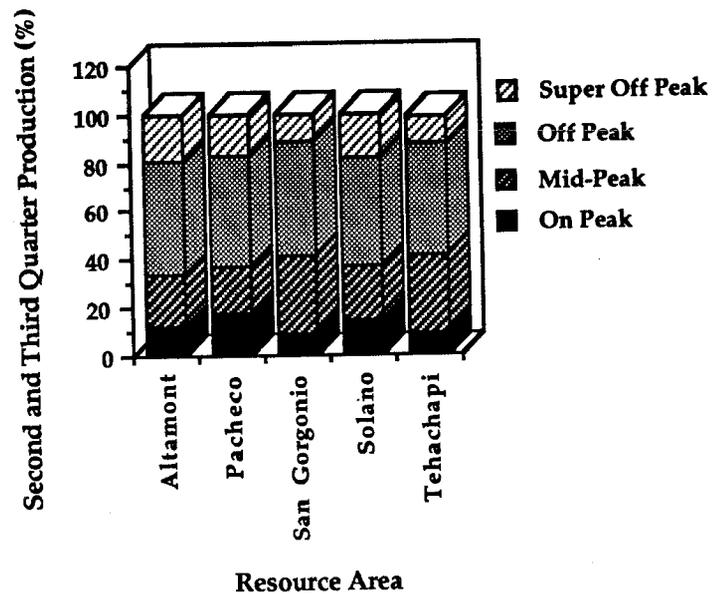


**FIGURE 24: Statewide Time-of-Use Distribution by Quarter**



**FIGURE 25: Percent of Output During Time-of-Use Demand Periods**

As mentioned in Section 5B, production and capacity trends should be viewed in conjunction with time-of-use distribution, especially when comparing the performance of individual resource areas. Percent of total electricity produced during the utility peak demand period (second and third quarters) by resource area is depicted in *Figure 26*. Pacheco and Solano, the two smaller resource areas, produced the greatest percentage of output "on peak" at 18 percent and 15 percent respectively.



**FIGURE 26: Percent of Output During Time-of-Use Demand Periods for California Resource Areas**

## 6. WPRS ANNUAL SUMMARY TABLES

Summary tables on the following pages include aggregate data for all wind projects submitting 1991 quarterly reports to the California Energy Commission as part of the WPRS program. Summary tables contain data extracted from project operator quarterly reports compiled in Section 7.

Summary tables are designed to provide information about specific resource areas, turbine sizes, turbine types, turbine manufacturers, turbine operators, and turbine origins (domestic or foreign). It should be noted 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. It is important to recognize that unless the new turbine capacity represents a significant percentage of cumulative capacity, the negative impact on performance for most turbine groups will be minimal.

## 1991 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	1,575,563	99,675	380,894,378	58	12	102 *	15,830	544
2nd Quarter	1,601,338	26,035	1,139,355,077	77	33	300 *	15,990	160
3rd Quarter	1,660,183	42,170	906,603,016	59	26	227 *	16,337	199
4th Quarter	1,679,158	24,300	361,653,448	66	10	91 *	16,387	108
<b>1991 Totals</b>	<b>1,679,158</b>	<b>192,180</b>	<b>2,788,505,919</b>	<b>65</b>	<b>20</b>	<b>720</b>	<b>16,387</b>	<b>1,011</b>
<b>RESOURCE AREA</b>								
<b>Altamont</b>								
1st Quarter	708,640	0	108,611,530	59	7	69	6,860	0
2nd Quarter	708,445	0	401,571,436	69	27	262	6,857	0
3rd Quarter	708,200	0	475,275,259	62	31	303	6,853	0
4th Quarter	704,420	0	93,331,384	67	6	61	6,818	0
<b>1991 Totals</b>	<b>704,420</b>	<b>0</b>	<b>1,078,789,609</b>	<b>64</b>	<b>18</b>	<b>695</b>	<b>6,818</b>	<b>0</b>
<b>San Geronio</b>								
1st Quarter	245,466	24,675	78,853,828	60	16	119 *	3,495	244
2nd Quarter	253,211	7,810	235,445,856	77	45	345 *	3,577	79
3rd Quarter	254,916	150	141,944,051	58	26	205 *	3,581	1
4th Quarter	255,036	0	60,574,089	75	11	88	3,581	0
<b>1991 Totals</b>	<b>255,036</b>	<b>32,635</b>	<b>516,817,824</b>	<b>68</b>	<b>25</b>	<b>757</b>	<b>3,581</b>	<b>324</b>
<b>Tehachapi</b>								
1st Quarter	561,457	75,000	182,615,520	56	16	133 *	4,875	300
2nd Quarter	579,682	18,225	460,580,785	85	38	326 *	4,956	81
3rd Quarter	621,062	42,020	220,389,215	53	17	145 *	5,136	198
4th Quarter	643,697	24,300	193,671,279	58	15	123 *	5,221	108
<b>1991 Totals</b>	<b>643,697</b>	<b>159,545</b>	<b>1,057,256,799</b>	<b>63</b>	<b>22</b>	<b>727</b>	<b>5,221</b>	<b>687</b>

## 1991 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	----	----	2,072,700	----	----	----	----	----
2nd Quarter	----	----	7,547,400	----	----	----	----	----
3rd Quarter	16,005	0	10,362,491	86	30	199	167	0
4th Quarter	16,005	0	2,124,696	78	6	41	167	0
<b>1991 Totals</b>	<b>16,005</b>	<b>0</b>	<b>22,107,287</b>	<b>82</b>	<b>18</b>	<b>240</b>	<b>167</b>	<b>0</b>
<b>Solano</b>								
1st Quarter	60,000	0	8,740,800	69	7	59	600	0
2nd Quarter	60,000	0	34,209,600	70	26	231	600	0
3rd Quarter	60,000	0	58,632,000	113	45	396	600	0
4th Quarter	60,000	0	11,952,000	95	9	81	600	0
<b>1991 Totals</b>	<b>60,000</b>	<b>0</b>	<b>113,534,400</b>	<b>87</b>	<b>22</b>	<b>767</b>	<b>600</b>	<b>0</b>

## 1991 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	55,927	0	11,053,884	42	10	67	1,780	0
2nd Quarter	55,927	0	30,917,082	53	28	189	1,784	0
3rd Quarter	56,807	0	21,137,652	48	19	130	1,784	0
4th Quarter	56,247	0	8,315,940	42	7	52	1,770	0
<b>1991 Totals</b>	<b>56,247</b>	<b>0</b>	<b>71,424,558</b>	<b>46</b>	<b>16</b>	<b>438</b>	<b>1,770</b>	<b>0</b>
<b>51-100 kw</b>								
1st Quarter	905,470	2,535	182,949,825	59	10	85 *	10,560	39
2nd Quarter	912,870	7,660	583,326,376	82	30	269 *	10,634	78
3rd Quarter	927,765	1,520	540,101,000	59	27	243 *	10,792	18
4th Quarter	923,500	0	161,027,355	67	8	73	10,750	0
<b>1991 Totals</b>	<b>923,500</b>	<b>11,715</b>	<b>1,467,404,556</b>	<b>67</b>	<b>19</b>	<b>670</b>	<b>10,750</b>	<b>135</b>
<b>101-150 kw</b>								
1st Quarter	235,214	22,140	72,111,661	71	15	127 *	1,935	205
2nd Quarter	235,364	150	193,761,118	72	38	340 *	1,936	1
3rd Quarter	235,634	150	127,536,334	64	25	224 *	1,938	1
4th Quarter	235,634	0	53,699,770	75	11	94	1,938	0
<b>1991 Totals</b>	<b>235,634</b>	<b>22,440</b>	<b>447,108,883</b>	<b>71</b>	<b>22</b>	<b>785</b>	<b>1,938</b>	<b>207</b>
<b>151-200 kw</b>								
1st Quarter	65,480	0	20,312,942	56	14	137	369	0
2nd Quarter	65,480	0	47,920,320	84	34	322	369	0
3rd Quarter	66,280	0	39,645,497	58	27	263	373	0
4th Quarter	66,280	0	16,762,313	50	12	111	373	0
<b>1991 Totals</b>	<b>66,280</b>	<b>0</b>	<b>124,641,072</b>	<b>62</b>	<b>22</b>	<b>833</b>	<b>373</b>	<b>0</b>

## 1991 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	313,472	75,000	86,579,752	59	15	134 *	1,186	300
2nd Quarter	331,697	18,225	266,235,190	85	40	386 *	1,267	81
3rd Quarter	373,697	40,500	157,272,024	60	22	197 *	1,450	180
4th Quarter	397,497	24,300	118,783,732	76	16	139 *	1,556	108
<b>1991 Totals</b>	<b>397,497</b>	<b>158,025</b>	<b>628,870,698</b>	<b>70</b>	<b>23</b>	<b>856</b>	<b>1,556</b>	<b>669</b>
<b>TURBINE AXIS</b>								
<b>Horizontal</b>								
1st Quarter	1,480,763	99,675	357,111,623	58	12	101 *	15,318	544
2nd Quarter	1,506,538	26,035	1,083,991,144	78	34	302 *	15,478	160
3rd Quarter	1,565,383	42,170	866,741,122	58	27	231 *	15,825	199
4th Quarter	1,584,358	24,300	347,430,185	67	11	91 *	15,875	108
<b>1991 Totals</b>	<b>1,584,358</b>	<b>192,180</b>	<b>2,655,274,074</b>	<b>65</b>	<b>21</b>	<b>725</b>	<b>15,875</b>	<b>1,011</b>
<b>Vertical</b>								
1st Quarter	94,800	0	15,896,441	55	8	107	512	0
2nd Quarter	94,800	0	38,168,942	65	19	257	512	0
3rd Quarter	94,800	0	18,951,385	65	9	128	512	0
4th Quarter	94,800	0	11,158,925	62	5	75	512	0
<b>1991 Totals</b>	<b>94,800</b>	<b>0</b>	<b>84,175,693</b>	<b>62</b>	<b>10</b>	<b>567</b>	<b>512</b>	<b>0</b>

## 1991 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	757,440	0	117,316,967	52	8	75	8,367	0
2nd Quarter	764,345	7,400	403,785,481	55	26	253 *	8,432	74
3rd Quarter	775,560	0	439,764,103	54	27	268	8,531	0
4th Quarter	770,860	0	97,013,486	50	6	60	8,487	0
<b>1991 Totals</b>	<b>770,860</b>	<b>7,400</b>	<b>1,057,880,037</b>	<b>53</b>	<b>17</b>	<b>656</b>	<b>8,487</b>	<b>74</b>
<b>FOREIGN TURBINES</b>								
1st Quarter	818,123	99,675	255,691,097	61	15	122 *	7,463	544
2nd Quarter	836,993	18,635	718,374,605	89	40	335 *	7,558	86
3rd Quarter	884,623	42,170	445,928,404	61	24	197 *	7,806	199
4th Quarter	908,298	24,300	261,575,624	75	14	112 *	7,900	108
<b>1991 Totals</b>	<b>908,298</b>	<b>184,780</b>	<b>1,681,569,730</b>	<b>72</b>	<b>23</b>	<b>766</b>	<b>7,900</b>	<b>937</b>

## 1991 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	18,462,364	----	19	530	283	0
Airmaster (USA)	1,000	0	0	----	----	----	10	0
Blue Max (USA)	4,000	0	1,978,091	33	6	255	80	0
Bonus (Denmark)	95,345	410	210,926,016	75	25	795 *	1,048	5
Bouma (Netherlands)	4,860	0	6,292,269	----	15	557	36	0
Carter (USA)	6,600	0	7,422,844	46	13	531	165	0
Century (USA)	8,900	0	680,106	----	2	132	104	0
Danwin (Denmark)	36,030	0	83,530,055	56	26	887	233	0
Delta (China)	150	150	59,108	42	12	196 *	1	1
ESI (USA)	23,495	0	19,126,931	31	9	261	343	0
Enertech (USA)	20,200	0	28,827,783	46	18	455	475	0
Fayette (USA)	135,465	0	27,176,317	12	3	243	1,351	0
Floda (Austria)	1,500	0	868,560	49	13	284	3	0
Flowind (USA)	94,800	0	84,175,693	62	10	566	512	0
HMZ (Belgium)	37,300	0	34,664,190	2	12	587	174	0
Howden (Scotland)	28,290	0	46,843,833	60	19	721	91	0
Jacobs (USA)	11,705	0	13,134,348	42	14	442	630	0
MWT (Japan)	165,000	75,000	347,629,414	70	25	869 *	660	300
Micon (Denmark)	134,363	24,675	278,683,495	80	25	763 *	1,495	244
Nordtank (Denmark)	81,350	0	162,204,834	83	23	732	990	0
Oak (USA)	20,777	0	34,284,628	72	19	481	322	0
Polenko (Netherlands)	2,700	0	3,881,701	71	16	522	27	0
Starwind (USA)	----	----	0	----	----	----	4	0
Storm Master (USA)	4,200	0	757,984	28	11	355	105	0
Sumitomo (Japan)	2,000	0	200,703	----	5	66	4	0
US Windpower (USA)	417,600	7,400	813,396,502	92	22	783 *	4,176	74
Vestas (Denmark)	272,455	84,285	410,123,501	70	23	700 *	2,580	383
WEG (England)	5,300	0	12,607,825	125	28	1,214	21	0
Wincon (USA)	21,368	0	26,748,002	69	21	644	200	0
Windane (USA)	14,000	0	46,274,200	119	37	1,406	35	0
Windmatic (Denmark)	16,335	260	18,332,372	56	14	429 *	219	4
Windtech (USA)	750	0	156,098	----	5	125	10	0

## 1991 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>								
Altamont Energy	----	----	33,922,052	----	----	----	----	----
American Power Systems, Inc.	3,705	0	4,493,123	37	14	422	204	0
Arbutus	15,260	0	26,076,000	54	19	480	234	0
Calwind Resources, Inc.	8,710	0	14,308,000	83	19	531	134	0
Cannon Financial Group	77,223	0	136,995,845	0	23	784	866	0
Coram Energy Group	11,320	0	18,462,364	0	19	530	283	0
Difko Administration (US), Inc.	24,675	24,675	51,650,716	97	30	857 *	244	244
Energy Unlimited, Inc.	9,680	150	19,636,000	82	25	832 *	130	1
FDIC/Thompson Engineering	2,890	0	3,668,000	98	14	481	38	0
Fayette	140,949	0	31,927,557	33	3	268	1,399	0
Flowind Corporation	141,240	0	181,931,737	61	15	686	865	0
Howden Wind Parks, Inc.	28,290	0	46,843,833	60	19	721	91	0
International Turbine Research	16,005	0	22,107,287	82	18	239	167	0
LFC Power Systems Corporation	21,840	0	44,803,800	106	23	719	336	0
Mogul Energy Corporation	4,000	0	1,978,091	33	6	255	80	0
Oak Creek Energy Systems	20,862	0	34,386,794	70	19	481	323	0
Renewable Energy Ventures	17,080	0	19,274,400	43	13	415	376	0
Riverview Ventures	4,360	0	3,124,800	49	10	353	218	0
San Gorgonio Farms	30,085	0	87,939,649	76	34	1,195	226	0
Seawest Energy Group	302,092	75,000	630,892,872	72	24	799 *	2,201	300
Southern California Sunbelt	13,045	260	15,126,604	68	16	468 *	167	4
Tera Corporation	8,555	0	3,467,165	8	5	113	145	0
U.S. Windpower	423,050	7,550	826,248,857	95	22	787 *	4,198	75
Westwind Association	16,207	0	29,892,003	78	21	663	172	0
Windfarms Management	----	----	1,926,000	----	----	----	----	----
Windland, Inc.	16,500	6,335	20,183,201	47	18	685 *	134	31
Windmaster	37,300	0	34,664,190	2	12	587	174	0
Windridge	----	----	3,588,000	----	----	----	----	----
Windtricity Development Corp.	400	0	501,769	----	19	444	10	0
Windustries, Inc.	6,720	0	5,883,700	24	14	358	144	0
Wintec, Ltd.	14,615	0	36,173,899	81	28	799	282	0
Zond Systems, Inc.	262,500	78,210	396,427,611	65	22	688 *	2,546	356

## 7. WPRS DATA

This section of the WPRS 1991 Annual Report contains performance data as submitted by wind project operators for four quarters. Wind data is organized by individual resource area; operators are 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 1991. For easy reference, the project name and corresponding number in Section 7 has been noted. Appendix B contains a list of turbine manufacturers keyed to sequential numbers assigned to operators and participants. Appendix C contains WPRS Regulations which provide definitions for most wind categories used in this report.

Data contained in the WPRS 1991 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 1991 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.

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

## WIND DATA SECTION NOTES

Wind data section 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 C*).

**Data missing.** Some operators submitted incomplete reporting forms. In these cases, items not completed were assigned a value 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 outputs 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 outputs 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. When project output is based solely on utility data (UD) and there is more than one turbine model, data is entered for only the first turbine model and is noted with an asterisk(\*). This is necessary since utility reports do not list output by individual turbine models.

**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 within the first quarter following installation.

**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.

## 1991 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)

1 ALTAMONT ENERGY CORP.  
337 Preston Court  
Livermore, CA 94550

A. Jess and Souza Ranches

FAILED TO FILE  
FAILED TO FILE  
FAILED TO FILE  
FAILED TO FILE

1  
2  
3  
4

4,917,614 (UD)  
7,173,591 (UD)  
19,624,509 (UD)  
2,206,338 (UD)

Other Participant:  
Grant Line Energy

**PROJECT TOTAL** 33,922,052

2 F.D.I.C./THOMPSON ENGINEERING  
410 Ericwood Court  
Manteca, CA 95336

A. Wind Farm I

Polenko (H) 302 100 kW @ 29 mph

1  
2  
3  
4

7,900 0 12 115,000 (V)  
50,800 0 12 565,100 (V)  
53,600 0 12 639,800 (V)  
8,700 0 12 53,000 (V)

Other Participant:  
American Diversified  
Wind Partners

Annual ----- 121,000 ----- 1,372,900

## 1991 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)

ALTAMONT PASS (Alameda & Contra Costa)

2 F.D.I.C./THOMPSON ENGINEERING (Cont'd)

A. Wind Farm I (Cont'd)	Windmatic	(H)	154	65 kW @	35 mph	1	6,090	0	26	169,000 (V)
						2	31,125	0	26	914,900 (V)
						3	33,375	0	26	1,072,200 (V)
						4	6,840	0	26	139,000 (V)
						Annual	77,430			2,295,100

**PROJECT TOTAL** 3,668,000

3 FAYETTE  
P.O. Box 1149  
Tracy, CA 95378

A. Castello Windranch	Fayette 95IIS	(H)	95	95 kW @	37 mph	1	7,000	0	8	0 (V)
						2	64,400	0	8	24,779 (V)
						3	61,600	0	8	99,639 (V)
						4	7,000	0	8	15,815 (V)
						Annual	140,000			140,233

**PROJECT TOTAL** 140,233

## 1991 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)

ALTAMONT PASS (Alameda & Contra Costa)

3 FAYETTE (Cont'd)

B. Fayette Wind Farms	Bonus 120/20	(H) 296	120 kW @	34 mph	1	15,000	0	0	0 (V)
					2	138,000	0	0	0 (V)
					3	132,000	0	0	0 (V)
					4	15,000	0	0	0 (V)
					Annual	300,000			0
	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	2	0 (V)
					Annual	600,000			0
	Fayette 75IIS	(H) 85	75 kW @	40 mph	1	6,000	0	14	0 (V)
					2	55,200	0	14	60,087 (V)
					3	52,800	0	14	99,630 (V)
					4	6,000	0	14	10,694 (V)
					Annual	120,000			170,411
	Fayette 95IIS	(H) 95	95 kW @	37 mph	1	7,000	0	1,050	35,809 (V)
					2	64,400	0	1,050	9,267,968 (V)
3					61,600	0	1,050	14,130,319 (V)	
4					7,000	0	1,050	1,440,285 (V)	
Annual					140,000			24,874,381	

## 1991 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)

3 FAYETTE (Cont'd)

B. Fayette Wind Farms (Cont'd)	Micon M110/US	(H)	293	108 kW @	33 mph	1	15,000	0	0	0 (V)
						2	138,000	0	0	0 (V)
						3	132,000	0	0	0 (V)
						4	15,000	0	0	0 (V)
						Annual	----- 300,000			----- 0

**PROJECT TOTAL** 25,044,792

C. Rachel I Energy Corp.	Bonus 120/20	(H)	296	120 kW @	29 mph	1	15,000	0	14	260,817 (V)
						2	138,000	0	14	999,509 (V)
						3	132,000	0	14	1,220,959 (V)
						4	15,000	0	14	140,229 (V)
						Annual	----- 300,000			----- 2,621,514

	Micon 110/US	(H)	293	108 kW @	33 mph	1	15,000	0	8	0 (V)
						2	138,000	0	8	0 (V)
						3	132,000	0	8	0 (V)
						4	15,000	0	8	0 (V)
						Annual	----- 300,000			----- 0

**PROJECT TOTAL** 2,621,514

## 1991 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)

3 FAYETTE (Cont'd)

D. 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

E. 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	0 (V)
						4	30,000	0	23	0 (V)
						Annual	600,000			0

Fayette 95IIS	(H)	95	95 kW @	37 mph	1	7,000	0	33	371 (V)
					2	64,400	0	33	257,005 (V)
					3	61,600	0	33	360,496 (V)
					4	7,000	0	33	36,715 (V)
					Annual	140,000			654,587

**PROJECT TOTAL** 654,587

## 1991 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)

ALTAMONT PASS (Alameda & Contra Costa)

3 FAYETTE (Cont'd)

F. WETA III	Bonus 120/20	(H)	296	120 kW @	29 mph	1	15,000	0	11	211,188 (V)
						2	138,000	0	11	838,714 (V)
						3	132,000	0	11	966,129 (V)
						4	15,000	0	11	113,695 (V)
						Annual	300,000			2,129,726
	Fayette 95IIS	(H)	95	95 kW @	37 mph	1	7,000	0	19	8,725 (V)
						2	64,400	0	19	191,453 (V)
						3	61,600	0	19	233,124 (V)
						4	7,000	0	19	12,087 (V)
						Annual	140,000			445,389
	Micon M110/US	(H)	293	108 kW @	33 mph	1	15,000	0	15	0 (V)
						2	138,000	0	15	0 (V)
						3	132,000	0	15	0 (V)
						4	15,000	0	15	0 (V)
						Annual	300,000			0

**PROJECT TOTAL** 2,575,115

## 1991 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)

ALTAMONT PASS (Alameda & Contra Costa)

3 FAYETTE (Cont'd)

G. Wind Energy Partners I	Fayette 75IIS	(H)	85	75 kW @ 40 mph	1	6,000	0	30	0 (V)
					2	55,200	0	30	0 (V)
					3	52,800	0	30	0 (V)
					4	6,000	0	30	0 (V)
					Annual	120,000			0

**PROJECT TOTAL** 0

H. Wind Energy Partners II	Fayette 75IIS	(H)	85	75 kW @ 40 mph	1	6,000	0	78	0 (V)
					2	55,200	0	78	0 (V)
					3	52,800	0	78	0 (V)
					4	6,000	0	78	0 (V)
					Annual	120,000			0

**PROJECT TOTAL** 0

## 1991 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)

ALTAMONT PASS (Alameda & Contra Costa)

3 FAYETTE (Cont'd)

I. Wind Energy Partners III	Fayette 75IIS	(H) 85	75 kW @ 40 mph	1	6,000	0	10	0 (V)	
				2	55,200	0	10	0 (V)	
				3	52,800	0	10	0 (V)	
				4	6,000	0	10	0 (V)	
				Annual	120,000			0	
	Fayette 95IIS	(H) 95	95 kW @ 37 mph	1	7,000	0	23	0 (V)	
				2	64,400	0	23	0 (V)	
				3	61,600	0	23	0 (V)	
				4	7,000	0	23	0 (V)	
				Annual	140,000			0	
	<b>PROJECT TOTAL</b>								<b>0</b>
	J. Windranch Partners I	Fayette 95IIS	(H) 95	95 kW @ 37 mph	1	7,000	0	17	0 (V)
					2	64,400	0	17	36,487 (V)
3					61,600	0	17	225,261 (V)	
4					7,000	0	17	31,310 (V)	
Annual					140,000			293,058	
<b>PROJECT TOTAL</b>								<b>293,058</b>	

## 1991 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)

3 FAYETTE (Cont'd)

K. Windranch Partners II	Fayette 95IIS	(H)	95	95 kW @ 37 mph	1	7,000	0	37	0 (V)
					2	64,400	0	37	128,970 (V)
					3	61,600	0	37	412,750 (V)
					4	7,000	0	37	56,538 (V)
					Annual	140,000			598,258

**PROJECT TOTAL** 598,258

4 FLOWIND CORPORATION

1183 Quarry Lane  
Pleasanton, CA 94566

A. FloWind I (Dyer Road)	Flowind 17	(V)	260	143 kW @ 44 mph	1	17,357	0	75	869,095 (V)
					2	68,169	0	75	3,670,307 (V)
					3	51,808	0	75	3,028,623 (V)
					4	15,447	0	75	988,965 (V)
					Annual	152,781			8,556,990

## 1991 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)

ALTAMONT PASS (Alameda & Contra Costa)

4 FLOWIND CORPORATION (Cont'd)

A. FloWind I (Dyer Road) (Cont'd)	Flowind 19	(V)	340	250 kW @	38 mph	1	30,717	0	1	20,338 (V)
						2	120,642	0	1	95,200 (V)
						3	91,688	0	1	153,226 (V)
						4	27,338	0	1	48,703 (V)
						Annual	----- 270,385			----- 317,467

**PROJECT TOTAL** 6,874,457

B. FloWind II (Elworthy)	Bonus Mark II	(H)	302	119 kW @	29 mph	1	37,854	0	225	5,609,600 (V)
						2	126,459	0	225	21,196,970 (V)
						3	138,986	0	225	26,979,490 (V)
						4	37,486	0	225	6,320,449 (V)
						Annual	----- 340,785			----- 60,106,509

	Bonus Mark III	(H)	415	150 kW @	29 mph	1	54,224	0	100	3,809,474 (V)
						2	171,710	0	100	12,443,396 (V)
						3	176,229	0	100	15,640,356 (V)
						4	49,705	0	100	4,293,120 (V)
						Annual	----- 451,868			----- 36,186,346

## 1991 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.		
<i>ALTAMONT PASS (Alameda &amp; Contra Costa)</i>										
4 FLOWIND CORPORATION (Cont'd)										
	B. FloWind II (Elworthy) (Cont'd)	Danwin H19	(H)	284	110 kW @ 30 mph	1	31,325	0	25	151,530 (V)
						2	108,504	0	25	76,947 (V)
						3	120,401	0	25	633,020 (V)
						4	32,207	0	25	503,155 (V)
					Annual		292,437			1,364,652
		Flowind F17	(V)	260	142 kW @ 44 mph	1	23,957	0	73	466,649 (V)
						2	107,527	0	73	2,427,271 (V)
						3	113,070	0	73	3,576,117 (V)
						4	24,342	0	73	618,810 (V)
					Annual		268,896			7,088,847
		Flowind F19	(V)	340	250 kW @ 38 mph	1	39,619	0	19	431,547 (V)
						2	187,009	0	19	2,147,128 (V)
						3	190,559	0	19	2,279,553 (V)
						4	40,134	0	19	319,966 (V)
					Annual		457,321			5,178,194
<b>PROJECT TOTAL</b>									<b>109,924,548</b>	

## 1991 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected	Turbines		Electricity
		Model	Axis	Rotor Size	(M2) (kW)		Prod./Turbine	New	Cum.	Produced
						(kWh)			(kWh)	
<i>ALTAMONT PASS (Alameda &amp; Contra Costa)</i>										
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	3,978,822 (V)
						2	16,524,000	0	82	17,805,900 (V)
						3	19,941,000	0	82	19,783,581 (V)
						4	7,293,000	0	82	4,010,202 (V)
Operator Comment See Appendix A Comment 1						Annual	51,000,000			45,578,505
		Howden 60/15	(H)	177	60 kW @ 34 mph	1	14,796	0	8	13,776 (V)
						2	40,284	0	8	86,784 (V)
						3	30,845	0	8	250,368 (V)
						4	11,491	0	8	359,184 (V)
						Annual	97,416			710,112
		Howden 750/45	(H)	1,590	750 kW @ 34 mph	1	161,660	0	1	52,080 (V)
						2	440,140	0	1	238,368 (V)
						3	421,260	0	1	183,264 (V)
						4	156,940	0	1	81,504 (V)
						Annual	1,180,000			555,216
<b>PROJECT TOTAL</b>										<b>46,843,833</b>

## 1991 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)	

ALTAMONT PASS (Alameda & Contra Costa)

6 LFC POWER SYSTEMS CORPORATION

14680 Patterson Pass Rd.  
Tracy, CA 95376

	A. Fields Ranch Wind Farm	Bonus 65/13	(H)	177	65 kW@	40 mph	1	10,099	0	211	2,736,595 (V)
							2	54,496	0	211	10,863,863 (V)
Other Participant: LFC No. 51 Corporation							3	57,499	0	211	12,005,524 (V)
							4	11,808	0	211	2,529,740 (V)
						Annual		----- 133,902			----- 28,135,722
		Nordtank 65/13	(H)	200	65 kW@	34 mph	1	10,099	0	125	1,621,205 (V)
							2	54,496	0	125	6,435,937 (V)
							3	57,499	0	125	7,112,276 (V)
							4	11,808	0	125	1,498,660 (V)
						Annual		----- 133,902			----- 16,668,078
<b>PROJECT TOTAL</b>											<b>44,803,800</b>

## 1991 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)

ALTAMONT PASS (Alameda & Contra Costa)

7 SEAWEST ENERGY GROUP

1455 Frazee Road, Suite 300  
San Diego, CA 92108

	A. Altech Energy, Ltd.	Enertech 44/40	(H)	140	40 kW @ 30 mph	1	9,700	0	144	492,354 (V)
Other Participants: Altamont Midway, Ltd. Altech Energy, Ltd. C.W.E.S. Forsat, Inc. TaxVest Wind Farms Western Windfarms						2	30,900	0	144	2,845,469 (V)
						3	30,300	0	144	3,843,988 (V)
						4	9,100	0	144	593,600 (V)
						Annual	80,000			7,775,411
							<b>PROJECT TOTAL</b>			<b>7,775,411</b>

	B. Astroseal, Battlement	Micon 65/13	(H)	200	65 kW @ 30 mph	1	13,700	0	8	72,326 (V)
						2	43,600	0	4	145,022 (V)
						3	42,900	0	4	124,225 (V)
						4	12,800	0	4	33,340 (V)
						Annual	113,000			374,913
							<b>PROJECT TOTAL</b>			<b>374,913</b>



## 1991 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)

ALTAMONT PASS (Alameda & Contra Costa)

7 SEAWEST ENERGY GROUP (Cont'd)

	E. TaxVest Wind Farms, Inc. II	Micon 60/13	(H)	200	60 kW @ 33 mph		1	13,700	0	11	15,143 (V)
							2	43,600	0	11	53,200 (V)
							3	42,900	0	11	80,606 (V)
							4	12,800	0	11	15,760 (V)
							Annual	113,000			164,709

**PROJECT TOTAL** 164,709

	F. TaxVest Windfarm 174	Micon 60/13	(H)	200	60 kW @ 33 mph		1	13,700	0	174	1,514,982 (V)
							2	43,600	0	174	5,580,019 (V)
							3	42,900	0	167	3,932,118 (V)
							4	12,800	0	167	1,285,892 (V)
							Annual	113,000			12,313,011

Operator Comment  
See Appendix A  
Comment 2

**PROJECT TOTAL** 12,313,011

## 1991 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)

ALTAMONT PASS (Alameda & Contra Costa)

7 SEAWEST ENERGY GROUP (Cont'd)

G. Viking-Energy 83	Micon 60/13	(H)	200	60 kW@	33 mph	1	14,300	0	26	106,123 (V)
						2	45,500	0	26	571,246 (V)
						3	44,800	0	26	855,602 (V)
						4	13,400	0	26	171,848 (V)
						Annual	118,000			1,704,819

**PROJECT TOTAL** 1,704,819

H. Seawest Energy Group, Inc.	Micon 60/13	(H)	200	60 kW@	33 mph	1	----	----	----	----
						2	----	----	----	----
						3	42,900	0	4	123,978 (V)
						4	12,800	0	11	99,277 (V)
						Annual	55,700			223,255

**PROJECT TOTAL** 223,255

## 1991 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.			
<i>ALTAMONT PASS (Alameda &amp; Contra Costa)</i>												
8 TERA CORPORATION 177 Bovet Rd., Suite 520 San Mateo, CA 94402												
Operator Comment See Appendix A Comment 3	A. Delta Energy Project (Delta I-III)	ESI 54	(H)	211	50 kW @	30 mph	1	42,400	0	58	14,300 (NV)	
							2	63,600	0	58	176,566 (NV)	
							3	63,600	0	58	321,229 (NV)	
							4	42,400	0	58	44,326 (NV)	
							Annual	212,000			556,421	
			ESI 54S	(H)	211	65 kW @	30 mph	1	46,400	0	87	151,840 (NV)
								39 mph	69,600	0	88	1,135,187 (NV)
								39 mph	69,600	0	87	1,401,516 (NV)
								39 mph	46,400	0	87	222,201 (NV)
								Annual	232,000			2,910,744
<b>PROJECT TOTAL</b>										<b>3,467,165</b>		

## 1991 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)

ALTAMONT PASS (Alameda & Contra Costa)

9 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	460	9,843,600 (V)
					2	81,900	0	460	36,360,800 (V)
					3	86,100	0	460	45,486,000 (V)
					4	21,000	0	460	8,990,799 (V)
					Annual	210,000			100,681,199

**PROJECT TOTAL** 100,681,199

B. Frick	USW 56-100	(H)	247	100 kW @ 29 mph	1	21,000	0	100	2,378,880 (V)
					2	81,900	0	100	7,297,961 (V)
					3	86,100	0	100	7,665,314 (V)
					4	21,000	0	100	2,108,201 (V)
					Annual	210,000			19,450,356

**PROJECT TOTAL** 19,450,356

## 1991 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.	

ALTAMONT PASS (Alameda & Contra Costa)

9 U.S.WINDPOWER (Cont'd)

C. Midway Road (Patterson Pass Road)	USW 56-100	(H) 247	100 kW @ 29 mph	1	21,000	0	1,401	29,459,985 (V)
				2	81,900	0	1,401	106,203,791 (V)
				3	86,100	0	1,401	112,352,493 (V)
				4	21,000	0	1,401	18,896,507 (V)
				Annual	----- 210,000			----- 266,912,776
	WEG MS-2	(H) 491	250 kW @ 33 mph	1	62,454	0	20	1,267,157 (V)
				2	256,065	0	20	3,973,616 (V)
				3	237,329	0	20	3,114,748 (V)
				4	68,700	0	20	3,977,321 (V)
				Annual	----- 624,548			----- 12,332,842
	WEG MS-3	(H) 855	300 kW @ 26 mph	1	0	0	1	37,873 (V)
				2	301,000	0	1	202,535 (V)
				3	336,000	0	1	34,575 (V)
				4	84,000	0	1	0 (V)
				Annual	----- 721,000			----- 274,983

<b>PROJECT TOTAL</b>	<b>279,520,401</b>
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## 1991 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)			

ALTAMONT PASS (Alameda & Contra Costa)

9 U.S.WINDPOWER (Cont'd)

D. Ralph	USW 56-100	(H)	247	100 kW @	29 mph	1	21,000	0	809	19,267,200 (V)
						2	81,900	0	809	66,518,400 (V)
						3	86,100	0	809	74,414,349 (V)
						4	21,000	0	809	13,146,552 (V)
						Annual	210,000			173,346,501

<b>PROJECT TOTAL</b>	<b>173,346,501</b>
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E. Vasco Road	USW 56-100	(H)	247	100 kW @	29 mph	1	21,000	0	774	11,534,400 (V)
						2	81,900	0	774	45,687,600 (V)
						3	86,100	0	774	58,978,800 (V)
						4	21,000	0	732	10,803,600 (V)
						Annual	210,000			127,004,400

<b>PROJECT TOTAL</b>	<b>127,004,400</b>
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## 1991 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)
<i>ALTAMONT PASS (Alameda &amp; Contra Costa)</i>										
10 WINDMASTER										
	P.O. Box 669									
	Byron, CA 94514									
	A. Windmaster	HMZ 200	(H)	373	200 kW @ 33 mph	1	2,837,629	0	139	2,837,629 (V)
						2	15,068,786	0	139	12,390,422 (V)
						3	15,955,411	0	139	13,719,616 (V)
						4	3,746,086	0	139	2,727,479 (V)
Operator Comment						Annual	37,607,912			31,675,146
See Appendix A										
Comment 4										
		HMZ 250	(H)	415	250 kW @ 33 mph	1	0	0	20	0 (V)
						2	2,813,966	0	20	0 (V)
						3	2,979,535	0	20	0 (V)
						4	699,549	0	20	0 (V)
						Annual	6,493,050			0
		HMZ 300	(H)	483	300 kW @ 33 mph	1	299,120	0	15	299,120 (V)
						2	2,532,569	0	15	1,027,147 (V)
						3	2,681,582	0	15	1,304,789 (V)
						4	629,594	0	15	357,988 (V)
						Annual	6,142,865			2,989,044
<b>PROJECT TOTAL</b>										<b>34,664,190</b>

## 1991 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.	
<i>ALTAMONT PASS (Alameda &amp; Contra Costa)</i>									
11 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	24,954	0	200	3,662,391 (V)
					2	84,020	0	200	12,385,689 (V)
Operator Comment					3	97,254	0	200	15,872,871 (V)
See Appendix A					4	26,772	0	200	3,847,769 (V)
Comment 5					Annual	233,000			35,768,720
<b>PROJECT TOTAL</b>									<b>35,768,720</b>

## 1991 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Projected		Turbines		Electricity
		Model	Axis	Rotor Size		Qtr.	Prod./Turbine	New	Cum.	Produced
						(kWh)			(kWh)	
<b><u>PACHECO PASS (Merced County)</u></b>										
12 INTERNATIONAL TURBINE RESEARCH										
2300 Technology Parkway, Suite 2										
P.O. Box 96										
Hollister, CA 95023										
	A. ITR									
										2,072,700 (UD)
										7,547,400 (UD)
		Wincon W200	(H)	452	200 kW@ 29 mph	3	232,000	0	4	760,932 (V)
						4	50,000	0	4	157,525 (V)
					Annual		282,000			918,457
		Wincon W99XT	(H)	346	100 kW@ 27 mph	3	113,000	0	96	5,504,061 (V)
						4	25,000	0	96	1,132,948 (V)
					Annual		138,000			6,637,009
		Vestas 17E	(H)	283	100 kW@ 33 mph	3	94,000	0	20	1,795,368 (V)
						4	21,000	0	20	383,468 (V)
					Annual		115,000			2,178,836
		Vestas V17	(H)	277	90 kW@ 33 mph	3	49,000	0	22	1,108,294 (V)
						4	11,000	0	22	196,325 (V)
					Annual		60,000			1,304,619
		Nordtank NKT65	(H)	216	65 kW@ 32 mph	3	49,000	0	25	1,193,836 (V)
						4	11,000	0	25	254,430 (V)
					Annual		60,000			1,448,266
<b>PROJECT TOTAL</b>										<b>22,107,287</b>

## 1991 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>SAN GORGONIO PASS (Riverside)</i>										
13 AMERICAN POWER SYSTEMS, INC. P.O. Box 2007 Rancho Mirage, CA 92270										
	A. WECS 33 Jacoby-Kerr Wind Park	Jacobs 26 17.5 @ 120'	(H)	49	18 kW @ 27 mph	1	10,346	0	16	59,036 (V)
						2	20,777	0	16	176,308 (NV)
						3	16,416	0	16	123,076 (V)
						4	8,037	0	16	37,777 (V)
					Annual		55,576			396,197
		Jacobs 26 17.5 @ 80'	(H)	49	18 kW @ 27 mph	1	9,491	0	134	448,650 (V)
						2	19,836	0	134	1,396,422 (NV)
						3	15,646	0	134	837,832 (V)
						4	7,182	0	134	316,433 (V)
					Annual		52,155			2,999,337
		Jacobs 29-20	(H)	61	20 kW @ 27 mph	1	12,277	0	54	198,788 (V)
						2	25,565	0	54	472,861 (NV)
						3	19,323	0	54	300,064 (V)
						4	9,662	0	54	125,876 (V)
					Annual		66,827			1,097,589
<b>PROJECT TOTAL</b>										<b>4,493,123</b>

## 1991 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)

SAN GORGONIO PASS (Riverside)

14 DIFKO ADMINISTRATION (US), INC.  
4909 Murphy Canyon Rd., Suite 460  
San Diego, CA 92123

Other Participant:  
Phoenix Energy Ltd.

	A. Difwind Farms, Ltd.V Section 20	Micon 108	(H)	294	108 kW@ 30 mph	1	42,400	16	16	526,999 (V)
						2	117,000	0	16	2,019,497 (V)
						3	78,600	0	16	1,332,980 (V)
						4	30,800	0	16	473,240 (V)
						Annual	268,800			4,352,716

<b>PROJECT TOTAL</b>	<b>4,352,716</b>
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	B. Difwind Partners	Micon 65	(H)	201	65 kW@ 30 mph	1	0	39	39	0 (V)
						2	0	0	39	0 (V)
						3	0	0	39	0 (V)
						4	0	0	39	0 (V)
						Annual	0			0

		Micon 108	(H)	294	108 kW@ 30 mph	1	0	116	116	3,750,000 (V)
						2	0	0	116	15,228,000 (V)
						3	0	0	116	8,076,000 (V)
						4	0	0	116	2,442,000 (V)
						Annual	0			29,496,000

<b>PROJECT TOTAL</b>	<b>29,496,000</b>
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## 1991 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)	

SAN GORGONIO PASS (Riverside)

15 ENERGY UNLIMITED, INC. (Cont'd)

A. Mountain Pass '85 Ltd. (Cont'd)	Delta 150	(H)	302	150 kW@	34 mph	1	----	----	----	----
						2	----	----	----	----
						3	127,500	1	1	17,608 (V)
						4	58,300	0	1	41,500 (V)
						Annual	185,800			59,108

**PROJECT TOTAL** 19,636,000

16 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	1,681,711 (V)
						2	81,100	0	168	5,486,414 (V)
						3	63,500	0	168	4,992,170 (V)
						4	28,300	0	168	1,597,680 (V)
						Annual	211,100			13,757,975
	Jacobs 26-17.5	(H)	49	18 kW @	27 mph	1	9,500	0	208	759,089 (V)
						2	19,800	0	208	2,159,986 (V)
						3	15,600	0	208	1,912,630 (V)
						4	7,200	0	208	684,720 (V)
						Annual	52,100			5,516,425

**PROJECT TOTAL** 19,274,400

## 1991 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)	
			(M2)	(kW)					
<i><u>SAN GORGONIO PASS (Riverside)</u></i>									
17 RIVERVIEW VENTURES 19020 North Indian Avenue North Palm Springs, CA 92258									
	A. RVI Windpark	Jacobs 20	(H) 50	20 kW @ 27 mph	1	8,634	0	177	530,400 (V)
					2	16,166	0	177	1,116,000 (V)
					3	12,394	0	177	1,116,000 (V)
					4	2,806	0	177	362,400 (V)
					Annual	----- 40,000			----- 3,124,800
						<b>PROJECT TOTAL</b>			<b>3,124,800</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)
					3	12,394	0	41	0 (V)
					4	2,806	0	41	0 (V)
					Annual	----- 40,000			----- 0
						<b>PROJECT TOTAL</b>			<b>0</b>
Other Participant: Whitewater Ventures, Inc.									

## 1991 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)

SAN GORGONIO PASS (Riverside)

18 SAN GORGONIO FARMS  
 21515 Hawthorne Blvd., Suite 1059  
 Torrance, CA 90503

Operator Comment See Appendix A Comment 7	A. San Gorgonio Farms Wind Park	Bonus 100	(H) 294	100 kW @ 28 mph	1	62,400	0	55	2,830,630 (V)
					2	146,520	0	55	8,383,000 (V)
					3	141,160	0	55	4,667,280 (V)
					4	49,920	0	55	2,004,354 (V)
					Annual	400,000			17,885,264
		Bonus 120	(H) 294	120 kW @ 40 mph	1	68,640	0	1	40,387 (V)
	2				161,172	0	1	156,788 (V)	
	3				155,276	0	1	93,397 (V)	
	4				54,912	0	1	31,723 (V)	
	Annual				440,000			322,295	
		Bonus 450	(H) 961	450 kW @ 30 mph	1	187,200	0	1	108,000 (V)
	2				439,560	0	1	455,280 (V)	
	3				423,480	0	1	369,480 (V)	
4	149,760				0	1	140,440 (V)		
Annual	1,200,000						1,073,200		

## 1991 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.		
<i>SAN GORGONIO PASS (Riverside)</i>										
18 SAN GORGONIO FARMS (Cont'd)										
A. San Gorgonio Farms Wind Park (Cont'd)	Bonus 65	(H)	177	65 kW @	33 mph	1	43,680	0	81	2,250,422 (V)
						2	102,564	0	81	6,351,615 (V)
						3	98,812	0	81	3,744,134 (V)
						4	34,944	0	81	1,613,292 (V)
						Annual	280,000			13,959,463
	Micon 65	(H)	177	65 kW @	33 mph	1	43,680	0	50	1,221,100 (V)
						2	102,564	0	50	3,364,913 (V)
						3	98,812	0	50	2,090,457 (V)
						4	34,944	0	50	897,177 (V)
						Annual	280,000			7,573,647
	Windane 34	(H)	908	400 kW @	30 mph	1	171,600	0	35	6,896,860 (V)
						2	402,930	0	35	19,690,080 (V)
						3	388,190	0	35	13,903,160 (V)
						4	137,280	0	35	5,767,120 (V)
						Annual	1,100,000			46,257,220
	Floda 500	(H)	1,018	500 kW@	31 mph	1	----	----	----	----
						2	----	----	----	----
3						494,060	0	3	547,320 (V)	
4						174,720	0	3	321,240 (V)	
Annual						668,780			868,560	
<b>PROJECT TOTAL</b>									<b>87,939,649</b>	

## 1991 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)

SAN GORGONIO PASS (Riverside)

19 SEAWEST ENERGY GROUP  
 1455 Frazee Rd., Suite 300  
 San Diego, CA 92108

	A. Altech Energy Ltd. II	Enertech 44/40	(H)	141	40 kW @ 30 mph	1	24,300	0	85	1,029,000 (V)
						2	56,100	0	85	3,504,000 (V)
						3	38,200	0	85	2,094,000 (V)
						4	15,500	0	85	612,000 (V)
						Annual	134,100			7,239,000

**PROJECT TOTAL** 7,239,000

	B. Altech Energy Ltd. III	Micon 100/US	(H)	283	108 kW @ 30 mph	1	53,500	0	268	6,988,045 (V)
						2	160,200	0	268	27,393,841 (V)
						3	108,900	0	268	15,031,822 (V)
						4	41,400	0	268	4,307,460 (V)
						Annual	364,000			53,721,168

		Micon 60	(H)	201	60 kW @ 30 mph	1	32,200	0	53	691,955 (V)
						2	79,900	0	53	2,894,159 (V)
						3	52,700	0	53	1,672,178 (V)
						4	22,200	0	53	516,540 (V)
						Annual	187,000			5,774,832

**PROJECT TOTAL** 59,496,000

## 1991 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Qtr.	Projected Prod./Turbine (kWh)	Turbines Installed		Electricity Produced (kWh)		
		Model	Axis (M2)	Rotor Size (kW)			New	Cum.			
<i>SAN GORGONIO PASS (Riverside)</i>											
19 SEAWEST ENERGY GROUP (Cont'd)											
Other Participant: Phoenix Energy, Ltd.	C. Phoenix Energy Associates	Enertech 44/40	(H)	140	40 kW @	30 mph	1	27,283	0	90	1,388,817 (V)
							2	59,388	0	90	3,269,367 (V)
							3	42,998	0	90	2,115,649 (V)
							4	17,331	0	90	557,135 (V)
							Annual	147,000			7,330,968
	D. Swanmill Farms I/Farms II	Danwin 23	(H)	415	160 kW @	29 mph	1	110,440	0	117	8,040,000 (V)
							2	170,680	0	117	19,720,000 (V)
							3	125,500	0	117	10,200,000 (V)
							4	95,380	0	117	6,720,000 (V)
							Annual	502,000			44,680,000
<b>PROJECT TOTAL</b>											
<b>28,411,284</b>											
<b>21,080,316</b>											
<b>44,680,000</b>											

## 1991 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>											
20	SOUTHERN CALIFORNIA SUNBELT										
	1700 W. Katella Ave. #310										
	Orange, CA 92668										
	A. Palm Springs Wind Park (Edom Hill)	Windmatic 155	(H)	189	65 kW @	32 mph	1	28,061	0	84	1,330,453 (V)
							2	57,957	4	87	4,701,895 (V)
							3	47,453	0	87	2,857,156 (V)
							4	14,057	0	83	1,166,835 (V)
Operator Comment							Annual	147,528			10,056,339
See Appendix A											
Comment 8											
		Starwind	(H)	0	0 kW@	0 mph	1	----	----	----	----
							2	0	0	4	0 (V)
							3	0	0	4	0 (V)
							4	0	0	4	0 (V)
							Annual	0			0
		Windmatic 17	(H)	227	95 kW@	34 mph	1	----	----	----	----
							2	----	----	----	----
							3	----	----	----	----
							4	14,037	0	4	56,148 (V)
							Annual	14,037			56,148
<b>PROJECT TOTAL</b>										<b>10,112,487</b>	

## 1991 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification				Qtr.	Projected	Turbines		Electricity
		Model	Axis	Rotor	Size		Prod./Turbine	New	Cum.	Produced
			(M2)	(kW)		(kWh)			(kWh)	
<i><u>SAN GORGONIO PASS (Riverside)</u></i>										
21 U.S. WINDPOWER 6952 Preston Ave. Livermore, CA 94550										
	A. Aldrich	USW 56-100	(H) 247	100 kW@ 29 mph	1	----	----	----	----	
					2	81,900	74	74	4,227,800 (V)	
					3	86,100	0	74	6,237,535 (V)	
					4	21,000	0	74	2,001,535 (V)	
					Annual	189,000			12,466,870	
		Bonus	(H) 415	150 kW@ 29 mph	1	----	----	----	----	
					2	66,000	1	1	67,000 (V)	
					3	160,000	0	1	119,865 (V)	
					4	57,000	0	1	57,665 (V)	
					Annual	283,000			244,530	
<b>PROJECT TOTAL</b>									<b>12,711,400</b>	

## 1991 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)

SAN GORGONIO PASS (Riverside)

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

A. Westwind Association Windpark	Micon 108	(H)	293	108 kW @	33 mph	1	50,893	0	13	469,173 (V)
						2	112,031	0	13	1,263,180 (V)
						3	91,002	0	13	555,864 (V)
						4	7,450	0	13	266,204 (V)
						Annual	261,376			2,554,421
	Micon 65	(H)	200	65 kW @	33 mph	1	38,170	0	46	1,194,757 (V)
						2	84,023	0	46	3,104,938 (V)
						3	68,252	0	46	1,404,683 (V)
						4	19,555	0	46	785,930 (V)
						Annual	210,000			6,490,308
	Nordtank 65	(H)	201	65 kW @	34 mph	1	38,170	0	13	291,858 (V)
						2	84,023	0	13	807,526 (V)
						3	68,252	0	13	367,658 (V)
						4	19,555	0	13	187,696 (V)
						Annual	210,000			1,654,738

## 1991 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

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

SAN GORGONIO PASS (Riverside)

22 WESTWIND ASSOCIATION (Cont'd)

A. Westwind Association Windpark (Cont'd)	Wincon 108	(H)	293	108 kW @	33 mph	1	47,940	0	16	591,663 (V)
						2	124,080	0	16	1,610,180 (V)
						3	64,860	0	16	674,445 (V)
						4	45,120	0	16	403,404 (V)
						Annual	282,000			3,279,692
	Wincon 110	(H)	295	110 kW @	33 mph	1	47,940	0	84	2,840,550 (V)
						2	124,080	0	84	7,410,177 (V)
						3	64,860	0	84	3,489,350 (V)
						4	45,120	0	84	2,172,767 (V)
						Annual	282,000			15,912,844

**PROJECT TOTAL** 29,892,003

23 WINDTRICITY DEVELOPMENT CORPORATION  
44790 S. Grimmer Blvd. #205  
Fremont, CA 94538

A. Alliance Wind Park  Operator Comment See Appendix A Comment 9	Storm Master 12	(H)	113	40 kW@	30 mph	1	0	0	10	64,958 (NV)
						2	0	0	10	188,421 (NV)
						3	0	0	10	248,390 (NV)
						4	0	0	10	0 (V)
						Annual	0			501,769

**PROJECT TOTAL** 501,769

## 1991 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)
<i>SAN GORGONIO PASS (Riverside)</i>										
24	WINDUSTRIES, INC. P.O. Box 913 North Palm Springs, CA 92258									
	A. Windustries I	Enertech 44/40	(H)	141	40 kW @ 30 mph	1	23,500	0	96	42,200 (NV)
						2	58,700	0	96	2,717,700 (V)
						3	45,500	0	96	2,299,200 (V)
						4	20,300	0	96	804,700 (V)
						Annual	148,000			5,863,800
		Enertech 44/60	(H)	141	60 kW @ 35 mph	1	28,900	0	48	0 (NV)
						2	78,800	0	48	0 (V)
						3	58,400	0	48	19,800 (V)
						4	24,600	0	48	100 (V)
						Annual	190,700			19,900
<b>PROJECT TOTAL</b>										<b>5,883,700</b>

## 1991 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

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

SAN GORGONIO PASS (Riverside)

25 WINTEC, LTD.  
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	2,567,507 (V)
						2	84,871	0	72	5,186,015 (V)
						3	65,071	0	72	3,262,093 (V)
						4	14,732	0	72	1,136,489 (V)
						Annual	210,000			12,152,104

<b>PROJECT TOTAL</b>	<b>12,152,104</b>
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Operator Comment  
See Appendix A  
Comment 10

	B. Wintec I Windpark	Carter 25	(H)	75	25 kW @ 26 mph					
						1	17,267	0	90	842,661 (V)
						2	32,332	0	90	2,004,571 (V)
						3	24,789	0	90	1,071,105 (V)
						4	5,612	0	90	589,762 (V)
						Annual	80,000			4,508,099

		Micon 60/13	(H)	200	60 kW @ 33 mph					
						1	45,326	0	23	710,139 (V)
						2	84,871	0	23	1,588,829 (V)
						3	65,071	0	23	742,695 (V)
						4	14,732	0	23	372,638 (V)
						Annual	210,000			3,414,301

<b>PROJECT TOTAL</b>	<b>7,922,400</b>
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## 1991 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)						
<b><u>SAN GORGONIO PASS (Riverside)</u></b>															
25 WINTEC, LTD. (Cont'd)															
Other Participant: San Gorgonio Wind	C. Wintec II (Whitewater)	Nordtank 65/13	(H)	201	65 kW @ 35 mph	1	45,326	0	63	2,037,600 (V)					
						2	84,871	0	63	4,663,200 (V)					
						3	65,071	0	63	2,581,200 (V)					
						4	14,732	0	63	1,275,600 (V)					
											Annual	----- 210,000			----- 10,557,600
											<b>PROJECT TOTAL</b>				----- 10,557,600
	D. Wintec Palm Windpark	Micon 65	(H)	200	65 kW @ 33 mph	1	45,326	0	30	1,025,253 (V)					
						2	84,871	0	30	2,241,608 (V)					
						3	65,071	0	30	1,144,000 (V)					
						4	14,732	0	30	480,667 (V)					
											Annual	----- 210,000			----- 4,891,528
											<b>PROJECT TOTAL</b>				----- 4,891,528
		Nordtank 65	(H)	201	65 kW @ 34 mph	1	45,326	0	4	120,406 (V)					
						2	84,871	0	4	308,012 (V)					
						3	65,071	0	4	164,425 (V)					
						4	14,732	0	4	57,424 (V)					
											Annual	----- 210,000			----- 650,267
											<b>PROJECT TOTAL</b>				----- 650,267
					<b>PROJECT TOTAL</b>				----- 5,541,795						

## 1991 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>SAN GORGONIO PASS (Riverside)</u></i>											
26 ZOND SYSTEMS, INC. 13000 Jameson Rd. Tehachapi, CA 93581											
	A. Painted Hills "B" & "C"	Vestas 15	(H)	184	65 kW @	35 mph	1	39,748	0	61	1,292,113 (V)
							2	87,085	0	61	3,865,088 (V)
Operator Comment							3	58,454	0	61	1,980,264 (V)
See Appendix A							4	27,271	0	61	948,108 (V)
Comment 11							Annual	212,558			8,085,573
		Vestas 17	(H)	227	90 kW @	45 mph	1	46,807	0	170	4,891,012 (V)
							2	102,550	0	170	13,152,314 (V)
							3	68,834	0	170	6,511,733 (V)
							4	32,114	0	170	3,405,345 (V)
							Annual	250,305			27,960,404
							<b>PROJECT TOTAL</b>				<b>36,045,977</b>
	B. Zond-PanAero Windsystems	Vestas 15	(H)	184	65 kW @	35 mph	1	48,749	0	460	10,025,452 (V)
							2	93,088	0	460	26,313,735 (V)
							3	68,169	0	460	14,249,590 (V)
							4	37,701	0	460	8,962,840 (V)
							Annual	247,707			59,551,617
							<b>PROJECT TOTAL</b>				<b>59,551,617</b>

## 1991 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>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	8,740,800 (V)
						2	81,900	0	600	34,209,600 (V)
						3	86,100	0	600	58,632,000 (V)
						4	21,000	0	600	11,952,000 (V)
						Annual	----- 210,000			----- 113,534,400
									<b>PROJECT TOTAL</b>	<b>113,534,400</b>

## 1991 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)	
			(M2)	(kW)						
<u>TEHACHAPI PASS (Kern)</u>										
28	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	231	4,654,565 (V)
						2	60,750	0	231	11,632,838 (V)
						3	45,600	0	231	4,167,519 (V)
						4	55,650	0	229	5,448,000 (V)
					Annual		202,500			25,902,922
		Windane 14	(H)	144	40 kW @ 30 mph	1	0	0	14	14,710 (V)
						2	0	0	14	2,270 (V)
						3	0	0	14	0 (V)
						4	0	0	0	0 (V)
					Annual		0			16,980
		Windtech 75	(H)	250	75 kW @ 55 mph	1	0	0	5	34,725 (V)
						2	0	0	5	88,892 (V)
						3	0	0	5	20,481 (V)
						4	0	0	5	12,000 (V)
					Annual		0			156,098
									<b>PROJECT TOTAL</b>	<b>26,074,000</b>

## 1991 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)

TEHACHAPI PASS (Kern)

29 CALWIND RESOURCES, INC.  
 23241 Ventura Blvd., Suite 216  
 Woodland Hills, CA 91364

A. Natural Resource Ventures (Wind Resource I)	Nordtank 65/13	(H)	201	65 kW @	35 mph	1	24,500	0	20	333,325 (V)
						2	36,500	0	20	721,458 (V)
						3	21,200	0	20	241,388 (V)
						4	17,800	0	20	284,798 (V)
						Annual	----- 100,000			----- 1,580,969

**PROJECT TOTAL** 1,580,969

B. Calwind Resources Inc. (Wind Resource I)	Nordtank 65/13	(H)	201	65 kW @	35 mph	1	28,440	0	114	2,606,675 (V)
						2	41,760	0	114	5,794,542 (V)
						3	28,320	0	114	2,146,612 (V)
						4	21,480	0	114	2,179,202 (V)
						Annual	----- 120,000			----- 12,727,031

**PROJECT TOTAL** 12,727,031



## 1991 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

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

TEHACHAPI PASS (Kern)

30 CANNON FINANCIAL GROUP (Cont'd)

A. Cameron Ridge Windpark Phase 3, 4A, 4B (Cont'd)	Nordtank 150 (H) 330 150 kW @ 42 mph	1	0	0	102	6,251,176 (V)
		2	0	0	102	14,914,486 (NV)
		3	0	0	102	4,762,625 (V)
		4	0	0	102	4,513,965 (V)
		Annual	0	0	402	30,442,252
	Nordtank 65/136 (H) 201 65 kW @ 35 mph	1	0	0	50	1,403,944 (V)
		2	0	0	50	2,594,769 (NV)
		3	0	0	50	756,550 (V)
		4	0	0	50	988,233 (V)
		Annual	0	0	200	5,743,496
Nordtank 90/16.6 (H) 215 74 kW @ 42 mph	1	0	0	340	11,178,228 (V)	
	2	0	0	340	21,829,428 (NV)	
	3	0	0	340	7,536,206 (V)	
	4	0	0	340	9,125,462 (V)	
	Annual	0	0	1360	49,669,324	

<b>PROJECT TOTAL</b>	<b>93,878,484</b>
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## 1991 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)

TEHACHAPI PASS (Kern)

30 CANNON FINANCIAL GROUP (Cont'd)

B. Cannon Phase I	Storm Master 12	(H)	113	40 kW@	38 mph	1	0	0	85	0 (V)
						2	0	0	85	0 (NV)
						3	0	0	85	0 (V)
						4	0	0	85	0 (V)
						Annual	0	0	0	0
						<b>PROJECT TOTAL</b>				
C. Cannon Phase II 1983	CT 6000	(H)	117	75 kW@	30 mph	1	0	0	60	0 (V)
						2	0	0	60	0 (NV)
						3	0	0	60	0 (V)
						4	0	0	60	0 (V)
						Annual	0	0	0	0
						<b>PROJECT TOTAL</b>				
	Windtech 75	(H)	197	75 kW@	35 mph	1	0	0	5	0 (V)
						2	0	0	5	0 (NV)
						3	0	0	5	0 (V)
						4	0	0	5	0 (V)
						Annual	0	0	0	0
						<b>PROJECT TOTAL</b>				

## 1991 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>										
30 CANNON FINANCIAL GROUP (Cont'd)										
	D. Cannon Phase V	Micon 108	(H)	284	108 kW @ 33 mph	1	0	0	138	8,310,632 (V)
						2	0	0	138	20,313,172 (NV)
						3	0	0	138	5,686,352 (V)
						4	0	0	138	6,908,281 (V)
					Annual	-----	0		-----	41,218,437
		Micon 250	(H)	452	250 kW @ 33 mph	1	0	0	3	370,124 (V)
						2	0	0	3	919,606 (NV)
						3	0	0	3	311,985 (V)
						4	0	0	3	297,209 (V)
					Annual	-----	0		-----	1,898,924
<b>PROJECT TOTAL</b>									<b>43,117,361</b>	

## 1991 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)

31 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	100	1,603,672 (V)
						2	0	0	100	3,022,831 (V)
	Other Participant: Energy Conversion Technology, Inc.					3	0	0	100	1,291,229 (V)
						4	0	0	100	1,071,597 (V)
					Annual	0			6,989,329	
						<b>PROJECT TOTAL</b>				<b>6,989,329</b>
	B. Coram TaxVest Windfarms	Aeroman 12.5 Series II	(H)	123	40 kW @ 27 mph	1	0	0	47	647,578 (V)
						2	0	0	47	1,399,174 (V)
	Other Participant: Coram Energy Group					3	0	0	47	446,987 (V)
						4	0	0	47	436,361 (V)
					Annual	0			2,930,100	
						<b>PROJECT TOTAL</b>				<b>2,930,100</b>

## 1991 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)		
<u>TEHACHAPI PASS (Kern)</u>											
31 CORAM ENERGY GROUP (Cont'd)											
	C. Coram TaxVest Windfarms	Aeroman 12.5 Series II	(H)	123	40 kW @ 27 mph	1	0	0	109	1,454,562 (V)	
						2	0	0	109	2,898,403 (V)	
						3	0	0	109	1,201,808 (V)	
						4	0	0	109	1,034,421 (V)	
Other Participant: CTV Marketing Group						Annual	-----		0	-----	6,589,194
<b>PROJECT TOTAL</b>											
<b>6,589,194</b>											
	D. Coram Energy Group	Aeroman 12.5 Series I	(H)	123	40 kW @ 27 mph	1	0	0	27	437,726 (V)	
						2	0	0	27	832,495 (V)	
						3	0	0	27	383,346 (V)	
						4	0	0	27	300,174 (V)	
Other Participant: Energy Conversion Technology, Inc.						Annual	-----		0	-----	1,953,741
<b>PROJECT TOTAL</b>											
<b>1,953,741</b>											

## 1991 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)	
			(M2)	(kW)						
<b><u>TEHACHAPI PASS (Kern)</u></b>										
32 ENERGY UNLIMITED, INC. 1 Aldwyn Center Villanova, PA 19085										
	A. Windy Flats '82 and Mountain Flats '83	Carter 25	(H)	75	25 kW @ 25 mph	1	27,774	0	25	0 (V)
						2	23,320	0	25	0 (V)
						3	12,464	0	25	0 (V)
						4	16,472	0	25	0 (V)
Other Participant: Zond Systems, Inc.										
					Annual	----- 80,030				----- 0
<b>PROJECT TOTAL</b>									<b>0</b>	

33 FLOWIND CORPORATION  
1183 Quarry Lane  
Pleasanton, CA 94566

	A. FloWind Cameron Ridge	Flowind 17	(V)	260	142 kW @ 44 mph	1	59,841	0	161	6,486,072 (V)
						2	90,175	0	161	13,458,150 (V)
						3	46,249	0	161	4,163,780 (V)
						4	55,297	0	161	4,139,575 (V)
Operator Comment See Appendix A Comment 12										
					Annual	----- 251,562				----- 28,247,577

## 1991 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

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

TEHACHAPI PASS (Kern)

33 FLOWIND CORPORATION (Cont'd)

A. FloWind Cameron Ridge (Cont'd)	Flowind 19	(V) 340	250 kW @	38 mph	1	115,641	0	122	5,261,437 (V)
					2	182,951	0	122	10,936,730 (V)
					3	90,982	0	122	3,810,880 (V)
					4	103,621	0	122	3,286,841 (V)
					Annual	493,195			23,295,888
	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
Sumitomo H22	(H) 363	200 kW @	30 mph	1	0	0	1	0 (V)	
				2	0	0	1	0 (V)	
				3	0	0	1	0 (V)	
				4	0	0	1	0 (V)	
				Annual	0			0	

## 1991 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)

TEHACHAPI PASS (Kern)

33 FLOWIND CORPORATION (Cont'd)

	A. FloWind Cameron Ridge (Cont'd)	Sumitomo H36	(H)	1,018	600 kW@	30 mph	1	0	0	3	200,703 (V)
							2	0	0	3	0 (V)
							3	0	0	3	0 (V)
							4	0	0	3	0 (V)
							Annual	0			200,703
										<b>PROJECT TOTAL</b>	<b>51,744,168</b>
	B. FloWind IV	Flowind 19	(V)	340	250 kW @	38 mph	1	94,005	0	58	2,336,520 (V)
							2	165,917	0	58	5,385,608 (V)
							3	84,944	0	58	1,923,748 (V)
							4	84,562	0	58	1,742,688 (V)
							Annual	429,428			11,388,564
										<b>PROJECT TOTAL</b>	<b>11,388,564</b>

Operator Comment  
See Appendix A  
Comment 13

## 1991 ANNUAL WIND PROJECT PERFORMANCE REPORTING DATA

Location/Operator	Project	Turbine Specification			Projected		Turbines		Electricity	
		Model	Axis	Rotor Size (M2) (kW)	Qtr.	Prod./Turbine (kWh)	Installed New	Cum.	Produced (kWh)	
<b><u>TEHACHAPI PASS (Kern)</u></b>										
34 MOGUL ENERGY CORPORATION 5204 Lansdale Bakersfield, CA 93306										
	A. Liberty Wind Park	Blue Max	(H)	97	39 kW@ 35 mph	1	11,300	0	80	361,128 (V)
					39 kW@ 35 mph	2	32,800	0	80	1,050,014 (V)
					50 kW@ 35 mph	3	21,124	0	80	296,256 (V)
					50 kW@ 35 mph	4	9,276	0	80	270,693 (NV)
Operator Comment See Appendix A Comment 14										
					Annual		74,500			1,978,091
<b>PROJECT TOTAL</b>										<b>1,978,091</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	32,006	0	1	24,783 (V)
						2	62,161	0	1	48,548 (V)
						3	38,587	0	1	15,458 (V)
						4	28,532	0	1	13,377 (V)
Operator Comment See Appendix A Comment 15										
					Annual		161,286			102,166
		Oak 4	(H)	78	15 kW @ 27 mph	1	10,847	0	10	105,960 (V)
						2	21,072	0	10	141,311 (V)
						3	13,083	0	10	56,936 (V)
						4	9,672	0	10	19,902 (V)
					Annual		54,674			324,109

## 1991 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)

TEHACHAPI PASS (Kern)

35 OAK CREEK ENERGY SYSTEMS (Cont'd)

A. Oak Creek Energy Systems (Cont'd)	Oak 5	(H) 80	22 kW @ 27 mph	1	12,110	0	1	7,009 (V)
				2	23,521	0	1	16,808 (V)
				3	14,600	0	1	6,437 (V)
				4	10,796	0	1	4,916 (V)
				Annual	61,027			35,170
	Oak 7A	(H) 184	55 kW @ 27 mph	1	20,089	0	79	1,356,699 (V)
				2	39,015	0	79	2,840,929 (V)
				3	24,219	0	79	982,781 (V)
				4	17,908	0	79	854,576 (V)
				Annual	101,231			6,034,985
	Oak 7B	(H) 199	55 kW @ 27 mph	1	21,410	0	132	2,486,454 (V)
				2	41,581	0	132	5,503,683 (V)
				3	25,812	0	132	2,300,871 (V)
				4	19,086	0	132	1,570,590 (V)
				Annual	107,889			11,861,598

## 1991 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)

TEHACHAPI PASS (Kern)

35 OAK CREEK ENERGY SYSTEMS (Cont'd)

A. Oak Creek Energy Systems (Cont'd)	Oak 9	(H)	296	90 kW @	27 mph	1	32,454	0	100	3,254,120 (V)
						2	63,032	0	100	7,295,007 (V)
						3	39,127	0	100	3,137,167 (V)
						4	28,932	0	100	2,342,472 (V)
						Annual	-----163,545			-----16,028,766

<b>PROJECT TOTAL</b>	34,386,794
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## 1991 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)

TEHACHAPI PASS (Kern)

36 SEAWEST ENERGY GROUP  
 1455 Frazee Road, Suite 300  
 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	7,072,237 (V)
Operator Comment See Appendix A Comment 16						2	204,000	0	91	11,432,248 (V)
						3	162,000	0	91	13,546,474 (V)
						4	114,000	0	91	5,434,444 (V)
						Annual	600,000			37,485,403
		Micon 110	(H)	300	108 kW @ 30 mph	1	70,700	0	251	13,834,493 (V)
						2	137,800	0	251	22,505,265 (V)
						3	85,700	0	251	17,603,550 (V)
						4	78,200	0	251	8,175,524 (V)
						Annual	372,400			62,118,832
		MWT-250	(H)	491	250 kW @ 21 mph	1	130,000	0	20	2,048,999 (V)
						2	240,500	0	20	4,715,021 (V)
						3	149,500	0	20	2,282,011 (V)
						4	130,000	0	20	1,290,802 (V)
						Annual	650,000			10,336,833

## 1991 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>										
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	3,906,811 (V)
						2	150,400	0	62	8,123,465 (V)
						3	93,500	0	62	4,446,980 (V)
						4	85,400	0	62	2,433,453 (V)
					Annual		406,600			18,910,709
							PROJECT TOTAL			128,851,777
	B. Mojave 17/16/18	MWT-250	(H)	610	250 kW @ 29 mph	1	156,450	0	340	25,360,744 (V)
						2	260,750	0	340	70,158,030 (V)
						3	178,800	0	340	31,068,060 (V)
						4	149,000	0	340	19,286,808 (V)
					Annual		745,000			145,873,642
							PROJECT TOTAL			145,873,642
	C. Mojave 4/Mojave 3/Mojave 5	MWT-250	(H)	610	250 kW @ 29 mph	1	156,450	300	300	27,923,980 (V)
						2	260,750	0	300	86,652,000 (V)
						3	178,800	0	300	49,515,096 (V)
						4	149,000	0	300	27,327,863 (V)
					Annual		745,000			191,418,939
							PROJECT TOTAL			191,418,939



## 1991 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)
			(M2)	(kW)					

TEHACHAPI PASS (Kern)

39 WINDLAND, INC.  
118 State Place, Suite 201  
Escondido, CA 92029

Operator Comment  
See Appendix A  
Comment 17,18

	A. Windland Wind Park (Boxcar I)	Bonus 120/20	(H)	296	120 kW @ 40 mph	1	78,000	0	11	456,061 (V)
						2	157,000	0	11	1,202,584 (V)
						3	78,500	0	11	426,338 (V)
						4	78,500	0	11	543,559 (V)
					Annual		392,000			2,628,542
		Carter 25	(H)	77	25 kW @ 30 mph	1	15,300	0	39	331,462 (V)
						2	30,700	0	39	729,734 (V)
						3	15,300	0	39	244,889 (V)
						4	15,300	0	39	233,937 (V)
					Annual		76,600			1,540,022
		Carter 250/300	(H)	332	250 kW @ 38 mph	1	120,000	0	13	279,471 (V)
						2	240,000	0	13	580,486 (V)
						3	120,000	0	13	263,512 (V)
						4	120,000	0	11	251,254 (V)
					Annual		600,000			1,374,723
		Storm Master 12	(H)	113	40 kW @ 42 mph	1	18,000	0	10	53,007 (V)
						2	36,000	0	10	111,197 (V)
						3	18,000	0	10	47,401 (V)
						4	18,000	0	10	44,610 (V)
					Annual		90,000			256,215

## 1991 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)

TEHACHAPI PASS (Kern)

39 WINDLAND, INC. (Cont'd)

A. Windland Wind Park (Boxcar I) (Cont'd)	Vestas 27	(H) 573	225 kW@	30 mph	1	----	----	----	----	
					2	----	----	----	----	
					3	157,500	12	12	714,661 (V)	
					4	157,500	0	12	1,049,418 (V)	
					Annual	315,000			1,764,079	
	Bonus 65/13	(H) 181	65 kW @	40 mph	1					
					2					
					3	37,200	4	4	0 (V)	
					4	37,200	0	4	43,621 (V)	
					Annual	74,400			43,621	
<b>PROJECT TOTAL</b>									<b>7,607,202</b>	
B. Windland Wind Park (Boxcar II)	Bonus 65/13	(H) 181	65 kW @	40 mph	1	37,200	0	4	44,537 (V)	
					2	74,400	0	4	64,933 (V)	
					3	----	----	----	----	
					4	----	----	----	----	
					Annual	111,600			109,470	
	Vestas 27	(H) 573	225 kW@	30 mph	1	----	----	----	----	
					2	----	----	----	----	
					3	157,500	15	15	775,213 (V)	
					4	157,500	0	15	1,258,110 (V)	
					Annual	315,000			2,033,323	

Operator Comment  
See Appendix A  
Comment 19

## 1991 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)

39 WINDLAND, INC. (Cont'd)

B. Windland Wind Park (Boxcar II) (Cont'd)	Enertech 44/60	(H)	180	60 kW @ 35 mph	1	0	0	12	150,386 (V)
					2	0	0	12	241,417 (V)
					3	0	0	12	108,042 (V)
					4	0	0	12	98,859 (V)
					Annual	0	0	48	598,704
	Vestas 25	(H)	491	200 kW @ 30 mph	1	125,000	0	20	2,363,076 (V)
					2	125,000	0	20	4,377,650 (V)
					3	125,000	0	20	1,390,746 (V)
					4	125,000	0	20	1,703,030 (V)
					Annual	500,000	0	80	9,834,502

**PROJECT TOTAL** 12,575,999

40 WINDRIDGE  
406 East Tehachapi Blvd.  
Tehachapi, CA 93561

A. Willowind	FAILED TO FILE	1	692,000 (UD)
	FAILED TO FILE	2	1,570,000 (UD)
	FAILED TO FILE	3	738,000 (UD)
	FAILED TO FILE	4	588,000 (UD)

**PROJECT TOTAL** 3,588,000

## 1991 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)
			(M2)	(kW)					
<b><u>TEHACHAPI PASS (Kern)</u></b>									
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	83,895	0	15	457,063 (V)
					2	110,896	0	15	1,146,057 (V)
Operator Comment See Appendix A Comment 20					3	66,277	0	15	450,919 (V)
					4	56,958	0	15	454,762 (V)
					Annual	318,026			2,508,801
						<b>PROJECT TOTAL</b>			<b>2,508,801</b>
	B. Project '82 Pool VO1, 1983 Pool VO2	Vestas 15	(H) 184	65 kW @ 35 mph	1	56,677	0	66	873,316 (V)
					2	74,918	0	66	2,155,905 (V)
Operator Comment See Appendix A Comment 21					3	43,423	0	66	527,792 (V)
					4	37,318	0	66	700,844 (V)
					Annual	212,336			4,257,857
						<b>PROJECT TOTAL</b>			<b>4,257,857</b>
	C. Project '82 Pool WO1, 1983 Pool WO2	Windmatic 14S	(H) 165	65 kW @ 35 mph	1	56,269	0	30	107,658 (V)
					2	74,378	0	30	431,892 (V)
Operator Comment See Appendix A Comment 22					3	44,452	0	30	137,832 (V)
					4	38,202	0	30	229,458 (V)
					Annual	213,301			906,840
						<b>PROJECT TOTAL</b>			<b>906,840</b>

## 1991 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>															
41 ZOND SYSTEMS, INC. (Cont'd)															
Operator Comment See Appendix A Comment 23	D. Project '83 Pool VO2, ZO1, ZO2, '84 Pool VO4	Vestas 15	(H)	184	65 kW @ 35 mph	1	62,772	0	95	1,581,278 (V)					
						2	82,974	0	95	3,779,339 (V)					
						3	49,060	0	95	1,068,531 (V)					
						4	42,163	0	95	1,293,899 (V)					
											Annual	236,969			7,723,047
											<b>PROJECT TOTAL</b>				<b>7,723,047</b>
Operator Comment See Appendix A Comment 24	E. Project '84 Pool VO4, '85 Pool VZ1	Vestas 15	(H)	184	65 kW @ 35 mph	1	52,220	0	97	1,688,149 (V)					
						2	69,026	0	97	3,871,249 (V)					
						3	41,254	0	97	1,202,150 (V)					
						4	35,454	0	97	1,473,877 (V)					
											Annual	197,954			8,235,425
											<b>PROJECT TOTAL</b>				<b>8,235,425</b>
Operator Comment See Appendix A Comment 25	F. Project '84 Pool VO4, VO5, '85 Pool VO7, '85 VZ1	Vestas 15	(H)	184	65 kW @ 35 mph	1	49,180	0	87	1,501,379 (V)					
						2	65,008	0	87	3,670,792 (V)					
						3	38,852	0	87	1,051,096 (V)					
						4	33,390	0	87	1,158,307 (V)					
											Annual	186,430			7,381,574
											<b>PROJECT TOTAL</b>				<b>7,381,574</b>

## 1991 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)
			(M2)	(kW)					
<b><u>TEHACHAPI PASS (Kern)</u></b>									
41 ZOND SYSTEMS, INC. (Cont'd)									
	G. Project '84 Pool VO6	Vestas 17	(H) 227	90 kW @ 35 mph	1	64,630	0	4	141,086 (V)
					2	85,430	0	4	296,088 (V)
Operator Comment					3	51,057	0	4	91,996 (V)
See Appendix A					4	43,879	0	4	105,722 (V)
Comment 26					Annual	244,996			634,892
									<b>PROJECT TOTAL 634,892</b>
	H. Project '84 Pool WO3	Windmatic 15S	(H) 184	65 kW @ 35 mph	1	32,495	0	9	6 (V)
	'84 Pool WO4				2	42,954	0	9	3,365 (V)
					3	25,671	0	9	457 (V)
					4	22,062	0	9	0 (V)
					Annual	123,182			3,828
									<b>PROJECT TOTAL 3,828</b>
	I. Project '84 Pool WO4	Windmatic 15S	(H) 184	65 kW @ 35 mph	1	8,754	0	1	0 (V)
					2	11,572	0	1	0 (V)
					3	6,916	0	1	0 (V)
					4	5,943	0	1	0 (V)
					Annual	33,185			0
									<b>PROJECT TOTAL 0</b>

## 1991 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)

	J. Project '85 Pool V13	Vestas 15	(H)	184	65 kW @ 35 mph	1	0	0	8	75,283 (V)
						2	0	0	8	347,829 (V)
						3	0	0	8	84,013 (V)
						4	0	0	8	90,813 (V)
Operator Comment See Appendix A Comment 27						Annual	0			597,938

**PROJECT TOTAL** 597,938

	K. Project '85 Pool V14, V18, V20	Vestas 15	(H)	184	65 kW @ 35 mph	1	38,567	0	41	694,740 (V)
						2	53,923	0	41	1,555,849 (V)
						3	32,514	0	41	424,436 (V)
						4	29,018	0	41	422,904 (V)
Operator Comment See Appendix A Comment 28						Annual	154,022			3,097,929

**PROJECT TOTAL** 3,097,929

	L. Project '85 Pool V19, V21, V26	Vestas 17	(H)	227	90 kW @ 35 mph	1	49,123	0	41	1,202,002 (V)
						2	68,682	0	41	2,701,739 (V)
						3	41,413	0	41	870,960 (V)
						4	36,960	0	41	1,014,804 (V)
Operator Comment See Appendix A Comment 29						Annual	196,178			5,789,505

**PROJECT TOTAL** 5,789,505

## 1991 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)	
			(M2)	(kW)					

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	58,423	0	34	903,243 (V)
						2	77,226	0	34	2,316,444 (V)
Operator Comment See Appendix A Comment 30						3	46,154	0	34	888,686 (V)
						4	39,665	0	34	1,016,601 (V)
						Annual	221,468			5,124,974
							<b>PROJECT TOTAL</b>			<b>5,124,974</b>
	N. Project '85 Windsystems Partners, "A" and "B"	Vestas 17	(H)	227	90 kW @ 35 mph	1	61,199	0	151	1,960,135 (V)
						2	83,046	0	151	8,108,605 (V)
Operator Comment See Appendix A Comment 31						3	48,034	14	165	3,198,877 (V)
						4	46,221	0	165	3,772,546 (V)
						Annual	238,500			17,040,163
							<b>PROJECT TOTAL</b>			<b>47,214,723</b>
		Vestas 17	(H)	227	90 kW @ 35 mph	1	61,199	0	249	5,069,371 (V)
						2	83,046	0	249	15,028,336 (V)
						3	48,034	0	235	4,255,972 (V)
						4	46,221	0	235	5,820,881 (V)
						Annual	238,500			30,174,560
							<b>PROJECT TOTAL</b>			<b>47,214,723</b>

## 1991 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)
			(M2)	(kW)					
<b><u>TEHACHAPI PASS (Kern)</u></b>									
41 ZOND SYSTEMS, INC. (Cont'd)									
	O. Project '86 Pool V23	Vestas 23	(H) 415	200 kW @ 35 mph	1	74,557	0	1	0 (V)
					2	98,552	0	1	0 (V)
					3	58,899	0	1	27,729 (V)
					4	50,618	0	1	19,835 (V)
Operator Comment See Appendix A Comment 32					Annual	282,626			47,564
									47,564
									<b>PROJECT TOTAL</b> 47,564
	P. Project '86 Pool V26	Vestas 17E	(H) 227	90 kW @ 35 mph	1	51,180	0	1	41,887 (V)
					2	71,558	0	1	93,037 (V)
					3	43,147	0	1	40,714 (V)
					4	38,507	0	1	35,996 (V)
Operator Comment See Appendix A Comment 33					Annual	204,392			211,634
									211,634
									<b>PROJECT TOTAL</b> 211,634
	Q. Project Victory Garden Phase IV	Vestas 27	(H) 572	225 kW @ 35 mph	1	110,882	0	31	2,738,279 (V)
					2	181,960	0	31	7,764,965 (V)
					3	137,981	0	31	3,177,220 (V)
					4	122,650	0	31	3,442,669 (V)
Operator Comment See Appendix A Comment 34					Annual	553,473			17,123,133

## 1991 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)

TEHACHAPI PASS (Kern)

41 ZOND SYSTEMS, INC. (Cont'd)

Q. Project Victory Garden Phase IV (Cont'd)	Vestas 27	(H)	572	225 kW @	35 mph	1	118,895	0	31	3,005,816 (V)
						2	172,530	0	31	6,001,761 (V)
						3	130,830	0	31	2,052,315 (V)
						4	116,293	0	31	2,831,324 (V)
						Annual	538,548			13,891,216
	Vestas 27	(H)	572	225 kW@	35 mph	1	116,942	0	31	3,454,381 (V)
						2	184,999	0	31	6,885,017 (V)
						3	140,285	0	31	2,991,281 (V)
						4	124,698	0	31	3,145,900 (V)
						Annual	566,924			16,476,579
	Vestas 27	(H)	572	225 kW@	35 mph	1	118,304	0	5	507,501 (V)
						2	184,079	0	5	1,255,774 (V)
						3	139,587	0	5	513,501 (V)
						4	124,078	0	5	516,758 (V)
						Annual	566,048			2,793,534

<b>PROJECT TOTAL</b>	<b>50,284,462</b>
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## 1991 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)

Operator Comment See Appendix A Comment 35	R. Project Zond '87 Pool V26	Vestas 15	(H) 184	65 kW @ 35 mph	1	42,718	0	2	37,822 (V)	
					2	66,468	0	2	154,676 (V)	
					3	50,403	0	2	54,193 (V)	
					4	44,803	0	2	44,800 (V)	
					Annual	204,392			291,491	
	Operator Comment See Appendix A Comment 36	S. Project Zond '87 (H&S 20)	Vestas 17	(H) 227	90 kW @ 35 mph	1	43,326	0	59	1,509,186 (V)
						2	67,414	0	59	4,480,001 (V)
						3	48,558	0	59	1,628,130 (V)
						4	43,162	0	59	1,757,265 (V)
						Annual	202,460			9,374,582
<b>PROJECT TOTAL</b>								<b>9,666,073</b>		
<b>PROJECT TOTAL</b>								<b>11,045,525</b>		

## 1991 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)

TEHACHAPI PASS (Kern)

41 ZOND SYSTEMS, INC. (Cont'd)

	T. Project Zond '87 (QFID 6107)	Vestas 15	(H)	184	65 kW @ 35 mph	1	42,718	0	3	57,914 (V)
						2	66,468	0	3	207,901 (V)
Operator Comment See Appendix A Comment 37						3	50,403	0	3	83,526 (V)
						4	44,803	0	3	58,371 (V)
						Annual	----- 204,392			----- 407,712
		Vestas 17	(H)	227	65 kW @ 35 mph	1	42,718	0	47	1,448,851 (V)
						2	66,468	0	47	4,311,972 (V)
						3	50,403	0	47	1,814,426 (V)
						4	44,803	0	47	1,803,479 (V)
						Annual	----- 204,392			----- 9,378,728
		Vestas 17E	(H)	227	90 kW @ 35 mph	1	42,718	0	13	178,738 (V)
						2	66,468	0	13	970,649 (V)
						3	50,403	0	13	568,887 (V)
						4	44,803	0	13	523,721 (V)
						Annual	----- 204,392			----- 2,241,995

**PROJECT TOTAL** **12,028,435**

## 1991 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)	New	Cum.	(kWh)

TEHACHAPI PASS (Kern)

41 ZOND SYSTEMS, INC. (Cont'd)

	U. Project Zond '87 (QFID 6108)	Vestas 17	(H)	227	90 kW @ 35 mph	1	42,718	0	62	1,756,218 (V)
						2	66,468	0	62	4,744,306 (V)
						3	50,403	0	62	1,934,136 (V)
						4	44,803	0	62	2,028,541 (V)
						Annual	204,392			10,463,201

Operator Comment  
See Appendix A  
Comment 38

**PROJECT TOTAL** 10,463,201

	V. Project Zond '84, Pool V04 1985 Pool V07	Vestas 15	(H)	184	65 kW @ 35 mph	1	47,257	0	45	797,280 (V)
						2	62,465	0	45	2,000,751 (V)
						3	37,332	0	45	746,790 (V)
						4	32,084	0	45	716,862 (V)
						Annual	179,138			4,261,683

Operator Comment  
See Appendix A  
Comment 39

**PROJECT TOTAL** 4,261,683

## 1991 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>										
41 ZOND SYSTEMS, INC. (Cont'd)										
	W. Sky River	Vestas 27/6067	(H)	573	225 kW@	35 mph	1	----	----	----
							2	121,647	81	81
Operator Comment							3	131,819	0	81
See Appendix A							4	103,980	12	93
Comment 40							Annual	357,446		37,017,737
		Vestas 27/6066	(H)	573	225 kW@	35 mph	1	----	----	----
							2	----	----	----
							3	128,758	83	83
							4	111,436	4	87
							Annual	240,194		18,175,904
		Vestas 27/6065	(H)	573	225 kW@	35 mph	1	----	----	----
							2	----	----	----
							3	17,071	70	70
							4	110,545	92	162
							Annual	127,616		18,381,746
<b>PROJECT TOTAL</b>								<b>73,575,387</b>		

## APPENDIX A: OPERATOR COMMENTS

Comment Number	Operator/Project Number	Project Name	Comment(s)
1.	Howden Wind Parks (5A)	Howden Wind Park I	Wind park is in full operation.
2.	Seawest Energy Group (7F)	TaxVest Windfarm 174	Micon 60/13 turbines were reassigned in third and fourth quarters from TaxVest to Seawest Energy (7H).
3.	Tera Corporation (8A)	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. In first quarter, projected production is based on average annual site wind speed of 18.6 mph.
4.	Windmaster (10A)	Windmaster	Effective May 16, 1990 all Windmaster Model 250kW turbines were placed under Viking Capital management and operated by Seawest Altamont. Viking Capital has elected not to operate the turbines since the fourth quarter of 1990.
5.	Zond Systems, Inc. (11A)	'85 Zond Windsystem Partners Series 85C	The production reported for this contract and turbine model includes kilowatt hours which would have been produced except that production was curtailed in the third and fourth quarters at the request of the purchasing utility and due to new facility construction requirements.
6.	Energy Unlimited (15A)	Mountain Pass '85 Ltd.	The number of cumulative turbines reflects upgrades to Bonus turbines during third quarter.

Comment Number	Operator/Project Number	Project Name	Comment(s)																		
7.	San Gorgonio Farms (18A)	San Gorgonio Farms	Floda turbines were removed from the system in November 1990 and returned to service in third quarter 1991.																		
8.	Southern California Sunbelt (20A)	Palm Springs Wind Park (Edom Hill)	Four Windmatic 17's were on line late second quarter but were initially reported as model 15S.																		
9.	Windtricity (23A)	Alliance Wind Park	Turbines were shut down during fourth quarter for preventive maintenance and repairs.																		
10.	Wintec, Ltd. (25B)	Wintec I Windpark	Ninety-five (95) Carter 25kW turbines were removed for retrofit.																		
11.	Zond Systems, Inc. (26A)	Painted Hills "B" & "C"	Turbine performance upgrades were completed in the fourth quarter.																		
12.	Flowind Corporation (33A)	Cameron Ridge	<p>Curtailed hours are included in the energy produced figure:</p> <table border="1"> <thead> <tr> <th></th> <th>17M</th> <th>19M</th> </tr> </thead> <tbody> <tr> <td>1st quarter</td> <td>3,506,128</td> <td>2,142,084</td> </tr> <tr> <td>2nd quarter</td> <td>4,555,784</td> <td>2,991,096</td> </tr> <tr> <td>3rd quarter</td> <td>1,118,472</td> <td>592,188</td> </tr> <tr> <td>4th quarter</td> <td><u>2,057,352</u></td> <td><u>545,064</u></td> </tr> <tr> <td></td> <td>11,237,736</td> <td>6,270,432</td> </tr> </tbody> </table> <p>Model 5 was a temporary interconnection to the substation and was terminated March 31, 1991.</p>		17M	19M	1st quarter	3,506,128	2,142,084	2nd quarter	4,555,784	2,991,096	3rd quarter	1,118,472	592,188	4th quarter	<u>2,057,352</u>	<u>545,064</u>		11,237,736	6,270,432
	17M	19M																			
1st quarter	3,506,128	2,142,084																			
2nd quarter	4,555,784	2,991,096																			
3rd quarter	1,118,472	592,188																			
4th quarter	<u>2,057,352</u>	<u>545,064</u>																			
	11,237,736	6,270,432																			

Comment Number	Operator/Project Number	Project Name	Comment(s)												
12.	Flowind Corporation (33A)	Cameron Ridge (Cont'd)	Flowind 25, Sumitomo H22 and H36 are test turbines which ran intermittently; therefore, no projected output has been provided.												
13.	Flowind Corporation (33B)	Flowind IV	<p>Curtailed hours are included in the energy produced figure shown for the 19-M turbines:</p> <table> <thead> <tr> <th></th> <th><u>19M</u></th> </tr> </thead> <tbody> <tr> <td>1st quarter</td> <td>1,460,520</td> </tr> <tr> <td>2nd quarter</td> <td>2,589,608</td> </tr> <tr> <td>3rd quarter</td> <td>723,748</td> </tr> <tr> <td>4th quarter</td> <td><u>410,688</u></td> </tr> <tr> <td></td> <td>5,184,564</td> </tr> </tbody> </table>		<u>19M</u>	1st quarter	1,460,520	2nd quarter	2,589,608	3rd quarter	723,748	4th quarter	<u>410,688</u>		5,184,564
	<u>19M</u>														
1st quarter	1,460,520														
2nd quarter	2,589,608														
3rd quarter	723,748														
4th quarter	<u>410,688</u>														
	5,184,564														
14.	Mogul Energy Corp. (34A)	Liberty Wind Park	During third quarter, 45 of 80 Blue Max turbines were in operation. During fourth quarter, 47 of 80 turbines were in operation.												
15.	Oak Creek Energy (35A)	Oak Creek	All Oak 4 model turbines were permanently retired from service during December 1991.												

Comment Number	Operator/Project Number	Project Name	Comment(s)																								
16.	Seawest Energy Corp. (36A)	Difwind VI/Viking I/ Viking II/ToyoWest	<p>Curtailed hours occurred in first quarter only as follows:</p> <table border="1"> <thead> <tr> <th><u>Model</u></th> <th><u>Production</u></th> <th><u>Curtailment</u></th> <th><u>Total</u></th> </tr> </thead> <tbody> <tr> <td>Nordtank 150</td> <td>3,031,534</td> <td>875,277</td> <td>3,906,811</td> </tr> <tr> <td>MWT 250</td> <td>1,854,671</td> <td>194,328</td> <td>2,048,999</td> </tr> <tr> <td>Danwin 160</td> <td>4,515,293</td> <td>2,556,944</td> <td>7,072,237</td> </tr> <tr> <td>Micon 110</td> <td><u>8,778,502</u></td> <td><u>5,055,991</u></td> <td><u>13,834,493</u></td> </tr> <tr> <td></td> <td>18,180,000</td> <td>8,682,540</td> <td>26,862,540</td> </tr> </tbody> </table>	<u>Model</u>	<u>Production</u>	<u>Curtailment</u>	<u>Total</u>	Nordtank 150	3,031,534	875,277	3,906,811	MWT 250	1,854,671	194,328	2,048,999	Danwin 160	4,515,293	2,556,944	7,072,237	Micon 110	<u>8,778,502</u>	<u>5,055,991</u>	<u>13,834,493</u>		18,180,000	8,682,540	26,862,540
<u>Model</u>	<u>Production</u>	<u>Curtailment</u>	<u>Total</u>																								
Nordtank 150	3,031,534	875,277	3,906,811																								
MWT 250	1,854,671	194,328	2,048,999																								
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Micon 110	<u>8,778,502</u>	<u>5,055,991</u>	<u>13,834,493</u>																								
	18,180,000	8,682,540	26,862,540																								
17.	Windland, Inc. (39A)	Windland Boxcar I	Cumulative total for Carter 250 turbines has been revised. Turbine models Bonus 65/13 and Vestas 27-225 were originally located at the Boxcar II site. They were moved to Boxcar I in July 1991.																								
18.-19.	Windland, Inc. (39A) (39B)	Windland Boxcar I Windland Boxcar II	The report of electricity produced, for each model turbine, is net kilowatt hours. The difference in the meter readings between the turbines and the Edison side of the interconnect facility, assuming meters are accurate, is transmission line losses. Transmission line losses average about five percent of the gross production. Gross production is the sum of meter readings from each turbine site.																								

Comment Number	Operator/Project Number	Project Name	Comment(s)
20.-39.	Zond Systems, Inc. (41A-G, J-W)	Project Names As Listed	The production reported for this contract and specified turbine models includes kilowatt-hours which would have been produced except that production was curtailed at the request of the purchasing utility and due to new facility construction requirements.
(41A)		Project '82 Pool PO1, 1983 Pool PO2	Curtailed production occurred in first and third quarters.
(41B)		Project '82 Pool VO1, 1983 Pool VO2	Curtailed production occurred in first and third quarters.
(41C)		Project '82 Pool WO1, 1983 Pool WO2	Curtailed production occurred in first and third quarters.
(41D)		Project '83 Pool VO2, ZO1, ZO2, '84 Pool VO4	Curtailed production occurred in first and third quarters.
(41E)		Project '84 Pool VO4, '85 Pool VZ1	Curtailed production occurred in first and third quarters.
(41F)		Project '84 Pool VO4, VO5, '85 Pool VO7, '85 VZ1	Curtailed production occurred in first and third quarters.
(41G)		Project '84 Pool VO6	Curtailed production occurred in first and third quarters.
(41J)		Project '85 Pool V13	Curtailed production occurred in first and second quarters.

Comment Number	Operator/Project Number	Project Name	Comment(s)
20.-39.	Zond Systems, Inc. (41A-G, J-W)	Project Names as Listed	The production reported for this contract and specified turbine models includes kilowatt hours which would have been produced except that production was curtailed at the request of the purchasing utility and due to new facility construction requirements.
(41K)		Project '85 Pool V14, V18, V20	Curtailed production occurred in first quarter.
(41L)		Project '85 Pool V19, V21, V26	Curtailed production occurred in first quarter.
(41M)		Project '85 Pool V22 '86 Pool V25, '87 Pool V26	Curtailed production occurred in first and third quarters.
(41N)		Project '85 Windsystems Partners, "A" and "B"	Curtailed production occurred in first, second and third quarters.
(41O)		Project '86 Pool V23	Curtailed production occurred in third quarter.
(41P)		Project '86 Pool V26	Curtailed production occurred in first quarter.
(41Q)		Project Victory Garden Phase IV	Curtailed production occurred in all four quarters.
(41R)		Project Zond '87 Pool V26	Curtailed production occurred in first, second and third quarters.

Comment Number	Operator/Project Number	Project Name	Comment(s)
20.-39.	Zond Systems, Inc. (41A-G, J-W)	Project Names As Listed	The production reported for this contract and specified turbine models includes kilowatt-hours which would have been produced except that production was curtailed at the request of the purchasing utility and due to new facility construction requirements.
	(41S)	Project Zond '87 (H&S 20)	Curtailed production occurred in first, second and third quarters.
	(41T)	Project Zond '87 (QFID 6107)	Curtailed production occurred in first, second and third quarters.
	(41U)	Project Zond '87 (QFID 6108)	Curtailed production occurred in first, second and third quarters.
	(41V)	Project Zond '84, Pool VO4 1985 Pool VO7	Curtailed production occurred in first and third quarters.
40.	Zond Systems, Inc. (41W)	Sky River	Curtailed production occurred in second quarter. Sky River reports have been revised. Projected quarterly production values for CY 1991 are not based on a full year's average. Values reflect the fact that Vestas 27/6065 and 27/6066 turbines were brought on line during third and fourth quarters and Vestas 27/6067 turbines were brought on line during second and fourth quarters.

**APPENDIX B  
WIND TURBINE MANUFACTURERS**

Appendix B contains the name, address and telephone number of each manufacturer and/or distributor of wind turbines installed in California wind projects as reported to WPRS during 1991.

MANUFACTURER/DISTRIBUTOR	COUNTRY OF ORIGIN	TURBINE BRAND NAME(S)	PROJECT(S) WHERE TURBINE IS USED
1. Airmaster c/o Basin Petroleum Service P.O. Box 1161 Powell, WY 82435 "No Longer Active"	U.S.	Airmaster	(37A)
2. American M.A.N. West Coast Office 303 Hegenberger Rd., Suite 402 Oakland, CA 94621	West Germany	Aeroman	(31A-D)
3. Bonus Wind Turbines, Inc. Fabriksvej 4 DK 7330, Brande Denmark	Denmark	Bonus	(3B-C, F) (4B) (6A) (15A) (18A) (21A) (28A) (39A-B)
4. Bouma Wind Turbines P.O. Box 79483 Houston, TX 77024	Holland	Bouma	(30A)
5. Carter Wind Systems, Inc. Route 1, Box 405A Burkburnett, TX 76364	U.S.	Carter	(25B) (32A) (39A)
6. Century Design, Inc. 3635 Afton Road San Diego, CA 92123 "No Longer Active"	U.S.	Century (CT)	(30A,C)

MANUFACTURER/DISTRIBUTOR	COUNTRY OF ORIGIN	TURBINE BRAND NAME(S)	PROJECT(S) WHERE TURBINE IS USED
7. Danish Wind Technology Marsk Stiysvey 4 DK 8800, Viborg Denmark	Denmark	Windane	(18A) (28A)
8. Danwin A/S Industrivej 12 DK-3000, Helsingor Denmark	Denmark	Danwin	(4B) (19D) (36A)
9. Delta Address Unknown "No Longer Active"	Unknown	Delta	(15A)
10. Energy Sciences, Inc. 7791 Fitch Irvine, CA 92714 "No Longer Active"	U.S.	ESI	(7C) (8A) (16A)
11. Enertech Corporation P.O. Box 1085 Norwich, VT 05055 "No Longer Active"	U.S.	Enertech	(7A) (19A,C) (24A) (39B)
12. Fayette Manufacturing Corporation P.O. Box 1149 Tracy, CA 95376	U.S.	Fayette	(3A-B, D-K)
13. Flowind Corporation 1183 Quarry Lane Pleasanton, CA 94566	U.S.	Flowind	(4A-B) (33A-B) (35A)
14. HMZ Belgium N.V. Rellestraat 3 Industrie Zone 5 3800 Sint-Truiden Belgium	Belgium	HMZ	(10A)

MANUFACTURER/DISTRIBUTOR	COUNTRY OF ORIGIN	TURBINE BRAND NAME(S)	PROJECT(S) WHERE TURBINE IS USED
15. Hall Machinery 1401 Airport Drive Bakersfield, CA 93308 "No Longer Active"	U.S.	Blue Max	(34A)
16. Holec Power Systems, Inc. P.O. Box 2227 Livermore, CA 94550	Denmark	Polenko	(2A) (41A)
17. James Howden and Company 195 Scotland Street Glasgow C5 9PJ Scotland	Scotland	Howden	(5A)
18. Micon Wind Turbines, Inc. 2352 Research Drive Livermore, CA 94556	Denmark	Micon	(3B-C,F) (7B,D-H) (14A-C) (18A) (19B-C) (22A) (25B,D) (30A,D) (36A)
19. Mitsubishi c/o SeaWest Industries, Inc. 1455 Frazee Road, Suite 300 San Diego, CA 92108	Japan	MWT	(36A-C)
20. Nordtank Energy Group Nyballevej 8 DK-8444 Balle Denmark	Denmark	Nordtank	(6A) (12A) (22A) (25A,C,D) (29A-B) (30A) (36A)
21. Oak Creek Energy Systems, Inc. P.O. Box 469 14633 Willow Springs Rd. Tehachapi, CA 93581	U.S.	Oak	(35A)
22. Starwind Maintenance 103 N. Hwy 101, Suite 2001 Encinitas, CA 92024	U.S.	Starwind	(20A)

MANUFACTURER/DISTRIBUTOR	COUNTRY OF ORIGIN	TURBINE BRAND NAME(S)	PROJECT(S) WHERE TURBINE IS USED
23. Sumitomo Machinery Corporation 2143 E. "D" Street Ontario, CA 91764	Japan	Sumitomo	(33A)
24. U.S. Windpower 6952 Preston Ave. Livermore, CA 94550	U.S.	U.S. Windpower (USW)	(9A-E) (21A) (27A)
25. Vestas P.O. Box 42 DK 6940, Lem Denmark	Denmark	Vestas	(11A) (12A) (26A-B) (39A-B) (41B, D-G, J-W)
26. Villas Styria Grossfolz 1-A 8790 Eisenerz, Austria	Austria	Floda	(18A)
27. Wincon Energy Systems 3942 Valley Ave. Pleasanton, CA 94566	U.S.	Wincon	(12A) (22A)
28. Wind Energy Group, Ltd. 345 Ruislip Rd. Southall, Middlesex, UB1 2QX England	England	Wind Energy Group (WEG)	(9C)
29. Wind Power Systems 9279 Cabot Drive San Diego, CA 92126 "No Longer Active"	U.S.	Storm Master	(23A) (30B) (39A)
30. Wind Turbine Industries Corporation 16801 Industrial Circle, S.E. Prior Lake, MN 55872	U.S.	Jacobs	(13A) (16A) (17A-B)

MANUFACTURER/DISTRIBUTOR	COUNTRY OF ORIGIN	TURBINE BRAND NAME(S)	PROJECT(S) WHERE TURBINE IS USED
31. Windmatic 17900 Sky Park Circle Suite 106 Irvine, CA 92714	U.S.	Windmatic	(2A) (20A) (37A) (41C,H-I)
32. Windtech Inc. P.O. Box 837 Glastonbury, CT 06033	U.S.	Windtech	(28A) (30C)

APPENDIX C

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.*