

**Future-Proofing, Charters and Standards:
The Integration of the Principles of future-Proofing in Cultural
Heritage Policy Documents**

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Introduction

The Principles of Future-Proofing provide a framework for the consideration of the design of the built environment which is not only resilient, but promotes responsible stewardship of our environment and more sustainable and enduring structures that will serve us far into the future with sensitive and appropriate interventions. This issue is most poignant when considering the built environment in the current environment of sustainable design, ecological awareness, and dwindling resources.

In an environment in which resources are more costly and harder to obtain year after year, maximizing the use of the existing built environment becomes more important. Tolerance of inappropriate interventions in existing historic buildings should be minimal. Interventions which cause the further deterioration of building fabric are not acceptable and should be prevented.

Future-proofing is also closely related to sustainable design strategies such as reducing material consumption, loss of embodied energy, and reduction of construction waste, reduction in energy consumption, and reduction in CO2 emissions. The ultimate goal of this research is to promote the appropriate rehabilitation and adaptive re-use of our existing building stock and extend their useful service lives rather than contributing to the consumption of the planet's resources.

What is Future-Proofing?

The etymology of the word "future" comes from the Latin word "futurus" meaning "yet to be." (Harper 2014a) The etymology of "proof" indicates that the word comes from 16th century and is used in the form of "proof against something." For instance, "waterproof" means something that cannot be damaged by water, and "foolproof" means something is "safe against the incompetence of a fool." (Harper 2014b) However, in the sense intended here, future-proof means not only that something can withstand the negative events of the future, but also may take advantage of the good events of the future. Thus "future-proofing" is defined as the process of anticipating the future and developing methods of minimizing the effects of shocks and stresses while taking advantage of positive future events.

Future-proofing is embodied by a set of principles derived from studying the use of the term in industries using the term “future-proofing” outside of the Architecture, Engineering, and Construction [AEC] industry. This term is commonly found in the electronics, data storage, and communications systems. It is also found in Industrial Design, computers, software, health care/medical, and product design. Generally speaking, in these industries, the term refers to the ability of something to continue to be of value into the distant future; that the item does not become obsolete. (Rich 2013)

Based on analysis of the industries mentioned above, the principles of future-proofing can be derived and codified to assist in the application of the concept to new projects. Through prior research, 10 Principles of Future-Proofing have been developed specifically for application to historic buildings. They are:

1. **Comply with the Secretary’s Standards.** The Secretary of the Interior’s Standards for the Treatment of Historic Properties provide excellent guidance for the long term retention of an historic building.
2. **Not promote deterioration – do no harm.** It is natural for all building materials to deteriorate. Interventions in historic structures should not accelerate the deterioration of the existing building fabric.
3. **Allow understanding of the historic structure.** Interventions in historic structures should allow the students of history in our future to understand and appreciate the original historic building as well as the interventions which have kept it viable.
4. **Stimulate flexibility and adaptability.** The interventions in an historic structure should not just allow flexibility and adaptability, but also stimulate it. Adaptability to the environment, uses, occupant needs, and future technologies is critical to the long service life of a historic building.
5. **Extend service life.** Interventions in historic buildings should help to make the building useable for the long term future rather than shorten their service life.
6. **Fortify against climate change, extreme weather and shortages of materials and energy.** Interventions should prepare the building for the impacts of climate change by reducing energy consumption, reducing consumption of materials, withstanding extreme natural events such as hurricanes and tornadoes.
7. **Increase durability and redundancy.** Interventions in historic buildings should use equally durable building materials. Materials that deteriorate more quickly than the original building fabric require further interventions and decrease the service life of the building.

8. **Reduce the likelihood of obsolescence.** The building should be able to continue to be used for centuries into the future. Take an active approach: regularly evaluate and review current status in terms of future service capacity. Scan the trends to provide a fresh perspective and determine how your historic building will respond to these trends.
9. **Consider long term life-cycle benefits.** The embodied energy in existing structures should be incorporated in environmental, economic, social, and cultural costs for any project.
10. **Incorporate local materials, parts and labor.** The parts and materials used in historic building interventions should be available locally and installed by local labor. This means that the materials and manufacturing capabilities will be readily available in the future for efficient repairs. (Rich 2013)

It is the intent of this paper to focus on development of the Principles of future-proofing specifically with relation to historic buildings; to analyze the development of charters, standards and other documents guiding the stewardship of cultural heritage in the United States and internationally; and, through comparison of these systems, to propose a method by which the Principles of Future-Proofing may be incorporated into these systems.

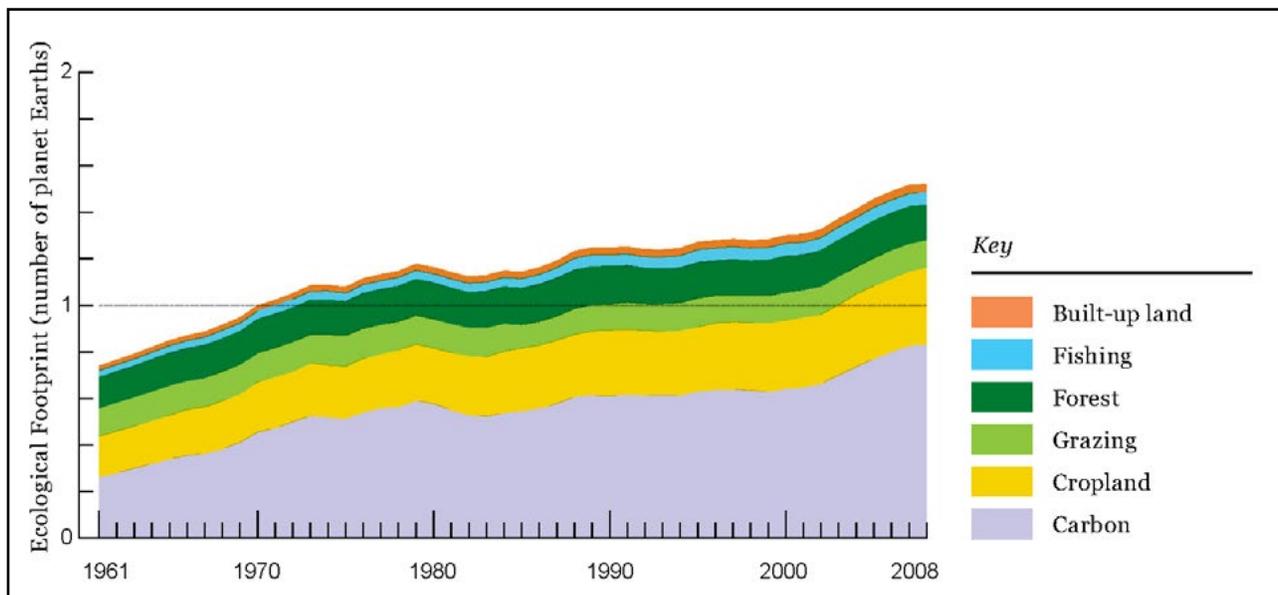
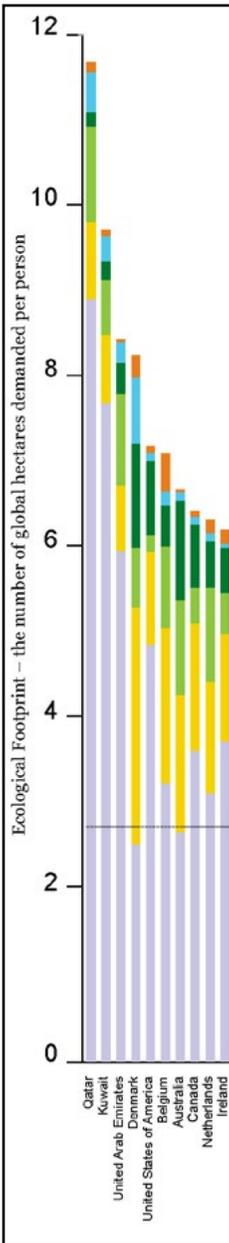


Figure 1: Global Ecological Footprint by component, 1961-2008. The largest component of the Ecological Footprint is the carbon footprint (55%). At a national level the carbon footprint represents more than half the Ecological Footprint for one-quarter of the countries tracked. It is the largest component for approximately half the countries tracked. Credit: http://awsassets.panda.org/downloads/1_lpr_2012_online_full_size_single_pages_final_120516.pdf

Why should Future-Proofing concern us?



Key

- Built-up land
- Fishing
- Forest
- Grazing
- Cropland
- Carbon

Figure 2: Ecological Footprint per country, per person, 2008. This comparison includes all countries with populations greater than 1 million for which complete data are available. Credit: http://awsassets.panda.org/downloads/1_lpr_2012_online_full_size_single_pages_final_120516.pdf

The world's existing building stock is one of the most valuable assets that the human race has created. It is also the most damaging to the environment and consuming the majority of the world's resources. As Christopher Davis of the USGBC states, the "annual replacement rate of buildings [the percent of the total building stock newly constructed or majorly renovated each year] has historically been about 2%." (Easton 2012) During slow economic periods, this replacement rate can be even slower. Buildings account for 73% of electricity consumption in the U.S. (Energy Information Administration 2013) and 38% of CO2 emissions. (Energy)

While aiming for materials and building products that are less technologically dependent, and with the understanding that the most appropriate building material may not be the least expensive one, one must also account for material availability, or, rather, scarcity. Statistics indicate that the current world population is using the resources of the planet at a rate 1.5 times greater than the ability of the planet to replenish them. (Global_Footprint_Network 2013) "In 2008, the Earth's total biocapacity was 12.0 billion global hectares [gha], or 1.8 gha per person, while humanity's Ecological Footprint was 18.2 billion gha, or 2.7 gha per person. This discrepancy means it would take 1.5 years for the Earth to fully regenerate the renewable resources that people used in one year." (WWF 2012) In 2008, the United States ranked fifth in the world for its ecological footprint, using the biocapacity of nearly 7 planet Earths. "If everyone lived like an average resident of the USA, a total of four Earths would be required to regenerate humanity's annual demand on nature." (WWF 2012)

In a world of rapidly depleting material resources and over consumption, it is imperative that humans consider material availability, durability, and embodied energy in our choices for creating our built environment as well as our stewardship of the built environment that already exists. In other words, we must make the most of the built environment we can. We cannot waste it because it does not make economic sense. Design of a built environment which does not take the best advantage of the capabilities of each material is wasteful and is a poor example for developing regions across the world who aspire to be like the developed countries.

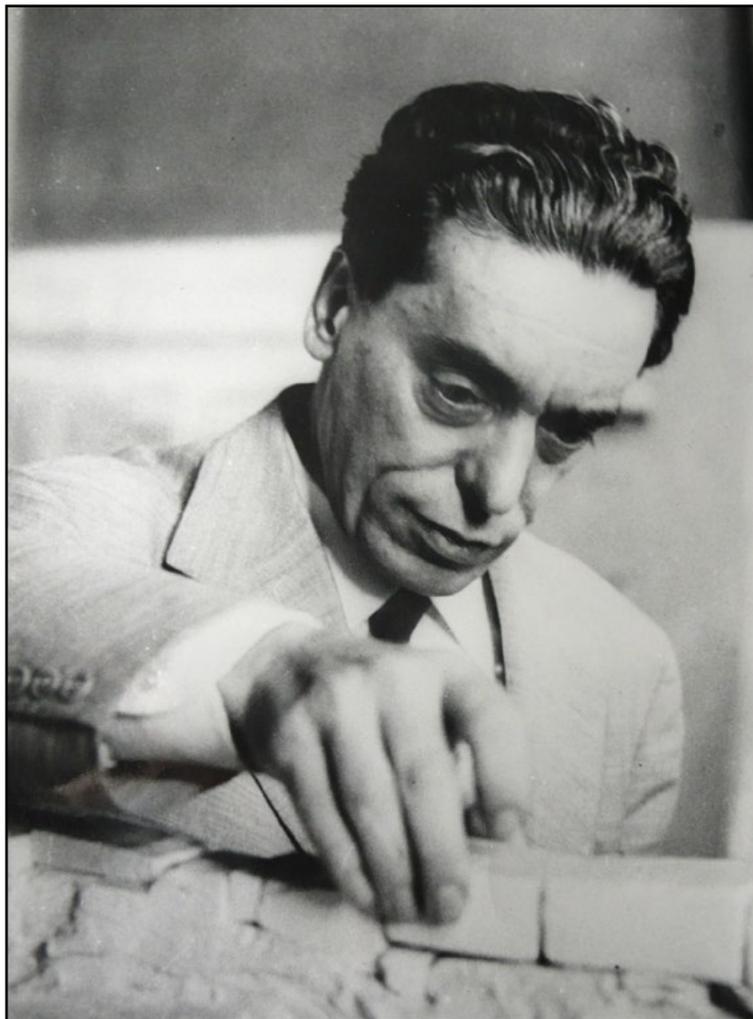
The above statistics suggest that the Principles of Future-Proofing should remove emotional human and historical factors from the selection of which buildings to keep for the long term future; that we should disregard their monumental or historical status in our societies. These statistics suggest that we focus on the durability and least energy usage. Indeed one can imagine a world in which all control is removed from people as to what is saved for the long term and what is recycled into a more durable component of the built environment.

How then do the Principles of Future-Proofing take account of occupant satisfaction with their environment. In some buildings, a computerized “building automation systems” monitor the building’s performance and adjusts features of the building automatically to minimize energy consumption and adjust to an artificially set standard of comfort for the occupants. Two scenarios are likely in such systems. First, aggressive energy conservation policies deployed through automated systems sacrifice occupant comfort to achieve high energy performance. For example, it may not allow an occupant to lower a window shade to prevent glare at their desk. Second, energy savings are sacrificed to avoid occupant complaints. (Zhen et al. 2013) Similarly, a harsh system of principles used to determine which buildings are kept for the future undermines the community satisfaction and psychological well-being of retaining culturally valuable structures. The retention of culturally, aesthetically, socially and emotionally valuable buildings for the long term must be balanced with the ability of a structure to provide long lasting service as a component of our built environment. This, then, is the role of the Principles of Future-Proofing: to provide a framework in which to evaluate the balance of intangible building values with practical environmental values. Future-proofing is balancing optimal performance with putting the shade down.

International Preservation – Cultural Heritage Policy Documents

There are two systems of guiding documents that have developed over the course of the 20th century. Internationally, a system has grown out of the 1964 Venice Charter and includes dozens of related charters, documents, declarations, principles and other statements regarding appropriate treatment of our cultural heritage. Within the United States, a system of Standards and Guidelines was developed in response to the passage of the 1966 National Historic Preservation Act. These two systems are similar in some ways and different in others. To gain a better understanding of them and compare them, an analysis of the two systems is appropriate.

The 1964 Venice Charter was intentionally developed as a very broad internationally applicable set of principles that



could be applied to any region and any type of asset, though it mostly focused on the built environment.

The Venice Charter elaborated on the Athens Charter of 1931, which was developed by conservationists of historic buildings. These conservationists became aware that it was important to go beyond listing and safeguarding historic buildings to understanding their historic context and environment. It is likely that the first president of ICOMOS, Piero Gazzola, had a significant influence in the composition of the Venice Charter. It has withstood multiple movements to be adjusted, revised and even replaced because of its broad phrasing, visionary scope, and the difficulty of writing another charter “as comprehensive and effective.” (Erder March 1977) The numerous challenges are evidenced by the extensive bibliography of articles on the Venice Charter that has been compiled by ICOMOS. (Documentation Center August 2004)

Figure 3: Piero Gazzola, First President of ICOMOS and likely the main authors of the Venice Charter. Credit: http://www.studioesseci.net/allegati/mostre/461/Piero%20Gazzola_m.jpg

Since 1964, a multitude of different cultural heritage

policy documents have been developed in the form of charters, documents, declarations, conclusions, pacts, conventions, recommendations, norms, accords, and other statements guiding the stewardship of our cultural heritage. (Steele 2009) Charters typically hold the highest priority, though, depending on the circumstances, other types of documents may be more important when considering a specific heritage asset. For simplicity, these statements will be referred to as “documents” throughout the remainder of this paper. What is critically important to understand is that none of these documents are legally binding in and of themselves. The structure of the international heritage conservation system is that all “member states” must pass legislation within their country ratifying the World Heritage Convention. (UNESCO 2014) An explicit requirement of this membership is the requirement that the members will adhere to the cultural heritage policy documents. As of September 2012, there are 190 member states that are parties to the Convention out of up to 196 independent countries. (UNESCO 2012)

Given the wide array of cultural heritage policy documents that have been developed in the international cultural heritage realm, it is difficult to organize them in a manner which makes clear exactly what has been provided and what might be missing. Geographical and/or regional classifications reveal that there are relatively few charters that have

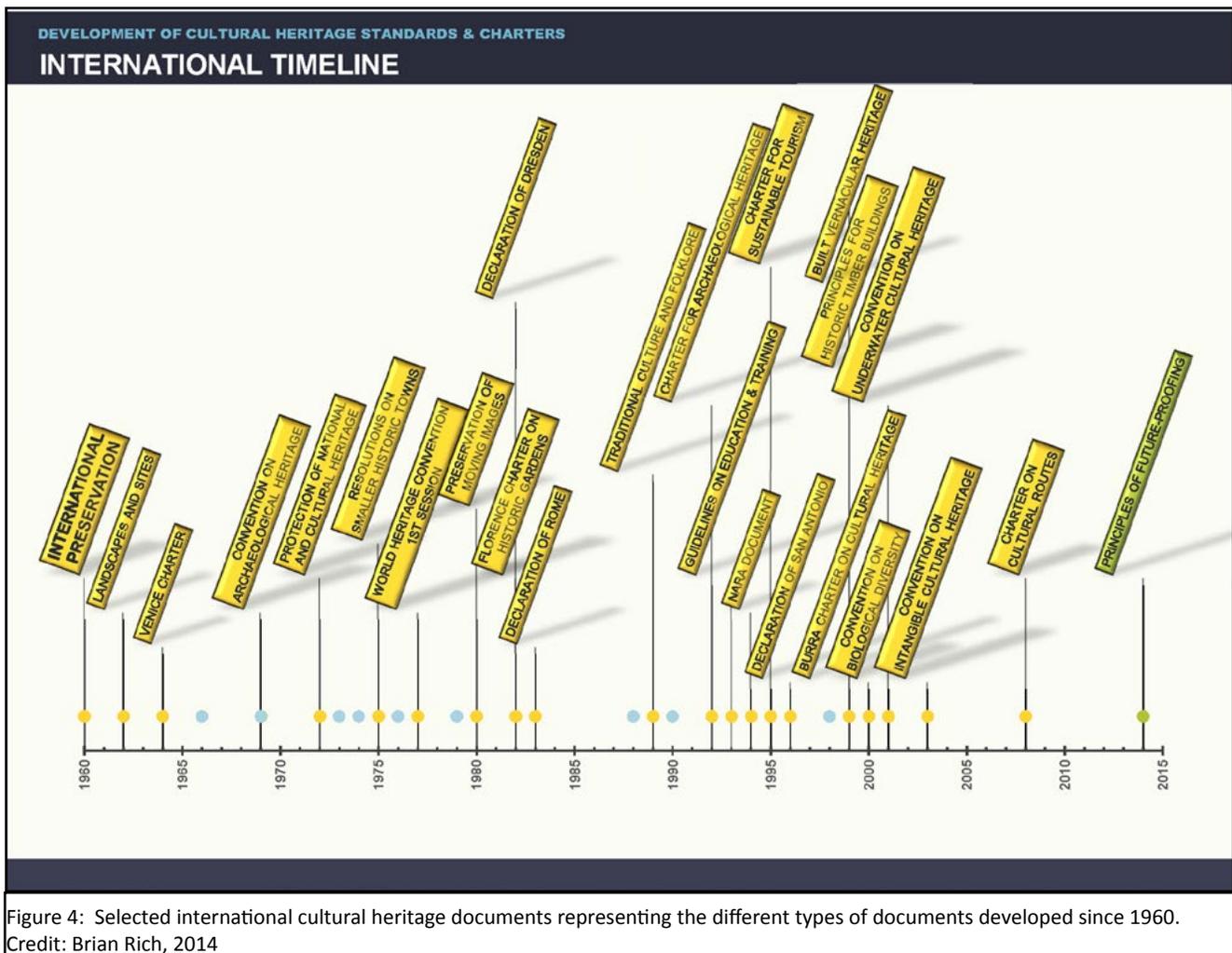


Figure 4: Selected international cultural heritage documents representing the different types of documents developed since 1960. Credit: Brian Rich, 2014

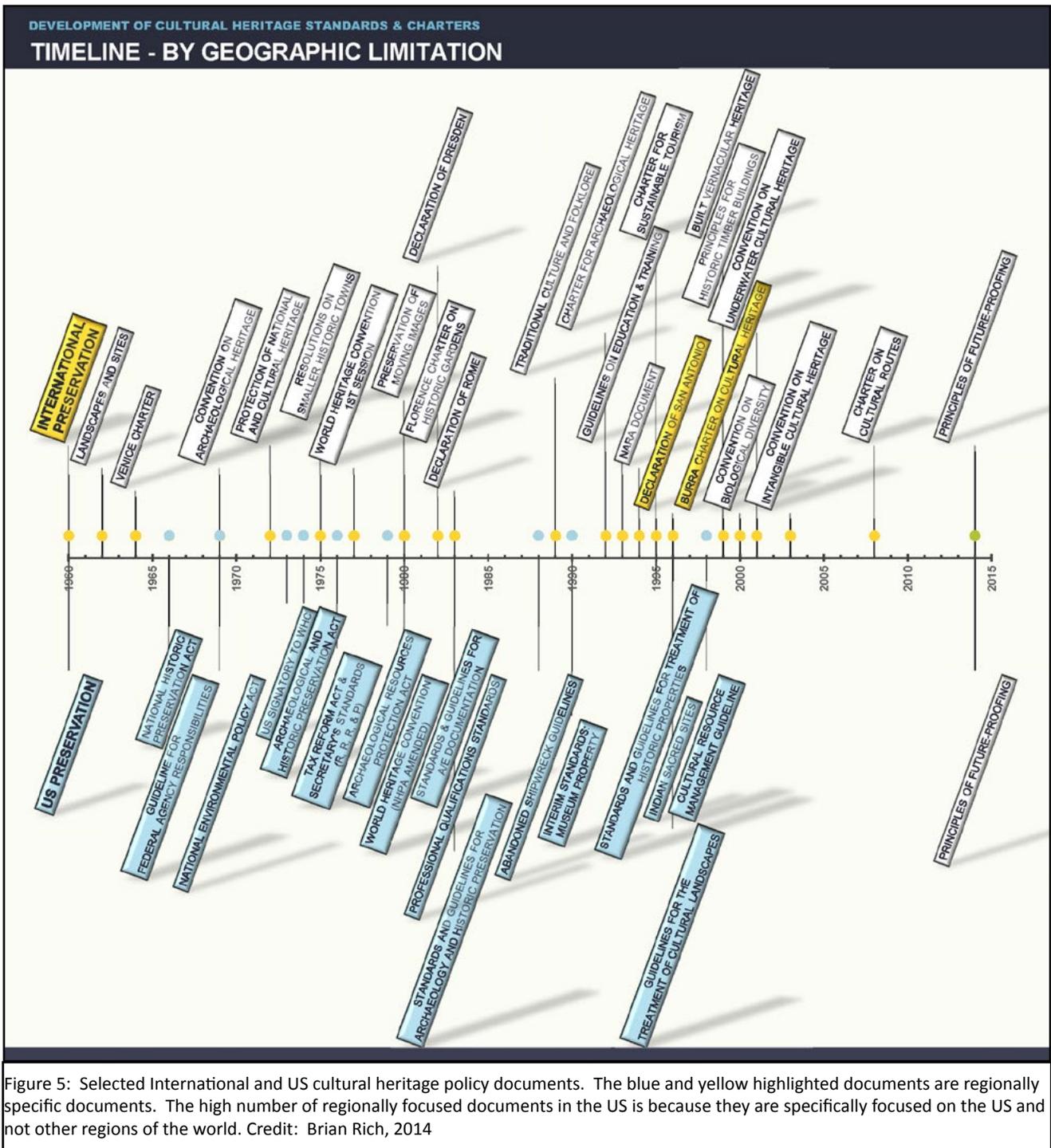


Figure 5: Selected International and US cultural heritage policy documents. The blue and yellow highlighted documents are regionally specific documents. The high number of regionally focused documents in the US is because they are specifically focused on the US and not other regions of the world. Credit: Brian Rich, 2014

been developed for specific areas. This suggests that the documents that have been developed are due to truly different circumstances that had not been addressed previously. For example, the 1999 Burra Charter, developed by a member state, is the first major charter to address indigenous cultural heritage, including cultural sites, and is particular to Australia. (Steele 2009) Similarly, the Principles for the Preservation of Historic Timber Buildings, developed by ICOMOS in 1999, are developed to address a particular technical issue in heritage buildings. In general, whether the subject of the charter is geographic [such as North America or South America], technical [such as heavy timber structures], specific to a building type or use [such as museums], a type of asset [such as intangible heritage, archaeology or landscapes], or a special topic [such as authenticity or underwater heritage], the documents are usually crafted in a manner that ad-

TIMELINE - BY SPECIAL TOPIC

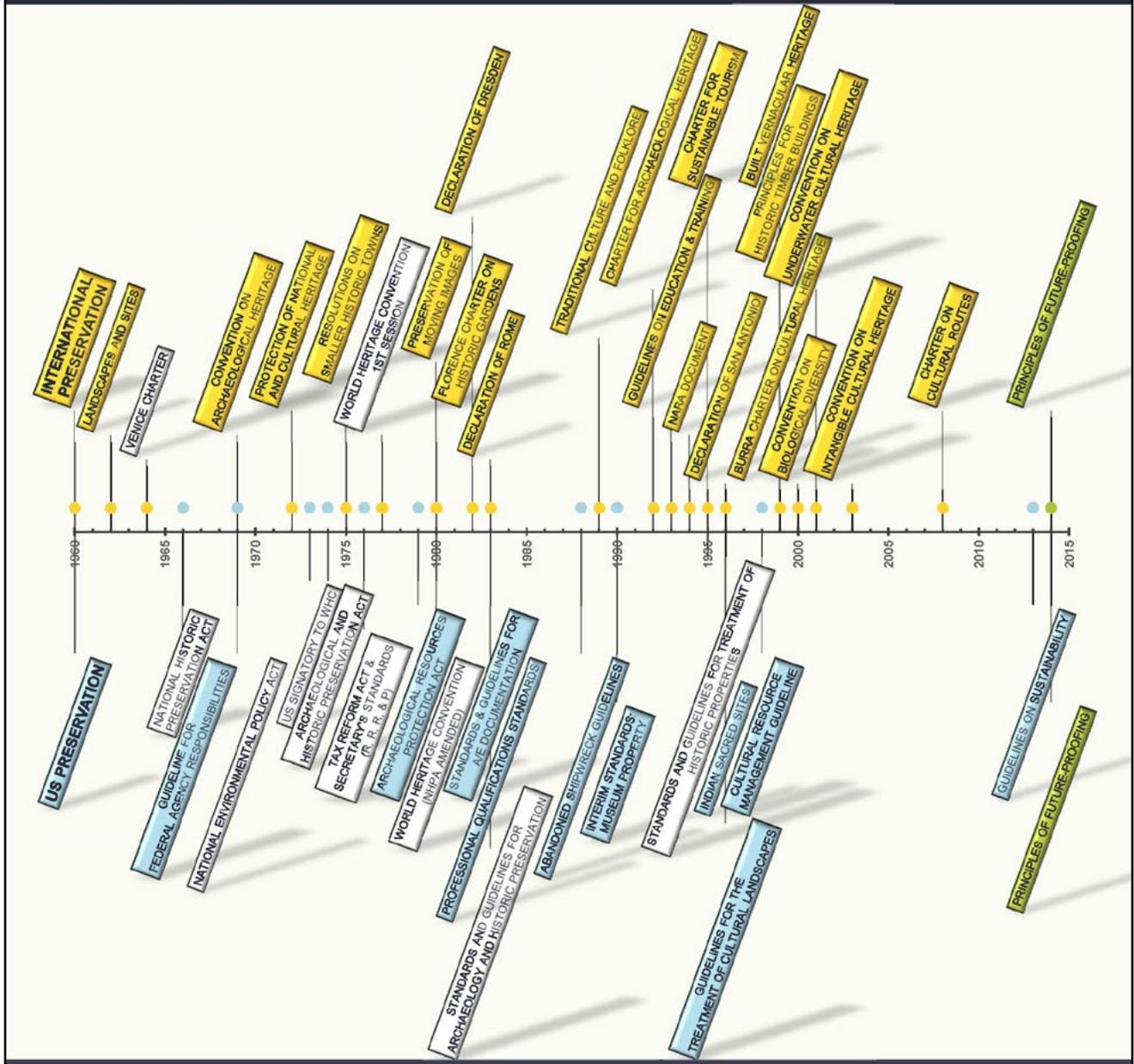


Figure 6: Selected International and US cultural heritage policy documents. Blue and yellow highlighted documents represent special topics addressed. Note that the International documents have a significantly higher number of special topics. Credit: Brian Rich, 2014.

dresses the particular need of that subject.

However, the structure of the international cultural policy documents enables them to work with each other in very important, flexible ways as well. For instance, while one charter addresses a subject for one region, it is written in a manner such that it can be applied to different regions and another charter does not have to be written on that subject. Each of the documents represents a different way of understanding our heritage values as they have developed over time. All of the cultural policy documents work together as a family of charters that guide different aspects of preserving our

TIMELINE - BY TECHNICAL SUBJECT

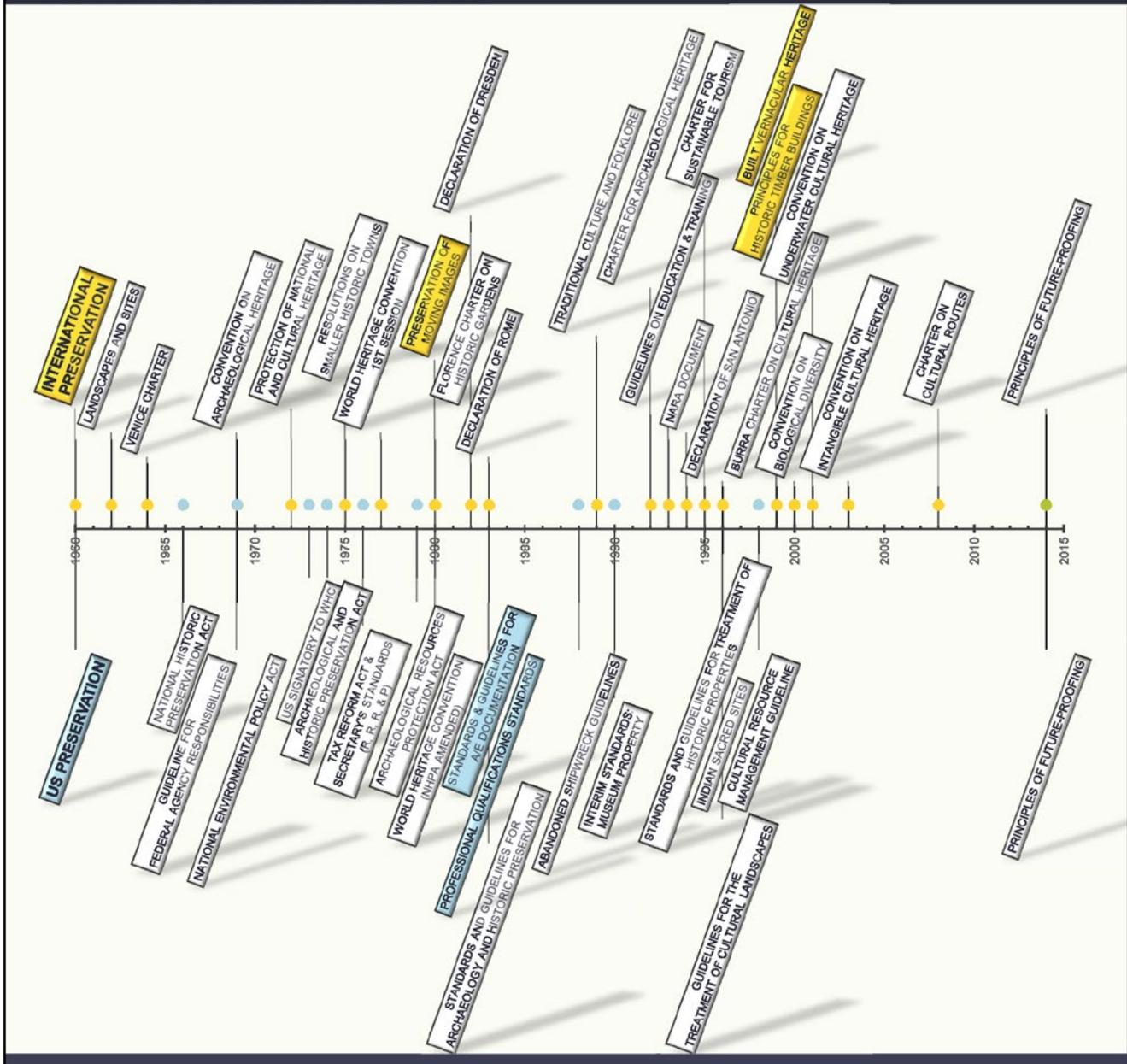


Figure 7: Selected International and US cultural heritage policy documents. Blue and yellow highlighted documents indicate technical subjects are addressed. Note that few technical subject rise to the level of policy documents. Extensive professional research on technical preservation topics are available. Credit: Brian Rich, 2014

cultural heritage. They are all necessary to address the multi-faceted variety of heritage assets that are being preserved today. Indeed, it is clear that there charters missing from this system. For instance, there are only a couple of charters that specifically address building materials. There could be charters for each type of building material that has been used. For instance, there are charters that address the unique conditions of almost every inhabited part of Earth, but there is no charter that addresses the unique conditions of the moon. Understanding the capabilities of this system, i.e., that general documents are supported by documents on specific subjects, is critical to understanding how to make the Principles of Future-Proofing work within this system.

TIMELINE - BY ASSET TYPE

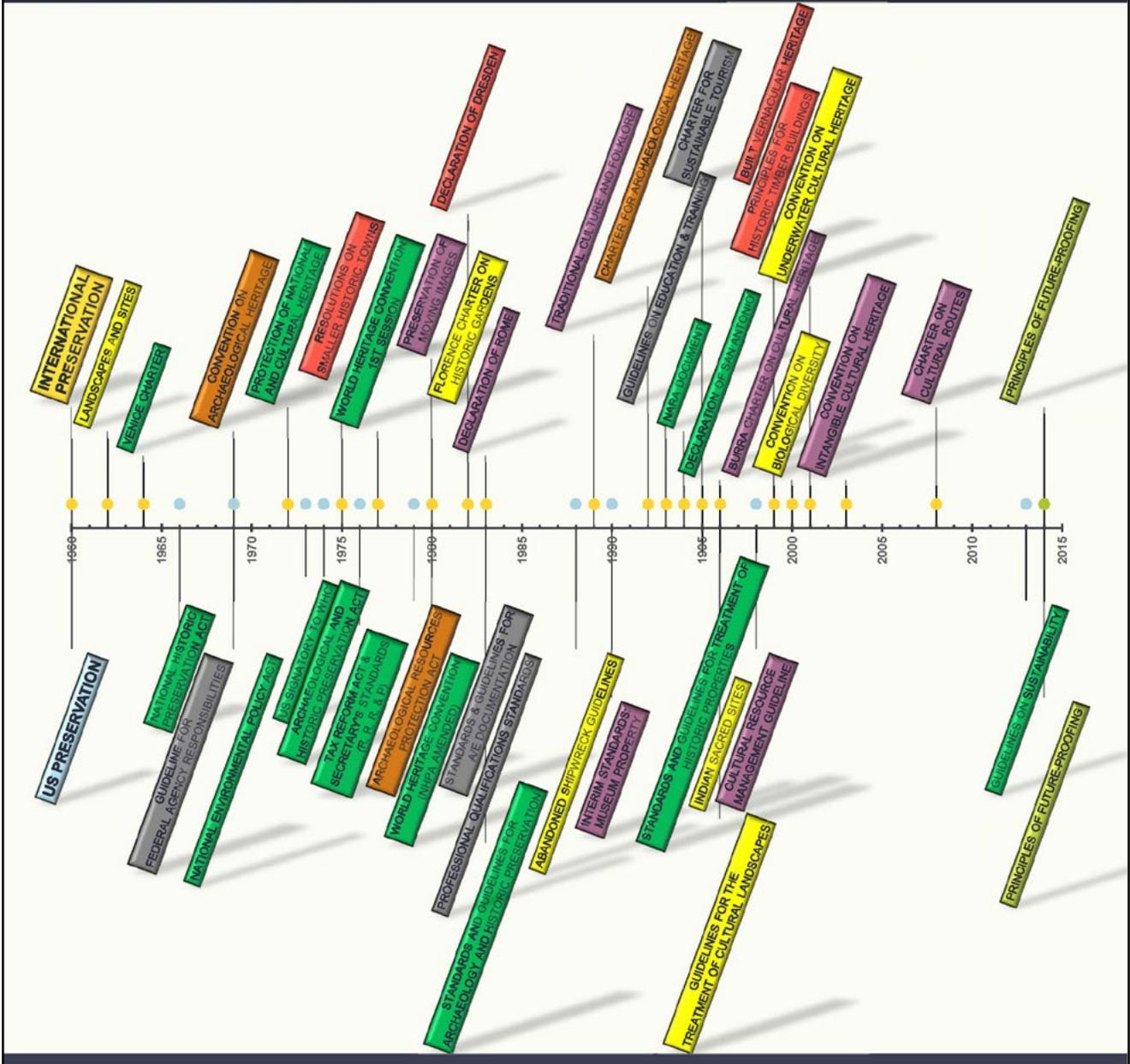
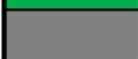


Figure 8: Selected International and US cultural heritage policy documents. Documents are highlighted according to the type of heritage asset to which they are relevant. Credit: Brian Rich, 2014

	Type of Asset
	Archaeology
	Buildings and Monuments
	Cultural
	Landscape and Site
	General
	Process/Training

TIMELINE

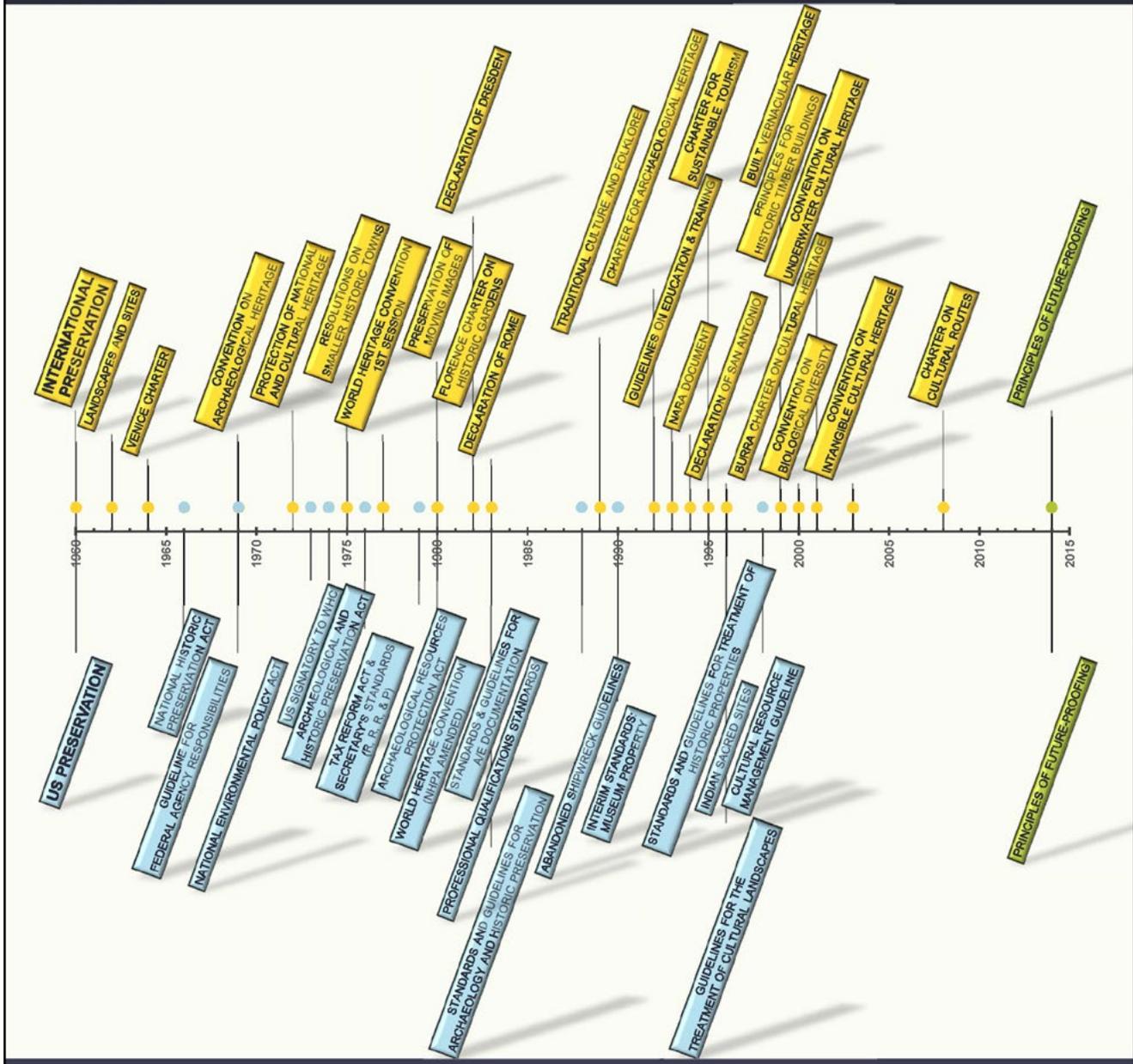


Figure 9: Selected International and US cultural heritage policy documents. Blue highlighted documents are applicable to the United States. Yellow highlighted documents are applicable to Parties to the World Heritage Convention. Credit: Brian Rich, 2014

Historic Preservation in the United States

The International system of heritage conservation, by contrast, is quite different from historic preservation in the United States is quite different – even including the name given to the same activities. Despite the fact that the National Historic Preservation Act of 1966 [NHPA] was passed two years after the Venice Charter, the NHPA does not incorporate or reference it, nor any other international cultural heritage policy document. (Steele 2009) Even though the United States

became a signatory to the World Heritage Council in 1973, and thus is bound by the international cultural heritage policy documents, it does not use them, except for cultural or natural world heritage sites.

The system of Standards and Guidelines in the US was developed in response to the requirements of the 1976 Tax Reform Act which authorized federal government money to be expended on historic preservation projects through a tax credit system. Development of the Standards was delegated to the National Park Service by the Secretary of the Interior. Formally known as the Secretary of the Interior's Standards for the Treatment of Historic Properties, the four Standards were required in order to have a somewhat objective basis upon which to evaluate the projects and test whether they could be awarded the tax credits. The four standards include Rehabilitation, Restoration, Reconstruction, and Preservation of Historic Buildings. The Standards are typically referenced as the criteria by which proposed projects are evaluated. The Standards are complimented by a set of guidelines which do not have the force of law but which illustrate the intent of the Standards.

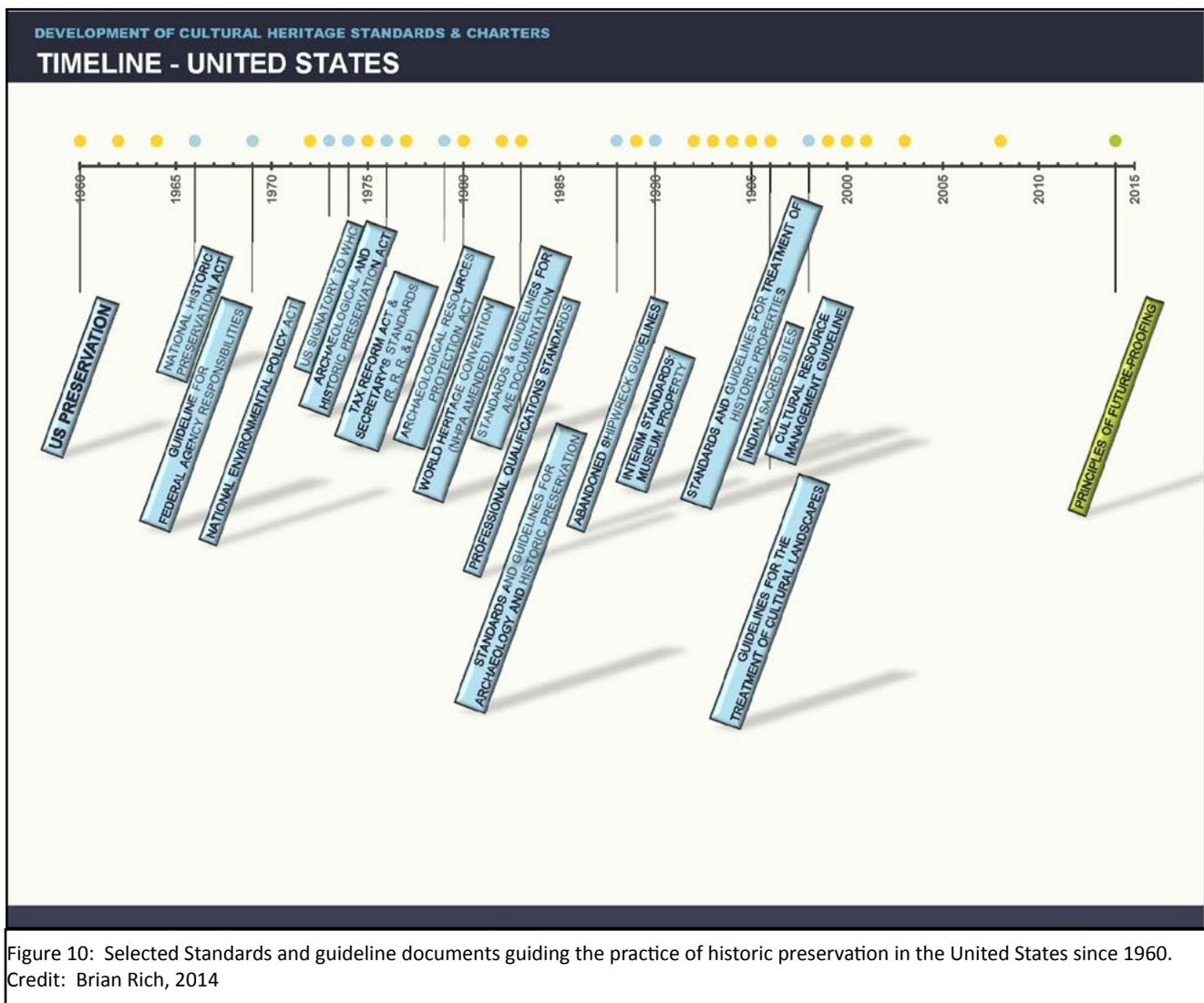


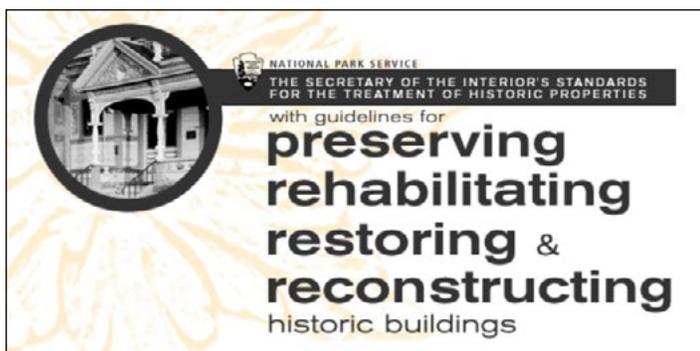
Figure 10: Selected Standards and guideline documents guiding the practice of historic preservation in the United States since 1960. Credit: Brian Rich, 2014

To implement the Standards, each state or local jurisdiction was required to pass enabling legislation. Either the enabling legislation or rules and regulations developed to compliment the legislation adopt the Standards. The preservation laws passed are significant in the US because they frame the requirements for preservation. By contrast, the international charters are developed without regard to specific legal or political influences and processes. Despite the intent of the Standards to be applied only to Federal Tax Credit Projects, they have become adopted by almost every jurisdiction across the US as the de-facto system for evaluating projects.

In addition to the Standards, several Policies, Directive, Technical Briefs, the Code of Federal Regulations [CFR], and other documents have been developed that have varying levels of control over actions taken on historic buildings. Policies and Directives have most often been issued by the Secretary of the Interior to clarify procedural issues at the Federal level. The CFR is the compliment to the legislation giving specific procedural and technical requirements for implementation of the legislation. There are also often directives and policies implemented by local jurisdictions as well. Technical Briefs are a series of technical guidance documents that are available to guide the design of interventions in historic buildings, but do not have legal standing as a requirement.

It is interesting to note the timing of the development of the Standards in the US. Consider the following:

- The Venice Charter was written and adopted in 1964. (Steele 2009)
- The US National Historic Preservation Act was passed and became law in 1966. (Steele 2009)
- The US became a signatory to the World Heritage Convention in July 1973. (UNESCO 2012)
- The US Federal Historic Preservation Tax Incentives Program was passed in 1976. (NPS 2013)



- The Secretary of the Interior's Standards and Guidelines were developed and first published in 1979, and have gone through several revisions subsequently. (Tyler, Ligibel, and Tyler 2009)

Figure 11: The logo on the home page of the Secretary of the Interior's website for the 4 Treatements for Historic Properties. Credit: <http://www.nps.gov/hps/tps/standguide/>

Given this timing, one wonders why the Venice Charter was

not adopted in the United States. Certainly it would have been well known amongst preservation professionals at the time. It is likely that the Venice Charter was not adopted precisely because of its very strengths, i.e., because of its general nature. Using the Venice Charter would not have provided objective enough criteria to evaluate Federal Tax Credit projects.

Similar to the international documents, the preservation related policies in the US can be classified in several different ways. The most important thing to note about this classification is that there are a larger number of documents that attempt to give general guidance, relatively few legally recognized Standards for aspects of cultural heritage other than buildings, and a host of non-compulsory documents that are intended to guide historic preservation work in the US. One further difference is that the US documents tend to be more technically precise and less subjective than the international documents. This limits their applicability to broad ranges of cultural heritage assets. The consequence is there are several gaps in the understanding and perception of cultural heritage within the US.

The essential difference from the international documents is that the Standards, Guidelines, and other guiding documents must be explicitly incorporated into the laws and/or rules and regulations that govern each municipality and state. The result is that often the applicable Standard is only the Standards for Rehabilitation, and that compliance with the remaining documents are not required. In the international system, once a States Party ratifies the World Heritage Convention, they have the resources of the Operational Guidelines and all of the international cultural heritage policy documents developed by the WHC, member states and organizations available.

The US preservation laws and documents are often awkward in their application especially because they do not cover the breadth of subjects and represent the values of cultural heritage well in a broad sense. For example, there have been several iterations of General Standards, but few are directed to specific topics such as building types, technical issues, or regions, nor are they integrated in a way that coordinates well. For instance, the Standards for Cultural Landscapes are rarely incorporated into a jurisdiction's requirements, and when they are, they may also conflict with the site requirements of the Rehabilitation standards. The result has been an ever changing landscape of less well written documents that are not necessarily applicable to all situations uniformly.

Integration of the Principles of Future-Proofing

It is instructive to consider the incorporation of the Principles of Future-Proofing within the LEED Rating Systems and compare this to incorporation within the US and international cultural heritage policy documents. In considering how the Principles may be best integrated into cultural heritage policy documents, both vertical and horizontal integration should be considered. Horizontal integration is a strategy where one creates or acquires outputs which are alike - either complementary or competitive. Vertical integration, is the integration of integrating subsystems according to their functionality, such as “multiple stages of production of a small number of production units” that are complete functional entities referred to as “silos.” (Wikipedia 2013)

For example, the US Green Building Council’s LEED Rating systems are vertically integrated: Each rating system is a vertically integrated independent system. The LEED Rating Systems are a series of criteria for evaluating the sustainable performance of a building. While the system is limited to buildings and their immediate sites, typically, they all have important commonalities. Their structure and implementation is the same in all of the systems, an ideal characteristic of a family of vertically integrated systems. In addition, they all have at least 6 rating categories that are consistent across the systems. All of them feature a specific category for experimental or developing criteria which allows for exceptions to the system. (USGBC 2014) Most important in this system of documents, each rating system is an integral system that is independent of the other rating systems. In the LEED system, the Principles of Future-Proofing would have to be incorporated into each “silo” as a criterion or category of criteria within each LEED system rather than as a parallel system of criteria. Further, the Principles would have to be incorporated into each of the rating systems simultaneously.

While the international cultural heritage policy documents and the US Standards appear similar in their structure and format and even their language, their implementation is quite different. Similar to the LEED Rating systems, the US historic preservation documents are implemented in a vertically integrated system. They are arranged and employed in a manner that allows them to operate independently from each other. In this arrangement, like the LEED Rating system categories, the Principles of Future-Proofing would have to be integrated into each Standard. As an independent standard, the Principles might be adopted, but it would be unclear as to when they should be applied. The US system was easy to create initially, but it is much more complicated to implement across the board changes to all of the Standards.

Because of the way the US system of historic preservation legislation and Standards are set up, however, there is another method of implementing the Principles of Future-Proofing. As discussed above, legislation is supported by a series of rules and regulations which are created and implemented by the agencies that oversee this particular aspect of government in each jurisdiction. For instance, the King County Historic Preservation Program has written and implemented Rules and Regulations that provide more precise guidance for their activities. In this situation, significantly more effort is required: there is the opportunity to implement the principles of Future-Proofing by adding them into each set of rules and regulations. The advantage of this process is that it would avoid the political challenges of changing the preservation legislation. The challenge with this proposal is that adoption of the Principles could be inconsistent across the country, not to mention the potential of creating financial hardships which are typically prohibited by current preservation law.

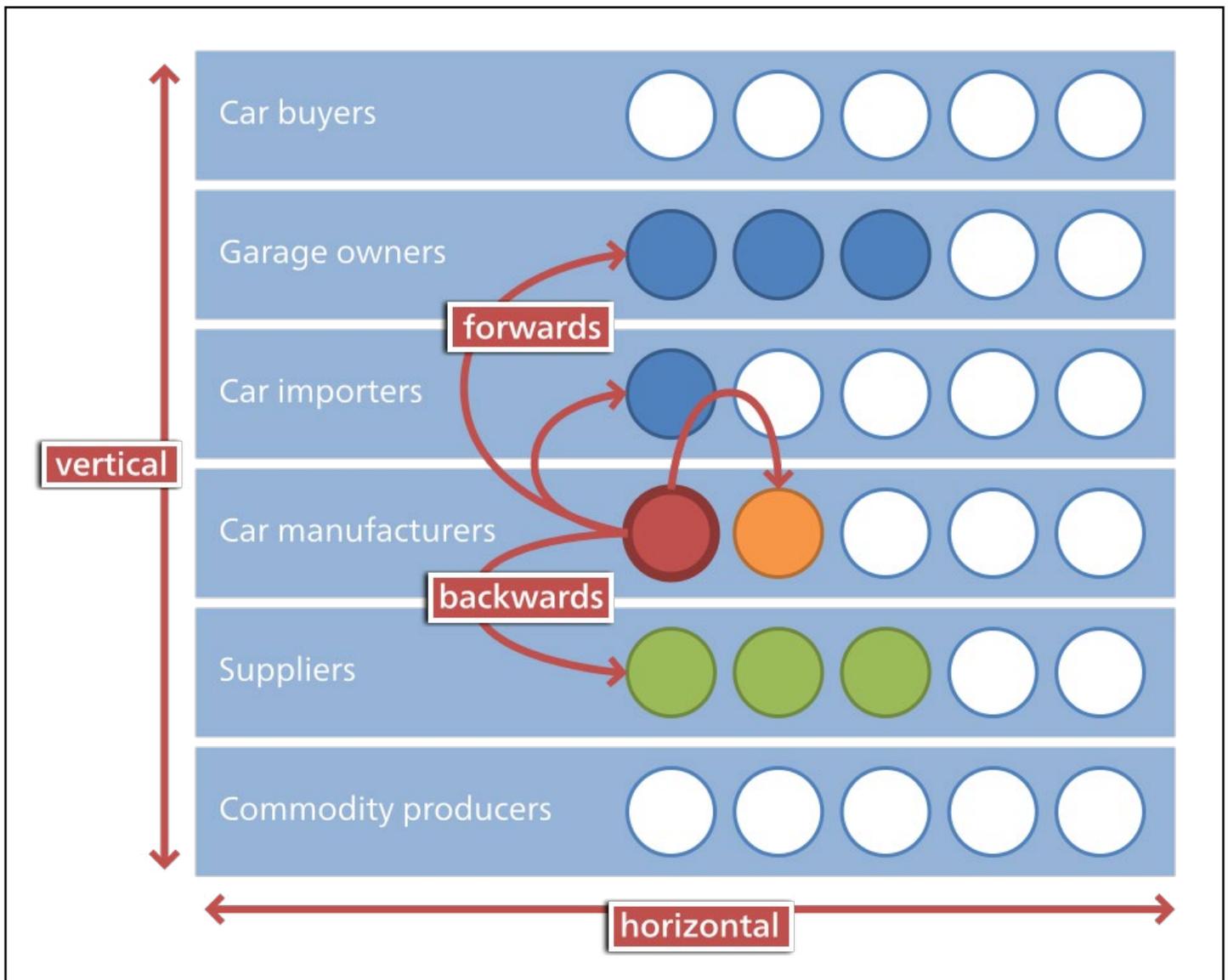


Figure 12: A diagram of horizontal versus vertical integration. Vertical integration includes all phases or steps in the process of developing a product from raw materials to the customer. Horizontal integration includes all of the capabilities at each phase. Credit: http://en.wikipedia.org/wiki/Vertical_integration

By contrast, international cultural heritage policy documents are an example of a set of horizontally integrated cultural heritage policy documents. Again, this is due to their implementation more than their format or structure. With the international cultural heritage policy documents, there may be several applicable documents to consider and inform decisions on cultural heritage projects. In international cultural policy documents, the Principles of Future-Proofing would be adopted as a parallel set of requirements, i.e., horizontally integrated, that would be employed at the same time a combination of the 1964 Venice Charter, 1999 Principles for the Preservation of Historic Timber Buildings, and the 1994 Nara Document on Authenticity. Horizontal integration of the Principles of Future-Proofing supports a broad range of applications. The Principles would be adopted as a new document that is broad enough to be applied to all regions, building types, and technical subjects like the other documents discussed above.

The Principles are applicable at the scale of minor interventions as well as large projects. At the small scale, for instance, consider the appropriate selection of mortar for repointing a brick wall system. Incorrect selection of mortar, such as mortar that is harder than the brick or not vapor permeable, may result in damage to historic building fabric, in this case, the brick. This irreparable damage is not in keeping with the Principles of not promoting deterioration, extending service life, high durability and reducing obsolescence. The Principles can also be broadly applied to the consideration of entire buildings and sites. For instance, the design of a series of commercial buildings with a 20 year design service life and developed in a flood zone would not meet the requirements of the Principles. Such a project would be prone to flooding and other damage from severe weather and cultural changes. It would also be likely built of materials intended to only last for a short period of time and would not meet the future-proofing goals of durability and long service life.

The Principles of Future-Proofing: An International Cultural Heritage Policy Document

International cultural heritage policy documents have some common characteristics that should be included if the Principles of Future-Proofing are to be implemented in the international arena. Most of the documents include some or all of the following items (Steele 2009):

Preamble

1. Discussing the context and geographic applicability

Acknowledgements

2. Recognizing previous Charters that inspired and informed the current effort

Definitions

3. Clarifying specific terminology as it relates to the current effort

Objectives/goals

4. Over-arching goals to assist in the interpretation of individual articles or principles

Principles

5. The core of the document with several concise statements of principle

Discussion

6. Elaboration upon the principles enumerated above

Specific Topics

7. Discussion of specific topics in relation to the principles

Given this structure, the Principles of Future-Proofing may be re-written as follows:

Preamble

1. In recognition of the 50th anniversary of the Venice Charter, we, the experts gathered in Seattle today, look forward to the continuing understanding of our built cultural heritage. At a time when we are faced with significant challenges of sustaining our habitation of planet earth, we aspire to be both better stewards of our environment and our heritage. The role of the Principles of Future-Proofing is to provide a framework in which to evaluate the balance of both the tangible and intangible values of our built environment, cultural heritage and environmental values.

Acknowledgements

2. The experts present acknowledge the significant visionary conception of the Venice Charter and subsequent cultural heritage policy documents that have been developed by dedicated professionals from around the world. We also wish to acknowledge the contributions of the USGBC and sustainable design professionals who continually inspire market growth toward a more sustainable built environment.

Definitions

3. For the purposes of these Principles, the following definitions are acknowledged:
4. Future-Proofing: The process of anticipating the future and developing methods of minimizing the effects of shocks and stresses while taking advantage of positive future events.
5. Cultural Heritage: “The heritage that includes artefacts, monuments, a group of buildings and sites that have a diversity of values including symbolic, historic, artistic, aesthetic, ethnological or anthropological, scientific and social significance.” (UNESCO 1972)
6. Natural heritage: “Natural sites with cultural aspects such as cultural landscapes, physical, biological or geological formations.” (UNESCO 1972)
7. Built Heritage: Immovable cultural heritage.

Objectives

8. The Principles of Future-Proofing are conceived in the spirit of the international cultural heritage policy documents. The Principles build upon and expand the understanding of the long term implications of preserving our built environment and respond to concerns of resiliency and resource limitations apparent in our contemporary world.

Principles

9. **Comply with applicable cultural heritage policy documents.** Cultural Heritage Policy Documents provide excellent guidance for the long term retention of an historic building.
10. **Promote prevention of deterioration of our built heritage.** It is natural for all building materials to deteriorate. Interventions in historic structures should not accelerate the deterioration of the existing building fabric. A proposed oath, with acknowledgment of the Hippocratic Oath and Cervat Erder’s proposal (Erder March 1977):
 - a. *The procedures and materials selected shall be for the benefit and respect of our cultural heritage. We shall give no harmful treatment, nor counsel such, nor aid in the deterioration or demolition of any monument. As stewards of our heritage and for the benefit of society, we shall spurn harmful practices and document all steps taken.*
11. **Allow understanding of the built environment and its place in our built heritage.** Interventions in historic structures should allow the students of history in our future to understand and appreciate the original historic building as well as the interventions which have kept it viable.

- 12. Stimulate flexibility and adaptability of our built heritage and our attitudes toward it.** The interventions in an historic structure should not just allow flexibility and adaptability, but also stimulate it. Adaptability to the environment, uses, occupant needs, and future technologies is critical to the long service life of a historic building.
- 13. Extend service life of our built heritage so it may continue to contribute to our knowledge and understanding.** Interventions in historic buildings should help to make the building useable for the long term future rather than shorten their service life.
- 14. Fortify our Built heritage against climate change, extreme weather and shortages of materials and energy.** Interventions should prepare the building for the impacts of climate change by reducing energy consumption, reducing consumption of materials, withstanding extreme natural events such as hurricanes and tornadoes.
- 15. Increase durability and redundancy of our built heritage.** Interventions in historic buildings should use equally durable building materials. Materials that deteriorate more quickly than the original building fabric require further interventions and decrease the service life of the building.
- 16. Reduce the likelihood of obsolescence of built heritage.** The building should be able to continue to be used for centuries into the future. Take an active approach: regularly evaluate and review current status in terms of future service capacity. Scan the trends to provide a fresh perspective and determine how your historic building will respond to these trends.
- 17. Consider long term life-cycle benefits of interventions in our built heritage.** The embodied energy in existing structures should be incorporated in environmental, economic, social, and cultural costs for any project.
- 18. Incorporate local materials, parts and labor into our built heritage.** The parts and materials used in historic building interventions should be available locally and installed by local labor. This means that the materials and manufacturing capabilities will be readily available in the future for efficient repairs.

If one were to consider incorporating the Principles of Future-Proofing into the US system of preservation Standards, it would be most successful as a component of a vertically integrated set of documents or as a paragraph that could be easily added to the rules and regulations for each jurisdiction. The succinctly phrased paragraph might take the core of each of the Principles and rely on supporting information to elaborate on its requirements. Below is a proposal for a vertically integrated Principle of Future-Proofing:

Future-Proofing shall prevent promotion of deterioration and obsolescence of our built heritage through the application of appropriate cultural heritage policy documents. It shall extend the service life of our built heritage through flexibility and adaptability, employment of durable materials and due consideration of the long term effects of appropriate interventions, local materials and labor, allowing for the ability to understand it's place in our built heritage.

Conclusion

The Principles of Future-Proofing are compatible with existing cultural heritage policy documents and Standards and may be composed in a manner which can be integrated into both the international and US system of cultural heritage. Where the international documents are arranged in a horizontally integrated system, the Principles can be integrated as a parallel document to be included on projects in a broad variety of locations, technical issues, building types, and can be arranged as a set of principles and explanatory information similar to existing charters and declarations. Though more difficult because of the vertical integration of the US system of preservation Standards and Guidelines, the Principles may be implemented in a couple of ways. First, the Principles may be integrated through incorporation into the current Standards. Alternatively, the Principles can be incorporated through the rules and regulations required to elaborate on existing preservation legislation in the jurisdictions having preservation programs.

For Further Consideration

With the understanding that the nature of historic preservation is constantly evolving and that current trends are toward value based preservation, it is suggested that consideration of the compatibility of the Principles of Future-proofing and value based preservation be investigated. Another potential area of investigation is the integration of Future-Proofing with sustainable design goals and, specifically, rating systems.

In the United States, consideration of the employment of the World Heritage Convention on a regular basis in place of the Secretary's Standards is appropriate. It seems that significant inertia is behind the use of the Standards and Guidelines, but the international cultural heritage policy documents could be phased in as the Standards are phased out or integrated as an alternate system of guidance for preservation professionals.

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