Carbon labels in tourism as persuasive communication

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Abstract

Ecolabels are widespread tools for policy and marketing in many industry sectors. Carbon labels focussing on carbon dioxide and other greenhouse gas emissions, are one specialised category of ecolabel. Carbon labels are currently in common use by tourism corporations, particularly those involved in air travel. All ecolabels, including carbon labels in tourism, rely on persuasive communication: i.e., providing technical information to individuals in ways that induce them to change relevant behaviours. This requires that individuals understand that information, appreciate its significance, trust its reliability, and know what to do about it. Here, these four criteria are applied firstly, to a set of leading tourism carbon label schemes, a producer perspective; and secondly, to a set of environmentally well-informed tourists using those schemes, a consumer perspective. Results indicate that tourism carbon label schemes suffer significant shortcomings both from the theoretical perspective of simple communications analysis and from the practical perspective of tourist understanding and action. Evidence to date is that tourists do indeed pay little attention to carbon labels. This analysis shows that even if tourists care about their climate change impacts, carbon labels are currently ineffective because of deficiencies in communications. Since such deficiencies can be overcome, there are opportunities for carbon labels to become more effective.

Keywords: certification, climate change, consumer behaviour, ecolabel, policy, sustainability

Introduction

The contributions of commercial tourism to global climate change have become increasingly significant. Tourism contributed an estimated 5% of global carbon dioxide (CO_2) emissions in 2005 (UNWTO-UNEP-WMO, 2008), and about 8% of the total anthropogenic contribution to radiative forcing, i.e. the warming caused by all greenhouse gas (GHG) emissions jointly (Scott et al. 2010). The largest component of tourism-related CO_2 emissions is from aviation (40%), followed by cars (32%), and accommodation (21%). These three sub-sectors, and their GHG emissions, are all growing. Numbers of travellers, average distance and frequency of travel, and average degree of luxury in accommodation are all increasing. As a result, despite gain in efficiency, emissions from tourism are predicted to grow by 135% over the three decades from 2005 to 2035 (UNWTO-UNEP-WMO 2008). This contrasts starkly with global efforts to curb GHG emissions across all economic sectors. Current evidence (IPCC 2013) indicates that GHG emissions must be cut by 80% from current levels by 2050 for mean global warming, relative to pre-industrial levels, to remain within the 2°C maximum warming guardrail.

Legal, economic and technological approaches to reduce GHG emissions from tourism have all proved largely ineffective to date. Despite stated commitment by the tourism industry to reduce

GHG emissions (e.g. World Travel and Tourism Council 2009), there is thus currently very limited evidence of how such reductions could realistically be achieved (Cohen et al. 2014; Gössling et al. 2013; Scott et al. 2010). Delays in defining binding goals for emission reductions within the International Framework Convention on Climate Change (UNFCCC) have led to political stalemate and stalling at the international level (UNFCCC 2013). At the level of individual nations, there is minimal new policy or legislation to achieve binding and monitored emission reductions, particularly with regard to tourism (OECD & UNEP 2011; OECD 2014). Governments are concerned over possible electoral backlash; and businesses, industry associations and lobbyists play on these concerns to undermine or overturn any attempt to introduce measures such as carbon taxes or emission trading schemes (Scott et al. 2014). Industry advocates such as IATA and ICAO argue instead for hypothetical technological solutions. Even if unprecedented technological breakthroughs were to occur, however, efficiency gains would be outpaced by growth (Gössling et al. 2013). In addition, proposed approaches such as biofuels also present major sustainability obstacles (UNEP 2009).

In the absence of effective legal, economic or technological approaches, attention has turned (Cohen et al. 2014; UNWTO-UNEP-WMO 2008) to weaker suasive instruments of environmental policy, such as ecolabels. These rely on communicating relevant technical information to individuals, to persuade them to change aspects of lifestyle and behaviour so as to lower their personal environmental footprints. They are thus effective only if they can indeed induce environmentally significant change amongst a large number of consumers. Suasive measures include government advertising campaigns, and a variety of government, industry and third-party ecolabel programs, such as carbon labels in tourism. Carbon labels and similar measures to encourage low-carbon consumer choices in tourism are thus widely debated (Cohen et al. 2014; UNWTO-UNEP-WMO 2008). Such choices include: using lower-GHG transport or accommodation or voluntary carbon offsets; choosing closer destinations; or travelling less frequently and instead, staying for longer periods of time at each destination (Buckley 2011a,b; Gössling 2010; UNWTO-UNEP-WMO 2008). Carbon labels are intended to provide the basis for the first of these, voluntary choice of low-GHG tourism providers. It is these labels that are the focus of this paper.

The social context for carbon labels in tourism is generally favourable, but behavioural change to date has been very limited. Reported attitudes towards sustainable practices and environmental management are generally positive both for travellers specifically, and for the broader populations of developed nations (e.g. Eurobarometer 2011; Hall 2013). Public awareness of the consequences of energy consumption for climate change is increasing (e.g. Barr et al. 2010; Higham and Cohen 2011). Understanding of climate change impacts of travel amongst actual air travellers is also improving (Cohen and Higham 2011, Higham and Cohen 2011). Despite this concern, awareness and knowledge, however, there has been very little change in actual behaviour, as demonstrated either by travel patterns or purchase of offsets (Araña et al., 2012; Cohen and Higham 2011; Gössling et al. 2009; Hall 2013; Miller et al. 2010). Such disparities between expressed values and demonstrated actions are commonplace where individuals compare personal costs and effort against diffuse social benefits (Kollmuss and Agyeman 2002; Stoll-Kleemann et al. 2001).

Such psychological barriers may be particularly significant in tourism, since people perceive holidays as short-lived but socially legitimate opportunities for more hedonistic behaviour than at home (Cohen et al. 2014; Hibbert et al. 2014), or as opportunities to gain social capital through travel (Gössling and Nilsson 2010; Urry 2011). People also travel for business, and to fulfil social obligations such as visiting family, which they may perceive as overriding environmental considerations (Buckley 2011, Gössling 2013). Suasive measures such as carbon labels must thus overcome significant psychological barriers before they can influence individual actions.

The principal factors which must be considered in order to change individual behaviour are well established, including perceived costs and benefits, moral and normative concerns, affect, context, and habits (Steg and Vlek 2009). These have been discussed, for example, in analysing individual use of cars (Lucas and Schwanen 2011). Broad-scale climate-change campaigns, in contrast, have to date used three approaches, successively but separately (van der Linden 2014): Early campaigns used cognitive-analytical approaches, assuming that knowledge changes attitudes and attitudes change behaviour. Subsequent campaigns used affective-experiential approaches, with negative emotional appeals and guilt messaging. The most recent campaigns use social-normative approaches, promoting social and moral norms to trigger behavioural change.

For the best chance at persuading individuals to overcome psychological barriers to low-carbon travel choices, therefore, evidence to date indicates that carbon labels in tourism should: incorporate declarative, procedural and effectiveness knowledge; explicitly communicate the context and relevance of climate change; appeal to cognitive, experiential and normative dimensions of behaviour; and target specific behaviours within their broader psychological context (Denicolo 2008, van der Linden 2014; Hall, 2013). Indeed, it can be argued that behavioural change is only likely when individuals possess knowledge encompassing: the physics of climate change; the role of GHG in climate change; the origin and significance of anthropogenic GHG emissions; the significance of each individual's consumption in contributing to aggregate global emissions of GHG; opportunities to reduce personal GHG emissions; and the relative effectiveness of different potential measures in reducing personal emissions. This represents a high degree of carbon literacy or carbon capability (van der Linden 2014; Hall, 2013; Whitmarsh et al 2011), much of it dependent on knowledge acquired by individuals independently of tourism activities.

This paper will test how well leading carbon labels in current use actually comply with these various criteria for effectiveness, both from a theoretical perspective and in the perceptions of environmentally well informed tourists.

Methods

To conduct these tests, the use of carbon labels in tourism is treated as an exercise in persuasive communication (Bettinghaus and von Holt 1968). Factors outlined by van der Linden (2014), Whitmarsh et al. (2011) and Hall (2013) are condensed into four criteria which are necessary and sufficient for adequate communication, itself necessary for individual action based on such communication. Even if all these criteria are satisfied, that does not guarantee action if individuals do not care about their climate-change impacts, the dimension of affect listed by Steg and Vlek (2009). This factor varies greatly between individuals, and is beyond the scope of this study. Individuals who do care, however, can only take action based on carbon labels if those labels provide effective communication, the aspect against which carbon labels are tested in this study. In a second step, it is tested how well, in the perception of environmentally well-informed travellers, carbon labels in tourism perform. This second test uses traveller perceptions as data.

The four criteria address whether, and to what degree, tourists: (i) understand the information communicated; (ii) appreciate its significance; (iii) trust its reliability; and (iv) know what action to take in consequence. Comprehensibility is a function of clarity in the label itself. Energy-efficiency labels in Europe (EC 2013), for example, use green, yellow or red bars, readily comprehensible by consumers with limited knowledge of energy and emissions. These are preferable to ratings using letters such as A and A+, which may also be confused as quality labels (Oxera 2006). Significance requires that the label shows clearly how the product or service contributes to global warming, relative to an easily understandable reference point such as mean per capita GHG emissions, or to other comparable products. Difficulties arise if these reference points are not standardised between label schemes (Buckley 2002, 2009, 2011; Lee 2011; Six Senses 2009; Stawreberg and Wikström 2011). Carbon labels for airlines, for example, may consider only CO_2, all GHG as CO_2-equivalents, or equivalent effects including high-altitude release of short-lived GHG; and they may or may not consider load factors, differentials between seat classes, and the effects of freight (Lee et al. 2009).

Our data for the first test, of the label formats and contents, are derived from publicly available carbon labels throughout the tourism industry. Most major stakeholders in tourism, including airlines, cruise operators, car retailers and rental agencies, train operators, tour operators, travel agents, online reservation platforms, accommodation, restaurants, and offset providers, now provide information on GHG emissions and other environmentally relevant activities (Gössling et al. 2013). Over 50% of IATA members now provide information on their environmental initiatives, and 14.5% offer carbon offsets (Gössling et al. 2013). Many airlines, railways, and other businesses also offer carbon calculators (e.g. Finnair 2013, Deutsche Bahn 2013; Atmosfair 2013). Ecolabels are widespread in tourism (Buckley, 2002, 2012, 2013; Font & Buckley, 2001; Honey, 2002). For instance, of over 430 ecolabels listed by the worldwide Ecolabel Index (2014), 128 apply in tourism (Table 1). Programmes were examined to determine whether or not they include a stand-alone carbon/GHG label, or a carbon/GHG component in an integrated ecolabel. In a subsequent step, carbon labels in four major subsectors of the tourism industry, namely airlines, air travel online distribution and offsetting, car rental, accommodation and catering were identified based on a literature review and additional searches on the Internet. No carbon labels specific to cruise ships or railways were identified, though some corporations do publish data on carbon intensities and overall GHG emissions (e.g. TUI Cruises 2013; AIDA 2013; SJ 2013, Deutsche Bahn 2013). For each subsector carbon labels were screened against the four criteria outlined above, and examined with regard to shortcomings in relation to each criterion and hence to effective communication.

Data for the second test, the perception of environmentally well-informed travellers, was derived from a survey of customers of a special interest tour operator association, Forum Anders Reisen (2014). This is a German-language group whose title translates to “Alternative Travel Forum”. It is an association of ~100 small, environmentally aware German tour operators, providing information on the CO_2 emissions of different packages to their customers. It publishes an English-language set of membership criteria, which effectively also form a member code of practice (Forum Anders Reisen, 2014a). The survey was carried out from March to June 2013. It was announced through the Forum newsletter, with 6,000 subscribers, and its Facebook page, with over 2000. In addition to questions addressing perceptions of carbon labels and their impact on travel choices, the survey also included questions relating to respondent demographics, environmental awareness, attitudes to climate change and GHG emissions, and purchase of offsets. Questions were framed as dichotomous, 5-point Likert-scale, or open-text responses. The Forum was thus used to provide a database of environmentally well-informed travellers; and travellers were asked how they, individually, perceived the carbon label used by the Alternative Travel Forum (kg CO_2), and how another type of label based on a colour scheme was perceived in comparison. Questions examined how well travellers understood the information communicated by such labels, how significant they assessed it to be, how reliable they considered it to be, and to what degree they took action as a result.

Results: Carbon Label Content and Format

Of the 128 ecolabels applicable in tourism, 78 (61%) include components relevant to GHG mitigation, such as energy consumption or emission reductions (Table 1). The remainder consider only social or environmental issues unrelated to climate change. For the purpose of this paper, nine carbon label programs are presented, as airlines, air travel online distribution and offsetting organizations, car rentals, accommodation providers and catering currently use these. These are illustrated in Figures 1 to 9, summarised in Table 2, and represent the wider spectrum of approaches to carbon labelling.

Only one label showing carbon intensities of different flights was identified. British carrier Flybe (2013) uses a label comparing aircraft models and journey lengths (Figure 1). It provides colour-coded and numerical information on noise, kg NO_x and CO_2 released at take-off and landing, and emissions for 500 km, 1000 km and 1500 km flights. The non-profit carbon offset organisation Atmosfair (2013) ranks airlines in carbon efficiency classes on the basis of observed (actual) fuel use for identical city-pair connections (Figure 2). Depending on fuel use in comparison to the technically best possible standard, efficiency points are given, which determine the position of the airline by efficiency class (A to G) and in the comparative ranking. Labels provided by German tour operator association Forum Anders Reisen (2013) show kg CO_2-equivalent emissions (Figure 3), but do not show the units in the label itself. The label also offers to sell offsets. The example in Figure 3 shows a 15-day journey to the Seychelles, with emissions of 3,340 kg CO_2-equivalent offsettable for 76 Euro. The online airline distribution platform Direct Flights (2013) provides a Carbon Friendly Flight Search, which uses colour codes to show carbon intensity as an overlay on prices (Figure 4). No calculation details are provided. Similarly, the Responsible Tourism Partnership (2013) offers a CO_2-efficiency application known as Calasi, as an add-on to online booking platforms such as Cheaptickets, Orbitz, EBookers, Expedia, and Voyages-SNCF. It claims that data are from Brighter Planet (2013) and based on recommendations of the Intergovernmental Panel on Climate Change, governments and airlines, i.e. using “Greenhouse Gas Protocol Scope 3, ISO 14064-1 and the Climate Registry standards”.

A number of car rental companies provide information on emission intensities, generally through color codes (Figure 5). In the European Union, car retailers are legally obliged to publish data on the emission intensities of different car models (European Parliament 1999). Formats, however, are inconsistent (World Energy Council 2013). The fuel economy label is now also in used in other countries in the world, and illustrated in Figure 6 for Brazil. It uses a color code and numerical data on CO_2 emissions per km. A comparable scheme in Australia uses green stars (Figure 7).

Accommodation providers have adopted a variety of carbon labeling systems (de Grosbois and Fennell 2011; Gössling 2010). Hotel association Viabono (2013) provides colour codes (Figure 8), and numerical data on CO_2 emissions per guest night. It lists specific emissions from operational subsectors such as mobility, building, food and beverages, print materials, and cleaning, and refers to a calculation method developed by CO_2OL (2013), however, without providing further details. Hotel chain Fuerte Hoteles (2013) also provides information on kg CO_2 emissions per guest night, but with no information on calculation (Figure 8). In the catering subsector, only one corporation providing carbon labels was found, the fast-food chain Max Burgers (2013). The label (Figure 9) shows emissions in kg CO_2-equivalent (kg CO_2-e), covering energy use in restaurants, transport, packaging and foodstuffs, and considering CO_2, CH_4, and N_2O, based on the greenhouse emission calculation standard ISO14.065 (Max Burgers 2013). The company also claims to purchase carbon compensation for its products, based on tree planting in Uganda (Figure 9). According to Max Burgers, ~15% of meal choices are low-carbon (Gössling 2010).

Several consistent patterns emerge from these cases. Most labels incorporate factual knowledge. The principal numerical indicator is kg CO_2 or CO_2-e, per person or per unit distance or consumption. Rankings and colour-coded infographics are commonplace. Bases for calculation, and hence reliability, are not shown on labels themselves, but only in background documents if at all. Available background documentation indicates a wide range of calculation standard. Different labels require different degrees of carbon literacy. Many labels incorporate procedural knowledge, expressed as relative climate sustainability. None of the labels considered here incorporates effectiveness knowledge, such as fuel savings achieved through choice of car model, or emissions 'saved' through a particular air transport choice.

A number of carbon labels offer linked offset sales. Their credibility depends on the technical offset measures adopted, reliability and precision of calculations, inclusion of all relevant GHG, additionality, baseline calculations, leakage, and verification and certification (Strasdas et al. 2010). Take-up of offsets is low, 1-2% for international flights and 5-10% for European domestic flights (Gössling et al. 2009; Lu and Shon, 2012; Mair, 2011; McKercher et al., 2010). Travellers purchasing offsets may also travel more, a rebound effect (Eijgelaar and de Kinderen 2014). This indicates a potential for carbon offsetting as part of carbon labelling, though a far greater effort needs to be made to address the readability of carbon labels and the credibility of offsets.

These results may thus be summarised as follows. There are at least 431 ecolabel schemes worldwide, of which 128 (29%) apply in tourism. This is a high proportion, relative to the economic scale of the sector. Of the 128 tourism ecolabel programs, 78 (61%) include a carbon or GHG component. This indicates widespread though not universal recognition, at least amongst ecolabel providers, that the contributions of tourism to climate change are a major component of the sector's overall environmental footprint. Within these 78 tourism carbon labels, only a small proportion even begin to approach basic good practice in persuasive communication, and we examine 9 of those in detail, across four tourism subsectors. For those 9, the main parameter used is kg-CO_2 or kg-CO_2-e per unit of consumption, either goods or services. This provides basic factual information. Few, however, distinguish clearly the precise parameter presented, e.g. whether it is kg-CO_2 or kg-CO_2-e, and for what unit of production, such as passenger-km.

Few labels express the significance of factual data on CO_2 emissions, eg relative to widely applicable benchmarks such as mean annual *per capita* kg-CO_2-e emissions, or relative to kg-CO_2-e emissions from comparable alternative product choices. Very few provide adequate information on the basis for calculation which would allow consumers to assess reliability. None provide information on the climate-change outcomes from choosing the carbon-labelled product. Many, however, use the carbon label as a lead to sell carbon offsets, with the strong implication that purchasing an offset is the appropriate individual response to the knowledge purportedly provided in the label. From a communications perspective, therefore, it would appear that carbon labels in tourism do not allow for informed choices by individual consumers. Rather, they are used as generic marketing tools, particularly to sell offsets as add-on purchases. Overall, therefore, if carbon labels in tourism are indeed intended to inform travellers, then from a communications perspective they could be improved greatly; but it remains possible that this is not their real goal.

Results: Perceptions of Environmentally Well-Informed Travellers

A total of 251 respondents answered the questionnaire, 61% female. Respondents were aged 22-74 years and on average took 2.3 journeys annually where they spent at least 5 nights spent at the destination. Over 75% of respondents considered themselves to be 'environmentally aware' or 'very environmentally aware'. Over 80% considered mitigating climate change as either 'important' or 'very important', and 79% 'agreed' or 'strongly agreed' that in order to achieve this, anthropogenic GHG emissions had to be reduced. Yet, only 45% felt themselves to be 'well informed' or 'very well informed' about CO_2 as a greenhouse gas, and only 57% felt that it was 'important' or 'very important' to compensate travel emissions. Only 17% claimed to have offset GHG emissions during their most recent holiday travel, though 47% supported the idea of mandatory compensation, i.e. the price for offsetting to be included in all journeys. In comparison, only 14% strongly opposed this suggestion.

Results also indicate that 27% considered 'kg CO_2' as an 'intelligible' indicator, while 34% suggested that it was an 'unintelligible' or even 'extremely unintelligible' measure of climate impact. Only 14% said that this indicator was relevant to their holiday choice, while 26% said that it had no importance at all. Another 23% considered the indicator as too abstract, or lacking the opportunity for comparison. For example, one respondent asked "What is the meaning of 650 kg CO_2? Is that a lot, very little, is it good or bad?" In contrast, 11% acknowledged that kg CO_2 values do shed light on emissions intensities, and another 6% suggested that the values raised awareness. Only 5% believed, however, that the indicator helped decision-making.

Respondents were also asked to consider an alternative colour-coded carbon label for a Dutch tour operator, originally developed by Eijgelaar and Peeters (2011), though not currently operational (Figure 10). Approval rates for this label were considerably higher. Overall, 60% suggested that the concept was either "good", "easy to understand" or "well-known" owing to its similarity with the EU label for white appliances. One respondent commented: "Very good! I have seen such a 'traffic light' label before, in the context of white appliances. Efficient and easy to understand." Only 13% considered the label of little help in assessing the impact of the journey. For example, one respondent said that it was "Maybe a little more enlightening than just CO_2. Still, I am not convinced. I am missing additional information. I mean, what is this really telling me?"

Only 2% of respondents said that carbon labels exercise a strong influence on their travel decisions. An additional 26% said that labels had ‘some’ influence, 10% would rethink holiday choices, and 11% would chose ‘greener’ alternatives if this were an option. As one respondent stated: “If different holiday types were made comparable, such a label would influence my decision making.” A substantial proportion of respondents, however (15%), were adamant that carbon labelling “has absolutely no influence on my decision ... Such a label would rather scare me off to book my holiday travel with this tour operator, because I would think they try to make me feel guilty about travelling.”

These results may be summarised as follows. For a self-selected sample of environmentally well-informed travellers, there was general agreement that climate change impacts should be an important consideration in tourism purchases, and that carbon labels could be valuable in making such choices. There was a proportion of travellers, however, even amongst this environmentally concerned respondent group, who were generally opposed to carbon labels and specifically denied that they would consider them in making travel purchases. There was a general view that even well-informed travellers are insufficiently literate, in their own perception, on the technical aspects of carbon emissions. There was general agreement that carbon labels are more likely to be used by travellers if they adopt simple colour-coded traffic-light infographics. There was also general agreement that a simulated label developed using persuasive-communication principles was more likely to influence decisions, than actual labels currently in use. Overall, therefore, there appears to be: a significant demand for well-communicated carbon labels in tourism; a perception both that current labels fail to satisfy this criterion; and concern that because of low carbon literacy, an effective label would need use a very simple presentation.

Conclusions

Ecolabels and ecocertification are now widespread in many industry sectors, but their impacts on consumer choices remain controversial. Positive perceptions are widely reported, albeit with low carbon literacy and limited effects on actual consumption (Corner and Randall 2011, Howell 2013, Hartikainen et al. 2014; Lin and Huang 2012; van Birgelen et al. 2009; Lee et al. 2010; Steinhart et al. 2013; Heinzle and Wüstenhagen 2012; Upham et al. 2011). Shortcomings, however, are also widely reported (Belton et al 2010; Bonroy & Constantos 2008; Buckley 2002, 2012, 2013 a,b; Cressey 2013; Edwards et al 2011; Mason 2011; Nunez 2007; Treves and Jones 2010). In addition, it is possible that consumers may prefer ecolabelled products not because of environmental concern, but because they confuse ecolabels as quality labels (Oxera, 2006) or perceive ecolabels as being correlated with quality parameters and hence use them as surrogate measures (Heinzle and Wüstenhagen 2012). In tourism, for example, carbon labels may indicate newer aircraft fleets.

Our findings here are that: few carbon labels in tourism have adopted best practice in persuasive communication; even leading labels suffer significant shortcomings in this regard; at least some travellers are keen to use carbon labels; but tourists lack carbon literacy and find current carbon labels uninformative and unpersuasive. It would therefore be useful to conduct further research on consumer responses to carbon labels that do indeed adopt improved communications practices. An experimental psychology approach (Sparks et al. 2013) could be used to manipulate aspects related to factual information, significance, reliability and effectiveness; or to compare different presentations such numbers or symbols, or stars, bars or traffic lights. Similar approaches could be used to test the degree to which consumers confuse environmental and quality labels, and the degree to which they may use ecolabels as quality surrogates.

We may also anticipate that carbon literacy will continue to improve as climate change impacts become more severe, and governments introduce more widespread policy measures such as carbon taxes and trading systems, or carbon labelling on consumer goods. Currently, carbon labels in tourism can escape consumer critique even if they are poorly presented and unreliable, since few consumers have the interest or expertise to identify their shortcomings. In future, however, we may see consumer demand for government regulation of carbon labelling in tourism so as to provide some standards or external accreditation and audit for third-party certification programs (Cohen and Vandenbergh 2012). This has happened for other forms of consumer certification (Buckley 2013a, Cressey 2013). From a practical perspective, therefore, it would be valuable to design and test best-practice carbon labels for the tourism sector, so that appropriate technical models are available when this social demand appears. Evidence from both tourism and other sectors indicates that ecolabels alone are not an adequate basis for effective environmental policy; but that in combination with legislative and economic measures, suasive communication can be a valuable policy tool. Therefore, it is worthwhile investing effort to make sure that carbon labels in tourism communicate clean-production information more effectively.

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Table 1. Tourism ecolabels

Label/Certification	Tourism*
1. 100 % Energie Verde, Italy	
2. Audubon Green Leaf Eco-Rating Program, North America	(M)
3. Austrian Ecolabel for Tourism	(M)
4. Bayerisches Umweltsiegel für das Gastgewerbe, Germany	(M)
5. BioHotels (ehc-Zertifizierung), Europe	(M)
6. BIO Hotels, Europe	
7. Blaue Schwalbe, Europe	(M)
8. Blue Flag, international	
9. Brazilian Sustainable Tourism Standard	
10. Calidad Galapagos, Galapagos	
11. California Green Lodging Program, USA	(M)
12. Certification for Sustainable Tourism (CST), Costa Rica	
13. Chouette Nature, France	
14. Clean Tourism Certificate, Poland	
15. Climate Action Certification Program (CACP), Australia	(M)

16. Connecticut Green Lodging Certification Program, USA	(M)
17. CSR-Tourism, Europe	(M)
18. David Bellamy Conservation Award, Great Britain	(M)
19. Delaware Green Lodging, USA	(M)
20. Discover Eco-Romania, Romania	(M)
21. EarthCheck, international	(M)
22. ECEAT Quality Label, Europe	(M)
23. eco awards Namibia	(M)
24. ECO certification, Malta	(M)
25. ECOCAMPING, Europe	(M)
26. ECObiz Queensland, Australia	(M)
27. ECO certification, Malta	(M)
28. Ecogite, France	(M)
29. eco hotels certified, Austria	(M)
30. Eco Hotels Certified, Europa	(M)
31. Eco-label "Donana 21", Spain	
32. EcoLabel Lu embourg	(M)
33. Ecolodge Japan	(M)
34. Eco-Friendly STAR Accreditation, Australia	
35. Ecotel, international	(M)
36. Ecotourism, Australia	(M)
37. Ecotourism Kenya's Eco-rating scheme	
38. Ecotourism Label, Ireland	
39. Ecotourism Norway	
40. EIFEL - Qualität ist unsere Natur, Germany	
41. EKOenergy, international	
42. EMAS, Europe	
43. Emblem of Guarantee of Environmental Quality, Spain	
44. Encouraging Conservation in Oklahoma, USA	(M)
45. EnerGuide for Appliances, Canada	
46. Energy Labelling of Buildings: EU	(M)
47. ENERGY STAR®, international	
48. Enviro-Mark®, international	
49. Estonian Ecotourism Quality Label	
50. European Ecolabel for tourist accommodation services and camp site services	(M)
51. European Ecotourism Labelling Standard (EETLS)	(M)
52. European charter for sustainable tourism in protected areas	
53. Fair Trade in Tourism South Africa	(M)
54. Florida Green Lodging Program, USA	(M)
55. Gîtes or Guest Rooms "Panda", Belgium	
56. Gites Panda, France	
57. GREAT Green Deal Guatemala	
58. Green Business Certified, USA	(M)
59. Green Certificate: Latvia	
60. Green-e Energy, USA, Canada	(M)
61. Green-e Marketplace, USA, Canada	(M)
62. Green Flag Award, United Kingdom	
63. Green Globe Certification, international	(M)
64. Green Hospitality Award, Ireland	(M)
65. Green Key, international	(M)

66. Green Key Eco-Rating Program, international	(M)
67. Green Leaf Business Scheme, United Kingdom	(M)
68. Green Leaf Environmental Standard, South Africa	(M)
69. Green Leaf Foundation, Thailand	(M)
70. Green Lodging Michigan, USA	
71. Green Power Australia	(M)
72. Green Restaurant, USA	(M)
73. Green Seal, USA	(M)
74. Green Star Hotel, Egypt	
75. Green Stay South Africa	(M)
76. Green Suitcase rating system, international	(M)
77. Green Tourism Business Scheme, UK & Ireland	(M)
78. Green Business Program, Hawaii	(M)
79. Heritage Environmental Rating Programme, international	
80. International Eco Certification Program	
81. ISO 14000, international	
82. Leadership in Energy and Environmental Design (LEED) for Hospitality, USA	(M)
83. Legambiente Turismo, Italy	(M)
84. Maine Green Lodging Certification Program, USA	(M)
85. Maryland Green Travel Program, USA	(M)
86. MINERGIE, international	
87. Missouri Certified Green, USA	
88. National Tourism Accreditation Framework NTAF, Australia	
89. Naturemade, Switzerland	
90. Nature's Best Ecotourism, Sweden	(M)
91. New Hampshire Sustainable Lodging and Restaurant Program, USA	(M)
92. Nordic Swan for hotels and youth hostels, Europe	(M)
93. Normas de Turismo Sostenible, Colombia	
94. OK Power, Germany	(M)
95. Oregon Bed and Breakfast Guild Green Certification Program, USA	
96. ÖKOPROFIT, international	(M)
97. PAN PARKS Initiative, Europe	
98. Partnership for a Sustainable Georgia	(M)
99. Peak District Environmental Quality Mark, United Kingdom	(M)
100. Programa Nacional de Auditoría Ambiental (PNAA), Mexico	
101. Prüfzeichen Schorfheide-Chorin, Germany	
102. PUG audit (TOFTigers), India,United Kingdom	
103. Q certification Tourism, Spain	
104. Qualitäts- und Umweltsiegel für den Kanutourismus, Germany	
105. Qualmark, New Zealand	(M)
106. Rainforest Alliance Certified, international	(M)
107. RECS International Quality Standard, Europe	(M)
108. Respecting our Culture (ROC), Australia	(M)
109. Responsible Tourism System - Biosphere Hotels, international	(M)
110. Rhode Island Hospitality Green Certification for the Hospitality and Tourism Industry, USA	(M)
111. SmartVoyager, Ecuador, Colombia, Honduras, Chile	(M)
112. South Carolina Green Hospitality Alliance, USA	(M)
113. South Luangwa Eco Awards, Zambia	
114. Stay Green Illinois, USA	(M)

115. Steinbock, Switzerland	
116. Sustainable Tourism Eco-Certification Program STEP, USA	(M)
117. Sustainable Tourism Education Program (STEP), international	(M)
118. Sustainable Tourism Standards, Mexico	
119. Tourisme Responsable, France	
120. Travel Green Wisconsin, USA	(M)
121. Travelife Awards, international	(M)
122. TÜV SÜD Mark EE01/EE02, Germany	
123. Umweltgütesiegel auf Alpenvereinshütten, Alps; Italy, Germany, Austria,	(M)
124. UNESCO World Heritage, international	
125. Vermont Green Hotels, USA	(M)
126. Viabono, Germany	(M)
127. Virginia Green, USA	(M)
128. WindMade, international	

* (M) Mitigation: label considers element of energy saving or avoided greenhouse gas emissions.

Table 2: Comprehensibility and knowledge domains for leading carbon labels in tourism

Tourism subsector	Information	Degree of carbon literacy required*	Knowledge domain covered**
1. Aviation – Flybe ecolabel	kg CO_2 per flight, per seat Colour scheme	High	F
2. Aviation - Atmosfair Airline Index	Ranking based on efficiency	Low	F, P
3. EU - carbon label for cars (version used in Brazil)	kg CO_2 per km, fuel use Colour scheme	Low	F, P
4. Car rental - Europcar	kg CO_2 per km Colour scheme	Low	F, P
5. Car rental – Drive now	Star-based ranking	Low	P
6. Tour operator - Forum anders reisen	kg CO_2 per journey	Medium	F
7. Online distribution – Direct Flights	Colour scheme Numeric ranking	Low	P
8. Hotel – Viabono	kg CO_2 per guest night Colour scheme	Low	F, P
9. Hotel – Fuerte Hoteles	kg CO_2 per guest night	Medium	F, P
10. Restaurants – Max Hamburgers	kg CO_2–equivalent per meal	Medium-High	F, P

* referring to the understandability of the carbon label; to understand the method used for calculation would in virtually all cases require a high carbon literacy.

**factual (F), procedural (P) and effectiveness (E) knowledge

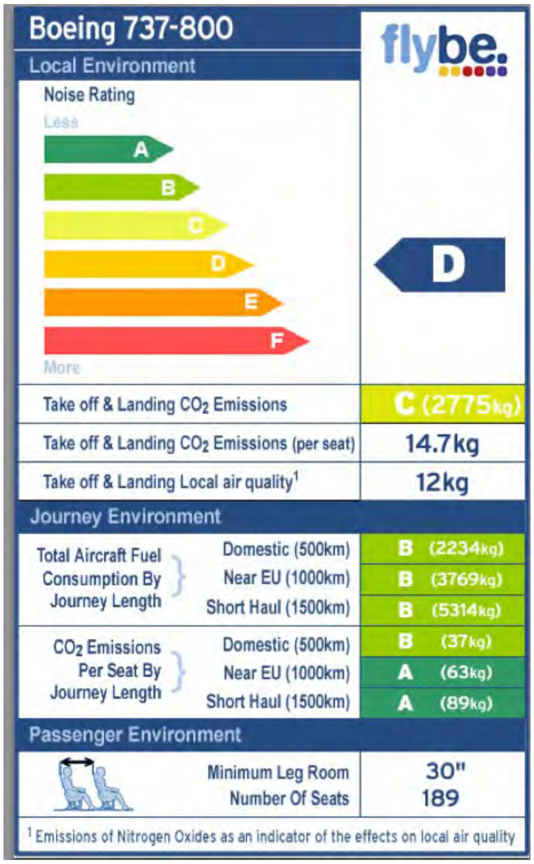


Figure 1: Flybe ecolabel. Source: Flybe 2013

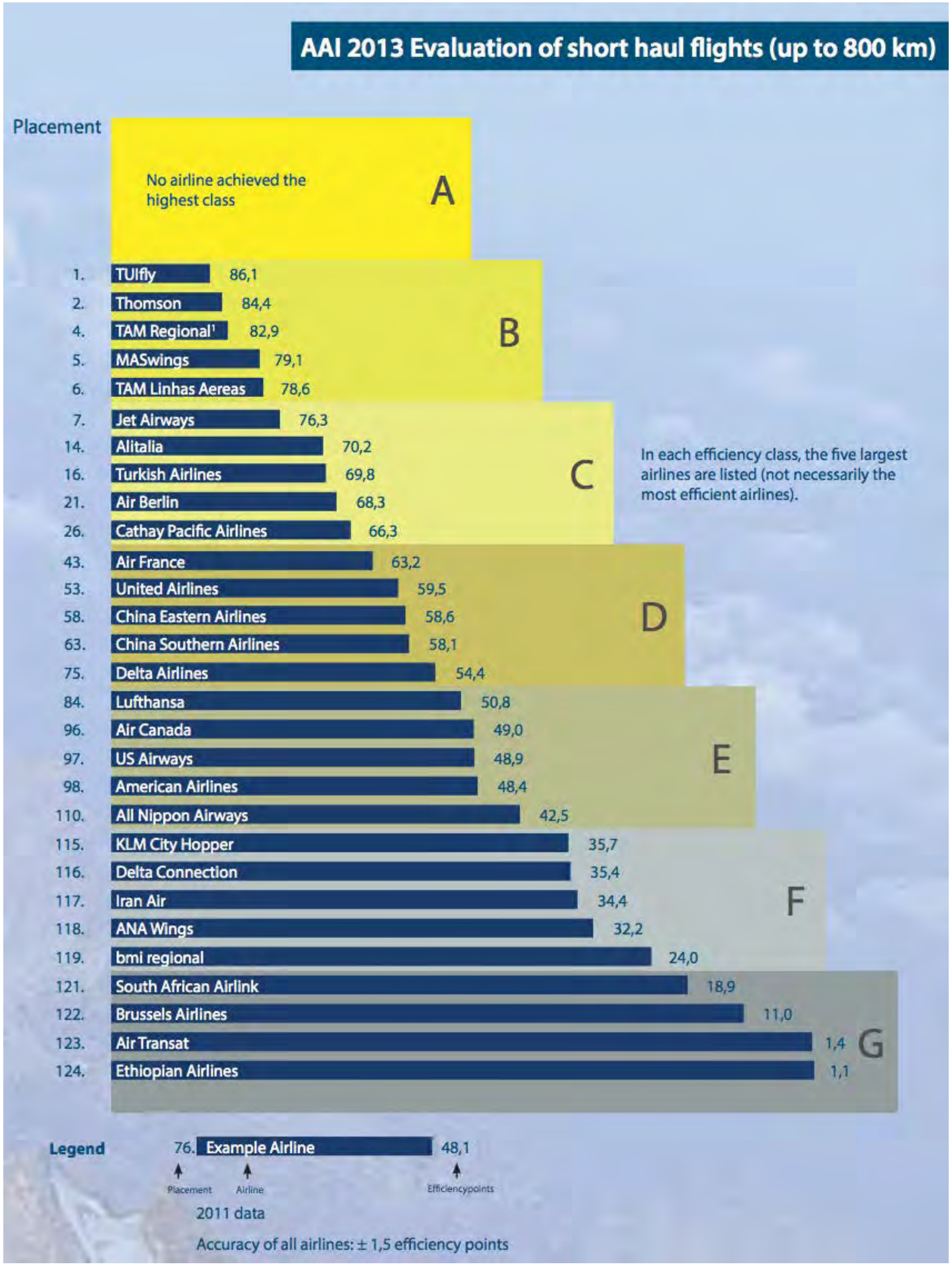


Figure 2: Atmosfair Airline Index. Source: atmosfair (2013).

Figure 3: Tour operator information on journey-specific emissions. Source: forum anders reisen 2012

Airlines	Carbon Rating	Airline Direct	Netflights.com	BudgetAir.co.uk	lastminute.com	Carlton Leisure	opodo	traveasy
AIR FRANCE	7	£1238	-	£1062	£1220	£1098	-	-
KLM	7	£1226	£1206	£1062	£1068	£1086	£1065	-
BRITISH AIRWAYS	5	£1269	£1321	cheapest £858 flight	£1273	£1177	£1196	-
Lufthansa	6		£914	£917	£1112	£910	£928	£919
SWISS	N/A		£930	£932	£1285	£930	£928	-
ANA	4		£1313	£1172	£1241	£1323	£982	-
JAL	9		£1177	£1181	£1181	£1320	£1097	-
Alitalia	6		£1157	£1032	-	£1103	£1102	-
virgin atlantic	4		greenest £901 flight	£906	-	£1833	£1328	-
CITYJET	N/A		-	-	-	-	-	-
KOREAN AIR	5		£1273	£1272	-	£1273	£1272	-
ASIANA AIRLINES	5		-	£1391	-	£1280	£1294	-
AEROFLOT	5		-	-	-	£1662	£1599	-
FINNAIR	1		-	-	-	-	£1014	-
THAI	5		-	£1416	-	-	-	-
TURKISH AIRLINES	5		-	-	-	£1593	-	-
Emirates	8		-	£1145	-	-	-	-
AIR CHINA	7		-	-	-	£1669	-	-

Figure 4: Global distribution systems (air travel). Source: Direct Flights (2013)

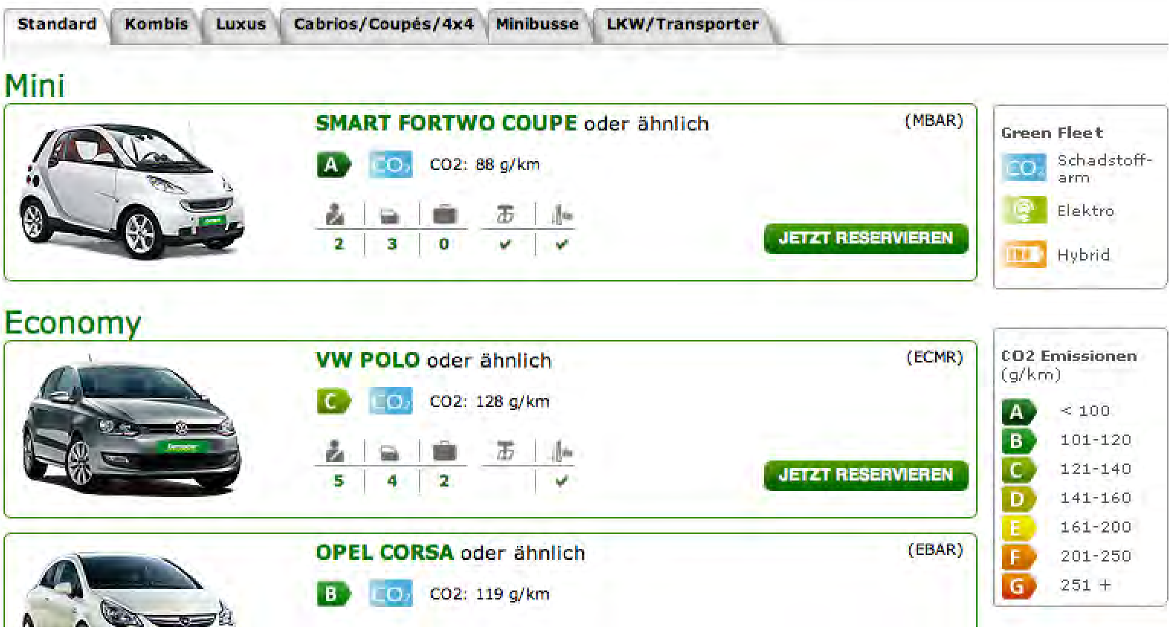


Figure 5: Emission intensities for different rental car choices. Source: Europcar 2013

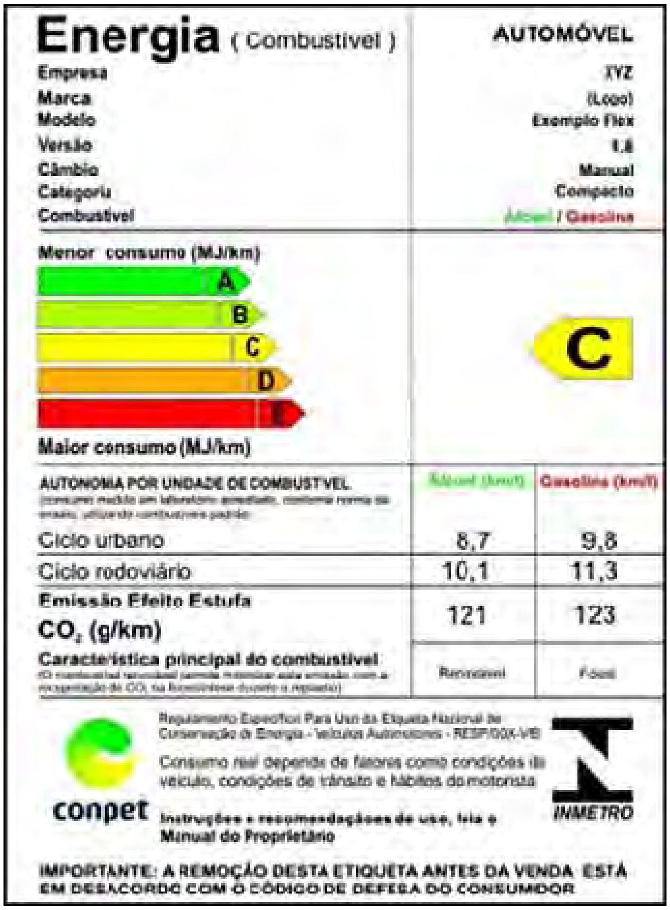
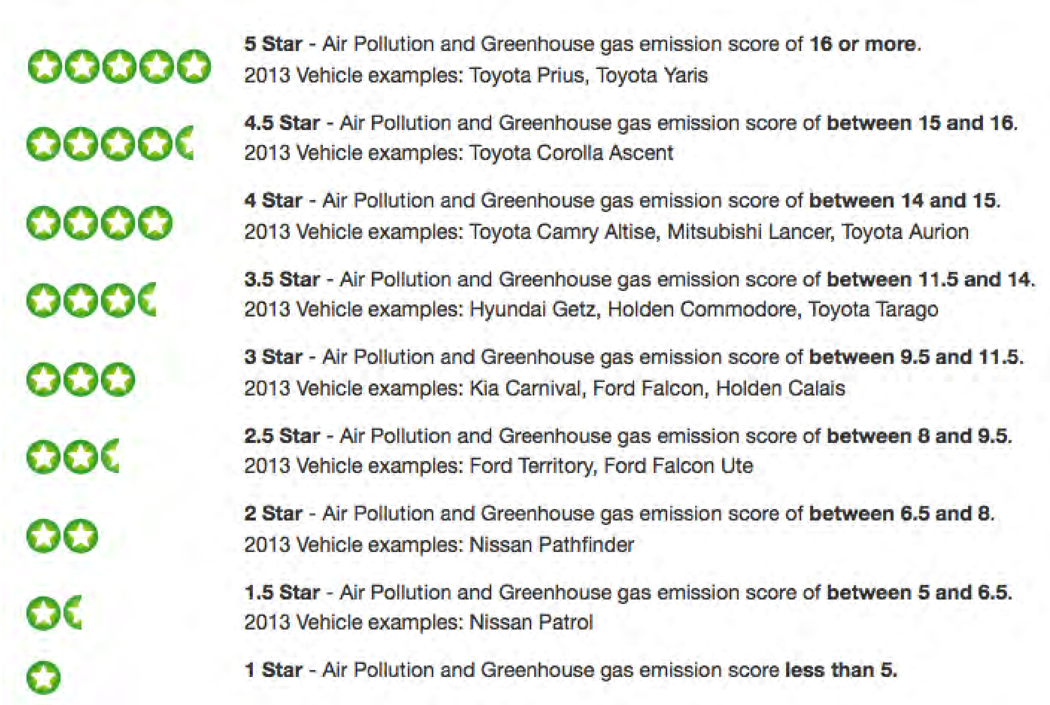


Figure 6: Information on emission intensities of cars (Brazil)
Source: UNEP 2013



5 Star - Air Pollution and Greenhouse gas emission score of **16 or more**.
2013 Vehicle examples: Toyota Prius, Toyota Yaris

4.5 Star - Air Pollution and Greenhouse gas emission score of **between 15 and 16**.
2013 Vehicle examples: Toyota Corolla Ascent

4 Star - Air Pollution and Greenhouse gas emission score of **between 14 and 15**.
2013 Vehicle examples: Toyota Camry Altise, Mitsubishi Lancer, Toyota Aurion

3.5 Star - Air Pollution and Greenhouse gas emission score of **between 11.5 and 14**.
2013 Vehicle examples: Hyundai Getz, Holden Commodore, Toyota Tarago

3 Star - Air Pollution and Greenhouse gas emission score of **between 9.5 and 11.5**.
2013 Vehicle examples: Kia Carnival, Ford Falcon, Holden Calais

2.5 Star - Air Pollution and Greenhouse gas emission score of **between 8 and 9.5**.
2013 Vehicle examples: Ford Territory, Ford Falcon Ute

2 Star - Air Pollution and Greenhouse gas emission score of **between 6.5 and 8**.
2013 Vehicle examples: Nissan Pathfinder

1.5 Star - Air Pollution and Greenhouse gas emission score of **between 5 and 6.5**.
2013 Vehicle examples: Nissan Patrol

1 Star - Air Pollution and Greenhouse gas emission score **less than 5.**

Figure 7: Car efficiency star rating system, Australia. Source: Drive now (2013)

Figure 8: Carbon labelling in hotels, Viabono (left) and Fuerte Hoteles (right)
Source: Viabono (2013); Fuerte Hoteles (2013)

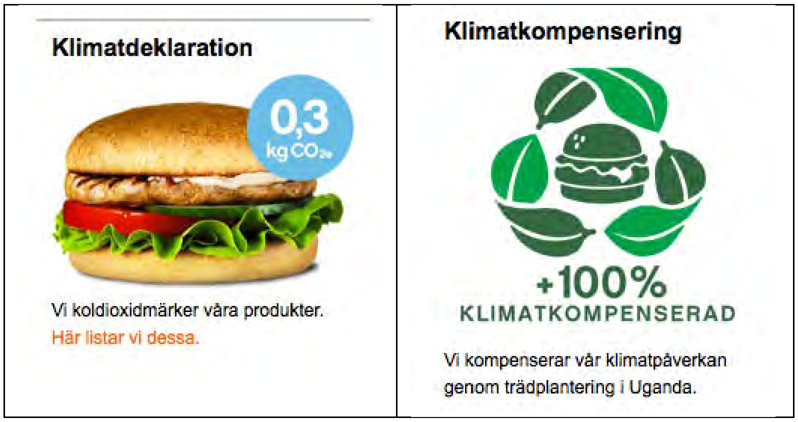


Figure 9: Carbon labelling of food
Source: Max Burgers 2013

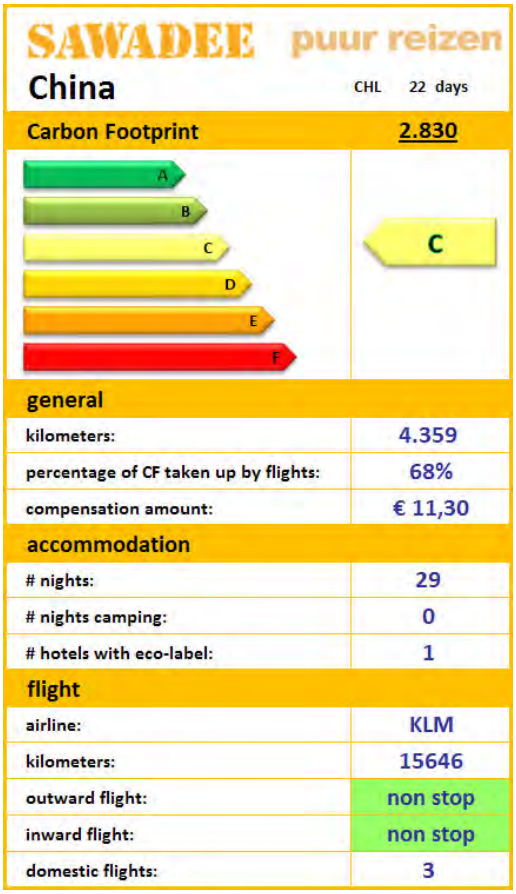


Figure 10: Suggestion for an alternative combined carbon label.
Source: Eijgelaar and Peeters 2011