1.2 Heritage and Climate Change Peter Cox

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Heritage & Climate Change

Peter Cox
Managing Director of
Carrig Conservation International Ltd.

Immediate Past President of ICOMOS
International Scientific Committee on Energy, Sustainability and Climate Change
(ISCES+CC)
Member of CCHWG
Member of CHN

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1

Introduction

Understanding how climate change impacts on heritage & Vice Versa

ICOMOS ISCES+CC International Scientific Committee on Energy, Sustainability, and Climate Change

ICOMOS Webinar Series

CCHWG ICOMOS

ICOMOS IRELAND INTERNATIONAL COUNCIL ON MONUMENTS AND SITES

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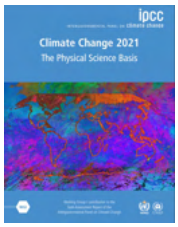
Introduction

2018 Special IPCC Report

- Current levels **1.0 degrees Celsius** above pre-industrial levels
- Projected to reach **1.5 degrees Celsius** between **13** and **32 years from now** if current emissions continue
- If we want to reach zero emissions before reaching 1.5 degrees, **every year's delay before initiating emission reductions decreases the remaining time available to do this by approximately two years**



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Introduction

"Climate change has been the fastest moving current threat [to natural World Heritage] increasing dramatically since 2014 – by 77% (62 sites in 2017 where it was assessed as a high or very high current threat, compared to 35 in 2014). "

(IUCN World Heritage Outlook 2, 2017)

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Introduction

Recent Events

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5

Introduction

St Mel's Cathedral Longford

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Introduction

ICOMOS & Climate Change

- International Scientific Committee on Energy & Sustainability
  - Energy Efficiency in Traditional & Heritage Buildings
  - Climate Change & Heritage
- Climate Change & Heritage Work Group
  - A 3-year Work Plan including "Future of our Pasts
- Sustainable Development Goals (SDGs) Work Group
  - A 7-point work plan
  - I head up section 3 - Localizing the SDGs

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CCHWG

UNESCO – needed to update their 2007 Climate Change Policy document it was agreed that ICOMOS would set up a work group: Andrew Potts, as convenor set out a Structure and invited people to lead:

Division 1 High Ambition
Division 2 Adaptation
Division 3 Mitigation & Energy Efficiency
Division 4 Loss and Damage

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Introduction

"Future of Our Pasts: Engaging Cultural Heritage in Climate Action" *2019 Report*

- Prepared by the ICOMOS Climate Change and Heritage Working Group
- Highlights a number of ways in which the core considerations of cultural heritage intersect with the objectives of the Paris Agreement
- Provides a framework for cataloguing the impacts of climate change drivers on 6 main categories of cultural heritage.

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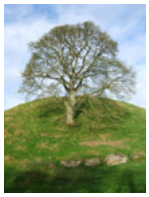
ICOMOS Ireland's 2009 Study for Irish Government "Climate Change & it's Effect on Heritage Concluded

• Climate Change will effect the conservation of Bru na Boinne and Clonmacnoise in the future.

• Monitoring at the sites will provide much needed quantifiable data on climate change impacts.

• Extending the monitoring scheme to include other geographical, climatic and typological sites is desirable.



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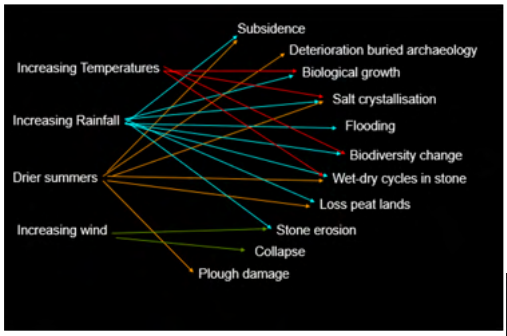
Introduction

Potential Impacts



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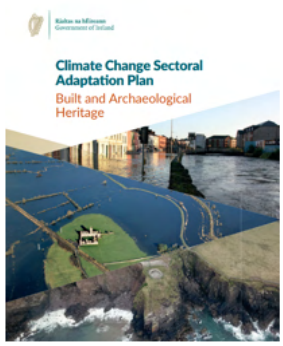
Climate Change Adaptation Sectoral Plan for Built and Archaeological Heritage



Contracting Authority: Dept. of Culture, Heritage & the Gaeltacht

Partners: University of Lincoln & Irish Green Building Council

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Climate Change Adaptation Sectoral Plan for Built and Archaeological Heritage

Observed & Projected Impacts for Ireland

- Increased annual averaged temperatures and less frost days (up by 0.8°C now and up to 1.6°C by 2060)
- Increased growing season (by 1 week so far and up to 40 days by 2060)
- Increase in intense rainfall events (up by 30% in winter by 2060)
- Increased likelihood of dry periods without rain (up by 40% in summer by 2060)
- Continued Sea Level Rise (currently rising at a rate of 2-3 mm/yr, leading to a total rise of up to 800mm by 2100)
- Increased frequency and intensity of storms
- Increased relative humidity in winter months

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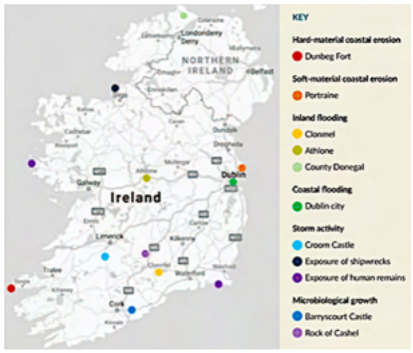
Climate Change Adaptation Sectoral Plan for Built and Archaeological Heritage

Climate Change Impacts in Ireland



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Climate Change Adaptation Sectoral Plan for Built and Archaeological Heritage

Climate Change Impacts in Ireland

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Climate Change Adaptation Sectoral Plan for Built and Archaeological Heritage

Adaptation Goals

GOAL 1	**Improve understanding of the heritage resource and its vulnerability to climate change impacts**
Objective 1	Establish a baseline for heritage resources from which change can be measured
Objective 2	Conduct risk and vulnerability assessments for climate change impacts on heritage
Objective 3	Undertake monitoring of climate change and its impacts
GOAL 2	**Develop and mainstream sustainable policies and plans for climate change adaptation of built and archaeological heritage**
Objective 1	Integrate cultural heritage issues into relevant national and local inter-sectoral policies & plans
Objective 2	Mainstream climate change adaptation into sectoral policy and conservation planning at all levels
Objective 3	Increase and improve disaster risk management for heritage
GOAL 3	**Maintain Ireland's heritage for future generations**
Objective 1	Increase the resilience of heritage resources under current conditions
Objective 2	Develop management and conservation approaches for changing environments
Objective 3	Find ways to capture value when loss is inevitable
GOAL 4	**Communicate and transfer knowledge**
Objective 1	Create a vision for the sector and demonstrate leadership in response to climate challenges
Objective 2	Create guidance and disseminate information
Objective 3	Enable the collection, archiving and sharing of data, experiences and learning related to heritage and climate change
Objective 4	Develop training
GOAL 5	**Exploit the opportunities for built and archaeological heritage to demonstrate value and secure resources**
Objective 1	Ensure that potential revenue streams lead to investment and the sufficient resourcing of Gs 1-4
Objective 2	Develop a better understanding of how the historic building stock, and its adaptive re-use, contributes to a low carbon society
Objective 3	Maximise the potential of using heritage as an engagement tool for cross-sector research and initiatives, public engagement and education in relation to climate change and adaptation

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A Guide to Climate Change Impacts

Published by Historic Environment Scotland in October 2019

Identifies many of the risks and hazards presented by climate change to heritage properties, but also presents potential adaptation solutions for the following 7 areas:

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Benediktbeuern

Location: Monastery Benediktbeuern

© Fraunhofer IBP

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Benediktbeuern

The Building: Alte Schäfflerei / *Old Cooperage*

Fraunhofer-Zentrum für energetische Altbausanierung und Denkmalpflege Benediktbeuern

Front view of the building before renovation.

Fraunhofer

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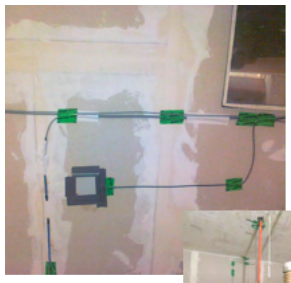
Benediktbeuern



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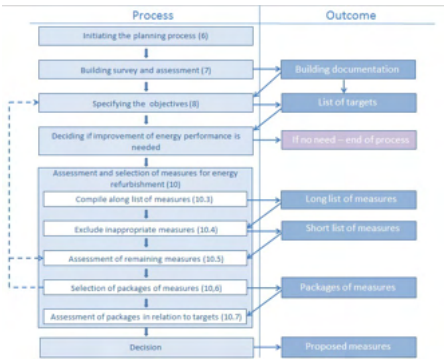
EN16883 Energy Retrofit of Heritage Buildings



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MITIGATION

- Understanding your building and its **actual** energy performance
- Knowing the best practice for a sensible energy upgrade
- Doing an accurate Life Cycle Analysis (LCA) for the project
- We must be ready to **Monitor** all interventions – we need hard evidence
- We need to fully understand Carbon Mitigation
- Renewable Energy and Whole Building Approach
- Maintenance

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MALADAPTATION

- Our greatest challenge is MALADAPTATION
- Not understanding your building
- Employing the wrong products and/or systems
- There are no quick fix solutions
- We do not want any more "Preston's"
- We must control what is done to our buildings
- In our European Research we identified 66 million dwellings in the 28 countries of Europe all dated pre-1945
- Only 8% of these had statutory protection
- That leaves a lot of buildings that can be Maladapted!

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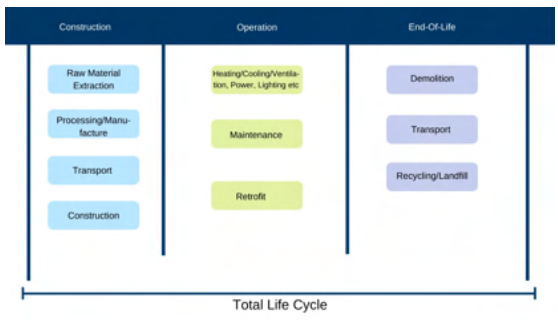
Understanding Carbon in the Built Environment



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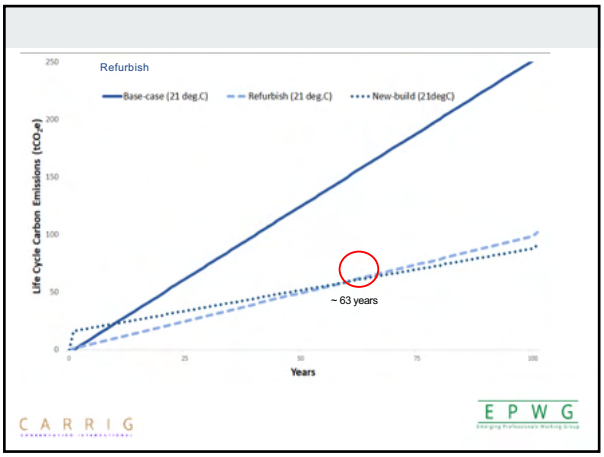

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Understanding Carbon in the Built Environment

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Understanding Carbon in the Built Environment

- NZEB, EPCs and BERs are all based on "Operational Carbon"
- We need to include "Embedded and Embodied Carbon"
- Historic England through Heritage Counts doing great work and there are a series of further studies imminent.
- We need greater cooperation and involvement from NCs, ISCs, WGs and other organisations.

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Understanding Carbon in the Built Environment

- We believe Policy needs to change and create a fairer deal for Heritage.
- EPDs (Environmental Product Declaration) needs to be Mandatory.
- A carbon fine for Demolition
- A Carbon Credit for Buildings older than 1945
- VAT removed from Conservation Works
- Sensible Energy Retrofits in Heritage Buildings can be achieved

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Education, Skills, Training & Certification

- We as an industry have to embrace all of the above
- Educating our professionals – architects, surveyors, engineers, conservation officers and planners
- Upskilling our construction sector in understanding traditional and heritage buildings
- Training our specifiers, suppliers and working with our manufacturers in developing more compatible& low carbon products for heritage buildings.
- Encouraging research to assist all of the above
- We ran a 10 module CPD course in Dublin over 5 days over 3 months – we had a sell out within a week with 120 participants and a 70 waiting list.

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Deep Energy Renovation of Traditional Buildings

Addressing Knowledge Gaps and Skills Training in Ireland

The Sustainable Energy Authority of Ireland
The Heritage Council
Carrig Conservation International, Ltd.
ICOMOS Ireland National Scientific Committee on Energy, Sustainability and Climate Change (NSCES+CC)

Author
Caroline Engel Purcell, PhD Arch, MSc Arch Cons, BA Arch

NSCES+CC Steering Committee
Colm Murray, The Heritage Council; **Peter Cox**, ICOMOS International Scientific Committee on Energy, Sustainability and Climate Change and Carrig Conservation International Ltd; **Lelia Budd**, Carrig Conservation International Ltd.; **Deirdre McDermott**, Vice President of ICOMOS Ireland.

March 2018

seai CARRIG ICOMOS Ireland EPWG

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Fundamentals of Energy Renovation for Traditional Buildings: CPD Course

Register now through the Heritage Council

- Developed in conjunction with the Heritage Council
- Attendance fees subsidised by SEAI
- 5 lecture days from November 1st 2019 to January 31st 2020
- Continuing Professional Development (CPD) credits provided by Royal Institu of the Architects of Ireland (RIAI) and Engineers Ireland (EI)

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Climate Vulnerability Index

The **Climate Vulnerability Index (CVI)** is a rapid assessment tool that has been specifically developed for application in World Heritage (WH) properties.

The severity of current climate impacts on individual WH properties varies, as do the rate at which they are occurring and the range of climate change drivers causing them.

The CVI differs from other vulnerability assessments by assessing both the **OUV Vulnerability** and the **Community Vulnerability** and is applicable to all types of WH properties.

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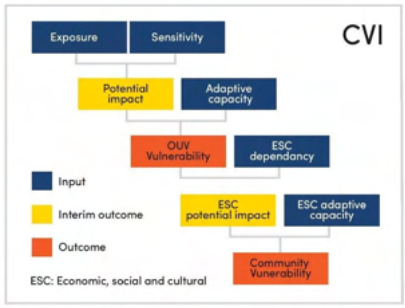
Climate Vulnerability Index

The CVI Methodology is designed to rapidly assess climate change impacts for natural, cultural or mixed World Heritage Sites



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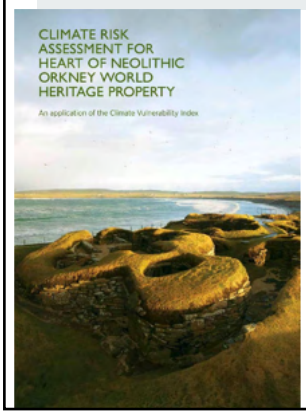
Climate Vulnerability Index



Published June 2019

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[3] Union of Concerned Scientists, Cambridge, Massachusetts, USA

[4] ICOMOS Climate Change and Heritage Working Group

[5] University of the Highlands and Islands, Scotland, United Kingdom

[6] Orkney Islands Council, Scotland, United Kingdom

[7] Historic Environment Scotland, Longmore House, Salisbury Place, Edinburgh, United Kingdom

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Adapt Northern Heritage

ADAPT NORTHERN HERITAGE

Supporting communities and local authorities to adapt northern cultural heritage to the environmental impacts of climate change and associated natural hazards through community engagement and informed conservation planning.

Climate Change and Cultural Heritage
Guide to Risk Assessment

Northern Periphery and Arctic Programme

EUROPEAN UNION

The Project Partners –Historic Environment Scotland, Minjastofnun Íslands (the Cultural Heritage Agency of Iceland), the Norsk institutt for kulturminneforskning (Norwegian Insitute for Cultural Heritage Research) and Riksantikvaren (Norway's Directorate for Cultural Heritage)

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Adapt Northern Heritage

Two workshops were held during 2019 on the effects of climate change on Ballinskelligs Priory and Castle, which were selected as a demonstration site for the Adapt Northern Heritage project.

The second workshop coincided with Heritage Week and included talks by the OPW, the CHERISH Project, Adapt Northern Heritage and the Archaeology Department of University College Cork.

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Adapt Northern Heritage

Climate Change and Cultural Heritage
Guide to Adaptation Planning

Northern Periphery and Arctic Programme

EUROPEAN UNION

ANH have developed a Guide to Risk Assessment to determine the risk to cultural heritage due to climate change based on its ***sensitivity*** and ***exposure*** to climate change elements

When risks are determined, planning is required to ensure that damage to the site is minimised.

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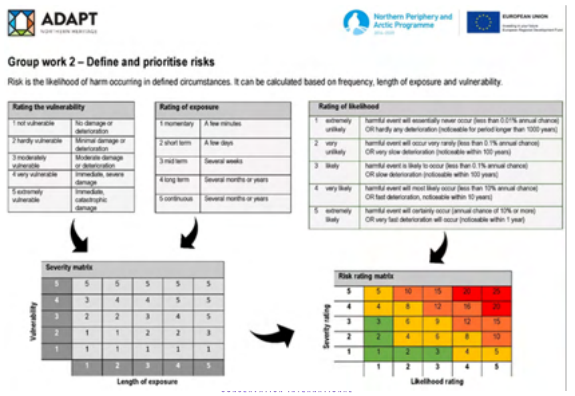
Adapt Northern Heritage



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Climate Change Risk Assessment for Ballinskelligs Priory, Co. Kerry

Carrig has been commissioned by the OPW to review the climate related risks for the architectural and archaeological heritage of the historic site.

Ballinskelligs Priory and Graveyard

Complex of monastic ruins from the 11th - 16th century.
Built when the Augustinian monks abandoned Sceilig Mhichil.

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Climate Change Risk Assessment for Ballinskelligs Priory, Co. Kerry

Erosion has been a threat to the site for over 100 years

The first stone and mortar seawall was constructed during the early 1900s, but the chancel to the abbey had already been lost by this point.

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Climate Change Risk Assessment for Ballinskelligs Priory, Co. Kerry

The current concrete seawall was constructed in the 1950s, but is showing serious signs of destabilisation and erosion.

The vertical wall actually increases wave heights during storms leading to increased levels of flooding and damage due to wave overtopping and debris throw.

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Climate Change Risk Assessment for Ballinskelligs Priory, Co. Kerry

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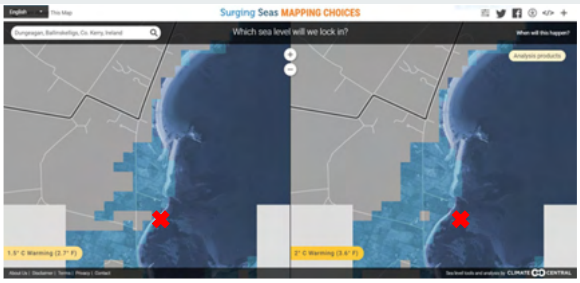
Climate Change Risk Assessment for Ballinskelligs Priory, Co. Kerry



UNESCO now recognises the equal value of natural heritage around cultural heritage sites and it no longer finds it acceptable to apply preservation methods that sacrifice one to save the other.

However, given the threat of sea level rise, a seawall with wave energy dissipating rock armour is the best short-term solution but we hope to explore more acceptable soft sea defense systems.

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Climate Change Risk Assessment for Ballinskelligs Priory, Co. Kerry



Vulnerability can be further decreased in the short-term by improving site drainage and continuing maintenance and stabilisation measures.

However, the OPW and Kerry CoCo will need to prepare the community for eventual loss if the site cannot be protected.

This study represents the acute challenges already being experienced at coastal heritage sites.

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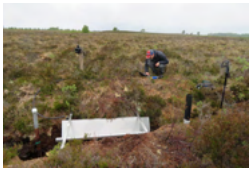
Trinity College Dublin
Carbon Sequestration in Peatlands



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Sustainable Development Goals

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Heritage and Climate Change

Thank You for your attention

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Useful Links

Special IPCC Report on Global Warming at 1.5 degrees Celsius, 2018
https://www.ipcc.ch/sr15/

CSO Statistics, 2019 Report
https://www.cso.ie/en/releasesandpublications/ep/p-eii/eii18/greenhousegasesandclimatechange/

SEAI Statistics, 2018 Report
https://www.seai.ie/data-and-insights/seai-statistics/key-statistics/co2/

Our World in Data, CO2 and Greenhouse Gas emissions
https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions

International Energy Agency Statistics, Global Alliance for Buildings and Construction 2018 Global Status Report
https://www.globalabc.org/uploads/media/default/0001/01/0bf694744862cf96252d4a402e1255fb6b79225e.pdf

"Future of Our Pasts: Engaging Cultural Heritage in Climate Action", 2019 Report
https://www.icomos.org/en/what-we-do/image-what-we-do/77-articles-en-francais/59522-icomos-releases-future-of-our-pasts-report-to-increase-engagement-of-cultural-heritage-in-climate-action

International Conference on Energy Efficiency, 2018
http://eebh2018.com/

International Conference on Energy Efficiency, 2016
https://www.eechb.eu/

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Useful Links

Irish Policies:

National Mitigation Plan, 2017
https://www.dccae.gov.ie/en-ie/climate-action/topics/national-mitigation-plan/Pages/default.aspx

Climate Action Plan, Ireland, 2019
https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx

National Adaptation Framework, 2018
https://www.dccae.gov.ie/documents/National%20Adaptation%20Framework.pdf

Climate Action and Low Carbon Development Act, 2015
http://www.irishstatutebook.ie/eli/2015/act/46/enacted/en/html

National Policy Position on Climate Action, 2014
https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/National-Policy-Position.aspx

National Climate Change Adaptation Framework, 2012
https://www.dccae.gov.ie/documents/National%20Climate%20Change%20Adaptation%20Framework.pdf

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Useful Links

International Policies:

Sustainable Development Goals, 2015
https://www.un.org/sustainabledevelopment/sustainable-development-goals/

Paris Agreement information document
https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

Climate Action Summit, First Notes, 2019
https://www.un.org/en/climatechange/un-climate-summit-2019.shtml

Agenda 2030 for for Sustainable Development adopted by UN, 2015
https://sustainabledevelopment.un.org/post2015/transformingourworld

Sendai Framework for Disaster Risk Reduction, 2015-2030
https://ec.europa.eu/echo/partnerships/relations/european-and-international-cooperation/sendai-framework-disaster-risk-reduction_en

EU Adaptation Strategy, 2013
https://ec.europa.eu/clima/policies/adaptation/what_en

EU White Paper 'Adapting to Climate Change', 2009
https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52009DC0147&from=EN

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