

Practitioner Paper

Understanding the impact of climate change of Scottish tourism

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Reviewed paper

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ABSTRACT

KEYWORDS: adaptation strategies, climate change, Scotland, tourism

Scottish tourism is forecasted to grow by 50 per cent over the next 10 years but one of the factors that may hinder or facilitate that growth is climatic change. Indeed, many people are now starting to question the impact of such significant growth on the planet. Therefore, this paper assesses the impact of climate change on Scottish tourism in

order that policy makers can separate the facts from the myths. The dimensions of climate change such as CO₂ emissions, temperature, rainfall, storms, and wind speed are discussed and the implications for Scottish tourism are mapped. Those implications may include the introduction of CO₂ allowances for all travellers, more wind farms in rural locations impacting on film tourism or the grouse species disappearing from Scotland. The paper concludes with a number of adaptation strategies that Scottish tourism agencies and business could adopt to mitigate climate change. The importance of this paper lies in understanding how climate change could impact upon a specific destination, in this case Scotland, and in providing a micro analysis of that impact.

SCOTTISH TOURISM

Dramatic landscapes and fantastic scenery are often quoted by visitors as one of the main reasons for visitation.¹ Tourism has flourished in Scotland since Victorian times and it is an industry that is forecasted to grow by 50 per cent over the next 10 years. One of the factors that may hinder or facilitate that growth is climatic change. Therefore, the purpose of this paper is to make an assessment of how climatic change could impact on Scottish tourism.

Globally, tourism is the world's largest industry and, according to the World Tourism Organisation,² it is forecasted to grow



1 from 565 million international arrivals in
 2 1995 to 1561 million by 2020. Many people
 3 are now starting to question that growth³
 4 due to the impact of such growth on the
 5 planet. For example, international aviation
 6 has made a significant impact on world CO₂
 7 emissions. In fact, it is the fastest growing
 8 contributor.⁴ Rising temperatures impact on
 9 the ecology of species such as the grouse in
 10 the Scottish Highlands and coastal erosion
 11 could reshape Scotland's 'links' golf courses.
 12 Further-a-field, the snow in the Alpine
 13 mountains is melting and this is threatening
 14 the economic variability of the ski industry
 15 in Switzerland. Some would say that the
 16 over-development of golf courses in Spain is
 17 unsustainable due to water shortages. Dramatic
 18 weather has a big, disruptive effect on
 19 destinations, with cities like New Orleans
 20 becoming uninhabitable and offering no
 21 viable tourism product in the near future.
 22 Climate change impacts upon everyone and
 23 no one can escape. Therefore, it is important
 24 to understand it and develop appropriate
 25 adaptive strategies.

26 VisitScotland is the national tourism or-
 27 ganization for Scotland, primarily responsible
 28 for marketing Scotland as a destination. The
 29 agency is also the Scottish Executive's (Gov-
 30 ernment) principal advisor on policy matters
 31 relating to tourism. VisitScotland has the
 32 ambition to be the best national tourism
 33 organization in the world. In order to reach
 34 this goal, it is committed to futures thinking
 35 and part of this future orientation is to con-
 36 sider the impact of climatic change on Scot-
 37 tish tourism.

38 CLIMATE CHANGE IN CONTEXT

39 The IPCC Third Assessment Report⁵ out-
 40 lines the potential evidence on climate
 41 change. It presents an increasing body of
 42 observations that show a warming world and
 43 changes in global and regional climate sys-
 44 tems. The UK Climate Impacts Programme
 45 (UKCIP) outlines a number of scenarios up
 46 to 2100 from low to high emissions. The
 47 general consensus among experts is that
 48 Scotland will have warmer, wetter and clou-
 49 drier winters, and warmer, drier summers.

1 But how will this impact upon Scottish tour-
 2 ism at a more micro level? For example,
 3 climate change and a resulting new climate
 4 will change the bioersity relationship in
 5 Scotland. This may mean the introduction of
 6 new bird species or even the possible ration-
 7 ing of air travel. Climate change is a complex
 8 subject that will change business practices
 9 and markets. But dealing with complexity
 10 means that we must understand the degree
 11 of impact and separating fact from myth.

12 MAPPING CLIMATE SCENARIOS TO 13 ORGANIZATION: KEY IMPACTS

14 In order to understand this impact, this paper
 15 draws upon the research led by AEA Tech-
 16 nologies⁶ who, as part of a wider public
 17 sector study, examined the impact of climate
 18 change on Scottish tourism and explored
 19 what adaptive strategies VisitScotland, the
 20 national tourism agency for Scotland, should
 21 adopt to mitigate climate change.

22 As a starting point, AEA Technologies
 23 undertook a mapping exercise to measure/
 24 assess such change. Table 1 summarises that
 25 impact. The research by AEA Technologies
 26 also provides the reader with a comprehen-
 27 sive review of the literature on climate
 28 change.

29 Based on this review material, the poten-
 30 tial effects identified include:

- 31 1. CO₂ targets could impact upon the eco-
 32 nomic growth of Scottish tourism:
 - 33 • The UK government and Scottish Ex-
 34 ecutive have short- and long-term goals
 35 of reducing greenhouse gas emissions.
 36 These include a legally binding reduction
 37 target under the Kyoto Protocol of a 12.5
 38 per cent reduction by 2012.
 - 39 • The EUs aviation industry is growing at
 40 7.7 per cent per annum and is the fastest
 41 growing sector that contributes to CO₂
 42 emissions – especially aircraft flying at
 43 high altitude. Aviation passengers do not
 44 pay the full social costs of CO₂ emissions,
 45 therefore we may see the introduction of
 46 VAT on air travel and fuel. However,
 47 such measures are seen as ineffective in

Table 1: Outline Assessment of the Impact of Climatic Change on Scottish Tourism

<i>Weather Scenario</i>	<i>Importance</i>
<p><i>CO₂ Emissions</i></p> <ul style="list-style-type: none"> Increased CO₂ emissions, predominately from aviation travel driven by Scotland's popularity as a tourism destination. Landscapes filled with wind farms in order to achieve Kyoto targets. 	<p><i>High (negative)</i></p> <p>Detrimental impact on Scotland's international markets and south east of England/London, due to the introduction of carbon taxes, rationing of air travel and consumer resistance to aviation travel. Car travel becomes expensive. Scotland no longer used as a rural film location as wind farms blot the landscape.</p> <p><i>Medium (positive)</i></p> <p>Scotland perceived as a sustainable and eco friendly destination that is carbon neutral. Integrated public transport, green tourism and consumer behaviour drives sustainability.</p>
<p><i>Temperature</i></p> <ul style="list-style-type: none"> Includes warmer summertime and warmer winter time temperatures. Summer heat waves. 	<p><i>High (positive)</i></p> <p>Medium dependency ratio between bed occupancy and the weather. High correlation between day trippers and the weather. Benefits in potential tourism products and destinations, not least from higher average temperatures, and spring/summer dryness that will extend the season for many activities. Reduction in snow and ice. Increased rates of day-tripping, perhaps also improvements in the balance of in-bound and out-bound tourists.</p> <p><i>High (negative)</i></p> <p>Detrimental impacts on the Scottish skiing industry, because of predicted warmer winters and less snowfall.</p>
<p><i>Rainfall – Average Precipitation</i></p> <ul style="list-style-type: none"> The predicted increase in rainfall during the winter. The predicted decrease in rainfall during the summer months which, allied to higher average temperatures, is expected to give rise to significantly reduced soil moisture. 	<p><i>Medium– Low (negative)</i></p> <p>Detrimental effects on tourism in winter months.</p>
<p><i>Rainfall – Frequency and Severity</i></p> <ul style="list-style-type: none"> The predicted increase in rainfall during the winter months and the potential for more intense and concentrated periods of rainfall at other times 	<p><i>Medium– Low (negative)</i></p> <p>Detrimental effects on tourism in winter as visitors are less inclined to brave the weather and visit tourist attractions. Unlikely to put winter visitors off from choosing Scotland as a location for a winter break as Scottish winters are not renowned for their clemency today. Secondary effects from floods – future disruptions are likely to sporting events and other activities.</p>
<p><i>Storms – Frequency and Severity</i></p>	<p><i>Medium– Low (negative)</i></p> <p>Detrimental effects on tourism. Access issues for islands. May also impact on winter car-touring.</p>
<p><i>Wind Speed</i></p>	<p><i>Low</i></p> <p>May impact on the timetables of inter-island ferries.</p>

(continued)

Table 1: (continued)

<i>Weather Scenario</i>	<i>Importance</i>
<i>Other (humidity, fog, insulation)</i>	<i>Low</i> Some possible impacts via visibility.
<i>Soil Moisture/Vegetation</i>	<i>High (negative)</i> Loss of some ecosystems, in the longer term, that could have important impacts on reducing the tourism products offered in some areas, e.g. reduction in scenic beauty in Scotland's most distinctive landscapes (e.g. in the highlands, mountains, heather moors and coasts).
<i>Sea Level Rise</i>	<i>Medium – High</i> Impacts likely to be localised in vulnerable areas such as estuaries. Low-lying firths where there are no protective sea defences may be vulnerable to loss of salt marsh and mudflats. Increased flooding risk in coastal areas is anticipated, both as a result of the average sea level rise and, potentially, due to changed or more extreme storm conditions. The increase in average sea level alone is expected to reduce the return period of given coastal flood events. Climate change could also lead to greater wave heights and more frequent storm and tidal surges.

- 1 changing behaviour and are seen as a
2 means of raising taxes. Higher fuel duties
3 on road transport have not impacted on
4 car usage.
- 5 ● In Germany, policy is driving a shift from
6 short haul budget air travel to rail as the
7 government has restricted landing slots at
8 airports in favour of international long
9 haul traffic. Such a policy in the UK
10 would curtail growth from inbound mar-
11 kets from London/South East of England
12 for city based tourism.
- 13 ● The government could curtail airport
14 expansion as a means to reduce CO₂
15 emissions and noise traffic.
- 16 ● We could see the introduction of indivi-
17 dual carbon accounts for UK citizens,
18 meaning the rationing and trading of
19 journeys.
- 20 ● At all levels of government there is con-
21 flict between growth and sustainability
22 policies; an example of this is wind farm
23 policy. A landscape strewn with wind
24 farms will impact on Scotland as a film
25 location.
- 1 2. Higher temperatures and a longer season
2 will present opportunities for the Scottish
3 tourism industry:
- 4 ● A 2–3°C change in temperature rise will
5 not change VisitScotland's core markets.
- 6 ● The season will be extended, reducing
7 seasonality and enhancing Scotland as an
8 all-year-round short break destination.
- 9 ● The impact of an extended season means
10 attractions and accommodation providers
11 need to supply products during the off-
12 season.
- 13 ● Higher and intolerable temperatures in
14 Europe, particularly in the Mediterranean
15 would mean that Scotland's temperate
16 climate would be more favourable for the
17 family and senior citizen markets.
- 18 ● Spain's overdevelopment of golf courses
19 will lead to water shortages and closure of
20 many courses.
- 21 ● Scotland sees an influx of Scandinavian
22 golfers in winter time, early spring and
23 late autumn as the weather in Scandinavia
24 gets too cold or snow-covered for golfers

- 1 to play at home. Should Scandinavia's
2 climate become milder, golfers will be
3 able to play at home during these seasons,
4 with a knock-on detrimental impact on
5 the Scottish tourism sector.
- 6 3. Winter sports in Scotland will be increas-
7 ingly at risk from shorter seasons and even
8 more unreliable snow cover:
- 9 • Winter sports providers offer a diversity
10 of experiences in order to reduce the risk
11 from poor snowfall.
 - 12 • Destinations such as Aviemore offer a
13 range of alternative activities such as
14 mountain biking, fishing, canoeing and
15 bird watching etc.
 - 16 • The revenue from winter sports is rela-
17 tively small.
 - 18 • The marketing of Scotland's winter tour-
19 ism proposition is an idyllic destination of
20 log fire, blue skies, crisp frosts and snow.
21 Cloudy, windy and rainy winters would
22 not have the same draw.
- 23 4. The potential impacts on ecosystems
24 could affect the natural beauty of certain
25 tourist hot-spots with distinctive landscapes
26 (e.g. in the Highlands):
- 27 • Changes in air temperatures, sea levels
28 and currents and precipitation patterns
29 could affect soil moisture levels, subsi-
30 dence, migration patterns, food chains
31 and other parameters in some of Scot-
32 land's most pristine landscapes.
 - 33 • Changes to the ecosystem means the Bass
34 Rock Seabird Centre no longer exists as
35 Scotland's unique coastal seabirds disap-
36 pear. Grouse shooting on Perthshire es-
37 tates is considerably curtailed and osprey
38 tours in the Highlands are no longer.
39 Although these events would not happen
40 overnight, a series of incremental, small-
41 scale changes will significantly affect the
42 overall health of the tourism sector.
 - 43 • 90 per cent of visitors rate Scotland's
44 pristine environment as a key choice in
45 visitation. Human, dramatic and endur-
46 ing is the essence of the VisitScotland
47 brand.
 - 48 • 21 per cent of visitors to Scotland under-
49
- 1 take field or nature studies to Scotland
2 often to see species unique to Scotland
3 such as capercaillie and 8 per cent of
4 visitors fish the rivers. The iconic em-
5 blems of Scotland such as wild salmon are
6 threatened by *Gyrodactylus Salaris*. The
7 visual effect on vegetation and landscape
8 generally is a serious issue for a scenery-
9 based tourism industry as climatic change
10 will reformulate mountain landscapes.
11 Whereas the loss of the arctic alpine
12 ecosystem on the Cairngorm plateau
13 would probably only affect specialist visi-
14 tors, losing iconic emblems would be
15 detrimental even to the average visitor.
16 Scotland would lose its magic appeal.
 - 17 • Warmer temperatures will also impact on
18 marine ecosystems and it is likely that sea
19 temperatures will rise. Higher tempera-
20 tures will result in algal bloom, which the
21 media has linked to Alzheimer's disease,
22 and this could create serious negative
23 publicity. More tangibly algal bloom
24 poses serious issues for the Scottish fish-
25 ing industry as it would contravene
26 health and safety legislation to sell con-
27 taminated shellfish for human consump-
28 tion. This would impact on activities
29 such as loch fishing and also on ancillary
30 industries. Removing shellfish from
31 menus would negatively impact on the
32 variety of Scottish fare available and per-
33 ception of the quality of Scottish food,
34 whether it is sold at home to the tourist
35 sector or exported.
- 36 5. Pressure of increased tourism on tourist
37 hotspots will require careful management
38 and consultation with local communities:
- 39 • Some of the most popular tourist areas in
40 Scotland such as the Spey-Aviemore cor-
41 ridor already experience inadequate
42 water supply during summer months.
43 The pressure of increased visitor numbers
44 combined with drier springs and sum-
45 mers could stretch the capacity of these
46 areas to cater for visitors and residents in
47 a sustainable manner.
 - 48 • The major golfing areas could also nega-
49 tively impact on hydrology should visitor

- 1 numbers rise dramatically. Increased ex-
 2 traction of water for fairways will have
 3 knock-on impacts on both local human
 4 populations and also marine and river
 5 wildlife.
- 6 ● Scotland's success as a tourism destination
 7 will facilitate further climate change
 8 problems through increased CO₂ emis-
 9 sions.
 - 10 ● A more holistic approach is recom-
 11 mended to ensure that increased visitors
 12 are a benefit to Scotland and that nega-
 13 tive consequences are limited, hence
 14 there is a need for a sustainability policy.

15 6. There could be impacts on marine trans-
 16 port to the islands and for winter visitors in
 17 general from increases in extreme weather:

- 18 ● Safety is a key issue for many tourists
 19 especially the elderly traveller. Damaging
 20 storms and hazardous winter weather
 21 could stigmatize Scotland in the eyes of
 22 this market.
- 23 ● Even in the mildest case, warmer, wetter
 24 and wilder winters would certainly affect
 25 the popularity of outdoor pursuits.
- 26 ● Island tourism is thriving with products
 27 such as archaeology, wildlife and distilleries
 28 attracting many visitors. Because of the
 29 weather, the island tourism sector re-
 30 mains much more seasonal than the rest
 31 of Scotland simply because transport links
 32 cannot be guaranteed even in today's
 33 climate.
- 34 ● There is also a potential impact on the
 35 golf sector as all of Scotland's most fa-
 36 mous courses are links courses and could
 37 suffer from increased erosion, flooding
 38 and other surge damage. Similarly, mar-
 39itime operators such as whale watching
 40 tours, ferries, boat operators, wind-surf-
 41 ing and sea-kayaking activities could find
 42 their activities and revenue curtailed if
 43 poor weather forces them to be increas-
 44 ingly shore-bound.
- 45 ● Murrayfield stadium was flooded in re-
 46 cent years immediately prior to a major
 47 sporting event and major disruption en-
 48 sued. If this was to happen more fre-

1 quently costs could rise to significant
 2 levels.

- 3 ● Stirling is already subject to regular severe
 4 floods and is a key tourist centre.

5 ADAPTATION STRATEGIES

6 Considering the implications of the above,
 7 adaptation strategies need to be developed.
 8 This means explicitly incorporating climate
 9 change as an issue on VisitScotland's risk
 10 register in order that an organization assess-
 11 ment can take place and appropriate actions
 12 considered. The benefits of such an approach
 13 are:

- 14 ● Climate change becomes an issue within
 15 the centre of the organization.
- 16 ● Any economic growth strategy for tour-
 17 ism must be counter balanced by sustain-
 18 ability. Short-term measures may mean
 19 long-term consequences. Climate change
 20 is interwoven with the issues of sustain-
 21 ability. It is now recognized as a key
 22 driver of consumer choice as the consu-
 23 mer and tourist are concerned about the
 24 environment and how they interact with
 25 that environment.⁷
- 26 ● There is a need to raise awareness of the
 27 impacts both with education and indus-
 28 try.
- 29 ● There is a need to integrate adaptation
 30 plans with other Scottish organizations
 31 for mutual benefit.

32 Table 2 identifies the risks for Scottish tour-
 33 ism.

34 CONCLUSIONS

35 The Scottish tourism industry has set itself a
 36 target of 50 per cent growth in tourism
 37 spend by the year 2015.⁸ In order to achieve
 38 that growth in a sustainable manner it is
 39 necessary to consider the dimensions of cli-
 40 matic change.

41 A number of risks have been identified
 42 that could challenge that growth in a number
 43 of ways, including:

- 44 ● CO₂ emissions and air travel – the over-
 45 reliance on air travel as a demand driver.

Table 2: Risk Assessment

<i>Risk</i>	<i>Degree of Impact</i>	<i>Probability</i>	<i>Geographic Spread</i>	<i>Degree of Urgency</i>	<i>Impact of Trend</i>	<i>Probability of Trend</i>
1. (Raising) awareness of CC and sustainability in corporate planning (corporate commitment).	High	High	Extensive	Now	Up	Static
2. Impact on the brand of Scotland: enduring, dramatic, timeless, unpolluted, natural.	High	High	Extensive	Now	Up	Up
3. As mitigation measures are implemented the aviation industry will be at risk from both oil depletion and CC levy. Budget flights and carriers disappear. Scottish Executive curtails air route development policy as environmentally unfriendly. Carbon rationing introduced.	High	High	Moderate	Now	Up	Up
4. Knowledge management and training. Staff need to have sufficient information to plan for climate change.	High	Med-High	Extensive	Now	Up	Static
5. The disappearance of emblematic species, i.e., salmon and Capercaillie, leaves Scotland a less attractive destination. Seen as poor stewards who 'lost' natural treasures.	Med-High	Med-High	Local	Now	Up	Up
6. Ability to respond to policy issues on climate change and mitigation limited by lack of resource and understanding, i.e., 200 wind farm applications.	Med-High	Med-High	Extensive	Now	Up	Up
7. Increased incidence of extreme storms and rainfall events /flash floods mean bathing water quality is repeatedly lost as are blue flags.	Med-High	Med-High	Moderate	Now	Up	Up
8. Transportation infrastructure could be put at risk from a major storm event. Lack of corporate thinking on sustainable transport exacerbates this.	Med-High	Med-High	Extensive	Soon	Up	Up
9. Ecology-based attractions, i.e., the Bass Rock Seabird centre may find their activities challenged as range of species and seasonality change.	Med-High	Med-High	Moderate	Soon	Up	Up
10. Extreme weather events and infrastructure failure dents Scotland's image through negative press and feedback from visitors on their return.	Med-High	Med-High	Extensive	Soon	Up	Up

(continued)

Table 2: (continued)

<i>Risk</i>	<i>Degree of Impact</i>	<i>Probability</i>	<i>Geographic Spread</i>	<i>Degree of Urgency</i>	<i>Impact of Trend</i>	<i>Probability of Trend</i>
11. Drier summers and increased visitor numbers mean that areas such as Speyside cannot meet demand; visitor/local tension may arise.	Med-High	Med	Moderate	Now	Up	Up
12. Extreme weather causes increasing and sometimes irreparable damage to tourism assets, particularly in the heritage sector.	Med-High	Med-High	Extensive	Now	Up	Up
13. Pest distributions change and could become more virulent. Impact of negative PR re. Lyme's disease, and GS disease in salmon.	High	Med-Low	Moderate	Later	Up	Up
14. The snow sports industry disappears as snow cover can no longer be guaranteed and winters become wetter. Replacement activities impacted by storms.	Med-Low	High	Local	Later	Up	Down
15. Visitors who value Scotland for its tranquillity and low key tourist industry, could be deterred by the influx of mass tourism infrastructure.	Med	Med	Extensive	Now	Up	Up
16. Coastal and urban attractions risk flooding from extreme rain or storm surges disrupt transport and events, i.e., Murrayfield.	Med	Med	Moderate	Now	Up	Up
17. Food tourism impacted as species are lost or inedible (shellfish) due to changes in the climate and ecosystem health. Scottish produce no longer viewed as 'pure'.	Med	Med	Local	Soon	Up	Up
18. Water quality standards are compromised by increased algal blooms/eutrophication as summer temperatures rise. Odour issues/unsightly. Also risk to blue flags.	Med	Med	Moderate	Soon	Up	Up
19. Should Scandinavia's climate get milder their golfers will be able to play at home during the winter, negatively impacting on Scottish courses.	Med	Med	Local	Soon	Up	Up
20. Low summer river flows discourage water sports.	Low	Low	Local	Soon	Up	Up
21. Longer season raises conflict between recreation and other seasonal activities, i.e., Stalking.	Low	Low	Local	Later	Up	Up

- 1 • Climate change as a key consumer driver
- 2 – an unbalanced growth policy could be
- 3 counter productive, hence the impor-
- 4 tance of a sustainable strategy.
- 5 • Climate change could impact on Scottish
- 6 icon species, such as salmon and grouse.
- 7 • Extreme weather will impact on Scot-
- 8 land's image.
- 9 • If the Scandinavian climate gets milder
- 10 Scotland will lose its Swedish golf
- 11 market.

12 Any growth strategy has to be done in a
 13 sustainable manner. The key decision makers
 14 in Scottish tourism have a responsibility to act
 15 as the guardians for tomorrow's tourists. It is
 16 essential that tourism has an everlasting fu-
 17 ture. VisitScotland has a remit for sustainable
 18 tourism and climate change is a core part of
 19 this. If research by the Carbon Trust is right,
 20 climate change has the potential to become a
 21 mainstream consumer driver by 2009.⁹
 22 Therefore, Scotland has an opportunity to
 23 position itself as a green tourism destination.
 24 But green tourism destinations must have a
 25 sustainable policy that is robust and cross-
 26 cutting to take account of adaptation issues.
 27 In the context of Scotland, the Tourism and
 28 Environmental Forum will be the champion
 29 of this cause – providing a challenging and
 30 strategic direction for the future.

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