

# 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

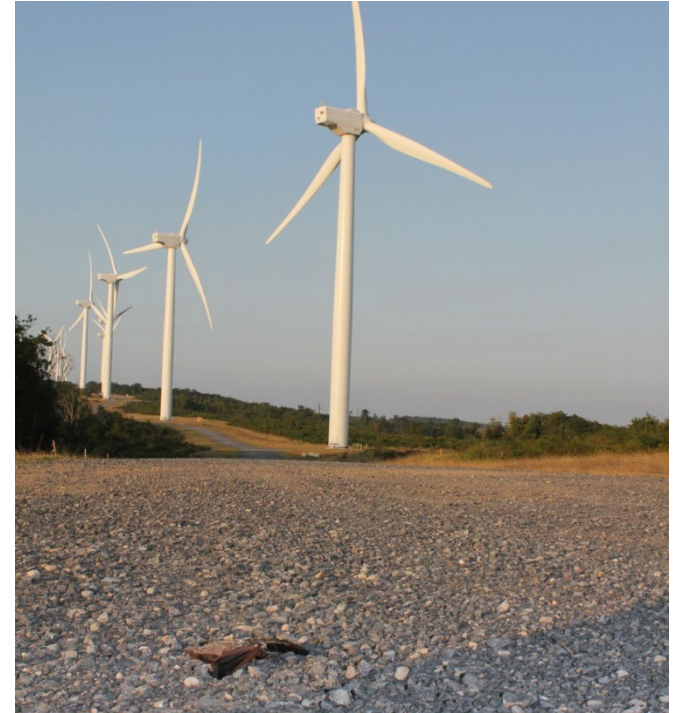


Implementing Agreement for Co-operation in the Research, Development, and Deployment of Wind Energy Systems

# 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.



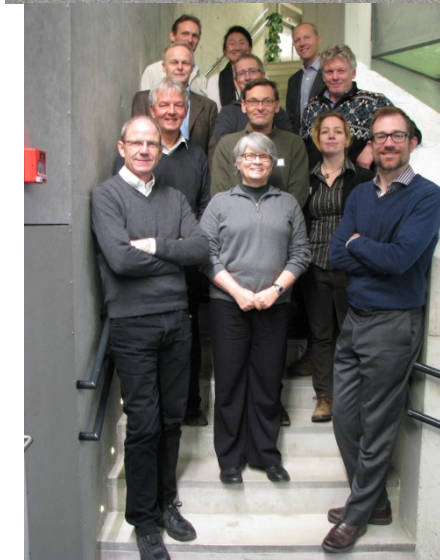
*Photo by Cris Hein,  
Bat Conservation International*

# 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

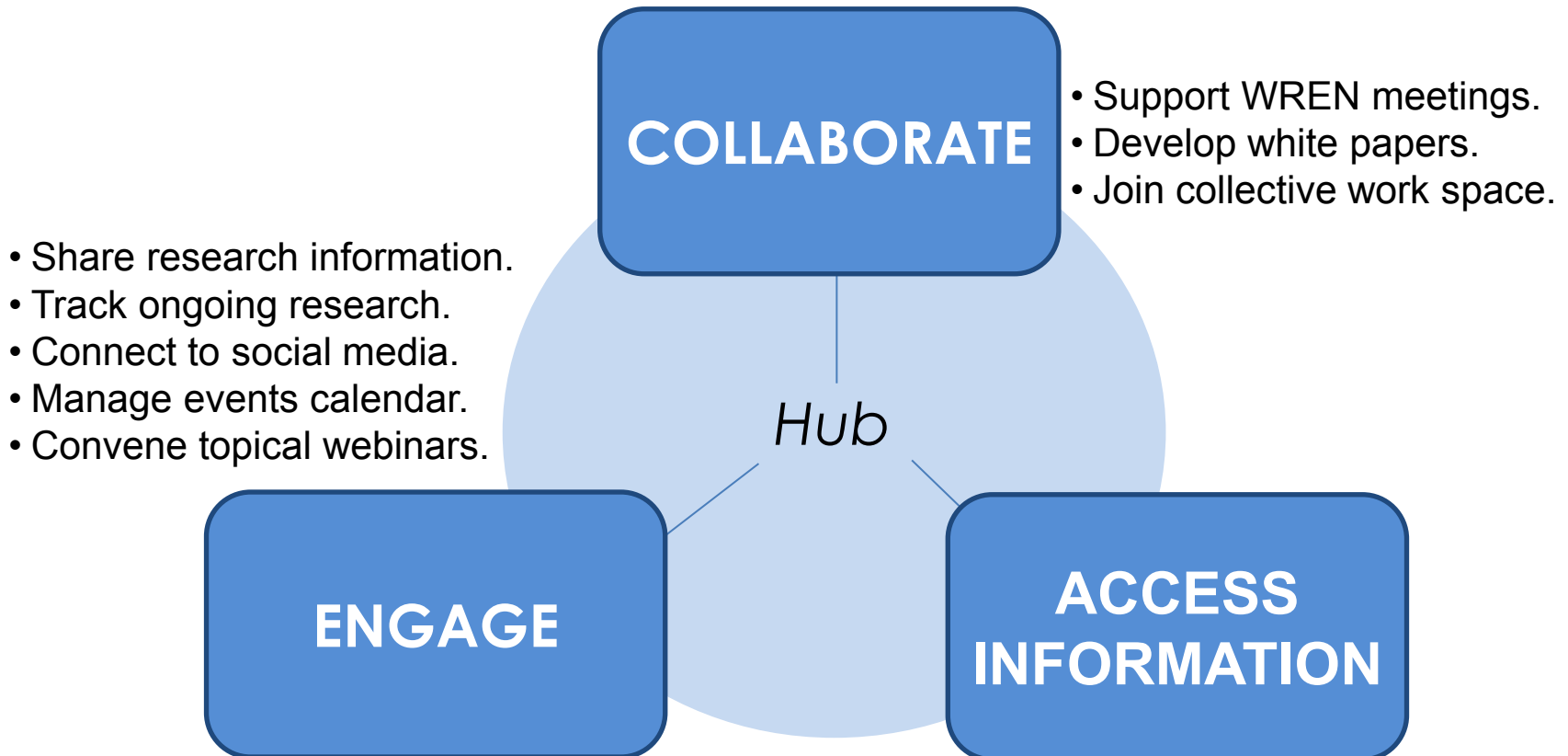
- Expanded international collaboration and knowledge transfer
- Publicly available information, accessible online, regarding the effects of wind development on wildlife and habitats
- Key work products:
  - **WREN Hub**
  - **White papers**
  - **Webinar series**
- Outreach and engagement



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 header includes the Tethys logo, navigation links (ABOUT, TETHYS CONTENT, CONNECTIONS, BROADCASTS, HELP), and a search bar. A banner image shows a seagull flying over the ocean. Below the banner, a text block states: "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", which mentions the Annex IV initiative and the 2016 State of the Science report. The footer contains social media icons for Facebook and Twitter, a "New User" button, a "Knowledge Base" button, a contact form with fields for Name, Email, and Comment, and a "Submit" button. Logos for the U.S. Department of Energy, ES (Ocean Energy Systems), and IEA Wind are also present.

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

Please select which content you are interested in viewing.

- Marine Energy Content
- Wind Energy Content
- All Content

Remember my selection (while logged in)

Title	Author*	Date**	Type of Content	Technology Type	Stressor	Receptor
Trends of Harbour Porpoise ( <i>Phocoena phocaena</i> ) Density in the Southern North Sea	Pesch					
A Methodology for Multi-Criteria Design of Multi-use Offshore Platforms for Marine Renewable Energy Harvesting	Zandbergen					
Approaching Population Thresholds in Presence of Uncertainty: Assessing Displacement of Seabirds from Offshore Wind Farms	Burton					
Avian Collision Risk Models for Wind Energy Impact Assessments	Mason					
Validation of Ecological and Amenity Impacts of an Offshore Windfarm as a Factor in Marine Planning	Singh					
Energy Systems and their Impacts on Marine Ecosystem Services	Papathanassiopoulou, E., et al.	December 2015	Journal Article	Offshore Wind	N/A	Ecosystem
Influence of Concrete Mix Design on CO2 Emissions for Large Wind Turbine Foundations	Barnitt, H.	November 2015	Journal Article	Offshore Wind	N/A	Socio-economics
Acoustic Indices for Biodiversity Assessment: Analyses of Bias Based on Simulated Bird Assemblages	Gasc, A., et al.	November 2015	Journal Article	N/A	N/A	Birds, Ecosystem

Home • Tethys Content • Search Map Viewer

Search Map Viewer

Please select which content you are interested in viewing.

- Marine Energy Content
- Wind Energy Content
- All Content

Remember my selection (while logged in)

Current search  
Search found 2620 items

Targeted Search  
Search All Fields

Search All

Technology Type

- Offshore Wind (263)
- Land-Based Wind (588)
- Tidal (356)
- Wave (308)
- Wave (200)
- Sea-Stream (48)
- OTEC (39)
- Ocean Current (14)

Please contact us if you would like to make suggestions or contribute information or documents to Tethys.

Name  Email

Comment

I agree to the terms & conditions

Please contact us if you would like to make suggestions or contribute information or documents to Tethys.

Name  Email

Comment

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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)

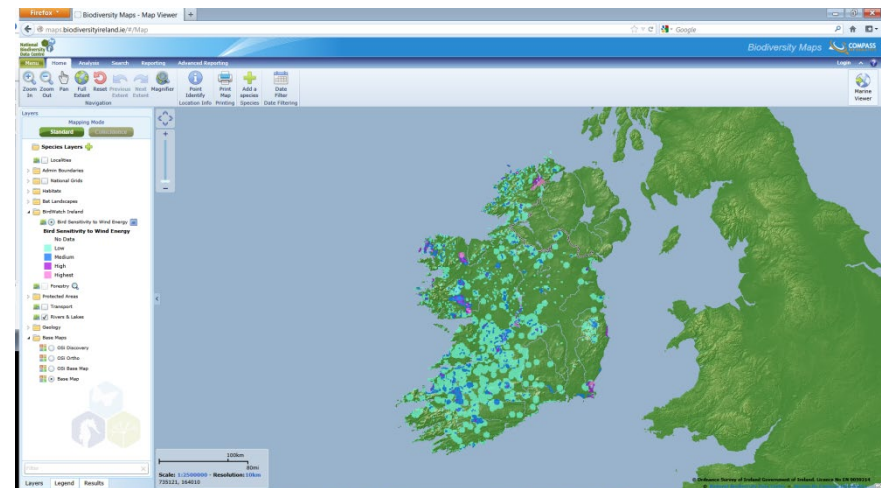


Map as shown within WREN Webinar #2 presented by Dr. Ross McGregor, Senior Ornithologist, Natural Power Consultants on a presentation entitled “Results of Ornithological Analysis for a UK Offshore Wind Farm”

# 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, Normandeau [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](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.