Final Report Summary - CATCH (Carbon Aware Travel Choices in the climate-friendly world of tomorrow)

This summary provides with a final overall and detailed description of the CATCH achievements at the end of the project. This includes the following:

- A description of the context where CATCH fits in and the objectives of the CATCH project pursued by the consortium. The context refers not only to the low carbon economy but also to the smart mobility aspects within the smart cities framework in which cities today are competing and collaborating each other to provide citizens with better quality of living and moving (section 4.1.2).
- A description of the main scientific and technology results achieved, in terms of tangible outcomes but also foreground. This ranges form improvement in CO2 emission estimation models to visual tools and communication strategies triggering sustainable mobility choices. All this also includes the way these results have addressed the project objectives and the different type of foreground generated by the project...
partners, mentioned in partners exploitation strategies and plans (section 4.1.3).
- The socio-economic impact and the wider societal implications generated by the project to a broad
  audience of potential users ranging from public decision-makers and stakeholders at city level to transport
  operators and travellers. A description of the main dissemination activities and exploitation of results
  involving the CATCH core interest group cities as well as other existing projects is also provided (section
  4.1.4).

Project context and objectives:

The context

The CATCH project was developed in response to the Seventh Framework Programme (FP7) call for
proposals that would help cities to reduce the amount of CO2 produced by travel choices. Despite of
several initiatives, most of which are supported through projects funded by the European Commission
(EC), there is still a need for a trusted and easily accessible resource which enables travellers, policy
makers, transport operators and other stakeholders, to determine appropriate actions addressing the
growing environmental challenge of reducing the carbon dioxide emissions from urban transport by
encouraging carbon-friendly travel choices.

CATCH stands for carbon-aware travel choice. Its mission is to become the natural place to look for
mobility related GHG reduction advice, data and information in a context characterised by the following
major challenges and trends:

- policy-makers at city level are getting more engaged in taking up sustainable urban mobility plans
  (SUMP);
- climate-change policy leaders are increasing their involvement of into climate-change mitigation
  strategies (this is not only due to legally binding climate change emission reductions but encouraged
  through NAPA and NAMA initiatives);
- implementation of carbon taxes as well as cap and trade schemes is being discussed in many countries,
  including emerging economies;
- increasing emphasis on green growth and sustainable policies are means supporting economic
development at a region and city level, Interest is recognized to tools creating awareness on these
aspects;
- increasing of the cost of fuel as well as the cost of driving encourage citizens shifting from private cars to
  public transport;
- ICT and smart mobility can play a key role for the optimization of urban mobility in cities (especially by
  supporting the smart cities model);
- increasing role of participatory budgeting also in low carbon economy at city level.

In response to the above mentioned challenges, the CATCH project developed a knowledge platform and
an integrated set of visual tools to inject carbon reduction into the public's and policy maker's decision
making. The online and interactive tools of the knowledge platform were developed and designed to:

- support city stakeholders to develop SUMPs;
- motivate travellers to adopt sustainable transport choices.

The platform and its tool can support local decision-makers in moving their city's population towards less carbon intensive transportation in three main ways:

- by providing information which help decision makers understand the nature of the problem and solutions to transport related carbon emissions in their city;
- by highlighting effective instruments and actions (data and indicators benchmarking the sustainable transport (or more broadly environmental city performance) to reduce carbon emissions in their city grounded in a real understanding of how to achieve behavioural change towards sustainable travel, and
- by highlighting best-practice approaches to exploit available knowledge.

CATCH objectives

The open knowledge platform and its set of visual tools developed by CATCH aim at pursuing the following objectives:

1. understanding the perceptions and attitudes of citizens and stakeholders towards greenhouse gas reduction in mobility and develops a knowledge engine based upon the motivational triggers derived from this understanding;
2. enhancing and increasing awareness of the environmental impacts of mobility and potential solutions to their management;
3. enabling travellers to make informed climate-friendly travel choices;
4. empowering city managers, public transport operators, and other mobility stakeholders to more readily and accurately incorporate environmental opportunities and challenges into their planning and innovation processes;
5. understanding the potential for change in climate-friendly behaviour resulting from the introduction of mobility packages and measures (e.g. taxes, user charges, carbon trading schemes, incentive / reward schemes etc.) targeted on GHG reduction;
6. linking the knowledge platform to a package of mobility policies and measures which ensure that the combination of such measures and the knowledge platform encourages behavioural change;
7. ensuring that new behavioural change mechanisms will be exploited, integrating the global dimension of GHG reduction with individual behavioural change;
8. enhancing the transparency and public understanding of climate change policies and thereby increases trust.

The CATCH knowledge platform and its visual tool have largely achieved the above-mentioned scientific and technological objectives.

Interest group

An interest group was set up to help define the development and direction of the CATCH knowledge platform. The interest group consists of representatives of local governments across Europe, the non-governmental organisations (NGO) sector, business sector, and research arena in the fields of carbon and
environmental management and transport. The interest group became part of the platform management group (also including CATCH partners) actively involved in evaluating the sustainability of the platform during the final conference and in taking up initiatives to further improve the platform / tools in the future.

Grounding work

The first deliverable of the project was the Behavioural inception report (D.1.1) which examined how people react to information on climate change, why they seek out information, and potential ways to create desirable behavioural change. Among the theories discussed were the theory of planned behaviour, stages-of-change, and choice architecture or nudges.

Research based on findings from that initial report was conducted, and results were compiled in the Research and design report (D.1.2). Quantitative and qualitative research was conducted to investigate gaps highlighted in the research and the needs of the project. Surveys and focus groups were used to investigate how people respond to different presentation formats of CO2 information with consideration to both understanding and motivation to reduce car use. Within the survey, several different influences were investigated such as stage-of-change (with respect to personal CO2 production), information anchors, and gain / loss framing.

Along with presenting information in clearer ways, the research looked at several points directly relevant to the outputs of the project such as climate change as well as non-environmental motivations to change and practitioner needs.

Design and development

Design charrette workshops involving a broad audience of potential users allowed to design the CATCH knowledge platform and visual tools. The platform consists of a powerful content management system (CMS) managing multimedia content and data. It is integrated with two interactive visual tools that allow for visualisation of data at the city level (the co-benefit tool, also called My City, and the scenario tool, developed in WP4). The input to both tools is the GHG and performance database (WP3). The database structure was initially developed in T3.1 and described in D3.1 and populated with data provided with the active involvement of the core interest group cities and algorithms estimated in task 3.2 (D.3.2).

CATCH tools

Building upon an initial scoping of the objectives, especially with regards to the most effective communication approaches, a decision was taken to eventually implement - and integrate in the wider CATCH knowledge platform - two main visual tools. The development of the tools will follow the guiding principles that have been set out in the grounding stage and in the design guidelines.

The co-benefit visual tool has the main aim to present information on carbon and other co-benefits in a comparative way through various features: an interactive performance sliding scale, a carbon-o-meter animation, two interactive rankings, a library of animations and widgets to communicate - with powerful semantics - the city’s levels of performance on a wide range of co-benefit indicators. A first prototype of
this tool has already been developed, and was presented to potential end users during the last interest group meeting held in the Hague in November 2010.

The visual transport scenario tool will form the very front end and the most interactive layer of the CATCH platform. The main difference between the co-benefit and the scenario tool lies in the temporal dimension of the information presented. While the co-benefit tool provides a picture of a range of indicators for a given year (cross-sectional view), the scenario tool will show the evolution of a range of indicators, possibly combined into factors or a composite index, over time. Visually, it will be web-based and will allow users to see interactions between two factors (bi-dimensional graph) and to compare performance of cities in the graph. Factors will be customized and the user will be able to select them from a list of transport and sustainability indicators (according to the data collected through WP3 work). Users will also be provided with functionalities to interact with points (cities) displayed on graphs and could visualize trajectories of cities over time.

Validation, evaluation and exploitation

A range of internal and external evaluation activities were carried out in T.1.3 to evaluate the success of the platform design in terms of objectives (and specifically in increasing awareness on transport CO2. Collaboration by all partners involved in this work package was provided. The Evaluation report (D1.3) reports the results of such evaluation. Partners provided feedback to D1.3 documentation as required and it was submitted in due time.

As main results, based on the grounding and evaluation activities carried out by UWE (D.1.3) validation activities carried out by SICE (D.6.2) and exploitation activities carried by MRC (D.7.2) we can state that the tools developed by the project partners and integrated in the CATCH platform are efficient and powerful tools.

Main scientific and technological (S&T) results / foregrounds

The main S&T results produced by the CATCH project fully address the objectives defined by the project (as indicated in section 4.1.2).

The CATCH S&T results can be grouped into two main categories:

- the CATCH platform and its integrated set visual tools;
- scientific achievements from research activities driving the design, development and implementation of the CATCH platform and tools.

The CATCH platform and its tools

The main aim of the CATCH project was to develop and promote a trusted knowledge platform designed to encourage carbon friendly travel choices in a city context and in doing so contribute towards a reduction in CO2 emissions from the transport sector. It was specifically seeking to encourage carbon friendly travel choices by increasing awareness of the negative impacts of carbon intensive mobility as well as of
potential solutions to their management.

The CATCH knowledge platform includes the following components:

- **CATCH CMS**
  This application is responsible for creating and managing in the CATCH platform a wide range of content (case studies, image galleries, video testimonials, third party links, etc.), which is organised through a navigation toolbar to let an easy content navigation by categories and co-benefits area. It gives different levels of access to different users according to authentication logic. The CMS is connected to two databases:

  - **CATCH best practice database:** This database stores documents of best cases on sustainable urban transport policies. Users can acquire knowledge about policies, plans, initiatives and results of low carbon successful cities and make comparison with less performing cities.
  - **GHG performance database:** This database stores a wide range of transport performance indicators (TPIs), estimation of CO2 emissions from road transport, sustainable performance (or quality of life) indicators (SPIs) by co-benefit.

Content search in the platform is structured to address the following needs:

- awareness (e.g. to understand a problem)
- knowledge (e.g. to identify the source of the problem)
- behaviour (e.g. to understand how people behave)
- action (e.g. to discover what could be done to reduce the problem).

The CATCH visual tools consist of two main interactive, motivational and interconnected visual tools enabling users to understand and appreciate the carbon consequences of mobility choices. These tools, namely co-benefit tool (or My City tool) and the scenario tool are awareness and advocacy instruments of the CATCH platform which provide a visually appealing interface and navigation experience that promotes a culture of sustainable mobility and triggers motivation to adopt low carbon mobility strategies and habits and support decision makers in designing and implementing plans to reduce carbon emissions. In particular:

- **Co-benefit tool (or My City tool)**
  It explains each co-benefit area and offers the users some interactive functionality to express their views through appealing interfaces and dynamic interactions directly linked to the GHG database. The tool recognises that to best communicate about low-carbon mobility, messages should link to other issues of value as well as other policy areas, and that they should be presented on the aggregate (in this case at city) level. Thus, the main aim of the tool is to present information on city-level carbon emissions from transport alongside other co-benefit areas (i.e. health, safety, economy, time, planning and society) in a comparative way between cities. Data on each of the co-benefit areas has been collected, and features include an interactive performance sliding scale, a carbon-o-meter animation, interactive rankings, a library of animations and widgets to communicate - with a powerful semantics - the city's levels of performance on a wide range of co-benefit indicators. Each city becomes element of a ranking tool which
ranks the top 5 cities in terms of CO2 and other indicators belonging to the six co-benefit areas.

If further developed, the tool would also be scalable in terms of the issues and co-benefits presented (while it is already completely scalable in so far as the associated co-benefit measures are concerned). This is particularly important, as other urban life aspects, which emerged during focus groups with the public as important, could also be included in the tool as featured benefits.

- Scenario tool
It consists of a simulator for potential / future scenarios at a city level. It allows a selection across a wide range of cities (which can be selected by the user from a map or through a list) and offers a two-dimensional graphical representation of data to observe the relative position of cities across years. The two axes on the graphical representation are customizable according to the type of comparison that is chosen by the user.

These innovative outcomes allow the CATCH platform to perform some functionalities of a city benchmarking tool where cities can be compared in terms of different transport and other sustainable performance indicators.

Among the main categories of users we mention the following:

1. public decision-makers including politicians, local authorities officers, city managers and urban planners, other public professionals and not for profit organizations involved in mobility and environmental sustainability aspects;
2. general public (including citizens; visitors, etc.);
3. transport operators and other mobility providers;
4. other business organisations not necessarily involved in mobility but interested into carbon management;
5. researchers.

Information that is relevant to those different categories of users varies according to their needs. For example, for a decision on transport, transport planners may be interested in information that will allow for cost-benefit analysis; a general public member may be more interested in personal impacts; a policy decision maker might want to know what areas of policy are affected; a transport operator would want to know how it affects their business. Design recommendations came out from WP2 to understand what information had to be presented and under which form.

Within each of those categories there will be individuals / groups who are more informed. More informed individuals will desire more descriptive information that will allow for personal analysis and comparison. In situations where an individual is less informed, prescriptive information that guides choice may be more desirable for the individual and the system (see D1.1 Behavioural inception report). More informed users may be able to guide less informed users by highlighting useful information and best practices. Further, a less informed individual desires more introductory level information that allows them to understand basic concepts without being confused or overwhelmed with details that may be important to more informed users.
The CATCH platform is an on-line tool open to all the above-mentioned users, enabling them to add to, comment on, share and discuss its data and content. The platform and its tools:

- provide both empirical and theoretical evidence about carbon, and its effects on human populations and the environment, using a mixture of academic, professional and mass media sources and connects this evidence to methods for individual and collective action;
- consider the wider benefits of carbon reduction, i.e. the co-benefits;
- stimulate and engages users by linking understanding to action;
- include interactive tools to help understand the climate change and wider environmental and societal impacts of transport choices;
- contain a broad range of original knowledge, and links to other sources;
- allow users to link to other people to best exploit information and data (under a social network philosophy).

Behavioural research (WP1) highlights that people have different triggers, or motivations, that lead to behaviour change. For example, while one individual may be motivated by environmental concerns to travel by less harmful modes, another individual may be motivated by health concerns to cycle to work rather than use a bus or drive a car. In both situations, the individual's impact is reduced, but the motivation to do so differ. For city leaders, it is not motivations on impacts to their self, but to the city.

City leaders must consider their citizen's wellbeing and there are various policy concerns that they must consider. Understanding synergies between transport and other policy areas can help them make smarter choices. Based on both the individual and city leader concerns, the CATCH project aimed to highlight co-benefits through data visualisation

The grounding research work carried out in WP1 showed that:

- few people are likely sufficiently motivated by environmental concerns to change their travel behaviour (Avineri and Waygood, 2010). Carbon reduction messages in mobility must focus on other (linked) issues of value and not just mobility because people without interest in the topic (i.e. deniers of global warming) will not seek out information related to carbon reduction;
- carbon reduction messages on mobility must tie policy benefits in mobility to other benefits (e.g. health, safety, economic development, social inclusion) that were not traditionally associated with transport because this fosters wider support.

Therefore, data and information on co-benefits in the platform can play a strong role for communicating the message of reducing carbon from travel.

In accordance with the grounding stage, as results of the WP2 design specification and requirements, CATCH has initially identified six main areas of co-benefits, defined in D.4.2 Building, visualization and integration of the co-benefit tool, as follows:

- cost / budget, i.e. how a low carbon mobility can help people and administrations save money;
- time and accessibility, i.e. how a low carbon mobility can entail a higher value of people’s time;
- health, i.e. how a low carbon mobility can entails positive repercussions for people’s health;
- safety, i.e. how a low carbon mobility generally means safer roads, a reduction in accidents and in related social costs;
- community, i.e. how a low carbon mobility generally brings about benefits in terms of sociality and a stronger community fabric;
- planning / land use, i.e. how a low carbon mobility culture can help shaping cities in a more sustainable way.

Along with CO2 estimates at a city level, indicators were sought and gathered that relate to the six co-benefit areas. Roughly 200 indicators were initially gathered, with roughly 40 indicators being sufficiently represented over various European cities to be included in the first co-benefit tool. Various resources were used to collect data, however, inconsistencies in indicators led to nearly all data coming from EuroStat’s urban audit, though in some instances missing data was found through other reliable sources.

CATCH innovates in the way to present that information to increase impact. Concepts such as the contextual design of information have been examined with respect to interpretation of sustainability and motivation to reduce transport CO2 emissions. Outcomes of this process are visible in the info-graphics used in the CATCH platform and visual tools.

A range of internal and external evaluation activities were carried in the CATCH project to evaluate the success of the platform design in terms of objectives (and specifically in increasing awareness on transport CO2).

S&T recommendations from UWE’s earlier work (D1.1 D1.2 D2.1’s interim report) have emerged in the My City tool and the scenario tool as well as the knowledge platform produced for the project. Over ten distinct concepts have been clearly implemented, while another eight are feasible, though not explicitly incorporated.

Another objective of the evaluation activities was to examine the effect of the platform design on awareness of transport CO2 and motivation or intention to lower transport CO2 emissions. This was addressed by the grounding research (D1.2). The presentation of CO2 information was based on research into the presentation of such information reported in D1.2. The new forms of presentation applied in the design of CATCH tools were found to have positive effects on interpretability and motivation over the most common presentation format of only mass.

As main results, based on the grounding and evaluation activities carried out by UWE, validation activities carried out by SICE and exploitation activities carried by MRC we can state that the tools developed by the project partners and integrated in the CATCH platform are efficient and powerful tools. Results of the evaluation task (1.4) showed how the My City tool was the most well received aspect of the platform. Users found it interesting, stimulating motivation to learn more, and well designed. Potential points of success for this product of the CATCH project are:

- followed guidance from earlier work;
- engaged with the grounding and design teams;
- developed initial concepts;
- went through an iterative process of seeking feedback from internal and external reviewers and then addressing problems.

For further discussion on the My City tool development please see the WP 4 reports D4.1 D4.2 and D4.3.

Scientific achievements

Two WPs of the project involved scientific research: WP 1 (Grounding and evaluation) and WP 3 (GHG and performance database). This section reports on the main scientific achievements of the research activities carried out in these two WPs.

Grounding and evaluation

This section describes the scientific achievements associated with activities carried out by tasks 1.1 (Behavioural inception report), 1.2 (Grounding), 1.3 (Design recommendations) and 1.4 (Monitoring and evaluation) within WP 1 in CATCH.

CO2 emissions are a relatively new concept for many travellers. Even among those who have a high level of climate change awareness and are concerned about travel-related emissions, perceiving or valuing the differences between alternatives is likely to be a challenging task. The research activities of the CATCH project explored the design features of effective formats of presentation. In particular, it examined the effect of alternative designs on awareness of transport CO2 and motivation or intention to lower transport CO2 emissions.

Following the literature review and the empirical research carried out by the UWE research team, the Research and design report (D2.1) provides a summary of recommendations that might be relevant not only to the CATCH partners who developed the platform and its tools, but also to the wider community of tool developers who are interested in incorporating design features that will make information on sustainable transport alternatives to be more effective.

The main recommendations are presented in the table below (these are further explained and illustrated in D1.2).

One of the empirical findings emerging from the research and to be reported in the academic literature suggest that negative valence framing of CO2 emission amounts is an effective means of increasing the perceived difference and superior to positive framing of the same information. Although the CO2 amounts do not have a direct private cost, framing was still found to work. Considering the effectiveness of negative framing in other fields, and the specific findings from CATCH, it can be suggested that valence framing information on transport-related CO2 emissions can be applied to situations where CO2 information is being presented to better highlight desirable choices. This includes transport-related tools and measures, such as on-line journey planners, personal travel plans (PTPs), or CO2 tax bands on cars. Future research should test our findings in experiments investigating mode choice or car purchases to test whether
applying a negative framing of travel information to highlight the less (socially or environmentally) desirable choices has a positive effect on the likelihood of an individual perceiving an augmented difference between alternatives, and thus making more sustainable choices.

Generally, the CATCH research establishes a view that more consideration should be given to how travel information is presented. Beyond valence framing there is a potential for a range of contextual effects to enhance the effect of information. The potential application of such findings would be for governments (and other providers of travel information) to enable, highlight more sustainable travel choices. Recently there has been an increasing interest in the influence that psychological and social factors have on travellers' behaviour. So-called soft transport policies were implemented in the United Kingdom (UK) under the name 'Smarter Choices' (see e.g. Cairns et al., 2004). Somewhat inspired by social psychology (although not applying systematic frameworks in the design and evaluation of measures), Smarter Choices is a wide range of rather diverse measures including persuasive and information elements. In a similar vein, Thaler and Sunstein (2008) and other behavioural economists suggest that through a choice architecture, and the incorporation of so-called nudges into the choice environment, policy makers can devise interventions that help people make better decisions. Incorporating valence framing and other factors having contextual effects in the design of information to influence travel choices could be seen as relevant techniques that are much in line with the rationale of both the 'Smarter Choices' and the nudge agendas. This calls for further investigation of contextual effects on individual perceptions and choices of travel alternatives, and for the development of tools to design and evaluate effective information formats.

GHG and performance database

This section describes the scientific achievements associated with activities carried out by task 3.2 (Data collection / collation / specification”) within WP 3 in CATCH.

The CATCH project has developed a knowledge platform that includes two main tools that allow for visualisation of data at the city level (the co-benefit tool, also called My City, and the scenario tool, developed in WP4). The input to both tools is the GHG and performance database. The database structure was initially developed in T3.1 and described in D3.1.

This following describes the scientific foreground related to the development of the database, its population with relevant data, and the estimation of city-specific per-capita road transport CO2 emissions. This scientific work not only contributed to the development of the main data engine of the CATCH platform and its tools, but can be further exploited (both as a methodology and as a database) and further applied to other European work.

CATCH scientific achievements in developing methodologies and techniques to estimate city-specific per-capita road transport CO2

The transport sector represents roughly 18 % of the CO2 emissions in the EU and is the only sector that has continued to increase emissions. As most people live and work in cities in the EU, it is important to identify the leaders and laggards with regard to efforts to decrease CO2 emissions from transport. Further, to help support change, identification of correlations between transport emissions and other policy levels
would be beneficial. Yet, before the CATCH project, there was no city-level results available related to emissions across the EU. The European Pollutant Release and Transfer Register (E-PRTR) inventory of diffuse sources has recently allowed for analysis of a range of atmospheric emissions at a 5 km resolution. However, before applying this data to inform practitioners and policymakers, validation of the data would be required by having it compared to the CO2 emissions estimated by an alternative methodology. The UK government maintains a higher (1 km) resolution emissions inventory based on a bottom-up methodology. The UK National Atmospheric Emissions Inventory (NAEI) has been used by the UWE research team to assess the reliability of the new E-PRTR data.

A comparison between the bottom-up NAEI method and the top-down method developed in CATCH to estimate transport-related carbon emissions using the E-PRTR data was carried out by the UWE research team. The work suggests that, at least for the UK, the E-PRTR is a close approximation of the transport-related CO2 emissions estimated by bottom-up methods, and accurate enough at the LUZ level. Although it cannot be definitively said that this holds for the remaining estimates of Europe, it does suggest that a relatively accurate estimate of city-level road transport CO2 can be made.

The correlations between estimations provided by the two methodologies indicate that there is a strong relationship between the E-PRTR and the UK-NAEI datasets. As was expected by the research team, correlations were strongest at the level of LUZ (R2 = 0.99 and slope of 1.03) was. This gives weight to the use of the LUZ based on a functional urban region (EC, 2004) as the most appropriate area on which to benchmark road transport emissions (further details are provided in the deliverable D3.2 and in the academic dissemination related to task 3.2).

In summary, the top-down methodology developed by the UWE research team in the CATCH project to estimate transport-related levels of carbon emissions at city scale was confirmed to be appropriate and reliable (and can be further applied to other research contexts); the data was incorporated in the CATCH platform and was used by the CATCH tools to provide comparisons and ranking of European cities; as emerged from the final evaluation its application that was considered to be successful by both targeted groups of platform users (general public and professionals and policy makers).

The scientific work was further disseminated in two scientific conferences. An academic paper based on the paper presented at the UTSG conference will be submitted to a scientific journal.

Potential impact:

Socio-economic impact and wider societal implications

Potential impact of research activities: Grounding research and evaluation (WP1).

Research impact

The literature review (D1.1) and findings emerging from the CATCH research activities (surveys, interviews, focus groups), and reported in academic literature, were cited by academics and applied in other projects. An example is a research at UC Berkeley, United States (US) on the effect of presenting
environmental attributes of transport alternatives on individual transport decisions.

There might be immediate benefits from the CATCH tools’ exploitation at the nearer future. The CATCH final event that was held in December 2011, attracted interest from academics, practitioners and policy makers who are interested in further exploring the application of the CATCH tools and methodologies. One of them is the North Sea Region Electric Mobility Network (e-mobility NSR). At the last 12 months UWE had academic visitors from the UK, Netherlands and Japan who showed specific interests in the CATCH work and explore possibilities to incorporate some of its findings and methodologies.

Policy impact

The CATCH research has established a view that more consideration should be given to how travel information is presented. Beyond valence framing there is a potential for a range of contextual effects to enhance the effect of information. The potential application of such findings would be for governments (and other providers of travel information) to enable, highlight more sustainable travel choices. Recently there has been an increasing interest in the influence that psychological and social factors have on travellers’ behaviour. So-called soft transport policies were implemented in the UK under the name Smarter Choices (see e.g. Cairns et al., 2004). Somewhat inspired by social psychology (although not applying systematic frameworks in the design and evaluation of measures), Smarter Choices is a wide range of rather diverse measures including persuasive and information elements. In a similar vein, Thaler and Sunstein (2008) and other behavioural economists suggest that through a choice architecture, and the incorporation of so-called nudges into the choice environment, policy makers can devise interventions that help people make better decisions. Incorporating factors having contextual effects in the design of information to influence travel choices could be seen as relevant techniques that are much in line with the rationale of both the Smarter Choices and the nudge agendas. This calls for further investigation of contextual effects on individual perceptions and choices of travel alternatives, and for the development of tools to design and evaluate effective information formats.

There is a growing interest among academics and policy makers in the application of behavioural sciences to the design of planning and policy measures to promote and sustain sustainable travel behaviours, and to enable behaviour change (such is the behaviour insights toolkit recently developed by DfT, the UK Department for Transport). However, there is a lack of empirical evidence and scientific knowledge in this area. The findings emerged from the CATCH project, and in particular from its research activities and academic dissemination, address some of this gap.

As an example of impact already made, insights emerging from the FP7 CATCH project led by Dr Avineri (and reported in academic literature) have been incorporated in the design of Car Fuel Economy label which will be displayed on every new car purchased in the UK. References to academic dissemination of CATCH were made by the designers, the Low Carbon Vehicle Partnership. The new design is likely to be introduced and implemented in 2013.

Potential impact of research activities: GHG and performance database and data set (WP3)

Better data supports better tools. The database and the methodological framework developed in CATCH
can be applied to a range of research, planning and policy tools that aim to evaluate and monitor sustainable transport at European cities, or to be incorporated in behaviour change measures to promote sustainable transport behaviours and policies.

The CATCH database establishes a baseline for transport-related carbon emissions (and other indicators) for European cities. Further years of data allow for trend analysis and to gauge whether cities are moving in the desired direction. This too would allow researchers and policymakers to identify trends and who the leaders and laggards were in the move to a low CO2 impact transportation system. It could also be used by citizens to judge whether political choices are providing the results that are necessary.

Although Eurostat's urban audit is a valuable resource, incorrect entries have been found during the course of the CATCH project. Therefore a systematic analysis of the data for outliers, and then a confirmation / correction of that data would help improve the validity of the database and its tools.

If, in a future development of the tools, it is possible to change data sets, more limited ones could be included. For example, a ranking of cities based on an indicator may be published, but may only refer to a limited number of cities in the CATCH database. It would be desirable to compare the CO2 levels of those cities without having to manually search them out.

Data on the urban audit website is updated from time-to-time. Efforts should be made to maintain the CATCH database so that the information contained there is as up-to-date as possible. The estimation of city-level road transport CO2 emissions that was conducted for 149 cities could be further expanded with more investment.

As well, the research suggests that the method used by E-PRTR is reasonably accurate at the LUZ level and if this process was carried out for earlier years, or future years, projections and trending would be possible.

Ideally, the CATCH database would function as a repository for reliable data fed by the cities themselves as they progressed towards a low carbon transport future. Discussion of how this might work will be left for WP7 Exploitation.

Potential impact of research activities: CATCH knowledge platform and visual tools (WP2-4-5)

In line with the trends and challenges identified in the context where the CATCH project fits in (section 4.1.2) the impact of research activities leading to develop the CATCH knowledge platform and its visual tools affect different audiences, as follows:

- Policy-makers at city level: they have expressed interest in adopting benchmarking tools such as the CATCH visual tools helping to define sustainable urban mobility plan (SUMPs), by comparing the transport / environmental performance of their city with other similar or non similar cities. SUMPs are complex plans produced through a very articulated process where information and citizen engagement is important. For decision makers is crucial having - from one side - a transparent goal setting, with problems affecting sustainable urban mobility and scenarios effectively communicated to citizens and public stakeholders -
and from the other side - a clear understanding of opportunities and effective measures and policy packages that can be implemented. CATCH can answer to such a need by giving decision makers access to data and indicators at a city level and guidance material on policy packages and best practice implemented in various cities as well as benchmarks tool to assess the performance of cities according to specific transport and non-transport indicators. A future evolution of CATCH might include information and data supporting all phases of the SUMP cycle process and display information on results achieved in each phase of that cycle.

- Policy-makers and travellers: The need for satisfying a rising demand for accessibility in a context of growing sustainability concerns requires, among the most immediate priorities, a better integration of the different modes of transport as a way to improve the overall efficiency of the system and the acceleration of the development and deployment of innovative technologies. The CATCH knowledge platform and its visual tools among the main messages pass this to different users with messages and data tailored to their needs.

- Climate-change policy leaders: These are increasing their involvement of into climate-change mitigation strategies (this is not only due to legally binding climate change emission reductions but encouraged through NAPA and NAMA initiatives). Relevant data and content on impact of GHG emissions on climate change can support policy-makers in taking up Climate change adaptation and mitigation plans at city level.

- Policy-makers and citizens: Citizens should be given better information on the reasoning behind transport policy decisions and on the available alternatives. Greater public involvement in transport planning, transport policy and related measures can be ensured by recourse to participatory instruments, from open consultations, surveys and stakeholders’ representation in decision processes to participatory budgeting tools. These latter consider how and where money is apportioned to fund and maintain services in communities and a process which directly involves local people in making decisions on the spending and priorities for a defined public budget. In a financial climate of public spending cuts and savings, many local authorities and bodies across Europe will find it increasingly necessary that they target their limited funds to projects and services which are most in need, and which the public value. CATCH, through aims to provide information and knowledge to the public about the impacts and benefits of different transport systems, and by establishing channels of communication between citizens and city planners, could become a useful component of a participatory budgeting tool to allow users to make informed choices about their local planning decisions.

- Transport operators: Public transport investment fuels jobs and business opportunities and in the context of the economic crisis, the volume and stability of employment in public transport is worth highlighting. The CATCH platform can be used to encourage investment in public transport infrastructure, generating a positive effect for jobs and provide the foundation for new business opportunities.

- Citizens: there is interest to inform and educate people at the early stage of their entrance in the society, such as when still at school. CATCH can include educational services and tools providing clear and simple examples about the importance of an environmental responsible behaviour and be promoted in schools and other educational establishments.
Dissemination activities

The dissemination plan (T8.1) was written by Polis, with contributions from partners, and sent to project coordinator to deliver to the EC in month 4. The plan defined the audience for dissemination, and some key dissemination tools:

- website (see T8.3)
- interest group (see T8.2)
- logo and PPT and deliverable templates
- leaflet
- project update
- contact database
- meetings with other projects
- dissemination at events.

Interest group

The interest group (T8.2) was set up by Polis, and five cities were recruited through an open call sent out to the Polis database from local authorities, consisting of over 2500 contacts working in local authorities across Europe. Seven applications were received, and five cities were chosen based on criteria outlined in the call. The decision was made by the whole CATCH consortium. These cities are Baia Mare (Romania), Odense (Denmark), Lisbon (Portugal), London Borough of Hounslow (UK) and Rotterdam (the Netherlands). Following a change in political shift in the city of Rotterdam, and budgetary pressures, they were forced to withdraw from involvement.

Additional to this, a group of experts were recruited by TRL to take part in interest group meetings:

- Ricci Andrea, ISIS
- Battaglini Antonella, Potsdam Institute
- Lonnroth Mans, Volvo Foundation
- Anderson Richard, Imperial College London
- Edant Caroline, Veolia Transport
- Klatka Sylwia, ConVoco
- Mark Major, EC.

The interest group participants, including the city representatives have attended all four interest group meetings, and provided input to the platform development and testing.

More specifically, four interest group meetings were held and organised by Polis: the first on 17-18 February 2010 in Brussels; the second on 15-16 November in the Hague (the offer to host from the Hague came from their attendance at the first meeting, and their interest in the project and topic); the third on 14 June 2011 in Brussels, and the fourth a larger event to mark the end of the project and present results to a wider audience on 13 December 2011 in Bristol, UK.
Each of the meetings consisted of a mix of presentations (both by CATCH partners, and external experts) and workshop sessions in which feedback was gained from the participants to drive the research and development at the foundation of the CATCH knowledge platform. The final meeting looked largely at presentation of results, and included presentations from three out of four of the interest group cities incorporating how they could use results from the CATCH project in their final work. The final event, organised by Polis, was hosted by the University of the West of England in Bristol.

The platform management group (PMG) was launched at the third interest group in June 2010 and involved representatives of all the four core interest group cities as well as representatives of the CATCH consortium, notably: Polis, SICE, UWE, TRL, UITP. The PMG played a key role in updating the CATCH platform with data and content. The exploitation model of the CATCH project is based on the growing of the PMG by involving other city stakeholders. An open-community based model supporting the exploitation was analysed in the exploitation action plan (D.7.1).

Dissemination outreach activities

The dissemination outreach activities (T8.3) include those introduced in D8.1:

1. The CATCH website (see http://www.carbonaware.eu/ online) was created and launched prior to the first interest group meeting. This website was constantly updated: this included monthly news items of what is going on in the project, and other relevant activities that the partners are involved in as well as updates from work package leaders, uploading of documents when they are ready for dissemination (deliverables, presentations, dissemination documents), and general review of text when required. The website was created and updated by Polis (with support primarily from TRL and MRC), and will be maintained and hosted by POLIS after January 2012.

2. A logo was created to maintain the corporate identity of the CATCH project. This work was lead by Polis. Various formats of the logo were created, and colour codes defined for the corporate identity. Further to this colour codes were further defined for the CATCH co-benefit areas which will feature on the CATCH platform.

3. PPT and deliverable templates were designed by Polis to ensure a united presentation to those external to the project.

4. A leaflet was created and printed, and copies sent to all EU partners. This was coordinated by Polis, and design files were sent to international partners, and the leaflet has also been translated into Chinese by Handan. The design of the leaflet was refreshed in 2011, also to include some of the project results. This again was sent to international partners and translated into Chinese.

5. A conference flyer was produced by Polis and distributed to stakeholders to advertise the final event of CATCH on 13 December 2011.

6. Three roll-up posters were also produced, lead by Polis, and distributed among the partners.

7. English / Spanish poster was produced by SICE and displayed at events in Spain.

8. Four project updates have been produced and circulated to the CATCH contact database by Polis, as well as wider audience of possible interested parties.

9. A dedicated contact database was created by Polis, through sign-up online and input from partners. The database contains 340 contacts.
10. Project partners have also included articles about CATCH in their newsletters, and links on their company / institution web pages: both to announce the project and relevant milestones, and particularly to disseminate CATCH events.

11. Project video was created by Systematica and uploaded on CATCH website as well as on YouTube channel: http://www.youtube.com/carbonaware Other videos were created by MRC.

12. Dissemination activities (outreach at events, publications, websites which have carried CATCH items) are listed below. Polis monitored possible dissemination activities through an excel spreadsheet. Possible conferences were presented at consortium meetings and distributed by email to see which opportunities were worth following up.

13. To communicate the work of CATCH, Polis coordinated the publication of seven co-benefit fact sheets as a way to communicate the research done in the project, and the need to express messages regarding low carbon mobility in terms of co-benefits.

14. The final CATCH dissemination event took place in Bristol on 13 December 2011. It was help jointly as an interest group meeting, so that representatives from the interest group could also contribute to the event to best portray the links between their work and CATCH. The event was attended by approximately 60 people, and presentations following the event disseminated to other mailing lists.

15. E-forum concentrated on building the links with the eGovernance initiatives listed above, whilst capitalising on the existence of the partner HANDAN in the CATCH project. A series of events were planned, with the first taking place in Yantai, followed by one in Sheffield to align exploitation strategies of the eGovernance projects alongside the plans for CATCH. Three further events have been planned to further capitalise on these relationships to assist with exploitation. One will be in Vienna, followed by one in Brussels and a set of events to take place in China in July 2012. Funding bids to the UK government have been made to assist in this phase of exploitation.

Dissemination in numbers

- 9000 visits to the website since launch;
- 340 contacts completed sign-up form online to receive input on the project;
- 10 papers published;
- 7 events organised by CATCH;
  - 1000 conference flyers distributed;
  - 3000 English-language leaflets distributed;
  - 3 roll-up posters produced;
- 20 conference abstracts written;
  - 85 conferences, exhibitions and workshops attended;
  - 4 project updates written;
  - 7 co-benefit fact sheets published;
- 20 mailings sent to CATCH database (through mailing software).

Publications and list of dissemination activities

Publications from the CATCH project are given in table below. These are 10 papers written by the consortium on results from CATCH. Of note are:
The paper 'Carbon aware travel choice for sustainable mobility' first published in TPM Conference Proceedings was chosen as one of five papers to appear in the TRL Annual Research Review 2011.

The paper presented by UWE at the Biennial Conference on Environmental Psychology Proceedings, Eindhoven, at September 2011, is among the papers selected by the editorial board of special issue of a leading transport journal and is currently under academic review.

Following a presentation made by UWE at the RGS-IBG Annual International Conference at London, September 2010, a book chapter was invited to a book Climate Change and Transport session to be published by Emerald at 2012.

Following a review process, a paper UWE have submitted entitled 'Applying goal framing to enhance the effect of information on transport-related carbon dioxide emissions' has been accepted (pending some additional minor revision) to a special issue of Transportation Research A on transportation psychology. Transportation Research A is a top-ranked academic journal in transport.

Also, inclusion in various websites:

- http://www.polis-online.org/index.php?id=520
- http://www.trl.co.uk/transport_consultancy/climate_change_in_the_transport_sector/encouraging_behavioral_change/carbon_aware_travel_choice_catch.htm
- http://www.transport.uwe.ac.uk/research/projects/catch.asp
- http://www.sice.com/contenidos/referencias idi/idi_001a08.html
- http://www.uitp.org/Public-Transport/sustainabledevelopment/
- http://www.uwe.ac.uk/aqm/latestnews.html
- http://www.eltis.org
- http://www.lept-eu.org
- http://www.eu-forum.org/article.php3?id_article=1131

Exploitation activities

Direct contact has been made with several other ongoing projects to explore synergies between projects, and possibilities to co-develop further RTD initiatives and host joint events. This contact was made by Polis, with support from MRC and TRL. The projects include: REACT, GHGTRANSPORD, WEATHER, TOSCA, DEMOCRITOS, TICKETTOKYO, CLIMACTREGIONS, CARE NORTH, CO2NEUTRALP, ECOMOBILITY SHIFT, SUNSET, ENHANCED WISETRIP, and EPOMM. Some of the above-mentioned projects were invited to attend the CATCH final conference in Bristol, in December 2012, in which a dedicated session on exploitation has been held.
Moreover, CATCH partners have had the possibility to attend meetings with REACT, TOSCA, GHG TRANSPORD, and DEMOCRITOS in which to look at and understand the synergies between the projects, and communicate the work that is going on in CATCH.

In particular, the main potential synergies have been identified with reference to the following RTD projects:

- **DEMOCRITOS** - The project developed a ‘Mobility credits model’ (MCM) allowing users and key players of the transportation system to understand quickly and directly the effects of their mobility options on greenhouses gas reduction. The MCM is associated to the pollution and traffic congestions in cities as an alternative method to the current pollution taxation where the compulsoriness is replaced by incentives and willingly acceptance. The MCM is the core of the mobility credit platform (MC) developed by DEMOCRITOS which act as a simulation tool to assess individual mobility in a defined area and period of time and in relation with GHG level, especially carbon dioxide. MCM aims to involve in this demonstrative game as many travellers as possible in order to enter into the system, to play and test how CO2 emissions are influenced by their usual mobility solutions. CATCH provide suitable indicators and information about possible cases in which the MCM can be further customized and applied.

- **TOSCA** - The project has identified promising technologies and fuel combinations to reduce the climate impact of EU transport to 2050 via scenarios. Estimation of their characteristics through expert questionnaires has showed that further study on behavioural change is needed to encourage their implementation. Scientific advancement on CATCH findings on how to motivate sustainable mobility behavioural can create relevant synergies.

- **REACT** - The project aimed at strengthening the RTD area on low-carbon transport by developing a Strategic Research Agenda (SRA). Interest to understand how key aspects of CATCH may foresee further development with new funding according to the REACT SRA was explored.

- **ELTISplus** - Good practice examples and tools illustrating the development and implementation of a SUMP are included in the examples database of ELTISplus. Links with the CATCH tools could facilitate design and implementation of SUMP by accessing CATCH data and information.

- **SUNSET** - The project adopts innovative ICT to encourage and help travellers to adopt a more sustainable mobility behaviour. In particular it develops and evaluates a set of services that use social networks and incentives to encourage people to travel more sustainably in urban environments. CATCH findings can be exploited in the research on the effects of various incentives on mobility-pattern recognition techniques.

- **TRANSFER** - CATCH can promote the adoption of the platform in developing countries to support the development of climate change strategies in transport.

- **MAPPER** - The project provides a comprehensive understanding of policies being enacted outside the EEA to reduce the climate impact of the transport sector and provide information on possible mechanisms to support GHG emissions reduction from transport. TRL as partner can facilitate CATCH embracing a role into supporting climate-change mitigation strategies.

- **WISETRIP** - CATCH can promote the take up of research results into the Enhanced WISETRIP project.

- **MOVE-TOGETHER** - CATCH can publish the review of the EU research projects on urban sustainable transport investigated by the MOVE-TOGETHER contributing to raise citizens awareness and appreciation of EU research on sustainable transport in the urban environment.
Possible synergies have also been discussed with the Covenant of Mayors. Interest from the CofM was in particular on the following aspects: connecting motivated users with valuable examples from CofM; estimates of transport CO2 per capita from the UNFCCC versus the bottom up approach adopted by the CofM. The CofM encouraged the CATCH project to send a bid, as they would be keen to fully explore how CATCH and CofM could mutually support each other.

Some partners of the CATCH consortium have already been developing new RTD proposals and demonstration projects with partners of some of the above-listed projects under the most recent call for proposals in FP7 and CIP.

List of websites:

The project public website is: http://www.carbonaware.eu managed by Polis and updated on a regular basis.

The CATCH platform and its visual tools are accessible via the CATCH website but also through the following weblink: http://www.q-sphere.com/catch/ managed by QS

The visual tools are also accessible through the following links:
http://www.systematica.net/catch/cobentool/v1.1 and http://www.systematica.net/catch/scenario_tool/
both managed by SYSTMA

Relevant contact details:

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Related documents

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