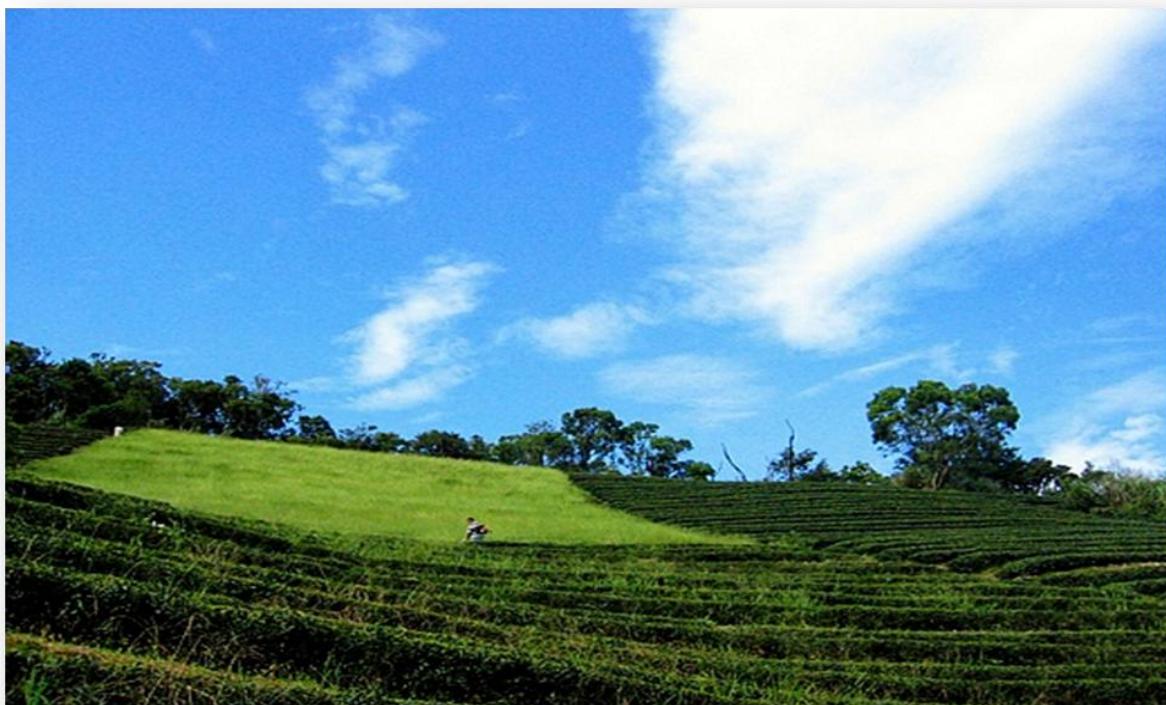


## Is low carbon tourism a good incentive for the development of a low carbon community? - A case study of the Pinglin District



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## **Abstract:**

Recently, the negative impacts caused by climate change have become more apparent. Once global temperatures reach the ‘tipping point’ (2°C), from which there is no return, it will lead to more severe damage. In this context, the notion of ‘low carbon community’ has emerged and is expected to spread out rapidly around the world as a new approach for tackling climate change. At the same time, it provides a new opportunity for local economic growth.

The case study, namely the Pinglin Low Carbon Tourism (PLCT) project, was initiated by the New Taipei City government in 2008, and the project could be seen as a top-down approach to reducing the CO<sub>2</sub> emissions of tourism and also as a means of revitalizing the local economy. Its ultimate vision is to make a transition towards a low carbon community (LCC). This paper aims to explore whether low carbon tourism (LCT) can act as a good option for realizing a low carbon community by using a community capacity framework and community empowerment theory.

The results of the project include both positive and negative impacts on social, environmental and economic dimensions. To some extent, the project has helped to generate income and job opportunities for local people and to increase confidence in their community identity. However, some conflicts of interest within the community, in combination with the passive participation of local residents in the project, could undermine its capacity in pursuit of its long-term low carbon community goal.

An alternative partnership model, which combines bottom-up empowerment with top-down incentives, rather than a strong government-led initiative, is suggested in the context of Pinglin to empower community capacity in order to create ‘low carbon’ change.

**Keywords:** Low carbon communities, Low carbon tourism, Pinglin, Carbon footprint, community empowerment

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## Table of Contents

1 Introduction .....	1
1.1 Problematique and background on a global scale .....	1
1.2 Taiwanese policy context – national and local actions for pursuing LCCs.....	2
1.3 Rationale for the study .....	3
2 Methods and materials .....	4
2.1 Research questions .....	4
2.2 Theoretical approach .....	4
2.3 Study design and data collection.....	5
2.4 Limitations and system boundaries .....	7
3 Literature review .....	8
3.1 Definition of carbon footprint & LCT.....	8
3.1.1 Carbon footprint .....	8
3.1.2 Low carbon tourism (LCT) .....	8
3.2 Community & Low carbon community (LCC).....	9
3.2.1 Meaning of community .....	9
3.2.2 Definition and types of LCCs.....	9
3.3 Case examples of LCCs in other countries .....	10
3.3.1 UK – The Ashton Hayes Going Carbon Neutral initiative.....	10
3.3.2 Japan – Do You Kyoto?.....	11
4 The setting .....	12
4.1 Pinglin District .....	12
4.1.1 Geographic area and its environment.....	12
4.1.2 Economic situation .....	13
4.2 The Pinglin Low-Carbon Tourism (PLCT) project .....	14
4.2.1 Rationale behind PLCT .....	14
4.2.2 Information about PLCT .....	15
4.2.3 Project development.....	17

## Table of Contents

5 Results .....	18
5.1 Impacts of the PLCT project .....	18
5.1.1 Social dimension .....	18
5.1.2 Economic dimension .....	20
5.1.3 Environmental dimension .....	21
5.1.4 Summary .....	22
5.2 Community capacity of Pinglin towards a LCC .....	22
5.2.1 Personal capacity .....	23
5.2.2 Cultural capacity .....	24
5.2.3 Organizational capacity .....	25
5.2.4 Infrastructural capacity .....	26
5.2.5 A short summary .....	27
5.3 SWOT analysis: barriers and potential towards a LCC .....	27
6 Discussion .....	30
6.1 The core value and essence of LCT and LCC .....	30
6.2 The role of the governments, the consultant company, and local community .....	31
6.2.1 City government .....	31
6.2.2 District office .....	31
6.2.3 Consultant Company .....	31
6.2.4 The community .....	32
6.3 Top-down versus Bottom-up approach .....	32
6.4 Low-carbon what? .....	34
6.5 Lessons learnt .....	35
6.6 Further comments .....	36
7 Conclusion .....	37
8 Bibliography .....	38
9 Appendix .....	43

## Figures

Figure 1 The vision of low carbon society in Taiwan.....	2
Figure 2 Prism of sustainability.....	4
Figure 3 Capacity framework .....	5
Figure 4 Map of Pinglin .....	12
Figure 5 Town Treasure of Pinglin .....	13
Figure 6 Tea planting – major economic activity in Pinglin.....	13
Figure 7 The development of the PLCT and number of tourist from 2003-2010.....	14
Figure 8 Routes of the PLCT.....	15
Figure 9 Mini shuttle bus.....	16
Figure 10 Electric golf cars & the tour guide.....	16
Figure 11 Beautiful scenes in Jingualiao .....	16
Figure 12 Vendor in Jingualiao Market (left); Tourists having lunch in dining area (Right) .....	19
Figure 13 SWOT analysis for a LCC in Pinglin.....	29
Figure 14 From Top-down to Partnership .....	34

## Tables

Table 1 Summary of the PLCT outcomes from 2007 to 2011 .....	17
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## Abbreviations

AHGCN	Ashton Hayes Going Carbon Neutral
ACDPV	Association of Community Development in Pinglin Village
AR4	the Fourth Assessment Report
ATP	Association of Tourism in Pinglin
AWNP	Association for Wildlife and Nature in Pinglin
CO <sub>2</sub>	Carbon Dioxide
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
DEP	Department of Environmental Protection
EMCs	Eco-Model Cities
Fig.	Figure
GHG	Greenhouse gas
LCC(s)	Low Carbon Community(-ies)
LCT	Low Carbon Tourism
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
MoEJ	Ministry of Environment Japan
Mt	Million tones
NGOs	Non-governmental organizations
NTD	New Taiwan Dollar
PCLCC	Promotion Council for the Low-Carbon Cities
PLCT	Pinglin Low Carbon Tourism
SEK	Swedish Krona
SWOT	Strength, Weaknesses, Opportunities and Threats
TEPA	Taiwan Environmental Protection Administration

## Currency<sup>1</sup>

A NTD currency equivalent to 0.215 SEK

<sup>1</sup> The currency is updated from the XE website (<http://www.xe.com>), as of April 5<sup>th</sup> 2011.

# 1 Introduction

## 1.1 Problematique and background on a global scale

Within the past two centuries, the improvement and advancement of scientific development and industrial technology has not only fostered economic growth but also deteriorated the carrying capacity of the environment (Arrow et al. 1995). As a result, anthropogenic climate change has become a pressing issue and is, undoubtedly, one of the biggest global challenges faced today (IPCC 2007).

According to the Fourth Assessment Report (AR4) published by the Intergovernmental Panel on Climate Change (IPCC), the impacts caused by climate change are becoming more apparent (*ibid.*). The amount of carbon dioxide (CO<sub>2</sub>) has grown from 280 ppm to 379 ppm, chiefly caused by fossil fuels use and partly from land use change (*ibid.*). In addition, greenhouse gas (GHG) emissions increased 70 percent between 1970 and 2004, and it is projected in the ‘business as usual’ scenario that emissions will further increase by 25 to 90 percent between 2000 and 2030 (*ibid.*).

Currently, many countries are adopting adaptation and mitigation responses in order to prevent ‘catastrophic’ climate change (Burch 2009). One such strategy is the growing interest in actions on different levels to pursue a ‘low carbon’ future. A low carbon economy or low carbon society policy is proposed to be a means to achieve this goal in many countries, at both national and sub-national levels, and to reduce carbon emissions through innovative solutions including renewable energy and other clean technologies, and at the same time help encourage economic growth.

For example, the United Kingdom (UK) government firstly proposed a strategy for developing a low carbon economy in its energy white paper *Our Energy Future - creating a low carbon economy* in 2003 (DTI 2003). This strategy has now widely spread and is acknowledged by many countries where many low carbon communities (LCCs) or carbon neutral communities are emerging (Alexander et al. 2007; Burch 2009; Mdluli & Vogel 2010; Reiche 2010). But why promote low carbon actions at the ‘community’ level is because it is easier for people to get together to raise awareness and change their behavior than letting them act alone. In this sense, as stated by Heiskanen and colleagues, LCCs provide a new context for energy related behavior change (2009: p.1).

Besides the many efforts made to develop LCCs, the concept of low carbon has also been adopted in the tourism sector in order to address climate change. Tourism is a major contributor to CO<sub>2</sub> emissions, contributing 5 percent to GHG emissions on the global level (Scott et al. 2008). However, in rural regions, especially in protected areas, local people rely much on tourism for supporting their livelihood. Thus, once tourism is affected by climate change, it can also threaten local livelihoods (*ibid.*). In other words, tourism is both a contributor and victim of climate change. It is important that the tourism sector is also committed to reducing CO<sub>2</sub>. In a place where tourism is a means by which a local economy is sustained, the shift to both LCT and LCCs is crucial and urgent. A brief literature review and case examples of LCCs will be explored in Chapter 3.

## 1.2 Taiwanese policy context – national and local actions for pursuing LCCs

For a long time, Taiwan since the 1970s followed the path of Western societies to modernization, industrialization and development, leading to environmental degradation and the exploitation of natural resources (Yu 2005). In addition, Taiwan is an energy-intensive country. According to the Bureau of Energy, Ministry of Economic Affairs, Taiwan, the country's CO<sub>2</sub> emissions per capita in the year 2008 were 11.0 tonnes which is lower than that of the United States (18.8 tonnes) while higher than that of Japan (9.0 tonnes) (Bureau of Energy 2009a; IEA 2010). The world average CO<sub>2</sub> emissions per capita were 4.39 tonnes (IEA 2010). In recent years, the effects of climate change, including extreme weather and rising temperatures, have become apparent and severe in Taiwan (Hsu and Chen 2002).

Although the notion of low carbon is new to Taiwan, it has begun to become popular in recent years. During the Third National Energy Conference in 2009, the Taiwanese government committed to reduce CO<sub>2</sub> emissions to 2008 levels by 2020, to 2000<sup>2</sup> levels by 2025, and to reduce CO<sub>2</sub> emissions by 50 percent of 2000 levels by 2050 (Bureau of Energy 2009b). Furthermore, the focus of the current Taiwanese energy policies<sup>3</sup> on green technologies also demonstrates the determination of the Taiwanese government to achieve a low carbon economy aligned with its goals of sustainable development (*ibid.*). During the 2009 conference, the government also launched an agenda to establish a 'low carbon society', and made a concrete time plan for this (*ibid.*). It expects to assist 50 communities to become LCCs by 2011, will assist 6 cities to become low carbon cities by 2014, and establish 4 low carbon living zones by 2020 (See Fig. 1).

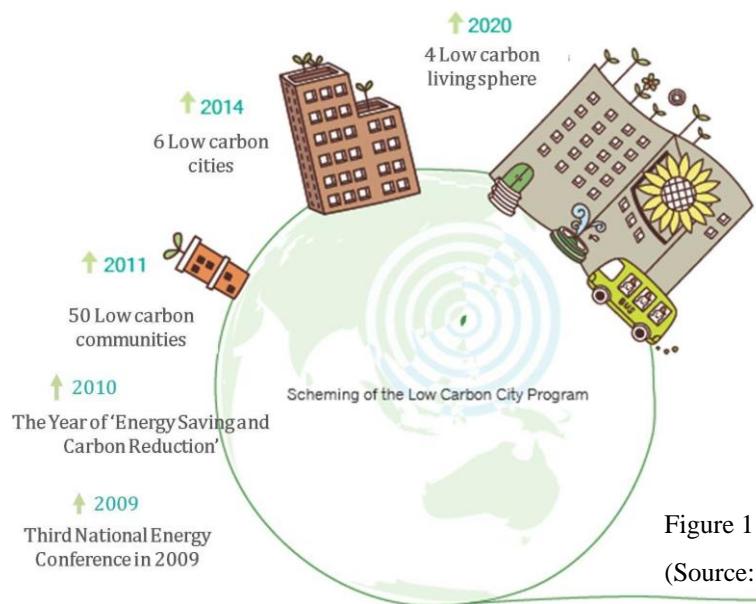


Figure 1 The vision of low carbon society in Taiwan.  
(Source: TEPA 2009)

However, before the Third Energy Conference was held and goals were set, New Taipei City had already established the first 'Development Center of Low Carbon Communities' under the Department

<sup>2</sup> The CO<sub>2</sub> emissions in Taiwan in 2000 year were 214 Mt.

<sup>3</sup> In order to promote the use of renewable energy and mitigate GHG emissions, the 'Renewable Energy Development Bill' was promulgated by the Legislative Yuan (Administration Council), Republic of China on 12<sup>th</sup> June 2009 (Bureau of Energy 2009).

of Environmental Protection of New Taipei City in 2008 with hopes that it will become the first low carbon city in Taiwan (DEP 2011). The Development Center is the first sector to be supervised by the local government, with the government being in charge of CO<sub>2</sub> emissions reduction through promoting green transport, recycling, low carbon life, and energy saving (*ibid.*). The tasks of the local carbon center are based on the concept of communities including families, schools, companies, and residential areas; consequently it could spread to the whole city (*ibid.*).

One of the first low carbon initiatives is the ‘Low Carbon Tourism’ project in Pinglin District. The Pinglin Low Carbon Tourism (PLCT) project was initiated by New Taipei City (a city authority) in 2008 in order to establish the first LCC model in one of its administrative areas. It is expected to influence on people’s behavior (including tourists and local people) towards more low carbon lifestyles, and to inspire other communities will follow this model to achieve its goal of being a low carbon city. This is due to the fact that the New Taipei City government intends to start from a small scale, with envisioned effects at a large scale, encouraging people to take action nationwide.

The PLCT initiative can be seen as a city government level action for addressing climate change issues in Taiwan. Its ultimate goal is to make Pinglin an LCC. Thus, to understand the whole process and rationale behind PLCT and investigate local residents’ attitudes can help to develop a fuller picture of how successful the project can be made at the community level in terms of leading people’s behavior and attitudes becoming more sustainable and environmentally-friendly.

### 1.3 Rationale for the study

Climate change is the significant driver behind government’s pursuit of LCCs (DECC 2009<sup>4</sup>; Kraxner et al. 2010). As Sinclair states the issue of climate change will help shift toward a new paradigm “in the understanding of the role of sustainable development” (Sinclair 2008: p.2). However, different countries have different strategies or priorities to develop LCCs at all levels (DECC 2009; Kraxner et al. 2010; Reiche 2010). In Taiwan, the PLCT initiative was created as a foundation stone to the development of an LCC in Pinglin by bringing local people economic benefits and opportunities, and at the same time, empowering the community. However, the outcomes of the low carbon initiative have yet to be fully examined by many studies. I see the importance and need to understand and disclose the mechanism behind it.

Through adopting a case study method, this thesis aims to examine the impacts of the PLCT initiative, and their influence on the development of an LCC in Pinglin. The thesis will also analyze the potential of PLCT and the barriers against it as an effective incentive for local community empowerment towards a more sustainable living by adopting a capacity framework.

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<sup>4</sup> UK Department of Energy and Climate Change (DECC) was created in 2008 in order to a) secure energy use, b) realize a low-carbon Britain, and c) achieve an international agreement on climate change in COP15 (DECC 2011)

## 2 Methods and materials

### 2.1 Research questions

Main research question:	How can the Pinglin Low Carbon Tourism (PLCT) initiative act as a catalyst to help Pinglin become a low carbon community (LCC)?
Sub-research questions:	<p>What are the social, environmental and economic impacts of the initiative that can support or impede Pinglin to develop a low carbon community?</p> <p>What are the intrinsic and extrinsic community capacities that can assist the transition towards a low carbon community in Pinglin?</p>

### 2.2 Theoretical approach

The theoretical framework of this thesis will be centered on the theory of ‘community empowerment’ in order to see how a LCT initiative makes local residents participate and how it helps to build upon the capacity of the community in response to climate change.

The adoption of community empowerment theory in tourism development can be found in the literatures on community-based tourism or community-based ecotourism (Scheyvens 1999). It is argued that the conventional ecotourism emphasizes more on the environmental and economic dimensions, while neglecting the important social and cultural aspects (*ibid.*). Thus, empowerment is crucial in the sense that it can ensure that a community is actively involved and has direct control over projects such as PLCT and subsequently an LCC (*ibid.*; Colton & Harris 2007). Therefore, in this paper, how the implementation of PLCT affects community empowerment of the community in Pinglin will be examined through analyzing its impacts and the community capacities.

Undoubtedly, any mode of tourism can have positive and negative consequences. The prism of sustainability (economic, environmental and social dimensions) will be adopted as the lens to examine the outcomes and impacts of the PLCT initiative which might support or impede people in the community to pursue an LCC. The indicators (see Fig. 2) in different dimensions will be used to analyse the impacts of the PLCT project. Concerning environmental impacts, the pressure on the bio-physical environment of Pinglin caused by the activities of the PLCT tours will be examined. In terms of economic impacts, the discussion will mainly focus on the economic benefits brought by the PLCT project. Concerning social impacts, local people’s satisfaction about the project, community cohesion, and social equity are important factors to be analyzed.

Figure 2 Prism of sustainability  
(Adopted from Cottrell et al. 2005)

<p><b>Environmental dimension:</b> the need to reduce pressure on the bio-physical environment</p> <p><b>Economic dimension:</b> local people’s needs for (material) welfare</p> <p><b>Social dimension:</b> individual behaviour, social equity, community cohesion, satisfaction</p>
--

Furthermore, a ‘capacity framework’ (see Fig. 3) proposed by Middlemiss & Parrish (2009) will be used to analyze and evaluate the different community capacities, which Pinglin inherently possesses and on which PLCT has effects, that can facilitate or handicap the implementation and process of low carbon actions, and the future development of an LCC in Pinglin. The thesis will examine personal, cultural, infrastructural, and organizational capacities, because these capacities can influence the outcomes of such low carbon action.

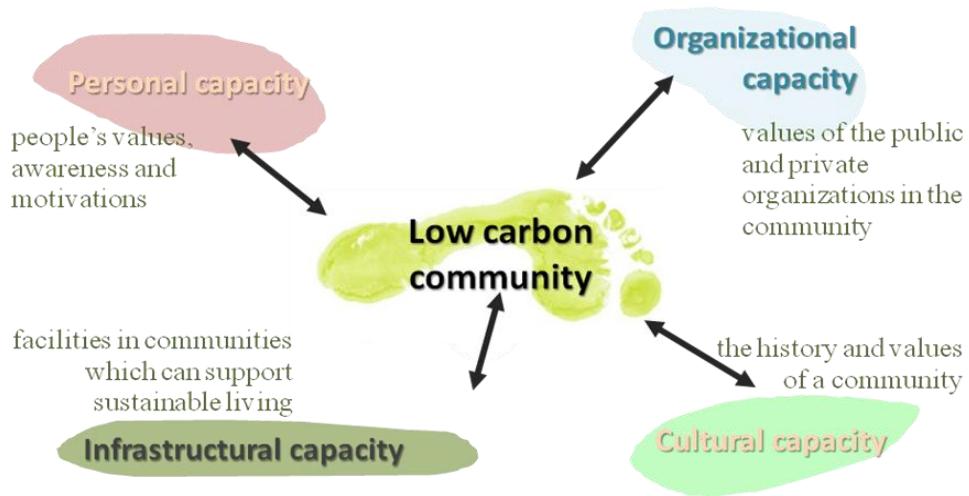


Figure 3 Capacity framework

(Adapted from Middlemiss & Parrish 2009)

### 2.3 Study design and data collection

A case study method is often used in social research for investigating a contemporary phenomenon in a ‘real-life’ context, since it is a flexible method which can help researchers gain a comprehensive and holistic understanding of the complexity behind a phenomenon or event where little is known about a subject (Yin 2003). As this research aims to explore not only the results of the PLCT initiative, but most importantly the process of the planning and implementation of the project and any changes it caused within the community which might impact the future development of an LCC, the choice of applying a single empirical case study as the research strategy is useful and feasible. In this case, the role of theory can be seen as a means of understanding what was observed and what knowledge I as a researcher gained from the field work.

The thesis is based on a qualitative research method through a deductive approach. The qualitative research methods often focus on words rather than quantification, that is, numbers or modeling (Bryman 2008: p.697). Thereby, additional insights and interpretations of the findings could be gained more precisely. Therefore, I first explore practices related to low carbon development through reviewing articles from journals, dissertations, books, and information on the Internet in order to develop a theoretical framework. Research from local publications and newspapers will be also

presented to build the context for PLCT, Taiwan. In addition, existing projects on the neighborhood, community, and the city around the world will be reviewed to see what can be learnt from their experiences; the case examples are discussed in Chapter 3 and Section 6.5. When devling into the related literature, I found that the theory of community capacity-building and community empowerment plays an important role in the dialogue of LCT and LCC. Subsequently, I bear my hypothesis and research questions developed from the theory in mind to the field.

The ways to collect data in order to prove my hypothesis includes document reviewing, field visits, observations and in-depth interviews. Through these methods, a rich and detailed picture of the PLCT initiative and residents' impressions about this initiative and their attitudes toward an LCC could be seen. An understanding of the obstacles that local people confront when pursuing low carbon lifestyles can also be gained. The triangulation which comprises the use of different methods and sources were adopted to enhance the credibility and reliability of my study (Bryman 2008: p.379; Yin, 2003).

As part of the preparation befor the interviews, an semi-structured interview guide<sup>5</sup> was developed for talking with local people in case they were not all fimilar with the topic. While interviewing some of the government officials and the employees of the Kaishin company (Kaishin Engineering Consultant Co. Ltd.), there was no need to use the prepared semi-structured interview guide<sup>6</sup> since the interviewees expressed their ideas and stories freely and on their own terms.

During each interview, a recorder was used to record the whole conversation with the interviewees' permission. During the field work, interview guides and a recorder were brought. In total, 17 in-depth interviews (between 1 and 2.5 hours in length) were conducted with different stakeholders of the PLCT, including local guides (Interviewees T01/T02/T03), villagers (Interviewee C03), local merchants (Interviewees C02/C05/C06/C07), local tea growers (Interviewee C08), staff of the PLCT (Interviewees C01/C04/P01), government officials (Interviewees P02/P03/P04) and employees of the Kaishin company (Interviewees K01/K02) to see the rationale behind and objectives of this initiative, people's satisfaction about the PLCT, and their attitudes on the development of an LCC. Interviewees were informed that their responses would remain confidential. Interviewee information is illustrated in Appendix 3.

After each interview, comments were written down and transcriptions were made immediately. The field notes and transcription were carefully read to look for the interviewees' responses to perform coding. The coding was based on the research questions; thereby the responses were coded to indentify the impacts of the PLCT, stakeholders' analysis (their knowledge and attitudes on the development of an LCC), and different community capacities (personal, infrastructural, organizational, and cultural) in Pinglin. The responses were coded into a computer. Moreover, in this phase more papers were reviewed to assist in the interpretation of the findings and the test of my hypothesis.

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<sup>5</sup> Interview guide for local people is attached in Appendix 1.

<sup>6</sup> Interview guide for government officials and staff in Kaishin company people is attached in Appendix 2.

## 2.4 Limitations and system boundaries

It should be acknowledged that although the objective of this exploratory research is to give a holistic overview of the development of low carbon tourism and a low carbon community, the short amount of time spent in the field can only represent parts of reality at a specific point in time. In addition, although the use of a single case study strategy provides several advantages, it is not to say the method is without any flaws. A common criticism of this method is that a single case study cannot be generalized (Yin 2003). However, the aim of the study is not to generalize the findings of the study to other projects in other settings, rather to provide an account of the development of LCT and an LCC in a rural Taiwanese setting, since it is acknowledged that each project and setting is specific and context-based.

## 3 Literature review

Although there is limited literature associated with LCT and LCCs, some relevant concepts can be found within the literature of ecotourism and sustainable communities (Middlemiss & Parrish 2009: p.2). In this chapter, definitions will be given to clarify the meanings of some important terms, and case examples will be introduced in order to build an understanding of the strategies and challenges that different communities in different countries used and encountered.

### 3.1 Definition of carbon footprint & LCT

#### 3.1.1 Carbon footprint

This paper does not aim to calculate the carbon footprint in Pinglin, however, it is essential to give a definition for it because LCT and LCCs are closely linked to this notion. In general, carbon footprint is considered to be rooted in the term ‘ecological footprint<sup>7</sup>’, which was firstly introduced by Ress, although the latter term is much more encompassing (Ress 1992). However, there is no consensus on the definition of carbon footprint. Different authors give different explanations which are well summarized by Wiedmann & Minx<sup>8</sup> (2007: p.3) Moreover, the ways it is calculated or measured are also diverse. Some scholarly articles only consider CO<sub>2</sub> emissions while others include other GHG emissions (*ibid.*). Basically, the measurement of carbon footprint can help individuals to quantify their contribution to global warming. In this paper, the definition of carbon footprint is defined as the total amount of CO<sub>2</sub> emitted directly or indirectly from an activity or over the life cycle of a product (*ibid.*).

#### 3.1.2 Low carbon tourism (LCT)

Although there is no universal definition of low carbon tourism (LCT), the main emphasis is that energy consumption and CO<sub>2</sub> emissions caused by the activities, products and services of tourism are minimized (Chiesa & Gautam 2009; Filimonau et al. 2011). The CO<sub>2</sub> emissions of tourism can be separated into direct and indirect emissions. Direct emissions embody transport (fuel and energy consumption), accommodation (electricity or gas consumption), restaurants and other tourist activities, while indirect emissions include energy producing and transportation infrastructure, manufacturing of vehicles, and construction of the accommodation or restaurant facilities (*ibid.*). When calculating the carbon footprint of tourism, the indirect impacts are normally not addressed, though they could also contribute a high proportion of emissions (*ibid.*).

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<sup>7</sup> The definition on ‘ecologic footprint’ can be found in Ress 1992.

<sup>8</sup> See Appendix 4

## 3.2 Community & Low carbon community (LCC)

### 3.2.1 Meaning of community

Before discussing LCCs, it is essential to make a clarification of the ‘community’ concept. In sociology, the notion of community has existed for a long time, and its definition can be found in a variety of papers (Hillery 1995). A community can be “territory- or geography-based” such as a neighborhood, town, or city (MaMillan & Chavis 1996: p.8). Another form of community is “relation-based”, thus a community can be a group of people living in different places who have common interests or goals (*ibid.*). Recently, Emejulu & Shaw (2010: p.8) define this term, saying that “the term of community can be ‘stretched’ in a multitude of different ways to refer to very different sets and networks of social relations. It can refer to a local area or a network of interconnections which may or may not be geographically close. And, of course, it can be used as a political and policy making tool – as well as a tool of opposition, of resistance and of struggle.”

### 3.2.2 Definition and types of LCCs

Recently, the idea of promoting LCCs has gained popularity because of increasing public awareness of climate change. The term LCC falls into the climate change agenda, so it is closely linked to the concept of carbon footprint. Furthermore, it is community-centered in which a community’s contribution to CO<sub>2</sub> emissions can be understood. Hence, communities, climate change and carbon footprint are key components of LCCs which are all tied together. However, sometimes, the term ‘LCC’ might be used with other terms such as ‘sustainable communities’ (Middlemiss & Parrish 2009). The major difference is that LCCs emphasize more the reduction of GHG emissions and the enhancement of energy efficiency in a community (Hourcade & Crassous 2008), while the concept of sustainable community is more encompassing, concerning a broad sustainable development agenda. But it should be acknowledged that LCCs encompass not only environmental issues but social dimensions when it comes to the community capacity to change (*ibid*; Heiskanen et al. 2009; Middlemiss & Parrish 2009) and economic incentives to achieve such change (Seyfang 2009).

Thus, how to define LCCs? Although, the term ‘LCC’ has been widely used in different fields, no agreed definition can be found (Murray & Dey 2009). Drawing on several studies (Burch 2009; Heiskanen et al. 2009; Middlemiss & Parrish 2009), in this paper, an LCC is defined as a community that attempts to mitigate GHG emissions and decrease its carbon emissions in food, energy, transport and the solid waste sectors through promoting a number of strategies of sustainable lifestyles including carpooling, car sharing, energy conservation, and eating habits (local & seasonal); applying clean energy technologies including green building materials, small or large-scale renewables; and other methods such as tree planting.

Drawing from the literature review, it can be seen that the types of LCC in terms of the approaches

executed and/or the ways it is managed can be divided into 2 types: (1) a top-down approach, which means it is governments or municipalities who launch the initiatives, dominate the situation and hold the power of decision making (Emejulu & Shaw 2010); and (2) a bottom-up approach from a grass root level, where a community who has a collective consciousness get together to combat climate change (*ibid.*). The debates of these two approaches to achieve a LCC will be discussed in Section 6.3.

In addition, according to Heiskanen et al. (2009: p.4), LCCs can be divided into four groups in terms of the ways they are organized: (1) place-based LCCs which usually have geographic boundaries such as cities, municipalities and so forth; (2) sectoral networks such as offices; (3) ‘interest-based’ such as non-governmental organizations (NGOs); and (4) virtual LCCs, that is, some movements organised via the Internet. No matter of the form of the LCC, the basic ideas are similar. The paper will focus on the first type of LCCs, since the case falls into this category.

### **3.3 Case examples of LCCs in other countries**

Globally, there has been lots of attempt for LCC. However, more of these examples are promoted in cities (Burch 2009; Kraxner et al. 2010) compared to those in rural areas (Alexander et al. 2007). This section will show two examples of communities in the UK and Japan who have worked toward achieving LCC or carbon neutral status recently. The example cases chiefly focus on the LCC with a geographic boundary, and are represented at different levels, namely a community in a small town and a megacity. Firstly, the policy of low carbon actions on the national level will be introduced, and then the strategies for the development of LCCs of these examples will be examined. The basic information on the community and the city can be found in Appendix 5.

#### **3.3.1 UK – The Ashton Hayes Going Carbon Neutral initiative**

The UK government aims to make the UK a low carbon country (DECC 2009). The government has committed to reduce CO<sub>2</sub> emissions by 80 percent by 2050 under the ‘Climate Change Act 2008’ in order to curb inevitable climate change (*ibid.*). In recognition of the importance of community-based actions for addressing issues of global warming, the Community Action 2020 was launched by the British government in 2006 to ‘think globally and act locally’ (HM Government 2005). The rationale behind starting actions with communities is because people “*often achieve more acting together than as individuals*”, while the role of the government is to support such initiatives (DECC 2009: p.92).

The case example examined here is a small rural village called Ashton Hayes located in Cheshire, UK. ‘The Ashton Hayes Going Carbon Neutral (AHGCN) project’ was officially launched by the Ashton Hayes Parish Council in 2006 (Alexander et al. 2007). The approaches that the AHGCN project applied in order to mitigate the carbon footprint of the community focused on different aspects including energy, transport, waste, lifestyle changes and knowledge sharing (AHGCN 2011). Within 4

years of implementation (2006-2010), CO<sub>2</sub> emissions of the community<sup>9</sup> were reduced by 19.5 percent (from 4,766 tonnes to 3,866 tonnes per year) mainly due to the behavioral changes of the residents by doing simple things like installation of insulation, reduction of flights, and the use of energy-efficient light bulbs; as well as the application of renewable energy in the public buildings such as the primary school and sports facilities (Alexander et al. 2010; ibid.). This case is quite successful in terms of its high profile; it attracted media attention (Jowit 2007; Ward 2007), and the story spread to not only other communities within the UK but communities around the world. The remaining barrier to this case was the residents' attitudes toward prioritizing sustainable behaviors (Edwards 2007).

### 3.3.2 Japan – Do You Kyoto?

In 2008, the Japanese Prime Minister Yasou Fukuda launched a vision called ‘A Low Carbon Society in Japan’ (Fukuda 2008). In order to make the transition to a ‘Low Carbon Society’, the Japanese government started the ‘Eco-Model Cities (EMCs)’ project in 2008 (Kraxner et al. 2010). The objective of this project is to establish the low carbon society model at a city level which was proposed by the Japanese Ministry of Environment (PCLCC 2008). To accomplish this goal, the government organized the ‘Promotion Council for the Low-Carbon Cities (PCLCC)’ in December 2008. Until now, 13 EMCs<sup>10</sup> have been selected (ibid.)

Kyoto is also one of 13 EMCs. The EMC proposal of Kyoto is known as ‘Do You Kyoto?’. The aim is reduce its CO<sub>2</sub> emissions by 40 percent by 2030 from 1990 emission levels, and then reduce this by 60 percent by 2050 (Kadokawa 2009). There are three projects promoted, namely (1) Kyoto - A City for Walking; (2) Kyoto - A City; and (3) Do You Kyoto? - Lifestyle Changes (ibid.). The activities take place in different sectors in different sectors, including transport, commercial, industrial, and residential.

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<sup>9</sup> The total CO<sub>2</sub> emission in each year (2006-2010) of the community in Ashton Hayes was measured by conducting household surveys, that is, door to door questionnaires, to see the total sum of CO<sub>2</sub> emissions produced from different housing types. More detail can be seen in Alexander et al. (2007).

<sup>10</sup> Details about the 13 Eco-model Cities can be seen in Appendix 6.

## 4 The setting

### 4.1 Pinglin District

#### 4.1.1 Geographic area and its environment

Pinglin District is one of the 29 districts of New Taipei City, located in Southeastern New Taipei City in Northern Taiwan. The map of Pinglin is illustrated in Fig. 4. The total area is around  $170 \text{ km}^2$ , which makes it the third biggest district of New Taipei City. There are seven villages in Pinglin. The total population in Pinglin is 6,529, and the total number households stands at 2,441 (Pinglin District Household Registration Office, 2011). It is a rural mountainous area, having the Hsuehshan Range on the East side. The geographical isolation makes Pinglin less developed (Minister of Interior 1993).

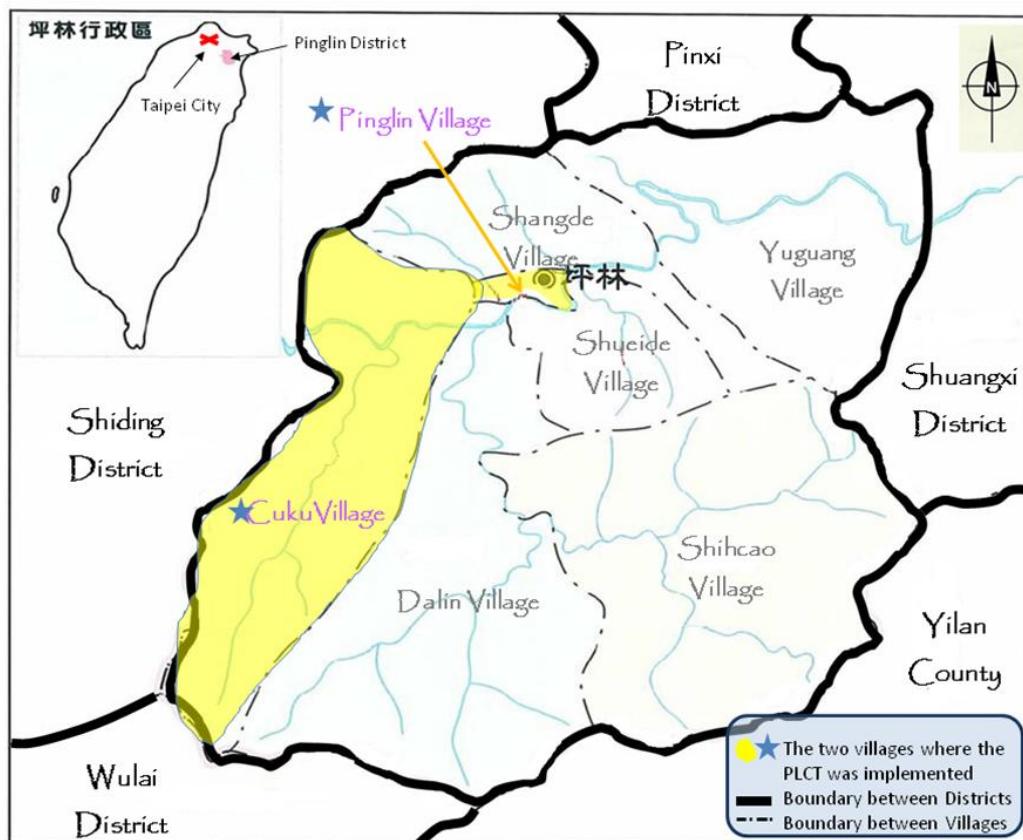


Figure 4 Map of Pinglin

The climate of Pinglin is warm and humid. The average annual rainfall is 3,500 mm (New Taipei City Government 2011). The average temperature is 25.6°C in summer and 15.9°C in winter (*ibid.*).

Pinglin is home to a remarkable biodiversity. First of all, the southern area of Pinglin belongs to the National Forest, which comprises 60 percent of the total area of Pinglin. The dominant vegetation has been classified as subtropical broadleaf moist forest (Minister of Interior 1993). Being a ‘Tea Town’,

its major scenery is fields of terraced tea plants. Moreover, fish species are also rich and diverse in Pinglin, for example, *Varicorhinus barbatulus* is the ‘Town Treasure’ of Pinglin, and the villagers called it the ‘firefly in the water’ (see Fig. 5). Since *Varicorhinus barbatulus* can only survive in clean water, it is also regarded as a bio-indicator of water quality.



Figure 5 Town Treasure of Pinglin  
- *Varicorhinus barbatulus*



Figure 6 Tea planting – major economic activity in Pinglin  
(Source: Pinglin District Office 2002: p.426)

#### 4.1.2 Economic situation

Since Pinglin is upstream of Feitsui Dam completed in 1987 for supplying water to the Taipei Metropolitan area, hydropower generation, and flood damage reduction (*ibid.*), it has since been planned to be a ‘Water Source Protected Area’. Due to the restrictions of being a Water Source Protected Area under the strict ‘Drinking Water Management Act’<sup>11</sup>, agriculture in particular tea farming (see Fig. 6) and forestry are its core industries since it is prohibited to build factories and perform other activities which will pollute water in Pinglin (Minister of Interior 1993).

The total cultivated area in Pinglin is about 10 percent of the total area (~1,700 hectares) (Pinglin District Office 2002). It is worth mentioning that this region is suitable for the growth of tea, due to the mountainous terrain, climate and soil of Pinglin (*ibid.*). 80 percent of working-age population<sup>12</sup> in Pinglin is tea growers, making Pinglin deserve its name of ‘Tea Town’ (*ibid.*). Thus, tea agriculture is the main economic activities. Of the total cultivated area, tea is grown in nearly 28.49 percent of the area (983.3 hectares), generating an annual income of about 500 million NTD (equal to 107 million SEK) (Pinglin Digital Opportunity Center 2011). The annual tea yield is 800,000 kg. It is famous for its Baozhong tea<sup>13</sup>, which is mainly cultivated in Pinglin in Taiwan.

The other major economic activity in Pinglin is tourism, since Pinglin was once the hub between Taipei City and Yilan County before the opening of Hsuehshan Tunnel in 2006. During that time, tourism generated much revenue for the Pinglin local economy (Interviewees C02/C07/T03; Lin 2008: p.19).

<sup>11</sup> The restrictions on the use of the land in ‘Water Source Protected Areas’ based on the Drinking Water Management Act, can be seen in Appendix 7 (TEPA 2006).

<sup>12</sup> According to the Council of Agriculture, Executive Yuan (Administration Council), ‘working-age population’ is defined as the number of people aged 16 years and older (Council of Agriculture 2011).

<sup>13</sup> Baozhong tea is the lightest of the Oolong teas, which has commonalities with Green teas.

## 4.2 The Pinglin Low-Carbon Tourism (PLCT) project

In this section, the rationale behind the PLCT project, that is, the development of the project will firstly be introduced. Secondly, general background information including tour routes and tourist sites of the PLCT project will be presented, which includes my first trip to Pinglin. Thirdly, the core ideas of the development of the project will be shown.

### 4.2.1 Rationale behind PLCT

Before the opening of the Hsuehshan Tunnel, people who wanted to travel between Taipei and Yilan had to drive via the Taipei-Yilan Road, and Pinglin stands at the midpoint of this road. Most people would take a rest or have a meal in Pinglin. Thus, during that time, there was a prosperous business in Pinglin, and the main business street (Shuiliujiao business area) was full of tourists who were heading to Yilan or to Taipei (Interviewees C02/T01/K02). When the Hsuehshan Tunnel was completed, the number of tourists in Pinglin declined dramatically. According to the 2010 PLCT report, the average number of tourists in Pinglin before June 2006 was 25,000 people per month (See Fig. 7) (Interviewee K02). However, after the opening of the Hsuehshan Tunnel, the average number of tourists declined to 5,000 people per month (*ibid.*). This 80 percent reduction in tourist visits caused economic losses and threatened the locals' livelihood. Another indicator can be found in the numbers of tourist visits to the Pinglin Tea Museum, which shows that after the opening of the Hsuehshan Tunnel, the number of visits to the Tea Museum in 2006 dropped to 35,025 from 42,859 in 2003 (Department of Budget 2011). The numbers of tourist visits increase after the implementation of PLCT (*ibid.*).

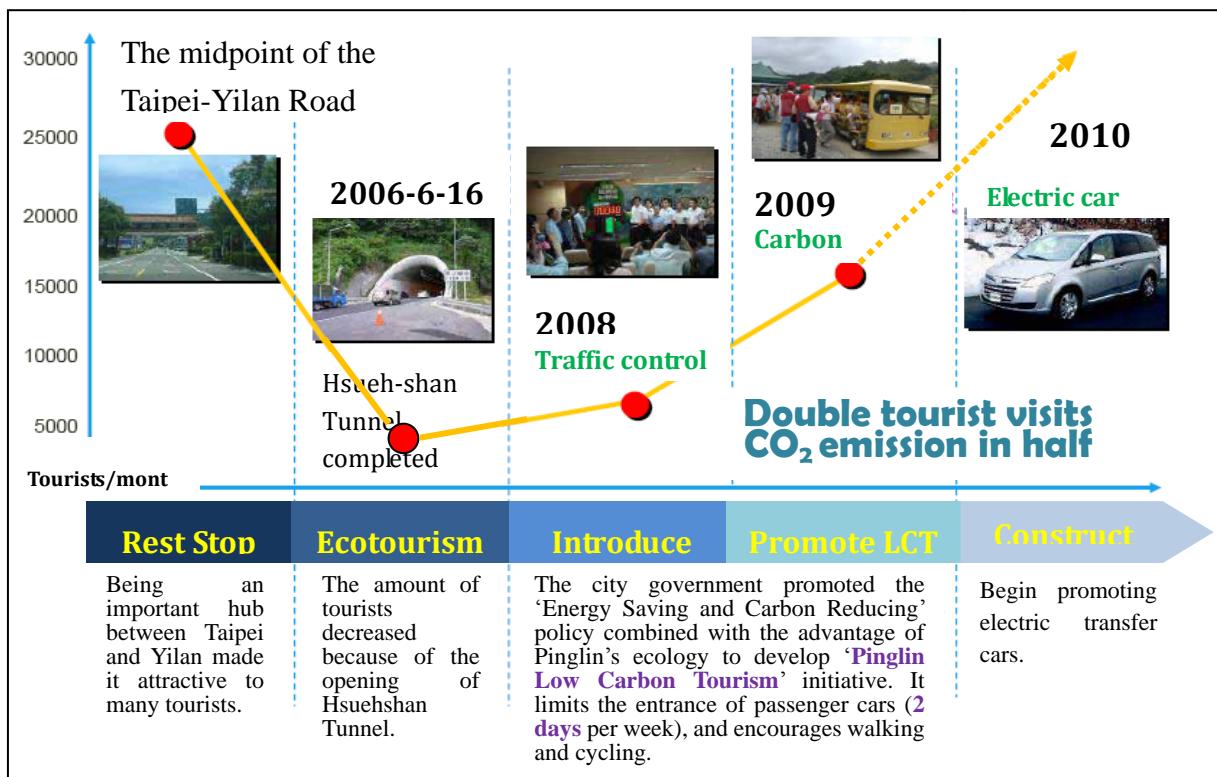


Figure 7 The development of the PLCT and number of tourist from 2003-2010

(Source: Provided by the Kaishin company)

To solve this problem, and aligning with the low carbon vision proposed by New Taipei City Government, the Environmental Protection Bureau of the New Taipei City Government decided to establish the first Low Carbon Tourist Center in Pinglin. The implementation of PLCT seems to be the ‘best scenario’ for Pinglin’s future. The objective of PLCT is to set up a model for the promotion of low carbon activities. Thus, there will not be overdevelopment in this area, and at the same time it will help to reduce pollution brought by tourists. Consequently, it will help to stimulate the local economy without doing harm to the environment (Interviewees P02/K02).

#### 4.2.2 Information about PLCT

The PLCT project was initiated by the New Taipei City government in collaboration with the Pinglin District Office, and officially began in 2008. Since then, the government invited proposals for the initiative from the private sector (various companies). Finally, the proposal of the Kaishin company was selected out of three proposals. The company serves as the developer, in charge of the planning of the PLCT project and assisting in the implementation of the tour activities.

In the first and second year of the project, the PLCT tours focused on Pinglin downtown (Shuiliujiao business area and the Tea Museum) in Pinglin Village and Jingualiao area in Cuku Village (Route 1 in Fig. 8). Jingualiao was selected because of its beautiful and comparatively less-developed natural environment. The tours are held on every Wednesday and Friday, and are free of charge. People who want to join the tour only have to sign up online for the open tour days (<http://www.pingling.com.tw/signup.php>).

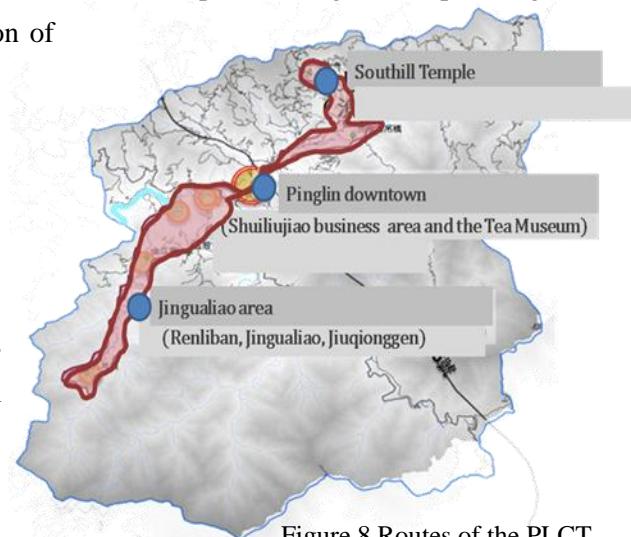


Figure 8 Routes of the PLCT

In order to understand the PLCT activities from a tourist perspective, I joined in a PLCT tour on 31<sup>st</sup> December 2010, which was also my first time in Pinglin. On this day, people who signed up for the tours met up front of the New Taipei City Hall. There were four mini shuttle buses (Fig. 9) waiting for us, and each bus could take 20 people. The idea is to reduce CO<sub>2</sub> emissions through carpooling, so that tourists would not drive their own cars. The staff of the PLCT tour reminded us to bring our own tableware on the bus. When we arrived in front of the Pinglin Low Carbon Tourist Center, four tour guides got on the buses. According to my observation, most people joined the PLCT tour are middle aged or older. This is probably because PLCT tours are held during workdays (Wednesday and Friday) when most people go to work. Indeed, when talking with some people on the bus, they told me they were already retired.

Our first destination was Jingualiao. Traffic regulation has been implemented in this area; thereby tour members have to alight the mini shuttle bus and change to an electric golf car (Fig. 10) in order to reduce carbon emissions. On arriving in Jingualiao, I was attracted by its natural environment immediately (Fig. 11). During lunch time, we bought ‘Carbon Vouchers’ (which will be discussed later), and the guide took us to his tea shop to have lunch. The guide was knowledgeable and told us about the vegetation and ecology in the Jingualiao area, the history and culture of the Pinglin Old Street, and tea history in the Tea Museum. The trip was informative in terms of making people know more about Pinglin. During the whole trip, the guide did not address the low carbon notion in detail. Thus, to some extent, in my opinion it is more like a nature tour.



Figure 9 Mini shuttle bus



Figure 10 Electric golf cars & the tour guide

In the third year of the PLCT (2010-2011) project, an additional route (6 tour days) was added into the project, with the destination being the Southill Temple (Route 2 in Fig. 8). The tour to the Southill Temple costs 500 NTD per person (equivalent to 107 SEK). This route has been added as an experimental route in order to gauge the tourists’ acceptance and willingness to pay for the PLCT. As one Kaishin company staff member told me, the difference between the free tour and fee-based tour is the latter emphasizes the low carbon concept including letting tourists watch two videos<sup>14</sup> relevant to climate change and taking part in some handicrafts by using waste materials (Interviewee K01). The approaches and significant achievements of the PLCT project are summarized in Table 1.

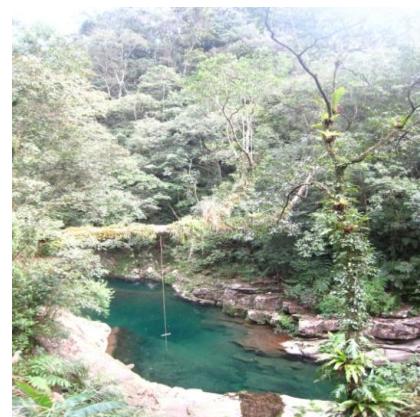


Figure 11 Beautiful scenes in Jingualiao

<sup>14</sup> One is the “± 2°C” documentary (<http://www.youtube.com/watch?v=9K4Li7dDVp4>), and the other is the “Please help the world” - COP15 opening film (<http://www.youtube.com/watch?v=NVGGgncVq-4> ).

Table 1 Summary of the PLCT outcomes from 2007 to 2011

<b>Year</b>	October 2008 to March 2011 Total tourist visits of PLCT: 18,040 (164 for free of charge tour days & 6 fee-based tour days)
<b>Project aim and approach</b>	Phase I: Develop the PLCT model Phase II. The introduction of 'Carbon Vouchers' Phase III. The introduction of a user-pays tour
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>- 52 job opportunities provided for local people</li> <li>- 60 stores joined Low Carbon Business</li> <li>- CO<sub>2</sub> reduction from transport<sup>16</sup>: 8,545,787 kg</li> <li>- Total visits<sup>17</sup>: 690,460 visits</li> <li>- Total tourist revenues<sup>18</sup>: 487 million NTD (equal to 104 million SEK)</li> </ul>

(Source: Summarized from 2009 & 2010 PLCT final report provided by the Kaishin company)

#### 4.2.3 Project development

The PLCT project is underpinned by four concepts: a) 'green' transportation, b) low carbon business, c) green behavior, and d) eco-tours (PLCT Final Report 2010), in which different stakeholders are involved, including tourists, local traders, local people, tour guides, governmental officials, and the consultant company.

'Green' transportation aims to encourage people to take public buses. The public buses are offered by the New Taipei City government. There are also electric golf cars to transport people from one village to another village. Further to this is the implementation of traffic regulation in the Jingualiao area on the days that PLCT tours are held. As a result, people who drive their own cars need to park their cars, and then either take the public buses or walk in this area. The rationale behind the promotion of 'green transportation' is due to the fact that transportation is the major contributor to CO<sub>2</sub> emissions in the tourism sector on the global scale, among these, air transport is the largest cause, following by car use, accommodation, and activities (Peeters et al. 2009; Scott et al. 2008) (see Appendix 8). Secondly, the Kaishin company assists local businesses (tea shops, restaurants and other shops) to become 'Low Carbon Business'. To achieve this, traders cannot automatically offer plastic bags to customers or use disposable tableware, moreover, they are encouraged to use local ingredients, and to recycle. If they meet these requirements, they can be granted the designation of being a 'Low Carbon Business'. In 2009, the idea of the 'Carbon Voucher' was introduced. Tourists are encouraged to buy Carbon Vouchers to make purchases in Low Carbon Business stores, because 10 percent of their spending will be used as part of a 'tree planting' fund in order to offset CO<sub>2</sub> emissions. Thirdly, tourists are encouraged to bring their own tableware from home. After the tour, they are asked to return their refuse back to their home in order to not pollute Pinglin's environment. Fourthly, it is hoped that through PLCT, tourists can enjoy the beautiful scenery and learn about the ecology, culture, and history of Pinglin.

## 5 Results

### 5.1 Impacts of the PLCT project

#### 5.1.1 Social dimension

There are both positive and negative social impacts of PLCT. Concerning the positive impacts, based on the interviews with local people (Interviewees C01/C02/C04/T01/T02/P01/P02/P03/P04/K01/K02), almost all agreed that the PLCT project has its value and function to educate local people and tourists and motivate people to behave environmentally friendly. Thus, PLCT serves as a catalyst in spreading green values for helping local people and tourists begin the journey towards a low carbon lifestyle. As some villagers commented:

*"To tell the truth, before PLCT took place, we did not even know what 'low carbon' actually means. It was not until the explanation by the Kaishin Company who came into our village to educate us that we understand the importance of low carbon."* (Interviewee C02 - March 3<sup>rd</sup>, 2011)

*"I think what PLCT makes me realize is the severity of the crisis (global warming) that our planet is facing now. Therefore, I would do my best to reduce CO<sub>2</sub>. For example, I begin to do recycling."* (Interviewee C01 - March 3<sup>rd</sup>, 2011)

One tour guide also expressed his compliments about PLCT as follows.

*"PLCT not only educates local people who participate, but also helps the spread knowledge and concepts related to 'low carbon' to the public by tour guides."* (Interviewee T02 - March 16<sup>th</sup>, 2011)

In addition, they thought the PLCT project is also helping Pinglin to become well-known and famous. It has successfully gained media attention including television, newspapers and magazines, as well as influencing on other communities (Interviewees C01/C02).

*"Before the PLCT project, most people thought Pinglin was merely a place for them to take a rest or have a meal just like a motorway service area<sup>15</sup>."* (Interviewee C01 - March 3<sup>rd</sup>, 2011)

*"In fact, Pinglin is a backward village, so people outside do not know how beautiful it is until they come here."* (Interviewee C02 - March 3<sup>rd</sup>, 2011)

On the other hand, unequal distribution of community power often happens within a community (Aref et al. 2010). From the conversations with local people, it is clear that varying political factions do exist in Pinglin. With the existence of such difference, it cannot be ensured that financial resources from the government can always be spent (that is, distributed) fairly in the community. In a rural village with a low population density like Pinglin, people might divide into several groups (referred to here as 'factions') due to their individual political preferences or self-interests. Financial resources are often directed to people who support the ruling party or people who hold more power within the

<sup>15</sup> In Taiwan, this is known as a service area, which usually has restaurants, toilets, and parking lots.

community. In this case, PLCT would probably evoke some conflicts among stakeholders. Some economic benefits, for example, tourist revenue or job opportunities generated from the initiative, are more likely to be controlled by people who are more powerful or influential in the community and people who are close to them. As a resident explained such factions exist in Pinglin:

*"The economic gains are always received by 'them' (people who have power)." (Interviewee C03 - March 7<sup>th</sup>, 2011)*

Indeed, such conflicts of interest among different groups within communities may influence the integration of community tourism development, leading to unwillingness for cooperation between different groups, and ignorance of the true need for people at large. For example, in the first year and the first half of the second year of the PLCT project, the Kaishin company found a place in Jingualiao area, and erected tents to invite only residents who live in the Jingualiao area to sell food for tourists having lunch in the 'Jingualiao market', shown in Fig. 12 (PLCT final report 2009). This activity was originally part of the itinerary of the PLCT tour. However, there are more stores (restaurants and tea shops) in Shuiliujiao business area compared to those in Jingualiao. The traders in Shuiliujiao business area also wanted some of the business (Interviewees P01/C08). Hence, some of the powerful traders who are also guides of the PLCT tour negotiated with the Kaishin company and the Pinglin District Office. As a result, the activity in Jingualiao was cancelled. In the second half of the second year of the PLCT project, the itinerary was changed to leave the tourists to have lunch in Shuiliujiao business area. From this example, we can see real conflicts of interest between the two groups of local people in the Jingualiao area and Shuiliujiao business area (referred to Fig. 8). As another resident put it:

*"Some staff' of the PLCT (he referred to guides) only consider their own interests. As I mentioned previously, the change of itinerary was suggested by them. Consequently, traders in Jingualiao cannot make a living." (Interviewee C08 - March 28<sup>th</sup>, 2011)*



Figure 12 Vendor in Jingualiao Market (left); Tourists having lunch in dining area (Right)  
(Source: 2009 PLCT finial report)

When further enquiring whether he had referred such situation to the Pinglin Office District or the Kaishin company, he answered:

*“We have not referred this yet. However, even if we do it, they (the Pinglin District Office & the Kaishin company) will listen to the guides since they are more powerful.... Besides, the Kaishin company has to follow the influential guides’ opinions, because they do not want to get involved into such conflicts. They just wanted the activities to be implemented smoothly.”*

(Interviewee C08 - March 28<sup>th</sup>, 2011)

However, when asking one Kaishin company employee about the cancellation of the ‘market’, she explained as follows:

*“The change of itinerary was due to: First, there was a concern about hygiene (the preparation of food is not fresh etc.), since at that time, the weather became warmer. Second, we wanted to allow tourists to choose what they want to eat instead of providing them with a limited choice in the ‘Jingualiao market’.”* (Interviewee K01 - April 8<sup>th</sup>, 2011)

Such contradiction between these two statements reveals an interesting phenomenon. There might be multiple causes of the cancellation, including warmer weather, inconvenience and consideration of tourist needs (limited choices and concerns about food). In addition, some of the businessmen in the Shuiliujiao business area tried to monopolize the tourism market.

### 5.1.2 Economic dimension

Undoubtedly, one of the goals of tourism is to generate economic benefits, whether it is profits for local traders, job opportunities for villagers or other tourist revenues. The implementation of the PLCT project indeed provided employment for local or non-local people, such as guides, staff in the Pinglin Low Carbon Tourist Center, golf car drivers, and staff to do traffic control or for other affairs. Besides of these direct employment opportunities, other indirect employment options also increased such as the recruitment of restaurant staff and income-generation for local farmers (Interviewee K02). Local producers can earn more money because of the promotion of eating local food, thereby many local restaurants tend to buy ingredients (fruit and vegetables) from local farmers (*ibid.*). According to the 2010 PLCT final report, until March 2011, it has created 52 job opportunities for local people including direct and indirect employment (PLCT final report 2010). Furthermore, it is estimated that the PLCT project brought about 400 million NTD<sup>16</sup> in economic benefits to Pinglin (equal to around 86 million SEK), though it did not state in the report in detail how the number was calculated (*ibid.*).

The different opinions among local people concerning the economic impacts of PLCT are shown. It is not difficult to find that interviewees who operate businesses, such as local traders felt they profited because of the increase in tourist numbers by the PLCT project. On the other hand, residents who do not have their own business and not being employed by the Kaishin company usually thought there was no impacts in terms of economic gains. Such a divergence of opinions can be found as follows:

<sup>16</sup> The total economic benefit of PLCT was calculated by the Kaishin company using total numbers of tourists multiplied by the average money that tourists spent in the previous year (Interviewee K02).

A tea trader in Pinglin Old Street - “*It helped improve the local economy, because tourists began to visit here. Once there were tourists coming, they would start buying things.*” (Interviewee C02 - March 3<sup>rd</sup>, 2011)

A male villager - “*I did not see any influence on the local economy, because tourists usually brought their own food from home when they came here. Thus, they did not buy anything. But for me, I got a job because of the PLCT.*” (Interviewee C04 - March 7<sup>th</sup>, 2011)

A local guide & tea trader in Shuiliujiao business area - “*Although the spending power of the Taiwanese has decreased in recent years, we hoped to bring more people to Pinglin to improve our local economy through PLCT. As a result, the tourism in Pinglin can run in a sustainable way. Indeed, the project brought more people to Pinglin which means lots of business opportunities.*” (Interviewee T01 - March 3<sup>rd</sup>, 2011)

In a rural area with a small population and few job opportunities, the implementation of the PLCT initiative indeed has had significant positive economic impacts for the community, especially when the local traders and tea farmers had experienced the sudden loss of tourists due to the opening of Hsuehshan Tunnel. For this reason, the local population cherishes these opportunities more. However, as discussed in the previous section, the majority of the profits from the PLCT project are directed to local traders who are more influential and powerful.

### 5.1.3 Environmental dimension

Pinglin’s environment has been preserved well for a long time due to the fact that it belongs to the Water Source Protected Area. Moreover, because of strict laws, there are no factories in Pinglin which prevents the environment of the community from being polluted (Pinglin District Office 2002). From the interviews it is not difficult to find that local people have many complaints about such strict laws, while at the same time they acknowledge that the strict laws make their natural environment well preserved (Interviewees C01/C02/C06/C08/P01/T01).

The key environmental problems identified in Pinglin were the production of waste by tourists and the behavior of some people, which has influenced residents’ daily lives, consequently increasing waste collection costs. One resident who lives in Jingualiao expressed her feelings about some of the environmental impacts caused by PLCT.

“*I saw tourists leaving litter. Besides, some of them illegally picked fruit or vegetables we grow, since they thought the fruits and vegetables belong to all.*” (Interviewee C03 - March 7<sup>th</sup>, 2011)

As one staff of the Kaishin company stated:

“*One time an elementary school came here to have their field trip, one of the students threw a bottle into the river. However, this was a single case, as we suggested tourists to take the waste they produce back home.*” (Interviewee K01 - April 8<sup>th</sup>, 2011)

With the increase in human activities in Pinglin, environmental damage, including air, water and soil pollution and the devastation of the natural environment and resources might become serious.

In terms of the positive contributions of PLCT, with the encouragement to eat locally, restaurants began to use local ingredients, and buy vegetables and fruit from local farmers, which then helps reduce food miles. Most importantly, the largest contribution to CO<sub>2</sub> reduction in the PCLT project comes from its change from the traditionally energy-intensive tourism transport pattern to low-carbon based transport modes including public buses, cycling and walking. For example, as stated in the 2010 PLCT final report, it is estimated that a total 3,717,917 kg CO<sub>2</sub><sup>17</sup> was saved between October 2010 and March 2011.

#### 5.1.4 Summary

The PLCT initiative has positive and negative impacts when viewed from social, environmental and economic dimensions. Firstly, it provides an educational function to raise people's awareness of low carbon actions, and increases their respect of local natural environment, history and culture. Secondly, the environmental impacts of the project have yet to be quantified. Although all PLCT activities need to be low carbon, the project cannot avoid some damage to the local environment caused by other tourists. Those tourists might be attracted by the project, though due to the limited positions of the PLCT tours opened online they might visit Pinglin by themselves. In this situation, tourism management is not easily implemented and controlled. Thirdly, more job opportunities were created and profits increased for local villagers and traders. However, it should be questioned if the economic benefits are distributed equally to the community and how the community is affected socially by PLCT. In the case of Pinglin, such benefits are shared by certain people (local elite), especially to those who are more influential in the community as well as in this project. Therefore, it is crucial to point out that the Pinglin District Office, the New Taipei City government, and the Kaishin company have to consider such situations before the implementation of the project to ensure and achieve social equity in this community. Otherwise, social equity might become a barrier that handicaps the transition towards an LCC. It is important that local residents share the faith in achieving an LCC in Pinglin without considering their self-interests first.

### 5.2 Community capacity of Pinglin towards a LCC

The notion of community capacity has an important role in creating changes such as the transition to an LCC. This paper was inspired by the definition proposed by Balint (2006: p.140), which states 'community capacity' is "the levels of competence, ability and skills necessary to set and achieve [an LCC]". Therefore, community capacity contains several elements including community participation,

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<sup>17</sup> However, it does not show how this number was calculated in the 2010 PLCT final report.

collective knowledge and values, local organizations' abilities and skills, partnerships with external organizations, resources and infrastructure (Moscardo 2008). In the following section, four categories of community capacity, namely personal, organizational, infrastructural, and cultural capacities, as proposed by Middlemiss & Parrish (2009), will be used to determine what capacities Pinglin inherently possesses and to frame how the PLCT initiative empowers or disempowers these four capacities of the community to become an LCC.

### 5.2.1 Personal capacity

Personal capacity means local residents' values, awareness, willingness and motivations related to pursuing an LCC in their community, as well as the relations between residents and local organizations (ibid.).

To some extent, the increase in tourist visits brought by the implementation of PLCT, tourists' positive feedback on recognition of the natural environment, the value of LCT and Pinglin's unique tea culture, have increased the confidence of local people which makes them more willing to cooperate with the government in promoting an LCC in Pinglin. As one village put it:

*"Villagers began to care more about the environment, because we have more 'guests' coming into our community. Thus, it helps promote community cohesion among villagers, thereby we want to create a better environment." (Interviewee C01 - March 3<sup>rd</sup>, 2011)*

Generally, the local residents of Pinglin have reached a consensus on the development of an LCC in their district, and believe it is the 'road' that they must take in order to curb global warming (Interviewees C01/C02/C03/C05/C0/C07). They believe that the success of the PLCT project will raise people's awareness of their environment, because they have to create a good image for attracting tourists. A local trader explained as follows

*"We must maintain the environment, so that tourists would want to visit here again and again. If our community is not low-carbon at all, how could we persuade people that they were participating 'low carbon' tourism?" (Interviewee C02- March 3<sup>rd</sup>, 2011)*

On the other hand, concerns about potential economically-oriented thinking among local traders or local farmers might disempower the community's abilities towards an LCC (Interviewees C06/P01). In this sense, once they cannot gain anymore profit from the PLCT, their environmental consciousness might become volatile. As a result, they will go back to their normal life (less environmental-friendly behavior). One local PLCT employee raised her concerns:

*"Perhaps, what local people care about is the substantial monetary benefits and how many business opportunities and tourists are brought by PLCT." (Interviewee P01 - March 7<sup>th</sup>, 2011)*

This supports Scheyvens' argument, saying that if the main diver of ecotourism is business, the economic gains might "alienate local communities" (Scheyvens 1999: p.245).

Moreover, although villagers expressed their willingness for supporting the development of an LCC, their attitude remains passive, meaning that they still want the government to take the lead, and they will be in cooperation with them. This can be seen when ask the interviewees whether they are willing to take over the PLCT project or future LCC development from the government, a local trader raised her concerns:

*"There are no pioneers in our village who are willing to take the first step. ... Moreover, personally, I think I do not have the ability to plan and implement such projects."*  
 (Interviewee C06 - March 7<sup>th</sup>, 2011)

*"I am worried because if the projects are taken over by our community, it will cause conflicts of interest"* (Interviewee C06 - March 7<sup>th</sup>, 2011)

However, the success derived from being an LCC depends much on the degree of active participation of all stakeholders within the community. Therefore, residents in Pinglin need to be more proactive and actively participate in the process.

### 5.2.2 Cultural capacity

Cultural capacity refers to the history and values of a community in supporting the legitimacy of sustainability (Middlemiss & Parrish 2009). Pinglin has a long history of performing fish protection through river preservation. As it is located in a Water Source Protected Area, the maintenance of water quality has always been an issue in this area. Indeed, until recently this issue<sup>18</sup> has continued to spur a debate among the Taipei City government, environmental advocacy groups, as well as experts and villagers (United Daily News 2006). The Fish Protection through River Preservation project was started in February 1999, first focusing on Jingualiao River, then expanding to cover all whole rivers of the Pinglin District (Interviewee C08). The attitudes of villages to this project have changed from resistance, through acceptance, to now actively volunteering to conduct inspections along the rivers. In the past, local people thought that the rivers were common property, so they had the right to catch fish. During that time, the rivers were considered to be like 'kitchens' in their backyards. Now, local people still think the rivers belong to them, but this means they have obligations and responsibilities to protect the rivers instead of depleting them. At the same time, villagers have realized only when natural resources are well preserved can they attract more tourists. Ten years have passed, with the successful outcome of a recovery of fish stocks (Interviewees C02/C05/C06/C08/T01/T03).

Indeed, most interviewees mentioned this project, and seemed very proud of what they and the Pinglin District Office have done to protect the rivers and fish stocks (Interviewees C01/C02/C06/C08/P01/T01). As one villager put it:

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<sup>18</sup> There was a debate on whether or not the Pinglin Interchange on the National Highway No. 5 should be opened to the public. The Taipei government, some experts, and environmental advocacy groups have argued that the opening of the Pinglin Interchange might cause negative impacts on the water quality in the Feitsui Dam, while the Pinglin District Office has resisted such arguments.

*“The development of the Fish Protection through River Preservation in Pinglin began in 1999. As you know, we are located in the Water Source Protected Area. We were always blamed for polluting water causing i.e., eutrophication in the Feitsui Dam. Therefore, our former villager mayor launched this initiative to get rid of this notorious image” (Interviewee T01 - March 3<sup>rd</sup>, 2011)*

This successful experience has created a sense of community<sup>19</sup> among local villagers in Pingling. However, to reach such a sense takes time. As one villager explained:

*“All things are difficult before they are easy. Thus, when we decide to do the right thing, we need to stick to our decision. In the end, it will make a success.” (Interviewee C02 - March 3<sup>rd</sup>, 2011).*

It is worth mentioning that, at first glance, the objective of the Fish Protection through River Preservation initiative is certainly in line with biodiversity conservation. However, in the context of community development, the objectives of this initiative were twofold (Interviewee C06). In fact, river preservation acts as a means to combine ecological preservation/restoration with economic development to build a sound environment for ecotourism development. The former town mayor, as well as local villages all understood that only when a rich natural resource exists, will more tourists come.

This experience demonstrates the importance of a key person who insists on doing the right thing. Moreover, with such experience, it has increased local people’s confidence which can ease the future development of an LCC.

### 5.2.3 Organizational capacity

Organizational capacity refers to values that the public and private organizations in the community possess, and their abilities to promote sustainability (Middlemiss & Parrish 2009). At present, three organizations related to tourism, community development and environmental protection exist in Pinglin, namely the Association of Tourism in Pinglin (ATP), the Association of Community Development in Pinglin Village (ACDPV), and the Association for Wildlife and Nature in Pinglin (AWNP). A brief introduction of these organizations is shown as follows:

#### (1) Association of Tourism in Pinglin (ATP)

ATP was established in 2000, and its aim is to promote tourism<sup>20</sup> in Pinglin (Interviewee T03; Pinglin District Office 2002). The ATP has cooperated with the Pinglin District Office to hold tour guide training courses with the assistance of the Tourism Bureau and the New Taipei City government in order to develop eco-tours within the village. The courses were offered to not only

<sup>19</sup> This term, ‘sense of community’ is widely used in the community psychology field, and is defined as “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members’ needs will be met through their commitment to be together” (McMillan and David 1986: p.9).

<sup>20</sup> The ATP has assisted in the regeneration programme of Pinglin Old Street (Interviewee T03).

local people, including tea traders, tea farmers, and teachers in high schools, but also people who live outside Pinglin. Until now, there are a total of 24 guides in the village (Pinglin Tourist Center 2011). Some of these guides are working for the PLCT project.

(2) Association of Community Development in Pinglin Village (ACDPV)

ACDPV was established in 1997 as a non-profit social group and is the only community development association in Pinglin District (Pinglin District Office 2002). Its goals are to promote social development and enhance community welfare.

(3) Association for Wildlife and Nature in Pinglin (AWNP)

AWNP was established in March 2007, and has around 60 members (Interviewees C01/C08). It was first formed by a group of local people in Jingualiao who are concerned about their environment, especially the rivers. Along with the goal of the Fish Protection through River Preservation initiative, the AWNP has organized a group of volunteer patrolmen to do inspections along rivers and streams. The AWNP is supervised by the Council of Agriculture to restore biodiversity in Jingualiao.

The operational mechanism and structure of the ATP is mature, compared to the other two organizations. Some members of the ATP in Pinglin do participate in the PLCT project, because they are guides and local traders (Interviewee T03). On the other hand, the involvement of the other two organizations is low (Interviewee K02). This is probably because the PCLT project is led by the government and planned by the Kaishin company, they tend to focus on the tourism development, and for holding some activities (arrangement of tour guides and planning of tour routes), they require the ATP's assistance. In addition, from my observation, although the three associations have similar goals, there is no actual or direct connection between them. This is probably because such associations in rural areas often lack of budget and ability to implement projects (Interviewee T03). They have to rely on financial and technical support from governments. However, all these organizations are equally essential to the development of LCC in Pinglin. These three organizations could represent different roles in an LCC. The ACT represents an agent for economic development, while the ACDPV represents an agent for societal development and the AWNP represents an agent for environmental preservation. For an LCC to be successful, it will need the three groups to participate and work together.

#### **5.2.4 Infrastructural capacity**

The last capacity, infrastructural capacity, means the facilities in the communities which can support low carbon living, such as transport, energy, and communication (Middlemiss & Parrish 2009). Although Pinglin is close to Taipei city, it is still a remote rural area. Except in the centre of Pinglin village or some communities in Jingualiao or other areas, most villagers' houses are spread out. Due to

this reason, without driving a car or scooter, transportation in the village is fairly inconvenient. However, because of the high profile of the PLCT project, the city government is willing to allocate more public funds for infrastructure in Pinglin, such as the introduction of electric cars in the community and construction of solar-powered charging stations for electric scooters or the construction of small scale renewable energy systems.

In addition, the Pinglin District Office has also started to put more effort into tourism development in order to attract more tourists. As a result, the Pinglin District Office applied for a budget from the central government and has cooperated with private bus companies to run public buses in the whole village (Interviewees C01/K01/K02). The advantages of a bus transit system, which is already running in the village, are as follows. a) Tourists are encouraged to leave their cars in order to reduce CO<sub>2</sub> emissions from car traveling. b) Local people can reduce their reliance on driving a car or scooter. c) Most importantly, disadvantaged people, like the elderly or women, also benefit from the bus transit system.

### **5.2.5 A short summary**

To some extent, the PLCT project has advanced Pinglin's community capacity in different dimensions, including building confidence, raising environmental awareness among residents, constructing new infrastructure, and applying small-scale renewable energy in the community. On the negative side, the economic thinking among local traders, the lack of sound organizational structures, and the low level of environmental commitment from local groups need to be improved in order for the preparation of an LCC development.

## **5.3 SWOT analysis: barriers and potential towards a LCC**

### ***Strengths***

As ecotourism often takes place in or near a natural environment, Pinglin was chosen to be the first destination to implement LCT due to its tremendous natural environment. Pinglin has a strong agriculture background, and now it has the vision to become an organic tea town (Interviewee T02), which is exceptionally important in the context of an LCC, especially in rural areas. Pinglin has established a sound tour guide system, and these local guides are more aware of the conservation of the natural environment (Interviewees T01/T02/T03) than other local people. For this reason, tour guides can potentially influence other villagers to pursue an LCC. Pinglin is located only a short distance from Taipei City and easy accessibility<sup>21</sup> makes access to information easier and possible, in comparison to remote rural areas (Interviewee K01).

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<sup>21</sup> It takes only 20 minutes by car through the major highway (National Highway No. 5).

### ***Weaknesses***

In Pinglin, most of the younger generation seek job opportunities or study in other cities, leaving an aging population in this small town. This is caused by the strict laws<sup>22</sup>, which limit the local development. This kind of ‘exodus problem’ can be found in other rural areas of Taiwan (Chou 2010). It has been shown that older people may be less aware of environmental issues than younger people due to the fact that older people often see ways that solve environmental problems as potentially endangering “the existing social order” and would have to change their “traditional values, habitual behaviors, and the existing institutions” (Van Liere & Riley 1980: p.183). The same situation can be found in Pinglin when talking with some villagers (Interviewees C01/C02/C07/T02). This foresees the difficulties for those who want to create an LCC in the local community. Furthermore, Pinglin relies too much on government resources in terms of financial support, since it has suffered tight budget constraints for a long time (Pinglin District Office 2002). For PLCT, it is also heavily dependent on the government’s monetary and technical support for local infrastructure construction, educational training and community development. Thus, this could force the Pinglin District Office and local residents to follow the government’s direction, resulting in the village losing its autonomy on the project’s management. However, local people are the ones who really know what they need. With only limited financial support from the government, it could become a problem to further develop green technologies. Limited opportunities for large-scale solar and wind power are other barriers. Moreover, passive attitudes (discussed in Section 5.2.3) are found when talking with some members of those organizations.

### ***Opportunities***

Since the Taiwanese government has identified climate change as a priority area, in accord with its visions of creating a Low Carbon Society in Taiwan, it could be expected that a greater share of the government budget will be spent to support low carbon actions. Furthermore, the Taipei City government has selected Pinglin as one of its districts to develop an LCC, while it is still in the planning stage (Interviewees P02/P04). The high level of media attention on the PLCT project (PLCT final reports 2009; 2010) could result in more rapid escalations for behavior changes for both visitors and local residents (Cohen 1998). In addition, it is known about that the farm workforce has decreased (Interviewee C08), and with the success of the PLCT project it could make young people more willing to move back to the village, resulting in a growing workforce. Furthermore, due to the promotion of local eating, along with the goal of being an organic town, it can provide a sustainable local food production system in Pinglin in the long run. In this context, local producers and consumers, as well as the local environment can benefit from this food system in a way that it is economically viable and environmentally sound.

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<sup>22</sup> Several interviewees complained about such strict laws, because under the laws, they are not allowed to construct new houses (Interviewee C02/C03/C05/C08). Once their children grow up and have their own families, it is hard for all of them to live together. Due to this reason, many of their children choose to move out.

### **Threats**

Finally, even the PLCT project advocates a ‘low carbon’ approach, there is no doubt that it still fits in the context of the tourism industry, which aims to make a profit. Thus, private operators from outside the area will be attracted to run a business in the village, which might undermine the local culture or lead a competition between outsiders and local people. Moreover, once other communities or destinations follow the so called ‘LCT wave’, Pinglin’s tourism might run the risk of a downturn in visitors if those destinations are more attractive to tourists. The New Taipei City government will probably reduce its investment in Pinglin. In combination with a limited budget, this could result in the halting of the LCC development in Pinglin. How to balance conservation and development thus becomes a crucial issue before the community is ready to enter into the next stage of the establishment of an LCC.

When talking to some villagers, they reveal their worries about the lack of local skills and abilities to implement actions of community empowerment in Pinglin (Interviewee C06); external expert teams or consultant companies must come to the village to develop and implement the project. Again, the decision making process might be controlled by these outsiders. Another issue is that the major highway which makes Pinglin more accessible might bring more tourists to the village, especially during weekends or holidays. This could have some negative impacts including threatening the natural species in this area, leading to an added burden on the local environment, as well as increasing the area’s carbon footprint. Fig. 13 Summarises the strengths, weaknesses, opportunities, and threats of development of an LCC in Pinglin.

<h3><b>Strength</b></h3> <ul style="list-style-type: none"> <li>1. Well preserved nature, rich biodiversity, less environmental damage than other areas.</li> <li>2. A unique tea culture</li> <li>3. High levels of cooperation between residents and the city government</li> <li>4. Economic benefits brought by LCT</li> <li>5. Potential to become an organic tea village</li> </ul>	<h3><b>Weaknesses</b></h3> <ul style="list-style-type: none"> <li>1. Lack of sound community development associations in Pinglin</li> <li>2. Difficult to achieve a consensus among residents towards an LCC</li> <li>3. Short term thinking</li> <li>4. Low levels of willingness to cooperate from residents who do not operate their own business</li> <li>5. Local tour guides' ability and knowledge on climate change</li> <li>6. Exodus of young people</li> </ul>
<h3><b>Opportunities</b></h3> <ul style="list-style-type: none"> <li>1. Vision of a Taiwan Low Carbon Society</li> <li>2. Convenience transportation due to the completion of National Highway No. 5</li> <li>3. City government's close attention</li> <li>4. The assistance of external experts</li> </ul>	<h3><b>Threats</b></h3> <ul style="list-style-type: none"> <li>1. Competition from other tourist destinations</li> <li>2. Private operators might be attracted to come into the village.</li> <li>3. High cost of renewable energy</li> <li>4. Highly dependent on external expert groups and the governments</li> </ul>

Figure 13 SWOT analysis for a LCC in Pinglin

## 6 Discussion

### 6.1 The core value and essence of LCT and LCC

The core strategies that the New Taipei City government and the Kaishin company used in developing the PLCT initiative can be separated into two parts. In the first place, for people in general, the officials and staff of the Kaishin company wanted to make ‘low carbon’ easy and fun, since the environmental consciousness of the Taiwanese public is not as mature in comparison with that in Western countries (Interviewees P02/K02). By making ‘low carbon’ become interesting, it becomes more attractive to tourists. As a consequence, people are more willing to participate and absorb the knowledge of low carbon initiatives, pass on this knowledge to other people, and finally make ‘low carbon’ part of their daily lives. This is close to what has been addressed in the UK’s Low Carbon Transition Plan, which notes that sustainable and ‘green’ lifestyles can be easier and become the norm if people feel they are supported and have “informed choices” (DECC 2009: p.92)

Secondly, the government uses the economy as a driving force to make the residents of Pinglin support the PLCT project. Once PLCT can create ‘economic opportunities’ and local people can earn a living, they can begin to think about how to do something good to the environment or further act to combat climate change (*ibid.*). In reality, local people have their own priority which is the substantial economic profits they gain. Undoubtedly, how is it possible to persuade people to go green or adopt sustainable living practices without having them make a living first? One Kaishin company employee made an interesting metaphor:

*“PLCT is like a stone, when you throw this stone into a pond, it must create some ripples.”*  
(Interviewee K02 - April 8<sup>th</sup>, 2011)

This corresponds to Skea and Nishioka’s (2008: p.S12) statement about pursuing a low carbon society in developing nations which says if it starts “from ‘development’ objectives”, these countries may realize the necessity to take mitigation and adaption strategies to combat climate change.

There is no doubt that the construction of green infrastructure and the application of renewable energy both have great potential to reduce CO<sub>2</sub>, and most importantly, that the development and advancement of an LCC has to start with the people at a niche level (*ibid.*). Stating in the PLCT final reports (2009; 2010), it acknowledges that a successful project will need the community to participate and be involved. As the employee of the Kaishin company told me that the core value of PLCT has followed the pattern of ‘community development’ and ‘community empowerment<sup>23</sup>’, with an ultimate goal - community capacity building (Interviewee K02). In reality, since the PLCT project is implemented through a top-down approach, which undermines the degree of community empowerment and participation. More discussion will be in Section 6.3.

<sup>23</sup> In fact, in 1994, the terms such as ‘community’, ‘community empowerment’, and ‘community participation’ became very popular in Taiwan (Chiang & Chang 2008). The goals are to make local villagers have a high level of community identity, resource mobilization and problem-solving ability.

## 6.2 The role of the governments, the consultant company, and local community

### 6.2.1 City government

The New Taipei City government acts as the organizer of the PLCT initiative and ensures there is always a budget. Furthermore, at the end of each year they evaluate the project's outcomes and achievements to ensure the quality of the project, and then decide whether or not the project will be continued. Frequently, in the early stages of a government-based project, local villagers usually took a 'wait and see' attitude. Thus, it is important that the government can offer some sort of incentive for local villages to get involved in, collaborate, and finally act decisively. In the PLCT project, the New Taipei City government also applied this strategy, since they provided an economic incentive 'to revitalise the local economy' which made local people more willing to cooperate. In the planning stage of the project, several public meetings were held to explain to the villages the positive impacts that the PLCT project could bring. It is essential that the city government not only emphasizes the economic side, but also the environmental ( $\text{CO}_2$  reduction) and social aspects (social equity in the community). In the context of community empowerment, we need to bear in mind that, as Cavaye (2000: p.6) states, the role of government is "indeed to provide services and external support for communities".

### 6.2.2 District office

In the context of LCCs, the Pinglin District Office is regarded as the leader in the village, which helps to lead the community as a whole towards sustainable development. The attitude and value of the village mayor can have a great deal of influence on local villagers' willingness to cooperate. This can be seen in the example described previously in which the former villager mayor insisted on launching the Fish Protection through River Preservation project without being afraid of opposition from local people in the early stages of the project and losing their votes at the next election (Section 3.2.3). In fact, their support is very important in the process of mobilization among residents. However, in the context of the PLCT initiative, the current role of the Pinglin District Office is under the supervision of the New Taipei City government, since the latter dominates the whole process of planning, management, and evaluation of the initiative. In such circumstances, there is a dependent relationship between the city government and the district office. It also acts as a bridge between local people and the city government.

### 6.2.3 Consultant Company

The Kaishin company created a good and systematic plan and the essential elements needed to make the PLCT project run efficiently and effectively. In this context, they are regarded as an outside professional expert team, since they have lots of experience in the community empowerment field (Interviewee K02). Under the circumstances, they not only built up a comprehensive plan for the

PLCT project, but simultaneously share their experiences, expertise, knowledge and advice with the local community through periodical visits or meetings. When talking with the employees of the company, they said they spent lots of time being ‘assimilated’ into this community. Kaishin also plays a role as a facilitator to make effective communication possible between the government and the community. As one Kaishin employee commented:

*“Our role is like the locomotive to direct the project heading in the right direction. It is hard work, because we have to communicate with local people and prepare everything for the activities....We hope one day when the government does not provide support, and we do not intervene, the PLCT project can still work well. As we are a consultant company, we want to return to the role as consultants.”* (Interviewee K01 - April 8<sup>th</sup>, 2011)

To some extent, their consultation has been effective in enhancing local people’s consciousness on the issues related to climate change. At the same time, it has achieved trust and support in the community.

#### 6.2.4 The community

From the observation, I found that in comparison with big cities like Taipei, Pinglin has a good environment, with low population and a strong agricultural background. These are the factors which can lead a successful self-sufficient LCC. When talking with the local villagers, some villagers have real determination to pursue an LCC (Interviewees T01/C02). More often, other residents were situated in a more passive position, meaning that they are more reactive rather than proactive in participating the PLCT project, especially for those who are not directly influenced by or benefit from PLCT. This is partly due to the lack of understanding in regards to the true essence of LCT and LCCs, which reveals local villagers’ lack of capacities to implement projects. From discussions with local residents, it was also found that some of them preferred a top-down approach (implemented by the city government and co-implemented by the district office) for the development of an LCC in the future due to their lack of ability and resources (Interviewees C02/C08/T01/T02). However, the community is the most important agent for LCCs. In such a case, residents in the village cannot merely be participants, but actors of change. Indeed, as Cavaye (2000: p.5) states: “government cannot build community capacity - only local people can build the capacity of their community.”

#### 6.3 Top-down versus Bottom-up approach

In this section, the debate whether the ‘top-down’ or ‘bottom-up’ is the best for an LCC in the context of Pinglin will be discussed. According to Emejulu & Shaw (2010), these two approaches have many different characteristics. Obviously, a top-down policy is initiated by the government which focuses more on management, while the bottom-up orientation means mobilization at the local community level, in which people can actively engage and intimately participate (*ibid.*).

The debate between top-down and bottom-up discourses has continued for a long time in different fields of community empowerment such as public health (Laverack & Labonte 2000) and community ecological conservation (Armesto et al. 2001), and other environmental issues (Kalipeni & Zulu 2002; Tal & Cohen 2007). The proponents for the bottom-up approach argue that it can meet the true needs of villagers in the community (Armesto et al. 2001). The criticism about the top-down approach mainly derives from its overemphasis on the role of governments or professionals from outside the community (*ibid.*). Some studies indicate several failed examples of community empowerment through a top-down manner (*ibid.*; Fraser et al. 2006). Thus, the opponents to the top-down initiative criticise the limited ability of the top-down approach to effectively dealing with some issues such as community cohesion and engagement (Nada-Rajah 2010).

Although community actions and empowerment put more emphasis on the bottom-up manner, there is a need to reconsider whether the community has the ability to practice such manner. For example, in Taiwan, community empowerment started to be promoted by the Taiwanese government in the early 1990s, and the slogan of community empowerment was ‘from bottom to top’ (Hwang et al. 2007). However, in practice, what these works applied was actually a centralized, top-down policy (Huang 2004). This is partly due to the fact that many communities lack the ability to mobilize, especially in rural areas (*ibid.*). Therefore, a combination of top-down and bottom-up might be a good compromise for future LCC development. In the case of PLCT, there is an obvious manifestation of a government-led approach. The city government delivers services/infrastructure and financial support into the community, and holds the power of decision-making and management. This can disempower the local community, since it creates dependency and diminishes autonomy. In this sense, the government does not truly empower local people and local associations or enhance their skills and capacity of planning/management and leadership. Returning to the question of whether a top-down or bottom-up approach is best option for LCT or LCCs, it is suggested that in the context of Pinglin, initially the PLCT project has to be top-down, as mentioned in Section 6.1, because: a) local people had little knowledge about LCCs before the implementation of PLCT, and b) the community lacks basic resources for implementation and development which are crucial for developing LCCs. When the community capacity in different dimensions<sup>24</sup> is enhanced, it will be suitable for Pinglin to start from a bottom-up approach for developing an LCC in the future.

Moreover, it will be easier if there are some ‘motivators’ in the community who can mobilize other villagers and ‘keep the fire burning’. However, one conversation with a villager reveals that there are no such motivators in the community (Interviewee C06). In this sense, it is good to create a collaborative partnership which combines the advantages of bottom-up empowerment and top-down incentives among the local community, the government, and the developer, that is, the consultant company (Armesto et al. 2001) (see Fig. 14). In this partnership relation, local community, the government, and the company can jointly plan projects (set up goals), while leaving the local people

<sup>24</sup> Discussed in Section 5.3

and the district office to make decisions since they are responsible for their community. For LCT and LCCs to be successful, local people in Pinglin will need to be committed to the project, and have the self-organizational abilities and management skills enhanced. The dominant role of the city government needs to switch to be a more supportive one (that is, by creating a framework to let communities play the major role and providing basic resources, such as a budget for running projects or applying renewable energy or technical assistance) instead of being a leader, while the consultant company (outside experts team) returns to its advisor role.

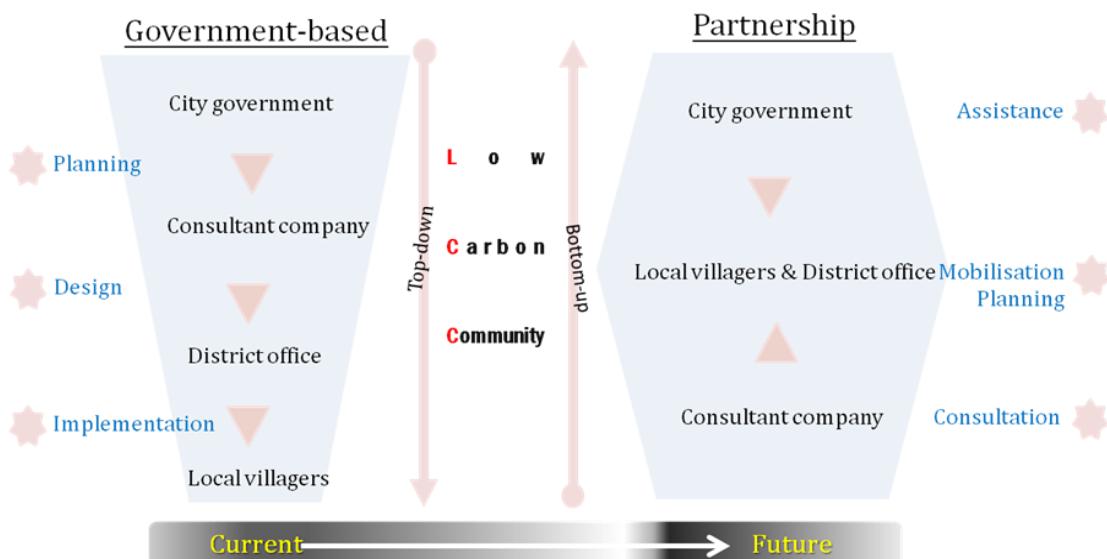


Figure 14 From Top-down to Partnership

#### 6.4 Low-carbon what?

In the global context, it is apparent that the driving force behind ‘low-carbon’ solutions is global warming. Indeed, it has gained greater popularity in the climate change agenda worldwide, such as in Finland<sup>25</sup>, the UK<sup>26</sup>, Japan<sup>27</sup>, Korea<sup>28</sup> and other countries. In order to avoid impacts caused by climate change, many countries have set targets to reduce CO<sub>2</sub> emissions. However, there is always a classic ‘dilemma’ between environmental protection and economic growth which might delay or halt actions taken by governments against climate change. In the context of such trade-offs, the establishment of a ‘low carbon society’ or ‘low carbon economy’ seems to provide a better and attainable solution in the long run for creating a win-win strategy to tackle climate change, and at the same time, to maintain economic development (Skea & Nishioka 2008). Of course, different countries face different problems and have different priorities, since they are in different phases of the development path (*ibid.*). It is argued that low carbon societies/economies exist to not only make developed countries move forward but also create opportunities for developing countries to grow sustainably. However, climate change is a global issue, despite the efforts made by individual nation, low carbon societies

<sup>25</sup> See the Finnish government’s foresight report (Prime Minister’s Office 2009).

<sup>26</sup> See Section 3.3.1

<sup>27</sup> See Section 3.3.2

<sup>28</sup> The President of South Korea, Myung-bak Lee, pledged to support the vision of ‘Low-carbon green growth’ on August 15, 2008 (Wang 2010).

will also rely on international cooperation. For example, a mode of partnerships between countries to work together to achieve the transition to a low carbon society can also be seen, in the Japan - UK project namely ‘Low-Carbon Society (LCS) Scenarios Towards 2050<sup>29</sup>’, and the ‘S-6 Research Project towards a low carbon societies in Asia<sup>30</sup>’.

## 6.5 Lessons learnt

In this section, it will be discussed what Pinglin can learn from the two LCCs examples - the Ashton Hayes Going Carbon Neutral project in the UK and the Do You Kyoto project in Japan featured in Section 3.3. Although these cases are different in terms of their size and scope and approaches they adopted. Apparently, the project in Ashton Hayes is a bottom-up approach, since “the Ashton Hayes idea came from the grassroots . . . it wasn’t started by any organization...it was almost like social entrepreneurship” (Hope & Alexander 2008: p.115). On the other hand, the Kyoto is a typical top-down approach. There are some successful experience and barriers which can be learnt in order to make a transition to a LCC in the future.

Firstly, both cases have a core group<sup>31</sup> (Ashton Hayes) or a Research Team<sup>32</sup> (Kyoto) formed to a) set up concrete target goals of carbon reduction, and b) develop methods to measure the carbon footprint or forecast carbon emissions in different sectors which have not been seen in the PLCT initiative. Indeed, although the aim of the initiative is to reduce CO<sub>2</sub> from tourism, there is no clear target for CO<sub>2</sub> emission reduction in the PLCT project. Besides, the way that total CO<sub>2</sub> reduction was calculated and written in the PLCT final reports is vague. This is probably because the consultant company is not an expert in this field. However, carbon footprint is crucial for this project, thereby it is suggested that a ‘core team’ which comprises different stakeholders (villagers, government officials, experts, and a research team) and other interest groups is suggested is formed. Indeed, an LCC will not be successful if there is a certain group in specific fields working alone, so the locals and people from different disciplines should work together. In doing so, a comprehensive investigation and careful and precise measurements of carbon footprints from each activities of tourism (transport, food system, and other activities) will be conducted. Secondly, when residents in Pinglin were asked about their opinions on the possibility to implement LCT and an LCC on their own, a number of the interviewees voiced their concerns about a lack of funding (Interviewees C03/C04), a lack of ability among residents (Interviewees C02/C06) and conflicts of interest among villagers (Interviewees C08/T03). These factors indeed can be barriers in developing LCCs, though, the case of Ashton Hayes shows that an

<sup>29</sup> The project was established by the Ministry of Environment Japan (MoEJ) and the Department for Environment, Food and Rural Affairs in the UK (DEFRA) (Strachan et al. 2008).

<sup>30</sup> The aims of the ‘S-6 Research Project’ are to establish a feasible and robust methodology for realizing a low-carbon society in Asian countries, for both country scenarios and local scenarios (Asia LCS 2011).

<sup>31</sup> This ‘core group’ is made by the Parish Council, the university, local primary school and volunteers, which is divided into technology; carbon sink; carbon clinic; conferences and exhibitions; and press and media teams (Charnock and Alexander 2006).

<sup>32</sup> The Research Team of Sustainable Society Kyoto, who constructs a roadmap to help transform Kyoto into a low carbon society, is made up of volunteers. More detail can be seen in their report (RTSSK 2009).

alternative model of community-based social entrepreneurship might solve these problems. In the discourse of social entrepreneurship, it is local people who own and manage community assets which can ensure the economic autonomy and enhance community cohesion (Clark et al. 2007). As mentioned in the previous paragraph, a core team can serve to facilitate the establishment of community-based social entrepreneurship. At the initial stage, volunteer villagers are indispensable as they can act as ‘motivators’ in the community to mobilize other villagers. In addition, during interviews, despite the response from one pessimistic resident<sup>33</sup>, I found that some villagers do have better ideas and suggestions for achieving an LCC in Pinglin. Thirdly, both the case examples show the importance of knowledge-sharing, experience exchange and collective actions with other communities, cities or counties. It is suggested that a knowledge-sharing platform is suggested be created, thereby, information and strategies on low carbon actions made by different communities can be learnt from other communities.

## 6.6 Further comments

Some other recommendations obtained from interviewees and my observations can be made to improve the current PLCT project. The functions of the local associations (ATP, ACTPV and AWNP) in Pinglin are somewhat weak. Lack of budget often limits their attempts to conduct projects (Interviewee T02). The government must provide some incentives or support for these associations to have their capacity of planning and management strengthen. Secondly, until now, tree-planting activities have not been held (Interviewee T02). In order to make both tourists and the Low Carbon Business stores build trust in the mechanism of ‘Carbon Vouchers’, the Pinglin District Office needs to make the use of the ‘Tree Planting Fund’ transparent. The substantial outcomes of tree planting will make tourists even more willing to buy Carbon Vouchers, so that more stores will want to join the Low Carbon Business. Besides, during the tour, the guides usually focus on introducing local history, culture, and the natural environment. Their knowledge about low carbon lifestyles is still limited. Thus, in the future, more educational training programmes focusing on related issues for tour guides should be offered. To promote social equity, it is important to ensure that the disadvantaged or vulnerable groups (for example, women, and elderly people) will be involved in the project and their voice will be heard.

In addition, the limitation for developing large-scale solar and wind power system within the community can be solved by applying small-scale renewable energy generation, which will require funds and some incentives from the government to encouraging local people to generate ‘green energy’ at home. Finally, it is essential to continuously monitor the impacts generated by low carbon tourism activities in order to guarantee sustainability of the project outcomes. The project should not merely focus on the positive economic impacts, while neglecting other negative impacts on environmental and social dimensions.

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<sup>33</sup> See Section 6.3

## 7 Conclusion

Although many researchers have found tourism helps to save local economies in rural villages such as Pinglin, it is not a panacea. The PLCT initiative aims to create an ‘alternative’ tourism pattern to provide a win-win solution for curing local economic problems and sustaining environmental conservation. To some extent, it indeed fosters information dissemination and awareness building on the issues of climate change. Furthermore, the cultural identify of local people has been enhanced, meaning that they now cherish their land and natural environment more. However, it was found that there is passive participation of local villagers and a strong dependence on the government’s and external consultants’ support.

Perhaps it is too early to judge whether the PLCT initiative is successful or not. Within the three years of the project development, we can see that local people’s attitudes are changing. Thus, PLCT will be a catalyst for the development of an LCC, if it applies a partnership approach which can truly empower local people, build community capacity and enhance participation. We should bear in mind that the realization of an LCC is not an outcome, but a continuous process. As Henry Ford once said:

“Coming together is a beginning, staying together is progress, and working together is success.” ... Henry Ford.

This paper concludes that the community in Pinglin should broaden the scope of its development agenda beyond ecotourism or low carbon tourism, taking the reinforcement of social and cultural conditions into consideration to achieve its long-term low carbon change goals.

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## 9 Appendix

### Appendix 1. Interview guide for local people in Pinglin

Code: \_\_\_\_\_

#### **Is low carbon tourism a good incentive for the development of low carbon community? – A case study of Pinglin District**

Name : \_\_\_\_\_

Date : \_\_\_\_\_

Location : \_\_\_\_\_

Time : \_\_\_\_\_

Personal information: age, profession and education background

1. Could you simply explain the rationale behind the Pinglin Low Carbon Tourism (PLCT) project?
2. What do you think is meant by 'low carbon' and 'carbon footprint'?
3. What are the social impacts of the project?
4. What are the environmental impacts?
5. What are the economic impacts?
6. To what extent are you involved in the project?
7. In your view, what makes the project successful or not successful?
8. What are your expectations for the long term goals of the project? Do you want the project to continue in the future?
9. Have you heard about low carbon communities (LCCs)? What do you think is meant by LCCs?
10. Could you explain the relationship between PLCT and a LCC?
11. What factors do you think will make local people to be supportive of a LCC development?
12. Did you or do you see any possible obstacles for implementing LCT and developing a LCC in Pinglin?
13. What do you think is your role (as a resident) for developing LCT and LCC in Pinglin?
14. Any suggestions in terms of this issue?

## Appendix 2. Interview guide for government officials and the Kaishin company

Code: \_\_\_\_\_

### **Is low carbon tourism a good incentive for the development of low carbon community? – A case study of Pinglin District**

Name : \_\_\_\_\_

Date : \_\_\_\_\_

Location : \_\_\_\_\_

Time : \_\_\_\_\_

Personal information: age, profession and education background

1. In your view, what is low carbon tourism (LCT)?
2. Could you explain the rationale behind the Pinglin Low Carbon Tourism (PLCT) initiative?
3. How did 'carbon footprint' of PLCT be calculated? Did it include all sources from tourist activities?
4. What are the social impacts of the project?
5. What are the environmental impacts?
6. What are the economic impacts?
7. To what extent are local involved? And how?
8. What makes the project successful? Are there indicators to measure success?
9. What are the long term goals of the initiative? Will the project continue in the future?
10. In your point of view, what is low carbon community (LCC)? Are there any indicators for LCCs?
11. Could you talk about the relationship between LCT and LCC?
12. What factors do you think will make local people to be supportive of LCC development in Pinglin?
13. Did you or do you see any possible obstacles for implementing LCT and developing a LCC in Pinglin?
14. What are the differences of the development of LCCs in Taiwan and foreign countries?
15. What do you think is the role of the government/your company for developing LCT and LCC in Pinglin?
16. What are the differences of LCC development in Taiwan and foreign countries?
17. What do you think is meant by 'low carbon'?
18. Any suggestions in terms of this issue?

### Appendix 3. Interviewee information

No.	Code*	Date	Category	Age
1	T01	March 3 <sup>rd</sup> , 2011	Local guide & Local trader (tea shop)	52
2	C01	March 3 <sup>rd</sup> , 2011	Villager & Part-time staff of PLCT	35
3	C02	March 3 <sup>rd</sup> , 2011	Local tour guide & Local trader (tea shop)	55
4	C03	March 7 <sup>th</sup> , 2011	Villager	58
5	C04	March 7 <sup>th</sup> , 2011	Villager & Part-time golf driver of PLCT	31
6	P01	March 7 <sup>th</sup> , 2011	Staff of the Pinglin Low Carbon Tourist Center	31
7	C05	March 11 <sup>th</sup> , 2011	Local trader (restaurant)	60
8	C06	March 11 <sup>th</sup> , 2011	Local trader	57
9	C07	March 16 <sup>th</sup> , 2011	Local trader (bakery)	53
10	T02	March 16 <sup>th</sup> , 2011	Local guide & Organic tea grower	50
11	P02	March 21 <sup>th</sup> , 2011	Director of the Development Center of Low Carbon Communities in New Taipei City	—
12	P03	March 28 <sup>th</sup> , 2011	The neighborhood magistrate of Pinglin Village	55
13	T03	March 28 <sup>th</sup> , 2011	Local guide & Local trader (tea shop) & Member of the ATP	—
14	C08	March 28 <sup>th</sup> , 2011	Organic tea grower	71
15	P04	March 30 <sup>th</sup> , 2011	Former director of the Development Center of Low Carbon Communities in New Taipei City	47
16	K01	April 8 <sup>th</sup> , 2011	Employee of Kaishin company	35
17	K02	April 8 <sup>th</sup> , 2011	Project manager of Kaishin company	40

\* 'C' stands for community

'P' stands for public sector

'T' stands for tour guides

'K' stands for the Kaishin company

## Appendix 4. Definitions of carbon footprint

Source	Definition
BP (2007)	"The carbon footprint is the amount of carbon dioxide emitted due to your daily activities – from washing a load of laundry to driving a carload of kids to school."
British Sky Broadcasting (Sky) (Patel 2006)	The carbon footprint was calculated by "measuring the CO <sub>2</sub> equivalent emissions from its premises, company-owned vehicles, business travel and waste to landfill." (Patel 2006)
Carbon Trust (2007)	"... a methodology to estimate the total emission of greenhouse gases (GHG) in carbon equivalents from a product across its life cycle from the production of raw material used in its manufacture, to disposal of the finished product (excluding in-use emissions).
Energetics (2007)	"... a technique for identifying and measuring the individual greenhouse gas emissions from each activity within a supply chain process step and the framework for attributing these to each output product (we [The Carbon Trust] will refer to this as the product's 'carbon footprint')." (CarbonTrust 2007, p.4)
ETAP (2007)	"...the 'Carbon Footprint' is a measure of the impact human activities have on the environment in terms of the amount of greenhouse gases produced, measured in tonnes of carbon dioxide."
Global Footprint Network (2007)	"The demand on biocapacity required to sequester (through photosynthesis) the carbon dioxide (CO <sub>2</sub> ) emissions from fossil fuel combustion." (GFN 2007; see also text)
Grub & Ellis (2007)	"A carbon footprint is a measure of the amount of carbon dioxide emitted through the combustion of fossil fuels. In the case of a business organization, it is the amount of CO <sub>2</sub> emitted either directly or indirectly as a result of its everyday operations. It also might reflect the fossil energy represented in a product or commodity reaching market."
Palliamentary Office of Science and Technology (POST 2006)	"A 'carbon footprint' is the total amount of CO <sub>2</sub> and other greenhouse gases, emitted over the full life cycle of a process or product. It is expressed as grams of CO <sub>2</sub> equivalent per kilowatt hour of generation (gCO <sub>2</sub> eq/kWh), which accounts for the different global warming effects of other greenhouse gases."

(Adopted from Wiedmann & Minx 2007: p.3)

## Appendix 5. Basic information of the case examples in Chapter 3

### Case 1 – Ashton Hayes, UK:

Ashton Hayes is a rural village in Cheshire, Northwest of England (see Map1) with a population of around 1,000 living in around 350 household. It is part of the parish of Ashton Hayes. Ashton Hayes aims to become the first carbon neutral community in England. It has taken many activities to reduce CO<sub>2</sub> emissions which are summarized in Table 1.



Map 1 Ashton Hayes

(Source: <http://asc2.futura.com/CaseStudies/AshtonHayes/Overview/Default.aspx>)

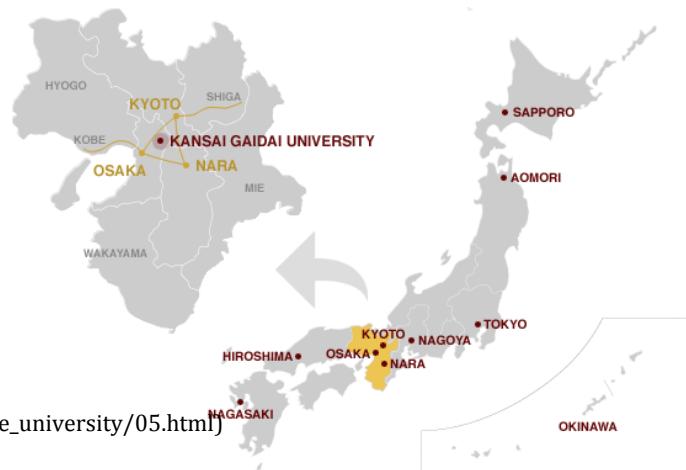
Table 1. Summary of the activities and events of AHGCN

Sector	Activities and Events
<b>Transport</b>	The construction of pedestrian footpath; Plan to have community electric car in 2011;
<b>Energy</b>	Home insulation (loft insulation, cavity wall, water pipe insulation); Installation of PV panels and a wind turbines on the roof of the primary school; Plan to build its own power generating station in the community; Microgrid feasibility study;
<b>Food</b>	Buy locally and eat locally; Establishment of Community Shop: provide local produce such as the fruit, veg and eggs (January 20100);
<b>Waste</b>	Reduce waste; Promote waste composting;
<b>Knowledge sharing</b>	Networking initiative: talking and emailing with people from all over the country; A collaboration with Nøtterøy, Norway;
<b>Others</b>	Education to raise awareness of school children; Tree planting;

(Summarized from the AHGCN project website: <http://www.goingcarbonneutral.co.uk/>)

### Case 2 – Kyoto city, Japan:

Kyoto is an old city, located in the central part of the island of Honshu (Map 2). It had once been the capital of Japan for around 1,000 years. The population in Kyoto is approximately 1.47 million. Its total area is 827.90 km<sup>2</sup>.



Map 2 Kyoto City

(Source: [http://www.kansaigaidai.ac.jp/asp/01\\_the\\_university/05.html](http://www.kansaigaidai.ac.jp/asp/01_the_university/05.html))

## Appendix 6. Eco-Model Cities (EMCs) in Japan

<b>Shimokawa, a low-carbon model society to attain harmony with forests in the northern region</b>	<b>Shimokawa Town pop. 3,900</b>	<b>Obihiro City pop. 170,000</b>	<b>Obihiro, a rural Eco-Model City</b>
<ul style="list-style-type: none"> <li>Fast-growing willows are grown for carbon fixation and utilized as fuel.</li> <li>A district heating and cooling system has been introduced.</li> </ul>			<ul style="list-style-type: none"> <li>Using cattle manure compost, etc. as an alternative fuel for kerosene</li> <li>No till-farming</li> </ul>
<b>Pedestrian-oriented city planning, activities for promoting low-carbon efforts by unleashing community capabilities</b>	<b>Kyoto City pop. 1.47 million</b>	<b>Toyama City Pop. 420,000</b>	<b>Toyama City's CO2 reduction plan based on the compact city strategy</b>
<ul style="list-style-type: none"> <li>Turning Shijo Street into a transit mall, controlling vehicle traffic in narrow streets, etc.</li> <li>Popularizing low-carbon houses that retain Kyoto's atmosphere; building <i>Kyomachiya</i> houses in the Heisei (1989-) period</li> <li>Efforts that take advantage of communities' capabilities: eco-neighborhood associations, eco-schools, etc.</li> </ul>			<ul style="list-style-type: none"> <li>LRT network</li> <li>Encouraging residents to relocate to areas that are readily accessible to the public transport services</li> </ul>
<b>Creating a low-carbon industrial complex, low-carbon lifestyle</b>	<b>Sakai City pop. 840,000</b>	<b>Chiyoda Ward pop. 45,000</b>	<b>Building an energy-efficient city, increasing energy efficiency</b>
<ul style="list-style-type: none"> <li>Setting up a mega solar system, large fuel cells, energy conservation equipment, etc.</li> <li>Solar power station in the city (setting up a photovoltaic power generation facility for 100,000 households)</li> <li>A community cycle system in collaboration with local industries</li> </ul>			<ul style="list-style-type: none"> <li>Achieving energy conservation of medium and small buildings</li> <li>Upgrading the district heating and cooling system, utilizing the heat of spring water</li> </ul>
<b>Carbon Free City in Asia</b>	<b>Kitakyushu City pop. 990,000</b>	<b>Yokohama City pop. 3.65 million</b>	<b>Achieving a large city type zero-carbon lifestyle by unleashing the potential of citizens: sharing knowledge, making more options available, and encouraging action</b>
<ul style="list-style-type: none"> <li>Low-carbon 200-year District taking advantage of advanced technologies</li> <li>Supplying unused heat from factories to local communities</li> </ul>			<ul style="list-style-type: none"> <li>Increasing renewable energy 10 times by 2025</li> <li>Giving economic incentives to build energy-efficient houses</li> </ul>
<b>Proposing a model of a sustainable small local government where the environment is in harmony with economy</b>	<b>Minamata City pop. 30,000</b>	<b>Iida City pop. 110,000</b>	<b>Utilizing natural energy and building a low-carbon city with citizens' participation</b>
<ul style="list-style-type: none"> <li>Sorting waste into 22 categories, attaining high-quality recycling</li> <li>Turning bamboo, etc. into biofuels</li> </ul>			<ul style="list-style-type: none"> <li>Extending the heating system to private houses</li> <li>Utilizing renewable energy on a city block basis</li> </ul>
<b>Wood biomass community recycling model project</b>	<b>Yusuhara Town pop. 5,020</b>	<b>Toyota City pop. 420,000</b>	<b>City planning by utilizing cutting-edge environmental technologies, and eco-friendly car use</b>
<ul style="list-style-type: none"> <li>Recycling-based forest management by producing wood pellets, etc.</li> <li>Setting up 40 wind turbines by FY2050</li> </ul>			<ul style="list-style-type: none"> <li>Introducing advanced environmental technologies in a low-carbon society model district before implementing these technologies in other districts</li> <li>Next-generation car sharing system, photovoltaic charging infrastructure</li> </ul>
<b>Local-production-for-local-consumption-based energy system utilizing sugar cane, etc.</b>	<b>Miyakojima City pop. 55,000</b>		7
<ul style="list-style-type: none"> <li>Using bioethanol fuel, generating power with bagasse (fibrous residue remaining after the extraction of juice from the crushed stalks of sugar cane), achieving a CO2-free automobile society</li> </ul>			

(Source: Fujita 2011, at the International Conference on Promoting Low-Carbon Cities)

## Appendix 7. Drinking Water Management Act

- Original 21 articles promulgated by presidential order on November 10, 1972
- Thirty-one articles revised and promulgated by presidential order on May 21, 1997
- Revisions to Articles 2, 5, 14 and 26 promulgated by presidential order on December 22, 1999
- Addition of Articles 12-1, 14-1, 24-1 through 24-3, and 25-1 promulgated by presidential order on January 8, 2003
- Revisions to Articles 3, 6-9, 12, 13, 15, 16, 19, 23, 24, and 29, the addition of Article 15-1, and the deletion of Articles 17 and 27 promulgated by presidential order on January 27, 2006

## Chapter 2 Water Source Management

### Article 5

Acts that pollute water source quality are prohibited in areas within a certain distance of a drinking water source quality protection area or drinking water intake point.

Acts that pollute water source quality in the foregoing paragraph means:

- I. Illegal logging of forests I. or clearing of land
- II. Development of industrial parks or establishment of polluting factories
- III. Development of nuclear energy or other forms of energy or construction of radioactive nuclear waste storage or processing facilities
- IV. Dumping, release or discarding of garbage, ash, earth and gravel, sludge, excrement and urine, waste oil, waste chemical products, animal carcasses or other articles sufficient to cause the pollution of water sources
- V. For-profit raising of livestock or poultry
- VI. Development of new communities. However, communities formed by aboriginal villages due to natural population increases shall not be subject to this restriction.
- VII. Construction, renovation or expansion of golf courses
- VIII. Extraction of earth and gravel, mineral exploration or mineral mining
- IX. Development of railways, mass transit systems, harbors or airports with scale and scope requiring the implementation of environmental impact assessments
- X. Those river channel modification projects sufficient to impact the self-purification ability of the river and that fail to receive the authorization of the competent authority and industry competent authority
- XI. Those roadway and athletic facility development projects that fail to receive the authorization of the competent authority and the industry competent authority
- XII. Other acts officially announced by the central competent authority as prohibited

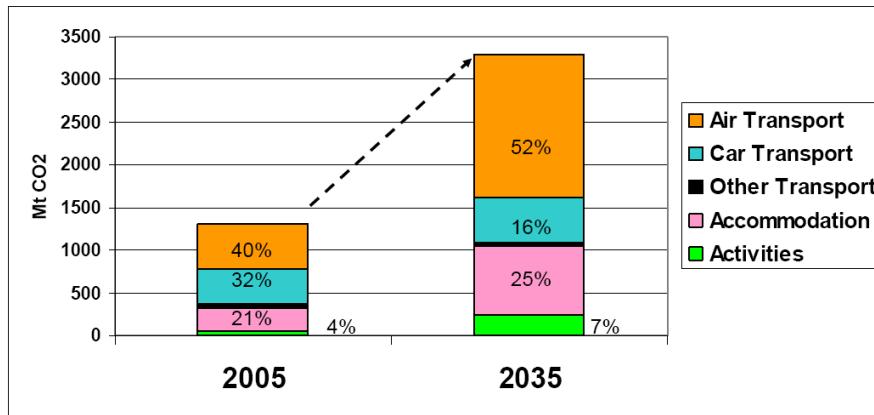
Those acts in Subparagraphs 1 through 9 and Subparagraph 12 of the foregoing paragraph that are necessary for the lives of residents and that receive the approval of the competent authority shall not be subject to this restriction.

The special municipality, county or city competent authority shall draft the scope of the drinking water source quality protection area and the certain distance from drinking water intake points in the foregoing paragraph, and shall issue official announcements after approval by the central competent authority. The central competent authority shall make determinations and issue official announcements for those circumstances that involve two or more special municipalities, counties or cities.

### Appendix 8. CO<sub>2</sub> emissions of tourism at the global level by sub-category

Sub-category	2005		2035	
	CO <sub>2</sub> (Mt)	%	CO <sub>2</sub> (Mt)	%
Air transport	515	40%	1,631	53%
Car transport	420	32%	456	15%
Other transport	45	3%	37	1%
Accommodation	274	21%	739	24%
Activities	48	4%	195	6%
<b>Total</b>	<b>1,307</b>	<b>100%</b>	<b>3,095</b>	<b>100%</b>
<b>Total world</b>	<b>26,400</b>			
<b>Tourism contribution</b>		<b>5%</b>		

(Source: Scott et al. 2008)



(Source: Scott et al. 2008)

This table and figure illustrate the contribution of tourism to CO<sub>2</sub> emission by different sector (transport, accommodation, and other tourism activities), and the projection in 2035 on the global scale.

It is shown that transport contributes the largest proportion of total CO<sub>2</sub> emission of tourism (75 percent), following by accommodation (21 percent). Within the transport sector, air transport accounts for 53 percent, following by car transport (43 percent), and other transport (4 percent).