



NUCLEAR CULTURAL HERITAGE

Nuclear Cultural Heritage: From Knowledge to Practice

Arts and Humanities Research Council,
research grant AH/S001301/1

Kingston University London, Concluding report

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The opinions expressed in the document are not necessarily those of the authors' employers.



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Suggested citation: Rindzevičiūtė, Eglė (2022) *Nuclear Cultural Heritage: From Knowledge to Practice. Concluding Report*. AHRC Research Networking Project, AH/S001301/1. Kingston upon Thames: Kingston University London.

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Introduction: Whither heritage?

The research networking project *Nuclear Cultural Heritage* (2018-2022) was set up to establish a network between scholars and practitioners for exploring an emerging field of thought and action: the heritagisation of nuclear objects, buildings and sites. The project gathered over 50 leading scholars, artists, designers, curators, archivists, heritage practitioners and nuclear industry representatives from the UK, France, Spain, Germany, Sweden, Lithuania, Ukraine, Russia, USA and Canada, who participated in four workshops dedicated to the following key issue areas: collecting, interpreting and governing nuclear cultural heritage. These workshops were hosted by Kingston University London (2019), Dounreay in Thurso, Scotland (2019) and Science Museum in London (2022). The UCL Institute of Advanced Studies and the UCL School of Slavonic and East European Studies hosted a roundtable discussion and the presentation of the concluding report (2022).

In addition to scholarly publications, the network issued a joint *Position Statement On Nuclear Cultural Heritage* (2019). A significant outcome of the network activities is the contemporary art exhibition *Splitting the Atom*, curated by Ele Carpenter and Virginija Januškevičiūtė, which opened at the Contemporary Art Centre in Vilnius, Lithuania, in 2020. Ele Carpenter and Eglė Rindzevičiūtė were consultants for Emilija Škarnulytė's film "Burial" (2022), which reflected on uranium mining and radioactive waste. The network's research agenda is taken forward in the research project *Nuclear Spaces: Communities, Materialities and Locations of Nuclear Cultural Heritage* (NuSPACES), funded by the EU Joint Programming Initiative on Cultural Heritage (2021-2024) and led by Dr Eglė Rindzevičiūtė (P.I., Kingston University London, UK), Dr Linara Dovydaitytė (Co-I., Vytautas Magnus University, Lithuania) and Prof Anna Storm (Co-I, Linköping University, Sweden).

This final report presents a summary discussion of the debates developed in the workshops highlighting some of the key insights and issues identified by network participants.

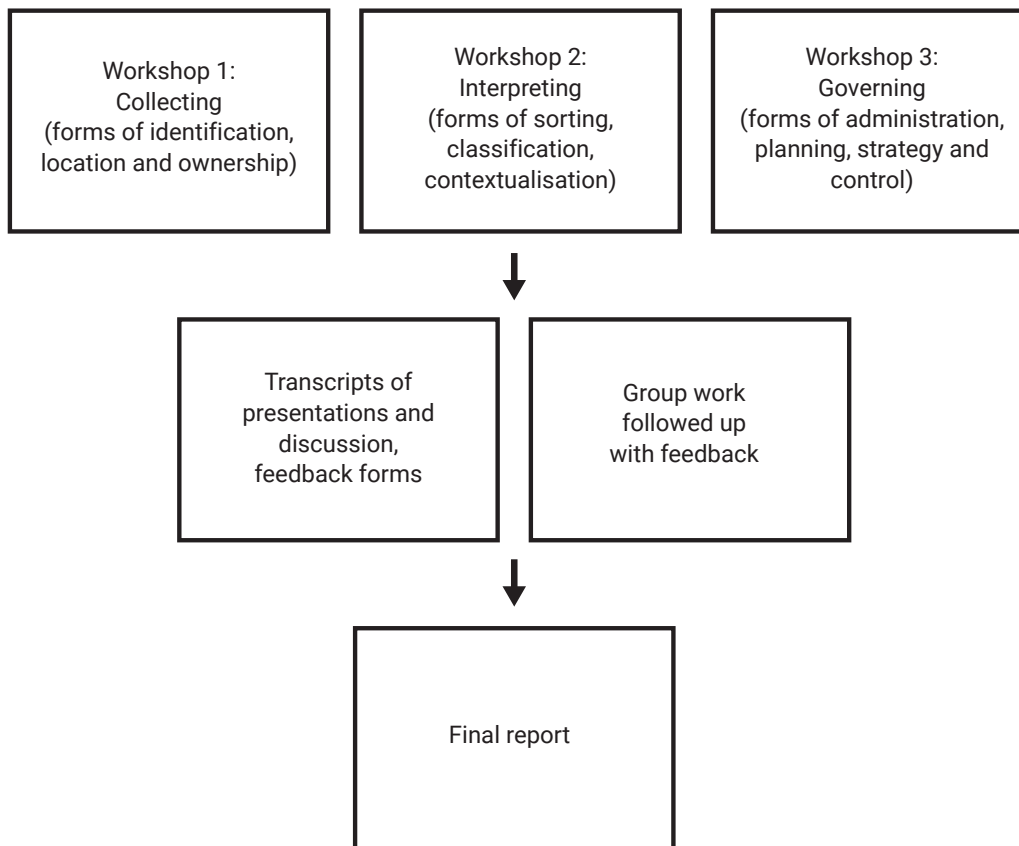


Figure 2. The process of evidence gathering

The writing of this report took place in the context of turbulent changes and increasing global insecurity, as Russia invaded Ukraine on 24 February 2022. Condemning Russia's aggression against Ukraine, the networking project ceased contacts with official institutions in Russia. The ongoing war requires rethinking anew questions of the cultural value of nuclear cultural heritage in the context of the re-securitisation of the nuclear industry along economic and national security lines. Although it is difficult to foretell which impacts will be lasting, the following points can be noted:

- In European countries, nuclear power is invoked not only as a green solution in energy transition to a decarbonised economy, but also as a matter of national security capable of weakening dependence on Russian oil and gas.
- Russia's capture of Ukrainian nuclear power plants and sites, Zaporizhzhia and Chornobyl', and shelling of nuclear facilities, propelled the civil nuclear energy sector into the sphere of military concerns in an unprecedented way.
- The risk of the potential deployment of nuclear weapons appears to have increased significantly.
- Russia's attack against Ukraine reverberates in the nuclear societies of the Global North and South, demonstrating just how much the safety of the nuclear industry is dependent on political stability and international coordination.

What, then, are the roles of cultural heritage in this extremely volatile and uncharted territory of the nuclear present and the future?

This report argues that there is an important place for nuclear cultural heritage: heritage is, after all, not an assembly of things, but a social process, an interface which enables societies to cope with difficult and complex problems. The emerging histories of nuclear cultural heritage-making demonstrate that new forms of society are produced through the practices of collecting, interpreting and governing nuclear cultural heritage. Moreover, nuclear cultural heritage-making has important implications for democracy and civil society because it opens up important pathways for joining up different policy sectors, bringing different stakeholders together and actively shaping more viable living milieus in the nuclear age.

While this report is not intended to be a conclusive overview of the state-of-the-art of nuclear cultural heritage as a field of research and practice – this task is being pursued in the NuSPACES project – we hope that it will inform nuclear cultural heritage scholars and practitioners about the complexity of this field of knowledge and action. We also hope that this report will serve the wider public as a useful reminder of the centrality of nuclear technology for our cultures and societies. It will hopefully inspire engagement in nuclear cultural heritage-making to make the nuclear world more democratic, reflexive and safe.

Acknowledgements

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I would like to thank all the participants of the workshops whose ideas fed into this report and I also thank the readers of the draft version of the report for their comments and suggestions: Robert Bud (Science Museum), Philip Greatorex (Sellafield Ltd), James Gunn (Dounreay Ltd), and Susan Molyneux-Hodgson (University of Exeter). A special thank you to Jonas Žukauskas for graphic design.

A note on illustrations.

The report is illustrated with images created by the artist Agnė Gintalaitė (2022). These images, produced with Midjourney, explore the configuration of nuclear imaginaries in the algorithmic environment: Midjourney creates images in response to textual prompts. The prompts deployed for these illustrations included keywords that are commonly used to describe nuclear iconography, such as post-nuclear landscape, nuclear fear, nuclear power plant, bright nuclear future, atomic explosion and so on. Although the resulting images clearly draw on the traditional repertoire of visual culture, they omit some of the widespread forms and tropes: for instance, the mushroom cloud did not appear following the prompt “nuclear explosion”. At the same time, the AI visualisations of nuclear power oscillate between Cold War propaganda aesthetics, Hollywoodian dystopia and the romantic aesthetics of decay.



Part 1. Collecting

This part of the project explored the practice of collecting nuclear cultural heritage. The practice of collecting is closely associated with the notion of heritage and inheritance: prominent collections underpin the very institutional identities of national museums and art galleries, which, as a rule, grew out of personal and royal collections of artworks, artifacts, curiosities and various objects. Accordingly, heritage-making as the collection of material objects has been widely criticised for being elitist and Eurocentric (Dercon 2011). Collecting as a hobby, however, is widespread in society. Through collection individuals practice systematic attribution of social values to material culture. Moreover, sociologists argue that it is through assembling, collecting and arranging materials that societies keep themselves from falling apart (Latour 2005).

We argue that nuclear cultural heritage-making is also a form of constructing society. Collection of nuclear cultural heritage, in its traditional sense, entails selecting distinctive or typical objects representing the development of the nuclear industry, listing buildings and sites as heritage objects and establishing museums displaying the histories of nuclear communities. However, the practice of collecting is far from straightforward in the nuclear sector which, since the Second World War, has been embedded in a regime of secrecy (Holloway 1996; Hughes 2003; Wellerstein 2021). Collecting nuclear cultural heritage, therefore, is limited in many ways, where access of curators and the public is restrained in the name of technological safety, national security and corporate economy. Collection of nuclear cultural heritage, even when it is done by prominent national heritage institutions, takes the form of “rescue collecting” or ad hoc “salvaging”; negotiating access to nuclear material culture is an important challenge for heritage professionals (W1; W3; Alberti 2022). At the same time it should not be forgotten that nuclear cultural heritage making is not limited to the technology, designs and laboratories of nuclear reactors and atomic bombs: it is also situated in landscapes and communities outside the official boundaries of nuclear establishments.

Decisions on what aspects of nuclear material culture could or should be preserved and made accessible to the public are key for the preservation of the nuclear past and safeguarding its future. Making such decisions is an active process. Collecting requires negotiation of competing meanings and creative assessment of continuously emerging new cultural resources and values: this is particularly important in dealing with the nuclear past, where lots of different systems of valuation - technoscientific, political, social, environmental and cultural - intersect. This complexity became particularly visible as the project explored different institutional and national cases, focusing on collecting as a form of active management of donor and recipient relationships, which bridge the nuclear industry, cultural heritage professionals, art practitioners, scholars and local communities.

The main finding of the project discussions was that *the ongoing process of nuclear decommissioning has significant implications for the cultural heritage sector*, because nuclear industry establishments routinely make

decisions about the preservation value of data, documents, samples, devices, objects, buildings and landscapes by deciding what will be preserved and what will be destroyed, auctioned or recycled. These decisions, taken by the nuclear industry, create path dependencies that will impact the future understanding of the history of 20th century nuclear power. Nuclear decommissioning is primarily based on the values of efficiency and safety and creating a new type of science and technology for the management of radioactive materials in the extreme long term. While these tasks are core for the industry, there is a pressing need to consider the creation of cultural values as part of the decommissioning process (W1).

While nuclear decommissioning entails disassembling reactors, taking down buildings, cleaning up landscapes, it is also about creating values through documentation, archiving and selective preservation of nuclear material culture. What types of cultural values and narratives will be preserved will differ across different academic disciplines and areas of practice involved: industrial heritage practitioners might focus on different forms of material culture than historians of particle physics, whereas environmental, political and cultural historians might select aspects of landscapes, architectural and industrial infrastructures, paying particular attention to the history of nuclear politics, nuclear labour and social relations in atomic communities (W1). The multiplicity of nuclear cultural heritage is exemplified in official heritage sites such as the uranium mining region of Erzgebirge/Krušnohoří in Germany and the Czech Republic, where the values of industrial, technological and scientific pasts are amalgamated with those of the natural environment and the social and political history of the Soviet occupation of Eastern Europe (W1; W3).

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It is clear that this multiplicity poses a challenge to collection: due to the specialisation of museums, objects might be decoupled from their context and transferred to specialist displays in, for instance, museums of aviation, transport or energy (W1). There is a risk that collection might fragment what are “cultural landscapes of identity and belonging” (W1).

These multiplicities are neither cohesive nor universal: nuclear cultural heritage is not always based on consensus but can emerge through contestation (Lowenthal 1985; Macdonald 2009). Cultural values can be highly contextual, even singular: it can be difficult to separate them from the original context. It would be utopian to search for a universal model of collecting nuclear cultural heritage that would be applicable across the nuclear industry internationally. Accordingly, adoption of a formal definition of nuclear cultural heritage would risk a degree of simplification that can be unhelpful in particular contexts.

The challenge, then, is to devise an approach to nuclear cultural heritage that is open enough to accommodate diverse contexts and changes, but specific enough to be operationalised. In the language of science and technology studies (STS), such a definition should be “translatable” in order to work in practice (Latour 2005; Callon 1984; Czarniawska & Sevon 1996). There is also a need for “translators” – or heritage agents – whose expertise and mandate is recognised in organisational contexts. Perhaps a good

starting point is the notion of heritage as a process and an interface for social reflexivity as well as for reshaping of the material milieus (Harrison 2015). The process-oriented definition is general enough to allow it to be deployed to scope areas for intervention. Recognising this, the Thurso position paper suggested the following definition:

“Accordingly, nuclear cultural heritage can be defined as anything that has come into contact with nuclear science and technology: a vast and hybrid field, including, but not limited to, nuclear power reactors, research reactors, nuclear weapons, nuclear propulsion systems, and isotope technologies in medicine and precision measurement. Identification of nuclear cultural heritage can take different forms: collecting, storing, archiving, preserving and caring for representative artefacts of nuclear material culture, mapping and safeguarding sites, preparing and selecting documentation, recording intangible practices, and establishing and keeping new archives. Each of these fields and corresponding practices require expertise that spans a broad range of professional and disciplinary sectors” (Rindzevičiūtė et al 2019, 4).

1.1. Collecting: implicit and explicit

In a way, the entire world population are collectors of nuclear cultural heritage: man-made radioactive isotopes have affected the planetary environment and, as Ele Carpenter suggested, “nuclear heritage is in our DNA, whether we like it or not” (W1). Nevertheless, from the heritage and cultural policy point of view, collection of nuclear cultural heritage is a conceptually and institutionally bounded process. The process of collection is based on the selective attribution of value which is embedded in different societal and cultural fields. What is a collectable and valuable item for one type of actor could be of little value for another actor.

This said, some forms of collecting may make a claim on universality and objectivity as they underpin the institutional identity of established heritage sector organisations, such as national art galleries and museums (Alberti 2005; Harrison et al 2020; Alberti 2022). Indeed, cultural institutions are described as “value banks” that attribute, preserve and distribute cultural values in a way that is not unlike financial banks (Joselit 2013). Because of their capacity to stabilise values, cultural institutions are recognised as capital-generating sites where social and political power is produced (Bourdieu 1987). The key issue here is to make the process of production fair and just, so that cultural values do not end up reproducing social inequalities (O’Brien 2014).

Even the most powerful cultural institutions do not allocate value freely, their power to collect is limited by other institutional fields with their own value structure. This is particularly evident where the cultural sector encounters the nuclear sector. The nuclear industry is a strongly institutionalised field defined by its own rules and highly regulated mode of practice, a hierarchy of professions and structures of values. However,

political symbolic value has been central for the nuclear industry since its beginning in the 1940s. Documenting the seminal events and inventions in the nuclear technology and celebrating “founding fathers,” such as Enrico Fermi and Igor’ Kurchatov, by erecting monuments and building museums, sprang from the nuclear industry’s grassroots (Ross 2021; Wellerstein 2021). Worldwide, nuclear establishments borrow widely from cultural heritage institutions by adopting the formats of collection and display in their information centres, museums, libraries and archives, generating, in this way, their own “nuclear exhibitionary complex” (Rindzevičiūtė 2021). In turn, museums of science and technology rely on academic historiography to sort the collections into meaningful orders (W1).

In this way, the values, models and principles underpinning collection of nuclear cultural heritage circulate and connect the fields of academia, cultural heritage and the nuclear industry. Yet this circulation has not always been explicit, reflexive and organisationally recognised. More often than not the cultural heritage dimension in the nuclear industry was developed as an implicit practice, similarly to what Jeremy Ahearne (2009) described as an implicit cultural policy, where values and principles are enacted without being guided by an explicit policy strategy. Cultural organisations collect nuclear material culture by drawing on more explicit principles, as they have to be both highly selective and practical: many collectables are large and complex (e.g. turbines and control rooms) or contaminated by radioactivity and require costly clean-up (Alberti 2022). Here, collaboration between national and regional museums collecting objects related to the history of the nuclear industry is required to avoid the risk of “thinking in institutional silos” (W1). It is precisely the process of nuclear decommissioning that made the need for more explicit nuclear cultural heritage-making evident.

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1.2. Collecting & nuclear decommissioning

The closing-down of nuclear facilities that have reached the end of their utility cycle is disruptive for local communities, which are faced with loss of income and, in the cases of monoindustrial atomic towns, their very *raison d’être*. Museums, especially local and regional museums situated in such localities, are particularly important because their collection-making actions can smooth the transitioning of the communities into new social and economic realities, facilitating a change that requires deep engagement and remaking of the community’s identity (W1). Here, collecting can act as a vital social glue that empowers collective identities: it is in the making, as well as unmaking, of collections where values are created.

Nuclear decommissioning emphasises efficiency; where the sites are cleared, there is a risk of valuable history being lost in the process. Operators of nuclear establishments base their strategic management on value frameworks, which are part of corporate governance. However, cultural and heritage values do not always feature strongly in these frameworks; when they do appear, they tend to be linked with risk management and public relations (Wylie 2021). Accordingly, museums and heritage practitioners have only partial access to the sites undergoing

decommissioning, which entails a high risk that valuable forms of material culture and tacit knowledge will be lost. Fortunately, there are positive changes in recognising this. For instance, in the UK, a heritage framework is being developed to address this issue at Historic England and Historic Environment Scotland. There is also a growing understanding of the need for joined up action between museums, heritage sites and archives so that the material culture does not get scattered but is collected along with paper documents (W1).

Collections are ultimately about the future: either as intergenerational gifts (Alberti 2005) or investments (Frey 2019). Nuclear decommissioning is also about the future: it entails not only the dismantling of facilities but also taking care of radioactive waste, some of which will remain hazardous for an extremely long time. The problem of radioactive waste management over the extremely long term, stretching to hundreds and thousands of years, can be conceptually linked with heritage management through the elements of intergenerational transmission, the imperative of care and the importance of retaining and communicating meaning (Holtorf and Högberg 2022; Storm 2020; Harrison 2020; Molyneux-Hodgson and Hietala 2015). Similarly, collecting nuclear cultural heritage, ideally, should be less about collecting “lumps of technology” by salvage or rescue (Alberti 2022), but more about capturing the spirit of the site being decommissioned so that it does not lose the power to impress audiences (W1).

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Moreover, like heritage making and collection, nuclear decommissioning requires detailed documentation to capture the physical features of the materials that are being dismantled and disposed of. This is where qualitative methods enter the operational world of nuclear power physics: the biographies of physical substances are not always fully documented in the archives, the knowledge of where certain materials originate from, how much were they exposed to radioactivity and how they were stored are sometimes preserved informally (Ialenti 2022). Hence such research methods as object-based research and oral history, associated with heritage studies, can contribute to making the technical decommissioning process safer. Steps are being taken in this direction in many nuclear sites that develop their Safety Cases and international organisations developing their long term strategy approaches (Ialenti 2022, Verma 2021; Brandt & Dame 2019; SKB 2019; Kärnavfallsrådet et al 2019; NEA-OECD 2015; Gunn & Croft 2010; Cocroft 2006).

1.3. Collecting and socio-economic development

Collecting is not limited to the production of symbolic values, which circulate in the cultural field, or operational values, which enhance the efficiency and safety of nuclear operators. Collection bridges the nuclear industry, the cultural sector and economic development. Since the rise of creative industries and creative economy policies in the 1990s, the economic potential of culture and heritage has been increasingly recognised in public policy frameworks (Garnham 2005). While the policy

idea of creative industries was initially formulated in response to the growing audio-visual and information technology sector, the economic value of culture was extended to other sectors, including cultural heritage (Sagger, Philips, Haque 2021).

Furthermore, as sociologists Boltanski and Esquerre (2020) insightfully noted, the concept of collection value has become a key mode in the production of capitalist value, where commodities are priced on the basis of their uniqueness and completeness. The collection value is described as a feature of the post-industrial economy, where meanings are used to enhance the profitability of commodities and generate new types of economies, particularly in deindustrialising regions. According to Boltanski and Esquerre (2020), whereas industrial commodities are serially produced, standardised and meant to be discarded, to be replaced through consumption of other commodities, commodities that are infused with collection value draw on notions of authenticity, expertise and the long-term. The accumulation of collection value, as Boltanski and Esquerre (2020) suggest, is particularly salient in the former industrial regions – and former disaster areas – that are looking for new sources of income (Banaszkiewicz 2022).

It is through collection that nuclear cultural heritage-making can contribute to economic regeneration in areas undergoing nuclear decommissioning: nuclear cultural heritage can introduce new values in economies where industrial facilities are being dismantled and jobs are disappearing. This research networking project revealed that nuclear decommissioning is already accompanied by vigorous attempts to infuse decommissioning with collection value: employees of nuclear establishments gather objects and records documenting the scientific and technical but also social and cultural history of those organisations. Similarly, resident communities gather objects related to nuclear establishments as part of the local history.

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These collecting activities can contribute to local and regional economic regeneration by creating a resource base for cultural tourism. Moreover, they also constitute a resource for learning and growing local expertise: collecting is a social process and not a mere physical accumulation of objects. Through knowledge exchange competencies and skills are developed. The very process of collecting has the potential to make communities more cohesive by fostering intergenerational communication and activating a reflexive relationship with the local environment.

Finally, collecting can enhance local democracy, because it is a selective and critical process in which both positive and negative values are identified. Counter-heritage is also emerging as anti-nuclear communities assemble archives documenting nuclear accidents and anti-nuclear activism (Jurkonyte 2022; Jacobs 2022; see Christopher Hill's ongoing research project "The New Nuclear Imperialism: Science, Diplomacy and Power in the British Empire"). Hence, collecting as a social process of valuation forms an important component of local self-government, providing a framework for scrutinising and assessing the industrial, social, infrastructural and environmental aspects of communities.



Part 2. Interpreting

Interpretation is key for nuclear cultural heritage-making: it shapes all aspects of this practice, guiding collection, presentation, and governance activities. We approach interpretation not as a mere symbolic arrangement of meanings, but as a formative, social and organisational activity: organisations and policy makers deploy narratives to make sense of disparate activities, to enable action and generate legitimacy (Czarniawska 2004). Nuclear cultural heritage-making, in this way, can be understood as a search of the meaning of the past and present, at the same time creating preconditions for the future.

Interpretations are made at many different locations which include nuclear establishments, resident communities, cultural institutions, such as museums, galleries, heritage associations, libraries and archives, research institutions such as universities, and local, national and international governmental bodies. The meanings of the nuclear past are therefore inevitably diverse and often conflicting, where the categories and narratives demarcate different approaches to nuclear legacies and nuclear futures (Kaijser et al 2021). The emergent forms of nuclear cultural heritage encapsulate this diversity, its dilemmas and tensions: heritage-making is a process of recognising diversity and finding a viable form of living with differences, but it is also about confronting existing hierarchies of interpretation, where some narratives are naturalised as “truths” while other narratives are neglected.

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Interpreting nuclear cultural heritage, therefore, entails both dealing with differences and producing differences by challenging dominant narratives. It is beyond the limits of this report to fully describe the existing narratives and categories as they are drawn widely from professional histories of science, technology, society, politics and international relations, popular culture and environment. However, we hope that this selection of interpretative narratives will give some idea about the diversity.

2.1. Established narratives

The following narratives can be considered fairly typical for the traditional forms of nuclear cultural heritage-making. They are “traditional” in the context of museum presentation of technoscientific progress (Alberti 2022, 80), because these narratives share a primary focus on technology and invention, hence directing attention to key figures and technical devices that drove the development of nuclear science and technology.

Progressive narratives of nuclear science and technology: this narrative, which is often called “Promethean,” is rooted in the Enlightenment notion of the human mastery of nature (Ialenti 2022). In nuclear heritage-making this narrative underpins the collection of “the firsts” and “the greats,” such as ground-breaking devices and materials, prominent buildings and elements of everyday material cultures related to the biographies of pioneering scientists (Rindzevičiūtė 2021; Boyle 2018; Fields 2015).

Examples of such firsts and greats are the Dounreay control panel, acquired by National Museums Scotland and Science Museum, the model of Britain's first atomic pile reactor GLEEP at Science Museum, and shells of the first nuclear bombs and ICBMs at the Imperial War Museum. These objects are valued because they are attached to the master narratives in national historiographies of nuclear power (Kaijser et al 2021). Progressive narratives are usually nation-centred, but internationally oriented, deployed to enhance national prestige and signal competitiveness. Promethean nuclear narratives were embedded in the Cold War competition through soft power (Josephson 1996; Schmid 2006). Such narratives clash strongly with some techniques of preserving industrial heritage through benign decay, because the nuclear industry regards any hint of "rust as a bad PR" (W2).

Heroic narratives and narratives of self-sacrifice: these are not unique to the nuclear industry, but are quite common to the industrial heritage of the energy sector, for instance, coal mining (W1). Heroic effort is associated with invention, but also maintenance of infrastructures, dealing with accidents and negative consequences of nuclear progress, such as population displacement and radioactive contamination. Like other forms of energy heritage, nuclear cultural heritage is embedded in geopolitical discourses of sovereignty. Like military heritage, nuclear cultural heritage often tells stories of self-sacrifice for the nation, detailing the heroic efforts of nuclear scientists and engineers. In some cases, heroic narratives are used in anti-nuclear contexts: for instance, the story of Andrei Sakharov, the Soviet nuclear weapons designer who became a prominent human rights activist and fought for nuclear disarmament (W1).

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Local narratives of nuclear industrialisation: these narratives are often found in the internal museums of nuclear establishments and local history museums in resident communities. These stories present the construction of nuclear establishments as an integral part of the social and environmental transformation of the locality and the region (Ross 2021; Rindzevičiūtė 2021; Storm 2014). These narratives tend to highlight progressive aspects of nuclear industrialisation. It is interesting that anti-nuclear narratives are rarely found in these local museums. Counter-narratives are more likely to be presented in the Cold War expositions and expositions on environmental and social movements. Examples are, for instance, the House of European History, which opened in Brussels in 2017; materials documenting anti-nuclear movements were included in the exposition on nuclear energy at Deutsches Museum in Munich in 1985 (W2). Anti-nuclear industrialisation narratives are also more prominent in the localities of accidents and post-colonial contexts where nuclear establishments were built by foreign colonising powers, for instance, in Ignalina and Visaginas, the Soviet nuclear power plant and a city built in Lithuania in the 1980s (Dovydaitytė 2020).

Military versus civil nuclear power narratives: although the military atom and the civil atom sectors are institutionally separated and governed by different state departments, in nuclear cultural heritage-making they sometimes intersect (Stirling & Johnstone 2021; Agar 2019). For instance, the military origins of nuclear energy are presented in local history

museums, such as the Sellafield exposition in Beacon in Whitehaven, UK. In other cases nuclear power is compartmentalised, where narratives about nuclear weapons are placed in military museums, while nuclear energy stories are presented in museums of science and technology, usually in the departments of energy and physics. It appears that the stories of the military atom are more accessible to audiences than those about atomic energy: the threat of the military atom is visualised in spectacular ways, which attracts audiences, whereas the industrial shapes of nuclear power plants can come across as mundane and indistinct (W2). However, in terms of storytelling, both military and civil nuclear power are embedded in grand narratives of nation-state, sovereignty and geopolitics.

Decommissioning narrative: this is a relatively recent narrative that is becoming influential in the nuclear cultural heritage context as many national nuclear industries re-orient themselves to radioactive waste management. These narratives, somewhat counterintuitively, are celebratory, emphasising technoscientific ingenuity in finding solutions to radioactive waste management. Echoing the Promethean narratives of the birth of the nuclear industry, decommissioning is often told through a heroic narrative, which can take a form of reckoning with the past, when radioactive contamination was inflicted on people and the environment. The extremely long-term future of radioactive waste and the projection of society over many generations in the future forms an important part of this narrative (Harrison 2020; Storm 2020). Decommissioning narratives are not, in this way, about the decline of the nuclear industry: they are about the search for new technological, social and political pathways to safeguarding radioactive waste. These narratives also seek to soften the local transition to a differently structured nuclear economy and articulate strong community ownership of nuclear localities (W2).

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Green renaissance narrative: this narrative is used by nuclear establishments to promote their services to the energy sector, where references to the nuclear past are used to invoke trust in technology and experts and where past achievements are invoked to argue for new developments, presented as solutions for the de-carbonisation of economies (Josephson 2022). It is strongly connected to the decommissioning narrative: green renaissance is only possible where the issue of radioactive waste treatment is solved. It is also connected to the cornucopian and Promethean narrative promising new, small scale and safer nuclear technologies, the development of which is once again infused with the values of national pride. While the green renaissance is about the future, not the past, it creates a framework for the nuclear industry to cultivate positive, promotional forms of cultural heritage to strengthen its brand (Rindzevičiūtė 2021).

2.2. Emerging narratives

These narratives diverge from the traditional stories as they are less focused on inventions and “founding fathers,” exploring, instead, the nexus of nuclear science and technology and society, in line with the new museology approaches (Alberti 2022).

Nuclear colonisation narratives: these narratives are critical of the development of nuclear power, pointing to its extractive and exploitative character: examples of critical nuclear cultural heritage include commemoration of the colonial uranium trade in Africa, Soviet nuclear colonialism in Eastern Europe, the Arctic and Central Asia, and nuclear testing during the Cold War. An important aspect is the theme of internal colonisation, where remote communities and ethnic minorities found themselves hosting nuclear establishments and, possibly, being future hosts of radioactive waste repositories (Bauer and Penter 2022; Hecht 2012; see also Linda Ross, ongoing and Christopher Hill, ongoing).

Post-humanist narratives: these narratives challenge the Promethean narrative of the human mastery over nature. It is mainly developed by cultural theorists and contemporary art practitioners who reflect on the hybrid human-nature-nuclear nexus, probing for new ways to make sense of local and global nuclear legacies (Carpenter 2020; Harrison 2020; Storm 2020). In contrast to the decommissioning narrative, where preservation mainly entails creating a corporate archive to store documents describing the radioactive materials and perhaps a museum exposition, the post-humanist narrative points to the entire global biosphere as an archive of nuclear modernity.

Intersectional narratives: these narratives shift the attention to human suffering and focus on the intersections of gender, race and class (Crenshaw 2017). Intersectionality has important implications for nuclear cultural heritage making, where racialised and gendered roles in the nuclear industry determine the values of material cultures and their future. For instance, women played a significant role working in administrative positions in nuclear establishments or supporting the social life of the atomic communities; however, their stories are often missing from collection strategies and expositions (Brown 2013). Great suffering was caused to members of non-European and non-white communities, affected by uranium mining and nuclear testing, but their stories are not prominent in the official presentations of national and local nuclear pasts (Bauer and Penter 2022; Hecht 2012). Intersectional narratives often occur in the contexts of anti-nuclear expositions and the history of 20th century colonialism and the Cold War.

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2.3. Art and culture intermediaries

The discussions conducted at the project workshops emphasised the importance of including new actors in the process of interpretation of nuclear cultural heritage. The narratives listed above are articulated, contested and transformed through the interaction of different groups, such as nuclear scientists and engineers, knowledge managers and public relations officers in the nuclear sector, heritage and museum professionals, amateur historians and community groups, and academic scholars and creative practitioners. As a result, these different and sometimes opposing narratives coexist simultaneously, but not always in the same place. There is a risk that the heritagisation of the nuclear past can become entrenched in different approaches and compartmentalised in line with institutional fields.

In this regard, the role of contemporary artists and creative practitioners was highlighted: as Ele Carpenter's work has demonstrated, artists are able to navigate the different professional fields, stimulating dialogue and introducing new ways of articulating the values of the nuclear past (Carpenter 2020). Contemporary art practitioners often deploy presentist approaches to engage with long-standing anti-nuclear arguments, which has the potential to appeal to younger audiences (W1). This is particularly important in postcolonial contexts, where creative practitioners probe the devalued, exhausted and economically no longer useful industrial infrastructures and landscapes and engage collaboratively with disempowered communities (Dovydaitytė 2022; Volkmar 2022). Artistic engagement with nuclearity, as the *Splitting the Atom* exhibition (2020) demonstrated, is genuinely transnational, where creative practitioners explore atomic sites in Europe, Australia and Asia, highlighting the epistemological challenges of visualising the atom and searching for new forms of ethical engagement with communities that were dispossessed by nuclear colonialism, both overseas and at home (Rindzevičiūtė 2021a). It can be suggested that contemporary art and creative practice could play a key role in re-making nuclear cultural heritage as a form of symbolic power that is not blind to inequalities and injustices, probing the potentials and limitations of the heritage process.

Finally, there is a tendency to (re)politicise history and cultural heritage in response to social tensions. As noted by Bauer and Penter (2022), master historical narratives find themselves subject to governmental control and censorship, particularly when they question nationalist myths. The governmental control of the narrative can also be expressed through the generation of non-knowledge, particularly about the negative consequences of uranium mining, nuclear testing and nuclear accidents (Hecht 2012; Brown 2019). Accordingly, governance of nuclear cultural heritage should seek to balance hegemonic discourses, creating spaces for articulating the nuclear past in other ways than the national, celebratory narrative of the atom and for facing the difficult aspects of the nuclear past.



Part 3. Governing

The last part of the project discussions explored the governmental issues, politics and policy of nuclear cultural heritage at local, regional, national and international levels. Nuclear cultural heritage is made in the context of stringent nuclear safety and national security regulations. At the same time, nuclear cultural heritage navigates the complex landscape of environmental, social, economic and cultural policies. All these policy worlds operate with different temporalities and geographic spaces. Their priorities are deeply embedded in institutional histories and do not always align. For instance, the principle of “art for art’s sake” has been historically important in cultural policy and clashes with the social and economic instrumentalisation of the arts (Vestheim 1994). However, in liberal democracies all public policy areas are undergoing a reform to become more inclusive and participatory. This participatory turn has played a part in opening the doors for arts and culture as part of stakeholder engagement in the nuclear industry. Transforming nuclear sites into cultural heritage sites requires substantive conceptual innovation to address such challenges as:

- 1) developing models of participatory governance across both the cultural and nuclear sectors,
- 2) developing social justice and ethical approaches for the inclusive development of tangible and intangible nuclear cultural heritage,
- 3) rethinking heritage-making in the context of the governance of radioactive waste, which requires dealing with the extremely long term: hundreds of thousands of years.

Governmental approaches to the nexus of society and nuclear power are problematised differently in different national and cultural contexts: nuclear pasts and futures are made and unmade in response to a wide range of economic, social and geopolitical factors (W3). However, the issue of inequalities, both international and intra-national, is something that otherwise very different countries share: arguably all nuclear societies would benefit from (industrial) transitional justice (W3). Nuclear cultural heritage-making can contribute to transitional justice, particularly in post-colonial regions such as the global South but also the post-Soviet space where reassessment of communist crimes and the negative consequences of nuclearization could bridge the divides in national histories (W3). A particularly important challenge is to address the difficult legacies of atomic colonialism, as well as atomic nationalism, in remote areas that were sacrificed for nuclear testing during the early atomic age (Hecht 2012; Hamblin 2021).

3.1. Residual governance

Here it is imperative that nuclear cultural heritage does not fall into the trap of what Gabrielle Hecht (2018) described as “residual governance,” where industrial waste is governed as an afterthought, where industries

treat people and places as externalities, residual to their “core” tasks of technoscientific invention and industrial production. As Paul Josephson has put it, there is a risk, in such situations, that “the atom will be governing us” rather than the other way around (W3). Residual governance has been tackled head on in environmental policy, where waste government frameworks apply the “polluter pays” principle. It is also tackled through economic policies of regional development, where companies are required to invest a portion of their profits in local socio-economic development. However, the legacies of contamination, infrastructural disruption, and decommissioning and historical injustices, cannot always be dealt with appropriately without addressing more complex social and cultural questions.

The forms of residual governance that emerge in the context of nuclear decommissioning develop from very heart of the Cold War phenomena of nuclear sovereignty, secrecy regimes, the large scale transformation of nature as well as a strong cultural imprint on public narratives of nuclear exceptionalism. The nuclear industry is presented as exceptional in terms of its complexity, but also safety, secured by exceptional industrial standards and safety culture (Hecht 2010). The long-standing criticism of the nuclear industry points to the governability gap – the discrepancy between the official discourse of safety that emphasises human control of nature and the history of accidents, the unresolved legacy of radioactive waste and the threat of nuclear war (Josephson 2022; Brown 2019; Jasanoff and Kim 2015). In turn, much intellectual and cultural criticism points to a certain ungovernability of the atom and the fragility of the nuclear utopia, arguing that it is imperative for the nuclear industry to shed their Cold War regime of secrecy and open up to public scrutiny (Wellerstein 2021; Ialenti 2022).

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Cultural heritage-making, in this regard, could constitute a particularly important avenue for democratising the nuclear sector, helping to shed its technocratic Cold War legacy. Indeed, in the last few decades many museums and heritage sites reoriented themselves to address challenges redefining their mission as future-makers in response to the global climate change and ongoing social transformation (Kemp 2021; Harrison 2020; Holtorf & Högberg 2022; Holtorf & Högberg 2015). This commitment to the future and development requires heritage professionals to leave the comfort of institutional autonomy (Bourdieu 1987). At the same time there is also a limited capacity to what heritage and cultural organisations can do: cultural policy is not a priority area in public policy and is chronically underfunded, despite the important societal role of cultural practices and the economic significance of creative industries, which are well demonstrated (Gray and Wingfield 2011).

The strategic challenges that heritage professionals encounter in collecting nuclear cultural heritage are a good illustration of the difficulty of their task. The low priority of cultural policy in public policy contributes to a large gap of “the 20th century industry in our lives,” a gap that is exacerbated when veterans of the nuclear industry – but also of industrial and military heritage – retire and the tacit knowledge used to mobilise governmental authorities

and communities to preserve the past is lost (W3). Heritage organisations have their own priority scales, where different types of industrial heritage are prioritised. For instance, Historic England prioritises the period from the 18th century to the First World War, which in principle leaves out the Cold War industrial and military heritage of nuclear power. The future nuclear industry planning objectives also intersect with heritage planning: where nuclear sites are expected to be entirely remediated into “green fields,” there is little space for complex heritage protection *in situ* (W3). There is a need, therefore, for policy innovation to find a working model for nuclear cultural heritage-making so that it is embedded in strategic development and does not become yet another form of residual governance.

3.2. Participatory governance and inclusion

The second issue for governability is the long-standing cultural policy dilemma of inclusivity expressed in a search for a participatory governance model. While it may appear that greater engagement of cultural actors in the nuclear sector will democratise the field, democratisation through cultural heritage is not a given: this is because cultural participation risks being confined to the narrow circles of experts and traditional, middle-class heritage audiences. In recent decades European cultural policies have been going through a “participatory turn” (Jancovic 2017). It is recognised that the model of the democratisation of culture by opening up elite institutions for wider access is insufficient and a different approach is required.

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The emerging participatory cultural policy approaches emphasise co-production and empowerment, where creative practitioners collaborate with multiple stakeholders. Here there is an important opportunity to integrate nuclear cultural heritage-making in the participatory framework that forms part of the decommissioning process for nuclear facilities and the siting of radioactive waste repositories. In many European countries, such as the UK, Sweden, Belgium and Germany, for instance, nuclear decommissioning entails substantive community engagement in decision-making (W3). Nuclear cultural heritage-making would arguably make this process more robust in terms of participatory engagement. Furthermore, it would also generate valuable resources that would benefit atomic communities. This process could feed into citizen science, enable people to understand technological affordances and risks, support collective memory and shape the body politic. Impacts of public engagement through nuclear cultural heritage could be especially significant in the areas of heavy radioactive contamination, such as Belarus, Ukraine and Kazakhstan (W3).

However, participatory cultural policy faces a lot of challenges. Proper participatory engagement requires long term, appropriately extensive schemes of funding, but many nuclear culture engagements, funded by the arts councils, are ad hoc and short-term (Carpenter 2020; Dovydaitytė 2022). In the context of ongoing economic crises, particularly Covid-19 pandemic and Russia’s war against Ukraine, there is a risk that many governments will continue reducing public spending on culture. In the UK, for instance, local authority spending on museums and arts is discretionary

and not obligatory by law. Cultural policy as a policy sector tends to be underfunded and of relatively low priority; given the scale and complexity of the nuclear sector, the reach of cultural funding is likely to be quite limited (Gray and Wingfield 2011).

It also is important to reflect on the tendency to design top-down models of participation where communities are invited to take part in the programmes designed by institutions, be they nuclear or cultural heritage. The very forms of public participation need to be co-developed so that they become genuinely inclusive, which means that nuclear cultural heritage is not made to be “about the community,” but made “with and by the community”. Developing such interactive models of public participation through nuclear cultural heritage entails dealing with the redistribution of power as well as the problem of trust in the benevolence of different actors involved (W3).

3.3. Strategic planning and sustainable development

The last strand of governing nuclear cultural heritage-making concerns strategic planning and sustainable development where local, regional, national and international levels intersect. Cultural and heritage policy is commonly made at the national level: for instance, in the European Union it follows the principle of subsidiarity. The United Nations Sustainable Development Goals do include culture; however, heritage and cultural policy remain minor areas in the broader developmental and sustainability-oriented governance (Duxbury, Kangas, De Beukelaer 2017). While many environmentalists criticise the very idea of sustainable governance as “business as usual,” there is a further risk that the idea of sustainability gets instrumentalised and used to promote corporate interests, whereas it should be used to secure intergenerational justice (W3).

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Nevertheless, a focus on sustainability can act as a window of opportunity for nuclear cultural heritage making. For instance, the 2022 Nuclear Decommissioning Authority’s Sustainability Strategy includes “cultural outcomes” as one of four pillars, in this way opening a novel channel for policy intersections (W3). Prior to this, the NDA included cultural engagement as part of its Corporate Social Responsibility, where it was linked closely with the socioeconomic impacts of the nuclear operations. In a similar way, it is through the socioeconomic framework that culture enters the horizons of local authorities. Here nuclear cultural heritage-making is required to demonstrate traceable impacts on local economic development.

Sustainability sits at the heart of the heritage sector as an imperative, but it forms an organisational and economic challenge, particularly where museums and heritage organisations depend on private fundraising to finance their activities (W3). This is of particular importance in the light of ongoing pressure to decarbonise economies, which requires an infrastructural overhaul as well as strong public support for energy transition. Strategic government of cultural heritage is based on a highly diverse organisational basis that combines infrastructural and local

planning authorities and cultural policy organisations. Nuclear cultural heritage projects can be integrated into the regional developmental strategies that primarily target decommissioning: a good example is the Nucleus archives of the UK's Nuclear Decommissioning Authority, which was built in Wick and which is expected to fulfil a cultural function locally. The intersections of international, national, and local levels of governance becomes particularly clear in the case of large projects, such as, for instance, the preparation of cases for listing as Unesco World Heritage sites, a project that was initiated in 1998 and inscribed in 2019. As Albrecht (2017) showed, the recent listing of the Erzgebirge/Krušnohoří transboundary region, which hosts the largest uranium mine in Europe that was key for the Soviet atomic bomb project, was a result of the transboundary collaboration of government departments, as well as local and regional administration bodies. At each level, different values were articulated and the art of nuclear cultural heritage-making was finding modes of bridging and translating those sometimes conflicting values into narratives and material culture. In terms of transboundary governance, Erzgebirge/Krušnohoří became "a symbol of the great efforts for redevelopment and recultivating a very heavily polluted region" (W3).

The issue with socioeconomic frameworks for cultural heritage-making is that they require a very particular form of bureaucracy and accountability associated with industrial governance that can stifle cultural creativity and limit the valuable impacts of creative practice. For instance, corporate values emphasise safety and seek to present a positive image (W3). Local governments use cost-benefit analysis to measure the short-term impacts of cultural engagement on the local economy. This does not always suit genuinely participatory and open creative projects that explore uncharted territories and may produce critical and uncomfortable narratives and knowledge. While heritage-making has a strong educational component (Dovydaitytė 2020) bound to increase the cultural capital of young generations in atomic locations, the actual socioeconomic impacts might be situated in a remote future and therefore will not be captured by the short-termist frameworks of evaluation. However, in the age of global and complex problems that require systems thinking and the orchestration of governance (Rindzevičiūtė 2023), nuclear cultural heritage-making can serve as a key litmus paper testing societal capacity to deal with the legacies of the past so that we are prepared for the future.



Conclusions

This report has outlined some key aspects of collecting, interpreting and governing nuclear cultural heritage that were debated in the research networking project. While full understanding of the issues and dilemmas that characterise nuclear cultural heritage-making requires further research, drawing on these pilot insights, the following points can be suggested for consideration by nuclear cultural heritage-makers.

Collecting:

- Insert collecting in the process of nuclear decommissioning: collecting should not be limited to salvaging
- Address the implicit and explicit values that underly collecting
- Assess the cultural value of technical sample collections
- Social life and nature are important parts of the history of nuclear technology
- Mobilise collecting to produce new values by using collecting to engage different stakeholders.

Interpreting:

- Introduce new mediators, such as artists and creative practitioners, to bridge different communities
- Contextualise the interpretations of tangible and intangible nuclear cultural heritage
- Avoid segregation and compartmentalisation of competing narratives, particularly when they are opposing and/or controversial.

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Governing:

- Address the unequal distribution of cultural capital to make participation in nuclear cultural heritage more inclusive
- Identify a set of strategic policy priorities at local, regional, national and international levels that could benefit from nuclear cultural heritage-making
- Recognise the need to orchestrate policy actions across different sectors
- Foster recognition of the traditions of professionalism and expert knowledge in the different policy fields
- Avoid the trap of residual governance, where nuclear cultural heritage-making is deployed as a mitigation of deindustrialisation and not as a development measure.

Finally, while recognising that the definitions of nuclear cultural heritage are evolving and will differ in different contexts, we suggest that it is important to consider nuclear cultural heritage as:

- A process-based practice rather than an object
- Emergent and context-specific rather than universal
- Circulated rather than stored

- Part of strategic development rather a relic of the past
- Practical rather than symbolic
- Co-produced rather than commissioned

To conclude, nuclear cultural heritage-making is an exciting, fast evolving practice which requires flexible and reflexive frameworks, combination of diverse forms of expertise and collaboration between different policy sectors. We hope that this report will inspire further research and action in this field.

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W2 Workshop 2: Interpreting, Thurso, Scotland, 2019.

W3 Workshop 3: Governing, Science Museum, London, 2022.

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