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# Research Reports 143:1

A quick scan of climate policy  
services and of underlying  
data system approaches  
Climate Bonus project report (WP1)



*Adriaan Perrels*

*Mikko Hongisto*

*Kaarina Hyvönen*

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*Ari Nissinen*

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Valtion taloudellinen tutkimuskeskus  
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A quick scan of climate policy services and of underlying data system approaches

## Climate Bonus project report (WP1)

March 2009

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# A quick scan of climate policy services and of underlying data system approaches Climate Bonus project report (WP1)

## Government Institute for Economic Research VATT Research Reports 143:1/2009

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### Abstract

This report is the first of a series of reports produced by the Climate Bonus study. In this project is surveyed what are the possibilities and the effectiveness of the combined use of (1) verified carbon footprints (possibly visualised through labels), (2) personalised monitoring and feedback services to households regarding the greenhouse gas intensities of their purchases, (3) a reward system (bonuses) for consumers who manage to reduce the embodied emissions, and (4) a secondary reward system for retailers that successfully reduce the emission intensity of their sales. This first report is based on a quick scan of literature and internet sources as well as on a few interviews. It provides an overview of developments in the applications of the constituent elements of the above mentioned combination elsewhere in Europe. Particular attention is paid to retail client bonus systems, green credit cards, carbon offset services, and product chain – emission data bases (notably specific emission attribution methodology and verification). In addition to a review of findings regarding experiences elsewhere the discussions include also theoretical or methodological considerations.

Key words: bonus systems, carbon compensation, carbon footprints, carbon offset, embodied emissions, feedback, LCA, lifecycle analysis

JEL classification: D1, D8, Q01, Q54, Q56

### Tiivistelmä

Tämä raportti on ensimmäinen Climate Bonus -hankkeeseen liittyvään raporttisarjaan. Tutkimushankkeessa tarkasteltiin ilmastopolitiikan toimenpiteiden yhdistämisen mahdollisuuksia ja vaikuttavuutta. Yhdistelmä koostuu (1) verifioidusta hiilijalanjäljistä (mahdollisesti visualisoitu merkinä), (2) kotitalouskohtaisesta ostoksien päästövaikutuksien seuranta- ja palautejärjestelmästä,

(3) palkkiojärjestelmästä kuluttajille, jotka onnistuvat vähentämään ostoksien sisältämiä päästöjä ja (4) toisesta palkkiojärjestelmästä vähittäiskaupoille, jotka todistettavasti onnistuvat vähentämään kokonaismyyntinsä keskimääräisiä ominaispäästöjä. Ensimmäinen raportti perustuu kirjallisuuden ja internetlähteiden tarkasteluun ja muutamiiin haastatteluihin. Raportin tarkoitus on antaa alustava yleiskatsaus eri elementtien kehityksestä ja sovelluksista muualla Euroopassa. Erityisesti otetaan huomioon vähittäiskauppa-alan palkkio(bonus)systemit asiakkaille, ns. vihreät pankki- ja luottokortit, kasvihuonepäästöjen kompensatiopalvelut ja tuotantoketjun päästötietokannat (ennen kaikkea ominaispäästöjen jaottelu). Yleiskatsauksen lisäksi käsitellään myös teoreettisia ja metodologisia pohdiskeluja.

Asiasanat: etukortit, ilmastopäästöjen kompensatio, hiilijalanjälki, välilliset päästöt, palaute, elinkaarianalyysi

JEL luokittelu: D1, D8, Q01, Q54, Q56

## Preface

The study *Climate Bonus - a carbon bonus/credit system for households* is carried out by a truly wide scoped cross-sector consortium. It is amalgamating a wide range of sector knowledge, experience, and co-operation, and ranges from basic research to applied research. The ambition of this project is to create and gauge new approaches and solutions for climate change mitigation. The objective of the Climate Bonus study is to provide consumers, manufacturers and retailers with knowledge, means and opportunities to make selections in every day life which favour low carbon emission solutions.

The project may also be regarded as a very fitting example of the kind of integrated approach which the Advisory Board for Sector Research<sup>1</sup> intends to promote. Furthermore, the project is also an example of how a substantial national research effort can create the basis for international co-operation, not only subsequently, but also concurrently. In fact for many national research themes it is straightaway beneficial to include a meaningful share of international co-operation, exchange or review.

This first research report of the Climate Bonus project aims to present lessons from abroad with respect to a range of issues that will return in subsequent project reports. On the other hand various economically relevant theoretical considerations are reviewed. Particularly interesting for VATT is the question to what extent this kind of compound climate policy related service packages will find its place in the policy portfolio. Indeed both researchers and decision makers have to find ways to better assess comprehensive and long term strategies such as in the case of climate policy.

Helsinki, March 2009

Seija Ilmakunnas

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<sup>1</sup> . The advisory body was established in 2007 with the aim to achieve better co-ordination with respect to strategic research for policy support purposes, which was so far mainly funded through separate predominantly single ministry programmes.



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# 1 Introduction

The CLIMATE BONUS study surveys the possibilities and effectiveness of the combined use of verified carbon footprints (possibly visualised through labels), personalised monitoring and feedback services to households regarding the greenhouse gas intensities of their purchases, a reward system (bonuses) for consumers who manage to reduce the embodied emissions, and a secondary reward system for retailers that successfully reduce the emission intensity of their sales.

Even though the *combination* of measures (or services, if you like) is still unique compared to similar initiatives, quite a number of studies, experiments and also commercial services with respect to each of the aspects of the combination can be found elsewhere in Europe (and beyond). For several of the aspects it is also obvious that societal and commercial interest is growing with respect to these elements. All this considered a quick scan of developments outside Finland was regarded as helpful for the other stages of the project<sup>2</sup>.

After some initial scanning it was decided to focus in particular on the following elements:

- Bonus systems
- Green credit cards
- Carbon offset services
- Product chain – emission data bases
  - (cumulative) specific emission methodology
  - verification

In addition to providing a discussion of findings regarding experiences elsewhere the discussions include also theoretical or methodological considerations. In chapter 2 an overview is given of theoretical considerations regarding measures aimed at making consumer behaviour more environmentally friendly. Chapter 3 discusses the experiences with bonus card (a.k.a. loyalty card) systems, including a few experiments with ‘green bonuses’. Subsequently, in chapter 4 some other climate impact information and emission reduction services for consumers are reviewed. Chapters 5 and 6 are closely related. In the former current insights regarding feasibilities and limitations of alternative emission assessment and attribution methods are briefly reviewed, whereas in the latter various types of data sources are reviewed, including the consequences of certain choices for attainable quality of the emission attribution. Chapter 7 provides some concluding observations.

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<sup>2</sup>. A summary of the project work plan can be found in Annex 1.

## **2 Theoretical considerations**

### **2.1 Consumer perspective**

If one wishes to endeavour in the promotion of green consumption, it is worthwhile to consider why people buy a green product or why – after all – they decide to buy something else.

Greenness may constitute different things for different consumers (Princen, 2006; Lehtonen, 2004). According to the judgement of a consumer it may relate to one or several environmental impacts, but it can also represent a wider notion of sustainability, also involving other aspects than environmental ones. Even if a large share of the clientele would be interested, many of them may still decide that another (green) product fits better to their preferences than the particular product under consideration.

Products, even those with a high degree of harmonisation such as electricity, constitute always a bundle of attributes for a consumer. Green products should rate better overall (over the range of attributes) than other products in order to get selected by a consumer (Sustainable Consumption Roundtable, 2006). In this case it is also important to realise that not necessarily factual, but perceived scores on attributes are decisive for the eventual choice. This applies to both the subset of sustainability attributes and to the other attributes such as functionality, design appeal, and affordability. This is where, next to psychological features, the incompleteness of markets and asymmetry of information kicks in.

Another issue is that a consumer may think that the provision of the public good aspect of a green good (e.g. the emission reduction effect compared to a default product choice) is to be achieved preferably via a public policy, even though as such the consumer agrees with the pursuit of the green policy goal (and its ambition level). The existence of separable public provision alternatives (of aspects of the green product) can have significant impact on the overall effectiveness of sustainable policies (e.g. Kotchen, 2005).

Furthermore, preference for public provision can be related to the level of trust in the alternative modes of provision or the impression of relative ineffectiveness. The degree of trust in a mode of provision is among others related to societal views. In this respect the acceptance of a particular green option may have little to do with qualities of that option as such. Another important factor that can breed or destroy trust of consumers is the credibility of the claims for greenness. The widening of the scope of greenness towards sustainability as well as globalisation of the economy impose quickly growing requirements regarding evidence based reporting of impacts of products and product chains.



Western consumption encompasses a large and ever increasing array of products and services. The mere amount of purchased commodities necessitates a consumer to apply efficient purchase strategies, i.e. a consumer develops habits with regard to product choice. For some consumers the prevailing strategy is to choose the cheapest option, for others it is loyalty to satisfactory products, whereas still others adhere predominantly to an impulsive way of purchasing (Zwick et al, 2003). To this should be added that the same consumer may employ quite different strategies in different realms of consumption. From these observations follows that for many products there are only a limited number of windows of opportunity during which a consumer judges it worthwhile to reconsider the range of alternatives more profoundly. Probably for many consumers loyalty promoting systems (i.e. bonus point collection systems) are an important approach, but for others (i.e. impulsive ones) high attention value is important. For new products attention value will be always important. Section 3 of this report reviews experiences with loyalty card, whereas also the reports of work packages 4c and 5 deal with the subject from a theoretical and empirical viewpoint respectively.

Habit formation links well to brand and shop loyalty. As regards the promotion of greenness in consumption loyalty and habit formation have both a positive and a negative side. The negative side is the earlier explained threshold for getting customer attention. Strong adherence to habits reduces the chances for new products to get established. On the positive side greenness can be branded as such, and in this way provide a platform for loyalty. However, in order to expand the client group this would require that greenness is linked to other attributes such as health, status, economic housekeeping, ethical business (e.g. Fair Trade label) or even ‘warm glow’<sup>3</sup>.

In case of a wider scope of green products or in case of intentions to influence consumption decisions of a wide range of products and consumption functions other challenges emerge on top of the questions raised above.

## 2.2 Supplier perspective

It depends on the position of the supplier (retailer) how it relates to the provision of green alternatives. A new entrant needs another approach than an incumbent, while a supplier of a range of alternatives has other interests than a supplier of green alternatives only. For a new entrant it will be difficult to convince the modal consumer to swap product (and supplier), instead such a company better starts to address the customers with a high eagerness to buy green products, even

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<sup>3</sup> . Warm glow refers to the mental reward one can derive from doing something good for society (and informing one’s peers about it).

if that constitutes a small group. These eager customers are often also willing to pay a higher price. For an incumbent, the overall portfolio counts. A possible extra gain from higher priced green alternatives needs to be balanced against other marketing options (of new products) that may produce good returns as well. Since the *core* of green buyers is usually fairly small (i.e. usually well under 10% of the potential clientele; e.g. Menger et al, 2005), there is a risk that in larger retail companies green product projects often loose from other marketing options, due to limited earning power.

A generically rising interest regarding the greenness of products, as currently seems to be the case, will interest retailers across the board. On the one hand it may imply that consumers are prepared to pay a bit more for the addition or expansion of the attribute 'greenness', whereas conversely it could also imply that consumers are turning away from obvious non-green alternatives, unless these would be offered against substantial discounts. In other words in early stages of market development a modest share of the consumers is prepared to pay a premium for greenness. The margins on such products can be good (e.g. Hawken et al, 1999), but overall market size, and hence earning capacity, is mostly limited<sup>4</sup>. Yet, if in a next stage the consumer interest for greenness is growing, either due to swings in public opinion or due to interlinking attributes (such as health and local production), retailers have to increase the supply range of green products in order to up keep their average margins. To some extent consumption in many Western countries seems to be traversing to such a stage. However, with a growing range of green products and a gradually better informed and more critical customer, it gets ever more important to guarantee genuine environmental improvements as crumbling credibility can quickly become a serious threat, which easily spills over to other sales areas of the firm concerned.

For larger retail chains one of the problems is to ensure that green alternatives can be delivered in growing quantities and according to reliable schedules. Furthermore, if retail chains are rearranging their supply portfolio, also overall purchase cost, logistics, etc. have to be accounted for in order to ensure effective sales margins are not deteriorating. In case of important suppliers also loyalties and risks for loosing certain tariff discounts might need to be considered. In turn this observation points at the necessity that in case of comprehensive attempts to transfer to a greener product portfolio (key) supply chains need to be involved. To this can be added that there are also other reasons, such as the validation of the greenness, which imply close co-operation throughout the supply chain. The flipside of these concerns about costs and complications is that, in as far as it

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<sup>4</sup>. It is often forgotten in the euphoria about green business success stories (such as reported in Hawken et al, op. cit.), that these margins indeed only stay so high in nascent or niche markets. In large economies such as the USA, this could still mean that some of these green companies grow to considerable sizes.

leads to slow adaptation to rising consumer interest in green products, it can result in loss of market share.

Summarising, the indications are ever stronger that the management of the greenness of a product portfolio in retail markets, is not only driven anymore by developments in environmental legislation and corporate social responsibility, but starts to assume a key role in the strategic planning of retailers. Early moves and uptake of premature green portfolio management systems may lead to extra cost and loss of credibility. On the other hand if a strong inclination towards rigour slows down the transition, a company may be outpaced by swifter competitors and lose market share. Further discussion more specifically on appropriate strategies for adopting carbon footprints can be found the reports of work packages 3 and 6, as well as in a summarising fashion in Perrels et al (2008).

### **2.3 Public authority perspective**

Given that countries are committed to achievement of various environmental targets (e.g. air quality in the EU, greenhouse gas emissions and the Kyoto Protocol) private efforts to lower environmental impacts do serve public interests and may imply that some environmental taxes do not need to be raised as much as in a situation without private environmental initiative.

Private initiatives that succeed in mobilising significant numbers of consumers might be economically efficient and thereby not only serve the environmental policy goals, but also serve economic policy goals such as maintenance of purchasing power.

Private initiatives to mobilise consumers may also have different distributional effects compared to public policy instruments. For example, emission taxes tend to have a digressive effect on income distribution. Yet, in this respect should be added that the current overall tax structure in many countries allows governments to raise taxes on natural resource use, while lowering taxes on labour income (the so-called 'Double dividend discussion', e.g. Goulder et al, 1999). If at least a part of the income tax deduction is realised as a lump sum, low income households may even experience a net gain.

With increasing levels of wealth several environmental taxes may need to be raised repeatedly, if the effect is linked to consumption with a high income elasticity<sup>5</sup>, e.g. such as in the case of car ownership and use. As a side effect there

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<sup>5</sup> .A high income elasticity of consumer demand (for a certain product) implies that the demand for that good grows proportionally or even more than proportionally with growing income. So, if a government wishes to moderate the demand for some good, because of its demerits, product taxes have to be raised repeatedly, when income continues to grow.

will be ever more groups of households for whom these high taxes start to kick in, thereby requiring compensatory measures of some kind. In turn this can reduce the economic efficiency of the tax policy appreciably. Or alternatively the public support for this kind of schemes is diminishing. From this could be derived the suggestion that private initiatives would get ever more fitting the more affluent a society is. Rising wealth can imply that the valuation of environmental quality rises, whereas also risk aversion increases (since there is ever more to lose) and people's horizon for their evaluated lifespan moves further away (as their life-expectancy increases). These mechanisms also underlie the theory of the Environmental Kuznets curve (e.g. Roca, 2003).

When considering the still developing structure of the international climate policy framework, it should be acknowledged that nation states are still the principal institutional entities via which commitments and accountability regarding target achievement are organised. In turn this means that national governments have still a keen interest in keeping oversight of national climate policy implementation and progress. Even though there is a growing recognition that realisation of a low emission society is eventually the work of citizens and companies (Kemp and Rotmans, 2005; Kok et al, 2002), the control over strategic steering options remains important for national governments and also interacts with other policies (e.g. the above mentioned 'double dividend' regarding employment effects). These considerations hint at hybrid instrumental structures, with operational levers possibly at the private side and strategic steering, framework arrangements, options for correcting incentives, and possibilities for monitoring and inspection at the public side.

## **3 Experiences with Bonus Card Systems**

### **3.1 The idea of bonus card systems**

Bonus card systems for customers are tools to bind customers, i.e. to make the customers loyal towards the retailing chain or service provider, or towards a brand. The loyalty programs with their bonus cards are currently offered in all fields of retailing and consumer services. Reasons for the emergence of loyalty programs can be found in retail and service structures (Arantola, 2002). Programs are prevalent in markets where low-involvement decisions are typical, and in situations, where there is little difference between prices or service content. Also in cases of intense competition among few competitors, of high fixed and low variable costs, and of idle capacity enabling the provision of free services loyalty programs often introduced (Duffy, 1997). Customer loyalty programs have been claimed to be helpful when the scheme directly supports customer value propositions, when relationship building adds to perceived value, when lifetime customer value is high, and when customer retention costs are less than acquisition costs (Dowling and Uncles, 1997).

The retail chains K-Group, S-Group and Tradeka have the largest membership bases among the bonus card systems in Finland. Also banks, airlines, and hotels, for instance, use bonus systems to bind their customers.

Customer loyalty programs and cards have been criticized for that they do not really promote loyalty nor alter the market or consumption structure. Rowley (1999) and Arantola (2002) claim that such cards are only effective when loyalty has already been established. According to Rowley (1999) a more realistic purpose of the loyalty cards is the collection of valuable customer knowledge. They do provide retailers and service providers with information on consumers' purchases and how product associations are being made. Loyalty cards have the potential to provide interesting insights into loyalty behavior in relation to brands, product range and store locations.

It seems that customer retention and customer information provision are considered as the principal goals of the loyalty programs, but the programs have also other goals and purposes. Table 1 presents a categorization of program goals as suggested in the literature (Arantola 2002, see also Dowling and Uncles 1997, East and Lomax 1999, Newell 2000).

Table 1. The goals of the customer loyalty programs (Arantola 2002).

Suggested goals	
Sales	Member's share of total sales
	Maintaining sales levels
	Increasing the loyalty of existing customers
	Cross-selling
	Increase and frequency of purchases
	Share of customer's wallet (total purchases in the category)
	Share of all purchases in preferred store
Profit	Maintaining margins and profit
	Customer value (purchases and profit)
Customer base	Acquire new customers
	Increasing the potential value of existing customers
Marketing effectiveness	Creating communication opportunities
	Campaign returns cost per lead
	Building a strong database
Branding	Differentiating a brand
	Pre-empting the launch of a competing brand or loyalty program
	Sharing value with the customer in proportion to the customer's value
	Improve brand or company image
Service development	Add customer support capacity
	Develop problem solution

The customer loyalty programs reward customers in a variety of ways for the loyalty to the retail chain or service provider. O'Brien and Jones (1995, see also Arantola 2002) found five dimensions of loyalty programs from which the consumer can distill the perceived value of such programs:

- 1) *Cash value* that in the simplest form is a discount. The company can also calculate the value of a reward in terms of required spending or the cash value of the reward.
- 2) *Redemption choice*, which refers to those products and services that the customer can obtain with the program currency.
- 3) *Aspirational value*, which motivates the customer to change his or her behavior in order to obtain some exiting reward.
- 4) *Relevance*, which means the role of the program in the customer's life. Relevance can be thought of in terms of waiting time to obtain rewards with realistic spending levels.
- 5) *Convenience*, which refers to the option to avoid coupons and other hassle.

Loyalty systems are typically designed to provide more perceived benefits the more a customer buys within a certain time span (per visit, per year, etc.). The benefits are almost never fully convertible into free disposable money. At best they allow the customer to reuse the bonuses for other purchases in the same retail chain within a certain time span. Sometimes there are more limitations. Benefits can also take other forms, for instance by linking them to exclusivity

(distinction), such as providing access to special events or special services (e.g. home delivery).

Table 2 presents features of loyalty programs with two dimensions – main benefits provided and openness for new entrants – and some examples from different sectors. Many programs have several types of rewards and would thus fit into many categories.

Table 2. *Categorization of features of customer loyalty programs and examples of industries (Arantola 2002).*

		Openness of joining				
		<i>All customers become members</i>	<i>All may opt to join</i>	<i>All above a certain spending level become members</i>	<i>All above a certain spending level may opt to join</i>	<i>Provider makes the selection: hidden/ clandestine</i>
<b>Benefit types</b>	<i>Member discount</i>		book club discount store (price club)			segmented offers
	<i>Points for rewards not related to core service</i>	banking credit card telecom	airline			segmented partner offers
	<i>Points for discounts of vouchers for core service</i>		retail airline	restaurant retail	banking	points may be counted internally
	<i>Points for special services</i>	banking telecom	airline hotel			points may be counted internally
	<i>Access to special services</i>		airline	banking	banking	segmented service levels
	<i>Access to exclusive information</i>		airline			segmented information
	<i>Access to exclusive customer service</i>		airline hotel			segmented customer service
	<i>Benefits to an affinity partner</i>		credit card			not possible

The loyalty cards, thus, entitles the card owners to receive discounts, bonus money and other benefits, which are not available to those who don't have the cards.

### 3.2 Consumers' response to loyalty programs

The initial purpose of the bonus systems, i.e. to bind the consumers to the regular customers of one retail chain or service provider has not come true, at least not in Finland. Many consumers have several bonus cards, and in most of the 2.5 millions Finnish households more than one bonus card is used. Almost all adults are

members of at least one bonus card system. The most popular bonus cards are the cards of the largest retail chains, i.e. S-Group, K-Group, Tradeka, and Stockmann. In last ten years, the number of bonus cards in Finland has increased faster than in other countries, and the trend of growing membership still seems to continue.

Also in other European countries the bonus cards are widely used. For example as of the year 2000 in the UK 83% of consumers were enrolled in loyalty programs, but 30% to 50% of the members were not active (Newell 2000). On the other hand, in the UK, first-store loyalty in supermarkets was about 80%, which makes the need for loyalty-incentives questionable (East and Lomax 1999). That is to say, a clear majority of the people seem to stick to their preferred supermarket anyhow.

An interesting question is why consumers engage in loyalty programs and how do they evaluate the effects of these programs. Only a few studies have addressed these issues, and loyalty programs in general, from the consumers' perspective (Arantola 2002, Kivetz and Simonson 2000). The most comprehensive insights into the consumers' views provide the studies conducted by Arantola (2000, 2002).

Arantola's quantitative pilot study (2000) was designed to discover the reasons for joining loyalty programs. Reasons for acquiring the card were inquired with a short list of options, and the order of the reasons was following: "Because of the member specials" (65% of the respondents chose it as one reason), "Because of bonuses" (62%) and "Because of the credit card" (10%).

The best features of the programs were also suggested to the respondents, and "Lots of different kinds of stores that offer points" gained 43% of the responses, "Good member special offers" (40%), "Enough stores within my reach" (36%), "Clear system" (33%), "Abundant bonuses" (29%), "Also specialty stores that offer points" (29%), "Good way of informing about service" (24%), and "Other" (6%). These responses were in line with the reasons for acquiring the card. (Arantola, 2000)

According to consumers' view bonus systems provide them various benefits as well as some disadvantages (Arantola, 2002). Table 3 presents relational benefits, which include perceptions of the anticipated and experienced relational benefits.



Table 3. Consumer's relational benefits (Arantola 2002).

Benefit type	Benefit	Description
<b>Monetary</b>	Free items or services	- Cash value: free items - Using the program currency: Redemption choice (relevant options) - Aspirational value: looking forward to reaching the benefit
	Discounts and bonuses	- Cash value: discounts - Cash value: bonuses based on volume
<b>Soft i.e. special treatment benefits</b>	Convenience benefits	- Limited hassle with e.g. coupons and mailings (customization benefits also create convenience benefits) - Non-monetary time-savings: faster service, reduced search costs, avoided learning costs - <i>N.B. Inertia: benefit from not having to make choices</i>
	Customization benefits	- Preferential treatment: overall service level and customer service - Special service not available to others - Customer history as an enabler - Customer information not available to all customers or earlier than to other groups of customers
	Specials	- Happenings and seminars - Gifts
<b>Recognition</b>	Reciprocity	- Good service in return for being a good customer
	Confidence benefits	- Feelings, such as comfort, security, trust, reduced anxiety, reduced risk through familiarity, cognitive consistency
	Relevance benefits	- Important role in the customer's life or one area of the customer's life, creates meaning - Ability to understand this role and to support the customer better than other providers - <i>N.B. Avoidance of boredom: the relationship needs to remain "fresh"</i>
	Social benefits - Tangible signs of relationship - Benefits realized by the personnel - Personal identification	- Signs visible to the personnel and to other customers - Personal recognition – remembering, individual level - Fraternalization or affinity – “togetherness” with personnel or a group of customers - Friendship with personnel - Self-esteem: social status (community) or individual status (personal perception)

Bonus systems provide a wide range of monetary as well as soft and recognition benefits. Many of the soft and recognition benefits are the exclusive member benefits that go beyond an economic component and can be highly valued by consumers (cf. Gable et al. 2008).

The valuation of received benefits can be decreased by perceived relational disadvantages (Table 4), which brings the concept of benefits close to perceived value. Relational disadvantages refer here to those disadvantages a consumer perceives from long-term relationships as opposed to engaging in other relationships or transactional behavior (Arantola 2002).

Table 4. Relational disadvantages (Arantola 2002).

Disadvantage	Description
Privacy (trust, distrust)	Attitude towards personal data
Resignation	Importance to the provider
Resentment	Unfair
	Unclear
	Does not allow to be guided in behavior
	Fear of missing out

Arantola (2002) studied also those reasons, the relational motivation, which makes consumers engage in loyalty programs or continue the relationship with the programs. She calls the reasons relationship drivers, and these are the relational benefits and relational disadvantages as well as relationship inertia and negative bonds (Table 5). Relationship inertia is one bond type, a neutral bond. However, the role of inertia in the state of relational motivation may be strong, and it is therefore important to highlight it. It may even be the main reason for a long customer relationship. Negative bonds are negative incentives.

Table 5. Consumers' relationship drivers (Arantola 2002).

Relationship drivers	
Relational benefits	Monetary benefits (economic bond)
	Soft benefits (knowledge bond, structural bond)
	Recognition: reciprocity (structural bond, trust)
	Recognition: social (emotional bond)
	Relevance (attraction, emotional bond)
	Confidence (attraction)
Relational disadvantages	Privacy (trust, distrust)
	Resignation
	Resentment
Relationship inertia	Active disinterest
	Passivity
Negative bonds	Economic bonds
	Structural bonds (difficult to switch)
	Geographic bonds (location)

The four relationship drivers together, through their internal dynamic, form the state of relational motivation:

- 1) Relational benefits are incentives to continue the relationship
- 2) Relational disadvantages are incentives to end the relationship

3) Relationship inertia refers to the factors that prevent switching without an active relationship perception

4) Negative bonds are negative incentives to continue the relationship

The individual motives to begin or continue the customer relationship – the elements of consumers' relational motivation profile – are, thus, monetary benefits, soft benefits, reciprocity, social/status, relevance, confidence, privacy, resignation, resentment, disinterest, passivity, economic bonds, structural bonds and geographic ponds.

Relational motivation is relationship specific, and it is influenced by perception of the focal relationship, the importance of the focal relationship, the perceived freedom of choice and available options, and the personal characteristics of the consumer. Depending on the industry, some motives are bound to have high importance, such as structural bonds in banking and insurance services or geographic bonds in grocery retailing (Arantola 2002).

### **3.3 Green bonus cards and consumers**

Our special interest concerns green bonus cards and their possibilities to change consumers' behavior into more environmental-friendly patterns. The introduction of green or carbon neutral credit cards is a fairly new development. These systems provide the opportunity for the consumer to delegate repetitive offset actions to the credit card system. The card automatically ensures offset purchases for the transactions made by the card. It may also entitle the holder to some counseling and/or special green services (e.g. an interest rebate on green home investments). There are also so-called environmental bonus cards and sustainability cards. There can be some differences between these card systems, but the basic idea underlying all of these systems is the same as in any other bonus cards: reward the consumer for his or her commendable actions in order to change consumer behavior (Verheyen 2006).

The 'NU-spaarpas' ('NOW saving pass'), the sustainable incentive card scheme, launched in 2002 in Rotterdam, is an example of these new card systems (Van Sambeek and Kampers, 2004). The initiative was an experiment which lasted 18 months. Every cardholder received NU points, when buying products or services from shops that participated in the NU savings program. Cardholders could redeem the collected points for rewards from participating firms. Rewards include, for instance, day passes for public transport or free admission to local attractions. Points can also be exchanged for "green specials" obtainable from participating shops, i.e. sustainable products.

It seems that only some studies have so far examined consumers' attitudes towards these green card or sustainability card systems. Verheyen from Belgium

(2006) has researched the possibilities and difficulties associated with the environmental and sustainability cards and the attitudes of the parties involved in these systems. The research resulted in a workshop that brought together representatives of retailers and supermarkets, environmental organizations, consumer organizations, governments, and several managers of environmental bonus cards or sustainability cards. He has examined in his study five pilot projects with environmental or sustainability bonus cards. Three of the projects were organized in Belgium, one in Germany and one in the Netherlands (Table 6).

There were many differences between the five projects. For instance, they had different goals: they rewarded inhabitants or customers for either environment-friendly or sustainable consumption. They also provided different benefits to consumers, either electronic or non-electronic rewarding cards, bonus schemes or direct discounts. In spite of these differences common conclusions could be drawn from these projects.

According to Verheyen (2005) the most important conclusion was that consumers were – generally spoken – very favorable to the bonus cards and schemes. The most important reasons to use these cards were “saving money” and “benefit for the environment”. There were also indications that a bonus system gives the consumer a perspective to change his or her environmental awareness into effective environment-friendly behavior. Most consumers preferred a direct discount for their environmentally sound purchases above a bonus system giving them a reward or discount later on.

*Table 6. Five pilot projects with environmental or sustainability bonus cards (Verheyen 2006).*

### **Pilot Project**

“Retour is Terug” (‘Reusables go Back’), operated by the inter-communal cooperative “Regionale Milieuzorg” and “Bond Beter Leefmilieu” (The association of Flemish environmental organizations), Belgium  
 “De Gemeentekaart” (the municipality card), operated by the inter-communal cooperative “Regionale Milieuzorg”, Belgium

“Met belgerinkel naar de winkel”, run by “Bond Beter Leefmilieu” (The association of Flemish environmental organizations) and UNIZO (The association of SMEs), Belgium  
 “The Umwelt.Plus.Karte”, Germany

“De NU-Spaarpas”, The Netherlands

### **Description**

Those inhabitants of the municipality of Zonhoven, who purchase beverages in return packages, receive a discount on their household waste tax. On registration, each household receives an electronic savings card that is being credited with every purchase of return bottles from participating retailers.

The electronic card, distributed among all the households of the territory of inter-communal cooperative “Regionale Milieuzorg”, controls the distribution of waste bags and monitors the weighing of waste disposal by individuals on waste yards, run by the inter-communal cooperative.

The aim of the project is to stimulate people to buy their groceries and other goods in local shops, while using their bike as means of transport. A non-electronic bonus card is used to reward the customers.

A non-electronic reward card for sustainable consumption from The city of Heidelberg.

A pilot project with an electronic savings card for sustainable consumption in Rotterdam in 2002-2003.

According to the findings of a few of these projects, consumers can be split up in three groups when it comes to environmental-friendly consumption: (1) a small group of environmentalists, (2) a large middle group of consumer convinced of the need of environment-friendly consumption, but not always acting in such a manner, and (3) a small group of consumers non-interested in environment-friendly consumption. It seemed that bonus schemes are an efficient instrument to confirm the consumption behavior of the first group and to alter the consumption behavior of at least a part of the middle group. In order to convince the consumers of the third group more imperative measures are needed. (Verheyen 2005).

Retailers participated in these pilot projects mostly for marketing reasons or – occasionally – for environmental reasons. The development and application of bonus systems for environment-friendly consumption or sustainability cards were considered very expensive, in particular when an electronic chip-card is being used. One option to avoid this would be to use already-existing electronic cards, such as loyalty cards from supermarkets or the electronic ID-card. In addition, the success of the bonus system is dependent on the simplicity of the system. Clear-cut communication and the simplicity of the system are essential. Verheyen (2005) also found out that “in order to ensure the viability of a bonus schemes a minimum market share of environment-friendly products has to be guaranteed.

These results and the consumers’ views of bonus card systems in general refer to that bonus cards have possibilities to effect on consumption behavior. Consumers seem to appreciate a wide range of benefits. Therefore, it seems that the green bonus card systems would interest more consumers, if systems provided different benefits to their users, both monetary, soft, and recognition benefits (cf. Arantola 2002).

## 4 Carbon offset and green bank/credits cards in Europe

Bonus systems specifically designed to encourage consumers to pursue purchases of low emission alternatives are still extremely rare. There are regional green bonus cards that promote local environmentally friendly products, such as those discussed in section 3. That concept mixes in other motives and is often not about greenhouse emission reduction per se. Furthermore, most of these cards are experimental and are or have been only temporary in use, (e.g. the often cited NU Spaarpas in Rotterdam). In 2008 there has been however a pilot in France with product specific greenhouse gas information meant. It concerned a wide range of foodstuffs and included options for overall monitoring for the consumer, e.g. by indicating on the sales slip the total amount of embodied greenhouse gas emissions of the foodstuffs bought. The calculations for the included foodstuffs are



based on calculation system 'Bilan Carbone' developed for the French Energy Agency ADEME. According to the press information (ADEME/Nord-Pas de Calais/E.Leclerc/Greenext – April 2008) the attributed amount of greenhouse gas emissions encompass primary extraction and production, (further) processing and manufacturing, logistics, retail, use, and discarding. The pilot took place in two supermarkets of the chain E.Leclerc in the region Nord-Pas de Calais. Apparently regional authorities are interested because of possibly favourable recommendations regarding the use of local producers in order to keep transport distances short. The pilot started in April 2008 and lasted 6 months.

There is another French retail chain, Casino, which is also active in developing environmental labelling for its product portfolio. That labelling scheme is covers more issues than greenhouse gases, but is less comprehensive regarding stages covered.

Figure 1. Example of a sales slip of E.Leclerc supermarkets in the test area

There is a wide portfolio of voluntary emission compensation services in Western-Europe, the USA and elsewhere that is growing rapidly. It concerns emission compensation services, green bank/credit cards, and regional green bonus cards

that promote local environmentally friendly products. According to Brohé (2008) the voluntary emission compensation market amounted to approximately 100 million US dollar in 2006. In terms of compensated emission volume the market grew by a factor 3 from 2005 to 2006 (figure 2).

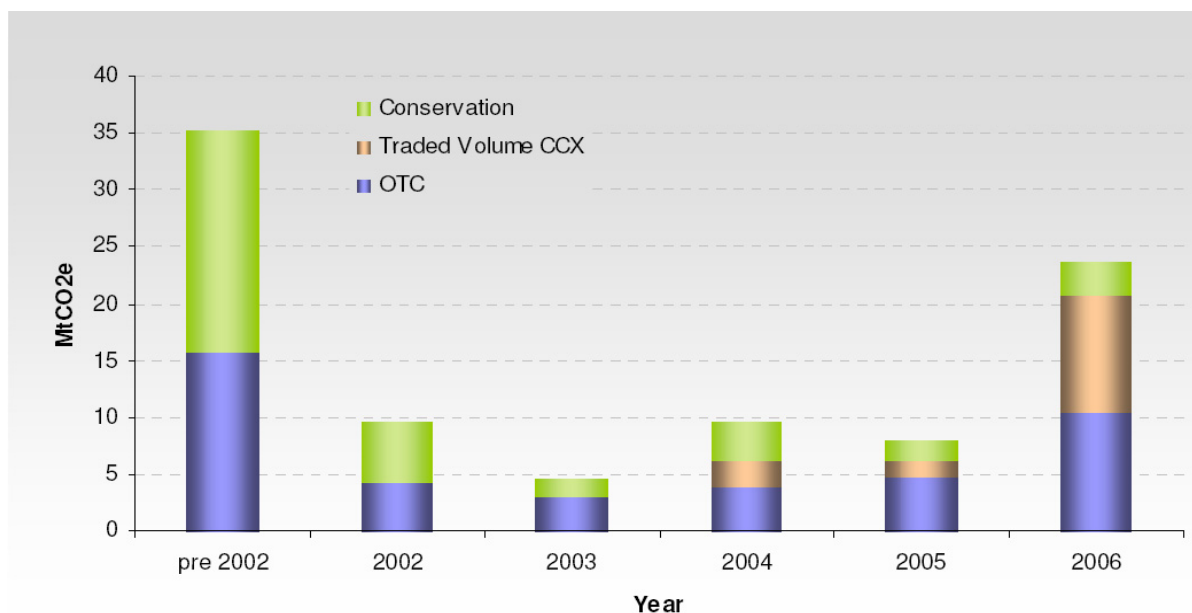


Figure 2. The development of the voluntary carbon offset market in terms of megatons CO<sub>2</sub> equivalent compensated (source: Brohé: 2008)

Ever more commercial banks and credit card companies are offering ‘green bank/credit cards’ (e.g. Rabobank in the Netherlands, Barclays bank in the UK, and VISA in various countries). For all the purchases paid by these cards a certain fraction is set aside to pay for carbon offset which is supposed to equal the amount of emissions embodied in the purchases. However the calculators applied to make the conversion of monetary units to attributed greenhouse gas emissions are of rather varying quality. There are however signs that some of the involved banks and service providers are willing to increase the level of differentiation by applying more extensive input-output systems and material flow databases. These improvements can produce reasonably reliable averages for product groups, but are still unfit for application to single products (i.e. genuine carbon foot printing), let alone for comparison of product/brand alternatives (see also sections 5 and 6).

In conjunction with the compensation services and green bank/credit cards there is also emerging a new background service that does a lot of the actual data handling for this kind of services. For example ClimaAccount and the related RePay are specialising in offering these services, e.g. to VISA (see e.g. <http://www.repay-international.com/en/index.html>). To the same cluster belong

more companies focusing on development of services, low emission technologies, and supporting ICT solutions (for either the services or the low emission technologies).

Even though this service area has basically good prospects, there are also a number of problems that need to be solved before this market (including the intended bonus system in CLIMATE BONUS) can assume a significantly larger role in emission reduction strategies (see also Nissinen and Seppälä, 2008). There are the following challenges:

- accuracy of attributed emissions per product / purchase
- reliability of the allegedly compensated or reduced emissions
- lack of standardisation in almost every respect (even though regarding verification a set of standards is emerging)
- lack of guarantees and inspection with respect to risks of resale of obtained emission rights (such as CERs, which could be easily resold from a repository)
- as yet no tracking of the implications of these schemes for a country's overall emission reduction performance, in this respect there are also risks for double counting e.g. inside and outside EU-ETS



## 5 Methodologies for carbon footprint calculations

In order to get accurate, reliable and comparable estimates of carbon footprints (i.e. climate change impacts) of products and services, a well specified methodology that takes into account the greenhouse gas emissions during the whole life cycle is required. It is then obvious that the standardized (ISO 14040) method 'life cycle assessment' or just 'LCA' is the basic methodology for carbon footprint measurements (Minx et al. 2007, BSi 2008, SETAC Europe LCA Steering Committee 2008). And as the LCA methodology leaves free choices for the practitioner making the assessment, more detailed rules are needed to assure the comparability of the results. This could be achieved by product specific rules (PCRs) of environmental product declaration system 'EPD' (defined in standard ISO 14025).

The production of good quality information about greenhouse gas emissions in each specific product chain is the biggest challenge for LCA becoming a mainstream tool. Nowadays a lot of efforts of each expert making the LCA is put into clearing out the environmental loads in the other life cycle stages than just the final production of the product or service in question. In addition to the final production phase of a product or service, information is needed for example from the raw material production and manufacturing of energy carriers, components and chemicals.

Minx et al. (2007), who made an analysis of the methods available for carbon footprint measurements, identified three methods being of relevance for carbon footprint measurements: (1) process life cycle assessment, (2) input-output methodology and, (3) hybrid life cycle assessment. They see hybrid LCA, i.e. combining process LCA and sector level economic and environmental account data i.e. 'input-output data', as the preferred method to achieve highest levels of robustness and comparability as well as cost effectiveness. However, this means that significant changes to the current draft methodology are needed. Although a variety of applications can be achieved today by process LCA, such as process improvement, hot spot analysis or supply chain management to decrease the carbon footprint, applications like type I eco-labelling (standard ISO 14024) or carbon trading that require high levels of robustness and comparability would not be achievable in the immediate future due to the requirements of the preferred methodology.

Hybrid life cycle assessment is carried out through the combination of process data and input-output data. According to Minx et al. (2007), hybrid life cycle methods can overcome some system boundary problems by using sector data from environmental input-output analysis as an additional source of secondary data, where no primary or secondary process level data is available. They state that in process LCA collection of process data is typically started without know-

ing the complete system, whereas in hybrid LCA the analysis starts from the complete system and adds process specific data, where available. The problem of system boundary setting would disappear as the study system would be inherently complete.

However, the lack of process specific data from the various actors in each product chain should perhaps be approached also by other means than just input-output data. Often the greenhouse gas emission of the manufacturer of the final product is fairly small compared with some previous manufacturers in the product chain. Take for example clothes. It is obvious that process information from the manufacturers of the yarn and fabric are needed, instead of just input-output data of the sector 'textile manufacturing'. But if there are – say – ten manufacturers in a production chain of a fabric, it is rather time consuming and often fruitless for the last actor, i.e. the manufacturer of the clothes, to get the information by asking the previous actors in the chain. However, it might be quite important for industrial food producers to understand and manage climate change impacts of their contract farms due to the fact that these impacts are interrelated to their products.

When real product-chain specific data are aspired, it must be known beforehand by each actor what kind of information is needed, and the data is to be delivered to the next step automatically (Nissinen 2006). Often the manufacturers in the chain could in principle clear this information rather easily. They just need to know what is exactly needed, and EPDs and their PCRs can be of great help here. And taking the hybrid focus here means that each upward chain can be ended with a value representing the whole system upwards, i.e. the value from the input-output analysis. This way the problem of system boundary setting disappears as the study system is inherently complete and it also includes emissions associated with service inputs, over-heads and capital goods, which are emissions components often been covered only very partially in the process LCA studies (Minx et al. 2007).

Two strategically important questions arise from the analysis above:

1. How to enable and encourage the production and delivery of carbon footprint information in companies?
2. How to realize the production of international input-output data sets?

It is good to note here that services like calculators of personal climate impacts ('carbon budgets') and subsequent compensation services often deal with specific parts of the consumption, related to the consumption of electricity in homes, heating of homes, use of fuels for passenger cars, and use of public transportation (e.g. [www.carbonneutral.com](http://www.carbonneutral.com)). Quite good estimates of the carbon footprints can be achieved for these actions, although a full life cycle is not accounted for.

Finally, it is worth noting that the aforementioned standards (ISO 14040, BSi 2008) also conflict with each other, even though for example BSi (2008) is sometimes claimed to be based on ISO 14040. The main differences between the standards concern allocation rules and especially avoidance and acceptance of allocation. Furthermore, ISO encourages the use of primary process based data, while BSi has been set up from a perspective of input-output based data.

## 6 Information sources

As regards the present information about the values of carbon footprints for various products and services, there seem to be three main sources, namely input-output data, LCA studies or life cycle based carbon footprint studies (to be presented in packages), and environmental product declarations.

Owing to the high aggregation level input-output data represent the most inaccurate information of these. The inaccuracy is connected both to the wide range of different products and services comprised in each sector and to the absence of the distinction of production process alternatives for given product groups. As a consequence the calculations can only use the average emissions and products of each industrial sector and thus the results can never be accurate for any specific single product. By distinguishing monetary and physical input-output flows (MIOT and PIOT), influences of process varieties can be accounted for to some extent (e.g. Hoekstra and van den Bergh, 2006) but generally spoken input-output systems cannot provide replicable sufficiently wide data bases, which would fulfil all the quality criteria of an updatable multi-product/multi-sector carbon foot printing system.

In an input-output based study covering 25 European countries estimates of climate impacts were calculated for 478 product groups (Tukker et al. 2006). A kind of follow-up in Europe is the EXIOPOL-project (<http://www.feem-project.net/exiopol/>), in which special attention is paid to the additional data requirements for environmental impact assessment. Similar analyses have been made for the USA economy, distinguishing 491 product groups (Carnegie Mellon University Green Design Institute 2008). In Finland, Mäenpää published results for 15 consumption commodity groups (Mäenpää 2005). These will be updated and possibly published at a more detailed level in a project named ENVIMAT (Seppälä et al, 2006).

Published life cycle assessments offer an evident source for carbon footprints. In Finland foodstuffs are presently the most intensively studied consumer product sector, and a number of LCAs have been published in the previous years. These include cheese, potato flour, oat flakes and gratinated potatoes (Katajajuuri et al, 2004), beer (Virtanen et al. 2007), cucumber (Katajajuuri et al, 2007) and broiler chicken (Katajajuuri et al, 2007). These Foodchain LCA projects have been carried out for individual brand products of the Finnish companies. This means that the data collection and generation is based on actual production chains, i.e. the chains from retail products up to farms has been traced back and respective data has been collected by actors of the chains. Correspondingly, results are product specific due to the use of primary data from field and actual suppliers. In addition to the Foodchain studies environmental impacts of beer (Virtanen et al, 2007), rainbow trout and Baltic herring (Silvenius and Grönroos, 2004), and milk and

rye bread (Grönroos and Seppälä, 2000) have been assessed in Finland. Environmental impacts and also carbon foot prints of food products vary quite a lot depending on the climate and conditions between areas where primary production has been taken place.

There are a couple of international yearly conferences (e.g. SETAC, Eco-Balance, LCA in Food) in which many LCA case studies have been presented. In addition to the International Journal of Life Cycle Assessment some other scientific journals publish LCA case studies. However, most of the published LCA studies are not dealing (in particular) with consumer products. In addition to the published LCA studies, there are commercial life cycle databases which include mostly material and process data (i.e. the aim is to help to make a LCA), but also of some final products. Concerning the food products the Danish LCA food database (<http://www.lcafood.dk/>) is the most important database concerning food imports.

Environmental product declarations, i.e. EPDs, strive for the comparability of the results, which is often problematic among LCAs. LCAs are often carried out without links to any EPD-system. The comparability can be achieved by means of product specific rules (PCRs). As the international EPD-system describes it ([www.environdec.com](http://www.environdec.com)), collecting LCA data to be included in the declaration is a core activity in the process of creating an EPD with the following for basic prerequisites:

1. to comply with international accepted principles for life cycle assessment, LCA, according to the ISO standards 14040-43,
2. to follow the general purpose of EPDs, the collection of data, methods and assumptions used as advocated in the ISO standard 14025 and described in the General Programme Instructions and,
3. to be in line with the product-category rules, PCRs, for the product category of interest. In addition to EPDs which cover several environmental impact classes, the international EPD-system has also issued so-called "Climate Declarations" as the first example of single-issue EPDs. In May 2008 there were six climate declarations, whereas the number of EPDs was 89, originating from seven countries.

In addition to the international EPD-system, there are national EPD-systems in the field of building materials. For example, in Finland the system ([www.rts.fi/ymparistoseloste](http://www.rts.fi/ymparistoseloste)) covers 37 products, expressing – among other things – the climate impacts of the products.

Looking at the carbon footprint efforts published, perhaps the most visible work has been done by the Carbon Trust in the UK (Carbon Trust 2008), often in co-

operation with the giant retailer Tesco. Tesco stated in January 2007 to strive for carbon footprint of all its 70 000 products (Tesco 2007). Carbon footprints were determined within a short time period of a couple of months for more than 10 products. However, it is not clear yet, whether a supporting climate declaration system with the PCRs will be developed.

The above reviewed information sources predominantly deal with concrete products, notably foodstuffs, which the consumer can – so to say – take from the shelf. For domestic energy and transportation energy there exist also own bodies of data, e.g. in relation to the European Emission Trade System. Furthermore, the emergence of smart metering in the residential sector may provide extra opportunities for supplying reliable and up-to-date information into the embodied emissions monitoring system for consumers (Hongisto et al, 2008). Similar options could be exploited with the emerging electronic travel card systems for public transport.

## 7 Concluding remarks

The purpose of this report reduces the need for extensive conclusions. Those can be found in the next reports of this project. Nevertheless a few concluding observations can be made.

The so-called voluntary carbon market is growing, and gradually starts to provide an extra outlet for achievement of climate policy goals. In connection with this trend all kinds of initiatives are developing, which are aimed at the consumer. Both initiatives with a commercial background and with a NGO-background, can be found.

If the voluntary carbon market is to play a bigger role, it needs to be regulated in order to ensure reliable, comparable and transparent data regarding achieved and achievable emission reductions, the costs of these reductions, and pricing of emission reduction and offset services. Transparency and reliability are key ingredients to get larger groups involved and to keep them involved.

Relevant theories regarding feedback, incentives, and product differentiation indicate that there is – in principle – space for this kind of services, but for realisation of significant potentials the design of the service package envisaged in CLIMATE BONUS and its roll-out need to be planned and managed very carefully.

The relevance for public authorities concerns both fiscal aspects and aspects of policy control. Fiscal instruments are often relatively effective and efficient in terms of their management and transaction cost. However, for some groups, sectors or applications the effectiveness may be only moderate. Also steady increases of tax levels often face their social and political feasibility limits. Another problem can be that the revenue function of a tax and its steering function may conflict start to conflict. If a tax appears to have strong guidance effects, it may result in substantial decreases of the collected revenue of that tax over time, thereby obliging the state to increase taxes elsewhere.

Climate policy deals with change processes that are cutting across the entire society, and indeed are often much more effective if there is broad support or even better if the implementation of changes is internalised in the strategic and operational decision making of companies and households. However, to achieve such a state of broad based internalisation, all kinds of facilities are necessary, often to relieve the imperfections of (quasi)markets. The service package envisaged by CLIMATE BONUS would be such a facility.

As regards implementation the CLIMATE BONUS concept is facing still a range of challenges regarding data systems design and build-up, data handling, and data quality assurance, both at the production side (to produce carbon footprints) and

at the consumption side (to provide effective and attractive feedback information). The role that customer rewards and/or fiscal benefits may play to enhance participation and interest in emission reductions, is as yet unclear, but merits further research.



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<http://www.greencardvisa.nl/index.php>

<http://www.climacount.com/about.php>

<http://www.milieucentraal.nl/pagina?onderwerp=Klimaatcompensatie>

<http://www.carbontrust.co.uk/solutions>

## Annex 1 – Summary of the project plan (abridged)

### *1. Introduction and rationale*

**The key purpose** of the proposed project CLIMATE BONUS is to assess the possibilities and effectiveness of a bonus system for households, which incites them to consume in such a way that greenhouse gas (GHG) emission are reduced and incites retailers to offer a product portfolio that advances the choice for low GHG solutions by households. In order to enable a properly functioning *and* credible bonus system the development of the underlying information system is indispensable.

In due course the proposed project serves other purposes as well. The development of the underlying information and knowledge system is expected to enable future elaborations for the purposes of e.g. climate policy monitoring, public health policies, etc. The information system in its own right constitutes an innovation with prospects for export potential.

#### *Needs for policy innovations*

Given the assumption that emission reduction policy will have to become stricter over time countries should start to think about instruments and approaches that go clearly beyond the current typical portfolio of policies and measures. Taxes, standards, and information packages are all very useful up to some point, after which incremental effects are getting ever weaker whereas incremental costs and problematic side-effects increase ever faster. New instruments can typically be found in the area of more elaborate voluntary (or negotiated) agreements and in the area of tradable rights. An emerging example in the EU is the concept of tradable white certificates (TWC), implemented in Italy, France and in some respect in the UK ([www.eurowhitecert.org](http://www.eurowhitecert.org); Perrels and Tuovinen, 2007). Another emerging idea is the concept of personal carbon credit systems, which has already gone a long way in the United Kingdom (Roberts and Thunim, 2006; Fawcett, 2007; Perrels, 2006).

The UK is the first EU country that is seriously preparing for such a system (the law proposal is due for parliament this autumn). Also in France is a rising interest in this kind of systems, even though possibly focusing on travel. In Belgium (Flanders) some experiments are carried out with household environmental credit cards (Verheyen, 2005). During the nineties in the Netherlands there has been a long term real life experiment with 20 households that had to achieve significant cuts in their direct and indirect energy use (CEA, 1999). One could also refer to the electronic road charge systems for passing into inner city areas in e.g. London

(Santos and Fraser, 2006), Stockholm (Stockholm city, 2006), Bergen (No.), Singapore, and Riga. Also various so-called carbon offsetting services are abounding. The more credible ones (e.g. <http://www.klimaatcompensatie.nl/>), which fund only certified emission reduction projects, usually involve large banks (e.g. Barclays in the UK and Rabobank in the Netherlands).

#### *Needs for broad and credible information systems*

Experiences to date with the European Emission Trade Scheme (EU ETS, e.g. EC 2005a, EC 2006a; EC 2006b Upston-Hooper et al, 2006) as well as with other environmental issues (e.g. forest product certification) indicate that credible, expandable and transparent information systems are essential for a meaningful operation of environmental (policy) control systems. Since the intended system is – eventually – very large and complex, the technical, behavioural and managerial design of the required information system is of crucial importance for the effectiveness and acceptance of the envisaged system. For this reason information system development gets ample attention throughout the project, also in conjunction with other aspects of the study. In fact the approach combines 'depth' with 'width'. The depth is in particular achieved in the area of foodstuffs, for which the entire production chain can be traced as much as possible at a detailed level. This enables the project team to assess prerequisites for credibility. On the other hand for various other product groups, with significant emission impacts, more aggregate approaches are pursued for the time being. This allows the project team to assess approximate overall effectiveness of the system.

In Finland, co-operation between the European Commission, (Finnish) research institutes, ICT-development companies, competent authorities (CA's), emission verifiers and installation operators has already produced practical solutions supporting EU-ETS integrity, emission controls and thus expansion of the whole scheme in Europe. ICT solutions can be seen as a "key technology for global emission control" and are indispensable for the efforts designed to tackle global environmental challenges.

#### *Towards comprehensive solutions*

A personal greenhouse gas credit system for households may hold the key to the policy challenges discussed above, since it combines comprehensiveness with options for gradual introduction, whereas it combines price(like) incentives with appropriate information provision. The system can take several forms. Essential is however that for all or a subset of household purchases the implied emissions

are accounted for (at the level of the individual household) and are somehow matched with a reference level, a reduction target, or whatever. Two principal forms to organise personal carbon credit system are by:

1. a cap and trade system
2. a bonus system

This proposal focuses on the second option. We think that cap-and-trade systems encompassing households may face significant political opposition as well as economic risks, whereas bonus systems are explicitly aiming at activating important mediators, by means of which households will get a better offer of low emission alternatives. There is mounting evidence that the involvement of the interface towards the consumer (i.e. the retailer) can enhance the effectiveness of emission reduction policies for households (Throne-Holst et al, 2007; Jackson, 2005). Anticipating further reduction obligations for Finland it can be expected that an effective involvement of households will be essential to achieve significant reductions on top of the obvious reductions in various energy intensive industries.

The bonus system would involve retail chains, banks, transport companies, and energy suppliers. Other sectors such as real estate and/or the building sector could be contemplated as well. Given the intended organisational design there would also be a role for (larger) municipalities and/or regions ('maakunta'). Once the bonus system is implemented, it would be worthwhile to consider a linkage with a parallel supporting programme for establishing and improving integrated supply chain carbon management (e.g. Carbon Trust, 2006).

### *3. Research plan*

This study should sort out the principal design requirements and provide indications of what kind of designs seem technically, commercially and socially feasible as well as economically and ecologically effective. An actual system could be built and tested in a follow-up project, even though also in that phase it is most probably about a (large scale) pilot.

It can be expected that over the course of the study and during the concluding evaluation phase all kinds of additional applications and extensions will be identified. These options will be reported since additional benefits will widen and deepen support across society. However, it should be self evident that such options otherwise will remain outside the analysis carried out in this study.

The principal question to be answered is:

*What are practically feasible design alternatives for a carbon bonus/credit system for households?*

Key issues to be tackled are:

- social feasibility (acceptability for consumers)
- commercial feasibility (for involved sectors and companies, also compared to alternative measures)
- legal feasibility (are there risks for infringements of competition law; compatibility with EU regulations)
- technical feasibility
- environmental effectiveness (does it produce any significant reductions in greenhouse gas emissions against reasonable efforts)
- economic effectiveness (does it produce substantial emission reductions against similar or lower costs than a substitute measure, and does it have other significant social-economic effects)

The approach combines 'depth' with 'width'. The depth is in particular achieved in the area of foodstuffs, for which the entire production chain can be assessed and traced at a detailed level. This enables the assessment of prerequisites for credibility. On the other hand for various other product groups with significant emission impacts more aggregate approaches are pursued for the time being.

The study consists of seven parts, being:

1. Inventory of Finnish and European bonus systems with ecological features and of larger multi-user information systems with environmental policy control purposes
2. Researcher-practitioner dialogue
3. Data and information system feasibility assessment
  - a. "Tier-d strategy" – based on real value chain data (which is/or could be verified through a 3<sup>rd</sup> party approach)
  - b. "Tier-c strategy" – based on emission data (at more specific product group data level, e.g. originating from lifecycle analysis and other studies)
  - c. "Tier-a/b strategy" – based on emission estimates (e.g. averages from national statistics) and emission indicators (uncertain basis, expert opinion).
4. Development and analysis of feasible and credible climate bonus systems
  - a. technical realm



- b. methodological realm
- c. economic and governance realm
- 5. Piloting the developed designs
- 6. Evaluation of most promising designs
- 7. Project co-ordination

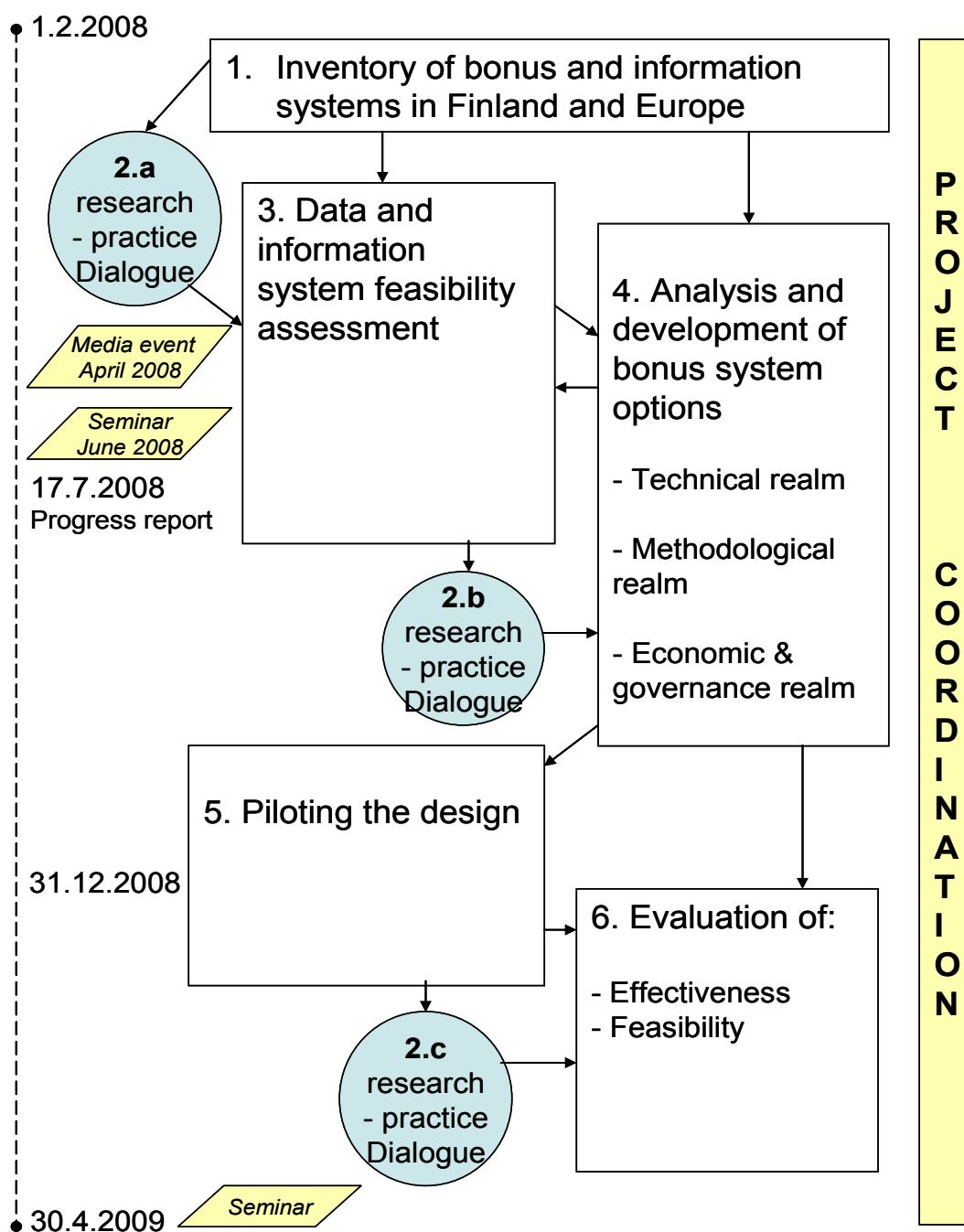


Figure A.1 Scheme of the study – timing and relations between work packages

#### *4. Consortium organisation*

There are five research partners, a number of private sector partners, and the Finnish Funding Agency for Technology and Innovation (TEKES). All these partners are co-funding the study, with TEKES as largest financier. In addition there is a network of domestic and foreign specialists. A steering group will be nominated consisting of representatives from the co-funding consortium partners.

The research group consists of:

- 1 Government Institute for Economic Research VATT (overall co-ordination; task leader for parts 1, 6 and subtask 4c; economic impact assessment, overall potentials for emission reduction, instrumental efficiency)
- 2 National Technical Research Institute (VTT) (task leader for part 4 and subtask 4a)
- 3 Finnish Environmental Institute SYKE (task leader for phase 2 and subtask 4b)
- 4 MTT Agrifood Research (MTT) (subtask leader for part 3)
- 5 National Consumer Research Centre (KTK) (task leader for part 5; piloting, societal acceptance and its underlying causes)

The private sector partners are:

- 1 The Kesko retail group, notably through its subsidiary Ruokakesko
- 2 Elisa telecommunication
- 3 HK Ruokatalo
- 4 Nokia
- 5 Stora-Enso (Consumer Board)
- 6 Tuulia International

In addition foreign specialists will be consulted

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