

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE DEPARTMENT OF ENERGY OF THE UNITED STATES OF AMERICA
AND
THE MINISTER FOR COMMUNICATIONS, ENERGY AND NATURAL RESOURCES OF
IRELAND
FOR COOPERATION IN
MARINE AND HYDROKINETIC ENERGY TECHNOLOGIES

The Department of Energy of the United States of America (DOE) and the Minister for Communications, Energy and Natural Resources of Ireland (the Minister) hereinafter referred to as the Participants:

Noting that both countries have an interest in accelerating the development of technologies and practices for capturing marine and hydrokinetic energy, and that expanding the sources of technical and operational data would help to further these interests;

Noting that an active marine and hydrokinetic energy industry can serve to strengthen national economies, reduce pollution, and provide energy security for the United States, Ireland and other countries;

Recognizing the benefit of sharing knowledge from best practices and lessons learned; and

Desiring to cooperate in the area of new and renewable energy technologies,

Have reached the following understanding:

Section 1 Objective

The objective of this Memorandum of Understanding (Memorandum) is to promote the research, development and deployment of marine and hydrokinetic energy technologies. Activities conducted under this Memorandum are intended to be a framework for the Participants' cooperation on the policy, scientific and technical, and other aspects of marine and hydrokinetic energy.

Section 2 – Areas for Cooperation

The Participants intend to establish a Joint Working Group and develop a work plan that should define the scope of their proposed cooperation under this Memorandum. The work plan may be revised in writing as mutually determined by the Participants. Cooperation under this Memorandum may include, but is not limited to, the following areas:

- A. Marine and Hydrokinetic Resource Assessment Methodology
- B. Exchange of Personnel for Short-term Visits and Assignments
- C. Test Planning and Evaluation of Marine and Hydrokinetic Energy Technology Demonstration Projects
- D. Exchange of Engineering and Environmental Test Data on Marine and Hydrokinetic Energy Technologies
- E. Exchange of Information on Marine and Hydrokinetic Energy Device Modeling
- F. Dissemination of Information on Participant Activities

Section 3 Participating Organizations

Each Participant may invite other government agencies and organizations and private organizations in its respective country to participate in cooperative activities under this Memorandum, at their own expense, and subject to such other terms as the Participants may specify. For DOE, such organizations may include, but are not limited to, DOE's National Laboratories and National Marine Renewable Energy Centers such as the National Renewable Energy Laboratory, Sandia National Laboratories, the Northwest National Marine Renewable Energy Center, the National Marine Renewable Energy Center of Hawaii, and the Foundation for Ocean Renewables; and for the Minister, such organizations may include, but are not limited to the Sustainable Energy Authority of Ireland, the Marine Institute, the Hydraulics and Maritime Research Centre, University College Cork, and other appropriate entities.

Section 4 Forms of Cooperation

Cooperative activities undertaken pursuant to this Memorandum may include, but are not limited to, the following:

A. Marine and Hydrokinetic Resource Assessment Methodology

The Participants may share resource assessment methodologies for various marine and hydrokinetic resources. Additionally, Participants may also share information on the best types of graphical user interfaces for making resource assessments publicly available on the internet.

B. Exchange of Personnel for Short-term Visits and Assignments

The Participants may send their personnel to serve in various work and/or study capacities in each other's countries. Such assignments may include but are not limited to work in mechanical, electrical, civil, and computer engineering as they relate to such areas as device testing and performance validation.

C. Test Planning and Evaluation of Marine and Hydrokinetic Energy Technology Demonstration Projects

The Participants may share information on testing protocols developed by institutions in each country for both laboratory and open-water demonstration projects. Participants may bring shared analyses of various testing protocols to international standards organizations such as the International Electrotechnical Committee and the International Energy Agency – for development of internationally accepted standards on best practices for test planning and evaluation of marine and hydrokinetic device demonstration projects.

D. Exchange of Engineering and Environmental Test Data on Marine and Hydrokinetic Energy Technologies

The Participants may share engineering, cost and environmental data generated from tests conducted in each Participant's respective country, subject to applicable non-disclosure restrictions on business-proprietary information. This data can be used to determine baseline and life-cycle costs, which can guide technology improvement opportunities for different types of marine and hydrokinetic technologies.

E. Exchange of Information on Marine and Hydrokinetic Energy Device Modeling

The Participants may share data on marine and hydrokinetic energy device and array modeling from projects supported by each respective Participant, subject to applicable non-disclosure restrictions on business-proprietary information. Examples of such models may include but are not limited to, device design, cumulative near-and far-field impacts of marine and hydrokinetic energy devices and arrays and array performance.

F. Dissemination of Information on Participant Activities

The Participants plan to disseminate shared analyses from their cooperative activities at a number of annual conferences and/or workshops, including but not limited to the Global Marine Renewable Energy Conference, the Marine Renewable Industry Association forum, the Ocean Energy Research Forum, and other appropriate events.

Section 5 Management

Each Participant should designate one Project Coordinator to jointly plan the technical approach for accomplishing the objectives of this Memorandum, and be responsible for the program, schedule, coordination and reports. A Joint Working Group should be established to review the work plan on an annual basis; and a Joint Working Group Meeting should be held at a jointly selected site, preferably at least annually.

Section 6 – General Considerations

A. Except when otherwise specifically determined by the Participants in writing, all costs including travel and lodging expenses, resulting from cooperation under this Memorandum are to be borne by the Participant that incurs them.

B. The implementation of this Memorandum by DOE is subject to the availability of appropriated funds and personnel; its implementation by the Minister is subject to the availability of funds and personnel of any participating organization.

C. This Memorandum does not create any legally binding obligations between the Participants.

D. Each Participant should conduct the activities contemplated by this Memorandum in accordance with applicable domestic laws and regulations, and international agreements to which that Participant's government is party.

Section 7 – Commencement, Duration, Modification, and Discontinuation

A. Activities under this Memorandum may commence upon signature by the Participants and continue for 5 years.

B. This Memorandum may be modified or extended for additional periods by written arrangement of the Participants.

C. The Participants may discontinue this Memorandum at any time by mutual consent in writing. Alternatively, if either Participant wishes to discontinue its participation in this Memorandum, it should endeavor to provide at least 90 days advance notice in writing to the other Participant.

Signed at DE, in duplicate, this 19th day of MAR, 2012.

Handwritten signature of Hay Kelly in black ink.

FOR THE DEPARTMENT OF ENERGY
OF THE UNITED STATES OF AMERICA:

Handwritten signature of John Hefner in black ink.

FOR THE MINISTER FOR
COMMUNICATIONS, ENERGY AND
NATURAL RESOURCES OF IRELAND: