Energy, air and climate change: a new sculptural language

by

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Abstract

This project has developed a sculptural language that actively responds to and participates in the climate change debate. It employs energy and air as key materials in direct response to climate change, a discourse framed and driven by the relationship between energy use and the earth’s atmosphere.

The research was motivated by a desire to develop an alternative approach to making environmentally engaged sculpture where singular strategies, such as utilising only recycled materials, have limitations in their ability to address the complex and seemingly intangible nature of climate change.

While the project has historical links to environmental and land art that emerged in the 1960s, the contextual focus has been sustainable design, sculpture and installation art which strategically integrate the materials of energy and air, made since the 1980s, the period in which the world became more aware about global warming. By synthesising formal and conceptual approaches from these sources, the project has developed a multifaceted sculptural language in response to the complexity of climate change. This language has been informed by artists such as Simon Starling and Tue Greenfort who create installation-based environmental systems. The metaphorical link between global warming and human respiration emphasized by Maria Miranda and Norie Neumark in their work Talking About the Weather (2006 ongoing) has been substantially explored in this project.

The research output consists primarily of sculptural objects whose form and function have been inspired by sustainable design and DIY culture. These objects require physical human input to demonstrate the mechanical dimension of their relationship to climate change. The sculptures are supplemented by video documentation that depicts their activation in order
to parody emergent climate change solutions such as alternative energy generation and carbon capture and storage. My presence in these videos as a test subject or tragic anti-hero offers a blackly humorous critique of individual climate change convictions.

Singular strategies for creating environmentally engaged sculpture are limited in their ability to respond to climate change. Through the strategic use of energy and air in a series of sculptural objects that incorporate elements of sustainable design and DIY culture, this research has developed a multifaceted language that actively responds to this complex environmental issue. By parodying alternative energy generation systems and highlighting a metaphorical association between global warming and human respiration, the project creates an opportunity for the viewer to reassess their climate change beliefs.
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CONTENTS

PART ONE: The Project 1
Why undertake research in response to the issue of climate change? 1
The Field of Practice 3
Air and Energy 8
Summary 10

PART TWO: Pursuit of the Project 11
Generating a Project 11
Air Vent Generators 12
Breath Generators 17
Carbon Capture and Storage 21
Breath Compressor 29
Compressed Breath Generator 30
Carbon Breath Tester 32
Perpetual Surrender 33
Divine Intervention 34
Installation of the work 36

PART THREE: Context 37
Systematic Change 37
Climate Change in the Gallery 45
Air and Climate Change 54
Sustainable Design and Art 61
Summary 70

PART FOUR: Conclusion 71

APPENDICES
APPENDIX ONE: List of Submitted Work 74
APPENDIX TWO: Bibliography 77
APPENDIX THREE: List of Illustrations 81
APPENDIX FOUR: Curriculum Vitae 87
PART ONE: The Project

This project has developed a sculptural language that actively responds to and participates in the climate change debate. It employs energy and air as key materials in direct response to global warming, a discourse framed and driven by the relationship between energy use and the earth’s atmosphere.

The project adds to a field of practice that explores ideas about climate change through a contextual focus on sustainable design, sculpture and installation art which strategically integrate the materials of energy and air. By synthesising formal and conceptual approaches from these sources, a multifaceted sculptural language has been developed in response to the complexity of climate change.

The research was motivated by a desire to develop an alternative approach to making environmentally engaged sculpture where singular strategies, such as utilising only recycled materials, have limitations in their ability to address the complicated and seemingly intangible nature of climate change.

Diverse mediums, including sculpture, installation and video, have been employed within this project in combination with a blackly humorous parody of DIY eco-culture and individual environmental endeavour to develop a new dynamic language in response to the issue of climate change.

Why undertake research in response to the issue of climate change?

The aim in undertaking postgraduate research was to radically shift my art practice away from the material driven methodology I had been employing for more than a decade. The work was becoming reliant on my ability to demonstrate an increased level of craft or workmanship to sustain my interest. While my practice in this period could be seen as diverse in terms of content and materials, I had begun to identify the limitations of an approach that relied predominately on a demonstration of skilled
craftsmanship. In undertaking this research, my practice has shifted dramatically, whilst retaining key aspects of my previous work. Sensitivity to the inherent formal and conceptual properties of materials, combined with a hands-on making aesthetic, remain as important elements in the project. The developments in my project have been instigated and influenced by extended and ongoing contextual research. The most surprising change brought about by this process has been the inclusion of my physical presence in the work through performative activities. This has in turn, for the first time, instigated the incorporation of video and installation into my working methodology.

Responding to an environmental concern through my art practice is an additional new development. For a considerable period of time I have been sceptical about the future of the human race given our apparent inability to respect the environment that sustains our existence. The predicted climate change apocalypse is indicative of our potential for self destruction. Dubious of visual arts’ ability to effectively contribute to an environmental solution, I have previously refrained from engaging with these issues via my art practice. One of my primary reservations regarding the effectiveness of art that engages with environmental issues is its ability to raise the awareness of an art audience already sympathetic to the cause. Given this view, how can I justify a research project that aims to engage with the issue of climate change? The answer is straightforward as this project does not harbour altruistic aspirations of providing a solution to this environmental issue, nor does it wish to present a didactic view regarding the validity of man-made global warming. The motivation for undertaking this research has been to question my beliefs and understanding of this complex issue by viewing it from a new perspective. Presenting the research to an audience aims to facilitate a reassessment of their environmental beliefs. Man-made climate change implicates all of us as being individually culpable for its creation, and so it follows that all of us contribute to global warming no matter how environmentally sympathetic we are.
The Field of Practice:


The project has historical links to Land and Environmental art of the 1960’s and 70’s. The most renowned works from this period engaged directly with the environment through site specific interventions in the landscape. This art movement transported sculptural practice out of the studio and gallery to alter existing perceptions of the landscape and critique our relationship with the environment. The works were both informed by and reliant on the specific location of their creation, whether they were permanent expansive interventions, as in James Turrel’s *Roden Crater* (1977 – present) or more ephemeral works such as Walter De Maria’s *Desert Cross* (1969). Dependence on site for both the context and location of the artwork limits the ability of this form of environmental art to address a global ecological issue such as climate change. Stephanie Smith, curator of the 2006 exhibition *Beyond Green: Towards a Sustainable Art*, indicates a trend away from site specific strategies in environmental art¹, citing “a more nomadic sensibility exemplified by the mobile structures, objects and processes/networks featured in this exhibition.”² The context for the research reflects this trend away from the site specific environmental art of the 1960’s and 70’s by focusing on sustainable design, sculpture and

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¹ This research recognises the distinction between 1960’s/70’s site specific environmental art and more contemporary environmental art practices that engage specifically with notions of place and time. The progression from site specific environmental art to practices engaged with elaborations across time and place are beyond the scope of this project.

installation art made since the 1980’s, the period in which the world became more aware of global warming. Given the broad spectrum of environmentally engaged art practice within this period and the necessary limitations placed on this research, the scope of investigation has primarily focused on art and design which strategically incorporates energy and or air as major components.

The complexity of climate change science also makes it difficult for artists to engage with this issue through strategies such as using only recycled materials. The *WEEE Man* (2005), a large figure made entirely from Waste Electrical and Electronic Equipment (WEEE) is a pertinent example of this approach. Designed by Paul Bonomini, this artwork, weighing in at 3.3 tonnes, represents the average amount of WEEE thrown away by a British citizen in their lifetime. While the use of a single category of recycled
material successfully visualises the WEEE problem, it is limited in its ability to explore the diverse conceptual dimensions and issues related to climate change. In addition, this approach posits that utilising green materials such as waste or recyclable components gives the artwork a form of green credibility. While this mode of practice results in a thorough consideration of specific environmental concerns, it inevitably ignores the contribution towards other ecological issues that result from the construction and display of the artwork.

In this context, the project addresses a perceived need for a new language, within sculpture and installation art practice, to engage with climate change. In the context chapter of this paper I identified and discussed the fields of art and design practice that have informed the development of this sculptural vocabulary. Although significant elements of the context for this research fit within the broad field of environmental art and design, I have chosen to also look beyond these areas to identify new possibilities. Given this discourse is framed by the relationship between energy use and the earth’s atmosphere, the project has been inspired by artworks which strategically engage energy or air as intrinsic materials. Incorporating these materials into the artworks produced for this project has been pivotal in developing tangible links to climate change.

Beyond the scope of the context discussed in the second chapter and outside the field of contemporary art practice, internet sites promoting alternative energy generation systems, especially those of a DIY nature, have continually inspired and informed the project. The internet is saturated with schemes for generating ‘green’ electricity. They range from ‘practical’ wind turbines, constructed from spare parts salvaged from the backyard shed, to the absurd ‘eco-friendly solar powered bra’ for charging your mobile phone or iPod. Why would anyone incorporate a solar panel into a garment

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normally shielded from the sun by outer layers of clothing? I suspect that the company responsible, *Triumph International*, had no intention of taking this creation beyond the prototype stage as evidenced by the product’s ludicrous and publicity oriented description:

![Figure 2: Triumph International, Solar Brassiere, 2008](image)

The green-colored bra which has the capacity to generate enough power to charge a cell phone or an iPod, incorporates a solar panel which produces electricity and is in turn wired to a mini electric bulletin board for displaying messages. And the benefits don’t end there. Water or vodka can be stored in the Solar Brassiere’s padding, and to sip the drink, simply insert a straw into the brassiere cup.\(^4\)

This preposterous product is an example of the bizarre eco-culture that climate change has generated. Apparently anything with a solar panel can be labelled as eco-friendly, even if the only ‘green’ aspect of the product is its colour.

\(^4\) Ibid.
Whilst this represents a perverse way to responsibly engage environmental issues, the emergence of this culture has given us a new context through which to consider the world. The Questionable Authority blog site discussion, *Weight Loss, Light Bulbs and Carbon Dioxide Emissions*, is a pertinent example of this phenomenon. Given the context of global warming, the author of this site, Mike Dunford, examined how the physical exercise he was undertaking to lose weight might be impacting on his carbon footprint. He then went on to extrapolate this to calculate the potential carbon emissions generated from weight loss across America; “That means that if every American lost all their excess weight this year, it would actually add much less than 0.1% to the total (American) carbon output.”

Although the solar powered bra and weight loss carbon emission blog are decidedly far fetched, perhaps even bordering on science fiction, they are an undeniable part of our response to global warming. They do not aspire to provide a meaningful environmental contribution; in contrast they are an attempt to engage the issue on a tangible and intimate level. The complex and conflicting nature of the science distributed by both sides of the climate change debate makes it difficult to comprehend and in turn separate truth from fiction. This confusion, combined with environmental campaigns that encourage us to ‘think global act local’, generates a level of anxiety as we struggle to personally contribute to an environmental solution. A state of anxiety is not conducive to making constructive decisions. No matter how bizarre or ineffectual products such as the solar bra might be, they are perhaps more ‘real’ and accessible than the science associated with this issue and as a consequence offer an outlet for our anxiety.

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6 Ibid.
The body of work developed through this project parodies the myriad of ineffectual attempts by individuals, documented on the internet, to make a personal contribution towards a solution for global warming. Irrespective of the prevailing views regarding the validity of man-made global warming, the existence of a climate change discourse is undeniable. In his landmark book on climate change, *The Weather Makers*, Tim Flannery refers to the prevalence of this discourse. “One of the biggest obstacles to making a start on climate change is that it has become a cliché before it has even been understood.”\(^7\) In an effort to challenge this cliché and to cut through environmental fatigue generated by global media saturation, this project has generated accessible conceptual links mediated through the actual discourse, as opposed to the at times impenetrable science.

**Air and energy:**
Energy and air are used as intrinsic materials within this research in ways that embody, and at times parody, scientific systems and processes related to climate change. The integration and manipulation of energy and air within the artworks references and demonstrates aspects of the relationship between energy consumption, the earth’s atmosphere and global warming. By parodying ‘the science’, a primarily objective experience is replaced by an actual subjective experience, thereby creating a personal connection between the viewer and this environmental issue. For example, with regard to air, the process of human respiration is used as a metaphor for our individual contribution to global warming. This primarily unconscious process increases the carbon dioxide concentration of the air we inhale. Given that carbon dioxide is the gas most associated with causing global warming, we are theoretically contributing to this predicted environmental disaster every time we exhale. This metaphor highlights the unavoidable link between the viewer and the predicted environmental apocalypse. Through devices such as modified respirators that enable the capture of

exhaled breath, the artworks facilitate the tangible perception of the unconscious and invisible process of human respiration. Various weather balloons, inflated as a consequence of the exhalations associated with various energy consumption activities, embody futile acts of carbon capture and storage, theoretically and literally alleviating anxiety by protecting the atmosphere from my exhaled carbon emissions.

The production of energy derived from burning fossil fuels, our main source of energy, is attributed as the dominant cause of man made global warming. Universal, large-scale processes of generating energy, from arrays of photovoltaic cells to burning fossil fuels, are inextricably linked to global warming. In an attempt to contrast the scale and anonymity of these operations and draw attention to the responsibility of the individual to contribute towards a climate change solution, I use my body to activate the artwork which in turn results in an associated generation of energy. My physical presence in these works personalises the struggle to find a solution to our dire environmental predicament by manifesting an antihero; a character capable of generating not just energy but also empathy.

Art galleries and museums consume large amounts of energy to preserve and display works of art. In addition to generating electricity via my bodily actions, this research project incorporates wind turbines to capture the energy of the outside air as it moves over the gallery and solar cells to harness the radiant energy emitted by gallery lighting. Attention is drawn to this normally anonymous energy use in the gallery through this perverse 8 The use of weather balloons, an established tool of climatology, as the capture and storage receptacles for the exhaled breath reinforces the reference to climate change. 9 The term used to describe the capture and storage of carbon in a manner that does not allow it to enter the atmosphere. Most commonly associated with the development of technology to capture and sequestrate the carbon dioxide from large emission sources such as coal fired power stations. 10 The IPCC Fourth Assessment Report: Climate Change 2007 indicates “Carbon dioxide is the most important anthropogenic greenhouse gas. The global atmospheric concentration of carbon dioxide has increased from a pre-industrial value of about 280 ppm to 379 ppm in 2005. The primary source of the increased atmospheric concentration of carbon dioxide since the pre-industrial period results from fossil fuel use, with land-use change providing another significant but smaller contribution.”
action, thereby causing the audience\textsuperscript{11} to reflect on the gallery as a consumer of energy and simultaneously challenging the relatively inert energy status of exhibiting artworks.

**Summary:**
The project aims to facilitate a reassessment of our beliefs about climate change through the development of a dynamic sculptural language that highlights our interaction with the air that surrounds us and engages directly with issues of energy use and misuse. This language has drawn on diverse sources that include the fields of sustainable art and design, contemporary sculpture and installation art, to shape its vocabulary. Outside of art and design practice, the research has also been informed by the discourse and eco-culture that has emerged in response to climate change.

\textsuperscript{11} Given the audience for this research is primarily working in, or consumers of, the visual arts.
PART TWO: Pursuit of the Project

The artwork produced for this research project can be categorized into three sections. Firstly, in an attempt to explore the possibility of engaging with climate change, the early work was designed to generate energy to offset its carbon footprint. The second group of works used the carbon dioxide enrichment properties of human respiration\footnote{With every breath we concentrate the carbon dioxide levels of the air we inhale from approximately 0.04\% to 4\%. This property of human respiration will be discussed later in this paper.} as a metaphor for our individual global warming complicity. The third area of exploration in this research comprises artworks which considered the relationship between the art gallery and climate change.

Generating a Project:

My initial approach to the research was partially inspired by viewing Glassorama (2008), a documentary about Australian glass artist Tom Moore that described the presence of an underlying environmental theme in the work being produced for Moore’s upcoming exhibition. My scepticism regarding the ability of visual art to provide effective environmental outcomes, led me to consider the potential hypocrisy of using an energy intensive process, such as glassblowing, to make an environmental statement. While the artist could rightfully claim that he was raising awareness of environmental issues, I questioned whether this was enough to offset his contribution to global warming, an unwanted by-product of making his work. Could this potential hypocrisy influence his authority to speak about things ‘environmental’ in a world obsessed with global warming? Given the aim of my research was to respond to the climate change debate, I decided to address the carbon footprint of my art practice as a methodology for engaging proactively with this environmental issue and ask the question: how did my practice contribute to my overall carbon footprint? The initial focus of the project considered how to reduce or
eliminate the carbon footprint of my art practice through the practice itself. One possible way of achieving this was to produce artwork that self-generated enough electricity to offset the energy required for its actual construction.

**Air Vent Generators:**
The allocation of my university studio space provided the first opportunity to generate electricity. The architectural feature of the studio that first captured my attention was the air duct and corresponding vent that dominated the room. I was curious as to why the previous occupant had blocked the air vent with paper towels. Upon removing the dust impregnated sheets of paper it became clear that there was no control switch to regulate the air now gushing into the space. While this created initial aggravation, I soon identified that the unwanted air flow represented an energy source with the potential to be harnessed. The air vent inspired a series of prototype air driven generators to produce electricity from the unwanted air flow.

![Air vent generator prototype 1, 2009](image)

The first prototype generator installed in the air vent was a very simple mechanism. An old computer fan was centrally mounted onto a circle of corflute cut to the size of the air outlet. The wires from the fan’s DC motor
were then connected to a rechargeable AA battery. Once attached to the air vent with *gaffa* tape the spinning computer fan commenced storing electricity in the battery. This generator was built from discarded components sourced from the sculpture department’s recycling area. The only new components were the battery holder and the *gaffa* tape. Given the conceptual premise at this time was to reduce the carbon footprint of my art practice, I needed to avoid using new materials to reduce the embodied energy\(^{13}\) of the generator. The higher the generator’s embodied energy, the larger the amount of generated energy required to offset its construction before a positive net energy gain could be achieved. As the construction of the generator was dictated by this need for energy efficiency, the resultant visual aesthetic of the object was distinctly utilitarian. No embellishments were added to this bare bones design that proudly displayed its functional components. This aesthetic was radically different to the crafted work of my practice prior to commencing this research. Despite this difference, I was intrigued by the honest nature of the generator’s construction. While this prototype produced barely enough electricity to charge one AA battery, its method of construction has been a considerable ongoing influence on this project.

With the second air vent generator prototype I endeavoured to increase the electrical output while still pursuing a low embodied energy construction strategy. Fans fashioned from scrap metal off-cuts were attached to four reclaimed motors from discarded compact disk drives. An off-cut of MDF board served to mount the motors into the air vent via a pre-existing fitting. Displaying the same utilitarian aesthetic as the first prototype, this generator produced enough electricity to run a clock or charge two AA batteries. No new materials were incorporated into this second generator. Theoretically the only additional energy put into its construction was through the use of power tools and my expended energy.

\(^{13}\) The total amount of energy required to manufacture, package, distribute and maintain a product for the duration of its life is known as its embodied energy.
This generator was far more efficient at producing electricity than the first prototype. However I became concerned regarding how my additional effort, and the use of powered equipment required for the work’s construction, interfered with the aim of producing positive net energy. This concern extended to the focus of the research project itself and led me to question what should be included when calculating the carbon footprint of my art practice. At what point in my day did my art practice start? When I started the journey to university or when I arrived at the studio? Should I take into account the energy required to produce any meals or hot drinks while working? These questions were endless. I was also concerned that not having absolute answers to these questions simultaneously limited what the
project could achieve using this methodology and invited the same criticism of dubious environmental veracity I had associated with the glass artist.

The final air vent generator was designed and installed as the doubt surrounding the direction of my project increased. I became aware that striving for carbon neutrality in my practice was naïve and also, due to the overwhelming focus on the technical demands of the work, limited the potential development of the research. This concern, combined with initial feedback identifying a self-righteous tone in the project, prompted a change in strategy. Reflecting on the air vent generator series I came to realise that what really interested me was the potential to harness waste energy\textsuperscript{14} sources to create energy, which in this case meant harnessing and transforming the unwanted air flow to produce electricity. While charging batteries with this electricity provided a ‘green’ source of energy, the question remained of what to do with this stored electricity.

\textbf{Figure 8: Air vent generator final prototype, 2009}

To take the project beyond the territory of scientific experimentation I

\textsuperscript{14} In the context of the research ‘waste energy’ refers to an unharmed energy source that is emitted as a by-product of another action or function. The kinetic energy of human respiration and the air flow from the vent in my studio are two examples of waste energy that are exploited in this project.
directed the generated electricity literally into an art context by using the power to illuminate *Insideout*, a twenty four hour gallery sited in the window of my studio space\textsuperscript{15}. By the time the gallery was ready for its first exhibition I had installed a second air vent generator in an adjacent studio space. The combined power of the two generators was enough to charge four AA batteries in a day. The charged batteries were then utilised to run a night\textsuperscript{16} lighting system for *Insideout*.

\textsuperscript{15} The gallery was inspired by the large number of curious tourists who peered into my studio. *Insideout* not only gave the tourists something else to look at, it also linked the art school directly into my research. At no time have I shown any of my own work in *Insideout* as I consider the gallery itself to be my work. Creating a closed loop system, since July 2009 *Insideout*, powered via electricity generated from a Tasmanian School of Art waste energy source, has hosted a series of works by Tasmanian School of Art students.

\textsuperscript{16} Incorporating motion and light sensors ensured the lights were only activated by nocturnal pedestrians, conserving further energy.
Breath Generators:
The window gallery resolved the air vent generator series of works and inspired a change of focus that shifted the research away from assessing the carbon footprint of my art practice, to concentrating on the potential of generating electricity from my body. This represented a continuation of my interest in exploiting waste energy identified with the air vent generators. By identifying and harnessing the normally wasted energy associated with actions such as breathing that my body performed to keep me alive, I could critique my climate change complicity. The act of breathing was identified as having the most potential to generate energy due to its constant and predictable properties. Attempts were made to harness the kinetic energy of my chest as it expanded and contracted during the respiration process. The generators constructed for this purpose were based on a design from the Instructables17 website.

![Breath powered USB charger (left) and my version (right)](image)

Initial prototypes indicated that this design was both inefficient and awkward. Efforts to generate energy from the expansion of my chest were quickly abandoned and the focus turned to harnessing the power of breath itself. Human respiration, a process which increases the carbon dioxide

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concentration of inhaled air approximately one hundred times is an ideal metaphor through which to critique our individual climate change culpability. The act of generating energy from exhaled breath expands upon this metaphor by providing a primitive method for offsetting the carbon dioxide we respire into the atmosphere.

Figure 14 (left): *Breath Generator 1*, 2009
Figure 15 (right): *Breath Generator 1* - with front cover removed

*Breath Generators* were constructed using the same low embodied energy principles applied to the air vent generators. The use of salvaged components again facilitated a utilitarian aesthetic identified as being present in the earlier works. The development of this aesthetic became an important part of the later works; especially as it suggested a ‘functional’ purpose for the artwork beyond the context of art and referenced sustainable design and the DIY eco-culture that pervades the internet.

These internet sites espouse the functional qualities of their individual climate change solutions, however, in reality they are often labour intensive and inefficient. While these dubious inventions may not provide practical environmental solutions, they offer their creators a flawed outlet for relieving the guilt of their ongoing contribution to global warming.
The futility and anxiety present in these DIY solutions is parodied in the artworks produced for this project. Generating energy from breathing into a Breath Generator is a futile activity when considered outside of the conceptual framework of the research. This process produces enough electricity to power LED lighting, however the power is only generated when breath is exhaled into the generator. Offsetting my carbon emissions by producing electricity as I exhale reinforces the conceptual aims of this project, but does not provide consistent ‘useful’ lighting.
*Breath Light Generator* (2009) documents this process where kinetic energy harnessed via my exhaled breath provides the sole lighting for the video. The video image alternates between complete darkness as I inhale, and a view of the side of my face illuminated momentarily as electricity is provided to the LED when I exhale.

In an attempt to provide a more consistent light, I experimented with storing the energy of exhaled breath in a party balloon. Acting as a battery, the balloon was connected to the inlet of the generator and then allowed to deflate, resulting in constant electricity being provided to the LED lighting located inside the balloon. This activity was documented in the video *Balloon Light Generator* (2009).

![Balloon Light Generator](image)

*Figure 19: Balloon Light Generator, 2009 – video still image*

This video, similar to *Breath Light Generator*, demonstrated the potential for the documentation of the artwork in action to become works in their own right. *Balloon Light Generator* in particular contained unexpected poetic properties that inspired me to continue incorporating photography and video as key components of my research.¹⁸

¹⁸ *Breath Light Generator* also marked the first occasion in which my physical presence was visibly incorporated into my art practice. I will address this in detail in a later chapter.
To increase the duration of continuous electricity generation I obtained several large weather balloons to expand the breath storage capacity. While these balloons allowed for more breath to be stored they expelled the breath at a reduced pressure compared to the smaller party balloon. This reduced pressure was not sufficient to turn the motor in the generator; an unexpected technical issue that forced me to develop a new function for the weather balloons and expand the scope of my project. This was a significant turning point in my research and resulted in the *Carbon Capture and Storage* works.

**Carbon Capture and Storage:**

The *Carbon Capture and Storage* series forms a major component of this project. The weather balloons, a climate science research tool, provide a fragile barrier to protect the world from my global warming emissions. Using the balloons to capture my enriched carbon breath emissions, effectively converted them into primitive forms of carbon capture and storage. Unlike the previous energy generation works which applied a strategic use of energy to reference global warming, these works exposed and experimented with the carbon rich qualities of exhaled breath in relation to the surrounding air.

To overcome the physically awkward and labour intensive process of blowing up the balloons in the traditional manner I experimented with modifying respirators\(^1\) to develop a hands free inflation method. I eventually settled on full face mask respirators primarily for their comfort level, but also for their ability to exaggerate my exclusion from the surrounding environment - a reference to our separation from the natural world and inability to live as part of nature. By modifying the respirators their function has effectively been inverted. Instead of providing protection from harmful elements in the surrounding environment, they now protect the environment from my harmful emissions.

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1. Respirators also facilitate obvious references to air pollution, a pertinent link to the association between greenhouse gases and climate change. Similar in appearance and operation to military gas masks, the use of respirators also alludes to chemical warfare and bio-terrorism.
25 Minute Carbon Capture and Storage was the first in a series of videos which documented the capture of my breath emissions. This activity used a modified respirator connected to a weather balloon via a series of plumbing components and a long grey water recycling hose. A short animation was generated from photographs taken at one minute intervals during the 25 minute event.

Given this was my debut carbon capture and storage performance I considered it to be a successful development in my research, however several problematic issues were identified. The first was the self conscious nature of my actions, a result of my acknowledgement of the camera’s presence and a lack of associated context for the activity. This was overcome in future actions by performing another activity, such as reading or vacuuming, whilst capturing my breath emissions. The second issue identified from 25 Minute Carbon Capture and Storage was the limitation the size of the balloon placed on the work - at twenty five minutes the balloon was full. While this presented a constraint on the potential duration of the carbon capture and storage events, it also highlighted the ability of different sized balloons to visualise the amount of breath exhaled over a given period. The title of this and subsequent Carbon Capture and Storage works references the time taken to inflate the balloon. The ability of the
weather balloons to demonstrate the normally indiscernible volume of breath exhaled over a given period became an important component of my sculptural language. The work facilitates both a visual and conceptual understanding of the volume of carbon enriched breath exhaled over a set time.

Several video works feature the use of a modified backpack to provide a portable means of capturing my carbon enriched breath emissions. Plumbing components housed in the backpack link a full face respirator to a connector on the exterior of the pack to which a weather balloon can be temporarily attached. The use of the backpack device transforms the attached balloon into an extension of my body; an industrialised external lung developed out of a perceived environmental necessity. The backpack demonstrates the utilitarian aesthetic first identified in the air vent generator works. Like the early works, the backpack aesthetic is influenced by construction methods which consider the future use of materials and components by allowing them to be easily retrieved for reuse, a reference to sustainable design principles. As an extension of the green dimension of this work, at the end of the backpack’s life as an art object, I intend to recycle the artwork by effectively separating the components, allowing the respirator to be used for its original intended purpose and the plumbing and reticulation elements to be incorporated into my future home renovations. The backpack will resume usual service baring only minor scars from its experience as part of an artwork.

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20 The influence of sustainable design principles on this project, such as those discussed in the book Cradle to Cradle: Remaking the way we make things, will be discussed in the context section of this paper.
Beyond concerns for future use, the choice of materials has also influenced fundamental formal qualities of the artworks. The backpack, respirators, first weather balloons, and majority of plumbing components were either completely black or contained black elements, a property dictated by their functional requirements and need for durability\textsuperscript{21}. The colour of these components was not a conscious consideration in the early stages of the research, however as this consistent formal quality emerged a conscious decision was made to utilise this black aesthetic throughout the project. Developing this formal property reinforces the utilitarian aesthetic in the artworks, thereby enhancing their functional credibility.

For \textit{30 Minute Carbon Capture and Storage} I wore the backpack to capture my breath emissions whilst vacuuming the lounge room of my home. The video documentation of this event shows the weather balloon, connected to

\textsuperscript{21} Perhaps the most famous historical use of black in relation to utilitarian practicality in design is the Ford Model T. In 1909 Henry Ford is widely attributed as stating “Any customer can have a car painted any colour that he wants so long as it is black” resulting in Model T’s produced between 1914 and 1926 only being available in black. Ford’s choice of black was guided by practical concerns rather than stylistic ones; at the time black paint was considered to be more durable and cheaper than other available paint colours.
the backpack, slowly inflating over the duration of the domestic activity.

![Figure 22: 30 Minute Carbon Capture and Storage, 2010 – video still image](image)

This work was exhibited as part of the *Lookout* exhibition at the Tasmanian Museum and Art Gallery (TMAG) in early 2010. For this exhibition the backpack was hung next to the monitor that displayed the 7 minute video documentation of the vacuuming event.

![Figure 23: 30 Minute Carbon Capture and Storage – TMAG installation](image)

This configuration, dictated by the space limitations of the group exhibition, highlighted an important consideration for the installation of future works. Displaying the backpack and video documentation directly adjacent to each
other diminished the level of intrigue; their proximity allowing each component to provide a rationalisation for the other, limiting the possible readings and subsequently discouraging the viewer to spend time investigating the intricacies and ‘ingenuity’ of this proposed environmental solution. To avoid this situation, the configuration of artworks in the Plimsoll Gallery has been designed to separate related elements to ensure the works can be experienced in relative isolation before their various associations with other elements are revealed. This installation strategy allows the viewer to consider the whole exhibition as one system or environment with interrelating components all working towards the same apparently futile outcome. As the viewer moves through the exhibition they are also reminded of the carbon dioxide that flows from their mouth and the possible impact this might have on the enclosed gallery environment.

As suggested by the new title of the vacuuming event, *Carbon Capture and Storage: 24 minutes 17 seconds* (2010), this version, as opposed to the edited *Lookout* presentation, shows the footage in real time. This is part of the afore-mentioned strategy employed to slowly reveal the associations between works in the exhibition. Showing the full length video documentation also restores the initial intention to reference surveillance footage, a context reinforced by the static high camera angle and low quality black and white properties of the video. Imitating the formal qualities of surveillance footage suggests that I might be part of a behavioural science experiment where the art audience play the role of the scientists analysing every move made by their oblivious test subject.

The video work, *Carbon Capture and Storage: 24 minutes 55 seconds* (2010), also employs the formal qualities of surveillance footage. This work documents the use of the modified backpack to capture my breath emissions whilst operating an orbital sander. The vacuum cleaner and orbital sander feature in these videos for two reasons. Firstly, they both operate on electricity, a reference to the generation of greenhouse gases through energy
consumption. Secondly, much like the backpack, they both have receptacles for the capture and storage of impurities to prevent contamination of the surrounding air. In *Carbon Capture and Storage: 24 minutes 55 seconds* the sander is used to smooth the woodwork of *Breath Compressor* (2010), a work under construction at the time this video was shot. This video links multiple artworks, extending the development of systematic processes beyond individual works to identify a much larger and more complex motivation behind the project as a whole.

![Figure 24: Carbon Capture and Storage: 24 minutes 55 seconds, 2010 – video still image](image)

Once again, the act of capturing my breath emissions to offset the energy consumed during the making process, references the carbon footprint of my art practice. The activities documented in these carbon capture and storage videos are ludicrous and impractical. Like many of the commercial and DIY green products marketed on the internet, they reference climate change action without actually providing practical solutions. My presence in the videos, as a test subject or tragic antihero, offers an at times humorous and futile benchmark for individual climate change action. The contrast between my earnest completion of the familiar domestic tasks and the absurd ineffectual nature of the carbon capture and storage locates the work somewhere between B-grade science fiction and the humdrum of the
everyday. This mixture of fantasy and reality is mirrored in the genre of the superhero where for every ‘Superman’ there is always a tragic Clark Kent with which to empathise.

Figure 25: 5 Hour Carbon Capture and Storage, 2010 – Six_a installation

5 Hour Carbon Capture and Storage (2010) is an exaggeration of the impractical nature of the dubious ‘green’ solutions promoted on the internet. By using a much larger weather balloon I was able to extend the duration of the carbon capture and storage event. Over a period of five hours, using the same modified respirator setup as 25 Minute Carbon Capture and Storage, a six foot balloon was inflated with my carbon enriched breath. To avoid extreme boredom and the self consciousness identified in 25 Minute Carbon Capture and Storage, I read from books related to my research for the five hour duration of this event. The video documentation, compressed down to 15 minutes, was then projected onto the inflated white balloon. This work was designed to visualise the volume of breath exhaled over an extended period. The size of the balloon was originally chosen to fit within the confines of the projection space at Six_a, a Hobart artist run initiative,
where I had a solo exhibition entitled *Warm Up* in April 2010\(^{22}\). The respirator remained attached to the balloon to identify how the balloon was inflated and to suggest the potential for further carbon capture and storage. The work juxtaposed the experiences of attraction and repulsion. The projected light on a slightly wavering balloon was far more aesthetically pleasing and seductive than I had imagined. However it was impossible to be lost in this beauty for long as the utilitarian properties of the attached hose and respirator reinforced the recognition of the balloon’s unpleasant contents. The disturbing thought of five hours of stale breath being kept at bay by a thin membrane of latex, added to the anxiety displayed by my unnaturally jerky movements generated by the time compressed documentation. This work has been recreated in the Plimsoll Gallery to approximate the confined and slightly claustrophobic environment of the Six_a projection space. The balloon has again been inflated with my breath over a five hour period, however this time I have chosen to watch environmental disaster films to maintain my ‘sanity’ during the extended activity.

**Breath Compressor:**

*Breath Compressor* was made to provide a ‘practical’ method of storing my captured breath emissions. A modified hand pump facilitates the compression of captured breath from a weather balloon into a gas cylinder; a reference to fossil fuel derived energy. The video, *Carbon Capture and Storage: 18 minutes 37 seconds*, documents the process of using the *Breath Compressor* to transfer one balloon of breath into the cylinder. The impractical nature of this action is compounded by wearing the backpack device to capture another balloon of breath whilst compressing the existing balloon of breath into the cylinder. This creates the notion of a never-ending

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\(^{22}\) *Warm Up* was held between April 9\(^{th}\) and May 1\(^{st}\) 2010 at Six_a artist run initiative in Hobart. The exhibition was an opportunity to trial and experiment with various works from my project and provided an alternative forum to solicit valuable feedback. Responses to the exhibition, including a positive review by Sean Kelly in *Artlink* magazine (Vol 30, no2, 2010. 87), significantly influenced and informed the future progress of the project and ultimately the final artworks shown in the Plimsoll Gallery.
process or system that defeats any functional gain generated by improving the method of breath storage. The large amount of energy required to compress the breath results in an increased rate of respiration, again denying the functional aim of the compressor. This impractical or dysfunctional quality embodied in a number of works serves several purposes. Firstly, it references my inability to find a practical way to contribute towards a climate change solution. Perhaps more importantly, it provides a humorous counterpoint to the traditional seriousness relating to environmental issues in an attempt to break down the climate change fatigue in the viewer and allow them to refresh and reassess their relationship to the environment.

Figure 26 (left): Breath Compressor, 2010 – with attached balloon inflated with breath
Figure 27 (right): Carbon Capture and Storage: 18 minutes 37 seconds, 2010 – video still image

**Compressed Breath Generator:**

Despite the impractical qualities of the compressor exposed in *Carbon Capture and Storage: 18 minutes 37 seconds*, it serves a functional purpose in relation to the research project. The Compressor facilitates a link between the beginning and end of the research through the production and supply of compressed breath in a portable cylinder. This breath can be used to produce electricity to power small electrical devices using the *Compressed Breath*

\[23\] Perhaps Oscar Wilde’s famous quote “Life is too important to be taken seriously” best sums up my use of humour to engage with the important issue of climate change.
Generator (2010); a link back to the early air vent and breath generator works.

Figure 28 (left): Compressed Breath Generator, 2010 – front view
Figure 29 (top right): Compressed Breath Generator - rear view
Figure 30 (bottom right): Compressed Breath Generator - top view

The generator has been designed to allow various temperature monitoring devices to be powered via the power jack located on the top of the handpiece. To take temperature readings requires the release of the compressed breath to activate the monitoring devices. Each dubious\(^{24}\) measurement ironically results in the release of carbon enriched breath into the atmosphere, theoretically contributing to global warming. Compared to the utilitarian aesthetic that dominates the work in this project, the Compressed Breath Generator and associated devices display a much higher degree of craftsmanship. This level of personal pride was hinted at in Breath Compressor through the inclusion of slight embellishments to the DIY plywood construction. However the generator and its associated attachments take this notion of pride in workmanship one step further. While they make no attempt to hide their functional qualities, the level of

\(^{24}\) The erratic nature of the electricity supplied to the attachments via the Compressed Breath Generator results in fluctuating and unreliable temperature measurements – amplifying the futility of measuring the direct effect of exhaled breath on local temperature.
finish and customised form present in these objects indicate their elevated status. Unlike many of the artworks in this project, which suggest a private or out-of-sight functionality, the refined appearance of the *Compressed Breath Generator* and attachments suggest these devices might be displayed and utilised openly in the home as if they were desirable designer objects.

Figure 31 (left): *Attachment One: Temperature and rate of carbon emission*, 2010

Figure 32 (right): *Attachment Two: Temperature, humidity and carbon emission*, 2010

**Carbon Breath Tester:**

Figure 33 (left): *Carbon Breath Tester*, 2010

Figure 34 (right): *One Tonne*, 2010 – video still image
Carbon Breath Tester (2010) contains a simple mechanism that advances a counter as you breathe into the mouthpiece. This is a pseudo scientific object designed to imply a quantification of breath exhaled and correspondingly, carbon dioxide emitted. The video One Tonne (2010) documents the process of blowing into the Carbon Breath Tester in an attempt to reach 1000 on the counter, a reference to 1000 kilograms or a metric tonne of carbon. Ultimately the video highlights that the counter can only be advanced to 999 before it reverts back to zero. The inability to reach 1000 acts as a metaphor for the intangible nature of a tonne of carbon. What would a tonne of carbon look like and is it the most appropriate measure to quantify our carbon emissions? One Tonne unifies the work exhibited for this research by providing a constant breathing soundtrack for the Plimsoll Gallery.

**Perpetual Surrender:**

The carbon footprint of art galleries is the focus of the climate change critique in Perpetual Surrender (2010). In this work the energy emitted by gallery lighting is harnessed by a solar panel to power a ‘perpetual’ flag of surrender. The energy generated by the light falling on the solar panel powers a propeller situated on top of the flagpole. This drives the flag forward until it hinders its own progress by casting a shadow on the solar panel, resulting in the flag retreating to its initial position where the whole process begins again. The self defeating nature of this work parodies our inability to change our unsustainable lifestyles despite the predicted climate change consequences.\(^{25}\) Perpetual Surrender parodies the inefficient use of solar technology, as the amount of electricity used by the lighting required to power this work far exceeds the energy output of the solar panel.

The energy consumed by gallery lighting is highlighted in Perpetual Surrender through the transformation of light energy into a more tangible

\(^{25}\) This is exemplified by the inappropriate use of solar panels to green wash existing products.
kinetic energy. The installation of this work, as part of my examination exhibition in the Plimsoll Gallery, extends the awareness of my energy consumption beyond lighting to include other energy users in the exhibition such as projectors, monitors, and audio equipment. Advertising the climate change complicity of my art practice reinforces my view that environmentally engaged art is not necessarily always good for the environment.

Figure 35: Perpetual Surrender, 2010 – Six_a installation

**Divine intervention:**

Inspired by an offshoot of this research project that considered the relationship between climate change and religion, the first incarnation of *Divine Intervention* (2010) was installed as part of my 2010 exhibition at Six_a. For this work five small wind turbines, installed on the exterior wall of the gallery, were connected to individual LED lights each mounted directly above one of five different religious texts inside the gallery. This tongue in cheek play on ‘religious enlightenment’ challenged the power of
each deity to influence the wind in order to generate light for their associated religious text. In a clear ‘sign’ that the gods were conspiring against me, the weather on opening night was very still and the wind turbines remained unmoved.

The true motivation behind the first installation of this work was to test how well the wind turbines and LED lights would function. Despite the erratic wind experienced for the duration of the exhibition, the quality of the pulsating light generated by the turbines was more seductive than I had imagined. The success of this test led to a reconsideration of this work for the Plimsoll Gallery. The religious books were replaced by texts which represent the various positions on the validity of man made climate change. This new installation of *Divine Intervention* asks God to influence the wind in order to literally shed some light on the legitimacy of this environmental issue. This work also allows an element of the outside climactic conditions to modify the internal environment of the gallery. The amount of wind outside directly influences the light display in the gallery and acts as a quasi wind monitoring system, a metaphor for our obsessive analysis of changes in the planet’s climatic conditions.
Installation of the work:
The installation of the artwork in the Plimsoll Gallery aims to promote the research as a cohesive collection rather than a compilation of individual self contained artworks. This approach has been taken to build upon the systems and associations already established in the work. The viewer is encouraged to re-evaluate each element of the exhibition as they progress through the gallery to reveal the relationships between the artworks.

Just past the entrance to the gallery, *Perpetual Surrender* slowly rocks back and forth casting an intermittent glow on the exhibition space as the white flag interrupts the flow of light to the solar panel. This pulsating light, combined with the repetitive sound of breathing emitted from *One Tonne*, unites the exhibition into one large co-ordinated eco-system. The sound of breathing continually prompts the viewer to consider their own breath emissions, inextricably linking them to the environment of the gallery and the work in the exhibition. In the sparsely lit main space the viewer encounters the modified backpack and *Breath Compressor* before they are given the opportunity to view their apparent function in the associated video works located in a separate dedicated room. The reference to time in the title of these *Carbon Capture and Storage* video works again prompts the viewer to consider their breathing, specifically how much they have expelled whilst in the gallery. On the opposite side of the gallery a thin gap between the wall panels allows a shaft of light to enter from the courtyard windows. This gap simultaneously divides the climate change texts of *Divine Intervention* into the two polarised views on man-made global warming and creates a link between the outside and inside spaces of the gallery. The gap also provides access for the wires to connect the externally mounted wind turbines to the LED lights above the texts. At the far end of the Gallery the spot lit respirator and the reflected glow from the projection onto the large balloon leads the viewer to discover the small, slightly claustrophobic space which houses *5Hour Carbon Capture and Storage*, the final and most dramatic reminder for the viewer of the quantity of breath they and those around them are exhaling into the gallery.
PART THREE: Context

While this research has historical links to environmental and land art that emerged in the 1960s, the contextual focus has been directed towards sustainable design, sculpture and installation art made since the 1980s, the period in which the world became climate change aware. To overcome the limitation of site specific and singular sculptural strategies identified in part one of this paper, the research has developed a multifaceted sculptural language in response to the complexity of this environmental issue. This language has been informed by four areas of visual art and design practice. Each one of these areas is presented as a separate section of this chapter. The first examines the use of environmental systems within contemporary sculpture and installation artworks. A particular emphasis is placed on the use of energy within these systems and how this methodology can be adapted to reference the issue of climate change. The second section discusses artworks that intervene with the climactic conditions inside the gallery. Through the exploration of artworks that incorporate air as an intrinsic material, the third section of this chapter identifies strategies for developing a tangible perception of the air that surrounds us. This component also examines the metaphorical link between human respiration and global warming. The final section of this chapter identifies the potential to engage with the climate change issue by directly incorporating sustainable design principles into visual art practice.

Systematic change:
In the 2007 Frieze Magazine article The Whole Truth, Max Andrews suggests that past models of artistic engagement with environmental issues have lost their relevance. He believes that the scope of artistic engagement with ecological issues is often too limited, suggesting that,

After decades of image-led, wilderness-obsessed forms of
‘environmental’ consciousness (all polar bears and soft-focus sequoias), practices with a Conceptual basis offer a more relevant traction in a perhaps not unfamiliar new eco-territory where so-called carbon ‘offsetting’ or corporate green-washing, for example, suggest a far more immaterial agenda.  

Andrews proposes that artists who work with environmental systems or processes might offer an alternative approach to engaging with ecological issues such as climate change. Given the discourse surrounding this issue is focused on the consumption of energy, I have considered how artists use energy within these environmental systems to inform the project.

Figure 38: Gustav Metzger, *Project Stockholm*, 1972/2007

Gustav Metzger’s *Project Stockholm* (1972/2007) was initially conceived in 1972 for the first UN Conference on the Human Environment in Stockholm. Metzger proposed to park one hundred and twenty cars around the periphery of a large clear plastic enclosure. The running cars’ exhaust emissions were to be captured inside the enclosure, slowly clouding up the clear plastic, making an otherwise hidden pollution visible. The project was not realized until the recent Sharjah Biennial in 2007. Exhibiting the work in the petroleum driven economy of the United Arab Emirates provided a potent if

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not paradoxical context for a project concerned with vehicle derived air pollution. Disturbingly, the thirty five year delay in exhibiting this work did not affect the relevance of its environmental commentary, adding another layer to the critique by highlighting the world’s long term inability to overcome its dependence on fossil fuels.

Metzger’s encapsulation of the exhaust emissions created an enclosed system that permitted the presence of the unwanted by-products from burning fossil fuels to be compounded and visibly perceived. The revelation of a primarily invisible process is a strategy developed in this project through the capture and storage of my exhaled carbon rich breath to prevent it from entering the atmosphere. Breathing is an automatic process; we take in invisible air and exhale invisible breath without conscious recognition of the act. The body is essentially an organic engine, transforming air, water and food (fuel) to generate energy and by-products such as carbon dioxide. The carbon dioxide we breathe out is identical to that emitted from cars powered by internal combustion engines. Just as Metzger was able to make visible the car exhaust emissions in *Project Stockholm*, the capture of human breath in the *Carbon Capture and Storage* works allows the viewer to consider the gaseous by-products exhaled by their body as it transforms raw materials into energy. This series of works takes the notion of ‘think global act local’ to a perverse extreme by transforming the human body into a site for environmental action.

In an equally unusual disclosure of the global warming properties of a bodily emission, Tue Greenfort set about harnessing the energy of fresh cows milk in his work *Milk Heat* (2009). Installed on an organic dairy farm, this work pumps warm fresh milk from inside a barn to a standard heat panel radiator located outside. Incorporating the functioning radiator as a recognizable consumer of energy and contributor to a building’s carbon footprint, allows Greenfort to associate the barn with more familiar domestic global warming activities. By creating a system that replaces heat energy
normally derived from fossil fuels with heat energy from fresh milk, this work reinforces the link between dairy farms and their production of the greenhouse gas methane; the gas most associated with the dairy industry’s carbon footprint. Greenfort concentrates this association by making the radiator the visual focus of the work; the exaggerated arrangement of pipes reinforce the futile and ineffectual nature of the structure. While the radiator’s normal function is reaffirmed by the warmth generated through the fresh milk, its only apparent purpose beyond the context of this artwork is to heat the outside environment.

Figure 39: Tue Greenfort, Milk Heat, 2009

Harnessing the energy from warm milk or human respiration will never be a practical solution for global warming. As absurd methods of energy generation, they highlight our acceptance of the rapid expansion in alternative energy products without necessarily considering the totality of their ‘green’ credentials. The promotion of electric cars as replacements for greenhouse gas emitting vehicles like those used in Project Stockholm is a perfect example of our environmental naivety. While they might be a valid
solution for localized urban pollution there is little if anything to be gained in terms of a solution for global warming. Until our houses are powered by green energy, the electricity to recharge the batteries in these cars will be generated by burning fossil fuels, which will in turn result in the production of greenhouse gases. Electric vehicles merely relocate the emission of these gases to a power station somewhere far away, out of sight.

This form of large scale out of sight electricity generation represents the very antithesis of the DIY energy production techniques explored in this research. By harnessing familiar localised energy sources, such as my body and the air vent in my studio, the project provides the viewer with a tangible and personal entry point into the climate change debate. In addition, the absurd low tech nature of the energy production mechanisms and processes steers clear of unachievable environmental outcomes. Through these processes and experiences viewers are encouraged to understand and harness the ecological systems within their immediate personal space, be that their home, their workplace or even their body.

Through the cannibalistic transformation of a domestic dwelling, Michael Sailstorfer’s 3 ster mit ausblick (3 ster with view, 2002) presents an example of a closed environmental system. The documentation of this work shows the slow destruction of an old wood cabin. The timber used for its original construction is fed into the cabin’s own internal log fire until the only trace of the structure is the glowing fire itself. This self referential method of activating an artwork through the corruption of the fire’s function creates a new relationship and tension between it and the wood structure of the cabin.

When I moved to Tasmania from the decidedly warmer climate of Perth, Western Australia, Hobart’s reliance on wood fires to provide household heating surprised me. Government policy to reduce the level of air pollution in Perth and the cheap supply of natural gas had rendered wood fires there virtually obsolete except for purely aesthetic purposes. My consideration of wood fires as environmentally unfriendly forms of heating was seriously challenged when I found myself reliant on a slow combustion fire for
warmth in my new Hobart home. My need to stay warm conflicted with my concern for the obvious pollution flowing from the chimney. Like the fire in 3 ster mit ausblick and my house in Hobart, respiration in this research has developed a split personality, simultaneously acting as a sustainer of life and a destroyer of the environment that maintains our existence. The life giving process of human respiration has been implicated as a damaging environmental activity, transforming our usually subconscious and inert relationship to breathing into a conscious contributor to global warming.

Figure 40: Michael Sailstorfer, 3 ster mit ausblick, 2002

The word Ster is Bavarian slang for a cubic metre of wood. The title then suggests both the amount of wood contained in the log cabin, and the corresponding quantity consumed by the fire. The Carbon Capture and Storage works use a similar quantitative strategy in the title to refer to the duration of the carbon capture activity. These works however effectively perform the opposite process to 3 ster mit ausblick by aspiring to prevent carbon from entering the atmosphere. Sailstorfer invites us to consider the cabin as both a shelter and a finite storage of energy and carbon. The act of using the cabin’s log fire to release the energy and carbon stored in the
wood amplifies the futility of destroying the shelter. The warmth generated by the fire escapes into the atmosphere through the newly created voids in the structure of the cabin. Like Greenfort’s Milk Heat, the only apparent function of 3 ster mit ausblick, beyond its art context, is to warm the outside environment.

In part one of this paper, contemporary art and design that engages ecological issues was identified as becoming less reliant on the fixed site specific strategies of 1960’s and 70’s land and environmental art. Although the modified backpack and Breath Compressor suggest the possibility of portability, like Milk Heat and 3 ster mit ausblick, it is this projects use of universal built environment contexts that reflects this shift away from a reliance on a unique site. While the barn in Milk Heat is located in Sweden, changing the context for the artwork to a dairy farm in another country would not significantly alter the conceptual reading of the work. The same could be said for the cabin in 3 ster mit ausblick or the activities documented in the nondescript domestic locations of the Carbon Capture and Storage videos. This shift towards a universal context is important to allow a critique of global issues such as climate change.

A more didactic example of nomadic strategies being employed to engage with global environmental issues is Simon Starling’s Three Day Sky (2004-2009). This work completes its preparatory stages adjacent to the Almeria Solar Platform Research Centre in the Tabernas Desert, Spain, by charging two batteries with two solar panels just outside the perimeter fence of the facility. The proximity of the collection site to such a large solar energy installation mocks the significance of the artist’s resources to make an environmental difference. It could also be suggested the artist is guilty of partaking in a bit of sneaky energy theft or daylight robbery. After three days of charging, the batteries are transported to a gallery where the stored energy powers a spray gun to paint an impression of the Tabernas desert sky on the ceiling.
The inefficient transportation of the heavy recyclable batteries from Spain to a distant gallery posits the energy collected from the desert sky is somehow different to the energy available from the gallery power outlet. This differentiation, despite the fact that all electricity is made up of a flow of electrons, suggests that electricity from a specific place can be considered as a separate material to which unique conceptual and contextual associations can be applied. Works such as *Breath Light Generator*, rely on the conceptual differentiation between electricity from a standard power outlet and electricity produced from individual human effort. To use a standard power outlet to supply electricity for the LED in *Breath Light Generator* or spray gun in *Three Day Sky* would completely erode the conceptual foundations of both works.

The 2009 incarnation of *Three Day Sky* was installed in the Walker Art Centre in Minneapolis. Three days of charging in the desert stores enough energy to run the spray gun for approximately one hour. In an interview for the Walker Art Centre, Starling summarised the relationship between the weather in Spain and artistic output in the gallery: "The more blue sky in Spain the more blue sky in Minneapolis - it’s a very simple equation."[^27]

Starling’s metaphoric action of importing foreign weather into the gallery by

painting an impression of the Tabernas Desert Sky on the Minneapolis ceiling, relates directly to the next topic for discussion; climate change in the gallery.

The works examined in this section illustrate the potential to reference climate change by strategically highlighting the generation and consumption of energy within an environmental system. A critique of our energy use, and correspondingly global warming, is created by substituting traditional methods of energy generation and consumption with absurd alternative processes. Important components of the sculptural language developed in the research have been formed by expanding upon this strategy for incorporating energy into the work. This approach is particularly evident in the breath generation works where in the context of global warming, the self defeating action of releasing carbon rich breath to generate electricity is applied to an already inefficient method of energy generation.

**Climate Change in the Gallery:**

Site specific installations and interventionist actions within the gallery space have seen the neutral status of gallery architecture slowly eroded. With the onset of artists making work in reference to climate change, this intervention has been taken a step further. Artists are now seeking to interfere with the precisely controlled climactic conditions inside the gallery, enabling these institutions to experience their own unique version of climate change.

As someone who has worked as an installation technician in art galleries, both large and small, my experience of these buildings goes beyond the inert facade of the exhibition space. When visiting an exhibition I notice the normally inconspicuous utilitarian features of the gallery such as the lighting system, the switches on the wall, the installation of projection and audio equipment, and the way temporary walls divide the space. I am also aware that behind the gallery walls, in the store rooms and loading docks there exists a very different aspect of these institutions. Here you will find the
accumulated waste from previous exhibitions, packing crates sent from
distant locations, environmentally unfriendly protective packaging, outdated
electronic equipment and perhaps a climate control system. This hidden
view of the gallery exposes the large amount of energy and materials
consumed to display and preserve artwork. While these institutions would
probably prefer to ignore their ecological impact\textsuperscript{28}, with the onset of global
warming their ability to look the other way is currently being tested as they
seek to host exhibitions that engage with environmental issues.

By highlighting the energy consumed by gallery lighting \textit{Perpetual
Surrender} attempts to expose this potentially hypocritical situation.
Converting light energy to kinetic energy via an incorporated solar panel,
this work draws attention to the presence of the gallery lights by making
them an integral part of the work. It attributes art status to the lighting
system for the duration of the exhibition to create a direct relationship
between the work and the gallery, permitting the viewer to consider it from
a new perspective. The lighting system’s usual function of providing gallery
visitors with the best possible viewing conditions has been corrupted in
\textit{Perpetual Surrender} to expose the associated consumption of electricity.
This highlights the interrelationships between the carbon footprint of my art
practice, the gallery as the mechanism for displaying my work and each
visitor to the gallery as consumers of the exhibition.

Tue Greenfort exploited the environmental conflict of interest faced by the
Sharjah Art Museum with his project \textit{Exceeding 2 Degrees} (2007) for
Sharjah Biennial 8. In response to the Biennial theme, \textit{Still Life: Art,
Ecology and the Politics of Change}, Greenfort persuaded the museum to
reduce its energy expenditure on climate control. After much negotiation
with conservators, Greenfort convinced the museum to reduce their energy

\textsuperscript{28} There are some indications that galleries are starting to respond to environmental issues.
A recent collaboration between The Australian Conservation Foundation and the Australian
Commercial Gallery Association resulted in the \textit{Green Gallery Guide}. Elements of this
document addressed methods for reducing energy consumption in the gallery, such as
changing to energy efficient lighting.
consumption on air-conditioning by allowing the temperature in the galleries to rise by two degrees celsius for the duration of the Biennial. This rise in temperature referenced the predicted impact of global warming outlined in the landmark Stern report of 2006\(^{29}\). At the end of the exhibition, the estimated savings from the reduced air conditioning running costs was donated to the environmental organisation Nepenthes to purchase an area of rainforest in Ecuador. Greenfort’s corruption of the museum climate control, like the functional reassignment of the lighting in *Perpetual Surrender*, directly incorporates an aspect of gallery energy consumption into the artwork. Blurring the line between art gallery and art in this context translates the ecological concerns of the artist, and the materiality and intent of the artwork to critique the institution as an environment. In *Exceeding 2 Degrees*, Greenfort satirises museum conservation whilst facilitating rainforest conservation.

![Image](image.jpg)

Figure 42: Michael Rakowitz, *Climate Control*, 2000-2001

Michael Rakowitz created his own gallery climate control system for his appropriately titled work *Climate Control* (2000-2001), installed in the special projects room at PS1 Contemporary Art Center, New York. Unlike most large galleries and museums, PS1 lacks a climate control system to regulate internal environmental conditions for the optimum preservation of

\(^{29}\) In 2006 economist Nicholas Stern released a seven hundred page report into the effects of global warming on the world economy.
artwork. In winter, the building’s radiators are turned up well above museum standard temperatures resulting in relative humidity levels of 11%, considerably lower than recommended museum standards. *Climate Control* used a series of galvanized tubes to link the outside environment and the internal radiators of the special projects room. A series of fans and timers regulated temperature by adjusting the flow of air from outside the gallery, while an internal humidifier adjusted the relative humidity of the room to 20%, the recommended museum standard for displaying works made of galvanized iron. Although the system was capable of providing ideal conditions for even the most delicate artworks, *Climate Control* physically dominated the room, thereby denying the opportunity to display other artwork. Rakowitz’s work then existed purely to create optimum conditions for its own display.

Rakowitz not only incorporates the energy consumption of the institution directly into his work, as in *Exceeding 2 Degrees* and *Perpetual Surrender*, he also facilitates an interaction between the exhibition space and the outside environment. His strategy of drawing on external climactic conditions to manipulate the internal gallery environment references our changing view of what constitutes an environment in the context of climate change. This issue has begun to alter the way we think about the environment, that has ceased to be just a distant landscape under threat; it now surrounds us everywhere we go: in our homes, workplace and the gallery.

Beyond the tongue in cheek religious guidance intimated in the title, *Divine Intervention* seeks to challenge the inert status of the exhibition space by allowing the outside weather to influence the internal environment of the gallery. The pristine walls of the Plimsoll Gallery not only separate the exhibition space from the loading dock and storage area, where the aforementioned evidence of environmentally unfriendly aspects of running a gallery can be found, they also separate the gallery from the world outside.
To control internal lighting conditions wall panels are usually installed in front of the large glass doors that separate the gallery from the courtyard. For the Plimsoll Gallery installation of *Divine Intervention* I have left a gap so as to allow natural light to leak into the gallery. This light, like the light from the LEDs connected to the externally mounted wind turbines, is dependent on the weather conditions outside. The changing light conditions experienced in the gallery extend the exhibition space beyond the walls of the building and out into the world.

This extension of the exhibition space beyond the gallery walls is a key feature of Simon Starling’s *Kakteenhaus* (2002). As with *Divine intervention* this expansion also resulted in a change to the environmental conditions in the gallery, however in the case of *Kakteenhaus* it is the temperature that is affected. Prior to *Three Day Sky*, Starling had already visited the Tabernas Desert to harvest a non-indigenous prickly pear cactus for this work. The cactus was then transported over thirteen hundred miles in Starling’s Volvo Estate to be installed at the Portikus exhibition space in Frankfurt Germany. The choice of the prickly pear cactus was far from coincidental. It was introduced to the Tabernas desert in the 1960’s by Spaghetti Western filmmakers, such as Sergio Leoni, in an attempt to make the desert look more like the American Wild West. This notion of an introduced species existing in a foreign landscape is mirrored in *Kakteenhaus*.

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30 A sub-genre of Western films made primarily in the 1960s and 1970s by Italian and European producers and directors.
The work was exhibited in winter and Starling converted the Portikus exhibition space into a makeshift greenhouse to keep the cactus alive. The engine from the Volvo estate used to transport the cactus was installed inside the exhibition space. The rest of the Volvo, connected to the engine by eighty-five feet of exhaust, water, and fuel pipes was parked outside. Each morning the gallery attendant would start the engine from the driver’s seat of the Volvo parked outside, the radiant heat from the engine and exhaust pipes was sufficient to provide an ideal climate for the cactus. By adjusting the choke on the car, the engine idling speed could be altered, resulting in a change in the amount of heat produced.

Starling intended the viewer to consider the inefficient and unsustainable nature of our transportation systems. In a 2003 interview for Artforum, Starling clearly outlines his intentions for *Kakteenhaus*.

The installation in Portikus set up a kind of theatrical dialogue between objects - one a fantastically efficient living thing, and the other a fantastically inefficient piece of engineering. The cactus has developed complex strategies for surviving in the harshest of environments, while the internal combustion engine - largely unchanged since Gottlieb Daimler and Wilhelm Maybach patented it in 1885 - is at best 30 percent
efficient at turning fuel into locomotion.31

The complex survival techniques of the cactus are matched by the intricacy of the Volvo heating system in *Kakteenhaus*. Despite this complexity, there is a distinctly austere utilitarian nature to the formal aesthetic of this work. Apart from the extension of the piping, Starling has limited the materials for the installation to the existing components of the Volvo and the cactus it transported. The formal aesthetic of *Kakteenhaus* is dictated by the functional aim of creating an environment to sustain the cactus. I have already identified how this relationship between function and utilitarian aesthetic emerged as a dominant influence on my project, resulting in a methodology distinctly removed from my previous highly controlled and crafted art practice. However the relationship of Starling’s work to many of the elements in this project goes beyond a shared aesthetic to include a regular engagement with perversely inefficient processes. While the inefficient transportation and preservation of the cactus in *Kakteenhaus* critiques the shortcomings of globalization, the ineffective energy generation techniques in this research seek to comment on our inability to overcome our dependence on fossil fuels. Despite the knowledge that generating energy from breath is a pointless task I go ahead and do it anyway, advertising my apparent stupidity further by documenting the process for all to see. This self defeating activity is perhaps no more idiotic than our continued use of fossil fuels to maintain our lifestyle despite the predicted environmental consequences.

Unlike the work already discussed in this section, Maurizio Cattelan’s *Dynamo Secession* (1997) contained his perverse processes within the confines of the gallery. For this work two bicycles connected to a dynamo were ridden by gallery attendants. The generated electricity powered several low voltage bulbs, to dimly illuminate the gallery space.

Cattelan set up a form of symbiotic relationship in this work, where the artwork’s existence is dependent upon the action of the gallery attendants, and the gallery attendants are dependent on the existence of the artwork so they have something to attend. While the ludicrous nature of the attendants actions relate directly to the futile activities in my project, experiencing a live performance creates a very different audience response than viewing the documentation of an event. By providing only video documentation of my actions the audience is able to remove themselves from any personal responsibility for maintaining my dignity. This encourages them to spend time with the work, enables them to laugh freely at my actions and form comparisons between their own environmental activities and my futile solutions.

The incorporation of the gallery attendants in *Dynamo Secession* creates a very different dynamic between the artwork and the audience. The live performance has the potential to place a level of guilt upon visitors to the gallery as they can clearly identify the amount of energy required to provide the lighting - a very different scenario to the unacknowledged energy consumed by the Plimsoll Gallery lights. By lingering in the gallery visitors condemn the attendants to more pedalling and perhaps humiliation, creating a conflict in the viewer between wanting to see the work and not wanting to
add to the workload of the attendants. While Cattelan is credited as confronting “what he perceived as the institution’s lack of energy”, it is plausible that more than ten years on this work could generate an associated climate change reference, with its unusual use of renewable energy generation. In addition to activating the work, it could be suggested that the gallery attendants were contributing to a reduction in the carbon footprint of the gallery.

Figure 45: Olafur Eliasson, Your waste of time, 2006

While Dynamo Secession generated its own electricity, Olafur Eliasson’s Your waste of time (2006) undoubtedly increased the carbon footprint of the Neugerriemschneider gallery where it was exhibited. For this energy intensive work six tons of ice that had broken away from Icelandic glaciers was transported to the gallery in Berlin. A cool room was constructed inside the gallery to keep the large pieces of ice intact. The choice to use ice from an Icelandic glacier references the artist’s Icelandic heritage and the demise of these ancient ice flows due to global warming. In this context, the consumption of large amounts of energy to transport and preserve the pieces of glacier serves to question our value judgments surrounding the preservation and display of this artwork.

As with all of the works discussed in this section, including Perpetual

32 Francesco Bonami et al., Maurizio Cattelan, Min. (Phaidon Press, 2003), 51
Surrender and Divine Intervention, Your waste of time provided the viewer with a tangible experience of an environment not normally associated with an art gallery. By changing the temperature or lighting conditions inside the exhibition space a point of comparison is created for visitors to reassess the environmental conditions they usually encounter in the gallery. This change in conditions is achieved by assimilating the gallery climate control into the actual artwork. Elevating a utilitarian aspect of the gallery to the status of art allows the viewer to reassess its usual function from a new perspective.

Air and Climate Change:
A good deal of ecological damage has occurred under the misguided policy of ‘out of sight out of mind’. The use of waterways to wash away industrial waste, burying heavy metals and non-biodegradable materials into landfill, and storing radioactive waste underground, are all obvious examples of this approach. The onset of global warming has highlighted another example of humans hiding their waste out of sight. The warming of the planet as a result of an accumulation of greenhouse gases in the atmosphere, is forcing us to reconsider the surrounding air as a place to deposit unwanted gaseous by-products.33 Perhaps we should not be surprised by this environmental development given the recent CFC (chlorofluorocarbon) inspired depletion of the ozone. It is the invisible nature of air, and the gases we release into it that has allowed us to continue with the ‘out of sight’ disposal method. Perhaps our inability to perceive the problematic greenhouse gases in the atmosphere diminishes the credibility of global warming as a genuine ecological disaster. We believe in the depletion of the ozone layer because we have been burned by the increased intensity of the sun’s ultraviolet rays.34 Whilst increased rates of sunburn and skin cancer confirm the

33 According to the IPCC Fourth Assessment Report: Climate Change 2007 “Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years. The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land use change, while those of methane and nitrous oxide are primarily due to agriculture.”

34 The National Cancer Prevention Policy 2007-2009 released by the Cancer Council of Australia states “Changes in the stratospheric ozone may also play a role in the incidence of skin..."
existence of a change in our environment, we continue to ignore the diminished quality of our air. In response this project has attempted to increase our awareness and understanding of the air that surrounds us. To investigate how this might be achieved I have considered how contemporary artists have made air into a tangible entity.

Figure 46: Marcel Duchamp, Air de Paris, 1919

There are examples of artists throughout the 20th century attempting to draw our attention to the air that surrounds us. Perhaps the most famous is Marcel Duchamp’s 1919 work Air de Paris (50 cc of Paris Air). One of a series of Readymades, Duchamp requested a pharmacist empty the contents of a glass ampoule and then reseal it, trapping the air inside. While Duchamp’s intention for this work was to challenge the definition of art, in relation to my project it is the questioning of the definition or quality of air that is significant. By declaring the air in the ampoule to be genuine Paris air, Duchamp prompts us to ask the question, what makes Paris air special? Does the air in Paris have its own individual characteristics that set it aside

cancer. The ozone layer acts as a barrier to UV radiation. Its depletion over the 20th century has resulted in higher incident radiation levels reaching the earth’s surface generally”
from the air in the rest of the world?
The video documentation that forms part of the *Carbon Capture and Storage* series in this project, clearly indicate the balloons in the Plimsoll Gallery exhibition are inflated with my exhaled breath. In *Air de Paris (50 cc of Paris Air)* Duchamp identifies the invisible contents of the ampoule to be Paris air. In a number of works I clearly identify the contents of the balloons as my breath to personalise the object and raise questions relating to our individual environmental impact. In addition, the potential for the balloon to break while someone is standing next to it creates a level of tension mixed with revulsion; if the balloon did break, it would be the equivalent of me breathing on them for an extended period, somewhere between 25 minutes and five hours depending on the size of the balloon.

In the 1977 performance *Breathing in, Breathing out*, artists Marina Abramović and Ulay presented the carbon dioxide enrichment process of human respiration by displaying the impact it had on their conscious state. With blocked nostrils the artists clamped their mouths together ensuring that the only air they could breathe in was the others exhaled breath. With each breath the oxygen in the shared volume of air was slowly depleted. The lack of oxygen and associated concentration of carbon dioxide resulted in the artists lapsing into an unconscious state seventeen minutes into the performance. By sharing one inhaled breath of air Abramović and Ulay’s work questions the nature of relationships and the implications of dependence on another human being.

*Breathing in, Breathing out* however also ironically demonstrates just how detrimental the process of respiration can be to human health. The air around us typically contains around 0.04% carbon dioxide while exhaled breath has a concentration of approximately 4%, one hundred times the concentration. With every breath we are theoretically contributing to the concentration of greenhouse gases in the atmosphere. This carbon enrichment process is used in my project to establish a tangible and personal
link between the viewer and global warming.

Figure 47: Marina Abramović and Ulay, *Breathing in, Breathing out*, 1977

In Tim Flannery’s landmark book on climate change, *The Weather Makers*, he references the ability of carbon dioxide from human breath to travel around the globe:

> The air you just exhaled has already spread far and wide. The CO2 from a breath last week may now be feeding a plant on a distant continent, or plankton in a frozen sea. In a matter of months all of the CO2 you just exhaled will have dispersed around the planet.35

This quote, and the one that follows, features on the website for the breath collection project *Talking About the Weather* (2006-ongoing) by Sydney artists Maria Miranda and Norie Neumark.

> In this project weathertalk is no longer a banal exchange of local weather forecasts, but instead we ask people to donate their breath - the breath which they would normally use to talk about the weather and the same breath that is spread far and wide as described by Tim Flannery.36

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The collection of breath in *Talking About the Weather* takes various forms. In addition to literally capturing and displaying breath in transparent receptacles, Miranda and Neumark request people ‘draw’ breath on paper, collect audio recordings of breath from passing pedestrians and administer a blog where they “invite you to donate TEXT breath. That is, please describe the breath you are taking right now, especially with reference to the weather that is conditioning it.”

![Figure 48: Maria Miranda and Norie Neumark, *Talking About the Weather*, 2006-ongoing](image)

Drawing a parallel between global warming and the process of respiration attempts to give each and every human on the planet a personal affiliation to the air around them and global warming. Alluding to the carbon we repetitively respire into the atmosphere in the form of carbon dioxide creates an element of anxiety to our relationship with the air around us.

The continuous sound of my breathing in the Plimsoll Gallery, emitted from

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37 Ibid.
the video work *One Tonne*, alludes to the presence of exhaled breath in the exhibition space. It prompts the viewer to consider their own respiration, an act that they would normally complete without conscious recognition. The repetitive rhythm of the recorded sound is matched by the slow but deliberate progression of the counter in the video. The ever increasing numeric display acts in much the same way as the volume change in the weather balloons to provide a record of the accumulating exhaled breath. The sound of each breath and associated motion of the counter in the gallery constantly reminds the viewer, even when they are not able to see the video footage of *One Tonne*, that the carbon count is rising.

![Figure 49: Martin Creed, Work No 268: Half the air in a given space, 2001](image)

Giving a physical presence to the surrounding air was the focus of Martin Creed’s *Work No 268: Half the air in a given space* (2001). For this work Creed filled half the volume of a gallery in the Yokohama Museum with black balloons inflated with air. Visitors to the museum experienced the physical volume of the air as they waded through the mass of balloons that engulfed their bodies. The act of encasing the air inside delicate balloons encouraged visitors to treat the air around them with a new found respect and level of care, a pertinent metaphor in the context of climate change and one I have adopted for my project.

The Victorian government also used black balloons in their current *You have*
the power: Save Energy climate change campaign to illustrate the volume of household greenhouse gas emissions. The advertisements for this campaign depict inflating black balloons emerging from household items as they consumed energy. The balloons are an attempt to break down a large volume of greenhouse gas into discreet tangible units. “A balloon can hold about 50 grams of greenhouse gas. Every Victorian household produces over 12 tonnes (240,000 balloons) of greenhouse gas emissions each year.”38 While we may not be able to stop all 240,000 balloons the campaign at least gives us the ability to achieve a reduction in our emissions by tackling the problem one balloon at a time.

Weather balloons have been used in my project to visualise the volume of breath expired through human respiration. The breath captured in these balloons has a higher concentration of the greenhouse gas, carbon dioxide, than the surrounding air. While the Victorian Government assigned a weight to the greenhouse gas in their balloons, I have chosen to describe the time required to inflate the weather balloons through respiration. The balloon allowed the Victorian government to help its residents understand the

volume of 50 grams of greenhouse gas. I have used balloons to allow the viewer to comprehend the volume of breath they would exhale in a set time, such as 30 minutes or five hours. This temporal relationship extends the association between human respiration and global warming beyond a single breath to imply the potential impact each individual might have on the environment during the course of their life.

By incorporating sound, written and oral description, and devices to capture and display a volume of gas, the works from this section outline multiple strategies that redefine the presence of air. These works also remind us that the composition of air is not fixed and that even apparently insignificant processes such as breathing can influence its makeup. The carbon dioxide enrichment properties of human respiration create a direct link between this primarily unconscious act and global warming. This association has been extensively developed in the Carbon Capture and Storage works.

Sustainable Design and Art:
The rapid development of environmentally friendly industries and their associated products in response to climate change has both informed and inspired my research. Examining the potential lifespan, ease of raw material reclamation and embodied energy of these products often exposes their dubious green credentials. A case in point is the integration of photovoltaic cells or solar panels into devices to give them environmental credibility. While solar panels are becoming increasingly more efficient, there are some situations where a product’s embodied energy will exceed the amount of solar energy produced during its functional life. The shelves of the local hardware or outdoor garden centre will probably be full of these spurious green products.
The solar powered owl garden light epitomises this form of ‘green’ consumerism. Constructed from poly resin, the owl has a low voltage light embedded in its chest that is powered by a solar panel ‘subtly’ mounted into its back. This form of green washing\(^\text{39}\) represents the very antithesis of sustainable design: it fails to generate positive net energy, is made from environmentally unfriendly materials and will inevitably end its life in landfill. If you consider the integration of a light into a nocturnal animal you would be justified in labelling this product oxymoronic.

This paradox is referenced in *Perpetual Surrender*; a work where substantially more energy is consumed to run the gallery lighting, than is produced by the work’s incorporated solar panel. In fact the reference to ineffective climate change solutions runs right through this research project. In the *Carbon Capture and Storage* series the amount of carbon captured is obviously not significant enough to present a real solution for global warming. The physical exertion and awkwardness of the capture process further exposes the environmental limitations of this procedure. The exaggerated absurdity of the climate change solutions presented in the project is a result of my incredulity that products like the solar powered owl light exist. I have a love-hate relationship with these idiotic objects, instantly

\(^{39}\) Green washing is the deliberate highlighting of environmental practices to promote a positive public image without a real change in overall environmental benefit.
drawn to their comical aesthetic and then profoundly dismayed at the ability of the human race to conceive such a toxic ‘green’ product.

While global warming has inspired the rapid development of alternative energy technology it has also ironically encouraged a new class of environmentally dubious consumerism. This self-defeating human behaviour is mirrored by the futile solutions developed in this project, like the solar powered owl light: the embodied energy of the artworks will always exceed the amount of electricity they can produce. Beyond the potential benefits of ‘raising environmental awareness’, something which I find hard to quantify, the project has a negative impact through the consumption of resources and energy. My sceptical view of raising awareness through art practice, outlined in part one of this paper, has perhaps resulted in the development of the research into not just a response to the issue of climate change, but also a personal critique of the effectiveness of environmentally engaged art. Is this field of art practice another form of green washing? After all you could argue that the solar owl light also generates an awareness of climate change by promoting alternative energy solutions.

Founders of the company McDonough Braungart Design Chemistry and authors of *Cradle to Cradle: Remaking the way we make things*, William McDonough and Michael Braungart, endorse the development of a new industrial revolution. They aim to rid the world of products like the solar powered owl light through a radical shift in design and an alternative approach to manufacturing. Their sustainable design principles take a holistic approach to the flow of energy and materials to avoid losing valuable resources into landfill. McDonough and Braungart blame this loss on inappropriate design.

They are lost not only for the lack of adequate systems of retrieval; they are lost also because many products are what we jokingly refer to as "Frankenstein products" or (with apologies to Jane Jacobs) "monstrous
hybrids" - mixtures of materials both technical and biological, neither of which can be salvaged after their current lives.  

McDonough and Braungart define materials as either biological or technical nutrients: “Biological nutrients are useful to the biosphere, while technical nutrients are useful for what we call the technosphere, the system of industrial processes.” They propose that ownership of these two streams of materials in products should remain with the manufacturer. Under such a scheme it would be in the manufacturer’s interest to incorporate design principles that allow raw materials to be easily retrieved for reuse at the end of a product’s useful life. McDonough and Braungart advocate that this will actually bring the price of production down, as effective design will make retrieving materials from existing products more cost effective than purchasing new virgin stock. They define this retrieval and reuse of materials as ‘upcycling’, a deliberate reference to what they deem as the inadequacies of our current attempts to curb waste through recycling. They consider recycling to be ‘down cycling’ due to the combined processing of high and low value materials that results in an overall degradation in the properties of the end product. Each time materials are recycled they lose some of their initial value, inevitably leading to the deterioration of the material to a point where it is no longer of any use.

This sustainable design principle of allowing raw materials to be easily retrieved for reuse at the end of a product’s useful life has heavily influenced my project. I have deliberately tailored the design and construction methods of my work to maintain the physical integrity of the incorporated materials and components. By using assembly techniques that allow for easy extraction of materials with little or no damage, the artworks

41 Ibid., 93
42 Ibid., 56
43 By physical integrity I mean the retention of the original functional and physical properties of materials by minimising or eliminating invasive construction techniques such as drilling and gluing.
in this project can be deconstructed and the components reused. This approach goes against the established idea that artworks should be maintained in their original form.

While material reclamation within a traditional art practice might be perceived as radical, there are indications that the current climate change predicament is motivating artists and curators to reengage with environmental issues through an investigation of sustainable design principles. The 2006 exhibition *Beyond Green: Toward a Sustainable Art*, held at the University of Chicago’s Smart Museum of Art, showcased a broad spectrum of artists and designers that consider how their practice can have a positive impact beyond the art world.

![Figure 52: Jane Palmer and Marianne Fairbanks, solar power bags, 2002-ongoing](image)

The exhibition included a series of prototype bags with flexible solar panels incorporated into their design for charging mobile phones, ipods and other small electrical devices. Unlike the monstrous solar owl light, the designers of these bags, Jane Palmer and Marianne Fairbanks, have taken a holistic approach to sustainable design. Sourcing waste materials and using local labour for construction, gives these products the green credentials automatically implied by the incorporated solar panels.

*Beyond Green: Towards a Sustainable Art* also featured a *paraSITE* shelter. Since 1998 artist Michael Rakowitz has produced more than 30 *paraSITE*
shelters in collaboration with homeless people in Boston, Cambridge, Massachusetts and New York City. These portable shelters use building hot air vents to inflate double walled tent structures to provide warm accommodation for people living on the streets. Custom designed in collaboration with the intended inhabitant, each \textit{paraSITE} is constructed from readily available materials such as plastic bags and tape. The \textit{paraSITE} exhibited in \textit{Beyond Green: Towards a Sustainable Art}, originally belonged to its inhabitant, Bill Stone. In a gesture that references McDonough and Braungart’s principle of product ownership remaining with the manufacturer, Bill returned the shelter to Rakowitz when he no longer needed it.

Figure 53: Michael Rakowitz, \textit{paraSITE (Bill S.)}, 1998

The \textit{paraSITE} series uses a wasted heat source to provide cheap, portable, warm accommodation for the homeless and served to highlight the inefficiency of building climate control systems. This work inspired my early attempts to generate electricity from waste energy sources, specifically the unwanted air flow emitted from the air vent in my studio. The location and poor design of this vent makes it both physically invasive and a potential health issue. Placing a generator in the air vent provided both free electricity and a method of defusing the draft in my studio. The air vent was transformed from a feature of my studio to be negated into a resource for the project. As the research progressed I found new ways to integrate the
generated electricity, using it to power the lights for the window gallery, charge the batteries in my digital camera for documenting the progress of the artwork, provide power for my portable soldering iron, and charge the 9 volt battery for the speech amplifier in the respirator used for 5 hour carbon capture and storage. This use of the electricity produced from the air flowing from the vent implicates it both physically and conceptually into my research, converting it from an inefficient central feature of my studio, into the centre of its own closed system.

The 2007 exhibition *Weather Report: Art and Climate Change*, held at the Boulder Museum of Art, also investigated the issue of sustainability in the context of climate change. In an introductory essay for the exhibition catalogue, Stephanie Smith asks the question: “What can cultural producers, institutions and audiences do in response to climate change?”44 Smith issues a direct challenge to artists and art institutions to become responsible for their environmental impact when she states:

if we are going to show art that addresses climate change or other topics related to sustainability, we should consider ourselves ethically bound to thoughtfully assess how we make use of resources (including money, time, and good will as well as materials).45

Responding to this challenge, Jane McMahan’s installation *Arapaho Glacier: What Goes Around Comes Around* (2007) could be seen as a sustainable version of Olafur Eliasson’s *Your Waste of Time* (2006). Both installations reference the demise of glaciers due to the impact of global warming. McMahon, however, relies on renewable solar energy to sustain her locally harvested glacial samples, avoiding the climate change complicity associated with the excessive energy consumption of *Your Waste of Time*. *Arapaho Glacier: What Goes Around Comes Around* consists of a

45 Ibid., 14
small refrigeration unit situated in the middle of a steel framed pavilion. The roof of the pavilion, made up of solar panels, harnesses the sun's energy to preserve the frozen state of the glacial ice in the refrigeration unit. The industrial aesthetic of McMahan’s installation is directly related to her desire to create a sustainable life support system for the glacial ice. In McMahon’s installation the solar panels perform a dual purpose, simultaneously providing the refrigeration unit with both energy and cooling shade.

The formal aesthetic of this installation is driven by the need to provide an efficient, sustainable environment for the preservation of the ice. The utilitarian nature of this work goes beyond the modernist principle of form following function\(^\text{46}\); it also provides the viewer with the necessary clues to comprehend the aims of the artist. Allowing the required function of the objects in my project to guide my aesthetic decisions has also resulted in the development of a utilitarian aesthetic. This formal quality facilitates more than just the efficient functioning of the object; it also provides important visual clues that reference my intentions for the work to engage the issue of climate change.

The juxtaposition of the limited functionality of my artworks against the earnest qualities of sustainable design creates a humorous contradiction. The

\(^{46}\) A principle associated with 20\(^{\text{th}}\) century modernist architecture and design where the form of the building or object is dictated by its intended function.
humour is developed further through the ludicrous actions required to activate the artworks and the apparent matter of fact way in which I carry them out. These actions give the viewer permission to laugh at my environmental efforts and the issue of climate change. I am a subscriber of notorious film maker John Waters’ approach to influencing opinion: “If you want to change anyone’s mind about anything, make them laugh. If you laugh at yourself, people will listen to anything you say.” Humour in this research thus becomes a useful device for overcoming the apparent fatigue surrounding the climate change discussion.

Stephanie Smith refers to the opportunities created through the amalgamation of sustainable design and visual art in an introductory catalogue essay for *Beyond Green: Towards a Sustainable Art*.

The convergence of these two strands can provide rich opportunities for artists to create satisfying visual forms that provide new ways of embodying critical practices. And when this convergence occurs around environmental questions, it resonates strongly with sustainable design’s goal of bringing social and aesthetic concerns together with environmental and economic ones.

Slovenian artist and architect Marjetica Potrc demonstrates this approach with her interventionist installation *Balcony with Wind Turbine* (2004). Conceived for the 3rd Liverpool Biennial this work was sighted on the fourteenth floor of one of the few remaining social housing tower blocks in Liverpool. For this project Potrc retrofitted a steel balcony complete with wind turbine onto the building. The installation provided two families with additional space, renewable energy and fantastic views of Liverpool. The local community viewed the balcony as a visual improvement to the tower’s aesthetically austere modernist architecture.

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The question of whether *Balcony with Wind Turbine* is architecture or art is irrelevant. Potrc used her skills from both fields to produce a work that perhaps someone working purely within the frameworks of art or design might not have been able to conceive. This creation of alternative modes of practice is the result of allowing the fields of art and design to interact. The amalgamation of these fields in this research has created a cross-disciplinary methodology, allowing my art practice to develop in new directions. While I would not describe my work as ‘green’, the incorporation of sustainable design principles has contributed to the extension of my aesthetic and conceptual repertoire.

**Summary:**

Methods for defining the presence and composition of air, absurd alternative energy generation and consumption processes, and sustainable design principles have all contributed to the formal and conceptual properties of this research. By synthesising the strategies employed in the contextual sources outlined in this chapter, a multifaceted sculptural language has been developed in response to the complexity of climate change. To extend this multiplicity and promote the project as one homogenous system, associations between individual elements have also been established. This diverse approach provides an alternative to the singular strategies employed in environmentally engaged art, such as using only recycled materials, which are limited responses to the complex and seemingly intangible nature of climate change.
PART FOUR: Conclusion

Motivated by a perception that established methodologies employed in environmentally engaged sculpture were limited in their ability to engage with the complexity of environmental issues, this research has developed a new multifaceted sculptural language to actively participate in the climate change debate. The site specific strategies employed in Land and Environmental Art of the 1960’s and 70’s, a field of sculpture historically linked to the research, have been replaced in this project by more nomadic methodologies within a local urban or domestic context. This move away from site specific methodologies reflects a recent trend in sculpture and installation art that responds directly to ecological issues. Strategies employed in these environmentally engaged artworks have been adopted and expanded in the project by incorporating principles of sustainable art and design to develop a sculptural language synthesised from diverse sources. The vocabulary of this language for engaging with climate change is developed further through the strategic use of energy and air in the submitted work, two materials intrinsically linked to global warming. By developing this multifaceted approach, the project is able to overcome the limitations of established environmentally oriented methodologies, such as using only recycled materials, to more effectively respond to the complexity of climate change.

As I attempted to negotiate the incoming tide of scientific information in the early stages of the research, it became very apparent that I was not equipped with the necessary skills to accurately assess this information. The volume and complexity of the arguments put forward by both sides of the climate change debate made separating fact from fiction almost impossible. My inability to make informed judgements led me to question whether my climate change convictions had been based on understanding facts or an accumulation of beliefs. In addition to contributing to the field of
environmentally engaged sculpture and installation by developing a language for engaging with climate change, the project also provided an opportunity to reassess my environmental beliefs and ability to constructively contribute towards an ecological solution.

Given the incomprehensible nature of climate science, the project’s focus turned to the more tangible eco-culture or discourse that has emerged in response to climate change. The output for the research parodies two familiar elements of this eco-culture, DIY alternative energy generation and carbon capture and storage. Creating absurd versions of these emergent environmental processes forms another important element of the sculptural language developed in the project. Futile solutions for global warming, such as the *Carbon Capture and Storage* works, provide a ridiculous benchmark with which to compare and critique the effectiveness of ‘genuine’ climate change solutions. This point of comparison is made tangible by the ‘solutions’ presented in this research. Unlike the complex science that attempts to define climate change, no specialised knowledge is required to assess the environmental effectiveness of works such as *Breath Compressor* or *Breath Light Generator*. The futile nature of these ecological ‘solutions’ also reflects my growing recognition that I may not be able to significantly contribute towards a climate change solution.

Highlighting the metaphorical association between global warming and human respiration in the research creates a tangible, personal link between the viewer and climate change. By implying that they theoretically contribute to global warming with every exhaled breath, the viewer is invited to reassess their environmental culpability. My presence in the videos, which document the activation of the sculptural objects, provides the viewer with a test subject or tragic anti hero with which to empathise and compare their own climate change beliefs. The critique of these beliefs evolves as the viewer navigates through the exhibition and gradually discovers the multiple associations between individual elements of the submitted work. Just as climate change convictions are influenced by the
input of new scientific information and statistics, the assumptions applied to the functionality of objects in the exhibition are challenged and adjusted as the links between them are revealed.

This project does not ask its audience to align themselves with a particular side of the climate change debate by presenting a didactic view on the validity of man made global warming. Instead, by parodying alternative energy generation systems and highlighting a metaphorical association between global warming and human respiration, the project creates an opportunity for the viewer to reassess where they stand. Through the strategic use of energy and air in a series of sculptural objects that incorporate elements of sustainable design and DIY culture, the research has developed a diverse language that actively responds to this complex environmental issue.

To develop this new sculptural language the project demanded a dramatic shift in my practice, requiring for the first time the incorporation of my physical presence into the work to successfully engage the research topic. Combined with my introduction to the use of video and installation practices, the research represents a substantial change in my working methodology. I have only just begun to identify the potential for these methodologies to further challenge and influence my practice, and they will undoubtedly feature in the works developed beyond the conclusion of this phase of my postgraduate study.
APPENDIX ONE: List of submitted works

Plimsoll Gallery

*Perpetual Surrender*, 2010
Solar panel, wood, aluminium, DC motor, propeller, foamcore, bearing.
210 x 35 x 23cm

*Breath Generator 2*, 2009
Wood, acrylic, steel plate, DC motor, LED, plumbing fitting.
16 x 9 x 4cm

*Breath Light Generator*, 2009
Standard definition video.
1 minute 20 seconds

*Balloon Light Generator*, 2009
Standard definition video.
49 seconds

*Breath Compressor*, 2010
Wood, hand pump, gas cylinder, castors, steel, compressed air hose & fittings.
75 x 132 x 36cm

*Compressed Breath Generator*, 2010
Air gun, wood, DC motor, acrylic, power socket.
18 x 9 x 5cm

*Attachment One: temperature and rate of carbon emission*, 2010
Wood, anemometer/thermometer, aluminium, plastic.
12 x 12 x 8cm

*Attachment Two: temperature, humidity and carbon emission*, 2010
Wood, humidity gauge/thermometer, plastic.
10 x 11 x 6cm
Attachment Three: internal temperature, 2010
Wood, internal thermometer.
5 x 26 x 5cm

Attachment Four: temperature, pH and carbon emission, 2010
Wood, pH meter/thermometer, aluminium, plastic.
4 x 21 x 7cm

Documentation of functioning Compressed Breath Generator & attachments, 2010
Standard definition video.
2 minutes 24 seconds

Modified backpack, 2010
Backpack, plumbing components, respirator, silicon.
49 x 30 x 35cm

Carbon Capture and Storage: 24 minutes 17 seconds, 2010
Standard definition video.
24 minutes 17 seconds.

Carbon Capture and Storage: 24 minutes 55 seconds, 2010
Standard definition video.
24 minutes 55 seconds.

Carbon Capture and Storage: 18 minutes 37 seconds, 2010
Standard definition video.
18 minutes 37 seconds.

5 Hour Carbon Capture and Storage, 2010
Standard definition video, respirator, weather balloon, plumbing parts.
Dimensions variable.

Carbon Breath Tester, 2010
Wood, tape counter, steel, siphon hose, elastic band.
56 x 22 x 19cm
One Tonne, 2010
Standard definition video.
20 minutes 38 seconds

Divine Intervention, 2010
Wind turbines, cable, wood, climate change texts, LED book lights.
Dimensions variable.

Studio
Air vent generator final prototype, 2009
Steel, DC motor, electrical cable.
12cm diameter x 6cm

Insideout, 2009
MDF, LED lighting system, batteries and holder.
60 x 60 x 32cm
APPENDIX TWO: Bibliography


APPENDIX THREE: List of Illustrations

PART ONE: The Project

Figure 1: RSA (Royal Society for the encouragement of Arts) project, *WEEE Man*, 2005
3.3 tonnes of scrap electrical and electronic equipment
source http://weeeman.org/

Figure 2: Triumph International, Solar Brassiere, 2008
Brassiere, solar panel, electric bulletin board
source http://www.techshout.com

PART TWO: Pursuit of the Project
(All works in part two by Michael Singe)

Figure 3: Air vent generator prototype 1, 2009
Corflute, computer fan, battery, battery holder, *gaffa* tape. 28cm diametre x 2cm

Figure 4: Air vent generator prototype 2, 2009
MDF, DC motors, steel, electrical wire. 27cm diametre x 6cm

Figure 5: Air vent generator prototype 2 charging batteries

Figure 6: Air vent generator prototype 2 powering attached clock

Figure 7: Air vent generator prototype 2 powering attached clock (detail)

Figure 8: Air vent generator final prototype, 2009
Steel, DC motor, electrical cable. 12cm diametre x 6cm

Figure 9: *Insideout* - external view, 2009
MDF, LED lighting system, batteries and holder. 60 x 60 x 32cm
Figure 10: *Insideout* – internal view

Figure 11: *Insideout* exhibiting part of Ben Ryan’s Honours submission in 2009

Figure 12: www.instructables.com version of *Breath powered USB charger*  
CD drive components, electrical circuit, rubber band.  
source www.instructables.com

Figure 13: my version of *Breath powered USB charger*, 2009  
Toy car components, DC motor, MDF, electrical wire, belt. 11 x 18 x 6cm

Figure 14: *Breath Generator 1*, 2009  
Wood, DC motor, acrylic, steel tube, steel plate. 9 x 9 x 4cm

Figure 15: *Breath Generator 1*- with front cover removed

Figure 16: *Breath Generator 2*, 2009 - with front cover removed  
Wood, acrylic, steel plate, DC motor, LED, plumbing fitting. 16 x 9 x 4cm

Figure 17: *Breath Generator 2* - rear view showing LED and motor

Figure 18: *Breath Light Generator*, 2009 – video still image  
Standard definition video. 1 minute 20 seconds

Figure 19: *Balloon Light Generator*, 2009 – video still image  
Standard definition video. 49 seconds

Figure 20: *25 Minute Carbon Capture and Storage*, 2009 – animation still images.  
Standard definition video. 28 seconds

Figure 21: Modified backpack, 2010 – studio testing.  
Backpack, plumbing components, respirator, silicon. 49 x 30 x 35cm

Figure 22: *30 Minute Carbon Capture and Storage*, 2010 – video still image  
Standard definition video. 6 minutes 51 seconds
Figure 23: 30 Minute Carbon Capture and Storage – TMAG installation

Figure 24: Carbon Capture and Storage: 24 minutes 55 seconds, 2010 – video still image. Standard definition video. 24 minutes 55 seconds.

Figure 25: 5 Hour Carbon Capture and Storage, 2010 – Six_a installation
Standard definition video, respirator, weather balloon, plumbing parts.
Dimensions variable.

Figure 26: Breath Compressor, 2010 – with attached balloon inflated with breath
Wood, hand pump, gas cylinder, castors, steel, compressed air hose & fittings.
75 x 132 x 36cm

Figure 27: Carbon Capture and Storage: 18 minutes 37 seconds, 2010 – video still image. Standard definition video. 18 minutes 37 seconds.

Figure 28: Compressed Breath Generator, 2010 – front view
Air gun, wood, DC motor, acrylic, power socket. 18 x 9 x 5cm

Figure 29: Compressed Breath Generator - rear view

Figure 30: Compressed Breath Generator - top view

Figure 31 (left): Attachment One: Temperature and rate of carbon emission, 2010
Wood, Anemometer/thermometer, aluminium, plastic. 12 x 12 x 8cm

Figure 32 (right): Attachment Two: Temperature, humidity and carbon emission, 2010. Wood, humidity gauge/thermometer, plastic. 10 x 11 x 6cm

Figure 33 (left): Carbon Breath Tester, 2010
Wood, tape counter, steel, siphon hose, elastic band. 56 x 22 x19cm

Figure 34 (right): One Tonne, 2010 – video still image
Standard definition video. 20 minutes 38 seconds
Figure 35: *Perpetual Surrender*, 2010 – Six_a installation
Solar panel, wood, aluminium, DC motor, propeller, foamcore, bearing.
210 x 35 x 23cm

Figure 36 (left): *Divine Intervention*, 2010 – wind turbines mounted outside Six_a
Wind turbines, cable, steel, religious texts, LED lights. Dimensions variable.

Figure 37 (right): *Divine Intervention* – religious texts and LED lights inside Six_a

**PART THREE: Context**

Figure 38: Gustav Metzger, *Project Stockholm*, 1972/2007
100 cars, plastic, steel framework. Dimensions variable
source http://artandsustainability.wordpress.com/

Figure 39: Tue Greenfort, *Milk Heat*, 2009
Radiator, water pipe. Dimensions variable
source http://www.johannkoenig.de

Figure 40: Michael Sailstorfer, *3 ster mit ausblick*, 2002
10 cibachrome photographs mounted on aluminium. Each 50 x 70cm
source http://www.galerieperrotin.com

Figure 41: Simon Starling, *Three Day Sky*, 2004-2009
Solar panels, batteries, electric spray gun, blue paint. Dimensions variable.
source http://www.themoderninstitute.com/

Figure 42: Michael Rakowitz, *Climate Control*, 2000-2001
Galvanised steel ducting, fans, timers. Installed PS1 Special Projects room
source http://michaelrakowitz.com/

Figure 43: Simon Starling, *Kakteenhaus*, 2002
source http://www.portikus.de
Figure 44: Maurizio Cattelan, *Dynamo Secession*, 1997
Bicycles, dynamos, light bulbs. Dimensions variable

Figure 45: Olafur Eliasson, *Your waste of time*, 2006
Vatnajökull ice, cooling system, styrofoam, wood, lacquer. Dimensions variable.

Figure 46: Marcel Duchamp, *Air de Paris*, 1919
Glass ampoule (broken & later restored). 13.5 x 20.5 cm
source http://www.philamuseum.org

Figure 47: Marina Abramović and Ulay, *Breathing in, Breathing out*, 1977
Photographic documentation of performance.
source http://contemporaryartpresentations.blogspot.com

Figure 48: Maria Miranda and Norie Neumark, *Talking About the Weather*, 2006-ongoing. DVD player, speakers, glass flask, plinths and perspex containers, paper.
Installation UTS Gallery Sydney.
source http://www.scanz.net.nz/weathertalk/weatherwebsite

Figure 49: Martin Creed, *Work No 268: Half the air in a given space*, 2001
Black balloons. Dimensions variable.
source http://www.martincreed.com

Figure 50: Victorian Government, *You have the power: Save Energy*, 2007-ongoing
Video still from television advertisement.
source http://www.saveenergy.vic.gov.au

Figure 51: Solar powered owl garden light
source http://www.crazysales.com.au

Figure 52: Jane Palmer and Marianne Fairbanks, solar power bags, 2002-ongoing
Leather, solar panels, storage batteries. Dimensions variable
source http://www.noonstyle.com
Figure 53: Michael Rakowitz, *paraSITE (Bill S)*, 1998
Plastic bags, polyethylene tubing, hooks, tape. Dimensions variable.
source http://michaelrakowitz.com/

Figure 54: Jane McMahan, *Arapaho Glacier: What Goes Around Comes Around*, 2007
Arapahoe Glacier Ice, glass, steel, refrigeration equipment, solar panels, batteries, aluminium screen. 250 x 305 x 305cm.
source http://janemcmahan.com

Figure 55: Marjetica Potrc, *Balcony with Wind Turbine*, 2004
Steel, wind turbine and associated energy infrastructure.
source http://www.potrc.org
APPENDIX FOUR: Curriculum Vitae

EDUCATION
1990 Bachelor of Fine Arts, Curtin University of Technology
2009 - current MFA Research Candidate, University of Tasmania

SOLO EXHIBITIONS
2010 Warm Up - Six_A
2007 Group Show - Galerie Dusseldorf
2003 Are we there yet? - Galerie Dusseldorf
2001 Forgotten Works from the Private Collection - 46 Grafton rd
1999 Run with the hares & hunt with the hounds - Galerie Dusseldorf
1993 Toys for big girls and boys - Galerie Dusseldorf

GROUP EXHIBITIONS
2010 Outlook - Tasmanian Museum and Art Gallery
2008 Staff Room - Moores Building
2008 Closet Circus - Bunbury Regional Art Gallery
2007 Staff Room - Moores Building
2007 Paperatzi - Albany WA
2006 30 Years On - Galerie Dusseldorf
2006 Staff Room – Moores Building
2006 Déjà vu - Galerie Dusseldorf
2006 Galerie Dusseldorf exhibit Melbourne Art Fair
2005 Bankwest Contemporary Art Prize
2005 Mine Own Executioner - Mundaring Art Centre
2005 City of Joondalup invitational art award
2005 Sir Charles Gairdner Art Award
2005 Shelf Life - Galerie Dusseldorf
2004 Mine Own Executioner - Mundaring Art Centre
2004 Galerie Dusseldorf exhibit Melbourne Art Fair
2004 City of Joondalup invitational art award
2003 Sir Charles Gairdner Art Award - Church Gallery
2002 Last Supper - Kurb
2002 Personal + Particular - Lawrence Wilson Art Gallery
2002 City of Joondalup invitational art award
2002 Town of Vincent art award
2001 City of Joondalup invitational art award
2001 Open Space Program - IASKA
2001 Galerie Dusseldorf exhibit Art01
2000 Gotham vs the saucer girls from Mars - Cinema Paradiso
1999 Nip & Fluff Christmas Show - Moores Building
1999 Galerie Dusseldorf exhibit ART 99
1998 Galerie Dusseldorf exhibit 6th Australian Contemporary Art Fair
1997 21 Years On - Galerie Dusseldorf
1997 Aherns Installation Art Project - Aherns department store
1996 Multiples - Verge Gallery
1996 Shelf Life - Essentials Supermarket
1996 Art Body Medicine - Perth Institute of Contemporary Art.
1995 Rose is a Rose - Galerie Dusseldorf
1995 100 Years: Western Australian Sculpture 1895-1995 - Art Gallery of Western Australia
1993  *Artexpo* - Perth Institute of Contemporary Art
1992  *3D Illusion* - Galerie Dusseldorf
1992  *Orientation* - Fremantle Arts Centre
1991  *A Sideways Glance* - Galerie Dusseldorf
1991  *3 Artists, 3Dimensions* - Artrage
1991  *Artist in residence* Perth City Council
1991  *Woodworks* - Curtin University
1990  School Of Art Degree Show - Curtin University
1990  *Drawing* - Curtin University of Technology
1989  *Waterworks* - Curtin University of Technology

**RECENT EMPLOYMENT**

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<th>Year</th>
<th>Position</th>
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<tr>
<td>2009 - current</td>
<td>Sessional Academic</td>
<td>Tasmanian School of Art, University of Tasmania</td>
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<tr>
<td>2006 - 2008</td>
<td>Sessional Academic</td>
<td>School of Design and Art, Curtin University of Technology</td>
</tr>
<tr>
<td>2006 - 2008</td>
<td>Technical Officer: sculpture workshop</td>
<td>School of Design and Art, Curtin University of Technology</td>
</tr>
</tbody>
</table>

**REPRESENTATION**

- Art Gallery Of Western Australia: Murdoch University
- Holmes a Court Collection: Bankwest
- Kerry Stokes Collection: Royal Perth Hospital
- City of Joondalup: King Edward Memorial Hospital
- Ian & Sue Bernadt Collection: Curtin University of Technology
- Horn Collection

**AWARDS / COMMISSIONS**

- Australian Postgraduate Award - 2009
- ArtsWA development grant - 2006
- City of Perth: 3x3 Forrest Chase installation project - 2006
- Artsource residency: The Gunnery, Sydney - 2004
- ArtsWA development grant - 2002

**BIBLIOGRAPHY**

- *Artlink*: Vol 30 No2 2010 – Sean Kelly
- *The West Australian*: October 29 2005 – Ric Spencer
- *Eastern Reporter*: September 27 2005
- *The West Australian*: July 19 2003 – Simon Blond
- *Shout magazine*: July/August 2003 – Andrew Nicholls
- *The West Australian*: November 9 2002 – Robert Cook
- *The West Australian*: June 12 1999 – David Bromfield
- *The West Australian*: October 17 1992 – David Bromfield
- *The West Australian*: October 13 1992