

FORMAT		
1. Name of resource	Guidelines for Selecting Solid State Lighting for Museums	
2. Location	https://www.getty.edu/conservation/publications_resources/pdf_publications/guidelines-solid-state-lighting.html	
3. Alternative location	https://www.researchgate.net/publication/287207122_Guidelines_for_Selecting_Solid-State_Lighting_for_Museums	
4. Author[s]	J. R. Druzik and S. W. Michalski	
5. Publisher/producer/host	Canadian Conservation Institute and The Getty Conservation Institute	
6. Year	2012	
7. Suggested citation	Druzik, J. R. and S. W. Michalski (2012). Guidelines for Selecting Solid-State Lighting for Museums	
8. Languages in which available	English	
9. Geographic area resource relates to	Global	
10. Does the resource relate to a specific time frame?		
11. Type	Report	
	Toolkit/Framework/Roadmap	Yes
	Sign-post to other resource (database)	
	Case studies	Yes
	Other	
12. If this is part of an initiative, what is the initiative?		
COLLECTIONS AND COLLECTIONS-BASED INSTITUTIONS		
13. Explicit links to collections	Yes	
14. Explicit links to museums/libraries/archives	Yes	
15. Types of institutions the resource covers	Museums	X
	Archives	X
	Libraries	X
	Other	X
16. Types of collections/disciplines the resource covers	Arts, humanities and social sciences: philosophy, psychology, religion, social sciences, law, politics, language, arts and recreation, architecture, literature, history,	X

	geography and ethnology, anthropology, archaeology	
	Science, natural history, technology, medicine, engineering, manufacturing	X
17. If no explicit links to collections, justification for inclusion	Collections-based institutions can use the resource to plan how to use collections to support climate adaptation initiatives and programmes.	
HOW IT CONTRIBUTES TO SUSTAINABLE DEVELOPMENT		
18. Collections-related activities the resource relates to (mark all that apply)		
Develop collections to protect and safeguard wider cultural and natural heritage more effectively , for example by targeting collecting to threatened forms of heritage in strategic ways		
Use collections to promote learning and educational opportunities that contribute to sustainable development more effectively , for example education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development and/or skills development relating to collections		
Use collections to promote cultural participation/social inclusion more effectively , for example by reducing barriers to participation, to ensure no-one is 'left behind'		
Use collections to promote sustainable tourism more effectively , for example by developing new products based on local cultural heritage, and/or considering the rights of stakeholder groups in relation to collections		
Use collections to support research that contributes to sustainable development (including all forms of personal and self-directed research at all levels that make use of stored collections) more effectively, for example by providing effective facilities, collections and information to meet researchers' needs		
Make decisions around collections that contribute to sustainable development more effectively		
i. employment (recruiting, staff training, staff safety)		
ii. energy consumption, greenhouse gas emissions, reduction, monitoring and reporting	X	
iii. waste management and reduction of waste		
iv. transport (forms of transport, energy use)		
v. commercial activities including copyright and IP		
vi. governance and management		
vii. security, disaster preparedness and risk reduction		

Direct external leadership, partnerships and collaborations towards sustainable development more effectively , for example by developing impactful partnerships	X
19. Does the resource relate clearly to any international conventions (mark all that apply)?	
Culture conventions:	
1952, 71 Protection of Copyright and Neighbouring Rights	
1954 Protection of Cultural Property in the Event of Armed Conflict	
1970 Fighting Against the Illicit Trafficking of Cultural Property	
1972 Protection of the World Cultural and Natural Heritage	
2001 Protection of the Underwater Cultural Heritage	
2003 Safeguarding of the Intangible Cultural Heritage	
2005 Protection and Promotion of the Diversity of Cultural Expressions	
Rio Conventions:	
Convention on Biological Diversity (CBD), Convention to Combat Desertification (UNCCD), Framework Convention on Climate Change (UNFCCC)	X
AIMS AND CONTENT	
20. What issues does the resource aim to address?	<p>“The process of selecting solid-state lighting (SSL) products for museums can be an intimidating experience. But by following four reasonable steps that process can be simplified into an organized search of discovery that will be enriching and hopefully enjoyable.</p> <p>In Section 1, this document begins by giving a simplified outline of how SSL, and light-emitting diodes (LEDs) in particular, work, their performance parameters, and what can go wrong with them. If all you want is a quick answer to the question, “Are LEDs safe and effective in museums, and how do I evaluate them?” jump to the end of Section 1 and read LED Decision-Making In a Nutshell...” (p.4)</p>
21. Intended audience of resource	[Anyone involved in decisions about using LED lighting in museums]
22. Process of development	“Much of the information in this guideline is taken from programs created by and for the United States Department of Energy, Lighting Research and Development Building Technologies Program... This document was originally prepared for a lighting workshop conducted at the Canadian Conservation Institute in the summer of 2011. We likewise appreciate the advice and questions of those workshop participants.” (p.4)
23. Organisation/structure/contents	<p>Introduction 5</p> <p>SECTION 1: What’s an LED and how does it differ from traditional lighting? 6</p> <p>How LEDs fit into sustainability goals for museums 8</p> <p>Comparison of LEDs to traditional lighting 11</p>

	<p>Luminous efficacy 11</p> <p>Life span and Lumen Maintenance 11</p> <p>Correspondent properties 12</p> <p>Color Rendering Index (CRI) 13</p> <p>Color consistency and appearance over time 14</p> <p>Form Factor (retrofit versus dedicated LED design) 16</p> <p>Cost and ROI Payback 17</p> <p>Mature versus evolving technologies 18</p> <p>Controlling Glare 19</p> <p>Blue versus violet chip-driven LEDs 20</p> <p>Dimming and Flicker 21</p> <p>Thermal Management 21</p> <p>Replacing T12 Fluorescent Lamps 22</p> <p>LED Decision-Making In a Nutshell 22</p> <p>SECTION 2: Making the Decision: Which LEDs Products to Buy 23</p> <p>REVIEW 23</p> <p>READ 24</p> <p>Product Testing (CALiPER) 24</p> <p>IES LM-79 24</p> <p>IES LM-80 25</p> <p>GATEWAY Demonstration 25</p> <p>ENERGY STAR 26</p> <p>Lighting Facts Labels 26</p> <p>LOOK 26</p> <p>AGREE 30</p> <p>Recap: Getting the Most Out of Your LED Products 32</p> <p>SECTION 3: A CCI Guide to Best Practices in Lighting Policy and Practice 33</p> <p>Sources for Solid-State Lighting Products Described in this Document 49</p> <p>U.S. Department of Energy Internet Resources 51</p> <p>Bibliography 52</p> <p>Appendix 1. Visual Comparison of Color Rendering Lamp Ratings 54</p>
FRAMEWORKS	
24. Framework structure	The 'LED Decision-Making In a Nutshell' checklist on p.22-3 can be considered as a framework (see the resource).
25. Relevant policy considerations	Yes
26. Resources for implementation identified	Yes
27. Specific assessment points/indicators/milestones/action plan for monitoring	Yes

28. ASPECTS OF SUSTAINABILITY COVERED BY RESOURCE (mark all that apply)	
People (social sustainability)	
Planet (environmental sustainability)	X
Prosperity (economic sustainability)	
Peace	
Partnerships	
29. CROSS-CUTTING CONSIDERATIONS COVERED BY RESOURCE (mark all that apply)	
Gender perspectives	
North and South perspectives	
HOW THE RESOURCE CONTRIBUTES TO AGENDA 2030 AND THE SDGs	
HOW AGENDA 2030 AND THE SDGs FEATURE IN THE RESOURCE	
30. SDGs and Agenda 2030 specifically mentioned?	No
31. SDGs specifically mentioned?	No
32. SDG targets specifically mentioned?	No
33. SDG indicators specifically mentioned?	No
SDGs AND SDG TARGETS AND LINKAGES	
34. Comments on SDG linkages	The resource supports action for a number of SDG targets including 7.3 (increase energy efficiency), 9.1 (develop sustainable infrastructure), 9.4 (retrofit existing infrastructure to be sustainable), 11.6 (reduce the environmental impact of cities), 12.2 (make sustainable use of natural resources), 12.6 (adopt sustainable practices), SDG 13.3 (climate change education and institutional capacity for addressing climate change). Ensuring lighting is not harmful to collections supports SDG 11.4 (protect and safeguard cultural and natural heritage).
35. SDGs and SDG targets the resource helps advance	
SDG 7. Ensure access to affordable, reliable, sustainable and modern energy for all 7.3 By 2030, double the global rate of improvement in energy efficiency	Reduction in energy use. Upgrade of old equipment to more efficient equipment. Uptake of renewable sources of energy.

<p>SDG 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</p> <p>9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all</p>	<p>Development of research-useful collections to support reliable, sustainable and resilient use by researchers and others.</p> <p>Number and proportion of collections facilities and stores that support economic development and human well-being.</p> <p>Number and proportion of collections facilities and stores that provide affordable and equitable access for all.</p> <p>Investment in collections facilities.</p> <p>Inclusion of collections information in regional and transborder initiatives, notably via digital access for discoverability.</p>
<p>SDG 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</p> <p>9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities</p>	<p>Number and proportion of collections facilities that:</p> <ol style="list-style-type: none"> 1. make efficient use of resources, with an ongoing drive for efficiencies and reductions in energy use and waste of all forms. 2. use clean and environmentally sound technologies, including climate-friendly energy sources and materials, with an ongoing commitment to reduce greenhouse gas emissions and waste of all forms. 3. adopt and/or prioritise collections-related processes and practices to reduce greenhouse gas emissions and waste of all forms.
<p>SDG 11. Make cities and human settlements inclusive, safe, resilient and sustainable</p> <p>11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage</p>	<p><i>11.4.1 Total expenditure (public and private) per capita spent on the preservation, protection and conservation of all cultural and natural heritage, by type of heritage</i></p> <p>Plans, policies and procedures in place for the safe use of collections for a variety of purposes, protecting and safeguarding both collections and those who use them.</p> <p>Plans, policies and procedures in place for the identification, safeguarding and protection of cultural and natural heritage at risk.</p>

	<p>Collecting programmes in place to protect, safeguard and make use of cultural and natural heritage, addressing the needs of communities and stakeholders, and ensuring that collections can be an effective resource for sustainable development.</p> <p>Number and diversity of educational, awareness-raising, research programmes, and partnerships that aim to strengthen protection of cultural and natural heritage.</p>
<p>SDG 11. Make cities and human settlements inclusive, safe, resilient and sustainable 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management</p>	<p>Plans in place to reduce negative impacts on air quality, and volume and forms of waste.</p> <p>Plans in place to eliminate waste of all forms as soon as possible.</p>
<p>SDG 12 Ensure sustainable consumption and production patterns 12.2 By 2030, achieve the sustainable management and efficient use of natural resources</p>	<p>Reduction of material footprint in terms of reductions in consumption of biomass, fossil fuels, metal ores and non-metal ores.</p>
<p>SDG 12 Ensure sustainable consumption and production patterns 12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle</p>	<p>Clear visions, strategies and plans in place for all aspects of sustainability – environmental, social and economic (people, planet, prosperity)- across all areas of activity.</p> <p>Visions, strategies and plans relating to sustainability to be publicly available and incorporated into planning documents.</p> <p>Commitments to be in line with local, regional, national and/or international targets and ambitions.</p> <p>Incorporation of sustainability into reporting for funders and other stakeholders, including the public. Reporting to include commitments and progress towards targets.</p>

SDG 13. Take urgent action to combat climate change and its impacts 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning		<p>Plans in place to enhance positive contributions to addressing climate change through use of collections. Plans in place to ensure collections, collections institutions and broader society can adapt effectively to climate change.</p> <p>Plans in place for effective education and awareness raising on climate change mitigation, adaptation, impact reduction and early warning.</p> <p>Plans in place to reduce negative contributions of collections-related functions, e.g. measuring greenhouse emissions with plans and targets in place to reduce them.</p>			
1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	