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Social value for whom, by whom and when? Managing stakeholder dynamics in a megaproject

Studies of project success have generally recognised the role stakeholder management plays in shaping a collective understanding of value. While these studies have typically focused on new-build, few studies have examined stakeholder management at the end of life of a built asset. This paper draws on a single megaproject case study into social value in nuclear decommissioning and remediation to examine how 'success' or 'failure' in projects is framed, and the implications of stakeholder management in shaping these notions of performance. By tracing historical developments of Dounreay, an experimental nuclear energy site at an advanced stage of decommissioning, it was found that key stakeholders change over time as those most affected by the changing dynamics of the megaprojects come and go, with resulting impacts on the ways conditions for success are framed and social value is defined. Our findings stress the importance of taking a pluralistic and processual view of stakeholders, and demonstrate the need for policy-makers, practitioners and researchers to pay greater attention to fragmentation and integration of stakeholders' interests and influences as they change over time. These dynamics of stakeholder management will in turn challenge pre-conceived ideas of success that are often framed in the early stages of a project.

Keywords: decommissioning, social impact, (mega)project management, Government, nuclear power, infrastructure planning

1 **Introduction**

2 Ever since Freeman (1984) argued for the need to think beyond the shareholder to consider
3 the needs of stakeholders, there have been numerous studies that examine stakeholder
4 management practices in project contexts (see e.g. Mok, Shen and Yang, 2015).

5 Consideration of broader stakeholder needs has since challenged the orthodoxy that project
6 success is merely the meeting of such traditional measures as time, cost and quality
7 (Atkinson 1999). There is growing recognition of the tensions that can arise from attempts
8 to meet the short-term 'iron triangle' of project time, cost and quality performance and the
9 capturing of long-term, lasting impacts of projects (Eriksson et al., 2014). Indeed, as Eskerod,
10 Huemann and Ringhofer (2015) argued delivering valuable impacts to project stakeholders
11 can be a challenge as they noted that stakeholder disappointment continues to be a
12 common feature of unsuccessful projects.

13 In a recent systematic review of scholarship on project stakeholder management, Mok, Shen
14 and Yang (2015) identified how studies have tended to focus on formalising stakeholder
15 management processes often in small-scale projects and typically focussing on the early
16 planning stage of the project life cycle. Such emphasis has come under critical scrutiny. For
17 example, in finding universal, systematic approaches to managing stakeholders, Engwall
18 (2003) argued that there has been relative neglect in understanding the unique specificities
19 of the institutional context in which projects are situated. Moreover, by focussing mainly on
20 the planning stage of the project life cycle, there is an implicit assumption that project
21 managers can design interventions that satisfy often conflicting needs of a multitude of
22 stakeholders at the front-end of projects; this ignores the reality of stakeholder management
23 as an ongoing process rather than a 'done deal' achieved through planning (Eskerod,
24 Huemann and Savage, 2015; Eskerod and Larsen, 2018). The need to examine stakeholder
25 management as an ever-changing, ongoing process (Friedman and Miles, 2002; Turkulainen

26 et al., 2015; Chan, 2016) is further underscored where megaprojects are concerned, a
27 context that has been relatively overlooked in stakeholder management scholarship (Mok,
28 Shen and Yang, 2015).

29 In this paper, we address these deficiencies by drawing on case study research into a
30 megaproject in nuclear decommissioning to examine how stakeholder management - as an
31 ongoing process - can have significant consequences for the ways in which project 'success'
32 and 'failure' is defined. We situate this case study within the contemporary and growing
33 concern over delivering social value in the megaproject context. In the UK, for instance, the
34 introduction of the Public Services (Social Value) Act in 2012 mandates that the provision of
35 public goods and services, including the delivery of public-sector projects, must consider how
36 the work "might improve the economic, social and environmental well-being of the relevant
37 area" (p. 2, Public Services (Social Value) Act 2012) . While delivering social value along this
38 triple bottom line seems reasonable, defining what this means is less straightforward since
39 there is no accepted definition of what social value means (see Nakamba et al. 2017).

40 Furthermore, growing interest in social value in construction (Cartigny & Lord 2017; Raidén
41 et al. 2019; Daniel & Pasquire 2018) has often focussed on client perspectives in the
42 procurement of construction projects (Cartigny & Lord 2018; Awuzie & McDermott 2016;
43 Loosemore 2015) with relative less attention paid to a wider range of stakeholders affected
44 by construction. Thus, our case study context of examining the dynamics of stakeholder
45 management in Dounreay, an experimental nuclear facility that is at an advanced stage of
46 decommissioning, is unique; while much research, even on mega construction projects, is on
47 new-built, the context in this study is on nuclear decommissioning and remediation
48 (Mulholland et al. 2019; Invernizzi et al. 2017). Thus, we also contribute to the literature by
49 broadening out beyond (front-end) planning to consider the dynamics of stakeholder
50 management during the end-of-life stage of the asset/project life cycle.

51 In what follows, we first review the literature on related fields of stakeholder management in
52 (mega-)project studies. We then explain the case study methodology before reporting and
53 discussing the findings of the implications of stakeholder management dynamics and the
54 notions of project 'success' or 'failure'.

55 **Stakeholder management: a planned or emergent process?**

56 Good governance of and engagement with stakeholders, with defined roles and
57 responsibilities and dedicated communication channels, have long been attributed as a key
58 condition of megaproject success (see Caldas and Gupta, 2016). To satisfy the needs of
59 project stakeholders, scholars have developed frameworks to characterise stakeholders
60 based on their relative position within or beyond the project organisation and their
61 respective influence and interest on project outcomes (e.g. Savage et al. 1991; Karlsen 2002;
62 Olander 2007; Ackermann & Eden 2011). These frameworks, often depicted as two-by-two
63 matrix of power and predictability of outcomes, are used to visually group and prioritise
64 stakeholders based on their power, legitimacy and urgency (see Mitchell et al, 1997), so that
65 the management of stakeholder expectations can be more effectively planned and managed
66 so that surprises and disruption to projects can be minimised. Others have developed more
67 nuanced, graphical methods to help project managers visualise the scale and scope of a
68 stakeholder's influence, the extent to which a stakeholder is more or less powerful, and the
69 depth of impacts to help identify where a potential stakeholder is coming from and
70 anticipate what is in it for the stakeholder (e.g. Bourne and Walker, 2005; 2006; Walker et
71 al., 2008). These tools are intended to guide project managers when seeking the
72 cooperation of, collaboration with or even containing stakeholders early on in the planning
73 phase of a project, which in turn creates the social license for a project to go ahead
74 (Aaltonen and Kujala, 2010; Aaltonen et al. 2015; Sánchez 2015).

75 These models have however come under critical scrutiny in recent times. For example, Davis
76 (2014; 2016) noted that how failure or success is viewed depends on the point in time when
77 a project's performance is measured. Shenhar and Holzmann (2017) re-evaluated the
78 success and failure of 14 megaprojects to show how 'failure' or 'success' can change
79 depending on whether one focussed on the immediate utility at the point of project delivery
80 or whether one considered the longer-term societal impacts that the project yielded.
81 Shenhar and Holzmann (2017) added that while alignment of all stakeholders to a shared
82 goal is desirable, the reality requires constant adaptation to complexity. This is especially
83 true in the megaproject context. For instance, in the nuclear energy sector, Locatelli et al.
84 (2014) reinforce this need for ongoing flexibility by arguing for looking beyond the
85 attainment of technical success to ensure that project teams build and sustain community
86 and political support. So while scholars have long called for a dynamic approach to engaging
87 with stakeholders (e.g. Bourne and Walker, 2006; Walker et al., 2008), prevailing frameworks
88 tend to focus on the identification of stakeholders and their needs and influences at a point
89 in time rather than to account for how these change over time (Jepsen and Eskerod, 2009;
90 Aaltonen and Kujala, 2010, and; Eskerod, Huemann and Savage, 2015). Thus, in line with
91 these recent calls to take a more processual view of stakeholder management, this study
92 focuses on the process of sensemaking as the identification and influence of who and what
93 matters changes over time.

94 **Making sense of social value in megaprojects**

95 Turning our attention to social value, there are also parallels that can be drawn between the
96 brief review of studies on managing stakeholders in (mega-)projects above and
97 developments in thinking about social value creation. Early scholarship on social value has
98 often focussed on the development of measurement frameworks with the identification of
99 stakeholders and their needs central to many. In the UK, examples of measurement

100 frameworks include the Social Value Evidencing Toolkit (SVET) developed to manage the
101 social value reporting processes for Highways England (Daniel & Pasquire 2017); applying
102 ecosystem services thinking to geographic information systems (GIS) Mapping to determine
103 the perceived use value of places, and; using a Social Values for Ecosystem Services (SolVES)
104 tool to capture the benefits of the natural environment on human wellbeing (Sherrouse et al.
105 2011). These frameworks are predicated on the assumption that engagement with
106 stakeholders is key in collecting information about what matters and assessing the social
107 value impacts created by projects.

108 Of the many frameworks available to capture social value, the Social Return on Investment
109 (SROI) methodology that attempts to quantify the monetary value of social investments is
110 the most commonly adopted approach. It has been used to underpin common tools such as
111 Social Profit Calculator and Social Value Portal (REF), with the latter creating the National
112 TOMS (Themes, Outcomes, Measures) which is being adopted slowly within the built
113 environment (REF). The SROI methodology developed in 2001 by the Roberts Enterprise
114 Development Fund (2001), a California-based employment social enterprise and refined by
115 the New Economics Foundation (NEF), seeks to produce a replicable, reliable methodology to
116 facilitate objective comparisons of social outcomes of projects. This SROI process relies
117 heavily on the use of agreed proxies (for example the Housing Associations' Charitable Trust
118 (HACT) Wellbeing Evaluation approach (Cabinet Office 2015)).

119 Although establishing an objective set of proxy measures can make it easier to compare the
120 social value outcomes across different projects, critics have also identified a number of
121 major shortcomings. For instance, Gair (2005) argued that the emphasis on quantifying
122 social returns of investment obscures the more qualitative aspects that give specificity to the
123 context of these economic and socio-economic measurements. In privileging what is
124 perceived to be objective and quantitative measures, there is also a sense that SROIs

125 highlight what is universal rather than what matters at a local level. Thus, even though the
126 New Economics Foundation (2007) suggests that stakeholders should be engaged in the
127 process of identifying what gets measured are the 'right' things for stakeholders concerned,
128 power is still implicitly placed with those who are considered "primary stakeholders, people
129 directly involved in the creation of social value, for example, project participants, or
130 employees"(p. 35) as these determine what kinds of data get collected. Thus, there have
131 been calls to move towards a more bottom-up approach of assessing cost-benefits and
132 impacts (Nicholls 2016; Gair 2005). Indeed, as Watson and Whitley (2017: 887) reflected in
133 their application of SROI in a construction project, "the data-crunching stages of the method
134 are far removed from the qualitative focus group data about specific design features".
135 Watson and Whitley (2017) also noted how it is not always possible to measure social value
136 simply by tracking what has changed before and after a design intervention because, and
137 especially in the case of new-built, the stakeholders have not experienced the built
138 environment before the transformation, and so what can only be captured are the
139 experiences of the new environment.

140 Thus, our salient review of social value reflects similar concerns already raised in our critique
141 of scholarship on managing stakeholders in projects in two ways. First, while there is
142 recognition that social value can mean different things to different people, there is a
143 tendency to focus on measuring and presenting social value as monolithic, objective 'truth',
144 in part because of the desire to enable comparisons in an audit society (see Power, 1997;
145 Shore and Wright, 2015). Second, the push towards quantification also means that focus is
146 placed on measuring social value at a moment in time, rather than to examine how social
147 value changes dynamically over time. In the context of megaprojects, tracking the ongoing
148 process of change over time, as opposed to leaving it to the end of the project, is paramount
149 as it is crucial not only to build political and community support for the project but also to
150 sustain that support over time.

151 Yet, in privileging the measurement and quantification of social value, a crucial step in the
152 process of establishing which aspects of social value matter to those affected by projects is
153 often overlooked; that is, there is a first of all make sense on who the key stakeholders are.
154 But, the question as to who are 'key' stakeholders changes over time. This is especially the
155 case in megaproject contexts. As Clegg et al. (2016) argued, as a project unfolds there is a
156 need to keep making sense of how stakeholders are changing and developing, and how this
157 evolution changes what they value, particularly since there are often complex and divergent
158 needs that change over the long timeframes that characterise megaprojects. Thus, rather
159 than to focus only on the quantitative measure of social value at a particular point in time, it
160 is important to pay greater attention to the unfolding narratives and changing discourses on
161 who and what matters over the project lifecycle (see Kornberger et al. 2006; Aaltonen and
162 Kujala, 2010).

163 Project studies have often been dominated by claims to rationality early on in the project
164 lifecycle (Clegg et al., 2016). For instance, it is typically the case that scholars argue for the
165 need to engage with stakeholders early on in the project lifecycle so that the power and
166 predictability of stakeholders can be mapped out to ensure the success of megaprojects
167 (Zidane et al. 2015; Ninan & Mahalingam 2017). Yet, this belief downplays the realities of
168 contestation and change, and the role resistance can play to generate productive value in
169 projects (Courpasson et al., 2011). In this paper, we join the growing line of scholarship that
170 emphasises the dynamic process of managing stakeholders and the creation of social value
171 through a single case study of decommissioning an experimental nuclear site in Dounreay in
172 Scotland.

173 **The Decommissioning Case Study**

174 Social impacts of transforming society that could affect the livelihoods of millions of people
175 are a defining characteristic of megaprojects (Flyvbjerg, 2014). The scale of these social

176 implications means that there is, more than ever, a significant need to engage with
177 stakeholders to define the performance (Mišić and Radujković, 2015) and to account for the
178 socially responsible outcomes of these projects (Ma et al., 2016). With the introduction of
179 the UK Public Services (Social Value) Act in 2012 the public sector needs to demonstrate
180 'social value' as part of any project delivery, and this calls into question as to what 'success' is
181 in terms of a socially valuable project.

182 In this paper, we draw on a case study in the UK nuclear decommissioning sector. The
183 Nuclear Decommissioning Authority (NDA) as a non-departmental public body reporting to
184 the Department for Business, Energy and Industrial Strategy, owns and is responsible for
185 decommissioning 17 nuclear sites in the UK. The programme is estimated to last 120 years,
186 with a projected cost of £120 billion. Delivering value for taxpayers' money whilst
187 addressing challenging technological and social complexities is therefore a wicked problem
188 that the NDA has to deal with. In this case study, we focus on Dounreay, the site of an
189 experimental nuclear facility constructed in 1955 to house what was then a first-of-a-kind
190 technology known as the 'Fast Breeder' reactor. Now Scotland's largest nuclear clean-up
191 and demolition project, the decommissioning and site remediation work is being contracted
192 since 2012 on a target cost basis to Dounreay Site Restoration Limited (DSRL) , one of the site
193 license companies (SLC) directly funded by the NDA.

194 **Data Collection and Analysis**

195 Our case study of Dounreay was informed by data collection that allowed us to trace how
196 Dounreay, its site and the local community, evolved from the time of its construction to the
197 present day. Documents were collected from a wide range of sources as is common for case
198 studies (Ridder, 2017), including official reports and publicity materials from DSRL and the
199 NDA, web-based information such as blogs and discussion boards, research papers and
200 theses about Dounreay, paraphernalia from local museums and places of interest to piece

201 together this historical overview, which enabled the reconstruction of how the concept of
202 'social value' was framed over time. 'Social value' was assessed against a typology
203 developed from academic literature, listed in Figure 1. The richness of the documents (circa
204 200) collected with a case study approach (Ridder, 2017) also allowed us to retrospectively
205 see how decisions made in the past had intended and unintended consequences for
206 delivering social value to those living in the area. We were able to investigate how
207 relationships between those working in Dounreay, and more recently DSRL and the NDA, and
208 the local communities changed over time, with resultant implications on perceived social
209 value.

210 INSERT FIGURE 1

211 The historical perspective, along with how 'social value' is perceived in the present day and
212 projected in the future, were also gathered through interviews with key stakeholders
213 representing DSRL and the local community. These interviews (n=9) were chosen through a
214 purposive sampling process through our connections with the NDA and Dounreay Limited
215 using a snowballing process (Ridder, 2017). The interviewees all lived within proximity of
216 Dounreay, representing either a 'community member' or 'working on site' as detailed in
217 Table 2. The interviews were compared with the documentary analysis to enable us to
218 develop corroborated insights into to how notions of 'success' and 'failure' were framed by
219 the actors concerned as they and the framing of 'success' and 'failure' changed over time.
220 Thus, we attempted to follow the actors to capture the past, present and perceptions of the
221 future as conversations around social value changed in Dounreay over time from a cross-
222 sectional study done over the course of 10 days.

223 INSERT TABLE 2

224 Semi-structured interviews focused on the participants' role and involvement, if any, with
225 the site and its societal value following an interview protocol (Spradley 1979), with the core
226 questions:

- 227 • Tell me about your background (professionally and personally)
- 228 • What are your views on nuclear decommissioning, remediation and regeneration?
- 229 • Have you heard of 'social value'? If not, what do you think it means?
- 230 • How does social value link in the work you do in decommissioning or regeneration?
- 231 • What do you think is the future of nuclear energy [and decommissioning] in your
232 community?

233 The participants were encouraged to talk freely and asked to elaborate on how and why
234 things happened in the ways they did in their interview accounts where appropriate. The
235 interviews were audio-recorded and transcribed verbatim. In addition to the interviews, the
236 first author also observed two private Site Stakeholder Group sub-committee meetings, one
237 focused on socio-economic impacts and one on decisions regarding site-end state, with
238 around 20 community representatives invited to sit on the committee to open dialogue with
239 site representatives. Furthermore, following the ethnographic walking methodology (Evans
240 & Jones 2011) she also did a number of site visits (see Table 2) to the decommissioning site,
241 local archives, nuclear museum, and heritage museum. Extensive notes were taken (circa
242 100 pages) along with photographs (n=380) of the local area to add richness of information
243 about the local context. These notes also allowed the first author to reflect on what was
244 observed and to identify emerging themes (Eisenhardt 1989).

245 The interview transcripts, field notes from observational research and site visits, and
246 documentary analysis were analysed to identify key emerging themes using qualitative data
247 software coding (Braun and Clarke, 2006), which we then compared with themes identified
248 in the stakeholder management and social value literature. In particular, we reflected on

249 how our analytical categories inform us about who had interest and influence in Dounreay
250 (e.g. Olander 2007), and who were deemed to have power, legitimacy and urgency (Mitchell
251 et al., 1997), paying careful attention to how these changed over time. We also examined
252 how 'success' or 'failure' was talked about and, where possible, identified how these
253 connected with the proxy measures of social value found in the literature, listed in Figure 1.
254 In line with inductive research, our analysis began as soon as our fieldwork began, and the
255 number of interviews in our snowball sampling was deemed sufficient when we reached
256 saturation, i.e. when our analysis was beginning to yield no significantly new insights (Guest
257 et. Al, 2006).

258 **The Dounreay social value timeline**

259 Dounreay is one site of the NDA's wider estate. It is situated in a rural community with the
260 nuclear work playing a significant role in the lives of the district. The area was initially chosen
261 for nuclear energy development due to the remote location, but also because the local
262 community was declining in the 1950s and so the siting of the experimental nuclear facility
263 was seen by politicians in Westminster as a means of creating a new lease of life for the
264 locality. As nuclear energy is being decommissioned in the area the NDA are managing a
265 sustainable transition to site closure.

266 There have been drivers and demands created by stakeholder input from both locally and
267 nationally (as shown in Table 3). Change of mission due to higher-level organisational
268 changes impacted progress, causing Dounreay to pass through three phases of social value
269 focus aligned with changing priorities. As the interacting local and national stakeholders
270 negotiated these changing priorities, shaping the social implications, local communities and
271 interested groups have been given opportunities to contribute through development of
272 practices such as Site Stakeholder Group meetings of community representatives.

273 The story of the social value success of failure has been defined by different criteria,
274 developed and changed over time. With three main phases being seen in the changing
275 environment over time, as outlined in Table 3, it is also worth considering how the
276 opportunities for success and failure differ from the local to national perspective, that is to
277 say stakeholders in different places will make sense of the impacts differently.

278 *INSERT TABLE 3*

279 *Phase 1. New nuclear: excitement of building a new society*

280 The building of a nuclear site is reflected on by all participants as a positive thing for the
281 area: there was a decline of the agricultural and fishing industries, so the prospect of new
282 jobs was appreciated. But participants also spoke favourably about the legacy they felt it
283 brought; attracting a "cosmopolitan" society with the influx of scientists and many pastimes
284 they brought with them, and also the international scientific impact, which was reflected in
285 the document data.

286 *Phase 2. Nuclear shut down: showing resilience through changing times*

287 A chemical explosion in 1977 caused damage on site and the first radioactive particles are
288 detected in the environment, adding to growing mistrust of nuclear energy before the
289 Chernobyl accident in 1986. This led to a turnaround on a planning decision in 1986 to build
290 new reprocessing plants, as in 1988 the UK Government then announced a phased end to
291 research and development at Dounreay. This aligned with the Government's decision to
292 privatise energy in the 1990s, halting all nuclear build.

293 Without a clear mission of what decommissioning meant for site-end state many employees
294 were unsure of their future, still hoping for jobs for life.

295 *Phase 3. Site mission to decommission: planning for alternative industries and investing in the*
296 *future*

297 This phase slowly emerged, responding to planning uncertainties on the site as
298 decommissioning as a goal was refined. A 60-year decommissioning plan was introduced in
299 2000 costing £4.3 billion, but after the NDA was established in 2005 a review was
300 undertaken in 2007 bringing decommissioning targets brought forwards to 2032 at a
301 reduced cost of £2.9billion. A senior member of staff labelled this phase as the “mission to
302 solely turn the site into waste”. This change in mission was in response to pressures from
303 central government but also driven by the aims within Dounreay organisational structure,
304 both of which were driven by external pressures felt after sever warning from the Health and
305 Safety Executive.

306 **Influencing success and failure: stakeholder dynamism demonstrated with**
307 **changing characteristics and priorities**

308 To examine the dynamics of Dounreay stakeholders a fragmented history of Dounreay and
309 its shifting contexts has been explored and outlined using three example stakeholder groups.
310 Framing patterns from the data chronologically demonstrated that as the overarching theme
311 of Dounreay changes the key stakeholders change - both those creating and influencing the
312 circumstances for success, but also those who will be most affected and how they respond.
313 The authors have codified the data thematically to identify how key stakeholders have
314 transformed over time, sometimes as completely new groups, but fulfilling similar roles as
315 previously.

316 Stakeholders can be both contributing and affected, or simply one, depending on how they
317 interact with Dounreay. For example, a stakeholder could potentially fall into two different
318 groups with differing needs and influence. One participant who worked on site as a previous
319 union representative was also active in local politics with the Scottish Green Party who are
320 anti-nuclear energy in all its forms. These two identities can clash with each other, as nuclear
321 energy is seen as both a friend and foe depending on which “hat” the participant is wearing.

322 Frameworks that neatly categorise the identities of individual stakeholders fall short of
323 accounting for these intrinsic struggles.

324 Not only do the characteristics and structure of the stakeholder groups change, but also their
325 priorities and needs. This is how the goals and targets for success and failure move.

326 This paper does not aim to outline all stakeholders involved, but has identified 3 to
327 demonstrate the complexities of stories, characteristics and priorities changing:

- 328 • Regulators: currently Office for Nuclear Regulation (ONR)
- 329 • Site owner: currently the NDA, how has it changed over decades
- 330 • Local community

331 The stakeholder groups were chosen due to the richness with which they featured in the
332 case study data collection. The simplified timelines presented below were derived from the
333 multiple data sources and unpacked to make sense of the complexity of stakeholders
334 contained within Dounreay's history. The data is presented simultaneously descriptively to
335 present a clear story, and interpretatively as the author makes connections between the
336 various data sources to understand the influence of changing context on stakeholder
337 characteristics shifting.

338 **Regulating 'safe and secure': industry learning and target setting**

339 In the rush to embrace new energy possibilities, environmental safety was not fully
340 understood: it was only after operation that the safety implications shaped the industry. and
341 in more recent years the balance of stringent environmental regulation is being compared to
342 other sustainable value factors. The primary regulatory bodies have focused on the
343 environmental safety, in terms of radiation, health and safety on site, pollution and nuclear
344 safety.

345 The guidelines and targets for environmental safety have changed considerably over the
346 decades. Following a major incident on the Windscale (now Sellafield) site in 1957 the
347 Nuclear Installations (Licensing and Insurance) Act 1959 established the Nuclear Safety
348 Division as the Inspectorate of Nuclear Installations within the Ministry of Power following a
349 recommendation from the UK Atomic Energy Authority (UKAEA) for a body to oversee
350 licencing new sites. Following the transfer of the Nuclear Safety Division to the Ministry of
351 Technology in 1968 it changed its title to Nuclear Installations Inspectorate (on
352 recommendation of the Nuclear Installations Act, 1965). This landscape has changed
353 significantly since then with all parties involved now operating in a new form.

354 Major changes happened at Dounreay when a series of safety incidents triggered an audit. A
355 decade after ceasing operation, but without a clear mission for the site, the safety audit
356 provided the guidance needed to strengthen the quality of work happening on site and set
357 targets for decommissioning and remediation.

358 *“To a degree it was also the straw that broke the camel’s back...when this happened*
359 *they said “right, stop”. And they conducted a ’98 major audit in the safety and*
360 *management of the site” - D04 Site manager*

361 In the review of the nuclear regulatory system (Stone 2008) there were many observations
362 made of the effectiveness of the industry. The most urgent issue identified was the lack of
363 skilled staff suitable for the Nuclear Inspector roles: it was difficult to retain staff due to
364 salary restrictions working in a public organisation, which was part of the reason for it
365 becoming a Public Corporation in 2014 after the 2013 Energy Act (Department of Energy and
366 Climate Change 2013). Several other recommendations were made for a more reliable
367 regulator: to restructure the organisation, and to create a single nuclear regulator for safety,
368 security and environment (previously HSE, EA and the Dangerous Goods Division of the

369 Department for Transport). The umbrella organisation became the Office for Nuclear
370 Regulation formed as an agency of HSE.

371 *“... nuclear is really tightly regulated... But it needs to be very closely regulated to*
372 *give people reassurance.” - D01 Environmental specialist*

373 All stakeholder groups benefit from this strategic relationship between the site and
374 regulator, as the reassurance of the safety and security from a somewhat feared technology.
375 This regulation helps provide a sense of reliability beyond what is expected from many other
376 contentious industries. However, it is of interest to note, the focus on “safe and secure” in
377 dialogue with stakeholders has been highlighted as an issue. Both in keeping the focus on
378 more negative aspects of nuclear energy, and by using technical-heavy language to convey
379 robustness which may be inaccessible to many, having the effect of many stakeholders not
380 understanding the safety and security measures in place.

381 **Following which leader? The shifting of responsibility and priorities**

382 UKAEA (UK Atomic Energy Agency) was established under Government ownership in 1954 to
383 do nuclear research and development for the burgeoning UK nuclear industry, with
384 Dounreay the centre for fast breeder technology. UKAEA’s role changed significantly as the
385 Science and Technology Act 1965 broadened their work beyond atomic energy research.
386 The UKAEA divided itself into 3 business groups, preparing 2 for sale and privatisation. This
387 left a split of staff onsite, with the Government Division responsible for decommissioning
388 installations, but with much of the technical skill needed lost in redundancies (Health and
389 Safety Executive 1998).

390 *“There wasn’t a clear strategy. It was “OK, you don’t want us to do this, what do you*
391 *want us to do next?” So there was a real hiatus.....And then within that, you had this*
392 *idea that one of the solutions was OK we set up all these units. Off you each go away*
393 *and try and win business, and try and sustain. And some teams worked together,*

394 *others were competing against each other, and AEAT in the middle of it of course*
395 *was set up as a private organisation which was still present on site. We had this huge*
396 *antithesis between AEAT and the sort of UKAEA people” - D04 Site manager*

397 Previous to the changes in 1980s, British Nuclear Fuels Ltd (BNFL) had been created as a split
398 of activities in UKAEA in 1971 for nuclear production to be managed separately. Later
399 becoming a public limited company owned by the UK Government, this created potential for
400 a business focus and encouraged technology spin offs. Further commercial parts of the
401 UKAEA were separated in 1995 to create Atomic Energy Authority Technology (AEAT).

402 AEAT later went on to be re-merged with UKAEA, and eventually UKAEA and BNFL merged to
403 form the NDA in 2005 after Government White Paper recommendations in 2003 led to the
404 2004 Energy Act establishing the organisation to bring the works together.

405 Commercial arms continued with several restructures and buyouts, under names such as
406 British Nuclear Group (BNG), Westinghouse , Nexia Solutions and Nuclear Sciences and
407 Technology Services (NSTS). These organisations do not now directly interact with Dounreay
408 from the NDA perspective, but this complex shuffling of operations and ownership reflects
409 well the changing “singular” stakeholder that is responsible for directing Dounreay work
410 priorities. Dounreay has consistently responded to the calls for change as they put in place
411 what the influential stakeholders requested: as government changed tactics, this was
412 implemented on the ground and encouraged through site “mission”.

413 The creation of the NDA in 2005 established a clear industry mission:

414 *“Our mission remains absolutely unchanged - to clean up the legacy from the UK’s*
415 *earliest nuclear sites, safely, securely and with care for people and the environment”*
416 *- NDA Business Plan 2019-2022*

417 And this is in stark contrast to the origins of Dounreay. Beginning as a Government project,
418 pushed by Westminster, this was a nationally critical infrastructure project – as a matter of
419 national safety and security.

420 *“UKAEA built a lot of houses in Thurso, a school, new high school, technical college,*
421 *hospital facilities” - D04 Site manager*

422 The predecessor of NDA was involved in the active building of society, but this now falls
423 beyond the remit of NDA’s work. There are still expectations of some stakeholders that this
424 is NDA’s responsibility and there has been a difficult change in mindset in how these services
425 are provided.

426 **Shifting identities: Who is the “local community”?**

427 *“...this was a very close knit community. Everybody knew everyone. If you think of an*
428 *isolated community of 2 ½ thousand people, where do you meet your life partner? At*
429 *the village dance. So everybody was related to everybody. You grew up surrounded*
430 *by aunts, uncles,... Now when Dounreay came you’d this mass import of incomers.*
431 *Now, obviously Atomics married locals and locals married Atomics, and it all became*
432 *quite a mix. By the time I came it was much more difficult to work out who was who.”*
433 - D09 Clergy community leader

434 At the conception of nuclear energy at Dounreay, the community was in decline. The
435 shrinking agriculture and fishing industries, particularly during the wars, meant that people
436 were moving south to bigger cities with more employment opportunities. This was partly
437 why Dounreay was chosen to locate the new, untested and unsure, nuclear energy
438 technology that emerged from the Government weapons programme in World War II at
439 Windscale (Sellafield).

440 New industry, and on such a large scale, meant the necessary influx of employees. Leading
441 scientists and engineers, with their families, moved from all over the UK, and quickly became
442 known as “the Atomics”. The interesting thing is how over the years these people stayed and
443 become the local community. Now, decades later, those ‘atomics’ view new incomers with
444 suspicion. This is even more noticeable with the American employees who come to work on-
445 site temporarily as part of the Cavendish Dounreay Partnership (of UK owned Cavendish
446 Nuclear Ltd, US headquartered Jacobs Engineering Group, and American-owned AECOM)
447 which emerged as part of the new site management structure. It was mentioned through
448 participant interviews and during SSG observations that these American-incomers made no
449 attempt to integrate with the community, creating a sense of distrust.

450 *“So it's more cosmopolitan in Thurso because, myself included, when I moved up I*
451 *wanted to be nearer to Doureay than other towns. And I think that's what's*
452 *happened with other people. They live up in other parts of the country....not so many*
453 *people that work at Dounreay that live in Wick. They haven't had many infiltrations,*
454 *or whatever the word that the locals use. I got called an 'incomer' recently, and I*
455 *thought I've been here 14 years. The joke is unless you've got two generations in the*
456 *graveyard, you're still an incomer.” - D06 Previous union rep*

457 The changing idea of who should be included as the “local community” creates challenges
458 around how to define “successful” decommissioning and the social value or impact of the
459 work. The stories emerging of changing identities over the previous decades, and who is
460 included in stakeholder plans, points towards uncertainty in future decades of
461 decommissioning work and “local communities”

462 **The ever-changing stakeholder**

463 These examples of three stakeholder groups show that the stakeholder characteristics and
464 their perceptions and requirements have changed over the decades, in turn highlighting the

465 challenges and complexities of holding down who and what matters in achieving social value
466 outcomes in a megaproject setting. Existing literature does not adequately grasp the
467 possibilities of the plurality of stakeholders when discussing stakeholder management, even
468 though some scholars like Bourne and Walker (2005; 2006) and Walker et al. (2008) have
469 long called for a need to provide a more nuanced picture of the scale, scope and depth of
470 influence of multiple stakeholder groups. Our analysis of the ever-changing stakeholder
471 management dynamics over time throws up two key concerns. Firstly, stakeholders come
472 and go, or emerge as important and less important over time. As some fall out and others
473 emerge as influential, this would alter what is regarded as valuable by those affected by the
474 project. Thus, we add to a growing body of literature that shows that project success is not a
475 fixed entity but that success is only success in the current time and space (e.g. Davis, 2014;
476 2016). Second, a stakeholder can also intrinsically change in character, shifting their position.
477 Thus, change also where a stakeholder changes their own position over time (which is very
478 plausible in a megaproject). Additional complexity is added to megaprojects when
479 considering that many stakeholders may individually hold several positions at once – for
480 example, an employee on site is also part of the local community. These stakeholders may
481 have conflicting positions at the same time, bringing their bias to the project and affecting
482 decisions made.

483 This paper aimed to investigate how the appreciation of stakeholders' perceptions on
484 success and failure can lead to more productive processes in stakeholder engagement,
485 whether through integration or fragmentation particularly in the challenge of megaproject
486 decommissioning (Mulholland et al., 2019).

487 Changes to what constitutes 'success' happen regularly as organisations iteratively define
488 the overall design and planning end goals that are influenced by and in turn influences the
489 identification of the relevant stakeholder groups. The power and influence of stakeholders

490 change over time as notions of 'success' or 'failure' become clearer. Thus, stakeholder
491 groups emerge as design and planning end goals become constructed, which in turn raises
492 new opportunities for other stakeholders to become involved.

493 Integration of these emerging stakeholders is difficult and the desire to integrate relevant
494 stakeholders is also questionable in larger, more complex projects since decommissioning
495 projects can span a long time and cross a vast space. Alternatively, Pitsis et al. (2004) suggest
496 integration is not essential for relationships, as fragmented parts can make up a whole. This
497 is not new thinking, with a 1969 government report suggesting that grouping all stakeholders
498 together for one labour solution did not offer to solve all the problems, even though some
499 statistics may show the benefit on productivity (Lewis 1969).

500 This empirical study also contributes to the ongoing conversation in defining what social
501 value means in practice (Cartigny & Lord 2017; Raidén et al. 2019; Daniel & Pasquire 2018),
502 including a wide array of stakeholders, beyond the common procurement focus (Cartigny &
503 Lord 2018; Awuzie & McDermott 2016; Loosemore 2015). It is by exploring the dynamic
504 nature of stakeholders that the conceptualisation of Social Value in practice has been
505 elevated – further explained in the final section as appreciating the balance between
506 needing anchor points for sense-making but in doing so taking a reductive approach to
507 complex stakeholder management (Brookes et al. 2017).

508 One limitation of this work is that all participants interviewed were local stakeholders to the
509 Dounreay site. However, in responses they spoke of both the local and national
510 environment of social value. These two levels of scale highlight an interesting question of
511 how social value outcomes vary between on-the-ground and higher level. This links with
512 Goldthau's (2014) work on the scales of investigating the sociotechnical relationships of
513 energy infrastructure governance but may have further implications in placing stakeholders
514 and their perspectives of social value on different scales. Thus far, Social Value studies have

515 tended to focus on local stakeholders and value so this study raises questions around
516 adequate boundaries of measurement (discusses further in Mulholland et. al, 2019).

517 Recommended future work for this study would be to compare this to another case study to
518 allow for comparison if the idea of fragmentation always holds up for megaproject work. It
519 would be interesting to analyse the influence and impact of stakeholder groups further, to
520 demonstrate the usefulness and impact of fragmentation for social value outcomes.

521 **Closing remarks on using SROI for Social Value**

522 As stakeholders have been demonstrated to be ever-changing, this presents a challenge with
523 the first (and therefore all subsequent) steps of the SROI process. The impact of
524 identification and definition of stakeholders at the beginning of the SROI process will be seen
525 in the final reporting stage (seen in Table 1)– this shapes who the focus of the study is and
526 the resulting communication, a common problem with project sense-making (Clegg, 2016).

527 It is by figuring out the who, where and when of social value that we can begin to examine
528 the more detailed social value outcomes of megaprojects and how they are best
529 communicated. Applying any approach for social value, particularly the more detailed SROI
530 approach, brings difficulty in applying a coherent approach across the whole timescale and
531 locations of a complex project raising boundary questions: For who? When? Where? For how
532 long? Therefore, Social Value measurement and reporting can be viewed as only an island of
533 stability in a sea of change (Brookes et al. 2017). The ever-changing stakeholder lives in an
534 ever-changing world, exacerbated by the non-permanent nature of projects. However, with
535 such long timescales in megaprojects, utilising islands of stability allows sense-checking to
536 occur.

537 Social value is both a process and an entity, it can utilised as a verb or a noun (Bakken &
538 Hernes 2006). The process is an attempt to create islands of stability. Attempting to
539 categorically measure and define the social value of a megaproject simplifies the complexity,

540 not telling the whole picture, but it creating signposts for an interaction between static and
541 dynamic identities.

542 With the growing concern for social value in infrastructure (Cartigny & Lord 2017; Daniel &
543 Pasquire 2018) and the reported high likeliness of megaproject failure (Flyvbjerg 2014) the
544 engineering community needs to move forwards with finding ways to report on the social
545 impact of their work, particularly for publicly funded projects. SROI offers one method to do
546 this.

547 However, the limitations of SROI have been acknowledged (Watson et al. 2016) and have yet
548 to be applied in a robust, systematic way in larger more complex contexts. This paper
549 outlines the challenges that will be faced by the engineering community in embracing the
550 methodology, but also the potential opportunities. SROI needs further investigation in
551 infrastructure and general megaproject case studies to unpack the opportunities of focusing
552 on the stakeholders and boundaries in creating meaningful SROI reports.

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