

Towards A Green Economy

-- Exploring the Political Feasibility of Carbon Tax Policy in Ireland

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Abstract

The thesis research aims to enrich us with knowledge about the concept of a green economy in a time of financial crisis and climate change, with the carbon tax as a policy instrument to achieve the green economy. The political feasibility of a carbon tax is one of the key policy evaluation criteria, to identify a correlation between the green economy and the carbon tax and what critical design elements most affect the political feasibility. To achieve this we will look at a fresh case study exploring the political feasibility of carbon tax policy in Ireland after it was implemented in December 2009 towards a green economy. The case study is based on the cross-sector surveys on the four critical elements of political feasibility: political context, social equity, environmental effectiveness, and economic effectiveness. The key findings from the surveys are analyzed and discussed, to reach the final conclusions.

Executive Summary

In a time of financial crisis and climate change, a concept of a green economy is proposed to tackle these challenges and achieve multiple goals. A carbon tax is regarded as one of the instruments available to policy-makers to achieve the green economy. Political feasibility is selected as the policy evaluation criterion in this research to evaluate the carbon tax policy, by analyzing the four critical design elements that may affect political feasibility: political context, social equity, environmental effectiveness and economic effectiveness. Ireland is selected as the case study country to explore the political feasibility of carbon tax policy towards a green economy.

The research first introduces the research background, defines the research problem, sets the research objective and research question(s), identifies the research scope, finds the research limitations and target audiences by applying the research methodology including research approach, methods for data collection and data analysis.

By establishing the conceptual framework of the research, including the theory of the green economy in a time of financial crisis and climate change, carbon tax as a policy instrument to achieve the green economy, and political feasibility as one of the key policy evaluation criterion, the research conducts the cross-sector survey by analyzing the four most critical elements that affect the political feasibility of carbon tax policy in Ireland: political context, social equity, environmentally effectiveness, and cost effectiveness. The analysis and discussion are conducted based on the key findings of the survey to reach the conclusion.

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Abbreviations

AFDA	Agriculture and Food Development Authority
CO ₂	Carbon Dioxide
CO _{2e}	Carbon Dioxide Equivalent
CPI	Consumer Price Index
EPA	Environmental Protection Agency
ETS	Emission Trading System
EU	European Union
GDP	Gross Domestic Production
GE	Green Economy
GEI	Green Economy Initiative
GHG	Greenhouse Gas
GGND	Global Green New Deal
LPG	Liquid Petroleum Gas
MT	Motor Tax
NCC	National Competitiveness Council
OECD	Organisation for European Economic Cooperation
PPP	Polluters Pay Principle
PWTA	Public Willingness to Accept
PWTP	Political Willingness to Push
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNEP	United Nations Environment Programme
SEM	Single Electricity Market
VRT	Vehicle Registration Tax
I FA	Irish Farmers Association
ITF	Irish Taxi Federation
ESB	Electricity Supply Board

1 Introduction

Chapter 1 aims to establish a general framework for the thesis research by introducing the research background, defining the research problem, setting the research objective and research question(s), identifying the research scope, finding the research limitations and target audiences, and giving a general thesis outline.

1.1 Background to the research

Facing the challenges of global warming and climate change, the burning of fossil fuels becomes the main contributor (UNFCCC 2010). It is also noticeable that "fossil fuels account for about 74 % of all carbon dioxide (CO₂) emissions and for roughly 57 % of all greenhouse gas (GHG) emissions" (UNEP 2010a). Therefore to reduce CO₂ emissions will play a significant role in combating global warming. With increasing concern about carbon dioxide reduction in a time of climate change, seeking environmental solutions to curb the greenhouse gas emission has become more urgent on many countries' political agenda (ESRI 2008; Laurent 2009; NDRC & MOF 2010).

However, the problem of reducing global emissions coincides with the severest global financial crisis since the 1930s, with many countries facing a severe economic downturn, fast falling GDP figures, a collapsed banking system, high inflation and unemployment rate (Reuters 2009).

The concept of the green economy was proposed by UNEP in 2008 in the current context of the prevailing global financial crisis and combating climate change, aiming to help governments tackle these challenges and move towards a green economy by "reshaping and refocusing policies" (UNEP 2009b; UNEP 2010b).

As one of the preventive environmental approaches, the carbon tax has been seen as a cost effective policy instrument to mitigating climate change by reducing CO₂ emissions in a minority of environmental forerunner countries in the world as early as in the 1990s (Poterba 1991), and gaining more attention by more countries after the Copenhagen summit (Walter 2010), including France, Ireland, China, etc (CTC 2009a; Walter 2010; MOF 2009).

For Ireland, reducing GHGs emissions has become more urgent with its degrading domestic environmental quality. Ireland has a small open economy, heavily dependent on exports, and was in the midst of a severe financial crisis as the carbon tax was introduced. In terms of energy, Ireland largely relies on fossil fuels, and the introduction of a carbon tax created a good opportunity to restructure its energy mix to be less fossil dependent and more renewable-oriented. Socially, the rising unemployment rate caused by the economic downturn became a major social concern in Ireland. Politically, the Irish government has been a two-party coalition in the past two years: the Green Party and Fianna Fáil (DOT 2009). The next General Election is

expected to be in 2010-2012 timeframe. At this critical moment, the Irish government announced it would initiate the carbon tax policy from the end of 2009, and believed that the carbon tax will help revive the Celtic Tiger and drive it towards a “green and smart” economy (DOT 2008).

1.2 Problem definition

Facing the current challenges of financial crisis and climate change, a concept of a green economy was proposed in 2008 by UNEP (UNEP 2009b; UNEP 2010b) to help governments tackle these challenges and achieve multiple goals. However, in this emerging area, only a few scholars like Mendonca and Rao have just started their research on the green economy (Mendonca *et al* 2010; Rao 2010), and found out UNEP, national governments, NGOs and others are now all looking at the green economy as the potential solution to solve the two problems of climate change and global recession (Mendonca *et al* 2010). Successful stories about countries moving towards a green economy not only come from a number of developing countries in Asia and Africa (UNEP 2010c), Europe also took action to move towards a green economy under the EU Cohesion Policy (EUROPA 2009). However, so far only a few EU countries like UK, France, Ireland, etc have integrated the green economy into their national commitments (BBC 2009; GT 2009; HGGE 2009).

A carbon tax tends to be a less popular instrument compared to the EU ETS to combat climate change (Shogren & Toman 2000), but it is gaining attention by more countries after the Copenhagen summit, such as France, Ireland, China, etc (CTC 2009a; Walter 2010; MOF 2009). It is also becoming more recognized now as one possible and effective instrument to achieve the green economy (Carto 2009; UNEP 2009e).

After a thorough literature review, it is found that, Ireland is the only country in Europe that has so far successfully introduced and implemented a carbon tax towards a green economy (see Figure 1-1). Besides, because it just opened an emerging research area of a green economy at the end of 2008 (UNEP 2009b; UNEP 2010b), only a few scholars like Mendonca and Rao started their research on this area (Mendonca *et al* 2010; Rao 2010). Therefore, **a research gap is shown: the political feasibility of carbon tax policy towards a green economy.**

Figure 1-1 A timetable of carbon tax introduction in European countries



Sources: Andersen 2008; Barde, 1997; Brännlund 1999; FOEN 2010; Pearce 2005; Richardson 2002; Santos et al 2009; Speck 2008; Svendsen 1998; Tamiotti 2009; UNEP 2009b; Walter 2010.

Ireland is selected as the case study country, is because it provides us with a good opportunity to fill in the research gap in the field of political feasibility of carbon tax policy towards a green economy; apply the latest theories into the practical research; provide empirical experience for those countries who will consider carbon tax as a climate instrument besides ETS to reduce CO₂ emissions after the Copenhagen summit (Walter 2010); those who will consider carbon tax as a solution to boom their economy in the current financial crisis; and those who will consider a carbon tax as a policy instrument to achieve a green economy when it is gaining attention globally (Mendonca *et al* 2010; UNEP 2010c; EUROPA 2009).

1.3 Research objective and research question(s)

The objective of this research is to enrich us with the knowledge about the concept and role of a green economy in a time of financial crisis and climate change, carbon tax policy as an effective instrument towards a green economy, political feasibility as one of the policy evaluation criterion, identify the key elements of the political feasibility of carbon tax policy towards a green economy through a case study.

To achieve this objective we need to understand the relationship between political feasibility of a carbon tax and how it fits in to the concept of a green economy and to what extent, if any, it can help to achieve a green economy. And we need to be clear on what we mean by a green economy, what it is and why it is important and what has been the impetus which has led to the development of this key concept of a green economy. Therefore we need to define what we mean when we talk about a green economy and to determine the key policy drivers such as climate change mitigation and the global financial crisis. We need to be clear on what we mean by a carbon tax, how and for what purpose it works in theory and in practice.

Once we have a clear understanding of the concept and rationale for a green economy and the principle of carbon tax as a policy instrument, we can focus on the primary research question which is the political feasibility of a carbon tax towards a green economy and evaluate the extent to which it contributes to the concept of a green economy and can either help or hinder its development. We need to determine what we mean by political feasibility, particularly as an evaluation criterion for carbon tax policy.

In order to evaluate the political feasibility of a carbon tax towards a green economy we need to identify what elements that prevented the political feasibility of carbon tax policy towards a green economy, the existing literature says about it, what case studies to date are in countries where a carbon tax has been introduced and to determine the rationale in those countries for introducing the carbon tax.

The Irish case is the only example where a carbon tax has been successfully introduced in a time of financial crisis and climate change with a specific goal to contributing to the development of a green economy in Ireland. A key objective therefore is to identify to what extent the recent Irish case and its introduction of a carbon tax during the global recession is unique and establishes what it adds to the literary and case study evidence.

Therefore, the following research questions are raised as main clues to lead the research:

- Why the concept of green economy is important in a time of financial crisis and climate change?
- What is the link between carbon tax and green economy?
- What is the link between political feasibility and carbon tax?
- What are the most critical design elements that affected the political feasibility of carbon tax policy?
- What does the case study tell us about the political feasibility of carbon tax policy towards a green economy?

1.4 Scope and limitations

Led by the research questions, the research is focused on a green economy, carbon tax, and the political feasibility of carbon tax policy towards a green economy. Therefore, the scope of the thesis research is defined as follows:

Green economy: The scope of the green economy in the research includes how it is defined, how the theory of green economy develops, when, in what context and why the concept of green economy is proposed, what goals is it going to achieve, why it is important in a time of financial crisis and climate change, what successful stories can be found about helping countries move towards a green economy.

Carbon Tax: The scope of the carbon tax in the research includes how it is defined, how it works from economic theory, compare with cap-and-trade, what role it is in climate change, what role it is in the green economy, what countries have introduced it.

Political feasibility: The scope of the carbon tax in the research includes how it is defined, what research has been done on political feasibility, why it is important, why it is selected as a policy evaluation criterion in this research, what main elements it is comprised of, how these elements

are defined, why they are important, and how to evaluate the political feasibility of carbon tax policy towards a green economy.

Case study: The case study is selected in Ireland which just introduced the carbon tax policy in December 2009 towards a green economy. The political feasibility of the carbon tax policy in Ireland will be explored through analysis and discussions based on the conducted cross-sector surveys, in terms of the four elements: political context, social equity, environmental effectiveness and economic effectiveness.

However, several limitations are embedded in this research due to the following reasons:

First, the carbon tax discussed in this thesis is within the policy realm instead of economic connotation. Therefore, the economic calculation such as how to price the carbon tax is not included in the research.

Second, the carbon tax policy discussed in this thesis refers to the unilateral domestic carbon tax policy. Therefore, issues like carbon leakage, international carbon tax, border adjustment, carbon tariffs and bans are not within the discussion of the research.

Third, interviews and questionnaires are subject to the different people's political preferences, economic status, social groups, environmental standpoints, professional knowledge, academic background, practical experience, personal values, etc. Different extent of the subjectivity is inevitable in the outcome of the interviews and questionnaire. Besides, the interviewees and questionnaire respondents are sampled in a small scale, therefore its result does not equal to the outcome of the large-scale survey.

1.5 Target group(s)

A wide range of target audience of the research may include:

Policy and decision makers. The research conducts an insightful analysis on the political feasibility of carbon tax policy in the case study country, which may support the policy and decision makers in this country with the reflection of some deficits of the current policy design, and recommendations on necessary improvements of policy design and implementation in the future. At the same time, the research may help the policy and decision makers in countries planning to introduce carbon tax towards a green economy with the empirical experience gained from the case study country, to obtain a better understanding of how to evaluate its own political feasibility.

Researchers and scholars. The research does some basic research work for the further theoretical and empirical development of the political feasibility of carbon tax policy towards a green economy, for those who are interested in furthering their research in this area.

Stakeholders. The research captures different attitudes towards the carbon tax policy from different stakeholders across sectors in Ireland, which helps the policy and decision makers better understand and take into consideration their interests and opinions to improve the policy design. In this way, the policy acceptance is further enhanced among stakeholders, which also helps the policy implementation.

1.6 Outline

The thesis consists of 6 chapters.

Chapter 1 aims to establish a general framework for the thesis research by introducing the research background, defining the research problem, setting the research objective and research question(s), identifying the research scope, finding the research limitations and target audiences, and giving a general thesis outline.

Chapter 2 describes the main research methodology applied in the research, including research approach, methods for data collection and data analysis.

Chapter 3 establishes the conceptual framework of the research, consisting of the concept of green economy, carbon tax, and political feasibility as one of the key policy evaluation criterion.

Chapter 4 explores the political feasibility of carbon tax policy in Ireland towards a green economy from four perspectives: political context, social equity, environmentally effectiveness, and cost effectiveness.

Chapter 5 conducts the analysis and discussion based on the key findings of political feasibility of carbon tax in Ireland in the previous chapter.

Chapter 6 reaches the conclusions based on the research findings, analysis and discussion.

2 Methodology

Chapter 2 describes the main research methodology applied in the research, including research approach, methods for data collection and data analysis.

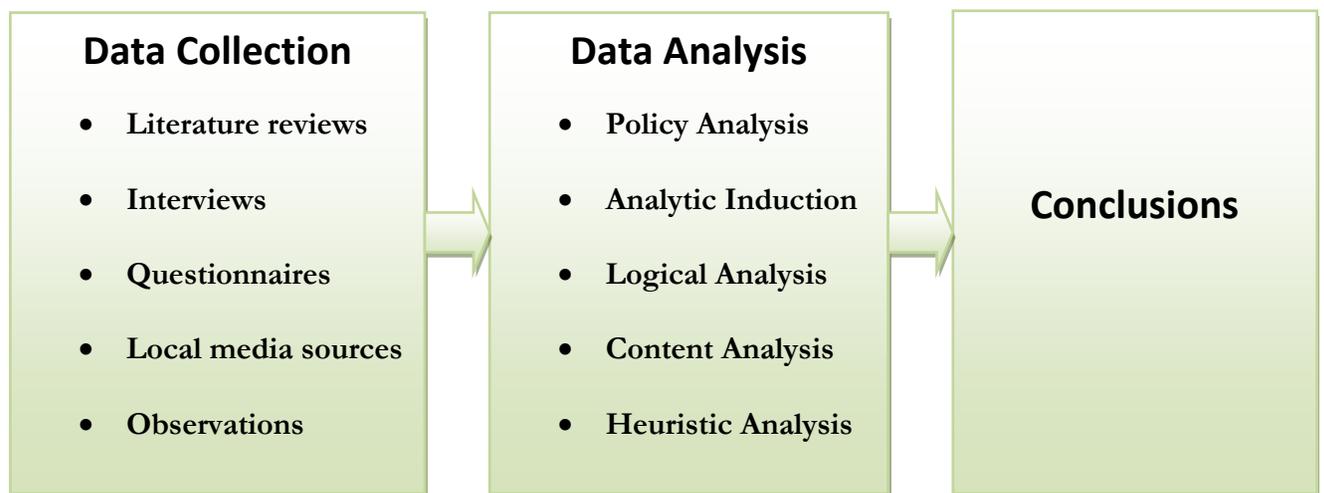
2.1 Research approach

The research approach is mainly focused on the political feasibility analysis in the research, which is the most useful, dominant, objective and indispensable tool in the policy design process (Calavera 2008; Dror 1969; McLaughlin & McLaughlin 2008; Oberlander 2003; Webber 1986), to evaluate if and to what extent the policy has attained its goal(s) (Hogwood & Gunn 1984), and “bridges the gap between the desirable and the possible” (Meltzer 1972) in a “less passionate, more independent” way (Webber 1986).

To conduct the political feasibility study, a conceptual framework is established in the research to theoretically solidify the concepts of a green economy, carbon tax and political feasibility. Based on the conceptual framework, a case study is selected to explore the political feasibility of carbon tax policy in Ireland.

To conduct the theoretical and practical research, the research approach is applied in the thesis as follows (see Figure 2-1):

Figure 2-1 Research Approach



In the data collection process, literature reviews, interviews, questionnaires, local media sources and author’s observations are used to collect and scan relevant data from different sources for further data analysis. In the research, the data refers to the theory of a green economy, carbon tax and political feasibility, as well as the related information on the carbon tax policy in Ireland.

In the data collection process, based on the collected data, the method of policy analysis, analytic induction, logical analysis, content analysis and heuristic analysis are applied to explore the political feasibility of carbon tax policy in Ireland.

2.2 Methods for data collection

The data collection methods applied in the research include:

Literature reviews. Literature reviews are usually used to identify the existing knowledge about a certain subject and what methods are useful for analyzing this subject (Spicker 2006). Examining how others have already researched the topic by literature review may help to form the research questions (Berg 1995). An extensive review of the relevant literature and academic documentation lays the groundwork for the theoretical framework of the research, as well as building up a broader theoretical base for the data analysis afterwards. Literature reviews in the research are applied in establishing the conceptual framework of the green economy, carbon tax and political feasibility, as well as having an overview of the carbon tax policy towards a green economy in Ireland and obtaining necessary information, to pave a way for the analysis of its political context, social equity, environmental effectiveness and cost effectiveness.

Interviews. Interviews have proven to be “an effective method of collecting information for research questions” (Berg 1995) and “one of the most important sources of case study information” (Tellis 1997). In the case study of the thesis research, interviews are conducted as “purposive conversations” as suggested by Spicker (2006) and play a key role of targeting the stakeholders and key actors and collect the information for an identified purpose, bridging a gap that the other sources of evidence are not be able to accomplish. Semi-constructed interviews and focused interviews are applied in the thesis research in different social sectors, including transport, agriculture, energy and environmental sector in Ireland, in an aim to conduct a deeper investigation on the political context, social equity, environmental effectiveness and cost effectiveness of carbon tax policy in Ireland, leading to the analysis and conclusion on its political feasibility.

Questionnaires. As one of the “multiple sources of evidence” (Yin 1994; Tellis 1997), questionnaires are not limited to the schedule and availability of the interviewees (Tellis 1997). Besides, questionnaires can be developed in a more flexible way aiming to collect more comments and opinions from different people. The questionnaire developed in the case study of the research is of great significance for expanding the information and data base by receiving feedback from Irish citizens from different backgrounds. It is designed to gauge public opinion on the introduction of carbon tax policy in Ireland from different perspectives, thus to explore how much is Public Willingness to Accept (PWOA) of the policy and its reason.

Local media resources. The main features of local media resources are timeliness and localized,

which can only be found when a field trip is paid. The local media resources applied in the thesis research are mainly the Irish Independent and *RTÉ news*, which look to give a deeper insight into the research and collect first-hand information. Local media resources are mainly applied in research in terms of the development of the carbon tax policy in Ireland.

Observations. Direct observation and participant observation are another two “sources of evidence” for the case study (Yin 1994; Tellis 1997). As “one of the effective qualitative research methods” (Berg 1995), observations are conducted to have a better understanding of the “reality” and “context” of the case study, and the latter helps form a more “insightful look into the interpersonal behaviour” (Yin 1994; Tellis 1997). Observations are made in the research by the author to conduct the stakeholders’ analysis through an objective and comprehensive look at different positions and interests of different stakeholders in the carbon tax policy.

2.3 Methods for data analysis

Methods for data analysis applied in the thesis research include data interpretation, content analysis and qualitative research methods.

Policy Analysis, as the “explicit, focused, and systematic analysis of governmental decisions and their effects on society” (Webber 1986), is used to evaluate political reasoning and feasibility and make the policy implementable (Meltsner 1972). Although different policy analysis models or checklists are suggested (HM Treasury 2003; Hogwood & Gunn 1981; Nagel & Neef 1979; Scriven 2007; Spicker 2006), “one of the important approaches of public policy analysis” is the political feasibility. Policy analysis is conducted in the research to analyze the evolution and political feasibility of carbon tax policy in Ireland towards a green economy, from the perspectives of political context, social equity, environmental effectiveness and cost effectiveness.

Analytic Induction, as the method mainly applied to develop an assumption about what happened, revise it until it fits the actual situation (Katz 1983), it “has come into important use” (Robinson 1951) to “present findings and analysis” (Glaser & Strauss 1967; Berg 1995). Analytic induction is applied in the research in a way of forming the assumption on who are the most affected stakeholders by the carbon tax policy in Ireland until the policy analysis is conducted to find the actual stakeholders.

Logical Analysis mainly refers to the logical reasoning or describing process by applying flow charts or diagrams (Miles & Huberman 1994). In the thesis research, this method is applied in showing the development of the carbon tax policy in Ireland, demonstrating the link between a green economy, carbon tax and political feasibility, illustrating the relationship among four

elements of the political feasibility, analyzing the key findings from the interviews and the questionnaire.

Content Analysis is broadly defined as “any technique for making inferences by systematically and objectively identifying special characteristics of messages” (Holsti 1968), recently, it is refined as the method of reviewing different information sources to analyze the latest focuses (Weber 1990). As Berg (1995) suggests, content analysis is accomplished by applying the criteria of selection, to “reflect all relevant messages as much as possible”. Content analysis is mainly applied in the research to analyze the potential political power change, which is one important part of the political context analysis of the carbon tax policy in Ireland.

Heuristic Analysis is the method used to study the individuals’ experience (Moustakas 1990). Heuristic analysis is applied in the research through interview with Irish taxi drivers, to find out their own experience on the potential impact of the carbon tax policy in Ireland.

3 Conceptual Framework

Chapter 3 establishes the conceptual framework of the research, consisting of the concept of green economy, carbon tax, and political feasibility as one of the key policy evaluation criterion.

Green economy

The concept of green economy can be traced back as early as 1989 when Pearce, Markandya and Barbier touched upon this concept for the first time in their *Blueprint for a Green Economy* (Pearce et al 1989). In 1991, Barrett (1991) and Pearce (1991b) also addressed this topic in *Bluepring 2: Greening the world economy*. However, an updated concept appeared much clearer in Jacobs' interpretation in 1991, which identified the objectives of the green economy as "zero growth" or "sustainable development" (Jacobs 1991). After that, a number of scholars like Milani, Shaw, Kennet and Heinemann further developed its concept and principles (Milani 2000; Shaw 2002; Kennet & Heinemann 2006).

However, the research on green economy is only confined within a limited theoretical area until UNEP launched the Green Economy Initiative (GEI) in 2008 and Global Green New Deal (GGND) in 2009 in the current context of the prevailing global financial crisis and combating climate change, aiming to help governments move towards a green economy by "reshaping and refocusing policies" (UNEP 2009b; UNEP 2010b).

Towards the severest global financial crisis since the 1930s sweeping across the world, a number of countries face the severe economic downturn, quickly falling GDP figures, collapsed banking system, high inflation rate and unemployment rate (Reuters 2009). At the same time, the climate change issue has been "raised to a new level" after the United Nations Climate Change Conference held in Copenhagen in 2009 (UNFCCC 2009).

The new complex context unfolds a more practical and broader new dimension of the green economy. This new dimension enables it to achieve multiple goals--"revive the economy, create jobs, protect vulnerable groups, and reduce carbon dependency" (UNEP 2009c; UNEP 2009d), which makes itself distinct from any previous concepts.

With the new dimension, the green economy is perceived as "one in which the vital links between economy, society, and environment are taken into account and in which the transformation of production processes, production and consumption patterns, while contributing to a reduction per unit in reduced waste, pollution, and the use of resources, materials, and energy, waste, and pollution emission will revitalize and diversify economies, create decent employment opportunities, promote sustainable trade, reduce poverty, and improve equity and income distribution" (UNEP 2009a). In brief, it is characterized with "increasing wealth, decent employment and successfully tackling inequities and persistent

poverty, and reduced ecological scarcities and climate risks” (UNEP 2010b). Thus a more comprehensive definition given to the green economy by UNEP is “*an economy that results in improved human well-being and reduced inequalities over the long term, while not exposing future generations to significant environmental risks and ecological scarcities*” (UNEP 2010b).

To avoid any confusion with other former concepts of the green economy, the green economy developed with the new dimension is termed as Green economy in this research. Nowadays, a few scholars like Mendonca and Rao started their research on the green economy (Mendonca *et al* 2010; Rao 2010), and found out UNEP, national governments, NGOs and others are now all looking at the green economy as the solution to solve the problems of climate change and global recession (Mendonca *et al* 2010). Successful stories about countries moving towards a green economy not only come from a number of developing countries in Asia and Africa (UNEP 2010c), Europe also took action to move towards a green economy under the EU Cohesion Policy (EUROPA 2009).

Carbon tax

Carbon tax is more favoured by economists because of its simplicity, predictability, stability (“earmarked” price), and fairness (Brännlund & Kriström 1997). Following the Polluters Pay Principle, as one of the most important environmental taxes, carbon tax is “an excise tax on the producers of raw fossil fuels based on the relative carbon content of those fuels” (OECD 1997). The reason why taxing fossil fuels can work is that their carbon content is easily ascertained (Shogren & Toman 2000).

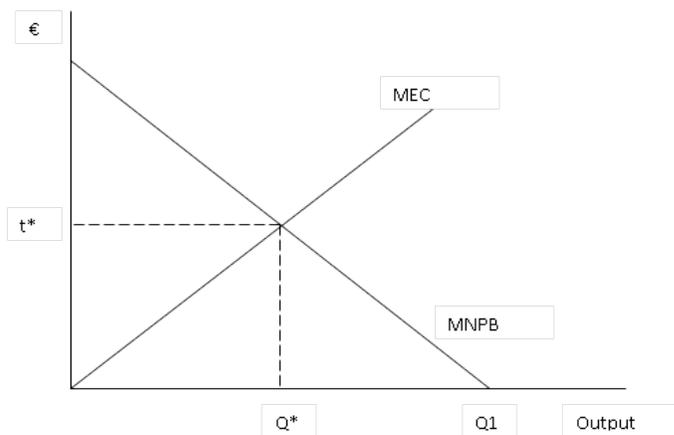
Economic theory

Briefly, the “revenue-neutral” carbon tax policy, means either it pays back the tax revenues (known as “dividends”) or reduces other taxes (known as “tax shifting”) (CTC 2007). The carbon tax is levied on what is considered a ‘bad’, therefore it is generally considered as a ‘double dividend’ taxation instrument compared to other taxes such as income tax which tax a ‘good’ (Turner *et al* 1993; CRS 2010). With a carbon tax shift, that money would go back to all taxpayers equally to help them pay the higher energy prices (PI 2007).

Specifically, a carbon tax is a market-based mechanism that looks to internalise the negative externality cost of pollution by placing a price on carbon intended to curb emissions (Ramseur & Parker 2009). It seeks to fix the price of carbon emissions but does not fix the quantity (Starvins 2009). A classic carbon tax is also known in the literature as a Pigovian tax named after A. Cecil Pigou, author of *Economics of Welfare* (1920) (Ramseur & Parker 2009). The pigovian tax looks to tax the externality at source to incentivise a change in behaviour towards more environmentally sustainable alternatives or a reduction in consumption (Jagers & Hammar 2009). In the absence of a carbon tax an individual or firm will produce output at

Q1. Introducing a carbon tax at t^* serves to change the decision-making process for the individual or firm. Producing output beyond Q^* results in a marginal net private benefit (MNPB) which is less than the carbon tax it would face if it continues to produce. The optimal level of production then changes from Q_1 to Q^* effectively reducing the output produced and internalising the marginal external cost (MEC) the individual or firm places on society resulting in their optimal level of production matching society's optimal level (see Figure 3-1).

Figure 3-1 The economic theory of carbon tax



The pigovian tax is a useful economic instrument to internalise the marginal cost of pollution, however, the problem with this tax is that it is difficult to determine the marginal cost of pollution at its optimal level. Or to put it another way, it is difficult to put a value on the level of pollution, the reduction required and optimal carbon tax level to achieve this. It is also difficult to determine the tax level needed to affect change. That said, it proves that the level of emissions output by individuals or firms will be higher if the government does not act and therefore that the carbon tax can be used as an efficient economic instrument to curb emissions and reduce or eliminate the externality cost of pollution by incentivising polluters to internalise their marginal cost of pollution (Barrett *et al* 1997).

Compare with “Cap-and-trade”

Compared to the more popular but also complicated European Union Greenhouse Gas Emission Trading System (EU ETS) (Shogren & Toman 2000), which is also known as “cap-and-trade”, carbon tax seems endowed with some advantages that economists would favour. A brief comparison has been conducted between carbon tax and cap-and-trade (Revelle 2009; CTC 2009b) (see Table 3-1) by selecting a series of indicators including emission certainty, price

predictability, environmental effectiveness, simplicity, transparency, equity, inclusiveness and timeframe.

Table 3-1 Carbon tax vs. Cap-and-trade

Comparison indicators	Carbon tax	Cap-and-trade
Emissions certainty	none	Yes
Price predictability	yes	none
Environmental effectiveness	yes (preventive)	yes (post-pollution)
Simplicity	more	less
Transparency	more	less
Equity	more	less
Inclusiveness	more	less
Timeframe	short	long

Source: Revelle 2009; CTC 2009b

It is evident that both are “market-based policy instruments targeting CO₂ emissions” (Stavins 2008), however they are applied in different ways. They are mutually complementary to achieve the same goal of reducing CO₂ emissions.

Role in climate change

It is widely accepted that the burning of fossil fuels is the main contributor to global warming and climate change (UNFCCC 2010). It is also noticeable that "fossil fuels account for about 74 % of all carbon dioxide (CO₂) emissions and for roughly 57 % of all greenhouse gas (GHG) emissions" (UNEP 2010a). Therefore to reduce CO₂ emissions will play a significant role in combating climate change.

In a tool kit of reducing CO₂ emissions, carbon tax is a forgotten but useful preventive economic and proactive policy instrument (Global Utmaning 2009; Shogren & Toman 2000), as well as "an instrument of environmental cost internalization" (OECD 1997) and “the cheapest way” (ESRI 2008) to reduce CO₂ emissions.

Role in green economy

Historically, the importance of environmental or ecological taxes (including carbon tax) as a policy instrument to achieve the sustainable development and green economy was recognized by Jacobs (1991) and Milani (2002). In the new context of the financial crisis and climate change, the role that carbon tax plays as a policy instrument to move towards a green economy was reconfirmed by the G20 Pittsburgh Summit held in September 2009, when six policy recommendations to achieve the green economy were adopted, including “create positive incentives and appropriate taxes” (UNEP 2009e). Carto (2009) also pointed out that politicians are now beginning to realise that they can use the national taxation system in a strategic way to achieve environmental objectives. The key is to achieve a green economy which is growing while environmental pollution and emissions are falling or kept at sustainable levels.

Application

Compared to the globally popular ETS, the reality for carbon taxation is that it has only been applied in a small number of countries (Barde, 1997), and the reason behind this is that a carbon tax is often regarded as politically infeasible as it brings more political challenges (Ramseur & Parker 2009) and risks. It is understandable that the public usually interpret the term “tax” in a negative way (Jagers & Hammar 2009), therefore it is not favoured by most of the politicians as it is not helpful with gaining voters. After the Nordic environmental pioneers--Finland, Netherland, Sweden, Norway and Denmark started implementing carbon taxes since the early 1990s (Andersen 2008; Barde, 1997; Brännlund 1999; Richardson 2002; Santos *et al* 2009; Speck 2008; Svendsen 1998; Walter 2010), some other countries are only trying to follow suit in recent years. In Oceania, Australia is proposing an interim carbon tax plan in 2010 (Parker 1999; Sullivan & Ormerod 2002; Taylor 2010). In North America, Canada and the U.S. started introducing carbon taxes in some provinces in 2007 (CTC 2009a; Duff 2008). In Europe, Slovenia, UK, France, Ireland etc. also tried to enact a carbon tax (CTC 2009a; Walter 2010). In Asia, China is planning to put carbon tax into practice in five years (MOF 2009).

However, carbon tax policy also fails in these countries. For example, the carbon tax in France became the “political sacrifice” when the government announced it would abandon it due to the public protest (Laurent 2009), especially when the public have doubts to what extent the carbon tax could work effectively to address the so-called climate issues and when they can see and feel the actual behaviour change as the government advocates, while at the same time they have to carry the even heavier tax burden on their shoulders because of the newly added carbon tax.

Political feasibility

It can be defined as “what is adoptable given policy constraints” (Oberlander 2003) and “the extent to which officials and policymakers are willing to accept and support a particular piece of public policy” (Calavera 2008). The importance of political feasibility in policy making has historically been studied by a number of scholars. As early as 1969, Dror (1969) not only defined the political feasibility in three “closely interdependent” ways and proposed a framework for political feasibility analysis, but also addressed the important role of political feasibility in policy making as a “dominant criterion” and “a measure” of a policy proposal. In 1972, Meltsner (1972) concluded that political feasibility study is one way of “bridging the gap between the desirable and the possible”.

In 2003, Oberlander addressed the important role that political feasibility plays as “an objective judge” in the political process (Oberlander 2003). Scholars like Brown, McLaughlin, etc also tried to look at political feasibility in different ways (Brown 2006; McLaughlin & McLaughlin 2008). After all, they realized no policy analysis is complete without political feasibility (McLaughlin & McLaughlin 2008), as without political feasibility, no matter what other criteria is feasible, the policy will not be optimal. Therefore, it is one of the most “uniquely critical criteria” to evaluate public policy (Calavera 2008).

The reason why political feasibility is selected as one policy criterion to evaluate carbon tax policy design in this research is that political feasibility is dominant, objective and indispensable at each stage of policy making (Calavera 2008; Dror 1969; McLaughlin & McLaughlin 2008; Oberlander 2003) as aforementioned, especially as a “most useful tool in policy design discussion and decisions” (Webber 1986). Therefore, It is suggested as a key and “extraordinary significant” policy evaluation criterion (Bardach 2005; Calavera 2008), to evaluate if and to what extent the policy has attained its goals (Hogwood & Gunn 1984), in a “less passionate, more independent” way (Webber 1986).

However, how do we evaluate the political feasibility of carbon tax policy in this research? Dror (1969) contended that political feasibility depends on different “variables”. More recently, some researchers found that several elements go to shape the political feasibility: effectiveness, cost effectiveness and equity (Bemelmans-Videc *et al* 1998; Bardach 2005). More specifically, Starvins (2008) suggested the following elements be applied to evaluate the carbon tax policy: environmental effectiveness, cost effectiveness and social distributional equity. And these three elements should be well fitted into the political context (Starvins 2008). Similar suggestions are also made by Nordhaus and Danish (2003) that the political feasibility depends on the environmental effectiveness and the distributional equity. Political experience or familiarity with the policy is another key factor that will influence the political feasibility (Bemelmans-Videc *et al.* 1998; Nordhaus & Danish 2003). Therefore, the most critical design elements that will affect the

political feasibility of carbon tax policy suggested in this research are: **Political context, Social Equity, Environmental Effectiveness, and Cost Effectiveness.**

Political Context of the carbon tax policy mainly refers to in what political climate the policy is designed (Dror 1969; Fischer 1995; Rossi *et al* 2004), including the Political Willingness to Push (PWOP) which decides the efficiency and effectiveness of the policy (Barde 1997), political powers and their change which will lead to a change in policy (Calavera 2008), policy-makers' experience (McLaughlin & McLaughlin 2008), how much the public trust the politicians (Jagers & Hammar, 2009), whether the political rationale of introducing it is "clear and transparent" (Bohm 1997), and whether it is the proper time to introduce it (Barde 1997; Bohm 1997; Webber 1986). It is also found that the carbon tax policy is sensitive to the political pressures (Starvins 2008), which would determine how the policy evolves.

Social Equity of the carbon tax policy mainly refers to how equitable the carbon tax policy is and how it is distributed across different sectors of the society (Starvins 2008). It has been realized that the "distributional regressiveness" of carbon tax would probably lead to the social inequity between the rich and the poor (Jagers & Hammar 2009; Turner *et al* 1993), therefore it is important to gain the public acceptance of it being revenue neutral (Bohm 1997; Pearce 1991a), including the support from different stakeholders, such as industries, environmental groups, etc. (Ramseur & Parker 2009). That is why it is suggested that political feasibility should analyze the interests of different actors or stakeholders and public opinions (Dror 1969; Webber 1986). Besides, some "ineffective and expensive" issue should be avoided to secure the equity when designing a carbon tax policy. For example, sectors subject to EU ETS should be separated from those subject to carbon taxes, so that no double levy is on CO₂ emissions (Tol 2007; ESRI 2008).

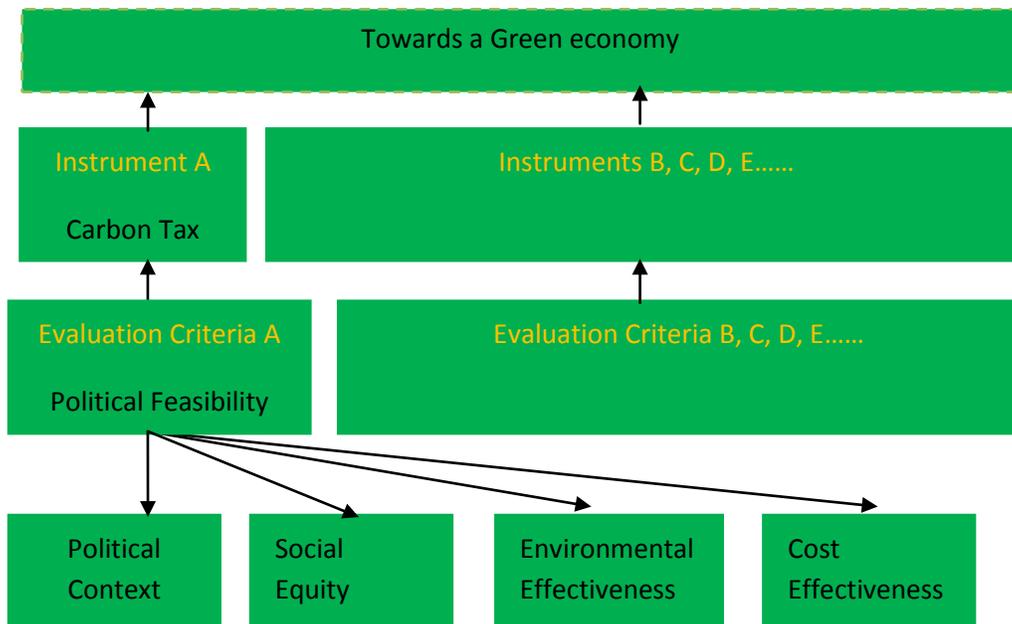
Environmental Effectiveness of the carbon tax policy mainly refers to if it achieves the environmental target, especially the emissions target (Starvins 2008). It must also be realized that the carbon tax cannot guarantee this target, however, as a trade-off, its cost certainty is more guaranteed (Starvins 2008).

Cost Effectiveness of the carbon tax policy mainly refers to the economic benefit it could bring, especially the revenue, how the public want to distribute the revenue (Ramseur & Parker 2009) and how the revenue is actually used to meet environmental targets at least cost (Jagers & Hammar 2009). For example, reducing the level of distortionary taxes, such as labour or income tax (Barrett *et al* 1997; Bohm 1997; Bovenberg & van der Ploeg 1993; Parry 2005; Ramseur & Parker 2009; Tietenberg 2007), recycling the tax revenue back to low income households (Grainger & Kolstad 2010; Ramseur & Parker 2009), stimulate R&D on environmental and energy technologies, and reduce fiscal deficits (Ramseur & Parker 2009). It is essential for the government to design a carbon tax policy from a long term sustainable perspective of gaining revenue (Barde 1997) and how to use the revenue appropriately to avoid increasing the tax

burden which may lead to its unacceptability among the public (Bohm 1997; Vos 1997). It is found that the public acceptability of carbon taxes could be enhanced if they are informed on the costs of carbon taxes to reduce emissions and on the cost of alternatives (Jagers & Hammar 2009).

To gain a better understanding the relationship between green economy, carbon tax and political feasibility as its evaluation criteria, it is illustrated as follows (see Figure 3-2):

Figure 3-2 The relationship between green economy, carbon tax and political feasibility



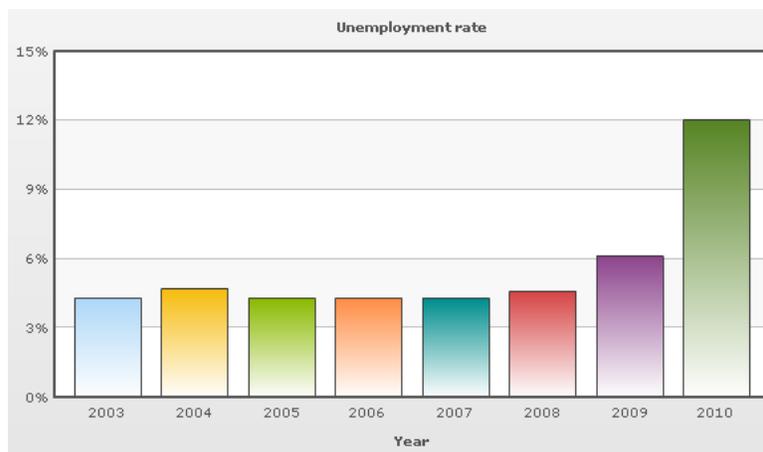
4 Findings—a case study in Ireland

Chapter 4 explores the political feasibility of carbon tax policy in Ireland towards a green economy from four perspectives: political context, social equity, environmentally effectiveness, and cost effectiveness.

4.1 Towards a green economy

The current financial crisis has exposed structural weaknesses in the Irish economy caused by a shift from an export-based economy to one focusing too heavily on the domestic construction sector and a lack of financial regulation in the banking sector. This has led to a severe contraction in the Irish economy with a bailout for the banks, a sharp decline in GDP and public finances and significant increases in unemployment and Government debt (ESRI 2008). According to the ESRI, the Irish economy has four major challenges: resolving the banking crisis, tackling the Government deficit, improving competitiveness, and addressing the economic and social unrest caused by rapidly rising unemployment (See Figure 4-1) (ESRI 2008).

Figure 4-1 The unemployment rate in Ireland during 2003-2010



Source: CIA 2010

The Department of the Taoiseach (DOT) believes the solution to Ireland’s current economic woes lies in “restructuring the economy, move away from fossil-fuel based energy production, meet our mandatory climate change emissions reduction targets” with the introduction of a carbon tax forming an important part of the Government’s “efficient taxation policies” to achieve the green economy (DOT 2009).

As can be clearly seen from the timetable of introducing carbon tax in Ireland (see Table 4-1), although the plan of introducing it has been shelved in the past few years, the Irish government finally put it into practice in December 2009 and in May 2010 (see Table 4-2), and has become the first and the only country in Europe to introduce a carbon tax towards a green economy.

Table 4-2 A timetable of introducing carbon tax policy in Ireland

Time	Event
2003	The Government started a consultation process on proposals for a carbon energy tax, planning to introduce it from the end of 2004. The tax is aiming to limit GHG emissions, in an effort to meet Ireland's Kyoto commitment (RTÉ 2003).
2004	A study carried out by the Irish think tank Economic and Social Research Institute (ESRI) found out that “applying carbon taxes across the board, while compensating low income households, would maximise the incentive to become more energy efficient”, as “revenues from carbon tax could provide €246 of compensation to low income households, which would be equivalent to the amount of carbon tax that they paid” (RTÉ 2004a).
2004	The Government decided to abandon the idea of introducing a carbon tax (RTÉ 2004b).
2008	Commission on Taxation was established to “examine the need for a levy on carbon emissions” (RTÉ 2008).
Sep 2009	Commission on Taxation made the recommendation on introducing a carbon tax (RTÉ 2009).
Dec 10th, 2009	Department of the Taoiseach ¹ announced a carbon tax of €15 a tonne wto be levied on transport fuels, including petrol and auto-diesel (DOT 2010).
May 1st, 2010	The carbon tax will be levied on non-transport fuels including kerosene, marked gas oil, liquid petroleum gas (LPG), fuel oil and natural gas. VAT will also be charged on the carbon. Participants in the EU ETS will be exempt from the carbon tax. Electricity is not subject to the carbon tax (DOT 2010).

¹ Taoiseach (in Irish) refers to Prime Minister.

Table 4-1 Main features of the carbon tax in Ireland

Rate of €15 per tonne of carbon		
Categories	Specific Products	Implementation Date
Transport Fuels	Petrol and Auto-diesel	10 December 2009
Non-transport fuels (oil and gas)	Kerosene, Marked Gas Oil, Fuel Oil, Liquid Petroleum Gas (LPG) and Natural Gas	1 May 2010
Solid Fuels	Coal and Commercial Peat	Subject to a Commencement Order

Source: DOT 2010

4.2 Political context

Based on the theory of political context aforementioned in the conceptual framework of the research, several questions are raised when exploring the political context of carbon tax policy in Ireland.

How is the Political Willingness to Push (PWOP) of introducing carbon tax in Ireland?

The Political Willingness to Push (PWOP) of introducing a carbon tax can be interpreted in terms of how strong the political commitment is to introduce it, which can be found in the Irish government documents. It is recognized by both the *Programme for Government 2007-2012* and *Commission on Taxation* that “[a]ppropriate fiscal instruments, including a carbon levy, will be phased in on a revenue-neutral basis over the lifetime of this Government” (DOT 2007).

Is the political rationale of introducing it is “clear and transparent”?

The political rationale of introducing a carbon tax in Ireland is clearly described as “the cheapest way to further lower carbon emissions, protect and enhance the environment” (ESRI 2008), as well as forming an important part of the Government’s “efficient taxation policies” to achieve the green economy (DOT 2009).

According to a survey with EPA (see Appendix A and B), it is found that any new taxes or increases in taxation, including the carbon tax, are not generally positively received by the tax payers, because of the potential negative impact on their disposable income. However, a notable exception is the plastic bag tax, because of the recognition of benefits. Therefore, it is important that **the purpose of new taxes or increases in taxation, including the carbon tax policy, therefore needs to be clearly explained.**

However, it seems that the public don't share the same opinion. According to the interviews with representatives from transport (See Appendix A and B), it is found that a **lack of knowledge of carbon tax policy is prevailing** in the interviewees. The knowledge about carbon tax policy among the interviewees is kept at the level of only knowing the name of "carbon tax". None of them know the details of the carbon tax policy until the interviewer briefly introduces it.

It is found that due to the prevailing lack of knowledge about the carbon tax policy in the public, it is suggested by the interviewees that **the government should promote the public education of the carbon tax policy**, in order to enhance the implementation effectiveness of the carbon tax policy.

What are the political powers in Ireland?

The current Houses of the Oireachtas (National Parliament) is made up of a coalition with Fianna Fáil, the Green Party and a number of Independents (DOT 2009). Fianna Gael, the Labour Party, Sinn Fein are the other major parties in Ireland. General Elections in Ireland take place every five years. The last General Election took place on 24 May 2007 (DOT 2009), which means that the next General Election must take place by 14 July 2012 at the latest following the dissolution of the 30th Dáil Éireann (the House of Representatives).

Historically the two parties in power have different political priorities. Environmental protection is one of the bases that Green Party is founded, as well as its declared mission statements (GP 2010). The leader of the Green Party is also the Minister for the Environment, Heritage and Local Government, who is the main promoters of environmental policies, including the carbon tax policy. The Green Party was seeking to introduce the carbon tax in a "holistic" way that takes both "equity" and "economic effectiveness" into consideration (Molony 2008). The political standpoint of Fianna Fáil about the carbon tax is much less idealistic and more rooted in the real politic of local and national elections and could be more or less understood when the carbon tax proposal was shelved in 2008 due to "the political pressure" (Molony 2008). In 2008, Fianna Fáil wanted to slow down the introduction of the carbon tax, due to the considerations of protecting the vulnerable groups (Molony 2008). However, the leader of Fianna Fáil and Taoiseach Brian Cowen warned the party members that "the Government could not delay making important decisions to control climate change" (Molony 2008).

What will the political powers change?

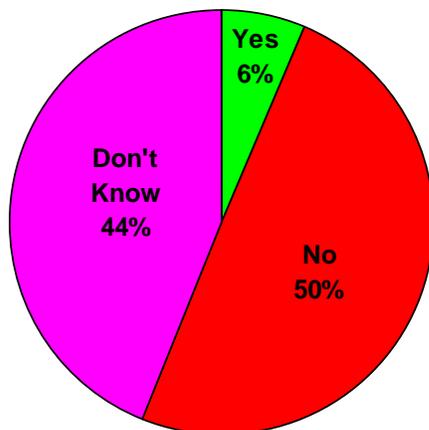
To answer these questions, a survey was conducted among randomly selected Irish citizens. It is found that **the dynamic change of the political power will influence the continuity, consistency and effectiveness of the carbon tax policy**.

The current recession is putting the current Government under considerable strain with many believing the Irish recession is predominantly a homemade one based on actions taken by property developers and bankers and supported and fuelled by the Government (namely Fianna Fail) over a prolonged period. However, it is believed that how long the carbon tax policy will be in effect depends to a considerable extent on how long the current political parties will be in power.

The latest predictions, taken on 3rd August 2010 by Paddy Powers (the largest bookmaker in Ireland), on a date for the next General Election place it sometime between the second half of 2010 and 2011 (Paddy Power 2010). Paddy Powers is also tipping Fianna Gael and the Labour Party to form the next coalition Government. This view is backed up by the latest opinion poll on 27 June 2010 by The Sunday Business Post (The Post 2010). In this opinion poll Fianna Fail has fallen from grace dropping from top spot to third. Its coalition partner, the Green Party, has also fallen in the polls. By contrast, the opposition parties have all gained, particularly the Labour Party who has climbed from around 10% up to 27% on the back of rising unemployment and growing unhappiness on how the Government is dealing with the recession.

How much do the public trust the politicians?

To answer this question, a questionnaire is sent to a sample group of Irish citizens from a range of backgrounds and professions (see Appendix C). Thirty-two respondents replied in all. From question 8 in the questionnaire “In your opinion, will the carbon tax be revenue neutral? Please give reasons for your answer”, it is found that half of those questioned do not believe the carbon tax will be revenue neutral (see chart below). Although the Government has insisted the carbon tax will be revenue neutral, only 6% believe this will be the case. It is found that **the government’s public persuasiveness of the revenue-neutral carbon tax policy is rather weak.**



What are the policy-makers’ experience on carbon tax policy?

According to the interviews with representatives from the transport and agricultural sector (See Appendix A and B), it is found that due to the lack of experience and under the current climate of economic recession, **the government needs more time and experience to implement the carbon tax policy.**

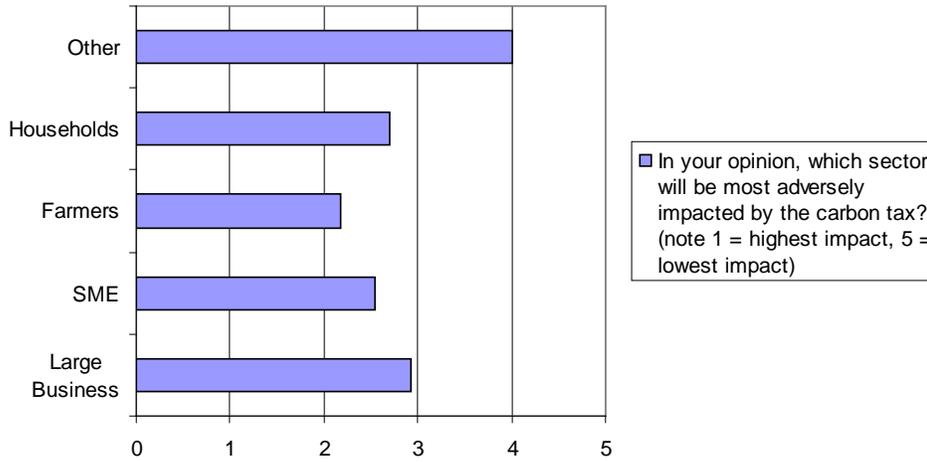
Is it the proper timing to introduce carbon tax policy?

According to the interviews with representatives from the transport and agricultural sector (See Appendix A and B), it is found that **the timetable of introducing the carbon tax should depend on the economic climate and the government's capability and experience.** The interviewees think that current economic recession in Ireland and the limited experience of the government makes it an ill time to introduce the carbon tax. It may be a better idea to introduce the carbon tax policy in the short run, say 5-10 years, after the economy has recovered.

4.3 Social Equity

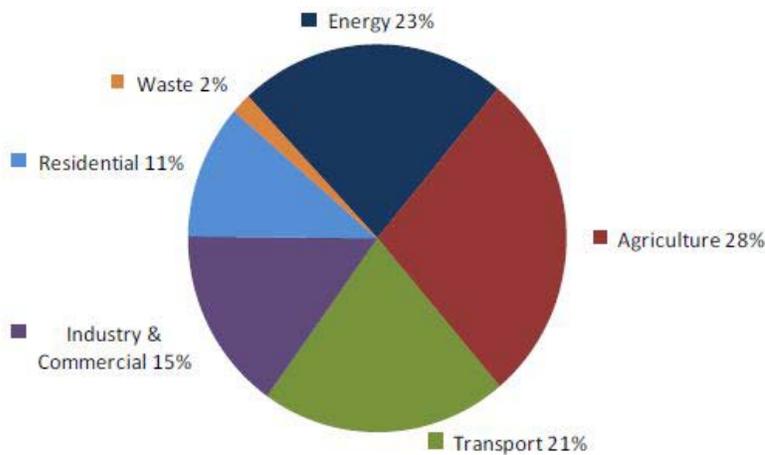
Based on the theory of social equity aforementioned in the conceptual framework of the research, stakeholders' analysis is conducted when exploring the social equity of carbon tax policy in Ireland.

To find who the stakeholders are, it is important to find out who are affected by the carbon tax policy. A questionnaire (see Appendix C) was sent to a sample group of Irish citizens from a range of backgrounds and professions to gauge public opinion. Thirty-two respondents replied in all. From Question 4 in the questionnaire "In your opinion, which sector will be most adversely impacted by the carbon tax? (note 1 = highest impact, 5 = lowest impact) Is this appropriate and fair?", it is found that respondents believe that farmers will be worst affected by the carbon tax, followed by small business, households and large business (see chart below). It was felt that large business would be able to pass on costs to consumers but that this would not be an option for other sectors. Transport companies considered to be in the small business sector were also noted a key interest group that are likely to be badly affected. It is found that **most believe farmers are mostly affected by the carbon tax policy.**



Based on the survey above, it is further explored that different sectors or industries may undertake different levels of the carbon tax burdens, which may not be evenly distributed among those sectors. It is clearly seen (see Figure 4-2) that the **transport sector, agricultural sector** and **energy sector** is predicted to contribute more GHG emissions in the coming years. Therefore, it is assumed that they are more likely subject to the impact of the carbon tax policy, especially for the non-ETS sectors: agriculture and transport (NCC 2009).

Figure 4-2 Projected sectoral share of total greenhouse gas emissions over the period 2008 – 2012 for the With Measures and With Additional Measures scenarios



Source: EPA 2010

To obtain a deeper investigation on how (in)equitable the carbon tax is levied on different sectors, some semi-structured interviews have been conducted among the representatives from those sectors which will be potentially affected by the carbon tax, to a varying extent.

Transport sector

Taxi industry is assumed as one of transport sectors that will be potentially affected by the carbon tax, as the taxi drivers have to pay more for the petrol due to the carbon tax, under the condition that the taxi price is not changed.

Representative 1: Irish Taxi Federation (ITF)

Irish Taxi Federation (ITF) (see picture below) is a non-governmental organization in Dublin, serving the interests of Irish taxi drivers. According to the interview with Mr. Ussher (see Appendix A and B), the President of ITF, his strong opinion was expressed against any tax, including the carbon tax, which is believed not only to hamper the taxi industry as a whole, but also ineffective to reduce the carbon dioxide emissions in the transportation sector in Ireland. His concern more goes to the protection of the interests of Irish taxi drivers who have to carry on more economic burden due to the carbon tax levied on petrol, while facing the more severe peers competition coming from the deregulated taxi industry. He believes that subsidizing the taxi drivers may offset the impact of the carbon tax on the taxi industry.



Irish Taxi Federation

Representative 2: Irish taxi drivers

Two locations are selected in Dublin city to conduct the interviews with randomly selected Irish taxi drivers (see Appendix A and B) about the impact of carbon tax on individual taxi drivers: Ballsbridge and O'Conner Street.



Ballsbridge, Dublin, Ireland

O'Conner Street, Dublin, Ireland

The interviewees are full-time Irish taxi drivers in Dublin. However, their opinions are differentiated towards the carbon tax policy. Taxi driver A supports the carbon tax policy as he believes it will effectively reduce the carbon dioxide emissions in the transport sector in Ireland, and the price of the carbon tax levied on petrol is reasonable. While taxi driver B is against the carbon tax policy as he believes it will not have prominent effect on the improvement of the environment in a small country like Ireland. However, they share the same observation that the petrol price is increasing since last December, and agree that this will increase the taxi operation cost. The same choice they have made to lower the cost is to shop around to find the cheapest petrol, as they cannot get any subsidies from the government to offset the carbon tax levied on the petrol. The other way they both agree to lower the cost is to promote sustainable taxi services. Given the current economic climate, they both prefer postponing the introduction of carbon tax policy.

In conclusion, the interviews above support the author's assumption that Irish individual taxi drivers and the taxi industry as a whole are actually affected by the carbon tax, to some extent. Some key findings are outlined below based on the above interviews (see Figure 4-3):

Figure 4-3 Key findings on the social equity of carbon tax policy in Ireland (transport sector)

Number	Key findings on the social equity of carbon tax policy in Ireland
	Key findings from the transport sector (ITF, taxi drivers)
1	Interviewees notice the petrol price is increasing since last December. However, due to the fluctuation of the international fuel price, they do not realize the increasing petrol price is linked with the carbon tax.

2	Sustainable taxi services are supported by the taxi drivers , including taxi sharing, choose electric vehicles (if related policy favours), focus on serving specific area only, etc., which not only saves the operation cost, but also is more environmental friendly. The appearance of a more sustainable eco-cab (see picture below) in Dublin indicates the trend of the sustainable travel.
3	Taxi industry should be given due consideration when it comes to the social equity of the carbon tax policy. According to the interviewees, taxi drivers should be taken into consideration as the vulnerable group when implementing the carbon tax policy.



Eco-cab in O'Conner Street, Dublin

Agricultural sector

Agricultural sector is estimated as another sector that may be adversely affected by the carbon tax policy. According to Agriculture and Food Development Authority (AFDA), in Ireland there are around 130,000 farmers. The primary agriculture accounts for 3% of GDP, twice of the average EU level, 7% of the total employment and 6% of all the exports. The agricultural food exports account for more than 8% of the total foreign earnings (AFDA 2010). Due to the carbon tax, it is assumed that farmers have to undertake more economic burden on the fuels that carbon tax has been levied on.

Representative: Irish Farmers' Association (IFA)



Irish Farmers' Association

According to the interview with Ms. Dwyer (see Appendix A and B), the chief economist of Irish Farmers' Association (IFA), it is not difficult to find her opinion against the carbon tax policy, on the grounds that the carbon tax levied on transport and non-transport oils lead to the price increase of those fuels, which undoubtedly add the production and transportation cost for the farmers, while they are "cost takers" and cannot transfer these costs to the supply chain. Of the total agriculture energy expenditure, marked gas oil accounts for 40%, petrol 20%, auto-diesel 14% and other fuel oils 2.5%. The other main energy expenditure is the electricity, which is exempt from the carbon tax. Of all the agricultural sectors, grain sector is the most affected, followed by dairying, pigs, poultry, horticulture, potato, cattle, sheep and aquaculture sector. The absence of the public transportation in rural areas and the consumption of home heating oil in rural communities could explain as another two reasons why farmers are adversely affected by the carbon tax policy. Although the farmers are the most affected, they cannot get any subsidies from the government to offset the impact of the carbon tax policy.

In conclusion, the interview with IFA just proves the author's assumption that due to the carbon tax levied on the fuels which Irish agriculture largely depend on, Irish farmers actually have to pay more on petrol and diesel to produce and transport their agriculture goods. Some key findings are outlined below based on the above interview (see Figure 4-4):

Figure 4-4 Key findings on the social equity of carbon tax policy in Ireland (agricultural sector)

Number	Key findings on the social equity of carbon tax policy in Ireland
	Key findings from the agricultural sector (IFA)
1	Among all the fuels, petrol, diesel, marked gas oil (also called green diesel or farm diesel) and fuel oil are believed to be the major fuels that will have an impact on the individual farmers and farming industry , especially the marked gas oil as it is

	mainly used for agricultural tractors.
2	Different agricultural sectors are affected by the carbon tax policy to a varying degree, of which grain sector is the most affected.
3	Social inequity is showed in agricultural sector when implementing the carbon tax policy. Due to the lack of experience, how to equally distribute the social burden of the carbon tax across each sector becomes a challenge for the government.
4	Rural community are most affected by the carbon tax policy, as they are lack of public transportation and needs fuels for the home heating.

Energy sector

Energy sector is assumed to be affected by the carbon tax policy, as Ireland heavily rely on the fossil fuels, especially coal and gas (DOT 2008). However, the electricity is subject to ETS instead of the carbon tax (DOT 2010) . In this case, how is the social equity demonstrated in the energy sector, especially for the electricity sector? Two representatives are selected from the energy sector for the interview: **Electricity Supply Board of Ireland (ESB)** and **EirGrid** Company, with the latter being a state-owned commercial Irish company providing transmission and market services for electricity consumers.

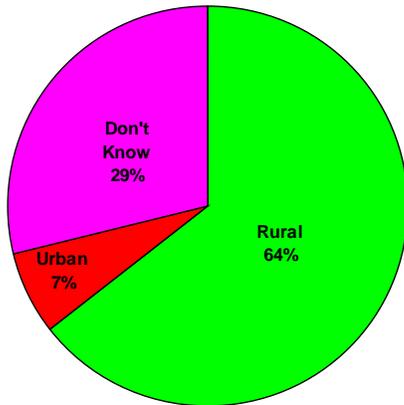
Based on the interview with two experts from ESB and EirGrid (see Appendix A and B), and a questionnaire (see Appendix C) sent to a sample group of Irish citizens from a range of backgrounds and professions, with thirty-two respondents replied in all. Some key findings are outlined below (see Figure 4-5):

Figure 4-5 Key findings on the social equity of carbon tax policy in Ireland (energy sector)

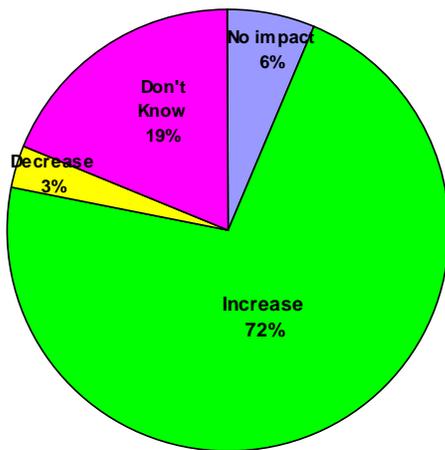
Number	Key findings on the social equity of carbon tax policy in Ireland
Key findings from energy sector (ESB and EirGrid)	
1	Social equity is demonstrated in the electricity sector when implementing the carbon tax policy. Electricity generation participated in the EU Emission Trading System (ETS), which make it currently exempt from the carbon tax. It is fair because it avoids the double charge of the carbon emissions from the electricity sector. Besides, since July 1st 2010, a Carbon Windfall Levy is applied to Irish electricity generators to recover their “windfall” gains by getting free carbon

	credits from the Single Electricity Market (SEM). The money gained from this levy will be used to protect the competitiveness of Irish enterprises.
2	CO₂ emissions from electricity generation will decrease in the future , as the proportion of renewable energy in the electricity generation is planned to increase in the coming years. In Ireland, the fuels used for electricity generation come from natural gas (accounts for 61%), coal (17%), renewable (11%), peat (7%), oil (4%) and others (0.08%), which contributes to the CO ₂ emissions. For example, from August 10 th -13 th , the CO ₂ emissions per hour from the electricity generation peak at 750 tonne. However, a target is set by the government that approximately 40% of the electricity generation will come from the renewable sources by 2020.
Key findings from question 3, 5 of the questionnaire	
3	Most believe rural communities are mostly affected by the carbon tax policy (from question 3).
4	Fuel poverty is believed to increase in low-income households due to the carbon tax policy (from question 5).

From question 3 in the questionnaire, “In your opinion, which community will be most adversely impacted by the carbon tax? Is this appropriate and fair?”, it is found that nearly two-thirds of those questioned believe that rural communities would be most adversely impacted by the introduction of the carbon tax with most of the other respondents undecided (see chart below). Less than one in ten thought that urban communities would face the biggest change. It is generally believed that those living in the countryside tend to have little alternative but to use their own means of transport with little or no public transport available as in the towns and cities. They also have to travel longer distances. Another point raised was that rural communities tend to rely more on fossil fuel heating. Cities tend to have a greater choice of heating fuels and at more competitive prices. It is also expected that the farming community will be affected in terms of increased diesel prices.



From question 5 in the questionnaire, “In your opinion, what impact will the carbon tax have on Fuel Poverty and what should Government do to protect the vulnerable?”, it is found that most respondents consider that the introduction of the carbon tax will result in an increase in fuel poverty (see chart below). Only 3% believe it will reduce fuel poverty. It is felt that an increase in fuel prices will hit poorer households more as they tend to be more dependent on fossil fuels for heating and have less insulated homes. It is also thought that increasing fuel prices during the recession when wages are falling and unemployment is increasing will hit some households. The old are identified as a particular section of society which will need to be protected.



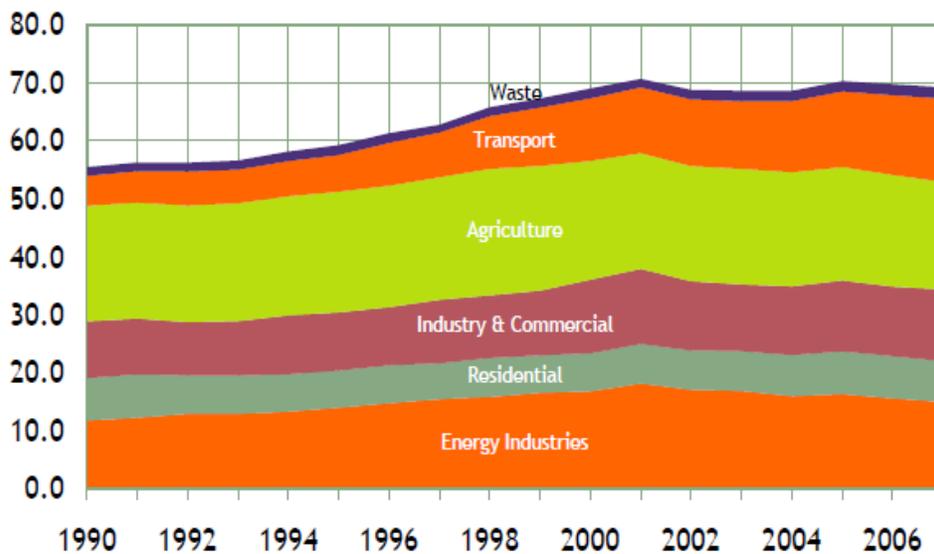
However, regarding the fuel poverty, according to survey with EPA experts (see Appendix A and B), it is assumed that if the carbon tax is implemented in isolation, it could have negative consequences for the fuel security of low-income households.

4.4 Environmental effectiveness

Based on the theory of environmental effectiveness aforementioned in the conceptual framework of the research, to explore the environmental effectiveness of carbon tax policy in Ireland, the analysis of current environmental condition in Ireland is made, as well as the projection in the future if carbon tax will achieve the emission reduction targets.

The current poor environmental situation in Ireland is contributed by the increasing energy demand and a heavy dependence on fossil fuels (NCC 2009). During 1990-2006, the greenhouse gas (GHG) emissions in Ireland increased by 25.6% (see Figure 4-6). The largest contributor is the transport sector, where GHG emissions increased by 165% since 1990 and accounted for 21% of the total emissions in 2007 (NCC 2009).

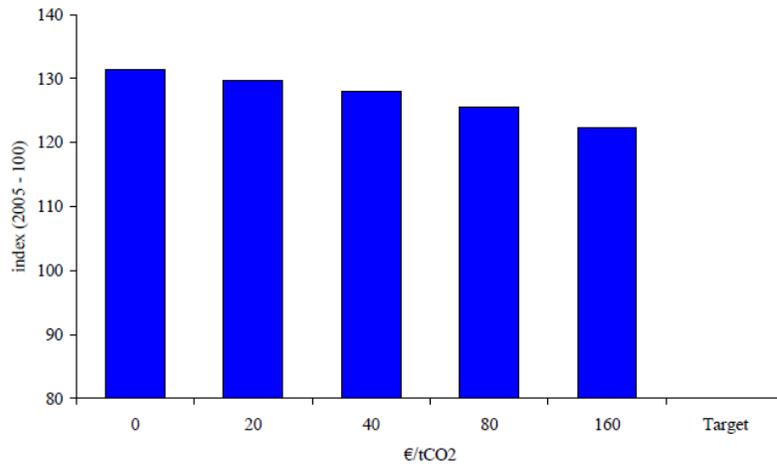
Figure 4-6 Greenhouse gas emissions (M/t CO₂) in Ireland during 1990-2007



Source: EPA 2009

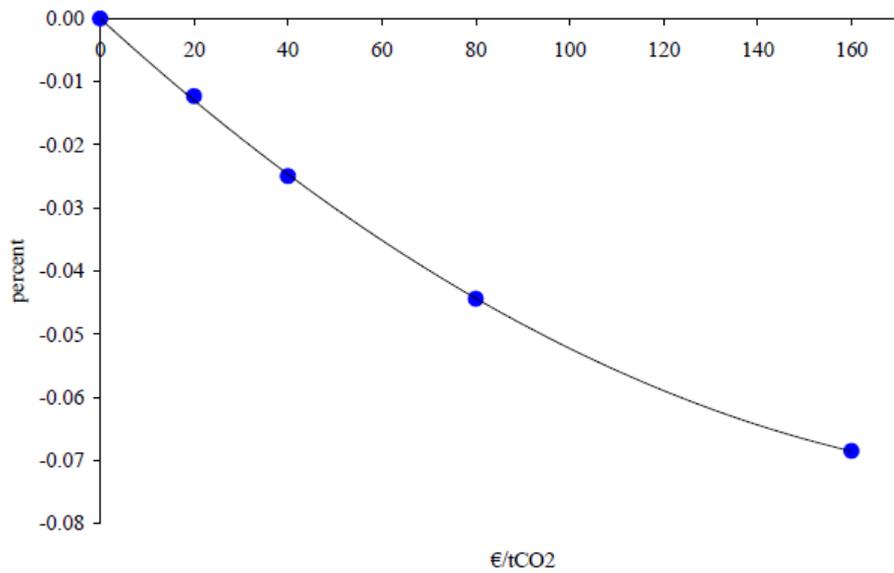
However, how much carbon dioxide emissions will carbon tax reduce? Some projections (see Figure 4-7 and Figure 4-8) are made by ESRI in 2008.

Figure 4-7 Non-electric carbon dioxide emissions (2020 indexed to 2005) as a function of the carbon tax. The EU target is shown for comparison.



Source: ESRI 2008

Figure 4-8 The reduction in 2020 in non-electric carbon dioxide emissions (relative to baseline emissions) as a function of the carbon tax.



Source: ESRI 2008

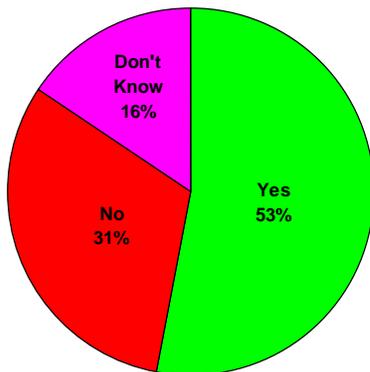
To find the standpoints on the carbon tax policy of the environmental organization, which undertakes the same task of emission reduction as the carbon tax policy does, a survey is conducted (see Appendix A and B) by contacting the Climate Research Section of Environmental Protection Agency (EPA) of Ireland. At the same time, to gauge the public opinion on the environmental effectiveness of the carbon tax policy in Ireland, a questionnaire (see Appendix C) was sent to a sample group of Irish citizens from a range of backgrounds and professions. Thirty-two respondents replied in all. Some findings are outlined as follows (see Figure 4-9):

Figure 4-9 Key findings on the environmental effectiveness of carbon tax policy in Ireland

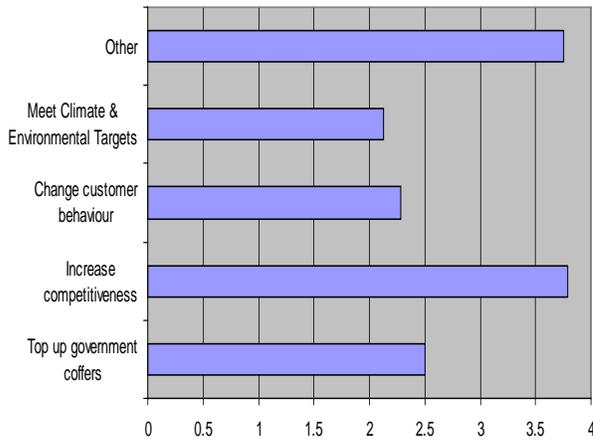
Number	Key findings on the environmental effectiveness of carbon tax policy in Ireland
Key findings from EPA	
1	The carbon tax policy is believed to change people’s behaviour, reduce emissions, and encourage people to use more efficient forms of transport and heating.
2	The long-term price signal of the carbon tax policy tends to be more likely change consumers’ behaviour. Only small environmental impact is expected in the short term at the current level of the carbon taxation. However, the long-term price signal of imposing the carbon tax should also have additional long term effects. When people expect a long term price signal, decisions can be made at a low cost over the long run to move to lower carbon alternatives or even to invest time or money into developing alternatives. In the short run, fewer options are available, so immediate impacts of the carbon tax policy on behaviour or choices may not be as strong at lower levels of carbon taxation.
3	The environmental effectiveness of the carbon tax policy should also consider the impact of other policy instruments. It is still too early to say the carbon tax policy will have any effect on changing customers’ behaviour and reducing carbon dioxide emissions, as it is not working alone. The Vehicle Registration Tax (VRT) and Motor Tax (MT) are introduced together with carbon tax at the same time in the transportation sector, so the effects from a change in those taxes should also be taken into account.
Key findings from question 1, 2, 9 of the questionnaire	
4	Over half support for the carbon tax policy based on their environmental concern (from Question 1).

5	Most believe that the carbon tax has a small or moderate impact on changing consumers' behaviour (from Question 2).
6	Most believe carbon tax policy is to meet climate and environmental targets (from Question 9).

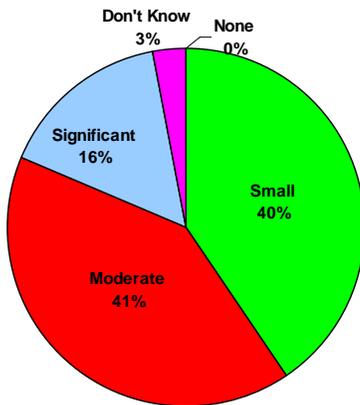
From question 1 in the questionnaire “Do you agree with the introduction of the new carbon tax in Ireland? Please give reasons for your answer”, it is found that over half of those questioned were in favour of introducing the new carbon tax in Ireland with roughly one-third against (see chart below). The main arguments put forward in support of introducing a carbon tax in Ireland are that it applies the principle of polluter pays; it incentivises carbon mitigation and reduction moving Ireland to a low-carbon future and environmental sustainability; and it will help lower Ireland’s reliance on imported fuels and facilitates renewable generation. The main arguments against focused on the perception that it was just another tax and that the focus should instead be on making improvements to building standards, public transport etc. A number of respondents noted that they were in favour of a carbon tax in principle but felt that its introduction during the current recession was ill-timed and that its introduction was only appropriate if implemented globally with Ireland having a negligible impact on emissions worldwide.



From question 9 in the questionnaire “Which of the following most accurately explains, in your view, the rationale and purpose for introducing the carbon tax? (note 1 = most relevant, 5 = least relevant)”, it is found that respondents tend to agree that the purpose of introducing the carbon tax was to meet climate and environmental targets and change consumer behaviour (see chart below). Some are more cynical and consider that the sole purpose of the carbon tax is to supplement the government coffers, especially when other tax revenues have fallen during the recession. The introduction of the carbon tax is not really viewed as a means of increasing Ireland’s competitiveness.



From question 2 in the questionnaire “In your opinion, what impact will the carbon tax have on changing consumer behaviour in Ireland?”, it is found that most respondents consider that the carbon tax will have a small or moderate impact on changing consumer behaviour in Ireland (see chart below). Many argue that until there are real alternatives for using fossil fuels then consumers’ ability to change their behaviour is limited, other than to reduce consumption which may not always be an option.

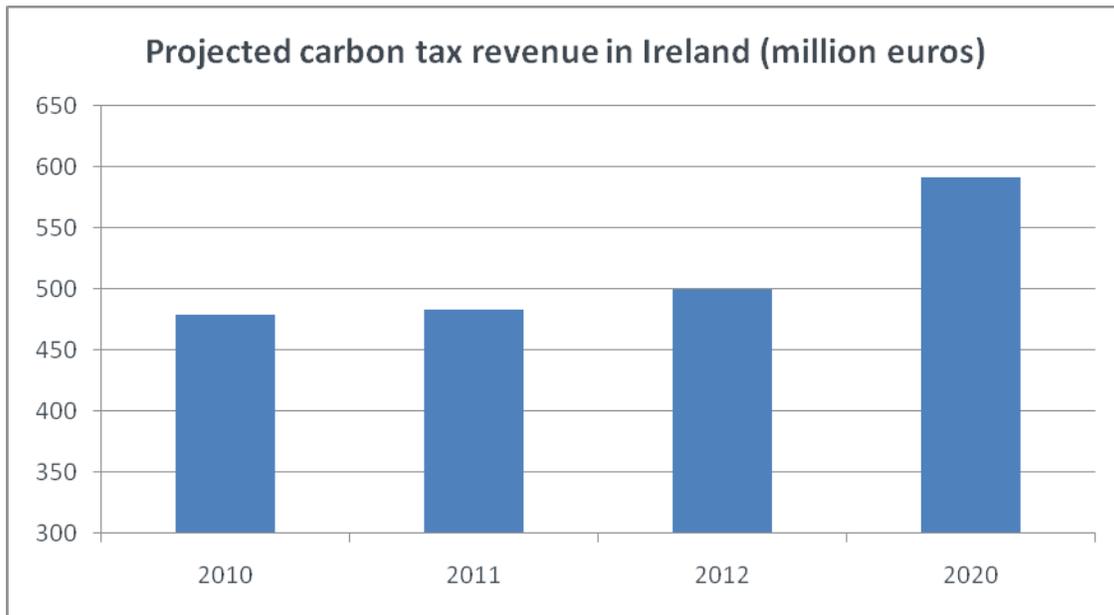


4.5 Cost effectiveness

Based on the theory of cost effectiveness aforementioned in the conceptual framework of the research, to explore the cost effectiveness of carbon tax policy in Ireland, the projection of carbon tax revenue is made, as well as the analysis of how to use the revenue to minimize the cost.

It is expected that the revenue raised from the carbon tax in Ireland will be €479 million in 2010, €482 million in 2011, €500 million in 2012, and €591 million in 2020 (see Figure 4-10) (Lyons & Tol 2010). The Government is adamant that the carbon tax will prove to be the least cost means of reducing relative labour costs without impacting negatively on competitiveness (Coghlan 2007).

Figure 4-10 Projected carbon tax revenue in Ireland (€ millions)



Source: Lyons & Tol 2010

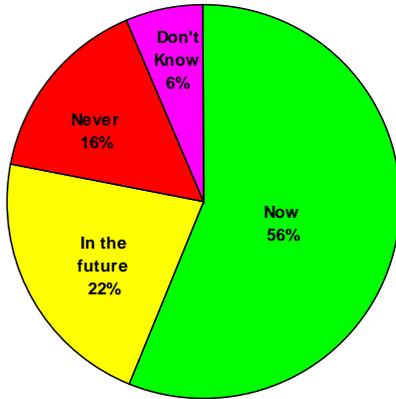
To repair the public finances, improve competitiveness and reduce the strain put on income taxes, the carbon tax is believed to help to broaden the tax base and add to the falling tax intake since the recession began. The National Competitiveness Council (NCC) considers that the carbon tax should be revenue neutral with funds used to mitigate income tax and social insurance increases and to finance energy efficiency and green economy initiatives (NCC 2009).

To perceive a better understanding on public opinions of how to use the carbon tax revenue interviews are conducted with representatives from transport sector and agricultural sector (see Appendix A and B), and a questionnaire was sent to a sample group of Irish citizens from a range of backgrounds and professions with thirty-two respondents replied in all. The key findings are outlined below (see Figure 4-11).

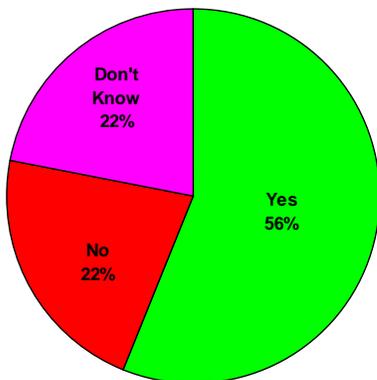
Figure 4-11 Key findings on the cost effectiveness of carbon tax policy in Ireland

Number	Key findings on the cost effectiveness of carbon tax policy in Ireland
Key findings from transport and agricultural sector	
1	The revenue gained from the carbon tax is supported to spend in renewable energy, environmental protection, the improvement of energy efficiency and go back to the most vulnerable groups .
Key findings from question 1, 2, 9 of the questionnaire	
2	Over half support for the carbon tax policy despite of the current economic recession (from Question 6).
3	Over half support for the carbon tax capped in the event of high international fuel prices (from Question 7).
4	Strong support for carbon tax revenue used for environmental targets and for protecting the vulnerable (from Question 10).

From question 6 in the questionnaire “Given the current economic climate, should the carbon tax have been introduced now, in the future or not at all? Please give reasons for your answer”, it is found that most respondents believe the carbon tax should be introduced with over half agreeing that it should be introduced now despite the recession (see chart below). Around 22% consider its introduction should be postponed until the economy recovers and 16% feel it should never have been introduced. Some feel the carbon tax should have been introduced long ago, others are of the view that it was always going to come in at some stage and now is as good a time as any. Others agree with its introduction but believe the timing is inappropriate with the recession or believe it should only be introduced once the largest emitters take the lead.

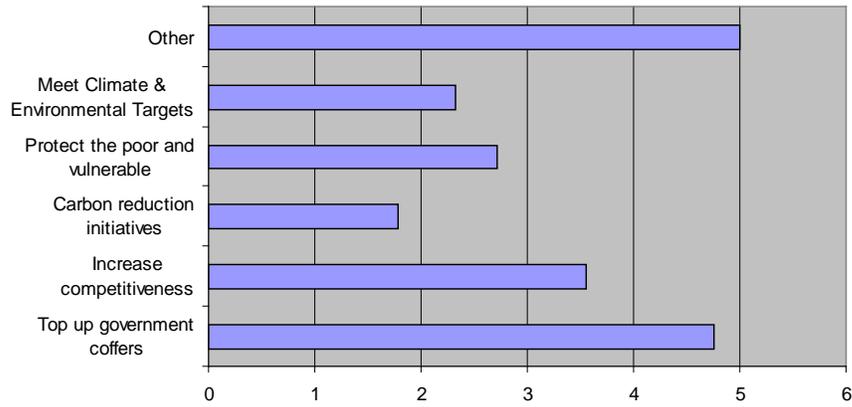


From question 7 in the questionnaire, “Do you think the Government should cap the level of the carbon tax if international fuel prices reach a predetermined point? Please give reasons for your answer”, it is found that of those questioned, 56% consider that the carbon tax should be capped in the event of high international fuel prices (see chart below). The remainder are split between those who disagree or don’t know. Many believe that fuel prices will increase over time and that high fuel prices should bring about a review of the carbon tax as the impact they feel will hit the less well off hardest. Those against a cap say it is a tax on CO₂ produced and the tax reflects the appropriate cost of CO₂.



From question 10 in the questionnaire “In your opinion, how revenues from the carbon tax best should be utilised? (note 1 = optimal use)”, it is found that according to respondents the tax revenue collected from the carbon tax should be used for carbon reduction initiatives and meeting climate and environmental targets (see chart below). There is also strong support for

using the tax revenue to protect the vulnerable. Few respondents believed the tax revenue should be used to increase competitiveness or top up government coffers.



5 Analysis and discussion

Chapter 5 conducts the analysis and discussion based on the key findings of political feasibility of carbon tax in Ireland in the previous chapter.

Is the carbon tax policy fitted in the political context in Ireland?

Based on the findings of political context, the Political Willingness to Push (PWOP) of introducing carbon tax in Ireland towards a green economy is currently strong, which enabled the carbon tax policy and its rationale to be clearly nailed down in the government paper and be effect, due to the strong political commitment of the current political power. However, the current government is considered to be the architects of much of Ireland's economic woes, together with the building and banking sectors. As the economic recession continues which may result in the increasing native political pressure, the popularity and trust in government is at an all time low, with many calling for an early general election amid the current financial crisis. Therefore, the political power change will likely happen earlier than expected, which will influence the continuity, consistency and effectiveness of the carbon tax policy, especially when the new political powers have different political focus and priority.

The other concern goes to the public lack of trust in the government and the carbon tax policy being revenue neutral. To make the carbon tax policy more acceptable by the public, the government may need more time, capability, experience, persuasiveness and education on the carbon tax policy in the public. And enhancing the awareness of the carbon tax policy among the public could probably increase the public acceptance of the policy.

Moreover, the environmental effectiveness, cost effectiveness and social equity of the carbon tax policy largely depends on if it fits the current and future political context.

Does the carbon tax policy in Ireland address the social equity?

Based on the findings of social equity, social (in)equity of the carbon tax policy is one of the public concerns, which mainly happens to the transport, agriculture, energy sector and the rural communities. Of all, transport sector, agriculture sector (especially grain sector) and rural communities are believed to be more adversely affected by the carbon tax policy, while energy sector (especially electricity sector) is not affected. In the most affected agricultural sector, petrol, diesel, marked gas oil (also called green diesel or farm diesel) and fuel oil are believed to be the major fuels that will have an impact on the individual farmers and farming industry. In the transport sector, sustainable transport is more and more favoured.

Fuel poverty, regarded as one of the potential adverse impact of the carbon tax policy, could possibly arouse the concern of social equity. To what extent the social equity of the carbon tax policy could be guaranteed largely depends on if it fits the economic situation, and if it fits the

current political context, rather, the government's ability and experience to implement it and how it disposes of the carbon tax revenue.

Is the carbon tax policy in Ireland environmentally effective?

Based on the findings of environmental effectiveness, the environmental effectiveness of the carbon tax policy in Ireland is difficult to show in the short run, however, given enough long time, it is believed to work in a way of changing consumers' behaviour, reduce emissions, develop renewable energy and achieve sustainability. And its environmental effectiveness will be increased if it co-works with other policy instruments.

The other facilitator of the environmental effectiveness of the carbon tax policy is the Public Willingness to Accept (PWOA). One way to achieve this is the public education and promotion of the policy, as it enhances public environmental awareness, and higher public environmental awareness would make PWOA easier. The other way to achieve the high PWOA is to secure the social equity, which would indirectly make it more environmental effective.

The environmental effectiveness is closely linked with the political context, namely, the political power's ability, experience and Political Willingness to Push (PWOP) are dominant when it comes to the design, implement and enforcement of the carbon tax policy, which partly decides its environmental effectiveness.

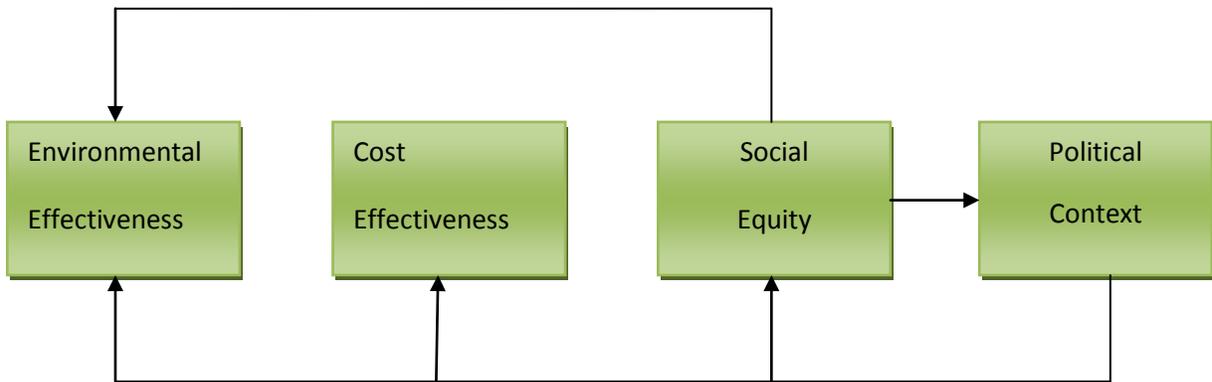
Is the carbon tax policy in Ireland cost effective?

Based on the findings of cost effectiveness, the cost effectiveness of the carbon tax policy mainly refers to its role and its nature of being "revenue neutral". The government is confident about the role of the carbon tax policy as "revenue raiser", as well as it being revenue neutral, minimizing the labour and income cost and protecting the low-income and vulnerable groups. However, the common public major concern lies in where the revenue will be utilized. More support is shown for it going back the environmental protection and the vulnerable groups that are most affected, or used for the development of renewable energy, or enhance the energy efficiency.

Another public concern lies in the current economic recession, which becomes the major reason that public consider against the carbon tax policy. The public believe the cost effectiveness of the carbon tax policy depends on the government's capability of coping with the current economic recession and balancing the social equity. Therefore, the political context seems more or less to influence the cost effectiveness of the carbon tax policy.

In a nutshell, based on the following analysis, it is found that the environmental effectiveness, economic effectiveness, social equity and political context interact with and mutually depend on each other (see Figure 5-1):

Figure 5-1 The relationship between four elements of political feasibility



Towards a green economy, with this mutual dependence relationship among the four elements, therefore, the political feasibility of the carbon tax policy depends on how well they react with each other.

6 Conclusions

Chapter 6 reaches the conclusions based on the research findings, analysis and discussion.

In a time of financial crisis and climate change, the emergence of a green economy brings the governments hope to achieve the multiple goals of revive the economy, mitigate climate change, increase the employment, etc.

Carbon tax has been playing its role as a climate instrument, together with other instruments such as ETS to reduce greenhouse gas (GHG) emissions in a small number of countries in the past decades. In the current context of financial crisis and climate change, theoretically the carbon tax is regarded as an effective instrument to help countries move towards a green economy. Practically, there is one case study merits attention: Ireland is the first and the only country so far in Europe to introduce the carbon tax policy towards a green economy.

As a significant policy evaluation criterion, the political feasibility is conceptualized in theory, and broken down into the four elements: political context, social equity, environmental effectiveness and cost effectiveness. Led by the research questions, cross-sector surveys have been conducted, in an effort to explore the political feasibility of carbon tax policy in Ireland towards a green economy.

Conclusions are drawn from the findings, analysis and discussions of the Irish case study:

The carbon tax policy generally fits the current political context in Ireland, but the current government needs more time, experience and persuasiveness in the public to implement the carbon tax policy. However, the dynamic change of the political power will influence the continuity, consistency and effectiveness of the carbon tax policy. The environmental effectiveness, economic effectiveness and social equity of the carbon tax policy largely depends on if it fits the current and future political context.

The social (in)equity is mainly across the energy, transport, agriculture sector and the rural communities, with the latter three most adversely affected by the carbon tax policy. To what extent the social equity of the carbon tax policy could be guaranteed largely depends on if it fits the economic situation, and if it fits the current political context, rather, the government's ability and experience to implement it and how it disposes of the carbon tax revenue. More support is shown for it going back the environmental protection and the vulnerable groups that are most affected, or used for the development of renewable energy, or enhance the energy efficiency.

The environmental effectiveness of the carbon tax policy in Ireland is difficult to show in the short run, however, given enough long time, it is believed to work in a way of changing consumers' behaviour, reduce emissions, develop renewable energy and achieve sustainability. There are four ways to increase the environmental effectiveness of the carbon tax policy in Ireland: strengthen the public education of the policy, and make it socially equitable across each sector, make it well coordinate and cooperates with other policy instruments, and improve the government's ability, experience and Political Willingness to Push (PWOP) of the policy.

The cost effectiveness of the carbon tax policy in Ireland depends on how much it will raise the revenue and how the government makes it "revenue neutral" to minimize other social cost and protect the vulnerable groups. The cost effectiveness also relies on the political context, rather, government's capability of coping with the current economic recession and balancing the social equity.

In conclusion, towards a green economy, the political feasibility of the carbon tax policy in Ireland depends on how the environmental effectiveness, economic effectiveness, social equity and political context interact with and mutually depend on each other. As a small country under the current economic and climate pressure, it is hard to say if it is the good or ill time to introduce the carbon tax policy. Since it is already in place, it is hoped that it would fully play its economic and climate roles. However, the upcoming political power change and the extent of the Public Willingness to Accept would probably become the dominant factors that decide the fate and evolution of the carbon tax policy in Ireland.

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Appendix A—List of interviewees

The following is a table with details about the professionals that were interviewed during May to August, 2010 for the research.

Name	Organization	Interview date	Interview place
Climate Research Section	Environmental Protection Agency of Ireland	May 18 th , 2010	Dublin, Ireland
Irish taxi drivers		July 27 th , 2010	Dublin, Ireland
Joe O’Conner	Electricity Supply Board of Ireland	July 15 th , 2010	Dublin, Ireland
John Ussher	Irish Taxi Federation	August 5 th , 2010	Dublin, Ireland
Rowena Dwyer	Irish Farmers’ Association	August 10 th , 2010	Dublin, Ireland
Salim Temtem	EirGrid Company	July 15 th , 2010	Dublin, Ireland

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Appendix B—Interview protocols

The interview protocols are used to conduct semi-structured and focused interviews in the research, aiming to identify different attitudes of different interest groups (transport sector, agriculture sector, energy sector and environmental protection sector) towards the carbon tax policy in Ireland.

General issues related to the carbon tax policy

1. Do you agree with the introduction of the Carbon Tax in Ireland? Why or why not?
2. Do you think the introduction of the Carbon Tax will effectively reduce carbon dioxide emissions in the transportation sector in Ireland?
3. Given the current economic climate, should the Carbon Tax have been introduced now, in the future or never?
4. What policy recommendations would you make to the Government on how should the revenues gained from the Carbon Tax be used?

Issues related to transport sector

1. Have you noticed any change in the price of petrol/diesel since the Carbon Tax was levied on transport fuels in December 2009?
2. Do you think the price of the Carbon Tax levied on transport fuels is reasonable? (15 euro/tonne).
3. Do you feel the Carbon Tax has had any impact on the Taxi industry since it was levied on transport fuels in December 2009?
4. Do taxi drivers get any subsidies from the Government to offset Carbon Tax levied on petrol/diesel?
5. In your opinion, which community is most adversely affected by the introduction of the carbon tax and what percentage of the burden do you feel they bear relative to the other communities?

6. Has the introduction of the Carbon Tax had any impact on changing the behaviour of taxi drivers and the industry as a whole in terms of initiatives to offset increasing fuel costs? If Yes what measures do you feel could be introduced and to what extent?
7. What policy recommendations on the Carbon Tax would you make to the Government, to protect individual taxi drivers and the taxi industry as a whole, and on how the revenue gained from the Carbon Tax should be used?

Issues related to agriculture sector

1. Carbon Tax is imposed on the following fuels (petrol, diesel, kerosene, marked gas oil, Liquid Petroleum Gas, fuel oil and natural gas). Which of these do you think will have the most and least impact on individual farmers?
2. Carbon Tax is imposed on the following fuels (petrol, diesel, kerosene, marked gas oil, Liquid Petroleum Gas, fuel oil and natural gas). Which of these do you think will have the most and least impact on the farming industry?
3. In your opinion, which farming sector will be most affected by the Carbon Tax?
4. In your opinion, which community is most adversely affected by the introduction of the carbon tax?
5. Do farmers get any subsidies from the Government to offset the impact of the Carbon Tax levied on fuels?
6. What policy recommendations on the Carbon Tax would you make to the Government, to protect individual farmers and the farming industry as a whole?

Issues related to energy sector

1. To what extent is the energy industry responsible for carbon dioxide emissions in Ireland?
2. Is the Carbon Tax currently levied on any energy industries in Ireland? If Yes, what are these energy industries? What impact do you think the carbon tax will have on these industries? If No, do you think this is appropriate and if so, why?
3. What is the composition of fuels used for power generation in Ireland?

4. Do you think it is appropriate that power generation is covered under the Emissions Trading Scheme and not the Carbon Tax?
5. What measures has the energy industry taken to reduce carbon dioxide emissions in Ireland?
6. In your opinion, which community is most adversely affected by the introduction of the carbon tax?
7. What policy recommendations on the Carbon Tax would you make to the Government, to protect energy users and the energy industry as a whole?

Issues related to environmental protection sector

1. After the COP 15 Copenhagen Conference, what measures is the EPA planning to take to address the climate change issues in Ireland?
2. Could you explain what role EPA is playing in relation to the carbon tax in Ireland?
3. What barriers do you think government can expect to encounter when implementing a carbon tax policy in Ireland in the current economic crisis? How can these barriers be overcome?
4. Do you think the introduction of a carbon tax will be positive from the (a) political, (b) economic, (c) social, and (d) environmental point of view?
5. Besides cap-and-trade, carbon tax is also regarded as a preventive economic instrument to reduce carbon dioxide emissions. Do you believe Ireland needs such an instrument in addition to the cap-and-trade system in the current context of the financial crisis and rising unemployment? Why?
6. How effective do you believe the introduction of a carbon tax will be in reducing carbon dioxide emissions in Ireland? Do you have relevant figures to support your opinion?
7. Since the carbon tax was levied on transportation fuels since last December, do you think it has had any effect on changing customer behaviour and reducing carbon dioxide emissions?
8. Do you believe carbon tax policy will create a good opportunity for the further development of (a) renewable energy; (b) electric vehicles; (c) energy efficiency in Ireland? Why?
9. Do you think the carbon tax policy design for Ireland is appropriate? Do you consider additional measures are required to maximize the benefits of emissions reductions? How can the revenues from carbon tax be best utilised?

10. The Irish government believes the carbon tax will help Ireland to achieve a Green Economy. What do you think of the relationship between the two?

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Appendix C—Questionnaire

The questionnaire is designed and sent to a sample group of Irish citizens from a range of backgrounds in April 2010, to conduct a general survey on the common Irish citizens' opinions about the carbon tax policy in Ireland. Thirty-two respondents replied in all. Nineteen respondents (59%) confirmed they were from an urban background. The remaining 13 respondents (41%) were from a rural background.

Questionnaire on the Carbon Tax Policy in Ireland

1. Which county are you coming from?

2. Are you from rural or urban area?

Rural

Urban

3. Do you agree with the introduction of the new carbon tax in Ireland? Please give reasons for your answer.

Yes

No

Don't know

Additional Comment(s)

4. In your opinion, what impact will the carbon tax have on changing consumer behaviour in Ireland?

None

Small

Moderate

Significant

Don't know

Additional Comment(s)

5. In your opinion, which community will be most adversely impacted by the carbon tax? Is this appropriate and fair?

Rural community

Urban community

Don't know

Additional Comment(s)

6. In your opinion, which sector will be most adversely impacted by the carbon tax? (note 1 = highest impact, 5 = lowest impact) Is this appropriate and fair?

	1	2	3	4	5
Large business	<input type="checkbox"/>				
Small/medium business	<input type="checkbox"/>				
Farmers	<input type="checkbox"/>				
Households	<input type="checkbox"/>				
Others	<input type="checkbox"/>				

Additional Comment(s)

7. In your opinion, what impact will the carbon tax have on Fuel Poverty and what should Government do to protect the vulnerable?

No impact

Increase fuel poverty

Decrease fuel poverty

Don't know

Additional Comment(s)

8. Given the current economic climate, should the carbon tax have been introduced now, in the future or not at all? Please give reasons for your answer.

Now

In the future

Never

Don't know

Additional Comment(s)

9. Do you think the Government should cap the level of the carbon tax if international fuel prices reach a predetermined point? Please give reasons for your answer.

Yes

No

Don't know

Additional Comment(s)

10. In your opinion, will the carbon tax be revenue neutral? Please give reasons for your answer.

Yes

No

Don't know

Additional Comment(s)

11. Which of the following most accurately explains, in your view, the rationale and

purposeor introucing the carbon tax? (note 1 = most relevant, 5 = least relevant)

	1	2	3	4	5
Top-up government coffers	<input type="checkbox"/>				
Increase Ireland’s competitiveness	<input type="checkbox"/>				
Change customer behaviour	<input type="checkbox"/>				
Meet climate/environmental targets	<input type="checkbox"/>				
Others	<input type="checkbox"/>				

Additional Comment(s)

12. In your opinion, how should revenues from the carbon tax best be utilised? (note 1 = optimal use)

	1	2	3	4	5	6
Top-up government coffers	<input type="checkbox"/>					
Increase Ireland’s competitiveness	<input type="checkbox"/>					
Carbon reduction initiatives	<input type="checkbox"/>					
Protect the poor and vulnerable	<input type="checkbox"/>					
Meet climate/environmental targets	<input type="checkbox"/>					
Others	<input type="checkbox"/>					

Additional Comment(s)

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