

INTERNATIONAL ENERGY AGENCY

**IMPLEMENTING AGREEMENT
FOR A PROGRAMME OF RESEARCH
AND DEVELOPMENT ON WIND
ENERGY CONVERSION SYSTEMS**

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TABLE OF CONTENTS

PREAMBLE	5
<i>Article 1</i>	
OBJECTIVES	5
<i>Article 2</i>	
IDENTIFICATION AND INITIATION OF TASKS	6
<i>Article 3</i>	
THE EXECUTIVE COMMITTEE	7
<i>Article 4</i>	
THE OPERATING AGENTS	9
<i>Article 5</i>	
ADMINISTRATION AND STAFF	10
<i>Article 6</i>	
FINANCE	10
<i>Article 7</i>	
INFORMATION AND INTELLECTUAL PROPERTY	13

Article 8

LEGAL RESPONSIBILITY AND INSURANCE	13
--	----

Article 9

LEGISLATIVE PROVISIONS	13
------------------------------	----

Article 10

ADMISSION AND WITHDRAWAL OF CONTRACTING PARTIES ...	14
---	----

Article 11

FINAL PROVISIONS	16
------------------------	----

Annex I

ENVIRONMENTAL AND METEOROLOGICAL ASPECTS OF WIND ENERGY CONVERSION SYSTEMS	18
---	----

Annex II

EVALUATION OF MODELS FOR WIND ENERGY SITING	27
---	----

Annex III

INTEGRATION OF WIND POWER INTO NATIONAL ELECTRICITY SUPPLY SYSTEMS	31
---	----

Annex IV

INVESTIGATION OF ROTOR STRESSING AND SMOOTHNESS OF OPERATION OF LARGE-SCALE WIND ENERGY CONVERSION SYSTEMS	36
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INTERNATIONAL ENERGY AGENCY

IMPLEMENTING AGREEMENT FOR A PROGRAMME OF RESEARCH AND DEVELOPMENT ON WIND ENERGY CONVERSION SYSTEMS

The Contracting Parties

CONSIDERING that the Contracting Parties, being either governments or international organizations or parties designated by their respective governments pursuant to Article III of the Guiding Principles for Co-operation in the Field of Energy Research and Development adopted by the Governing Board of the International Energy Agency (the "Agency") on 28th July, 1975, wish to take part in the establishment and operation of a Programme of Research and Development on Wind Energy Conversion Systems (the "Programme") as provided in this Agreement;

CONSIDERING that the Contracting Parties which are governments and the governments of the other Contracting Parties (referred to collectively as the "Governments") participate in the Agency and have agreed in Article 41 of the Agreement on an International Energy Program (the "I.E.P. Agreement") to undertake national programmes in the areas set out in Article 42 of the I.E.P. Agreement, including energy research and development, and have referred in Chapter IV of the Long-Term Co-operation Programme, adopted by the Governing Board of the Agency on 30th January, 1976, to the establishment of a co-operative programme on wind power;

CONSIDERING that in the Governing Board of the Agency on 28th June, 1977, the Governments approved the Programme as a special activity under Article 65 of the I.E.P. Agreement;

CONSIDERING that the Agency has recognized the establishment of the Programme as an important component of international co-operation in the field of wind energy research and development;

HAVE AGREED as follows:

Article 1

OBJECTIVES

(a) *Scope of Activity.* The Programme to be carried out by the Contracting Parties within the framework of this Agreement shall consist of co-operative research, development, demonstrations and exchanges of information regarding wind energy conversion systems.

(b) *Method of Implementation.* The Contracting Parties shall implement the Programme by undertaking one or more tasks (the "Task" or "Tasks") each of which will be open to participation by two or more Contracting Parties as provided in Article 2 hereof. The Contracting Parties which participate in a particular Task are, for the purposes of that Task, referred to in this Agreement as "Participants".

(c) *Task Co-ordination and Co-operation.* The Contracting Parties shall co-operate in co-ordinating the work of the various Tasks and shall endeavour, on the basis of an appropriate sharing of burdens and benefits, to encourage co-operation among Participants engaged in the various Tasks with the objective of advancing the research and development activities of all Contracting Parties in the field of wind energy conversion systems.

Article 2

IDENTIFICATION AND INITIATION OF TASKS

(a) *Identification.* The Tasks undertaken by Participants are identified in the Annexes to this Agreement. At the time of signing this Agreement, each Contracting Party shall confirm its intention to participate in one or more Tasks by giving the Executive Director of the Agency a Notice of Participation in the relevant Annex or Annexes and the Operating Agent for each Task shall give the Executive Director of the Agency a Notice of Acceptance of the Task Annex. Thereafter, each Task shall be carried out in accordance with the procedures set forth in Articles 2 to 11 hereof, unless otherwise specifically provided in the applicable Annex.

(b) *Initiation of Additional Tasks.* Additional Tasks may be initiated by any Contracting Party according to the following procedure:

- (1) A Contracting Party wishing to initiate a new Task shall present to one or more Contracting Parties for approval a draft Annex, similar in form to the Annexes attached hereto, containing a description of the scope of work and conditions of the Task proposed to be performed;
- (2) Whenever two or more Contracting Parties agree to undertake a new Task, they shall submit the draft Annex for approval by the Executive Committee pursuant to Article 3 (e) (2) hereof; the approved draft Annex shall become part of this Agreement; Notice of Participation in the Task by Contracting Parties and acceptance by the Operating Agent shall be communicated to the Executive Director in the manner provided in paragraph (a) above;
- (3) In carrying out the various Tasks, Participants shall co-ordinate their activities in order to avoid duplication of activities.

(c) *Application of Task Annexes.* Each Annex shall be binding only upon the Participants therein and upon the Operating Agent for that Task, and shall not affect the rights or obligations of other Contracting Parties.

Article 3

THE EXECUTIVE COMMITTEE

(a) *Supervisory Control.* Control of the Programme shall be vested in the Executive Committee constituted under this Article.

(b) *Membership.* The Executive Committee shall consist of one member designated by each Contracting Party; each Contracting Party shall also designate an alternate member to serve on the Executive Committee in the event that its designated member is unable to do so.

(c) *Responsibilities.* The Executive Committee shall:

- (1) Adopt for each year, acting by unanimity, the Programme of Work, and Budget if foreseen, for each Task, together with an indicative Programme of Work and Budget for the following two years; the Executive Committee may, as required, make adjustments within the framework of the Programme of Work and Budget;
- (2) Make such rules and regulations as may be required for the sound management of the Tasks, including financial rules as provided in Article 6 hereof;
- (3) Carry out the other functions conferred upon it by this Agreement and the Annexes hereto; and
- (4) Consider any matters submitted to it by any of the Operating Agents or by any Contracting Party.

(d) *Procedure.* The Executive Committee shall carry out its responsibilities in accordance with the following procedures:

- (1) The Executive Committee shall each year elect a Chairman and one or more Vice-Chairmen;
- (2) The Executive Committee may establish such subsidiary bodies and rules of procedure as are required for its proper functioning. A representative of the Agency and a representative of each Operating Agent (in its capacity as such) may attend meetings of the Executive Committee and its subsidiary bodies in an advisory capacity;
- (3) The Executive Committee shall meet in regular session twice each year; a special meeting shall be convened upon the request of any Contracting Party which can demonstrate the need therefor;
- (4) Meetings of the Executive Committee shall be held at such time and in such office or offices as may be designated by the Committee;
- (5) At least twenty-eight days before each meeting of the Executive Committee, notice of the time, place and purpose of the meeting shall be given to each Contracting Party and to other persons or entities entitled to attend the meeting;

notice need not be given to any person or entity otherwise entitled thereto if notice is waived before or after the meeting;

- (6) The quorum for the transaction of business in meetings of the Executive Committee shall be one-half of the members plus one (less any resulting fraction) provided that any action relating to a particular Task shall require a quorum as aforesaid of members or alternate members designated by the Participants in that Task.

(e) *Voting.*

- (1) When the Executive Committee adopts a decision or recommendation for or concerning a particular Task, the Executive Committee shall act:
 - (i) When unanimity is required under this Agreement: by agreement of those members or alternate members which were designated by the Participants in that Task and which are present and voting;
 - (ii) When no express voting provision is made in this Agreement: by majority vote of those members or alternate members which were designated by the Participants in that Task and which are present and voting.
- (2) In all other cases in which this Agreement expressly requires the Executive Committee to act by unanimity, this shall require the agreement of each member or alternate member present and voting, and in respect of all other decisions and recommendations for which no express voting provision is made in this Agreement, the Executive Committee shall act by a majority vote of the members or alternate members present and voting. If a government has designated more than one Contracting Party to this Agreement, those Contracting Parties may cast only one vote under this paragraph.
- (3) The decisions and recommendations referred to in sub-paragraphs (1) and (2) above may, with the agreement of each member or alternate member entitled to act thereon, be made by mail, telex or cable without the necessity for calling a meeting. Such action shall be taken by unanimity or majority of such members as in a meeting. The Chairman of the Executive Committee shall ensure that all members are informed of each decision or recommendation made pursuant to this sub-paragraph.

(f) *Reports.* The Executive Committee shall, at least annually, provide the Agency with periodic reports on the progress of the Programme.

Article 4

THE OPERATING AGENTS

(a) *Designation.* Participants shall designate in the relevant Annex an Operating Agent for each Task. References in this Agreement to the Operating Agent shall apply to each Operating Agent in respect of the Task for which it is responsible.

(b) *Scope of Authority to Act on Behalf of Participants.* Subject to the provisions of the applicable Annex:

- (1) All legal acts required to carry out each Task shall be performed on behalf of the Participants by the Operating Agent for the Task;
- (2) The Operating Agent shall hold, for the benefit of the Participants, the legal title to all property rights which may accrue to or be acquired for the Task.

The Operating Agent shall operate the Task under its supervision and responsibility, subject to this Agreement, in accordance with the law of the country of the Operating Agent.

(c) *Reimbursements of Costs.* The Executive Committee may provide that expenses and costs incurred by an Operating Agent in acting as such pursuant to this Agreement shall be reimbursed to the Operating Agent from funds made available by the Participants pursuant to Article 6 hereof.

(d) *Replacement.* Should the Executive Committee wish to replace an Operating Agent with another government or entity, the Executive Committee may, acting by unanimity and with the consent of such government or entity, replace the initial Operating Agent. References in this Agreement to the "Operating Agent" shall include any government or entity appointed to replace the original Operating Agent under this paragraph.

(e) *Resignation.* An Operating Agent shall have the right to resign at any time, by giving six months written notice to that effect to the Executive Committee, provided that:

- (1) A Participant, or entity designated by a Participant, is at such time willing to assume the duties and obligations of the Operating Agent and so notifies the Executive Committee and the other Participants to that effect, in writing, not less than three months in advance of the effective date of such resignation; and
- (2) Such Participant or entity is approved by the Executive Committee, acting by unanimity.

(f) *Accounting.* An Operating Agent which is replaced or which resigns as Operating Agent shall provide the Executive Committee with an accounting of any monies and other assets which it may have collected or acquired for the Task in the course of carrying out its responsibilities as Operating Agent.

(g) *Transfer of Rights.* In the event that another Operating Agent is appointed under paragraph (d) or (e) above, the Operating Agent shall transfer to such replacement Operating Agent any property rights which it may hold on behalf of the Task.

(h) *Information and Reports.* Each Operating Agent shall furnish to the Executive Committee such information concerning the Task as the Committee may request and shall each year submit, not later than two months after the end of the financial year, a report on the status of the Task.

Article 5

ADMINISTRATION AND STAFF

(a) *Administration of Tasks.* Each Operating Agent shall be responsible to the Executive Committee for implementing its designated Task in accordance with this Agreement, the applicable Task Annex, and the decisions of the Executive Committee.

(b) *Staff.* It shall be the responsibility of the Operating Agent to retain such staff as may be required to carry out its designated Task in accordance with rules determined by the Executive Committee. The Operating Agent may also, as required, utilize the services of personnel employed by other Participants (or organizations or other entities designated by Contracting Parties) and made available to the Operating Agent by secondment or otherwise. Such personnel shall be remunerated by their respective employers and shall, except as provided in this Article, be subject to their employers' conditions of service. The Contracting Parties shall be entitled to claim the appropriate cost of such remuneration or to receive an appropriate credit for such cost as part of the Budget of the Task, in accordance with Article 6 (f) (6) hereof.

Article 6

FINANCE

(a) *Individual Obligations.* Each Contracting Party shall bear the costs it incurs in carrying out this Agreement, including the costs of formulating or transmitting reports and of reimbursing its employees for travel and other per diem expenses incurred in connection with work carried out on the respective Tasks, unless provision is made for such costs to be reimbursed from common funds as provided in paragraph (g) below.

(b) *Common Financial Obligations.* Participants wishing to share the costs of a particular Task shall agree in the appropriate Task Annex to do so. The apportionment of contributions to such costs (whether in the form of cash, services rendered, intellectual property or the supply of materials) and the use of such contributions shall be governed by the regulations and decisions made pursuant to this Article by the Executive Committee.

(c) *Financial Rules, Expenditure.* The Executive Committee, acting by unanimity, may make such regulations as are required for the sound financial management of each Task including, where necessary:

- (1) Establishment of budgetary and procurement procedures to be used by the Operating Agent in making payments from any common funds which may be maintained by Participants for the account of the Task or in making contracts on behalf of the Participants;
- (2) Establishment of minimum levels of expenditure for which Executive Committee approval shall be required, including expenditure involving payment of monies to the Operating Agent for other than routine salary and administrative expenses previously approved by the Executive Committee in the budget process.

In the expenditure of common funds, the Operating Agent shall take into account the necessity of ensuring a fair distribution of such expenditure in the Participants' countries, where this is fully compatible with the most efficient technical and financial management of the Task.

(d) *Crediting of Income to Budget.* Any income which accrues from a Task shall be credited to the Budget of that Task.

(e) *Accounting.* The system of accounts employed by the Operating Agent shall be in accordance with accounting principles generally accepted in the country of the Operating Agent and consistently applied.

(f) *Programme of Work and Budget, Keeping of Accounts.* Should Participants agree to maintain common funds for the payment of obligations under a Programme of Work and Budget of the Task, the following provisions shall be applicable unless the Executive Committee, acting by unanimity, decides otherwise:

- (1) The financial year of the Task shall correspond to the financial year of the Operating Agent;
- (2) The Operating Agent shall each year prepare and submit to the Executive Committee for approval a draft Programme of Work and Budget, together with an indicative programme of work and budget for the following two years, not later than three months before the beginning of each financial year;
- (3) The Operating Agent shall maintain complete, separate financial records which shall clearly account for all funds and property coming into the custody or possession of the Operating Agent in connection with the Task;
- (4) Not later than three months after the close of each financial year the Operating Agent shall submit to auditors selected by the Executive Committee for audit the annual accounts maintained for the Task; upon completion of the annual audit, the Operating Agent shall present the accounts together with the auditors' report to the Executive Committee for approval;
- (5) All books of account and records maintained by the Operating Agent shall be preserved for at least three years from the date of termination of the Task;

- (6) Where provided in the relevant Annex, a Participant supplying services, materials or intellectual property to the Task shall be entitled to a credit, determined by the Executive Committee, acting by unanimity, against its contribution (or to compensation, if the value of such services, materials or intellectual property exceeds the amount of the Participant's contribution); such credits for services of staff shall be calculated on an agreed scale approved by the Executive Committee and include all payroll-related costs.

(g) *Contribution to Common Funds.* Should Participants agree to establish common funds under the annual Programme of Work and Budget for a Task, any financial contributions due from Participants in a Task shall be paid to the Operating Agent in the currency of the country of the Operating Agent at such times and upon such other conditions as the Executive Committee, acting by unanimity, shall determine, provided however that:

- (1) Contributions received by the Operating Agent shall be used solely in accordance with the Programme of Work and Budget for the Task;
- (2) The Operating Agent shall be under no obligation to carry out any work on the Task until contributions amounting to at least fifty per cent (in cash terms) of the total due at any one time have been received.

(h) *Ancillary Services.* Ancillary services may, as agreed between the Executive Committee and the Operating Agent, be provided by that Operating Agent for the operation of a Task and the costs of such services, including overheads connected therewith, may be met from budgeted funds of that Task.

(i) *Taxes.* The Operating Agent shall pay all taxes and similar impositions (other than taxes on income) imposed by national or local governments and incurred by it in connection with a Task, as expenditure incurred in the operation of that Task under the Budget; the Operating Agent shall, however, endeavour to obtain all possible exemptions from such taxes.

(j) *Audit.* Each Participant shall have the right, at its sole cost, to audit the accounts of any work in a Task for which common funds are maintained, on the following terms:

- (1) The Operating Agent shall provide the other Participants with an opportunity to participate in such audits on a cost-shared basis;
- (2) Accounts and records relating to activities of the Operating Agent other than those conducted for the Task shall be excluded from such audit, but if the Participant concerned requires verification of charges to the Budget representing services rendered to the Task by the Operating Agent, it may at its own cost request and obtain an audit certificate in this respect from the auditors of the Operating Agent;
- (3) Not more than one such audit shall be required in any financial year;
- (4) Any such audit shall be carried out by not more than three representatives of the Participants.

Article 7

INFORMATION AND INTELLECTUAL PROPERTY

It is expected that for each Task agreed to pursuant to this Agreement, the applicable Annex will contain information and intellectual property provisions. The General Guidelines Concerning Information and Intellectual Property, approved by the Governing Board of the Agency on 21st November, 1975, shall be taken into account in developing such provisions.

Article 8

LEGAL RESPONSIBILITY AND INSURANCE

(a) *Liability of Operating Agent.* The Operating Agent shall use all reasonable skill and care in carrying out its duties under this Agreement in accordance with all applicable laws and regulations. Except as otherwise provided in this Article, the cost of all damage to property, and all expenses associated with claims, actions and other costs arising from work undertaken with common funds for a Task shall be charged to the Budget of that Task; such costs and expenses arising from other work undertaken for a Task shall be charged to the Budget of that Task if the Task Annex so provides or the Executive Committee, acting by unanimity, so decides.

(b) *Insurance.* The Operating Agent shall propose to the Executive Committee all necessary liability, fire and other insurance, and shall carry such insurance as the Executive Committee may direct. The cost of obtaining and maintaining insurance shall be charged to the Budget of the Task.

(c) *Indemnification of Contracting Parties.* The Operating Agent shall be liable, in its capacity as such, to indemnify Participants against the cost of any damage to property and all legal liabilities, actions, claims, costs and expenses connected therewith to the extent that they:

- (1) Result from the failure of the Operating Agent to maintain such insurance as it may be required to maintain under paragraph (b) above; or
- (2) Result from the gross negligence or wilful misconduct of any officers or employees of the Operating Agent in carrying out their duties under this Agreement.

Article 9

LEGISLATIVE PROVISIONS

(a) *Accomplishment of Formalities.* Each Participant shall request the appropriate authorities of its country (or its Member States in the case of an international organization) to use their best endeavours, within the framework of applicable legislation, to facilitate the

accomplishment of formalities involved in the movement of persons, the importation of materials and equipment and the transfer of currency which shall be required to conduct the Task in which it is engaged.

(b) *Applicable Laws.* In carrying out this Agreement and its Annexes, the Contracting Parties shall be subject to the appropriation of funds by the appropriate governmental authority, where necessary, and to the constitution, laws and regulations applicable to the respective Contracting Parties, including, but not limited to, laws establishing prohibitions upon the payment of commissions, percentages, brokerage or contingent fees to persons retained to solicit governmental contracts and upon any share of such contracts accruing to governmental officials.

(c) *Decisions of Agency Governing Board.* Participants in the various Tasks shall take account, as appropriate, of the Guiding Principles for Co-operation in the Field of Energy Research and Development, and any modification thereof, as well as other decisions of the Governing Board of the Agency in that field. The termination of the Guiding Principles shall not affect this Agreement, which shall remain in force in accordance with the terms hereof.

(d) *Settlement of Disputes.* Any dispute among the Contracting Parties concerning the interpretation or the application of this Agreement which is not settled by negotiation or other agreed mode of settlement shall be referred to a tribunal of three arbitrators to be chosen by the Contracting Parties concerned who shall also choose the Chairman of the tribunal. Should the Contracting Parties concerned fail to agree upon the composition of the tribunal or the selection of its Chairman, the President of the International Court of Justice shall, at the request of any of the Contracting Parties concerned, exercise those responsibilities. The tribunal shall decide any such dispute by reference to the terms of this Agreement and any applicable laws and regulations, and its decision on a question of fact shall be final and binding on the Contracting Parties. Operating Agents which are not Contracting Parties shall be regarded as Contracting Parties for the purpose of this paragraph.

Article 10

ADMISSION AND WITHDRAWAL OF CONTRACTING PARTIES

(a) *Admission of New Contracting Parties: Agency Countries.* Upon the invitation of the Executive Committee, acting by unanimity, admission to this Agreement shall be open to the government of any Agency Participating Country (or a national agency, public organization, private corporation, company or other entity designated by such government), which signs or accedes to this Agreement, accepts the rights and obligations of a Contracting Party, and is accepted for participation in at least one Task by the Participants in that Task, acting by unanimity. Such admission of a Contracting Party shall become effective upon the signature of this Agreement by the new Contracting Party or its accession thereto and its giving Notice of Participation in one or more Annexes and the adoption of any consequential amendments thereto.

(b) *Admission of New Contracting Parties: Other OECD Countries.* The government of any Member of the Organisation for Economic Co-operation and Development which does

not participate in the Agency may, on the proposal of the Executive Committee, acting by unanimity, be invited by the Governing Board of the Agency to become a Contracting Party to this Agreement (or to designate a national agency, public organization, private corporation, company or other entity to do so), under the conditions stated in paragraph (a) above.

(c) *Participation by the European Communities.* The European Communities may participate in this Agreement in accordance with arrangements to be made by the Executive Committee, acting by unanimity.

(d) *Admission of New Participants in Tasks.* Any Contracting Party may, with the agreement of the Participants in a Task, acting by unanimity, become a Participant in that Task. Such participation shall become effective upon the Contracting Party's giving the Executive Director of the Agency a Notice of Participation in the appropriate Task Annex and the adoption of consequential amendments thereto.

(e) *Contributions.* The Executive Committee may require, as a condition to admission to participation, that the new Contracting Party or new Participant shall contribute (in the form of cash, services or materials) an appropriate proportion of the prior budget expenditure of any Task in which it participates.

(f) *Replacement of Contracting Parties.* With the agreement of the Executive Committee, acting by unanimity, and upon the request of a government, a Contracting Party designated by that government may be replaced by another party. In the event of such replacement, the replacement party shall assume the rights and obligations of a Contracting Party as provided in paragraph (a) above and in accordance with the procedure provided therein.

(g) *Withdrawal.* Any Contracting Party may withdraw from this Agreement or from any Task either with the agreement of the Executive Committee, acting by unanimity, or by giving twelve months written Notice of Withdrawal to the Executive Director of the Agency, such Notice to be given not less than one year after the date hereof. The withdrawal of a Contracting Party under this paragraph shall not affect the rights and obligations of the other Contracting Parties; except that, where the other Contracting Parties have contributed to common funds for a Task, their proportionate shares in the Task Budget shall be adjusted to take account of such withdrawal.

(h) *Changes of Status of Contracting Party.* A Contracting Party other than a government or an international organization shall forthwith notify the Executive Committee of any significant change in its status or ownership, or of its becoming bankrupt or entering into liquidation. The Executive Committee shall determine whether any such change in status of a Contracting Party significantly affects the interests of the other Contracting Parties; if the Executive Committee so determines, then, unless the Executive Committee, acting upon the unanimous decision of the other Contracting Parties, otherwise agrees:

- (1) That Contracting Party shall be deemed to have withdrawn from the Agreement under paragraph (g) above on a date to be fixed by the Executive Committee; and
- (2) The Executive Committee shall invite the government which designated that Contracting Party to designate, within a period of three months of the withdrawal of

that Contracting Party, a different entity to become a Contracting Party; if approved by the Executive Committee, acting by unanimity, such entity shall become a Contracting Party with effect from the date on which it signs or accedes to this Agreement and gives the Executive Director of the Agency a Notice of Participation in one or more Annexes.

(i) *Failure to Fulfil Contractual Obligations.* Any Contracting Party which fails to fulfil its obligations under this Agreement within sixty days after its receipt of notice specifying the nature of such failure and invoking this paragraph, may be deemed by the Executive Committee, acting by unanimity, to have withdrawn from this Agreement.

Article 11

FINAL PROVISIONS

(a) *Term of Agreement.* This Agreement shall remain in force for an initial period of three years from the date hereof, and shall continue in force thereafter unless and until the Executive Committee, acting by unanimity, decides on its termination.

(b) *Legal Relationship of Contracting Parties and Participants.* Nothing in this Agreement shall be regarded as constituting a partnership between any of the Contracting Parties or Participants.

(c) *Termination.* Upon termination of this Agreement, or any Annex to this Agreement, the Executive Committee, acting by unanimity, shall arrange for the liquidation of the assets of the Task or Tasks. In the event of such liquidation, the Executive Committee shall, so far as practicable, distribute the assets of the Task, or the proceeds therefrom, in proportion to the contributions which the Participants have made from the beginning of the operation of the Task, and for that purpose shall take into account the contributions and any outstanding obligations of former Contracting Parties. Disputes with a former Contracting Party about the proportion allocated to it under this paragraph shall be settled under Article 9 (d) hereof, for which purpose a former Contracting Party shall be regarded as a Contracting Party.

(d) *Amendment.* This Agreement may be amended at any time by the Executive Committee, acting by unanimity, and any Annex to this Agreement may be amended at any time by the Executive Committee, acting by unanimity of the Participants in the Task to which the Annex refers. Such amendments shall come into force in a manner determined by the Executive Committee, acting under the voting rule applicable to the decision to adopt the amendment.

(e) *Deposit.* The original of this Agreement shall be deposited with the Executive Director of the Agency and a certified copy thereof shall be furnished to each Contracting Party. A copy of this Agreement shall be furnished to each Agency Participating Country, to each Member country of the Organisation for Economic Co-operation and Development and to the European Communities.

Done in Paris, this 6th day of October, 1977.

For the REPUBLIC OF AUSTRIA:

For the NATIONAL RESEARCH COUNCIL OF CANADA
(designated by the Government of Canada):

For the MINISTRY OF TRADE AND INDUSTRY
for and on behalf of the Government of Denmark:

For the KERNFORSCHUNGSANLAGE JÜLICH GmbH
(designated by the Government of Germany):

For the GOVERNMENT OF IRELAND:

For the STICHTING ENERGIEONDERZOEK CENTRUM NEDERLAND
(designated by the Government of the Netherlands):

For the NEW ZEALAND METEOROLOGICAL SERVICE
for and of behalf of the Government of New Zealand:

For the NATIONAL SWEDISH BOARD FOR
ENERGY SOURCE DEVELOPMENT
(designated by the Government of Sweden):

For the DEPARTMENT OF ENERGY
for and on behalf of the Government
of the United States of America:

Annex I

ENVIRONMENTAL AND METEOROLOGICAL ASPECTS OF WIND ENERGY CONVERSION SYSTEMS

1. *Objectives of the Task*

The objectives of this Task are divided into the following three areas:

Area A: Environmental Impact and Operational Safety of Large-Scale Wind Energy Conversion Systems (WECS).

The objective of the work to be carried out in this area is to define, analyse and collect data on environmental impact and operational safety of wind energy conversion systems consisting of units in the megawatt range.

Area B: Investigation of the Uncertainty in Wind Forecasting for Wind Power Networks.

The objective of the work to be carried out in this area is to determine the level of uncertainty in wind forecasting for time periods extending from 1 up to 72 hours, appropriate for the planning of power extraction from a network of wind power plants. The objective includes the determination of the forecasting uncertainty for winds at different levels up to 100 m above the surface of the earth as a function of the forecast period, the roughness of the terrain, and the vertical stability of the air for different climatic regions and seasons of the year. It also includes uncertainty analysis of the predicted time duration of wind velocities, which are of significant importance for the regulation of power extraction from wind power generators and other more conventional power plants.

Area C: Load Case Recommendations.

The objective of the work to be carried out in this area is to examine and develop wind models for the structural design of WECS and to develop common principles for the application of wind data for the design of WECS. Load case data for different types of WECS will be developed and recommended for international use in order to enable design cost comparisons to be made.

2. *Means*

Area A: Environmental Impact and Operational Safety of Large-Scale WECS.

Sub-Task A.1: Study of WECS Farm Area and WECS Safety Limit Requirements. The study will be based on siting examples in actual environments and in different types of countryside.

Responsible Participant: The National Swedish Board for Energy Source Development.

Sub-Task A.2: Study of Combined Wind-Biomass Energy Systems. The study will determine whether cost reductions and improved operations can be achieved by locating wind farms adjacent to biomass-fired power stations and in the short-rotation forestry plantations used to supply these stations.

Responsible Participant: The Government of Ireland.

Sub-Task A.3: Study of Wind Wake Effects. The yearly energy yield (from rotor axis WECS) of clusters of wind turbines in a given wind climate will be examined by means of wind tunnel test methods and theoretical calculations.

Responsible Participant: The Stichting Energieonderzoek Centrum Nederland.

Sub-Task A.4: Study of the Impact of Large-Scale WECS on the Performance of Electromagnetic Wave Systems. An inventory will be made of the effects of rotating and parked wind turbines (horizontal and vertical axis type) with rotor diameters of 50-70 m and tower heights of 50-70 m on:

- (a) Broadcasting systems;
- (b) Telecommunication systems; and
- (c) Radar position finding and direction finding systems.

Responsible Participant: The Stichting Energieonderzoek Centrum Nederland.

Sub-Task A.5: Study of Aesthetic Factors and Visual Effects of Large-Scale WECS. The study will be performed using photography or video-tapes of actual sites where WECS farms might be located. Full site WECS units will be copied on to the photographic or video materials to illustrate visual effects.

Responsible Participant: The National Swedish Board for Energy Source Development.

Sub-Task A.6: Report. The Operating Agent will integrate the results of Sub-Tasks A.1 to A.5 into a report.

Area B:

Sub-Task B.1: Investigation of Uncertainty in Wind Forecasting for Wind Power Networks.

- (a) Each Participant will define criteria for an objective wind forecast verification scheme, and for the determination of uncertainty levels of wind forecast in terms of their relation to power generation efficiency.
- (b) The Operating Agent will prepare and operationally test a computer programme for objective wind forecast verification and for the evaluation of uncertainty in different wind forecasting techniques for different wind levels and forecast

periods. The Operating Agent will make the computer programme available to all Participants in this Task.

- (c) Each Participant will test different wind forecast techniques for levels up to at least 100 m above ground in different climatic regions and terrain of its country for a period of one year by applying the computer programme developed under sub-paragraph (b) above.
- (d) Each Participant will report to the Operating Agent on the work carried out in sub-paragraphs (a) and (c) above including the submission of well-documented verification tables and uncertainty analysis on standard Reporting Formats, with detailed descriptions of the forecasting techniques used, together with characteristics of the terrain roughness and climatic regions.
- (e) The Operating Agent will integrate the results of (a) to (d) above into a report.

Area C:

Sub-Task C.1: Load Case Recommendations.

- (a) Each Participant will compile and submit to the Operating Agent:
 - (1) Data on existing load case definitions;
 - (2) Reviews of existing installations available for measurements of applicable data; and
 - (3) Follow-up on experiences from existing WECS design.

The Operating Agent will collate the foregoing material and distribute to the Participants an initial report on the state-of-load cases for WECS.

- (b) The Operating Agent will be responsible for the selection and adaptation of engineering models of wind. The models shall include:
 - (1) Site parameters;
 - (2) Extreme wind predictions (amplitudes, extensions and directions) in space and time of extreme gusts with specified probability;
 - (3) Wind shear; and
 - (4) Turbulence (spectra, cross spectra and coherence functions).

The models shall have characteristics which are relevant to the engineering models and sufficient for load case calculations.

- (c) The Operating Agent will develop methods of application of the wind models selected in sub-paragraph (b) above to the design of horizontal axis and vertical axis WECS, rotating and parked.
- (d) The Operating Agent will formulate load case lists for generally applicable cases of horizontal and vertical axis turbines.
- (e) The Operating Agent will prepare a report on sub-paragraphs (a) to (d) above with recommendations for additional R & D activities.

3. Results

Area A: Environmental Impact and Operational Safety of Large-Scale WECS.

The results of these Sub-Tasks will be a report on:

- (a) Land and unit safety area analysis of large-scale WECS;
- (b) The analysis of combined wind-biomass energy systems;
- (c) Data on wind wake effects;
- (d) Impacts of large-scale WECS on the performance of electromagnetic wave systems; and
- (e) Aesthetic factors and visual effects of WECS.

Area B: Investigation of Uncertainty in Wind Forecasting for Wind Power Networks.

The result of the work carried out in this co-operative area will be a report containing specific background data and conclusions on:

- (a) The statistical uncertainty of the prediction of the time duration of wind velocities below the cut-in velocity level and above the rated velocity level of wind energy generators for forecasts up to 72 hours, related to different weather situations and seasons of the year;
- (b) The statistical uncertainty and variability of the predicted wind velocities between the cut-in velocity and the rated velocity, at wind values which are of significant importance for wind energy extraction;
- (c) An overall evaluation of the effectiveness of wind forecasts and their economic use in practical operational use for wind power generation;
- (d) Recommendations on possible improvements which might be made in wind forecasting techniques.

Area C: Load Case Recommendations.

The result of the work carried out in this co-operative area will be a report on:

- (a) The status of WECS load case definitions;
- (b) Selected wind models, including technical descriptions of the models;
- (c) Methods for calculating loadings on horizontal and vertical axis wind turbines with examples of application;
- (d) Load case lists of generally applicable cases for horizontal and vertical axis wind turbines; and
- (e) Recommended additional R & D activities.

4. *Time Schedule*

One and one-half years.

5. *Specific Responsibilities of the Operating Agent*

- (a) Within sixty days of the entry into force of the Agreement, the Operating Agent will, in collaboration with the other Participants, prepare and submit to the Executive Committee a detailed Programme of Work and Budget for the Task.
- (b) The Operating Agent will transfer to each Responsible Participant of Area A each year a sum equal to the costs of that Responsible Participant's Sub-Task as set out in paragraph 6 (a) below in accordance with a schedule to be determined by the Executive Committee. The Operating Agent is not obliged to transfer to Responsible Participants a total sum of money for the Task greater than that which it has received in contributions.
- (c) The Operating Agent shall compile the results of the Task into a final summary report and distribute this report to each Participant. If appropriate, the report will include proposals for new Task Annexes to carry out additional R & D activities. Each Responsible Participant and the Operating Agent shall provide a separate report on each Sub-Task for which it is responsible; such reports shall be distributed to all *Annex I* Participants by the Operating Agent.
- (d) The Operating Agent shall be responsible for the organization of meetings of experts nominated by Participants.

6. *Funding*

- (a) With regard to costs incurred in carrying out the Sub-Tasks in Area A and the work undertaken by the Operating Agent in Area B and Area C, the total costs shall be jointly borne by the Participants as provided in Article 6 of the Agreement. The proportions shall be as follows:

Participants	% of Total Costs
Austria	3.5
Canada	7.5
Denmark	3.5
Germany	15
Ireland	7
Netherlands	16
New Zealand	3.5
Sweden	29
United States	15

- (b) The total cost for work to be commonly funded under this Task is expected to be US \$ 348,000 at July 1977 price levels and exchange rates. The total cost is the sum of the costs of each of the Sub-Tasks set forth in the following schedule which are expected to be as set out below. Such levels may not be exceeded except by agreement of the Executive Committee, acting by unanimity:

Responsible Participant or Operating Agent	Sub-Tasks	Costs (US \$)
Operating Agent	A.1	20,000
Ireland	A.2	30,000
Netherlands	A.3	44,000
Netherlands	A.4	44,000
Operating Agent	A.5	20,000
Operating Agent	A.6	11,000
Operating Agent	B.1	50,000
Operating Agent	C.1	129,000
Total		348,000

- (c) The Executive Committee, acting by unanimity, shall adjust the figures referred to in the schedules in sub-paragraphs (a) and (b) above at least annually to take account of changes in exchange rates and price levels to ensure that the necessary real resources will continue to be available to operate the Task. If significant changes in such exchange rates or price levels occur, the Executive Committee, acting by unanimity, shall consider whether to adjust the Programme of Work to the available funds or to increase the level of funding.
- (d) Each Participant shall transfer to the Operating Agent its share of the total costs of the Task in accordance with a time schedule to be determined by the Executive Committee, acting by unanimity.
- (e) Each Participant shall bear other costs it incurs in carrying out its responsibilities in Area B and Area C under this *Annex I*, including the cost of formulating or transmitting reports and of reimbursing its personnel for travel as well as other expenses incurred in connection with work carried out on the respective Sub-Tasks.

7. *Operating Agent*

The National Swedish Board for Energy Source Development.

8. *Information and Intellectual Property*

- (a) *Executive Committee's Powers.* The publication, distribution, handling, protection and ownership of information and intellectual property arising from this *Annex I* to the IEA Implementing Agreement for a Programme of Research and Development on Wind Energy Conversion Systems (hereinafter called *Annex I*) shall be determined by the Executive Committee, acting by unanimity, in conformity with this Agreement.
- (b) *Right to Publish.* Subject only to copyright restrictions, the *Annex I* Participants shall have the right to publish all information provided to or arising from *Annex I* except proprietary information.
- (c) *Proprietary Information.* The *Annex I* Participants shall take all necessary measures in accordance with this paragraph, the laws of their respective countries and international law to protect proprietary information. For the purposes of this *Annex I*, proprietary information shall mean information of a confidential nature such as trade secrets and know-how (for example, computer programmes, design procedures and techniques, chemical composition of materials, or manufacturing methods, processes, or treatments) which is appropriately marked, provided such information:
 - (1) Is not generally known or publicly available from other sources;
 - (2) Has not previously been made available by the owner to others without obligation concerning its confidentiality; and

- (3) Is not already in the possession of the recipient *Annex I* Participant without obligation concerning its confidentiality.

It shall be the responsibility of each Participant supplying proprietary information to identify the information as such and to ensure that it is appropriately marked.

- (d) *Production of Relevant Information by Governments.* The Participants and the Operating Agent should encourage the governments of all Agency Participating Countries to make available or to identify to the Participants and the Operating Agent all published or otherwise freely available information known to them which is relevant to the Task.
- (e) *Production of Available Information by Participants.* Each Participant agrees to provide to the other Participants and the Operating Agent previously existing information, and information developed independently of the Task, known to it which is necessary to the Task, freely at its disposal and the transmission of which is not subject to any contractual and/or legal limitations:
- (1) If no substantial cost is incurred by the Participant in making such information available, at no charge to the Task therefor;
 - (2) If substantial costs must be incurred by the Participant to make such information available, at such charges to the Task as shall be agreed between the Operating Agent and the Participant with the approval of the Executive Committee.
- (f) *Acquisition of Information for the Task.* Each Participant shall inform the other Participants and the Operating Agent of the existence of information that can be of value to the Task, but which is not freely available, and the Participant shall endeavour to make the information available to the Task under reasonable conditions, in which event the Executive Committee may, acting by unanimity, decide to acquire such information.
- (g) *Reports on Work Performed under the Task.* Each Participant and the Operating Agent shall provide reports on all work performed under each Task and the results thereof (arising information), including proprietary information, to the other Participants. Reports summarizing the work performed and the results thereof, excluding proprietary information, shall be prepared by the Operating Agent and forwarded to the Executive Committee.
- (h) *Copyright.* Each Participant and the Operating Agent may take appropriate measures necessary to protect copyrightable material generated under this Task. Each Participant may reproduce and distribute such material, but shall not publish it with a view to profit.

9. *Participants in this Task*

The Contracting Parties which are Participants in this Task are the following:

The Republic of Austria,

The National Research Council of Canada,

The Ministry of Trade and Industry (Denmark),

The Kernforschungsanlage Jülich GmbH (Germany),

The Government of Ireland,

The Stichting Energieonderzoek Centrum Nederland,

The New Zealand Meteorological Service,

The National Swedish Board for Energy Source Development,

The Department of Energy (United States of America).

Annex II

EVALUATION OF MODELS FOR WIND ENERGY SITING

1. *Objective*

The objective of the Task is to evaluate a group of computer models submitted by Participants for initial screening of wind turbine sites.

2. *Means*

The steps to be undertaken in order to accomplish the foregoing objective are set forth below.

- (a) Each Participant, including the Operating Agent, will be invited to submit descriptions of computer models for optimum WECS site selection to the Operating Agent to be segregated according to the terrain and meteorological conditions.
- (b) Each Participant, including the Operating Agent, will:
 - (1) Identify data bases and submit descriptions to the Operating Agent who will segregate them into study areas, with different terrain and meteorological conditions. The data sets will also be matched with the models they are most useful in evaluating;
 - (2) Review the proposed matching of models with data sets, recommend any changes which are considered advisable, and identify the role in the evaluations each would like to play.
- (c) A meeting of Participants will be held to finalize the selection of models to be evaluated and the data sets with which each is matched, and to prepare and reach agreement on a programme of work for the evaluations.
- (d) Each Participant, including the Operating Agent, whose model has been selected on the basis of the results of the meeting will develop user's guides for a computer model, which will spell out all steps necessary to the operation of the model, from preparation of input data to the interpretation of the model output. The guides will specify the units for all variables and parameters, the acceptable limits on all the variables and parameters, and will contain a well-documented computer programme.
- (e) Each Participant, including the Operating Agent, on the basis of the results of the meeting, will:
 - (1) Adapt the data set identified in sub-paragraph (b) (1) above to the models and its own computing facilities;

- (2) Adapt the models to its computing facilities and programme languages;
- (3) Perform the main computations to evaluate the identified models;
- (4) Report on evaluation tests including recommendations for using the given model in various terrain and atmospheric conditions; recommendations will also be made for any additional modelling work and field tests which appear to be needed.

3. *Results*

The results of these co-operative activities will be:

- (a) A report of the verification tests summarizing the step-by-step procedure and results of the evaluations. Included in the report will be the recommendations of the investigators with regard to using the given model for various terrain and atmospheric conditions.
- (b) A composite user manual for the models tested for different sets of data from varying terrain features. Included in this manual will be the results of all validation sets and indication of maximum usefulness of the models.

4. *Time Schedule*

One and one-half years.

5. *Specific Responsibilities of the Operating Agent*

- (a) Within sixty days of the entry into force of the Agreement, the Operating Agent will, in collaboration with the other Participants, prepare and submit to the Executive Committee a detailed Programme of Work for the Task.
- (b) The Operating Agent shall compile and assess all results into a final report and distribute this report to each Participant. If appropriate, the report will include proposals for new Task Annexes to accomplish additional activities.
- (c) The Operating Agent shall be responsible for the organization of workshops and meetings of experts nominated by Participants.

6. *Funding*

- (a) Each Participant will bear its own costs in carrying out the Task, including reporting and travel expenses of representatives.
- (b) The cost of workshops and meetings of experts will be borne by the host country.
- (c) This *Annex II* is expected to involve a level of effort of two person-years per Participant.

7. *Operating Agent*

The Department of Energy (United States of America).

8. *Information and Intellectual Property*

- (a) *Executive Committee's Powers.* The publication, distribution, handling, protection and ownership of information and intellectual property arising from this *Annex II* to the IEA Implementing Agreement for a Programme of Research and Development on Wind Energy Conversion Systems (hereinafter called *Annex II*) shall be determined by the Executive Committee, acting by unanimity, in conformity with this Agreement.
- (b) *Right to Publish.* Subject only to copyright restrictions, the *Annex II* Participants shall have the right to publish all information provided to or arising from *Annex II* except proprietary information.
- (c) *Proprietary Information.* The *Annex II* Participants shall take all necessary measures in accordance with this paragraph, the laws of their respective countries and international law to protect proprietary information. For the purposes of this *Annex II*, proprietary information shall mean information of a confidential nature such as trade secrets and know-how (for example, computer programmes, design procedures and techniques, chemical composition of materials, or manufacturing methods, processes, or treatments) which is appropriately marked, provided such information:
 - (1) Is not generally known or publicly available from other sources;
 - (2) Has not previously been made available by the owner to others without obligation concerning its confidentiality; and
 - (3) Is not already in the possession of the recipient *Annex II* Participant without obligation concerning its confidentiality.

It shall be the responsibility of each Participant supplying proprietary information to identify the information as such and to ensure that it is appropriately marked.

- (d) *Production of Relevant Information by Governments.* The Participants and the Operating Agent should encourage the governments of all Agency Participating Countries to make available or to identify to the Participants and the Operating Agent all published or otherwise freely available information known to them which is relevant to the Task.
- (e) *Production of Available Information by Participants.* Each Participant agrees to provide to the other Participants and the Operating Agent previously existing information, and information developed independently of the Task, known to it which is necessary to the Task, freely at its disposal and the transmission of which is not subject to any contractual and/or legal limitations:

- (1) If no substantial cost is incurred by the Participant in making such information available, at no charge to the Task therefor;
 - (2) If substantial costs must be incurred by the Participant to make such information available, at such charges to the Task as shall be agreed between the Operating Agent and the Participant with the approval of the Executive Committee.
- (f) *Acquisition of Information for the Task.* Each Participant shall inform the other Participants and the Operating Agent of the existence of information that can be of value to the Task, but which is not freely available, and the Participant shall endeavour to make the information available to the Task under reasonable conditions, in which event the Executive Committee may, acting by unanimity, decide to acquire such information.
- (g) *Reports on Work Performed under the Task.* Each Participant and the Operating Agent shall provide reports on all work performed under each Task and the results thereof (arising information), including proprietary information, to the other Participants. Reports summarizing the work performed and the results thereof, excluding proprietary information, shall be prepared by the Operating Agent and forwarded to the Executive Committee.
- (h) *Copyright.* Each Participant and the Operating Agent may take appropriate measures necessary to protect copyrightable material generated under this Task. Each Participant may reproduce and distribute such material, but shall not publish it with a view to profit.

9. *Participants in this Task*

The Contracting Parties which are Participants in this Task are the following:

The National Research Council of Canada,

The National Swedish Board for Energy Source Development,

The Department of Energy (United States of America).

Annex III

INTEGRATION OF WIND POWER INTO NATIONAL ELECTRICITY SUPPLY SYSTEMS

1. *Objective*

The objective of this Task is to analyse the engineering and economic possibilities of large-scale wind energy systems in the 300 MW range converting wind power into electrical power with special attention to complementary power regulation capacity, including storage and peaking power systems.

2. *Means*

The following two phases of work will be undertaken in order to accomplish the objective:

(a) Phase 1

- (1) A mathematical simulation model will be developed, including a computer programme, based on an electricity supply system consisting of the following components:
 - (i) A wind power station made up of a large number of individual plants with an installed overall power in the range of hundreds of megawatts;
 - (ii) Power storage facilities;
 - (iii) Electricity supply systems including power plant and supply regulating capacities;
 - (iv) Electricity consumers.
- (2) The following parameters will be considered in developing the model:
 - (i) Edited wind power availability data;
 - (ii) Edited power consumption data on the power supply system;
 - (iii) Minimum requirements for feeding power into the power supply system in peak load, medium load and base load operation;
 - (iv) Type and size of storage;
 - (v) System service life;
 - (vi) Cost of power transportation;

- (vii) Cost of installation, operation and maintenance of all system components.

Special requirements of Participants will be accommodated in the development of the model.

The model will be tested by means of previously existing data without recourse to new research and development activities.

(b) Phase 2

When the computer programme is operational, the Operating Agent will process newly measured data from Participants' countries.

3. Results

The results of this Task will be :

- (a) A cost-optimized mathematical simulation model including computer programme which describes the integration of wind power in national electricity supply systems, and which is easily adaptable to similar fluctuating energy sources, such as solar or wave energy.
- (b) Processed data pertinent to national wind climate and electricity supply systems of Participants' countries; prediction of the technical and economic possibilities of large-scale introduction of wind power.

4. Time Schedule

Phase 1	Development of the Model	1 1/4 year
	Testing of the Model	3/4 year
Phase 2	Calculation with the Data of Participants	3 months

Total: 2 1/4 years.

5. Specific Responsibilities of the Operating Agent

- (a) The Operating Agent will be responsible for the performance of the Task.
- (b) The Operating Agent shall integrate all Programme results into a final report and distribute this report to each Participant. When appropriate, the report will include proposals for new Task Annexes to accomplish additional activities within the Programme.

- (c) The Operating Agent shall be responsible for the organization of meetings of experts nominated by Participants.

6. *Funding*

(a) *Task Costs*

- (1) The total cost of this Task is expected to be DM 506,000 at April 1977 price levels and exchange rates, and may not exceed such level except upon the unanimous agreement of the Executive Committee.
- (2) The Executive Committee, acting by unanimity, shall adjust the figures referred to in sub-paragraph (1) above at least annually to take account of changes in exchange rates and price levels in the country of the Operating Agent to ensure that the necessary real resources will continue to be available to operate the Task. If significant changes in such exchange rates or price levels occur, the Executive Committee, acting by unanimity, shall consider whether to adjust the Programme of Work to the available funds or to increase the level of funding.

(b) *Sharing of Task Costs*

- (1) The total costs incurred in the operation of this Task shall be jointly borne by the Participants as provided in Article 6 (g) of the Agreement in the following proportions:

Participants	% of Total Costs
Denmark	7
Operating Agent	40
Netherlands	13
Sweden	13
United States	27

- (2) Each Participant will transfer to the Operating Agent its share of the total costs of the Task for each year in accordance with a time schedule to be determined by the Executive Committee, acting by unanimity.

7. *Operating Agent*

Kernforschungsanlage Jülich GmbH.

8. *Information and Intellectual Property*

- (a) *Executive Committee's Powers.* The publication, distribution, handling, protection, and ownership of information and intellectual property arising from this *Annex III* to the IEA Implementing Agreement for a Programme of Research and Development on Wind Energy Conversion Systems (hereinafter called *Annex III*) shall be determined by the Executive Committee, acting by unanimity, in conformity with this Agreement.
- (b) *Right to Publish.* Subject only to copyright restrictions, the *Annex III* Participants shall have the right to publish all information provided to or arising from *Annex III* except proprietary information.
- (c) *Proprietary Information.* The *Annex III* Participants shall take all necessary measures in accordance with this paragraph, the laws of their respective countries and international law to protect proprietary information. For the purposes of this *Annex III*, proprietary information shall mean information of a confidential nature such as trade secrets and know-how (for example, computer programmes, design procedures and techniques, chemical composition of materials, or manufacturing methods, processes, or treatments) which is appropriately marked, provided such information:
 - (1) Is not generally known or publicly available from other sources;
 - (2) Has not previously been made available by the owner to others without obligation concerning its confidentiality; and
 - (3) Is not already in the possession of the recipient *Annex III* Participant without obligation concerning its confidentiality.

It shall be the responsibility of each Participant supplying proprietary information to identify the information as such and to ensure that it is appropriately marked.

- (d) *Production of Relevant Information by Governments.* The Participants and the Operating Agent should encourage the governments of all Agency Participating Countries to make available or to identify to the Participants and the Operating Agent all published or otherwise freely available information known to them which is relevant to the Task.
- (e) *Production of Available Information by Participants.* Each Participant agrees to provide to the other Participants and the Operating Agent previously existing information, and information developed independently of the Task, known to it which is necessary to the Task, freely at its disposal and the transmission of which is not subject to any contractual and/or legal limitations:
 - (1) If no substantial cost is incurred by the Participant in making such information available, at no charge to the Task therefor;

- (2) If substantial costs must be incurred by the Participant to make such information available, at such charges to the Task as shall be agreed between the Operating Agent and the Participant with the approval of the Executive Committee.
- (f) *Acquisition of Information for the Task.* Each Participant shall inform the other Participants and the Operating Agent of the existence of information that can be of value to the Task, but which is not freely available, and the Participant shall endeavour to make the information available to the Task under reasonable conditions, in which event the Executive Committee may, acting by unanimity, decide to acquire such information.
- (g) *Reports on Work Performed under the Task.* Each Participant and the Operating Agent shall provide reports on all work performed under each Task and the results thereof (arising information), including proprietary information, to the other Participants. Reports summarizing the work performed and the results thereof, excluding proprietary information, shall be prepared by the Operating Agent and forwarded to the Executive Committee.
- (h) *Copyright.* Each Participant and the Operating Agent may take appropriate measures necessary to protect copyrightable material generated under this Task. Each Participant may reproduce and distribute such material, but shall not publish it with a view to profit.

9. *Participants in this Task*

The Contracting Parties which are Participants in this Task are the following:

Kernforschungsanlage Jülich GmbH (Germany),

The Stichting Energieonderzoek Centrum Nederland,

The National Swedish Board for Energy Source Development,

The Department of Energy (United States of America).

Annex IV

INVESTIGATION OF ROTOR STRESSING AND SMOOTHNESS OF OPERATION OF LARGE-SCALE WIND ENERGY CONVERSION SYSTEMS

1. *Objective*

The objective of this Task is to investigate possibilities for low rotor stressing, high operational smoothness and system vibration control of a 3 MW wind power system. The technical objective involves controlling the rotor blades in order to reduce additional loads resulting from wind profiles, gusts and gravity, to the extent that the rotor has to carry a minimum of loads not required to produce the input power of the plant.

2. *Means*

By means of improved design, accurate calculations and experiments using a wind-tunnel model, an extremely light but durable design of a 3 MW plant will be prepared. For the rotor, a hub concept will be developed which minimizes stressing of the structure and disturbances to the operational smoothness by external influences. A dynamic analysis of the whole system will be carried out in order to avoid damage due to unacceptable vibrations. By means of wind-tunnel experiments, the computational methods will be verified, measures will be taken to increase the smoothness of operation, and decreases of stressing will be verified. The Task will be carried out on the basis of the following outline Programme of Work:

(a) Rotor Development

- (1) Aerodynamically optimal rotors;
- (2) Smoothness of rotor operation;
- (3) Rotor blade computations using Finite Element Methods; and
- (4) Investigations into materials behaviour;

(b) Vibration of the Complete Wind Power System

- (1) Examination of the interference between tower and rotor which provides an important load case for the blade; and
- (2) Computations for different types of towers and selection of best tower design;

(c) Wind-Tunnel Investigations

- (1) Investigation methods and determination of data for models and wind tunnels;
- (2) Computation, design and construction of several wind-tunnel models in connection with the investigations to be carried out according to item (4) below;

- (3) Development and completion of the systems for acquisition, transfer and evaluation of data for experiments provided under item (4) below, planning a system for the supervision of operational data for a prototype;
- (4) Wind-tunnel experiments;
- (5) Two-dimensional investigations (profiles);
- (6) Three-dimensional investigations.

3. *Results*

The results of this Task will be contained in a report on the theoretical and experimental study of a 3 MW wind power system.

4. *Time Schedule*

1. Rotor Development	2 years
2. Tower/Rotor Vibration	1 year, parallel to 1
3. Wind-Tunnel Experiments	1 1/3 year, parallel to 1 + 2

Total: two years.

5. *Specific Responsibilities of the Operating Agent*

- (a) The Operating Agent will be responsible for the performance of the Task.
- (b) The Operating Agent shall integrate all Programme results into a final report and distribute such report and supporting documentation to each Participant. When appropriate, the report will include proposals for new Task Annexes to accomplish additional activities within the Programme.
- (c) The Operating Agent shall be responsible for the organization of meetings of experts nominated by Participants.

6. *Funding*

(a) *Task Costs*

- (1) The total cost of this Task is not expected to exceed DM 916,000 at April 1977 price levels and exchange rates, and may not exceed such level except upon the unanimous agreement of the Executive Committee.

- (2) The Executive Committee, acting by unanimity, shall adjust the figures referred to in this paragraph at least annually to take account of changes in exchange rates and price levels in the country of the Operating Agent to ensure that the necessary real resources will continue to be available to operate the Task. If significant changes in such exchange rates or price levels occur, the Executive Committee, acting by unanimity, shall consider whether to adjust the Programme of Work to the available funds or to increase the level of funding.

(b) Sharing of Task Costs

- (1) The total costs incurred in the operation of this Task shall be jointly borne by the Participants as provided in Article 6(g) of the Agreement in the following proportions:

Participants	% of Total Costs
Denmark	7
Operating Agent	40
Netherlands	13
Sweden	13
United States	27

- (2) Each Participant will transfer to the Operating Agent its share of the total costs of the Task for each year in accordance with a time schedule to be determined by the Executive Committee, acting by unanimity.

7. Operating Agent

Kernforschungsanlage Jülich GmbH.

8. Information and Intellectual Property

- (a) *Executive Committee's Powers.* The publication, distribution, handling, protection and ownership of information and intellectual property arising from activities conducted under this *Annex IV* to the IEA Implementing Agreement for a Programme of Research and Development on Wind Energy Conversion Systems (hereinafter called *Annex IV*) and rules and procedures related thereto shall be determined by the Executive Committee, acting by unanimity, in conformity with this Agreement.

(b) *Right to Publish.* Subject only to restrictions applying to patents and copyrights, the *Annex IV* Participants shall have the right to publish all information provided to or arising from *Annex IV* except proprietary information. Proprietary information shall not be accepted for or utilized in the Task without express approval of the Executive Committee, acting by unanimity.

(c) *Proprietary Information.* The Operating Agent and the *Annex IV* Participants shall take all necessary measures in accordance with this paragraph, the laws of their respective countries and international law to protect proprietary information provided to or arising from the Task. For the purposes of this *Annex IV*, proprietary information shall mean information of a confidential nature such as trade secrets and know-how (for example, computer programmes, design procedures and techniques, chemical composition of materials, or manufacturing methods, processes, or treatments) which is appropriately marked, provided such information:

- (1) Is not generally known or publicly available from other sources;
- (2) Has not previously been made available by the owner to others without obligation concerning its confidentiality; and
- (3) Is not already in the possession of the recipient *Annex IV* Participants without obligation concerning its confidentiality.

It shall be the responsibility of each Participant supplying proprietary information to identify the information as such and to ensure that it is appropriately marked.

(d) *Identification and Use of Pre-existing Information*

- (1) The Operating Agent shall encourage the governments of all Agency Participating Countries to make available or to identify to the Operating Agent all published or otherwise freely available information known to them that is relevant to the Task.
- (2) The Participants shall notify the Operating Agent of all pre-existing information, and information developed independently of the Task, known to them which is relevant to the Task and which:
 - (i) Will be made available to the Task without contractual or legal limitations; or
 - (ii) Will or can only be made available to the Task with contractual or legal limitations.
- (3) Information of the type defined in sub-paragraph (2) (ii) above should be accepted for and utilized in the Task:

(i) If solely owned or controlled by a Participant, in which case sub-paragraphs (f) (2) and (3) below will apply;

(ii) In any other case, only if arrangements can be made for licence and use in accordance with sub-paragraph (f) (1) below.

(e) *Arising Proprietary Information.* It shall be the responsibility of the Operating Agent to identify information arising from the Task which qualifies as proprietary information under this paragraph and ensure that it is appropriately marked. If any Participant questions the decisions of the Operating Agent regarding the proprietary nature of arising information, the question shall be submitted to the Executive Committee for decision. Proprietary information arising from the Task shall be the property of the Operating Agent for the benefit of the Participants. The Operating Agent shall license such proprietary information:

- (1) To each Participant, its government and the nationals of its country designated by the Participant for non-exclusive use in the country of that Participant on terms and conditions exclusively stipulated by that Participant and notified to the other Participants;
- (2) Subject to sub-paragraph (1) above, to each Participant, its government and nationals of its country designated by the Participant for use in all countries on favourable terms and conditions as stipulated by the Executive Committee, acting by unanimity, taking into account the equities of the Participants based upon the sharing of obligations, contributions, rights and benefits of all Participants;
- (3) To the government of any Agency Participating Country and nationals designated by it for use in such country in order to meet its energy needs on reasonable terms and conditions as stipulated by the Executive Committee, acting by unanimity.

Royalties under such licences shall be held by the Operating Agent for the benefit of the Participants, except that royalties, if any, under sub-paragraph (1) above shall be the property of the Participant.

(f) *Licensing of Pre-existing Proprietary Information*

(1) Pre-existing proprietary information procured by the Operating Agent shall be the property of the Operating Agent for the benefit of the Participants and shall be treated as arising proprietary information. Pre-existing proprietary information licensed to the Operating Agent for the benefit of the Participants may be licensed for:

- (i) Use under this Task only, where the information is not needed for further commercial use;

- (ii) Use under the Task and further commercial use, when the information is needed for practising the results of the Task, in which case rights shall be obtained to permit either further licensing by the Operating Agent or direct licensing from the owner on reasonable terms and conditions to the Participants, their governments and the nationals of their countries designated by the Participants for use in all countries.
- (2) Pre-existing proprietary information solely owned or controlled by a Participant which is needed for the Task shall be licensed to the Operating Agent for use in the Task only at no cost to the Task. If such information is partially owned or controlled by a Participant, then efforts shall be made by the Participant to reduce or eliminate as possible the benefit that might accrue to it.
- (3) Each Participant agrees to license for use in the field of wind energy conversion systems and on reasonable terms and conditions all pre-existing proprietary information solely owned or controlled by it which is necessary for practising the results of the Task and has been utilized in the Task to:
 - (i) The other Participants, their governments and nationals of their countries designated by the Participants for use in all countries;
 - (ii) The governments of Agency Participating Countries and nationals designated by them for use in their respective countries in order to meet their energy needs.

In determining reasonable terms and conditions for licensing pre-existing proprietary information owned or controlled, in whole or in part, by a Participant for use other than in the Task as required in this paragraph, consideration shall be given to the equities of the other Participants based upon the sharing of obligations, contributions, rights and benefits of all Participants.

- (4) Pre-existing proprietary information owned or controlled, in whole or in part, by parties other than the Participants may be procured by or licensed to the Operating Agent only with the express approval of, and under terms and conditions stipulated by the Executive Committee, acting by unanimity.

(g) Licensing Pre-existing Patents

- (1) Pre-existing patents solely owned or controlled by a Participant which are needed for use in the Task shall be licensed to the Operating Agent for use in the Task only at no cost to the Task. If such patents are partially owned or controlled by a Participant, then efforts shall be made by the Participant to reduce or eliminate as possible the benefit that might accrue to it.

- (2) Each Participant agrees to license for use in the field of wind energy conversion systems and on reasonable terms and conditions all pre-existing patents solely owned or controlled by it which are necessary for practising the results of the Task and have been utilized in the Task to:

- (i) The other Participants, their governments and nationals of their countries designated by the Participants for use in all countries; and
- (ii) The governments of Agency Participating Countries and nationals designated by them for use in their respective countries in order to meet their energy needs.

In determining reasonable terms and conditions for licensing pre-existing patents owned or controlled, in whole or in part, by a Participant for use other than in the Task as required in this subparagraph, consideration shall be given to the equities of the other Participants based upon the sharing of obligations, contributions, rights and benefits of all Participants.

- (3) Pre-existing patents owned or controlled, in whole or in part, by parties other than the Participants may be procured by or licensed to the Operating Agent only with the express approval of, and under terms and conditions stipulated by, the Executive Committee, acting by unanimity.

(h) Arising Inventions

- (1) Inventions made or conceived in the course of or under the Task (arising inventions) shall be identified promptly and reported by the Operating Agent with a recommendation of the countries in which patent applications should be filed. The Executive Committee shall, acting by unanimity, establish procedures for processing such recommendations to determine where and when patent applications will be filed at the expense of the Task.
- (2) Information regarding inventions on which patent protection is to be obtained shall not be published or publicly disclosed by the Operating Agent or the Participants until a patent application has been filed in any of the countries of the Participants, provided, however, that this restriction on publication or disclosure shall not extend beyond six months from the date of reporting of the invention. It shall be the responsibility of the Operating Agent to appropriately mark Task reports which disclose inventions that have not been appropriately protected by the filing of a patent application.
- (3) Patents obtained in the country of each Participant shall be jointly owned by the Participant for that country and the Operating Agent

which shall hold its interest for the benefit of the Participants. Patents obtained in other countries shall be owned by the Operating Agent for the benefit of the Participants.

(i) *Licensing of Arising Patents.* Each Participant shall have the sole right to license its government and nationals of its country designated by it to use patents and patent applications arising from the Task in its country and the Participant shall notify the other Participants of the terms of such licences. Royalties obtained by such licensing shall be the property of the Participant. Other licences under such patents and patent applications shall be granted by the Operating Agent:

- (1) To each Participant, its government and nationals of its country designated by the Participant for use in all countries on favourable terms and conditions as stipulated by the Executive Committee, acting by unanimity, taking into account the equities of the Participants based upon the sharing of obligations, contributions, rights and benefits of all Participants;
- (2) To the government of any Agency Participating Country and nationals designated by it for use in such country on reasonable terms and conditions as stipulated by the Executive Committee, acting by unanimity, in order to meet its energy needs.

Royalties obtained from such other licensing shall be held by the Operating Agent for the benefit of the Participants.

(j) *Copyright.* The Operating Agent shall take appropriate measures necessary to protect copyrightable material generated under the Task. Copyrights obtained shall be the property of the Operating Agent for the benefit of the *Annex IV* Participants, provided, however, that the *Annex IV* Participants may reproduce and distribute such material, but shall not publish it with a view to profit.

(k) *Inventors and Authors.* Each *Annex IV* Participant will, without prejudice to any rights of inventors or authors under its national laws, take all necessary steps to provide the co-operation from its authors and inventors required to carry out the provisions of this paragraph. Each *Annex IV* Participant will assume the responsibility to pay awards or compensation required to be paid to its employees according to the laws of its country.

(l) *Determination of National.* The Executive Committee may, acting by unanimity, establish guidelines to determine what constitutes a "national" of an *Annex IV* Participant.

9. *Participants in this Task*

The Contracting Parties which are Participants in this Task are the following:

The Ministry of Trade and Industry (Denmark),

The Kernforschungsanlage Jülich GmbH (Germany),

The Stichting Energieonderzoek Centrum Nederland,

The National Swedish Board for Energy Source Development,

The Department of Energy (United States of America).