

Article

Floating Away: The Impact of Hydroelectric Power Stations on Tourists' Experience in Iceland

Anna Dóra Sæþórsdóttir ^{1,*} and C. Michael Hall ² 

¹ Department of Geography & Tourism, Faculty of Life and Environmental Sciences, University of Iceland, 101 Reykjavík, Iceland

² Department of Management, Marketing and Entrepreneurship, University of Canterbury, 8140 Christchurch, New Zealand; michael.hall@canterbury.ac.nz

* Correspondence: annadora@hi.is; Tel.: +354-525-4287

Received: 27 May 2018; Accepted: 2 July 2018; Published: 4 July 2018



Abstract: It is of vital importance that nature-based tourist destinations maintain their natural resources in a sustainable way. Nature and wilderness are the main attractions for tourism in Iceland. The Central Highlands are uninhabited with little visible evidence of human influence except for some huts, gravel roads, and a small number of hydroelectric power plants. However, there are plans for further hydroelectric power development in the area. The Blanda Power Station was constructed in 1991 at the edge of the North Central Highlands. This paper presents the results of a questionnaire survey conducted among tourists in the area in the summer of 2016 with a total of 1078 answered questionnaires. The objective was to estimate the impact of the power station on the experience of tourists and to assess whether their attitude differs from that of tourists in locations where power plant construction has been proposed. The results show that the power plant infrastructure at Blanda, with the exception of transmission lines, does not seem to disturb the experience of the majority of tourists. Tourists at Blanda are also more positive towards power plants than at locations where there are no power plants but where they have been proposed.

Keywords: wilderness tourism; nature-based tourism; sustainable tourism; sustainable development; economic development; tourist attitudes; renewable energy; wilderness; purist scale; hydroelectric development

1. Introduction

Given that hydroelectricity is a renewable source of energy which is as an important driver for climate change mitigation (e.g., Klöpper [1]), the acceptance of hydroelectric power in societies is generally high. However, hydroelectric power plants have an unavoidable impact on the landscape, reflecting Nadaï and Horst [2], (p. 143) observation, “There can be very little doubt that energy will remain the number one driver for landscape transformation in the 21st century”. As a result of demands for low carbon energy hydroelectric power plant infrastructure will unavoidably stretch further into places that have so far been unaffected by such developments. Meanwhile it is of vital importance for tourist destinations that are based on nature-based tourism to preserve their relative naturalness. The demand in the Western world for the use of natural landscapes for tourism and recreation has been steadily expanding, due to the growing number of visitors, increased leisure time, and a continued favorable disposition to wilderness and remote landscapes. Furthermore, the economic prospects of nature-based tourism are very promising in many northern regions given that there is often an abundance of pristine nature and few other development alternatives.

It is generally assumed that power plants and accompanying infrastructure reduce the attractiveness of nature-based tourism destinations [3]. Therefore, opposition against power plant

development can be expected and it is often greater in natural areas which possess a high-quality landscape [4], than at destinations where developments are already in place [5]. This can partly be explained via the changes to senses of place identity, place attachment [6] and a social construction of nature in which the “naturalness” of wilderness has been questioned, (e.g., [7–10]).

This study follows these ideas by evaluating the impact of a hydroelectric power station on the experience of tourists and whether their attitude differs from tourists in areas in which power plant construction is pending. The case comes from Blanda hydroelectric power station in northern Iceland—a region rich both in hydropower and in popular locations for nature-based tourism.

Large-scale production of hydroelectric power started in Iceland in the mid-1960s and currently the country produces the most renewable electricity per capita in Europe [11]. There are plans for further development of hydroelectric power plants in areas that might create conflicts with nature-based tourism as most of the proposed plants are located in high-value natural areas. In recent years, nature-based tourism has become the largest export sector in Iceland with 83% of visitors claiming nature as the primary reason for visiting the country and nearly 50% state the country’s pristine landscape and wilderness is the main attraction of Icelandic nature [12]. Blanda hydroelectric power station is at the periphery of the uninhabited Central Highlands, referred to here as the Highlands. Research conducted among tourists has demonstrated that wilderness is an important part of the appeal of the Highlands [13–15]. Yet, given the impending developments and their potential affect on the tourism sector, it is imperative that a better understanding on tourist perceptions of the impacts of power plants on the landscape is gained.

Based upon a questionnaire survey among tourists at Blanda Power Station the aim of this paper is to examine:

- How tourists experience the area around Blanda Power Station and whether they perceive wilderness as a part of the attraction.
- The attitude of tourists towards power plant constructions in the area.
- The attitude of tourists towards power plants in Iceland.
- Whether tourists’ attitudes towards the questions above differs depending on main variables (i.e., nationality, age, gender, travel pattern, season).
- Whether there is a difference in the attitude of tourists in the vicinity of Blanda Power Station and the seven other areas where power plant development has been proposed.

Bishop [16] argued that in the near future, landscapes will change significantly due to the development of renewable energy as a response to climate change. This will presumably result in power plant infrastructure becoming increasingly visible in the landscape in natural areas in many parts of the world [16]. However, this brings up major public policy issues regarding the development of renewable energy versus its impact on the natural environment and the prosperity of economic sectors that rely on locations with high degrees of naturalness, such as the tourism industry. In countries and regions with an economically significant nature-based tourism sector that depends on natural areas and wilderness as an attraction, an understanding of tourists’ perceptions of the effects of power plant construction should therefore become integral to policy discourse. If, as Nadaï and Van der Horst suggest, “Landscape has become a key arena for the debate on energy policy” [2] (p. 143), then it is imperative that debate is informed and evidence-based with respect to the relative values of energy and tourism development and the interrelationships between these sectors. Consequently, this study addresses some of the most important issues with respect to sustainable development in peripheral and wilderness areas with significant energy development potential [17] that are also nature-based tourism destinations.

The next section discusses concepts of the social construction of nature, place identity, and place attachment in relation to the meaning of wilderness [6], along with how people perceive power plant constructions in natural areas. A description of the research area and comparative locations is provided, as well as an account of the methods that were employed and data processing. A comprehensive

analysis of the questionnaire results is provided, with the main results discussed in the wider context of the policy and planning discourse surrounding such developments as well as the implications for future energy and tourism development.

2. Constructing Place

The geographical concept of ‘topophilia’ (love of/for a place) addresses the emotional connections between people and the physical environment as a way of admiring the landscape [2,18,19]. The connection between humans and places has been looked at, for example, via the lens of ‘place identity’ which describes how the physical and symbolic characteristics of places add to peoples’ sense of self or identity [20]. ‘Place attachment’ is a related concept, which consist of relations between behaviour, perception and feelings that are supposed to evolve through individual experiences with the physical environment. Local people usually have more experiences of neighboring areas as they use them more than others and are therefore assumed to develop stronger attachment to the areas [21]. Thus, their opposition to environmental change is expected to be greater than those with weaker place attachments. This relationship has been studied empirically by Vorkinn and Riese [22] who evaluated the connections between place attachment and the local opposition against a proposed hydropower project in Norway. They showed that the stronger local people felt attached to the proposed area the more negative they were towards development, indicating that a power plant in the area would reduce place attachment.

In this context, a ‘place’ refers to a space that has been given a symbolic meaning by individuals and groups via processes of social and economic developments. Thus, a place is a dynamic concept that can change over time. Places are of various size/scale and their realities can vary. Some places are quite ‘real’ such as, for example, an island. Others, like wilderness, are more of an idea, at least according to social constructionists, e.g., [7,9,10], that fit perceptions of a landscape. However, this is a selective practice in which individuals tend to see what fits into their image of a place and their prior beliefs. According to Bell [23] people tend not to see, or forget more easily, negative visual experiences that do not fit their prior image of how the area should look like. Accordingly, the meaning people ascribe to certain landscapes depends on their preconceived image of how an area is supposed to look like. Social constructionists consequently argue that the perception of a landscape depends on individuals’ knowledge and that such knowledge is constructed through communicative connections between people, as well as between people and institutions. From this perspective, environmental knowledge is therefore actively produced by individuals and groups rather than being a passive reflection of reality. For instance, if tourists assume an area to be wilderness and they understand wilderness as a non-human world with unspoiled nature, they may consciously or unconsciously avoid seeing human made modifications of the environment and thereby construct their perceived reality. Hence ‘wilderness’ according, to this approach, is a cultural and historical construction [24].

Studies among tourists in the various areas within the Icelandic Highlands have showed that despite human influence like roads, mountain huts and some other infrastructures, most tourists still experience the area as wilderness. Thus, the social construction of the wilderness in Iceland suggests that tourists see what they want to see and that they make and preserve in their minds an image of the Highlands as wilderness or unspoiled nature [25,26]. As Devine-Wright [27] observes, consideration needs to be given as to how power plant constructions ‘fit’ with the socially constructed ideas and the symbolic image of how the area ‘should’ look. Therefore, it is really the alteration of a certain landscape that causes the most dissatisfaction but not the new landscape as such. Consequently, new power plant developments have to fit in with the existing place identity and its symbolic dimensions in order to be acceptable to affected communities [6,19,28,29].

Much research [30–35] highlights that the most important factor preventing people’s acceptance of renewable energy are their visual perceptions of the appendant infrastructure. Built structures seem to reduce wilderness experiences considerably. Although the type of construction does not appear to matter, whether they are directly related to tourism and outdoor recreation, or related to other

industries, e.g., dams and hydroelectric power plants [13,36–39]. Studies among tourists in nature destinations in Iceland have similarly shown that tourists are rather negative to pending power plant constructions albeit that they are renewable [13,40,41]. That also goes for hydroelectric and geothermal power plant proposals [42] wind farms [41], and transmission lines [40].

There is a large difference between the visibility of the various renewable energy types and the energy landscapes they create. The visual contrast in the landscape from a hydroelectric power plant is, for example, far less than that of a wind farm. Wind farms have very large structures with reflective surfaces, and therefore contrast strongly with the natural environment. As a result, they are usually visible over long distances. For example, in Western American landscapes, Sullivan et al. [43] recommend a radius of 48 km for assessing the visual impact of a wind energy facility. Hydroelectric power plants, on the other hand, create a very different visual experience. They involve housing where turbines and transformers are kept but these buildings are often built underground and therefore have only limited visual impact.

Hydroelectric power plant infrastructure comprises dams, canals, reservoirs, transmission lines, buildings and roads. Reservoirs can create their own landscape signature by taking the appearance of a natural lake, which could potentially create a more positive experience of an area. As Henry David Thoreau (1854) stated in *Walden*: “A lake is the landscape’s most beautiful and expressive feature. It is earth’s eye; looking into which the beholder measures the depth of his own nature.” However, the surface of reservoirs fluctuates and when it is low it may be an eyesore as the bank can be covered in silt that sometimes can also cause erosion and feed sandstorm when the wind blows. Furthermore, reservoirs lie in depressions in the landscape that are often vegetated, so when the vegetation disappears under the reservoirs the ecological landscape is changed substantially. Hydroelectric power plants also often alter the appearance of the neighboring environment as waterfalls can disappear or their flows reduced, river turbidity altered, and rivers and canyons can become dry. Such events that can affect the recreational use of whitewater habitats due to reduced kayaking and rafting opportunities [44,45], as well as affecting fishing and hunting of water-fowl.

All types of power plants need a way to transfer the energy from the production site to the demand site and therefore transmission lines are a necessary accompanying structure. Due to their visibility they therefore have a substantial impact on landscape perception and attachment towards the area.

New or improved roads are usually unavoidable for the construction of new hydroelectric power plants. However, while roading can have a substantial impact on visual amenity, it can also make locations much more accessible to visitors and therefore have a major effect on what type of tourism develops, what kind of tourists visit and their number [38].

Tourist preferences towards nature destinations varies along a broad spectrum, from appreciation of wilderness with no or little human intrusion to places with considerable infrastructure that have been changed substantially by humans. Different variables can be used to differentiate tourists’ preferences in nature destinations. One widely used method [46–49] is the so-called Purist Scale model which divides tourists into the groups purists, neutralists and nonpurists according to their satisfaction with qualities and settings in wilderness and other nature destinations. Purists prefer to travel in a pristine environment, with primitive facilities and search for solitude, while nonpurists do not notice or get disturbed by environmental change, appreciate good facilities, and are not disturbed by the number of travelers. Stefánsson, Sæþórsdóttir and Hall [40] found that purists are more negative towards transmission lines and wind turbines than neutralists and nonpurists. This study further investigates the extent to which different groups of tourists respond to power generating infrastructure in a high natural quality landscape.

3. Materials and Methods

3.1. Hydroelectric Power in Iceland

Iceland is the largest producer of renewable electricity per capita in Europe and produces 2.07 times more than Norway, which is the second largest. Iceland is ranked in 15th place among European countries with regard to total production of renewable electricity in total [11]. Hydroelectric power produces about 73% of the electrical power produced in the country, while 27% comes from geothermal sources [50]. About 80% of the total energy produced in Iceland is used by a few (<10) power-intensive industries [51]—all owned by foreign companies. The low price of energy is the main reason that transnational power intensive industries are located in Iceland [52].

The Icelandic population is about 335,000 people and almost all settlement is below 200 m. About 63% of the population lives in the capital area, and the rest lives in towns and farms scattered along the coast and in valleys that penetrate the country to varying degrees [53]. The interior of Iceland, the Central Highlands, cover approximately 40% of the country and form a high plateau at 400–700 m altitude. The area is largely desert-like though occasional depressions and valleys are vegetated. The landscape is diverse and, in many ways, unique, characterized by wide open spaces, with vast lava fields, sandy or stony deserts, geothermal areas, mountains and large ice caps which melt water runs from and forms powerful glacial rivers. The area is uninhabited and there is little visible evidence of human influence except mountain huts for travelers, a small number of power plants and primitive gravel roads. There are two main roads that cross the Highlands between the north and south. One of them is Kjalvegur, which passes the research area presented in this study.

Utilizing rivers to produce hydroelectric power began in Iceland in 1904 when the first hydroelectric power plant was built and for the first half of the twentieth century small hydropower plants were built in towns and at farms in all parts of the country except in the Highlands. In the beginning, such developments were solely for domestic use but, in the late 1960s, the first aluminum smelter was built. To provide the smelter with power, Landsvirkjun (The National Power Company) was set up with the aim of building and operating a new power station, by far the largest in Iceland. It was built at the southern periphery of the Highlands, where the river Þjórsá was harnessed as it runs southwards from its origin in the glacier Hofsjökull in the center of the Highlands. This marked the beginning of hydroelectric power production in the Highlands. In the following years, six more plants were built in the same area. The first hydroelectric power plant, Blanda Power Station in the northern part of the Highlands, was built in 1991 when the river Blanda was harnessed. Blanda, like Þjórsá, also flows from the glacier Hofsjökull but to the north. In 2007 the largest hydroelectric power plant was built in the northeast of the Highlands.

The harnessing of geothermal energy started in 1978 when the first plant was built. So far, no geothermal power plants have been built in the Central Highlands but this could change, as some of the most energetic geothermal areas are located there. Geothermal power plants consist of large buildings for turbines and steam separators, as well as drill holes that sometimes steam that are connected to the main buildings by long pipelines.

Significantly, tourism has benefitted from increased access as a result of roads constructed for the building of power plants. Increased accessibility can have enormous impacts because of the growth in visitor numbers and the further along a destination is in the development process the more obvious the environmental problems tend to be [54,55].

3.2. Blanda Hydroelectric Power Station

The river Blanda is one of the longest rivers in Iceland, about 125 km long and with a catchment area of about 2370 km². It mostly contains glacial meltwater, although several spring creeks join its stream. The surrounding landscape is characterized by a rather homogenous and expansive plateau at 400–600 m.a.s.l., which is covered by moraine and glaciofluvial deposits. The installed capacity of the power plant is 150 MW (Landsvirkjun, 2016). The power station building lies at the highland border

by the northern part of Kjalvegur mountain road. The bulk of the power plant construction itself lies underground, although above ground there is a building and nearby lies a personnel residence along with some other constructions. Further inland from the power station are two reservoirs that have made their mark on the landscape. The larger of the two is called Blöndulón, and at 57 km², is the third largest inland body of water in Iceland and is situated approximately 25 km by road from the power station building. The other reservoir is the 5 km² Gilsárlón, located 5 km by road from the power station. In addition, there are a few natural lakes used to canalize water distribution. The mountain lakes were all crystal-clear before the power station was constructed but because of their role in water distribution are now gray colored. The reservoirs and the former natural lakes are connected through diversion canals that are about 9800 m long. Five dams have been built in the area. The three main dams are between 44 and 34 m high (Landsvirkjun, 2016). As a result of lake expansion and the formation of reservoirs, about 62 km² of land was submerged and some of it vegetated. As compensation, the power company financed the construction of fences, huts and stables in the area and the nearby heaths were reclaimed and cultivated. Roads were also built and asphalted. The electricity from Blanda Power Station is conducted through two 132 kV high voltage transmission lines that lie to the north from the power station. In addition to infrastructural developments, the landscape has been altered due to the Blanda River no longer flowing along its natural course, although the water flowing down it has become clearer.

3.3. Data Collection

The method employed in this study was a questionnaire survey conducted among tourists in the area. Since the objective of the research was to assess the impact of Blanda Power Station and its pertinent infrastructure on the experience of tourists, the respondents had to have travelled through the area where the power station infrastructure is visible before answering the questionnaire. Moreover, they could not have travelled so far from the area so as to not realize what area they were being asked about. As mentioned, the landscape around the power station contains no specific location that all tourists stop to visit. Therefore, reaching a sample group in the area was methodologically challenging.

The method adopted for the research meant that two interviewers were working simultaneously. One interviewer was located at the northern end of the power station's impact area, by the crossroads of Kjalvegur and the road to the power station/employee building. The questionnaire was handed to the tourists that were entering the Kjalvegur mountain road from the north. The other interviewer was posted in the southern part of the area, on Kjalvegur mountain road just north of the mountain hut Áfangi, where a parking space/rest area and picnic table has been set up. There the questionnaires were handed to the tourists that were coming from the south via Kjalvegur. The interviewers had a signpost in order to draw the attention of tourists. All the passengers in the cars that stopped were asked to answer the questionnaire except for the driver. Those who agreed to participate were handed a questionnaire they answered while driving through the power station impact area, which took about 15 min. Once they had filled out the questionnaires they were delivered upon meeting the interviewer on the other side of the area. Usually the duration of the drive gave the respondents ample time to fill out the questionnaire, nevertheless, if the tourists had any questions left, they would stop the vehicle and finish answering before continuing on their journey.

Tourists on organized tours were approached differently because it is usually more time-consuming to hand out and explain a questionnaire to a group of tourists in a bus than to individuals in private cars, plus the schedule of organized tours is generally full, leaving them with little time to answer. Tour guides or bus drivers were requested to take questionnaires with them and the passengers were asked to respond whilst on the bus. The interviewers gave the guides/drivers a stamped envelope and were asked to mail the questionnaires back to the researchers.

The data collection over the summer took place for two weeks; between the 28 June until the 4 July and in the autumn between the 2 and 8 September 2016. The total number of private and group vehicles that drove through the area was 479 during the summer and 369 over the autumn.

The number of vehicles that did not stop to participate in the survey were 150 over the summer and 51 during autumn. Hence, the response ratio compared with the number of vehicles was 67% during the summer and 86% over the autumn. In total, 1078 questionnaires were answered and handed in, 617 in the summer and 461 in the autumn.

3.4. Questionnaire and Data Analysis

The questionnaire was available in four languages, i.e., Icelandic, French, German, and English. It comprised 27 questions, some had a number of subquestions. Their subject can be divided into the following categories:

1. Background questions regarding age, gender, residence, and a question that categorizes tourists into purists, neutralists, and urbanists on the purist scale.
2. Questions concerning the stay in the area, e.g., experience and attraction and whether wilderness was part of that.
3. Questions about appropriate infrastructure in the research area.
4. Questions about attitudes towards the construction of the various types of renewable power and whether the production should be in the Highlands or in Lowlands.
5. Questions regarding attitudes towards Blanda Power Station and its impact on tourists' experience.
6. The impact of further harnessing of energy on tourists' interests in returning to Iceland.

The questionnaires contained a few questions that included the word 'area', as in, for example, "how do you perceive the area?" and "do you think wilderness is a part of the appeal of the area?" It has been an acknowledged dilemma in similar research that tourists place distinct meaning to the concept of an area [56]. In this research concerning the impact of the Blanda Power Station on the experience of tourists, the area in question is not an officially defined area with borders in the manner of a nature reserve or a municipality. In order to assist the tourists in realizing what particular area was under discussion, a map of the research area and the infrastructure pertinent to Blanda Power Station was handed out to the respondents along with the questionnaires (Figure 1). The northern border of the area that is shown on the map is right north of the power station main building and its outgoing transmission line, while the southern border is just south of the southern part of the Blöndulón reservoir. Kjalvegur mountain road can be seen in the middle of the map and the eastern and western borders of the area reach approximately 5 to 15 km east and west off the road.

However, not all individuals are equally proficient at reading a map and what is more, not all of the respondents dedicated much time to reviewing the map. Therefore, it is likely that on some occasions the questions relating to a specific area have been answered in view of the respondent's own definition of the area. This is, for example, rather obvious in a question regarding the duration of the tourists' stay in the area where it says that the respondents have stayed on average 2.6 nights in the area and that day tour visitors have stayed on average 3.4 h. Here the respondents must have had a much larger area in mind than the one the researchers were asking about and showed on the map that went along with the questionnaire.

A few questions were open and this gave respondents an opportunity to answer in their own words. However, the majority of the questions were multiple-choice closed-ended questions based on a five-point Likert scale, i.e., 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree. Certain means were calculated from the results in order to make a comparison between different aspects possible.

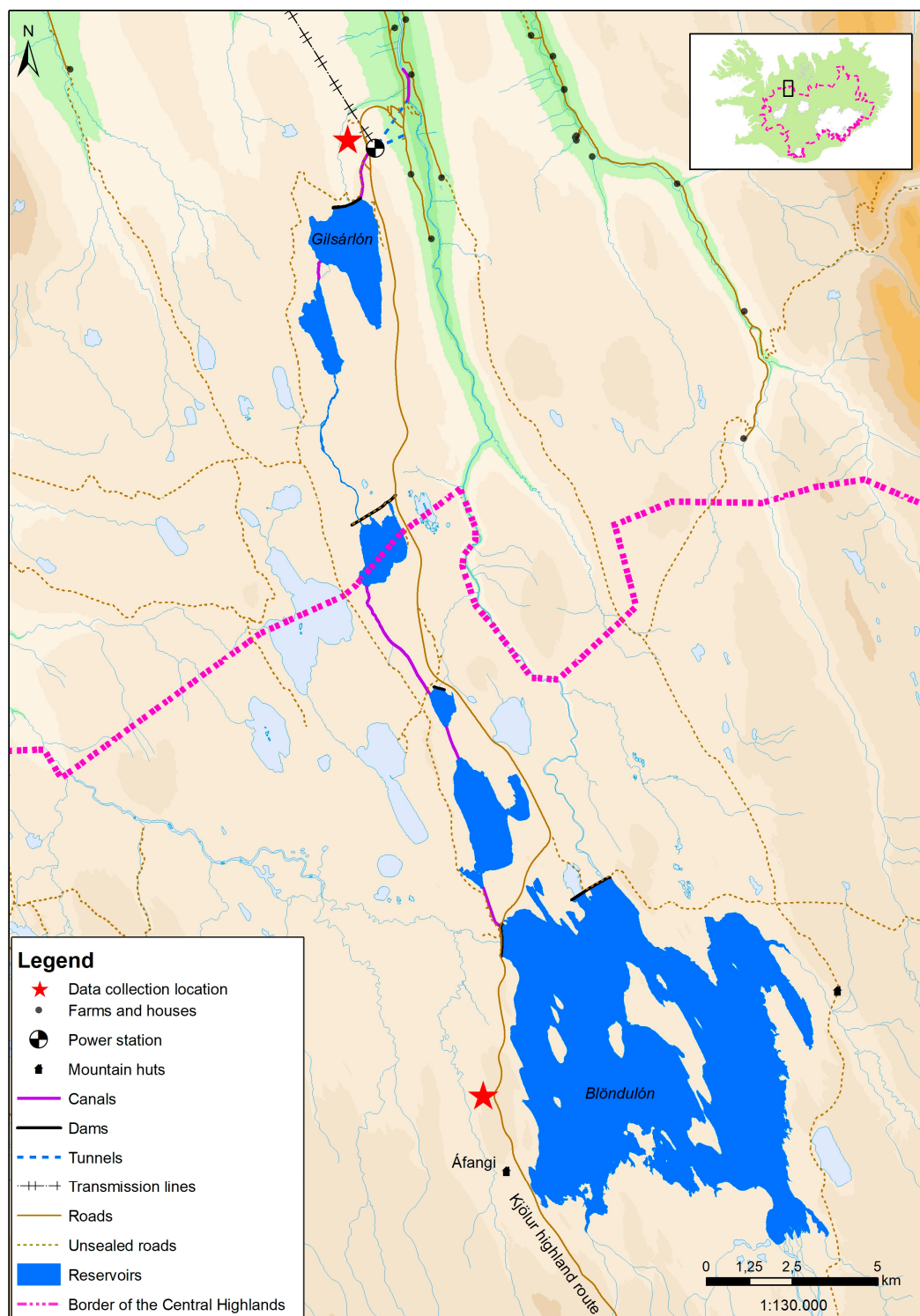


Figure 1. The map followed in the questionnaire survey and shows the research area.

The data was analyzed for information as to whether there was a statistically significant difference between tourists' answers depending on gender, age, nationality, place of residence in Iceland (capital versus rural areas), means of travel, duration of hiking tours, overnight and day tour visitors, along with the categories of the purist scale (urbanists, neutralists, purists, strong purists). The answers were also analyzed according to whether the tourists were arriving through the Highlands from the south or on their way to the Highlands from the north, after the season (summer and autumn),

as well between first-time visitors and repeat visitors. Research was conducted related to pending power station projects in the summer of 2015, which was partly based on a similar questionnaire as the one presented here [57]. That research was executed at seven areas. In the following analysis of the data a comparison is made between the answers from respondents at Blanda Power Station and each of these seven areas. This kind of comparison, i.e., between the opinion of tourists at an area where hydroelectric power plants have already been constructed and at places where there are proposals to construct power plants has, according to our knowledge, not been made before. Due to hydroelectric power plants' potential effects on tourism, and the likely growth of both sectors in the future, it is vital to have a better understanding of tourists' perception of the impact of power plants on the destination.

Obviously, a comparison between different locations is always challenging as no two places are identical. The types of tourism activities and main attractions in the seven comparison areas are different (Table 1). The seven comparison areas have different degrees of medium to high naturalness. Two of them are in the center of the Highlands (Hagavatn and Nýidalur) with only a mountain hut in the vicinity and a dirt road passing by. Three are in the Lowlands (Trölladyngja, Skagafjörður and Seltún). Skagafjörður is an accessible rural area with farms and agriculture. Seltún and Trölladyngja are reachable in about 30 min from the capital area by car. Seltún is accessible by an asphalted road and is a kind of mass tourism destination for international visitors. Trölladyngja, on the other hand, can be reached by a dirt road and is mostly visited by domestic visitors. Two of the comparison areas (Aldeyjarfoss and Hólaskjól) are similar to Blanda by being at the edge of the Highlands. Although Blanda is the only place where a power plant has been constructed, there are some reservoirs approximately 13–15 km away from Nýidalur (Figure 2).

Table 1. Main characteristics of the seven comparison areas.

Research Areas	Location	Attraction	Main Tourist Activity	Main Tourist Market	Proposed Power Plant
Hagavatn	Highlands	A glacier lagoon and wilderness landscape	Jeep safari and hiking	International and Icelanders	Hydroelectric
Nýidalur	Highlands	Wilderness landscape	Mostly driving, some hiking and riding	International and Icelanders	Hydroelectric & Geothermal
Aldeyjarfoss	Edge of the Highlands	A waterfall and wilderness landscape	Mostly driving, some hiking and riding	Mainly international	Hydroelectric
Hólaskjól	Edge of the Highlands	Wilderness landscape	Driving, hiking, riding and biking	Mainly international	Hydroelectric
Skagafjörður	Lowlands	Rural landscape	River rafting, hiking and riding	Mainly international, some Icelanders	Hydroelectric
Trölladyngja	Lowlands	Geothermal area in natural area	Hiking, close to the capital area	Mainly Icelanders	Geothermal
Seltún	Lowlands	Geothermal area in rural landscape	Popular for daytrips from Reykjavík	Mainly international	Geothermal

Analyzed from Sæþórsdóttir, Stefánsdóttir and Stefánsson [57].

In order to examine whether there were differences between the abovementioned variables, a *t*-test was employed where there were only two groups (for example, gender and daytrip versus overnight visitors), while an ANOVA was used where there were three or more groups (for example, Nonpurists, neutralists and purists). In the cases where the ANOVA showed significant dissimilarities within a parameter the difference between specific groups was located through a post-hoc test. A Hochberg's GT2 was employed if the variance was the same and a Games–Howell post-hoc test if they differed [58].

In the following presentation of the results, the main outcome from the Blanda sample is displayed in a chart and underneath a table with the mean and the standard deviation as well as the results from the various statistical analyses. In the discussions the significant difference is set at a *p*-value below 0.05.

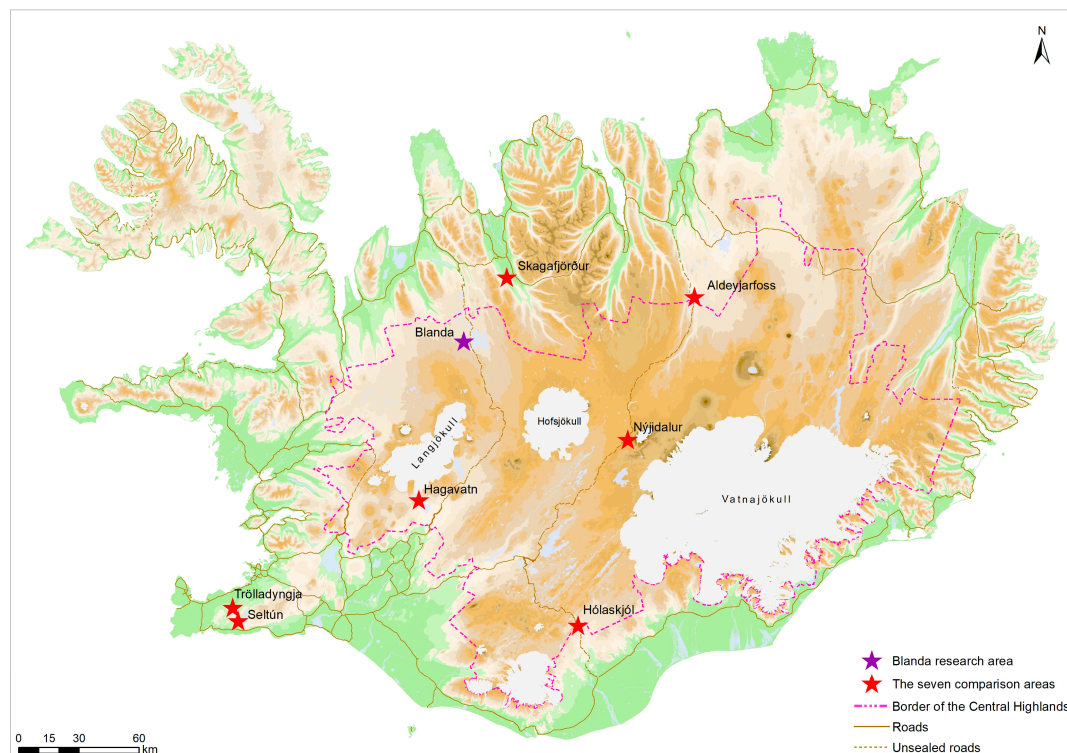


Figure 2. Blanda research area and the seven comparison areas.

4. Results

4.1. Tourists' Perception of the Naturalness of the Area

Tourists were asked an open question concerning what fascinates them about the area. The responses to this question were diverse, however, after encoding, ten categories emerged that reflect the most common answers. Some categories overlap, furthermore the responses of many fall under more than one category and therefore the total ratio is higher than 100%. What attracts most, or 52% of the respondents, is the view, open vast spaces, and beauty. Many (36%) say that they are attracted to the landscape and nature, while 26% mention the wilderness and uninhabited areas. About 13% list quietude and solitude, whereas plants and animals are named by 10% of the respondents. About 7% of tourists say that water appeals to them and four individuals specifically mentioned the reservoirs of Blanda power station. Of note, 6% mentioned areas outside the defined research area, shown on the map that followed the questionnaire, like the geothermal area Hveravellir, which is about 30 km away—a two-hour drive south of the reservoir Blöndulón. About 3% of respondents state that driving through the area is appealing to them and the same proportion mention harnessing of energy and/or green energy as an attraction.

A vast majority, about 92% of tourists in the vicinity of Blanda Power Station, feel that wilderness constitutes a part of the appeal of the area, 4% do not consider wilderness as a part of the attraction, while another 4% have no opinion on the matter. In comparison to the research areas of pending power station projects in the summer of 2015 [57], wilderness makes up for less of the appeal in the area surrounding Blanda Power Station. The areas where wilderness is regarded as a part of the attraction by the highest ratio of respondents are Aldeyjarfoss, Hagavatn and Nýjidalur (98%), followed by Hólaskjól, Seltún, Skagafjörður and Trölladyngja (93–96%), with Blanda with 92%.

Approximately 79% of the respondents go to the Blanda area to experience wilderness, 14% do not visit the area for this purpose and 8% are neutral to this question. A comparison with the research areas related to pending power station projects in the summer of 2015 shows that Blanda and Seltún

are less visited to experience wilderness than the other locations. About 79% go to Blanda and Seltún to experience wilderness, compared with 92–94% of those that visit Aldeyjarfoss, Nýjidalur and Hagavatn, and 87–89% of Hólaskjól, Trölladyngja and Skagafjörður.

An analysis of visitors' attitudes, according to Stankey [59] Purist sScale, shows that there is a statistically significant difference between the average score in the eight areas (anova test $F = 24,768$, $p < 0.001$). Blanda is visited by fewer purists than the other locations, except Seltún, since purists are about 22% of all visitors in the Blanda area and 11% at Seltún. At the other locations the proportion of purist–urbanist is rather similar with about 27–38% being purists (Figure 3).

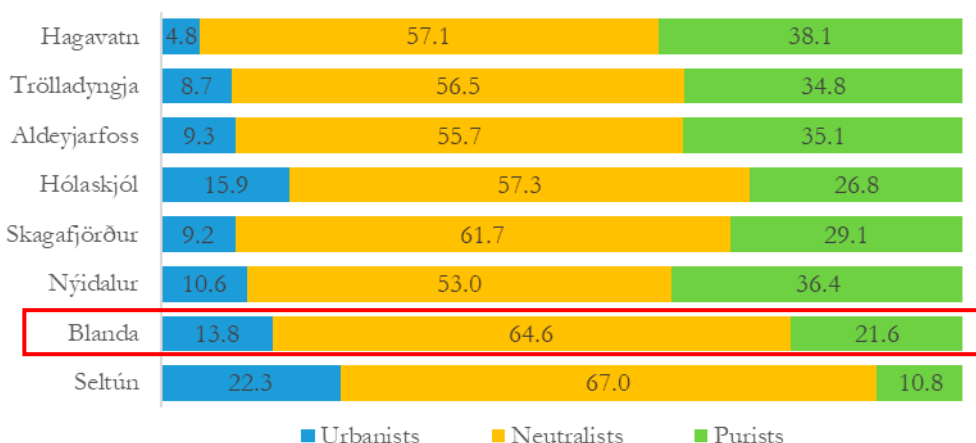


Figure 3. Division of tourists at Blanda and the seven comparison areas according to the Purist Scale.

Tourists at Blanda were asked whether they felt that nearby infrastructure, that they know of but is out of sight, affects their experience of the wilderness/unspoilt nature of the area. The largest group, 47% of respondents, does not feel that nearby infrastructure affects their experience if it is out of sight and 32% consider it to have little effect. Less than 13% consider that it affects their experience somewhat, while 5% believe it affects their experience rather much and 4% say that it affects their experience very much.

Tourists in the vicinity of Blanda Power Station were also asked what infrastructure, or signs of human interference, could be present without the concepts 'wilderness' or 'unspoilt nature' losing their meaning. It was possible to select more than one option. According to 21% of tourists no signs of human interference could be present. On the other hand, over 80% feel that the presence of mountain huts and tracks by hikers and sheep do not make wilderness meaningless, 60% consider road tracks to be permissible and 56% man-made walking paths. Fewer (40%) regard reservoirs, fences (39%) and roads (33%) as permissible and ever fewer consider transmission lines (19%), visitor centers (14%), transmission towers (14%), power stations (12%), wind turbines (11%), and hotels (7%) as acceptable infrastructure without the concepts of wilderness/unspoiled nature losing their meaning.

The respondents were asked to describe whether they considered the research area around Blanda power station was natural or developed. About 63%, consider the area very natural, while 26% consider it rather natural. About 7% of tourists regard the area as rather or very artificial and 4% are neutral towards this question (Table 2). However, all of the places used from the 2015 research were perceived to be more natural [57]. The attitude of tourists at Blanda Power Station did differ according to age, although the multilateral comparison does not show a difference between specific groups. There is also a distinction in attitudes depending on nationality, as Icelandic respondents consider the area less natural than the French, Germans, Austrians/the Swiss, Americans/Canadians, Beneluxians, the British/Irish and those that are categorized as "other nationalities". Neutralists regard the area as more natural than purists and those travelling in a private vehicle consider it less natural than those travelling in a rented car or on a tour bus. Those that have not visited the area previously consider it

more natural than those that have been there before, while those that walked for three to five hours regard the area as more natural than the groups that walked for less than three hours. Tourists that were coming through the Highlands from the south along Kjalvegur also felt that the area was more natural than those going to south. Other parameters showed no statistical significant difference.

Table 2. The perception of the area as natural or developed.

%

1.5

5.4

3.9

26.2

63.1

Very developed	Somewhat developed	Neither nor	Somewhat natural	Very natural
	N	Mean	St.dev.	t-Test/Anova
Total	1032	4.44	0.908	-
Female	474	4.49	0.848	$t = 1.182$
Male	477	4.42	0.926	$p = 0.238$
Younger than 25 years	120	4.51	0.820	$F = 2.450$ $p = 0.032$
25–34 years	234	4.34	0.932	
35–44 years	119	4.30	0.988	
45–54 years	185	4.46	0.891	
55–64 years	156	4.50	0.947	
65 years and older	92	4.65	0.777	
Iceland	82	3.63	1.282	$F = 10.684$ $p < 0.001$
Germany	338	4.56	0.734	
France	103	4.72	0.733	
Switzerland/Austria	86	4.48	0.822	
USA/Canada	74	4.45	0.924	
Benelux nations	66	4.61	0.762	
Visegrád nations	50	4.22	1.016	
Italy/Spain	49	4.20	1.207	
Nordic nations	38	4.32	0.989	
Other nations	76	4.49	0.774	
Icelanders living in capital area	22	3.73	1.032	$t = 0.244$
Icelanders living outside of capital area	51	3.65	1.383	$p = 0.808$
Rental car	601	4.53	0.816	$F = 11.836$ $p < 0.001$
Own car	179	4.12	1.118	
Bus	148	4.54	0.811	
Motorcycle/quad, bicycle, horseback	30	4.13	1.106	
Heading north on F35	457	4.55	0.855	$t = 3.269$
Heading south on F35	491	4.36	0.905	$p = 0.001$
Repeat visitors	161	4.15	1.125	$t = -3.782$
First-time visitors	841	4.50	0.841	$p < 0.001$
Day trip visitors	557	4.41	0.896	$t = -1.328$
Overnight visitors	369	4.49	0.882	$p = 0.185$
Nonpurists	114	4.40	0.975	$F = 5.435$ $p = 0.005$
Neutralists	553	4.48	0.851	
Purists	185	4.23	1.023	
Summer	583	4.46	0.896	$t = 0.797$
Autumn	449	4.41	0.925	$p = 0.426$
Came to experience wilderness	806	4.48	0.883	$t = 2.331$
Didn't come to experience wilderness	128	4.26	1.014	$p = 0.021$

4.2. The Impact of Blanda Power Station

Tourists at Blanda Power Station were asked what impact the fact that the river Blanda has been harnessed had on their interest in travelling in the area. About 67% of the respondents stated that the power station has no effect on their interest in travelling in the area. Those that say the power station has a positive effect on their interest are more numerous (19%) than those that say it has a negative effect (13%). There is no statistical difference between groups regarding this subject except that it had a more positive impact on urbanists and neutralist than purists.

Tourists were asked whether they had noticed any infrastructure on their way through the area, the options being no or yes. About 90% of respondents said they noticed infrastructure, while 10% stated that they had not seen any infrastructure. Those that responded in the affirmative were then asked to specify what impact certain types of infrastructure, such as reservoirs, dams, canals, transmission lines, asphalt road and gravel road, had on their experience. The available options were that the effect was very negative, somewhat negative, no effect, somewhat positive and very positive.

Between 39–61% claimed that the various types of infrastructure had no effect on their experience (Figure 4). Transmission lines caused a much more negative effect on the experience of tourists than other infrastructure whereas about 54% said they had a negative effect. The reservoirs and the gravel road have a positive effect on the experience of 46–47% of those that notice them, and 10–13% say the impact was negative. The asphalt road was perceived somewhat more negatively. The dams and the canals had positive effect on 25–34% and negative on 14–21%.

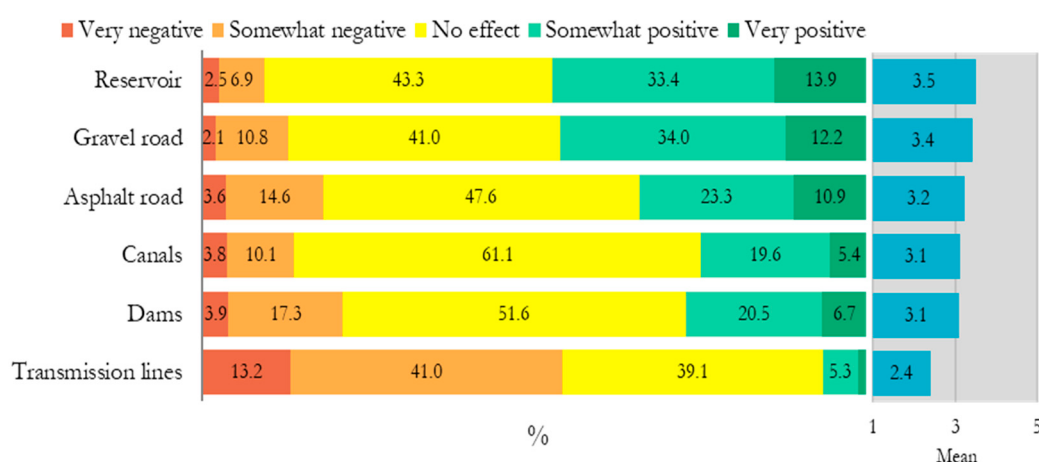


Figure 4. Effects of Blanda power plant infrastructure on tourist experiences.

In the following sections the responses to the question regarding the impact of all the various types infrastructure are analyzed in more detail.

4.2.1. The Impact of Reservoirs on Experience

About 43% of tourists at Blanda Power Station state that the reservoirs have no impact on their experience of the area (Table 3). Approximately 47% say their impact was positive and 10% say it was negative. The reservoirs have a more positive effect on the French than Germans. They also have a more positive effect on urbanists and neutralists than purists. Furthermore, there is a difference in the experience of tourists depending on mode of travel, while the variance between different groups is not significant according to a multilateral comparison. Other parameters showed no statistical significant difference.

Table 3. Impacts of reservoirs on tourist experience, analyzed by groups.

	N	Mean	St.dev.	t-Test/Anova
Total	873	3.49	0.904	-
Female	395	3.49	0.894	$t = 0.265$
Male	411	3.48	0.903	$p = 0.791$
Younger than 25 years	76	3.46	0.791	$F = 1.054$ $p = 0.385$
25–34 years	191	3.41	0.895	
35–44 years	109	3.49	1.015	
45–54 years	162	3.43	0.855	
55–64 years	140	3.49	1.014	
65 years and older	94	3.66	0.727	
Iceland	82	3.32	1.295	$F = 2.873$ $p = 0.002$
Germany	286	3.33	0.724	
France	89	3.78	0.822	
Switzerland/Austria	74	3.57	0.795	
USA/Canada	68	3.46	0.905	
Benelux nations	56	3.61	1.090	
Visegrád nations	43	3.67	0.747	
Italy/Spain	31	3.61	1.022	
Nordic nations	28	3.54	1.138	
Other nations	61	3.61	0.936	
Icelanders living in capital area	25	3.60	1.080	$t = 1.096$
Icelanders living outside of capital area	48	3.25	1.391	$p = 0.277$
Rental car	508	3.55	0.875	$F = 2.888$ $p = 0.035$
Own car	166	3.33	1.047	
Bus	122	3.39	0.777	
Motorcycle/quad, bicycle, horseback	27	3.41	1.152	
Heading north on F35	361	3.50	0.916	$t = -0.012$
Heading south on F35	441	3.50	0.858	$p = 0.990$
Repeat visitors	149	3.38	1.119	$t = -1.491$
First-time visitors	700	3.53	0.838	$p = 0.138$
Day trip visitors	491	3.54	0.928	$t = 1.191$
Overnight visitors	303	3.46	0.871	$p = 0.234$
Nonpurists	100	3.64	0.835	$F = 7.195$ $p = 0.001$
Neutralists	477	3.52	0.866	
Purists	150	3.25	0.983	
Summer	488	3.46	0.908	$t = -1.159$
Autumn	385	3.53	0.898	$p = 0.247$
Came to experience wilderness	696	3.48	0.910	$t = -0.849$
Didn't come to experience wilderness	106	3.56	0.947	$p = 0.396$

4.2.2. The Impact of a Gravel Road on Experience

About 46% of tourists by Blanda Power Station say that the gravel road had a positive effect on their experience of the area, 41% say the gravel road had no impact, while 13% say the impact was negative (Table 4). The gravel road had a more positive effect on neutralists and purists than urbanists. It also has a more positive effect on purists than strong purists. Tourists travelling in buses are affected more negatively by the gravel road than those using other means of transportation. Moreover, the gravel road has a more positive effect on the experience of tourists during the summer than during the autumn. Other parameters showed no statistical significant difference.

Table 4. Impacts of a gravel road on tourist experience, analyzed by groups.

	Very negative	Somewhat negative	No effect	Somewhat positive	Very positive
	2.1	10.8	41.0	34.0	12.2
	%				
	N	Mean	St.dev.	t-Test/Anova	
Total	962	3.43	0.911	-	
Female	437	3.39	0.928	$t = -1.469$ $p = 0.142$	
Male	450	3.48	0.873		
Younger than 25 years	90	3.42	0.948	$F = 0.924$ $p = 0.464$	
25–34 years	220	3.42	0.853		
35–44 years	112	3.59	0.945		
45–54 years	171	3.45	0.848		
55–64 years	151	3.44	0.906		
65 years and older	104	3.34	0.991		
Iceland	84	3.35	1.125	$F = 1.090$ $p = 0.368$	
Germany	312	3.41	0.895		
France	97	3.53	0.855		
Switzerland/Austria	78	3.55	0.816		
USA/Canada	71	3.30	0.991		
Benelux nations	65	3.54	0.849		
Visegrád nations	44	3.64	0.810		
Italy/Spain	42	3.48	0.862		
Nordic nations	38	3.32	0.989		
Other nations	69	3.32	0.899		
Icelanders living in capital area	25	3.56	1.044	$t = 1.081$ $p = 0.283$	
Icelanders living outside of capital area	50	3.26	1.175		
Rental car	573	3.45	0.912	$F = 4.689$ $p = 0.003$	
Own car	175	3.49	0.958		
Bus	132	3.20	0.795		
Motorcycle/quad, bicycle, horseback	26	3.81	0.939		
Heading north on F35	411	3.47	0.890	$t = 0.842$ $p = 0.234$	
Heading south on F35	475	3.40	0.912		
Repeat visitors	159	3.44	0.945	$t = 0.195$ $p = 0.845$	
First-time visitors	779	3.42	0.894		
Day trip visitors	539	3.42	0.873	$t = -0.835$ $p = 0.404$	
Overnight visitors	338	3.48	0.912		
Nonpurists	102	3.20	0.923	$F = 5.401$ $p = 0.005$	
Neutralists	531	3.47	0.869		
Purists	167	3.54	0.848		
Summer	540	3.49	0.896	$t = 2.281$ $p = 0.023$	
Autumn	422	3.36	0.926		
Came to experience wilderness	762	3.48	0.890	$t = 2.262$ $p = 0.025$	
Didn't come to experience wilderness	118	3.25	1.047		

4.2.3. The Impact of An Asphalt Road on Experience

Almost half of tourists by Blanda Power Station, or 48%, say that an asphalt road has no impact on their experience in the area, 34% say it impacts positively, and 18% say the effect is negative (Table 5). Tourists' attitude towards an asphalt road varies depending on their age group according to an ANOVA test, however, a multilateral comparison does not detect a significant difference between groups. An asphalt road has a more negative impact on purists than neutralists and urbanists. Furthermore, it has a more positive effect on those southbound than on those heading north through Kjölur. Other parameters showed no statistical significant differences.

Table 5. Impacts of a paved road on tourist experience, analyzed by groups.

	N	Mean	St.dev.	t-Test/Anova
Total	742	3.23	0.953	-
Female	330	3.30	0.909	$t = 1.924$
Male	354	3.17	0.942	$p = 0.055$
Younger than 25 years	67	3.46	1.105	
25–34 years	163	3.21	0.892	
35–44 years	89	3.09	0.925	$F = 2.562$
45–54 years	134	3.10	0.917	$p = 0.026$
55–64 years	119	3.30	0.962	
65 years and older	84	3.42	0.908	
Iceland	71	3.13	1.206	
Germany	212	3.30	0.838	
France	82	3.15	0.891	
Switzerland/Austria	58	3.16	0.854	
USA/Canada	54	3.48	0.818	$F = 0.845$
Benelux nations	56	3.16	0.848	$p = 0.574$
Visegrád nations	37	3.35	1.006	
Italy/Spain	31	3.19	1.167	
Nordic nations	31	3.23	1.230	
Other nations	63	3.24	0.946	
Icelanders living in capital area	20	3.65	1.137	$t = 2.159$
Icelanders living outside of capital area	44	2.95	1.219	$p = 0.035$
Rental car	438	3.25	0.902	
Own car	144	3.19	1.073	$F = 0.425$
Bus	94	3.30	0.890	$p = 0.735$
Motorcycle/quad, bicycle, horseback	22	3.09	0.868	
Heading north on F35	264	3.05	0.950	$t = -3.787$
Heading south on F35	413	3.33	0.910	$p < 0.001$
Repeat visitors	140	3.11	1.117	$t = -1.444$
First-time visitors	587	3.25	0.908	$p = 0.150$
Day trip visitors	417	3.22	0.944	$t = -0.474$
Overnight visitors	267	3.25	0.946	$p = 0.636$
Nonpurists	86	3.42	0.913	$F = 14.623$
Neutralists	410	3.30	0.905	$p < 0.001$
Purists	123	2.82	1.017	
Summer	427	3.26	0.903	$t = 0.736$
Autumn	315	3.20	1.017	$p = 0.462$
Came to experience wilderness	581	3.18	0.957	$t = -3.191$
Didn't come to experience wilderness	95	3.52	0.932	$p = 0.001$

4.2.4. The Impact of Canals on Experience

A majority (61%) of tourists in the vicinity of Blanda Power Station say that canals connected to the power station do not affect their experience of the area (Table 6). About 25% of respondents state that the canals have a positive effect and 14% say they affect their experience in a negative manner. There is a difference between the attitudes of tourists towards canals depending on their age group according to the ANOVA test. Nevertheless, a multilateral comparison does not detect a significant difference between groups. The canals have a more negative impact on purists than on neutralists and urbanists. Other parameters showed no statistical significant difference.

Table 6. Impacts of canals on tourist experience, analyzed by groups.

	Very negative	Somewhat negative	No effect	Somewhat positive	Very positive
	3.8	10.1	61.1	19.6	5.4
	%				
	N	Mean	St.dev.	t-Test/Anova	
Total	663	3.13	0.806	-	
Female	287	3.17	0.796	$t = 1.171$	
Male	314	3.10	0.783	$p = 0.242$	
Younger than 25 years	59	3.31	0.749	$F = 2.461$ $p = 0.032$	
25–34 years	152	3.04	0.708		
35–44 years	82	3.13	0.828		
45–54 years	120	3.13	0.885		
55–64 years	106	3.03	0.786		
65 years and older	62	3.37	0.814		
Iceland	78	3.00	1.184	$F = 1.109$ $p = 0.354$	
Germany	188	3.06	0.695		
France	66	3.08	0.686		
Switzerland/Austria	56	3.23	0.660		
USA/Canada	49	3.22	0.715		
Benelux nations	47	3.17	0.732		
Visegrád nations	33	3.36	0.742		
Italy/Spain	28	3.11	1.066		
Nordic nations	27	3.30	0.912		
Other nations	47	3.21	0.690		
Icelanders living in capital area	21	3.38	1.071	$t = 1.589$	
Icelanders living outside of capital area	50	2.90	1.199	$p = 0.117$	
Rental car	381	3.16	0.719	$F = 1.898$ $p = 0.129$	
Own car	140	3.06	0.969		
Bus	77	3.14	0.806		
Motorcycle/quad, bicycle, horseback	22	2.77	0.973		
Heading north on F35	267	3.15	0.839	$t = 0.115$	
Heading south on F35	332	3.14	0.733	$p = 0.908$	
Repeat visitors	128	3.02	1.004	$t = -1.653$	
First-time visitors	518	3.17	0.738	$p = 0.100$	
Day trip visitors	377	3.14	0.808	$t = 0.356$	
Overnight visitors	231	3.12	0.780	$p = 0.722$	
Nonpurists	67	3.36	0.829	$F = 12.203$ $p < 0.001$	
Neutralists	385	3.15	0.703		
Purists	112	2.82	0.903		
Summer	366	3.14	0.789	$t = 0.298$	
Autumn	297	3.12	0.828	$p = 0.766$	
Came to experience wilderness	527	3.12	0.804	$t = -0.944$	
Didn't come to experience wilderness	76	3.21	0.914	$p = 0.346$	

4.2.5. The Impact of Dams on Experience

Over half of tourists, or 52%, in the vicinity of Blanda Power Station say that dams do not impact their experience in the area, 27% say a dam impacts them in a positive manner and 21% say the effect was negative (Table 7). The age variant is at the alpha level according to an ANOVA test, while a multilateral comparison does not show a significant difference between groups. The presence of dams has a more positive effect on urbanists than other groups and it also has a more positive effect on neutralists than purists. Other parameters do not show a significant difference.

Table 7. Impacts of dams on tourist experience, analyzed by groups.

	N	Mean	St.dev.	t-Test/Anova
Total	852	3.09	0.891	-
Female	376	3.13	0.857	$t = 1.256$
Male	407	3.05	0.885	$p = 0.209$
Younger than 25 years	76	3.11	0.759	
25–34 years	195	2.94	0.871	
35–44 years	103	3.01	0.857	$F = 2.165$
45–54 years	160	3.10	0.863	$p = 0.056$
55–64 years	135	3.13	0.960	
65 years and older	81	3.28	0.855	
Iceland	82	3.12	1.309	
Germany	260	2.93	0.739	
France	88	3.09	0.797	
Switzerland/Austria	74	3.19	0.753	
USA/Canada	63	3.17	0.752	$F = 1.923$
Benelux nations	60	3.00	0.991	$p = 0.046$
Visegrád nations	40	3.30	0.758	
Italy/Spain	35	3.11	0.963	
Nordic nations	32	3.25	1.136	
Other nations	65	3.28	0.893	
Icelanders living in capital area	22	3.50	1.144	$t = 1.521$
Icelanders living outside of capital area	50	3.00	1.340	$p = 0.133$
Rental car	506	3.08	0.810	
Own car	168	3.11	1.061	$F = 0.884$
Bus	102	3.06	0.830	$p = 0.449$
Motorcycle/quad, bicycle, horseback	27	2.81	1.178	
Heading north on F35	360	3.03	0.907	$t = 1.646$
Heading south on F35	422	3.14	0.820	$p = 0.100$
Repeat visitors	148	2.99	1.082	$t = -1.403$
First-time visitors	681	3.12	0.827	$p = 0.162$
Day trip visitors	484	3.08	0.902	$t = -0.424$
Overnight visitors	299	3.11	0.870	$p = 0.672$
Nonpurists	93	3.39	0.834	$F = 27.273$
Neutralists	482	3.13	0.802	$p < 0.001$
Purists	145	2.63	0.970	
Summer	478	3.12	0.873	$t = 1.269$
Autumn	374	3.05	0.912	$p = 0.205$
Came to experience wilderness	672	3.06	0.887	$t = -1.576$
Didn't come to experience wilderness	106	3.21	0.973	$p = 0.116$

4.2.6. The Impact of Transmission Lines on Experience

Transmission lines had a negative impact on the experience of 54% of tourists at Blanda Power Station (Table 8). Approximately 39% of tourists say they are unaffected by the transmission lines, while 7% say their effect is positive. The transmission lines had a less negative effect on the experience of tourists that are 66 years old and older than on all the other age groups except the second eldest, 56–65 years old. The transmission lines had a greater negative effect on the French respondents than Germans and they had a less negative effect on urbanists than the other groups on the purist scale. The transmission lines had a less negative effect on neutralist than on purists and strong purists and a greater negative effect on those travelling in a rental car than on those on tour buses. Additionally, they had a more negative effect on those who had travelled over the Highlands to the north on Kjalvegur than on those travelling southbound. Other parameters showed no statistical significant difference.

Table 8. Impacts of transmission lines on tourist experience, analyzed by groups.

	13.2	41.0	39.1	5.3	1.3	%
Very negative	Somewhat negative	No effect	Somewhat positive	Very positive		
	N	Mean	St.dev.	t-Test/Anova		
Total	907	2.40	0.832	-		
Female	415	2.42	0.842	$t = 0.566$		
Male	421	2.39	0.802	$p = 0.572$		
Younger than 25 years	86	2.44	0.791			
25–34 years	212	2.30	0.716			
35–44 years	111	2.28	0.906	$F = 5.588$		
45–54 years	165	2.37	0.751	$p < 0.001$		
55–64 years	148	2.45	0.921			
65 years and older	81	2.81	0.853			
Iceland	82	2.46	1.124			
Germany	290	2.53	0.749			
France	91	2.16	0.749			
Switzerland/Austria	79	2.39	0.741			
USA/Canada	68	2.34	0.704	$F = 2.307$		
Benelux nations	61	2.31	0.743	$p = 0.015$		
Visegrád nations	41	2.24	0.888			
Italy/Spain	40	2.45	0.876			
Nordic nations	33	2.15	1.004			
Other nations	64	2.44	0.889			
Icelanders living in capital area	23	2.87	1.100	$t = 1.468$		
Icelanders living outside of capital area	50	2.46	1.110	$p = 0.146$		
Rental car	548	2.36	0.772			
Own car	169	2.43	0.943	$F = 4.410$		
Bus	111	2.66	0.858	$p = 0.004$		
Motorcycle/quad, bicycle, horseback	26	2.27	0.724			
Heading north on F35	377	2.31	0.811	$t = -2.560$		
Heading south on F35	457	2.46	0.810	$p = 0.011$		
Repeat visitors	153	2.42	0.991	$t = 0.266$		
First-time visitors	733	2.40	0.783	$p = 0.790$		
Day trip visitors	522	2.38	0.826	$t = -0.729$		
Overnight visitors	304	2.42	0.809	$p = 0.466$		
Nonpurists	96	2.65	0.794	$F = 21.912$		
Neutralists	510	2.42	0.744	$p < 0.001$		
Purists	161	2.04	0.809			
Summer	506	2.42	0.834	$t = 0.583$		
Autumn	401	2.39	0.829	$p = 0.560$		
Came to experience wilderness	717	2.36	0.817	$t = -3.198$		
Didn't come to experience wilderness	116	2.63	0.900	$p = 0.001$		

4.3. Desirable Infrastructure in the Area

Tourists were asked how desirable they considered 19 different types of infrastructure in the Blanda Power Station area. Mountain huts are the structures that the respondents regard as most desirable in the area, as 74% consider them rather or very desirable. Camping sites (58%) and gravel roads (59%) are also considered to be desirable infrastructure in the area. The infrastructure felt to be least desirable in the area were hotels, since 77% regard them to be rather or very undesirable. Stores and restaurants are undesirable according to 68% of the respondents and wind turbines (62%), transmission towers (57%) and transmission lines (56%) are also among the least desirable infrastructure in the area (Figure 5). Less than one-third regard hydroelectric power stations in the area as undesirable, while over a quarter of the respondents consider them desirable and 42% find them acceptable.

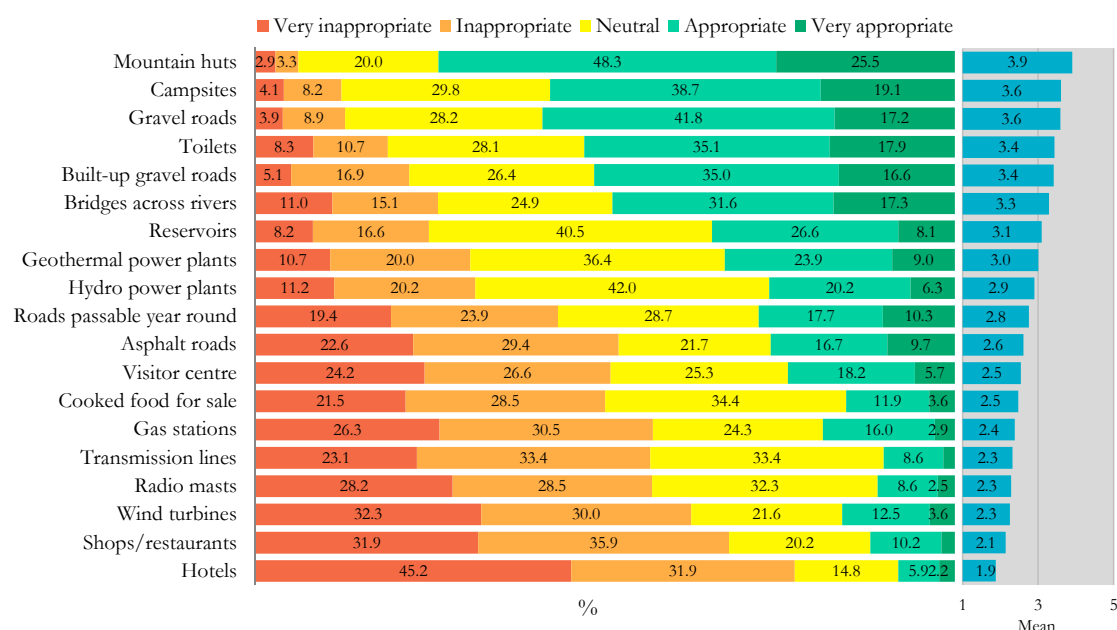


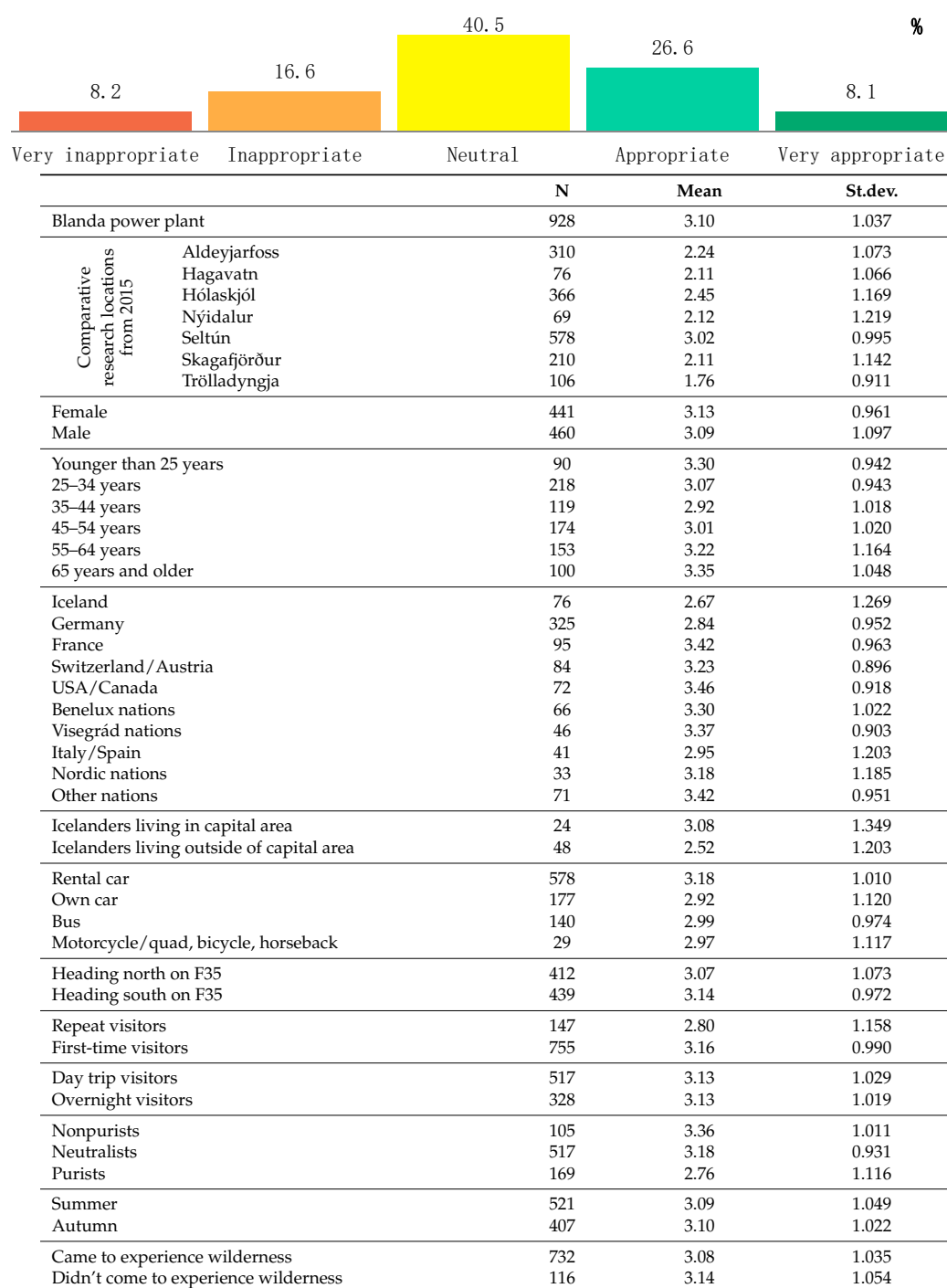
Figure 5. Opinions on structures/facilities in the area.

Of the abovementioned those constructions that belong to power production were analyzed further here below:

4.3.1. Reservoirs

Reservoirs are considered acceptable according to 41% of tourists to the Blanda Power Station area, 27% regard them as rather desirable and 8% find them very desirable (Table 9). Approximately 25% consider them to be undesirable in the area. Reservoirs are felt to be more desirable by Blanda Power Station then at all the locations that were studied in the 2015 research except Seltún [57].

The 26–35 years old age group considers reservoirs as less desirable than the youngest and oldest groups, i.e., those 25 years old and younger and those who are 66 years old and older. Icelanders regard reservoirs as less desirable than the French, Americans/Canadians, Beneluxians, Visegrád Group inhabitants, and the British/Irish. Germans also find them less desirable than the French, the Swiss/Austrians, Americans/Canadians, Beneluxians, Visegrád Group inhabitants, and the British/Irish. Urbanists and neutralists consider reservoirs as more acceptable than purists and strong purists. Those travelling in a rental car find them more acceptable than those travelling in a private vehicle. Moreover, those that have visited the area previously regard reservoirs as less desirable than those visiting it for the first time. Other parameters showed no statistical significant difference.

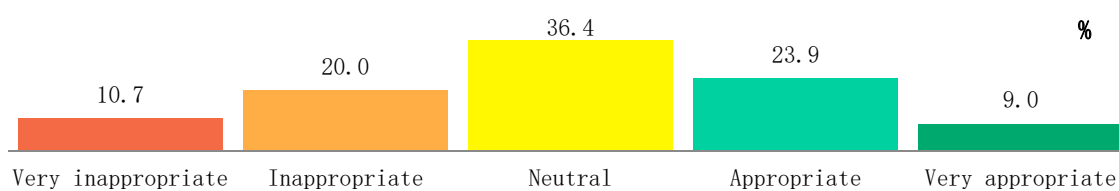
Table 9. Opinions on reservoirs in the area.

4.3.2. Geothermal Power Stations

Geothermal power stations are considered acceptable by 36% of respondents, 24% regard them as rather desirable and 9% find them very desirable (Table 10). Approximately 31% find them undesirable. Geothermal power stations are regarded as more acceptable by tourists by Blanda Power Station than by tourists at all of the research areas in the study of 2015. In the vicinity of Blanda Power Station Icelanders consider geothermal power stations to be less desirable than the French, the Swiss, Austrians, Americans/Canadians, Visegrád Group inhabitants, the British/Irish and those pertaining to the group “other nationalities”. German respondents also regard them as less desirable than

Americans/Canadians and the British/Irish. Urbanists and neutralists find geothermal power stations more desirable than purists and strong purists. Moreover, purists regard them as more desirable than strong purists. The ANOVA test demonstrates a significant difference over this aspect between distinct modes of travel, while a multilateral comparison does not show a difference between modes of travel. Those that have visited the area previously consider geothermal power stations less desirable than those visiting for the first time. Other parameters showed no statistical significant difference.

Table 10. Opinions on geothermal power stations in the area.



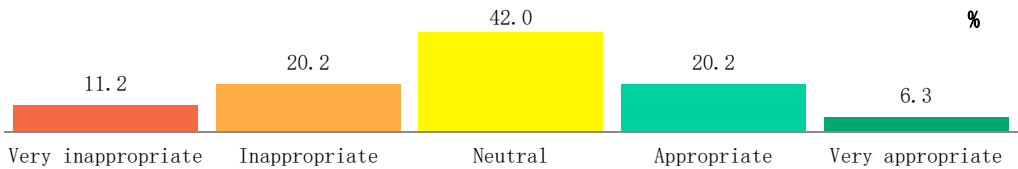
	N	Mean	St.dev.	t-Test/Anova
Blanda power plant 2016	915	3.00	1.108	-
Comparative research locations from 2015				
Aldeyjarfoss	306	2.42	1.117	$p < 0.001$
Hagavatn	75	2.31	1.262	$p < 0.001$
Hólaskjól	368	2.55	1.225	$p < 0.001$
Nýidalur	70	2.21	1.273	$p < 0.001$
Seltún	573	3.01	0.996	$p = 1.000$
Skagafjörður	207	2.53	1.165	$p < 0.001$
Trölladyngja	106	1.87	1.005	$p < 0.001$
Female	439	3.01	1.077	$t = -0.056$
Male	450	3.02	1.129	$p = 0.956$
Younger than 25 years	92	3.25	1.065	
25–34 years	216	2.98	0.947	
35–44 years	117	2.91	1.013	$F = 2.548$
45–54 years	169	2.86	1.134	$p = 0.027$
55–64 years	152	3.14	1.242	
65 years and older	96	3.18	1.231	
Iceland	74	2.42	1.239	
Germany	320	2.84	1.067	
France	97	3.27	1.195	
Switzerland/Austria	85	3.02	0.963	
USA/Canada	69	3.38	0.925	$F = 6.406$
Benelux nations	60	3.05	1.111	$p < 0.001$
Visegrád nations	47	3.19	0.992	
Italy/Spain	40	2.98	1.121	
Nordic nations	34	3.03	1.267	
Other nations	70	3.47	0.989	
Icelanders living in capital area	24	2.58	1.248	$t = 0.755$
Icelanders living outside of capital area	46	2.35	1.233	$p = 0.453$
Rental car	567	3.09	1.099	
Own car	177	2.88	1.169	$F = 3.639$
Bus	138	2.83	1.046	$p = 0.013$
Motorcycle/quad, bicycle, horseback	29	2.76	1.057	
Heading north on F35	410	3.02	1.122	$t = 0.075$
Heading south on F35	429	3.02	1.062	$p = 0.940$
Repeat visitors	144	2.77	1.256	$t = -2.545$
First-time visitors	744	3.06	1.066	$p = 0.012$
Day trip visitors	502	3.00	1.069	$t = -0.606$
Overnight visitors	328	3.04	1.111	$p = 0.545$
Nonpurists	101	3.23	1.048	
Neutralists	508	3.14	1.036	$F = 21.151$
Purists	172	2.56	1.161	$p < 0.001$
Summer	518	3.03	1.136	$t = 0.833$
Autumn	397	2.97	1.070	$p = 0.405$
Came to experience wilderness	717	2.97	1.106	$t = -1.105$
Didn't come to experience wilderness	118	3.09	1.177	$p = 0.270$

4.3.3. Hydroelectric Power Stations

Hydroelectric power stations are regarded as acceptable by 42% of respondents, 26% find them desirable, while 31% find them undesirable (Table 11). Hydroelectric power stations are considered

more acceptable by tourists in the vicinity of Blanda Power Station than at all the locations that were studied in the summer of 2015, except by Seltún. According to the results from an ANOVA test the average varies between age groups, while a multilateral comparison does not show a significant difference between certain age groups. Germans consider hydroelectric power stations less desirable in the area than Americans/Canadians and the British/Irish. Purists and strong purists also find them less desirable than urbanists and neutralists. Other parameters showed no statistical significant difference.

Table 11. Opinions on hydroelectric power stations in the area.



	N	Mean	St.dev.	t-Test/Anova	
Blanda power plant 2016	916	2.90	1.048	-	
Comparative research locations from 2015	Aldeyjarfoss	302	2.07	1.015	$p < 0.001$
	Hagavatn	77	2.03	1.038	$p < 0.001$
	Hólaskjól	366	2.33	1.167	$p < 0.001$
	Nýidalur	71	2.04	1.212	$p < 0.001$
	Seltún	569	2.88	0.975	$p = 1.000$
	Skagafjörður	211	2.09	1.115	$p < 0.001$
	Trölladyngja	100	1.79	0.935	$p < 0.001$
Female	439	2.90	0.977	$t = -0.326$	
Male	452	2.92	1.115	$p = 0.745$	
Younger than 25 years	93	3.10	0.979		
25–34 years	218	2.89	0.936		
35–44 years	115	2.72	0.987	$F = 2.841$	
45–54 years	172	2.84	1.041	$p = 0.015$	
55–64 years	151	2.93	1.132		
65 years and older	95	3.18	1.185		
Iceland	72	2.72	1.406		
Germany	319	2.73	0.964		
France	94	2.84	0.987		
Switzerland/Austria	86	2.99	0.874		
USA/Canada	69	3.16	0.918	$F = 3.479$	
Benelux nations	59	3.00	1.130	$p < 0.001$	
Visegrád nations	47	3.11	0.983		
Italy/Spain	44	2.84	1.200		
Nordic nations	34	2.91	1.264		
Other nations	73	3.33	0.987		
Icelanders living in capital area	24	3.08	1.530	$t = 1.369$	
Icelanders living outside of capital area	45	2.60	1.321	$p = 0.175$	
Rental car	570	2.95	1.022		
Own car	174	2.86	1.124	$F = 1.419$	
Bus	139	2.78	1.041	$p = 0.236$	
Motorcycle/quad, bicycle, horseback	29	2.69	1.105		
Heading north on F35	409	2.85	1.052	$t = -1.536$	
Heading south on F35	432	2.96	1.019	$p = 0.125$	
Repeat visitors	138	2.80	1.239	$t = -1.185$	
First-time visitors	751	2.93	1.004	$p = 0.238$	
Day trip visitors	503	2.91	1.046	$t = -0.046$	
Overnight visitors	329	2.92	1.028	$p = 0.963$	
Nonpurists	102	3.24	1.045	$F = 31.420$	
Neutralists	507	3.00	0.908	$p < 0.001$	
Purists	172	2.40	1.127		
Summer	519	2.94	1.042	$t = 1.209$	
Autumn	397	2.85	1.056	$p = 0.227$	
Came to experience wilderness	716	2.84	1.034	$t = -3.478$	
Didn't come to experience wilderness	119	3.19	1.076	$p = 0.001$	

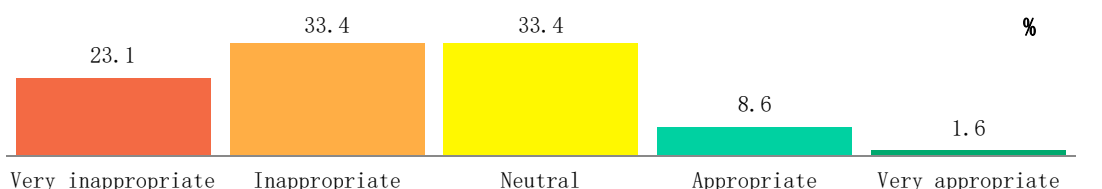
4.3.4. Transmission Lines

Transmission lines are felt to be undesirable according to 57% of respondents, 33% consider them acceptable and 10% consider them desirable in the area (Table 12). Tourists regarded transmission lines

as being more acceptable in the Blanda Power Station area than in all of the locations under review in 2015, except at Seltún where they are considered more desirable than Blanda Power Station.

The French consider transmission lines less desirable in the vicinity of Blanda Power Station than the Swiss/Austrians, Americans/Canadians and the British/Irish. There is a significant difference between all of the groups in the purist scale regarding attitude towards transmission lines by Blanda Power Station. Those travelling northbound over Kjölur find transmission lines less desirable than those heading south. Other parameters showed no statistical significant difference.

Table 12. Opinions on transmission lines in the area.



	N	Mean	St.dev.	t-Test/Anova
Blanda power plant 2016	923	2.32	0.975	-
Comparative research locations from 2015				
Aldeyjarfoss	310	1.95	0.907	$p < 0.001$
Hagavatn	79	1.87	0.992	$p = 0.005$
Hólaskjöl	371	2.06	1.003	$p = 0.001$
Nýidalur	72	1.57	0.836	$p < 0.001$
Seltún	570	2.64	0.984	$p < 0.001$
Skagafjörður	215	2.13	1.070	$p = 0.266$
Trölladyngja	107	1.78	0.914	$p < 0.001$
Female	441	2.34	0.945	$t = 0.543$
Male	456	2.30	0.997	$p = 0.587$
Younger than 25 years	92	2.45	0.894	
25–34 years	223	2.30	0.897	
35–44 years	118	2.18	0.921	$F = 2.206$
45–54 years	170	2.28	0.942	$p = 0.052$
55–64 years	154	2.33	1.085	
65 years and older	96	2.57	1.103	
Iceland	73	2.27	1.216	
Germany	320	2.28	0.910	
France	97	2.00	0.935	
Switzerland/Austria	84	2.43	0.826	
USA/Canada	72	2.63	1.080	$F = 2.978$
Benelux nations	66	2.35	0.984	$p = 0.002$
Visegrád nations	47	2.32	0.862	
Italy/Spain	40	2.20	1.043	
Nordic nations	36	2.17	0.910	
Other nations	71	2.59	1.022	
Icelanders living in capital area	23	2.52	1.201	$t = 0.993$
Icelanders living outside of capital area	47	2.21	1.232	$p = 0.324$
Rental car	582	2.33	0.949	
Own car	174	2.23	1.061	$F = 0.740$
Bus	137	2.39	0.987	$p = 0.528$
Motorcycle/quad, bicycle, horseback	27	2.33	0.877	
Heading north on F35	415	2.21	0.943	$t = -3.283$
Heading south on F35	431	2.43	0.939	$p = 0.001$
Repeat visitors	146	2.25	1.048	$t = -1.070$
First-time visitors	750	2.34	0.949	$p = 0.285$
Day trip visitors	511	2.34	0.929	$t = 0.214$
Overnight visitors	323	2.32	1.013	$p = 0.831$
Nonpurists	102	2.87	0.951	
Neutralists	516	2.36	0.903	$F = 37.428$
Purists	176	1.90	0.918	$p < 0.001$
Summer	523	2.34	0.966	$t = 0.623$
Autumn	400	2.30	0.986	$p = 0.533$
Came to experience wilderness	729	2.26	0.957	$t = -3.772$
Didn't come to experience wilderness	114	2.63	1.041	$p < 0.001$

4.3.5. Wind Turbines

Wind turbines are considered undesirable by 62% of respondents, 22% consider them acceptable, 13% find them rather desirable, and 4% regard them to be very desirable in the area (Table 13). Wind turbines are regarded as more acceptable by tourists at Seltún than in the vicinity of Blanda Power Station. Those 25 years-old and younger are more in favor of wind turbines in the Blanda Power Station area than those 46 years-old and older. Americans and Canadians consider wind turbines more acceptable than all other nationalities, except the British/Irish. Those classified as “other nationalities” also find wind turbines more acceptable than Icelanders, Germans, the French and Beneluxians. Moreover, Swiss/Austrian tourists consider them more acceptable in the area than Germans.

Table 13. Opinions on wind turbines in the area.

		32.3	30.0	21.6	12.5	3.6	%
		Very inappropriate	Inappropriate	Neutral	Appropriate	Very appropriate	
		N	Mean	St.dev.	t-Test/Anova		
Blanda power plant 2016		926	2.25	1.140	-		
Comparative research locations from 2015	Aldeyjarfoss	308	2.20	1.141	$p = 1.000$		
	Hagavatn	78	2.13	1.085	$p = 1.000$		
	Hólaskjól	372	2.12	1.130	$p = 0.762$		
	Nýidalur	74	1.84	1.086	$p = 0.063$		
	Seltún	570	2.71	1.099	$p < 0.001$		
	Skagafjörður	212	2.25	1.128	$p = 1.000$		
	Trölladyngja	104	2.04	1.023	$p = 0.858$		
Female		442	2.30	1.114	$t = 1.260$		
Male		457	2.21	1.152	$p = 0.208$		
Younger than 25 years		91	2.63	1.189			
25–34 years		221	2.45	1.138			
35–44 years		118	2.22	1.079	$F = 4.554$		
45–54 years		170	2.15	1.026	$p < 0.001$		
55–64 years		154	2.09	1.260			
65 years and older		98	2.09	1.158			
Iceland		77	2.17	1.351			
Germany		321	1.95	1.002			
France		100	2.20	1.155			
Switzerland/Austria		85	2.45	1.086			
USA/Canada		67	3.10	1.116	$F = 9.782$		
Benelux nations		64	2.17	1.106	$p < 0.001$		
Visegrád nations		48	2.38	1.064			
Italy/Spain		43	2.28	1.054			
Nordic nations		33	2.15	1.034			
Other nations		70	2.81	1.158			
Icelanders living in capital area		24	1.79	1.179	$t = -1.666$		
Icelanders living outside of capital area		49	2.35	1.408	$p = 0.100$		
Rental car		579	2.28	1.118			
Own car		179	2.32	1.243	$F = 2.763$		
Bus		135	1.99	1.011	$p = 0.041$		
Motorcycle/quad, bicycle, horseback		29	2.24	1.244			
Heading north on F35		412	2.17	1.106	$t = -1.964$		
Heading south on F35		436	2.32	1.132	$p = 0.050$		
Repeat visitors		148	2.14	1.193	$t = -1.332$		
First-time visitors		749	2.27	1.109	$p = 0.183$		
Day trip visitors		508	2.17	1.088	$t = -3.517$		
Overnight visitors		331	2.45	1.183	$p < 0.001$		
Nonpurists		102	2.57	1.182	$F = 12.492$		
Neutralists		513	2.33	1.098	$p < 0.001$		
Purists		174	1.94	1.054			
Summer		523	2.24	1.133	$t = -0.467$		
Autumn		403	2.27	1.150	$p = 0.641$		
Came to experience wilderness		726	2.21	1.111	$t = -1.058$		
Didn't come to experience wilderness		118	2.32	1.124	$p = 0.290$		

Purists are more opposed to wind turbines in the area than neutralists and urbanists. Those travelling in tour buses are also less in favor of wind turbines than those travelling in a private or rental vehicle. Overnight visitors regard wind turbines as less desirable in the area than those on day tours. Furthermore, those heading south on Kjölur find them less desirable than those travelling northbound. Other parameters showed no statistical significant difference.

4.4. Interest in Visiting Power Stations' Visitor Centres

Respondents were asked about their interest in visiting the visitor centers of hydroelectric and geothermal power plants. Approximately 55% of tourists say they are interested in visiting such visitor centers, 13% are somewhat interested, 16% have little interest and 16% have no interest in visiting them. Strong purists are less interested in visiting than the other groups in the purist scale and purists are less interested than neutralists and urbanists. Those travelling in the area during the summer were more interested in visiting the centers than those travelling in the autumn. Other parameters do not show a significant difference.

4.5. Attitude Towards the Construction of Power Stations and the Impact of Further Harnessing of Energy on Tourists' Interests in Returning to Iceland

Tourists' attitudes towards the construction of power stations in Iceland were surveyed and if it mattered as to whether the power station is located in the Highlands or in the Lowlands (Figure 6). Tourists are most negative towards transmission lines and wind turbines in the Highlands with 58–61% being rather or very negative in their attitude towards them. The number of tourists that are negative towards transmission lines and wind turbines in the Lowlands and hydroelectric power stations in the Highlands is higher (41–43%) than those with a positive attitude towards them (18–27%). The respondents are most positive towards further development of geothermal power stations in the Lowlands, with about 47% being positive. Approximately 36% of tourists are positive towards further development of hydroelectric power plants.

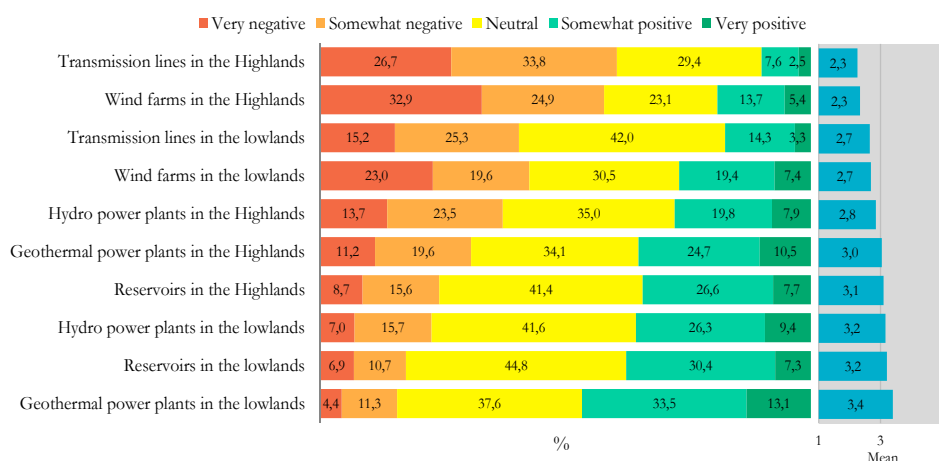


Figure 6. Attitudes towards power infrastructure in the Highlands and Lowlands.

Foreign tourists in the vicinity of Blanda Power Station were asked whether further harnessing of energy in Iceland would make it more or less likely that they would return to the country in the future (Table 14). About 75% state that further harnessing of energy would have no impact on their interest in travelling again to Iceland in the future. Approximately 19% of tourists say they would be less likely to return if there would be further harnessing of energy, while 7% would be more likely to return.

The French are less likely to return to Iceland because of further harnessing of energy than Germans, the Swiss/Austrians, Americans/Canadians, Visegrád Group inhabitants, Italians/Spaniards, the British/Irish and those classified as “other nationalities”. Urbanists are more

likely than any of the other purist scale groups to return in spite of further harnessing of energy. Neutralists are also more likely to do so than purists. Those travelling over the summertime are more likely to return if further harnessing of energy occurs than those travelling in the autumn. Other parameters do not represent a significant difference.

Table 14. The impact of further harnessing of energy on tourist interest in returning to Iceland, analyzed by groups.

	N	Mean	St.dev.	t-Test/Anova
Total	856	2.87	0.617	-
Female	420	2.90	0.589	$t = 1.050$
Male	414	2.85	0.647	$p = 0.294$
Younger than 25 years	83	2.95	0.561	
25–34 years	213	2.82	0.629	
35–44 years	106	2.90	0.646	$F = 0.718$
45–54 years	163	2.88	0.571	$p = 0.610$
55–64 years	134	2.90	0.592	
65 years and older	93	2.86	0.669	
Germany	327	2.87	0.497	
France	96	2.50	0.725	
Switzerland/Austria	81	2.93	0.346	
USA/Canada	66	2.94	0.605	
Benelux nations	67	2.84	0.809	$F = 7.859$
Visegrád nations	48	3.25	0.812	$p < 0.001$
Italy/Spain	45	2.89	0.532	
Nordic nations	33	2.94	0.704	
Other nations	72	3.00	0.581	
Rental car	575	2.87	0.620	
Own car	117	2.85	0.567	$F = 0.094$
Bus	137	2.88	0.669	$p = 0.964$
Motorcycle/quad, bicycle, horseback	21	2.90	0.436	
Heading north on F35	391	2.84	0.650	$t = -1.123$
Heading south on F35	419	2.89	0.586	$p = 0.262$
Repeat visitors	89	2.78	0.617	$t = -1.572$
First-time visitors	747	2.88	0.614	$p = 0.116$
Day trip visitors	482	2.88	0.624	$t = 0.595$
Overnight visitors	307	2.86	0.625	$p = 0.552$
Nonpurists	100	3.13	0.597	$F = 23.068$
Neutralists	471	2.90	0.549	$p < 0.001$
Purists	150	2.63	0.691	
Summer	492	2.91	0.590	$t = 2.015$
Autumn	364	2.82	0.650	$p = 0.041$
Came to experience wilderness	685	2.85	0.632	$t = -2.167$
Didn't come to experience wilderness	99	2.99	0.598	$p = 0.032$

5. Discussion

5.1. Tourism and Hydroelectric Power Plants

This study seeks to analyse how tourists perceive a hydroelectric power plant in natural environment. It furthermore evaluates if it reduces the attractiveness of a nature destination, as is often assumed [3], by reducing its wilderness qualities, namely naturalness and remoteness. The method used for the paper, i.e., to ask tourists en route while they drive through an area with various hydroelectric power plant infrastructure is quite innovative and provided useful information. The results showed that despite the fact that 90% noticed the power plant infrastructure at Blanda it

did not seem to particularly affect the experience of the tourists. About 39–61% of respondents claim it had no effect, depending on the type of infrastructure. Transmission lines have the most negative effect on tourists' experience as 54% claimed they had a negative impact. This is in keeping with other research conducted in Iceland [13,40,57], as well as abroad [29,60,61], that show transmission lines are the least desirable infrastructure in natural areas. This study furthermore indicates that the transmission lines had a more negative effect on the experience of the tourists that came from the Highlands, i.e., those that had been driving in the area with no permanent human settlement for 4–6 h than those who just left the inhabited lowland. It is noteworthy that those coming from the Highlands are just about to see the transmission lines when they are finishing answering the questionnaire while the ones coming from the Lowlands have had them in their sight for a while and even driven under them shortly before answering the questionnaire. This might be an indication that being in the wilderness makes you more sensitive towards human artefacts and constructions in the landscape compared to being in a cultural landscape.

These results are in keeping with an Icelandic study on the effect of transmission lines on tourists [40] which showed that tourists are more negative towards transmission lines in the Icelandic Highlands than in the Lowlands. Both studies [40] indicated that when it comes to the impact of transmission lines French respondents were very sensitive towards them. Nevertheless, this study does not show the variance between the attitudes of Icelanders and the other inhabitants of Nordic countries, that the other Icelandic study [40] showed with respect to the strongest opposition to transmission lines.

This study also suggests that other types of infrastructure had a limited negative impact as 10–20% claimed them to have a negative effect on their experience. The gravel roads and the reservoirs raised positive feelings among about 46–47%. A few visitors even praised the lake/the reservoir as it presented a variation from the interminable sandy desert. The French tourists experience the reservoirs more positively than other nationalities, while the transmission lines had the most negative effect on their experience. Approximately a quarter of the respondents claimed that the canals and dams had a positive effect on their experience.

Despite the power plant infrastructure in the area most tourists regard the area as very natural, although 7% of tourists consider it developed. Nonetheless, in comparison with the seven locations studied in 2015 the Blanda area is considered less natural. The power plant does not seem to impair the image of the central Highlands as the vast majority of tourists, or 92%, consider wilderness a part of the attraction of the area. Nevertheless, in comparison with the locations in 2015 [57], wilderness is regarded as being less a part of the appeal of the area in the vicinity of Blanda Power Station.

About 40% of tourists did not feel that the presence of reservoirs causes the concepts of wilderness and unspoilt nature to lose their meaning, 19% consider the presence of transmission lines to be permissible and 12% that of power stations. Still, the visibility of infrastructure is important for tourists, since just under half of them consider the infrastructure they are aware of but is not visible still affect their experience, while about a third feel that it has little effect, 13% say it has some effect, 5% state that the impact on their experience is rather significant and 4% regard it to be very significant. This situation reflects the idea of nature as a social construct, which suggests that the subjective reality of tourists is to a large extent based on preconceived ideas they have regarding the area. In light of this, the image of Iceland's central highlands as an unspoilt wilderness [25], could render foreign tourists oblivious to reality, i.e., they do not seem to notice the infrastructure present in the area they were travelling through. As Priestley and Evans [62] point out, people have a tendency to overestimate the actual visual impact of energy infrastructure they feel negatively towards.

Even though the existing power plant infrastructure around Blanda does not disturb tourists all that much, 37% of tourists are negative towards further construction of hydroelectric power stations in the Highlands, 35% are neutral and 28% of the respondents are positive towards further construction. Still, tourists at Blanda Power Station are more positive towards further hydroelectric power developments in the Highlands than the tourists at all the locations in 2015, except those by

Seltún [57]. Similar trends can be seen in the results regarding the development of hydroelectric power stations in the Highlands as towards the current infrastructure. That is, purists, the French, and those that have visited the area previously, are more negative towards hydroelectric power stations and geothermal power stations in the Highlands as well as in the Lowlands than those that are visiting for the first time. This situation reflects Vorkinn and Riese [22] work, which suggests that the more people feel attached to an area the more negative they are towards proposed power plants.

5.2. Explanation of the Results

Various explanations can be provided to help explain these results. One is that possibly the design of Blanda power plant and accompanying structure is good and well-adjusted to the landscape. Another reason for why the power infrastructure in the Blanda area causes little disturbance to the experience of tourists could be its locational setting. The landscape is homogenous and does not have some major natural attractions as at some of the other destinations, i.e., where there is a waterfall, which would disappear if the proposed hydroelectric power plant would be built.

The statistical comparison made in this study between the attitudes of tourists in the Blanda Power Station area and the seven research areas in 2015 showed that there is a difference between these locations since the attitude at Blanda towards power plants is more positive. There is one exception, which is Seltún. Tourists at Blanda (and Seltún) are dissimilar to those at the other locations when it comes to the division of tourists according to the purist scale, as at Blanda (and Seltún) there are fewer purists and more urbanists and neutralists than at the other six areas. Consequently, it appears that those who have the highest demands for what can be considered unspoilt nature visit the Blanda area to a lesser extent than the other areas (except Seltún). One of the possible explanations for this could be self-selection, given that tourists are aware that a power station has been constructed at the northern edge of the Central Highlands. Thus, those who have high demands for unspoilt nature avoid travelling to the Blanda area and direct their travel somewhere else in the Highlands. Accordingly, it is possible that the Blanda Power Station has diminished the areas' attraction for purists. Indications from other research suggest that a certain type of tourist stops visiting an area after power stations have been constructed. For instance, the research of Devine-Wright [27] has shown that alterations in the landscape of areas that are in opposition to the image and experience that individuals connect with them can lead to their abandonment of the areas.

This study showed that all types of power plant infrastructure had greater negative effects on purists than on urbanists and neutralists. This study, as well as others in Iceland [14,37,49], have also shown that the types of tourists travelling to the various parts of the Highlands of Iceland vary substantially, mostly according to the accessibility of the destinations. Destinations seem to appeal to different users not only depending on their accessibility, which goes hand-in-hand with the installations and infrastructure on site, but also the number of tourists. Increased access to tourist destinations is often a side effect of power plant developments, which then changes the type of tourism and what kind of tourist visits the area, as well as the overall number. An example of this can be seen in Landmannalaugar, the most visited highland destination, where access was increased after the harnessing of energy in the area of Tungnaá and Þjórsá in the late 1960s. As a result, the area is relatively accessible and has become well-known among travellers who come to Iceland. The number of tourists visiting the area is quite high and fewer purists visit the area now and instead seek more secluded areas [55]. It is therefore possible that, at Blanda, certain tourist types (purists) have moved away from the area to more remote and more natural locations as has happened in Landmannalaugar [14,55].

At the same time, a new type of tourism has started at the river Blanda, which is salmon angling. Before the hydroelectric power station was built, a lot of sediments were transported by the glacial river so the water was gray and even though salmon was in the water it could not see the bait. But when the river was stilled behind the dams the sediments it contained sank to the bottom of the reservoir. Since the power plant was built, the river has become clearer and is now one of the best salmon rivers in Iceland. Over half of tourists in the vicinity of Blanda Power Station state their interest in visiting

power stations visitor centers while travelling in Iceland. Urbanists and neutralists are more interested in such visits than purists. Three out of every four tourists feel that further harnessing of energy would not affect their interest in a second trip to Iceland, while a fifth of tourists believe that it would make them less likely to return. There is a considerable difference between the impact of further energy production on tourists, depending on whether they are purists or urbanists. These results suggest that further energy infrastructure would have a more positive than negative effect on the interest of urbanists in travelling to Iceland, while the impact on purists would be negative. Moreover, the impact of further harnessing of energy would be more negative on the French than on most other nationalities with the French less likely to return to Iceland if more power stations are constructed.

6. Conclusions

The results of the study provide interesting insights into how tourists perceive the impact of energy infrastructure in areas with high naturalness values. The main findings of this study are that most tourists in the vicinity of Blanda Power Station are satisfied with their stay in the area, while 8% are dissatisfied with the main attractions of the area: natural beauty, vast open landscape, quietude and calm. In spite of the fact that Blanda Power Station is on the edge of the Central Highlands, close to inhabited areas and power infrastructure, such as reservoirs, dams, canals, roads, and transmission lines can be found there, 92% of tourists consider unspoilt wilderness a part of the attraction of the area. Nevertheless, this percentage is lower than at the locations of the comparative 2015 research [57]. Accordingly, Blanda Power Station does not seem to impair the Central Highlands' image as unspoilt wilderness for the tourists passing through the area. Up to 87% of tourists say they did not notice the power station and its appendant infrastructure.

Most tourists find the area surrounding Blanda Power Station natural, although 7% of tourists consider it artificial. Approximately 67% of tourists' state the existence of the power station does not affect their interest in travelling in the area, while a slightly higher percentage of respondents say the effect is positive (19%) rather than negative (13%). Therefore, perhaps unsurprisingly, over half of tourists in the vicinity of Blanda Power Station claim to be interested in visiting a power station visitor center while travelling in Iceland. With respect to the application of the purist scale, 65% of the tourists in the vicinity of Blanda Power Station are neutralists, 20% are purists, 14% urbanists and 1% strong purists. There were considerably more purists at all of the research areas in the study of 2015, except at Seltún [57].

These results are significant in the Icelandic context given the current substantial increase in visitors to the country, the majority of which identify nature as a major reason for visiting, and debate over the extent to which tourism may be affected by planned and future hydroelectric and other energy developments. The results here suggest that, on the whole, hydroelectric infrastructure has only limited effects on tourist perception of high areas of naturalness, although transmission lines have been identified as having a far greater impact [44]. This does mean that with careful planning, including potentially the undergrounding of some transmission lines, hydroelectric developments may be relatively compatible with tourism in some circumstances. However, it should be stressed that the limitations of the study to this particular location and time of research, even given its comparisons to previous studies [57], may possibly reduce the applicability of the results in a wider context. Nevertheless, it appears that the research may significantly inform planning and policy debates with respect to the relationships between hydroelectric and other energy developments and tourism. In this context it is therefore very important to keep in mind that areas appeal to different user groups depending on their characteristics, as well as on what energy installations and infrastructure are in place. Therefore, it must be considered what group of tourists makes use of an area when the impact of infrastructure on experience is being researched and, in a wider tourism planning and marketing context, what type and number of tourists are being sought.

Author Contributions: A.D.S. conceived and designed the surveys; A.D.S. and C.M.H. wrote the paper.

Acknowledgments: Landsvirkjun funded the data gathering used in the study. The University of Iceland and Landsvirkjun covered the costs of open access publishing. Silja Gunnarsdóttir and Sigurbjörg Eðvarðsdóttir helped gather data; Anna Mjöll Guðmundsdóttir and Hulda Þorsteinsdóttir set the data into SPSS; Þorkell Stefánsson helped analyse the data; Adam Hoffritz made the maps; Zsófia Cságoly and Þórhildur Heimisdóttir also provided assistance.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Klöpper, Y. Southeast Asian water conflicts—From a political geography perspective. *Asia Eur. J.* **2008**, *6*, 325–343. [CrossRef]
2. Nadaï, A.; van der Horst, D. Introduction: Landscapes of energies. *Landsc. Res.* **2010**, *35*, 43–155. [CrossRef]
3. Tveit, M.; Ode, Å.; Fry, G. Key concepts in a framework for analysing visual landscape character. *Landsc. Res.* **2006**, *31*, 229–255. [CrossRef]
4. Nadaï, A.; van der Horst, D. Wind power planning, landscapes and publics. *Land Use Policy* **2010**, *27*, 181–184. [CrossRef]
5. Devine-Wright, P.; Batel, P. Explaining public preferences for high voltage pylon designs: An empirical study of perceived fit in a rural landscape. *Land Use Policy* **2013**, *31*, 640–649. [CrossRef]
6. Van Veelen, B.; Haggett, C. Uncommon Ground: The role of different place attachments in explaining community renewable energy projects. *Sociol. Rural.* **2017**, *54*, 533–554. [CrossRef]
7. Williams, D.R. The social construction of arctic wilderness: Place meanings, value pluralism, and globalization. Paper presented at the Wilderness in the Circumpolar North: Searching for Compatibility in Ecological, Traditional, and Ecotourism, Values, University of Alaska, Anchorage, AK, USA, 15–17 May 2001.
8. Callicott, J.B.; Nelson, M.P. Introduction. In *The Great New Wilderness Debate*; Callicott, J.B., Nelson, M.P., Eds.; The University of Georgia Press: Athens, GA, USA, 1998; pp. 1–22.
9. Proctor, J.D. The Social construction of nature: Relativist accusations, pragmatist and critical realist responses. *Ann. Assoc. Am. Geogr.* **1998**, *88*, 352–376. [CrossRef]
10. Demeritt, D. What is the ‘Social Construction of Nature’? A typology and sympathetic critique. *Prog. Hum. Geogr.* **2002**, *26*, 767–790. [CrossRef]
11. EIA, BETA. Total Renewable Electricity Net Generation. U.S. Energy Information Administration. 2015. Available online: https://www.eia.gov/beta/international/data/browser/#/?pa=00000000000000000000000000000001&c=1028j008006gg61680a0a4k000e8ai00gg0004g800ho0008&ct=0&tl_id=2-A&vs=INTL.29-12-ALB-BKWH.A&vo=0&v=H&start=2013&end=2015 (accessed on 25 June 2018).
12. Icelandic Tourist Board. *Erlendir Ferðamenn á Íslandi Sumar 2016* [En: Foreign Tourists in Iceland during the Summer of 2016]; Icelandic Tourist Board: Reykjavík, Iceland, 2016.
13. Sæþórsdóttir, A.D. Tourism struggling as the Icelandic wilderness is developed. *Scand. J. Hosp. Tour.* **2010**, *10*, 334–357. [CrossRef]
14. Sæþórsdóttir, A.D. Preserving wilderness at an emerging tourist destination. *J. Manag. Sustain.* **2014**, *4*, 65–78. [CrossRef]
15. Sæþórsdóttir, A.D.; Ólafsdóttir, R. Planning the wild: In times of tourist invasion. *J. Tour. Res. Hosp.* **2017**, *6*. [CrossRef]
16. Bishop, I. *The Renewable Energy landscape: Preserving Scenic Values in Our Sustainable Future*; Routledge: London, UK, 2017; (Preface).
17. Sovacool, B. What Are We Doing Here? Analyzing fifteen years of energy scholarship and proposing a social science research agenda. *Energy Res. Soc. Sci.* **2014**, *1*, 1–29. [CrossRef]
18. Tuan, Y. *Topophilia: A Study of Environmental Perception, Attitudes, and Values*; Columbia University Press: New York, NY, USA, 1974.
19. Bridge, G.; Bouzarovski, S.; Bradshaw, M.; Eyre, N. Geographies of energy transition: Space, place and the low-carbon economy. *Energy Policy* **2013**, *53*, 331–340. [CrossRef]
20. Proshansky, H.M.; Fabian, A.K.; Kaminoff, R. Place-identity: Physical world socialization of the self. *J. Environ. Psychol.* **1983**, *3*, 57–83. [CrossRef]

21. Low, S.M.; Altman, I. Place attachment. In *Place Attachment*; Altman, I., Low, S.M., Eds.; Springer: Boston, MA, USA, 1992; pp. 1–12.
22. Vorkinn, M.; Riese, H. Environmental concern in a local context: The significance of place attachment. *Environ. Behav.* **2001**, *33*, 249–263. [\[CrossRef\]](#)
23. Bell, S. *Landscape: Pattern, Perception and Process*; Routledge: London, UK, 2012.
24. Castree, N. *Nature, Key Ideas in Geography*; Routledge: London, UK; New York, NY, USA, 2005.
25. Sæþórsdóttir, A.D.; Hall, C.M.; Saarinen, J. Making wilderness: Tourism and the history of the wilderness idea in Iceland. *Polar Geogr.* **2011**, *34*, 249–273. [\[CrossRef\]](#)
26. Hall, C.M.; Saarinen, J. Polar tourism: Definitions and dimensions. *Scand. J. Hosp. Tour.* **2010**, *10*, 448–467. [\[CrossRef\]](#)
27. Devine-Wright, P. Rethinking nimbyism: The role of place attachment and place identity in explaining place-protective action. *J. Community Appl. Soc. Psychol.* **2009**, *19*, 426–441. [\[CrossRef\]](#)
28. Devine-Wright, P. Place attachment and public acceptance of renewable energy: A tidal energy case study. *J. Environ. Psychol.* **2011**, *31*, 336–343. [\[CrossRef\]](#)
29. Devine-Wright, P.; Howes, Y. Disruption to place attachment and the protection of restorative environments: A wind energy case study. *J. Environ. Psychol.* **2010**, *30*, 271–280. [\[CrossRef\]](#)
30. Pasqualetti, M.J.; Gipe, P.; Righter, R.W. *Wind Power in View: Energy Landscapes in a Crowded World*; Academic Press: New York, NY, USA, 2002.
31. Johansson, M.; Laike, T. Intention to respond to local wind turbines: The role of attitudes and visual perception. *Wind Energy* **2007**, *10*, 435–451. [\[CrossRef\]](#)
32. Wolsink, M. Planning of renewables schemes: Deliberative and fair decision-making on landscape issues instead of reproachful accusations of non-cooperation. *Energy Policy* **2007**, *35*, 2692–2704. [\[CrossRef\]](#)
33. Wolsink, M. Near-shore wind power—Protected seascapes, environmentalists’ attitudes, and the technocratic planning perspective. *Land Use Policy* **2010**, *27*, 195–203. [\[CrossRef\]](#)
34. Frantál, B.; Kunc, J. Wind turbines in tourism landscapes: Czech experience. *Ann. Tour. Res.* **2011**, *38*, 499–519. [\[CrossRef\]](#)
35. Pasqualetti, M.; Smardon, R. Social acceptance of renewable energy landscapes. In *The Renewable Energy Landscape: Preserving Scenic Values in Our Sustainable Future*; Apostol, D., Palmer, J., Pasqualetti, M., Smardon, R., Sullivan, R., Eds.; Routledge: New York, NY, USA, 2016.
36. Manning, R.E. *Studies in Outdoor Recreation: Search and Research for Satisfaction*, 2nd ed.; Oregon State University Press: Corvallis, OR, USA, 1999.
37. Sæþórsdóttir, A.D. Planning nature tourism in Iceland based on tourist attitudes. *Tour. Geogr.* **2010**, *12*, 25–52. [\[CrossRef\]](#)
38. Johnson, B.J.; Hall, T.E.; Cole, D.N. *Naturalness, Primitiveness, Remoteness and Wilderness: Wilderness Visitors’ Understanding and Experience of Wilderness Qualities*; U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Aldo Leopold Wilderness Research Institute: Missoula, MT, USA, 2005; Available online: <https://www.wilderness.net/toolboxes/documents/vum/Visitors%20Experience%20and%20Wilderness%20Qualities.doc> (accessed on 3 June 2018).
39. Hallikainen, V. *The Finnish Social Wilderness*; USDA Forest Service Proceedings; USDA: Newtown Square, PA, USA, 2000.
40. Stefánsson, Þ.; Sæþórsdóttir, A.D.; Hall, C.M. When tourists meet transmission lines: The effects of electric transmission lines on tourism in Iceland. *Energy Res. Soc. Sci.* **2017**, *34*, 82–92. [\[CrossRef\]](#)
41. Sæþórsdóttir, A.D.; Ólafssdóttir, R.; Smith, D. Turbulent times: Tourists’ attitudes towards wind turbines in the southern Highlands in Iceland. *Int. J. Sustain. Energy* **2017**, *1*, 1478–6451. [\[CrossRef\]](#)
42. Sæþórsdóttir, A.D.; Saarinen, J. Challenges due to changing ideas of natural resources: Tourism and power plant development in the Icelandic wilderness. *Polar Rec.* **2015**, *52*, 82–91. [\[CrossRef\]](#)
43. Sullivan, R.; Kirchler, L.; Lahti, T.; Roché, S.; Beckman, K.; Cantwell, B.; Richmond, P. Wind turbine visibility and visual impact threshold distances in western landscapes. In Proceedings of the 37th Annual Conference on National Association of Environmental Professionals, Portland, OR, USA, 18 May 2012.
44. Karwacki, P. The Kipawa river versus the Tabaret river diversion projects. *Appl. Energy* **2003**, *75*, 2221–2233. [\[CrossRef\]](#)
45. Hynes, S.; Hanley, N. Preservation versus development on Irish rivers: Whitewater kayaking and hydro-power in Ireland. *Land Use Policy* **2006**, *23*, 170–180. [\[CrossRef\]](#)

46. Fredman, P.; Emmelin, L. Wilderness purism, willingness to pay and management preferences: A study of Swedish mountain tourists. *Tour. Econ.* **2001**, *7*, 5–20. [[CrossRef](#)]
47. Hendee, J.C. *Wilderness Users in the Pacific Northwest: Their Characteristics, Values, and Management Preferences*; Research Paper PNW: 61: Pacific Northwest forest and Range Experiment Station; U.S. Dept. of Agriculture: Portland, OR, USA, 1968.
48. Vistad, O.I.; Vorkinn, M. The wilderness purism construct—Experiences from Norway with a simplified version of the purism scale. *For. Policy Econ.* **2012**, *19*, 39–47. [[CrossRef](#)]
49. Ólafsdóttir, R.; Sæþórsdóttir, A.D.; Runnström, M. Purism scale approach for wilderness mapping in Iceland. In *Mapping Wilderness: Concepts, Techniques and Applications*; Carver, S.J., Fritz, S., Eds.; Springer: Dordrecht, The Netherlands, 2016; pp. 157–176.
50. Orkustofnun [En National Energy Authority]. *Os-2018-T006-01: Uppsett rafafli og Raforkuframleiðsla í Virkjunum á Íslandi 2017* [En. *Installed Electricity and Power Generation in the Power Plants in Iceland 2017*]; Orkustofnun: Reykjavík, Iceland, 2018.
51. Orkustofnun [En National Energy Authority]. *Os-2017-T016-01: Þróun Raforkunotkunar á Íslandi* [En. *The Evolutin of Energy Use in Iceland*]; Orkustofnun: Reykjavík, Iceland, 2017.
52. Jonsson, T.; Pinson, P.; Nielsen, H.A.; Madsen, H.; Nielsen, T.S. Forecasting electricity spot prices Accounting for wind power predictions. *IEEE Trans. Sustain. Energy* **2013**, *4*, 210–218. [[CrossRef](#)]
53. Statistics Iceland. *Mannfjöldi eftir þéttbýlisstöðum, Kyni og Aldri 2011–2018* [Eng: *Population by Municipalities, Gender and Age 2011–2018*. edited by Hagstofa Íslands [eng: *Statistics Iceland*]; Hagstofa Íslands: Reykjavík, Iceland, 2018.
54. Sæþórsdóttir, A.D.; Ólafsson, R. Nature tourism assessment in the Icelandic master plan for geothermal and hydropower development. Part I: Rapid evaluation of nature tourism resources. *J. Herit. Tour.* **2010**, *5*, 311–331. [[CrossRef](#)]
55. Sæþórsdóttir, A.D. Managing popularity: Changes in tourist attitudes in a wilderness destination. *Tour. Manag. Perspect.* **2013**, *7*, 47–58. [[CrossRef](#)]
56. Hall, C.M.; Page, S.J. *The Geography of Tourism and Recreation: Environment, Place and Space*, 4th ed.; Routledge: London, UK, 2014.
57. Sæþórsdóttir, A.D.; Stefánsdóttir, B.; Stefánsson, Þ. Viðhorf ferðamanna til nokkurra virkjana í 3. áfanga Rammaáætlunar [En: Tourists view towards power plants in the third phase of the master plan for nature protection and energy utilization]. In *Rammaáætlun Vernd- og orkunýting landsvæði* [En: *The Master Plan for Nature Protection and Energy Utilization*]; Land- og ferðamálafræðistofa, Líf og umhverfisvísindadeild Háskóla Íslands: Reykjavík, Iceland, 2015.
58. Field, A. *Discovering Statistics Using Spss*, 2nd ed.; Sage: London, UK, 2005.
59. Stankey, G.H. *Visitor Perceptions of Wilderness Recreation Carrying Capacity*; edited by USDA Forest Service Research Paper; USDA Forest Service: Ogden, UT, USA, 1973.
60. Tangeland, T.; Aas, Ø. *Kraftinstallasjoner i Naturområder—Effekter på Turisme, Friluftsliv og Bruk av Fritidsboliger: En Literaturstudie* [Transmission Line in Natural Environments—Effects on Tourism, Outdoor Recreation and Use of Summer Houses]; Norwegian University Life Sciences: Norwegian, Norway, 2010.
61. Tempesta, T.; Vecchiato, D.; Girardi, P. The landscape benefits of the burial of high voltage power lines: A study in rural areas of Italy. *Landsc. Urban Plan.* **2014**, *126*, 53–64. [[CrossRef](#)]
62. Priestley, H.; Evans, G.W. Resident perceptions of nearby electric transmission line. *J. Environ. Psychol.* **1996**, *16*, 65–74. [[CrossRef](#)]

