Hyperextended objects in environmental planning

Julia Martin (Dipl.-Ing., MFA, PhD cand.)
Goldsmiths College, University of London, UK

Abstract

This paper discusses how objects of concern are imagined, defined, treated, and created in environmental planning today, and asks whether - in times of ecological crisis and climate change - considerable conceptual changes might be needed in the way objects are defined in environmental planning. The question is explored in connection to current discourses in object philosophy, contemporary art theory, and artistic research practice. Reflecting upon my ongoing case study in East Iceland the text problematises the modernist notion of "closed objects" and introduces the concept of the "hyperextended object".

The critique of objects in environmental planning can be regarded as a step towards the critical rethinking of ecology definitions and of the reasoning behind adaptation and mitigation measures in response to climate change effects. The latter will occur perhaps most noticeably in the Arctic, but also with no lesser relevance in all other parts of the world. A structural reconsideration of planning methodologies and frameworks, focussing on what constitutes an object of concern, appears as a local as well as transnational undertaking of great urgency.

Closed objects and their critique

Environmental evaluation procedures and their instruments such as Environmental Impact Assessments (EIA) are determined by the idea of specific objects of concern, for example a new bridge, a dyke, a proposed hydroelectric dam, or an aluminium smelter. These objects are considered from a perspective which differentiates strictly between one object and another, between objects and subjects, Nature and Culture, the "given" and the "intervention". It is a perspective which sets clear but artificial frames around these objects, thereby deciding in advance where the concern about their ecological agency can or should end.

Such thinking in "closed objects" works well within a modernist worldview, which has constructed and maintained a dualistic division between Nature and Society since the early days of industrialisation and Romanticism. However, recent discourses in the fields of ecocriticism, systems theory, and philosophy regarding the cultural dimension of global ecological crisis have contributed to a rigorous questioning of modernist thought. The notion of a detached, "given", passive Nature is no longer seen as undisputable, but as closely related to the illusory ideas of unlimited growth and endless natural resources, created and strategically upheld by the economic ideologies of modern capitalism, and unwittingly supported by the creation of romanticised images of a nature "over there" while arguing for its protection and conservation. Looking at the co-evolution of industrialisation, romanticism, and environmentalism in the 19th century, this correlation, leading to an exclusion of nature from the political mechanisms of human society, has been outlined for example by Kerstin Stakemeier (2009) and Kate Soper (1995).

The modernist understanding of the world and its objects has been challenged for example by Bruno Latour (2004), Timothy Morton (2010), and Donella Meadows (2008). They discuss nonhuman entities, specifically objects, as active, shape-shifting, co-dependent agents in ecological systems, instead of as passive, introvert and unchanging solids. Looking at objects in this way has immediate consequences for looking likewise at the agency of subjects, of immaterial entities, and of their relationships in what we might call the Social. The idea of equally active and co-dependent objects and subjects, irrespectively of their traditional categorization as entities of either the Nature or Culture realm, fundamentally redescribes human-nonhuman relationships, developing a sharpened awareness for the various forms of agency in beings, forces, events, infrastructures, policies, and physical matter. It directly participates in current attempts to redefine the idea of ecology in non-binary terms and to use this as new worldview for an ecological age, which has recently, perhaps counterproductively, been termed the Anthropocene.
Referring critically to current object oriented propositions for such a 'nonmodern' ecological worldview (Latour 2004), my research seeks to imagine objects not as "closed", but as "hyperextended objects". These are understood as heterogeneous structures including and superimposing all materials, infrastructures, situations, and physical beings affected by an initiating object's ecological agency, including long-distance and long-term relationships.

I will later argue that thinking in hyperextended objects has profound implications for the consideration of objects of concern in environmental planning, and fundamentally questions the tools and rhetorics of its evaluation procedures.
Before specifying hyperextended objects and the methodology of their investigation further, the text will first give an overview of the definitions for active objects delivered by the above mentioned authors. All these propositions have their problems and blind spots, particularly regarding their applicability in practical ecology, and regarding the ethical and political implications of an ecology modelled as a democracy of equal humans and nonhumans. The following three concepts describe ecologically active objects as 'actants', 'strange strangers', and 'stocks and flows'.

Bruno Latour's actants

In continuation of his contributions to Actor-Network-Theory, the philosopher and sociologist Bruno Latour rejects the distinction traditionally made between active subjects and passive objects and speaks instead of equally active human and nonhuman actants. Nonhuman actants can be individual living and nonliving beings, as well as ideas, forces, material flows, or collectives. The relationships of actants are crucial and constitutive for their existence: Understood as entirely relational, actants are defined not by their own unchanging essence, but exclusively by their actions upon other entities, i.e. their relational activity and agency. If relationships change, the actant changes with them or dissolves. All actants are thereby constantly transforming. As elements of a 'political ecology', also described as a 'parliament of things', they form collectives following a consultation and selection process which in itself can develop a specific agency and motivation (Latour 2004).

Dissolving the categories of objects and subjects and describing entities of all kinds as equally active and vocal flattens the hierarchy between humans and nonhumans in a way that enables radically new definitions of ecology. The focus on the agency and contingency of relations between actants delivers a necessary critique of persisting beliefs in the givenness of a distant, silent Nature.
The main problem with the concept of actants in regard to strategic and sustainable planning is that they cannot be held accountable for their past activities, if their actant-ness, once relative to this past situation, has meanwhile ceased to exist. Neither can they be

expected to act for the future, because it is impossible to know which constitutive relationships they will be engaged in, and therefore, how they will exist and behave. Actants, in their extremely situation-specific characterization, only exist in the moment. In Latour's definition they are active but ahistorical and thereby highly unreliable in terms of sustainability strategies.

This could at some point also lead to the question how strongly the idea of sustainability still relies upon a modernist definition of foreseeable and stable object-subject relationships.

Timothy Morton's strange strangers

According to the literature scientist Timothy Morton, ecology can be understood as an unordered 'mesh', consisting of the temporary encounters and interrelations of human and nonhuman 'strange strangers', which retain a perceptual distance towards each other and can therefore always be perceived as 'strange' or 'other'. These entities constitute each others' experiential environment and are thereby co-dependent through immediate aesthetic and sensual encounters (Morton 2010). In the mesh everything is intimately connected in an inescapable, claustrophobic coexistence. Nevertheless, there is no real sense of "us" as a whole. 'Strange strangers' appear to be less communicative and political than Latour's relational actants - unlike those, 'strange strangers' do not negotiate in order to maintain, improve or change their relationships. In their unavoidable environmental coexistence they can not be rejected or chosen by each other. They can only be accepted, endured - or 'loved', as Morton suggests.

The idea of the 'strange stranger' acknowledges the relational limitations intrinsic to ecological existence - physical limitations as well as the unknowability of certain events, entities, or aspects of entities which lie outside human cognition or experience. Thinking 'strangeness' offers a possibility for human awareness to accept and make sense of these limitations, as a necessary survival strategy in an allinclusive, highly complex ecology.

However, in their intuitive immediacy 'strange strangers' seem to be characterised by a higher degree of passivity towards their environment than actants. Introverted and distanced, and rather uninterested in their own agency and impact upon other entities

beyond a state of mere endurance, they appear to be ignorant of the problematics embedded in the agency of not-knowing and not-doing. When considering the 'strange stranger' in the context of environmental planning, the inertia of embeddedness and of a passive witness-observer perspective towards relationships dissolves any agency that endeavours to be consciously directed towards change. Taking responsibility for constructive, strategic, and visionary developments and reactions, which might have to be entirely counter-intuitive for an individual in its momentary environmental setting, can probably not be expected from the encapsuled 'strange stranger'.

Donella Meadows' stocks and flows

Donella Meadows takes a systems theorist's view of objects in ecologies. She describes them as part of 'stocks', which are considered as the basic, perceptible, measurable elements of any dynamic system. Stocks constitute an accumulation of entities over time which fluctuates according to the flows of material and energy within the system. The speed and direction of flows is in turn influenced by the level and behaviour of the stocks, which are not necessarily physical things but can also present for example a quantity of information, of wellbeing, or of motivation (Meadows 2008, Meadows et al 2010).

The theorization of objects as collective participants of stocks leads to an observation of their behaviour in systems which challenges the ultimate immediacy of relational actants and strange strangers. Meadows maintains that stocks react with a delay to the flows that are active in systems; they serve as buffers or shock absorbers. This adds a very important detail to the consideration of ecology which has been rather neglected by Latour and Morton: the agency of time. Studying the behaviour of systems, Meadows focuses particularly on the surprising effects of exponential rather than linear growth and on the individual, hardly predictable reaction times of objects in complex assemblages with other entities. To consider a system- and object-specific delay of agency, or a contingent sudden outbreak of agency, significantly complicates the manageability of ecological agents. In regard to decisionmaking in practical ecologies and environmental planning, Meadows' analysis highlights the necessity of investigating objects and their individual and 'stock' behaviour empirically and in great detail, taking into account situation-specific tipping points, leverage points, feedback loops, and the capacity to overshoot and collapse as

integral possibilities of systems behaviour (Meadows 2008). Despite such close focus on individual objects and their immediate context, she insists that it is equally necessary to maintain the overall perspective of systems thinking, which connects one specific system with many others, forming multiple ecologies on different scales of observation and operation. This may lead to an awareness of the potential and actual incompatibility of corrective changes to specific systems on global versus local levels. A multi-scalar ecological view acknowledges and problematizes the possibility that the dynamics driving positive change in large.scale and small-scale systems, such as practical adaptation strategies, can in fact eclipse each other.

Problems of closed objects in Environmental Impact Assessments

Systems theory argues that decisionmaking based on isolated objects severely misunderstands the complex behaviour of agents in dynamic systems. In "Limits to Growth. The 30-year update" (Meadows et al 2010) the authors concede that ecological crisis is the result of a crisis of systemic thinking and that therefore the mitigation strategies of green capitalism and environmentalism, as well as most technological advances, are unable to solve the deeper systemic problems of human organisation today. From this could follow that the narrow perspective frames set by Environmental Impact Assessment criteria around objects of concern misrepresent the wider systemic relationships of both the object and its environment. They distract - sometimes strategically - from the causal chains and contingencies making this object a translocal concern in the first place. Thereby the traditional planning instruments such as EIA might participate in ignoring or even reinforcing fundamental systemic and relational problems between human and nonhuman ecological agents that go beyond the immediately local physical and social relationships of a "closed object".

Hyperextended objects as embodiments of ecological and political relationships

Hyperextension as a research process traces the ecological agency of objects as fully as possible, investigating their infrastructures, by-products, and economic and social effects, in order to discover actual and potential, temporary and permanent reaction points with the operational fields into which the object has been deliberately or accidentally placed and

through which it keeps moving. The wider ecological agency of the object and of the assemblies it forms with other actants and processual forces can be revealed, thereby forging and articulating ever-expanding concentric, polycentric, and overlapping entanglements of consequential relations.

As an active and creative process hyperextension is more than information gathering. Its scope and quality relies upon the individual practicioner's cross-disciplinary research, his or her accidental and specific knowledge, experience, imagination, subjectivity and limitations. Therefore, despite its quasi-scientific interest, it produces a personalised ecological object, which always explictly includes the researcher and his or her efforts and awareness. On a methodological level, the hyperextension of objects can be understood as a practical, fieldwork-led research process through which we learn to perceive ecological objects as physically existing entities influenced by specific material and immaterial forces and by individual constellations of investigative experience and knowledge, including our own. This avoids standardisation and insists upon each ecological object's unique correlations and potential contingencies.

Kárahnjúkar Hydroelectric Project as hyperextension case study

The case study of Kárahnjúkar Hydroelectric Project in East Iceland which is briefly presented here explores how an object's multiple and overlapping cause-effect-relationships might change the overall evaluation of its agency; it also tests how to make its relational complexities readable. My fieldwork-based research around the structural and contextual components of this project, conducted in 2011 and 2012, included visual landscape analysis, speculative documentation, performative actions, archival research, presentations and discussions, and information gathering through conversations with local experts.

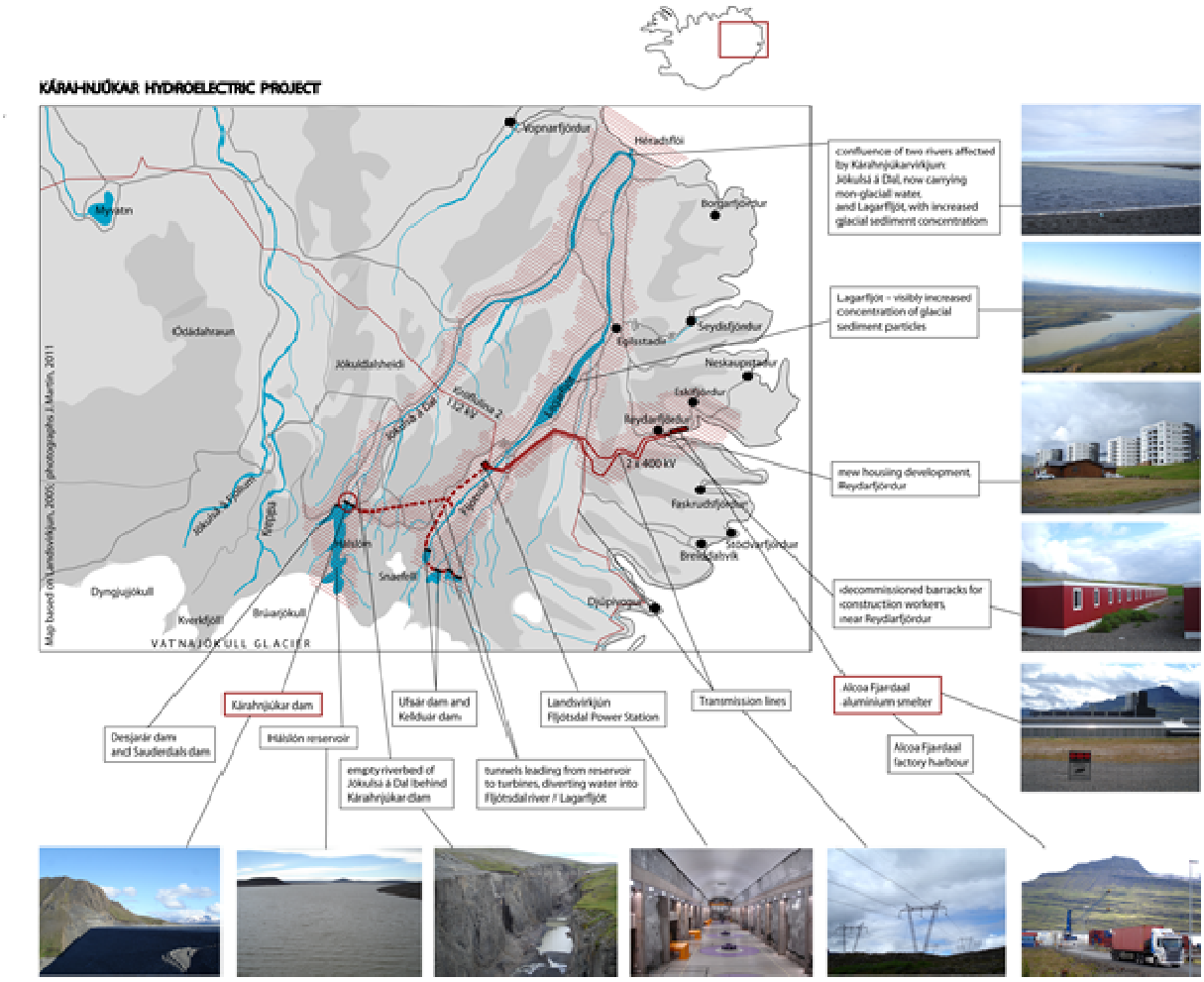

Image 1: Visual documention of the hyperextended object (excerpt). Julia Martin 2012

Hydroelectric dams, ususally the focus objects in debates about planned hydroelectricity projects, are particularly good examples for hyperextended (or hyperextend-able) objects. All dams are unique, site-specific constructions, whose appearance has developed out of their topographical situatedness. They already approach the limits of conventional objecthood - regarding their scale, their perceivability as objects rather than as architecture, the technical and energetic effort and mastery required to build them, and the expansive reach of their material and immaterial causalities. The agency of such a dam as object is from the start quite obviously a collective, ecological, and political one. It exists even before the dam's construction, as a political idea or interest, and reaches far beyond its local physical impact and the duration of its functional life. Hydroelectric projects are examples for human-nonhuman collectives stretching across time and space according to causal chains and automatisms yet to be fully deciphered. Their ecological and social impacts can be highly

problematic, reaching far beyond the immediately measurable effects of the described project itself.

"Kárahnjúkar Hydropower Plant is a hydroelectric power plant in eastern Iceland designed to produce 4,600 GWh annually for Alcoa's Fjardaál aluminium smelter 75 kilometres to the east in Reydarfjördur. The project, named after nearby Mount Kárahnjúkur, involves damming the Jökulsá á Dal River and the Jökulsá í Fljótsdal River with five dams, creating three reservoirs. Water from the reservoirs is then diverted through 73 kilometres of underground water tunnels and down a 420-metre vertical penstock towards a single underground power station. The smelter became fully operational in 2008 and the hydropower project was completed in 2009. The Kárahnjúkastífla Dam is the centerpiece of the five dams and the largest of its type in Europe, standing 193 metres tall with a length of 730 metres and comprising 8.5 million cubic metres of material."

Image 2: Kárahnjúkar Hydroelectric Project as described on Wikipedia (excerpt), 19.10. 2013

The tracing of extended causal chains, for example considering the final use of the generated energy, or the political and social conditions during and after the project's emergence, is often necessarily neglected in Environmental Impact Assessments looking at "closed objects". This is not to say that EIA do not make serious efforts to cover the full ecological footprint of an object or project, but their initial conceptual separation between an intruding object and its environment by default separates causes and effects too neatly and narrowly. It distracts from the realisation that the decision for or against a proposed project is a decision for or against the emergence of a new hyperextended object, or "constellation of actants", much larger than the initiating intruding object.

The Kárahnjúkar Hydroelectric Project in Iceland is a good example for this misunderstanding of an object's reach as ecological actant. Completed in 2009, the scheme was built with the intention to produce cheap, supposedly climate friendly energy for industrial use, creating regional jobs at the same time. Thinking in terms of hyperextension, Kárahnjúkar Hydroelectric Project cannot be understood without the Alcoa aluminium smelter in Reydarfjördur, which is the main consumer of the generated energy, and the main reason for the project's existence. When regarding the project's infrastructure as a closed object affecting only East Iceland, the reduced equation which weighs effects upon "Nature" against effects upon "Society" might appear to make sense. When regarding it as a

hyperextended object however, the ecological agency of the project counteracts its proclaimed green-energy-motivation as well as its new-jobs-motivation. Hyperextension is an object-oriented conceptualization of ecological relationships on very large and very detailled scales. It maintains that the dams, the reservoir, the power station, the transmission lines, the affected rivers, the attached aluminium smelter, and the regional housing and infrastructure developments all can be seen as the same ecological object - as well as the Bauxite mine in Jamaica, the carbon anode factory in Norway, and the container ships transporting raw materials and the finished aluminium ingots. Going even further, the objects made out of this 'climate-friendly'-produced aluminium also belong to the hyperextended object that is or should be under discussion in the EIA - airplanes, weapons, beverage cans, bicycle frames, yoghurt pot lids, window frames, take-away trays, or sculptures. Allowing for example for the production of airplanes within the hyperextended object eliminates the supposedly 'green' agency of its use of hydroelectricity. Likewise, the closure of Alcoa's Badin aluminium smelter in North Carolina in order to relocate production to Iceland, where energy costs are much lower, eliminates the new-permanent-jobs argument, if we consider employment on a transnational level. One community's gain has here been another community's loss. The hyperextension of objects in this way contributes to a critical discussion of the means and ends of production and construction in ecological collectives beyond the nation state and other frames, approaching a redefinition of human-nonhuman ecologies and ecological agency which might be more appropriate to the scale and complexity of ecological crisis we are facing in this century.

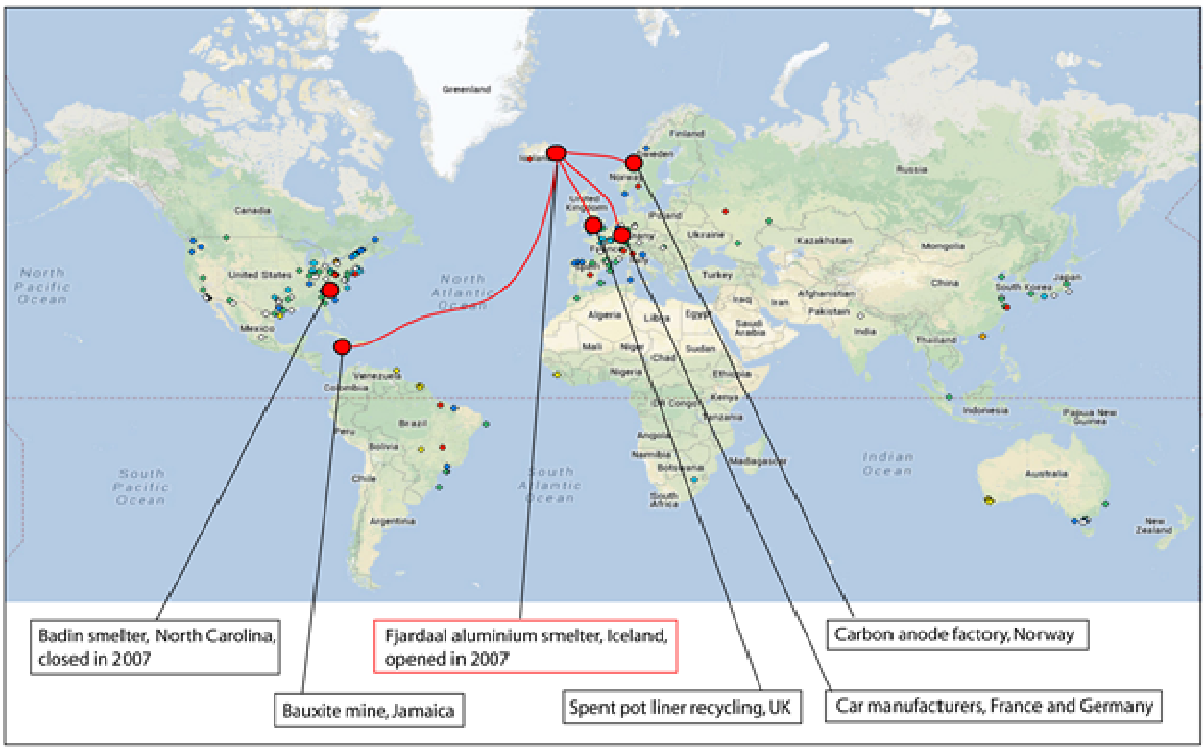

Image 3: The hyperextended object on a transnational scale. Julia Martin 2013. Base map accessed at http://www.alcoa.com/global/en/about_alcoa/map/globalmap.asp, 19.10.2013

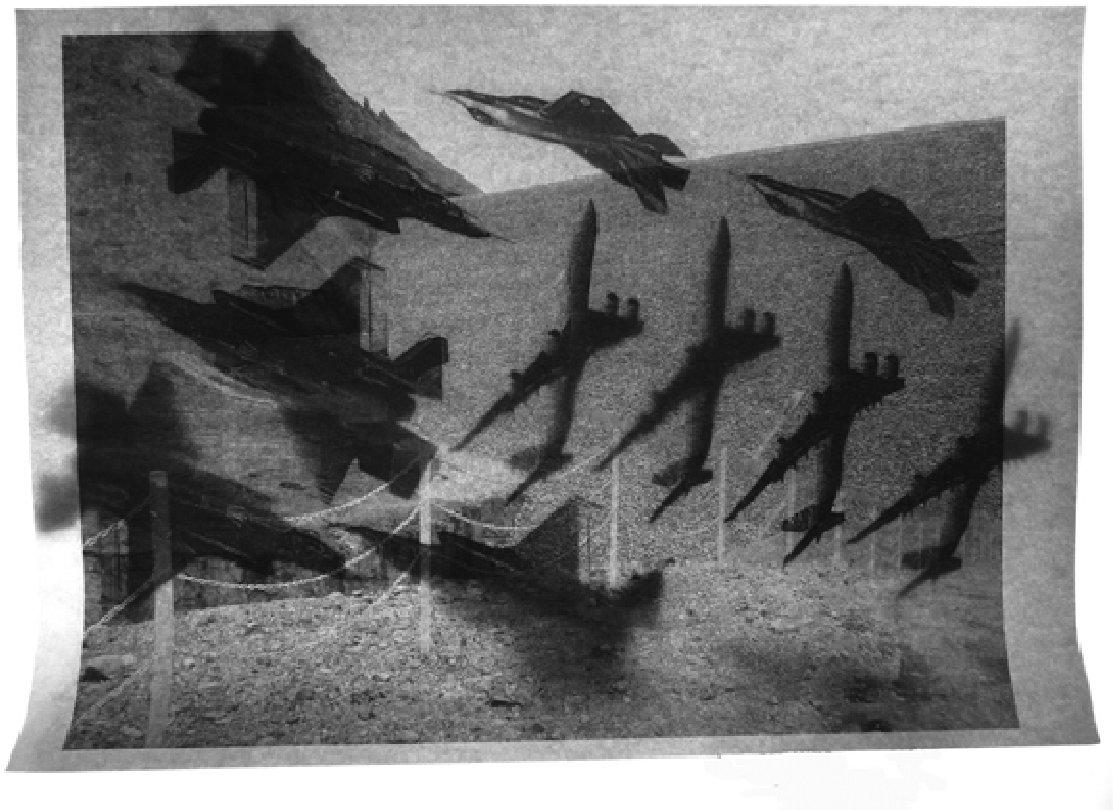

Image 4: Means and ends: hydroelectricity, aluminium, and the military and aviation industry. Collage, xerox paper and acetate, Julia Martin 2012

Environmental Impact Assessments are by their purpose and methodology limited to national contexts and therefore cannot assess the full ecological and social agency of such expansive internal and external object correlations. They are forced to refer only to single components of such ecological constellations, which might be politically pre-determined for example by territorial demarkations. The instruments, formats and rhetorics currently used in conventional environmental planning and legislation are based on thinking in closed, local, controlled and homogenous objects, not in hyperextended, active, ecological objects - let alone in collectives of interrelated hyperextended objects. Therefore they must struggle and fail to represent the full scale of an assessed object's ecological agency. Distortions of prognoses, and errors in the planning of adaptive and mitigating measures are likely results of the partial view upon dynamic translocal systems. Unable to deal with extreme complexity, the frameworks defining closed objects can become targets of political manoevering and "fact-production", grooming the conditions of evaluation and consideration to the benefit of those who want certain objects to come into existence.

The Environmental Impact Assessment reports of Kárahnjúkar Hydroelectric Project and of the Fjardaal aluminium smelter in East Iceland are interesting and complex examples supporting this hypothesis. They indicate some of the constrictions and distortions of evaluation, caused by the procedural and practical demands to frame the object of concern as a "closed" object. In the following paragraphs examples will be given for how the rhetorics of these two EIA reflect the conceptual basis behind current assessment methodologies, still firmly rooted in a modernist Nature-Society dualism.

Fjardaal aluminium smelter EIA

The Fjardaal aluminium smelter in Reydarfjördur, operated by Alcoa, is the main consumer of the electricity generated by Kárahnjúkar Hydroelectric Project. Throughout the history of its planning process, Alcoa has pushed the project through a phase of intense public protests against the Kárahnjúkar scheme, and has even successfully promoted an expansion of the plant's productive capacity. The company has been making particular efforts to secure local support by making cultural investments in the affected communities.

The Screening Risk Assessment of the Fjardaal smelter, a specialised EIA focusing mainly on air emissions, was conducted by Exponent (2006), a company contracted by Alcoa. The report initially draws a conceptual frame around the "object of concern", excluding certain considerations which are deemed irrelevant. Among these is for example the consideration of the amount of greenhouse gases generated by the smelter. In times of climate change this can be regarded as a very problematic omission. Also neglected is the impact of increased land and sea traffic caused by the production activity of the factory, its harbour, and attached businesses. The detrimental effect of air pollutants on the flora and fauna nearest to the smelter is relativised by the introduction of a "dilution zone", within which environmental standards are lowered, compared to the outside of this zone. Ironically, its size is calculated according to the already expected radius of higher-than-allowed pollution. These exclusions could possibly be regarded as an indication for a strategic tailoring of more favourable frameworks and evaluation criteria by the assessors or their employers, within the limits of Icelandic legislation and EU environmental standards. The reasoning behind them constitutes a reduction of assessment scenarios and of the definition of "environmental impact" to fit the narrow frame of a spatially and temporally closed object. For example:

"Perfluorcarbons were not modeled because they are expected to be generated sporadically over short time periods and there are no regulatory limits for perfluorcarbons. Furthermore, environmental concern about fluorcarbons stems from their potential role as a greenhouse gas, rather than from potential localized human health or ecological effects." (Exponent 2006, section 2-3)

Here it becomes apparent that climate change and greenhouse gas production are not considered a major environmental concern. In case of aluminium smelting this makes political sense for the proponents, since the Fjardaal factory is in the same report expected to emit 770.000 t of CO2 per year.

"The immediate area surrounding the facility is not inhabited, and future residential use is considered unlikely because of the location and the formal regulatory restrictions on its use. Specifically, a dilution zone has been established in the Environmental Operating Permit

according to Icelandic regulations (Reydaral 2001). This area is off limits to residential and agricultural or rangeland use. The dilution zone allows dilution of chemicals to take place and stipulates that chemical concentrations from the facility emissions may exceed environmental limits within the area (Alcoa 2005). (...). It is necessary to abide by (the) limits outside the dilution zone." (Exponent 2006, section 2-5)

The introduction of a dilution zone highlights more than anything the relative arbitrariness of agreed limitations for pollutants, ever more so since the dimensions of the zone have been calculated according to the expected distribution of pollutants when running the factory as desired, not according to an as-little-as-possible pollution scenario. (Alcoa 2006, Reydaral 2001, p.140)
"The Fjardaal facility will use imported anodes (and will thus not include an anode production plant) and spent pot liner will be exported rather than being placed in a onsite landfill." (Exponent 2006, Executive summary)

This excludes the ecological impact generated by transport, and by the manufacturing and recycling of anodes. It also takes out of the equation the deposition of pot liners, which will now be placed in landfills abroad. Although still a liability of the factory, they appear to be outside of the responsibility of the factory's proponents in Iceland, simply by crossing the national borders. The outsourcing of waste disposal, and thus the distortion of the ecological agency of a production chain, is a standard trick for gaining the approval of a government's decisionmakers.

Kárahnjúkar Hydroelectric Project EIA

In the Kárahnjúkar Hydroelectric Project EIA (Landsvirkjun 2001), concentrated efforts have been made to assess the ecological impact of the entire scheme, assembling an object that consists of a number of components and stretches across a large region and diverse habitats. The identified impacts consequentially cover a wide array, including environmental, social and economic effects. The object described and assessed here in form of a "project", at first glance does not look like a closed object, because of the diversity of its components and its relative spatial expansiveness.

"The impact area of the project includes highlands by the glacier Vatnajökull as well as land along the rivers through the valleys of Jökuldalur and Fljótsdalur out to the coast of Héradsflói." (Landsvirkjun 2001)

However, the EIA's investigations of the Kárahnjúkar Project still omit an evaluation of the transregional impacts, and the global political agencies connected with it. Following the concept of the hyperextended object, the cultural and political as well as ecological significance of Kárahnjúkar Hydroelectric Project can not be sufficiently recognized and acknowledged, if its assessment does not take into account in the same report its direct correlation and co-evolution with the attached Alcoa aluminium smelter and the use of the produced aluminium. Both players in this scheme, the producer and the consumer, are framed separately in two separate EIA, although they are strategically and materially intimately linked. The controversy at that time in Iceland about the problematic coming-into-being of this project was a clear sign for the neglect of debates around the ethics of exactly these pragmatic correlations. They have quite rightly expanded into a critical political discussion of democracy, sustainability, value, and meaning (Magnason 2008).

Kárahnjúkar EIA could perhaps be regarded as a prime example for the limitations of current assessment procedures despite their best efforts at inclusiveness, highlighting the necessity to develop instruments in environmental planning that are better able to encompass the complex cultural dimensions attached to objects of concern: questions of meaning, of sustainable economics, of wellbeing, of the prioritisations regarding means and ends. These questions are at the center of political and economic planning concerns today, rather than hidden in the margins of an exclusively environmentalist discourse, as global climate change forces analysts and decisionmakers to fundamentally reconsider their thought models and tools. For example, the information provided by EIA should look beyond narrow national boundaries and interests. It should make clear the global environmental and political context in which the assessed object or project is to be understood. Decisionmakers should not merely be presented with a closed, controllable model object and its immediate and quantifiable pros and cons, but also with the complex, largely unquantifiable and unlimitable situation unfolding around and because of this object. This would highlight not only the costs and gains, but the wide-reaching functional responsibilities attached to the decisionmakers'

actions. Of course, this kind of contextual description of an object under consideration depends heavily on the integrity of the researchers, the scope of their contextual thinking, and their independence from any direct stakes in the object or project to be assessed. It might therefore not make sense to allow those agents to provide the EIA report who have an individual interest in the coming-into-being of the object or project to be evaluated. In the case of Kárahnjúkar, the national energy provider Landsvirkjun itself provided the report and unsurprisingly came to the following conclusion:

"It is Landsvirkjún's conclusion that the environmental impact of the project is within acceptable limits, in light of economic benefits which the anticipated power plant would yield to the nation, and of the development in employment associated with the sale of power. The developer therefore applies for approval of the project." (Landsvirkjun 2001)

In a further statement regarding the profitability of the project, the report's rhetorics are shown to be deeply influenced by a traditional modernist attitude, strictly and problematically separating the concerns of nature from those of society, and effectively forcing decisionmakers to choose between the two. Such rhetorics unnecessarily polarise the complex relationships between ecological agents in a way that gives a clear advantage to the promoters of the project through a political argument exaggerating monetary value:

"In short, a decision on whether the plant is justified in relation to the country's economy has to build on an evaluation of whether social and economic advantages weigh heavier than the effects on nature." (Landsvirkjun 2001)

This formulation very clearly puts decisionmakers under pressure to act "for society" without questioning the reasonability of the frame set around such a "society", particularly the national frame. It entirely ignores the involvement of the project in economic and political strategies such as the business plan of a multinational aluminium producer, and equally avoids the fundamental discourses regarding the increasingly obsolete and non-sustainable ideology of endless growth which is closely connected to a dualistic worldview. From an ecological perspective the profitability study of Kárahnjúkavirkjun as calculated by Landsvirkjun will be flawed, because it does not include transnational costs and effects. In an

age when ecological crisis has become decidedly global, it should be asked whether individual national and corporate interests should be allowed to lead the assessment of large-scale projects such as Kárahnjúkavirkjun, which by their mere physical and iconic dominance play an important role in deciding what kind of future economic and cultural development is to be chosen or rejected, locally and globally.

Artistic research into new concepts of ecology for environmental planning

The planning-relevant potential of the hyperextension of objects lies in the expansion of the idea of ecological objects, as well as in the critique of standardized evaluation and development strategies. We could now ask how deeply assessment procedures and planning policies would have to be changed in order to describe, evaluate, and manage hyperextended objects appropriately. This is important for future environmental planning in times of climate change: Despite the pressure to react quickly upon the effects of ecological crisis, it is essential to avoid letting future mitigation and adaptation strategies "push in the wrong direction" (Meadows 2008), merely covering up the deeper systemic problems in our current economies, for example the stubborn belief in unlimited growth. Considering decision-making processes as traceably politically and materially interrelated with the lifecycles of objects, subjects, and their assemblies, should make it impossible to declare any of these elements as unchangeable. This awareness should help planners of all disciplines to think more precisely of alternatives to the seemingly "natural" developments and "given facts" of current economic ideologies. Technological development is essential today, but for different reasons and on much deeper levels than the promoters of adaptive industrialisation have in mind. Making sustainable, post-carbon and post-growth technologies function adequately however still requires a much better systemic and unromanticized understanding of local and global human-nonhuman ecologies, and of the motivations and dynamics that drive them internally and externally.

Tracing, revealing, and constructing human-nonhuman ecologies as complex systems thus requires very diverse knowledge about entities, agencies, and their relations. Regarding objects, infrastructures and systems, art practice and art theory have produced a stunning amount of analytical and imaginative work on the ontology of agency-endowed entities, and can offer this knowledge for the cross-disciplinary discussion and exploration of ecological

agents. My own artistic research, using artistic and non-artistic methodologies and presentation formats, aims to contribute to the discourse about ecology with this ongoing investigation of hyperextended objects.

References

Alcoa Fjardaal (2006). Aluminium Plant in Reydarfjördur. Environmental Impact Statement. accessed at http://www.alcoa.com/iceland/ic/pdf/2006_08_eia_english.pdf (19.10.2013)

Exponent (2006). Screening Risk Assessment for Air Emissions from the Alcoa Fjardaal Aluminium Smelter. accessed at http://alcoa.com/iceland/ic/pdf/2006_04_vidauki_8_en.pdf (19.10.2013)

Latour, B. (2004). Politics of Nature. How to bring the Sciences into democracy. Cambridge Mass.: Harvard University Press.

Landsvirkjun (2001). Kárahnjúkar Hydroelectric Project up to 750 MW. Environmental Impact Assessment. accessed at http://www.docstoc.com/docs/26715705/III-ENVIRONMENTAL-IMPACT-ASSESSMENT (12.04.2012).

Magnason, A. S. (2008). Dreamland. London: Citizen Press.

Meadows, D. H. (2008). Thinking in Systems: A Primer. Vermont: Chelsea Green Publishing.

Meadows, D. H.; Meadows, D.; Randers, J. (2010). Limits to Growth: The 30-year update. Vermont: Chelsea Green Publishing.

Morton, T. (2010). The Ecological Thought. Cambridge Mass.: Harvard University Press.

Reydaral HF (2001). Aluminium Plant in Reydarfjördur. Environmental Impact Assessment.

Soper, K. (1995). What is Nature? Oxford: Blackwell.

Stakemeier, K. (2009). Der Ausschluss der Natur. Kunstforum, 199, p. 156-165.