

Initial Plan

Carbon Neutral Cardiff by 2030

Cardiff University | CM3203 | 40 Credits

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Project Description

Our planet is facing a climate emergency which requires action now. Policies are being put in place to ensure global warming is limited to 1.5 degrees Celsius – a threshold the Intergovernmental Panel for Climate Change (IPCC) suggests is safe. These policies are in place to meet the essential target of carbon neutrality by mid-21st century. This target is also laid down in the Paris agreement signed by 195 countries, including the EU (European Parliament, 2021). Many countries and large organisations have set themselves an additional goal of a CO₂ emissions reduction of at least 50% by 2030, compared to 1990. For the UK this goal is 68% (Boscia, 2021). Due to the increased pressure from our government to meet this goal many cities have implemented their own strategies to do their part in reducing the UK's contribution to climate change.

Cardiff has implemented a strategy in response to the climate emergency called “One Planet Cardiff”, which outlines their plan on making Cardiff carbon neutral by 2030. The strategy contains 7 key themes: energy, waste, built environment, food, green infrastructure & biodiversity, water and transport (One Planet Cardiff, 2020). In addition, Cardiff has also implemented a strategy called “Child Friendly City” which is in place to ensure that young people have an equal chance to thrive and reach their potential (Child Friendly Cardiff Strategy, 2018). This strategy crosses over One Planet Cardiff because climate change is one of the largest emergencies the future generation will face, if nothing is done, impacting their way of life and future opportunities. One Planet Cardiff strategy acts as a catalyst in ensuring that young people will have a safe environment to live, thrive and grow in.

For my project I will be working with Lee Patterson, Educational Directorate, and with the strategies mentioned above to create and analyse policies to aid in Cardiff's goal to achieve carbon neutrality by 2030. I will be focussing on the education sector and exploring the 7 key themes outlined in “One Planet Cardiff” in relation to the running and the creation of schools across Cardiff. The aim of this project will be to use System Dynamics to model the problem space and identify potential policy action. I will be creating both qualitative causality models and quantitative simulation models that identify and test potential policy solutions. To ensure the results are relevant and specific to Cardiff's environmental impact I will aim to gather the data I require for my simulations from the Cardiff Council, through Lee Patterson. My hopes for the project are to provide Cardiff Council with tested and evidenced policy action that, if implemented, will ensure Cardiff is on track to achieve carbon neutrality by 2030.

Project Aims and Objectives

Aims:

- To use system dynamics to model the education sectors impact on the environment, with the aid of the One Planet Cardiff and Child Friendly City strategy principles to support the identification and testing of policy action.
- Provide evidence, to Cardiff Council, on the impact that identified and existing policy action could have on the carbon neutral target obtained from the results of the simulation(s).

Objectives:

1. Gather research on previous environmental policies that have been implemented within Cardiff and similar locations.
 - Review other city strategies to gain an understanding of common policies.
2. Gather details on the context area through independent and collaborative research with Cardiff Council.
3. Find models around a similar problem space to aid in identifying common areas that policies are required.
4. Use my research to map the system to display all constituent components and their interactions.
 - Ensuring relationships are fully supported and back up by evidence.
5. Identify policies through examination of my qualitative model and the loops in the model.
6. Use my qualitative model to perform a quantitative analysis through the creation of a stock and flow diagram(s).
 - Only partial quantitative analysis due to the time limitations of the project.
 - Analysis will focus on a specific area of the chosen context which will be selected after examination of the qualitative model.
7. Design and run simulations of my quantitative model(s) to test the identified and existing policy action to gather evidence of their effect on the carbon neutral goal.
8. Review and discuss the results of my simulations with Cardiff Council, evaluate potential future continuation and adaption of identified successful policy action.

Work Plan & Risk Plan

Meetings with my supervisor will occur on a weekly basis at least once a week, specific date, and time to be decided. Additional meetings will be had with my Cardiff council contact and my technical supervisor (when required and/or needed). My first project review will take place during my supervisor meetings when there is sufficient work completed to be reviewed. I expect this to be around week 5. I will have an additional review meeting around week 7 to allow for feedback given to be worked on before the easter break.

Below is my work plan for the project, it includes my deliverables, documentation that will be completed and milestones I intend to achieve each week.

Work Plan

Week	Dates	Deliverables	Documentation	Milestone
1	1 st Feb – 5 th Feb	Conduct background research for initial plan. First supervisor meeting to discuss any unclear aspects of the project.	Initial Project Plan report.	Initial Plan submitted.
2	8 th Feb – 12 th Feb	Brief Cardiff Council on the plan for this project. Continue independent background research with a focus on objectives 1, 2 & 3. Conduct research on system dynamic modelling to brush up on my knowledge.	Write up the background research for objectives 1 & 2 and the research on system dynamic modelling.	Background independent research completed. Objectives 1, 2 & 3 completed.
3	15 th Feb – 19 th Feb	Meet with my technical support contact. Meet with Cardiff Council to discuss components of my qualitative model.	Write up the modelling hints and tips I am provided. Brainstormed map + details discussed in my meeting with the council.	Mapping of the problem begun + details gathered.

		<p>Begin brainstorming the qualitative model (casual loop diagram).</p> <p>Find evidence for relationships made</p>	Write up any relationship evidence found.	
4	22 nd Feb – 26 th Feb	Complete casual loop diagram.	Document the diagram (including details of loops discovered and next steps)	<p>Casual Loop Diagram completed.</p> <p>Objectives 4 & 5 completed.</p>
		Identify where policy actions (loops) are required addressing.	Write up policy actions required.	
		Identify data required and request from Cardiff Council where applicable.	<p>Write up the data requirements to send to Cardiff Council</p> <p>Add to relationship document.</p>	
5	1 st March – 5 th March	Request any additional data required from Cardiff Council where applicable.	Write up any data received from Cardiff Council and the data I obtained myself.	Data required received or obtained ready to be used for quantified model(s) and simulations.
		Obtain data that Cardiff council couldn't get me.	Document causality brainstorm.	
		Causality Brainstorming.		
		Begin work on the quantitative model(s) using chosen software.		
		Review meeting with supervisor to look at work completed so far in the project.		
6	8 th March – 12 th March	Complete quantitative model(s)	Document the quantitative model(s).	<p>Completion of quantitative model(s).</p> <p>Objective 6 completed.</p>
		Begin designing the simulations.	Write up the design of the simulations + the policy actions being simulated.	

7	15 th March – 19 th March	<p>Work on the simulations with the aim to complete if results allow.</p> <p>Second review meeting with supervisor to ensure project is following the time scale and expectations for work completed before easter.</p>	Add to simulations write up.	Simulations completed.
8	22 nd March – 26 th March	Check the correctness of data models and running of simulation (complete simulation).	Amend any documents depending on outcome of checks.	<p>Completed and amend additional models or simulations.</p> <p>Objective 7 completed.</p>
		Begin reviewing and analysing the results and policy action.		
9-11 (Easter Break)	27 nd March – 18 th April	Easter Break		Rest.
12	19 th April – 23 rd April	Review the results from the simulations and carry out any additional simulations required.	Write up results and evaluation of the simulations.	Results discussed with Cardiff Council.
		Review of results with Cardiff Council.	Write up feedback from the review session.	Objective 7 completed.
13	26 th April – 30 th April	Compiling the final report begins.	Write up the first draft of the report compiled from previous document and work log.	First draft report completed.
14	3 rd May – 7 th May	Continue with compiling the final report	Second draft report completed (in need proof-reading)	Second draft report completed.
		Gather references together and ensuring report is ordered correctly.		
15	10 th May – 14 th May	Finalise the report through proof-reading.	Finalised dissertation report ready for submission on the final day of the week (14/05/2021)	Final dissertation report completed and submitted.

Risk Plan

This risk plan has been created to ensure I have taken in consideration potential problems that I could face in the project. I have identified those risks and included their potential impact on my project, the probability the risk could happen and how I have responded to try and mitigate these risks.

Risk	Impact on project (1-low – 5-high)	Probability of occurrence (1-low – 5-high)	Mitigation Response
Cardiff Council not being able to get the data required	4	3	I'll ensure to be open and transparent about the data required as soon as possible. In week 2 I will provide Lee with the details of my project to give him a better understanding of what data I may request in a few weeks' time. Overall reducing the risk of this occurring.
Insufficient Data Received From Cardiff Council (Not enough available)	2	3	I have planned on obtaining some data independently to give my project more diversity. Meaning if Cardiff Council are unable to give me a sufficient amount of data, I will make up for it through independent means.
Work Loss	5	1	I have two back up storing methods for all my work: Apples iCloud and Microsoft Teams. Both will be used to ensure any completed work isn't lost during the project.
Illness/ unforeseen circumstances	2-3	2	As seen from last year anything is

			possible in terms of unpredictable circumstances. To ensure I can cope with these scenarios I have allowed extra time for modelling and will be researching and gathering data independently. Which benefits the project but also allows me to complete the project without any support from the council if something were to happen and forces them to withdraw their support.
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Ethics

Before beginning the project, I need to consider the ethics involved. For my project, following the procedure in Figure 1, I do not need ethical approval because I am not involving human participation. I will be using data provided by Cardiff Council which will not include any personal information, observations, or interviews.

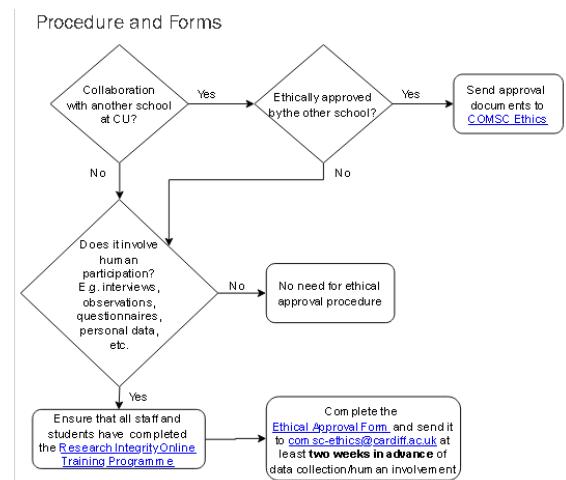


Figure 1

References

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