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COMMISSION

WIND PERFORMANCE REPORT SUMMARY 1996-1999

STAFF REPORT

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Gray Davis, Governor

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Dora Yen
Juan Guzman
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Mary D. Nichols
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Wind Performance Reporting Summary 1996-1999

October 2001

NOTICE

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ACKNOWLEDGEMENTS

Acknowledgements are due to all those who have helped establish the Wind Performance Reporting System (WPRS). The WPRS report was developed by the California Energy Commission in conjunction with the State's wind industry, American Wind Energy Association (AWEA), the Department of Energy (DOE) and is under the direction of Dora Yen, Technical Lead for Wind Energy Resources in the Public Interest Energy Research (PIER) Renewable Research and Development Group.

Special appreciation is extended to George Simons, Elaine Sison-Lebrilla, Pramod Kulkarni, Catherine Small, Suzanne Korosec, and Brenda Sturdivant for providing support, information, and assistance in compiling related wind information.

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CHAPTER 1. INTRODUCTION

With rising fossil fuel and natural gas prices, energy shortage concerns as well as environmental impact concerns, the generation of electrical energy using "free", non-polluting wind energy has steadily regained worldwide momentum. Trends throughout the 1990s have shown wind energy to be the fastest growing, most readily financed and implemented renewable energy technology with worldwide operating installed capacity nearing 8,000 Megawatts (MW) in 1998 and exceeding 12,000 MW at the end of 1999.[1] With some 3,900 MW of new wind capacity installed worldwide in 1999 alone[2], wind is proving to be valuable resource for affordable and reliable electricity generation.

The goal to boost wind energy to 25 percent of California electricity by 2020 can be achieved by extending the federal tax credit (PTC) to December 31, 2001. Along with numerous State sponsored renewable energy initiatives, including the California Energy Commission's Public Interest Energy Research (PIER) program, and the Administration's "Wind Powering America" program. In the United States (U.S.), federal and statewide support has helped to increase the market for wind generated electricity.

California has long been a leader in developing wind energy and renewable policies, but that role has changed with the passage of Assembly Bill 1890 in 1998. In the mid-1990s, resources for wind energy hit an all time low as long-term power purchase contracts came to an end. During the period from 1996-1999, significant changes occurred in the structure of the electrical market in California that has affected California's role in wind. This resulted in a major restructuring and consolidation of the wind operators. By the late 1990s, with Assembly Bill 1890 (AB) and the passing of Senate Bill 90 (SB), renewable energy received a rejuvenating pulse.[3] In addition to State programs, renewable energy proponents, and wind facility operators are making use of the new federal production tax credits (PTC) as well as State funded incentive programs to re-power and replace older turbine technology and add new capacity with newer, more efficient turbines.

Wind operators are now looking for more advanced turbine technology, sophisticated monitoring, and resource management tools to help them maximize production and compete in California's volatile electricity market. Detailed data provided by reports such as the WPRS provide prospective on industry performance, development trends and insight on future development needs for the industry. Ultimately the growth in wind power technology relies not on technology alone but also on the policies that govern the operation and development. Technological needs and governing policies must reinforce each other to meet the challenges of this changing industry.

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[1] *Wind Power Monthly*, Vol. 16, No. 1, January 2000, p.42.

[2] Wind Energy Outlook 2000, AWEA, [www.awea.org/outlook2000].

[3] *Investing in Renewable Electricity Generation in California*, Commission Report, California Energy Commission, P500-00-022, June 2001.

CHAPTER 2. BACKRGOUND ON WPRS

Wind Performance Report Summary Program Scope
California law requires the California Energy Commission to serve as a central repository in State government to collect and disseminate information on energy supplies. Since January 1985, WPRS regulations have required all California wind operators with projects rated at 100 kW or more to provide quarterly wind performance reports if they sold electricity to a power purchaser (utility). WPRS reports filed by operators included information such as 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, evaluates these data, and documents findings in annual reports on wind industry performance in California. Wind energy related information and previous WPRS documents may be found on the Commission maintained website, [*www.energy.ca.gov/*].

Efforts Leading to the Wind Project Performance Reporting System
The Commission Wind Program was initiated in 1977 and later expanded in 1978 with the passage of California AB-2976 authored by Assemblyman Henry Mello. The Mello bill required the Commission to implement a State wind energy program to expedite the commercialization of utility-scale wind turbines. The Commission was responsible for assessing wind resources throughout California, operating a public wind information center, testing wind turbines, and conducting research to support development of large-scale prototype wind turbines.

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

Reasons for Wind Performance Report Summary Regulations
WPRS regulations were instituted for many reasons. First, the industry, investors, financial community, and government agencies need actual performance data to better evaluate the status of wind technology and necessary improvements. Second, wind performance data provide a better understanding of the role wind resources can play in meeting California's energy needs. Lastly, the WPRS provides the public with an open and objective source of information about wind energy technologies.

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 project financing from institutional lenders and foreign investors. WPRS data also were needed to establish performance credibility with these new sources of financing.

Information Provided by Wind Performance Report Summary Reports
The WPRS reports include the following information for wind projects in California rated at 100 kilowatts (kW) or more, that sell electricity to a power purchaser: turbine manufacturers, model numbers, rotor diameter and kW ratings; the number of cumulative and new turbines installed; the projected output per turbine (no longer reported after 1995); the output for each turbine model; and the output for the entire project. The report is compiled from quarterly reports submitted by project operators and public utilities. The Commission staff uses this WPRS data to analyze wind project performance and industry production and capacity trends. The Annual Report also contains data summary tables reflecting performance statewide and by resource area; turbine size, type and origin; manufacturer; and project operator. Note that totals expressed in tables and figures may not equal 100 percent due to rounding.

Since 1985, the Commission has collected, documented and evaluated data submitted by operators and utilities in compliance with WPRS regulations. Extensive empirical data collected and disseminated by the Commission are used by industry, utility, investor, manufacturer, government, and research and development groups to evaluate the performance and relative benefits of wind technology.

Information Not Provided by Wind Performance Report Summary Reports
WPRS reports do not provide information on every wind energy project in California. 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. Non-operating wind projects are not required to report to the Commission. Other unreported capacity includes turbines that do not produce electricity for sale, such as turbines installed by utilities, government organizations and research facilities. Additional unreported capacity results when operators fail to file. Installed capacity for these operators cannot be confirmed and only kWh production verified from utility reports is included in WPRS reports. In addition, WPRS reports cannot account for the impact turbine age has on performance because turbines are often reported in groups combining old and new machines.

Considerations and Limitations Using Wind Performance Report Summary Data
Although many valuable observations about California's wind industry can be drawn from WPRS data, it is important to recognize some major limitations:

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

2. Data reported by qualifying facilities and utilities and/or other sources may not compare directly because the wind industry still does not employ a standardized turbine rating system. Turbines are tested under different conditions and rated at widely varying miles-per-hour specifications. Whenever standard formulation is used to compute values, the equations and inputs are described.

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

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

CHAPTER 3. WPRS DATA COMPILATION ISSUES

The Commission has continued to collect WPRS data on a quarterly basis since 1985 and has provided annual WPRS reports from 1985-1995. With restructuring and resource demands, no reports have been produced since 1995. At the beginning of 2001, the PIER Renewables Research and Development Group (R&D) assumed responsibility to compile and evaluate the WPRS data. Because of the large volume of data and in light of the changes since 1996, this report provides a summary of years from 1996 to 1999. The most updated information on operational wind projects, operators, manufacturers and contacts are provided for 1999. The R&D staff will continue its efforts to compile WPRS data, and future WPRS reports will resume on an annual basis. The 2000 report is scheduled for release in December of 2001. All reports will be made accessible via the Commission website.

Validation. Originally, quarterly summary reports from the utilities were to be used to validate each operator or qualifying facility (QF) quarterly data for capacity in kilowatts (kW) and electricity production in kilowatt-hour (kWh). However, numerous inconsistencies appeared in the data from these sources making validation between the two difficult. Discrepancies often existed between utility and QF data for installed capacity. Upon further investigation, the R&D staff determined that the utilities provide capacity data for only those operators who have a power sales agreement. Figures in this report are based on the contracted maximum capacity and are not consistently updated for changes due to re-powering or to an increase or decrease in actual site capacity. In addition, some sites failed to file quarterly data. Thus, discrepancies exist between QF site installed capacity reports versus utility summary reports. In some cases, a direct comparison of individual QF production numbers is also not possible because data for more than one project were combined under a single utility contract making it difficult to verify and track individual project output figures. Whenever possible, individual QF site data are used since the data proved to be more consistent and traceable.

Failed to File. Utility quarterly reports inform the Commission staff of all wind farm operators with projects rated at 100 kW or more that sell power to utilities. These operators are required to submit quarterly data reports for the WPRS. However from 1996 to 1999, many wind operators failed to file for one or more quarters. They or their managing facilities were individually contacted and a request to update their information was made. Operators who sold power and were contacted but did not submit reports are noted as “failed to file” in the charts and tables.

Reports with Missing Data. Some project operators filed incomplete WPRS reports or reports that did not follow prescribed formats. The predominant missing data item was projected quarterly output per turbine. (See Changes to WPRS Reporting). Some wind operators reported only annual output estimates or combined data for several projects into one report. Requests were made to the projects to update their reporting format.

Commission staff continues to work with and assist project operators by simplifying the reporting process and to ensure data consistency and completeness.

Changes to WPRS Reporting. Several changes were implemented to simplify the reporting and data collection process during this reporting period. Project operators were notified and sent a new, single-page, electronic reporting format for each facility. The new format replaced the old four page forms. The new format also eliminated some data fields that are currently not reliable enough to track. Specifically, the projected data are not requested at this time and may be reinstated at a later date once forecasting/predictive capabilities have been improved.

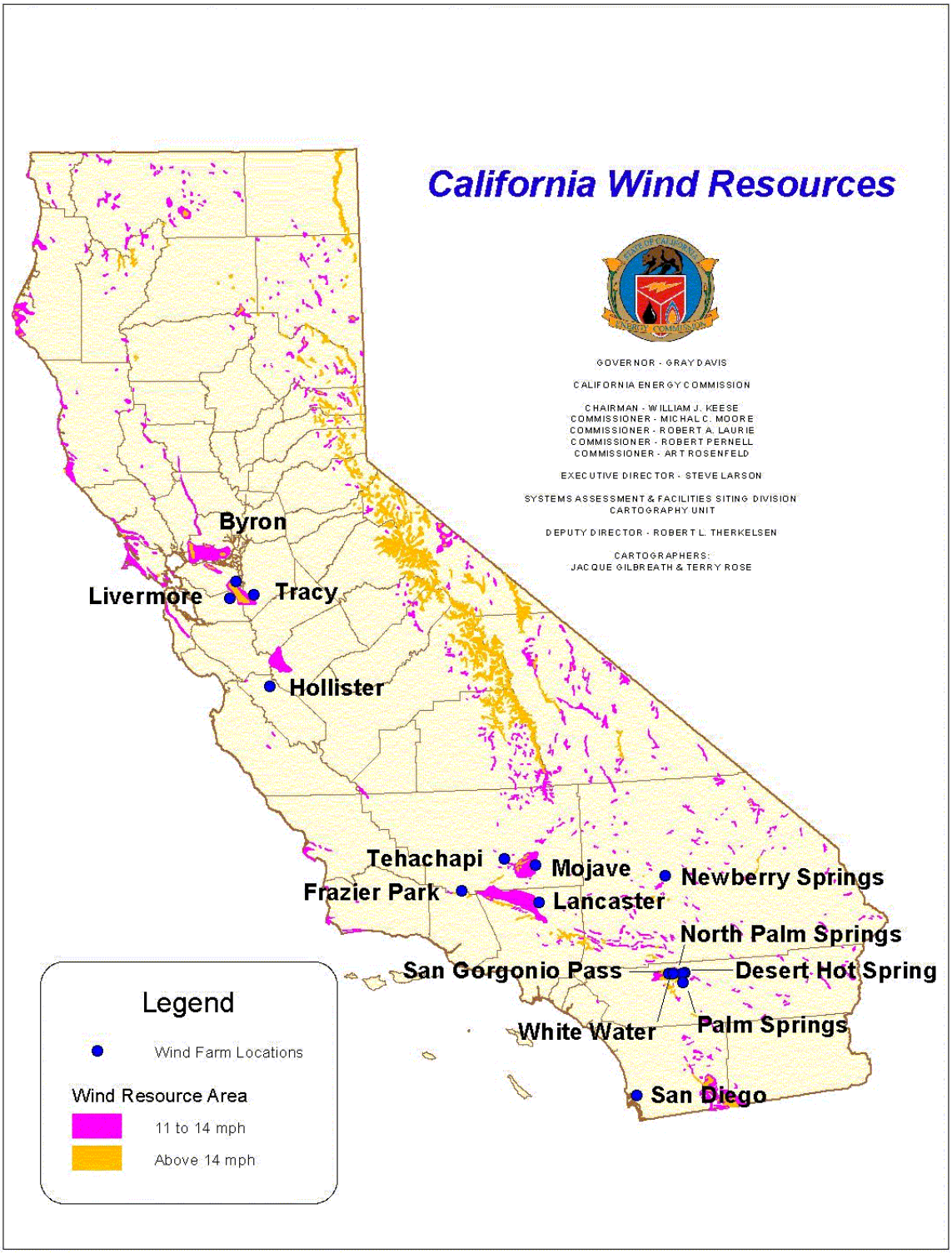
CHAPTER 4. CALIFORNIA WIND RESOURCES AREAS

The wind resource map in the following page includes the geographical location and wind quality associated with the major wind resource areas in California. Note, the information presented is based on resource assessments performed in the late 1970s and mid-1980s and contains uncertainties in data quality and resolution. The Commission is currently developing an updated wind resource assessment for California scheduled for completion by mid-year 2002. The updated assessment will provide annual and seasonal wind resource data for various elevations at a higher quality and resolution than the existing maps.

During the period from 1996-1999, wind performance data were received from operators with projects located in the following resource areas but are by no means limited to only these resource areas:

- Altamont Pass
- Pacheco Pass
- San Gorgonio Pass
- Tehachapi Pass
- 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: California Energy Commission Energy Facilities and Siting and Environmental Protection Division, Cartography Unit, [*www.energy.ca.gov/]*.

CHAPTER 5. DATA SUMMARY

5.1 Industry Performance

Graphs in this section reference industry performance tables summarized in Section 6 from 1996 to 1999. As previously reported, these tables are based on individual operator's (QF-qualifying facility) data reported to the Commission. These data will be emphasized. Thus in some cases, the data presented may not correspond directly to numbers provided by the utility data summaries for reasons indicated in Section 3.

Total Capacity. During the 4th quarter of 1999, 1,406 MW was reported as operational by qualifying facilities, as shown in Figure 5.1. Accounting for those facilities that "failed to file" within the given period, the operational capacity in California is estimated to be 1,670 MW for 1999. From 1996 to 1997, operational capacity based on operator data showed a general decline in the industry. This trend was due in part to industry restructuring, mergers, and the attrition of older turbine technology. In subsequent years, however a steady increase in capacity can be noted. This resurgence in wind generation was partly due to re-powering efforts in the area as well as to various state initiatives aimed at supporting renewable energy resources. Specifically, AB1890 and SB90 provided funding to support existing and new renewable energy projects over a four-year period from 1998 to 2001.

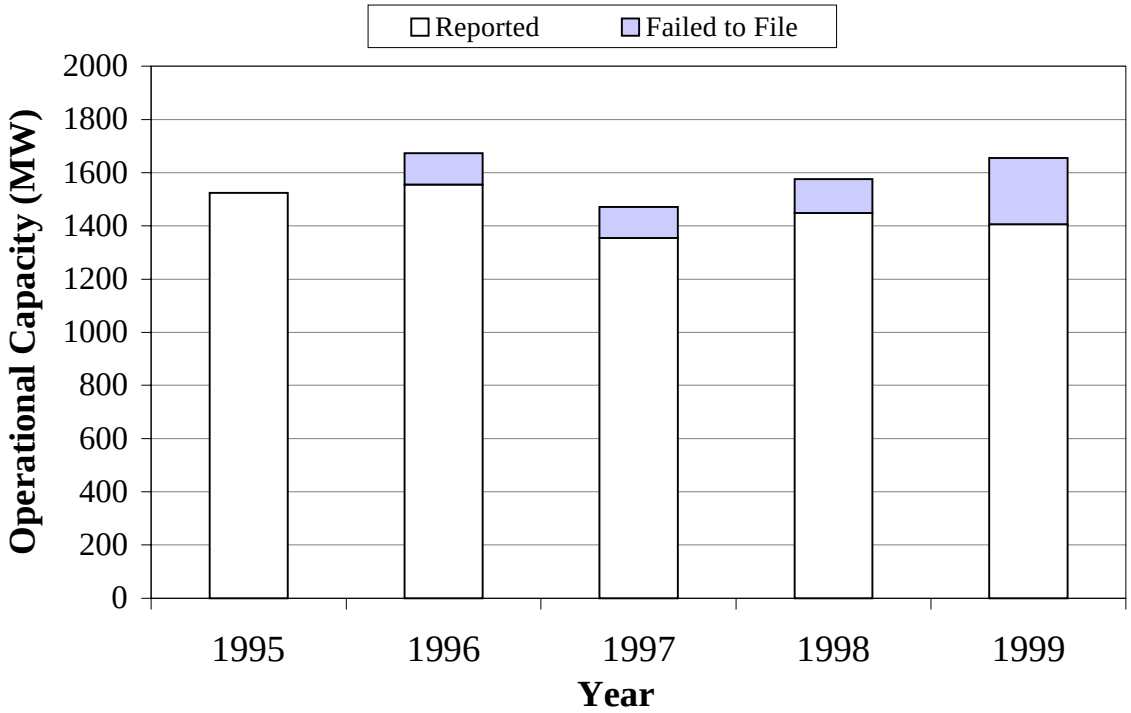


Figure 5.1. Total operational capacity (MW) from 1995-1999.

Table 1 shows how the wind energy capacity changed from 1995-1999 in the State. A total of 65 MW of new or re-powered capacity was installed in 1999 as opposed to the 164 MW capacity reductions in 1997. Note it is difficult to discriminate between re-powering and new capacity unless the facility is a newly added facility (i.e., other than

the standard offer, SO4 contracts). In general and in the context of this report, re-powering refers to the physical replacement of older turbines with new turbines. This definition differs from the traditional definition which refers to refurbishing existing turbines with new blades, generators, or other components to increase the capacity and output. Nowadays, turbines are generally replaced versus refurbished.

Table 1. Wind energy capacity change from 1995-1999.

Year	Capacity Change (MW)
1995	1
1996	-28
1997	-164
1998	201
1999	65

Electricity Output. In 1999, the California wind industry reported more than 2.8 billion kWh of electricity output as depicted in Figure 5.2. Combining the numbers from those that "failed to file," the industry output exceeded 3.2 billion kWh. This is more than enough electricity to light a city the size of San Francisco. With the attrition of older technology and massive re-powering efforts in 1998, the period from 1996-1999 experienced a tremendous fluctuation in the amount of electricity generated.

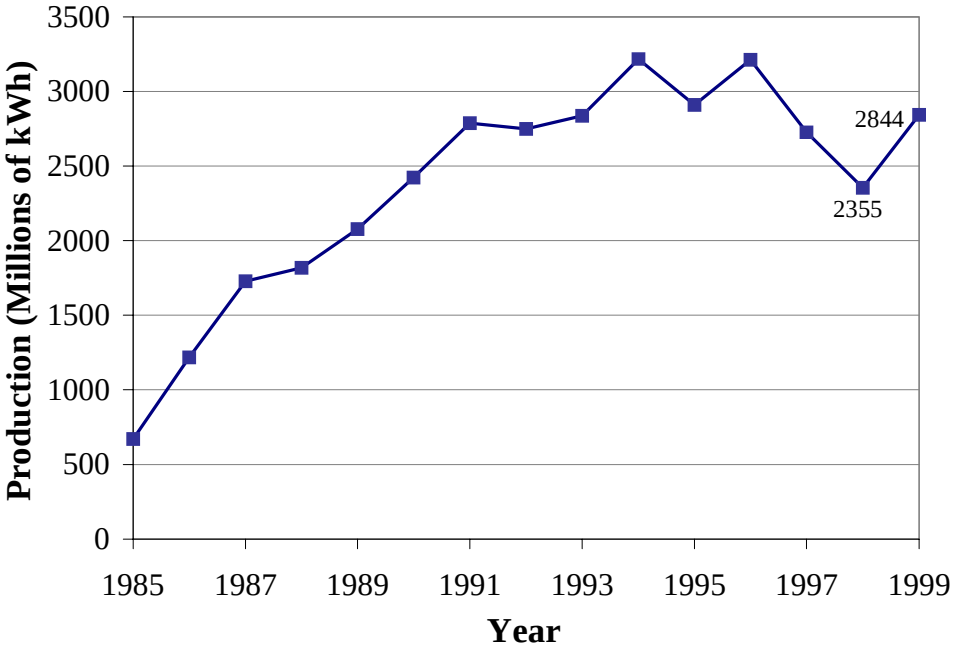


Figure 5.2. Statewide wind energy production for 1985-1999 in millions of kWh.

Capacity Factor. The Capacity Factor is a measure of efficiency, which 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. Although variations exist with wind turbine ratings based on widely differing test conditions, procedures and non-standardized miles-per-hour specifications, the capacity factor is

still considered a strong indicator of wind project performance. Voluntary standards for testing wind turbines, however, have been developed by the American Wind Energy Association.

The annual capacity factor is typically computed based on annual production figures and turbine capacity for the year, or it can be computed as the average of quarterly capacity factors calculated for each group of turbines reported in that quarter. With WPRS quarterly data available from operators, only operating turbines are used to calculate the capacity factor so that performance results are not skewed by non-operational capacity. With significant re-powering and new capacity installation during the period of 1996 to 1999, changes to the capacity are only included in the capacity factor calculation during the quarter of installation. Although new turbines are not likely to operate for the entire quarter in which they are installed, this method provided the most consistent method for calculating CF without randomly interpreting when new turbines are operational or nonoperational.

As shown in Figure 5.3, the resulting statewide annual capacity factor is holding strong in the 20% range. Despite the turbulent restructuring and shakeout period throughout the 1996-1999 period, the 2% increase in capacity factor from 1995 and 1999 is a good indicator that overall efficiency has improved since 1995. Whether this level of efficiency can be maintained or perhaps increased remains to be seen in the coming years as more advanced turbines continue replacing older models. Examining the summarized data tables in Section 6 for the State and by individual resource areas, there is an overall improvement in the capacity factor in 1999. The CF achieved by many California wind projects continues to exceed 30% during the high wind seasons (2nd and 3rd quarters).

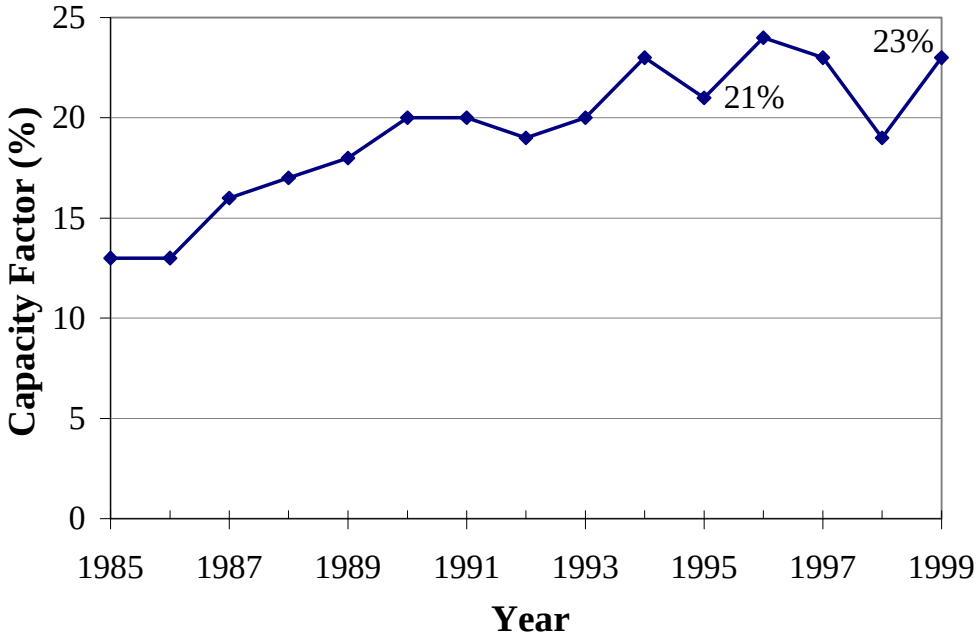


Figure 5.3. Statewide capacity factors from 1985-1999.

5.2 Production and Capacity Trends

5.2.1 Statewide

In 1999, 65 MW of new or re-powered capacity was installed in California, a significant increase compared to the 1 MW in 1995. Figure 5.4 depicts the trends in capacity from 1996-1999 by quarter. Although facilities that "failed to file" were not included, the decreasing trend in capacity throughout 1997 contrast the steady increase from 1998 and 1999. As shown in Figure 5.5, from 1996 to 1997, capacity declined noticeable (-164 MW) as well as number of turbines (-725 turbines), due to attrition of older turbines, cannibalization for parts and shutdown of facilities in 1997. By the second half of 1998, nearly 201 MW of capacity were back on-line with most of the activity occurring in the Tehachapi wind resource area. In Tehachapi alone, over 600 turbines were re-powered or brought back on-line in 1998. Re-powering efforts with larger and more efficient turbines occurred throughout the late 1990s resulting in the positive net capacity change despite a steady drop in the total number of turbines. (Figure 5.5)

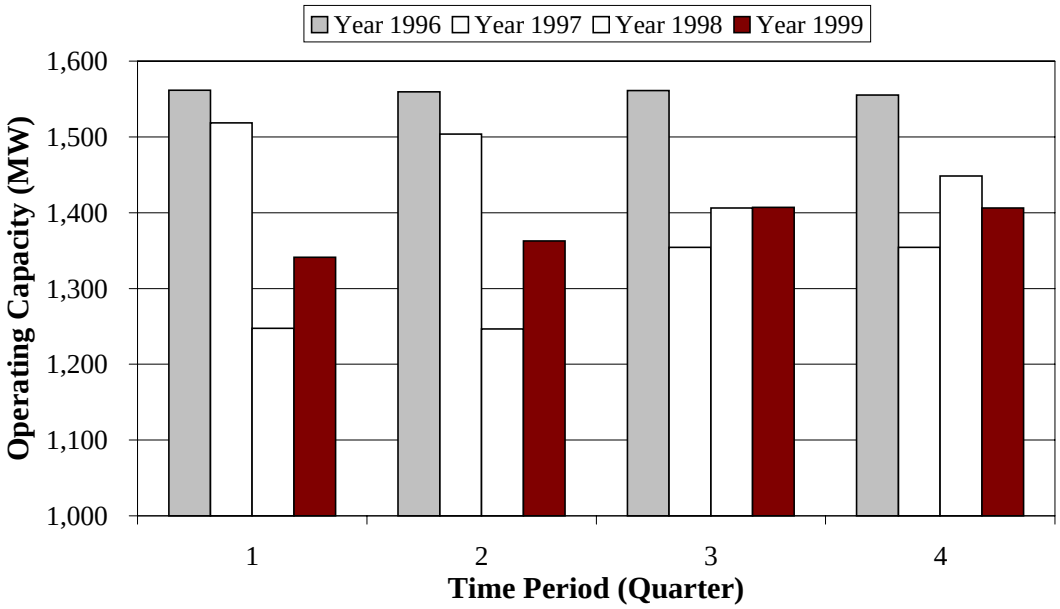


Figure 5.4. Statewide capacity from 1996-1999 by quarters. Note: values do not account for "failed to file" facilities.

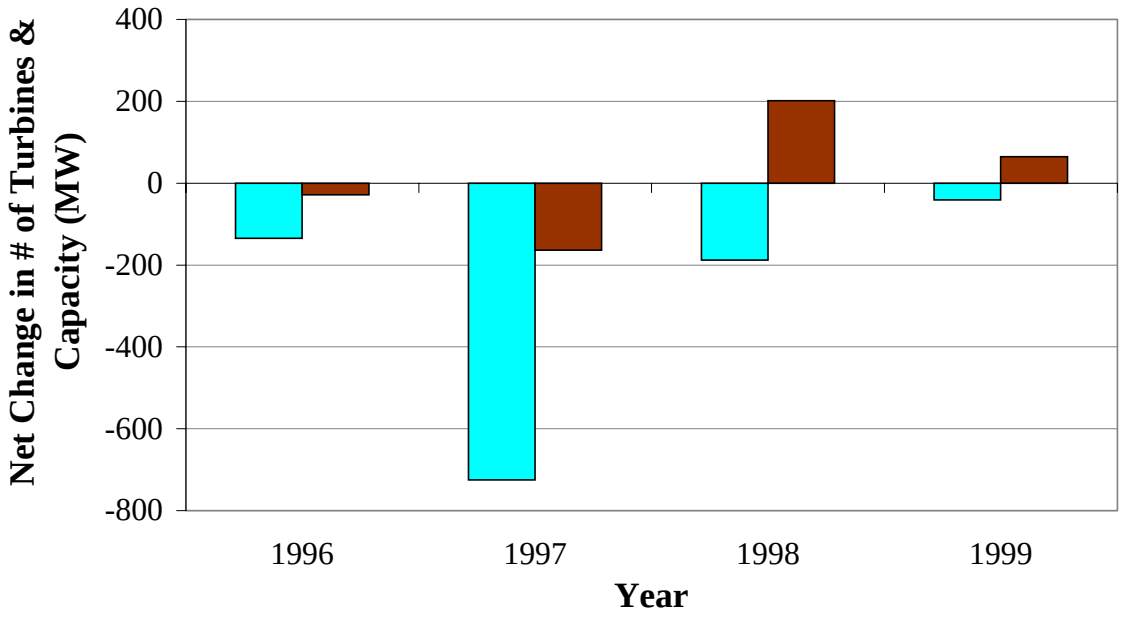


Figure 5.5. Change in # of turbines and capacity in MW from 1996-1999.

Quarterly wind output trends from 1996-1999 are shown in Figure 5.6. These trends were consistent with the typical California wind resource profiles: low winds at the beginning and end of the year and high winds during spring and summer when the warmer seasons create a natural draw of cool coastal air into hot inland valleys and deserts. Data indicated that almost 70% percent of all annual output was produced in the second and third quarters of 1999 (Figure 5.7). This figure corresponds well with California's peak demand for electricity during summer the months. Quarterly capacity factors were consistent with the previous California wind resource reports. The statewide capacity factors for 1999 were 18%, 36%, 29%, and 12% respectively for the first, second, third and fourth quarters.

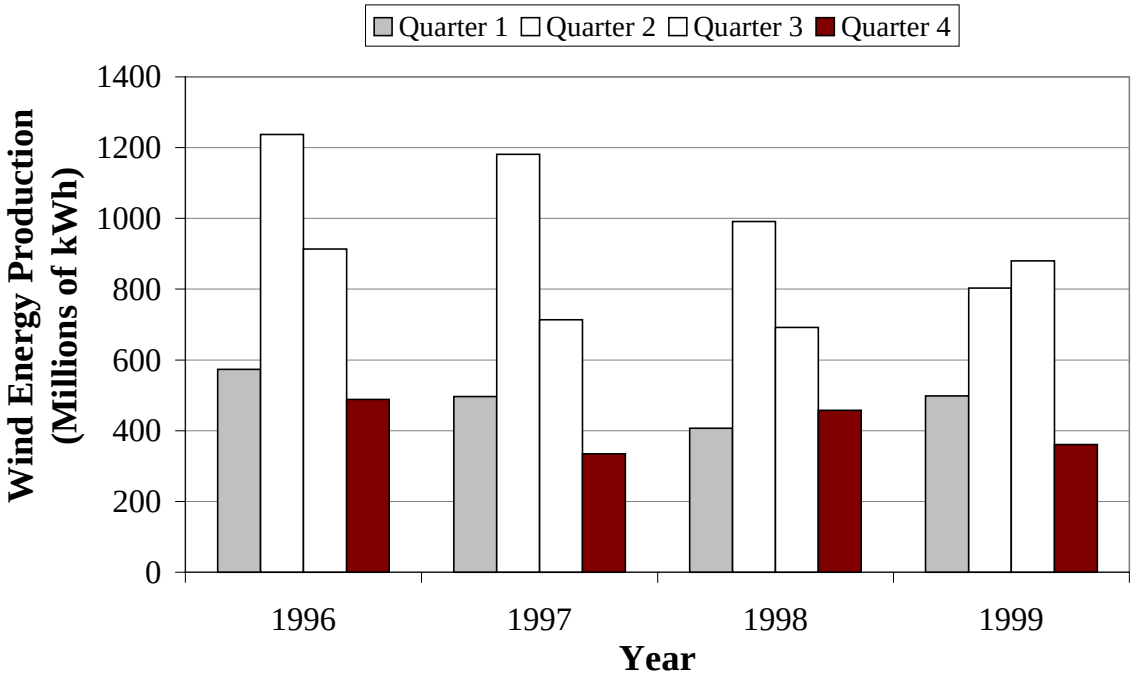


Figure 5.6. Breakdown of statewide wind energy production by quarters.

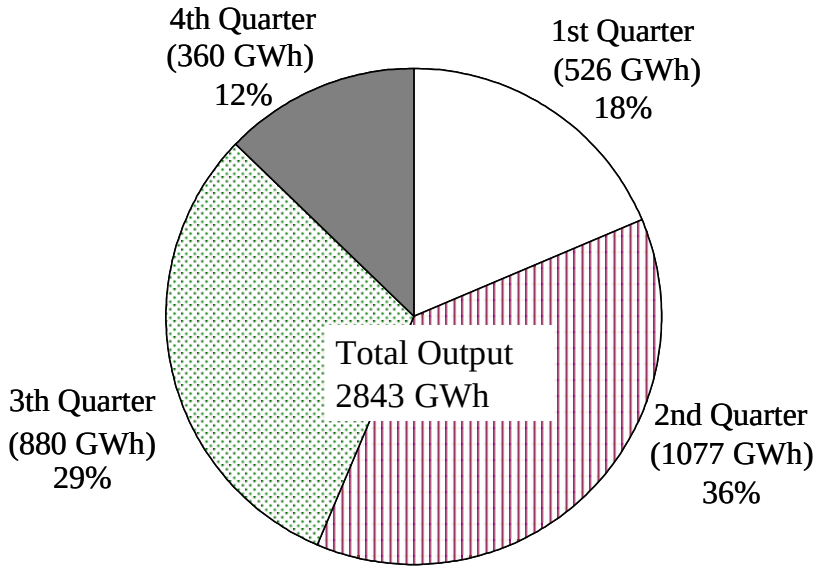


Figure 5.7. Statewide wind energy production per quarter 1999 (GWh or millions of kWh).

5.2.2 Resource Area

Although wind project operators from five different resources areas in California reported to WPRS, more than 10,000 of California's wind turbines are located in three primary regions: Altamont Pass (east of San Francisco), Tehachapi (southeast of Bakersfield), and San Gorgonio (east of Los Angeles), as shown in Figure 5.8. All five resource areas are narrow mountain passes leading into hot valley or desert regions.

These regions account of nearly 95% of all of California's wind generation and approximately 11% of the world's wind-generated electricity in 1999.

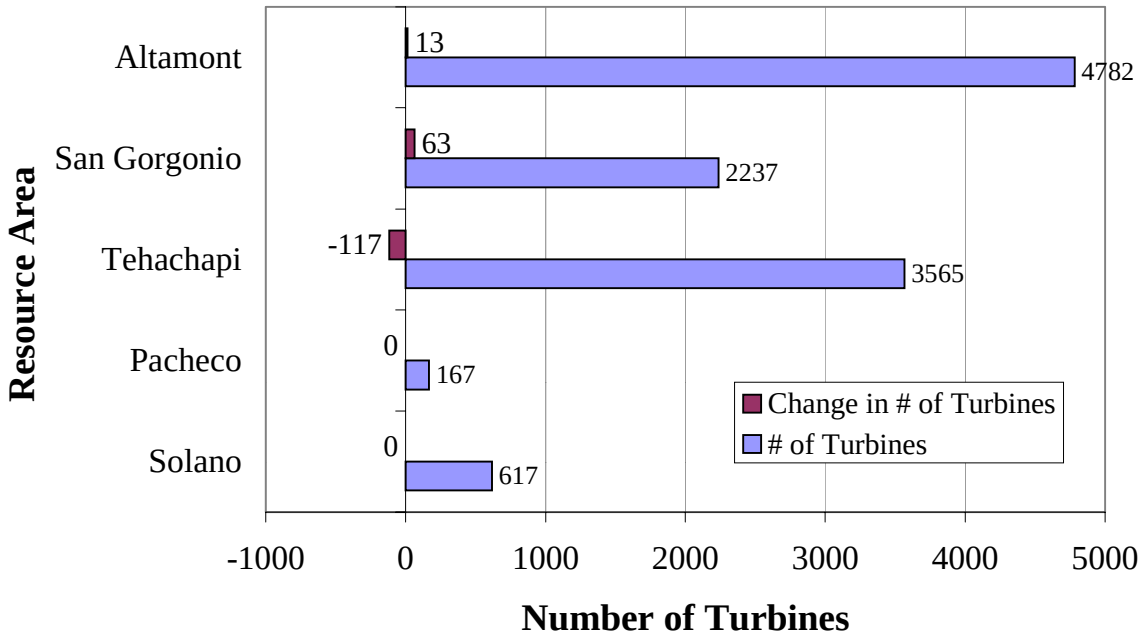


Figure 5.8. Number of turbines and the change in turbines by resource area in 1999.

In 1999, among the five regions identified, the Tehachapi area accounts for nearly 40% of all capacity, 34% in the Altamont, 20% in San Gorgonio, 1% in Pachecho and 5% Solano. (Figure 5.9a) The quarterly production output trends for each region are compared in Figure 5.9b for 1999. Figure 5.10 shows the change in number of turbines per resource area in 1999. The annual capacity factors are compared for all regions are shown in Figure 5.11. In general, all regions showed an increase in capacity factor from 1998 to 1999 with only San Gorgonio dropping slightly.

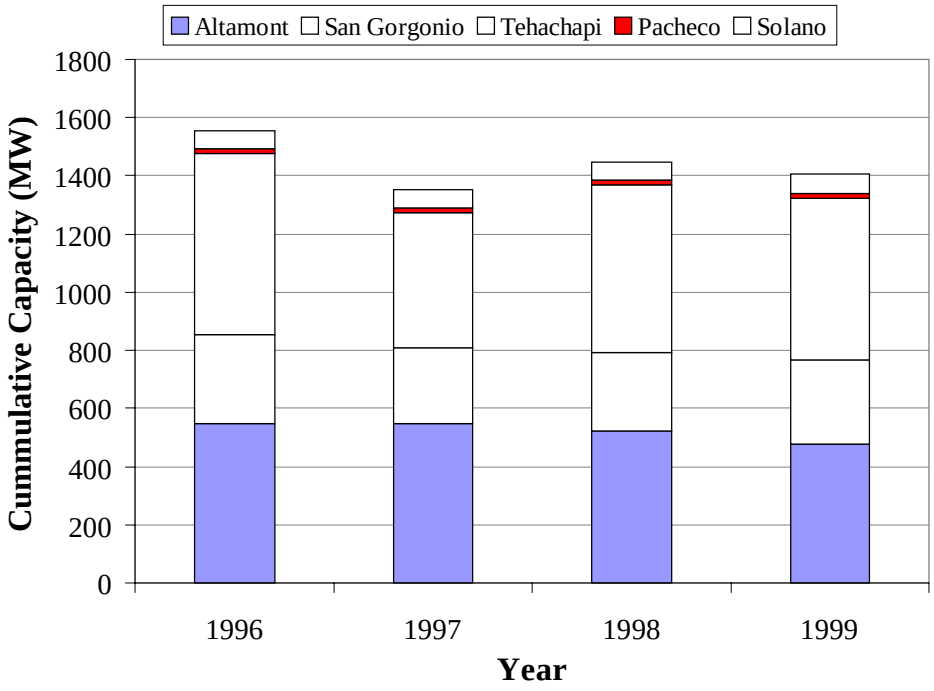


Figure 5.9. a) Statewide capacity from 1996-1999

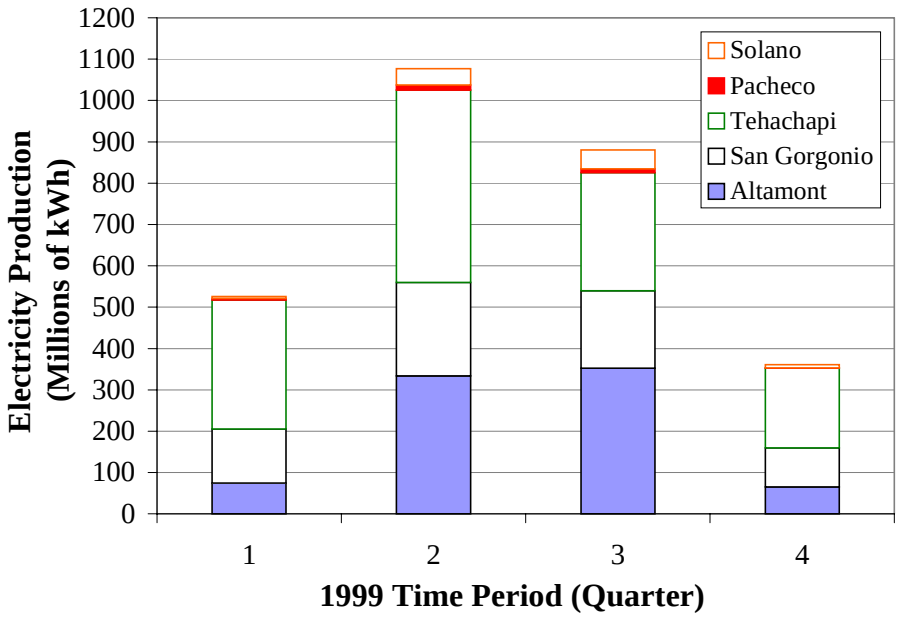


Figure 5.9. b) Electricity production by resource areas for 1999.

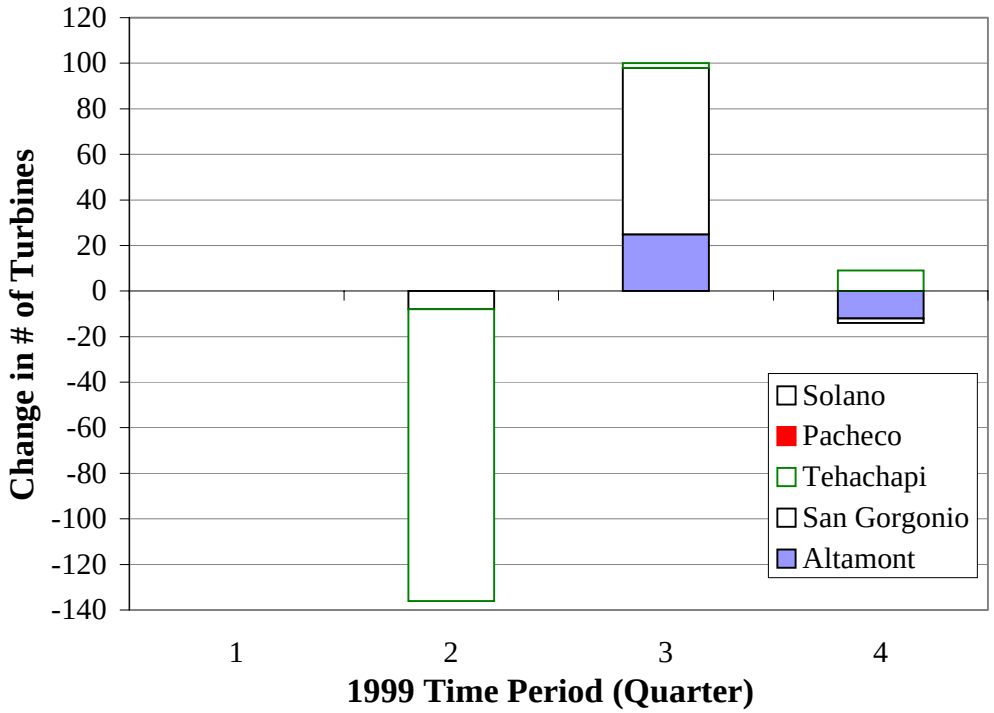


Figure 5.10. Changes in number of turbines per quarter in each resource area in 1999.

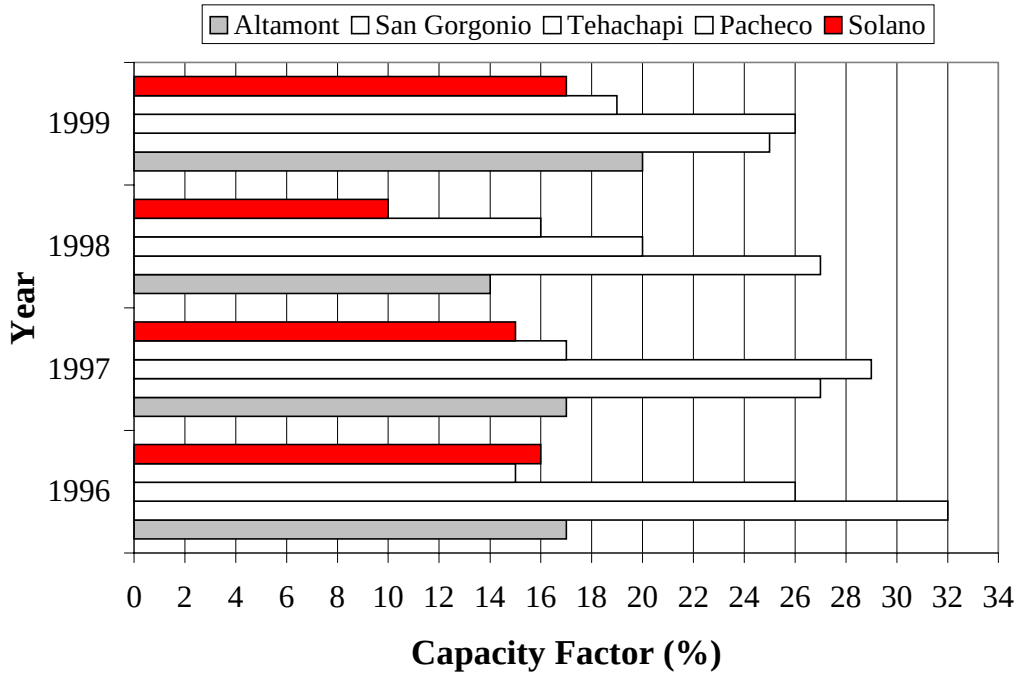


Figure 5.11. Capacity factor by resource areas from 1996-1999.

5.2.3 Turbine Size and Type

In the past, WPRS performance results tracked horizontal and vertical axis, utility-scale turbines. By 1999, no vertical axis machines were reported in operation. Nearly 100% of new and re-powered capacity comes from three bladed, upwind, horizontal axis turbines manufactured in Europe. Since the restructuring of the wind industry in California, the total number of turbines has declined compared to 1996 where the total number of turbines was reported at 13,404 (Figure 5.12). At the end of 1999, there were only 11,368 turbines, a 15% decrease in the number of turbine.

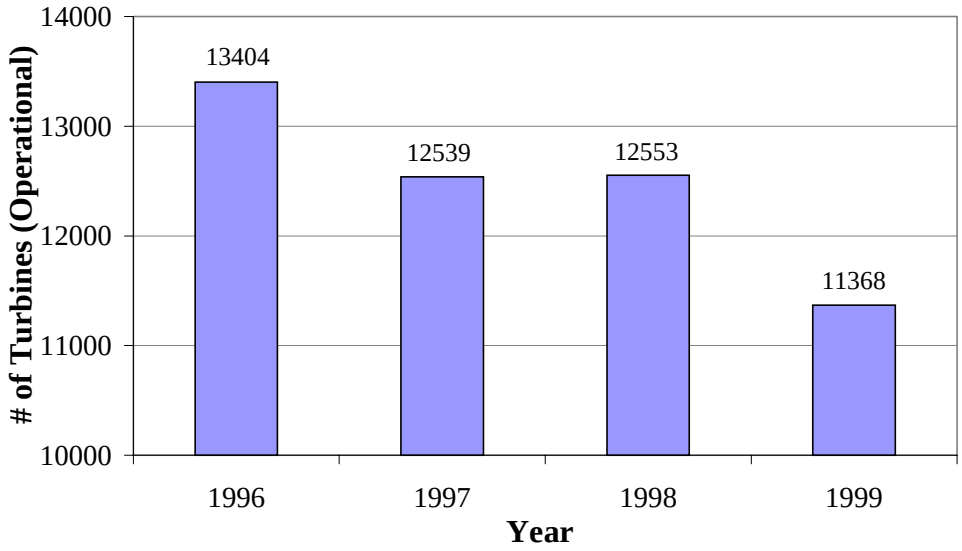


Figure 5.12. Total number of turbines in operation in 1996 to 1999.

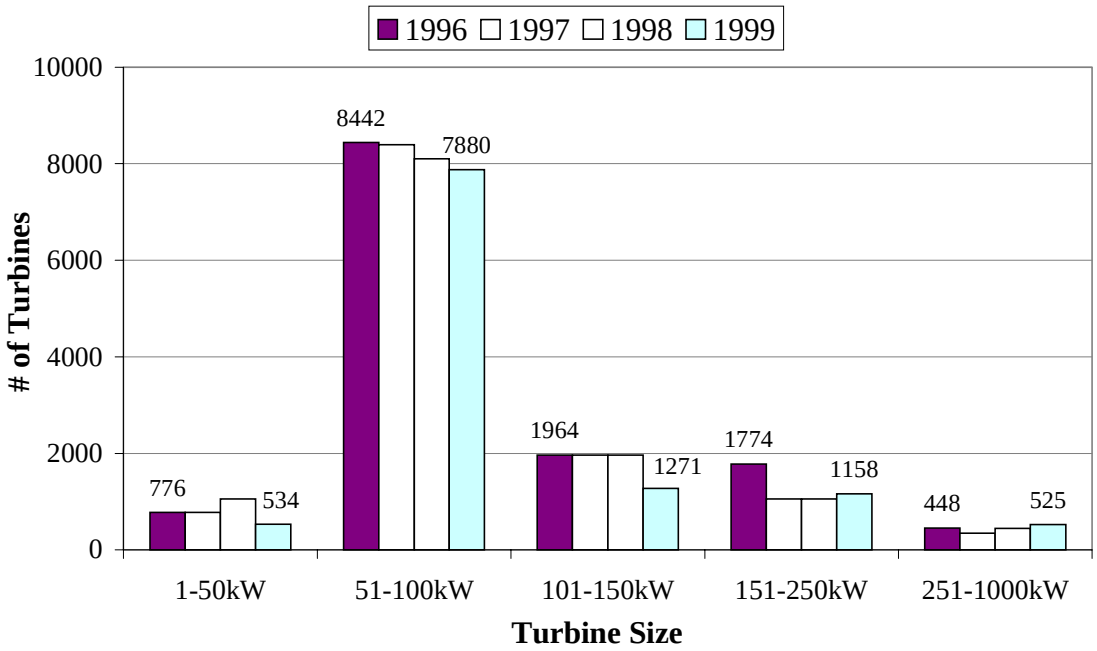


Figure 5.13. Number of turbines by turbine size from 1996 to 1999.

Figure 5.13 summaries the various turbine sizes and numbers found in California from 1996 to 1999. Smaller turbines were one of the earliest proponents, less than 100 kW stills dominate the California wind park landscape. In 1999, turbines under 100 kW account for nearly 75% of the total number of turbines. Larger, more advance turbines, however, are slowly replacing these smaller machines as evident in the 1999 figures. Turbines less than 250kW have been declining, and turbines greater than 250kW gained by 17% over 1996 numbers.

The decline in number of turbines fortunately does not translate to a decline in wind electricity production or efficiency. From Figure 5.14 and Figure 5.15, the 17% gain in turbines larger than 250kW translates to nearly 70% increase in capacity from 156 MW to 264 MW and 30% increase in production in 1999. Throughout the shake out and test period for the newly installed turbines, efficiency (capacity factor) declined slightly (Figure 5.16); however, the overall efficiency (capacity factor) rose by 2% from 1995 to 1999. The point is that merely counting turbines does not give a good indicator of wind performance trends. In fact, the decline in the total number of turbines is expected to continue as newer, more efficient and larger capacity turbines replace older, smaller capacity and less efficient turbines. The result would be a steady increase in annual energy output at an increased but steady capacity factor.

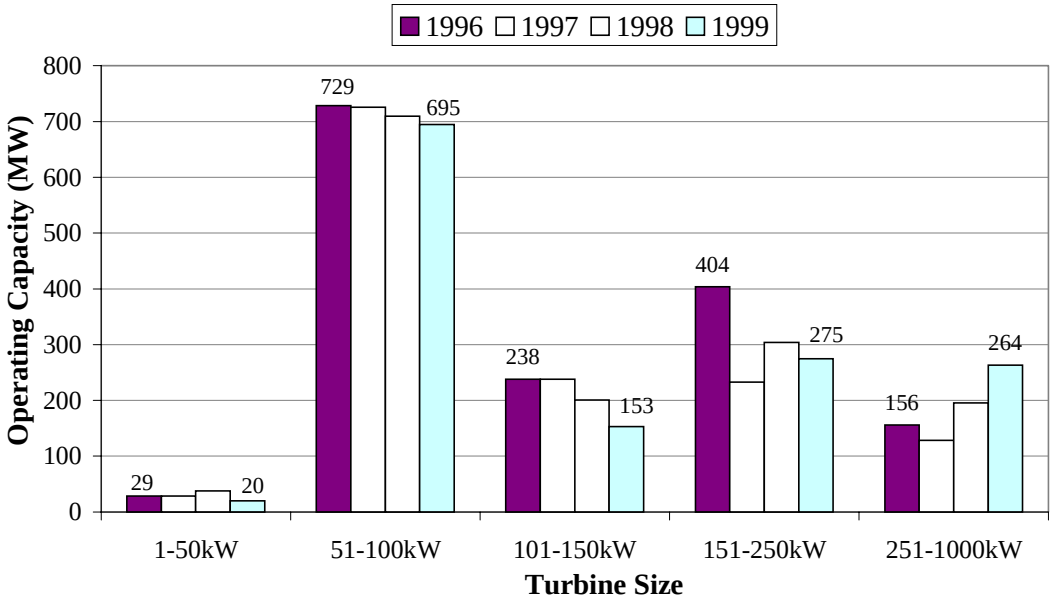


Figure 5.14. Turbine capacity by turbine size for 1996 to 1999.

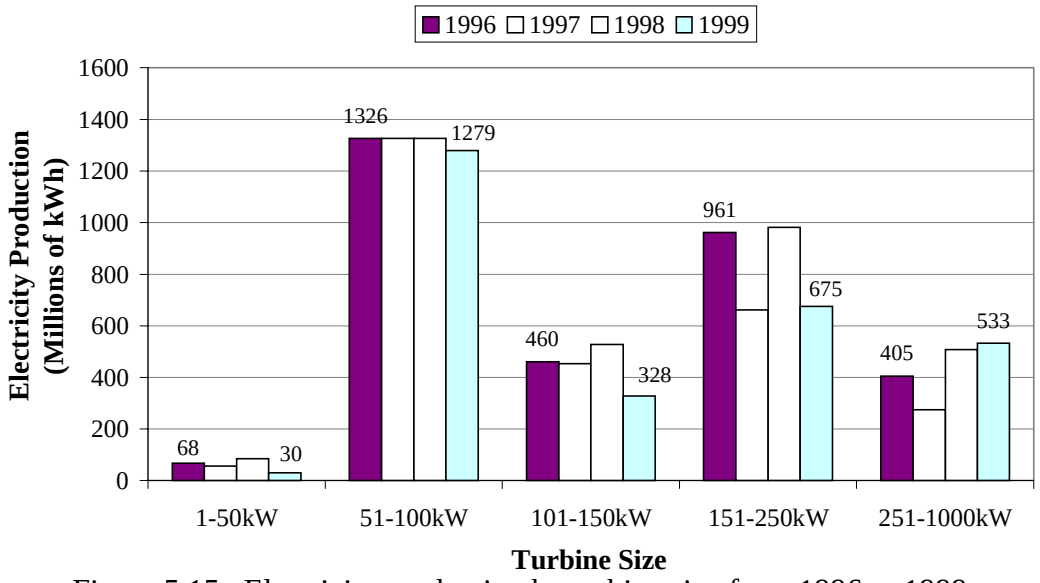


Figure 5.15. Electricity production by turbine size from 1996 to 1999.

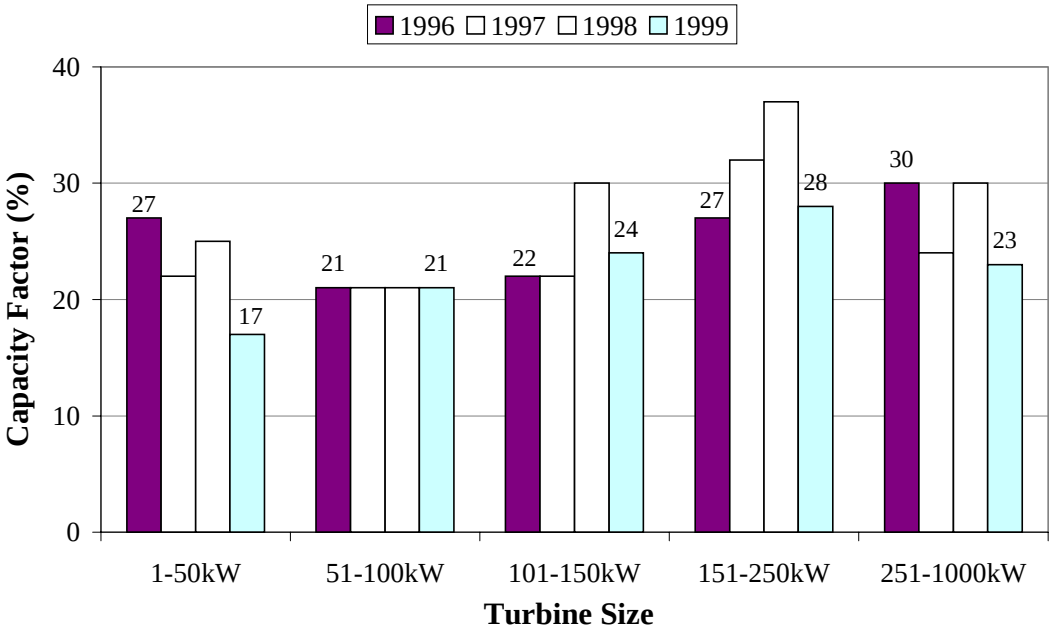


Figure 5.16 Capacity factor compared to number of turbines by size for 1999.

5.2.4 Turbine Manufacturers

The seven largest wind turbine manufacturers are shown in Figure 5.17. They account for over 88% of wind generation capacity in California in 1999. Their generating capacity factors are shown in Figure 5.18, and performance by energy per rotor swept area (kWh/M^2) is shown in Figure 5.19.

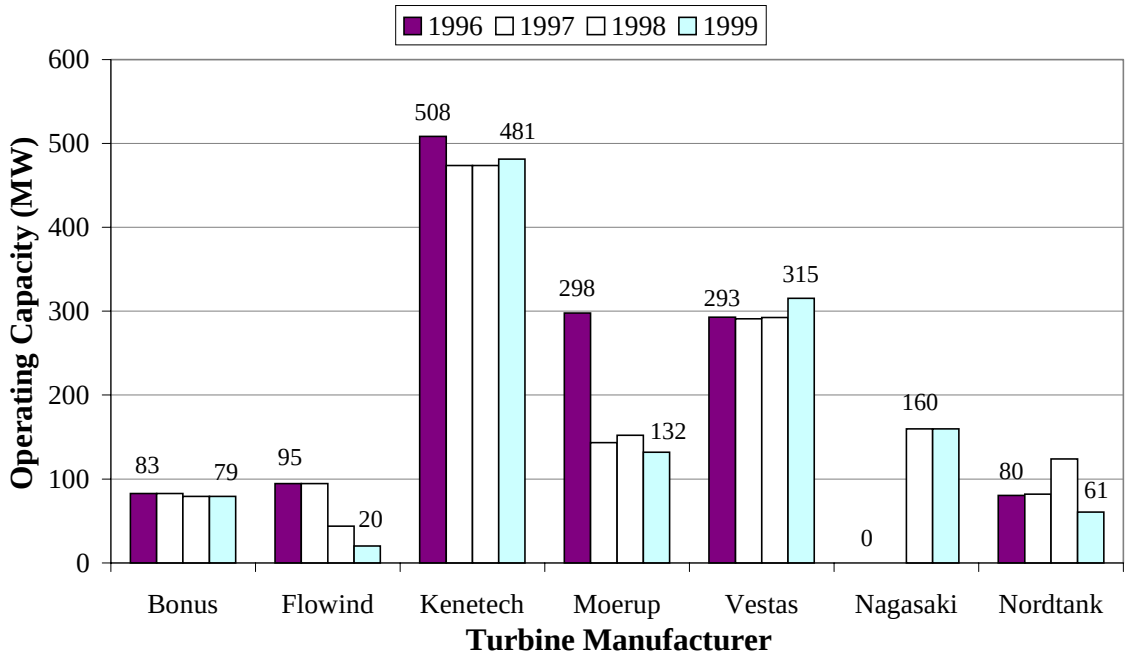


Figure 5.17. Operating capacity for 7 major turbine manufacturers from 1996-1999.

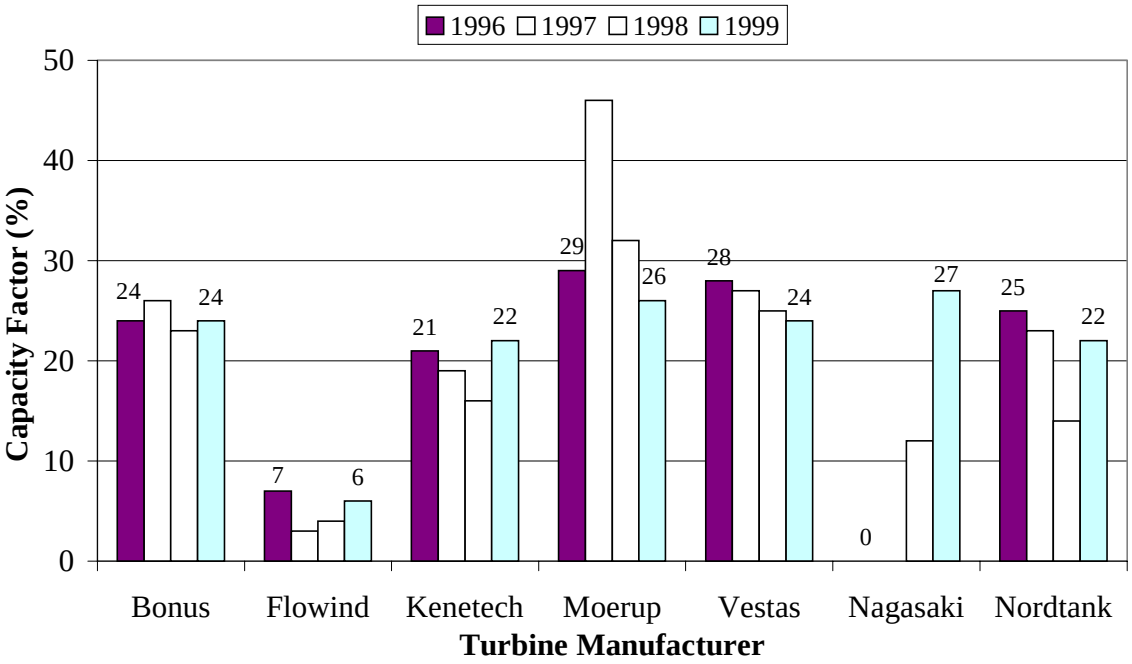


Figure 5.18. Capacity factor (%) for 7 major turbine manufacturers from 1996-1999.

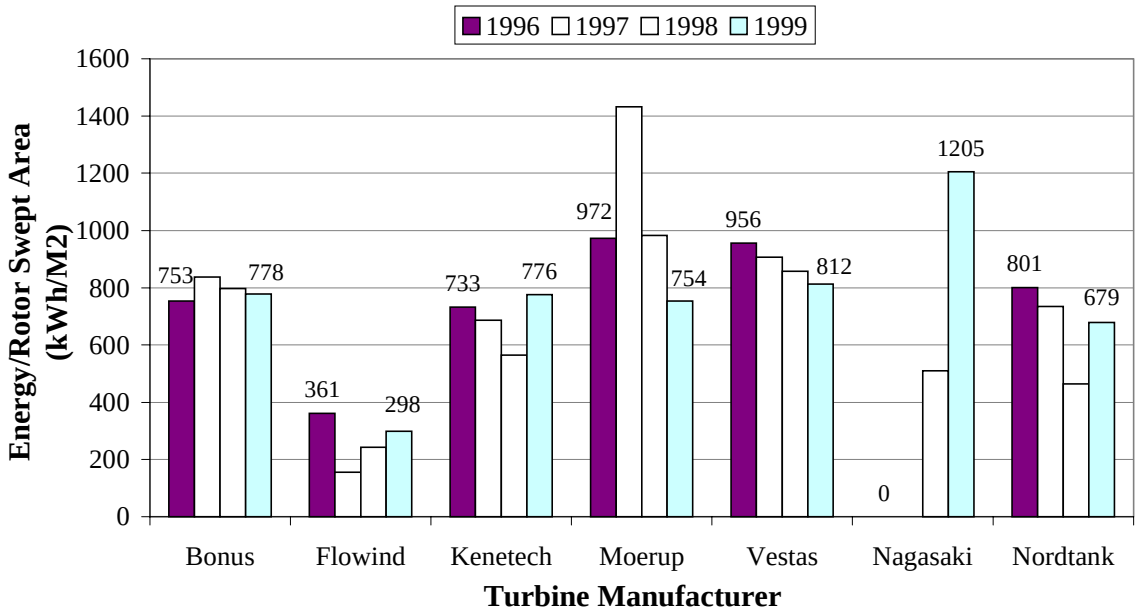


Figure 5.19. Energy/rotor swept area for 7 major turbine manufacturers from 1996-1999.

5.2.5 Wind Project Operators

Results for seven major wind project operators are presented in the following figures. In Figure 5.20, results show that within the 1996-1999 period, several of the larger operators restructured and consolidated. Before 1997, the major operators included Kenetech, SeaWest, Zond, Flowind and Cannon. By 1998, Zond was purchased by Enron Corporation, Green Ridge took over operations of the Kenetech, and Flowind facilities and FPL Energy took over Cannon and Cameron Ridge operations. From Figure 5.21, capacity factors for these operators are comparable. Performance in terms of rotor swept area is presented in Figure 5.22 with FPL Energy facilities showing the largest potential.

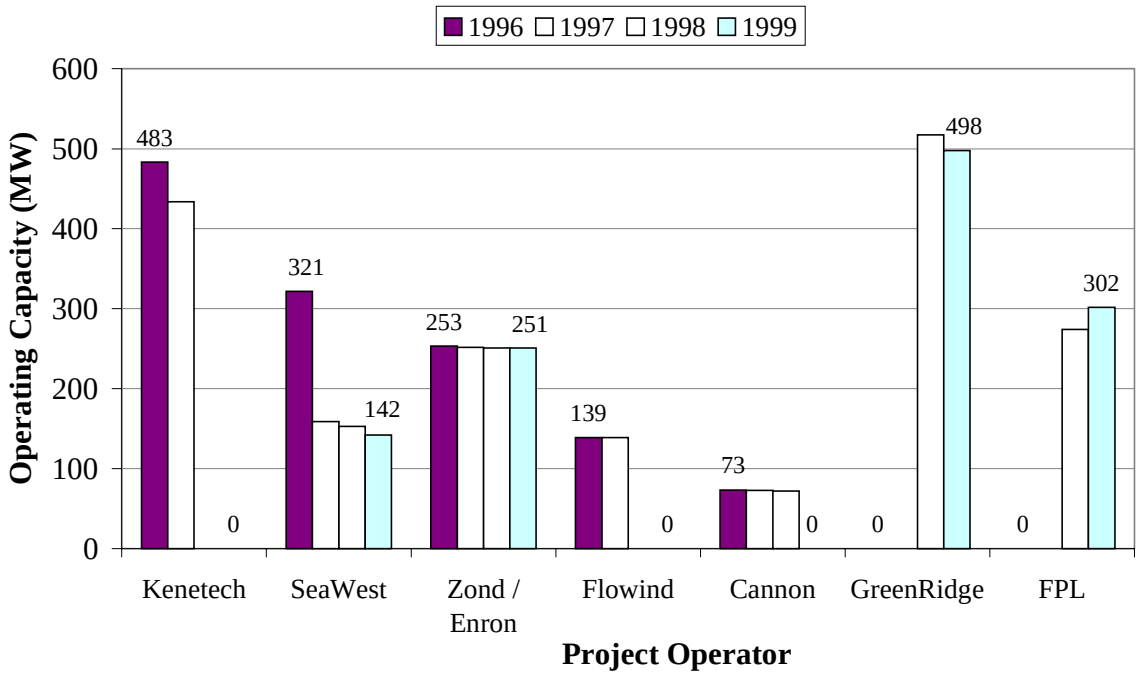


Figure 5.20. Operating capacity (MW) for top 7 wind facility operators from 1996-1999.

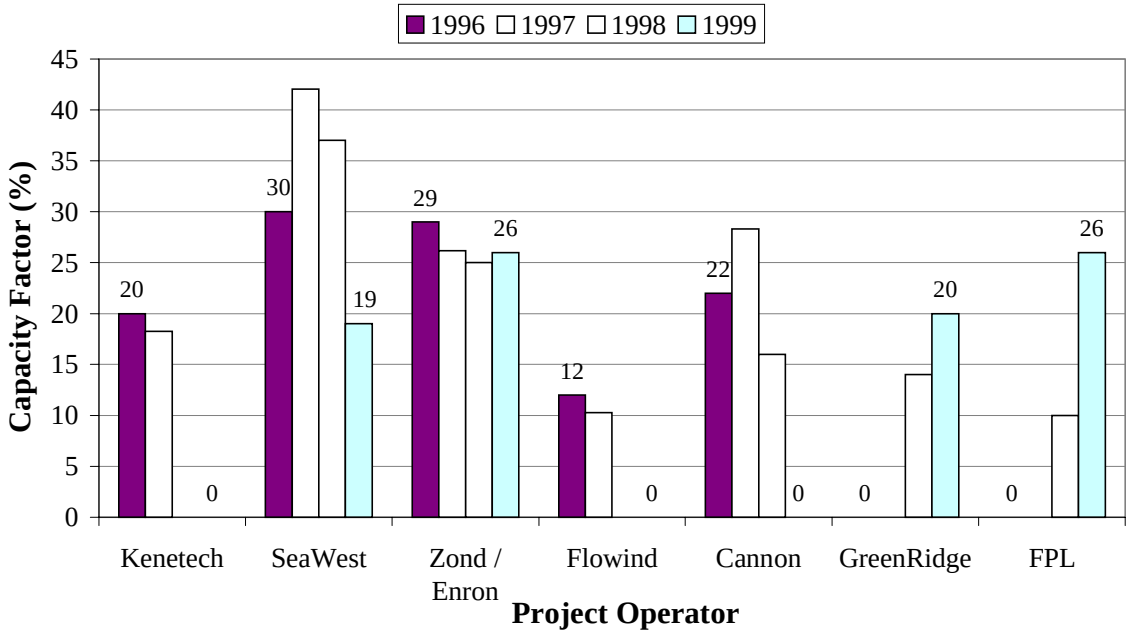


Figure 5.21. Capacity factors for top 7 wind facility operators from 1996-1999.

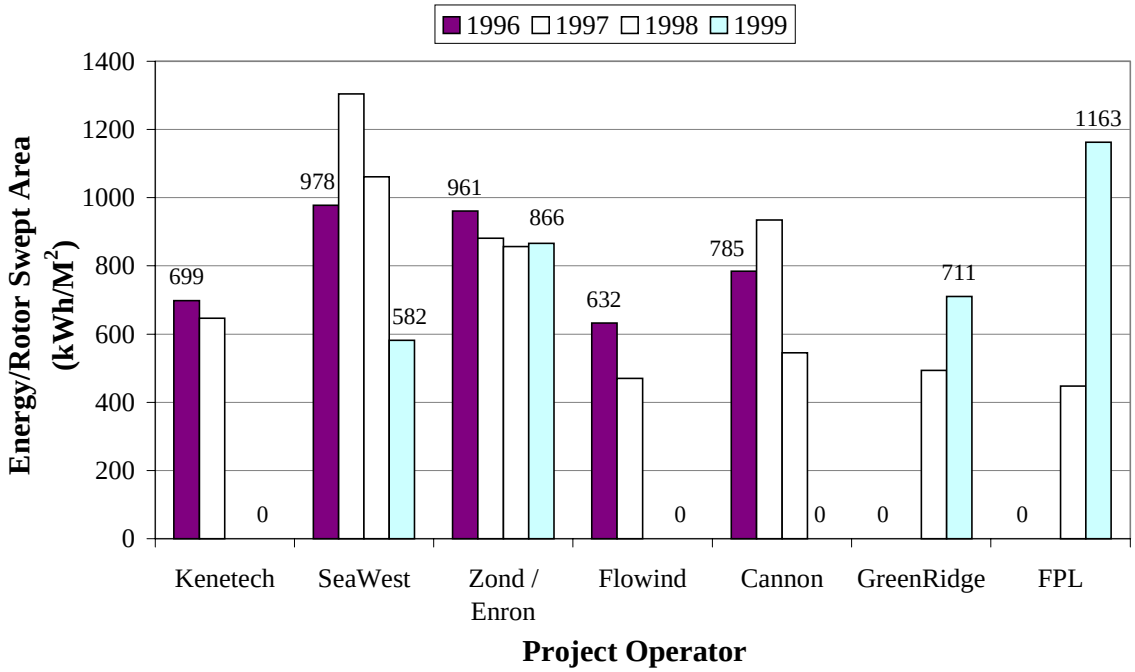


Figure 5.22. Energy/rotor swept area (KWh/M^2) for top seven wind facility operators from 1996-1999.

5.2.6 Foreign and Domestic

Figure 5.23 compare domestic and foreign turbine market in 1985 and in 1999. Domestic turbines accounted for 67% of the total installed capacity in 1985 and over 50% of new installations (see table 5.1). With nearly all U.S. wind turbine manufacturers out of business by the early 1990s, only 35% of U.S. manufactured turbines installed in the mid-1980s to early 1990s remain in operation, with 86% of new or re-powering turbines coming from foreign manufacturers. Table 5.1 summarizes the results from 1985-1999, based on percentage of total capacity and percentage capacity change based on added capacity.

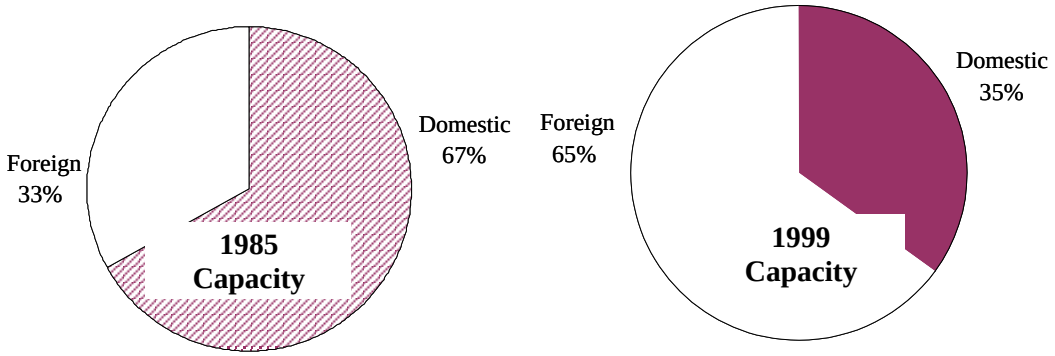


Figure 5.23. Comparison of capacity by turbine origin between 1985 and 1999.

Table 5.1 Comparison of domestic and foreign capacity and % change from 1985-1999.

Year	Domestic Capacity (%)	Foreign Capacity (%)
1985	67	33
1986	55	45
1987	56	44
1988	58	42
1989	52	48
1990	53	47
1991	46	54
1992	47	53
1993	45	55
1994	46	54
1995	43	57
1996	45	55
1997	47	57
1998	38	62
1999	35	65

CHAPTER 6. SUMMARY TABLES

Summary tables on the following pages include data for all wind projects submitting 1999 quarterly reports to the Commission as part of the WPRS program. Summary tables are extracted from project operator quarterly reports compiled in Section 7 for 1999. Projects which "failed to file" for this period are also summarized. Data include information about specific resource areas, turbine sizes, turbine types, turbine manufacturers, turbine operators, and turbine origins. The tables are listed in the following order from 1999 to 1996.

- Statewide and Resource Area Summary
- Turbine Size Summary
- Turbine Manufacturer Summary
- Wind Operator Summary

Although the staff has been continuously working with facilities to standardize reporting formats, some operators still have not complied with standard formats. Reports are still filed which combined totals for multiple wind facilities making it difficult to track individual facilities. In addition, some operators have failed to file reports resulting in missing data. These result in discrepancies with utility reported totals.

Note that the cumulative turbine capacity reported includes new and re-powered turbines beginning the quarter they came on line. Because new turbine capacity did not represented a significant percentage of cumulative capacities, the impact on annualized totals was considered minimal.

FACILITIES THAT FAIL TO FILE

(Data listed are from utility summary reports)

YEAR: 1999

QFID	Project Name	Net Capacity (MW)	Total Output (kWh)	Location	Source Utility
6090	Alta Mesa Pwr. Purch. Contract Trust	28.17	76,697,110	San Gorgonio	SCE
6011	Windland, Inc. Boxcar I Purchase Contract Trust	6.55	14,054,680	Tehachapi	SCE
6097	Windland, Inc. Boxcar II Purchase Contract Trst	7.74	18,320,260	Tehachapi	SCE
6053	Difwind Farms Limited V	7.88	17,995,870	San Gorgonio	SCE
6088	Difwind Partners	14.96	35,495,500	San Gorgonio	SCE
6234	Oak Creek Energy Systems Inc.	27.47	47,162,030	Tehachapi	SCE
6004	ZOND Cabazon Development Corp.	39.75	94,202,710	Tehachapi	SCE
16W019	Altamont Energy Corp	16.80	-	Altamont Pass	PG&E
16W009	Altamont-Midway, Ltd.	12.50	15,679,913	Altamont Pass	PG&E
01W001	Buena Vista Energy, LLC	37.55	193,925	Altamont Pass	PG&E
16W028	Patterson Pass Wind Farm LLC	22.00	43,979,022	Altamont Pass	PG&E
01W094	Tres Vaqueros Wind Farms, LLC	28.00	35,675,370	Altamont Pass	PG&E
	Total:	249.37	399,456,390		

YEAR: 1998

QFID	Project Name	Net Capacity (MW)	Total Output (kWh)	Location	Source Utility
6090	Alta Mesa Pwr. Purch. Contract Trust	28.17	83,247,740	San Gorgonio	SCE
6011	Windland, Inc. Boxcar I Purchase Contract Trust	6.55	13,627,000	Tehachapi	SCE
6097	Windland, Inc. Boxcar II Purchase Contract Trst	7.74	18,226,370	Tehachapi	SCE
6053	Difwind Farms Limited V	7.90	18,565,310	San Gorgonio	SCE
6088	Difwind Partners	15.10	32,458,690	San Gorgonio	SCE
01W094	Tres Vaqueros Wind Farms, LLC	28.00	26,167,994	Altamont Pass	PG&E
16W009	Altamont-Midway, Ltd.	12.50	13,071,024	Altamont Pass	PG&E
16W028	Patterson Pass Wind Farm LLC	22.00	36,900,018	Altamont Pass	PG&E
	Total:	127.96	242,264,146		

YEAR: 1997

QFID	Project Name	Net Capacity (MW)	Total Output (kWh)	Location	Source Utility
6090	Alta Mesa Pwr. Purch. Contract Trust	28.17	73,697,970	San Gorgonio	SCE
16W019	Altamont Energy Corp	16.80	-	Altamont Pass	PG&E
16W009	Altamont-Midway, Ltd.	12.50	16,491,294	Altamont Pass	PG&E
16W028	Patterson Pass Wind Farm LLC	60.00	42,349,537	Altamont Pass	PG&E
	Total:	117.47	132,538,801		

YEAR: 1996

QFID	Project Name	Net Capacity (MW)	Total Output (kWh)	Location	Source Utility
6090	Alta Mesa Pwr. Purch. Contract Trust	28.17	84,528,000	San Gorgonio	SCE
16W019	Altamont Energy Corp	16.80	-	Altamont Pass	PG&E
16W009	Altamont-Midway, Ltd.	12.50	15,419,466	Altamont Pass	PG&E
16W028	Patterson Pass Wind Farm LLC	60.00	37,850,598	Altamont Pass	PG&E
	Total:	117.47	137,798,064		

Note: Capacity and production numbers for facilities that failed to file in the reporting timeframe are given above. Data is obtained from utility reports and are not included in WPRS summary data tables in the sections following. To estimate statewide capacity and production numbers, the failed to file facility numbers (capacity or production) will need to be added to the summary data.

1999 STATEWIDE DATA SUMMARY TABLE

Data Category	Net Capacity (MW)	New Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in Turbines
STATEWIDE							
1st Quarter	1,341	0	525,996,269	18%	153	11,409	0
2nd Quarter	1,363	22	1,077,322,109	36%	243	11,273	-136
3th Quarter	1,407	44	880,246,835	29%	256	11,373	100
4th Quarter	1,406	-1	360,896,204	12%	105	11,368	-5
1999 Totals	1,406	65	2,844,461,416	23%	756	11,368	-41
RESOURCE AREA							
Altamont							
1st Quarter	474	0	74,468,375	7%	62	4,769	0
2nd Quarter	474	0	334,076,701	32%	280	4,769	0
3th Quarter	479	5	352,469,803	34%	292	4,794	25
4th Quarter	477	-2	64,979,273	6%	54	4,782	-12
1999 Totals	477	3	825,994,152	20%	688	4,782	13
San Gorgonio							
1st Quarter	247	0	130,642,791	24%	210	2,174	0
2nd Quarter	246	0	225,378,686	42%	362	2,166	-8
3th Quarter	288	42	187,458,658	30%	250	2,239	73
4th Quarter	288	0	94,964,987	15%	127	2,237	-2
1999 Totals	288	0	638,445,122	25%	851	2,237	63
Tehachapi							
1st Quarter	539	0	312,570,554	26%	254	3,682	0
2nd Quarter	561	22	465,777,375	38%	364	3,554	-128
3th Quarter	558	-3	285,411,173	23%	224	3,556	2
4th Quarter	559	1	192,027,593	16%	151	3,565	9
1999 Totals	559	20	1,255,786,695	26%	986	3,565	-117
Pachecho							
1st Quarter	16	0	3,135,805	9%	59	167	0
2nd Quarter	16	0	12,344,243	34%	232	167	0
3th Quarter	16	0	9,407,686	26%	177	167	0
4th Quarter	16	0	1,741,782	5%	33	167	0
1999 Totals	16	0	26,629,516	19%	501	167	0
Solano							
1st Quarter	65	0	5,178,744	4%	32	617	0
2nd Quarter	65	0	39,745,104	28%	244	617	0
3th Quarter	65	0	45,499,515	32%	280	617	0
4th Quarter	65	0	7,182,569	5%	44	617	0
1999 Totals	65	0	97,605,932	17%	600	617	0

1998 STATEWIDE DATA SUMMARY TABLE

Data Category	Net Capacity (MW)	New Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in Turbines
STATEWIDE							
1st Quarter	1,247	0	386,067,622	14%	126	11,934	0
2nd Quarter	1,246	-1	810,005,093	30%	307	11,923	-31
3th Quarter	1,406	160	696,378,259	23%	195	12,493	-23
4th Quarter	1,448	42	462,767,775	15%	121	12,553	-134
1998 Totals	1,448	201	2,355,218,748	19%	750	12,553	-188
RESOURCE AREA							
Altamont							
1st Quarter	523	0	61,465,935	5%	48	4,908	0
2nd Quarter	523	0	243,628,852	21%	190	4,908	0
3th Quarter	523	0	272,230,915	24%	212	4,908	0
4th Quarter	523	0	60,053,327	5%	47	4,908	0
1998 Totals	523	0	637,379,027	14%	496	4,908	0
San Gorgonio							
1st Quarter	268	0	114,609,702	20%	156	2,745	0
2nd Quarter	268	0	266,365,228	45%	363	2,745	0
3th Quarter	268	0	158,587,065	27%	216	2,745	0
4th Quarter	268	0	91,639,005	16%	125	2,745	0
1998 Totals	268	0	631,201,000	27%	859	2,745	0
Tehachapi							
1st Quarter	375	0	202,564,479	25%	204	3,497	0
2nd Quarter	374	-1	273,435,026	33%	276	3,486	-11
3th Quarter	534	160	228,447,579	20%	175	4,056	570
4th Quarter	576	42	301,763,145	24%	196	4,116	60
1998 Totals	576	201	1,006,210,229	20%	653	4,116	619
Pachecho							
1st Quarter	16	0	2,728,688	8%	51	167	0
2nd Quarter	16	0	8,377,531	23%	158	167	0
3th Quarter	16	0	8,389,140	23%	158	167	0
4th Quarter	16	0	2,832,575	8%	53	167	0
1998 Totals	16	0	22,327,934	16%	420	167	0
Solano							
1st Quarter	65	0	4,698,818	3%	29	617	0
2nd Quarter	65	0	18,198,456	13%	112	617	0
3th Quarter	65	0	28,723,560	20%	177	617	0
4th Quarter	65	0	6,479,723	5%	40	617	0
1998 Totals	65	0	58,100,557	10%	357	617	0

1997 STATEWIDE DATA SUMMARY TABLE

Data Category	Net Capacity (MW)	New Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in Turbines
STATEWIDE							
1st Quarter	1,518	0	497,321,224	15%	130	13,254	0
2nd Quarter	1,504	-14	1,181,135,047	36%	311	13,142	-122
3th Quarter	1,354	-150	714,376,860	24%	209	12,538	-604
4th Quarter	1,354	0	334,659,373	11%	98	12,539	1
1997 Totals	1,354	-164	2,727,492,504	23%	749	12,539	-725
RESOURCE AREA							
Altamont							
1st Quarter	547	0	86,331,724	7%	65	5,037	0
2nd Quarter	547	0	340,752,128	28%	255	5,037	0
3th Quarter	547	0	338,866,907	28%	254	5,037	0
4th Quarter	547	0	69,142,419	6%	52	5,037	0
1997 Totals	547	0	835,093,178	17%	625	5,037	0
San Gorgonio							
1st Quarter	270	0	117,375,583	20%	159	2,781	0
2nd Quarter	256	-14	249,808,996	45%	358	2,671	-110
3th Quarter	264	8	159,944,806	28%	226	2,713	42
4th Quarter	264	0	86,415,587	15%	122	2,713	0
1997 Totals	264	-6	613,544,973	27%	865	2,713	-68
Tehachapi							
1st Quarter	620	0	282,896,628	21%	184	4,652	0
2nd Quarter	620	0	549,585,448	40%	358	4,650	-2
3th Quarter	462	-158	169,982,221	17%	147	4,004	-646
4th Quarter	462	0	168,218,133	17%	146	4,005	1
1997 Totals	462	-158	1,170,682,430	29%	835	4,005	-647
Pachecho							
1st Quarter	16	0	2,093,008	6%	39	167	0
2nd Quarter	16	0	9,260,307	26%	174	167	0
3th Quarter	16	0	10,199,654	28%	192	167	0
4th Quarter	16	0	2,542,250	7%	48	167	0
1997 Totals	16	0	24,095,219	17%	453	167	0
Solano							
1st Quarter	65	0	8,624,280	6%	53	617	0
2nd Quarter	65	0	31,728,168	22%	195	617	0
3th Quarter	65	0	35,383,272	25%	217	617	0
4th Quarter	65	0	8,340,984	6%	51	617	0
1997 Totals	65	0	84,076,704	15%	517	617	0

1996 STATEWIDE DATA SUMMARY TABLE

Data Category	Net Capacity (MW)	New Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in Turbines
STATEWIDE							
1st Quarter	1,561	0	573,363,959	17%	145	13,546	0
2nd Quarter	1,559	-26	1,237,738,782	36%	313	13,515	-31
3th Quarter	1,561	2	913,736,323	27%	231	13,538	23
4th Quarter	1,555	-4	488,033,741	14%	124	13,404	-134
1996 Totals	1,555	-28	3,212,872,804	24%	813	13,404	-142
RESOURCE AREA							
Altamont							
1st Quarter	547	0	93,018,828	8%	69	5,054	0
2nd Quarter	547	0	291,190,929	24%	217	5,054	0
3th Quarter	548	2	338,435,263	28%	252	5,080	26
4th Quarter	547	-2	94,765,138	8%	71	5,037	-43
1996 Totals	548	0	817,410,158	17%	609	5,037	-43
San Gorgonio							
1st Quarter	310	0	187,499,585	28%	220	3,010	0
2nd Quarter	310	0	363,207,609	53%	426	3,010	0
3th Quarter	310	0	203,268,410	30%	238	3,010	0
4th Quarter	307	-3	103,212,753	15%	123	2,926	-84
1996 Totals	307	-3	857,188,356	32%	1,007	2,978	-84
Tehachapi							
1st Quarter	623	0	280,285,634	21%	180	4,698	0
2nd Quarter	621	74	549,606,752	40%	356	4,667	-31
3th Quarter	621	0	319,977,472	24%	207	4,664	-3
4th Quarter	620	0	274,517,880	20%	177	4,657	-7
1996 Totals	620	74	1,424,387,738	26%	920	4,657	-7
Pachecho							
1st Quarter	16	0	2,283,184	6%	43	167	0
2nd Quarter	16	0	7,028,524	20%	132	167	0
3th Quarter	16	0	8,993,730	25%	169	167	0
4th Quarter	16	0	3,585,562	10%	68	167	0
1996 Totals	16	0	21,891,000	15%	412	167	0
Solano							
1st Quarter	65	0	10,276,728	7%	63	617	0
2nd Quarter	65	0	26,704,968	19%	164	617	0
3th Quarter	65	0	43,061,448	30%	265	617	0
4th Quarter	65	0	11,952,408	8%	73	617	0
1996 Totals	65	0	91,995,552	16%	565	617	0

1999 TURBINE DATA SUMMARY TABLE

Data Category	Net Capacity (MW)	New Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in Turbines
TURBINE SIZE							
1-50 kW							
1st Quarter	20.00	0	5,830,314.00	13%	84.0	537	0
2nd Quarter	19.73	-0.27	11,816,223.00	27%	173.0	529	-8
3th Quarter	19.98	0.25	9,249,454.00	21%	133.4	534	5
4th Quarter	19.98	0	3,150,548.00	7%	45.4	534	0
1999 Totals	19.98	-0.02	30,046,539.00	17%	435.7	534	-3
51-100 kW							
1st Quarter	704.36	0	192,170,134.20	12%	104.51	8017	0
2nd Quarter	690.07	-14.29	521,160,769.40	34%	289.97	7811	-206
3th Quarter	694.57	4.5	439,904,394.50	29%	243.05	7880	69
4th Quarter	694.57	0	125,771,257.00	8%	69.49	7880	0
1999 Totals	694.57	-9.79	1,279,006,555.10	21%	706.63	7880	-137
101-150 kW							
1st Quarter	160.25	0	61,977,156.60	18%	153.43	1334	0
2nd Quarter	161.00	0.75	118,333,397.40	34%	291.51	1341	7
3th Quarter	153.83	-7.17	106,376,467.30	32%	274.73	1275	-66
4th Quarter	153.02	-0.81	41,059,679.90	12%	106.28	1271	-4
1999 Totals	153.02	-7.23	327,746,701.20	24%	848.37	1271	-63
151-250 kW							
1st Quarter	267.92	0	167,806,439.20	29%	279.17	1129	0
2nd Quarter	267.92	0	247,051,316.40	42%	411.01	1129	0
3th Quarter	274.81	6.89	156,560,649.00	26%	255.82	1159	30
4th Quarter	274.56	-0.25	103,759,623.00	17%	169.63	1158	-1
1999 Totals	274.56	6.64	675,178,027.60	28%	1115.63	1158	29
251-1000 kW							
1st Quarter	188.45	0	98,212,225.00	24%	277.10	392	0
2nd Quarter	223.95	35.5	178,960,402.60	36%	407.40	463	71
3th Quarter	263.66	39.71	168,155,869.70	29%	297.13	525	62
4th Quarter	263.66	0	87,155,096.10	15%	154.00	525	0
1999 Totals	263.66	75.21	532,483,593.40	23%	940.91	525	133

1998 TURBINE DATA SUMMARY TABLE

Data Category	Net Capacity (MW)	New Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in Turbines
TURBINE SIZE							
1-50 kW							
1st Quarter	38.00	0	15,414,143.60	19%	100.9	1015	0
2nd Quarter	38.00	0	35,648,541.00	43%	233.3	1015	0
3th Quarter	38.00	0	22,131,588.00	27%	144.9	1015	0
4th Quarter	38.00	0	11,332,768.00	14%	74.2	1015	0
1998 Totals	38.00	0	84,527,040.60	25%	553.3	1015	0
51-100 kW							
1st Quarter	711.40	0	162,533,343.20	10%	85.9	8133	0
2nd Quarter	710.80	-0.6	470,504,756.00	30%	249.1	8124	-9
3th Quarter	709.40	-1.4	415,004,057.00	27%	220.3	8101	-23
4th Quarter	709.40	0	209,849,855.00	14%	106.7	8101	0
1998 Totals	709.40	-2	1,325,663,993.40	21%	589.4	8101	-32
101-150 kW							
1st Quarter	201.60	0	61,541,055.60	14%	120.6	1692	0
2nd Quarter	201.40	-0.2	224,267,513.00	51%	439.8	1691	-1
3th Quarter	200.90	-0.5	140,244,177.00	32%	275.5	1686	-5
4th Quarter	200.90	0	100,928,749.00	23%	173.5	1686	0
1998 Totals	200.90	-0.7	526,981,494.60	30%	726	1964	-6
151-250 kW							
1st Quarter	163.00	0	84,420,654.00	24%	228.4	743	0
2nd Quarter	163.00	0	117,752,946.00	33%	319	743	0
3th Quarter	304.20	141.2	379,535,768.00	57%	567.2	1307	564
4th Quarter	304.20	0	399,945,191.00	60%	595.9	1307	0
1998 Totals	304.20	141.2	981,654,559.00	37%	1462.7	1056	0
251-750 kW							
1st Quarter	133.70	0	55,616,427.00	19%	180.4	351	0
2nd Quarter	133.70	0	113,245,238.30	39%	367.4	351	0
3th Quarter	153.80	20.1	140,203,864.00	42%	429.5	384	33
4th Quarter	195.80	42	198,669,085.00	46%	490.3	444	60
1998 Totals	195.80	62.1	507,734,614.30	30%	1252.9	444	93

1997 TURBINE DATA SUMMARY TABLE

Data Category	Net Capacity (MW)	New Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in Turbines
TURBINE SIZE							
1-50 kW							
1st Quarter	29.00	0	7,197,579.50	11%	71.8	776	0
2nd Quarter	29.00	0	22,105,948.90	35%	220.7	776	0
3th Quarter	29.00	0	19,606,204.90	31%	195.7	776	0
4th Quarter	29.00	0	7,158,297.30	11%	71.5	776	0
1997 Totals	29.00	0	56,068,030.60	22%	559.8	776	0
51-100 kW							
1st Quarter	726.50	0	190,581,345.30	12%	98.2	8409	0
2nd Quarter	726.20	-0.3	533,795,565.90	34%	275	8405	-4
3th Quarter	725.70	-0.5	411,947,783.40	26%	212.5	8397	-8
4th Quarter	725.70	0	147,334,916.80	9%	75.9	8397	0
1997 Totals	725.70	-0.8	1,325,663,993.40	21%	662	8397	-12
101-150 kW							
1st Quarter	238.30	0	79,856,417.00	15%	136.7	1964	0
2nd Quarter	238.30	0	192,167,889.00	37%	329	1964	0
3th Quarter	238.30	0	121,258,330.00	23%	207.6	1964	0
4th Quarter	238.30	0	59,354,023.60	11%	101.6	1964	0
1997 Totals	238.30	0	452,636,659.60	22%	774.9	1964	0
151-250 kW							
1st Quarter	403.80	0	177,075,705.00	20%	192	1772	-2
2nd Quarter	385.00	-18.8	326,877,733.00	39%	373.8	1657	-115
3th Quarter	232.40	-152.6	76,568,203.00	15%	156.8	1055	-602
4th Quarter	232.60	0.2	80,598,236.00	16%	163.8	1056	1
1997 Totals	232.60	-171.2	661,119,877.00	32%	1343.4	1056	-718
251-750 kW							
1st Quarter	121.30	-34	42,610,177.00	16%	153.3	333	-15
2nd Quarter	125.30	4	106,187,910.00	39%	368.6	340	7
3th Quarter	128.80	3.5	84,996,339.00	30%	285.5	346	6
4th Quarter	128.80	0	40,213,899.00	14%	135	346	0
1997 Totals	128.80	-26.5	274,008,325.00	24%	920.3	346	-2

1996 TURBINE DATA SUMMARY TABLE

Data Category	Net Capacity (MW)	New Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in Turbines
TURBINE SIZE							
1-50 kW							
1st Quarter	34	0	12,543,475	17%	105	905	0
2nd Quarter	34	0	27,086,958	36%	227	905	0
3th Quarter	34	0	18,862,761	25%	158	904	-1
4th Quarter	29	-5	9,254,486	15%	92	776	-128
1996 Totals	29	-6	67,747,680	27%	675	776	-129
51-100 kW							
1st Quarter	729	0	219,784,766	14%	112	8,455	0
2nd Quarter	727	-2	497,624,420	31%	255	8,424	-31
3th Quarter	729	2	414,412,603	26%	212	8,448	24
4th Quarter	729	0	186,870,204	12%	96	8,442	-6
1996 Totals	729	-1	1,325,663,993	21%	679	8,442	-13
101-150 kW							
1st Quarter	238	0	77,242,751	15%	132	1,964	0
2nd Quarter	238	0	192,280,095	37%	329	1,964	0
3th Quarter	238	0	122,772,386	24%	210	1,964	0
4th Quarter	238	0	68,085,415	13%	117	1,964	0
1996 Totals	238	0	460,380,647	22%	788	1,964	0
151-250 kW							
1st Quarter	404	0	189,223,105	21%	205	1,774	0
2nd Quarter	404	0	356,228,636	40%	386	1,774	0
3th Quarter	404	0	229,879,046	26%	249	1,774	0
4th Quarter	404	0	186,003,266	21%	202	1,774	0
1996 Totals	404	0	961,334,053	27%	1,034	1,774	0
251-750 kW							
1st Quarter	156	0	74,569,862	22%	198	448	0
2nd Quarter	156	0	164,518,672	48%	437	448	0
3th Quarter	156	0	127,809,527	37%	340	448	0
4th Quarter	156	0	37,820,370	11%	101	448	0
1996 Totals	156	0	404,718,431	30%	1,076	448	0

1999 TURBINE MANUFACTURER DATA SUMMARY TABLE

Data Category	Net Capacity (MW)	Change in Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in # of Turbines
Turbine Manufacturer							
American M.A.N. (Germany)	11.30	0	18,423,890.00	19%	529.29	283	0
Bonus Energy A/S (Denmark)	79.30	-0.13	168,328,643.00	24%	777.96	808	-2
Carter Wind Systems (USA)	1.45	0	1,002,303.00	8%	230.41	58	0
Danwin A/S (Denmark)	12.17	0	28,747,041.00	27%	868.49	45	0
Delta (Unknown)	0.75	0	1,027,867.00	16%	680.71	5	0
Energy Sciences, Inc (USA)	1.10	0.25	392,935.00	4%	84.65	22	5
Enertech (USA)	5.76	-0.32	7,055,717.00	14%	349.99	144	-8
FloWind Corp. (USA)	20.19	-1.82	10,296,885.00	6%	298.11	127	-12
James Howden and Company (Scotland)	0.99	0	-	0%	0.00	3	0
Kenetech Windpower Inc (USA)	481.30	0	914,344,284.00	22%	775.69	4352	0
Moerup Manfacturing Co. (Denmark)	131.90	33.9	295,225,130.90	26%	753.86	1051	10
Nagasaki Shipyard and Machinery (Japan)	159.75	0	382,005,714.00	27%	1205.04	597	0
NEG Micon A/S (Denmark)	56.00	0	118,402,911.50	24%	1957.72	80	0
Nordex Wind Turbines (Germany)	4.00	0	8,689,483.00	25%	948.63	4	0
Nordtank Energy Group (Denmark)	60.81	-9.79	116,106,002.00	22%	679.19	763	-136
Vanguard (USA)	7.80	-0.39	3,734,383.00	5%	413.10	40	-2
Vestas Wind Systems A/S (Denmark)	315.32	35.5	660,550,670.90	24%	812.41	2543	71
Wincon Energy Systems (USA)	21.27	0	38,570,622.00	21%	601.29	199	0
Wind Energy Group (England)	5.00	5	3,096,755.00	7%	315.35	20	20
Windane (Denmark)	13.60	0	43,185,960.00	36%	1398.87	34	0
Windmatic (Denmark)	16.02	2.53	25,274,219.00	18%	690.34	190	13

1998 TURBINE MANUFACTURER DATA SUMMARY TABLE

Data Category	Net Capacity (MW)	Change in Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in # of Turbines
Turbine Manufacturer							
American M.A.N. (Germany)	11.30	0	18,115,116.00	18%	520.41	283	0
AWT (USA)	0.90	0	563,332.00	7%	348.38	3	0
Bonus Energy A/S (Denmark)	79.40	0	157,784,407.00	23%	796.77	810	0
Cannon Energy Corp (USA)	4.00	-0.2	540,749.00	2%	509.18	2	-1
Carter Wind Systems (USA)	1.45	0	2,714,760.60	21%	624.08	58	0
Danwin A/S (Denmark)	18.70	0	56,109,757.00	34%	783.73	136	0
Delta (Unknown)	0.75	0	2,031,149.00	31%	1345.13	5	0
Energy Sciences, Inc (USA)	0.85	0	855,436.00	11%	238.48	17	0
Enertech (USA)	13.60	0	26,465,976.00	22%	550.81	342	0
FloWind Corp. (USA)	43.90	0	16,441,635.00	4%	243.29	227	0
James Howden and Company (Scotland)	29.30	0	230,182.30	0%	3.42	94	0
Kenetech Windpower Inc (USA)	473.80	0	656,376,086.00	16%	565.06	4277	0
Moerup Manfacturing Co. (Denmark)	152.30	0	422,865,988.60	32%	983.23	1498	0
Nagasaki Shipyard and Machinery (Japan)	159.80	0	161,886,670.00	12%	510.67	597	0
NEG Micon A/S (Denmark)	44.10	42	15,229,412.00	4%	319.76	63	60
Nordtank Energy Group (Denmark)	123.90	-0.8	157,136,932.50	14%	464.82	969	-2
OAK (USA)	16.90	0	32,972,729.00	22%	570.44	250	0
Vanguard (USA)	8.20	0	6,512,400.00	9%	686.09	42	0
Vestas Wind Systems A/S (Denmark)	292.40	-10	646,410,179.00	25%	857.29	2472	-13
Wincon Energy Systems (USA)	21.30	0	35,489,200.70	19%	553.26	199	0
Windane (Denmark)	13.6	0	48,014,770.00	40%	1555.29	34	0
Windmatic (Denmark)	13.5	0	22259786	19%	643.18	177	0

1997 TURBINE MANUFACTURER DATA SUMMARY TABLE

Data Category	Net Capacity (MW)	Change in Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in # of Turbines
Turbine Manufacturer							
American M.A.N. (Germany)	11.30	0	20,143,699.00	20%	578.69	283	0
Bonus Energy A/S (Denmark)	82.80	0	185,061,299.00	26%	837.80	826	0
Cannon Energy Corp (USA)	6.00	0	1,635,270.00	3%	1026.53	3	0
Carter Wind Systems (USA)	5.17	0	6,150,771.60	14%	558.91	108	0
Danwin A/S (Denmark)	17.30	-18.7	40,139,350.00	26%	880.38	116	-117
Delta (Unknown)	0.75	0	3,481,242.00	53%	2305.46	5	0
Energy Sciences, Inc (USA)	1.15	0	1,075,421.00	11%	231.67	22	0
Enertech (USA)	14.40	0	28,875,773.00	23%	577.05	354	0
FloWind Corp. (USA)	94.50	0	23,243,704.00	3%	155.56	511	0
James Howden and Company (Scotland)	28.30	0	33,646,512.00	14%	517.65	91	0
Kenetech Windpower Inc (USA)	473.80	0	797,155,667.00	19%	686.25	4277	0
Moerup Manfacturing Co. (Denmark)	143.60	-152.3	578,057,862.40	46%	1432.07	1490	-627
Nordtank Energy Group (Denmark)	81.70	0	166,227,315.30	23%	734.87	989	0
OAK (USA)	18.30	-55	36,911,914.00	23%	591.41	273	-1
Storm Master (USA)	0.40	0	116,149.00	3%	102.79	10	0
Vanguard (USA)	8.20	8.2	1,496,148.00	2%	157.62	42	42
Vestas Wind Systems A/S (Denmark)	291.00	-1.2	686,290,868.00	27%	906.34	2535	-12
Wincon Energy Systems (USA)	21.30	0	33,782,569.30	18%	526.65	199	0
Wind Energy Group (England)	6.00	0	10,945,439.00	21%	1114.61	20	0
Windane (Denmark)	13.4	0	49,190,840.00	42%	1593.38	34	0
WindMaster (USA)	37.3	0	5,053,200.00	2%	74.98	174	0
Windmatic (Denmark)	13.5	0	18,811,490.00	16%	543.54	177	0

1996 TURBINE MANUFACTURER DATA SUMMARY TABLE

Data Category	Net Capacity (MW)	Change in Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in # of Turbines
Turbine Manufacturer							
American M.A.N. (Germany)	11.30	0	21,854,939.00	22%	627.8531127	283	0
Bonus Energy A/S (Denmark)	82.80	0	172,255,548.00	24%	752.8717384	838	0
Cannon Energy Corp (USA)	1.00	0	1,447,865.00	17%	545.3352166	5	0
Carter Wind Systems (USA)	7.17	0	11,116,149.60	18%	681.3453632	118	0
Danwin A/S (Denmark)	36.00	0	98,646,679.00	31%	1047.783054	233	0
Delta (Unknown)	0.75	0	3,481,242.00	53%	2305.458278	5	0
Energy Sciences, Inc (USA)	1.15	-0.6	1,099,800.00	11%	236.9237398	22	-13
Enertech (USA)	14.40	-4.6	38,032,077.00	30%	757.472276	354	-115
FloWind Corp. (USA)	94.50	-0.8	53,963,611.00	7%	361.1587024	511	-1
James Howden and Company (Scotland)	28.30	0	33,646,512.00	14%	517.654574	91	0
Kenetech Windpower Inc (USA)	508.30	0	923,371,998.00	21%	732.8767977	4392	0
Moerup Manfacturing Co. (Denmark)	297.90	-0.6	758,614,663.50	29%	972.3011839	2147	-11
Nordtank Energy Group (Denmark)	80.40	0	177,982,866.90	25%	801.0787109	969	0
OAK (USA)	18.50	-2.1	40,128,295.00	25%	634.1557058	278	-34
Storm Master (USA)	0.40	0	273,648.00	8%	242.1663717	10	0
Vestas Wind Systems A/S (Denmark)	292.90	-0.4	727,486,236.00	28%	955.8953197	2554	-6
Wincon Energy Systems (USA)	21.30	0	36,625,325.00	20%	570.968182	199	0
Wind Energy Group (England)	6.00	0	44,717,899.00	85%	4553.757536	20	0
Windane (Denmark)	13.60	0	49,190,840.00	41%	1593.380409	34	0
WindMaster (USA)	37.3	0	4,018,476.00	1%	59.62838319	174	0
Windmatic (Denmark)	13.4	2.4	17743978	15%	514.9764772	177	38

1999 OPERATOR SUMMARY TABLE

Data Category	Net Capacity (MW)	Change in Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in # of Turbines
PROJECT OPERATOR							
AB Energy	6.97	0	20,279,611.00	33%	1141.7	31	0
Calwind Rosources, Inc.	22.82	0	42,857,504.00	21%	607.5	351	0
Coram	11.32	0	18,423,890.00	19%	529.3	283	0
EUI Management	19.58	-0.13	37,221,576.00	22%	754.1	163	-2
FPL Corp.	301.82	19.94	689,618,314.80	26%	1163.0	1157	-117
GreenRidge	497.65	3.18	870,412,726.00	20%	710.8	4660	8
International Turbine Research	16.40	0	26,629,516.00	19%	501.0	167	0
Northwind	13.08	0	16,694,119.00	15%	421.0	189	0
San Gorgonio Farms, Inc.	33.07	0	108,636,462.00	38%	1284.1	227	0
SeaWest Energy Group	141.79	41.79	235,167,249.00	19%	581.9	1092	70
Southern California Sunbelt	11.02	0	17,415,946.00	18%	605.6	139	0
Westwind Association	16.21	0	33,618,023.00	24%	745.6	172	0
WindPower Partners 1993 LP	53.50	0	140,201,186.00	30%	1214.1	190	0
Wintec	9.84	0	22,416,583.00	26%	741.6	187	0
Zond & Enron	250.76	0	564,868,710.50	26%	866.2	2360	0

1998 OPERATOR SUMMARY TABLE

Data Category	Net Capacity (MW)	Change in Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in # of Turbines
PROJECT OPERATOR							
AB Energy Inc.	6.90	0	20,790,047.00	34%	1170.4	31	0
Calwind Resources, Inc.	22.80	0	41,277,244.00	21%	585.0	351	0
Cannon Energy Group	72.20	-0.4	103,357,060.00	16%	545.1	663	-3
Coram Energy Group	11.30	0	18,115,116.00	18%	520.4	283	0
EUI Management	15.70	0	39,371,846.00	29%	970.7	161	0
FPL Corp.	274	42	246,008,102.00	10%	447.0	1298	60
Green Ridge	517.30	0	616,512,169.00	14%	493.4	4743	0
International Turbine Research	19.80	0	24,905,312.70	14%	408.0	167	0
Northwind	13.10	0	14,166,531.30	12%	357.3	189	0
San Gorgonio Farms	33.00	0	115,321,166.00	40%	1350.3	231	0
SeaWest Energy Group	152.60	0	490,645,942.00	37%	1061.4	1807	0
Southern California Sunbelt	11.00	0	18,847,986.00	20%	655.4	139	0
Westwind Association	16.20	0	34,552,836.00	24%	766.3	172	0
Wind Power Partners 1993 LP	46.00	0	120,970,769.00	30%	1230.3	115	0
Wintec, Ltd.	9.60	0	25,919,740.40	31%	857.5	187	0
Zond Systems, Inc.	250.70	-0.87	558,822,165.00	25%	856.9	2360	-13

1997 OPERATOR SUMMARY TABLE

Data Category	Net Capacity (MW)	Change in Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in # of Turbines
PROJECT OPERATOR							
AB Energy Inc.	69.70	0	21,396,300.0	3.5%	1204.543151	31	0
Calwind Resources, Inc.	22.80	0	38,981,312.00	19.5%	893.7183208	351	0
Cannon Energy Corp.	72.60	-0.2	180,056,193.0	28.3%	934.6673778	666	-1
Coram Energy Group, Ltd.	11.30	0	20,143,699.0	20.3%	578.6922635	283	0
Difko Administrations	24.60	0	51,877,492.00	24.1%	761.6833605	244	0
EUI Management PH Inc.	15.70	0	33,293,181	24.2%	820.8377959	161	0
Flo Wind Corporation	138.90	0	125,157,215.0	10.3%	470.5724561	861	0
Howden Wind Park	28.20	0	33,646,512.00	13.6%	517.654574	91	0
International Turbine Research	16.40	0	24,095,219	16.8%	453.3266669	167	0
Kenetech Windpower, Inc.	433.90	0	693,569,120.0	18.2%	646.0742627	4,183	0
Northwind Energy, Inc.	12.00	0	16,861,943.8	16.0%	451.0229444	186	0
San Gorgonio Farms, Inc.	24.50	0	113,974,054.0	53.1%	1327.920097	233	0
SeaWest Energy Group, Inc.	158.60	-162.6	584,387,715.0	42.1%	1304.818698	1,810	-702
Southern California Sunbelt	11.00	0	14,481,113.00	15.0%	503.5665279	139	0
Westwind Association	16.20	0	29,393,208.0	20.7%	651.88	172	0
WindDriven LLC	37.30	0	5,053,200.00	1.5%	74.98219373	174	0
WindLand Inc.	17.20	0	30,453,701.0	20.2%	738.3753594	141	0
Windpower Partners	46.00	0	114,531,986.0	28.4%	1164.830775	115	0
Wintec Energy, Ltd.	7.90	0	19,269,565.8	27.8%	795.41	81	0
Zond Systems, Inc.	251.70	-1.2	576,869,774.0	26.2%	880.9176042	2,374	-12

1996 OPERATOR SUMMARY TABLE

Data Category	Net Capacity (MW)	Change in Capacity (MW)	Output (kWh)	Actual Capacity Factor (%)	kWh/Square Meter	Number of Turbines	Change in # of Turbines
PROJECT OPERATOR							
AB Energy Inc.	6.98	0	22,368,940.00	37%	1728.311659	31	0
Calwind Resources, Inc.	7.41	0	22,166,744.00	34%	967.3886707	134	0
Cannon Energy Group	73.29	0	152,372,753.00	24%	784.7954892	669	0
Coram Energy Group	11.32	0	21,854,939.00	22%	627.8531127	283	0
Difwind Farms	24.68	0	56,693,000.00	26%	832.3863219	244	0
EUI Management	15.71	0	33,293,181.00	24%	820.8377959	161	0
Flowind	138.90	0	141,493,437.00	12%	632.3108509	518	0
Howden Wind Park	28.29	0	33,646,512.00	14%	517.654574	91	0
International Turbine Research	16.41	0	21,891,000.00	15%	411.8565623	167	0
Kenetech	483.34	0	854,554,443.00	20%	698.5289264	4527	0
Northwind	12.09	0	11,736,104.00	11%	313.9170813	186	0
San Gorgonio Farms	24.59	0	113,974,054.00	53%	1327.920097	233	0
SeaWest Energy Group	321.43	-5.6	839,209,185.00	30%	977.997266	2516	-136
Southern California Sunbelt	10.90	0	15,983,170.00	17%	558.7759012	139	0
Westwind Association	16.21	0	34,398,449.00	24%	762.8842094	172	0
Wind Power Partners 1993 LP	46.00	0	137,700,170.00	34%	1400.459395	115	0
WindDriven LLC	37.30	0	4,018,476.00	1%	59.62838319	174	0
WindLand Inc.	17.2	0	37,090,390.00	25%	899.287415	141	0
Wintec, Ltd.	9.84	0	25,365,141.00	29%	839.1828558	187	0
Zond Systems, Inc.	253.44	-0.4	632,992,830.00	29%	960.9816242	2393	-6

CHAPTER 7. OPERATOR DATA

7.1 List of Wind Project Facilities

The following list includes the names and addresses of California wind projects reporting 1999 performance data to the WPRS program. The listed is ordered by qualifying facility numbers assigned by the utilities (Southern California Edison – SCE or Pacific Gas and Electric – PG&E).

1999 WIND PROJECT FACILITIES LISTING

QF ID	Utility	Project Name	City	Contact Street	Contact City	State	Zip
6004	SCE	Cabazon Power Partners, LLC	Tehachapi	P. O. Box 1910	Tehachapi	CA	93581
6006	SCE	Mogul Energy Corp.	Tehachapi	P.O Box 1232	Tehachapi	CA	93581
6007	SCE	Zond Systems, Inc.	North Palm Springs	P. O. Box 1910	Tehachapi	CA	93581
6008	SCE	San Gorgonio Farms, Inc.	Whitewater	21515 Hawthorne Boulevard, Suite 1059	Torrance	CA	90503
6011	SCE	Windland, Inc.	Mojave	10081 Cameron Canyon Road	Mojave	CA	93501
6013	SCE	Windcorp Energy, Inc.	Tehachapi	P. O. Box 1388	Tehachapi	CA	93581
6018	SCE	Oak Creek Tryon Zephyr Park Project	Mojave	4225 Executive Square	La Jolla	CA	92037
6024	SCE	Cannon Energy Corporation	Mojave	10315 Oak Creek Road	Mojave	CA	93501
6026	SCE	CTV Management Group	Tehachapi	14981 Ballou Circle	Westminster	CA	92683
6030	SCE	LG&E Power, Inc.	Costa Mesa	575 Anton Boulevard, Suite 258	Costa Mesa	CA	92626
6031	SCE	El-Ft Management Ph, Inc.	West Conshohocken	100 Four Falls Corporate Center, Suite 215	West Conshohocken	PA	19428-2968
6036	SCE	LG&E Power, Inc.	Costa Mesa	575 Anton Boulevard, Suite 258	Costa Mesa	CA	92626
6037	SCE	Tehachapi Power Purchase Trust	Mojave	1455 Frazee Rd. Suite 820	San Diego	CA	92108
6038	SCE	Zond Systems, Inc.	Tehachapi	P. O. Box 1910	Tehachapi	CA	93581
6040	SCE	Zond Systems, Inc.	Tehachapi	P. O. Box 1910	Tehachapi	CA	93581
6041	SCE	Zond Systems, Inc.	Tehachapi	P. O. Box 1910	Tehachapi	CA	93581
6042	SCE	Zond Systems, Inc.	Tehachapi	P. O. Box 1910	Tehachapi	CA	93581
6043	SCE	Zond Systems, Inc.	Tehachapi	P. O. Box 1910	Tehachapi	CA	93581
6044	SCE	Zond Systems, Inc.	Tehachapi	P. O. Box 1910	Tehachapi	CA	93581
6051	SCE	Phoenix Energy Limited	North Palm Springs	1455 Frazee Rd. Suite 900	San Diego	CA	92108
6053	SCE	NAWP Inc.	San Diego	1455 Frazee Road, 9th Floor	San Diego	CA	92108-4304
6055	SCE	FORAS Energy, Inc.	North Palm Springs	63-905 19th Avenue	North Palm Springs	CA	92258
6056	SCE	CTV Management Group	Tehachapi	14981 Ballou Circle	Westminster	CA	92683
6058	SCE	Southern California Evolvet Developers	Desert Hot Springs	3216 E. Imperial Highway, Suite 280	Brea	CA	92821
6057	SCE	c/o ESI Energy, Inc.	Mojave	10315 Oak Creek Road	Mojave	CA	93501
6058	SCE	San Gorgonio Westwinds II, LLC	North Palm Springs	1455 Frazee Road, Ninth Floor	San Diego	CA	92108-4304
6059	SCE	Calwind Resources, Inc.	Tehachapi	2658 Townsgate Road, Suite 122	Westlake Village	CA	91361
6061	SCE	Windridge, Inc.	Tehachapi	P. O. Box 1388	Tehachapi	CA	93581
6062	SCE	Energy Dev. & Construction	North Palm Springs	21515 Hawthorne Blvd. Suite 1059	Torrance	CA	90503
6063	SCE	c/o ESI Energy, Inc.	Mojave	10315 Oak Creek Road	Mojave	CA	93501
6064	SCE	San Gorgonio Farms, Inc.	Whitewater	21515 Hawthorne Boulevard, Suite 1059	Torrance	CA	90503
6065	SCE	ESI Energy, Inc.	Juno Beach	700 Universe Boulevard	Juno Beach	FL	33408-2683
6066	SCE	ESI Energy, Inc.	Juno Beach	700 Universe Boulevard	Juno Beach	FL	33408-2683
6067	SCE	ESI Energy, Inc.	Juno Beach	700 Universe Boulevard	Juno Beach	FL	33408-2683
6067	SCE	NAWP Inc.	North Palm Springs	1455 Frazee Road, 9th Floor	San Diego	CA	92108-4304
6068	SCE	FORAS Energy, Inc.	North Palm Springs	63-905 19th Avenue	North Palm Springs	CA	92258
6069	SCE	CTV Management Group	Tehachapi	14981 Ballou Circle	Westminster	CA	92683
6068	SCE	FORAS Energy, Inc.	North Palm Springs	63-905 19th Avenue	North Palm Springs	CA	92258
6091	SCE	c/o ESI Energy, Inc.	Mojave	10315 Oak Creek Road	Mojave	CA	93501
6092	SCE	Cannon Energy Corporation	Mojave	10315 Oak Creek Road	Mojave	CA	93501
6094	SCE	Seawind Industries, Inc.	North Palm Springs	1455 Frazee Road, 9th Floor	San Diego	CA	92108-4304
6095	SCE	Dutch Energy Corporation	San Gorgonio Pass	2658 Townsgate Road, Suite 181	Westlake Village	CA	91361
6096	SCE	Enron	N. Palm Springs	63-905 19th Avenue	N. Palm Springs	CA	92258
6097	SCE	Windland, Inc.	Mojave	10081 Cameron Canyon Road	Mojave	CA	93501
6098	SCE	LG&E Power, Inc.	Costa Mesa	575 Anton Boulevard, Suite 258	Costa Mesa	CA	92626
6102	SCE	Victory Garden Phase IV Partner - 6102	Tehachapi	700 Universe Boulevard	Juno Beach	FL	33408-2683
6103	SCE	Victory Garden Phase IV Partner - 6103	Tehachapi	700 Universe Boulevard	Juno Beach	FL	33408-2683
6104	SCE	Victory Garden Phase IV Partner - 6104	Tehachapi	700 Universe Boulevard	Juno Beach	FL	33408-2683
6105	SCE	Zond Systems, Inc.	Tehachapi	P. O. Box 1910	Tehachapi	CA	93581
6106	SCE	Zond Systems, Inc.	Tehachapi	P. O. Box 1910	Tehachapi	CA	93581
6107	SCE	Zond Systems, Inc.	Tehachapi	P. O. Box 1910	Tehachapi	CA	93581
6108	SCE	Zond Systems, Inc.	Tehachapi	P. O. Box 1910	Tehachapi	CA	93581
6111	SCE	Zond Systems, Inc.	Tehachapi	P. O. Box 1910	Tehachapi	CA	93581
6112	SCE	Zond Systems, Inc.	Desert Hot Springs	P. O. Box 1910	Tehachapi	CA	93581
6113	SCE	Desert Wind II PPC Trust	Mojave	10315 Oak Creek Road	Mojave	CA	93501
6114	SCE	Desert Wind III PPC Trust	Mojave	10315 Oak Creek Road	Mojave	CA	93501
6118	SCE	LG&E Power, Inc.	North Palm Springs	575 Anton Boulevard, Suite 258	Costa Mesa	CA	92626
6126	SCE	John W. Harbor	Newberry Springs	47716 Fairview	Newberry Springs	CA	92365
6136	SCE	G & L Ranch	Frazier Park	2508 Johnson Road	Frazier Park	CA	93225
6139	SCE	Antelope Valley Calif. Poppy Reserve	Lancaster	43779 15th Street West	Lancaster	CA	93534
6213	SCE	Wintec Energy, Ltd.	Palm Springs	125 E. Tahquitz Canyon Way, Suite 201	Palm Springs	CA	92262
6234	SCE	Oak Creek Energy Systems Inc.	Mojave	1455 Frazee Road, #900	San Diego	CA	92108
6236	SCE	Calwind Resources, Inc.	Tehachapi	2658 Townsgate Road, Suite 122	Westlake Village	CA	91361

1999 WIND PROJECT FACILITIES LISTING (Con't)

01WB04	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
01WB19	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
01WB35	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
01WI44	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
01WI46A	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
01WI46B	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
01WI46C	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
01WI46D	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
08WI46A	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
08WI46B	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
08WI46C	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
08WI46D	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
08WI48	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
18WB11	PG&E	Altamont Infrastructure Company	Livermore	6185 Industrial Way	Livermore	CA	94550
18WB09	PG&E	Altamont Midway, LTD.	Tracy	1455 Frazee Rd. Suite 900	San Diego	CA	92108
01WB11	PG&E	Altech I	Tracy	1455 Frazee Rd. Suite 900	San Diego	CA	92108
1WB06H	PG&E	Dyer Road	Tracy	1455 Frazee Rd. Suite 900	San Diego	CA	92108
01WB07	PG&E	ESI Project or CWES Project	Tracy	1455 Frazee Rd. Suite 900	San Diego	CA	92108
01WB09, 16WB18	PG&E	Flowind I (Deer Road)--Flowind Partners1, Flowind Partners 2	Tracy	One California Street, 4th Floor	San Francisco	CA	94111
16WB14,16WB15, 16WB16,16WB17	PG&E	Flowind II (Ellsworth)--Flowind 3-4,Flowind 4-4, Flowind5-4, And Flowind 6-4	Tracy	One California Street, 4th Floor	San Francisco	CA	94111
25WI05	PG&E	International Turbine Research, Inc	Hollister	P O Box 85	Hollister	CA	95024
01WB05	PG&E	Northwind Vaquero-Souza Windpark	Palm Springs	125 E. Tahquitz Canyon Way, Suite 201	Palm Springs	CA	92262
18WB20	PG&E	Patterson Pass Wind Farm	Tracy	Four Embarcadero Center, Suite 4000	San Francisco	CA	94111-6106
01WB06	PG&E	SWEG (Seawest Energy Group)	Tracy	1455 Frazee Rd. Suite 900	San Diego	CA	92108
01WB15	PG&E	Tanwest 11	Tracy	1455 Frazee Rd. Suite 900	San Diego	CA	92108
01WB04	PG&E	Tres Vaqueros Windfarms, LLC	North Palm Springs	P O Box 1043	North Palm Springs	CA	92258
01WB12	PG&E	Venture Winds	Tracy	1455 Frazee Rd. Suite 900	San Diego	CA	92108
01WB14	PG&E	Viking 83	Tracy	1455 Frazee Rd. Suite 900	San Diego	CA	92108
01WB01	PG&E	Winddrives, Inc.	Byron	PO Box 645 7681 Byron Hotsprings Rd	Byron	CA	94514-0645
01WB17	PG&E	Zond Windsystem Partners LTD Series 85-C	Livermore	P O Box 1910	Tehachapi	CA	93581

7.2 Performance Data by Wind Projects

This section contains performance data as submitted by California wind project operators for four quarters in 1999. The data are listed alphabetically by operator name. Under each operator, reporting projects are identified along with qualifying facility IDs (QFID), capacities, wind turbine models, number of turbines and production figures for the year. An asterisk next to the QF facilities indicates that some portion of the data was incomplete.

Data contained in this report represent performance results over a span of four years from 1996-1999, with details for 1999 presented. Because of the volatility during this period, data from any one year should not be used as the sole basis for evaluating overall wind project performance.

7.2.1 Section Notes

These notes describe how WPRS data are reported and calculated. Points of clarification and limitations of the data are also discussed. Definitions for most wind data categories used in this section are contained in WPRS regulations (Appendix D).

Data missing. Some operators submitted incomplete reporting forms. Items not completed are designated by "N/A" or dashes (---) to distinguish missing data from values of "0". Note that operators who submit reports with missing data are in violation of WPRS regulations.

Failed to File. The 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, the Commission staff notified non-reporting operators by mail of the WPRS requirements. Non-reporting operators who were notified but did not respond 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 account for some of these differences.

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.

Rotor (M^2). The diameter of the rotor-swept area for each wind turbine allows different wind systems to be compared independently of wind resource area. In theory, 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.

1999 WIND PROJECT PERFORMANCE REPORTING DATA

AB Energy Inc.

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWh) Q1	Energy Produced in (kWh) Q2	Energy Produced in (kWh) Q3	Energy Produced in (kWh) Q4	Annual Energy Produced
AB energy Inc.	6899	6.9	Vestas V27	225kW @ 27MPH	31	31	31	31	5,338,030.00	7,473,317.00	4,892,531.00	2,574,543.00	20,278,611.00

Calwind

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWh) Q1	Energy Produced in (kWh) Q2	Energy Produced in (kWh) Q3	Energy Produced in (kWh) Q4	Annual Energy Produced
Wind Resource I	6860	8.71	Nordtank 65/13	65kW@34.7MPH	134	134	134	134	4,213,266.00	6,214,036.00	2,916,798.00	2,341,280.00	15,682,480.00
Tehachapi Windplant	6236	14.1	Bonus 65/13	65kW@34.7MPH	217	217	217	217	7,868,996.00	10,246,248.00	4,626,028.00	4,433,772.00	27,175,044.00
													42,857,524.00

Coram Energy Group, Ltd. 1999

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWh) Q1	Energy Produced in (kWh) Q2	Energy Produced in (kWh) Q3	Energy Produced in (kWh) Q4	Annual Energy Produced
Coram Energy Group Ltd	6829	1.1	Aeroman 12.5/Series 1	40kW @ 27MPH	27	27	27	27	531,487.00	784,762.00	422,406.00	259,936.00	1,998,583.00
Coram Tar/Vest Wind Farms	6829	4.0	Aeroman 12.5/Series 2	40kW @ 27MPH	100	100	100	100	2,002,084.00	2,981,329.00	1,663,423.00	1,029,614.00	7,676,451.00
Coram Tar/Vest Wind Farms	6858	1.9	Aeroman 12.5/Series 2	40kW @ 27MPH	47	47	47	47	531,487.00	784,762.00	422,406.00	259,936.00	1,998,583.00
Coram Tar/Vest Wind Farms	6858	4.3	Aeroman 12.5/Series 2	40kW @ 27MPH	109	109	109	109	1,846,237.00	2,040,646.00	1,324,864.00	936,512.00	6,758,273.00
													18,423,890.00

EUI Management PH Inc.

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWh) Q1	Energy Produced in (kWh) Q2	Energy Produced in (kWh) Q3	Energy Produced in (kWh) Q4	Annual Energy Produced
Mountain Pass/66 Ltd	6831	3.23	Bonus 65	65kW@30MPH	66	66	66	66	2,219,086.00	2,187,036.00	2,387,890.00	1,107,676.00	7,968,687.00
Mountain Pass/66 Ltd	6831	7.68	Bonus 120	120kW@40MPH	64	64	64	64	3,864,375.00	3,584,982.00	3,269,666.00	1,954,625.00	12,653,647.00
Mountain Pass/66 Ltd	6831	0.75	Delta 150	150kW@40MPH	5	5	5	5	243,542.00	275,032.00	327,629.00	180,844.00	1,027,087.00
Mountain Pass/66 Ltd	6831	2.08	Micon 108	108kW@30MPH	26	26	26	26	1,876,362.00	1,986,523.00	1,879,748.00	883,671.00	6,626,294.00
Mountain Pass/66 Ltd	6831	0.25	Bonus 250	250kW@30MPH	1	1	1	1	68,676.00	89,562.00	124,005.00	84,353.00	363,590.00
Mountain Pass/66 Ltd	6831	4.00	Nordex 1000	1000kW@30MPH	4	4	4	4	1,818,087.00	2,154,896.00	2,890,198.00	1,726,522.00	8,589,463.00
													37,221,676.00

FPL Inc.

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWh) Q1	Energy Produced in (kWh) Q2	Energy Produced in (kWh) Q3	Energy Produced in (kWh) Q4	Annual Energy Produced
Phase 3, 4A, 4B	6824	16.16	Nordtank 160 kW	160kW@32MPH	101	101	100	100	4,666,793.40	8,249,661.00	7,568,626.00	4,969,112.00	25,409,161.40
Phase 3, 4A, 4B	6824	17	Nordtank 75	75kW@32MPH	316	227	226	226	5,602,189.00	10,524,862.00	9,662,326.00	5,743,944.00	31,503,219.00
Phase 3, 4A, 4B	6824	3.186	Nordtank 65 kW	65kW@32MPH	48	3	8	0	3,088,271.20	3,027,932.40	-	-	6,107,083.60
Phase 3, 4A, 4B	6824	0.32	Micon 100 kW	100kW@33MPH	3	3	3	3	2,368,271.20	3,027,932.40	2,597,001.50	2,145,689.00	9,931,244.10
Phase 3, 4A, 4B	6824	0.5	Micon 250 kW	250kW@33MPH	2	2	1	1	2,368,271.20	3,027,932.40	2,597,001.50	2,741,686.00	10,527,260.10
Phase 3, 4A, 4B	6824	24.5	V47	660kW@33MPH	0	49	49	49	-	5,741,373.60	5,586,568.00	3,544,772.00	14,872,713.60
Cannon Energy/Phase 5	6892	10.0	Micon 100 kW	100kW@33MPH	100	100	8	8	10,215,462.00	12,400,721.00	4,220,966.00	1,771,196.40	28,608,345.20
Cannon Energy/Phase 5	6892	12.6	Vestas V39	450kW@30MPH	28	28	28	28	5,836,092.00	6,314,368.50	6,241,333.00	3,842,392.00	22,734,085.90
Cannon Energy/Phase 5	6892	11	V47	660kW@33MPH	0	22	22	22	-	6,114,368.50	4,941,303.00	3,442,392.00	14,498,086.90
FloWind III	6857	44.11	NEG MICON 700	700kW@33MPH	63	63	63	63	27,968,282.00	38,534,698.00	19,593,468.00	10,462,298.00	87,647,741.00
FloWind III	6857	0.75	Micon 100 kW	100kW@33MPH	0	7	34	34	-	7,395,007.00	9,796,235.00	5,231,148.00	23,022,390.00
Desert Wind II	6863	45.5	MHI 250	250kW@33MPH	182	182	182	182	15,964,015.00	30,387,143.00	17,366,136.00	8,808,976.00	72,448,086.00
Desert Wind II	6863	2.4	MHI 600	600kW@33MPH	4	4	4	4	4,769,385.00	9,082,143.00	5,210,440.00	2,842,694.00	21,734,662.00
Desert Wind II	6113	75	MHI 250	250kW@33MPH	300	300	300	300	50,868,710.00	68,683,979.00	54,004,068.00	27,260,910.00	212,828,670.00
Desert Wind III	6114	21.25	MHI 250	250kW@33MPH	86	86	86	86	12,712,387.00	22,743,104.00	13,875,018.50	8,358,117.00	57,688,626.50
Desert Wind III	6114	15.6	MHI 600	600kW@33MPH	26	26	26	26	3,813,650.00	6,622,966.00	4,352,505.50	2,507,736.00	17,306,889.50
Cameron Ridge LLC (IV)	6897	11.9	NEG MICON 700	700kW@33MPH	17	17	17	17	7,306,586.00	12,573,884.00	7,864,948.00	3,009,742.50	30,756,170.50
Cameron Ridge LLC (IV)	6897	0.75	Micon 100 kW	100kW@33MPH	0	0	8	7	-	-	-	1,806,846.50	1,806,846.50
													685,618,314.00

1999 WIND PROJECT PERFORMANCE REPORTING DATA

GREEN RIDGE — **Altamont Power Windplant**

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWH) Q1	Energy Produced in (kWH) Q2	Energy Produced in (kWH) Q3	Energy Produced in (kWH) Q4	Annual Energy Produced
Flowind I (Dyer Road)	N/A	17.00	F-17	140kW@44MPH	119	119	119	108	400,767.00	2,688,633.00	4,004,938.00	486,546.00	7,640,884.00
Flowind I (Dyer Road)	N/A	5.00	F-19	250kW@38MPH	20	20	20	18	130,149.00	811,397.00	1,453,575.00	160,800.00	2,556,001.00
Flowind II (Elworthy)	N/A	2.70	O-110	110kW@30MPH	25	25	25	25	136,787.00	669,011.00	636,354.00	136,319.00	1,577,471.00
Bonus Mark II H23	N/A	20.60	B-120	118.5kW@29MPH	225	225	225	225	5,219,103.00	15,407,974.00	25,531,528.00	5,048,150.00	51,206,755.00
Bonus Mark III H24	N/A	15.00	B-150	150kW@29MPH	100	100	100	100	3,086,369.00	9,267,329.00	14,137,724.00	3,069,288.00	29,562,700.00
													92,631,811.00

Altamont Windplant

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWH) Q1	Energy Produced in (kWH) Q2	Energy Produced in (kWH) Q3	Energy Produced in (kWH) Q4	Annual Energy Produced
Altamont WindPlant	N/A	343.00	KCS-56	100kW@29MPH	3430	3430	3430	3430	55,996,632.00	260,771,228.00	261,772,969.00	46,559,533.00	625,060,362.00
Altamont WindPlant	N/A	12.30	KVS-33	Variable	41	41	41	41	3,370,764.00	14,180,677.00	13,172,095.00	3,514,152.00	35,238,508.00
Altamont WindPlant	N/A	5.00	WEG-250	250kW@33MPH		8	20	20	-	-	2,422,480.00	674,306.00	3,096,786.00
													663,395,625.00

Montezuma Hills Windplant

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWH) Q1	Energy Produced in (kWH) Q2	Energy Produced in (kWH) Q3	Energy Produced in (kWH) Q4	Annual Energy Produced
Montezuma Hills Windplant	N/A	6.00	KCS-56	100kW@29MPH	600	600	600	600	4,977,426.00	38,720,651.00	43,906,917.00	6,839,101.00	94,444,095.00
Montezuma Hills Windplant	N/A	5.10	KVS-33	Variable	17	17	17	17	201,318.00	1,024,453.00	1,592,598.00	343,468.00	3,161,837.00
													97,605,932.00

San Gorgonio Windplant

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWH) Q1	Energy Produced in (kWH) Q2	Energy Produced in (kWH) Q3	Energy Produced in (kWH) Q4	Annual Energy Produced
San Gorgonio WindPlant	N/A	7.40	KCS-56	100kW@29MPH	74	74	74	74	3,317,477.00	5,373,486.00	5,188,011.00	2,359,322.00	16,238,296.00
San Gorgonio WindPlant	N/A	0.25	Bonus	250kW@33MPH	1	1	1	1	115,636.00	187,887.00	167,239.00	70,301.00	541,062.00
													16,779,358.00

International Turbine Research 1999

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWH) Q1	Energy Produced in (kWH) Q2	Energy Produced in (kWH) Q3	Energy Produced in (kWH) Q4	Annual Energy Produced
Pacheco Pass	25W105	0.80	Wincon 200	200kW@29MPH	4	4	4	4	181,628.00	769,848.00	682,156.00	114,952.00	1,748,584.00
Pacheco Pass	25W105	9.60	Wincon W99XT	100kW@27MPH	96	96	96	96	1,718,690.00	6,736,536.00	5,157,903.00	916,111.00	14,529,240.00
Pacheco Pass	25W105	2.00	Vestas V17E	100kW@33MPH	20	20	20	20	415,505.00	1,586,096.00	1,237,195.00	218,875.00	3,458,080.00
Pacheco Pass	25W105	1.98	Vestas V17	90kW@33MPH	22	22	22	22	261,950.00	1,202,862.00	817,654.00	137,848.00	2,420,311.00
Pacheco Pass	25W105	1.63	Nordtank NKT 65	65kW@31MPH	25	25	25	25	423,732.00	1,487,284.00	1,046,194.00	255,561.00	3,214,771.00
Pacheco Pass	25W105	0.50	Nordtank 500	500kW@29MPH	1	1	1	1	133,877.00	581,619.00	454,584.00	98,438.00	1,248,518.00
													26,629,516.00

1999 WIND PROJECT PERFORMANCE REPORTING DATA

Northwind Energy, Inc.

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWh) Q1	Energy Produced in (kWh) Q2	Energy Produced in (kWh) Q3	Energy Produced in (kWh) Q4	Annual Energy Produced
Northwind Vaquero-Souza Windpark	01W005	15.18	Nordtank 65kW	65kW@34MPH	186	186	186	186	1,420,019.00	7,089,122.00	6,330,250.00	1,125,000.00	16,004,119.00
Northwind Vaquero-Souza Windpark	01W005	15.18	Howden 330kW	330kW@34MPH	3	3	3	3	-	-	-	-	-
													16,004,119.00

San Gorgonio Farms

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWh) Q1	Energy Produced in (kWh) Q2	Energy Produced in (kWh) Q3	Energy Produced in (kWh) Q4	Annual Energy Produced
Energy Development & Const. Corp.	6862	3.00	Vestas V-39 500 kW	500kW@38MPH	6	6	6	6	2,075,394.00	3,586,968.00	2,133,461.00	1,922,125.00	9,707,999.00
San Gorgonio Wind Farms Inc. I	6809	2.73	Bonus 65 kW	65kW@33MPH	42	42	42	42	2,310,290.00	3,670,419.00	2,466,060.00	1,181,330.00	9,628,099.00
San Gorgonio Wind Farms Inc. I	6809	0.42	Micon 60 kW	60kW@33MPH	7	7	7	7	429,520.00	686,228.00	512,146.00	237,680.00	1,874,480.00
Whitewater Hill 20	6864	2.47	Bonus 65 kW	65kW@33MPH	38	38	38	38	1,869,140.00	2,940,569.00	1,752,190.00	864,620.00	7,226,530.00
Whitewater Hill 20	6864	2.73	Micon 60 kW	60kW@33MPH	38	38	38	38	1,532,271.00	2,770,212.00	1,782,479.00	906,051.00	6,991,013.00
Whitewater Hill 20	6864	0.12	Bonus 120 kW	120kW@40MPH	1	1	1	1	98,270.00	156,308.00	97,560.00	49,340.00	398,480.00
Whitewater Hill 20	6864	6.60	Bonus 120 kW	100kW@38MPH	66	66	66	66	4,820,210.00	8,616,948.00	6,040,230.00	2,549,070.00	21,026,460.00
Whitewater Hill 20	6864	13.60	DWT Windane 34	400kW@38MPH	34	34	34	34	8,261,440.00	15,081,800.00	13,140,440.00	6,102,200.00	43,165,960.00
Whitewater Hill 20	6864	0.45	Bonus 450	450kW@38MPH	1	1	1	1	254,680.00	181,368.00	303,520.00	170,560.00	908,120.00
Whitewater Hill 20	6864	2.50	Vestas V-39 500 kW	500kW@38MPH	5	5	5	5	1,801,640.00	3,287,128.00	2,357,700.00	1,183,280.00	8,629,000.00
													108,036,462.00

SeaWest

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWh) Q1	Energy Produced in (kWh) Q2	Energy Produced in (kWh) Q3	Energy Produced in (kWh) Q4	Annual Energy Produced
NAWP Inc. (East Winds Proj)	6852	3.98	Micon 600	578kW@38MPH	7	7	7	7	2,298,996.00	3,580,408.00	2,940,483.00	1,340,409.00	10,160,126.00
VPI Enterprises-Altech (III) Section 16-29 Trust	6887	21.78	Micon 108	108kW@38MPH	201	201	201	201	9,808,090.00	19,384,663.00	14,330,492.00	2,998,962.00	46,572,217.00
VPI Enterprises-Altech (III) Section 16-29 Trust	6887	3.13	Micon 65/13	60kW@30MPH	63	63	63	63	1,011,080.00	1,917,156.00	1,840,064.00	379,973.00	5,168,192.00
VPI Enterprises-Altech (III) Section 16-29 Trust	6887	8.63	Micon 700	631kW@38MPH	0	0	14	14	-	-	6,109,374.00	4,147,870.00	10,257,244.00
Windustries-Section 16-21 PPA Trust	6858	0.32	ETK 44/40	40kW@30MPH	8	0	8	0	368,644.00	-	-	-	368,644.00
Windustries-Section 16-21 PPA Trust	6858	8.83	Micon 700	631kW@38MPH	0	0	14	14	-	-	8,434,790.00	5,040,715.00	13,475,505.00
San Jacinto Power Section 22 Trust	6894	7.88	Vanguard 987	196kW@38MPH	40	42	48	40	1,558,746.00	2,175,637.00	-	-	3,734,383.00
San Jacinto Power Section 22 Trust	6894	2.53	Windmatic 15S	196kW@38MPH	0	0	13	13	-	-	2,131,587.00	816,521.00	2,962,108.00
San Jacinto Power Section 22 Trust	6894	11.98	Micon 700	664kW@38MPH	0	0	18	18	-	-	8,106,939.00	6,030,717.00	14,137,656.00
Dutch Energy	6895	9.42	Nedwind 40	471kW@38MPH	20	20	20	20	5,411,180.00	10,147,303.00	6,580,310.00	5,030,717.00	27,169,570.00
Windwinds II-Phoenix Section 20 Trust	6857	-	Micon 65/13	60kW@30MPH	0	0	0	0	-	-	-	-	-
Windwinds II-Phoenix Section 20 Trust	6857	-	ETK 44/40	40kW@30MPH	0	0	0	0	-	-	-	-	-
Windwinds II-Phoenix Section 20 Trust	6857	10.08	Micon 700	631kW@38MPH	0	0	16	16	-	-	9,297,090.00	5,602,981.00	14,900,071.00
Tehachapi Power Purchase Contract Trust	6837	27.18	Micon 108kW	108kW@38MPH	261	261	261	261	13,646,783.00	22,996,240.00	13,667,996.00	7,366,380.00	56,677,321.00
Tehachapi Power Purchase Contract Trust	6837	5.00	MWT-250	250kW@38MPH	20	20	20	20	1,862,370.00	3,694,109.00	4,944,058.00	2,589,476.00	12,179,013.00
Sea West Energy (CWES - 01W007)	01W007	0.68	ESI 54	50kW@30MPH	17	17	22	22	-	120,472.00	256,646.00	15,817.00	392,935.00
Sea West Energy (Viking - 01W014)	01W014	0.33	Micon 65/13	13kW@LOW Sp.	28	28	28	28	129,986.00	1,324,798.00	1,423,309.00	220,883.00	3,098,946.00
Sea West Energy (Altech - 01W011)	01W011	5.76	ETK 44/40	40kW@30MPH	144	144	144	144	-	2,978,459.00	3,468,417.00	320,963.00	6,666,873.00
Sea West Energy (Desert - 01W006)	01W006	0.01	Micon 65/13	13kW@LOW Sp.	1	1	1	1	6,039.00	29,422.00	26,193.00	11,296.00	73,749.00
Sea West Energy (Tosco - 01W015)	01W015	11.64	Micon 65/13	60kW@30MPH	194	194	194	194	63,483.00	989,459.00	912,930.00	122,948.00	2,088,730.00
Sea West Energy (Western - 01W012)	01W012	2.47	Windmatic	65kW@30MPH	38	38	38	38	116,360.00	2,431,817.00	2,098,632.00	230,647.00	4,908,165.00
													235,157,249.00

Southern California Sunbelt Developers, Inc.

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWh) Q1	Energy Produced in (kWh) Q2	Energy Produced in (kWh) Q3	Energy Produced in (kWh) Q4	Annual Energy Produced
Palm Springs Wind Park	6856	5.27	Windmatic 17s	95kW@34MPH	60	60	60	60	2,153,737.00	4,365,819.00	1,253,864.00	757,046.00	8,544,460.00
Palm Springs Wind Park	6856	4.75	Windmatic 15s	65kW@31.5MPH	73	73	73	73	2,022,072.00	3,946,722.00	2,046,074.00	853,998.00	8,871,486.00
													17,415,946.00

1999 WIND PROJECT PERFORMANCE REPORTING DATA

BNY Western Trust Company

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWh) Q1	Energy Produced in (kWh) Q2	Energy Produced in (kWh) Q3	Energy Produced in (kWh) Q4	Annual Energy Produced
WestWind Assoc. Windpark	6096	16.20	Micon 108kW	108kW @ 33MPH	18	18	18	18	737,889.00	1,310,794.00	711,563.00	398,353.00	3,158,589.00
WestWind Assoc. Windpark	6096	16.20	Micon XT 110kW	110kW @ 33MPH	64	64	64	64	4,523,323.00	8,132,771.00	4,024,117.00	2,462,016.00	19,142,227.00
WestWind Assoc. Windpark	6096	16.20	Micon 108kW	108kW @ 33MPH	13	13	13	13	518,194.00	990,485.00	467,530.00	261,203.00	2,237,412.00
WestWind Assoc. Windpark	6096	16.20	Micon 65kW	65kW @ 38MPH	46	46	46	46	1,714,617.00	3,136,641.00	1,525,646.00	821,812.00	7,198,616.00
WestWind Assoc. Windpark	6096	16.20	Nordtank 65kW	65kW @ 38MPH	13	13	13	13	447,186.00	775,415.00	420,336.00	246,262.00	1,889,199.00
													33,619,023.00

WindPower Partners 1993, L.P.

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWh) Q1	Energy Produced in (kWh) Q2	Energy Produced in (kWh) Q3	Energy Produced in (kWh) Q4	Annual Energy Produced
Buck Substation	6030	13.60	KVS-33	100-415 kW@35MPH	36	36	36	36	9,114,379.00	17,575,066.00	13,734,670.00	5,933,174.00	46,357,279.00
Whitewater Substation	6035	5.70	KVS-33	100-415 kW@35MPH	19	19	19	19	3,779,020.00	8,454,161.00	6,619,408.00	3,612,863.00	22,466,116.00
Altech Substation	6088	16.00	KVS-33	100-415 kW@35MPH	8	6	6	8	1,420,121.00	2,726,589.00	2,114,660.00	867,815.00	7,128,185.00
Altech Substation	6088	7.55	Kenetech 56-100	100kW@29MPH	75	75	75	75	3,462,739.00	5,807,023.00	5,440,854.00	2,462,398.00	17,103,664.00
Riverview Substation	6118	4.80	KVS-33	100-415 kW@35MPH	16	16	16	16	4,266,628.00	8,626,363.00	6,076,865.00	3,258,510.00	20,420,366.00
Carter/Trust Substation	6213	16.20	KVS-33	100-415 kW@35MPH	13	13	13	13	1,306,183.00	5,807,684.00	2,616,078.00	1,428,637.00	12,757,580.00
Carter/Trust Substation	6213	16.20	KVS-33	100-415 kW@35MPH	16	16	16	16	2,497,000.00	5,171,000.00	4,141,008.00	2,068,120.00	13,876,128.00
													140,201,186.00

BNY Western Trust Company

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWh) Q1	Energy Produced in (kWh) Q2	Energy Produced in (kWh) Q3	Energy Produced in (kWh) Q4	Annual Energy Produced
Wintec I WindPark	6213	16.20	Carter 25kW	25kW @ 26MPH	58	58	58	58	413,981.00	277,964.00	225,606.00	95,232.00	1,002,383.00
Wintec Palm Windpark	6213	16.20	Micon 65kW	65kW @ 38MPH	63	63	63	63	1,724,686.00	3,040,505.00	1,685,378.00	766,791.00	7,217,669.00
Wintec Cahuilla Windpark	6213	16.20	Nordtank 65kW	65kW @ 34MPH	76	76	76	76	3,223,479.00	6,030,233.00	3,885,575.00	1,638,324.00	14,196,611.00
													22,416,663.00

Zond/Enron

Project Name	QFID	Net Cap Committed (MW)	Models	Wind Speed	# of Turbines Q1	# of Turbines Q2	# of Turbines Q3	# of Turbines Q4	Energy Produced in (kWh) Q1	Energy Produced in (kWh) Q2	Energy Produced in (kWh) Q3	Energy Produced in (kWh) Q4	Annual Energy Produced
Zond Windsystems Inc.	31W017	18.00	Vestas V-17	90kW@35MPH	200	200	200	200	3,710,770.00	14,597,780.00	14,897,002.50	2,908,647.00	36,024,159.50
Mesa Wind Developers	6007	28.90	Vestas V-15	65kW@35MPH	460	460	460	460	18,366,730.00	29,203,960.00	15,595,358.00	9,448,020.00	73,125,050.00
Victory Garden I	6039	4.62	Vestas V-15	65kW@35MPH	71	28	71	71	2,090,420.00	1,259,040.00	520,500.00	406,340.00	4,256,300.00
Victory Garden II	6040	5.72	Vestas V-15	65kW@35MPH	88	73	88	88	2,706,329.00	3,351,880.00	1,410,830.00	1,304,939.00	8,772,978.00
Victory Garden III	6041	4.75	Vestas V-15	65kW@35MPH	73	61	73	73	2,161,169.00	2,662,600.00	1,082,730.00	1,022,570.00	6,919,069.00
Victory Garden III	6041	0.27	Vestas V-17	90kW@35MPH	3	3	3	3	117,280.00	190,130.00	77,180.00	52,670.00	437,210.00
Victory Garden IV	6042	2.97	Vestas V-15	65kW@35MPH	43	43	43	43	1,301,392.00	1,821,511.00	783,296.00	707,567.00	4,613,766.00
Victory Garden IV	6042	2.97	Vestas V-17	90kW@35MPH	33	33	33	33	1,899,450.00	2,330,490.00	1,015,391.00	631,080.00	5,876,461.00
Victory Garden IV	6042	0.20	Vestas V-23	200kW@33MPH	1	1	1	1	-	-	-	-	-
Zond Windsystems Partners 85-A	6043	0.52	Vestas V-15	65kW@35MPH	8	8	8	8	167,400.00	295,680.00	183,150.00	93,070.00	879,300.00
Zond Windsystems Partners 85-A	6043	14.49	Vestas V-17	90kW@35MPH	182	161	182	182	5,995,074.00	8,173,680.00	3,572,708.00	3,468,391.00	21,209,773.00
Zond Windsystems Partners 85-B	6044	20.88	Vestas V-17	90kW@35MPH	232	232	232	232	9,146,417.00	12,671,280.00	4,787,274.00	5,188,346.00	31,793,307.00
Sky River Partnership (Wilderness)	6085	38.22	Vestas V-27	225kW@35MPH	161	161	161	161	29,148,900.00	38,997,020.00	22,222,440.00	18,068,770.00	108,399,130.00
Sky River Partnership (Wilderness II)	6086	19.80	Vestas V-27	225kW@35MPH	98	98	98	98	15,129,770.00	19,641,460.00	10,981,050.00	10,112,490.00	55,864,780.00
Sky River Partnership (Wilderness III)	6087	20.92	Vestas V-27	225kW@35MPH	93	93	93	93	16,869,540.00	19,423,680.00	9,324,960.00	12,168,720.00	57,886,910.00
Victory Garden Phase IV Partnership	6102	6.97	Vestas V-27	225kW@35MPH	31	31	31	31	5,463,080.00	7,391,690.00	3,465,030.00	3,208,090.00	19,217,980.00
Victory Garden Phase IV Partnership	6103	6.97	Vestas V-27	225kW@35MPH	31	31	31	31	4,216,000.00	5,422,360.00	3,310,220.00	2,643,000.00	14,920,080.00
Victory Garden Phase IV Partnership	6104	6.97	Vestas V-27	225kW@35MPH	31	31	31	31	4,765,580.00	6,464,170.00	3,226,160.00	2,925,840.00	17,381,750.00
Zond Systems Inc Meridith X	6105	5.04	Vestas V-17	90kW@35MPH	56	56	56	56	2,862,910.00	3,941,180.00	2,074,673.00	1,918,390.00	10,817,153.00
Zond Systems Inc Meridith XI	6106	0.13	Vestas V-15	65kW@35MPH	2	2	2	2	66,460.00	121,140.00	81,540.00	41,370.00	311,580.00

1999 WIND PROJECT PERFORMANCE REPORTING DATA

APPENDICES

Appendix A contains a listing of turbine manufacturers and references to wind facilities utilizing their model of turbines (referenced by QF numbers).

Appendix B identifies sources of wind energy technical assistance available to California project proponents.

Appendix C contains the current WPRS data reporting template used by operators. This section will also be reserved for comments made by wind operators detailing maintenance and operation issues through the year.

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

APPENDIX A: TURBINE MANUFACTURERS AND FACILITIES

TURBINE MANUFACTURER	COUNTRY OF ORIGIN	TURBINE MODEL	PROJECT OPERATOR	QFID
American M.A.N.	Germany	Aeroman 12.5/Series 1	Coram	6029
American M.A.N.	Germany	Aeroman 12.5/Series 2	Coram	6029
American M.A.N.	Germany	Aeroman 12.5/Series 2	Coram	6055
American M.A.N.	Germany	Aeroman 12.5/Series 1	Coram	6089
Bonus Energy A/S	Denmark	B-120	GreenRidge	16W014,16W015, 16W016,16W017, 01W009,16W010
Bonus Energy A/S	Denmark	B-150	GreenRidge	16W014,16W015, 16W016,16W017, 01W009,16W010
Bonus Energy A/S	Denmark	Bonus	GreenRidge	?
Bonus Energy A/S	Denmark	Bonus 65/13	Calwind Rosources, Inc.	6236
Bonus Energy A/S	Denmark	Bonus 65	EUI Management	6031
Bonus Energy A/S	Denmark	Bonus 120	EUI Management	6031
Bonus Energy A/S	Denmark	Bonus 250	EUI Management	6031
Bonus Energy A/S	Denmark	Bonus 65 kW	San Gorgonio Farms, Inc.	6009
Bonus Energy A/S	Denmark	Bonus 65 kW	San Gorgonio Farms, Inc.	6064
Bonus Energy A/S	Denmark	Bonus 120 kW	San Gorgonio Farms, Inc.	6064
Bonus Energy A/S	Denmark	Bonus 120 kW	San Gorgonio Farms, Inc.	6064
Bonus Energy A/S	Denmark	Bonus 450	San Gorgonio Farms, Inc.	6064
Carter Wind Systems	USA	Carter 25kW	Wintec	6213
Danwin A/S	Denmark	Nedwind 40	SeaWest Energy Group	6095
Danwin A/S	Denmark	D-110	GreenRidge	16W014,16W015,16W016, 16W017, 01W009,16W010
Delta	Unknown	Delta 150	EUI Management	6031
Energy Sciences, Inc	USA	ESI 54	SeaWest Energy Group	01W007
Enertech	USA	ETK 44/40	SeaWest Energy Group	6058
Enertech	USA	ETK 44/40	SeaWest Energy Group	6051
Enertech	USA	ETK 44/40	SeaWest Energy Group	01W011
FloWind Corp.	USA	F-17	GreenRidge	16W014,16W015,16W016, 16W017, 01W009,16W010
FloWind Corp.	USA	F-19	GreenRidge	16W014,16W015,16W016, 16W017, 01W009,16W010
James Howden and Comp	Scotland	Howden 330kW	Northwind	01W095

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Kenetech Windpower Inc	USA	KCS-56	GreenRidge	01W004, 01W018, 01W035, 01W144, 01W146A, 01W146B, 01W146C, 01W146D, 06W146A, 06W146B, 06W146C, 06W146D, 06W148, 16W011
Kenetech Windpower Inc	USA	KVS-33	GreenRidge	01W004, 01W018, 01W035, 01W144, 01W146A, 01W146B, 01W146C, 01W146D, 06W146A, 06W146B, 06W146C, 06W146D, 06W148, 16W011
Kenetech Windpower Inc	USA	KCS-56	GreenRidge	06W148
Kenetech Windpower Inc	USA	KVS-33	GreenRidge	06W148
Kenetech Windpower Inc	USA	KCS-56	GreenRidge	?
Kenetech Windpower Inc	USA	KVS-33	WindPower Partners 1993 LP	6030
Kenetech Windpower Inc	USA	KVS-33	WindPower Partners 1993 LP	6035
Kenetech Windpower Inc	USA	KVS-33	WindPower Partners 1993 LP	6098
Kenetech Windpower Inc	USA	KCS-56	WindPower Partners 1993 LP	6098
Kenetech Windpower Inc	USA	KVS-33	WindPower Partners 1993 LP	6118
Kenetech Windpower Inc	USA	KVS-33	WindPower Partners 1993 LP	6213
Kenetech Windpower Inc	USA	KVS-33	WindPower Partners 1993 LP	6213
Moerup Manfacturing Co.	Denmark	Micon 600	SeaWest Energy Group	6052
Moerup Manfacturing Co.	Denmark	Micon 108	SeaWest Energy Group	6087
Moerup Manfacturing Co.	Denmark	Micon 65/13	SeaWest Energy Group	6087
Moerup Manfacturing Co.	Denmark	Micon 700	SeaWest Energy Group	6087
Moerup Manfacturing Co.	Denmark	Micon 700	SeaWest Energy Group	6058
Moerup Manfacturing Co.	Denmark	Micon 700	SeaWest Energy Group	6094
Moerup Manfacturing Co.	Denmark	Micon 65/13	SeaWest Energy Group	6051
Moerup Manfacturing Co.	Denmark	Micon 700	SeaWest Energy Group	6051
Moerup Manfacturing Co.	Denmark	Micon 110/U	SeaWest Energy Group	6037
Moerup Manfacturing Co.	Denmark	MWT-250	SeaWest Energy Group	6037
Moerup Manfacturing Co.	Denmark	Micon 65/13	SeaWest Energy Group	01W014
Moerup Manfacturing Co.	Denmark	Micon 65/13	SeaWest Energy Group	01W006
Moerup Manfacturing Co.	Denmark	Micon 65/13	SeaWest Energy Group	01W015
Moerup Manfacturing Co.	Denmark	Micon 108	EUI Management	6031
Moerup Manfacturing Co.	Denmark	Micon 65kW	Wintec	6213
Moerup Manfacturing Co.	Denmark	Micon 108kW	Westwind Association	6096
Moerup Manfacturing Co.	Denmark	Micon 65kW	Westwind Association	6096
Moerup Manfacturing Co.	Denmark	Micon 108 kW	FPL Corp.	6024
Moerup Manfacturing Co.	Denmark	Micon 250 kW	FPL Corp.	6024
Moerup Manfacturing Co.	Denmark	Micon 108 kW	FPL Corp.	6092
Moerup Manfacturing Co.	Denmark	Micon 108 kW	FPL Corp.	6057
Moerup Manfacturing Co.	Denmark	Micon 108 kW	FPL Corp.	6091
Moerup Manfacturing Co.	Denmark	Micon 60 kW	San Gorgonio Farms, Inc.	6009
Moerup Manfacturing Co.	Denmark	Micon 60 kW	San Gorgonio Farms, Inc.	6064
Nagasaki Shipyard and M	Japan	MHI 250	FPL Corp.	6063
Nagasaki Shipyard and M	Japan	MHI 600	FPL Corp.	6063
Nagasaki Shipyard and M	Japan	MHI 250	FPL Corp.	6113
Nagasaki Shipyard and M	Japan	MHI 250	FPL Corp.	6114
Nagasaki Shipyard and M	Japan	MHI 600	FPL Corp.	6114
NEG Micon A/S	Denmark	NEG MICON 700	FPL Corp.	6057
NEG Micon A/S	Denmark	NEG MICON 700	FPL Corp.	6091
Nordex Wind Turbines	Germany	Nordex 1000	EUI Management	6031

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Nordtank Energy Group	Denmark	Nordtank 65/13	Calwind Resources, Inc.	6060
Nordtank Energy Group	Denmark	Nordtank NKT 65	International Turbine Research	25W105
Nordtank Energy Group	Denmark	Nordtank 500	International Turbine Research	25W105
Nordtank Energy Group	Denmark	Nordtank 65kW	Wintec	6213
Nordtank Energy Group	Denmark	Nordtank 65kW	Westwind Association	6096
Nordtank Energy Group	Denmark	Nordtank 65kW	Northwind	01W095
Nordtank Energy Group	Denmark	Nordtank 150 kW	FPL Corp.	6024
Nordtank Energy Group	Denmark	Nordtank 75	FPL Corp.	6024
Nordtank Energy Group	Denmark	Nordtank 65 kW	FPL Corp.	6024
Vanguard	USA	Vangrd 95T	SeaWest Energy Group	6094
Vestas Wind Systems A/S	Denmark	Vestas V-17	Zond	01W017
Vestas Wind Systems A/S	Denmark	Vestas V-15	Zond	6007
Vestas Wind Systems A/S	Denmark	Vestas V-15	Zond	6039
Vestas Wind Systems A/S	Denmark	Vestas V-15	Zond	6040
Vestas Wind Systems A/S	Denmark	Vestas V-15	Zond	6041
Vestas Wind Systems A/S	Denmark	Vestas V-17	Zond	6041
Vestas Wind Systems A/S	Denmark	Vestas V-15	Zond	6042
Vestas Wind Systems A/S	Denmark	Vestas V-17	Zond	6042
Vestas Wind Systems A/S	Denmark	Vestas V-23	Zond	6042
Vestas Wind Systems A/S	Denmark	Vestas V-15	Zond	6043
Vestas Wind Systems A/S	Denmark	Vestas V-17	Zond	6043
Vestas Wind Systems A/S	Denmark	Vestas V-17	Zond	6044
Vestas Wind Systems A/S	Denmark	Vestas V-27	Zond	6065
Vestas Wind Systems A/S	Denmark	Vestas V-27	Zond	6066
Vestas Wind Systems A/S	Denmark	Vestas V-27	Zond	6067
Vestas Wind Systems A/S	Denmark	Vestas V-27	Zond	6102
Vestas Wind Systems A/S	Denmark	Vestas V-27	Zond	6103
Vestas Wind Systems A/S	Denmark	Vestas V-27	Zond	6104
Vestas Wind Systems A/S	Denmark	Vestas V-17	Zond	6105
Vestas Wind Systems A/S	Denmark	Vestas V-15	Zond	6106
Vestas Wind Systems A/S	Denmark	Vestas V-17	Zond	6106
Vestas Wind Systems A/S	Denmark	Vestas V-15	Zond	6107
Vestas Wind Systems A/S	Denmark	Vestas V-17	Zond	6107
Vestas Wind Systems A/S	Denmark	Vestas V-17E	Zond	6107
Vestas Wind Systems A/S	Denmark	Vestas V-27	Zond	6107
Vestas Wind Systems A/S	Denmark	Vestas V-17	Zond	6108
Vestas Wind Systems A/S	Denmark	Vestas V-15	Zond	6111
Vestas Wind Systems A/S	Denmark	Vestas V-17	Zond	6111
Vestas Wind Systems A/S	Denmark	Vestas V-17E	Zond	6111
Vestas Wind Systems A/S	Denmark	Vestas V-15	Zond	6112
Vestas Wind Systems A/S	Denmark	Vestas V-17	Zond	6112
Vestas Wind Systems A/S	Denmark	Vestas V17E	International Turbine Research	25W105
Vestas Wind Systems A/S	Denmark	Vestas V17	International Turbine Research	25W105
Vestas Wind Systems A/S	Denmark	V47	FPL Corp.	6024
Vestas Wind Systems A/S	Denmark	Vestas V39	FPL Corp.	6092
Vestas Wind Systems A/S	Denmark	V47	FPL Corp.	6092
Vestas Wind Systems A/S	Denmark	Vestas V-39 500 kW	San Gorgonio Farms, Inc.	6062
Vestas Wind Systems A/S	Denmark	Vestas V-39 500 kW	San Gorgonio Farms, Inc.	6064
Vestas Wind Systems A/S	Denmark	Vestas V-27	AB Energy	6089

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Wincon Energy Systems	USA	Wincon 200	International Turbine Research	25W105
Wincon Energy Systems	USA	Wincon W99XT	International Turbine Research	25W105
Wincon Energy Systems	USA	Wincon 108kW	Westwind Association	6096
Wincon Energy Systems	USA	Wincon XT 110kW	Westwind Association	6096
Wind Energy Group	England	WEG-250	GreenRidge	01W004, 01W018, 01W035, 01W144, 01W146A, 01W146B, 01W146C, 01W146D, 06W146A, 06W146B, 06W146C, 06W146D, 06W148, 16W011
Windane	Denmark	DWT Windane 34	San Gorgonio Farms, Inc.	6064
Windmatic	Denmark	Windmatic 15S	SeaWest Energy Group	6094
Windmatic	Denmark	Windmatic	SeaWest Energy Group	01W012
Windmatic	Denmark	Windmatic 17s	Southern California Sunbelt	6056
Windmatic	Denmark	Windmatic 15s	Southern California Sunbelt	6056

APPENDIX B: SOURCES OF WIND ENERGY TECHNICAL ASSISTANCE/INFORMATION

California Energy Commission:

George Simons
PIER Renewables Program Manager
Research & Development
1516 Ninth St., MS-43
Sacramento, CA 95814
(916) 654-4659

Dick Anderson
Technical Coordinaor, Avian Mortality
System Assessment & Facility Siting
1516 Ninth St., MS-40
Sacramento, CA 95814
(916) 654-4166

Marwan Masri
Renewables Energy Programs Manager
Renewables Public Incentive Programs
1516 Ninth St., MS-XX
Sacramento, CA 95814
(916) 654-4531

Tim Olson
International Program Manger
Energy Technology Export Program
1516 Ninth St., MS-45
Sacramento, CA 95814
(916) 654-4528

News media, please contact:
Claudia Chandler
Assistant Director
Media and Public Communications
Office
(916) 654-4989
[www.energy.ca.gov]

National Resources:

Electric Power Research Institute
(EPRI)
Chuck McGowin, Manager
Wind Power Integration
3412 Hillview Avenue
Palo Alto, CA 94304
(650) 855-2121
[www.epri.com]

American Wind Energy Association
(AWEA)
122 C Street, NW, 4th Floor
Washington, DC 20001
Main: (202) 383-2500
[www.awea.org]

National Renewable Energy Laboratory
(NREL)
Susan Hock
National Wind Technology Center
1617 Cole Blvd.
Golden, CO 80401
(303) 384-6950

Sandia National Laboratories
(SNL)
Henry Dodd
P.O. Box 5800, MS-0708
Albuquerque, NM 87185-0708
(505) 844-5253
[www.sandia.gov]

[www.nrel.gov]

U.S. Department of Energy
(DOE)
Peter Goldman, Director
Office of PV and Wind Technology
1000 Independence Ave., SW
Washington, DC 20585
(202) 586-1995
[www.eren.doe.gov/wind]

University of California
Wind Energy Consortium
Cornelis van Dam
University of California at Davis
One Shields Avenue
Davis, CA 95616
(530) 752-7741
[www.ucdavis.edu]

APPENDIX C: REPORTING TEMPLATE

Reporting template

Contact Person :	
Address :	
Phone # :	
E-Mail :	
QFID # :	
Wind Project Name :	
Operator Name :	

	Model 1	Model 2	Model 3
Turbine Model			
Manufacturers' Name and Address			
Cumulative number of turbines installed			
Number of turbines installed during reporting period			
Rotor (m2)			
Size (kW) at MPH			
Resource Area			
Installed Capacity (MW)			
Actual Electricity Produced, 1st quarter (kWh)			
Actual Electricity Produced, 2nd quarter (kWh)			
Actual Electricity Produced, 3rd quarter (kWh)			
Actual Electricity Produced, 4th quarter (kWh)			
Actual Annual Production (kWh)			
Power Purchaser (Utility) Name			

COMMENTS :

Reserved for operator comments

#	QFID	OPERATOR NAME	COMMENT
1			
2			

APPENDIX D: WPRS REGULATIONS

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

WIND PROJECT PERFORMANCE REPORTING SYSTEM

Adopted
November 28, 1984

1381 Title and Purpose

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

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

1382 Definitions

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

(a) "Contingency Costs": 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": cumulative total number of turbines of a given model installed by the end of the reporting period.

(c) "Electricity Produced (kWh)": 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": name used for the project in any prospectus, offering memorandum, or sales literature.

(e) "Number of Turbines Installed During Reporting Period": number of additional turbines installed during the calendar quarter of the reporting period.

[Projected information currently not tracked. Items (f)-(h) do not apply for current report]

(f) "Project Cost": total cost of the turbines installed during the reporting period. Project cost includes all debt and equity investment in the project (including non-recourse 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)": annual average kilo-watt hour (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^2)": rotor swept area in square meters for each turbine model.

(j) "Size (kW)": the turbine manufacturer's published power rating in kW for a given wind speed in mile per hour (mph).

(k) "Turbine Model": manufacturer's name or commonly used term for the model of a specific rotor (M^2) and size (kW).

(l) "Wind Power Purchaser": any electricity utility or other entity that 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 purchasers firm
(3) Date of report
(4) Name of wind project operator
(5) Number of contract with wind project operator
(6) kWh produced during reporting period
(7) Dates of reporting period
(8) The maximum MW 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 a 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