

## NEUTRALISING A FACULTY: VICTORIA UNIVERSITY'S CARBON NEUTRAL FACULTY OF ARCHITECTURE AND DESIGN

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### Summary

International research suggests that the built environment may be responsible for approximately a third of global carbon emissions. It is therefore particularly appropriate that Victoria University's Faculty of Architecture and Design, in Wellington, New Zealand has taken the significant step of becoming the Southern Hemisphere's first carbon neutral campus, and the world's first carbon neutral Faculty of Architecture and Design. This is part of the Faculty's long term commitment to sustainability in the built environment and is consistent with a growing international movement calling for Architecture Schools to be carbon neutral by 2010.

The process and opportunities that enabled the Faculty to become carbon neutral in May 2008 are outlined, including the preparation of a greenhouse gas emissions inventory, an emissions reduction and management plan and the audit and accreditation process. The successes and difficulties inherent in the approach taken are examined.

As well as reduced environmental impact, this paper analyses further significant anticipated benefits of the Faculty of Architecture and Design's carbon neutral status, including opportunities to publish research and enhance the reputation of the Faculty and the significant opportunities arising for the development of new teaching tools and methods. Involvement and participation by students in reduction plans and the facilitation of a forum for debate and discussion about the future of carbon trading markets are also elaborated on.

It is anticipated that the process undertaken by Victoria University of Wellington's Faculty of Architecture and Design could be used as an example by other educational institutions moving towards becoming carbon neutral. It is posited that reducing and offsetting carbon emissions in academic institutions, particularly those responsible for the education of new generations of built environment professionals, could become an important part of the creation of a built environment that is better able to address mitigating the causes of climate change.

### 1. Introduction

Climate change will affect many aspects of life and has well documented social, economic and environmental impacts (Stern 2006; Chapman, Boston, and Schwass 2006). Public awareness of this and with it Government directives to address climate change issues, have increased significantly in the last two years in New Zealand and in many other countries. Coupled with this is the growing realisation that the global built environment contributes significantly to the causes of climate change through construction and demolition practices, but most significantly through operational and embodied energy (O'Connell 2003; Alcorn 2003; Lend Lease Corporation, et al, 2007). Built environment professionals and designers will have to address reducing greenhouse gas emissions in the future as well as find solutions to adapting to many of the changes that will come about through climate change (Camilleri, Jaques, and Isaacs 2001). O'Connell (2003) points out that *'current projections indicate New Zealand buildings will potentially suffer significant impacts this century..., the direct and indirect costs of which may be very high'*.

Many of the negative human impacts on climate and ecosystems have been described as a failure in design rather than available technology (Orr 2002; McDonough and Braungart 2002). Lowe (2000) estimates for example that reductions of 80% in carbon emissions form the built environment are possible using current technologies. It is appropriate then that Victoria University of Wellington's Faculty of Architecture and Design is addressing climate change issues in part by reducing and offsetting greenhouse gas emissions. This is consistent with a growing international movement calling for Architecture Schools to be carbon neutral by 2010 (Architecture 2030 2008). The Faculty will be a pilot for the rest of Victoria University of Wellington (VUW) in assessing the feasibility of ongoing and future greenhouse gas (GHG) offsetting and emissions reduction planning for the university's other four campuses.

The Faculty of Architecture and Design participated in Landcare Research's carboNZero programme to achieve certification, and obtained international Gold Standard carbon credits through a sponsorship agreement, to offset GHG emissions. These credits are sourced from Meridian Energy's wind farm projects in New Zealand<sup>1</sup>.

## 2. The Carbon Neutrality Debate

It is acknowledged that voluntary carbon offsetting and trading is still in its infancy in New Zealand but that this is growing rapidly internationally (Bellassen and Leguet 2007). The difficulties with 'carbon neutrality' achieved through offsets are acknowledged in their role as a potential green washing mechanism. Harris (2007) points out that *'despite its positive attributes... the role of offsetting should be only temporary, creating much needed early emissions reductions and generating awareness, whilst being only a small part of a much wider and longer term global effort to tackle climate change.'*

For this reason the Faculty consider it prudent to use participation in the carboNZero programme primarily as a platform to plan for and instigate significant GHG emission reductions. Offsetting is considered to be the final step in a plan that seeks to avoid, then reduce and finally offset emissions. 'Carbon neutrality' also provides a valuable forum to discuss and raise awareness of the issues of climate change that effect in the case of the Faculty of Architecture and Design: the built environment; tertiary education and research; and New Zealand. It is the intention of the Faculty of Architecture and Design to combine carboNZero certification with a range of additional sustainability initiatives and research already existing and proposed for the Faculty. This is in line with a wider strategy to move towards becoming a leading educational institution for environmentally sustainable design.

## 3. Opportunity for Engagement in Climate Change Issues

The Faculty deciding to become carbon neutral and then making this a reality was a long and somewhat complicated process. This is briefly described below in chronological order.

### 3.1 Initial Steps: A Carbon Neutral Course

Since 1997, the School of Architecture has offered a specialist elective course in Sustainable Architecture. More than a third of the second year cohort of architecture students elected to take this course in 2007. This course is open to all students in the University beyond first year and is designed to give an introduction to the philosophy, concepts and ideas of sustainable and regenerative architecture. The objective is to enable students to incorporate these ideas into further study and into their practice of architecture, design, building science and related fields.

In late 2006, the course coordinator began to investigate opportunities to engage the students in debate on carbon trading and carbon neutrality as part of the educational programme concerned with climate change. The decision was made to explore the possibility of the course becoming carbon neutral through both emissions reduction and offset.

Initial calculations for the course were made by sourcing university records for energy use (gas and electricity) and estimating the proportion of these figures that the course was responsible for. Assumptions were also made for commuting by establishing distances of student and staff residences from the campus. Paper use and field trip emissions were calculated from the previous year's course.

New Zealand based online carbon calculators and emissions multipliers were used<sup>2</sup> and compared to come up with an estimated carbon emissions amount for the course. These online calculators use different factors and methods, and are not consistent with each other or with international calculators (Bottrill 2007). In light of this, the highest estimate was used. A figure of just under 2 tones of carbon equivalent emissions was reached for the course of 50 students.

#### 3.1.1 Determining Offset Options

Several avenues were explored in determining an appropriate method for reducing and offsetting GHG emissions. Because making the course carbon neutral was intended to be an educational exercise for the students involved, it was thought that involving them in the offsetting part of carbon neutrality might be appropriate. For this reason, carbon sequestration through tree planting was initially investigated. Both the Greater Wellington Regional Council, which offers a corporate volunteer programme to plant trees in community group planting areas, and a local non-governmental forest regeneration scheme<sup>3</sup> were approached for tree planting possibilities. While both were willing to have students plant trees for them, the framework for measuring the carbon sequestration potential and ensuring the continuation of the planted areas was not in place. Although research has been done in New Zealand and internationally defining methods for calculating carbon stored in trees and forests (Landcare Research 2006; Brown 2002), it was thought that tree planting in projects not specifically dedicated to carbon sequestration would be problematic and would not be a robust method of carbon offset. It was also difficult to calculate how many trees and of which species would be suitable in a local context.

<sup>1</sup> For a full description see <http://www.meridianenergy.co.nz/AboutUs/Emissions+trading.htm> and Appleyard (2004).

<sup>2</sup> CarboNZero, NIWA, BRANZ.

<sup>3</sup> Manawa Karioi Trust

A search was made for other Tertiary institutions that had attempted a similar project to ascertain best international practice. Newcastle University launched their first carbon neutral degree course in 2006 (Newcastle University Press Office 2006). Personal correspondence between the two institutions helped to define the best way to progress with carbon neutrality. The potential problems with tree planting were discussed and the need for engagement with recognised carbon offset and certification programs established (Broderick 2006). A recommendation to source credits from Gold Standard projects was made.

The Gold Standard is a certification scheme that registers projects in the Clean Development Mechanism (CDM), Joint Implementation (JI) and voluntary offset markets and is endorsed and supported by 51 non-governmental and charitable organisations. The projects accepted by the Gold Standard Foundation for registration must be *'clearly additional, involve local stakeholders in their design and show transparently how they will contribute to sustainable development'* (The Gold Standard 2006). Independent validation and verification of the projects also takes place. Being *'clearly additional'* refers to a project could not take place without the sale of its carbon emissions reduction credit in a carbon market (Bellassen and Leguet 2007). Gold Standard accepts only energy efficiency or renewable energy projects and is not open to forestry projects, due mostly to the problem of the impermanence of forests (Bellassen and Leguet 2007). Few projects have achieved the grade for Gold Standard to date, but the number is increasing rapidly (Harris 2007). The Gold Standard (2006) point out that Gold Standard verified projects are selected because they provide additional benefits (social, economic or environmental) beyond just emissions reduction *'lest offsetting become a zero sum game where emissions are reduced in one place while they continue in another'*.

In New Zealand, Meridian Energy supplies Gold Standard third party verified emission reductions (VERs) carbon credits from their wind farms in Te Apati and White Hill. These projects were among the first registered with the Gold Standard, and are the only New Zealand source of Gold Standard credits. The decision was made that using these credits would mean that some of the uncertainty with forest offsets would be avoided and importantly that the highest standard of international carbon credits would be met (Bumpus 2007). It was decided this method of offset was more relevant to students of architecture and design, who will in part be responsible for the energy performance of the built environment and will be making decisions about energy sources and energy efficient design and technologies in the future. It was also thought that approaching a local New Zealand carbon credit provider would be more desirable than sourcing credits from another country.

### 3.1.2 Securing Carbon Credits – A Sponsorship Agreement

Meridian Energy were approached in March 2007 to explore sponsorship potentials, and were positive about providing their Gold Standard carbon credits to offset the course's emissions. To increase the educational and research collaboration potential of the sponsorship agreement for both parties, it was agreed that a Memorandum of Understanding (MoU) would be drawn up between the Faculty of Architecture and Design and new Meridian Energy subsidiary Right House. Right House specialises in energy conservation and energy efficiency in the residential sector<sup>4</sup>. This relationship began in 2007 with Meridian and Right House participating in various courses in the Faculty on critique panels and offering guest lectures where appropriate. The MoU was formally signed in on the 31<sup>st</sup> of March 2008.

## 3.2 Expanding the Scope: A Carbon Neutral Faculty

Senior Faculty management and academic staff were involved during sponsorship negotiations with Meridian Energy. After learning that a sponsorship agreement was possible, the decision was made to try to expand the project to include not only one course, but the entire Faculty. Several initiatives to strengthen and expand the capacity of the Faculty to deliver a high standard of education in sustainable architecture and design had already begun, including development and expansion of compulsory and senior aspects of the sustainability programme, and significantly increasing staff numbers with specialties in aspects of sustainability. Addressing the problems of climate change, through engaging in the carboNZero programme was seen as being a suitable addition to these set of initiatives. Between April and September of 2007, the sponsorship agreement with Meridian Energy was expanded and agreed to in principle.

Victoria University's Faculty of Architecture and Design is made up of the School of Architecture (architecture, building science, landscape architecture and interior architecture programmes) and the School of Design (digital media and industrial design programmes). The Faculty is housed separately from the rest of Victoria University on the Te Aro Campus, located in central Wellington, New Zealand. Two connected building facilities make up the campus, which houses lecture theatres, design studios and computer suites, a workshop, library, offices, and exhibition space. Approximately 1200 students are enrolled in courses in the Faculty and more than 100 academic, general and technical staff are employed.

### 3.2.1 Calculating the Faculty's Emissions

Faculty wide emissions were calculated by analysing external records and internal accounting records. Direct emissions sources (termed scope one) were identified as gas (used for boilers) and vehicle fleet (consisting of one diesel van). Indirect emissions (scope two and three) included the hiring of vehicles (buses

<sup>4</sup> <http://www.righthouse.co.nz/>

for field trips), flights (both international and national), and waste. Electricity for the Faculty is supplied by Meridian Energy, 100% of which is generated by wind and hydro sources<sup>5</sup>. Meridian Energy themselves went through the carboNZero programme in 2007 and were New Zealand's first certified carboNZero energy company (Meridian Energy 2007). Electricity use was measured therefore for the Faculty, but was not recorded as requiring offset. This was a requirement by Meridian Energy in the sponsorship agreement and was agreed to by carboNZero to avoid double counting of emissions. Increasing energy efficiency was however included in the GHG Emissions Reduction Plan. Because the Faculty began GHG calculations in 2007, 2006 was initially used as the base line year. Total emissions for the Faculty were calculated to be equivalent to 192 tones of carbon.

### 3.2.2 Certifying the Faculty's Carbon Neutral Status

To ensure the most robust and transparent process of reducing and offsetting GHG emissions, it became apparent that the Faculty would have to obtain certification of carbon neutrality from an independent organisation. This was a requirement of the Meridian Energy sponsorship agreement to ensure that the process had integrity, and would be robust under scrutiny. Certification would also ensure that calculations were correct and that procedures in planning for reductions and offsets met international best practice based upon a rigorous, third party verified process.

There is currently only one organisation that is able to certify individuals, organisations or events as carbon neutral in New Zealand. The carboNZero programme was established by Landcare Research, a Crown Research Institution in 2001, after more than a decade of climate change and GHG reduction research<sup>6</sup>. Initial quotes were obtained from the carboNZero programme and from Pricewaterhouse Coopers for a third party audit in March and April of 2007.

### 3.3 Final Goal: A Carbon Neutral University?

During the negotiation and recalculation period to enable to whole Faculty to become carbon neutral, funding was sought from the central university. At this time however, the university's Environmental Committee also submitted a proposal for central university funding for the entire university to become carbon neutral. While this initially held up the process for the Faculty, valuable research into emissions across the university was conducted by URS consulting (commissioned by the Environmental Committee), which was then able to be used by the Faculty. The proposal for the whole University to engage with carboNZero was unsuccessful; however a decision was made to grant funding to the Faculty, so they could act as a test pilot for going through the carboNZero process, and committing to GHG reductions, on the condition that going through the carboNZero process be run as a research project.

## 4. Time delays and unexpected issues

Initial timelines for the project anticipated that by September of 2007, the Faculty would have completed all requirements for certification and would be able to claim carboNZero status. Several delays in the process made this impossible. Final quotes and contract agreements for the Faculty from the carboNZero programme were held up due to the possibility of the entire University becoming carbon neutral. If this proposal had been successful, this would have included the Faculty of Architecture and Design, making the process of the Faculty becoming carbon neutral redundant. Once it was established that funding for the entire university to become carbon neutral was not obtainable, progress on the Faculty going through the carboNZero process resumed.

The six month period between the initial quote for Faculty participation in the carboNZero programme and the final quote meant that a substantial increase occurred in projected costs. This required further funding to be sought from central university funds, which added to the length of the process. Because of these delays, it became apparent that certification would not be achieved in 2007, but rather 2008. The 2006 base line year for emissions measurement had to be changed therefore to 2007.

In January of 2008 after all of the major issues had been rectified, the Faculty was in a position to engage with all parties in the carboNZero programme. A three month time period to redo the inventory for the 2007 year and draw up the Emissions Reduction Plan and Greenhouse Gas Emissions Inventory Report was agreed to by all parties (as illustrated in Figure 1).

After a re-calculation of emissions for 2007 a new figure 341 tonnes was arrived at. Additional emissions sources that were included in the 2007 inventory were the use of taxis, rental cars and industrial gases used in the workshop. The increase from 2006 figures was accounted for by increases in the scope of the inventory, changes in emissions factors, changes in calculation methods, and actual increases in emissions. This meant that the sponsorship agreement of providing carbon credits to offset 200 tones of carbon emissions had to be expanded once more, leading to further time delays.

<sup>5</sup> In 2007, 68% of all electricity available for purchase by consumers in New Zealand was generated from renewable sources including hydro, wind, geothermal, and biomass. This figure was 65% in 2006 (Statistics New Zealand 2008).

<sup>6</sup> <http://www.carbonzero.co.nz/index.asp>

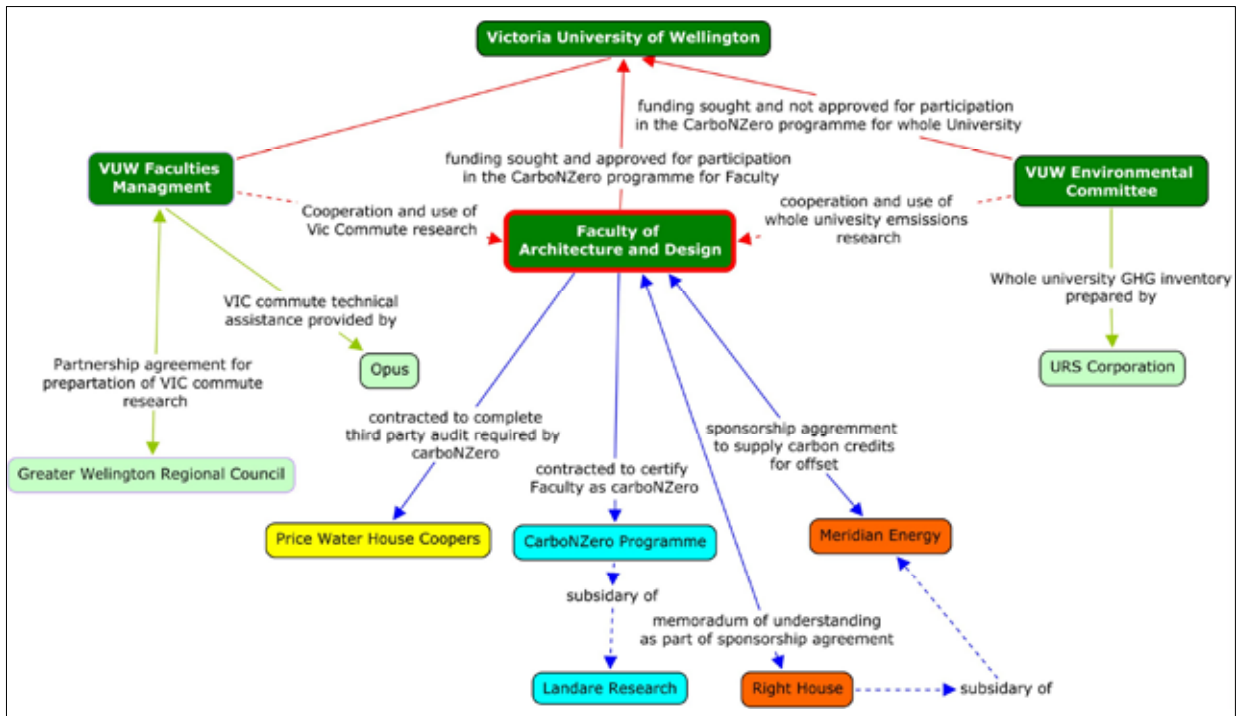


Figure 1 Participants in VUW Faculty of Architecture and Design's carbonZero Process.

## 5. The carbonZero Process

The carbonZero process involved six steps:

### 5.1 Measure - understand and measure GHG emissions

The Faculty prepared a 2007 Greenhouse Gas Inventory in February of 2008. The process of sourcing data for the GHG inventory was at times difficult, exacerbated by a lack of reporting and record keeping structure for GHG emissions. Most external records such as those for gas and electricity consumed, diesel purchased for the van and flights purchased from the university's travel agent were easy to obtain. Records of hiring cars and buses for field trips were more difficult to obtain. Calculating waste was also difficult and several qualified assumptions were made by Landcare Research.

Research commissioned by the university's Environmental Committee on university wide emissions contributed to the Faculty's inventory. The inventory was handed to carbonZero, who produced the emissions calculations based on most recent emissions factors and checked all the data for accuracy and made sure no emissions were left out. A Greenhouse Gas Emissions Inventory Report was completed in mid April 2008<sup>7</sup>. The purpose of the report was to document direct and indirect greenhouse gas emissions from the Faculty of Architecture and Design and was prepared in accordance to International Standard ISO 14064-1:2006, (Technical Committee ISO/TC 207 2006) and the GHG Protocol for Corporate Accounting and Reporting (WRI-WBCSD, 2004) in order to meet carbonZero certification procedures.

### 5.2 Manage - make a commitment to manage and reduce emissions

The Faculty prepared a Greenhouse Gas Emissions Reduction Plan in April 2008<sup>7</sup>. This incorporated comments and suggestions by interested staff, included several student initiatives to reduce GHG emissions in the Faculty, and involved negotiations and advice from the university Facilities Management Team. The objectives of the plan were to: demonstrate management commitment to reducing GHG emissions; maintain and introduce effective GHG emissions accounting procedures; target both the most significant and the easiest to address emissions; and to target reduction of emissions that are significant, but considered to be outside the scope of the Faculty's operations.

Major emissions were identified as the burning of gas which is used in boilers (41% of total emissions requiring offset); GHG emissions from decomposition and transportation of waste (32% of total emissions requiring offset); and the burning of fossil fuels used in international flights (26% of total emissions requiring offset). Student and staff commuting, although not included in the inventory, due to the difficulties in accurately measuring the emissions from this source (Buttazzoni and Zyla 2005), were targeted in several ways in the management reduction plan. A Victoria University of Wellington travel plan (Vic Commute) was

<sup>7</sup> GHG Emissions Inventory Report and GHG Emissions Reduction Plan are available from the author upon request.

prepared as an internal university document<sup>8</sup>. It estimated commuting emissions by conducting a survey in 2007. Faculties Management used these same results to estimate that student and staff commuting could be responsible for an additional 130 tonnes of emissions for the Faculty of Architecture and Design. This would equate to approximately 28% of total emissions if it were included.

### **5.3 External Audit - conducted by an approved qualified auditor**

The third party audit of the GHG Emissions Inventory Report was carried out by Pricewaterhouse Coopers in June of 2008. Several suggestions were made to ensure that the report was accurate and adhered to international best practice.

### **5.4 Mitigate - offset or mitigate remaining or unavoidable emissions**

Meridian Energy organised the retirement of carbon credits through the M-co company to meet the requirements of the carboNZero process. This ensured that the credits were cancelled in a maintained independent register and that they could not be on sold in the future. The credits supplied to the Faculty were a combination of 2006 and 2007 Gold Standard credits.

### **5.5 Certification - verify mitigation step and issue certificate**

Landcare Research provided the certification of the Faculty's carboNZero status after the first four steps were completed in June 2008.

### **5.6 Marketing - communicate achieving carboNZero certification**

Public announcements of the Faculty's carbon neutral status were made in June 2008, to coincide with International World Environment Day. Meridian Energy and the Faculty co-operated in media announcements. Case studies and further information about the Faculty's carboNZero status were posted onto the university and carboNZero websites<sup>9</sup>.

## **6. Benefits of a Carbon Neutral status**

It is the intention of the Faculty to quantify benefits of becoming carbon neutral, where possible, after a year period. There are a number of anticipated benefits that can be discussed here that ultimately made the project more attractive for allocation of funding by central university, and allowed it to proceed.

### **6.1 Environmental Benefits**

The primary benefit and justification of the Faculty participating in the carboNZero programme is the reduction of GHG emissions in mitigating the causes of climate change. Through the carboNZero certification progress, a detailed GHG Emissions Reduction Plan must be put into action. It is anticipated that this will result in tangible GHG emissions reductions in the Faculty that could have environmental benefits that go beyond Faculty boundaries.

If a university wide commitment is made to reduce and offset carbon emissions, after a successful trial period conducted by the Faculty of Architecture and Design, significant emissions reduction may occur across the entire university. The carboNZero programme has acknowledged that the Faculty is the first educational institution to go through the programme in New Zealand and as such sets a benchmark.

### **6.2 Social and Cultural Benefits**

As the Faculty of Architecture and Design embarks on strengthening its capability to deliver sustainable design education, it is important that its own conduct is brought into line with what it teaches. By being an early adopter of voluntary carbon offset and GHG emissions reduction measures, the university is able to take a leadership role on climate change in a New Zealand context. This provides a platform to bring attention to climate change issues in a positive forum, to debate or normalise the idea of voluntary GHG emissions reduction planning, and potentially to enhance the reputation of both the University and Meridian energy.

The potential to involve students in projects to reduce emissions further and to facilitate debate and discussion about carbon trading and climate change in general has been taken, and will be developed further during the year trial period. The main building on the campus is already set up to be an educational tool and is studied in depth by building science students in particular. Students in the Sustainable Architecture course devised GHG emissions reduction schemes for the Faculty and implemented them where possible in 2007. Some of these ideas and projects were included in the Faculty GHG Emissions Reduction Plan. The potential to involve more students will be developed in 2008 and 2009. This may include: involvement in projects to reduce emissions further; participation in monitoring and measurement

<sup>8</sup> Available from <http://www.victoria.ac.nz/fm/services/vic-commute.aspx>

<sup>9</sup> Available from [http://www.carbonzero.co.nz/members/organisations\\_certified.asp#VUW](http://www.carbonzero.co.nz/members/organisations_certified.asp#VUW) and <http://www.victoria.ac.nz/architecture/>

associated with such projects; participation in GHG inventory data collection and management; and participation in debate and discussion about carbon trading.

### 6.3 Economic Benefits

The reduction of gas use, paper use, international flights, and waste produced in accordance with the Faculty's GHG Emissions Reduction Plan is expected to have tangible economic benefits for the Faculty and University alongside the anticipated environmental benefits. Preparing for managing GHG emissions while it is still voluntary will likely be less costly than leaving it until institutions such as universities are regulated to take account of their GHG emissions.

It is expected that unique research opportunities will arise from a carbon neutral status. With increased monitoring and more accurate records it is anticipated that students and academic staff alike will be able to analyse results and carry out additional research projects. It is possible that academic research papers would subsequently be published in international journals or conference proceedings. The Memorandum of Understanding between the Faculty and Right House, a subsidiary of Meridian Energy is also expected to herald research opportunities for both parties. Improving and cementing the Faculty's reputation as a leader in sustainable design and architectural education and research may bring further economic benefits by attracting high achieving students and staff.

## 7. Recommendations and Findings

The conclusion to be drawn from the experience of the author is that although all parties in the process were willing to make a carbon neutral Faculty of Architecture and Design a reality, it took substantial time and effort for all groups to be clear about the process involved and to fulfil their parts. This is due in part to steep learning curves for the Victoria University and for the Faculty of Architecture and Design, and rapid changes in the carboNZero programme, and carbon trading in general during the time period. It is clear that it is important to carefully define the scope of the project first to avoid delays caused by recalculation of emissions and sourcing funding. Other significant delays were caused by rapid changes in how GHG emissions are measured and offset, and the costs of certification.

The commitment of senior management to the process was important in the Faculty obtaining carboNZero certification. In larger organisations, having a dedicated and resourced team to source required data, write the necessary reports and coordinate communication and record keeping is seen to be a crucial part of an efficient process. Although a number of parties are necessarily involved in the process, making the coordination of the project more complex, several beneficial relationships have been formed and a success of the process has been using participation in the carboNZero programme as both an educational and research opportunity for students and staff.

The efforts of the Faculty of Architecture and Design to move towards carboNZero certification were not made public for some time while negotiations were taking place. Once the plans were discussed with a wider group of staff and students, opportunities for wider engagement were taken. In inviting staff in particular to participate in the GHG Emissions Reduction Planning, greater 'buy in' was thought to have occurred. Students that participated in designing and implementing initiatives to reduce GHG emissions in the Faculty in late 2007 also commented on the positive experience of practical engagement in reducing the causes of climate change.

## 8. Conclusion

The process of becoming certified carbon neutral was longer than initially planned for and significant delays occurred during the process for Victoria University's Faculty of Architecture and Design. By clarifying the decisions that were made and outlining the process that was undertaken, it is anticipated that other intuitions or organisations may avoid some of the same time delays.

Along with the environmental benefits of reducing GHG emissions, it is clear that engaging in carbon reduction and offset measures will have significant additional benefits for the Faculty in terms of educational, research and marketing potentials. Economically, the benefits are expected to be longer term.

It remains to be seen if the significant efforts that the Faculty have and will go to in reducing GHG emissions will result in a net reduction, or reduction in intensity (per student), of GHG emissions. The opportunity to be leaders in addressing climate change in the built environment however, sends a clear signal to students, staff and the public alike that working towards mitigating the causes of climate change is considered to be important by Victoria's Faculty of Architecture and Design as a design and built environment educational institution.

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