GUIDELINES

FOR THE INSTALLATION OF RENEWABLE ENERGY-RELATED INFRASTRUCTURES AND EQUIPMENT AND THEIR POTENTIAL IMPACT ON CULTURAL HERITAGE

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IMPORTANT NOTE:

At the time of the publication of this document, no relevant case studies were found within the Spanish context. Thus, the case studies contained in the Annex are extracts from the document ***World Heritage and wind energy planning protecting visual integrity in the context of the energy transition. Inspiring practices from four European countries***, developed by UNESCO and the Ministry of the Ecological Transition of the Government of France.

CONTENT

A

EXECUTIVE SUMMARY

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The climate emergency and current energy crisis has spurred frenetic renewable energy development throughout our landscapes, villages and cities. In this context, the ICOMOS National Committee in Spain (hereinafter, ICOMOS-Spain) has united professionals from all over the country to work together to compile practices, ideas and concerns to ensure that **our rich cultural heritage values** are **integrated into the implementation of these forms** of more **sustainable energy**.

To achieve this, we require a country-wide planning approach which includes a thorough analysis of each site to simplify decision making and minimize the impact on cultural assets (tangible and intangible).

Current Spanish cultural heritage and environment legislation (both at national and regional levels, according to the 1978 Constitution) lacks specific information on how the impact of facilities and infrastructures (in this case, wind or photovoltaic energy) on cultural assets should be assessed, both in the context of the Environmental Impact Assessment and the authorization for projects on protected cultural assets.

Therefore, these Guidelines aim to help legislators, decision makers, government department technical staff, facility developers and project planners advance towards the much sought after compatibility between renewable energy and the conservation and protection of our cultural heritage values, using the **Heritage Impact Assessment Methodology** (HIA), published in mid-2022 by UNESCO and its three advisory bodies, ICOMOS, IUCN and ICCROM.

Finally, a series of interesting **case studies** from other European countries (Austria/Hungary, France, Germany and the United Kingdom) compiled by UNESCO and the French Ministry of Ecological Transition have been included.

ICOMOS-Spain, the local branch of an extensive **international network of heritage experts**, hopes these Guidelines will facilitate renewable energy analysis and planning in relation to our cultural heritage and, above all, that the Guidelines will give rise to many case studies that can be exported and shared throughout the country, so that heritage becomes part of the solution in the midst of this global climate change process.

B

INTRODUCTION

JORDI TRESSERRAS JUAN

President of ICOMOS-Spain

As President of ICOMOS-Spain, it is an honor to present these *Guidelines for the installation of renewable energy-related infrastructure and equipment and their potential impact on cultural heritage*, developed in 2022 by a specialized working group created for this purpose, mostly composed of ICOMOS member experts.

ICOMOS (International Council of Monuments and Sites), a unique and democratic international non-profit organization founded in 1965, which has built a strong philosophical and doctrinal framework for the conservation and sustainable management of cultural heritage worldwide. During its 20th General Assembly, and in line with other entities and institutions with similar goals, **ICOMOS declared the climate emergency** and appealed to its members to undertake urgent collective initiatives aimed at safeguarding heritage from climate change through a preventive approach to global warming. The declaration also recognizes the huge potential of cultural heritage to develop inclusive, transformative and fair climate action.

The ICOMOS National Committee in Spain is mandated to contribute to ICOMOS 2021-2024 Triennial Scientific Plan (***Cultural Heritage and Climate Action***) objectives. The plan aims to develop a coordinated strategy with the National and Scientific Committees on climate change and cultural heritage. To this end, the participation of both institutional members and the Ministry of Culture and Sports itself has been key, through the Directorate General (*Dirección General*) of Cultural Heritage and Fine Arts, as well as every heritage Directorate General, and autonomous communities which are part of our entity, in addition to professionals with experience in the area.

ICOMOS-Spain also wants to be involved in finding answers to this complex problem, which directly affects those responsible for cultural heritage management and protection in our country. To do this, as these Guidelines explain, we believe the Heritage Impact Assessment specific methodology proposed by ICOMOS must be applied.

As a public interest organization, composed exclusively of experts in cultural heritage, we hope the reflections and recommendations in these Guidelines will serve to support the implementation of sustainable development and collective action against climate change solutions that are compatible with cultural heritage values. We hope the Guidelines will help us to work together and share experiences with other ICOMOS national and regional committees, especially with the ICOMOS European Group and ICOMOS LAC (Latin America and the Caribbean), with whom we keep a close relationship.

I would also like to highlight the exemplary collaborative work carried out by our network to develop these Guidelines, and to thank every professional who played a part in this for their generous contribution, both at an individual level or as members of ICOMOS-Spain's institutions. Finally, I would also like to give credit to the work of its coordinators, José Alberto Alonso, Clara Villalba and Camino Enríquez. Without their extraordinary work drafting, editing and synthesizing, this document wouldn't exist.

By last, we would like to acknowledge the fundamental support of the General Directorate of Cultural Heritage of the Government of the Autonomous Community of the Region of Murcia, which is part of ICOMOS-Spain as an institutional member, and to thank them for their generous contribution, which has helped our organization to translate and further disseminate the document.

Tossa de Mar, November 3, 2022

ISAAC SASTRE DE DIEGO

Director General of Cultural Heritage and Fine Arts of the Ministry of Culture and Sport

We are living in times of rising lifestyle transforming changes. Traditional economic models that shaped our behavior and seemed steady and permanent are now not only being increasingly questioned, but seem doomed to exhaustion, or at least need a thorough revision of their foundations.

Perhaps the biggest challenge we are facing is climate emergency. The change in environmental conditions around the world hopelessly affects every order of coexistence, causing natural disasters, property damage, human migrations… The alarm has already been raised due to the over-exploitation of limited natural resources, while the energy crisis is forcing us to achieve the sustainable development goals ahead of schedule. We cannot wait for 2030 to hit the milestones set.

And in the midst of this perfect storm, cultural heritage, its needs, and its opportunities arise. Heritage, through cultural landscapes, traditional knowledge or intangible values, stands as a guide and example of sustainability. It is where we look to find balance between culture, humanity, and nature. We find that circular economy, giving people a reason to stay, communities whose identity is forged through the land they have learned to use and exploit respecting the cycle has made them millenary. Cultural heritage is the alternative, the future. But at the same time, there is a delicate balance between its fragile conservation, and its necessary and timely use and exploitation. Our museums, archives and monuments must also become sustainable in their energy consumption, while preserving their essence and values.

Therefore, the publication, by ICOMOS-Spain, of the *Guidelines for the installation of renewable energy-related infrastructure and equipment and their potential impact on cultural heritage*, cannot have come at a better time. A very useful tool, like others developed in recent years by ICOMOS-Spain, which further reinforces the body's role as a reference for all heritage professionals. The Guidelines are also aligned with the initiatives that the Ministry of Culture and Sport is developing in this same direction, such as the *Cultural Heritage Sustainable Management Green Paper*, to be published soon.

Madrid, November 2, 2022

C

BACKGROUND

BACKGROUND

1. ICOMOS (International Council on Monuments and Sites) is a unique and democratic international non-profit organization dedicated to promoting the conservation, protection, use and enhancement of cultural heritage worldwide. Created in 1965, ICOMOS has built a **solid philosophical, doctrinal and managerial framework** for the sustainable conservation of heritage around the world.

2. ICOMOS National Committee in Spain (ICOMOS-Spain) was founded in 1980 to represent ICOMOS interests at a national level. Every one of its members are professionals or entities specialized in different fields of cultural heritage. To acknowledge its social role, ICOMOS-Spain was declared **a public interest organization** by the Spanish Ministry of the Interior in 2021.

3. This document is intended to be a guide to good practice for decision-making, design, placement and maintenance of renewable energy facilities that affect cultural landscapes, historic sites (urban and rural), and monuments or buildings listed in the Spanish State.

4. The current climate and environmental emergency, declared in Spain by agreement of the Council of Ministers in January 2020, orders governments, companies and civil society entities to change their operational dynamics. This reality has been aggravated by a global energy crisis, which is forcing far-reaching decisions to be made in a short time. Therefore, we must **urgently transform traditional production and consumption patterns and behaviors**, to decarbonize productive sectors in a way that mitigates economic and social risks caused by the impact of climate change.

5. As the United Nations points out, to achieve the desired greenhouse gas emissions reduction, mainly carbon dioxide, traditional energy sources based on fossil fuels must be replaced by clean energies.

6. Due to Spain's geographical and climatic characteristics, the most used renewable energy sources are those based on wind and solar energy, which require the installation of wind turbines and photovoltaic panels, respectively.

7. Although these technologies are undoubtedly positive as regards decarbonization, they can also produce negative effects on the heritage values of landscapes, historic sites or buildings with some degree of protection due to their historical or cultural interest. Therefore, **these impacts** must be **anticipated, evaluated and mitigated** when seeking solutions that guarantee the coexistence between the economy's sustainable development, and the conservation and protection of cultural heritage as a common legacy for society as a whole.

D

SCOPE, METHODOLOGY AND ACKNOWLEDGMENTS

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8. ICOMOS-Spain, as a non-governmental and public interest organization dedicated to promoting the theory, methodology and technology applied to the conservation, protection and valorization of cultural heritage, has **brought together its individual and institutional members in a working group** to analyze the current situation and try to harmonize an adequate response to the current needs of ecological development and transition, as well as for the preservation of our cultural heritage's values.

9. ICOMOS-Spain initiated the drafting of this document, which has been coordinated by José Alberto Alonso, Clara Villalba and Camino Enríquez, members of the Board of Directors and Executive Secretary, respectively. The following individual members of the organization have also collaborated: Uxío Novoneyra, Luis Mansilla, Montserrat Villaverde, Felipe Agustín Monzón, Vicente Dualde, Rosa María Ricoy, Asunción Martínez, Carmen Rey, Emiliano Hernández, Justo Portela, Luis García and Ana Yáñez. The following institutional members have also participated, represented by:

   - ☐ Viceconsejería de Cultura y Deportes de la Junta de Comunidades de Castilla-La Mancha: Patricia Hevia
   - ☐ Dirección General de Patrimonio Cultural de la Junta de Comunidades de Castilla y León: Laura López
   - ☐ Dirección General de Patrimonio Cultural del Gobierno de Asturias: Mariana Suárez and Andrea Álvarez
   - ☐ Dirección General de Patrimonio Cultural de la Generalitat de Catalunya: Tania Álvarez, Daria Calpena, Anna Almacellas and Miquel Barba
   - ☐ Dirección General de Patrimonio Cultural de la Generalitat Valenciana: Esther Miquel and Antonio Vicente
   - ☐ Dirección General de Patrimonio Cultural del Gobierno de Aragón: Nuria Hernández and Clara Villalba
   - ☐ Dirección General de Patrimonio Cultural de la Comunidad de Madrid: Eduardo Lillo and Esther Bazo
   - ☐ Consell de Mallorca: Miquel Vadell
   - ☐ Dirección General de Bellas Artes del Ministerio de Cultura y Deporte: Antonio Jesús Antequera Delgado

10. The **methodology** used to prepare these Guidelines has mainly been **collaborative**, with regular meetings between every group member, from March until the end of July 2022. A general analysis of the issue was first carried out, researching national and international publications from key organizations working in cultural heritage protection. Thanks to the close relationship between ICOMOS-Spain and its European counterparts, a parallel study was carried out to understand how the problem was being addressed in neighboring countries. The background experience of the members from practically every geographical area in the peninsula and islands helped to understand specific local difficulties, which led to interesting debates. We also worked collaboratively on an impact matrix, which helped to identify and organize the challenges and threats, and to draft the present document.

11. We would like to thank the dedication and commitment of every member of ICOMOS who has played a part in the elaboration of this document.

E

POLITICAL AND ENVIRONMENTAL CONTEXT

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12. The **Paris Agreement**, an international treaty signed in 2015 by 196 states, aimed to limit global warming to less than 2 degrees Celsius compared to pre-industrial levels. This was a milestone in the multilateral climate change process as it marked the first time every country agreed to come together to fight climate change and adapt to its effects.

13. At the end of 2019, the **UN** asked all the countries in the world to declare a climate emergency until carbon neutrality was achieved. The emergency was **ratified by the European Parliament** in 2019 and **declared by the Government of Spain** in January 2020.

14. On November 29, 2019, the **European Parliament** declared a climate emergency, committing to reduce global warming-causing CO2 emissions by 55% by 2030, and to achieve neutrality by 2050. At the end of December of the same year, Ursula Von der Leyen, President of the European Commission, announced the **European Green Pact**, a set of ambitious policies in the areas of climate, energy, transport and taxation aimed to lead the economy towards a green and clean Europe, with an allocated budget of more than 1 trillion euros.

15. The **Government of Spain**, inspired by the 2030 Agenda Sustainable Development Goals, presented in April 2020 the *Transformation and Resilience Plan* for investments based on 10 development factors to leverage sustainable and inclusive growth. Following this same decarbonization strategy, the Ministry for the Ecological Transition and the Demographic Challenge (hereinafter MITECO) has presented the ***National Integrated Energy and Climate Plan 2021-2030*** *(PNIEC)*, which defines energy policies to reduce greenhouse gases the next ten years, and the ***National Climate Change Adaptation Plan*** *(PNAC)*, a basic planning tool to reduce present and future damage from climate change, and build a more resilient economy and society.

F

CULTURAL HERITAGE CONTEXT

CULTURAL HERITAGE CONTEXT

16. The **Council of Europe** Framework Convention on the value of cultural heritage for society, known as the **Faro Convention**, was signed in Portugal in 2005, and was ratified by Spain in 2022. This agreement proposes a new cultural heritage management model that focuses on people and human values. It highlights cultural heritage's value and potential as a resource for sustainable development and for improving people's quality of life, and also defends everyone's right to create bonds with the cultural heritage of their choice, while respecting the rights and freedoms of others. It also draws attention to the need for society-wide participatory processes and highlights the importance of heritage education to promote dialog between cultures and religions.

17. Sustainability is one of the five pillars of the European Framework for Action on Cultural Heritage, which emphasizes its potential to improve social capital, boost economic growth, and ensure environmental sustainability. Culture and heritage can help achieve inclusive and sustainable development.

18. In September 2022, the **European Union** published **Strengthening Cultural Heritage Resilience for Climate Change. Where the European Green Pact meets Cultural Heritage**, a document which describes the contribution of cultural heritage to decarbonization, and identifies the threats it faces in the near future.

19. In Spain, **MITECO** presented in 2021 the ***National Climate Change Adaptation Plan 2021-2030***. Most notably, both natural heritage (paragraph7.4) and cultural heritage (paragraph 7.9) are identified as threatened in the plan. It mentions the Spanish Cultural Heritage Institute's (IPCE) ***National Emergency and Risk Management Plan*** as a risk management document for risks derived from climate change. Action line 9.1 identifies the integration of risks derived from climate change in the conservation of cultural heritage, and 9.2 mentions the identification and transfer of useful vernacular knowledge to adapt to climate change (identifying good practices in the use of technologies, and vernacular knowledge to adapt to climate conditions, while developing a list of useful traditional technologies and practices, and organizing a formative session on the use of traditional technologies and practices for adaptation).

20. For years, the United Nations Educational, Scientific and Cultural Organization (**UNESCO)** has been prioritizing the need to face climate change challenges for the protection and safeguarding of cultural heritage through the following publications: ***World Heritage and Tourism in a Changing Climate***, ***Climate Change and World Heritage***, ***Climate Change Adaptation for Natural World Heritage Sites. A Practical Guide*** and ***Managing Disaster Risks for World Heritage***.

21. Published in 2013 by **UNESCO**, ***Renewable Energy Futures for UNESCO sites. RENFORUS*** describes successful cases of renewable energy use in Biosphere Reserves and World Heritage Sites. Among those described are the installation of windmills in El Hierro and Fuerteventura, the installation of solar panels in the historic center of Edinburgh and the Abbey of Fontevraud.

Biosphere Reserves and World Heritage Sites are considered globally as sites of excellence where new and best practices are introduced to manage nature, heritage and human activities. Biosphere Reserves are sites established by countries and recognized under UNESCO's Man and the Biosphere (MAB) Program to promote sustainable development based on local community efforts and solid science. By definition, they are perfect when testing and demonstrating innovative approaches for sustainable development, from a local to an international scale. The World Network of Biosphere Reserves is a dynamic and interactive network of 610 biosphere reserves in 117 countries, including 12 transboundary sites. The 24th session of the International Coordinating Council for Man and the Biosphere (MAB) Program confirmed that different network creation initiatives are important to promote Biosphere Reserves (BR) as sites for development alternatives powered by renewable and efficient energies, thus contributing to climate change mitigation efforts and sustainable development in general.

The World Heritage List includes 962 cultural and natural heritage assets that the World Heritage Committee considers to be of exceptional universal value. At its 29th session, the World Heritage Committee highlighted the importance of climate change and its impact on World Heritage Sites (WHS), in their exceptional universal value, integrity and authenticity. The preservation of UNESCO sites remains one of the main development priorities of interested governments. Having been declared UNESCO sites, both are places that seek to reconcile the conservation of biological and cultural diversity, and economic and social development. Although socio-economic development within UNESCO sites is highly vulnerable due to human activities, its careful management remains one of the objectives for every concerned country. This demands to take urgent and necessary action to achieve a self-sustained socio-economic development, that involves the sustainable management of natural and locally available resources.

Among other factors, the energy system plays a key role in providing basic energy services to local communities, and every existing infrastructure at UNESCO sites. Thus, the widespread use and application of renewable energy local sources will help reduce the damage caused to the ecosystem by energy production, while contributing to local communities' sustainable development, through access to energy services.

22. **ICOMOS**, **UNESCO's** Advisory Body at World Heritage Sites, participates in the joint initiative with the IPCC, an intergovernmental panel composed of climate change experts, called ***Cultural Heritage and Climate Change***. They hold international meetings on Culture, Heritage and Climate Change as well as put forward public policy recommendations to include culture in the climate agenda.

23. At the end of 2019, **ICOMOS** published ***The Future of Our Pasts***, a document that links cultural heritage and climate action. The document identifies and analyzes climate change risks and describes methodologies for assessment, mitigation, education, adaptation and resilience.

The publication analyzes the opportunities when culture and heritage are promoted as a mechanism to fight climate change, as well as the threats if the steps taken do not focus on preserving heritage values in our buildings, landscapes or others.

It explicitly calls on governments to design good practice strategies to accommodate renewable energies without losing heritage values.

24. **ICOMOS**, in collaboration with Europa Nostra and the European Investment Bank, has published the ***European Cultural Heritage Green Paper*** which details the importance of cultural heritage as a key driver and actor for a green transition.

25. **ICOMOS** has produced ***Heritage and the Sustainable Development Goals. Policy Guidance for Heritage and Development Actors***, a document which linked the 17 Sustainable Development Goals with good practices in cultural heritage management and protection. Goal 7 "Affordable and non-polluting energy" specifically identifies as good practice the installation of solar panels on the roofs of an Edinburgh neighborhood, a site included in the World Heritage List.

ICOMOS follows the holistic construction approach to increase energy efficiency in buildings and historic sites. In addition to improving building structure and the environmental performance of building systems, renewable energy systems can be successfully added to historic buildings to provide them with their own cheaper, cleaner energy source. In Edinburgh, a World Heritage listed city, solar panels have been added to historic buildings in a way that respects the cultural value of each place. Solar thermal panels were installed on the south-facing inner slopes of valley roofs on Category B-classified early 19th century houses to provide 50% of the hot water requirements to the housing association tenants of these houses. The installation of solar thermal panels formed part of a larger Renewable Heritage Project, led by Changeworks in partnership with the Lister Housing cooperative. The panels cause little damage to the historic building's structure and their installation is reversible, which means the panels can be removed without damaging the historic element. At the same time, solar thermal panels are carefully placed so they are not visible from key historical perspectives addressed by the SDGs, such as Edinburgh Castle or from nearby streets. Along with the installation of renewable energy, energy efficiency in the houses was improved through the building's comprehensive approach, such as the installation of secondary glazing.

G

HERITAGE IMPACT ASSESSMENTS:

THE IMPORTANCE OF A GOOD ANALYSIS IN DECISION MAKING

HERITAGE IMPACT ASSESSMENTS

26. National and regional regulations on cultural heritage in Spain largely restrict any intervention on assets of cultural interest (BIC - Spanish legal protection category) which may negatively affect their values: new facilities, wiring, other discordant elements, etc.

27. Current regulation for the installation of renewable energy infrastructure developed by MITECO and the different Spanish autonomous communities, establishes, in certain cases, the need to carry out an **Environmental Impact Assessment** (EIA) for its authorization (Ley 21/2013, of December 9, on environmental assessment and other regional development standards). However, national and regional regulations on EIA, which do consider the possible impact on cultural heritage and landscape, do not establish a specific methodology on how to analyze the possible impact. This makes it extremely difficult for involved parties to interpret. This applies to both contractors and project planners, and even the relevant authorities in charge of the protection of cultural assets themselves, who are also responsible for the relevant sectoral reports.

28. To make informed decisions, according to objective criteria, the Heritage Impact Evaluation (hereinafter, HIA) is a tool of great interest. It is perfectly applicable, although it is not explicitly included in Spanish legislation. Although HIAs are little known in Spain, they are **documents written by professionals specialized in cultural or natural heritage that evaluate the possible impact** projects or infrastructures may have on the authenticity, integrity or management of heritage sites.

29. The HIA represents **an opportunity to achieve sustainable development compatible with cultural heritage protection and conservation**. It identifies the site's values, analyzing possible risks and impacts arising from the proposed infrastructure, and also proposes and analyzes a range of possible alternatives with an assessment of their potential impact. HIAs promote and encourage a meaningful, inclusive and equal participation of every interest group, including local communities.

30. HIAs must be undertaken by highly specialized professionals who have extensive knowledge of local heritage and culture regulation, the site affected by the infrastructure, and the proposed project. As far as possible, the technical team responsible for writing the HIA should be comprised of an interdisciplinary and independent group of experts.

31. An **HIA** should include as a minimum:

a) background research, clear identification of the scope and the starting point;

b) a comprehensive knowledge of the proposed project and alternatives;

c) identification, prediction and evaluation of caused impacts;

d) measures for possible mitigation and improvement;

e) a report/notification to all parties;

f) a record's monitoring methodology until its conclusion.

32. In 2022 ICOMOS published ***Guidance and Toolkit for Impact Assessments in a World Heritage Context,*** in collaboration with UNESCO, **ICCROM** and **IUCN,** which has become a reference for writing HIAs in World Heritage sites for its extraordinary quality and clarity, and which could be applied to other cultural assets.

H

WIND TURBINE AND SOLAR FARM INSTALLATIONS

AND THE IMPACT ON CULTURAL HERITAGE

WIND TURBINE AND SOLAR FARM INSTALLATIONS, AND THEIR IMPACT ON CULTURAL HERITAGE

33. The ***Integrated National Energy and Climate Plan*** **(INECP)** 2021-2030, published by the **Spanish Government**, forecasts a total installed capacity of 157 GW by 2030, where 50 GW will be wind power and 37 GW solar power, almost doubling installed capacity from 2021.

34. At the end of 2020, **MITECO** published the ***Environmental Zoning for the implementation of renewable energies: Wind and Photovoltaic***. The document provides a zoning methodology and indicators for the installation of these infrastructures, classifying land according to the presence of urban centers, bird protection zones, wetlands, biosphere reserves, Natura 2000 Network, as well as fifteen other categories. However, the only cultural heritage and landscapes identified are on the Camino de Santiago, as well as the other assets inscribed on the UNESCO World Heritage List.

35. Autonomous communities are responsible for the authorization of wind and solar farms up to 50 MW capacity. For larger installations, MITECO is the competent body. The authorization of these projects includes, where defined in national and regional laws, an environmental assessment. However, although the protection of cultural heritage is clearly mentioned, how to assess the possible impact on such heritage is not defined.

36. Wind farms affect the land in multiple ways. The sheer size of the turbines mean they are landmarks that transform the landscape. However, the construction of access roads, underground evacuation lines, and transformation and distribution centers also affect the landscape in general, and ethnological and archaeological heritage in particular.

37. Similarly, in the case of solar farms, not only do the photovoltaic panels occupy large expanses of land, but they require the installation of a power distribution and transformation structure and network that have a much greater impact on the land than the panels themselves.

38. In addition to the impact these technologies have on the landscape, often the negative socio-cultural or economic impact on local communities must be considered too. High densities of these infrastructures have been linked to trends in depopulation or loss of traditional jobs, and with potential impact on agriculture, livestock and tourism.

39. In most cases, the benefits generated by the renewable energy industry do not reach the local community, and maintenance jobs are very scarce, which means that the industry fails to contribute to local employment and the population of these vulnerable areas.

40. There is a flow of land titles from small owners to large corporations or multinationals, which is driving local businesses and primary sector activities to relocate and abandon areas.

41. When, due to an infrastructure installation project's characteristics and location, an EIA is already required during the planning phase, an HIA should also be required. The HIA should follow a clear methodology, such as the one compiled by ICOMOS experts (2022). This methodology identifies and gives voice to the different interested parties (those mainly affected by or who will benefit from the project), analyzes risks, proposes alternatives and, where appropriate, assesses the necessary mitigation measures.

42. On the other hand, when a project with a potential impact on a legally protected property is not subject to an EIA procedure, HIA methodology should be taken into account in the corresponding cultural authorization process. A HIA will be mandatory, in any case, when dealing with assets inscribed in the World Heritage List, and it is highly recommended for those declared BIC (Spanish legal protection category).

43. To aid informed decision-making, visualization software is useful to develop models and simulate wind turbine placement and panel-occupied areas to evaluate how these installations affect the landscape (see case studies included in the **Annex** to this document). **Scottish Natural Heritage** has developed a comprehensive methodology to perform analyses and produce visual representations of wind turbines in the landscape, which can form part of the heritage assessment.

44. As general criteria for design and land impact mitigation, three-dimensional analysis models with the aforementioned visual studies, using geographic information systems (GIS), are needed. The aim of these studies is to produce installations that concentrate and not disperse, avoid inland and coastal landmarks, place every identical turbine using light colors and with the blades turning in the same direction, and use the latest generation technology which are larger but also are more powerful.

45. Such landscapes and their buffer zones should be identified to limit visual impact on protected landscapes.

46. Exploration of possible financial compensation for local communities through taxes or direct income as a fair transition fund is necessary, so they could use these resources to mitigate impact and for cultural and landscape heritage valorization.

47. An analysis of long-term social and environmental profitability of marine infrastructures installation is necessary. This, in many cases, could have a much smaller impact.

48. The possibilities of private and public energy management joint ventures are important, where municipalities can be participants and beneficiaries of energy management.

49. In any case, the use of overarching solutions in the environment must be encouraged, to minimize impacts upon the assets, their environment and the physical area in which they are located.

I

SOLAR PANEL INSTALLATIONS

AND THEIR IMPACT ON HISTORIC BUILDINGS AND ENSEMBLES

SOLAR PANEL INSTALLATIONS AND THEIR IMPACT ON HISTORIC BUILDINGS AND ENSEMBLES

50. The rise in energy prices due to the current geopolitical situation and the promotion of a transition to renewable energies is leading to the request for solar panel installations on historic ensembles and buildings with different heritage protection levels.

51. Solar panels and collectors placed on sloping roofs cause an unavoidable visual impact on architectural ensembles. At the same time, it does not seem reasonable to deny the owner of a building with heritage protection access to renewable energies, since this could lead to the refusal to live in these types of buildings due to higher energy costs.

52. The HIA implementation methodology, published by ICOMOS in 2022, should be used to make an informed decision during the cultural authorization process. When the project deals with assets inscribed in the World Heritage List or its buffer zone, an HIA must be mandatory, while it is highly recommended for those declared BIC (Spanish legal protection category).

53. To prevent the proliferation of one-off installations, with no prior planning, we shall mention several successful initiatives to establish energy communities in municipalities where they have used, in a planned and orderly manner, the roofs of public buildings or handed over public ownership land close to protected areas to provide clean energy, thus minimizing, and even avoiding the visual impact on buildings and historic complexes.

54. Another area of interest for this purpose are investigations into virtual batteries or solar banks, so that culturally protected areas could be prioritized to use surplus energy produced in other less affected areas.

55. Although the insertion of discordant elements onto the monument category of cultural interest assets must be avoided, we find more and more installations on roofs of unique historical buildings and monuments, especially in northern Europe. Following HIA methodology, the building's views, the different options for possible installations, and its location, sometimes, on surfaces which are not visible from the outside or that do not significantly affect the view from different points are analyzed; always taking into account the preservation of heritage values and the reversibility criteria. *Historic Environment Scotland* has published **a guide to good practice** for the installation of the so-called "micro-renewables" in historic centers or monuments.

56. The identification of buffer zones, which enlarge the protected area for BICs and other, usually smaller, protected assets, helps enormously to limit the visual impact on cataloged landscapes. To define buffer zones, existing information such as landscape maps or other analysis tools, can be used to enable a more efficient and environmentally friendly decision-making.

57. The exploration of possible financial compensation for local communities through taxes or direct income as a fair transition fund is necessary, so they could use these resources to mitigate impact and for cultural and landscape heritage valorization.

58. An analysis of the long-term social and environmental profitability of marine infrastructure installation is necessary. This in many cases, could have a much lower impact.

59. The exploration of private and public energy management joint ventures is important, where municipalities can be participants and beneficiaries of this energy management.

60. In any case, the use of overarching solutions in the environment must be encouraged, to minimize impacts on the assets, their environment and the surrounding area. Where installations are authorized on roofs, the composition plan must be studied as if it were an elevation to protect the building's "fifth façade".

J

CONCLUSIONS AND RECOMMENDATIONS

61. Identify every group of interest and promote participatory processes and communication between all of them.

62. Avoid the adoption of general, or "one size fits all" guidelines. A specific analysis of each wind or solar infrastructure project is required, on a case-by-case basis, following a clear methodology, such as the Heritage Impact Assessment (HIA) proposed by ICOMOS, and drafted by experts from different fields related to the asset and its environment, that evaluates the impact on the building, historical ensemble or landscape.

63. Promote prompt legislation change as regards the Environmental Impact Assessment at institutional level. Legislation change should take place at national (under review at the time of the writing of this document) and at autonomous community-level. It should include a reference to the aforementioned HIA methodology within the general procedure, to clarify how the possible impact of these projects on cultural heritage should be analyzed and evaluated.

64. Include installation impact analysis tools/mechanisms in cultural heritage legislation as well as cultural authorization procedures, on a mandatory basis for World Heritage assets, and highly recommended (or in a simplified way) for assets of cultural interest (BIC).

65. Provide guidance on the Heritage Impact Assessment methodology to national, regional and local authorities, transferring the general principles published by ICOMOS International to a local level, using simple language that makes it easier to understand for all those involved and facilitates planning and sharing goals.

ICOMOS-Spain, as an entity entirely composed by cultural heritage experts, will play a key role in training and making this methodology known among its individual and institutional members, as well as among civil society, within its program of activities.

66. Provide up-to-date national or international examples of best practice, that show how to best combine sustainable installations with the preservation of cultural heritage and landscapes. UNESCO, in collaboration with the French Ministry of Ecological Transition, has published a document called ***World Heritage and wind energy planning*** with case studies and good practice for installing these infrastructures in Europe.

67. Encourage collaboration between national and regional authorities, while ensuring interdepartmental cooperation, to improve planning farms and other infrastructures, and identifying cultural heritage and landscape protection or safeguarding areas.

68. Promote dialog from the planning phase, identifying groups of interest and undertaking consultation processes that include the local community, civil society entities, and any other involved actors.

69. Promote the joint development of impact matrices which include all interested parties and involved actors to identify indirect cultural, economic or social risks such as depopulation, the loss of traditional trades or practices.

70. Consider the addition of a visual buffer zone that limits the visual impact caused by infrastructures.

71. Disclose successful case studies as a way to increase acceptance towards transition.

72. Encourage collaboration and research in the field of industrial design so that it takes into account the particularities of heritage and landscape values when designing different construction solutions and installations.

73. Encourage the optimization and improvement of existing infrastructures (e.g., wind farms) by replacing and/or removing inefficient or obsolete installations, as opposed to building new ones.

74. Keep up to date with state-of-the-art solutions and technologies, as well as examples already used on cultural heritage, to best integrate and optimize the installation and minimize impact.

75. Carefully design the location of all elements of the installation (from energy generation to the point of consumption), to maximize its harmonization with the landscape, historical complex, or building, according to each case.

76. Promote dialog between the authorities and suppliers to adopt specific solutions for historic sites and protected landscapes that minimize or eliminate impact on their values (e.g., taking advantage of the surplus energy produced elsewhere, in areas where it is not possible to place anything without damaging its values).

77. When this is not possible, analyze the possible compensation by other means to the inhabitants of protected areas.

K

ANNEX

CASE STUDIES

IMPORTANT NOTE:

At the time of the publication of this document, no relevant case studies were found within the Spanish context. Thus, the case studies contained in the Annex are extracts from the document ***World Heritage and wind energy planning protecting visual integrity in the context of the energy transition. Inspiring practices from four European countries***, developed by UNESCO and the Ministry of the Ecological Transition of the Government of France.

View from Tannenberg in Jois to the vineyards.
© Manfred Horvath Photographie/ Verein Welterbe Neusiedler See*

CASE STUDY
Fertö/Neusiedlersee Cultural Landscape

General information on the property

Property name	Fertö/Neusiedlersee Cultural Landscape
Year of listing	2001
Criterion	(v)
'Type' of site and landscape setting	Cultural landscape; flat lands surrounding large lake with scenic views; to the east of the lake lies the aesthetically characteristic and sensitive area with forested slopes and entangled patterns of varying land types, ranging from vineyards and lawns to the reed belt, including the 'cherry blossom region', to the north lies the arid and technically dominated Parndorf Plain.
Area of property	68,369 ha
Area of buffer zone (ha)	6,347 ha
Total area (ha)	74,716 ha
Other national zoning applied for the protection of the property	A visual zone or sight zone ('Sichtzone') was developed to support the buffer zone. Established in 2008, it was published in 2011 as part of a special building policy for construction projects in and near the World Heritage property, and was integrated into the amended building regulations in 2019. This considers visual relations within the area as well as distinct topographic or infrastructural features and boundaries (e.g. site boundaries, woods, streams, railways). The zone has a direct landscape relationship with the property, and more important projects require heritage impact assessments and approval.
Statement of Outstanding Universal Value (SOUV) - criteria	*Criterion (v): Lake Fertő/Neusiedler has been a crossroads for different cultures for eight millennia, graphically demonstrated by its varied landscape, the result of an evolutionary and symbiotic process of human interaction with the physical environment.*
Statement of Outstanding Universal Value (SOUV) - Integrity	The listed property, located on the Austro-Hungarian border, not only is characterized by diversity, but has also maintained – in terms of both natural and cultural aspects – its landscape and socio-economic and cultural features, as well as its land use forms, the several century-long continuity of its viticulture and stock raising, and the rich characteristics of settlement architecture and structure related to land-use. The integrity of the property is based on geological, hydrological, geomorphological, climatic, ecological as well as regional and cultural historical characteristics. The landscape of Lake Fertő/Neusiedler has advantageous natural and climatic conditions, which have made it suitable for agricultural cultivation and stock raising for thousands of years. The water, the reed beds, the saline fields, alkaline lakes and their remains, the row of hills enclosing the lake from the west with forests and vineyards on top, represent not only natural geographical component features, but also hundreds of years of identical uses of the land and the lake, making the area a unique example of humans living in harmony with nature. Lake Fertő/Neusiedler is Among the world's saline lakes, and its surrounding area is unique in terms of the organic, ancient, diverse and still living human/ecological relationship characterizing the lake and society. The characteristic human-made elements of the cultural landscape include the traditional, semirural architectural character of the settlements around the lake, the settlements' structures, the unity of the homogeneously arranged buildings on squares and streets, and several 18th- and 19th-century palaces in their landscape settings. The centuries-long viticulture, viniculture and reed management contribute to the continuity of land use as well as to the continuous use of traditional building materials.

Much of the value of the area lies in the genuinely unchanging qualities of its way of life, the preservation of vernacular architecture and a landscape based on traditional and sustainable use of a limited range of resources. Though tourism is both a challenge and a catalyst to this, associated development and insertion of intrusively modern construction will need to be controlled. Maintaining these characteristics and the conditions of integrity will entail the development and enforcement of guidelines and zoning regulations to ensure that new development does not occur on open land and that it respects the form and scale of traditional buildings.

Vernacular architecture in the property.

Focus on the HIA document

Title	 Wind farm zoning and the Fertö/Neusiedlersee Cultural Landscape World Heritage property *Original title: Windpark-Zonierung und Welterbe Fertö-Neusiedler See. Expertise zu den Auswirkungen der Windpark-Zonierung auf die Integrität des Welterbes Fertö-Neusiedler See*
Year of study	2012
Commissioned by	Office of the Provincial Government of Burgenland, Austria
Author	ÖIR (Austrian Institute for Spatial Planning) and MECCA
Format (No of pages)	PDF, 57 pages (including 4 pages of annexes)
Availability (online or contact)	Internal working document, not publicly available. Contact site management: post.welterbe@bgld.gv.at

Purpose of study **Proposed typology:** **(a) Prospective study for development or spatial planning** **(b) Evaluation of status quo** **(c) related to specific project**	Type (b) and (c) The study was compiled in preparation of the ICOMOS Advisory Body Mission in March 2013 with the aim of showing how the State Party accommodated World Heritage conservation. Particular attention was given to aspects related to landscape and visual values and the development of wind energy. In an initial stage, the authors retrace the regulatory framework for the protection of the property, which has undergone constant updates and adjustments since the property was listed in 2001. The document also refers to the rapid development of renewable energy in the Federal State of Burgenland, thanks to an efficient regional planning approach. It describes the relationship between wind energy and World Heritage conservation in other countries. A comparison of the situations leads to the conclusion that the visual integrity of Lake Fertö/ Neusiedler is less sensitive to the development of wind energy in the wider setting than in many other cases, e.g. the emblematic Mont Saint-Michel (France). The study closes with an impact assessment for existing wind farms and gives excerpts from the assessments of three approved wind farm projects at different development stages (underway or planned).
OUV 'translation'	The authors believe that the OUV of the property consists principally in the characteristic variety of different landscape types. Without deepening the analysis, the study explains that the assets are sufficiently preserved within the property, the buffer zone and natural preservation areas (e.g. Ramsar wetlands, biosphere reserve, national park, Natura 2000). The wider landscape setting, they argue, in particular towards the *Heideboden* or the Parndorf Plain, is not and has never been relevant to the OUV of the property. These areas are traditionally used for intensive agriculture and a gravel pit, and are highly affected by technical infrastructure (e.g. motorway, electrical towers, railways).
Area under examination	The authors refer to the position of wind parks in relation to the World Heritage property within distances of up to 30 km away from the World Heritage property. For the more detailed assessment however, the authors limit the area to a distance of up to 10 km. This distance, they argue, corresponds to the annual *average visibility* taking the changing weather and atmospheric conditions into account. Visibility beyond 10 km is relatively rare. The authors consider a distance of a suitable zone from the property 'some 5 km from the visual zone and 7 km from the property' as 'far away' (see also ÖIR and Mecca 2012: 20).
Landscape analysis	With reference to the management plan, the authors refer to the 'natural geographical entity' of the property and to the variety of at least 12 different landscape types on both the Austrian and Hungarian sides. The authors further describe the division into three zones of different sensitivity in the special building policy for constructions near the World Heritage property from 2011. According to that zoning, the area to the west of the lake is the most prestigious in terms of landscape quality and beauty, and therefore the most sensitive to visual impacts. At the same time, developments on the Parndorf Plain or similar places may have distant effects, yet should not have any dominant or distorting impacts on the visual integrity in any case. The zones are shown on a map and in photos taken from the selected viewpoints.  Landscape view of the World Heritage Cultural Landscape of Fertö/ Neusiedler See. © Manfred Horvath Photographie/ Verein Welterbe Neusiedler See*

Identification of viewpoints	The authors chose a number of viewpoints to document the cultural landscape from different perspectives and provide the 'characteristic views' over the various types of landscapes. The choice is therefore rather aesthetic without particular scientific, literary or historical justification.  Landscape with Neusiedler See near Fertőrákos © Manfred Horvath Photographie/ Verein Welterbe Neusiedler See* The documentation of the views in six photos is accurately detailed and explained in the caption. First, a map shows the location of the viewpoints, the view direction and distance to the closest existing or planned wind energy facility. The points are located at the periphery of the property and directed towards the lake – views outside the property are not considered relevant to the site's appraisal. Second, the authors explain the technical details on the equipment (i.e. Nikon D7000 with a sensor) and the visual basics of the shots in terms of angle of view, focal length and picture diagonal. The latter should help understanding of the photos with respect to the dimensions of the human field of vision.
Visibility study	Visibility studies are a basic part of the identification of suitable zones within the framework of regional planning and are therefore not further explained in this study. In combination with a dominance analysis, they serve to assess the height and position of a turbine in detail. In this context, regional planning in Burgenland also sets blade height limits. The study examines the visual conditions in the region to obtain an average maximum distance of 10 km for the study (see above 'area under examination').  Landscape view of the World Heritage Cultural Landscape of Fertö/ Neusiedler See, Western shore, turbines at the horizon, 2012. © Gregori Stanzer

Visualizations of wind farms		The study presents examples of photomontages of three wind farm projects. All images are accurately specified with names and sources, dates and photographic details similar the method used in the photo documentation. The projects had been approved earlier and their visual impacts were inspected by the ICOMOS/IUCN Advisory Mission. The photo points for these projects (marked as FM on the map) are located just outside the buffer zone and as closely as possible to the wind farms, i.e. at distances of 2, 4 and 6 km. They go away from the lake, directly towards the projected wind farm. In these specific project-related visualizations, the turbines show more technical specifications and variety in terms of colour and blade direction. Additional graphic marking in the images is kept rather orderly: simple text lines refer to the content (viewpoint or depicted object), one example indicates existing turbines with red circles to contrast with the planned project, another example retouched the turbines to adjust them to the weather conditions shown. The photos convey the blurry effect of the atmosphere, as turbines tend to loose contrast in the distance despite cumulative effects. The examples are followed by brief general explanations of methods and principles of professional photomontages. The tone is rather educational, as if addressing a broader public. It includes explanations of technical steps (choice of viewpoints, focal length, calibration of directions, and required information for photo documentation including exact geo-references), as well as recommendations that photomontages should be produced using specialized software and reflecting average visibility and weather conditions as a basis for contrasts. Images could be adjusted accordingly by means of image software such as Gimp2. Moreover, visualizations should depict whole structures and choose appropriate image sections according to the human visual field. The study argues that photomontages are more realistic and comprehensive than visualizations based on virtual landscape images. The document shows some examples of photomontages taken from the impact assessments of developers. The authors indicate certain wind turbines with circles in the visualizations.
Details on visualizations	**Technical devices, hardware, software**	The report gives some specific technical information, which conveys a spirit of transparency and credibility for the analysis. Instruments included various cameras (Nikon D7000 with DX-format sensor (23.6*15.6 mm); Canon 450D (22.2*14.8 sensor) and a miniature camera), standard GPS device, compass for the calibration of directions, a tripod and a level for the horizontal position. WindPro 2.6 (EMD) was used for the photomontages, control points generated through aerial photos or GPS tools as additional support tools for detail adjustments, and Gimp2 is suggested as possible image software.
	Selection of viewpoints and their presentation (criteria, number, etc.)	• 12 viewpoints, directed towards the property, and across the lake to the turbines • Identification of 3 points for photomontages at a distance of 2, 4 and 6 km to the planned facilities (blade height: 186 m), less distance to existing lower structures (blade height 100 m)
	Distances identified	Distances across the lake reach up to 30 km, however the study argues that the local visual conditions only attain an average visibility of up to 10 km (see also above: 'area under examination').
	Data on wind turbines (height, capacity, blades, etc.)	The only technical detail on the turbines is the blade height of 186 m as per the maximum height allowed in the regional plan. The three photomontages show differentiated types and positions of the turbines, which may indicate some details of the specific plans they visualize without specifying them to the reader.
Evaluation method and criteria		The authors use the international comparison to show that other European properties have more characteristic silhouettes to protect. Moreover, domination analysis reveals that newer projects are farther away and have less, and therefore acceptable, impact. No reference to ICOMOS guidance.

Outcome/analysis	• The suitable areas for wind energy are concentrated on two areas that are not part of the characteristic landscape and thus considered irrelevant to the property's integrity. • Visible wind farms are not dominant on the silhouette as viewpoints with far-reaching views are over 20 km away from turbines, and therefore have negligible impacts. • The silhouette is not a protected asset of the cultural landscape. • Highly sensitive areas of the landscape are located in the western part of the property and are not affected by the new wind farm projects. • New projects are further away than the existing wind farms and are therefore less visible. • The closest wind farms already existed at the time of listing and are therefore part of the inventoried setting. • Wind energy development is compatible with the visual integrity of the property.
Results	The study remained an internal document. It fed the discussions during the Advisory Mission and the management retained the information for the conservation of the property.
Feedback	The 2013 ICOMOS/IUCN report shows that the experts disagree with the conclusion of the assessment because the landscape, in their opinion, is saturated and the visual integrity 'irreversibly' impacted. They found a lack of awareness of the OUV and its attributes and suggest conducting a study of the setting as well as a carrying capacity study on the landscape to set a recognized baseline for evaluation of future development projects.
Lessons learned & recommendations	Positive • Inspiring comprehensive study with a focus on how the State Party deals with World Heritage conservation in view of energy transition, shedding light on a wide range of considerations (description of larger policy and regulatory framework, comparison with other European cases, presentation of tools and methods for heritage impact assessment) • Interesting comparison with other cases of World Heritage and wind energy development to showing that a wider setting for the surrounding landscape is not a key asset for the OUV • Technical details provided in each image of the photo documentation and the visualizations • Provision of accurate and detailed maps Points for improvement • Rather narrow analysis of the OUV and the significance of the wider setting • Selection of the viewpoints could be supported. • Both points could be remedied by a dedicated setting study.

Recommendations and lessons learned

POLICY FRAMEWORK

- The recommended clarification of visual attributes of OUV and the wider setting will provide a basis for impact assessments at any planning stage and increase planning certainty. This tool facilitates appropriate consideration in planning processes. It may, under certain circumstances, increase their weight in relation to other factors related to fields such as economic growth, tourism or agricultural production.
- *Training in or raising awareness of visual integrity of a World Heritage property among government authorities, including Heritage Conservation.*
- Advisory mission is as an efficient means to obtain valuable and impartial advice from international experts and case-specific informal guidance: the 2013 Advisory Mission provided important insights and recommendations, which influenced planning processes and will also guide the upcoming evaluation and revision of the management plan.
- Regional Planning, as a consensus working tool, promotes sustainability through early participatory consultation and communication processes in a pre-planning phase for wind energy developments. *The participatory process has been praised as a key asset and 'secret recipe' (Bell, Schellmann 2014: 20), to reach the unusually broad acceptance and support of wind energy development in the region.* As such, it may ultimately be considered the guarantor of a sustainable energy transition.
- Encourage media and press or partner stakeholders (e.g. WWF) to promote the property and considerations about wind energy development, to raise awareness and increase credibility and acceptability.
- Develop guidance for landscape assessments on the basis of proven scientific methods, consider Annex IX of the ICOMOS/ IUCN Advisory Mission Report (2013), a bibliography on visual issues on the landscape.
- Develop projection criteria (based on the example of the building criteria) for wind energy projects.
- Define a Visual Zone in support of a buffer zone (see also LIA in France).

HERITAGE IMPACT ASSESSMENTS

- Provide technical details for each image of documentation or visualization.
- Provide accurate and detailed maps.

Selected bibliography and links

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ÖIR (2015), *Windparks im Nordburgenland – Masterplan für Repowering, Beurteilung von sechs Eignungszonen in Hinblick auf Repowering in den Gemeinden Gols, Mönchhof, Neudorf, Pama, Parndorf und Potzneusiedl,* Final report, commissioned by the Office of the Provincial Government of Burgenland, Directory, Department of Spatial Planning and the Promotion of Housing construction

Lake Neusiedler World Heritage Association (Verein Welterbe Neusidler See) (2011), *Welterbe Kulturlandschaft Fertő - Neusiedler See, Kriterien für das Bauen im Welterbe* (criteria for construction within the property), Eisenstadt, and related assessment criteria (*Prüfkriterien für das Bauen im Welterbe)*, both available at https://www.welterbe.org/seiten/18, last consulted on 9.2.2020

Verein Welterbe Neusiedler See (2019), *Bauen im Welterbe, ein kleiner Leitfaden,* Eisenstadt, available at: https://www.welterbe.org/download/47, last consulted on 20.5.20

Austrian Site Management: www.welterbe.org/

Hungarian Site Management: www.fertotaj.hu

Vézelay, Church and Hill
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CASE STUDY
Vézelay, Church and Hill

General information on the property

Property' name	Vézelay, Church and Hill (Also listed as part of the serial property of the Routes of Santiago de Compostela)
Year added to the World Heritage List	1979 (listed without buffer zone) Minor boundary modification in 2007 (adding a buffer zone)
Criteria	(i), (vi)
'Type' of site and landscape setting	Clear skyline with a central focus on a single hill crowned by the basilica
Area of property	183 ha
Area of buffer zone (ha)	18,373 ha
Total area (ha)	18,556 ha
Other national zoning applied for the protection of the property	*Aire d'Influence Paysagère de Vézelay* (Vézelay Landscape Impact Area, (LIA)) The LIA is a French tool developed for World Heritage properties to support decision-making related to wind farm planning in the wider setting. It includes a preliminary step to propose an operational translation of the OUV of a property into landscape conservation objectives. It aims to identify knowledge, descriptions and recommendations related to the appropriateness and compatibility of wind farm projects in areas under examination. *LIAs designate perimeters for consideration of the relevant visual relationships of a landscape, including important views of and from a World Heritage property. Perimeters can go beyond the buffer zone, but are directly related to the property.*
Statement of Outstanding Universal Value (SOUV) - criteria	The World Heritage Committee adopted the retroactive statement of OUV in 2019 at its 43rd session. The text is not available in English at the time of preparation of this document but will eventually be translated . (see also Decision 43 COM 8E, and working document WHC/19/43. COM/8E.Add, p. 4). Below is an informal translation of the French original. *Criterion (i): The Basilica of Saint Mary Magdalene of Vézelay is one of the masterpieces of Burgundian Romaneque art. The central nave (1120-1140), strikingly punctuated by its bicolour double arches, is adorned with a series of capitals unique in their style and variety of subjects. Its sculpted portal situated between the nave and narthex, with the 'Mission des Apôtres' (Mission of the Aposteles) on the tympanum, makes it one of the major monuments of western Romanesque art.* *Criterion (vi): In the 12th century, Vézelay Hill was a location of choice where, reaching a kind of peak, medieval Christian spirituality gave birth to a variety of different forms, ranging from prayer and epic poetry ('chansons de geste') to a crusade.*
Statement of OUV - Integrity	As part of the Statement of OUV, the official English translation will be provided eventually (see explanation above). The following is an unofficial English translation: *Vézelay, the 'Eternal Hill', fully retains the landscape characteristics of the site where its abbey was founded in the Early Middle Ages. It is dominated by the abbey church and the village, which sprang up around the abbey and its activities, ending at the foot of the slope. Beyond this, fields, meadows and forest extend all around.*

Focus on the HIA document

Title	 Vézelay Landscape Impact Area and wind turbine projects Original title: *Aire d'Influence Paysagère de Vézelay et projets éoliens*
Year of study	2017
Commissioned by	Bourgogne-Franche-Comté DREAL (Regional Directorate for Environment, Land Planning and Housing)
Author	Bourgogne-Franche-Comté DREAL, conducted with the support of DRAC (Regional Directorate of Cultural Affairs) and UDAP 89 (Departmental Union for Architecture and Heritage) and the Ministries of Environment and Culture
Format (No of pages)	PDF, 169 pages (including 60 pages of annexes)
Availability (online or contact)	www.bourgogne-franche-comte.developpement-durable.gouv.fr/aire-d-influence-paysagere-de-vezelay-et-projets-a7082.html contact: sbep.dreal-franche.comte@developpement-durable.gouv.fr
Purpose of Study **Proposed type:** **(a) Prospective study for development or spatial planning** **(b) Evaluation of status quo** **(c) related to specific project**	Type (a) prospective study for development planning The 'Landscape Impact Area' study in Vézelay was launched to address to the widely varying approaches found among the increasing number of projects starting to emerge in the area some 15 to 20 km away from the property. It aims to provide a complete and well-supported analysis as a basis for more objective consideration for each operation, and a comprehensive approach toadequate protection of the property, to avoid ad-hoc assessments. Stated objectives include: • serve as a benchmark for future decisions, • formalize the criteria, support claims, • propose a clear method to provide transparency and credibility for stakeholders • propose a method that is replicable in other cases *'The objective of the study was not to draw a 60-kilometer exclusion zone around Vézelay, but to try to find the right balance between the protection of the asset in terms of what it essentially contains, particularly in the light of its Outstanding Universal Value, and the development of the territory. Therefore, beyond this area, there is an area of lesser influence that could allow the development of wind power.' (Marechal, in:* Association of French World Heritage Sites *(2017): 22)*

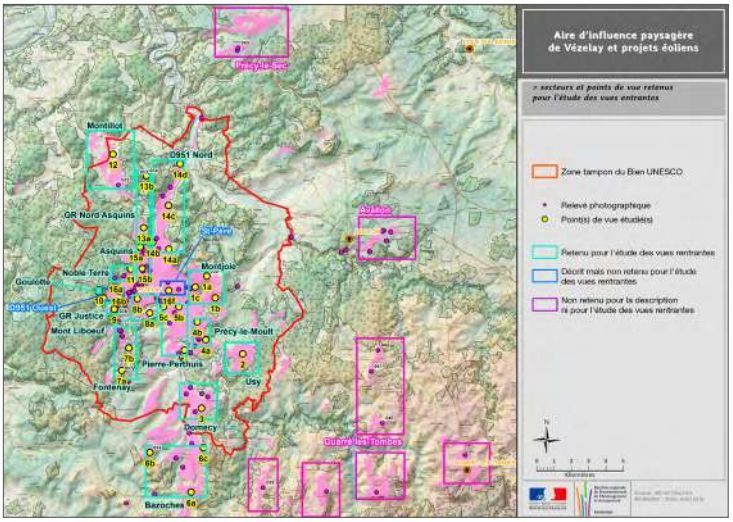
OUV 'translation'	 Landscape Vézelay. © Ministère de la transition écologique The authors translate the OUV into material assets and support choices with literary and historical evidence: Justification: Literary and poetic descriptions of the site and the views justify the identification of attributes, e.g. the visibility of the church or the hill (entering views), and the views away from the church, as well as spiritual aspects. Evidence of artists known to have worked or lived in the area support the sources. The site's significance also stems from being a part of the *Camino de Santiago*, which links it culturally and historically to other places in the area; places with visual links to the basilica are used as viewpoints in the study. Spatial translation of OUV criteria into visual assets: Criterion (i) covers the characteristic placement of the basilica on a hill. Therefore, the 'eternal hill' must remain intact. Criterion (ii) focuses on spirituality, mirrored in the heightened setting and in expressions of Catholic belief, i.e. places linked to the *Camino de Santiago*, and places for contemplation and meditation must be preserved. Priority views identified based on these criteria: • Incoming views: the hill's landscape qualities must be maintained. • Outgoing views: the spirituality of the site is conveyed by the majestic view over landscape from terraces, ramparts and cemetery. • Northern axis conveys the pilgrimage route.
Area under examination	The study examines a radius of 30 km around Vézelay.
Landscape analysis	Detailed description of physical characteristics of the wider setting highlighting the visual implications and views (hilly landscape and horizons, a valley surrounded by domed ridges, long views, long silhouettes, etc.). Less factual descriptions are quoted from the national landscape Atlas, *'Atlas des paysages de l'Yonne'*, with expressions like 'masterful' placement on the 'eternal hill'. A landscape block diagram shows Vézelay and four other towns to illustrate the description.

Identification of view points

Process in two steps:

A. Incoming views – focus on basilica:

- Calculation of church's visibility based on initial visibility study (viewshed study.)
- Cross-checking of visibility with routes, paths, *Camino de Santiago*, etc.
- Consideration of viewpoints identified in OUV-translation
- Onsite check of calculated/theoretical view points
- Selection of relevant viewpoints and grouping into sectors: out of an initial 100 viewpoints, 15 sectors were selected, each comprising one to three representative or 'priority' viewpoints.
- Sectors are described in terms of their sensitivity (moderate, high, very high) and prioritized and examined, one by one, applying the visual model and the visualizations.



Choice of sectors and view points retained for the study of entering views, prioritized according to criteria concerning landscape characteristics (e.g distance), type of view, contribution to the OUV (cf. DREAL Bourgogne 2017: 16).

B. Outgoing views – focus on panoramic landscape views from the hill:

Three sectors identified based on OUV translation and visitation frequency: terraces, upper cemetery, northwestern ramparts – subsequently used for panoramic view analysis with visual model and visualizations of wind farms

Visibility study

The visibility or viewshed study is based on a digital terrain model. It helps identify relevant viewpoints, which are then also cross-checked against the reality on the ground. The authors describe this step as the 'theoretical calculation of the visibility' of the basilica or the potential turbines, which alludes to the potential areas for co-visibility of turbines. The visibility study also serves as a basic model for the visualizations of wind turbines. Given the relatively rough data of the terrain model, which does not consider any vegetation, the study applies a maximized zone of visibility. Likewise, the church height of 40 m was extended over the entire hill when examining incoming views.

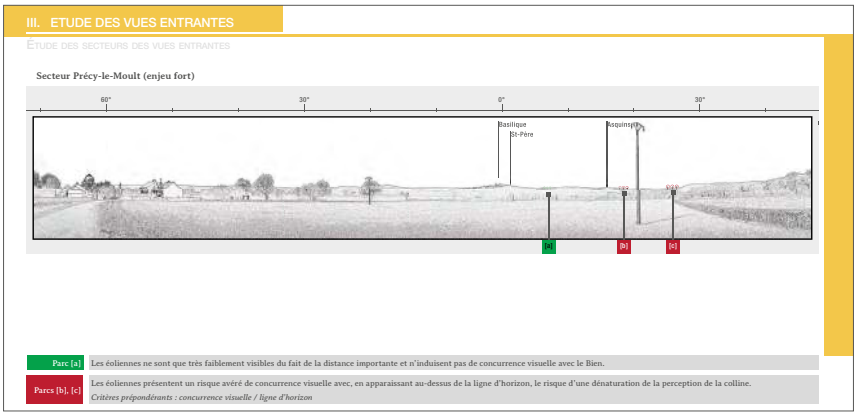
Methodological explanation of viewshed analysis.

Visualizations of wind farms

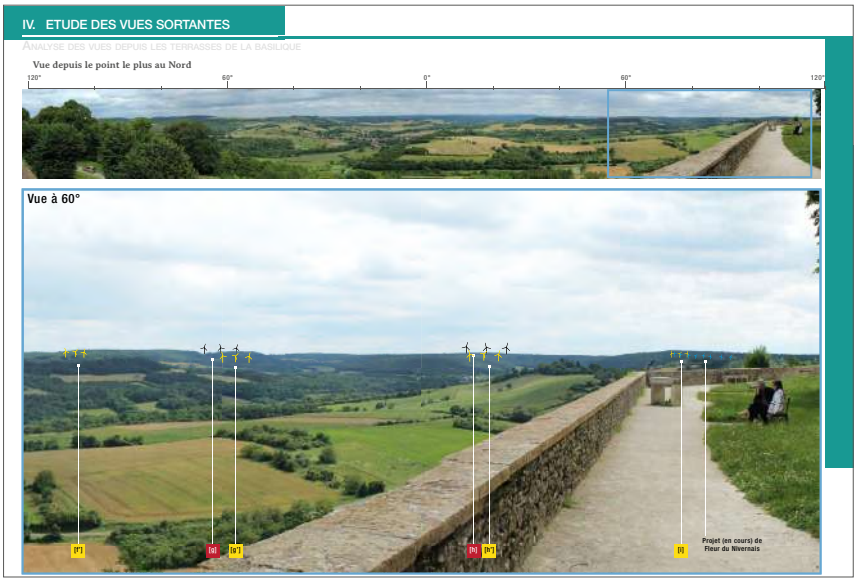
Virtual insertion of 180m-high turbines in the landscapes

The presentation of incoming and outgoing views is graphically distinct:

- Incoming views are shown in panoramic landscape views in computer-generated images that resemble carefully traced pencil drawings. What are known as 'wirelines' are based on a Digital Terrain Model and indicate the three-dimensional shape of a landscape in combination with additional elements (see also SNH 2017: 6, 29 ff). The landscapes in light grey are bordered by a line, which contrasts with the plain white sky. The background does not feature any softening atmospheric effects of a distant landscape.
  The landscape views are referenced according to the human view field model, with a central point at 0° – the position of the basilica – and 60° to both left and right.
  Within the landscapes, small graphic symbols for turbines, i.e. small sticks with a circle on top for towers and rotors, are placed in groups of three in the zoned landscape, outside the buffer zone. The colour of these wind farms (green, yellow, red) indicates the risk zone where they are located. An accompanying map with corresponding references helps the reader understand the visualized positions of the turbines. The groups are further marked by a coloured number referring to a short impact assessment in the table below.
- Outgoing views are rendered in photographic panoramic 'baseline' views, which highlight the view sections under examination and focus in the image below. The images contain graphic references to the assessments, similar to the incoming views. Wind farms are also represented by small groups of three turbines and placed in adjusted size into the landscape. Their position in front and colour in yellow or black contrast with the environment and make them stand out in the image, both below and above the horizon. Support maps help the reader understand the views and their respective geographic contexts.



Example of the depiction of an incoming view in a wireline image with references to the impact assessment stated below the image.



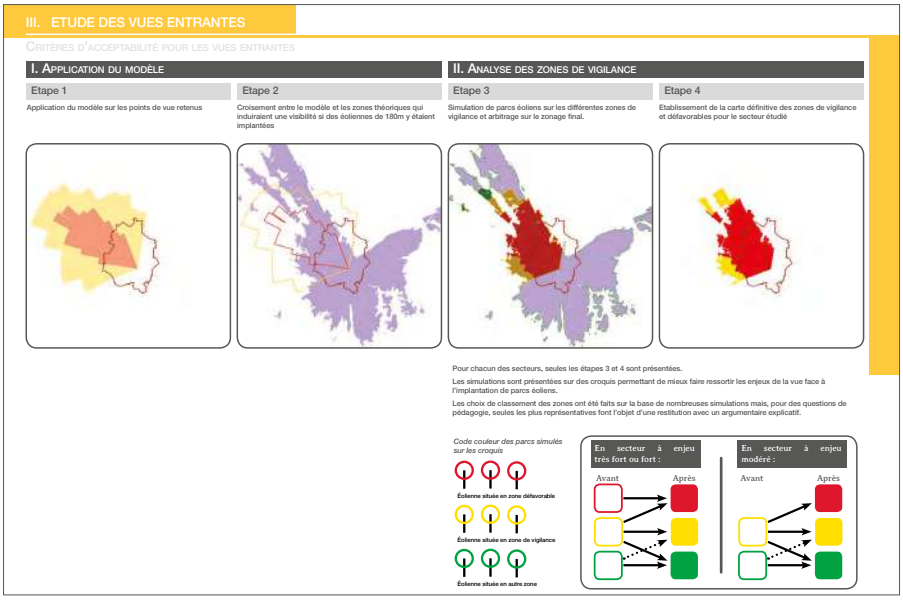
Example of the depiction of an outgoing view with panorama baseline on top and the view section focused on below, with graphic accentuation, colour code and reference to evaluation scheme.

Vèzelay study, DREAL Bourgogne 2017

Details on Visualizations	**Technical devices, hardware, software**	• Digital Terrain Model BD ALTI® 25 IGN: only topographic data were considered for the calculations (maximized visible zones); vegetation was considered in the simulations to check incoming and outgoing views (CORINE Landcover 2012) • WindPro 3.0 for the visibility maps and photomontages/turbine visualizations
	Selection of viewpoints and their presentation (criteria, quantity, etc.)	• Selection based on OUV and visitation frequency • Incoming views: 15 sectors with one to three viewpoints each (39 viewpoints in total) • Outgoing views: three sectors • Photographs with graphic marks, schematic images of landscapes with silhouette line, topographic maps
	Distances identified	For outgoing views, the maximum distances identified vary from 20 to 30 km depending on the importance of the sector to the OUV, i.e.: • From the terrace (high visitation frequency), the unfavourable 'red' zone reaches the optical limit of 20 km. Beyond that distance, turbines cannot be seen properly unless reinforced by accumulation, placement or night activity. • The view from the cemetery includes a historically significant and therefore particularly visually sensitive axis. The red zone reaches a distance of 25 km, followed by a yellow caution zone of 30 km. • The less sensitive sector of the ramparts reaches a maximum distance of 20 km.
	Data on wind turbines (height, capacity, blades, design, etc.)	• Hight limit: 180 m at blade tip • Placement: arbitrary: 'we placed wind turbines kind of everywhere' • Study considers an existing wind farm 20 km away and other wind farms in the planning phase.

Evaluation method and criteria

The analysis examines the incoming and outgoing views separately. From each viewpoint, the potential visual impacts are evaluated basis on acceptability and non-acceptability criteria. The results of both view directions are then combined into a single map showing acceptable and unacceptable placement areas for turbines.



Explanation of the application of the acceptability criteria, i.e. the steps leading to the evaluation.
Vèzelay study, DREAL Bourgogne 2017

Assessment in three steps:

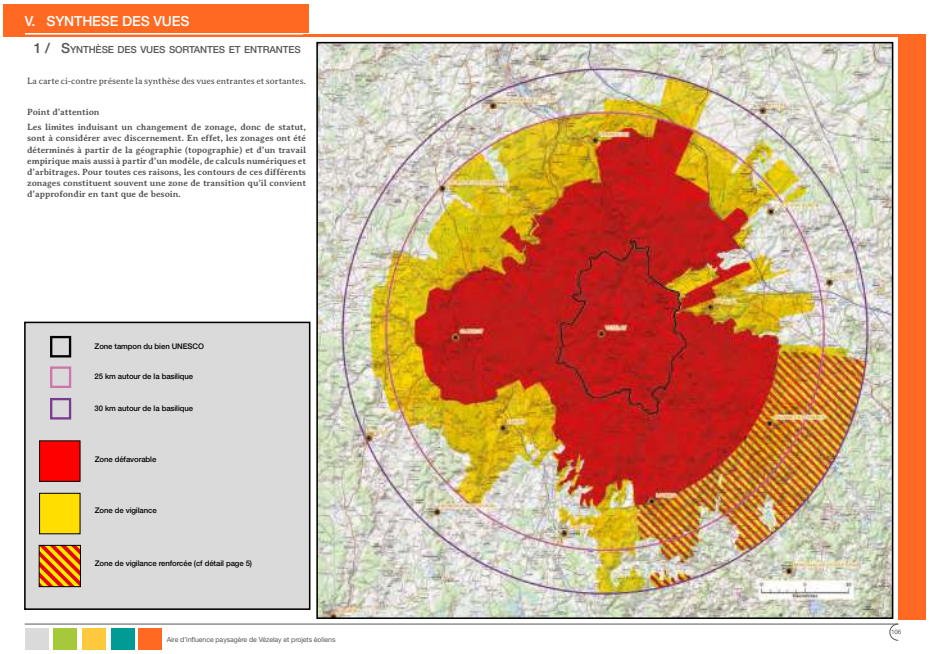
1. The acceptability or unacceptability criteria for incoming views are developed based on influencing factors in relation to the viewpoint, including angle of view, distance, visual competition, horizon and environmental impacts already in place. The impact is evaluated in two steps:

- a first step gives a rough indication of the zoning based on the two main influencing factors: angle of view and distance of the turbines. The results are shown in a graphic model of three coloured zones: 'unfavourable' (red), 'caution' (yellow) and 'other zones' (green)
- a second analytical step serves to refine the rough map. It includes more landscape-oriented criteria to further differentiate the red and yellow zones. The criteria include visual competition, scale, horizon, masking effects or pre-existing elements with environmental impacts.

2. The criteria for the outgoing views involve the broader landscape perception and do not focus on one major object. They include the scale, horizon, distance, changes of perspective or landscape organization. The analysis is conducted in two steps similar to the incoming views.

3. Finally, incoming and outgoing views are overlaid and provide a summary map of the LIA with exclusion or unfavourable, caution and increased caution zones. The rest of the perimeter is considered not to have any specific relevance to protection of the OUV and its attributes. However, a heritage impact assessment may be required to assess any impact on other potential factors not related to World Heritage values.

ICOMOS guidance (2011) is not mentioned as a reference, but the colour code to cross-check and assess impacts indicates some association.

Outcome/analysis	Differentiated map of the LIA with different levels of sensitivity, ranging from unfavourable to caution zones, but without favourable or low-impact zones  Synthesis of entering and outgoing views – AIP Study (2017) Vèzelay study, DREAL Bourgogne 2017 Well supported 'translation' of the assets of the OUV, identification of relevant viewpoints, and detailed photographic documentation of the property
Results	Transparent and clear methodology and criteria for replication and reference for HIAs in the region (project managers and assessment providers) Results feed into management
Feedback (given in the proceedings, see also Association of French World Heritage Sites, 2017: 42 ff)	• Praised for clarity and precision (e.g. ICOMOS) enabling a focused definition of the essential assets of the property • Some see the benefit of an LIA sudy in general as a means for the State to provide a necessary reference framework to support the case-by-case system for specific wind farm planning. It enables tailoring of a caution zone to the specific conditions of a site, as opposed to 30 to 40km zones that preclude any development. Others, however, consider LIA zones that tend to largely exceed a property's buffer zone to be too large and restrictive. • Wind power project manager: involvement of the wind sector would have enabled the use of more appropriate and up-to-date technical standards and equipment (e.g. higher performance versions of WindPro to create zones).
Lessons learned	Positive The methodology is explained in a clear and instructive way – this provides transparency and enables replication. Points for improvement • Visualizations: the technical assumptions about wind turbines and their arbitrary placement, as well as their graphic indications (circles, colours, sharp contrasts and pointers), intended to increase 'readability' rather than to provide 'realistic views' may be the subject of debate on good practices for visualizations. • Wording: strive for neutral wording, and avoid terms that may be read as biaised (e.g. 'parasitize' as a verb to designate visual interference or co-visibility).

Recommendations and lessons learned

The French case presents a variety of recommendations and challenges concerning the development of both heritage impact assessments and policy frameworks. As in the other cases, these points are not necessarily new, but are worth highlighting, and include the points listed below:

POLICY FRAMEWORK

- Create an inter-ministerial working group and cooperation between the sectors at the local level as well.
- Develop a guide for drafting impact assessments for wind farm projects, based on cases such as the French example, including World Heritage considerations in particular.
- Include special consideration for World Heritage in general requirements on all wind farm planning within sight of a World Heritage property.
- Develop a common language to describe landscape types and qualities to facilitate debates on potential impacts.
- Explore ways to seek economic inclusion or solidarity.
- Promote the quality of World Heritage properties as laboratories that foster advances in reproducible thinking and fieldwork that is further replicable.
- Promote HIAs as tools for iterative project development and to improve knowledge on ways to limit the impacts.
- Seek development of tangible and impartial elements for managers and enable examination of requests by government authorities (objective and sharable methodology).

HERITAGE IMPACT ASSESSMENT

- The study intends to be as clear and transparent as possible on the complex methodology. It gives detailed steps and approaches, supported by graphics and images. The instructive approach serves to set standards and pursues three goals: (1) the method serves to structure the process and make it understandable to readers, (2) it also helps formalize the work as much as possible, for the sake of transparency, and (3) it allows it to serve as a model for replication in other cases. (see also DREAL Bourgogne, 2017: 4). In terms of financial, technical and human resources, the production and regular updating of this complex study in other contexts will pose a challenge.
- The 'translation' of the key assets of the OUV is crucial in identifying and documenting the elements that make up the OUV of a landscape. In order to arrive at the most appropriate, balanced and broadly recognized definition, it is advisable to plan a consultation phase with other stakeholders on the composition of the elements.
- Improve cooperation between conservationists and project managers when preparing landscape assessments, to ensure the use of up-to-date technical equipment.
- Cross-check visualization approach with project managers and other stakeholders to align the standards of the technical and methodological framework.

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Archaeological Border Complex of Hedeby and the Danevirke, the Crooked Wall of the Danevirke Rainer Heidenreich

CASE STUDY:
Archaeological Border Complex of Hedeby and the Danevirke

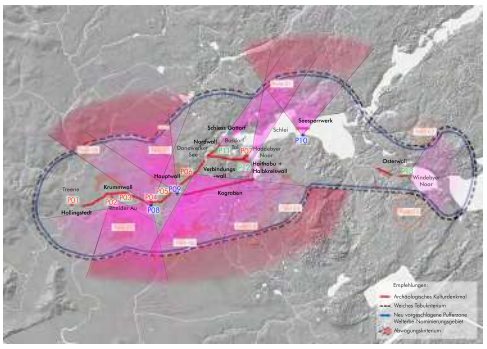
General information on the property

Property name	Archaeological Border Complex of Hedeby and the Danevirke
Year of listing	2018
Criteria	(iii), (iv)
'Type' of site and landscape setting	Archaeological serial site, remains of Viking trading town and defensive structure, spatially linked elements (earthworks, walls, ditches, settlement, cemetery, harbour), 8th to 11th centuries
Area of property	227.55 ha
Area of buffer zone (ha)	2,670 ha
Total area (ha)	2,897.55 ha
Other national zoning applied for the protection of the property	In addition to the buffer zone, the authorities have defined a protection perimeter of 5 km around the property. It is included in the regional plan. The study uses three different terms to refer to the perimeter: 'protection perimeter' (German 'Umgebungsschutz'), 'soft taboo criterion' (a term used in German regional planning) and distance buffer ('Abstandspuffer'). The study develops an alternative buffer zone based on the 5km protection perimeter. The newly proposed perimeter adapts the distance to the actual visual relationships by increasing or decreasing the distance. The proposal merges the buffer and the adjusted 'protection perimeter' into one. Although the maps in the nomination file and in the current version of the regional plan for wind energy development (3rd consultation round in 2019) do not show the newly recommended buffer zone, it may still be considered in the revised regional plan and in the management of the property.
Statement of Outstanding Universal Value (SOUV) - criteria	*Criterion (iii): Hedeby in conjunction with the Danevirke were at the centre of the networks of mainly maritime trade and exchange between Western and Northern Europe as well as at the core of the borderland between the Danish kingdom and the Frankish empire over several centuries. They bear outstanding witness to exchange and trade between people of various cultural traditions in Europe in the 8th to 11th centuries. Because of their rich and extremely well preserved archaeological material they have become key scientific sites for the interpretation of a broad variety of economic, social and historic developments in Viking Age Europe.* *Criterion (iv): Hedeby facilitated exchange between trading networks spanning the European continent, and – in conjunction with the Danevirke – controlled trading routes, the economy and the territory at the crossroads between the emerging Danish kingdom and the kingdoms and peoples of mainland Europe. The archaeological evidence highlights the significance of Hedeby and the Danevirke as an example of an urban trading centre connected with a large-scale defensive system in a borderland at the core of major trading routes over sea and land from the 8th to 11th centuries.*
SOUV - Integrity	Hedeby and the Danevirke encompass archaeological sites and structures of the 6th to 12th centuries, which represent a trading town and an associated defensive wall complex. The area includes all elements that represent the values of the property – the monuments and ramparts, locations of significance, and all the archaeological remains that embody the long history of the Hedeby-Danevirke complex. The components representing the Danevirke reflect the stages of construction and the evolution of the defensive works, as sections were reconstructed and new portions of walls were built. The buffer zone is a protective and managerial entity that preserves important viewsheds and ensures that the core elements of the area will be maintained for the future.

Focus on the HIA- document

Title	 Assessment of the impact of planned wind turbines on the visual integrity ofpotential World Heritage property 'Archaeological Border Complex of Hedeby and the Danevirke' *Original title: Untersuchung der Auswirkungen geplanter Windenergieanlagen auf die visuelle Integrität des potenziellen Welterbes ‚Archäologische Grenzlandschaft von Haithabu und Danewerk'*
Year of study	2017
Commissioned by	Federal Archaeological Office of Schleswig-Holstein (responsible for site management)
Author(s)	Michael Kloos Planning and Heritage Consultancy in cooperation with V-cube GbR
Format (No of pages)	PDF, 43 pages
Availability	https://www.schleswig-holstein.de/DE/Landesregierung/ALSH/Welterbe/pdf/sichtfeldanalyse.pdf?__blob=publicationFile&v=2
Purpose of Study (proposed typology): **Prospective study for development or spatial planning** **Evaluation of status quo** **Related to specific project**	Type (a) prospective study for regional planning purposes • Declared objectives: • Documentation of visual relationships relevant to the OUV • Recommendation for an appropriate buffer zone based on the preliminary 5km protection perimeter • Assessment of the possible impact of potential areas suitable for wind energy on the OUV, to inform the revision of the regional plan for wind energy development • Provision of a 'legally incontestable' and binding basis for appropriate protection of the property's visual integrity The study focuses on visual assessment of the setting. It was not commissioned as a 'full-fledged' HIA according to the ICOMOS Guidance. Parts, such as the landscape asset analysis and the explanation of the evaluation criteria, are given in condensed form. For technical information on approaches and methods, the authors refer to the HIA on the 'Heumarkt Neu' construction project in the *Historic Centre of Vienna* World Heritage site (see also Kloos 2019).
OUV 'translation' into attributes that convey OUV and description of setting	The authors refer to the landscape quality of the property and the interrelations between the elements and the surrounding landscape to justify the need to maintain an undisturbed visual setting and to expand the buffer zone accordingly. Besides the *historic testimony* of the setting, the study found that the visual interrelations between the elements are also important for *contemporary appreciation*.
Area under examination	The Archaeology Office of the state provided the geographic scope of the study, encompassing the protection perimeter as well as the nine nearby search fields for potential suitable areas for wind power development. Search fields sometimes overlap with the protection perimeter. The area spans some 36 km x 20 km (720 km2).
Landscape analysis	The Chapter 'Notes on Danevirke and Hedeby' briefly describes the main elements of the serial archaeological site, their positions, dimensions and historical functions, as well as their remains. The sites are presented individually, rather than as part of and in relation to their common landscape setting. The notes attest to the cultural and historical relevance of the elements as a basis for subsequent classification of the viewpoints. The chapter is illustrated with a selection of maps and photographic material, as well as a historic view from the 19th century.

Identification of viewpoints



The summary table of results with view points and search fields. The sensitive views are marked in pink and reach beyond the proposed buffer zone. The map also serves to illustrate the recommendations.

The Federal Archaeology Office provided a number of viewpoints, which the authors classify into 'relevant' or 'more relevant' views.

Initial desktop studies and a site visit along with two experts from the Danevirke Museum and the Federal Archaeology Office helped select 13 relevant viewpoints for the visualizations. These were grouped into three different sight categories: (1) view from Danevirke to the south, (2) view to the north onto the Danevirke, (3) sight from the Danevirke to the north.

Visibility study

The visibility study is the core of the document and is referred to as such, e.g. in the regional plan.

Visualizations of wind farms

Overview of visual analysis.

The authors explain the three steps in the development of the visualizations:

1. Desktop assessment of visualizations in a 3D computer model

a. Inclusion/referencing of potential wind turbines and search fields for suitable areas in a computer model

b. A visual field analysis gives an initial rough idea of the potential impact of wind farms. In the absence of specific wind farm plans, the authors assumed a 'worst-case scenario', installing the maximum number of wind turbines in the potential suitable areas.

2. Onsite visit for digital documentation of the viewpoints:
The expert team took GPS-referenced 360° digital panorama photographs to document the 13 viewpoints, enabling consideration of all potential suitable areas from each viewpoint.

3. Inclusion of photographic data in the virtual 3D computer model: based on the geo-referenced data from the digital photos, the computer produces similar panoramic pictures. This enables overlapping of the virtual images with the photographic images and production of the visualizations of potential turbines.

Graphic enhancement:

- Turbines are graphically contrasted (darkened or highlighted) to increase their visibility against the background of a misty winter landscape, considered too blurry for visualizations. The authors recommend bright summer skies and a clear view for photomontages.
- Individual rotors are surrounded by a light white circle and their positions vary: some are upfront, and some turned to the side in half or full profile. Red circles mark the wind turbines or wind farms, to focuse on in the image; in case they pose a potential risk to the visual integrity of the property, an additional 'potential risk' note ('Gefährdungspotential') is inserted in the photo.

Details on Visualizations	**Technical devices**	The study does not provide any specifications on the technical devices or photographic details used. However, in background exchanges for this document, the authors stated that the digital panoramic photos of the visualizations are made up of multiple individual photos ('stitching'). The core photo has a focal length of 35 to 50 mm, which corresponds to the angle of the human eye. The team did not use WindPro.
	Selection of viewpoints and their presentation (criteria, quantity, etc.)	The 13 viewpoints used for the visualizations are marked on a map of the property along with the potential suitable areas. However, the geographic overview lacks reference and a scale (see also Figures 7.1, 8.1, 9.1). The photomontages, one or two per viewpoint, graphically show the potentially visible turbines in the suitable areas in the background. Below the visualizations are short descriptions of the location, the observed visual effect and its evaluation based on the scale proposed in the ICOMOS guidelines (neutral/low to very high negative impact). Above the photomontages, panoramic views show the specific context and mark the view section.
	Distances identified	Aside from the overall dimensions of the area (36 km x 20 km), only approximate distances are mentioned, e.g. referring to the fact that negative visual impacts could also occur beyond a distance of 5 km.
	Wind turbine data (height, capacity, rotor blades, design, etc.)	• The authors based their visualizations on the technical data provided by the Federal Archaeology Office: hub height: 149 m, rotor diameter: 120 m, total height/blade tip: 200 m. • The study gives other potential technical details for the turbines, including the adjustable triple blades, the coating in matt grey to prevent light reflection, the position and design of the daytime and nighttime markers in terms of colour (grey, red, orange-red) and (flashing) lights. However, since these specifics were not definitive at the time of the study, and due to the inability to include them in a printed report, the authors noted, for the impact assessment, that optical effects would be greater in reality.
Evaluation method and criteria		The authors identify two main factors for the assessment: 1. Quality of the viewpoint: within the relevant viewpoints provided, the authors classify their quality as 'high' and 'very high' according to their cultural-historical significance, visitation frequency and the quality of the landscape experience. 2. Visibility of the turbines from a viewpoint in terms of extent, scope and distance: the impact may vary depending on how much of the turbine is visible, the number of visible turbines, and the distance from the property. The study mentions three 'assessment criteria', but no baseline or measurement to evaluate an effect. The names of the criteria ('technical dominance of the landscape image', 'visual dominance' and 'distortion of the landscape scale') describe negative impacts rather than neutral evaluation criteria. The authors apply the ICOMOS assessment scale to weigh the factors for the evaluation. Accordingly, the scale includes five levels to indicate the significance of an effect or overall impact: neutral, slight, moderate/high, high/very high, very high.
Outcome/ analysis		Seven of the nine potential suitable areas are considered problematic, and plans for the development of a specific wind farm project in these areas will require an impact assessment. The potential risk of a negative impact exceeds the 5km protection perimeter in most cases. The authors list four recommendations in a summary map: (a) adjustment of the existing '5km protection perimeter', increasing and decreasing the area where applicable for its definition, (b) transformation of the perimeter into the buffer zone, (c) integration of sight corridors into the new regional plan, (d) consideration of visual relationships in management.
Results		The visual study feeds into the current revision of the regional plan for wind energy in Schleswig-Holstein. The second draft plan gives a detailed exclusion zone for the development of wind energy at a distance of 3 to 5 kilometres around the World Heritage property, according to the specifications of the 'visual study' (see also General Planning Concept of the second draft of the partial update of the regional development plan and regional plans I to III (topic: wind energy), (2018), point 2.4.2.14 (p. 43f.). The regional plan concluded a second consultation round in January of 2019, and the revision is underway. The visual study will further inform management of the property, particularly in view of the current update to the management plan.

Feedback	not available
Lessons learned & observations	1. Positive lessons Integration of a visual protection area and sensitive sight corridors into regional planning and management is an efficient proactive means to achieve transparency and increase planning reliability. 2. Points for improvement • Be mindful of clear and neutral terminology and wording, to provide a tool for all parties: assessment criteria, etc., should be defined in a neutral way, and a glossary may help clarify terminology. • Visualizations: the authors made a number of decisions, which could be used to develop a good practice for visual representation of wind farms, e.g. considerations related to the graphic indication of turbines, adequate choice of visual conditions (e.g. worst-case scenario?), and appropriate assumptions for technical factors. • Maps and photos should always provide basic information, such as scale, focal length, etc. Observations: The property was listed as an archaeological complex in 2018. The study still considers it to be a cultural landscape. The text of the regional plan states that this change does not affect the results of the study.

Recommendations and lessons learned

The German case yields a variety of lessons learned and recommendations concerning both the development of heritage impact assessments and the policy frameworks, including the points below:

POLICY FRAMEWORK

- Foster stakeholder dialogues as a platform to develop solutions that adequately address to the variety of positions and challenges at play in the development of wind energy in a way that is compatible with World Heritage protection;
- Initiate a process to develop a framework for a good technical practice for visualizations, bringing together experts and practitioners from World Heritage protection, the relevant authorities and the wind energy sector;

HERITAGE IMPACT ASSESSMENTS

- This preventive study focuses on assessment of the visual aspects of the property and the wider setting. As for the management plan, further specification of the property's OUV, attributes and wider setting was not necessary for the recently listed site, and would have required additional resources. Dedicated documentation provides a sound basis for impact assessments and monitoring, including on relevant criteria and the status quo. It provides a key reference that informs planning and project considerations.
- Consider protection of the visual integrity of a property at an early stage, ideally during preparation of a nomination file, when it is still on the Tentative List. This requires proper documentation and justification to adequately inform management, regional planning and authorization processes. This documentation increases transparency around OUV protection needs, as well as planning certainty, and ensures timely attention to relevant planning considerations.

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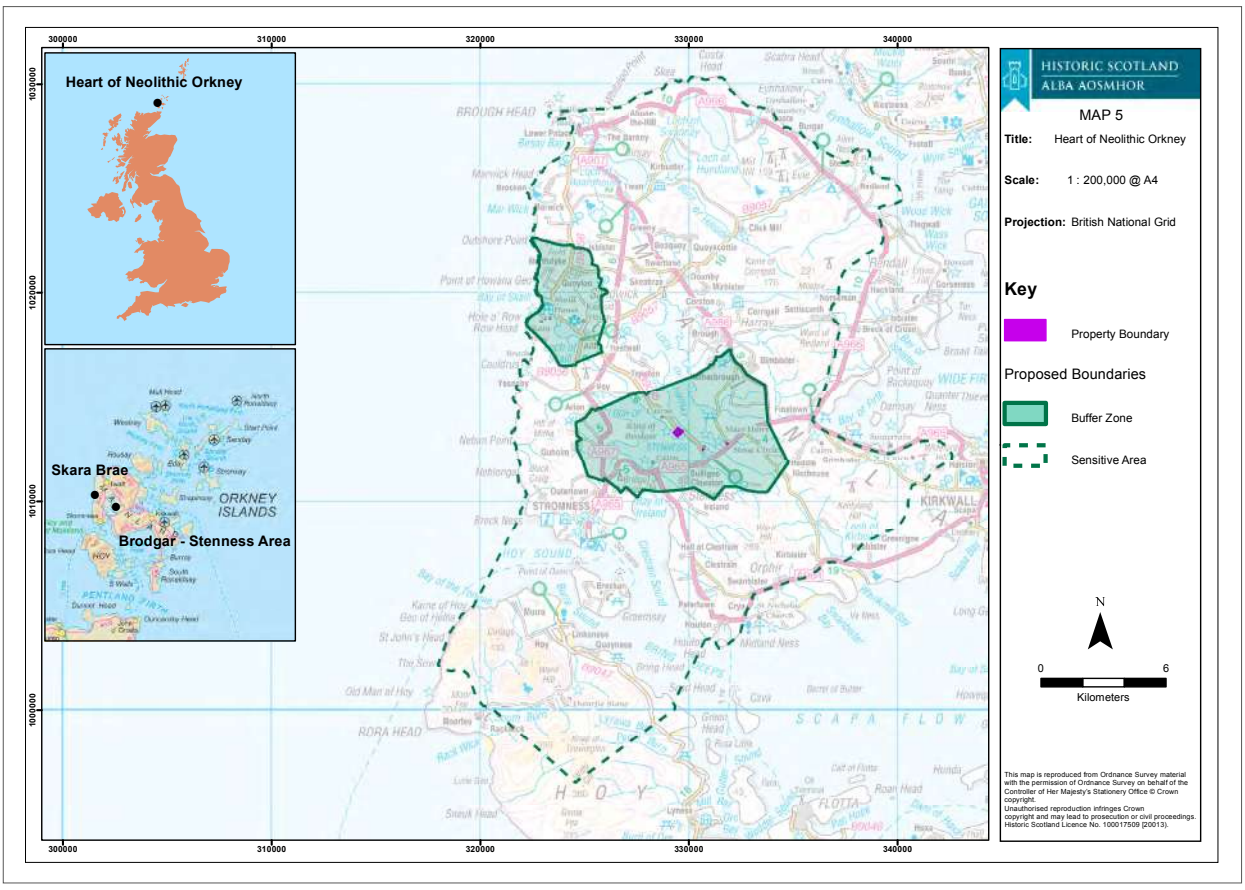
Heart of Neolithic Orkney, Skara Brae

CASE STUDY
Heart of Neolithic Orkney

General information on the property

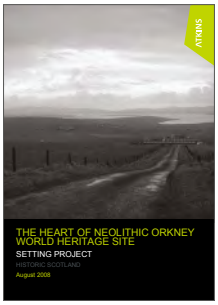
Property name	Heart of Neolithic Orkney
Year of listing	1999 Minor boundary modification in 2015
Criteria	(i), (ii), (iii), (iv)
'Type' of site and landscape setting	Prehistoric domestic and ceremonial sites
Area of property	15 ha
Area of buffer zone (ha)	6,258 ha
Total area (ha)	6,273 ha
Other zoning applied for the protection of the property	Sensitive area for onshore wind energy developments prescribed in the local development plan – the area corresponds to the property's buffer zone: i. Heart of Neolithic Orkney World Heritage site Development will only be permitted within the inner sensitive zones if it is demonstrated that the development would not have a significant negative impact on the Outstanding Universal Value of the World Heritage site or its setting. Development will not be permitted where it breaks the skyline at the sensitive ridgelines of the World Heritage site when viewed from any of its component parts, or where it will be sited in any location with a potential impact on the World Heritage site, unless it is demonstrated that the development will not have a significant negative impact on either the Outstanding Universal Value or the setting of the World Heritage site.'



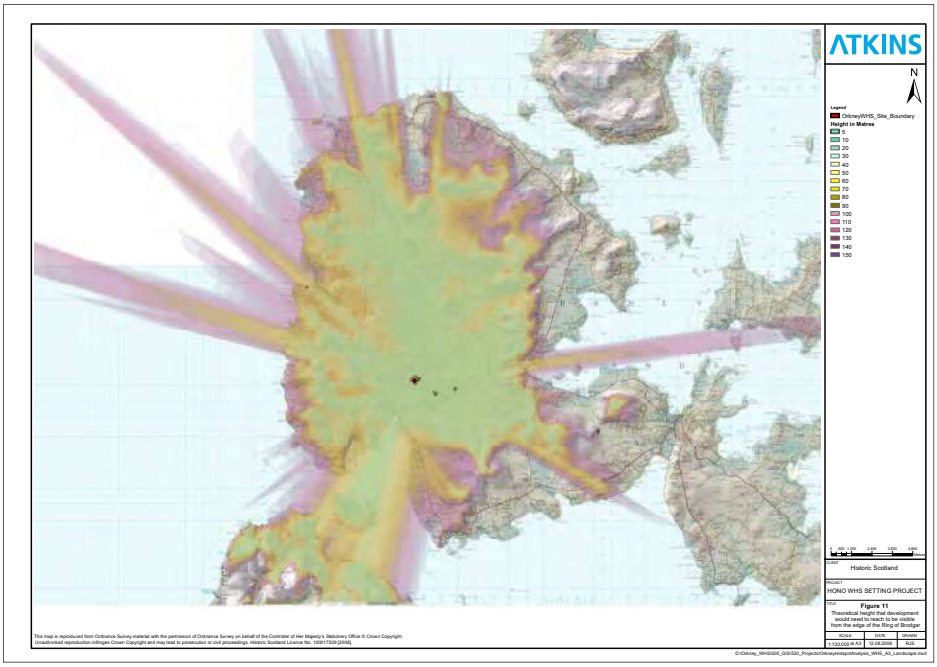
Map reflecting minor boundary modification (WHC-15/39.COM/8B.Add).

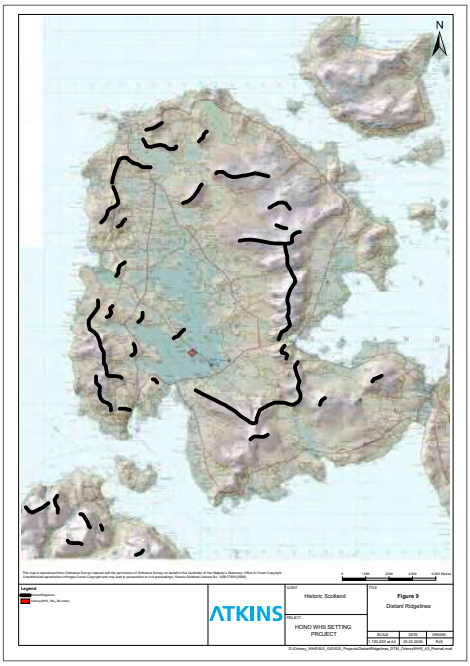
Statement of Outstanding Universal Value (SOUV) - criteria	*Criterion (i): The major monuments of the Stones of Stenness, the Ring of Brodgar, the chambered tomb of Maeshowe, and the settlement of Skara Brae display the highest sophistication in architectural accomplishment; they are technologically ingenious and monumental masterpieces.* *Criterion (ii): The Heart of Neolithic Orkney exhibits an important interchange of human values during the development of the architecture of major ceremonial complexes in the British Isles, Ireland and northwest Europe.* *Criterion (iii): Through the combination of ceremonial, funerary and domestic sites, the Heart of Neolithic Orkney bears a unique testimony to a cultural tradition that flourished between about 3000 BC and 2000 BC. The state of preservation of Skara Brae is unparalleled amongst Neolithic settlement sites in northern Europe.* *Criterion (iv): The Heart of Neolithic Orkney is an outstanding example of an architectural ensemble and archaeological landscape that illustrate a significant stage of human history when the first large ceremonial monuments were built.*
Statement of OUV - Integrity	All the monuments lie within the designated boundaries of the property. However, the boundaries are tightly drawn and do not encompass the wider landscape setting of the monuments that provides their essential context, nor other monuments that can be seen to support the Outstanding Universal Value of the property. Part of the landscape is covered by a two part buffer zone, centred on Skara Brae in the west and on the Mainland monuments in the central west. This fragile landscape is vulnerable to incremental change. Physical threats to the monuments include visitor footfall and coastal erosion.

Focus on the HIA document

Title	 The Heart of Neolithic Orkney World Heritage site setting project, final version, August 2008
Year of study	2008
Commissioned by	Historic Scotland
Author	Prepared by Atkins Heritage with significant input from ADAS Consulting
Format (No of pages)	112 pages (including 38 pages of annexes)
Availability (online or contact)	https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=d74f27d1-ee18-456a-bc6a-a59a00a2987d (consulted last on 27.11.2019)
Purpose of study **Proposed type:** **(a) Prospective study for development/spatial planning** **(b) Evaluation of status quo** **(c) Related to specific project**	Type (a) Purpose: • Provide an objective description of the setting of the property. • Offer recommendations for the definition of an improved buffer zone and the nature of related policies. • The study was commissioned in the context of increasing wind farm developments in the area as indicated in Decision 32COM 7B.118.

OUV 'translation'	• The study highlights the significance of the surrounding landscape for the OUV, as the *'basin-like location formed by the ring of visually distinct hills and the lochs' was the reason why men constructed monuments there in the first place (see also Atkins Heritage, 2008, 3.1.2: 4)* • The evaluation of visual relationships draws on scientific research, i.e. 'well-established and now standard approaches to landscape archaeology and archaeological interpretation.' (idem, 3.5.1: 11) • Based on indications from the management plan and field work, a number of 'factors for consideration' serve to frame the definition and description of the setting (see also idem, 4.3: 16)
Area under examination	Proposed sensitive area under examination: 45.267 ha, estimated maximum distance from the property: 25 km.
Landscape analysis	• The landscape is described as intrinsically linked to the OUV, where 'values' intermingle with merely topographic conditions, e.g. when speaking of 'topographical, archaeological, perceptual and experiential relationships with the surrounding physical and archaeological landscapes' (Atkins Heritage, 2008, 3.1.1: 4). The current archaeological approach is based on 'the premise that the physical topographic landscape and cultural landscape were closely interlinked, with less distinction than applied today.' (idem, 3.2.2: 5) • Annex B, Landscape character, describes the topography of West Mainland Orkney & Hoy. The World Heritage property lies entirely in West Mainland Orkney. Out of twelve landscape types identified in this area, four are considered relevant to the World Heritage property.
Identification of viewpoints	• The authors consider historical and seemingly 'intentional' views, and aspects related to the current experience of a visitor (including general and specific views, visual relationships between monuments, as well as people's physical sensory experience, e.g. sound and smell) and define nine criteria to justify their choice. • Regarding the presentation of views, the authors recommend producing a series of high-quality photographs from the selected viewpoints, preferably taken in summer, to establish the baseline situation and help determine the impact of future development proposals on the setting of the site. Photographs should be of suitable quality for publication, to serve as basis for future accurate visual representation of development proposals, and should be updated regularly, e.g. once every five years, for monitoring purposes. These steps are in line with the guidance on *Visual representation of wind farms – good practice guidance* (SNH 2006).  Plate 1 Examples of Panoramic views from the Ring of Brodgar and Stones of Stenness Copyright Historic Scotland. Prepared by Envision High quality photos for monitoring purposes. Plate 1 of the setting study with examples of panoramic views from the Ring of Brodgar and Stones of Stenness. *Source:* Atkins Heritage, 2008

Visibility study		A DTM-based analysis of the viewshed, in conjunction with an analysis of the views and relationships mapped, i.e. General views in and around the World Heritage Property (Figure 7), and the visual links between the monuments (Figure 8), helped develop the extent of the recommended 'sensitive area for onshore wind energy developments'.  Viewshed analysis of the Heart of Neolithic Orkney *Source:* Atkins Heritage, 2008 : figure 11
Visualizations of wind farms		The study does not visualize any wind farms. It does however show how high a building would need to be, theoretically, to be seen from certain viewpoints (Ring of Brodgar). The terrain data are rather rough, as they do not factor in any vegetation or buildings below 5 m in height. The resulting map should therefore be read as a general indication of areas where wind turbines or other high-rise developments may have a potential negative impact on the setting.
Details on visualizations	**Technical devices, hardware and software**	• Digital Terrain Map: Ordnance Survey contour data • High-quality photographs and high-accuracy GPS equipment for optimal reference documentation
	Selection of viewpoints and their presentation (criteria, number, etc.)	• Selection of 23 viewpoints for the two distinct parts of the property, including viewpoints with panoramic views, simple one-way views and long stretched views from roads (Figure 7) • Identification of over 15 visual links between monuments (Figure 8) • Photographs, maps and geographical reference Recommended technical procedure to document viewpoints: Positions of viewpoints must be accurately mapped and geo-referenced in each photograph to facilitate monitoring and allow applicants and other parties to take the same photographs. 'These grid points can then be physically marked on the ground (e.g. using survey nails) and/or described with a combination of text, measurements and photographs.' The authors recommend London View Management as a model framework (see also Atkins Heritage, 2008, 7.4.20: 41f; the 2012 version of the framework is available at https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/planning-guidance/london-view-management).
	Distances identified	The study does not mention any specific distances, but the detailed maps indicated application of an estimated maximum distance of 25 km.
	Data on wind turbines (height, capacity, blades, etc.)	Not applicable

Evaluation method and criteria	• The study identifies key features of the setting, which should not be affected by any developments, including undeveloped ridgelines and key views of and from the monuments, e.g. sightline and its backdrop from the entrance to the Maeshowe. • Study was prepared prior to the ICOMOS guidelines.
Outcome/analysis	The descriptions of the setting and identification of key features provide a solid foundation for future planning, monitoring and management: viewpoints, viewshed analysis, photographs, methods and reference documents.
Results	 The results served as a basis for the minor modification of the buffer zone (see also 39 COM 8B.50) and inform decisions up to the present day. Moreover, the sensitive zone is considered in all relevant planning tools, including the Orkney Development Plan and related guidance. Map of distant ridgelines of the Heart of Neolithic Orkney *Source:* Atkins Heritage, 2008 : figure 9
Feedback	Management confirmed that the study remains a key reference for decision-making up to the present day.
Lessons learned & recommendations	Positive lessons • Proper documentation and description of setting as reference for planning, monitoring and management • Rich documentation material in terms of high-quality photos of viewpoints (regularly updated for monitoring and impact assessments) and high-quality maps (definitions, viewshed studies) • No technical assumptions about wind turbines and their location – maintains the 'neutral' tone of documentation • Recommendations for future guidance and policies show awareness of potential conflicts with wind development and express an accommodating attitude; the study is not intended to be 'overly prohibitive', but seeks to 'support the continued economic use of the land' (Atkins Heritage, 2008, 7.4.10: 38).It should by no means give the impression 'that all forms of development on the whole of Orkney are constrained by the WHS' (idem, 7.4.11: 39) • Recommendations for the development of 'supplementary guidance' show the concern for practical application and the need 'to develop streamlined and concise development plans and [...] provide developers and householders with robust and detailed guidance [...] to help reduce ambiguity and [...] enable OIC and its partners to robustly assess applications and defend their decisions' (idem, 7.4.14f: 40) • Inspiring considerations and references on topics related to the 'setting' and the preparation of photo documentation and visualizations. Point for improvement • The authors mention that consultations were held, but without detailing how and with whom.

Recommendations and lessons learned

The case of Scotland (UK) offers a variety of lessons learned and recommendations concerning both the development of heritage impact assessments and the policy frameworks, including the points below.

POLICY FRAMEWORK

- Develop dedicated guidance with key information and explanations on strategies and processes for planners, developers, decision-makers, etc., and make it easily accessible online.
- Seek out consultation processes, particularly when developing practical guidance.
- Develop a 'short guide' for a World Heritage property, comprising all relevant information on the site and its setting to inform and raise awareness among stakeholders and the interested public around the specifics and conservation requirements.
- Encourage visible involvement of specialized organizations, through consultations, and in particular the publication of supporting guidance, reports and online resources, or public events. This increases visibility and credibility.

HERITAGE IMPACT ASSESSMENTS

- Identify the OUV, attributes and wider setting in a dedicated study to determine protection and management needs. The information offers a sound basis for impact assessments, monitoring and management. These studies should strive for maximum neutrality, and therefore should avoid anticipating potential future wind farm plans unless developed in consultation with experts from the wind sector or in cases of specific plans and data.
- Provide information on protection of the visual integrity of a property to inform management, regional planning, and authorization processes, in order to increase transparency and enable early awareness and maximum planning certainty.
- Strive to produce high-quality documentation, including photographs and geo-referenced maps, to keep as records and reference

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