



WREN—An International Collaborative Working to Resolve Environmental Effects of Wind Energy

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Smøla Wind Farm, Norway. *Photo from Bjørn Iuell, Statkraft*

Presentation for the
Sustainable Energy
Authority of Ireland
Seminar on
International Wind
Energy R&D
Collaboration

Dublin, Ireland
April 6, 2016

NREL/PR-5000-66271

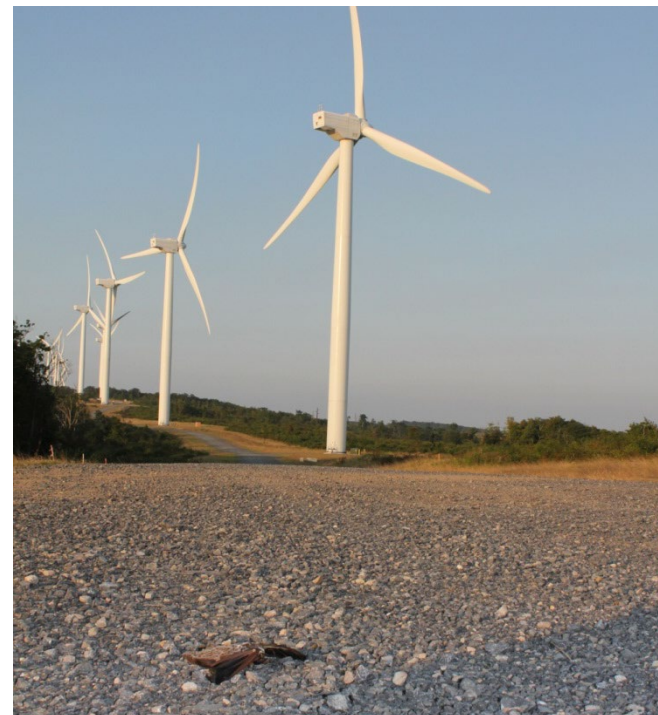


Implementing Agreement for Co-operation in the Research, Development, and Deployment of Wind Energy Systems

Objective and Strategy

The International Energy Agency's (IEA's) Wind Task 34 is also known as WREN.*

- Objective: to facilitate international collaboration that advances global understanding of environmental effects of offshore and land-based wind energy development
- Strategy: to create a shared global knowledge base and community of practice around research, monitoring, and management of the environmental effects of wind energy development.



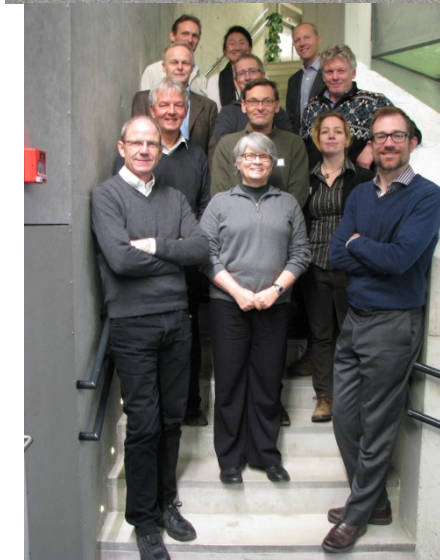
*Photo by Cris Hein,
Bat Conservation International*

Participants



WREN met in
Bern, Switzerland,
in October 2015

WREN met in
Berlin, Germany, in
March 2015



WREN met in
Trondheim, Norway,
in December 2013

Country	Organization
France*	EDF R&D
Germany*	Berlin Institute of Technology
Ireland	BirdWatch Ireland
Netherlands	Rijkswaterstaat—Department of Water Quality
Norway	Norwegian Institute for Nature Research
Spain*	Spanish National Research Council
Sweden	Swedish Energy Agency, Vindval
Switzerland	Federal Office of Energy
United Kingdom	Marine Scotland Science—Marine Laboratory
United States	National Renewable Energy Laboratory, Pacific Northwest National Laboratory, and the U.S. Department of Energy

* Currently inactive

Expected Results and Key Work Products

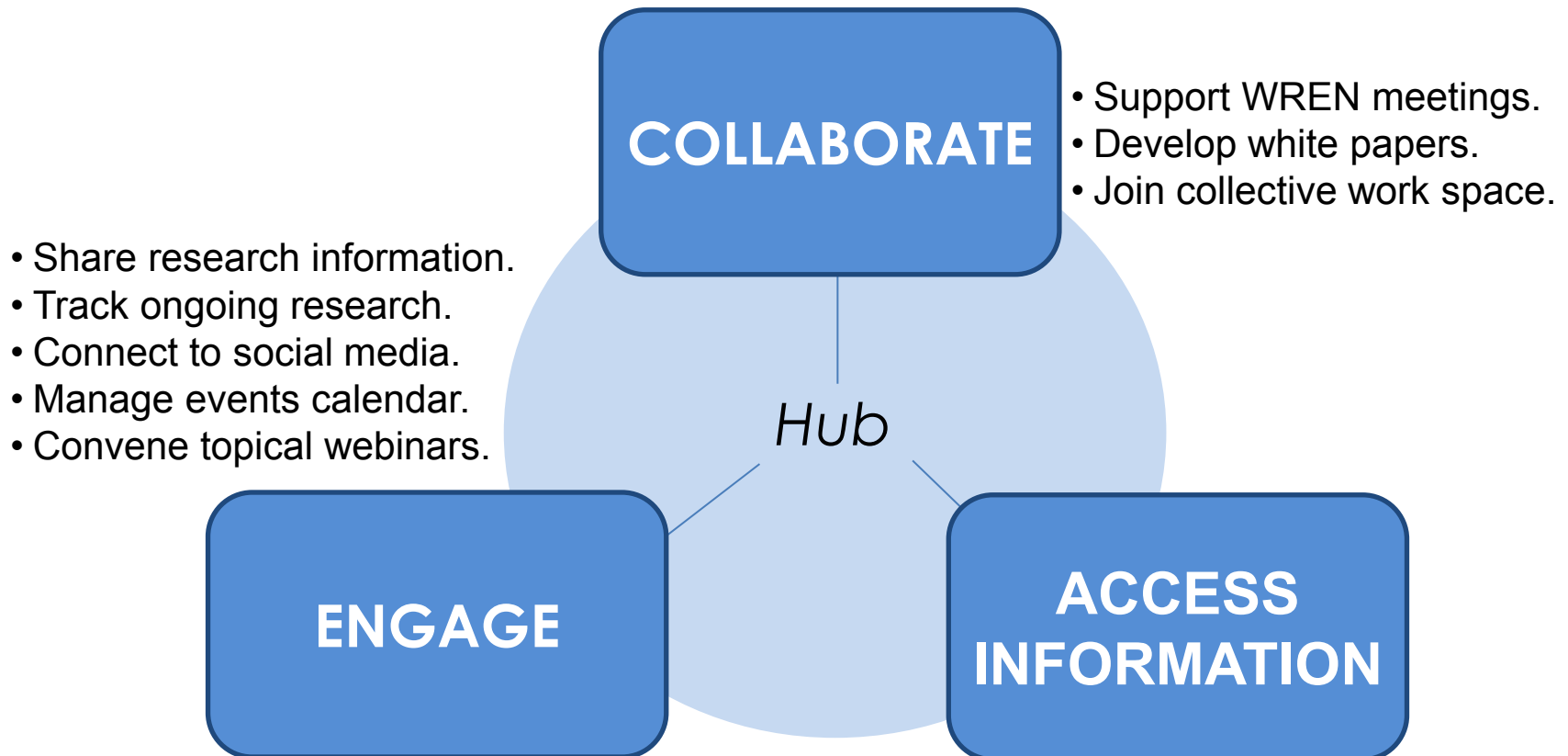
- Expanded international collaboration and knowledge transfer
- Publicly available information, accessible online, regarding the effects of wind development on wildlife and habitats
- Key work products:
 - **WREN Hub**
 - **White papers**
 - **Webinar series**
- Outreach and engagement



Radio-tagged golden eagle.
Photo by Randy Flament, NREL 23585

WREN Hub

<http://tethys.pnnl.gov/>



- Access environmental effects information.
- Find experts.
- Search linked databases.
- Compare country-specific information.

WREN Hub Changes

Home Page Redesign

- ▶ Redesign complete
- ▶ Better division of wind energy and marine energy
- ▶ Wind and marine energy equally represented throughout site
- ▶ Easy access to Knowledge Base (quick link)
- ▶ Easy access to WREN Hub (click on bottom right square).



A screenshot of the Tethys website home page. The page has a blue header with the Tethys logo and navigation links: ABOUT, TETHYS CONTENT, CONNECTIONS, BROADCASTS, HELP. Below the header is a banner image of a seagull flying over the ocean with the text "Are you new to Tethys? Check out the Tips for Tethys page to get started." Below the banner is a paragraph: "Tethys is a knowledge management system that actively gathers, organizes, and disseminates information on the environmental effects of marine and wind energy development." The main content area is divided into four large square tiles: "Marine Energy" (Generating electricity from the sea), "Wind Energy" (Generating electricity from wind on land and at sea), "Annex IV" (Addressing environmental effects of marine energy internationally), and "WREN" (Resolving conflicts between wind and wildlife internationally). To the right of these tiles are three smaller sections: "NEW USER" (If you are new to Tethys, start here to learn more), "KNOWLEDGE BASE" (Access thousands of publications and more, in a searchable database), and a calendar for "MARCH 2016". Below the calendar is a "Tethys Story" section titled "Up to Date Compendium of Science on Marine Renewable Energy Effects Released" with a "Read More" link. At the bottom of the page is a contact form with fields for Name, Email, and Comment, and a Submit button. The footer contains social media icons for Facebook and Twitter, the IEA Wind logo, and the text "© 2011-2016 PNNL | Contact Tethys".

Front page of Tethys, PNNL

WREN Hub Changes

Knowledge Base—Division of Content

- ▶ You can now search wind energy content separately.
 - Currently 2,100+ wind energy documents
 - Currently 1,500+ marine energy documents
 - Currently 3,100+ documents total (with overlap).
- ▶ While logged in, you can save your preferences.



Home » Tethys Content » Search Knowledge Base

Search Knowledge Base

This screenshot shows the search results page for 'Search Knowledge Base'. A modal window is overlaid on the page, asking the user to 'Please select which content you are interested in viewing.' The modal has three buttons: 'Marine Energy Content', 'Wind Energy Content', and 'All Content'. Below the buttons is a checkbox labeled 'Remember my selection (while logged in)'. In the background, a table of search results is visible with columns for Title, Author, Date, Type of Content, Technology Type, Stressor, and Receptor. The 'Current search' section shows 'Search found 2620 items' and a 'Targeted Search' section with a 'Search All Fields' dropdown and a 'Search All' input field.



Home » Tethys Content » Search Map Viewer

Search Map Viewer

This screenshot shows the 'Search Map Viewer' page. A modal window is overlaid on the page, asking the user to 'Please select which content you are interested in viewing.' The modal has three buttons: 'Marine Energy Content', 'Wind Energy Content', and 'All Content'. Below the buttons is a checkbox labeled 'Remember my selection (while logged in)'. In the background, a map of the Pacific Northwest region is displayed with search results marked as blue dots. To the right of the map is a 'Legend' section and a 'Technology Type' dropdown menu.

This screenshot shows the contact form on the TETHYS website. It features social media icons for Facebook and Twitter, a 'New User' button with a link to 'learn more', and a 'Knowledge Base' button with a link to 'Access thousands of publications and more, in a searchable database'. The form includes fields for 'Name', 'Email', and 'Comment', a checkbox for 'I agree to the terms & conditions', and a 'Submit' button. A decorative image of jellyfish is on the left side of the form.

This screenshot is identical to the one above, showing the TETHYS contact form.

Screen shots from Tethys, Pacific Northwest National Laboratory

White Papers

Current topics

- Adaptive management (mid- to late 2016)
- Considerations for upscaling individual effects of wind energy development toward population-level impacts on wildlife (late 2016)
- Individual to population and cumulative impacts
- Reconciling argumentations for and against the sustainable development of wind energy (green versus green: reconciling climate mitigation, water savings, and other global environmental benefits with local impacts on wildlife and habitat—2017).

Other topics

- Interrelationships of three topics
- Estimating risk to animals from development of wind energy projects.



Male greater sage-grouse on a lek in Wyoming. Photos by LuRay Parker, Wyoming Game and Fish Department, (top) NREL 20645 and (bottom) NREL 20646



Webinar Series

- Topics are proposed/selected by WREN members; the goal is to conduct quarterly webinars.
- Webinars to date:
 - **Webinar #1—September 2014: Strategies to Reduce Bat Fatalities at Wind Energy Facilities and Bat-Friendly Operation Algorithms: Reducing Bat Fatalities at Wind Turbines in Central Europe** (Cris Hein, Bat Conservation International; and Oliver Behr, [German] Ministry for the Environment, Nature Conservation, Building and Nuclear Safety)
 - **Webinar #2—December 2014: Attraction and Interaction of Marine Mammals and Seabirds to Offshore Wind Farms** (Debbie Russell, University of St. Andrews Sea Mammal Research Unit; and Ross McGregor, Natural Power)
 - **Webinar #3—April 2, 2015: Understanding Avian Collision Rate Modeling and Discussing What This Means in a Population Context** (Mark Collier, Bureau Waardenburg [Netherlands]; and Aonghais Cook, British Trust for Ornithology)

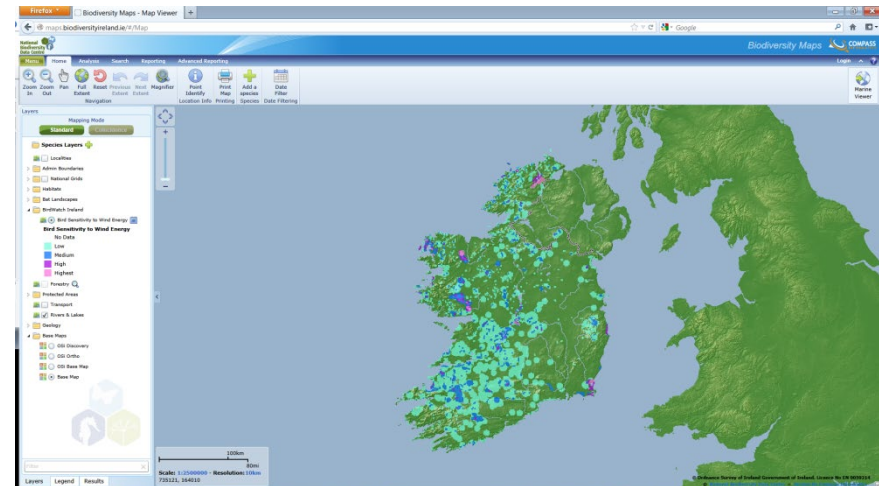


Map as shown within WREN Webinar #2 presented by Dr. Ross McGregor, Senior Ornithologist, Natural Power Consultants on a presentation entitled “Results of Ornithological Analysis for a UK Offshore Wind Farm”

Webinar Series (continued)

- **Webinar #4—August 2015: Avian Sensitivity Mapping and Wind Energy Projects Where Tools Have Been Developed to Assess the Potential Vulnerability of Birds to Wind Energy Development** (Julia Robinson Willmott, Normandeu [U.S.]; Sinéad Cummins, BirdWatch Ireland; and Roel May, Norwegian Institute for Nature Research)
- **Webinar #5—December 2015: Tools and Approaches That Have Been Developed and/or Used to Monitor Wildlife at Existing and Potential Wind Energy Development Sites, Both Onshore and Offshore** (Kate Williams, Biodiversity Research Institute [U.S.]; and Henrik Skov, DHI Group [Denmark])
- **Webinar #6—March 2016: Presence, Behavior, Migration, and Detection of Offshore Bat Activity, Outcomes of Research, and Deterrence** (Trevor Peterson, Stantec Consulting Services, Inc. [U.S.]; Sander Lagerveld, Institute for Marine Resources and Ecosystem Studies [The Netherlands]; and Maarten Platteeuw, Dutch Ministry of Infrastructure and Environment [The Netherlands])

Screenshot of Irish Terrestrial Bird Sensitivity Map for Wind Energy (source: <http://maps.biodiversityireland.ie/#/Map>) discussed by Sinéad Cummins from Bird Watch Ireland in a presentation entitled “Bird Sensitivity Mapping for Wind Energy Developments in Ireland” during WREN webinar #4. Development of a marine version of this sensitive map is in discussion.



Potential Future Webinar Topics

- Future topics are expected to continue to align with the overall WREN goals with suggestions as follows:
 - **June/July**—environmental marine impacts discussion about the latest MaRVEN report from Europe regarding information gaps and potential environmental impacts: building phase, type of foundation, noise production, and mitigation. A compatible speaker will be found to complement MaRVEN. This June webinar would be developed in partnership with the U.S. Bureau of Ocean Energy Management and possibly Tetra Tech (which has expressed interest in supporting this through their international offices).
 - **September/October 2016**—under discussion
 - Adaptive management, including technology progress and white paper results to date, or
 - Compensation topics.
 - **December 2016/January 2017**—environmental uncertainty and risk and/or compensation topics.

Outreach and Engagement

- Develop fact sheets. (Specific topics to be determined.)
- Develop slide decks. (Specific topics to be determined.)
- Give presentations at conferences and other relevant meetings.

Given to date

- 2014 (May) industry meeting held in conjunction with IEA Wind ExCo73 (Newcastle, U.K.)
- 2014 (November) National Wind Coordinating Collaborative Research Meeting (Colorado, U.S.)
- 2015 (May) Conference on Wind Energy and Wildlife Impacts (Berlin, Germany)
- 2015 (November) side event held in conjunction with the European Wind Energy Association (Paris, France)
- 2016 (April) Sustainable Energy Authority of Ireland International Wind Energy R&D Collaboration (Dublin, Ireland).

Planned

- 2016 (November) National Wind Coordinating Collaborative Research Meeting (Colorado, U.S.)
- 2017 (September) Conference on Wind Energy and Wildlife Impacts (Lisbon, Portugal).



Questions?

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IEA Wind Task 34:

http://www.ieawind.org/task_34.html

WREN Hub: <http://tethys.pnnl.gov/>

WREN Webinars:

<http://tethys.pnnl.gov/environmental-webinars>



A flock of black-tailed godwits (*Limosa limosa*) fly past Cahore Wind Farm in southeast Ireland. *Image by Oran O'Sullivan*

Notice: The IEA Wind agreement, also known as the Implementing Agreement for Co-operation in the Research, Development, and Deployment of Wind Energy Systems, functions within a framework created by the International Energy Agency (IEA). Views, findings and publications of IEA Wind do not necessarily represent the views or policies of the IEA Secretariat or of all its individual member countries.