Encouraging low carbon policies through a Local Emissions Trading Scheme (LETS)

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Abstract

Local authorities are important actors to mitigate climate change. They can implement policies which can reduce emissions of greenhouse gases in sectors like transport, waste, agriculture and land use, land use change and forestry (LULUCF). They can also implement policies which can increase carbon dioxide removals. The European Union Emissions Trading Scheme (EU ETS) is one of the most important initiatives to reduce carbon dioxide emissions in the EU. It is a cap and trade scheme encompassing almost half of the European-wide carbon dioxide emissions. However, carbon dioxide removals and sectors associated with local authorities’ responsibilities are not included in the EU ETS. The main objective of this paper is to propose an original cap and trade system, called LETS, designed to involve local authorities. The LETS was then tested and applied to all the local authorities in the mainland of Portugal covering emissions and removals of a single greenhouse gas (carbon dioxide) in the LULUCF and the transport sectors. The system proved to have the necessary conditions to be implemented and adaptable to other country contexts.

Introduction

Climate change is one of the most important threats to humanity. Human activities contribute to the emissions of greenhouse gases (GHG) and to the removal of these gases from the atmosphere. Therefore humanity has been singled out as responsible for a warming influence on the climate (IPCC, 2007). According to the Stern Review on the Economics of Climate Change (Stern, 2007), overall, mitigation measures are likely to cost less than the damage caused by the effects of climate change in a business as usual scenario. The Kyoto Protocol defined commitments for 2010 on the reduction of greenhouse gases emitted by the most industrialized countries. Several European Union (EU) countries are facing difficulties to achieve their objectives. Under those objectives, EU must reduce the overall emissions by 8%, but 5 years before 2010 (the commitment period) the overall reductions were only around 2% (Eurostat, 2008).

Climate change is a global threat but local and individual actions are essential to mitigate it. In this article, we focus on the potentials of local policies on climate change. In the first place we discuss which local policies can mitigate climate change. Secondly, we analyze the EU policies on climate change and how they are linked to local approaches. Finally, we propose a cap and trade system to encourage local policies to reduce CO₂ emissions and we study its application in respect of mainland Portugal.

Local policies on climate change

In this section, we analyze local policies which can reduce GHG emissions and boost their removal from the atmosphere. We approach a number of policies, in particular those dealing with urban planning, land-use, transport, forest areas (carbon sinks), waste, housing and energy.

Urban and land use planning

In urban areas, different land uses generate different activities, and each one has different metabolic systems which transform energy, water and other resources into energy, other materials and waste (Pauleit & Duhme, 2000). The transformation of fossil fuels into energy and CO₂ through various urban activities is an important impact of cities on climate change (Rees, 1997). Cities are CO₂ producers and have low carbon storage capacities (Whitford, Ennos, & Handley, 2001). Climate change policies should cover all human activities, and urban policies are also important to mitigate climate change. In this respect, Baccini (1997) explains the importance of reducing the energy spent in house heating and in transport of people and goods.

Land use planning is seen as an important instrument in the move to secure more sustainable urban development (e.g. Haughton, 1997; Mindali, Raveh, & Salomon, 2004). Despite this claimed importance, national and international perspectives have dominated climate change modeling and analysis (Grazi & van den Bergh, 2008). In a similar way, two recent FP7 projects, SUME...
cesses should promote functional density instead of population density. Ewing (1997) considers that an urban pattern with land use diversity, good connectivity to the main road network, sidewalks and bicycle lanes is an appropriate approach to suburban areas planning. Decreasing energy consumption is a major benefit, obtained through linked trips and shorter trip lengths.

However, sceptics about diversity argue that while behavioural changes may be sought, they cannot be assured. Major land use changes may not lead to decreasing trip lengths. For instance, in an empirical study in the San Francisco Bay Area, residents’ attitudes seemed far more associated with travel patterns than with land use characteristics (Kitamura, Mokhtarian, & Daidet, 1997). Moreover, if the promotion of full compatibility between uses is not well planned, diversity can give rise to an increase of energy consumption (Mindali et al., 2004).

The integration of different policies, adapted to the different characteristics of different cities, should require a more balanced approach. There are varying perspectives and no consensus about the best policies. The main conclusion is that, even though we do not have a doctrine (or path) of urban and land use planning policies for the mitigation of GHG emissions, the planning literature recognises that land use planning itself is an instrument which can have a significant influence on climate change.

Transport

As we have referred to before, urban and land use planning can affect the transport sector emissions. For this reason, local authorities play an important role in the control of air pollution associated with transport (Monni & Raes, 2008). However, over the last decades, the low density, car dependent model has become dominant (Banister, 2007). All forms of transport are bound to consume energy, we use calories to walk, fuel to move cars, electricity to power the metro and aircraft fuel to fly (Zegras, 2007). Carbon dioxide emissions in this sector depend on the distance traveled by each passenger, on the vehicle occupation, on the fuel used to produce energy and on a CO₂ emission factor (Monni & Raes, 2008). According to these authors, economic growth induces higher trip lengths, more frequent trips and a lowering of vehicles occupancy rates. The main challenge is to change these tendencies. And the idea is not to prohibit the use of cars but rather to design cities with quality and with an acceptable scale so that residents do not have the need to use the car so often (Banister, 2008). Thus, land use and transport are complementary issues. But land use planning is not the only instrument which local authorities have to mitigate GHG emissions in transport. Local authorities influence emissions through infrastructural policies, regulatory measures, changing citizen's behaviour and developing public transport options.

Infrastructure is a major factor in determining modal choice. For instance, European cities which have the highest road lengths per person also have the highest energy expenditure (Mindali et al., 2004). By creating bus and bicycle infrastructure, local authorities can influence more people to use public transport and the bicycle, therefore reducing transport emissions (Grazi & van den Bergh, 2008). The attractiveness of a bicycle network will be higher if it provides direct links to destinations without conflicting with other forms of traffic (Huwer, 2000).

Circulation taxes are a particular kind of regulatory measure. They are seen as strategic policies which can decrease car dependence (Sadownik & Jaccard, 2001). Urban toll ring charging can be associated with CO₂ emissions, and parking taxes can also be an instrument to decrease car use (Grazi & van den Bergh, 2008). In several world cities studied by Kenworthy and Laube (1996), public transport use is higher when there are fewer central parking places as compared to the number of jobs. Integrated policies are required to secure behavioural change. In Freiburg, Germany, for instance, a policy to promote cycling is pursued alongside car

1 http://www.sume.at.
2 http://www.bridge-fp7.eu.
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