Green ICT Project

Project Management Plan

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Date: March 21 2011

Version: 2.0

List of Abbreviations

ANU	Australian National University
CO2e	Carbon Dioxide Equivalent Emissions
DOI	Division of Information
EMP	Environmental Management Plan
GHG	Green House Gas
ICT	Information and Communication Technology
LITSS	Local IT Support Staff
PMG	Project Management Group
PSG	Project Steering Group

Contents

1 Introduction

1.1 Problem Statement

The global climate is changing, largely due to the observed increases in human produced greenhouse gases. It is estimated that Information and Communication Technology (ICT) contributes around 2-2.5 per cent (Gartner, 2009) of global greenhouse gas (GHG) emissions. These percentages are likely to grow as ICT becomes more widely available. At the same time, ICT can significantly help reduce climate change by**:**

a) Promoting the development of more energy efficient devices, applications and networks;
b) Encouraging environmentally friendly design, and
c) Reducing the carbon footprint of ICT

The ANU Environmental Management Plan (ANUgreen, 2009) articulates sustainability targets and implementation strategies to guide ANU environmental management to 2015 and beyond. The EMP's target is to reduce carbon dioxide equivalent (CO2e) emissions by 20% by 2015. One of the key ways to do this is to reduce electricity consumption, as it is a major contributor to GHG emissions. The Green ICT initiative will give the ANU a platform to understand the growing energy demand of ICT, ICT's contribution to the carbon footprint of the ANU, and to research and implement ways to reduce its negative environmental impact across the ANU campus.

The ANU consumed 82,242,411 kWh of electricity and emitted 74,018.2 t CO2e in 2009 (Australian National University, 2010). Within organizations, ICT consumes around 15% of the electricity used (Gartner, 2009). Based on this research, the annual electricity consumption of ICT for the ANU for 2009-10 is estimated to be 12,336,361 kWh, thus contributing approximately 11,102.7 t CO2e emissions to the carbon footprint of the ANU.
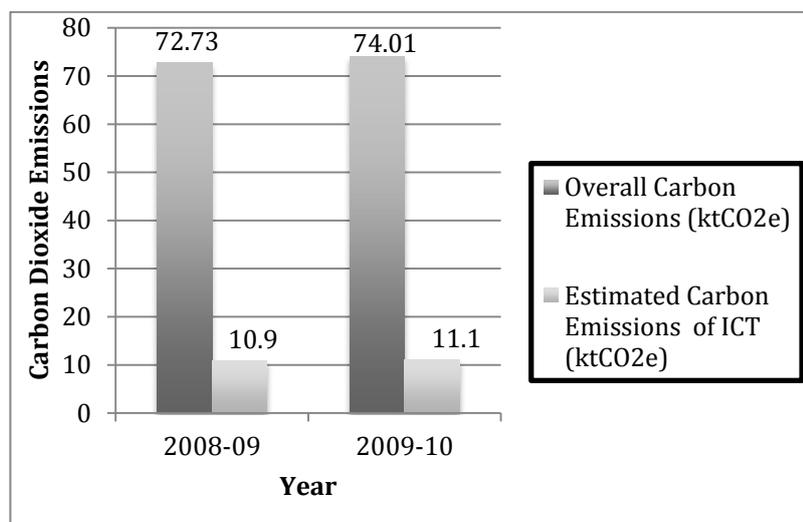

Figure 1: Electricity Consumption and Carbon Dioxide Emissions at the ANU

This project will aim to identify as accurately as possible, within the given constraints, the ICT carbon footprint of the ANU and then implement ways to reduce the carbon footprint of ICT at the ANU.

1.2 Project Objectives

The main objectives of this project are to:

a) Investigate and record the data on the carbon dioxide footprint (CO2e) of ICT within the ANU.

b) Identify ways to reduce the carbon footprint of ICT within the ANU.

c) Work with stakeholders to identify industry trends in the adoption of green IT practices and evaluate energy efficient technology that can reduce the environmental impact of ICT.

d) Identify government incentives available to companies adopting sustainable IT practices.

e) Increase awareness amongst stakeholders about Green ICT.

f) Reduce the carbon emissions of ICT across the campus by 10% by June 2011.

2 Scope Management Plan

2.1 Utilization matrix

This table gives the outputs and the outcomes of the project. The outputs are the direct and measureable products of the project. The outputs are outlined in the vertical column. The outcomes are the results and impact that this project would have in the ANU community and elsewhere.

Output/Outcome	1 Reduce Carbon Emissions of ICT across the campus by 10%	2 Reduce Energy Cost of ICT by 5%	3 Increase the awareness amongst Stakeholders by 40 %
Develop Website to inform ANU community about the consumption, cost and ways to reduce energy of ICT			x
Report Energy Consumption of ICT	x	x	x
Report of ways to Reduce CO2e of ICT	x	x	
Deploy ways to reduce CO2e emissions at the ANU	x	x	

Figure 2: Outputs and Outcomes

2.2 Is/Is-Not

The Is-Is not diagram outlines in the scope of the project in a tabular form.

Is	Is Not
Energy Consumption of facility operations (Heating, cooling and lighting) associated with ICT and ICT Infrastructure (Desktop, Server, Data Centre, Network, High Performance, Imaging)	Energy Consumption due to other types of load
Located at the ANU Acton Campus.	Other ANU Property
ICT devices owned by the ANU	Laptops, portable devices carried by students

Figure 3: Is Is-not

2.3 SIPOC

The SIPOC diagram is used to identify all relevant elements of the Green ICT project before beginning the work on the project. The SIPOC diagram includes a high-level map of the process that "maps out" its basic steps. Below is the SIPOC diagram for the Green ICT project.

S	**I**	**P**	**O**	**C**
Suppliers	Inputs	Process	Outputs	Customer
University	Facility operations associated with ICT	Start: Switch on Equipment in ICT infrastructure	Tonnes of Carbon Dioxide Emitted	ANUgreen
	ICT infrastructure	Consumption of Energy		
		Stop: Switch off equipment in ICT infrastructure	Energy Cost (AUD)	Facility & Services, Head of Colleges, Division of Information[1], IT Managers
Research through Green ICT Initiative	Consumption		Energy Consumed (kWh)	
	Cost	Share Information about Green ICT initiatives	Number of Stakeholders who buy-in	Facility & Services, Head of Colleges, Division of Information, IT Managers, ANUgreen
	Ways to reduce energy of ICT			

Figure 4: SIPOC Diagram

2.4 Constraints

1. Decentralized Management of ICT infrastructure

The ANU operates a decentralized ICT infrastructure management system. Each College and area manage their own ICT systems, and hence achieving an overall reduction of 10% CO2e footprint would be a constraint in the implementation phase of this project. Those areas at the University that make recommended changes in their ICT to reduce energy consumption would see considerable reduction in their energy consumption and CO2e footprint.

2. Fluctuation in the ICT Energy consumption with various application use

The energy consumption of the various devices fluctuates due to a various factors. Energy consumption values measured during this project and those from the data sheets, measured values using an Elemetric E9 meter, and software monitoring techniques. With all these techniques used to measure the energy consumption, an accuracy of 85-99% would be maintained.

3. Changing Nature of ICT Infrastructure

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[1] Division of Information (DOI) includes the Data Centre Managers, Director ITI, SDS, and other DOI staff who are involved in the project at various phases.

The ANU refreshes its ICT infrastructure every 3-5 years. The audit conducted during this project (2010) would be outdated very soon due to the fact that various areas refresh their ICT infrastructure at different times. This project would look at ways in which a more sustainable way of keeping track of the ICT could be implemented at the ANU.

4. Increasing use of laptops and portable devices

    With an increase in the use of portable ICT devices, the use of desktop computers across the University is reducing especially in the student laboratories. This would be a constraint, as laptops have not been considered in the scope of the baseline measurement of ICT devices in this project. New strategies to track the use of laptops would be considered during the course of this project.

5. Time Frame for project and implementation of ICT solutions

    The project time frame outlined (July 2010-August 2011) to achieve a 10% reduction in ICT energy consumption would be a constraint as the number of changes occurring across the ANU during this time frame could clash with implementation of solutions that would reduce the CO2e of ICT. For example, a windows 7 rollout is planned in 2011 that could delay implementation of desktop power management software in certain areas.

2.5 Assumptions

1. While evaluating baseline energy consumption, we will assume that the devices are switched on during the University operating hours and in stand-by mode after hours of operation.

2. While measuring the power draw of the devices, Power consumption of the devices will be taken from the product data sheets, or assumed to the nearest model type where data sheets are not available.

3. In the scope of this project, ICT devices are limited to Desktop computers, Servers, Data Centre's, Network Equipment, High Performance Computing, Imaging Devices (Printers, Multi-function devices). The terms ICT devices and ICT infrastructure would be used interchangeably in this document to represent these six categories of ICT.
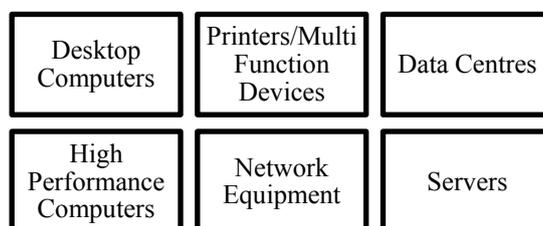

Figure 5: Categories of ICT infrastructure

4. ICT devices that are at the ANU Acton Campus are included in this project. This does not include laptops and portable devices carried by students and staff.

5. The baseline year for ICT energy consumption would be 2010.

2.6 CTQ matrix

The Critical To Quality (CTQ) Matrix will be a characteristic of the finished product. CTQ's are the most important, measureable characteristics of the finished product that are strongly linked to customer requirements. This strong link is indicated via the CTQ matrix below.
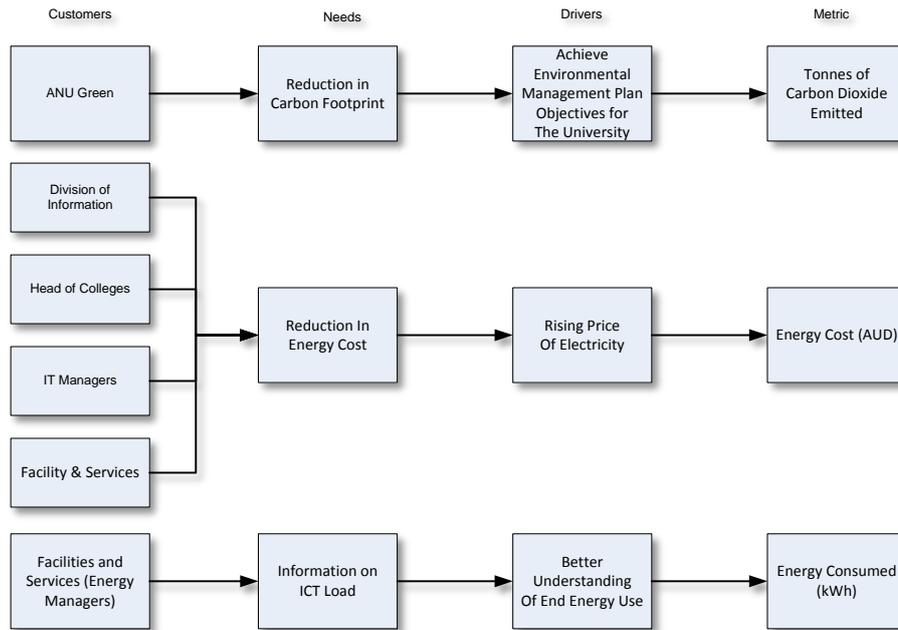
Figure 6: CTQ Matrix

2.7 Project life cycle

The Green ICT project would be adopting the DMAIC approach to project management. DMAIC is a basic component of the six-sigma methodology- a way to improve work processes by eliminating defects. Using the DMAIC approach will improve efficiency and eliminate defects in the project implementation. The Information Services Project Planning and Support Office will provide critical project management support and guidance during the course of this project.

Figure 7: DMAIC Framework

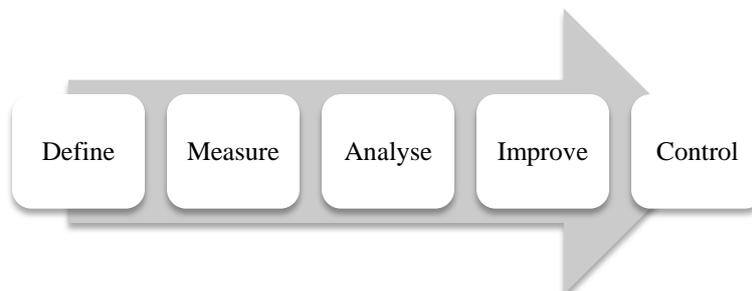The DMAIC methodology includes five steps that include; Define, Measure, Analyze, Improve and Control. Here is some information regarding each step.

Define: Define is the first step in the process. In this step, it is important to define specific goals in achieving outcomes that are consistent with the demands of EMP.

Measure: In order to determine whether or not defects have been reduced, you need a base measurement. In this step, accurate measurements of the ICT devices and their energy consumption will be made and relevant data collected so that future comparisons can be measured to determine whether or not defects have been reduced.

Analyze: Analysis is extremely important to determine relationships and the factors of causality.

Improve: Making improvements or optimizing processes based on measurements and analysis can ensure that defects are lowered and processes are streamlined.

Control: This is the last step in the DMAIC methodology. Control ensures that any variances stand out and are corrected before they can influence a process negatively causing defects. Controls can be in the form of pilot runs to determine if the processes are capable and then once data is collected, a process can transition into standard production. However, continued measurement and analysis must ensue to keep processes on track and free of defects below the Six Sigma limit.

3 Time Management Plan

The time management plan outlines all the main milestones with the Gantt chart outlining the dates by which they are due.

3.1 Main milestones

Outlined below are the main milestones of the project

10 February 2011 Develop Project management Plan: The project plan will outline the objectives, project management methodology, risk management plan, Gantt chart, communication plan for this project.

26 March 2011 Website with Information on the Initiative: The website for the Green ICT project will inform the ANU community and third parties of the progress of the green ICT project, the initiatives and strategies developed, and the long term goals of the project. This website will aim to build an interactive relationship with end users that encourage feedback and cooperation between areas. The website would be launched at Earth Hour on 26th March at the ANU.

30 April 2011 Baseline Carbon Inventory of ICT at the ANU: This report will outline the findings of the research done through the Measurement phase of this project. The baseline carbon inventory of the ICT at the ANU will provide information on the carbon dioxide emissions at the ANU, the energy cost of ICT.

March-April-May 2011 Pilot Projects Demonstrating Sustainable ICT Initiatives: Various locations at the ANU will be used as sites to test new energy efficient technologies that will assist in reducing the environmental impact of ICT at the ANU.

June 2011 Sustainable ICT Initiative at the ANU: A policy document recommending strategies to be adopted by ICT managers at the ANU would be drafted that would assist in improving the energy efficiency of the ICT infrastructure into the future.

July-August 2011 Report and Monitor Outcomes /Establish Working Group on Sustainable ICT Initiative: Outcomes would be documented and a working group would be established who would look into energy efficiency of ICT.

3.2 Gantt chart

The Gantt chart is a bar chart that will illustrate the project schedule. The Gantt chart outlines the Critical Path that clearly defines the engagement of stakeholders and website as key objectives of the project.
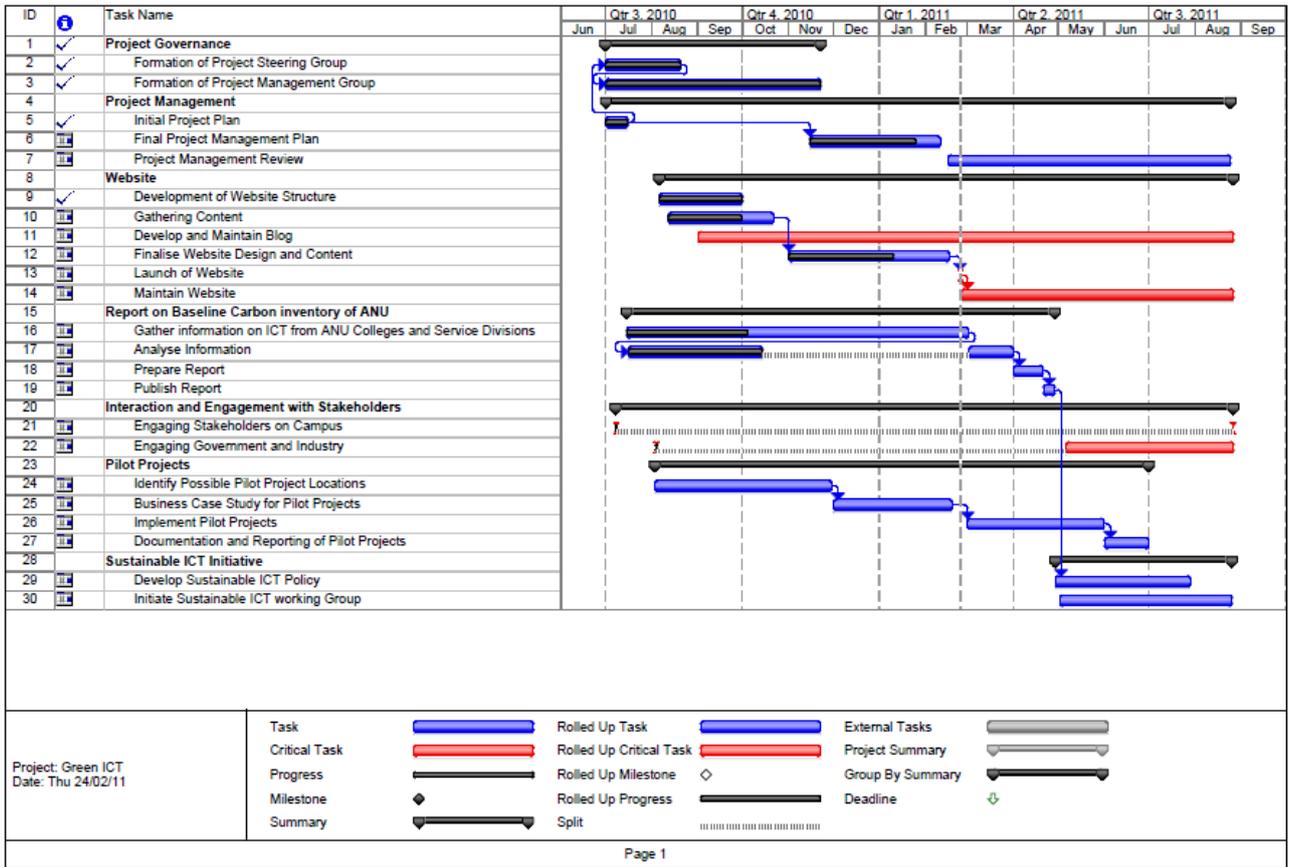

Figure 8: Gantt chart

4 Cost Management plan

The costs associated with the project will be covered by the Energy and Sustainability office, through the ANUgreen program. A budget through this program would cover costs that occur on a day to day basis for this project. Additional costs if they are to be incurred would first be taken for approval to the PSG for seeking the authorized budget.

5 Quality Management Plan

Measuring the Key performance Indicators (KPI's) outlines in the scope of this project would monitor the quality of this project. The KPI's would be used to measure the quality of this project at the time of delivery. The KPI's of this project are:

- Reduction in Carbon Dioxide Emissions of ICT across the University campus (10% by June 2011)
- Raise awareness of environmental impact of ICT amongst Stakeholders (40% increase in awareness)
- Establish sustainable ICT policy and working group

6 Human Resource Management Plan

6.1 Governance and engagement

The governance structure proposed for the project is depicted and described below:
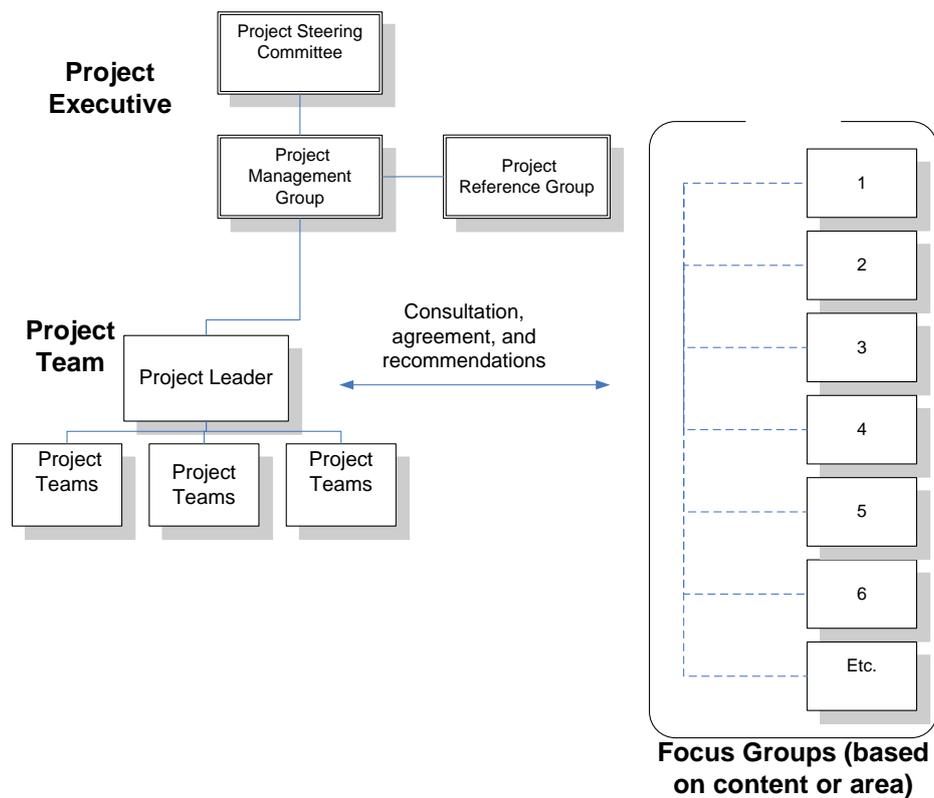
Figure 9: Governance Structure

A. Project Steering Group

The Steering Committee will meet on a regular basis and have overall responsibility for the project. The committee has the following membership:

- Mr Rick Van Haeften - Director, Information Services (Chair)

- Mr Bart Meehan - Associate Director, Facilities and Services (Deputy Chair)

- Mr John Sullivan - Manager, Recycling and Sustainable Systems

- Mr Phil Drury - Senior Information Systems Manager

- Mr Dennis Vukoja - Manager, Information Technology

The group manages major risk elements associated with the project and is responsible for making major decisions regarding the initiation, budget, resources, go live, and closing of the project.

The Steering Committee will have the following responsibilities in relation to the advancement project:

a) Regularly review and assess major project risks

b) Assist in the mitigation and avoidance of major project risks

c) Review and make decisions on issues and risks promoted to the committee from the Project Management Group

d) Approve all key project messages and communications

e) Report progress to ANU Executive

B. Project Management Group

The Project Management Group (PMG) will meet on a regular basis to act as a reviewing body for functional decisions and processes connected to the project. The group will approve business decisions and processes. Any unresolved issues will be escalated to the Steering Committee for resolution.

The PMG will have the following responsibilities in relation to the project:

a) Review and approve issues, business process changes, functionality changes, and communications

b) Formulate process and procedural recommendations to be implemented in support of the project deliverables.

c) Develop policy change recommendations to appropriate University authorities in regard to project deliverables

d) Assist with resource requirements, selection of focus group members, and formation of additional project work groups to complete project work as required

e) Develop working assignments for its membership and focus groups based on project requirements

f) Aid communication throughout The University regarding project tasks and messages during the course of the project

g) Act as advocates for the project among peer groups

C. Focus Group

Project Focus Groups will be formed as needed based on advice from members of the PMG. The Focus Groups' primary purpose is to provide a source of expert knowledge and input to the project. Focus Groups are representative of organizational areas that would potentially be impacted by process changes that are introduced by the project. Generally, the Focus Groups are consultative in nature. The Steering Committee, the PMG, the project team, and other

University stakeholder groups will refer issues raised by the focus groups for input and consideration. While the issues are managed by the project team and reported to the PMG on a regular basis, many of the issues will be specific to a portfolio, program or group. The list below identifies activities with which the Focus Groups will be involved:

a) Consult with the project team regarding specific issues and assist in providing solutions that will be provided to the Project team and PMG for action

b) Raise issues to the PMG and Project Team during the analysis of current business processes

c) Facilitate the implementation of changes to business process that are required for the project

d) Assist in the communication of project messages during the course of the project

e) Act as advocates for the project among peer groups

D. Project Team

The project team will work specifically on business process and functional documentation and develop the application based on that analysis and design. The scope of the work will be defined in the approved Project Charter. The project team is responsible for the delivery of the application, associated university business processes, and communication and training material. Project team members will report directly to the Project Manager who will provide feedback on project performance for all project team members: Specific responsibilities are listed below:

a) Execution of project plan

b) Execution of communication plan

c) Manage collection and resolution of issues raised by project stakeholders

d) Provide materials for PMG/PRG and Focus Group meetings

e) Meet University and project objectives and quality standards

6.2 RACI matrix

Below is the list of key stakeholders and the RACI Matrix. The Legend is given below.

a) Responsible: Those who do the work to achieve the task. There is typically one role with a participation type of *Responsible*, although others can be delegated to assist in the work required.

b) Accountable (also Approver or final Approving authority): The one ultimately accountable for the correct and thorough completion of the deliverable or task, and the one to whom *Responsible* is accountable. In other words, an *Accountable* must sign off (Approve) on work that *Responsible* provides.

c) Consulted: Those whose opinions are sought; and with whom there is two-way communication.

d) Informed: Those who are kept up-to-date on progress, often only on completion of the task or deliverable; and with whom there is just one-way communication.

#	Deliverable	Project Manager	ANUgreen	PSG	PMG	DOI	IT Managers	Projects Office	Head of Colleges/Divisions
1	Develop Project Management Plan	R	C	C	C	I	I	R	I
2	Website for Green ICT Project	R	I	C,I	C,I	I	I	I	I
3	Baseline Carbon Inventory of the ANU	R	R	I	I	I	I	I	I
4	Pilot Projects	R	C	C	C	R	R	I	C
5	Sustainable ICT Initiative	R	R	C	R	A	A	I	I
6	Report and Monitor Outcomes	R	R	C	A	I	I	I	I
7	Working Group on Sustainable ICT	R	R	C	A	I	I	I	I

Figure 10: Stakeholder list

6.3 Motivation vs. Involvement & Power vs. Interest

This graph outlines the motivation of the various stakeholders in this project and their involvement in the project. Using this chart the project teams could seek to gain more involvement from those stakeholders who are not involved in the project. Similarly the power and interest graph showcases interest from various stakeholders.

	Motivation			Involvement				Power			Interest		
	High	Medium	Low	High	Medium	Low		High	Medium	Low	High	Medium	Low
ANUgreen	x			x					x		x		
PSG	x				x			x			x		
PMG		x			x				x			x	
DOI			x			x		x					x
IT Managers			x			x		x					x
Projects Office			x	x					x		x		
Head of College/ Service Divisions			x			x		x					x

Figure 10,11: Motivation Vs Involvement & Power Vs Interest

7 Communication Management Plan

The Communication Management Plan outlines the location, frequency, objectives and meeting groups for communicating specific issues and risks of the project.

Name of the Meeting	When	Where	Who	Objective
PSG	Every 2 months	FS Conference Room	PSG	Review progress of the Project, Deal with critical risks and issues
PMG	Every Month	FS Conference Room	PMG	Deal with critical issues of the project
IT Managers of Colleges	Every Month	Location Varies	IT Managers	Implementation of energy efficient solutions
LITSS	Every Month	Location Varies	LITSS	Gain feedback on ICT issues
Project Management Review	Every Week	88T	Marco Feris	Review Project management technique
Project Review	Every 2 Months	88T	Samantha Gilbert	Gain insight into achieving project outcomes
Project Update	Every Month	FS Conference Room	John Sullivan, Su Wild-River	Resolve project issues and review objectives

Figure 12: Communication Plan

8 Risk Management Plan

The Risk Management Plan outlines the High, Medium and Low risks this project may face. The plan also outlines the mitigation and contingency strategies that would be adopted in the case of occurrence of each risk.

8.1 High level risks

Risks	Responsible	Priority	Contingency	Mitigation
1. Communication with multiple Stakeholders	Project Manager, PSG, PMG	H	Email LITSS Group, IT Managers Group	Regular Updates on Website, Emails to LITSS, Face-to-Face communication with IT Managers. Meetings with Stakeholders
2. Selection of time slot for trial of energy efficient solutions	Project Manager, IT Manager	H	Initiate a Trial Document addressing concerns of IT managers, with time frame of trial and resources required: Time, Systems, People	Schedule and gather support from IT Staff 2 months in advance for specific trials
3. Incorrect Information/Data gathered	Project Manager, ANUgreen	H	Fall back to the data gathered from Desktop Power Management Software	Gather information from Data Sheets of the manufacturers
4. Diverse Group of stakeholders with varied interests of Stakeholders	Project Manager, PMG, PSG	H	University Wide ICT Plan: Procurement, Use and Disposal Strategy, Highlight the Cost Savings in AUD ($) and Whole of Life Savings to Stakeholders	Interaction through PMG, PSG, Email, Meetings to encourage involvement
5. Stakeholder not interested in Buy-in of project	PSG, Project Manager, PMG	H	Provide information on successful trials	Regular Updates on Website, LITSS, IT Managers
6. Energy Savings do not translate to cost benefit for IT	Project Manager, PMG, IT Manager	H	Record a baseline that is transparent to all stakeholders. Develop incentives for IT Managers for making energy savings.	Report the energy consumption before and after the changes are made. Develop and propose a policy where energy savings gets transferred to the IT Managers
7. Data Centre Changes could cause risk to servers being run in them	Project Manager, DOI	H	Move to backup Solutions	Prepare Risk Management Plan for the Data Centre Changes

8.2 Medium level risks

Risks	Responsible	Priority	Contingency	Mitigation
10.Budget for identified solutions	Project Manager, PSG	M	Apply for Green Loan Fund/Carbon Fund	Inform PSG of Budgetary Requirements at Initiation
11. Stakeholders not aware of the benefits of the project	Project Manager, PMG	M	Showcase Case Studies with ANU Fact Sheet	Communicate with Stakeholders on a regular basis sharing benefits of project and solutions
12. Insufficient Time to achieve 10% reduction across campus	Project Manager, PSG, PMG	M	Amount of Reduction achieved will be showcased, and the possibilities of it scaling across the campus will be demonstrated	Initiate Discussions with various IT managers, to showcase trials which will demonstrate benefits
13. Decentralised ICT Management to implement solutions	Project Manager, PSG	M	University Wide ICT Plan: Procurement, Use and Disposal Strategy	Communication with Stakeholders regularly and with key information
14. Accuracy of Baseline Information	Project Manager, ANUgreen	M	Refer to Data Sheets of the devices which give the power consumption	Gather information from IT managers and use the reporting software for confirming the readings calculated. Readings with different power meters taken to get most accurate figures
15. Tender Process	Project Manager, DOI, PSG	M	Initiate the tender Process in Advance	Screen softwares available based on feedback from IT managers on campus

8.3 Low level risks

Risks	Responsible	Priority	Contingency	Mitigation
16. Different ICT Systems	Project Manager	L	Identify Solutions which can adapt to different ICT systems	Holistic Solutions/ Platform independent
17. Refresh of ICT Systems	Project Manager	L	Identify Solutions which can be used with a range of ICT systems	Holistic Solutions/ Platform independent

9 Procurement Management Plan

When the need for procurement arises, it would be mentioned to the PMG and PSG for approval. If software purchases are required, support would be sought from the DOI contracts office for drafting the proposal and conducting the purchase. Any capital expenses required for physical changes to ict infrastructure or its facilities would be taken to the PSG for further approval. Final approval for any procurement would be sought from the PSG after a detailed business case is put forward.

10 Conclusion and Next Steps

This project is strategically linked to the environmental management plan of the university. Thus, green ICT should be investigated on a continuos basis from the universities environmental sustainability point of view. With the conclusion of the project, the university could look into this project in the following ways:

1. Sustain the focus groups created through this project to look at green ict practices
2. Develop and implement a sustainable ICT policy for the ANU. This would be a strategic policy aligning more closely to University wide IT Policies and Strategies.
3. Use the pilot projects as case studies to initiate further change

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