The CitiCAP (citizens' cap and trade co-created) Project
Zoom-In 1

Personal Carbon Trading Pilot

Project led by the City of Lahti, Finland

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Executive Summary

The CitiCAP Project focuses on co-creating and implementing a Personal Carbon Trading (PCT) scheme for mobility to reduce traffic emissions in Lahti. This will be a first city-wide pilot of PCT ever performed within the EU. Through the PCT scheme citizens can receive benefits, such as discounted bus tickets or bicycle repair services, in exchange for smart mobility choices. In practice, the personal carbon footprint for mobility will be calculated with a new mobile application based on a transport mode detection solution.

The objective of the pilot is to improve understanding of what motivates citizens to change everyday practices in mobility so that the goal of carbon neutrality in Lahti is achieved. The pilot will help to provide insights about economic and social factors that influence an individual's' personal environmental responsibility. In addition, it aims to identify socio-technical structures that influence reducing emissions of the mobility sector and increasing demand for low-carbon services and business models. The Lahti pilot will help to provide 'a proof of concept' so that it can be rolled out to different cities.

This Zoom-In aims to take a critical view of PCT; outlining some of its core components, the key challenges that will be faced by the City of Lahti, the linkages with other EU policies and lessons learned from other related initiatives. The conclusions of this report aims to determine whether PCT is still a 'policy ahead of its time'.

Introduction

Transport is responsible for around a quarter of the EU's greenhouse gas (GHG) emissions, making it the second-biggest emitting sector after energy. As such, it has a key contribution to make to decarbonising the European economy. At the same time, the transport sector has not seen the same gradual decline in emissions as others: emissions only started to decrease in 2007 and still remain higher than in 1990. Within this sector, road transport is by far the biggest emitter accounting for more than 70% of all GHG emissions from transport in 2014, which contributes about 20% of the EU's total emissions of carbon dioxide (CO_2), of which half originate in urban areas. As such, if the EU is to achieve its goal of reducing emissions from the sector by 60% by 2050, significant efforts will be needed.

Put simply, decarbonising transport is a major challenge. While GHG emissions from non-transport sectors fell 15% between 1990 and 2007, transport emissions increased by 33% over the same period. Cities and local authorities will play a crucial role in delivering the EU's goals. They are already implementing incentives for low-emission alternative energies and vehicles, encouraging active travel (cycling and walking), public transport and bicycle / car-sharing / pooling schemes to reduce congestion and pollution. In this context, the CitiCAP project can play a crucial role in advancing the EU's objectives to decarbonise the transport sector, notably as the Commission starts its 2050 strategy for long-term EU GHG emissions reductions that will make a major contribution to the Paris Climate Agreement.

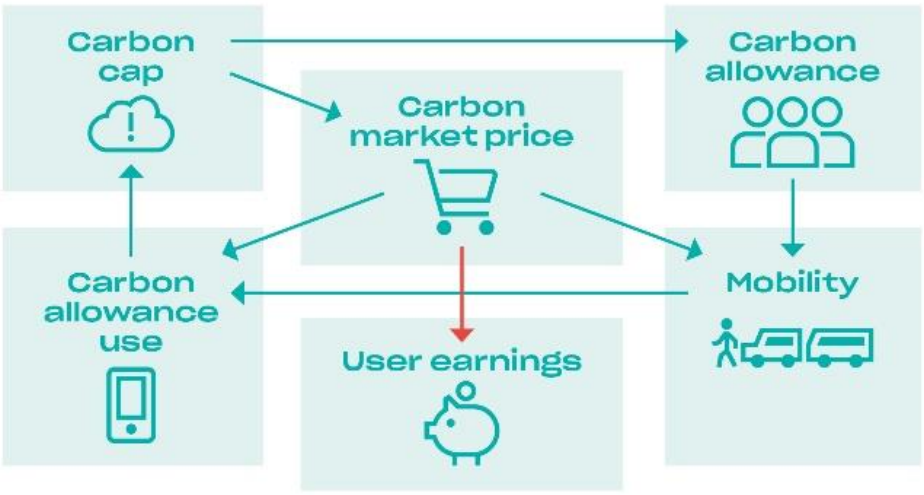
If the EU is to have the slightest chance in meeting its climate targets it cannot neglect the domestic and personal sector. Reductions in carbon emissions from business and industry will be meaningless unless accompanied by significant and equal reductions from households and individuals. Existing initiatives are

unlikely to bring about behavioural change on the scale required, with many individuals choosing to disregard the connection between their own emissions and the larger challenge. PCT might be the kind of radical measure needed to bring about behavioural change.

The city of Lahti has ambitions for a stretch CO_2 reduction target of 70% by 2030, compared to 1990 levels. Furthermore, Lahti has set itself the goal to be carbon neutral by 2040. This will naturally entail a special focus on traffic emissions and sustainable urban mobility to stop the increase of traffic emissions, which currently amount to around one third of total emissions. A special emphasis will now be placed on the CitiCAP project which aims to change the attitude and behaviour of citizens to promote the shift to sustainable mobility. A PCT scheme for mobility will be co-created and implemented during the project to reduce traffic emissions. This is the first city-wide pilot of transport PCT ever performed which can significantly advance efforts in an area which has stalled for the past 10 years. In doing so, it can lead and shape the debate of the future policy landscape of both cities, national governments and the EU which will make it cheaper and easier to decarbonise the transport sector going ahead.

Personal Carbon Trading - the basics

Theoretically in a PCT scheme, individuals are allocated an allowance of carbon from within an overall national or local cap on the quantity of carbon emissions produced by individuals within the jurisdiction. People surrender their credits as they make certain purchases that result in emissions that can include emissions from transport. Those who need or want to emit more than their allowance have to 'buy' allowances from those who can emit less than their allowance. Alternatively, those who emit less can be rewarded for doing so. The market effect encourages people to pursue energy efficiency and to reduce their carbon emissions. Over time, the overall emissions cap (and therefore individual allocations) can be reduced in line with international, national or local targets. As a result, the price of carbon allowances becomes more expensive encouraging people to reduce their emissions.



The basic logic of PCT (source: CitiCAP)

As already mentioned, it is clear that existing policies are unlikely to achieve the goals that have been set out and agreed upon. Accompanied by existing policies, significant changes to individual behaviour and patterns of consumption and production will therefore be essential. While PCT is not the only mechanism that aims to encourage behavioural change (this will be touched upon later), it could spearhead behavioural change across a range of environmental concerns by bringing them to the forefront of people's and decision makers awareness.

A brief history of PCT

PCT firstly attracted interest in the UK as a possible policy option which led to a programme of research being commissioned by the Department for the Environment, Food and Rural Affairs (Defra) in 2008. It looked at the technical feasibility and potential costs, effectiveness and strategic fit, public acceptability and distributional impact. Defra's conclusions was that this is a 'policy ahead of its time' as the key concerns were around public acceptability and costs, with doubts whether these issues could be addressed satisfactorily. The Department further concluded that further research was necessary but a Parliamentary enquiry into the issue concluded that PCT was essential.

To date, wider governmental interest has not been forthcoming. The only real trial to date was the Norfolk Island Carbon and Health Evaluation (NICHE) Programme in Australia, which was established in 2011 and aimed at using a PCT system to reduce carbon emissions and obesity. Participants were given feedback on their carbon usage compared to national norms and were given a personal carbon allowance / target. The intention was to monitor the carbon footprint associated with high energy dense, processed foods, with a household survey conducted in March 2012 to measure whether behaviour had changed. What it showed is that there was a relationship between attitudes to health, the environment and carbon trading systems. What is less clear whether this actually resulted in people changing their attitudes and improve the public acceptability of PCT systems. It does however highlight the importance of behavioural change to PCT and the need to engage citizens in relation to their behaviours.

One particular study in France, which looked at the preference of PCT to other climate policies such as a carbon tax highlighted a favourable attitude to the approach. The study was unable to show how effective it would be to reduce personal emissions from travel or reduce car usage but that further research was deemed necessary to determine how societal beliefs can influence behaviour. Another study looked at the effects of PCT on people's decision to adopt electric vehicles in Jiangsu, China. The results showed that PCT can effectively change the decision to adopt electric vehicles. The choice experiment showed that is was more effective than tolls, taxes but less effective than government subsidies.

PCT and the importance of people's behaviour

PCT follows the 'polluter pays' principle but also the principle of reasoned action - in that people are rational beings who have the ability to process and use information available and in turn use this information to achieve reasonable behavioural decisions. It is best described as a causal chain where behaviour is determined by an individual's beliefs and attitude, subjective (also termed social) norms

which are 'the perceived social pressure to perform or not to perform the behavior', motivation to comply and lastly, the intention to perform a particular behaviour. The ability or perception to perform such a behaviour is just as critical - it outlines the importance of the 'carrot' and 'stick' approach to policy making but also the need to engage the public to convince them of the need to change their behaviour. At the same time, if this was so simple, then we would not need to explore new policy tools such as PCT which highlights the inherent challenges associated with it.

The challenges of PCT

The challenges surrounding personal carbon trading are multi-faceted and will not be easy to overcome. Beyond technical questions, personal carbon trading would have to overcome significant obstacles of political and public acceptance. The following issues were ranked by the UK House of Commons Environmental Audit Committee in 2008, which considered what extent PCT should play in government policies, as among the most significant obstacles:

- Coverage: who receives an allocation? Of what size? How frequently? Which emissions are included?
- System and operation: the need to provide efficient and reliable systems which can cope with massive amounts of data, processing transactions in different formats and providing real time updates on account levels.
- Administration: the need to have a trusted and capable administrative body; and the sensitive setting of the allocation curve on the fine line between public acceptability and driving down emissions. Fraud must be avoided at all costs and the scheme must be enforceable.
- Finding space in the policy landscape: many carbon emissions are already counted as part of existing policy instruments, such as the EU Emissions Trading Scheme (EU ETS). For personal carbon trading to work, it would need to fit with other schemes.
- Public acceptability: personal carbon trading would be a major initiative, affecting every individual in the country or city. Perceptions of the scheme as over-restrictive, unnecessary, inequitable, or burdensome, whether or not rightly founded, would prove very difficult to overcome in certain quarters.
- Engagement with the scheme: measures will need to be taken to ensure that individuals understand the scheme and know how to use it. The public's involvement with the scheme will be needed, both for its effectiveness and for its acceptance. Mechanisms and strategies accounting for those who are unable or unwilling to participate will be needed.
- Ensuring equity: measures would have to be taken to prevent unfair distributional impacts, including protecting high risk groups such as those suffering from fuel poverty, or deciding whether or not to provide children with an allowance. The extent to which issues of inequity are deemed to have been tackled successfully will significantly affect the public's acceptance of the scheme.
- Obtaining political commitment: the long-term commitment and political courage required of any government must be substantial if it is to introduce such a radical and potentially unpopular scheme. If it is to work, personal carbon trading will require support across a wide political spectrum.

Further challenges specific to the City of Lahti is how 'carbon capable' people are so that they can make informed judgements in order to reduce their carbon footprint. There is a significant misconception on the amount of active trading will be required but it is widely considered that a PCT should be mandatory but with the pilot phase, there is a risk that only the 'converted' with already low carbon footprints will want to engage. It will be important that the pilot engages a broad range of the population, both high and low polluters as well as high and low income households, if real lessons are to be learned so that the scheme can be scaled up effectively.

There is also the risk that some quarters of society, notably low income households, women due to the perception of fear in using public transport or people with disabilities, may be unduly punished which would make it a politically sensitive policy to pursue. For instance, people may have poor access to public transport and are therefore reliant on private transport as there is no alternative. Ensuring the fair distribution of emissions will be essential.

The need to ensure enhanced accessibility will be paramount which will need to be addresses in other areas of the project, such as through the effective implementation of their Sustainable Urban Mobility Plan (SUMP), smart bicycle lane and data platform that will enable integrated sustainable transport and last mile solutions to enable an effective PCT. This will ensure that individuals can see that they have alternatives to private transport thereby enabling them to change their behavioural intention.

There is the political risk in that Lahti's environmental and transport policies could be seen to be failing to reduce emissions from the sector and that the individual must now bear the cost and not the city. As such, Lahti's PCT must be championed at the highest levels but this will only come with public acceptability. This 'chicken and egg' scenario is most probably highlighted by the fact that PCT has so far not attracted any political support as a real policy option to date. Due to this, there are very limited lessons to be learnt which makes the CitiCAP such a fascinating project.

PCT and links to other EU and national policies

With the EU ETS already in place, this raises a question whether PCT's would create overlapping policies. Currently transport is outside the scope of the EU ETS but there have been some calls for its inclusion. European Commission analysis has shown that even a carbon price of €50 per tonne (at the start of 2018 it was around €7 per tonne, with prices later in the year at €18 per tonne) would only raise diesel prices by around 13 cents a litre, not nearly enough to drive emissions down and cut journeys, encourage people to drive more efficiently or shift to sustainable transport modes.

Including PCT alongside the EU ETS with the transport sector would create potentially create inconsistent carbon prices. This would also create inefficient abatement choices and possible carbon leakages. This would result in two clear problems: double regulation and double counting of emissions.

It is therefore unlikely in the near term that PCT would be introduced EU wide given that different EU countries have very different carbon footprints depending on how clean their energy mix or transport offer is. There is also the issue of varying national targets which will result in different obligations and subsequent allocations, thereby making it difficult to see how a tradable EU wide mechanism could work. At the local level as well, across Europe, different cities and regions have varying levels of authority which would also make it difficult for some subnationals to implement PCT in their specific area.

Green taxation and personal carbon trading both affect individuals. While carbon taxation is a cost even to those who produce very few emissions, carbon trading rewards those with low emissions, and only penalises those who exceed their allocation. Both methods use a 'stick', but personal carbon trading offers a 'carrot' to. Finland has a carbon tax at around $110 per tonne according to the World Bank in 2017 which can have an impact on driving change but not engaging people. As such, PCT has the potential to drive greater emissions reductions than green taxation as a carbon allowance would incentivise behavioural change and also engage individuals to reduce their emissions.

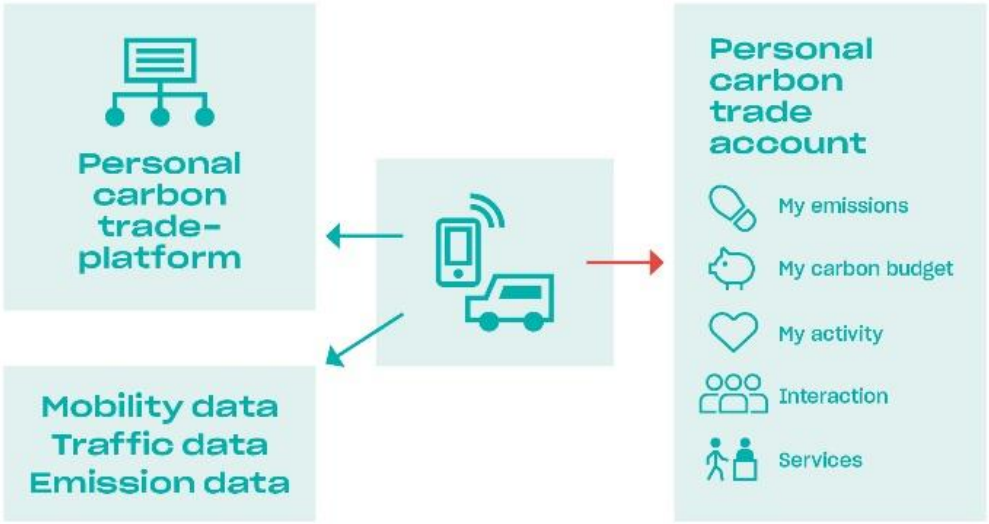
Lahti's approach to PCT

Lahti's PCT model is voluntary-based and emphasizes incentives over penalties. The PCT model of Lahti promotes active mobility and public transport use. It does this by utilising ICT-technology where it is possible to make it easy, simple and attractive. The goal is to have around 1,300 users in the pilot, which equates to around 1% of the population of Lahti.

Personal mobility tracking is done with a PCT mobile app, which can identify different types of mobility, as well as time and distance travelled. Emission rates for different mobility types are extracted from an open data source, whilst Lahti-specific data is used for estimating emissions from public transport. When the user manages to save carbon allowances, they earn virtual euros that can be used for benefits and services provided through the PCT. Users are not punished for surpassing the amount of carbon allowances, but it increases the carbon price at the market. The carbon price increases, when collectively more users surpass rather than save their allowances. In the vice versa situation, carbon price decreases accordingly. This is directly reflected on the price of different modes of transport and acts as an incentive to choose a low-carbon mobility option. A car driver can earn PCT credits too by reducing the travelling distance, using carpooling or changing to an electric or biogas vehicle. The cap can be lowered after a certain period, which will raise the carbon price. It is also possible to encourage citizens to reduce their carbon emissions through targeted communication campaigns when the carbon price is significantly higher than usually. The floor price (the carbon price in the beginning) will be set so that it reflects true cost of carbon.

A carbon cap will be defined based on the emission reduction targets set by the city of Lahti and adjusted by the amount of participants. Carbon cap stands for the total amount of carbon allowances, which are allocated to the participants. Citizens will be engaged in deciding the allocation principle. This is reflected in the whole project in that the Lahti PCT model is co-created from the start with the city's decision-makers, residents, local businesses and collaboration partners all involved. The aim is to create a pilot,

which truly engages the surrounding community and gives all stakeholders a possibility to have an early impact in the planning phase through several different engagement events.



The future structure of the Lahti PCT model (source: CitiCAP)

Summary of progress to date and next steps

In terms of progress to date, over the course of the project's first year, the data platform was developed alongside an extensive stakeholder engagement process mentioned above. The first round of user mobility data collection is also being established for defining the baseline and carbon cap. The next step is to launch and pilot the scheme with the results analysed in the final year of the project so that policy recommendations can be developed.

Conclusions

When developing recommendations for wider adoption, it is important that the public are not faced with a mixed signal. Although the surrender of allowances for public transport would be minimal in comparison to the purchase of road fuels, a public transport system that was entirely exempt from personal carbon allowances would provide a far clearer incentive for individuals to leave their cars at home.

The CitiCAP project is a potential game changer in that it will pilot and test a new policy concept for urban mobility for the first time in the world. Important lessons will be learned but the conditions required to accurately simulate behaviour and transaction under a full PCT will be difficult to replicate in a pilot with limited participation. At the same time, 'we don't know, if we don't try'.

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