

International Energy Agency

Programme of Research and Development on
Wind Energy Conversion Systems

IEA R&D Wind Energy

ANNUAL REPORT 1987

Published by

National Energy Administration

Sweden,

for the IEA R&D WECS Executive Committee

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FOREWORD

This is the tenth Annual Report of the IEA Programme for Research and Development on Wind Energy Conversion Systems (IEA R&D WECS) reviewing the activities during 1987. The report is submitted to the IEA in accordance with the recommendations of the IEA Committee on Research and Development.

D F Ancona
Chairman of the
Executive Committee

B Pershagen
Secretary of the
Executive Committee

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EXECUTIVE SUMMARY

The IEA Programme for Research and Development on Wind Energy Conversion Systems (IEA R&D WECS) started in 1977. Fourteen countries are participating: Austria, Belgium, Canada, Denmark, Germany, Japan, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, United Kingdom and United States. Italy is in the process of joining.

The IEA R&D WECS programme comprises nine Tasks, six of which have been successfully completed. Current Tasks include Task VII Study of Offshore Wind Energy Conversion Systems, Task VIII Study of Decentralised Applications for Wind Energy, and Task IX Intensified Study of Wake Effects behind Single Turbines and in Wind Turbine Parks. All current projects are task-sharing, i.e. the participating organisations are committed to in-kind contributions to an agreed programme, managed by an Operating Agent. The Central Electricity Generating Board (U.K.) is acting as Operating Agent for Task VII and Task IX, and the U.K. National Engineering Laboratory for Task VIII.

Substantial progress is reported from the ongoing Tasks. The Study of Offshore WECS (Task VII) is virtually complete and the final report will be published in early 1988. The national studies have established a range of generating costs, at the lower end of which offshore wind energy could be an economic alternative to other forms of electricity generation. The general feeling about the prospects for offshore wind

energy is more optimistic than previously. A programme of further work on offshore wind energy is recommended, including a plan for an offshore prototype.

Eleven countries are participating in Task VIII Decentralised Applications for Wind Energy. The Task has two Subtasks on Site Assessment Techniques to define models and techniques for obtaining wind and load data for decentralised wind systems, and on Wind Diesel Systems for analysing the performance of these systems. The work is also targeted towards the production of two handbooks in the Subtask areas. During 1987, three working group meetings were held. Detailed information has been collected for Subtask A, and work on the handbook is well advanced. Subtask B has concentrated on model validation rather than handbook drafting.

Seven countries are participating in Task IX Intensified Study of Wind Turbine Wake Effects. The objectives, schedules and technical issues were discussed at the first meeting in May 1987. The contributions from the participating countries include wake measurements from windfarms and single turbines as well as theoretical model studies. The following technical issues were identified: wake meander, added turbulence, overlapping shear layers, the near wake, and averaging times.

In the series of documents on Recommended Practices for Wind Turbine Testing and Evaluation, the first edition of Vol 8 Glossary of Terms, and the second edition of Vol 1 Power Performance Testing were published during the year. Other documents are in preparation.