Advanced study of the atmospheric flow Integrating REal climate conditions to enhance wind farm and wind turbine power production and increase components durability

Fact Sheet

<table>
<thead>
<tr>
<th>Project Information</th>
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<tbody>
<tr>
<td>AIRE</td>
<td>Funded under</td>
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<tr>
<td>Grant agreement ID: 101083716</td>
<td>Climate, Energy and Mobility</td>
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<tr>
<td>DOI</td>
<td>Total cost</td>
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<tr>
<td>10.3030/101083716</td>
<td>€ 5 424 916,43</td>
</tr>
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<td>Start date</td>
<td>EU contribution</td>
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<tr>
<td>1 January 2023</td>
<td>€ 5 424 916,00</td>
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<tr>
<td>End date</td>
<td>Coordinated by</td>
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<tr>
<td>31 December 2026</td>
<td>FUNDACION CENER</td>
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<td>Spain</td>
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Objective

To deliver the future needed renewable energy capacity, wind farm developers will have to use larger turbines, at higher altitudes, explore novel geographical regions and offshore sites. Currently, wind turbines and wind farms are designed and operated considering “just” wind conditions. Consequently, the models do not take into account the physics and aerodynamics of atmospheric wind flows at high altitudes, neither how this is affected by the location, the effect of precipitation and/or sand. This reduces the
expected efficiency of wind energy production, and makes hard to estimate the energy outputs, operating costs and lifespan of blades and turbines, increasing variability and the risk to investors and project developers when designing wind farms, reducing the total potential investment. Unless new sites can be identified and designed optimally, the LCOEs will start to rise as developers have to design wind farms that cannot be well predicted with conventional models.

The AIRE consortium foresees precipitation and other events (clouds, sand, shear, inflow) that wind brings into the state of play to be the new key parameters for siting of wind turbines, wind farm design, component design and O&M strategies planning. AIRE will investigate solution to assess the potential impact of REAL climate conditions in different terrains, and different altitudes both onshore and offshore, gathering information from 4 experimental sites and 4 commercial wind farms. Specially AIRE will bring together researchers, blade manufacturers and utilities to create an open access knowledge hub of experimental data, develop new numerical models, build tools to design and control wind turbines and wind farms. The effectiveness of the developed tools and models will be validated using data from commercial wind farms.

Fields of science

- engineering and technology
- environmental engineering
- energy and fuels
- renewable energy
- wind power
- engineering and technology
- mechanical engineering
- vehicle engineering
- aerospace engineering
- aeronautical engineering

Keywords

- atmospheric flow
- wind
- wind power
- precipitation
- sand
- high altitude
- complex terrain
- offshore
- blade erosion
- numerical model
- mesoscale
- wind farm control
- airfoil
- curtailment
- prediction

Programme(s)

- HORIZON.2.5 - Climate, Energy and Mobility
- HORIZON.2.5.2 - Energy Supply
**Topic(s)**

HORIZON-CL5-2021-D3-03-04 - Physics and aerodynamics of atmospheric flow of wind for power production

**Call for proposal**

HORIZON-CL5-2021-D3-03

See other projects for this call

**Funding Scheme**

RIA - Research and Innovation action

**Coordinator**

FUNDACION CENER

Net EU contribution

€ 1 187 040,00

Address

Avenida ciudad de la innovacion 7
31621 Sarriguren
Spain

Region

Noreste > Comunidad Foral de Navarra > Navarra

Activity type

Research Organisations

Links

Contact the organisation
Website
Participation in EU R&I programmes
HORIZON collaboration network

Other funding

€ 0,00

**Participants (9)**
DANMARKS TEKNISKE UNIVERSITET

Denmark

Net EU contribution

€ 1 095 625,00

Address

Anker engelunds vej 101
2800 Kongens lyngby

Region

Danmark > Hovedstaden > Københavns omegn

Activity type

Higher or Secondary Education Establishments

Links

Contact the organisation  
Website  
Participation in EU R&I programmes  
HORIZON collaboration network

Other funding

€ 0,00

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TEKNOLOGIAN TUTKIMUSKESKUS VTT OY

Finland

Net EU contribution

€ 727 762,50

Address

Tekniikantie 21
02150 Espoo

Region

Manner-Suomi > Helsinki-Uusimaa > Helsinki-Uusimaa

Links

Contact the organisation  
Website  
Participation in EU R&I programmes  
HORIZON collaboration network

Other funding

€ 0,00
FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV

Germany

Net EU contribution
€ 697,897.50

Address
Hansastraße 27c
80686 München

Region
Bayern > Oberbayern > München, Kreisfreie Stadt

Links
Contact the organisation
Website
Participation in EU R&I programmes
HORIZON collaboration network

Other funding
€ 0.00

SIEMENS GAMESA RENEWABLE ENERGY AS

Denmark

Net EU contribution
€ 233,750.00

Address
Borupvej 16
7330 Brande

Region
Danmark > Midtjylland > Vestjylland

Activity type
Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links
Contact the organisation
Participation in EU R&I programmes
HORIZON collaboration network
CAPITAL ENERGY ENGINEERING SL

Spain

Net EU contribution

€ 423 885,00

Address

Paseo club deportivo 1 edif 13 2 po
Madrid

SME

Yes

Region

Comunidad de Madrid > Comunidad de Madrid > Madrid

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

Contact the organisation

Participation in EU R&I programmes

HORIZON collaboration network

Other funding

€ 0,00

ENGIE

France

Net EU contribution

€ 523 831,00

Address

1 place samuel de champlain
92400 Courbevoie

Region

Île-de-France > Île-de-France > Hauts-de-Seine

Links
CONSORCIO PARA EL DISENO, CONSTRUCCION, EQUIPAMIENTO Y EXPLOTACION DE LA PLATAFORMA OCEANICA DE CANARIAS

Spain

Net EU contribution

€ 197 000,00

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Carretera de taliarte
35200 Telde

Region

Canarias > Canarias > Gran Canaria

Links

Contact the organisation  Website  Participation in EU R&I programmes  HORIZON collaboration network

Other funding

€ 0,25

THIRD-PARTY

UNIVERSIDAD DE LAS PALMAS DE GRAN CANARIA

Spain

Net EU contribution

€ 40 000,00

Address

C/ juan de quesada 30
35001 Las palmas de gran canaria

Region

Canarias > Canarias > Gran Canaria

Links

Contact the organisation  Website  Participation in EU R&I programmes  HORIZON collaboration network
Partners (1)

Participation in EU R&I programmes
HORIZON collaboration network

Other funding
€ 0,00

CARTAGO VENTURES SL
Spain
Net EU contribution
€ 298 125,00

Address
Av diagonal 580 planta 4 pta 2
08021 Barcelona

SME
Yes

Region
Este > Cataluña > Barcelona

Activity type
Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links
Contact the organisation
Participation in EU R&I programmes
HORIZON collaboration network

Other funding
€ 0,18

OFFSHORE RENEWABLE ENERGY CATAPULT
United Kingdom
Net EU contribution
€ 0,00

Address