POSSIBILITIES FOR MOBILITY-RELATED PERSONAL CARBON TRADING AS A POLICY TOOL

Personal carbon trading (PCT) is an interesting policy tool to motivate people to reduce greenhouse gas emissions using economic incentives, information on emissions and peer pressure. In 2020, the European Green Capital Lahti piloted personal carbon trading in the mobility sector. The pilot was globally the first city-wide PCT experiment based on ICT and mobile phone technologies. The pilot provided insights on PCT which can be utilized and replicated elsewhere.

INTRODUCTION

A core target of personal carbon trading (PCT) is that participants reduce their greenhouse has (GHG) emissions. Each user has a certain amount of emission allowances, and the amount of allowances depends on the chosen emission allowance allocation method and on the total GHG emission reduction target (emission cap). Participants who stay below the set allowance level can sell their extra allowances and users who exceed their allowances must purchase additional ones. The allowance price varies depending on the supply and demand.

Previous research and pilots have considered PCT as a policy ahead of its time. Increased interest among individuals to take climate action, ambitious climate targets of cities and improved ICT technology provide a good opportunity to execute a large scale PCT pilot. The aims of the mobility PCT pilot in the city of Lahti were:

- to create a PCT model and to pilot it using mobile phone technology;
- to promote sustainable urban mobility and to assess how a selected PCT model impacts users' mobility emissions;
- to gather knowledge of what motivates citizens towards sustainable mobility;
- to provide an example that can be utilized to develop and implement PCT models in different cities around the world.

APPROACH AND RESULTS

The PCT model was developed based on previous research and co-creation with residents of Lahti. The technical implementation of the PCT was done using ICT technology and mobile phone applications. The pilot was voluntary and concentrated on the incentivizing aspects of PCT. The model was constructed around virtual euros, which could be earned through PCT and used to purchase valuable products and services in the application's marketplace.

Approximately 2 500 user IDs were registered for the app, and the number of active users in the PCT pilot varied weekly from 100 to 350. The PCT system functioned as planned: user specific emission allowances were allocated based on initial questions, users' mobility modes and distances were automatically recognized, information on mobility emissions was provided almost in real time and users could earn virtual euros.

The app data shows a slow decrease in mobility emissions for the pilot period in autumn 2020. A similar but lower decrease can be also seen in the data from reference users who did not participate

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in the PCT. It is not clear how much participation in the PCT pilot drove the decrease in users' emissions; most likely, the main factor was the intensification of COVID-19. In the pilot's final survey, 36% of the app users claimed that their mobility became more sustainable due to the use of the app. The answers indicate that the key reasons for this were information on one's own mobility emissions and one's willingness to challenge oneself. The third reason was incentives through PCT. The base level for emission allowance prices in the pilot was € 0.1/kg_{CO2}, which rose to € 0.5 and € 0.75/kg_{CO2} for certain weeks. However, higher prices did not seem to have an impact on users' average weekly emissions.

POLICY RECOMMENDATIONS BASED ON THE PILOT IN A SWOT FRAMEWORK

The SWOT framework (Figure 1) below presents the main policy implications and recommendations regarding mobility-related PCT.

Figure 1: Mobility-related personal carbon trading in a SWOT framework

STRENGTHS - Information on one's own emissions, a willingness to challenge oneself and economic incentives motivate some to reduce their emissions - Voluntary PCT providing information on mobility emissions and small incentives can be a good tool to support users' sustainability transition	**WEAKNESSES** - Mandatory or penalizing PCT is challenging to implement with ICT technology due to possibilities to cheat in the system (21% of users admitted to cheating) - Voluntary PCT interests only some citizens, and high emitters are challenging to get onboard - Technical improvements are still needed e.g. to automatic mobility mode recognition and mobile phone battery consumption - PCT and CO_2 prices are complex and challenging for many to understand - A comprehensive PCT should include also other consumption categories which complicates the system
OPPORTUNITIES - ICT technology enables automatic and user friendly PCT implementation for mobility - User-specific emission allowance allocation is considered as a fair way to implement PCT - Mandatory PCT with penalizing features would allow emissions trading between users and would most likely be an effective policy tool to reduce emissions	**THREATS** - Money, prizes and discounts earned through PCT may be subjects to taxation, which reduces the CO_2 value for users - Taxation requires gathering more specific user information, which requires strong data protection - The CO_2 price may need to increase significantly before it motivates users to reduce their mobility emissions - It is challenging to keep users interested in using an app for voluntary PCT

Additional information

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