KADECO
KEFLAVIK AIRPORT DEVELOPMENT COMPANY
ALTA

Development context

For the Keflavík Airport Development Area

January 2021

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A1469-004-U01

Contents

Sustainability and resilience

The project's goal is to create an airport area which is environmentally, socially and economically sustainable, as well as resilient.

In this report, sustainability and resilience are defined by three main frames of reference:

Environmental sustainability

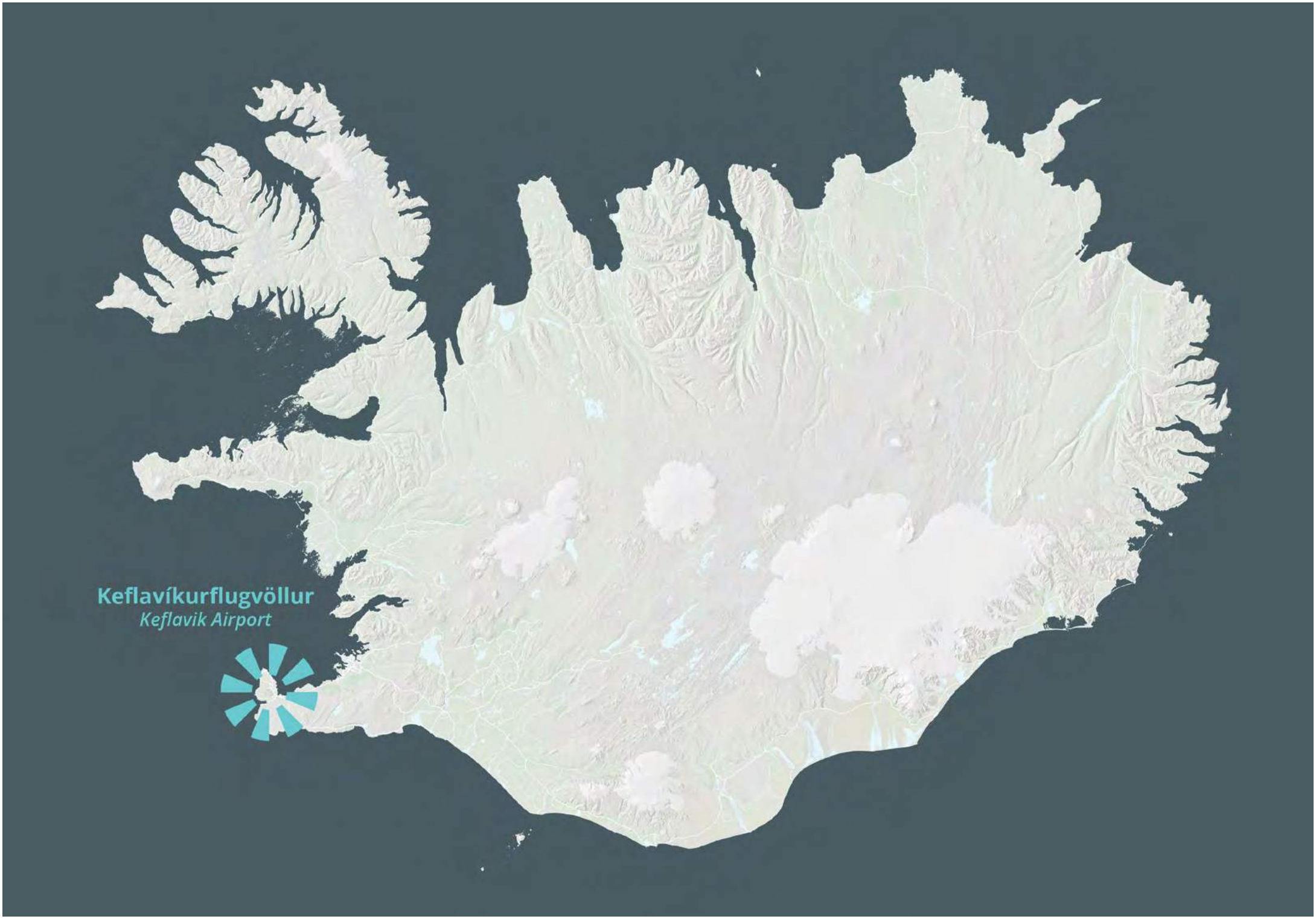
Successful airport areas consider adjustment to climate change as a necessary step towards securing the wellbeing of future generations. At the same time, they use the reduction of CO2 emissions as an encouragement for technological and economical innovation, and sustainable urban planning as an opportunity to save money in the long term. Finally, well-designed airport areas consider a commitment on the reduced emissions of greenhouse gases to be a powerful tool for gaining support from society, improving communication with the authorities and attracting investors from the private sector.

Social sustainability

Aviation is generally acknowledged as a driving force of economic growth, both regionally and nationally. It is also a powerful tool for creating employment. International airport hubs like Keflavík Airport are usually one of the largest employers of the surrounding communities and even of the entire country. According to the references of Airports Council International Europe, it can be expected that with every 1,000 passengers 0.8 jobs are created in aviation and related services. That means 6,000 jobs based on the number of passengers in 2019. The world's employment market is rapidly changing and in the coming years we will attempt to build on Keflavík Airport's position as a force for creating employment, to strengthen the current industries in the airport area and to create new opportunities for inhabitants in the municipalities around the airport. That is how the Icelandic labor force can be prepared for upcoming changes in the employment market.

Economic sustainability

Successful airport areas acknowledge that the development of a diverse group of customers, operations and land use are necessary for securing a long-term economic resilience for both the airport and the surrounding communities. From the airport's point of view it is possible to lessen the impact of unexpected economic shocks which suddenly reduce the number of passengers, for example due to a volcanic eruption, bankruptcy of an airline or a global pandemic, by developing additional sources of income outside the airport area. From the surrounding communities' point of view, the development of the airport area is a powerful tool for increasing their tax base and—as mentioned earlier—creating local employment opportunities. Together, the airport and surrounding communities can seek tenants and investments from the public and private sectors to increase their resilience both during times of rapid growth and recession. This both reinforces already existing industries so that they can thrive and attracts other industries to the airport area.


Keflavíkurflugvöllur
Keflavik Airport

Introduction

Kadeco, a company owned by the Icelandic state, has been tasked with making a strategic development plan for the area surrounding Keflavík Airport in cooperation with Isavia, Reykjanesbær and Suðurnesjabær municipalities.

The plan is intended to support employment in the region. Abundant opportunities can be found in the region and therefore it is paramount that the plan proves successful. Keflavík Airport is equally important for the entire country as it is Iceland's point of connection with the outside world. Kadeco's task is to create a powerful development plan and a strategic land use plan based on a vision for the area, market analysis and international competitions for ideas and planning.

This document is intended to form the basis for the development of a future vision for the Keflavík Airport area and a regional brand. The presumption analysis provides an image of the area's uniqueness, possible opportunities and challenges involved, along with the competitive advantage of the area compared to other international airport development areas. It is also intended to inform participants in the planning competition of the general prerequisites for the project.

The presumption analysis is in two parts:

- Analysis of regional prerequisites in the airport's surrounding areas, the Suðurnes region, the capital region and other regions in Iceland.
- Analysis of international context and foreign airport areas.

In addition to the presumption analysis, various information about the project can be found on a special project website: https://www.kadeco.is/

I. International background Analysis

This part provides background on airports, aviation, and airport area development from an international perspective

By Max Hirsh, Managing Director of the Airport City Academy and Research Fellow at the University of Hong Kong.

1 Macro Trends Impacting Aviation and Airport Area Development: Looking to 2030

This chapter highlights the key macro-level trends that will have a profound impact on the aviation industry and on the development of airport areas in the coming decade. We can break these trends down into four areas:

the future of work

the future of leisure

the future of trade

and the future of the environment

For each of these macro trends, the chapter investigates two key questions:

- What's driving change?
- How will the Keflavík airport area be affected?

Specific guidance on how KEF and Kadeco can leverage these transformations is provided in Chapter 3.

1.1 The Future of Work

What's driving change?

Automation and digitalization are transforming the world of work. In the coming decade, three key trends will lead to paradigmatic changes in how we work—and *where* we work:

- **increasing popularity of working from home (WFH)**
- **widespread adoption of videoconferencing (VC) technology**
- **automation and digitalization of tasks currently performed by people**

None of these trends are new: VC technology, for example, has been around for decades. But the outbreak of the novel coronavirus has accelerated these three trends, and led to broader societal acceptance of their social, spatial, and economic impacts. Prior to COVID-19, working from home (WFH)—also known as "home office"—had been a common practice among self-employed professionals for many years. In an effort to retain talent, companies in high-skilled service industries, such as law and finance, also permitted their employees to work from home several days per week. Some companies viewed WFH as a privilege, awarded to knowledge workers and senior managers, as well as to loyal long-term staff.

It is important to note that WFH had an uneven effect on different industries, and on different types of workers. Some tasks, such as writing an email, can easily be accomplished from nearly anywhere. Others are tied to a fixed physical location (e.g. repairing a road), or can only be performed under strict hygienic conditions (e.g. preparing food). The table below displays the industries that are most likely and least likely to be impacted by WFH. [1].

Most likely to WFH	Least likely to WFH
Educational services	Transportation and warehousing
Professional, scientific, and technical services	Construction
Management of companies and enterprises	Retail trade
Finance and insurance	Agriculture, forestry, fishing, and hunting
Information	Accommodation and food services

1 Dingel, Jonathan and Brent Neiman. "How Many Jobs Can be Done at Home?" University of Chicago Becker Friedman Institute for Economics. April 2020.

It is also important to note that the social acceptance of working from home varies considerably across institutional cultures. Companies characterized by a relatively flat hierarchy and a free flow of information across teams adopt more readily to WFH. By contrast, institutions with rigid hierarchical structures and an aversion to discussing confidential information via email or video call struggled to adapt. Age and technical literacy also play a role, particularly in the public sector. In Germany, for example, many older civil servants and school teachers were unable to work from home during COVID-19 restrictions because they lacked the basic infrastructure necessary for telecommuting (e.g. a laptop and a high-speed internet connection). Children in poorer households struggled to adapt to online learning for the same reason.

The Icelandic state has now enforced a policy called 'jobs without location´ or *störf án staðsetningar*. In practice this means by 2024 10% of advertised jobs at ministries and state institutions do not have a specific location. The aim of this policy is to aid people from rural communities and smaller urban clusters to apply for state jobs which are by and large located in the south-west corner of the country. This is part of the government's response to domestic migration from rural areas to the capital region. There is also anecdotal evidence of larger companies being more flexible about remote working.

In the short term the global pandemic of 2020 radically expanded the number of people working from home. In response to mandatory lockdowns and quarantines, many employers reversed their workplace policies. Rather than an exceptional privilege, WFH became the norm, as companies limited in-office work to essential tasks that are either difficult or impossible to complete without face-to-face (F2F) interaction. For many professionals, the psychological impact of COVID-19 was defined by the sudden need to work from home. Some employees loved the idea; others hated it. Either way, the crisis has forced companies to become more flexible about remote work arrangements. The long term implications of the pandemic are yet to materialise. As this report goes to press, many businesses are reevaluating how much of their staff need to come back to the office, and for what purposes. For cash-strapped firms, working from home could be a tantalizing way to cut costs. While it's highly unlikely that offices will entirely disappear, businesses' spatial requirements will inevitably change.

How might the Keflavik airport area be affected?

As noted in chapter 3, office space and business meeting facilities are two of the key pillars of the airport real estate industry. For airport area development companies like Kadeco, the future of commercial office space is an evolving discussion that needs to be considered from two perspectives. First, while working from home is a feasible option for advanced service industries like tech, finance, and insurance, it's much harder to implement in sectors that require sustained physical presence, such as transport, construction, and hospitality. Second, no matter how much businesses go digital, some activities will still need to take place face-to-face. That's especially true for tasks that involve extensive teamwork or require a high level of trust. Social scientists have long argued that virtual forms of communication—be it by video, email, or phone—are a useful substitute for face-to-face meetings. But they can't entirely replace them. Business relationships are built on trust, and that trust develops through physical, face-to-face encounters. Moreover, many people hesitate to discuss sensitive topics online, opting to postpone those discussions until the next physical meeting. Finally, offices will continue to play an important role in maintaining employees' work/life balance, particularly for working parents. Office parks that offer quiet areas and flexible childcare options could be a big draw.

Post-pandemic work habits will also impact airport MICE facilities. Their future depends on how quickly business travel returns to pre-COVID levels. Even after the pandemic subsides, tight budgets and liability issues will prompt companies to take a harder look at employee travel requests. Is attending that big conference absolutely necessary to connect with clients, or would a video call suffice? How effective is that training program? Tough questions like that will negatively affect business meeting facilities. At the same time, organizers' spatial and technical needs will evolve. Blockbuster expos hosting thousands of delegates may give way to smaller, more targeted events. Some participants will attend in person, while others will join online. That will require much better videoconferencing facilities.

The table below summarizes these changing needs and how they will likely shape future demand for office space.

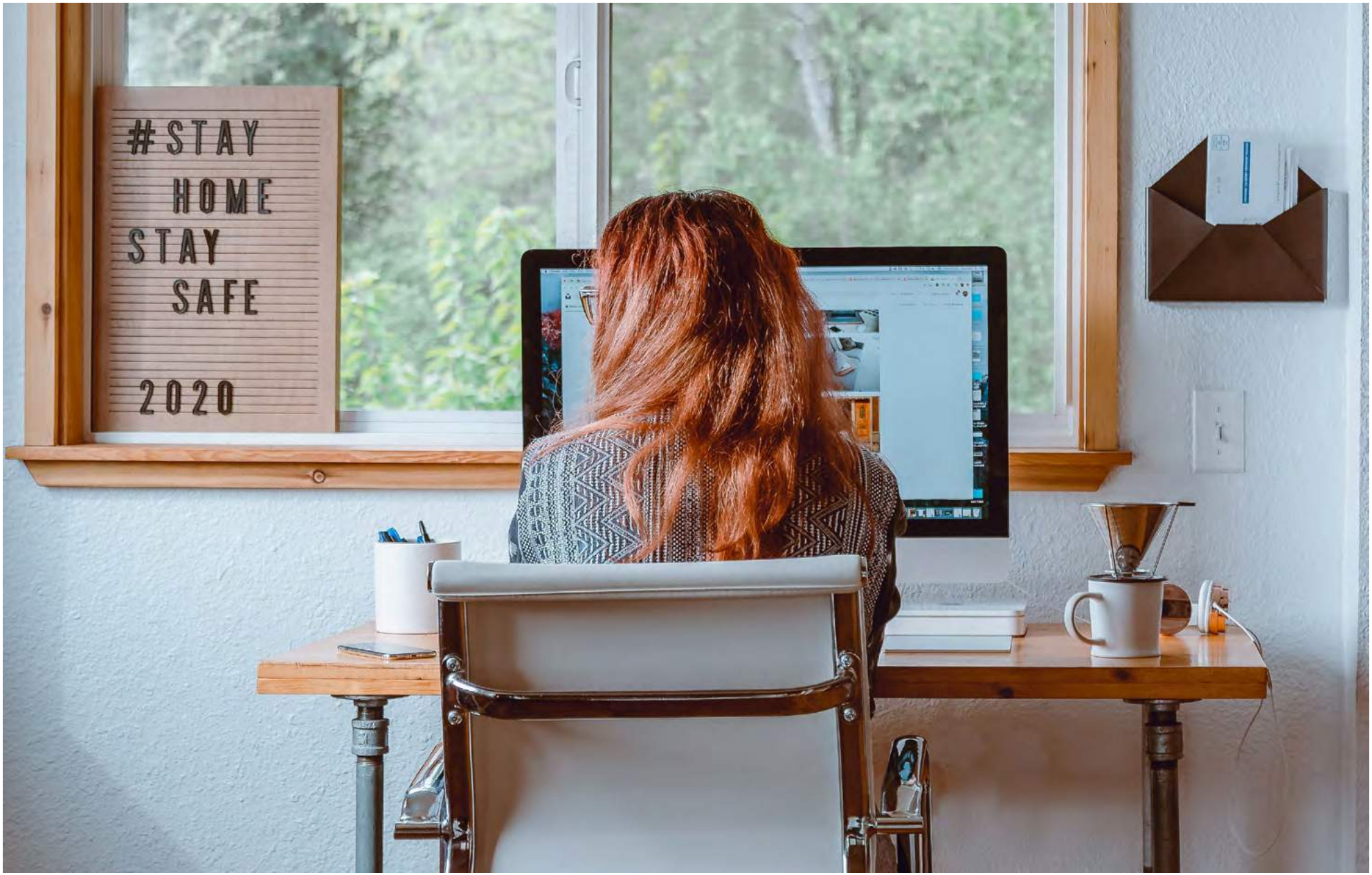
A need for…	Drives demand for…
Teamwork and training	Better meeting facilities (formal & informal)
Online/offline flexibility	Better videoconferencing facilities
Sensitive transactions	Quiet rooms
Work/life balance	Childcare facilities

These prognoses may sound bleak—but for airports, the news isn't all bad. The pandemic has changed how companies choose where to locate—and airports stand to benefit. For decades, knowledge-intensive firms preferred lively inner-city neighborhoods, citing the many conveniences of a high-density work environment. COVID led to a shift in priorities. With public health (and costs) front and center, those same neighborhoods are starting to look too crowded, too expensive, and too difficult to reach by car. That may lead to increased demand for suburban office parks. Before corona, they were often criticized for being boring, sterile, and antiseptic. After corona, those qualities suddenly seem more like an asset than a liability.

Successful airports like KEF will leverage that change in attitudes by positioning themselves as experts in biosecurity. Having implemented enhanced hygiene precautions and contactless technologies in the terminal, they'll apply those same measures to their landside real estate ventures. For airport-adjacent commercial property, that could be a major selling point.

Main references:

- https://globalworkplaceanalytics.com/cut-oil
- https://www.reviews.com/utilities/internet/when-doors-open-again-return-to-coworking-space-or-continue-working-from-home/
- https://www.wuv.de/karriere/corona_wird_den_bueromarkt_drastisch_veraendern
- https://www.wiwo.de/erfolg/beruf/homeoffice-so-sehen-dax-konzerne-die-arbeitswelt-nach-corona/25846736.html
- https://www.newgeography.com/content/006597-the-future-office-space-real-estate-market
- https://www.forbes.com/sites/traversmark/2020/04/09/37-of-jobs-can-be-done-from-home-according-to-a-new-economic-analysis


#STAY
HOME
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2020

1.2 The Future of Leisure

What's driving change?

The coronavirus crisis also seriously disrupted the global tourism industry. As this report is being published, the long-term impact on tourism remains an open question, depending first and foremost on the efficacy and adoption rate of vaccines. It also depends on the extent and duration of the COVID-induced economic downturn. When confronted with a diminished personal financial outlook, leisure travel is typically one of the first strategies that consumers deploy to cut costs.

Analysis in late 2020 by Icelandair and the Central Bank of Iceland estimated between 750,000 and 950,000 tourist arrivals for the year 2021. Moreover, In December 2020, the CEO of the Icelandic Travel Industry Association (SAF) indicated that it would take three to four years for the country to recover from the current crisis[1].

It is important to note, however, that COVID's impact on tourism is temporary, and is the function of a single external shock. Analysis of previous epidemics—such as the SARS outbreak of 2003—suggests that paranoid germophobia will gradually mellow into a calmer sense of precaution, as tourism operators raise their hygiene standards and travelers readjust to interacting with strangers in close proximity. By contrast, concerns regarding the social and ecological impact of tourism precede the outbreak and are likely to have a more profound long-term effect. These concerns coalesce around two key issues: the negative socio-spatial consequences of overtourism on the one hand, and climate change on the other.

The table on the next page outlines three emerging leisure trends, as well as their potential impact on the Kadeco development area.

1 "Iceland's tourism sector will need three to four years to recover from COVID-19." Schengen Visa Info News. 8 December 2020.

Main references:

- https://www.compassoffices.com/en/about-us/blogs/intl-travel-tourism-trends-2021-after-covid19/
- https://assets.kpmg/content/dam/kpmg/xx/pdf/2020/11/consumers-new-reality.pdf

Þróun	Hvað felst í henni?	Hver eru áhrifin?
Preference for remote, low-density, and "clean" destinations	While urban tourism and "city hops" will continue to be an important industry segment, many tourists will prioritize less crowded destinations such as smaller cities and rural areas. These trips will be motivated by safety concerns, as consumers seek affordable destinations that are perceived to be "clean."	**Mostly positive.** Iceland will benefit from its international reputation as a safe, clean, and sparsely populated destination whose primary attraction is its natural beauty.
Fewer, wealthier tourists	If business travel does not recover quickly to pre-crisis levels, airlines may need to rebalance their revenue sources by increasing the price of economy class tickets. In that scenario, domestic tourism would continue to attract a mass market, and long-distance leisure travel by air would be dominated by middle- and upper-income consumers capable of absorbing the additional costs. Many destinations would see a shift towards fewer, wealthier tourists. This socioeconomic shift portends both positive and negative outcomes. On the one hand, focusing on fewer, wealthier tourists allows governments to address growing concerns about overtourism while also guaranteeing that the tourism industry remains profitable. Economic development studies show that high-income visitors generate considerably more tourism revenue and jobs per capita compared to budget travelers. Some countries that depend heavily on tourism, such as Thailand, have introduced entry fees to accelerate that trend. In Q4 2020, Icelandic tourism policy witnessed a similar shift, with the rollout of tourism initiatives and long-term visa programs targeting high-net worth individuals. On the other hand, a shift towards fewer, wealthier tourists threatens the hard-won democratization of air travel that has taken place over the past 40 years. Simply put, flying may again become reserved for the rich and powerful. Curtailing the freedom of movement of lower-income citizens has significant ethical implications. It may also exacerbate the rise of populist, far-right social movements that threaten the democratic order.	**Both positive and negative.** Thanks to the qualities outlined above, Iceland is well positioned to expand its market share of high-income leisure travel. It will also help to address Icelanders' growing concerns about the impact of mass tourism on the environment and quality of life. However, leisure passengers' upward socioeconomic shift will accelerate the decline of Iceland's budget tourism market, already battered by the collapse of the low-cost carrier WOW. Hotel, Airbnb, and fast-food operators will need to update their business model accordingly, or look for jobs in other industries. Moreover, if flying overseas becomes financially unfeasible for a significant portion of the Icelandic population, it may exacerbate social tensions between perceived haves and have-nots.
More interest in sustainable travel.	Ethical concerns over the environmental impact of tourism are having a significant impact on consumers' leisure travel choices. Consumer pressure has prompted systemic changes among key industry stakeholders such as airlines and hotel operators, as witnessed by a reduction in plastics and single-use containers. At the same time, so-called "flight shaming" has drawn attention to the aviation industry's poor environmental track record. Thus far, however, that heightened awareness has not led to a significant decline in consumers' willingness to fly.	**Both positive and negative.** Iceland has a global reputation as a clean and ecologically conscious nation. This is a considerable asset that the Icelandic tourism industry can leverage moving forward. However, the Southern Peninsula is not commonly regarded as a tourism destination. Unless significant efforts are undertaken to change its positioning--for example by raising the profile of the Reykjanes Geopark--the Keflavik airport area is unlikely to become a major tourism destination.

How will the Keflavik airport area be affected?

As the ratings agency Fitch notes, "the tourism industry has been one of the key drivers of Iceland's economic growth, wage increase, influx of foreign labor, and rising real estate prices." Indeed, in 2019, tourism accounted for 9% of Iceland's GDP, and more than one-third of total exports[1]. The future of Icelandic tourism thus has broader implications beyond the industry itself. To maintain social and economic stability, Iceland will need to adapt to the realities of post-COVID leisure travel, and to engage with the shifting needs and desires of visitors. This may lead to a bifurcated approach to tourism: with one strategy focused on high-income travelers from abroad, and the other focused on Icelandic "staycationers" who—either by choice or by necessity—opt to spend their holidays closer to home.

Icelandic people do not perceive the airport area as a "typical" tourism destination. In order to attract them to Keflavik, Kadeco and its partners would need to develop leisure services, facilities, and products that are not available elsewhere in the capital region, or are better than existing competitors. On the other hand, for overseas visitors, Iceland is a "black box." They have vague ideas about the country's key features—volcanoes, lunar landscapes, hot springs—but do not attach those features and activities to specific locations apart from a few well known examples, such as the Blue Lagoon. The Kadeco development area can capitalize on this lack of detailed knowledge—and on its proximity to the airport and Blue Lagoon—by developing new tourism attractions in the airport area that cater to the consumer desires and aesthetic preferences of upper-income overseas visitors, such as an organic farm.

1 Fitch Ratings. "Fitch Revises Iceland's Outlook to Negative; Affirms at 'A.'" 22 May 2020.

1.3 The Future of Trade

What's driving change?

The coming decade will see a paradigm shift in how businesses deliver goods to their customers. Three factors are driving that change:

- **The expansion of e-commerce**
- **Technological innovations in cargo operations and supply chain management**
- **Onshoring, nearshoring, and the expansion of strategic product reserves**

This section summarizes each of these drivers, and analyzes their potential impact on the planning of the Keflavik airport area.

Expansion of e-commerce. While traditional retail continues to overwhelmingly dominate the market—accounting for four-fifths of all sales—its share is slipping as bricks-and-mortar enterprises struggle to counter the competitive advantages of online shopping. Between 2007 and 2019, e-commerce's market share in the United States tripled, jumping from 5% to more than 16% of retail sales[1]. In 2019, global e-commerce retail sales amounted to more than $3.5 billion. By 2022, that figure is projected to more than double to $6.5 billion[2]. Much of the industry is dominated by American and Chinese giants like Amazon and Alibaba; along with firms in emerging economies, such as Flipkart. Increasingly, these companies are seeking to consolidate their operations by developing their own supply chain networks. Many have already established their own last-mile delivery networks, bypassing national postal services and partnering with traditional players such as FedEx and DHL. In the coming decade, it is likely that e-commerce giants will seek to expand their footprint in the air cargo and freight forwarding industries. In so doing, they will follow the example of Amazon Air, a cargo airline that exclusively transports Amazon packages. That shift will have significant implications for airports, logistics operators, and freight forwarders.

Technological innovations in air cargo and supply chain management. In the coming decade, that paradigm shift in the business model of air cargo will be accompanied by simultaneous innovations in the technology that is used to transport goods from place to place.

Onshoring, nearshoring, and the expansion of strategic product reserves. In the coming decade, deepening geopolitical tensions will drive businesses and governments to rethink their offshore manufacturing practices, and in particular to reconsider their dependence on China. Motivated by political pressure and/or government incentives, some companies will bring production

1 Ali, Fareeha. "A Decade in Review: E-Commerce Sales vs. Retail Sales, 2007-2019." Digital Commerce 360. 3 March 2020.

2 Clement, J. "Global Retail E-Commerce Sales, 2014-2023." Statista. 27 August 2020.

back to their home countries ("onshoring"), while others will move manufacturing sites closer to their products' end users ("nearshoring"). Companies that outsourced production to low-wage labor markets will compensate for the increase in labor costs by automating production. In the near term, these trends will drive demand for high-quality advanced manufacturing facilities in advanced economies. Finally, the supply chain disruptions experienced during the coronavirus crisis will push governments to expand their strategic inventories of key supplies such as consumer goods, protective equipment, and pharmaceuticals. In the short term, that will lead to greater demand for warehouses, where goods can be stored under secure, sanitized, and temperature-controlled conditions.

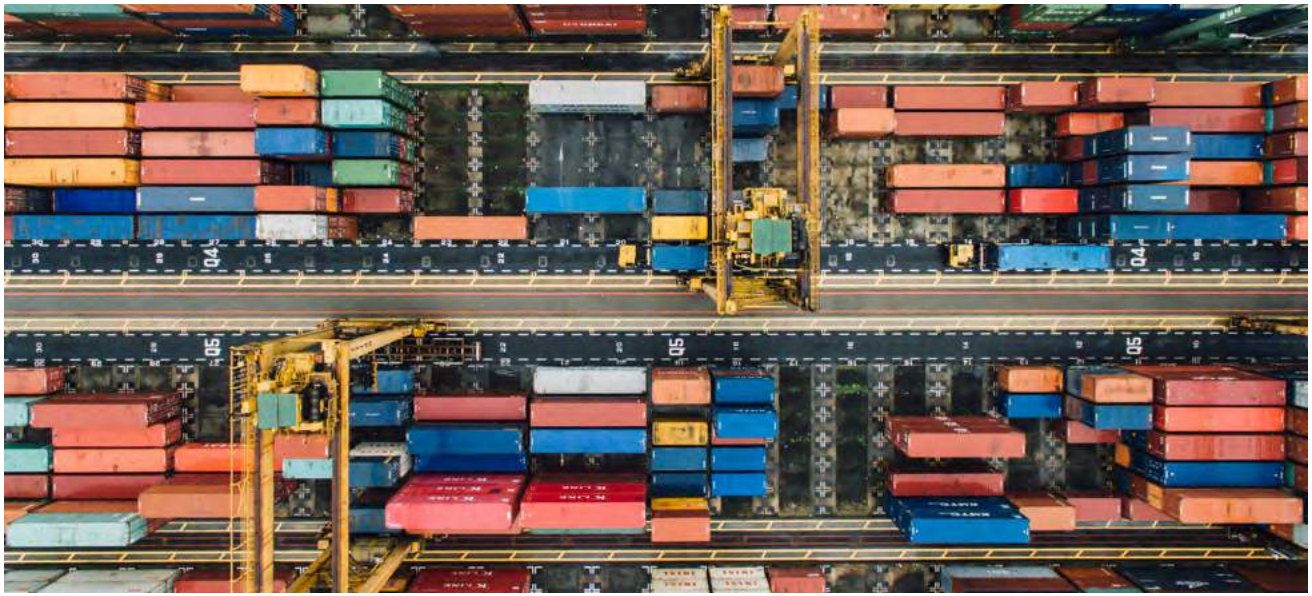
How will the Keflavik airport area be affected?

Viewed from a global perspective, KEF is not a significant cargo hub. Its annual throughput (ca. 60,000 metric tons) pales in comparison to global players like Anchorage and Hong Kong, where throughput is measured in millions, rather than thousands, of tons. Moreover, efforts to engage with international retail e-commerce firms will be hampered by the small size of Iceland's domestic consumer market, as well as by Iceland's geographic isolation.

Nevertheless, both the airport and the airport area stand to benefit from the three trade transformations outlined above—that is, if Keflavik can persuasively articulate its unique niche and operational advantages in a highly competitive global air cargo market. Viewed from abroad, Keflavik has three key competitive advantages:

- **A reputation as a clean, safe, and transparent place to conduct business**
- **Openness to new technologies**
- **Positive bilateral relations with Europe, the US, the UK, and China**

Taken together, these advantages put Keflavik in a good position to develop secure, safe storage facilities, to serve as a base for advanced manufacturing, and to serve as a test bed for emerging long-distance cargo drone technologies.



1.4 The Future of the Environment

Hvað er það sem knýr fram breytingar?

Globally, aviation accounts for about 2% of CO2 emissions. Consumers are increasingly prioritizing climate change, and they have singled out airplanes as a major source of pollution. Over the past five years, that has led to a backlash against air travel, particularly in Northern Europe, where a “flight shaming” movement has begun to affect spending habits, travel patterns, and infrastructure investments. One example is Sweden, where government agencies and private companies have imposed a ban on short-haul flights, requiring their employees to travel instead by train. In Norway, meanwhile, the civil aviation authority Avinor plan to introduce electrified aircraft on key domestic routes by 2030, and to operate a completely electrified domestic route network by 2040[1].

How much and how quickly these regulatory and attitudinal changes will impact the aviation industry on a global scale has yet to been persuasively measured. However, it is clear that a paradigm shift is taking place, as more passengers—and governments—are calling on airports and airlines to clean up their act. Moving forward, the aviation industry’s key challenge is to find an approach to climate change adaptation that is both environmentally and economically sustainable. First and foremost, that will require significant improvements in aircraft design. In the short term, aircraft manufacturers need to increase the fuel efficiency of jets and use more aerodynamic building materials, such as carbon composites. They also need to increase the use of sustainable aviation jet fuels: including both synthetic fuels, as well as biofuels that blend petroleum with other fuel sources such as cooking oil, plant oil, and agricultural waste. The medium to long term will see more significant changes in aircraft design, along with changes in the fuel sources used to power them. With that goal in mind, approximately 200 companies worldwide are seeking to develop electric and/or hybrid powered aircraft.

How will the Keflavik airport area be affected?

In the coming decade, climate change adaptation will affect the Kadeco development area in three key ways. First, Isavia, Icelandair, and air cargo operators will need to demonstrate concrete steps towards decarbonizing their operations. Second, any new development in the airport area will need to adhere to stricter carbon neutrality goals. The necessary improvements in airport design and airport-area development are discussed in greater detail in Chapters 2 and 3, respectively.

1 Avinor. Forslag til program for introduksjon av elektrifiserte fly i kommersiell luftfart. March 2020.

Third, unless global CO2 emissions radically decline with immediate effect—which is extremely unlikely—the year-round ice cap covering the Arctic Ocean will disappear by 2035, and perhaps as early as 2030. While this is an extremely unfortunate development, the disappearance of multi-year sea ice will open up a new maritime trade corridor called the Transpolar Sea Route (TSR). TSR would enable cargo vessels to sail directly across the North Pole without the help of ice breakers, considerably reducing the time, cost, and fuel required to move goods between Europe, Asia, and the Pacific coast of North America (see map). Should TSR become a commercially viable shipping route for even part of the year—which appears highly likely—it will upend existing trade patterns and significantly transform the maritime cargo industry.

The melting of the Polar ice cap will herald a dark new chapter in the ongoing process of climate change. To say that it is an unwelcome development is a gross understatement. However, even if all of the world's major producers of CO2 immediately committed to drastic decarbonization measures, it would still not be sufficient to reverse the disappearance of multi-year sea ice in the Central Arctic Ocean. It can also not be overlooked that Iceland stands to benefit considerably from the TSR thanks to its geographic location. Proximity to the new route could open up new opportunities for Iceland's maritime cargo industry, as well as for sea-to-air cargo transshipment in the Keflavik airport area.

2 Global Trends and Innovations in Airport Area Development

Developing the airport area is a priority for airports, and for the cities and nations that they serve.

Developing the airport area is a priority for airports, and for the cities and nations that they serve. On the one hand, airports depend on landside real estate as a crucial source of non-passenger revenue, and as an insurance policy designed to mitigate risks inherent to the aviation industry. (see 2.1). On the other hand, cities and regions promote airport-led urban development to achieve a broad range of social and economic development goals.

Drawing on examples from leading airport areas from around the world, this chapter investigates why developing the airport area matters for airports, and why it matters for cities and national governments. It then identifies the four key drivers that fundamentally determine the success or failure of any airport area development project. Specifically, it highlights customer focus, site-specific development, effective governance, and project positioning as necessary preconditions for delivering a substantial return on investment, and for moving efficiently from the concept stage to implementation.

The chapter illustrates those success factors through case studies that have been selected for their particular relevance to the Keflavík airport area. Finally, the chapter analyzes the primary airport areas that compete directly with KEF, and evaluates Keflavík's relative strengths and weaknesses from a global perspective.

To identify the most relevant international references cases, four selection criteria were applied:

- airports with annual passenger volumes that are similar to KEF
- airport areas with comparable spatial opportunities and challenges: for example, large land reserves and low population densities
- airport regions whose social and economic geography is comparable to that of the Southern Peninsula and Reykjavik capital region
- airport areas that are global thought leaders, and that have pioneered development strategies that are transferable to Iceland

2.1 Why Do Airport Areas Matter for Airports, Cities, and National Governments?

In recent decades, policymakers, planners, and leaders in the aviation industry have come to recognize airport area development as both an essential pillar of the airport business model, and as a key driver of urban, regional, and national economic growth. To better understand the prominence of these airport-led urban development projects, it is important to begin with a simple—but often overlooked—question: why does developing the airport area matter for airports? Their primary mission, after all, is to move airplanes in and out of the airport, and to assist the passengers and goods aboard those planes with their onward journey. Casual observers might therefore assume that the airports' interests do not extend beyond the terminal and the airfield. So why, then, do many of the world's most successful hubs devote so much time and resources to developing the surrounding area?

The answer lies in the fact that non-aeronautical revenue (NAR) has become an essential part of the airport business model: accounting for approximately 40% of airports' global income[1]. At most airports, travel retail and car parking represent the top two sources of non-aeronautical income. Property development ranks third, accounting for 15% of airports' global NAR.

However, in the aftermath of COVID-19, property development has taken on a more important role in generating NAR. Unlike travel retail and parking—which collapsed following the precipitous decline in air travelers—income derived from airport real estate is immune to sudden changes in passenger numbers. When travelers disappear, real estate keeps generating income for the airport. During the 2020 pandemic, real estate was one of the only reliable money makers: a rising star at a time when most revenue sources plummeted. As airports seek to diversify their revenue sources, they have come to recognize that real estate is not only an additional source of revenue, but also functions as a countercyclical 'insurance policy' that enables airports to manage unavoidable risks in the aviation industry. By providing a reliable financial cushion, property development enhances airports' financial and organizational resilience when unexpected disruptions—be it a public health crisis, a terror attack, a natural disaster, or an airline bankruptcy—wreak havoc on their core business.

Developing the airport area is also a priority for policymakers and planners at the local, regional, and national levels of government. Around the world, they have come to recognize that airports are essential drivers of economic development. Airports are typically one of the nation's largest employment centers, and one of the best connected places in the country.

Nowhere is that more clear than in Iceland, where approximately 1.8% of the national workforce is directly employed at Keflavík airport[2]. Successful cities such as Denver, Singapore, and Zurich have leveraged that connectivity to advance a broad range of social and economic development goals. Through airport-led projects, they use the airport as an anchor for expanding the city outward, and draw on the infrastructure that connects the airport to the CBD as the backbone for urban expansion and redevelopment. In so doing, they spread the benefits that typically accumulate in city centers—such as access to higher education and employment opportunities—to the wider region. At the same time, successful cities use airport-led urban development as a means to tackle common inner-city challenges, such as overtourism, a lack of affordable housing for young families, and a lack of affordable office space for early-stage companies. By building new research campuses, workspaces, tourism attractions, and residential areas in the airport area and along the airport corridor, policymakers thus aim to distribute economic opportunities and raise the attractiveness of the entire urban region as a place to live, work, and visit.

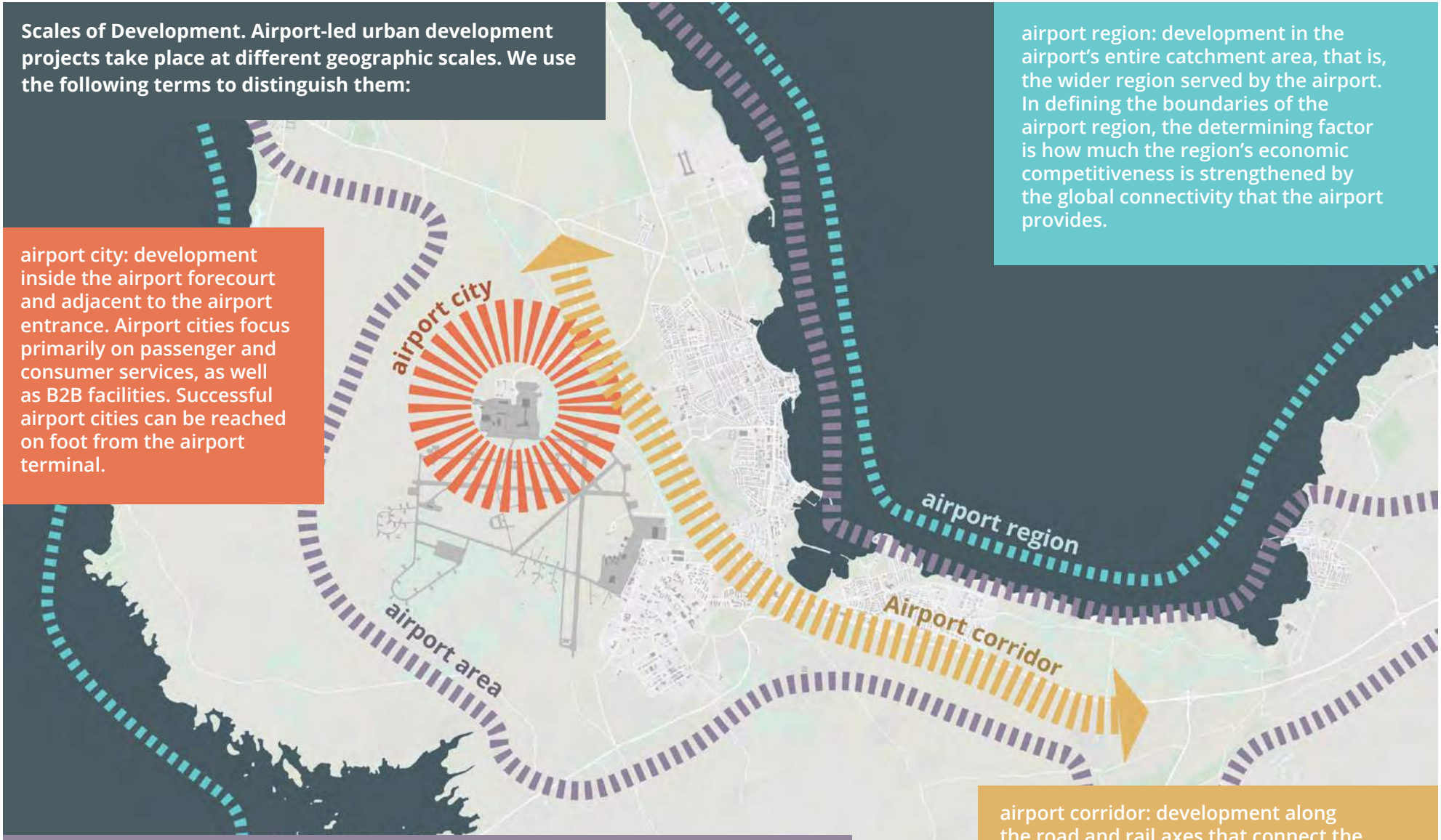
1 Airports Council International. Airports Economic Report. 2019.

2 Figures calculated based on workforce data provided by Isavia and Statistics Iceland.

Scales of Development. Airport-led urban development projects take place at different geographic scales. We use the following terms to distinguish them:

airport region: development in the airport's entire catchment area, that is, the wider region served by the airport. In defining the boundaries of the airport region, the determining factor is how much the region's economic competitiveness is strengthened by the global connectivity that the airport provides.

airport city: development inside the airport forecourt and adjacent to the airport entrance. Airport cities focus primarily on passenger and consumer services, as well as B2B facilities. Successful airport cities can be reached on foot from the airport terminal.



airport area: development in the wider area surrounding the airport and airfield. This includes cargo and logistics hubs that require direct access to the airfield. It also includes manufacturing, processing, and energy production and storage facilities, as well as land-intensive B2B and B2C services. Developments in the airport area are accessible by car or public transportation in 10-20 minutes from the airport terminal.

airport corridor: development along the road and rail axes that connect the airport to major population centers in the airport catchment area. Mixed-use transit-oriented development (TOD), incorporating residential, commercial, and industrial functions, are a key feature.

2.2 Airport Area Programming and Land Use Strategies

To do so, urban planners and commercial developers apply a variety of programming and land use strategies. Broadly speaking, the most common strategies fall into six categories:

- passenger services, e.g. airport hotels, parking garages, and car rental facilities
- business services, e.g. office parks and MICE facilities
- services for local consumers, e.g. retail, entertainment & leisure, tourism attractions
- cargo infrastructure, e.g. warehouses and logistics centers
- social infrastructure, e.g university campus, medical services, sports facilities
- energy infrastructure, e.g. solar farms and microgrids

It is important to note that these categories are not mutually exclusive. In fact, many of the most successful airport area developments serve multiple audiences and multiple purposes. An airport hotel is a good example. While its core business is to provide overnight accommodation for air travelers, it can also host international conferences. A full-service hotel restaurant can be an attractive venue for business lunches and after-work drinks during the week, as well as for parties and private celebrations on the weekend. Moreover, some hotels even double as social infrastructure for the local community. A good example is a German hotel that partners with a local primary school, which uses the hotel pool for children's swimming classes in the late morning: a time when most hotel guests have already checked out.

The following table provides an overview of airport-area programming strategies, illustrated with successful international examples.

Land use	Example
Office Space	Schiphol CBD (AMS), Changi Business Park (SIN)
Cargo & Logistics	Amazon Air (CVG), Cargo City (BUD)
Entertainment & Leisure	AsiaWorld-Expo (HKG), Dorian Gray (FRA), Airport Stadium 12 movie theatre (STS)
Retail	Airport Shopping Center (ZRH), The Jewel (SIN), Landside Duty Free (MNL)
Residential	Aviapolis (HEL), Gateway Gardens (FRA)
Education & Research	Singapore University of Technology & Design; Singapore Aviation Academy (SIN), EIN
Medical	Health Center Vienna Airport (VIE)
Film Production	Blackhall Studios (ATL)
Sports & Recreation	Runway Visitor Park (MAN), Buitenschot Land Art Park (AMS)
Culture	Finnish Aviation Museum, Aviapolis Art Residency (HEL)
Energy	Airport City Solar (YEG), London City Airport Microgrid (LCY)
Agriculture/Agribusiness	Australian Center of Excellence in Food Innovation (SWZ)

2.3 Success Factors for Airport Area Development

Given their shared interest in developing the airport area, hundreds of airports, cities, and national governments around the world have launched ambitious airport-led development projects, often branded as an "airport city," "airport corridor," or "aerotropolis." However, despite their best intentions, many of these have projects have failed to deliver a significant return on investment. Still others struggle to move from the concept stage to implementation. To a large degree, these shortcomings are due to the fact that planners and policymakers have focused primarily on the airport area's spatial layout and underlying economic framework. Less attention has been paid to key factors such as the airport area's governance, land ownership structure, property development model, and existing market demand, all of which crucially determine how feasible it is to implement an airport-area development plan and deliver a positive return on investment. Research conducted by the author indicates that insufficient awareness of these factors among key decision makers is the most common barrier to success in airport areas. Moreover, a lack of experience in real estate development, poor coordination between the key development parties, and an unclear understanding of the project's target customers prevent many airport-area development programs from moving forward

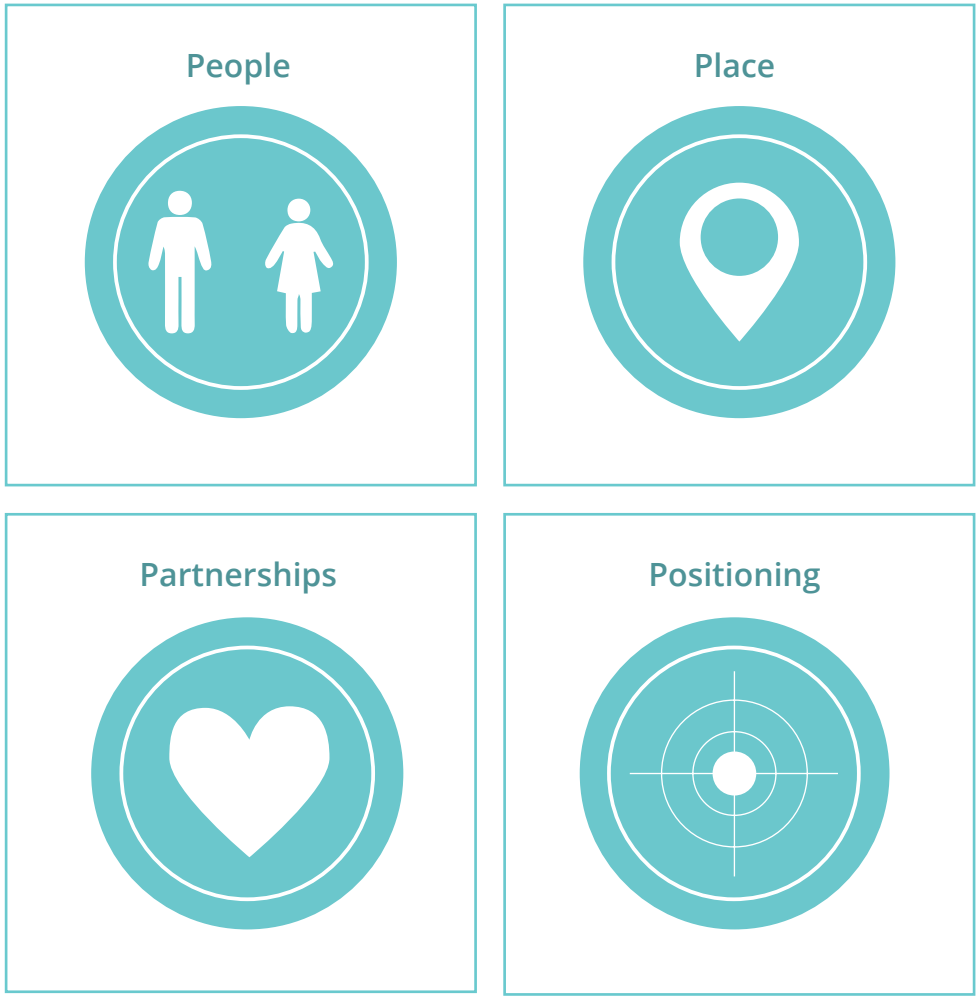
Why do airport areas fail?

There are many reasons why airport areas fail to meet their full potential. The most common include:

- a lack of experience with real estate development on the part of the airport authority and its key development partners
- political pressure to produce an overly optimistic business case that exaggerates the attractiveness of airport real estate, inadequately assesses actual market demand, and underestimates competition from comparable developments located nearby
- the implementation of a generic, copy-and-paste development concept, based on a single reference case from another airport area, rather than a site-specific plan that leverages unique local success factors
- a lack of coordination and unclear division of labor between the key development parties
- an unclear vision of what types of customers the project aims to attract, along with an unclear understanding of those target customers' specific needs and desires
- an inability to convince key stakeholders and decision makers to prioritize airport area development, leading to a lack of momentum.

What, then, are the key factors that fundamentally determine the success or failure of any airport-area development project? An analysis of available data points to four key drivers of success. They can be summarized as the "four Ps:"

The Key Drivers of Success: The "Four Ps"



2.4 People: Customer Focus

First and foremost, successful airport areas begin the development process by focusing on *people*: specifically, the people who live, work, and run businesses in the airport area. They initiate the concept development stage by identifying the types of customers that the project can potentially attract. That includes people already present in the area—such as passengers, airport employees, and local residents—as well as target customers in the wider region, such as business owners and potential new inhabitants. Next, successful airport areas investigate the unique needs and desires of each of these target customer groups, and identify which of those needs are currently not being met. Allowing customer focus to drive the concept development stage empowers planners and developers to pinpoint specific services, facilities, and land uses that respond to those unmet demands. While successful airport areas differ considerably in terms of their ownership structure, economic agenda, and land use strategy, they are united by an unwavering attention to the needs and desires of their target customers. That customer-focused development approach is known as *airport urbanism*.

Successful airport areas begin the concept development process by identifying potential customers for future development in the airport area. Those customers fall into four categories:

- passengers
- residents
- employees
- business owners

Less successful airports, on the other hand, depend on a product-driven approach to property development. They begin the process with a predetermined set of building types—for example, an office park or a logistics hub—and then look for potential customers to fill those buildings. In so doing, they ignore the actual needs of the local business community, and overlook innovative opportunities to capture new sources of revenue. Not surprisingly, these generic business districts often duplicate existing facilities in the surrounding area, leading to high vacancy rates and a poor return on investment.

2.5 Place: Site-Specific Development

The second driver of success is place. Successful airport areas create place-based strategies that leverage the airport's unique geographic advantages and engage with market gaps in the airport's catchment area. To do so, they focus on three critical spatial considerations:

- local connectivity in the airport area;
- airport ground access: that is, the ground transportation network that links the airport to major population centers; and
- distance to the CBD.

Local connectivity in the airport area. Airports generally have excellent long-distance connections to a range of domestic and international destinations. But airport areas are often characterized by poor local connectivity. Public transportation can be limited, and walkability is a common challenge: leading to what transport planners refer to as the last-mile problem. The airport itself may be an attractive place to do business: but an office park or shopping center located even just a few hundred meters from the terminal will struggle to attract customers in the absence of dedicated walkways and convenient ground transportation options. Successful airports avoid these challenges by deploying a coherent mobility and urban design concept for the entire airport area.

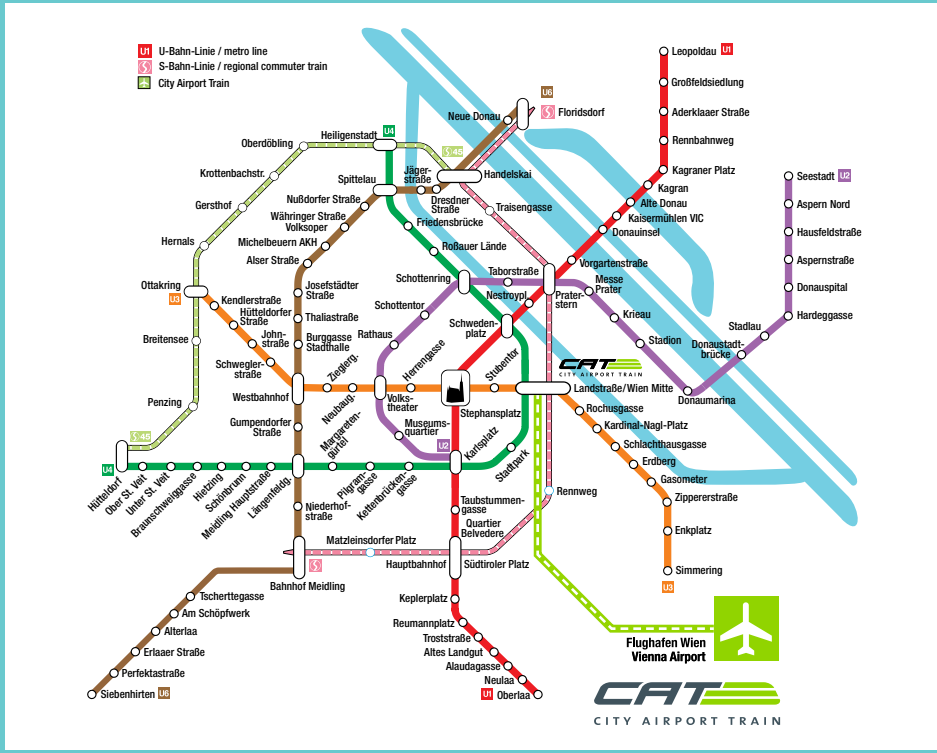
Airport ground access. Airports' primary mission is to facilitate arrival and departure of aircraft, and to assist the passengers and goods aboard those planes with their onward journey. In effect, airports operate as multimodal mobility hubs, where road, rail, and maritime networks intersect with air transportation. After all, very few travelers' final destination is the airport itself; and very few airport employees live in close proximity to their workplace. It's therefore essential to provide frequent, comfortable, and reliable ground transport connections that link the terminal to destinations across the airport's catchment area. Moreover, as airports adapt to the challenges of climate change, providing adequate ground access has gained a new urgency. Ground access is one of the biggest sources of pollution in the aviation industry. Every day, thousands of passengers and employees drive to the airport, generating enormous quantities of CO2. Convincing them to use mass transit, rather than coming by car, would be a huge step towards decarbonization. To do that, smart airports and smart cities invest in comfortable and convenient public transport connections between the airport and the surrounding region. That additional ground connectivity, in turn, significantly raises the accessibility and attractiveness of urban development in the airport area.

Distance to the CBD. Successful airport areas also acknowledge the importance of place by evaluating their airport's locational advantages in the context of the wider urban region. A key consideration is how far the airport is from the CBD and other major population centers—and that's a distance that customers measure in minutes, not in kilometers. Some types of development, such as business meeting facilities, depend on quick access to the city center. Other land uses, such as industrial activities and energy production, fare better in more remote locations.

Focusing on these three place-based factors—local connectivity in the airport area, ground transportation links to and from the airport, and distance to major population centers—empowers successful airport areas to pinpoint specific services, facilities, and land uses that are most appropriate to their unique spatial context.

Case Study: Vienna (VIE) and Kunming (KMG)

The cases of Vienna (VIE) and Kunming (KMG) offer two contrasting examples of how airport areas can leverage their relative proximity or distance to the city center. At VIE, high-speed trains link the airport to central Vienna in 15 minutes. For VIE's airport city, those quick rail connections open up programming options that benefit from proximity to the city center, such as business meetings and conferences. By contrast, an airport located far from the CBD needs to come up with very different strategies. A case in point is Kunming, the capital of China's Yunnan province. Kunming Changshui airport (KMG) is located in a rural area, more than 30km from the city center. KMG functions as an important regional hub, connecting remote towns across the mountainous province to cities in China and Southeast Asia. Those remote towns are both major tourist destinations, as well as production sites for crops used traditional Chinese medicine (TCM). KMG's airport area development strategy leverages the airport's hub status by emphasizing those two economic sectors: offering hotels and Yunnan-themed retail outlets to layover tourists on the one hand; and providing processing and transshipment facilities for the province's medical botany industry on the other.



2.6 Partnerships: Governance

Airport-led urban development projects involve a wide range of people and organizations with an interest in their evolution. It is only by having a clear understanding of each stakeholders' short-term and long-term priorities that a consensus can be achieved to enable meaningful change to occur. With that in mind, successful airports coordinate what is being built on the airside, landside, and beyond the perimeter fence in order to advance development strategies that complement, rather than compete with, each other. To do so, they create strategic partnerships with key development parties in the airport area. The most successful partnerships have five things in common:

- a shared vision for the airport area, expressed through a well defined set of short-term and long-term goals;
- a willingness to look beyond each partner's own institutional boundaries in order to optimize the airport area's economic potential and strengthen regional competitiveness;
- a clear division of labor based on each partner's area of expertise;
- a shared financial interest in the success of the project; and
- regular face-to-face meetings.

Key Development Parties. While the institutional arrangements vary from airport area to airport area, the most important development partners typically include:

- **airport authority**
- **local municipality/municipalities**
- **largest municipality in airport catchment area**
- **regional/provincial government**
- **private developers**
- **national transportation ministry**

In addition, the following stakeholders also play an important role:

- **economic development agency**
- **landowners**
- **investors and lenders**
- **tenants/end users**
- **citizens' groups**

Large-scale airport-led development projects frequently involve multiple landowners and developers, and they often cut across countless administrative boundaries: towns and provinces on the one hand, and government ministries and regional planning authorities on the other. The more actors that are involved, the harder it becomes to implement a coherent long-term vision. Successful airport areas address that challenge head-on by establishing a governing body that brings the key development parties to the table, and where binding decisions can be made. By contrast, single-handed attempts to develop the airport area—without the cooperation of external partners—are more likely to lead to unrealistic development plans. They are also more likely to suffer from inadequate access to capital, and from protracted disputes that can delay or even derail the entire project.

Governing the airport area is a complex undertaking that depends on the local legal framework, landownership structure, and real estate development practices. There is no one-size-fits-all solution that can be applied to every airport area. However, a global survey of airport areas reveals three common governance approaches:

state-led: the national government designates the airport area as a special zone of national importance administered directly by a special-purpose development agency. Local regulations and land-use policies are superseded in order to expedite the development and expropriation process. This approach is common in China, where the central government has designated more than 20 Airport Economic Demonstration Zones (AEDZs) across the country. While this top-down model streamlines public-sector inefficiencies in the permitting and approval process—a common challenge for all airport areas—it is less adept at surveying actual market demand and incorporating the perspective of the private sector.

market-driven: a voluntary association brings together cities, economic development agencies, and companies with a shared interest in developing the airport area. The association prioritizes the needs of the local business community, and seeks to align individual investors' objectives with the job creation and economic competitiveness goals of local municipalities. One example is the Aerotropolis Atlanta Alliance (AAA), which brings together cities, counties, and companies based in the airport area. The Alliance's members—designated as "investors"—join on a voluntary annual basis. This is a more flexible approach to governance that allows the spatial and programmatic scope of airport-area development to grow and change according to market demand. However, with the association's members and physical planning boundaries in a constant state of flux, implementing a long-term vision and coherent urban plan for the airport area can be challenging.

hybrid (state+market): one or more public institutions—e.g. a ministry, airport authority, and/or municipality—establish a private company to plan, develop, market, and manage large-scale development projects in the airport area. A key example is the Schiphol Area Development Company (see boxed text). The strength of this model lies in its ability to combine political support and long-term planning capabilities from the public sector with the operational flexibility and corporate governance practices native to the private sector. The model's weakness lies in the potential for collusion between elected officials and private developers, distorting the market and harming public-sector transparency. Rigorous monitoring procedures are therefore essential to guarantee long-term success.

Case Study: Schiphol Area Development Company (SADC)

The Schiphol Area Development Company (SADC) was founded in 1987 to develop commercial real estate in the area surrounding Amsterdam's Schiphol International Airport (AMS). The oldest organization of its kind, SADC offers important lessons to other airport areas seeking guidance on effective governance strategies and efficient consensus-building techniques that deliver a profitable and sustainable return on investment for multiple stakeholders.

SADC is a private real estate development company that is owned by four public-sector shareholders: Schiphol Group, the airport operator; the province of North Holland, which is responsible for regional planning issues in the airport area; the municipality of Haarlemmermeer, where most of SADC's assets are located; and the municipality of Amsterdam, the largest city in Schiphol's catchment area. Each of the four shareholders owns a 25% share of SADC: a figure based on the initial contribution—either land, capital, or a combination of the two—that each party invested into the company.

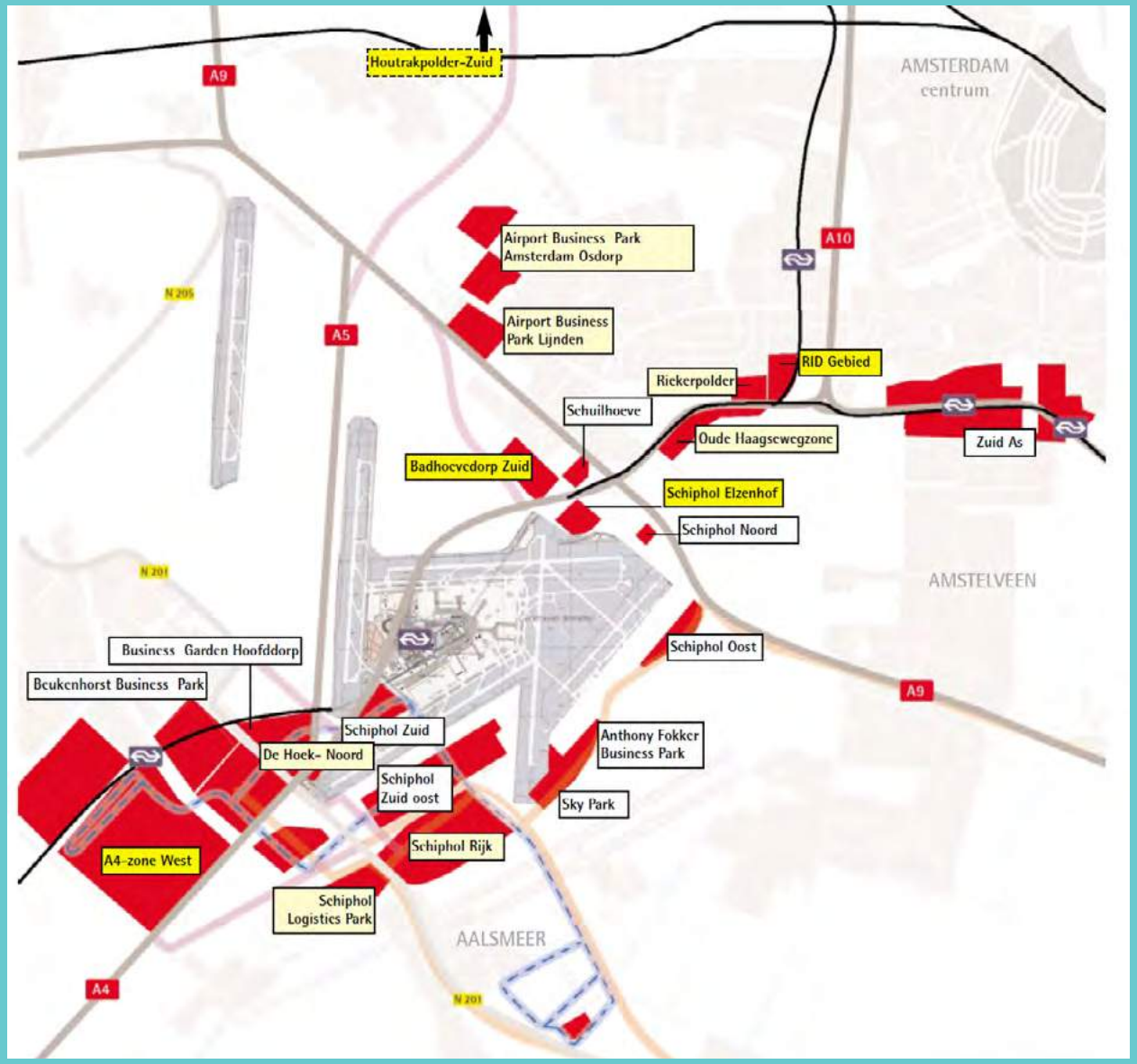
SADC's long-term success can be attributed to three key factors. First, the four development parties have agreed on a shared vision for the airport area, and a shared set of both short-term and long-term goals. Second, the four parties are willing to look beyond their own borders to optimize the economic potential of the airport and the surrounding cities. In so doing, they strengthen the competitive position of the entire region on both a national and international level. Finally, SADC's mission was borne out of a sense of urgency. At the time of its founding, the Netherlands found itself in the middle of an economic crisis, characterized by high unemployment and macro-level structural changes. SADC's shareholders recognized the need to create jobs and attract companies and foreign investment. Moreover, the four development parties shared a sense that not only the airport, but also the entire region, needed to reinvent itself in order to remain competitive. And they recognized that that reinvention could only take place if the key decision makers in the airport area joined forces.

SADC's initial goal was to attract companies and create employment in the airport area. Over time, the organization expanded its mission beyond economic growth alone to focus on broader societal returns, such as improving the livability and sustainability of the airport area. SADC deploys four key strategies to achieve those goals. First, SADC defines the economic development strategy for the entire airport area. In so doing, it links the spatial and economic objectives of the national government to the development goals of the airport and local municipalities. In that sense, the organization operates like a regional economic development agency.

Second, SADC takes those strategies forward by operating as a property development vehicle. Staff conduct market analyses, provide real estate development and management expertise, coordinate master planning and design contests, and serve as the main point person for tenants and investors throughout the development process. Third, SADC markets the airport area via a voluntary association—called the Amsterdam Airport Area (AAA)—that brings together public agencies and private companies from around the region. Working together with the Dutch national investment board, SADC promotes the airport and the airport area on both a national and global scale, and operates as a one-stop shop to help foreign companies get set up in the area.

Finally—but perhaps most importantly—SADC functions as the 'glue' that holds its four shareholders together: managing relationships between the key development parties and keeping the four organizations aligned on a value level. Frequent face-to-face meetings are designed to ensure that the shared vision for the airport area remains relevant and a priority for all four development parties. Moreover,

SADC organizes 3-4 workshops per year to discuss high-level vision and spatial planning issues. Recent topics included how to improve the transport links that connect the airport to the capital area; as well as how to align Schiphol's airport master plan with the master plan for the airport area. Leveraging SADC's coordinating role has great improved cooperation between the airport, municipalities, and regional government. Moreover, by avoiding the problem of silos, SADC's role as an information-sharing platform has significantly streamlined the development process.



2.7 Positioning: Marketing and Branding

The final P—positioning—addresses one of the biggest challenges that every airport real estate project faces: how to build momentum, and how to build the support that is needed to drive development forward. Less successful projects fail to get off the ground due to a lack of momentum. In many instances, plans to develop the airport area have been discussed for a decade or longer. After prolonged periods with few tangible results, investors, stakeholders, and the general public quickly lose faith in the project's viability.

By contrast, successful airport areas position their project to build both *internal* support—that is, among the key development parties—as well as *external* support among investors, tenants, and government officials. To do so, they publicize a project vision that offers compelling answers to five key questions:

- How does the project advance the airport's strategic goals?
- How does the project advance the city's/the nation's development goals?
- What benefits will the project bring to the community?
- Why does this project need to be built *right now*?
- What will happen if the project *doesn't* get built?

Successful airport areas can answer these questions confidently and persuasively; less successful ones can't.

2.8 Keflavík in Global Perspective: Competing Airport Areas

This section provides an overview of the Keflavík airport area's main international competitors. A comprehensive perspective on these competing airport areas is essential to understand the development opportunities in the Kadeco planning area, in particular the feasibility of attracting international tenants and investors.

The following selection criteria were applied to identify KEF's main competitors:

- competitive geography and connectivity: airports with competing geographic locations and route networks
- competitive passenger services: airports that compete with KEF for passenger traffic, including transatlantic service and medium-haul leisure destinations
- competitive cargo services: airports that compete with KEF for cargo traffic
- competitive landside development: airports with existing airport city/airport area development projects and/or with the potential to develop such projects in the future
- competitive business context: airport areas with comparable levels of government transparency, access to talent and capital, and ease of doing business

Based on these criteria, five airport areas were identified as Keflavík's main competitors: Amsterdam (AMS), Dublin (DUB), Frankfurt (FRA), Helsinki (HEL), and Oslo (OSL). The table below outlines the operational profile of each of these airports, as well as the scale of development in the surrounding airport area.

Airport	Annual passenger volume (m pax)	Annual cargo volume (1,000 metric t)	Operator Profile	Airport area development	Key development parties
AMS	71.7	1,592	Schiphol Group	High-density airport city in terminal forecourt (Schiphol CBD) and TTC facilities (Schiphol Oost), including office, hotel, MICE, air cargo facilities. Seven business parks in airport area covering 600+ ha. Focus on aerospace, logistics, fashion, F&B, life sciences, glass, furniture.	Schiphol Area Development Company (see 3.6), Schiphol Real Estate, municipality of Haarlemmermeer, municipality of Amsterdam, external developers
DUB	32.9	138	DAA	Dublin Airport Central (DAC): commercial office space development. Phase 1 (20,000 sq m) completed Q3 2020 with anchor tenants Kellogg's and ESB. Phase 2 extension to be completed in 2022. Two on-airport hotels, sports club, swimming pool.	DAA, external developer
FRA	70.6	2,091	Fraport	The Squaire: largest office building in Germany (140,000 sq m) completed adjacent to Terminal 1 in 2011. Anchor tenants include KPMG, Lufthansa, two Hilton hotels, Rewe supermarket. Gateway Gardens: 35ha transit-oriented, mixed-use "global business village" including office space, hotels, convention center, and apartment complex. Commuter railway station opened 2019.	Fraport Real Estate, external developers
HEL	21.8	230	Finavia	Aviapolis: 40 sq km master plan for mixed-use, transit-oriented airport city. Railway linking airport to Helsinki center via Aviapolis completed 2015. Phases 1 and 2 completed with 3 office blocks, hotel, Finnair HQ, residential new town, start-up innovation center, drone testing facility, shopping center, public library, community center. Current Phase 3 focuses on retail, office, high-density residential, aviation museum, and tourism attraction.	City of Vantaa, consortium of 6 external developers, private landowners, Finnair, Finavia
OSL	28.5	181	Avinor	Oslo Airport City (OAC): 100ha mixed-use, "energy positive" commercial & residential development. Porsche Center and conference hotel to be completed in 2021 and 2022, respectively. On-site production of renewable energy aims to create an "energy-positive airport city."	Oslo Airport City AS, municipality of Ullensaker

Sources: ACI, Ireland Central Statistics Office, airport websites.

2.9 Keflavík in Global Perspective: Strengths and Weaknesses

The final section of this chapter investigates Keflavík's strengths and weaknesses from a global perspective. In order to evaluate the international competitiveness of the airport area, we have compared the development opportunities and constraints in the Southern Peninsula—analyzed in Part II of this report—with developments in globally leading airport areas (see section 3.2) and at KEF's key competitors (see 3.8).

Based on that analysis, we have identified the following strengths and weaknesses in the Keflavík airport area:

Strengths:

- Iceland's reputation for safety, transparency, and ease of doing business
- integration into European Economic Area, Schengen, SEPA
- educated, digitally literate workforce
- high level of English language proficiency
- positive bilateral relations with the EU, UK, USA, China
- high level of GDP/consumer spending power
- young population with high growth rate (2,9% p.a. compared to 0,2% p.a. in EU)
- availability of land with few development constraints
- availability of essential infrastructure (water, sewage, internet)
- availability of renewable energy
- airspace capacity in Reykjavik flight information region (FIR)
- proximity to key markets in Europe & North America
- favorable intellectual property regime
- strong ties with educated Icelandic diaspora in Scandinavia and North America

Weaknesses:

- small domestic consumer market
- low population density in airport area
- high cost of labor
- reduced aerial connectivity following bankruptcy of WOW
- no direct air service to Asia and the Middle East
- low cargo traffic and limited cargo facilities
- overdependence on tourism and aluminum production
- poor transport connections between airport and capital area
- no clear contact person for companies interested in locating in airport area
- low international visibility: outside Iceland, Keflavík is a "black box"
- poor marketing of airport area, both nationally and internationally
- poor design quality of airport forecourt creates unfavorable first impression of Iceland
- poor level of retail offerings and social infrastructure (health care, education) on Southern Peninsula
- lack of coordination between Isavia and local municipalities leads to complex planning procedures, duplication of services, and missed development opportunities

Planning for Success

Developing any airport area requires creativity and patience, along with an ability to set realistic goals that can be achieved within a reasonable timeframe. It also requires a deep understanding of each development party's strategic priorities—and an ability to adapt when those priorities change. To do so, successful airport areas focus on people: investigating the needs and desires of their target customers in order to drive the concept development process. Drawing on those customer insights, they propose place-based land use and urban design strategies that leverage the airport's unique geographic advantages. Through partnerships, they establish a governance framework to implement those strategies in an efficient and mutually beneficial manner. Lastly, by leveraging the power of positioning, successful airport areas build support for the project by highlighting its value, timeliness, and relevance. Focusing on the four Ps—people, place, partnerships, and positioning—empowers planners to deliver a sustainable return on investment to the key development parties, and to transform the airport area into an attractive place to live, work, and visit.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3 Future Development of the Keflavík Airport Area: Opportunities and Recommendations

Kadeco has a once-in-a-lifetime opportunity to transform the Keflavík airport area into a national powerhouse of economic growth and innovation.

Kadeco has a once-in-a-lifetime opportunity to transform the Keflavík airport area into a national powerhouse of economic growth and innovation. With strategic planning, developing the airport area will improve the airport's operational efficiency and drive non-aeronautical revenue for Isavia, create economic growth and employment opportunities in the surrounding communities, and position Iceland as a global thought leader in the aviation industry.

Drawing on the research findings presented in this study, we identify six spatial and economic development opportunities in the Keflavík airport area. We then propose five strategic recommendations that illustrate how Kadeco needs to evolve as an organization in order to realize those development opportunities in a timely and efficient manner.

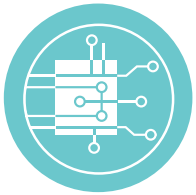
3.1 Future of the Airport Area: Spatial & Economic Development Strategies

An 'early win' to kickstart development. Many successful airport areas kickstart development by building new office facilities for one of the development parties: for example, the airport authority, the municipality, or the airport real estate development company itself. Another strategy is to commission a public-sector anchor project, such as a medical center, school, research campus, or sports facility. Commissioning an 'early win' has three main purposes. On the one hand, it generates employment and footfall in the planning area, creating demand for housing, retail and other services. More importantly, an 'early win' is essential for raising investor confidence. Groundbreaking ceremonies and construction site tours demonstrate that the project is indeed moving forward, significantly raising the ability to attract investors and end users. Finally, an 'early win' that improves the life quality of local residents—such as a health center or a school—represents an effective tool for building the community's support for the entire project.

Relevant data: see chapters 2.2, 2.8, 7.2, 7.5, 9.4

A strategic cargo vision for the airport and airport area. In the coming years, KEF urgently needs to grow its cargo business in order to compensate for the virus-induced decline in passenger traffic. Our preliminary market demand analysis of the seafood, medical equipment, and pharmaceutical industries identified numerous missed opportunities to expand KEF's cargo footprint; and attract related storage, transshipment, and processing facilities to the airport area. Moreover, we see a good potential to relocate sea cargo operations from Reykjavik's Sundahöfn port to Helguvík. Taken together, these strategies would enable the southern peninsula to rebrand itself as an intermodal cargo hub. Finding the best solution for integrating the first, second, and third line air cargo infrastructures with processing and storage facilities will require close coordination between Isavia, Kadeco, and the municipalities. It will also require input from private-sector partners regarding industry-specific operational requirements.

Relevant data: see chapters 1.3, 1.4, 6.3, 6.4, 7.2, 8.6, 8.7, 9.2, 9.4



A research center and testing facility for long-range cargo drones. Our analysis of aviation technology trends indicates that Keflavík is uniquely positioned to establish itself in the emerging field of long-range cargo drones. Doing so would address the logistical challenges of Icelandic companies that produce time-sensitive products, and could ameliorate the structural imbalance between imports and exports in the Icelandic economy. Moreover, a future-focused technology project could help to advance KEF's status as a 'rising star' in the air cargo industry. Marketing the ecological dimension of the project would also empower Kadeco to access sustainable investment funds from both the public and private sectors. Finally, such a flagship project could serve as the basis for establishing a strategic partnership with another airport/airport area, for example in the UK or Scandinavia.

Relevant data: see chapters 1.3, 1.4, 2.2, 2.9, 7.6, 8.1, 8.7

A retail hub and leisure destination in the airport forecourt. Developing landside shopping, food & beverage, and other services aimed at local consumers will help KEF to address a multi-year decline in passenger-related commercial revenues. Moreover, a regional service center offering goods and services that are currently unavailable on the southern peninsula will raise the life quality of local communities. The retail hub could include a leisure destination designed for both local residents and visitors, such as an open-plan food hall and event space. Taken together, these measures would generate additional revenue streams for the airport, create employment opportunities for small and medium enterprises, and increase the overall attractiveness of the airport area as a place to live, work, and visit.

Relevant data: see chapters 1.2, 2.1, 2.2, 2.4, 8.4, 9.3, 9.4

A green energy project/airport microgrid. Constructing an airport microgrid based on renewable energy sources would increase aviation security by addressing current vulnerabilities in the airport's electricity supply. It is also a feasible near-term strategy for achieving the airport's carbon neutrality goals. Moreover, a microgrid could be deployed to attract energy-intensive industries to the airport area. These tenants would purchase electricity directly from the airport, thereby creating a new non-passenger revenue stream. Locating the energy farm to the south or west of the airfield would also be a good way to increase the development potential of this less desirable part of the airport area.

Relevant data: see chapters 1.4, 2.5, 5.5, 6.5, 8.5, 9.2

Improved connectivity between KEF and the Reykjavik capital area. The ground transportation options linking Keflavík to the capital area are currently extremely limited, and significantly below the international benchmarks of Keflavík's competitors. Improving ground access to and from KEF would increase the attractiveness of the entire airport area as a place to live and work. It is also a feasible near-term strategy for achieving the airport's carbon neutrality goals.

Relevant data: see chapters 1.4, 2.5, 2.8, 2.9, 6.2

3.2 Future of Kadeco: Governance, Positioning, and Partnership Strategies

Create a mission statement that outlines Kadeco's purpose and organizational objectives, defines the role played by each of its four shareholders, and articulates a shared vision for the future development of the airport area. The mission statement will form the basis for communicating with government, the private sector, the media, and the general public. It should be short and easily understood by a wide audience.

Prioritize 3-5 economic development strategies for the airport area. Engage the private sector to evaluate the level of market demand and investment appetite needed to guarantee the economic strategies' commercial viability. Publish these strategies in a project vision document.

Prepare a master plan and urban design contest in order to attach the economic development strategies to specific sites in the airport area. Identify 2-3 priority development zones and define the tentative boundaries of the planning area.

Implement a governance framework that will advance Kadeco's vision for the airport area, and will provide the necessary support needed to implement the spatial and economic strategies.

Develop a marketing, branding, and public relations strategy for Kadeco and the airport area.

II. Local context analysis

This part provides a local context for the airport deveopment area and surrounding regions from a domestic perspective.

By Alta Consulting.

4 Iceland and the development area

Iceland is an island in the middle of the North Atlantic on the plate boundaries between Europe and North America. It takes approximately three hours to fly from Iceland to Central Europe and five hours to cities on the East Coast of North America.

Various facts about Iceland:

- Iceland measures 103,000 km^2 and is Europe's second largest island.
- Inhabitants numbered 366,000 in 2020.
- Icelandic is the national language, but most people have conversational skills in English.
- Iceland has one of the world's oldest operating parliaments.
- The world's first democratically elected female head of state became the President of Iceland in 1980.
- Iceland is part of the EEA and NATO but not of the EU and has no military of its own.
- Quality of life in Iceland ranks the sixth best in the world, according to the UN' Human Development Index (HDI).
- Iceland ranks ninth in gender equality, according to the UN's Gender Inequality Index (GII)[1]
- Life expectancy is among the highest in Europe, at 81 years for men and 84.1 for women[2]

1 HDI
2 Hagstofan

4.1 The development area

The development area around Keflavík Airport is in the west of Reykjanes peninsula in Southwest Iceland, in about a 30–minute driving distance from the capital region. The communities on the peninsula, south of Hafnarfjörður, are collectively called Suðurnes. The airport was constructed during World War II when the British and later the Americans occupied Iceland. After the war, the US military operated a base (Naval Air Station Keflavík) in the airport area until 2006.

Centre of aviation in the North Atlantic

Keflavík Airport is by far the largest airport in Iceland and serves a key role in connecting the country with the outside world. Since Iceland is an island the airport also serves as a transport centre for the entire country and the vast majority of passengers who travel to or from Iceland pass through it. The airport has undergone rapid growth in the past years in keeping with Iceland's increased popularity as a tourist destination.

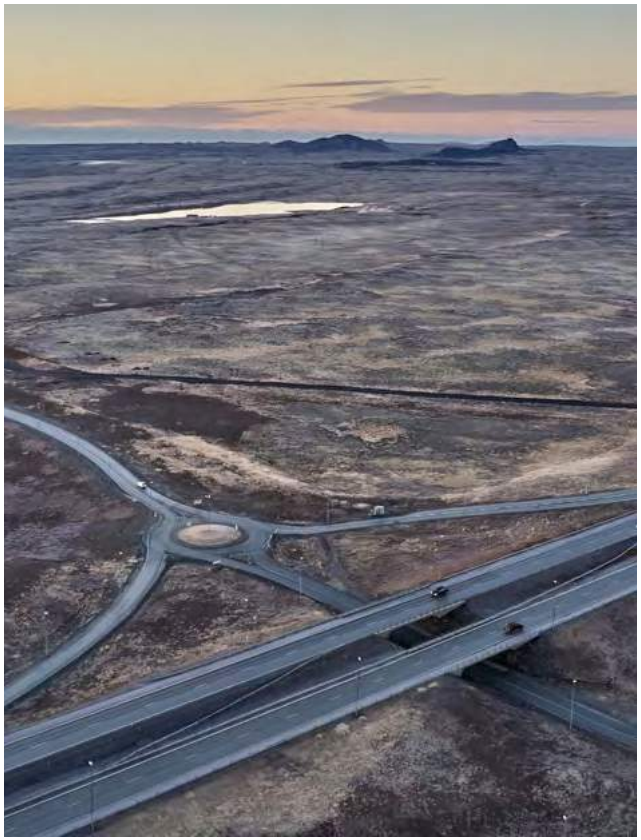
The airport connects two continents — North America and Europe. It is also well-positioned for connections to Asia and various opportunities lie in increased flights across the North Pole.

Strong connection between society and airport operations

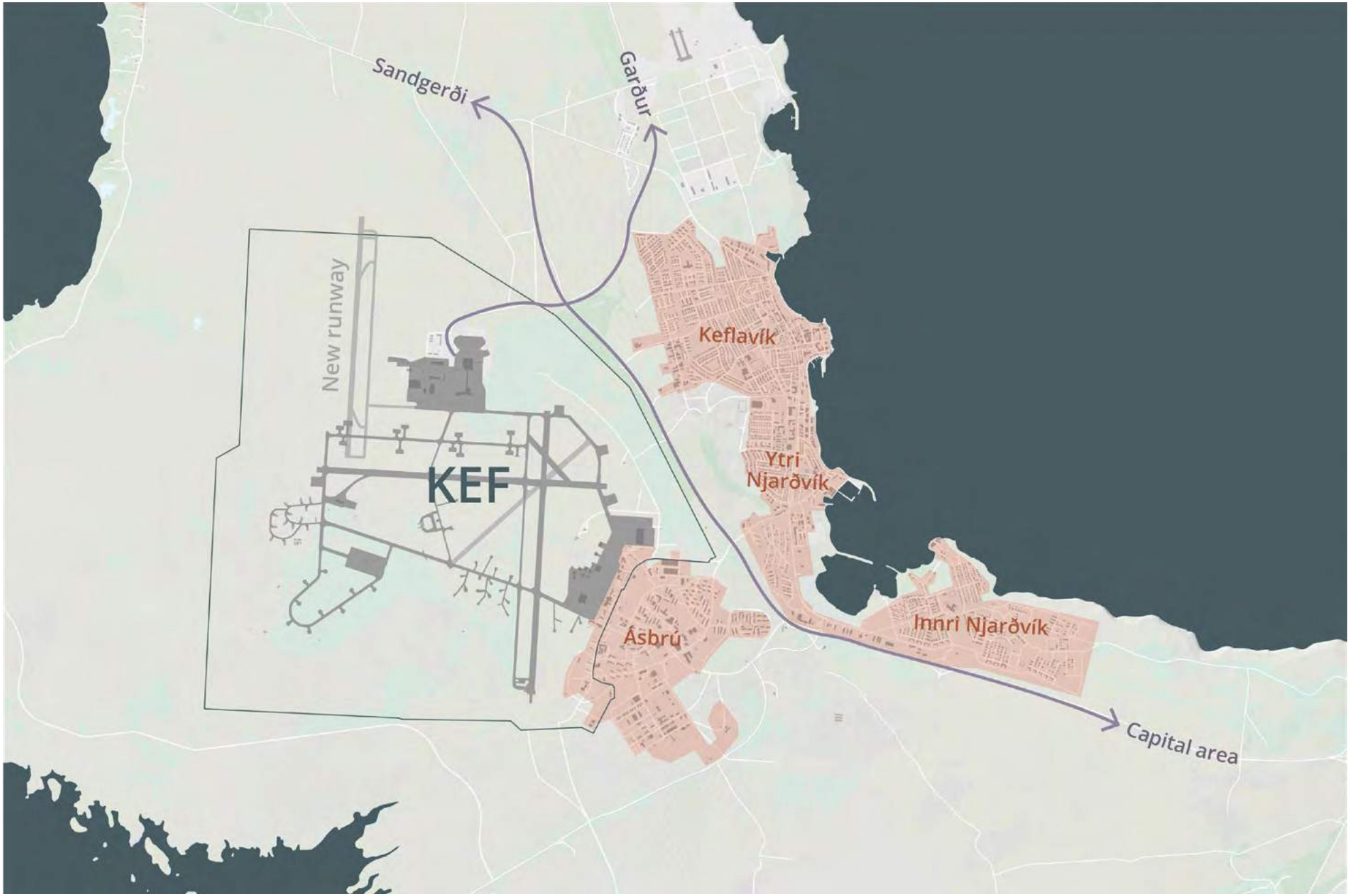
The airport area itself is located on the boundaries of two municipalities: Suðurnesjabær and Reykjanesbær. Through time, the communities around the airport area have had strong economic and social connection with business operations in the area. The airport's activities have increased considerably in the last few years due to the increased number of tourists. This comes with opportunities, as well as challenges. So far, the communities closest to the airport have proven important service providers for the airport, which has created a multitude of jobs for inhabitants in the region. However, this dependency makes the region very sensitive to economic swings related to the airport's operations, as the recent global pandemic has demonstrated, as well as the departure of the US military in 2006.

Hidden gem in the vicinity of an airport

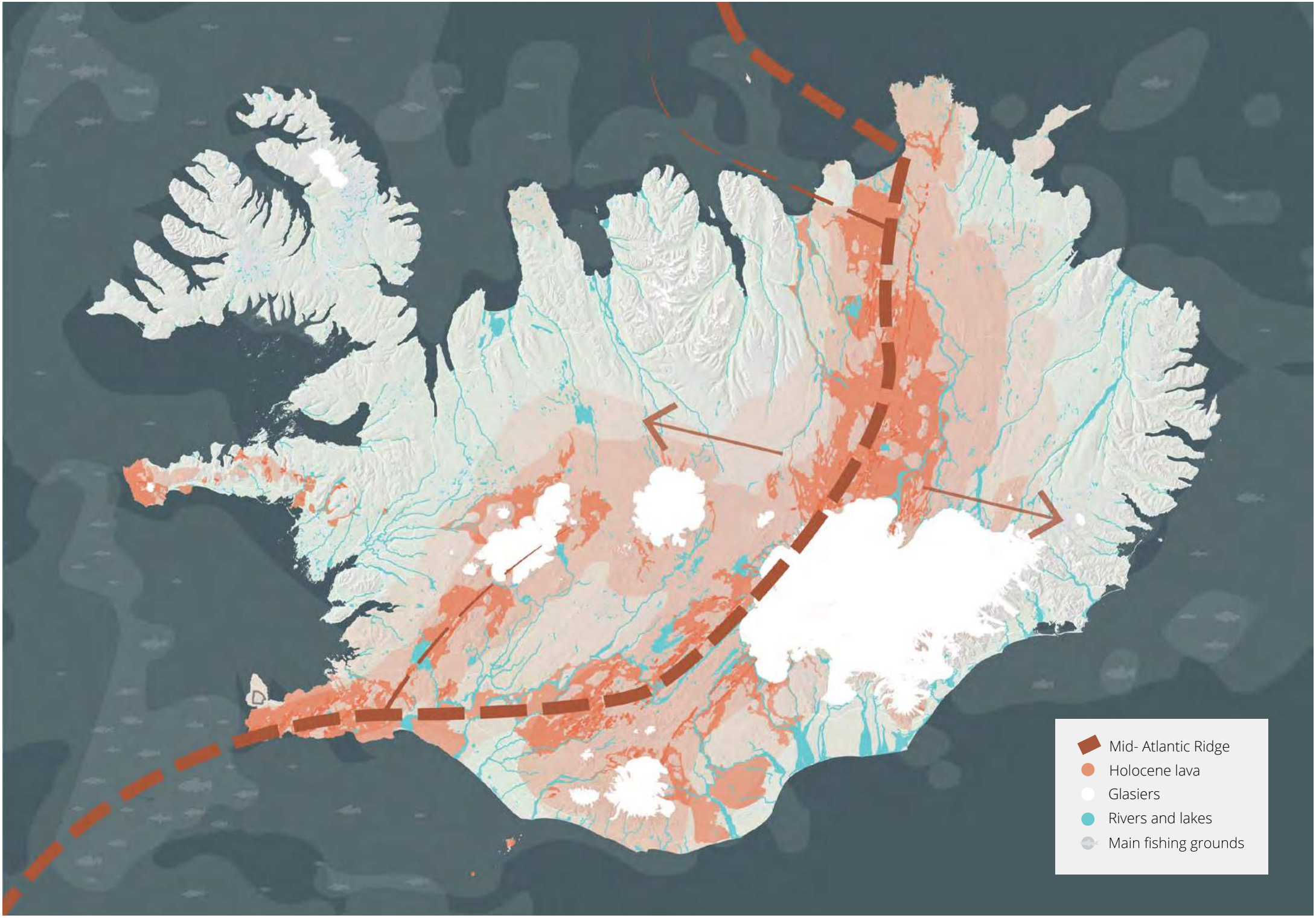
There are also various unused opportunities in relation to strengthening the image of Reykjanes peninsula as a destination where tourists spend more time. The proximity to the capital region leads to many tourists choosing to book accommodation there rather than in the Suðurnes region[1]. The environment around Keflavík Airport and Reykjanes peninsula are characterised by tranquility and unique nature, framed by wide expanses and the ocean in a spectacular fashion. In 2017, Reykjanes was named one of the 100 most sustainable destinations in the world by the non-profit foundation Green Destinations. Within minutes after landing at Keflavík Airport one can escape from international turmoil into a different world of magnificent earth formations, eco-friendly energy and the ocean's bounty. Great opportunities lie in the region, both as a place for innovation and as a remote destination en route of international air traffic.



1 Reykjanes destination plan 2018-2021.



Urban areas close to the airport area and main transport links.


Mid- Atlantic Ridge
Holocene lava
Glasiers
Rivers and lakes
Main fishing grounds

5 Resources

Iceland has a wealth of various natural resources which are of utmost importance to the Icelandic nation. They create a unique position for the country, from which the airport area can benefit.

The main resources are:

- **Extraordinary landscape:** A resource which grows in importance in accordance with the increasing number of tourists.
- **Renewable energy:** Generated by geothermal heat and hydropower and is paramount to modern society.
- **Pure drinking water:** Good access to clean water of high-quality is an important resource. It is also connected to a clean environment and atmosphere.
- **Unique flora and fauna:** Especially marine life is of immense importance for the Icelandic economy.
- **The weather and climate:** Creates a setting which always has to be taken into consideration.

5.1 Distinct landscape

Island created by volcanic eruptions

Iceland is an island in the middle of the North Atlantic just below the Arctic Circle. It was created by volcanic eruptions which makes the country a "peculiar mix of fire and ice"[1]. Iceland's landscape is characterised by opposites: On the one hand, earth formations, lava fields and black sands which bear witness to the island's volcanic activity, and, on the other, the glaciers that exist because of its northern latitude and have a big influence on the country's appearance. The nature reflects the island's relatively young age and a low ratio of cultivated land with sporadic vegetation, making the bedrock and subsoil, along with a multitude of geological heritage sites, visible[2]. This special landscape, untouched nature and wide expanses are the main attraction for foreign tourists.

1 Snorri Baldorsson (2014). *Lífríki Íslands*, bls. 10.

2 Þóra Ellen Þórhallsdóttir, Þorvarður Árnason, Hlynur Bárðarson, Karen Pálsdóttir (2010). *Íslenskt landslag - Sjónræn einkenni, flokkun og mat á fjölbreytni.*

Moss-covered lava fields

Reykjanes peninsula is a young territory which can clearly be seen in its landscape. The area is characterised by moss-covered lava fields which indicate the region's volcanic activity. The last series of eruptions occurred in the area around the time of Iceland's settlement in the 9th century AD. The lava flowed from fissure eruptions, which produce great volumes of lava and little ash. Basalt is the peninsula's main rock type. The area closest to the airport is an expansive plain with uncultivated, tussocky ground, unsheltered from the wind and stormy weather. On the ragged shoreline the surf beats the black rocks that surround the peninsula. This landscape of contrasts immediately grabs the attention of foreign visitors when they arrive at Keflavík Airport[3].

3 Markaðstofa Reykjanes. Áfangastaðaáætlun Reykjaness 2018-2021.

Landscape of plate boundaries

There is a wealth of earth formations on Reykjanes peninsula. The peninsula is generally low-lying with small basalt mountains, either free-standing or part of long mountain ranges, created by sub-glacial eruptions. In the peninsula's southern regions, the geothermal activity is clearly visible in geothermal areas with craters, boiling hot springs and columns of steam. Thus, the landscape reflects Iceland's location on the Mid-Atlantic Ridge where the North American and Eurasian Plates meet in a spectacular manner. In no other places are these plate boundaries as tangible as in the landscape in the Suðurnes region[4].

4 Reykjanes UNESCO Global Geopark, 2017.

The main landscape features of Reykjanes Peninsula; geothermal landscape and the coast.

Expansive ocean

Almost wherever you stand on the peninsula the beach is close by and the vast open ocean within sight. The rugged shoreline of Suðurnes, where the surf beats against the black rocks, plays an important part in shaping perceptions of the region's landscape. The beaches are either rocky or characterised by black sands where seabirds dwell. The view to the north across Faxaflói bay is uninterrupted and when the conditions are right, this is a great place for viewing the northern lights. For centuries, local inhabitants have mainly lived off the ocean's resources — and fisheries remain an important industry for the region.

Airport area in a safe distance from natural hazards

Several series of volcanic eruptions have occurred on the southern Reykjanes peninsula in historic times (that is, after the end of the Ice Age). There is also considerable seismic activity in the region, particularly on the western peninsula, although the earthquakes are usually minor. The airport area is located at a relatively long distance from the most active area, which stretches through the southern peninsula, from the east to the west, and is visible by a series of geothermal hotspots.

The airport area is also relatively far inland and elevated and so there is no risk of damage due to rogue waves. In some places along the coast there is a risk of flooding or sea erosion[5].

5 Vegagerðin. Suðurstrandarvegur - Mat á umhverfisáhrifum - síðari hluti.

5.2 Renewable energy

Unique position in energy issues

Iceland is in a unique position when it comes to energy issues given that almost 100% of its electricity is produced by renewable energy sources, of which 70% is produced by hydropower plants and 30% by geothermal power plants. Additionally, geothermal heat is used directly for domestic heating, making geothermal heat the primary energy source with a 70% share of energy usage[1]. So far wind power has not been used much for electricity production in Iceland but in the past few years interest in this energy source has increased[2].

Electricity production with a low carbon footprint

Landsvirkjun, the national power company, operates 15 hydropower plants, three geothermal plants and two windmills in five areas across the country. The carbon footprint of Landsvirkjun's electricity production is very low compared to its production capacity, or slightly more than 22,000 tons of CO2 equivalents (CO2-eq) per year. The same electricity production in most other countries would result in the emission of about 6.5 million tons of CO2-eqs per year, which equals more than Iceland's entire CO2 emissions in one year[3]. Almost 85% of Landsvirkjun's electricity is sold to major users (approximately 14.1 terawatt

1 Vísindavefurinn (2016). Hvaða orkugjafar eru á Íslandi.
2 Umhverfis- og auðlindaráðuneytið (2018). Skýrsla starfshóps um regluverk í tengslum við starfsemi og framkvæmdir vegna vindorkuvera.
3 Lansvirkjun (2019). Ársskýrsla 2019 - Ávarp forstjóra.

hours in 2019), mainly in the aluminum industry, but more recently also to data centres, which are on the increase. The remaining electricity goes to the wholesale market, such as to HS Orka on Reykjanes, which sells the electricity at retail price to domestic users and other kinds of companies[4].

Geothermal heat in the Suðurnes region

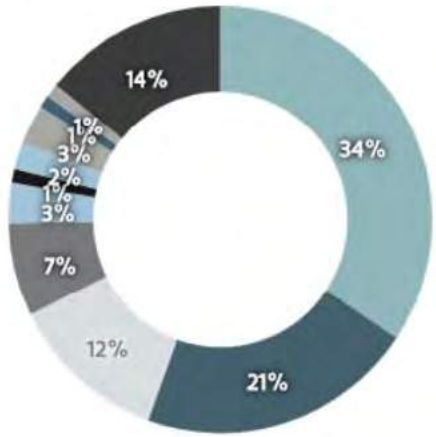
Geothermal heat is the region's primary energy source. Geothermal activity is connected to the volcanic belt on top of the plate boundaries that run through the length of Reykjanes peninsula. There are a few high-temperature geothermal areas of various power levels. All of the areas lie within some kind of nature reserves and therefore it is important to bear in mind that the exploitation of these areas should not be in violation of their protective status[5].

4 Lansvirkjun (2019). Ársskýrsla 2019 - Viðskiptavinur.
5 Svæðisskipulag Suðurnesja, 2008-2024.

Versatile use of geothermal heat

Good access to fresh water, pure cold subterranean seawater, heated subterranean seawater and warm run-off water puts Reykjanes in a strong position when it comes to production of geothermal heat[6]. Today, there are two power plants on Reykjanes peninsula, Svartsengi Power Station and Reykjanes Power Plant, which produce electricity and warm water. Svartsengi Power Station produces 75 MW of electricity and 190 MW of thermal power for heating. Reykjanes Power Plant produces 100 MW of electricity[7]. HS Orka and HS Veitur distribute electricity and warm water from the power plants. The Blue Lagoon was created from run-off from Svartsengi Power Station.

6 Svæðisskipulag Suðurnesja, 2008-2024.
7 HS Orka, Power Plants.



The aluminum industry (Alcoa, Rio Tinto, Norðurál and TDK foil) is the largest user of electricity, followed by silicon metal production plants (Elkem and PCC) and data centers (Verne, Advania and Etix).

Entrepreneurship and modern times

A resource park has been established near the geothermal power plants. It is a symbol for new times, new ways of thinking and an encouragement to find more and better uses for all of the products of geothermal power plants. Excess hot water has been used for incredibly diverse purposes, including the Blue Lagoon, beauty and health products, biotech companies and aquaculture.

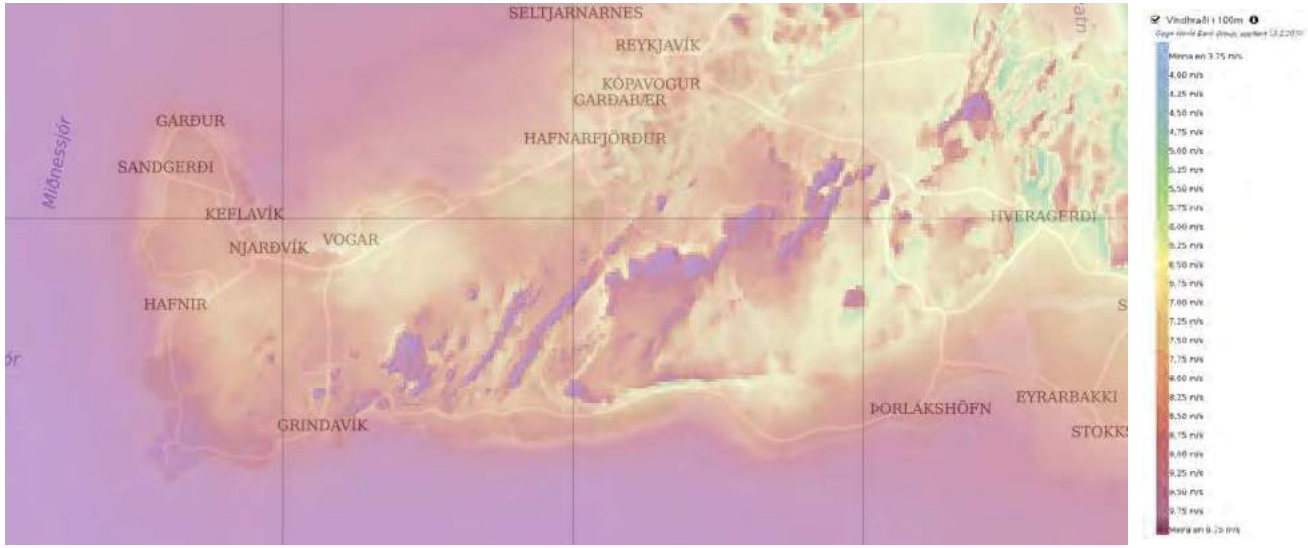
Other eco-friendly energy sources

Domestic production of other renewable energy sources is in rapid growth, including methanol production at Carbon Recycling International (CRI), biodiesel production from leftover frying fat at Íslenska Gámafélagið and Orkey. Sorpa and Norðurorka produce methane from landfill gas which is created at disposal areas in the capital region and Akureyri. It is used for powering cars, buses and garbage trucks[8]. There are a few methane and hydrogen stations for cars in the country[9].

Wind power

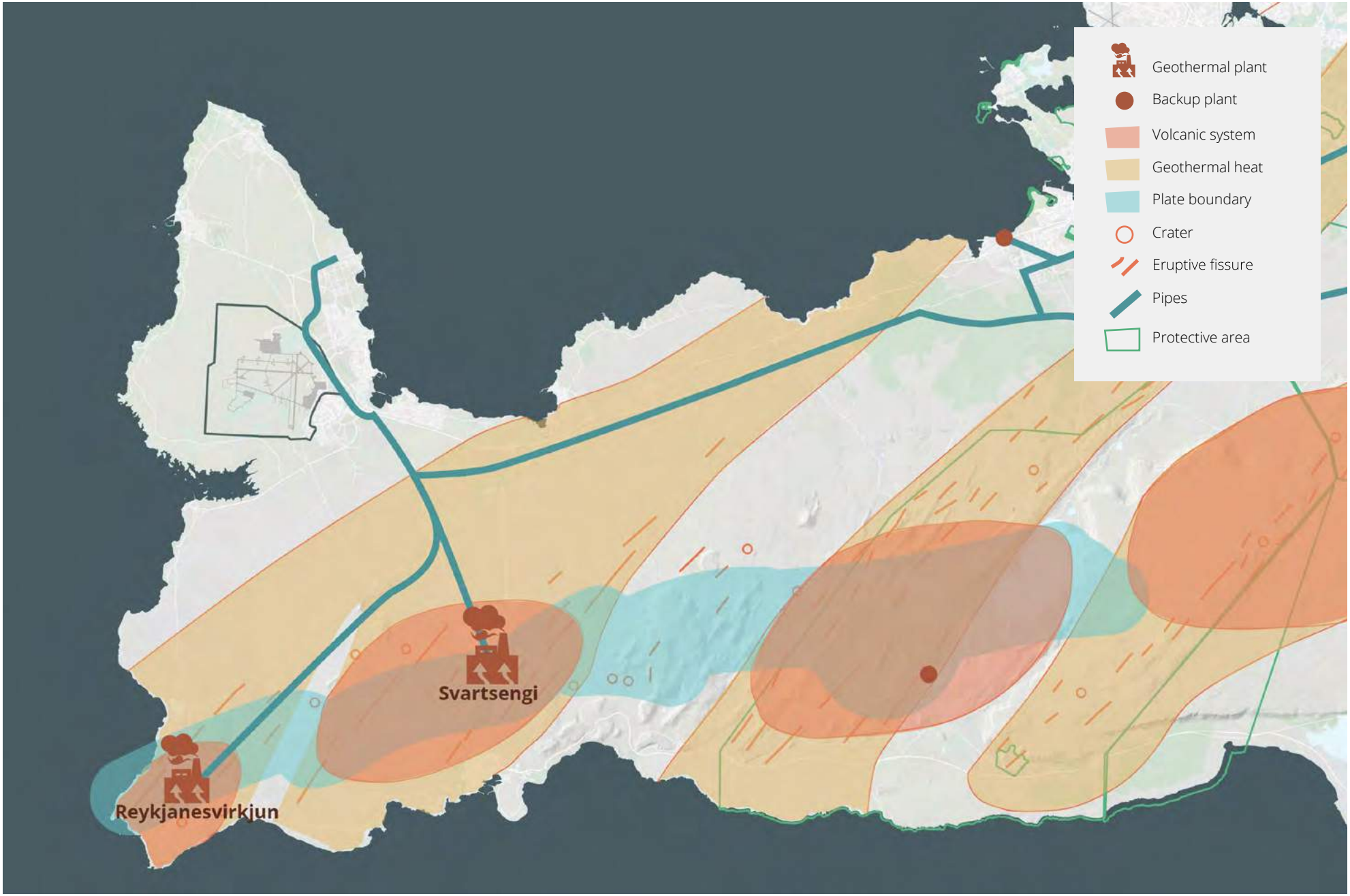
In Iceland, wind power has not been harnessed to any great extent. A few experimental projects have been carried out in the past years, however, none of which took place in the Suðurnes region. It is clear that great opportunities lie in the exploitation of wind power, given that Iceland is one of the windiest countries in the world, and wind power production is considered to go well with hydropower production[10].

When the wind speed on Reykjanes peninsula is considered, it can be seen that most areas on the peninsula may be feasible for wind power stations. The average wind speed in the region in an altitude of 100 metres is between 6.5 and 9.75 m/s[11]. It is generally considered that wind speed of more than 7 m/s is sufficient for a wind power station[12]. The lowlands on the southern part of the peninsula by the sea are the region's windiest point. However, many other factors must be taken into account, such as noise and visual pollution, and therefore further research is necessary in the area[13].



8 Orkustofnun. Endurnýjanlegir orkugjafar í samgöngum.
9 Stjórnarráð Íslands (2019). Átak í fjölgun hleðslustöðva um allt land.

10 Orkustofnun. Vindorka - Virkjunarkostir til umfjöllunar í 3. áfanga rammaáætlunar.
11 Global Wind Atlas.
12 Renewables first. How windy does it have to be.
13 Orkustofnun. Vindorka - Virkjunarkostir til umfjöllunar í 3. áfanga rammaáætlunar.



The location of geothermal energy on the Reykjanes peninsula.

5.3 Pure drinking water

Freshwater is one of Iceland's resources and Iceland has a wealth of clean water. The country is also known for its clean environment and atmosphere. All of these resources are becoming more scarce in the world and the importance of protecting them is growing.

Blue gold

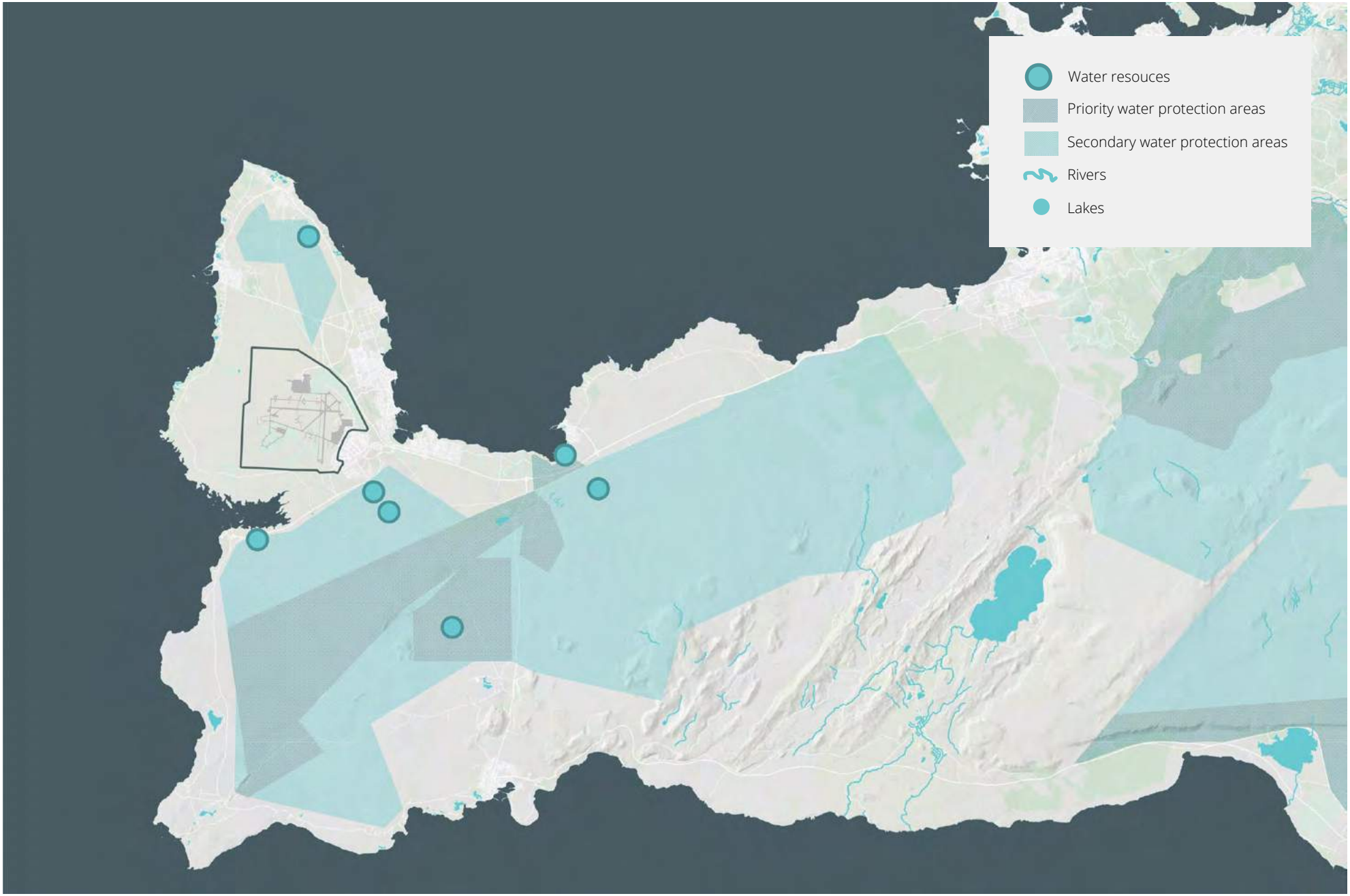
According to estimates, the freshwater reserve for every Icelandic inhabitant is approximately 532,000 tons, which is twenty- to one hundred-fold the reserve of other countries in Northern Europe. The best and safest freshwater is extracted from the ground. Its quantity and quality depends on the properties of the strata. Groundwater may be polluted where there is little or no subsoil on top of the bedrock, which would otherwise protect the groundwater from pollution that comes from general traffic[1]. Freshwater is a resource which is constantly becoming more important in a global context and is therefore sometimes called blue gold.

1 Veðurstofna Íslands. Grunnvatn á Íslandi.

Plentiful groundwater

In the western Reykjanes peninsula is an approximately 40 m thick freshwater lens that floats about 1 m above sea level in an extremely permeable bedrock. Therefore, special care must be taken to prevent pollution from being carried into the groundwater[2]. Drinking water is collected in water springs and around them are defined water protection areas where all constructions and operations that can threaten the safety of water supply are prohibited. The areas are divided into centre and periphery areas where stricter provisions are in effect for the centre areas than periphery areas[3]. The airport area itself is not located in a water protection area but two periphery areas of water protection areas are in the vicinity of the airport and they must be taken into account.

2 Ísor (2019). *Ásbrú Hydrogeology.*
3 Reglugerð um neysluvatn nr. 536/2001.



Water resourses in the Reykjanes peninsula.

5.4 Unique flora and fauna

An oceanic island on the Arctic Circle

Only 15,000 years ago the oceanic island we now call Iceland was completely covered by the Ice Age glacier which extended into the sea. There are few plant and animal species in Iceland but many of their stocks are large, e.g. the stocks of some shorebirds and seabirds nesting in cliffs are among the largest in the North Atlantic. In Icelandic waters are some of the richest fishing grounds in the world and large stocks of marine mammals exist there. The marine life benefits from warm and cold ocean currents meeting off the coast of Iceland[1].

The ocean as an important resource

Only a short distance off the coast of the Suðurnes region are bountiful fishing grounds with species like cod, haddock and lobster in large quantities[2]. Fishing has been practiced in the region for centuries. Good growing conditions for phytoplankton which are created when warm and cold ocean currents meet form the basis for the rich fishing grounds in Icelandic waters. The plankton also absorbs large quantities of CO^2 and is therefore important both for the biosphere and atmosphereg[3]. In Iceland a fisheries control system (quota system) is in place to prevent overfishing.

1 Snorri Baldursson (2014) Lífríki Íslands, bls. 6
2 Vísindavefurinn (2009). Hver eru helstu fiskimið Íslands?
3 Vísindavefurinn (2002). Hvers vegna eru ein auðugustu fiskimið jarðarinnar í kringum Ísland?

Diverse birdlife and beaches

Along the shoreline, seabird populations nest in cliffs, and the birdlife on rock and seaweed covered beaches is diverse, as well as the populations of shorebirds and waterbirds that can be found in ponds and on mudflats. Further inland, moorland birds are common, such as rock speedwells and golden plovers, and a few species of predatory birds exist there as well. The largest bird territory in the region is on Rosmhvalanes headland, which also has by far the largest nesting area for lesser black-backed gulls in the country[4]. The coastline on the west of the headland is also a very important habitat for birds, particularly for eider ducks, harlequin ducks, sanderlings and sandpipers[5]. Furthermore, Krísuvíkurberg sea cliff is defined as an important seabird habitat for kittiwakes, guillemots and razorbills.

4 Náttúrufræðistofnun. Rosmhvalanes.
5 Náttúrufræðistofnun. Kalmanstjörn–Garðskagi.

Land animals

Wild land animals in the region include foxes, minks and mice[6]. The Arctic fox is the only land mammal which is believed to have existed in Iceland prior to human settlement in the 9th century AD.

Agriculture has been practiced in Iceland since people first settled there which has had a significant impact on the country's flora and fauna. Through history, sheep farming is the most common type of agriculture practiced in Iceland, along with the breeding of other domestic animals, including cattle, and pork and poultry farming has increased in recent decades. Sheep roam free in the summer, grazing on sensitive vegetation and contributing to soil erosion. The Icelandic horse is a unique breed which has proven rather popular in other countries.

6 Vegagerðin. Suðurstrandarvegur - Mat á umhverfisáhrifum - síðari hluti.

5.5 Weather and climate

Weather conditions in Iceland

Iceland lies on the boundaries between two climate zones, the temperate and Arctic zones, and has a subarctic marine climate. A warm ocean current from the south, the North Atlantic Current, causes the climate to be rather mild given the country's latitude. The average annual temperature in the lowlands from 1971 to 2000 ranged between 2 and 5°C (36 and 41°F). Southerly winds that carry precipitation determine largely where the largest glaciers are located, in the southeastern part of the country[1]. The winters in Iceland are relatively mild and the summers cool.

Bright summers and dark winters

Iceland is positioned just south of the Arctic Circle and therefore there is a great difference in daylight hours between summer and winter. At summer solstice it is bright nearly 24 hours a day, while in winter, the sun is only visible for a few hours a day. In the winter, the sun hangs very low in the sky, making buildings cast long shadows, which means that generally, it is not advisable to construct high-rise buildings. At summer solstice the sun reaches 49° above the horizon at the highest point.

In the winter there is less time for outdoor recreation due to the sparse daylight hours, yet winter sports like skiing, Alpine skiing as well as cross country and mountain skiing, are growing in popularity. In spite of the darkness, in the last few years the number of tourists has increased in all seasons and many of them come specifically to witness the northern lights during the darkest days of winter.

Climate change in Iceland

The temperature has risen significantly in Iceland in the past decades, resulting in glacial retreat, glacial rivers changing course, rapid elevation of the southeastern coast, more widespread forests and different arrival and nesting time of various bird species. The biosphere of the ocean has also undergone changes, new species have arrived in Icelandic waters while others retreat. The acidification of the ocean occurs at a higher rate off Iceland, along with a related negative impact on the biosphere, compared to most of the world's other oceans[2]. However, it does not appear that the temperature will become unbearably high or that drought will become more common in Iceland due to climate change.

Windy conditions on Reykjanes peninsula

The weather on Reykjanes peninsula is shaped by the warm Atlantic Ocean which surrounds the island in all seasons. The annual average temperature is high and above freezing point during the winter months. Low pressure systems from the southwest are common in Iceland and they cause windy conditions in Reykjanes. Late in the spring and in summer there are fewer low-pressure systems and calm days are rather common during those seasons. SE and E wind

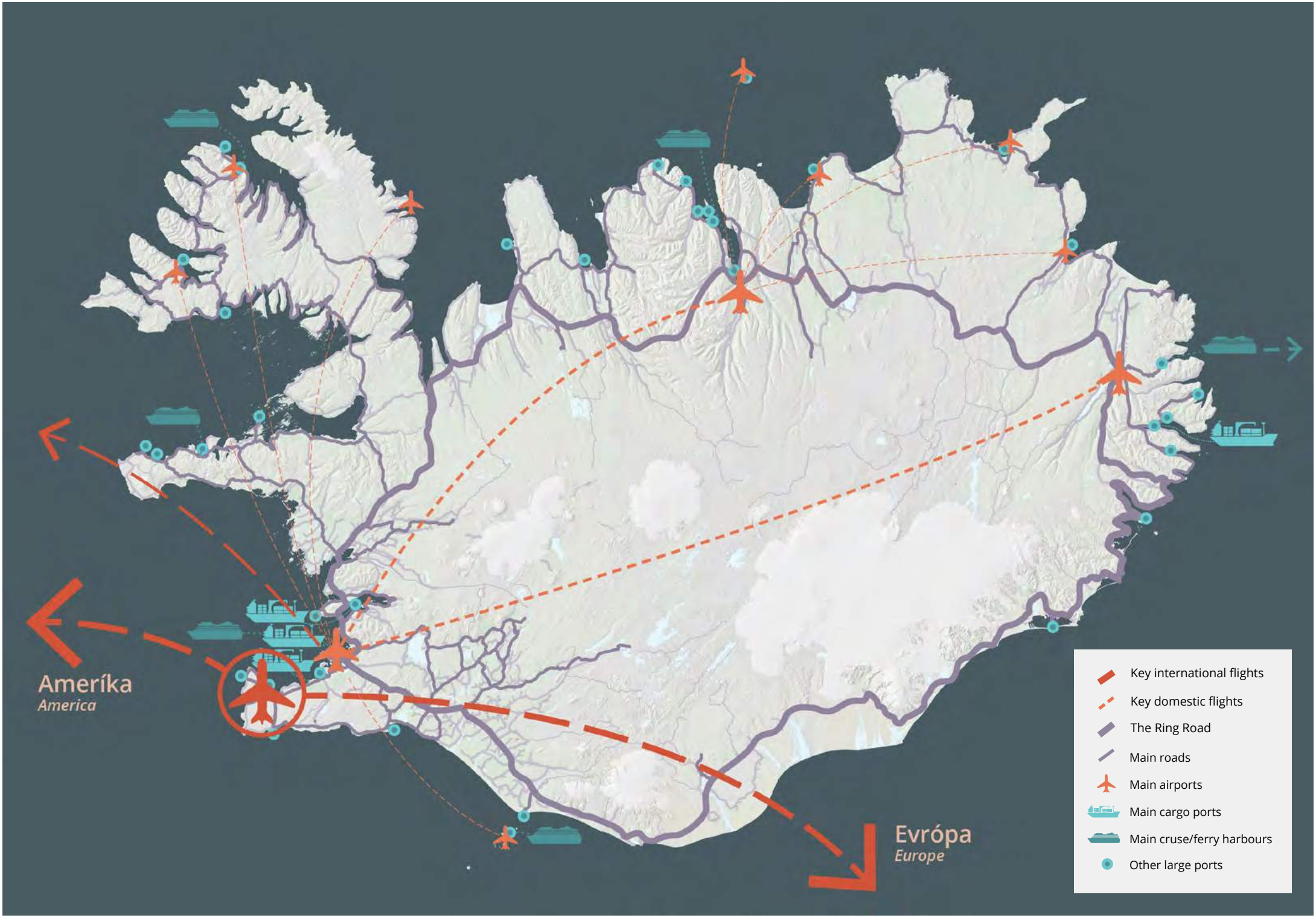
directions are the most common and often they come with precipitation. N and NNE wind directions are also usual, but they come with dry weather and sunshine[3]. The picture to the right shows a wind rose for the times when shelter is most needed. The red color symbolizes the frequency and direction of wind on warm and dry afternoons when shelter from buildings create perfect conditions for outdoor recreation. The blue color symbolizes stormy days, that is, of wind speed above 10 m/s during the day. During such conditions it is also good to have shelter outside. The data is from the weather station at Keflavík Airport.

1 Vatnajökulsþjóðgarður. Loftslag og veður á Íslandi

2 Veðurstofa Íslands (2018). Skýrsla vísindanefndar um loftslagsbreytingar.

3 Heklan, Atvinnuþróunarfélag Suðurnesja. 2017.

The wind rose shows main wind directions when shelter is most needed. On warm and dry afternoons in red and very windy days (over 10 m/s) in blue.


Ameríka
America
Evrópa
Europe
Key international flights
Key domestic flights
The Ring Road
Main roads
Main airports
Main cargo ports
Main cruse/ferry harbours
Other large ports

6 Infrastructure and connections

The economy requires good access to resources and efficient connections to the outside world. Human capital, resources and energy become products and services which must be delivered to customers.

Infrastructure and connections in Iceland are to some extent shaped by the country being a sparsely populated island. The main infrastructure is:

- **Road transport:** Transport veins between regions in different parts of the country are important as most people travel by car. Domestic cargo transport is mostly by truck as there is no rail system in the country.
- **Eco-friendly modes of transport:** Are constantly becoming more important both in form of public transport, cycling, walking and micro-mobility.
- **Air transport:** There are a few other airports in the country but Keflavík Airport is by far the largest.
- **Ports and sailing:** Are important for a fishing nation like Iceland.
- **Distribution system for energy:** Electricity and thermal power are transported between regions.
- **Telecommunication:** There are outstanding telecommunication connections in the entire country.

6.1 Road transport

Widespread car ownership and multitude of rental cars

Icelanders primarily travel by road. Car ownership is widespread and growing, with 309,000 cars registered in the country in 2018, of which 230,000 were registered to domestic households, or 659 personal cars per 1,000 individuals. The majority of the car fleet is privately owned but the ratio of rental cars has increased significantly in the past years in line with the growing number of tourists[1]. Driving by private car is also the most common mode of transport; the ratio of cars of overall transport is as high as 75% on average, according to statistics[2]. Domestic cargo transport is also mostly by road as there is no rail system in Iceland.

Reykjanesbraut highway

Reykjanesbraut highway is one of the most frequented sections of road outside urban areas with approximately 18,000 vehicles per 24 hours on average (AADT)[3]. Almost all travelers who come to the country pass through Reykjanesbraut, in addition to the staff of the airport area. Suðurnes is the region in Iceland which has the lowest seasonal fluctuations in terms of number of tourists apart from the capital region[4].

1 Hagstofna Íslands (2019). Fjöldi ökutækja og eldsneytisnotkun 1995-2018
2 SSH. Ferðavenjukannanir.
3 Vegagerðin. 2018. Umferð ÁDU.
4 Markaðstofa Reykjanes. Áfangastaðaáætlun Reykjaness 2018-2021.

The Ring Road around the country

The Ring Road (Highway No. 1) encircles Iceland and connects most of the country's habited regions, apart from Suðurnes, Snæfellsnes, the Westfjords and the coastline of Northeast Iceland. The road is 1,321 km long in total, with a paved surface and mostly two-lane. The heaviest traffic on the Ring Road is around the capital region and around larger towns like Selfoss and Akureyri. However, in less-populated areas there are sections of the road where there is very light traffic or fewer than 100 vehicles a day.

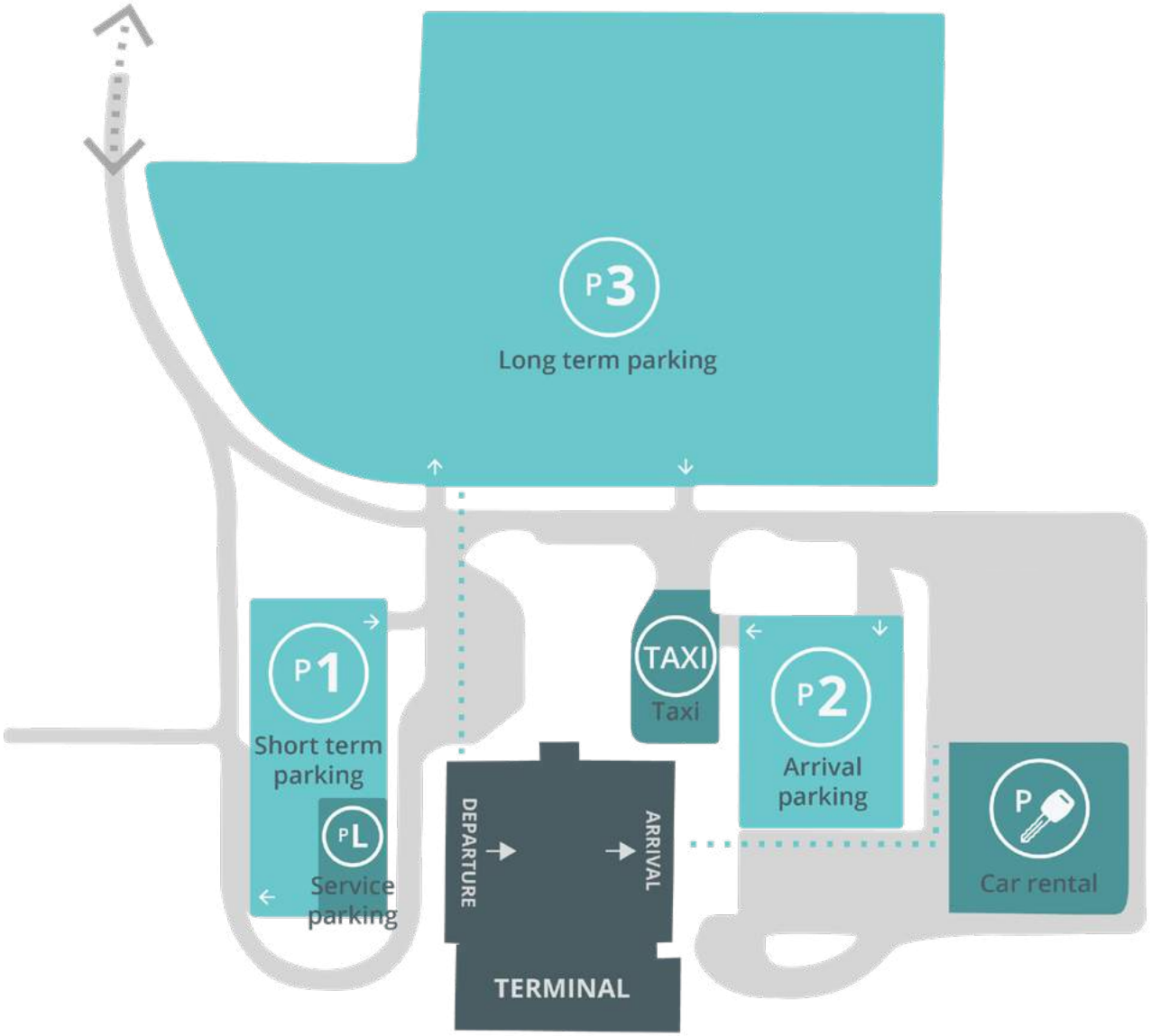
For a long time, it has been popular among Icelandic tourists to drive around the Ring Road as a large part of the country is accessible from it. In recent years, the road has grown in popularity among foreign tourists, who rent a car, bring their own car or bicycle and drive or cycle the Ring Road.

Suðurstrandarvegur

Suðurstrandarvegur lies from Grindavík east to Ölfus where it connects with highway No. 1 and the growing cargo port of Þorlákshöfn. Suðurstrandarvegur recently went up by one category at the Icelandic Road and Coastal Administration and is now cleared five times a week in the winter if necessary. In the Reykjanes destination plan it is pointed out that with increased road service it is possible to increase product supply in the region[5].

5 Markaðstofa Reykjanes. Áfangastaðaáætlun Reykjaness 2018-2021.

Driving distances from Keflavik airport to key locations.



Parking around the Keflavik airport.

Energy exchange in road transport

Icelanders' carbon footprint, not including soil emissions, is to a large extent caused by the usage of fossil fuels for transport. Iceland is the ideal location for electric transportation. Electricity production in Iceland hardly includes any carbon, distances are relatively short and the climate is suitable for long-term durability of batteries. In 2018 there were a little more than 2,000 electric cars in the country. In the past few years, many more charging stations for electric cars have been established, mostly by Orka náttúrunnar[6].

Parking lots by the terminal

Air passengers can rent long-term or short-term parking spots by the airport and the price for parking was recently increased. Short-term parking spots are intended for those who are driving people to or picking people up from the airport. The first 15 minutes are free and after that the hourly rate is ISK 500–750. Long-term parking spots cost ISK 1,750 per day for the first 7 days and after that the daily rate drops slightly. Prices of parking spots booked online in advance are discounted. Isavia had 2,600 long-term parking spots in 2019, which was an increase of 200 from the previous year. On an ordinary day, the booking ratio for parking is 50–60%, but during peak seasons, such as during Easter in the past few years, parking has been fully booked[7].

6 Orkusetrið fyrir umhverfis- og auðlindaráðuneytið. 2018. Orkuskipti í vegasamgöngum.

7 Fréttastofa RÚV (2019). Bílastæði við flugstöðina óðum að fyllast

Designated parking spots that are leased to employees for ISK 2,000 per month are located to the north of the air terminal in a 5–minute walking distance[8].

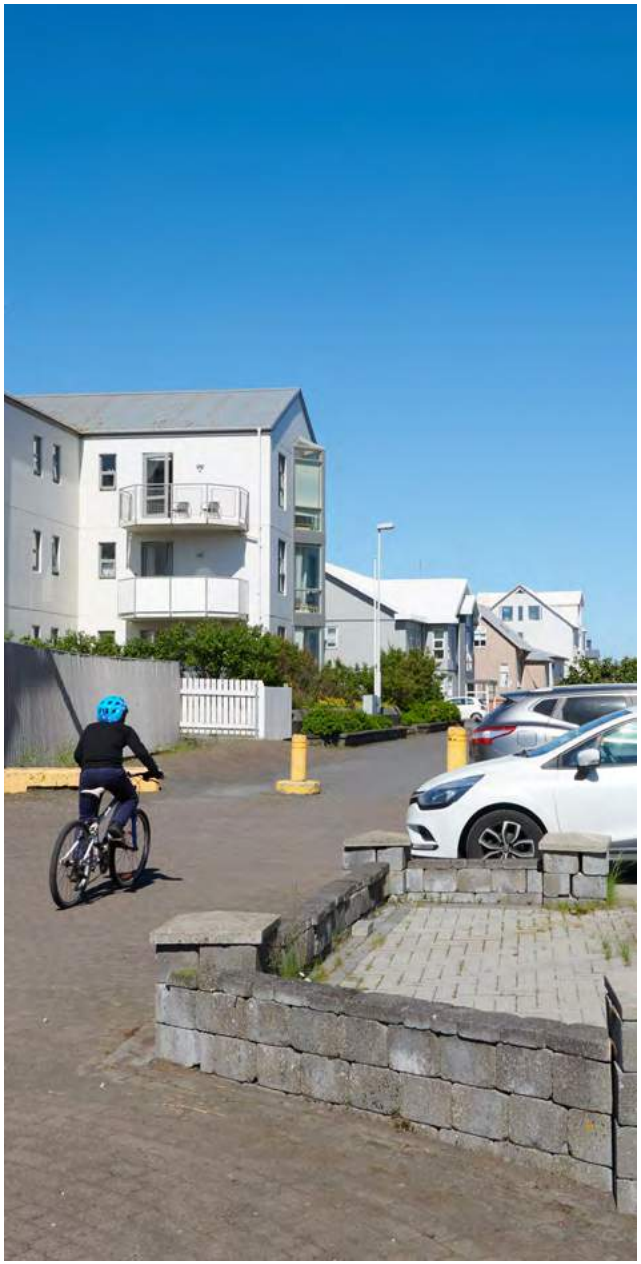
According to Isavia's plans, parking spots for air passengers and staff are to increase by 1,600 to the north and northeast of the terminal. Once achieved, the total number of general parking spots by the terminal will reach 5,000[9].

Parking services and car rentals

In addition to Isavia's parking lots, the number of parking services by Keflavík Airport has increased in the past years. The car can be delivered to the representative of a parking service outside the terminal, who takes the car to a parking lot which belongs to the parking services and is located elsewhere. The company delivers the car back upon the owner's arrival. The price ranges depend on the company as well as the level of service. Some companies offer services beyond car storage, such as oil change, cleaning and polishing.

Four car rental companies operate at the airport, with service desks in the arrival hall and designated parking lots to the east of the terminal.

8 Isavia. Starfsmannastæði.
9 Isavia (2019). Stækkun Keflavíkurflugvallar.



6.2 Eco-friendly modes of transport

The difficulty of public transport outside the capital region

Public transport has not been a common mode of transport in Iceland in the past decades. It is mostly used in the capital region, where it accounts for about 5% of transportation and has been increasing slightly in the past years. The ratio is much lower in the Suðurnes region, at 1%. Public transport in the capital region consists of yellow buses run by Strætó bs, which depart every 15–60 minutes depending on the place and time. Public transport outside the capital region is organised by the respective local authorities. Most of them have a service agreement with Strætó bs, like the local authorities in the Suðurnes region. Operational difficulties have proven a hindrance to public transport outside the capital region, especially in smaller communities. The frequency of public transport services depends on the funding allocated by the respective authority[1].

Buses to and from Keflavík Airport

Strætó's scheduled trips between Keflavík Airport, Reykjanesbær and Reykjavík are by Route No. 55. It runs from 6:30 am to 12 midnight on weekdays and starts running half an hour later on weekends. Scheduled trips are every hour on weekday afternoons but every 1–2 hours at other times. A single ride costs ISK 1,760, and takes about 1 hour and 25 minutes from Keflavík Airport to BSÍ bus terminal in Reykjavík. It is one of the most frequently used public transport routes in Iceland outside the capital region with approximately 100,000 passengers per year and most passengers in the autumn (September–November). Surveys indicate that a large part of passengers are tourists, even though it has not been studied specifically. Poor access and bad visibility of the bus stop for bus No. 55 outside the air terminal has long been criticised. It is hard to realise where to walk from the terminal, which can be confusing for those who don't know the area, and there is no signage to point out the direction[2].

Other public transport in the Suðurnes region

A local bus service is operated within Reykjanesbær municipality where a new schedule was taken into use in January 2020. It has two routes, R1 and R3, and they connect the municipality's communities together. Neither route runs to the terminal but both connect with route No. 55 by transfer stations. The buses depart every half an hour from 7:30 am to 6:30 pm and every hour until 9:30 pm on weekdays and less frequently on weekends. Strætó also operates a connecting route to the towns of Garður and Sandgerði (Route 89), Grindavík (Route 88) and Vogar (Route 87), which are both connected to the air terminal and capital region by Route No. 55. These routes generally depart at every 1–3 hours on weekdays and 2–6 hours on weekends (on weekends there are no trips to Vogar).

1 Efla (2019). ALMENNINGSSAMGÖNGUR Á LANDSVÍSU.

2 Efla (2019). ALMENNINGSSAMGÖNGUR Á LANDSVÍSU.

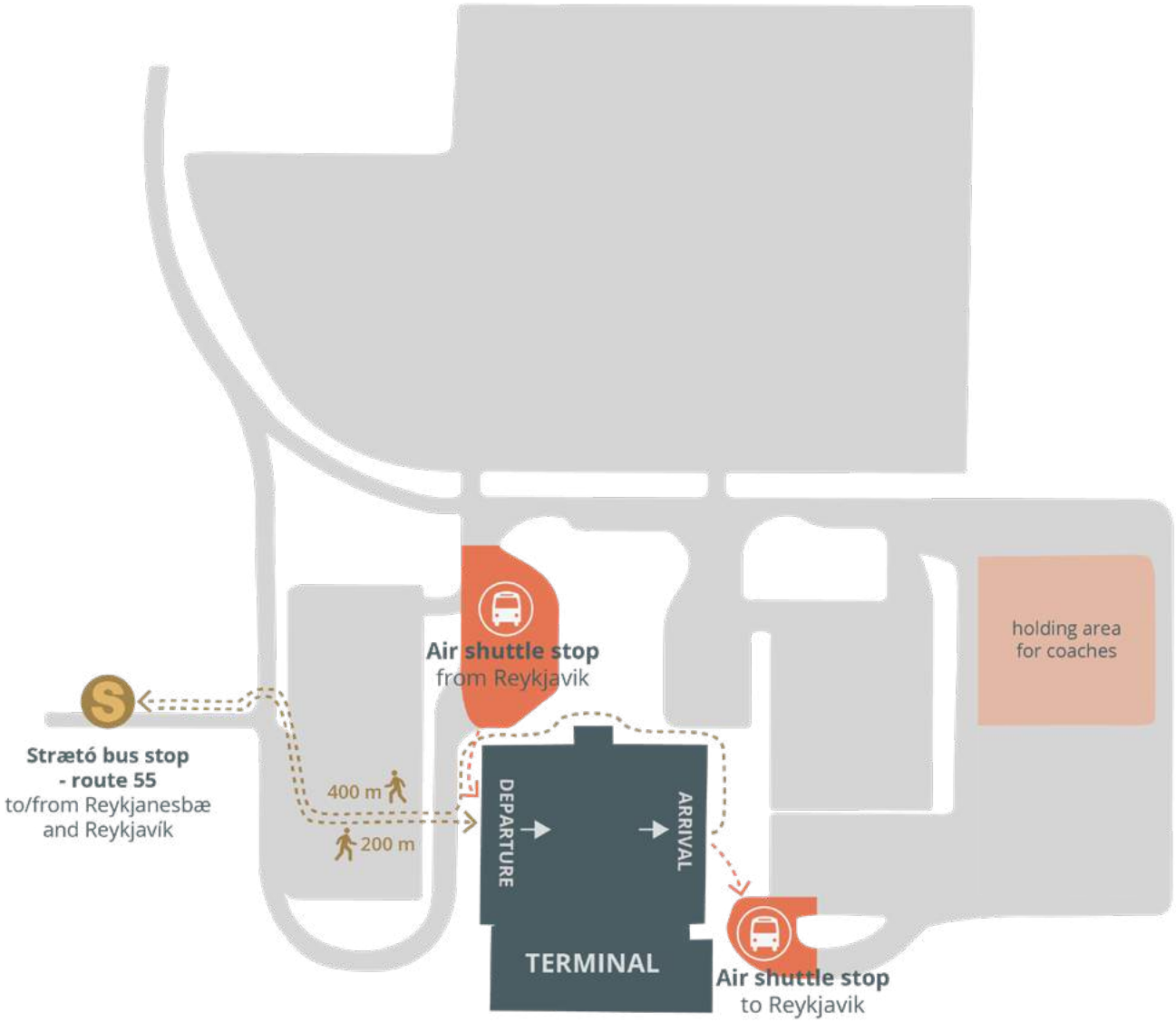
The map shows modern public transport connections as well as historical footpahts.

Air shuttles for travelers

At the air terminal, facilities are allocated to two air shuttle companies at a time. In the past few years, the bus companies Flybus (Reykjavík Excursions) and Airport Direct have offered air shuttle services between the air terminal and Reykjavík[3]. Trips usually run every 30 or 60 minutes and are organised to support timely service with arrivals and departures at the airport. A single ride costs ISK 3,499 with Flybus and ISK 3,290 with Airport Direct and the drive takes around 45 minutes. These companies also offer drop-off services to the largest hotels in Reykjavík for an extra fee. Foreign tourists use the air shuttle services to a larger extent than Icelanders, who prefer to drive their own car and store it at the airport.

Bus service at the airport

As already mentioned, the access to Strætó's bus at the airport is not good. The stop is not clearly visible and rather inaccessible, especially to arrival passengers. However, the air shuttle companies are given prime parking outside the air terminal and are clearly visible. The air shuttle companies are also clearly visible inside the terminal, but they pay a high rate for these facilities through tender offers.



Access to public transport around Keflavik airport.

3 Isavia. Bílastæði og samgöngur.

Active modes of transport

More and more emphasis is placed on active modes of transport like cycling and walking for getting between places in a healthy and environmentally-friendly way. In the past years, the infrastructure for cycling has improved with the establishment of cycling paths around the capital region. This development has not taken place to the same extent in the Suðurnes region. Recently, electric scooters have grown in popularity, both privately owned and rental scooters. Rental services are operated in the most densely inhabited areas of the capital region.

The ratio of active transport appears to be rather low in Suðurnes. In 2019 cycling accounted for 5% and walking 14% of transportation in the capital region but in Suðurnes in 2019, the ratio was 2% for cycling and 11% walking[4]. Under the current circumstances, given the relatively long distance to the airport, it is unlikely that many people would use an active mode of transport to get there. A walking and cycling path was recently extended to the airport and good facilities for bicycle storage and repairs established.

Historical footpaths in uninhabited areas

Nature is widely accessible in the Suðurnes area and the region is ideal for different kinds of outdoor recreation. There are many historical footpaths in the region and many of them have been marked and mapped, 230 km in total. Uninhabited areas are accessible for example by

following historical footpaths, like *Skipastígur* and *Prestastígur*. *Reykjavegur*, which is 125 km long, lies from Reykjanestá to Nesjavellir[5].

The footpaths are often marked by beautifully stacked cairns where the route has been shaped by hoofmarks and footprints of travellers past. These walking routes have a natural surface and often require appropriate footwear.

In Suðurnes the popular annual Blue Lagoon Challenge is held, a 60 km mountain bike competition from Hafnarfjörður past Krýsuvík to the Blue Lagoon.

Development in the next few years

Iceland's Climate Action Plan from 2020 onwards gives a higher significance to eco-friendly modes of transport. Emphasis is placed on the development of infrastructure for active modes of transport, a tax refund is given for the purchase of bicycles and electric scooters, as well as reinforcing public transport by various means[6]. The municipalities in the capital region have already launched a joint project on drastically improving public transport with a new bus rapid transit (BRT) route on designated lanes called Borgarlínan.

There have also been ideas of airport rail services from Keflavík Airport to Reykjavík but it is unclear when or how these ideas will materialise[7].

4 SSH. Ferðavenjukannanir.

5 Svæðisskipulag Suðurnesja, 2008-2024.

6 Stjórnarráð Íslands (2020). Aðgerðaáætlun í loftslagsmálum.

7 Svæðisskipulag Suðurnesja, 2008-2024.

6.3 Air transport

Air transport is immensely important for an island nation like Iceland and by far the most common way for Icelanders to travel to other countries. Air transport is also important for domestic travel, not least due to long distances and impassable roads in winter.

Keflavík Airport

Keflavík Airport is the country's primary international airport and it has undergone significant growth in the past years. The airport has two runways in regular use. Both runways are more than 3,000 metres long and fulfill all international standards[1]. The airport's operations area measures approximately 260 ha and in 2016 buildings in the area measured a total of 164,500 m2, including terminals, air hangars, aprons, fuel storages, offices and hotels[2].

Number of passengers at Keflavík Airport

Keflavík Airport is by far the largest airport in the country with a 99.4% share of international flights in 2019. The number of passengers who pass through Keflavík Airport grew rapidly from 2010 to 2018 when it reached almost 10 million. However, the number of passengers dropped somewhat in 2019, down to just over 7 million, of which just over 2 million were transit passengers[3].

1 Isavia (2019). Flugtölur.
2 Isavia (2019). Stækkun Keflavíkurflugvallar.
3 Isavia (2019). Flugtölur.

It can be assumed that the number will drop well below that figure in 2020 due to the impact of the COVID-19 pandemic and currently it is difficult to make any predictions for the near future.

The background of passengers at Keflavík Airport

Most tourists who come to Iceland fly in from North America (31%), followed by Central and Southern Europe (23%), and Great Britain (16%). Approximately 8% come from each of the following regions: The Nordic countries, Eastern Europe and Asia. Most travelers are aged between 25 and 34 (34,5%) and have an above-average income (54.2%)[4].

Cargo transport at Keflavík Airport

Keflavík Airport is also by far the largest when it comes to cargo and mail transport between countries and next to nothing is flown overseas from other airports. Almost 55,000 tons of cargo and mail were sent from Keflavík Airport in 2019, which was a slight decline from 2018. Until then cargo transport had increased gradually since 2010[5]. Even though an extensive recession has occurred due to the COVID-19 pandemic, cargo transport has not been affected as much as passenger flights. Both cargo planes and passenger planes have been used for cargo transport while the virus has prevented passenger flights.

4 Ferðamálastofa. Mælaborð ferðþjónustunnar.
5 Isavia (2019). Flugtölur.

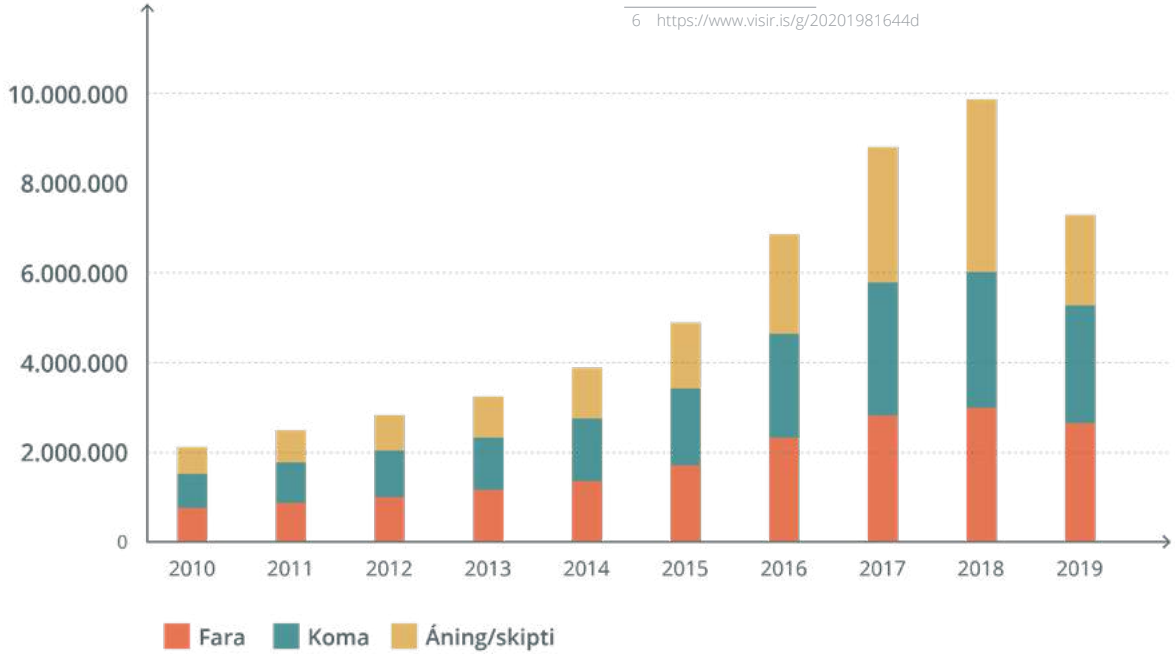
The expansion of Keflavík Airport

Isavia has worked on the expansion of Keflavík Airport in the past years in line with the increasing number of passengers to ensure maximum efficiency of the current runway system. The development plan is based on passenger number forecasts. It is assumed that the number of passengers will increase again in the next few years and the development plan includes the enlargement of terminals, building of parking garages, along with changes to the runway system and the taxiway system for manoeuvring of aircraft.

Keflavík Airport as a charging station

Kadeco sees opportunities in the possibility of Keflavík Airport becoming an important charging station for the first electric aircraft traveling across the Atlantic in the coming decades. The airport served a comparable role in the post war years, that is as a refueling station back when aircraft were unable to fly across the Atlantic without refueling. Today still, smaller-range aircraft use the airport for this purpose. In addition to the location in the middle of the Atlantic, Keflavík Airport has the advantage of being able to offer renewable energy, making the flight as environmentally-friendly as possible[6].

6 https://www.visir.is/g/20201981644d



International air passangers in icelandic airports from 2010-2019. Data from ISAVIA.

Domestic flight in Iceland

Domestic flight in Iceland is first and foremost intended to connect the capital region with towns in other parts of the country. Airfares only account for about 1/3 of the cost of operating the domestic airports, while 2/3 are covered by the Icelandic state treasury. Scheduled flights to Ísafjörður, Akureyri, Húsavík, Egilsstaðir and Vestmannaeyjar are supported by private demand but scheduled flights to other destinations are supported by the state. The airfares are often unstable and relatively high. The increase of foreign tourists on domestic flights has not gone hand-in-hand with the increase of tourists in the past years[1]. Recently, the Ministry of Transport and Local Government presented a project called Loftbrú (Air Bridge) which provides inhabitants outside the capital region with the option of lower airfares when flying to the capital. The project is part of the government agreement on reinforcing domestic flight and building up public transportation in all parts of the country.

Reykjavík Airport

Reykjavík Airport is located in the Vatnsmýri district in central Reykjavík and is the country's primary domestic airport with more than 300,000 passengers in 2019. It serves as an alternate airport for Keflavík Airport. In addition to destinations in Iceland, there are flights to five destinations in Greenland from the airport and in 2019, 26,000 international passengers passed through the airport. The airport has two runways[2].

1 Efla (2019). ALMENNINGSSAMGÖNGUR Á LANDSVÍSU.
2 Isavia (2019). Flugtölur.

Akureyri and Egilsstaðir Airports

The airports in Akureyri and Egilsstaðir also serve as alternates for Keflavík Airport but flights from these airports are mainly to other domestic destinations. In 2019, domestic passengers numbered almost 170,000 in Akureyri and just over 80,000 in Egilsstaðir, which was a decrease by almost 12% in Akureyri and 10% in Egilsstaðir from the previous year. There were 16,000 international passengers at Akureyri Airport and 2,300 at Egilsstaðir Airport in 2019[3].

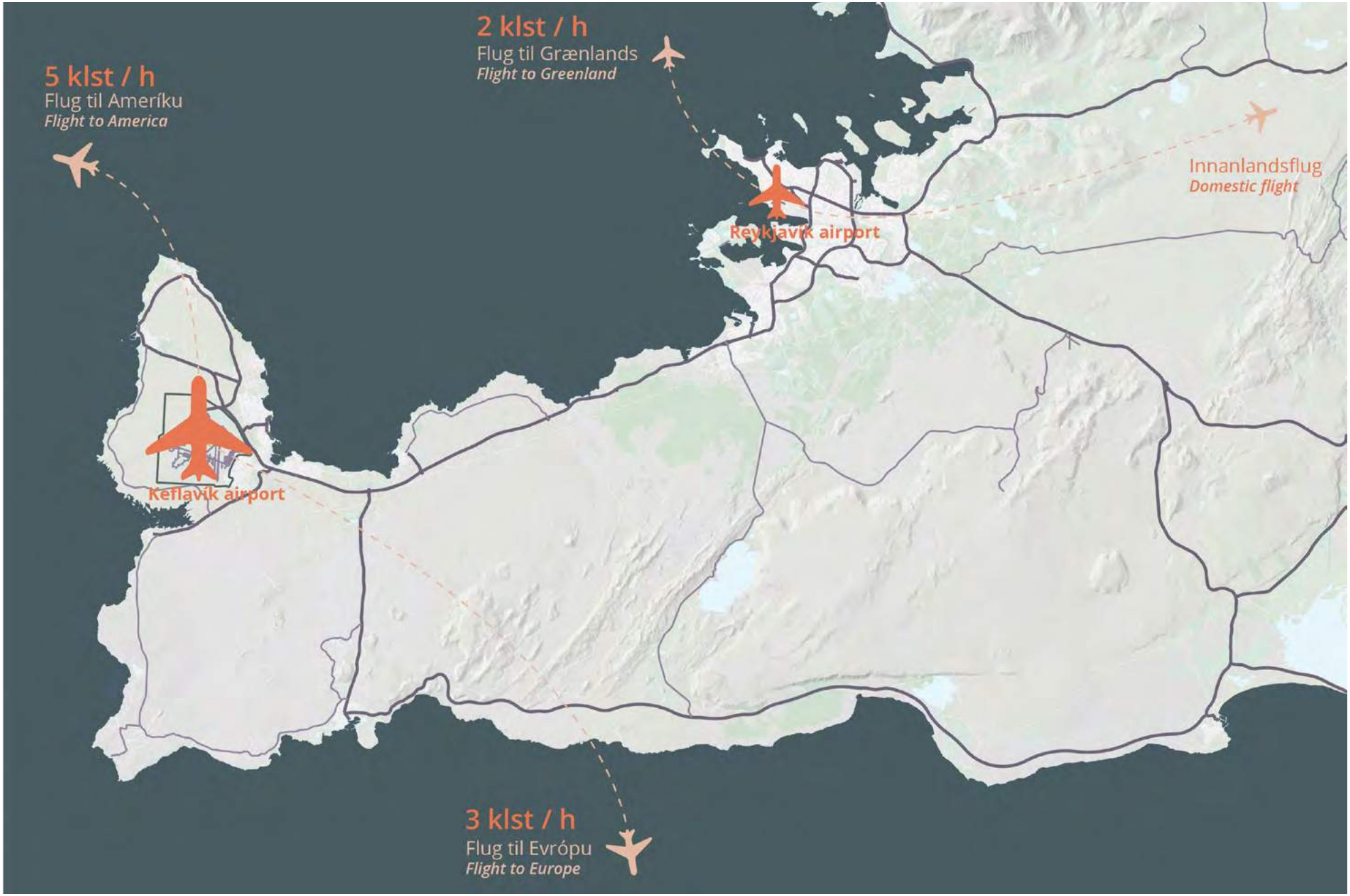
Uncertain future for Reykjavík Airport

The location of Reykjavík Airport has been debated heatedly in the past decades. The airport is in the Vatnsmýri district in the city centre on valuable land which is considered to be important for the development and densification of population centres. The viewpoints of those who would like to develop Vatnsmýri are at odds with the viewpoints of those who believe that inhabitants outside the capital region should have easy access to Landspítali University Hospital and other services in the capital region by air. Options of building a new airport in Hvassahraun in about a 25–minute driving distance from Keflavík Airport have been looked into but no decisions have been made. Analysis indicates that relocating domestic flight to Keflavík Airport would increase the ratio of foreign passengers but decrease the ratio of Icelandic passengers who would use domestic flights. The viability of relocating the centre of domestic

3 Isavia (2019). Flugtölur.

flight to Keflavík Airport has not been properly analysed[4]. It is likely that the opening of a centre for domestic flight at Keflavík Airport would have a positive impact on the Suðurnes region and create opportunities for further developments.

4 Efla (2019). ALMENNINGSSAMGÖNGUR Á LANDSVÍSU.



International and domestic air transport to and from Reykjanes Peninsula.

6.4 Ports and sailing

Sailing off Iceland

Icelanders are a sailing nation as most other island people. Fisheries has been the nation's main industry since the early 20th century, when fisheries overtook agriculture as the most important source of income. Imported goods and domestic products intended for export are mostly transported by sea freight. The passenger ferry Norræna sails from Seyðisfjörður harbor to the Faroe Islands and Denmark and there are ferry connections to inhabited islands off Iceland's coast.

Ports in Iceland

A total of 70 ports in Iceland are registered to the Port Association of Iceland. Most serve as fishing ports. The primary port for general cargo transport is Sundahöfn in Reykjavík. There are scheduled sea freights to and from ten ports in the country. Straumsvíkurhöfn, Grundartangahöfn, Reyðarfjarðarhöfn and Reykhólahöfn exclusively service the large-scale industry[1].

Ports in Reykjanes

The ports on Reykjanes peninsula are operated by the respective municipalities and primarily service fishing vessels and various cargo transport. The main ports are in Helguvík, Keflavík, Njarðvík, Grindavík and Sandgerði. The largest harbour area is at Helguvík port, which was planned for sea freight for the large-scale industry but the future of such industry in the area is unclear[2].

Growing tourism

Keflavíkurhöfn offers services for cruise ships and in the long-term it is estimated that the port will mainly focus on ships connected to tourism[3]. In addition, tourism companies have expressed interest in using the ports in Grindavík and/or Helguvík as a transit area for cruise ships due to the short distance to the airport. Whale watching companies operate from the marina at Grófin in Reykjanesbær and from Vogar in Vatnsleysuströnd[4].

Extensive fishing ports

The main fishing ports in the area are Grindavíkurhöfn, one of the most comprehensive fishing ports in the country[5], and Sandgerðishöfn, where there are prime facilities for fishing vessels and good fishing grounds close by[6]. The ports in Reykjanesbær have also been connected to fisheries for a long time but the number of fishing vessels that use the ports has dropped in the past decades as fishing quota has been sold away from the area. It is assumed that in the future Njarðvíkurhöfn will become the primary fishing port in Reykjanesbær while Keflavíkurhöfn will exclusively service tourism vessels[7].

Many opportunities in Helguvík port

Today, Helguvíkurhöfn is first and foremost a port for freight vessels connected with operations in the industrial area in Helguvík but also serves as a landing port for pelagic fish. Freight vessels have increased significantly in Helguvíkurhöfn in the last few years in consistency with the airport's progression and it is estimated that the freight industry will continue to expand there in the near future. There is plenty of space for enlargement and there are only 4 km from the port to Keflavík Airport which creates many opportunities for transport. There are also many opportunities involved in the development of the industrial area in Helguvík considering the interplay between a container port and an international airport. The port currently has a 150–metre long quay and a 100–metre oil dock. According to estimates, the quay will be extended to up to 670 metres and a container area of up to 40,000 m^2 constructed. The port is the import harbour for jet fuel for Keflavík Airport and the country's other airports[8].

1 Samtök iðnaðarins. Hafnir.

2 KPMG (2018). Suðurnes 2040.

3 Reykjaneshöfn (2018). Framtíðarsýn komandi 10 ára.

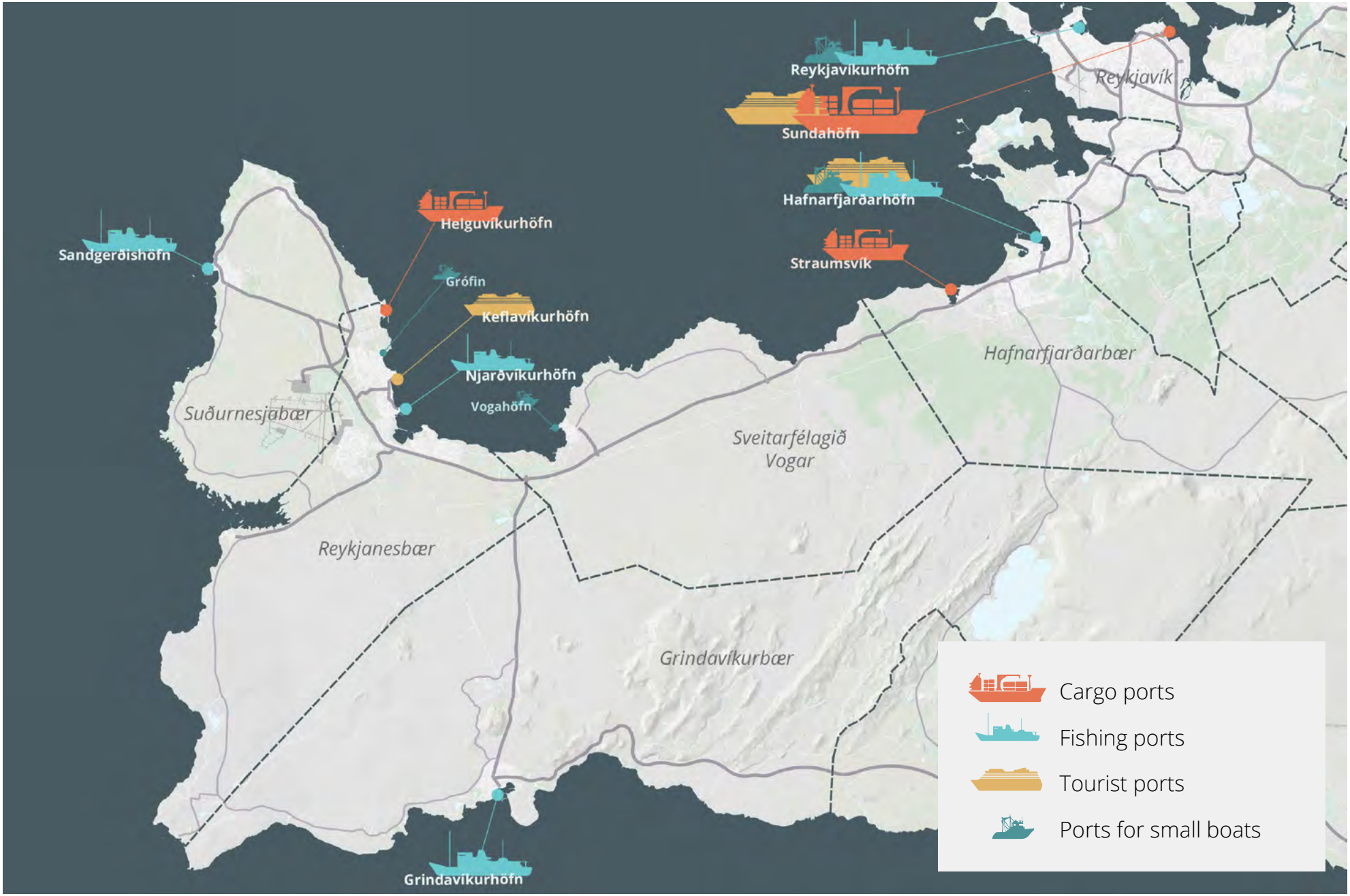
4 Markaðsstofa Reykjaness. Áfangastaðaáætlun Reykjaness 2018-2021.

5 Grindavíkurbær (2019). Grindavíkurhöfn stærsta löndunarhöfn þorsks.

6 Sangerðisbær. Saga sandgerðishafnar.

7 Reykjaneshöfn (2018). Framtíðarsýn komandi 10 ára.

8 Reykjaneshöfn (2018). Framtíðarsýn komandi 10 ára.



The map shows locations of different ports in Reykjanes Peninsula.

6.5 Energy transmission system and energy security

The main transmission system for electricity

Landsnet hf., a publicly owned company, supervises the main electricity transmission system and runs the transmission lines at a voltage of 66 kW and higher, along with single lines at a voltage of 33 kW which serve regional systems. The highest voltage of transmission lines is 220 kW but some of them are designed to transmit up to 400 kW and therefore the voltage can be raised to increase the transmission capacity if necessary. The total length of Landsnet's transmission lines is 3,360 km, of which 261 km are underground or in the sea[1].

The electricity transmission system in the Suðurnes region

The capital and Suðurnes regions are mostly fed directly from the main transmission system. From Hamranes there is a connection to Suðurnes by the power line Suðurnesjalína 1, through which the geothermal power plants of HS Orka, Orkuverið Svartsengi and Reykjanesvirkjun are connected, along with the distribution system of HS Veitur. Additionally, Landsnet transmits energy through the line to the data centres Verne and Advania. Due to increased electricity usage in Suðurnes, including because of data centers, the 132 kW transmission system in Southwest Iceland has become heavily loaded. HS Orka plans to increase the production capacity of the Svartsengi and Reykjanesvirkjun plants to meet the increased need for electricity in the region[2].

Suðurnes power line 2

Plans have been made to commence the construction of the power line Suðurnesjalína 2, which is part of the main transmission system, at the end of 2020 or in 2021. Today, the transmission of electricity between Suðurnes and the capital region goes through Suðurnes power line 1 (a 132 kW overhead line). If Suðurnes power line 1 would suddenly become non-operational, it would without exception cause a blackout in the Suðurnes region[3].

Energy usage and safety

With the existence of Suðurnesjalína 2, the energy safety in the Suðurnes region will increase significantly. Once fully operational, both the distribution safety and voltage level of the transmitted energy will increase. Additionally, increased electricity production is planned within the region, both with the expansion of Reykjanesvirkjun and new power plants on Reykjanes peninsula so that the total production could amount to 605–655 MW. According to electricity forecasts, the peak load in Suðurnes could reach 160 MW in 2050, but on top of that large-scale industry plans assume energy needs of as much as 265 MW[4]. There is some uncertainty surrounding all of these plans.

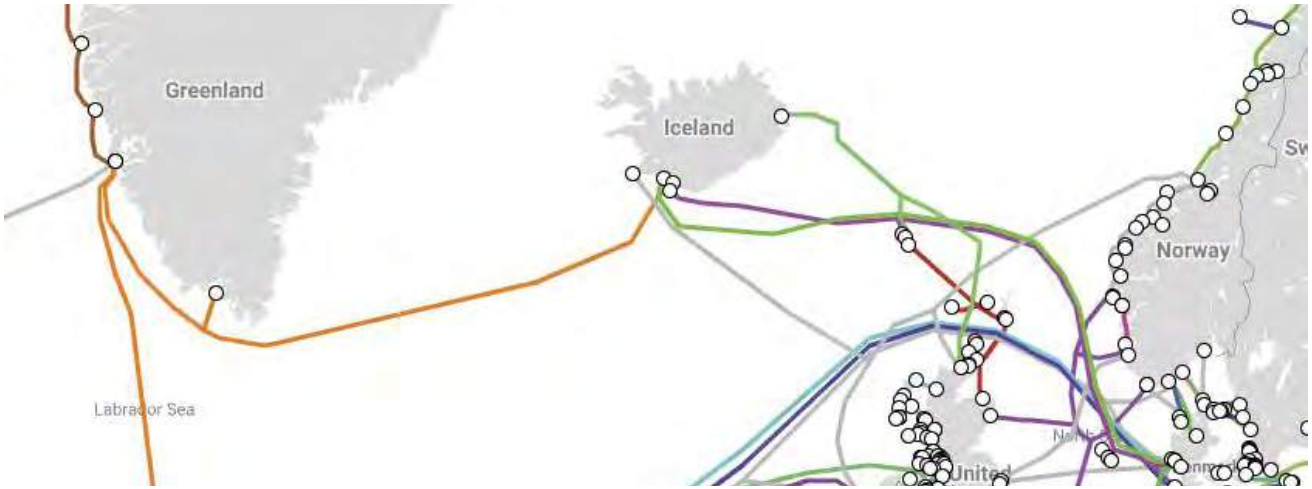
1 Landsnet. Kerfisáætlun Landsnets 220-2029.

2 Landsnet. Kerfisáætlun Landsnets 220-2029.

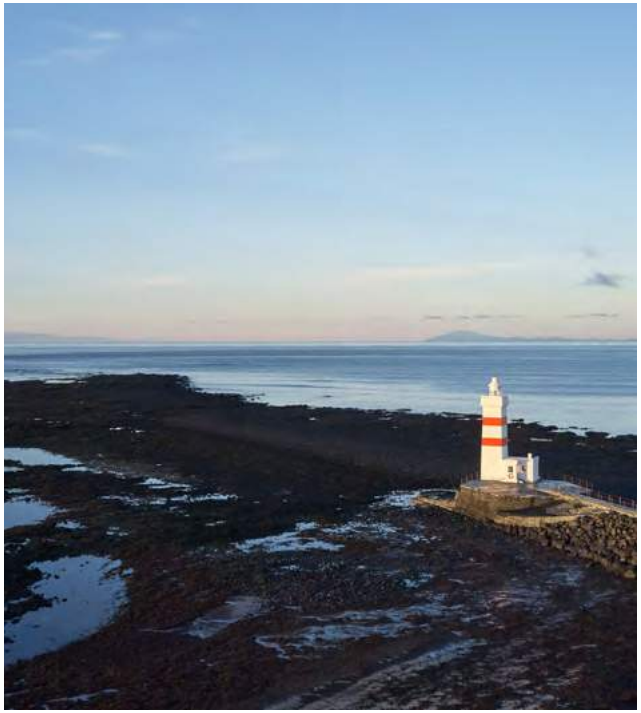
3 VSÓ fyrir Landsnet (2019). Suðurnesjalína 2 - Matsskýrsla.

4 Landsnet (2016). Suðurnesjalína 2, valkostaskýrsla, samantekt.

Main enery transmition lines (Landsnet) including the upcomming Suðurnes power line 2.



Submarine cable connections from Iceland to neighbouring countries - snapshot from https://www.submarinecablemap.com/



6.6 Telecommunication

Telecommunication and internet use in Iceland

The Post and Telecom Administration in Iceland serves the purpose of securing a beneficial, safe and accessible telecommunication service for all inhabitants. Icelanders are among the world's biggest users of internet and mobile phones and the usage level has increased continuously in the past years. In 2011, mobile phone subscriptions outnumbered inhabitants and more than 90% of inhabitants use a computer and the internet daily. The data storage in use has also increased in the past years[1]. This extensive internet and mobile phone usage is possible due to the expansive distribution of mobile phone and internet services for GSM, 3G and 4G in the country[2].

1 Hagstofa. Fjarskipti.
2 Póst- og fjarskiptastofnun. Útbreiðslukort og tíðnitöflur

Fibre optic cable by marine cable

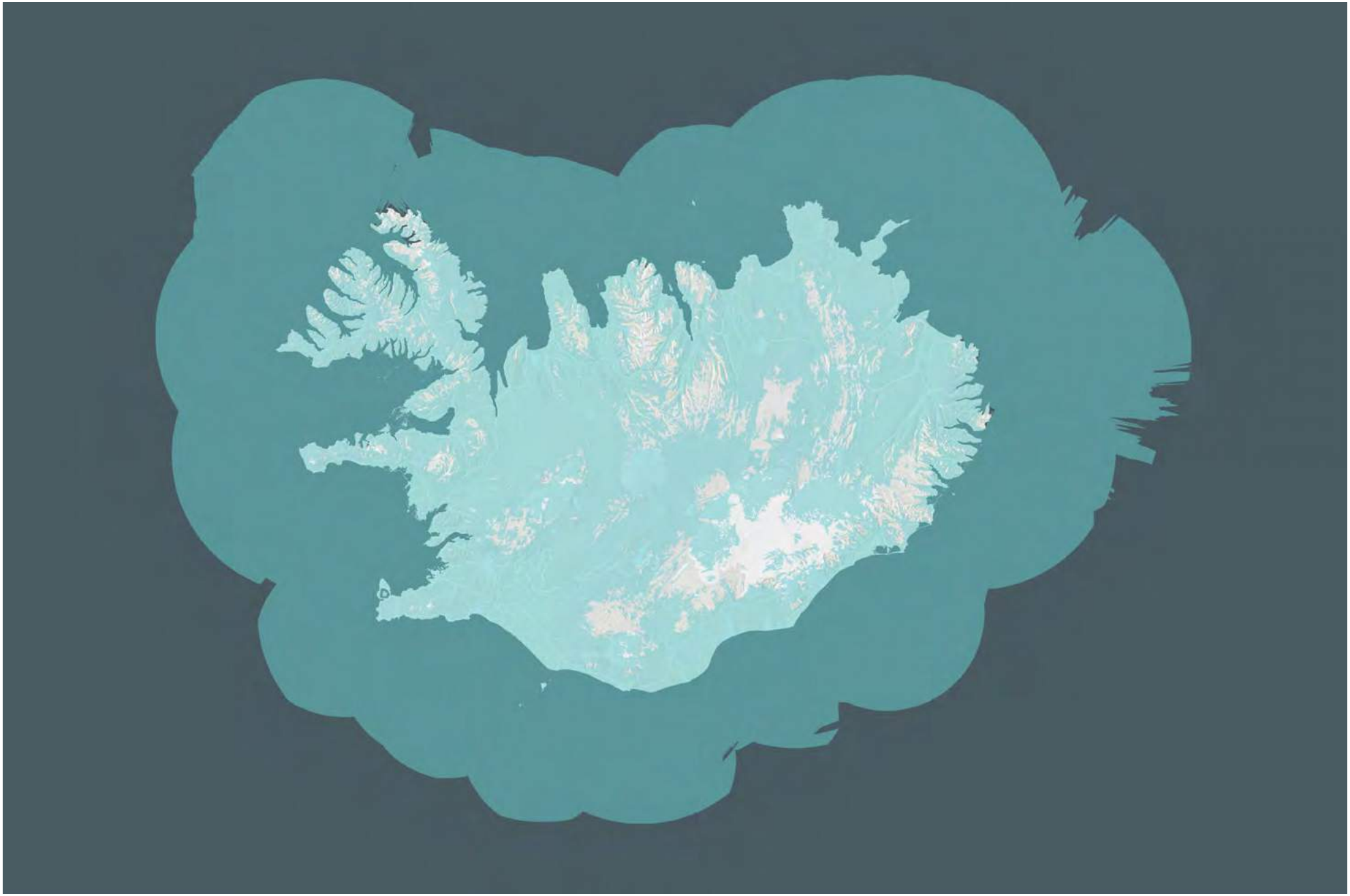
Iceland has fibre optic connections with the outside world by three marine cables, Farice and Danice which go to Europe, and Greenland Connect, which goes to North America through Greenland. Fibre optic ring networks have been established in most of the country's inhabited areas and the fibre opticalisation of the access network has come far in the country.

More than 120,000 households in Iceland in 2020 were completely connected to a fibre optic cable, or 82% of the country's households. Around 66% use the connection, which is the highest ratio in Europe. About 20,000 households have yet to be connected in Iceland. When only the plans of Gagnaveita Reykjavíkur, which is a telecommunication company owned by Orkuveita Reykjavíkur, on the installation of fibre optic cables are taken into account, approximately 90% of households in Iceland will be connected by 2023. The government's goal is for Iceland to be fully fibre opticalised as soon as possible[3].

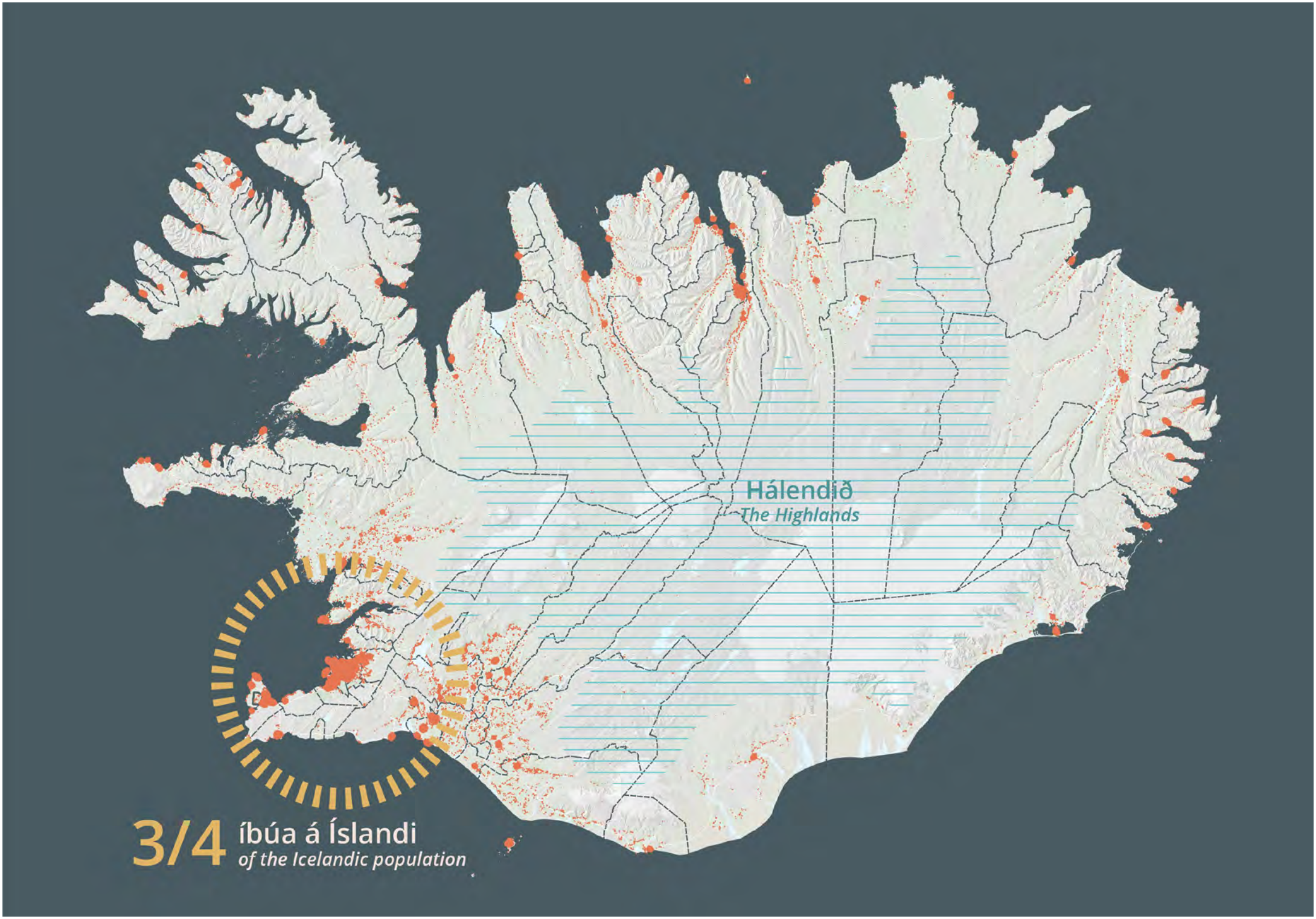
Fibre optic cable in the Suðurnes region

Gagnaveita Reykjavíkur and Míla are working on establishing a connection for up to 1,800 households with a 1,000 MB fibre optic cable in 2020, in addition to those that are already connected in Reykjanesbær[4].

3 Ljósleiðarinn (2020). Ísland leiðandi í ljósleiðara í Evrópu.
4 Ljósleiðarinn (2020). Jarðvinna að hefjast í Reykjanesbæ.



The map shows the area covered by internet services and 4G in Iceland.


Hálendið
The Highlands
3/4 íbúa á Íslandi
of the Icelandic population

7 Society

A society where there is a general agreement on rules and arrangements is likely to succeed. Good health and education form its foundation.

In this chapter the social context of the development area, both in the Suðurnes region and in the entire country, is discussed. The following issues will be covered:

- **Administration in Iceland:** The state and municipalities
- **Population:** Population patterns in the country and in the areas surrounding the development area
- **Inhabitants:** A summary of the demography in the region
- **Real estate market:** Price and demand
- **Service:** Supply of basic services in the region
- **Education and research:** Such as the main universities and learning centres
- **Culture and recreation:** Such as cultural activities, food and sports

7.1 Administration

The Icelandic state

Iceland is a representative democracy and parliamentary republic. The president is elected by popular vote for a term of four years. The government, led by the prime minister, has the executive power. Iceland's parliament, which is called Alþingi, has 63 nationally elected parliamentarians. Iceland's governments are almost always coalition governments of two or more political parties. The judiciary power lies with the court system where the Supreme Court is the highest court. In Iceland there are two equal administrative levels: the state and municipalities.

Iceland's international cooperation

Iceland was one of the founding states of NATO (North Atlantic Treaty Organisation) but has no operating army. Iceland is a member of EFTA (European Free Trade Association), the EEA (European Economic Area) and the Shengen Area, but not a member of the European Union. Iceland has a seat on the Arctic Council, an intergovernmental forum that addresses the issues of the Arctic regions, and chairs the council 2019-2021 under the slogan: "Together towards a sustainable Arctic"[1].

Municipalities

Iceland's municipalities control planning and operate various services, including kindergartens, elementary schools, waste collection, public transport, social housing and social services. There are 72 municipalities in Iceland in total. Their expenses amount to 13% of GDP, which makes them a key player in the Icelandic economy[2].

The largest part of the municipalities' income, around 60%, comes from the local tax paid by residents, that is, a share of the income tax collected by the state. Various service receipts make up around 19% and the real property tax 12%.

Municipalities in the Suðurnes region

The airport area lies on the boundaries of the municipalities Suðurnesjabær and Reykjanesbær. In the Suðurnes region there are also two other municipalities, Grindavíkurbær in the southeast and Vogar in the north. Additionally, Hafnarfjarðarbær owns land on Reykjanes peninsula, which is surrounded by Grindavíkurbær municipality.

1 Iceland Chamber of Commerce (2019). The Icelandic Economy.

2 Iceland Chamber of Commerce (2019). The Icelandic Economy.

7.2 Population centres

The centre of urbanisation in Southwest Iceland

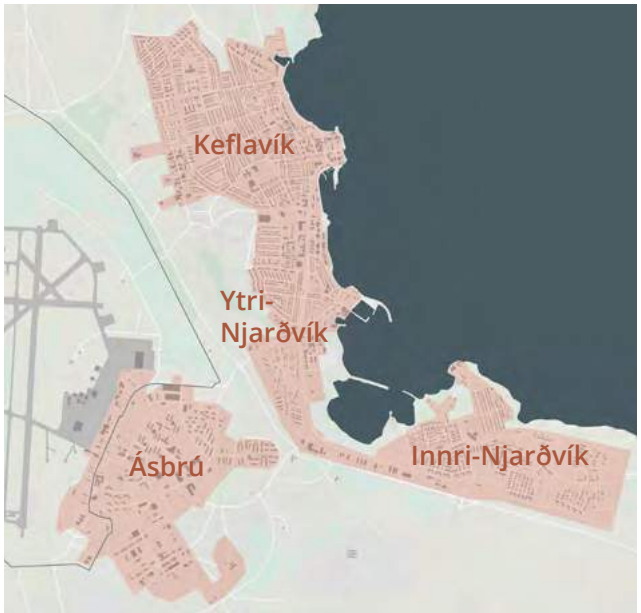
In Iceland, population centres can be found on and around the coast but the Highland in the interior is mostly considered to be uninhabitable. Most Icelanders, or 94%, live in urban areas. Population centers are either coastal towns or connected with agriculture further inland. The capital region is by far the largest population centre in the country with 2/3 of the country's inhabitants: 225,378 people on January 1, 2020. Approximately ¾ of the country's inhabitants live in the capital region's surrounding area, in the southwestern part of the country in the so-called Hvítá-Hvítá region, which includes Suðurnes.

The history of settlement in the Suðurnes region

Habitation in Suðurnes has long been characterised by the closeness of the sea and rich fishing grounds. Since the area was first settled, people have lived along the seaside. Fishing farmers practised sheep farming in mountain dairies in the summer and went fishing on rowboats from fishing stations in the winter. For about 1,000 years, the settlement has been characterised by mountain dairy farming and fishing from fishing stations. Nowhere else in Iceland were there more fishing stations than in Suðurnes and in many places there are trails and cairns in the lava which mark ancient national routes between fishing stations. In the 15th century and until the early 19th century, extensive trade with foreign merchants was practised at some of the harbours in the region.

When the US military established itself in Suðurnes in the 1940s, population centres formed and ways of working changed as the army required labour. That is one of the reasons for the rapid population increase in Suðurnes within a few decade[1].

1 KPMG (2018). Suðurnes 2040.

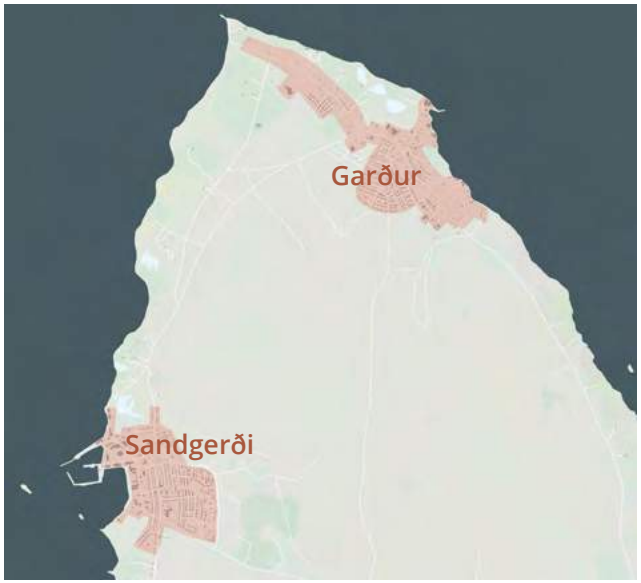


Keflavík, Innri- og Ytri-Njarðvík

The largest population centres in Suðurnes are the joint towns of Keflavík, Njarðvík and Ásbrú in Reykjanesbær with 19,311 inhabitants on January 1, 2020. Keflavík and Njarðvík (Innri and Ytri) were originally traditional fishing villages, which extend along the seashore, but have since grown and extended further inland, especially in the last few years. Through the towns lies the main street Hafnargata / Njarðarbraut with a range of stores and services. Hafnargata is framed by rather elegant buildings and has a vibrant street life. The street, along with Vatnsnes peninsula—on which there are plans of mixed use-development—has the potential to make the town atmosphere even more attractive.

Ásbrú

Ásbrú is the part of Reykjanesbæjar which is located closest to the airport but due to the positioning of runways there is less noise pollution there than in the centre of Keflavík. The US military built the neighbourhood for the Naval Air Station which was in operation 1952–2006. During that period, it was a closed and fenced-off community. After the military left in 2006, the neighbourhood was opened up and merged with Reykjanesbær with new inhabitants. Recently, a framework design was made for Ásbrú. The local government in Reykjanesbær has decided that Ásbrú will be the next development area in the municipality and that the next new school will be built there. It is estimated that in Ásbrú a neighbourhood of up to 14,000 inhabitants can be established in the next 30 years. Population development forecasts estimate that residents in Ásbrú will increase by as many as 5,000 by 2030.



Sandgerði

There were 1,852 residents in Sandgerði on January 1, 2020. It is a fishing village with a large fishing port and various operations, such as in relation with research and innovation. The town has a beautiful natural environment around the pond Sandgerðistjörn and interesting architecture on Krókskotstún and Landakotstún. Sandgerði is relatively densely populated and the streets are framed by houses and green gardens. Near the town centre is the city hall and a public park, a grocery store and uninhabited areas, where there is an option for urban densification in a prime area to improve town life.

Garður

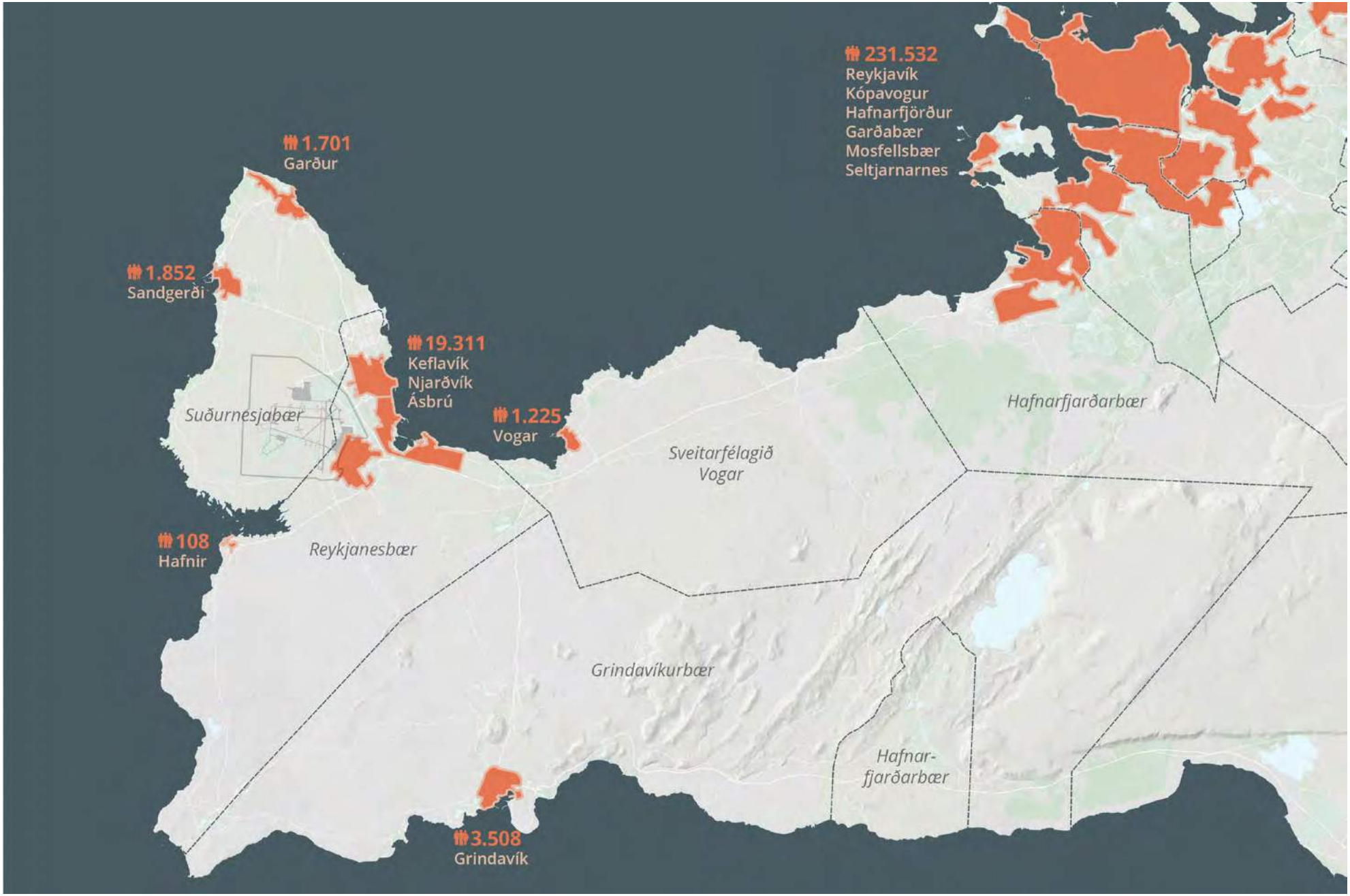
The town of Garður had 1,701 residents on January 1, 2020. The town´s unique position lies in an unconventional population pattern which can best be described as a collection of small farms that stand along the shoreline and jointly form a cluster called Garður. Coupled with its two lighthouses, Garður is a place like no other and a place that inspires creativity. The town has a heritage museum, culture house by Útskálar and an international art festival called Ferskir vindar, or “Fresh Winds.” The view of Snæfellsnes peninsula and Reykjavík is spectacular and there is also an unobstructed view of the northern lights when they come out to play.

Grindavíkurbær

Grindavík had a population of 3,508 on January 1, 2020. The town, which lies in Grindavíkurbær municipality, is the only urban area on the southern coast of Suðurnes. The main industry is fisheries and in town there are fishing and fish processing companies with extensive operations.

Vogar

Vogar á Vatnsleysuströnd is the smallest population centre in Suðurnes with 1,225 inhabitants on January 1, 2020. Vogar is a small fishing village in the municipality Vogar in a ten-minute driving distance east of the airport area. Vogar is first and foremost characterised by a rocky beach and a beautiful view of the ocean.



The population of Reykjanes Peninsula and the capital area of Iceland in 2020 (Hagstofa)

7.3 Inhabitants

Inhabitants are increasing in Southwest Iceland

The population development in Iceland is vastly different between regions but in the past few years the number of inhabitants has increased in all regions. The increase has been relatively higher on the southwestern corner of the country than in other regions. In the last two years, population growth has been the highest there; the increase was 6.3% on average in Suðurnes, 3.9% in South Iceland and 2.6% in the capital region. This has also been the development in the aforementioned regions when a longer period is observed[1]. Icelanders are the second youngest nation in the European Economic Area[2].

Inhabitants are increasing in the Suðurnes region

The number of inhabitants has increased in the past few years, especially because of relatively low real estate prices and increased operations at Keflavík Airport[3]. According to estimates, the population in Suðurnes will continue to grow and reach 34,835 in 2030[4].

Inhabitants of foreign origin in the Suðurnes region

Foreign citizens who reside in Suðurnes increased massively in 1998– 2019, from just over 300 to more than 4,900. At the end of 2019 almost every fifth inhabitant in Reykjanesbær had a foreign citizenship. In the other three municipalities, the ratio is 13-16%[5]. Overall, inhabitants in the Suðurnes region have 78 different nationalities, of which Poles is by far the largest group, numbering 2,484 on January 1, 2017. Large operators at Keflavík Airport have stated that their planned developments will primarily be based on imported labour[6].

Increasing level of education

Icelanders have a relatively high level of education compared to other OECD nations. In 2019, 42.4% of residents aged 25–64 had graduated from university. In 2007 only 12% of residents in Reykjanesbær had a university degree but 10 years later, in 2017, 24% of respondents in a survey by Market and Media Research (MMR) had graduated from university. The ratio of residents who have completed other kinds of studies has also increased[7].

1 Íslandsbanki. 2019. Íslenskur íbúðamarkaður 2019.
2 Iceland Chamber of Commerce (2019). The Icelandic Economy.
3 KPMG (2018). Suðurnes 2040.
4 Markaðsstofa Reykjaness. Áfangastaðaáætlun Reykjaness 2018-2021.
5 Byggðastofnun 2015-2019. Sóknaráætlun Suðurnesja.
6 KPMG (2018). Suðurnes 2040.
7 Keilir (2018). Menntunarstig í Reykjanesbæ hefur tvöfaldast á tíu árum.

7.4 Real estate market

Housing prices

In the capital region, Suðurnes region and South Iceland, where population growth is greatest, housing prices have also shot up. Since 2000, the real price of housing in Suðurnes and South Iceland has increased the fastest compared to other regions, or 5.4% on an annual basis. In Suðurnes, leverage is 39%, but there is also a relatively high mortgage room in the case of domestic housing with an apparent leeway for increased leverage[1].

Demand for residential accommodation

Considering the number of inhabitants, the ratio of foreign labour is by far the highest in the Suðurnes region compared to other regions in Iceland (14%), which may be part of the reason for the high demand for residential housing in this area. Now that it looks like the employment market is about to enter a period of recession, it can be expected that the pressure on increased supply of housing will drop, especially in the areas with the highest ratio of foreign labour[2].

Rental prices

The average rental price for a two-bedroom apartment is the highest in the capital region and the second highest in the Suðurnes region. Suðurnes has the highest share of rental apartments per number of inhabitants, or around 8%, followed by the capital region with around 6%. Part of the reason may be that many people choose to live in the Suðurnes region rather than in the capital region because of lower rental prices[3].

1 Íslandsbanki. 2019. Íslenskur íbúðamarkaður 2019.

2 Íslandsbanki. 2019. Íslenskur íbúðamarkaður 2019.

3 Íslandsbanki. 2019. Íslenskur íbúðamarkaður 2019.

7.5 Services

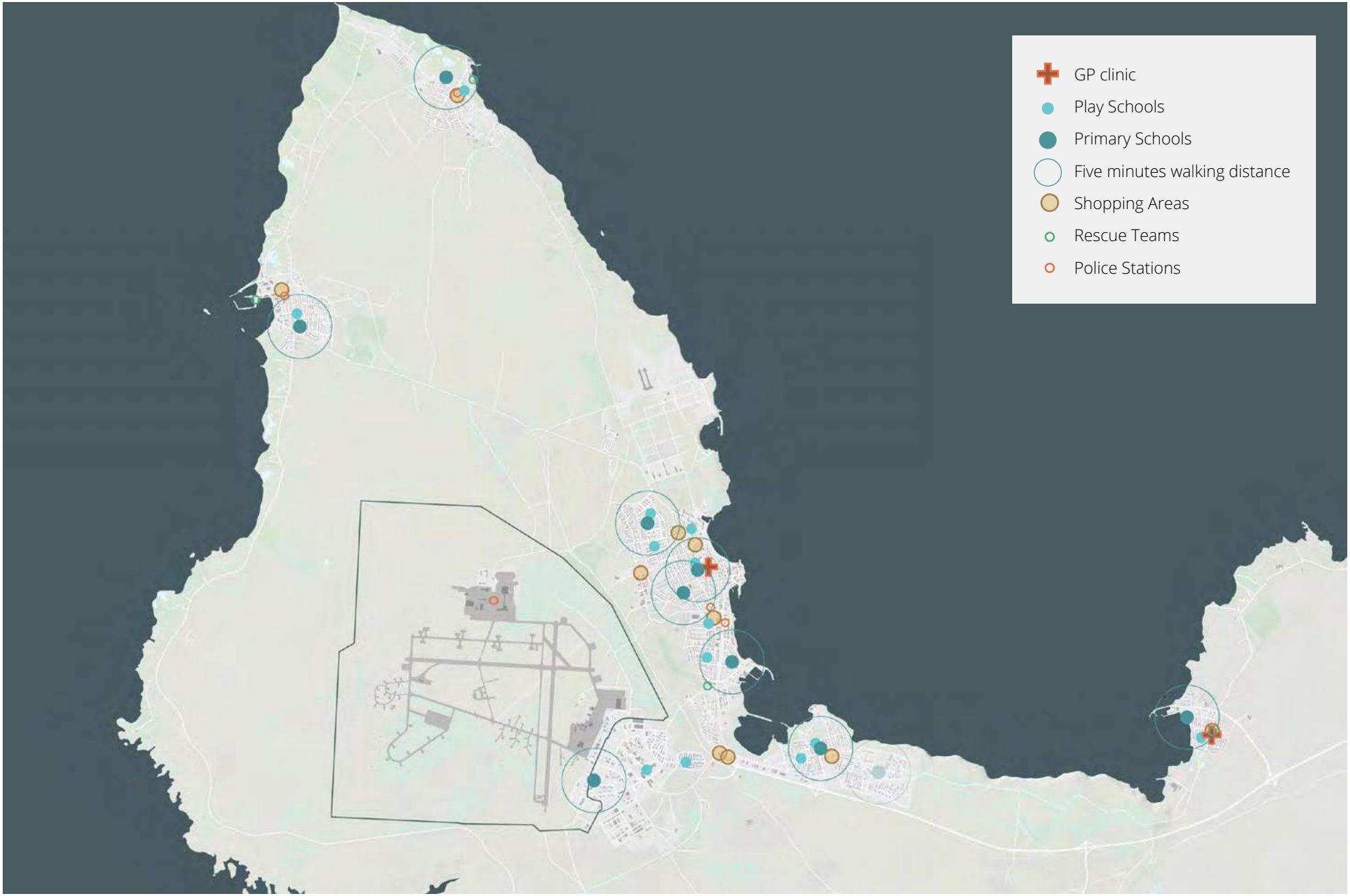
The Icelandic healthcare system

In an international comparison, the Icelandic healthcare system is generally considered to be of a good standard. Overall, healthcare workers in all fields of the healthcare system have a high level of education and are highly qualified. However, residents' access to healthcare services varies depending on where they live and the waiting lists for certain operations are too long. Generally, it is considered that the Icelandic healthcare system has performed well in handling the COVID-19 global pandemic, both the Civil Protection team—led by the Director of Health and the Chief Epidemiologist in cooperation with the police—and health care institutions. Effective civil protection measures made it possible to limit the spread of the virus so that healthcare institutions were able to care for those infected. Landspítali University Hospital and Akureyri Hospital opened special COVID-19 outpatient and inpatient units.

Landspítali University Hospital

Landspítali in Reykjavík is the country's national hospital and a university hospital. Due to the country's small population, Landspítali serves a more extensive role than comparable institutions in countries with larger populations. In certain cases, patients must be sent to hospitals abroad for treatment and therefore Landspítali must cooperate with university hospitals in neighbouring countries. This especially applies to new, costly and rather rare treatments which require extremely specific knowledge. The hospital also cooperates with university hospitals elsewhere in the Nordic countries and beyond in the field of higher and continuous education for healthcare workers, science and innovation[1].

1 Stjórnarráð Íslands (2019). Heilbrigðisstefna -Stefna fyrir íslenska heilbrigðisþjónustu til ársins 2030.



Main community services near the airport area.

Healthcare service in the Suðurnes region

The healthcare jurisdiction of Suðurnes includes the five municipalities in the region. Suðurnes Hospital & Health Centre is based in Reykjanesbær. The hospital and health centre have after-hour shifts and a doctor on call 24/7. There is also a healthcare centre in Grindavík and a healthcare clinic in Vogar[2]. Local authorities have pointed out that the state's financial contributions to the region have not been in line with its population development in the past few years. For example, many inhabitants seem to seek healthcare services in the capital region, given that around 3,000 Suðurnes inhabitants are registered to healthcare centres in the capital region[3].

Pre- and elementary schools in the Suðurnes region

In Iceland, compulsory education is for 6 to 16-year-olds attending 1st to 10th grade of elementary school. Reykjanesbær operates seven elementary schools and Suðurnesjabær two. All schools offer daycare after school or organised after-school activities. In Iceland, daycare is generally operated by the municipalities. Services are at a moderate price - this is important, as in most families, both parents work outside the home. In Reykjanesbær there are ten kindergartens and two in Suðurnesjabær.

2 Markaðsstofa Reykjaness. Áfangastaðaáætlun Reykjaness 2018-2021.
3 RÚV (2020). Suðurnes fá lægst framlag á hvern íbúa til heilsugæslu.

Policing

Suðurnes is one jurisdiction which includes all five municipalities. The main police station is in Reykjanesbær but there are branches in all other municipalities. The police authority is also responsible for border control at Keflavík Airpor[4].

Search and rescue squads

Search and rescue squads operate all around the country and are based on the work of volunteers. The Icelandic Association for Search and Rescue (ICE-SAR) is the national association of search and rescue and accident prevention. Their joint mission is to prevent accidents, safe lives and valuables. In order to fulfil that role, groups of volunteers are always available, night and day, year-round[5]. ICE-SAR defines the Suðurnes region as Area 2. It has a divisional management which controls operations, five rescue squads, five accident prevention divisions, five youth groups and two emergency vessels[6].

4 Markaðsstofa Reykjaness. Áfangastaðaáætlun Reykjaness 2018-2021.
5 Slysavarnafélagið Landsbjörg. Félagið.
6 Markaðsstofa Reykjaness. Áfangastaðaáætlun Reykjaness 2018-2021.

7.6 Education and research

Universities in Iceland

The education available in Iceland has increased significantly in the past years and decades. Undergraduate study programs are available in most subjects and many graduate study programs are also available. In some cases, though, students must seek higher education outside of Iceland. There are seven educational institutions in the country that offer programs at university level, four which are operated by the state and three by private universities:

- University of Iceland
- University of Akureyri
- Hólar University College
- Agricultural University of Iceland
- Bifröst University
- Reykjavík University
- Iceland University of the Arts

University of Iceland

The University of Iceland is the oldest university in the country, founded in 1911. It is also the largest university by far with more than 13,000 students. It has the most diverse program offering in five schools and a number of research institutions:

- School of Social Sciences
- School of Health Sciences
- School of Humanities
- School of Education
- School of Engineering and Natural Sciences

Reykjavík University

Reykjavík University is the second largest in Iceland with approximately 3,500 students. The university emphasises having a connection with the employment market and in the past years it has increased the offering of undergraduate, graduate and doctoral programs.

Gró (previously the United Nations University)

In addition to the aforementioned schools of higher education, the United National University offers four courses of study in Iceland in cooperation with domestic institutions, on subjects in which Iceland is leading:

- Gender Equality Studies & Training Programme
- Geothermal Training Programme
- Land Restoration Training Programme
- Fisheries Training Programme

Research in Iceland

The volcanic activity in Iceland, caused by its location on the plate boundaries of the North American and Eurasian plates, makes the country an interesting place for geological research and research connected with the exploitation of geothermal heat for power production. Emphasis has also been placed on research of the ocean's biosphere because the nation's livelihood depends on maintaining access to an unpolluted and healthy marine ecosystem.

The Icelandic nation is small and through time it has been rather isolated. The Icelandic sagas make it possible for Icelanders to trace their lineage back to the first settlers. For this reason, Iceland is the ideal place for genetic research. Iceland-based research company deCODE genetics has been successful in that field.

Keilir Academy in Reykjanesbær

Keilir Academy is a comprehensive educational institution in Ásbrú. It was established in 2007 to counteract unemployment in the area but also to serve a key role in the area's development after the US military's departure. The study courses offered at Keilir are largely based on close cooperation with the employment market in the Suðurnes region. It has the following four divisions:

- Preliminary University Studies, which prepares students for university studies;
- Aviation Academy, with pilot and air mechanics programs;
- Health Academy, offering adventure guide studies, Nordic personal trainer certificate and podiatry programs, and;
- Secondary School Education with an emphasis on game creation.

Suðurnes Science and Learning Centre

The Suðurnes Science and Learning Centre, which is located in Sandgerði, was founded on April 1, 2012, by all municipalities in Suðurnes, the University of Iceland Suðurnes Research Centre, the Southwest Iceland Nature Research Centre and Keilir Academy. The Science and Learning Centre takes part in research and development, university studies and the integration of educational work, in addition to continuous education and cooperation with other educational institutions in Suðurnes. The Science and Learning Centre is one of the founding parties of Reykjanes Geopark and has been an active partner in projects which focus on educating the public further on the region's nature, flora and fauna.

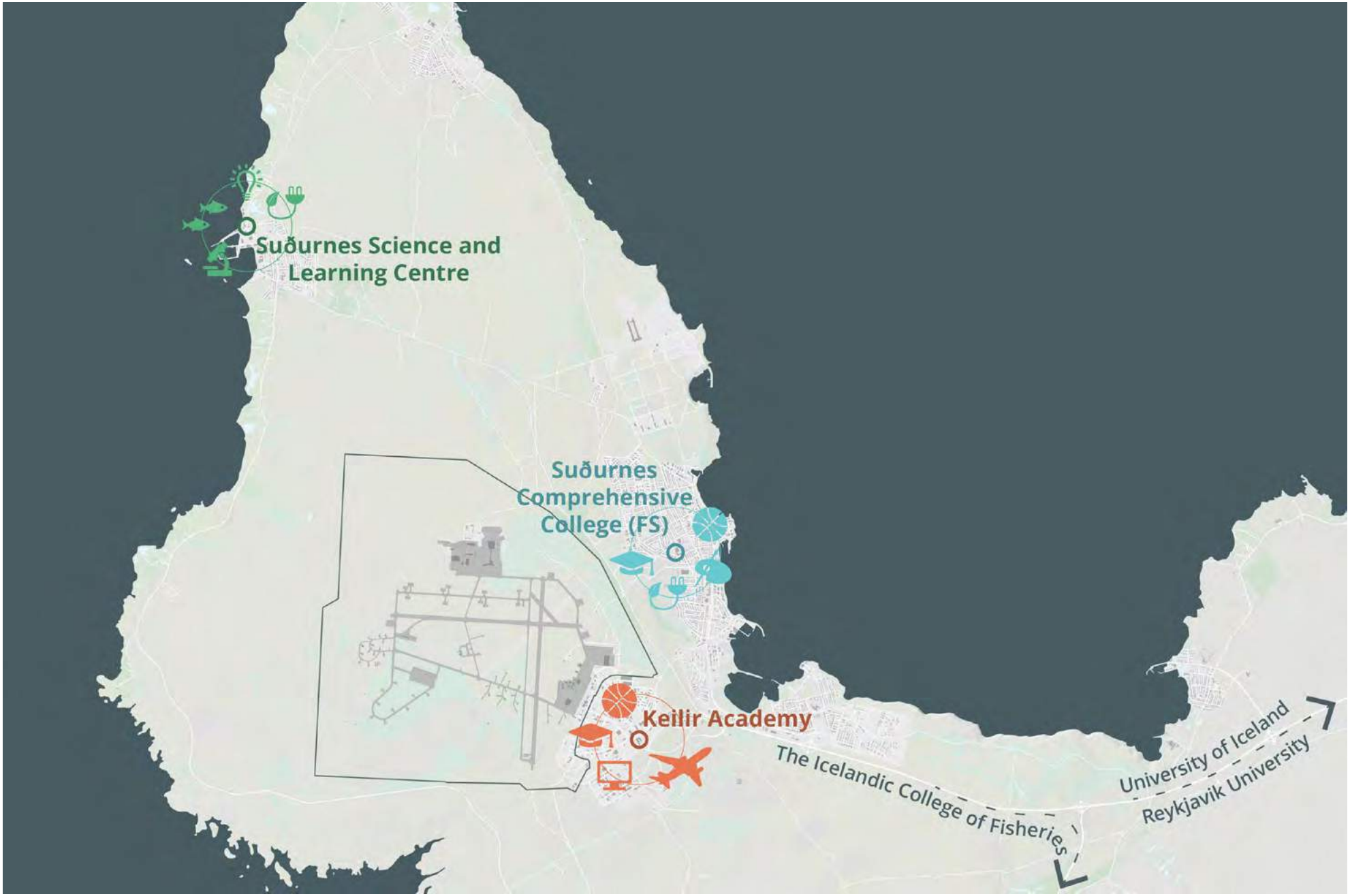
Suðurnes Comprehensive College (FS)

FS in Reykjanesbær was founded in 1976. The school's mission is to offer diverse education at secondary school level and prepare students for higher education and/or the employment market.

The Icelandic College of Fisheries

The Icelandic College of Fisheries is operated in Grindavík. Its role includes increased teaching in fishing gear production (netting) and offering young people the chance to study fishing, fish processing and aquaculture at secondary school level[1].

1 KPMG (2018). Suðurnes 2040.



The map shows key education and research institutions near the airport area.

7.7 Culture, sports and recreation

The Icelandic sagas and literature

Icelandic culture is built on the nation's literary heritage and literature. The oldest Icelandic literary works were written around 1100 but have their origins in oral histories which go back to the settlement at the end of the 9th century. Over the centuries, literature maintained its significance among the general public, which is evident when considered that the majority of the nation was literate in spite of widespread poverty. Today still, literature has an important share in the common Icelanders' life and a multitude of new books is published every year.

Icelandic filmmaking

The Icelandic film industry has grown in the past decades and some of the films produced in Iceland have garnered attention abroad. Foreign filmmakers and music video producers have also increasingly filmed in Iceland, including in the Suðurnes region. Most of these films include shots of eerie landscapes, glaciers, lava and black sands and often have superhero themes. These include *James Bond, Star Wars, Batman Begins, Prometheus, Thor: The Dark World, Noah, Captain America* and part of the popular television series *Game of Thrones.*

Icelandic music

In the past few years, music has grown in importance as part of the nation's cultural life and quite a few Icelandic musicians have been successful outside of Iceland. Some of the most notable musicians are Björk, Sigur Rós, Emilíana Torrini and Of Monsters and Men. Nanna Bryndís Hilmarsdóttir, one of OMAM's founders and lead vocalists, grew up in Garður in Suðurnes.

The Iceland Airwaves music festival, which has been held annually in Reykjavík in early November since 1999, has had a large part in raising awareness of Icelandic music and it attracts many foreign music lovers. Harpa Concert Hall and Conference Centre at Reykjavík harbour, where the Iceland Symphony Orchestra is based, is the country's grandest music hall. Large concerts have also been held at Laugardalshöll arena and in Kórinn sports complex in Kópavogur, where world-famous artists like Ed Sheeran, Justin Timberlake and Arcade Fire have performed.

Culture and recreation in the Suðurnes region

As the capital region is only a short drive away, Suðurnes residents often go to Reykjavík for recreational purposes. The following cultural institutions are operated in Suðurnes:

- Duus Museum in Reykjanesbær, which houses the municipality's art and heritage museum.
- The Icelandic Museum of Rock 'n' Roll in Hljómahöll in Reykjanesbær.
- Viking World in Reykjanesbær.
- Sudurnes Science and Learning Center in Sandgerði, which accommodates three different nature and history exhibitions.
- Byggðasafn Garðskaga heritage museum.
- In Garður the annual international arts festival Ferskir vindar (Fresh winds) is held in mid-winter.
- Kvikan, the culture house in Grindavík.

Icelandic food culture

For a long time, Icelandic food culture was characterised by simple fish and lamb dishes. Food was often salted, smoked or pickled to increase its preservation quality and all parts of the animal were used. The reason for this was mainly general poverty and lack of grain, vegetables and spices. As energy and water is plentiful, the supply of greenhouse-grown vegetables has now increased, and the importation of food has increased as well. In the last decades, ambition in food preparation has increased among Icelanders, along with the availability of top-quality ingredients for cooking diverse meals. The culinary scene, including some world-class restaurants, has flourished with the increased number of tourists.

Geofood in the Suðurnes region

Even though most restaurants are located in central Reykjavík there are some excellent restaurants in other regions, too. That is also the case in Suðurnes, where more and more eateries are offering locally-caught seafood[2]. A few restaurants in Suðurnes have participated in "Geofood", an international project organised by Nordic geoparks tasked with strengthening the production of local food, encouraging the use of local ingredients and increasing the value of the product. The goal is to further develop the project in cooperation with producers and restaurants in the region.

Organised sports in Iceland

Participation in traditional sports is very high in Iceland. For example,

46% of the nation were members of at least one sports club within the National Olympic and Sports Association (ÍSÍ) in 2009. It is especially common that children and teenagers practice sports, in 2011, about 52% of children, age 15 and younger, practised sports organised by the association. In spite of Iceland's small population, Icelandic athletes have been fairly successful abroad, including the national team in men's handball, the national teams in men's and women's football, the national team in group gymnastics and the national team at the World Championships for the Icelandic Horse[3]. Drivers of Icelandic achievement in football in the last few years are considered to include the active sports clubs and the quality of training facilities in covered football pitches which have been built around the country.

2 Markaðsstofa Reykjaness. Áfangastaðaáætlun Reykjaness 2018-2021.

3 Þórólfur Þórlindsson, Viðar Halldórsson, Jónas Hlynur Hallgrímsson, Daði Lárusson, Drífa Pálín Geirs (2014). Íþróttir á Íslandi - Umfang og hagræn áhrif. 2015.

Organised sports in the Suðurnes region

There are sports clubs in all municipalities in the Suðurnes region:

- Keflavík
- Njarðvík
- Reynir Sandgerði
- Víðir in Garður
- Grindavík
- Þróttur in Vogar

They provide a diverse offering of sports, albeit with the biggest emphasis on football and basketball. Reykjaneshöllin (7840 m^2) sports complex in Reykjanesbær accommodates sports clubs Keflavík and Njarðvík but also facilitates events other than sports, such as large concerts. Hópið (3500 m^2) in Grindavík is a multi-use football arena.

Golf courses in the Suðurnes region

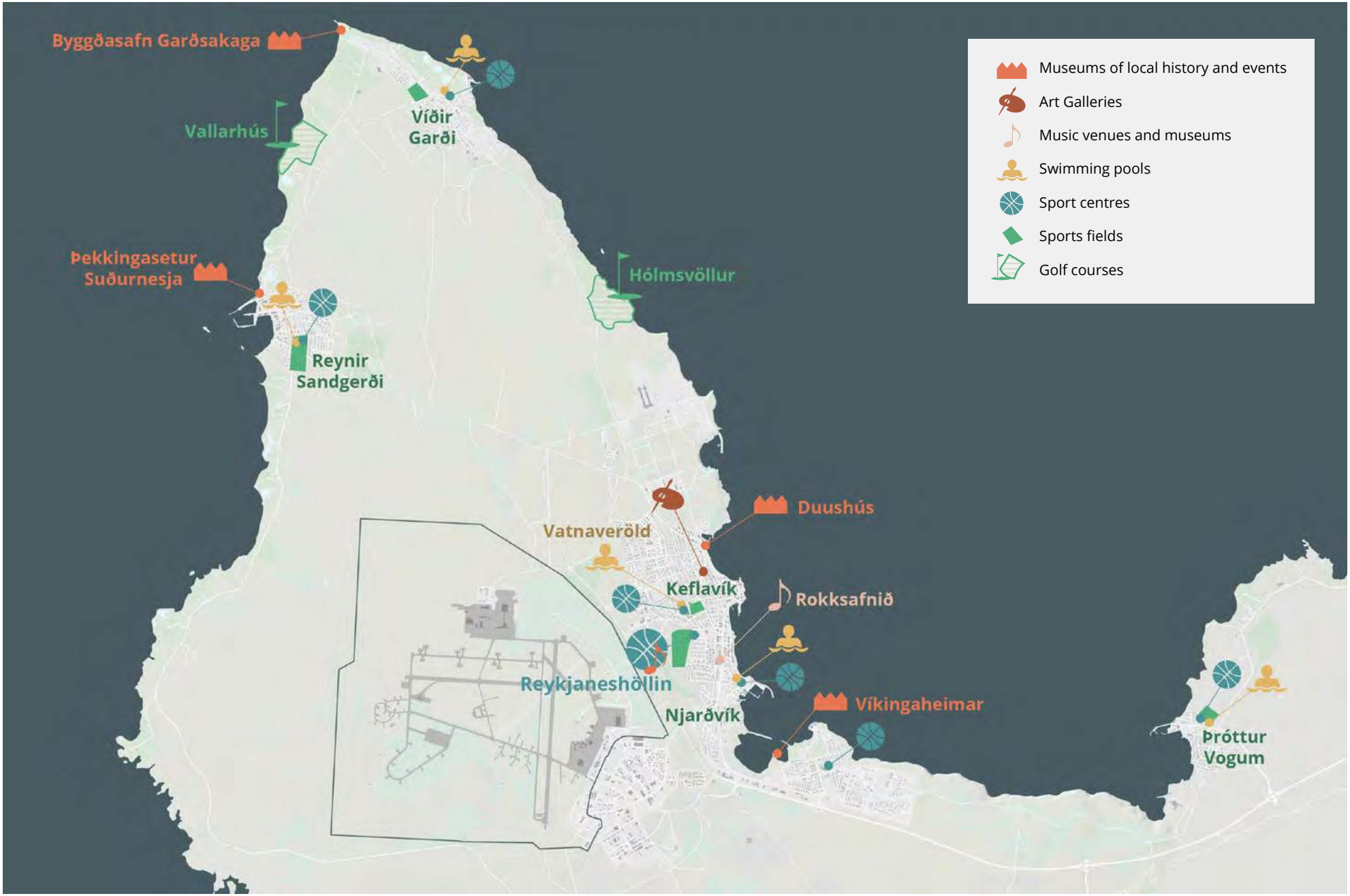
There are four high-quality golf courses in Suðurnes. Due to the mild climate, they open early in the spring and close later in the autumn than elsewhere in the country. All are 18-hole courses, except for Kálfatjörn, which is a 9-hole course.

- Húsatóftir in Grindavík
- Vallarhús in Sandgerði
- Hólmsvöllur in Garður
- Kálfatjörn in Vogar

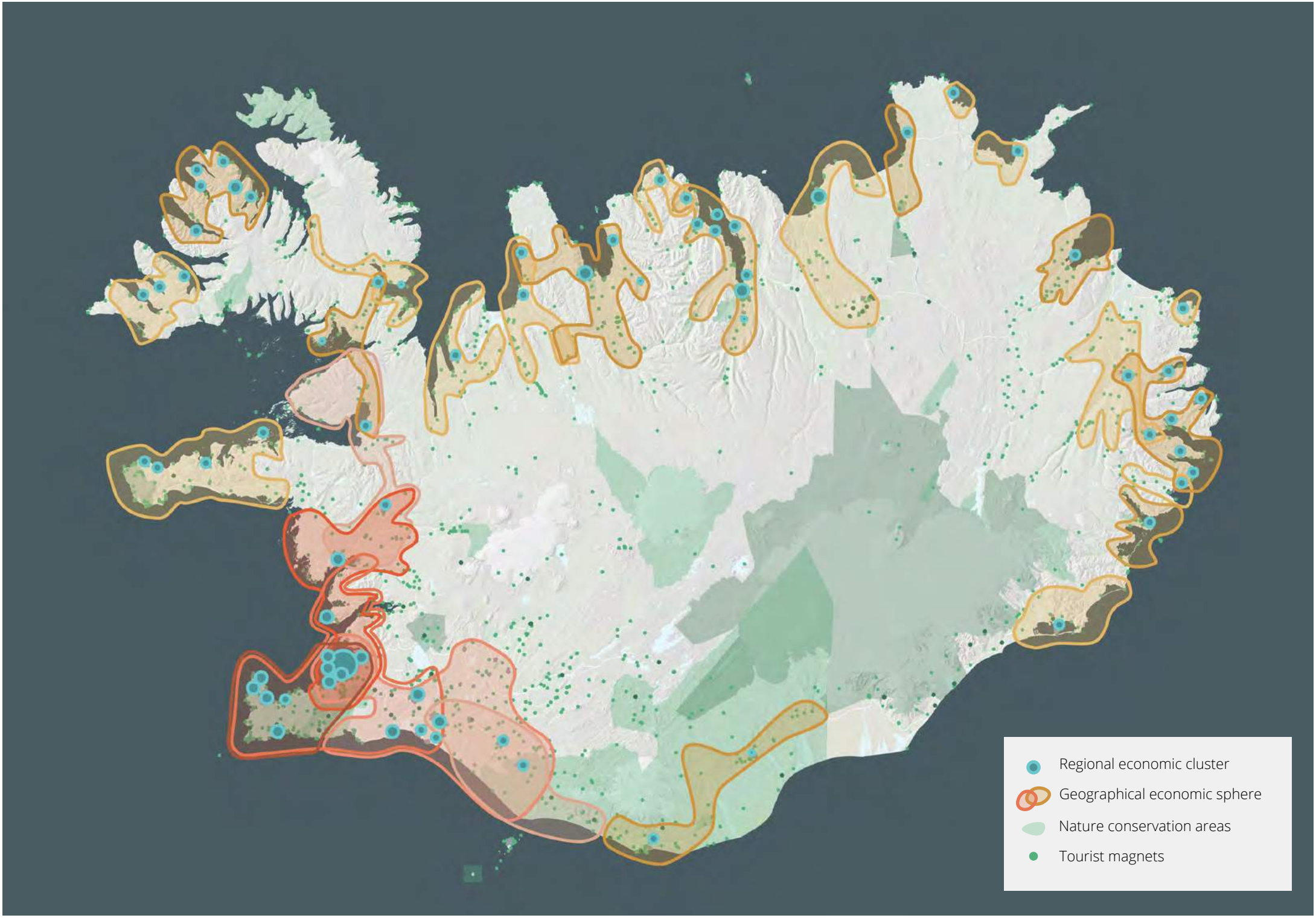
Swimming pools and bathing locations in the Suðurnes region

Given that Suðurnes is in a high-temperature geothermal area, it isn't possible to bathe in natural hot springs in the region. The Blue Lagoon, which is manmade, made the National Geographic's list of the 25 wonders of the world in 2012. Because of the geothermal heat, heated outdoor swimming pools, which are open year-round, can be found in most towns in the country. The following public pools can be found in Suðurnes:

- Vatnaveröld, Reykjanesbær
- Sundlaugin, Njarðvík
- Sundlaugin, Vogar
- Sundlaugin, Garður, Suðurnesjabær
- Sundlaugin, Sandgerði, Suðurnesjabær
- Sundlaugin, Grindavík



The map shows the location of main culture, sports and recreation activities near the airport area.


Regional economic cluster
Geographical economic sphere
Nature conservation areas
Tourist magnets

8 The Economy

It is important that the economic system is prepared to make use of the opportunities available in a sustainable and fair way. In the past few years, extensive debate and development have taken place regarding the exploitation of resources for the benefit of the economy.

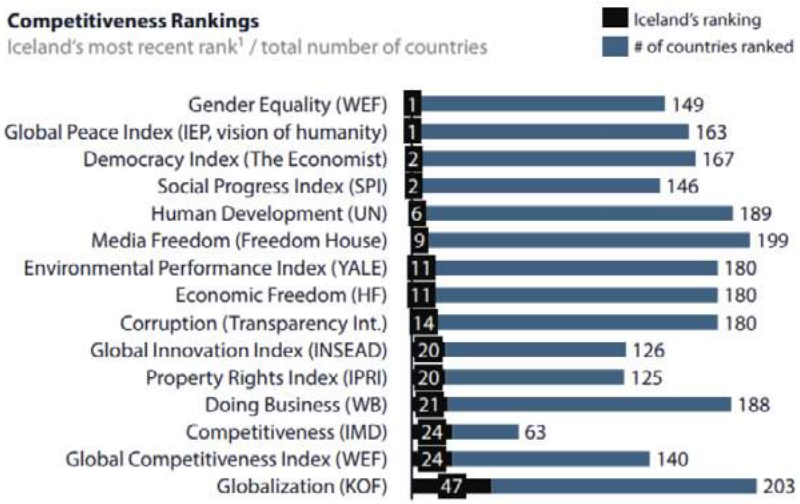
This chapter covers the characteristics of the Icelandic economy and specifically the economic environment of the development area. The following issues will be addressed:

- **The economic system:** Development, main pillars and support
- **Industries: Main export, enterprises and industries**
- **Airport-related operations:** The airport's impact on the economy and its inner operations
- **Tourism:** The extent of tourism in the region has increased significantly in the past years
- **Energy-intensive industries:** Aluminum smelters, silicon metal processing plants and data centres
- **Fisheries and agriculture:** The basic pillars of fisheries and aquaculture in recent years
- **High-tech and innovation:** Growing industries in an international context

8.1 The Economic system

Mixture of a free economy and Nordic welfare state

The Icelandic economy is a mixture of a free economy and a Nordic welfare state. Iceland ranks sixth in the global Social Progress Index[1]. Income is high per capita. Iceland has the smallest economic system in OECD with a GDP of ISK 2,803 billion (USD 25.9 billion) in 2018. In the past few years Iceland has been among the highest-ranking nations in terms of quality of life. This is a result of strong institutions, a qualified labour force, high labour force participation rates, an open and flexible economic system, safe democracy and little corruption. The nation also ranks first in terms of gender equality and peace. In the World Bank's 2018 Global Competitiveness Report, Iceland is No. 24 of 140 countries. According to the report, the country's main strengths are macroeconomic stability, information and communications technology and human resources[2].



Icelands competitiveness ranking. Snapshot from The Icelandic Economy 2019.

The banking collapse and reconstruction of the economy

One cannot discuss the Icelandic economy without mentioning the impact of the economic collapse in 2008 when the country's three largest banks—which had assets equal to the country's ninefold GDP—went bankrupt within a few days of each other. In the four years prior, economic growth in Iceland measured higher than in any other high-income country, or 6.5% on average. The recession which followed the collapse was also more extensive in Iceland than in most other European countries. In the years following the collapse, sustainable growth and a more diverse economy was encouraged by attracting energy-intensive operations and supporting tourism, resulting in higher growth than in other high-income countries[3].

The Icelandic króna

The Icelandic króna is one of the smallest currencies in the world and exchange rate fluctuations have a great impact on inflation. This was particularly evident in 2008 and 2009 when the exchange rate dropped by 50% following the economic collapse, causing inflation of 18.6%. Inflation has remained low since 2014, measuring 3.1% in 2019. The Central Bank aims to keepinflation around the target of 2 ½%, with interest rates which are usually much higher than in the USA and the European Union

In June 2020, the Central Bank's policy interest rates were 1.00% after a rapid decrease following he economic impact of the global pandemic[4].

1 Socialprogress.org. 2020 Social Progress Index.
2 Iceland Chamber of Commerce (2019). The Icelandic Economy.
3 Iceland Chamber of Commerce (2019). The Icelandic Economy.
4 Iceland Chamber of Commerce (2019). The Icelandic Economy.

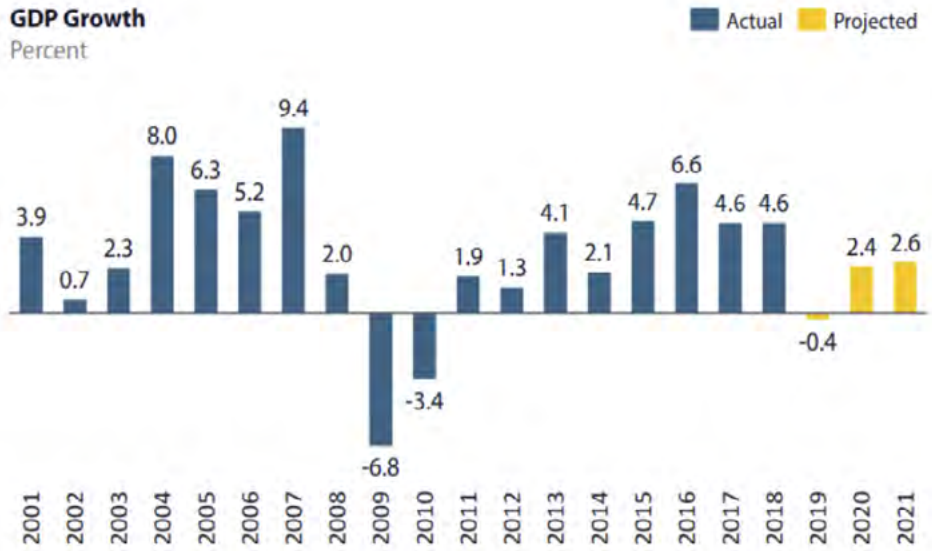
Foreign trade

Since 2009, there has been a constant current-account surplus which measured 5.2% of the GDP on average. Then there was a turnaround due to increased export revenue, especially from tourism. In 2018, export of products and services amounted to 47% of GPD with a current-account surplus of 3.6%. The share of state treasury's debt in GDP was 38% in 2018. Foreign debt has not been as low for decades and the country's credit rating has improved accordingly[5].

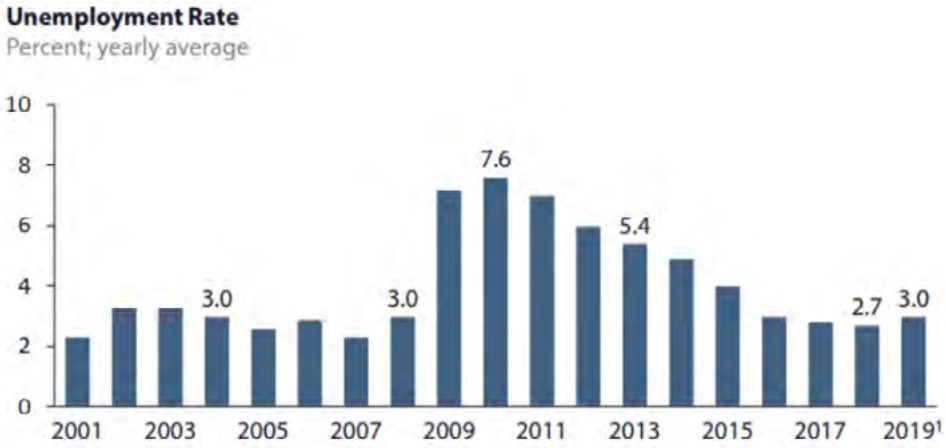
Main industries

Iceland's main export industries are tourism, fisheries, the aluminum industry and the international sector, which combined make up 37% of the GDP. Iceland's domestic sector is comprised of operations which supply residents with products and services, for example, wholesale and retail, real estate, construction, culture and arts, public services, IT and communications, tourism and transportation and financial services.

The domestic sector accounts for 63% of GDP and public services alone, 20%.

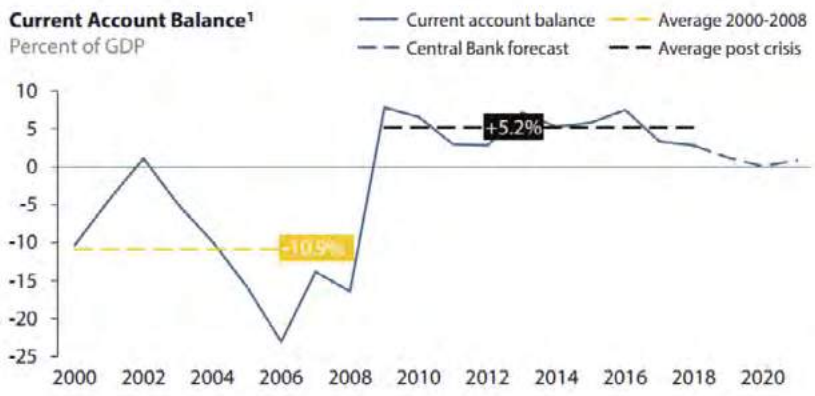


The graph shows GDP growth in Iceland from 2001 -2021. NB: the projection was made in 2019 or before Covid. Snapshot from The Icelandic Economy 2019.

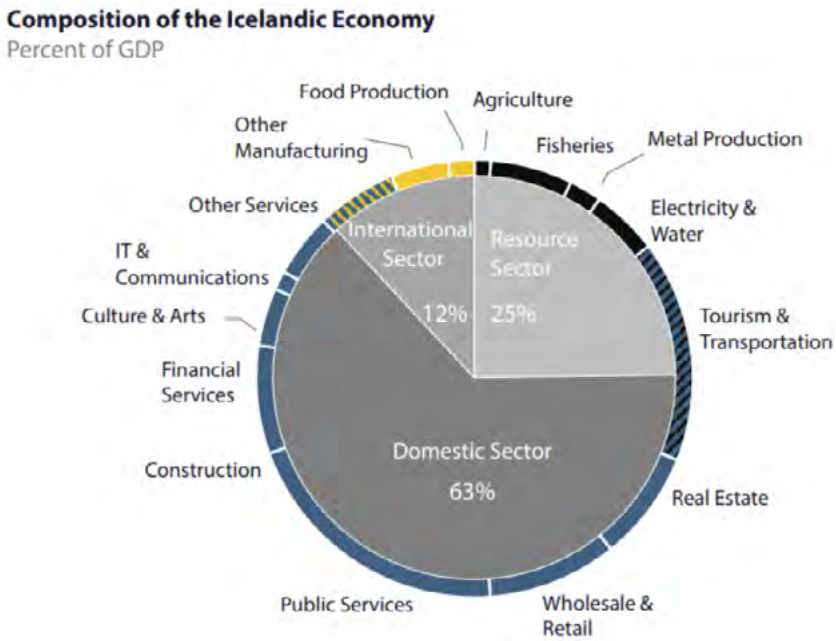


The graph shows unemployment rates in Iceland from 2001-2019. Snapshot from The Icelandic Economy 2019.

5 Iceland Chamber of Commerce (2019). The Icelandic Economy.



The Icelands Account Balance. Snapshot from The Icelandic Economy 2019.



The Composition of the Icelandic Economy. Snapshot from The Icelandic Economy 2019.

The impact of economic fluctuations on the Suðurnes region

It was an immense shock for the economy of the Suðurnes region when the US military departed the Naval Air Station at Keflavík practically without notice in the autumn of 2006 after more than 60 years. With the military's departure, around 600 diverse and well-paid jobs were lost. The economic collapse two years later also had an extensive impact on Suðurnes[6]. In the decade following 2010, the number of foreign tourists increased significantly, which gave the Suðurnes economy a great boost. In 2019, Wow air, Iceland's second-largest airline which flew about 1/3 of passengers to the country, went bankrupt. However, the airline's collapse didn't seem to have as big an impact on the economy as feared, as Iceland continued to attract tourists and remained a destination on the route networks of many airlines. That is, until the latest shock, the global COVID-19 pandemic. In the summer of 2020, the pandemic was still raging and it remained uncertain when it would subside. Even though tourists were allowed to visit the country, after being tested for COVID-19 at the airport, they were only a tiny fraction of the number of tourists who have visited Iceland in the last few years.

6 KPMG (2018). Suðurnes 2040.

The government's actions due to COVID-19

The Icelandic economy has not been immune to the impact of the COVID-19 pandemic, especially tourism which is undergoing a massive recession. The national economy's good position in the last few years has enabled the Government of Iceland to take various measures to counteract the impact of the global pandemic:

1. *Businesses experiencing temporary difficulties due to a fall in revenue will be given flexibility, e.g. extended deadlines for taxes and other public charges.*
2. *Efforts will be made to provide temporary relief to the tourism industry, including temporarily reducing industry-specific tax payments.*
3. *Once the situation returns to normal, a marketing campaign will be launched to promote Iceland as a tourist destination and Icelanders will be encouraged to travel domestically.*
4. *Measures to stimulate private consumption and demand will be enacted, e.g. tax reduction or increased benefits.*
5. *Ongoing and planned infrastructure projects will be accelerated.*
6. *The Government will cooperate with the Icelandic Financial Services Association on their response to foreseeable liquidity and payment difficulties of tourism companies.*
7. *The HF-Fund will transfer funds from the Central Bank to increase the ability of banks and creditors to provide credit to both companies and individuals*[7].

7 Stjórnarráð Íslands (2020). Viðspyrna fyrir íslenskt efnahagslíf.

Other tax reliefs

Foreign specialists hired in Iceland can be eligible for a 25% deduction from their income during the first three years after they're hired, provided they fulfill certain requirements.

Start-up companies can be eligible for a tax deduction which corresponds to 20% of paid expenses for innovative projects, provided they fulfill certain requirements. The financial support is for a maximum of ISK 6 million per year, or ISK 900 million in the case of contracted research or development work.

Individuals who invest in businesses, subject to certain requirements, can subtract 50% of the amount they invested from their total annual income and capital tax. The goal is to support innovation and employment by encouraging investors to provide growing companies with new share capital[8].

Foreign producers of films and television programmes can apply for a refund of up to 25% of the production cost spent in Iceland. This has helped make Iceland a desirable filming location, complementing good air transport, infrastructure and local expertise in the film industry[9].

8 Stjórnarráð Íslands (2020). Skattaívilnanir.
9 Mbl.is (2018). Skattar vega þungt í ákvörðun um tökustað.

8.2 Industries

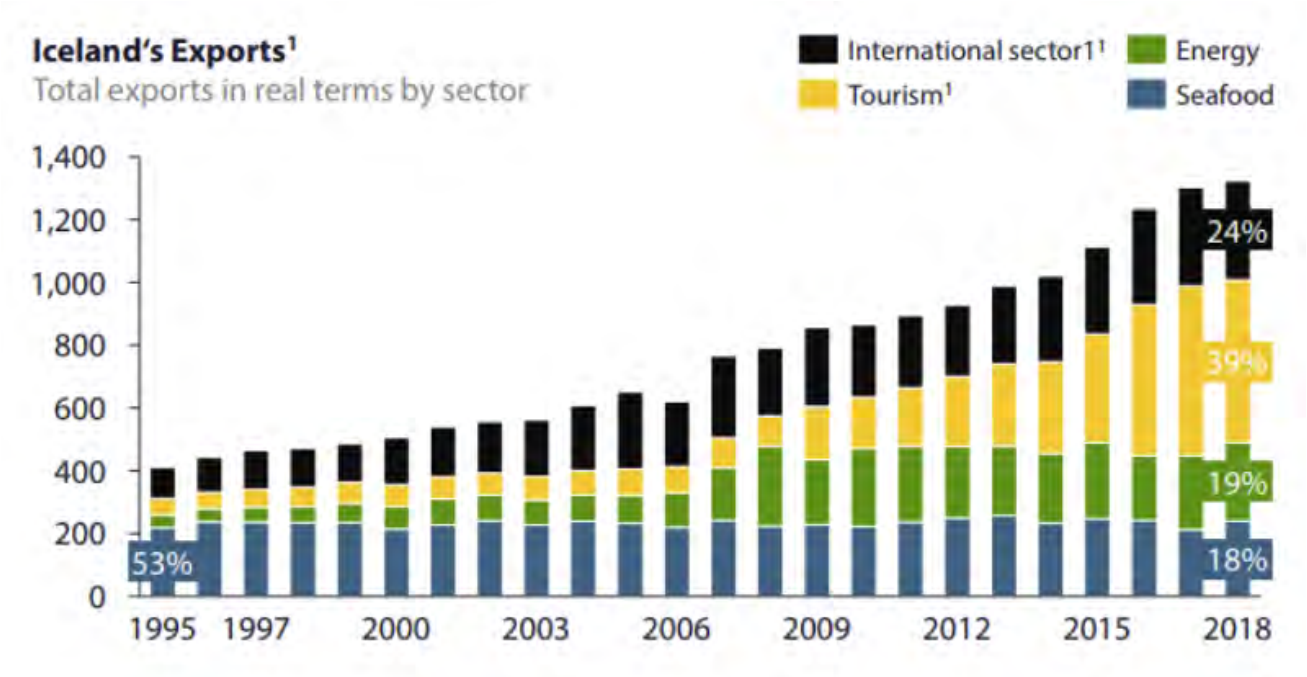
Iceland's main export industries

Iceland's main export industries are tourism (39%), fisheries (18%) and energy, primarily used by aluminum smelters (19%). That leaves the international sector (24%). Diversity has increased greatly in the last two decades, noting 25 years ago fisheries supplied the national economy with more than half of all export revenue[1].

Stærstu fyrirtækin á Íslandi

The country's ten largest companies in 2018 post turnover in ISK millions were (the change in turnover between years is in brackets):

1. Icelandair Group hf 163,714 (8%)
2. Marel hf. 153,008 (22%)
3. Eimskipafélag Íslands hf. 88,026 (10%)
4. Alcoa Fjarðaál sf. 84,921 (9%)
5. Hagar hf. 84,921 (14%)
6. Landsbankinn hf. 84,185 (4%)
7. Íslandsbanki hf. 82,351 (5%)
8. Norðurál Grundartangi ehf. 81,536 (16%)
9. Arion banki hf. 77,476 (-18%)
10. Össur hf. 66,425 (9%)



Iceland's Exports by sector. Snapshot from The Icelandic Economy 2019.

1 Iceland Chamber of Commerce (2019). The Icelandic Economy.

The employment development area in the Suðurnes region

The Suðurnes region can be considered as one employment area as about 80% of inhabitants in the region are employed within it. However, many inhabitants in Suðurnes work in the capital region, which is considered to be within the same employment development area, or around 14% in 2017[2].

The main industries in the Suðurnes region

The economy in the Suðurnes region is mainly based on tourism and aviation-related operations, fisheries, construction and various services. The ratio of service is higher in Suðurnes due to its vicinity to Keflavík Airport compared to other regions where production has a bigger share. In October 2017, 24% of Suðurnes residents worked in tourism, transportation and cargo transport. Education, training and various cultural operations accounted for 10%. A large portion of inhabitants also earn a living from providing services and selling goods in relation to operations in and around Keflavík Airport[3].

Heklan, the Regional Development Agency for the Reykjanes peninsula

Heklan, the Regional Development Agency for the Reykjanes peninsula is a collaborative project between the Icelandic state and the Suðurnes municipalities. Established in 2011, Heklan supports economic developments in the region in cooperation with individuals, companies, associations, municipalities and other parties of interest. Its projects include data processing, analysis and research of issues that concern employment and regional development in the area in addition to innovation.

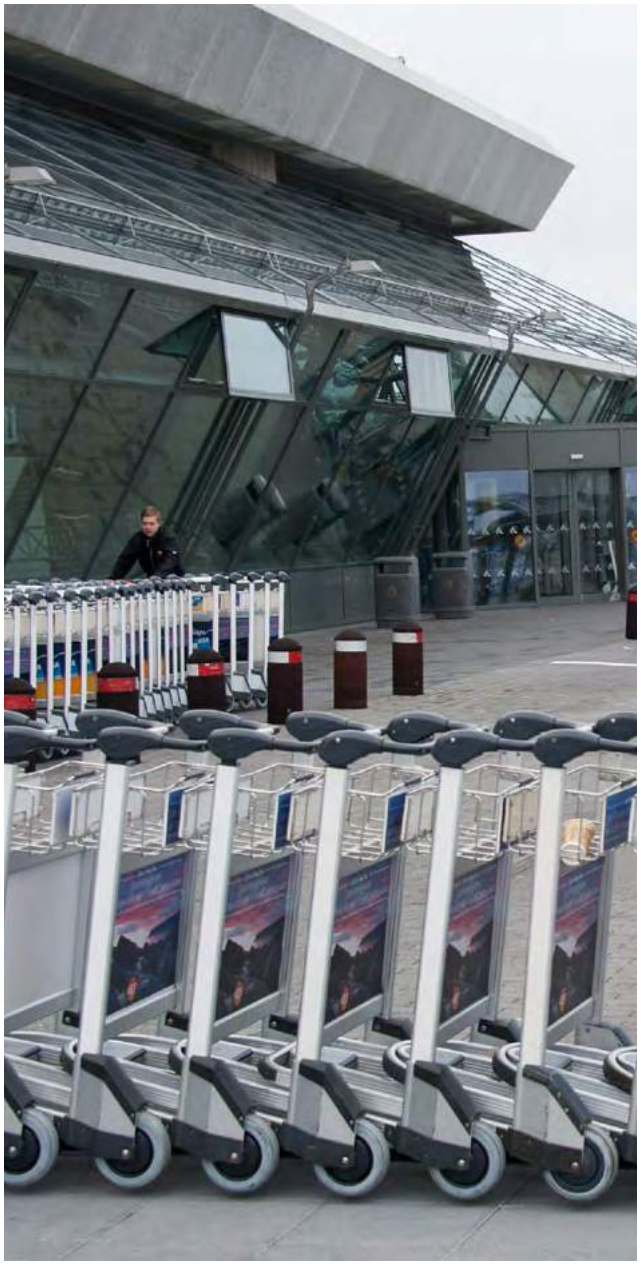
Usually low unemployment rates

Usually, there is not much unemployment in Iceland, or about 3.5–4.0%. The unemployment rate increased to 3% in 2019, up from 2.7% in 2018, but until then it had dropped every year since 2010 when the rate was the highest after the banking collapse, or 7.6%. The recession in the tourist industry and bankruptcy of WOW air, the second-largest Icelandic airline, in March 2019 partly explain the increased unemployment rate last year.

More than 80% of wage earners in the country are members of labour unions. Income has increased in the growth period of the last years and the wage index increased by 8.4% between 2014 and 2018. For comparison, the wage index only increased by 2.2% in the other Nordic countries at the same time[4].

During the most recent growth period, there was a lack of labour and competition for employees in aviation-related operations in Suðurnes due to the generally low employment rates. Two large companies in the region, Isavia and the Blue Lagoon, require many employees. The employment level in Suðurnes fluctuates greatly in line with the number of passengers at Keflavík Airport. The unemployment rate peaked at 12% shortly after the economic collapse and remained higher than 10% until 2012, at which point it began to decrease year by year[5]. Many of those who are unemployed are foreign citizens[6]. Uncertainty surrounds the development of the employment market following the global pandemic and it is difficult to predict how the situation will evolve from one month to the next.

2 Markaðsstofa Reykjaness. Áfangastaðaáætlun Reykjaness 2018-2021.
3 KPMG (2018). Suðurnes 2040.
4 Iceland Chamber of Commerce (2019). The Icelandic Economy.
5 KPMG (2018). Suðurnes 2040.
6 RÚV (2020). Nærri 20% atvinnuleysi á Suðurnesjum.



8.3 Aviation-related operations

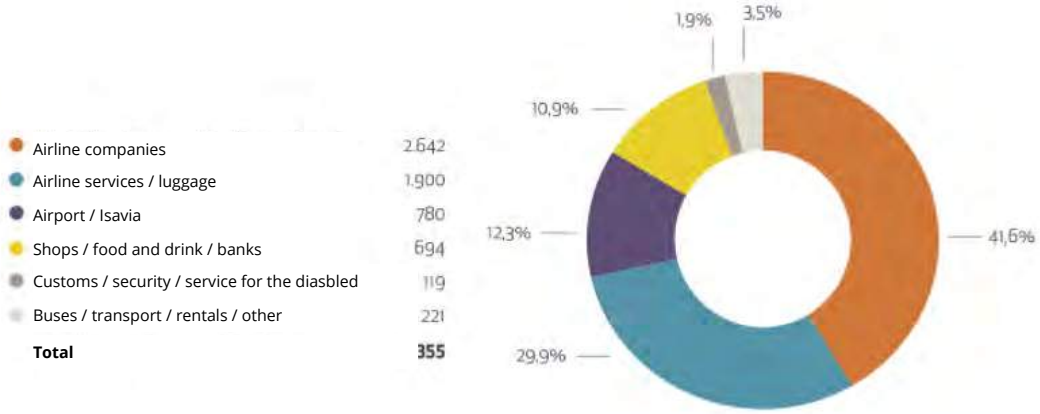
The background of aviation services

Aviation activities on Miðnesheiði (Miðnes heath) on Reykjanes peninsula began during World War II. The airport—which was originally called Meeks Field—was built by the US military during its occupation of Iceland and was one of the largest airports in the world at the time. Later the airport became an important stopover location for refueling for aircraft traveling across the North Atlantic, between Europe and the USA. The Flugstöð Leifs Eiríkssonar terminal was inaugurated in 1987. The terminal was enlarged in 2001 to fulfill requirements of the Schengen agreement. The terminal was expanded again in 2008 and has since been in a constant process of enlargement, coinciding with the extensive increase of tourists in the past decade. The US military operated an army base at the airport until its departure in 2006[1].

By far the largest workplace in the Suðurnes region

Relatively many more people work at airports in Iceland compared to other European countries, or 10.8 for every 1,000 inhabitants with a 1.5% impact on economic growth. Keflavík Airport is by far the largest workplace in the Suðurnes region. In 2016, there were more than 5,600 direct jobs at the airport. These include jobs at airlines, that is, pilots, cabin crew, air mechanics, companies that load and unload aircraft, as well as jobs at stores, restaurants, security, police, customs, public transport and car rentals. These jobs have increased quickly in the past few years in line with the rapid increase in passengers[2]. In the

1 Isavia. Masterplan 2015-2040.
2 Isavia (2016). Keflavíkurflugvöllur - Stóriðja í stöðugum vexti.



Jobs in different sectors at Keflavik Airport, summer 2016. (Snapshot from Keflavíkurflugvöllur - Stóriðja í stöðugum vexti. 2016.)

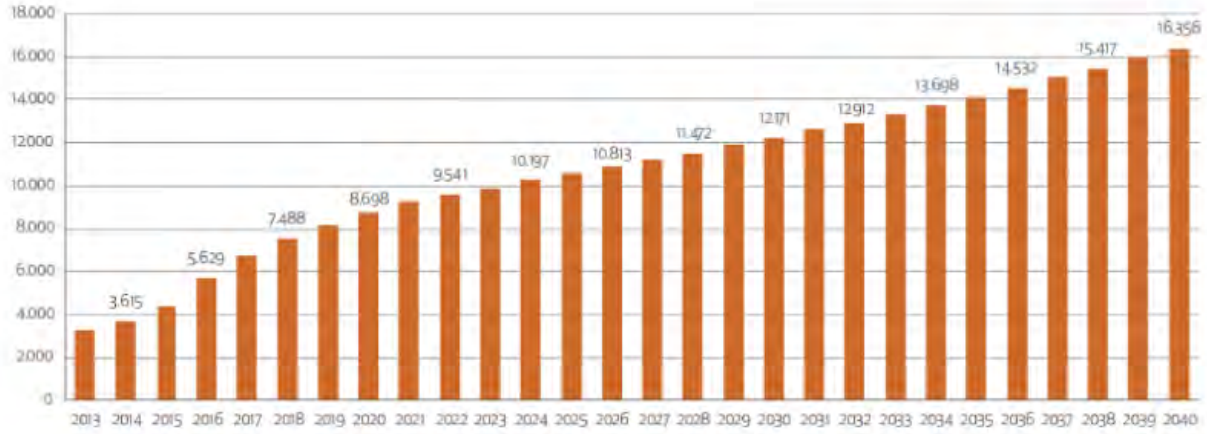
summer of 2018 it was estimated that there would be approximately 8,650 direct jobs at Keflavík Airport[3].

Important part of the economy

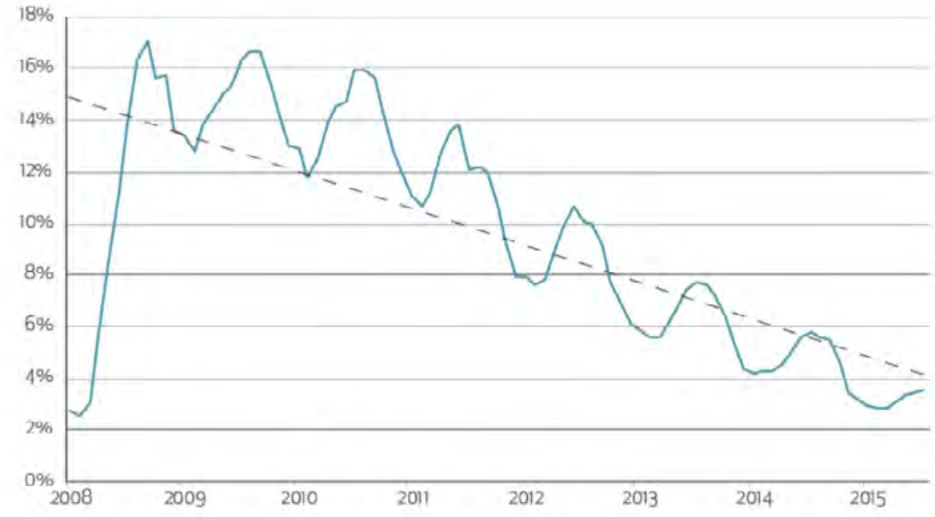
The economic influence of airports extend far beyond the actual airport area. With direct flight connections companies can ship their products quickly and without complication to foreign markets and employees can travel between countries on business trips. The arrival of budget airlines in the past years has increased competition in flights across the Atlantic and therefore Icelandic airlines have increasingly considered more distant destinations, for example in Asia[4].

Extensive growth because of increase in passengers

There has been a great increase in the number of direct jobs at Keflavík Airport in the past years, consistent with the increase in passengers. To meet the increased demand for labour both aviation service companies, IGS and Airport Associates, have hired foreign labour and invested in housing in the Suðurnes region to accommodate them. Unemployment in Reykjanesbær has decreased in the past year in line with increased air traffic at Keflavík Airport[5].

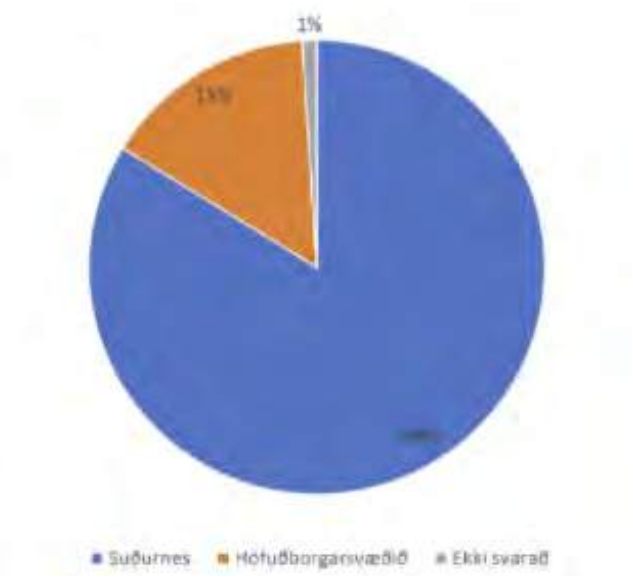


Number of jobs at Keflavík Airport (projection carried out before Covid) (Snapshot from Keflavíkurflugvöllur - Stóriðja í stöðugum vexti. 2016.)

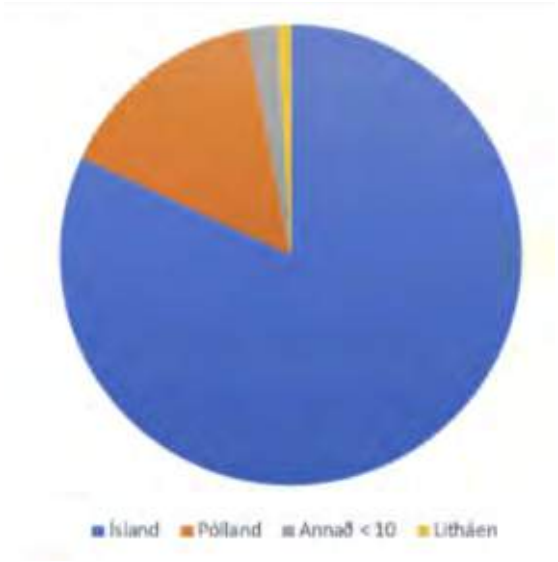


Decrease in unemployment correlates directly with increase in air traffic at Keflavík Airport. (Snapshot from Keflavíkurflugvöllur - Stóriðja í stöðugum vexti. 2016.)

3 KPMG (2018). Suðurnes 2040.
4 KPMG (2018). Suðurnes 2040.
5 Isavia (2016). Keflavíkurflugvöllur - Stóriðja í stöðugum vexti.



Residence of staff.



Nationality of staff.

Companies at Keflavík Airport

In 2018, 41 companies were operating at Keflavík Airport. The companies vary in size and are very different from one another, but all of them offer some kind of service, for example, transport service, car rentals, stores and restaurants. The majority of employees at the airport work for the four largest companies: Isavia, Lagardere Travel Retail, Icelandair Group and Airport Associates. About 84% of the employees of companies at the airport live in the Suðrunes region and about 15% of them are of foreign origin, mostly Polish. In the summer of 2018, almost 30 airlines, which had more than 100 destinations, offered flights to Keflavík[6].

Isavia

Isavia ohf. is a company owned by the Icelandic state and is responsible for the development and operation of Keflavík Airport. Isavia has three subsidiaries: Isavia ANS, which is responsible for air navigation in the Reykjavík Control Area—which is one of the largest control areas in the world, Isavia Regional Airports, which operates the regional airports, and Duty Free Iceland, which operates five stores in the Flugstöð Leifs Eiríkssonar terminal at Keflavík Airport. Around 1000 people work at Isavia and its subsidiaries[7].

Icelandair Group

Icelandair Group was the largest company in Iceland in 2018 with a turnover of ISK 167.3 billion, according to Frjáls verslun business magazine. This position was achieved in spite of a reduction in the company's turnover from the previous year due to various internal and external factors. Among them was a difficult competitive position—which changed somewhat after the main competitor, WOW air went bankrupt in March 2019—and the grounding of the airline's Boeing 737 MAX aircraft[8]. In 2020, the COVID-19 pandemic has had a massive impact on the operations of Icelandair, as of all other airlines, and it is unclear if and when things will return to normal.

Icelandair Group has nine subsidiaries, which are all related to aviation or tourism service: Icelandair, Icelandair Cargo, IGS, Air Iceland Connect, Iceland Travel, Loftleiðir Icelandic, the travel agency Vita and Fjárvakur. Icelandair Group had a total of 4,700 employees in 2019. Short descriptions of Icelandair Group's subsidiaries which operate at Keflavík Airport follow.

Icelandair

Icelandair flies from Keflavík Airport to many of the biggest cities in Europe, USA and Canada. It has built up an international route network with Iceland in its centre.

6 KPMG (2018). Suðurnes 2040.

7 Isavia. Fyrirtækið - um okkur.

8 Viðskiptablaðið (2019). Icelandair stærst.

Icelandair Cargo

Icelandair Cargo is responsible for cargo transport to and from the country. A total of 56,000 tons of cargo were transported in 2017. Fresh fish is mostly transported in the hold of passenger jets and has increased with the advent of larger aircraft and growth of year-round destinations[9].

IGS (Icelandair Ground Services)

IGS ehf. is an international air service company, which is divided into Aircraft Handling Service, ground handling for scheduled and charter flights, IGS Catering Service, which offers catering handling and delivery services for airlines, and Cargo & Mail Service, responsible for cargo transport within the airport area, loading and unloading[10].

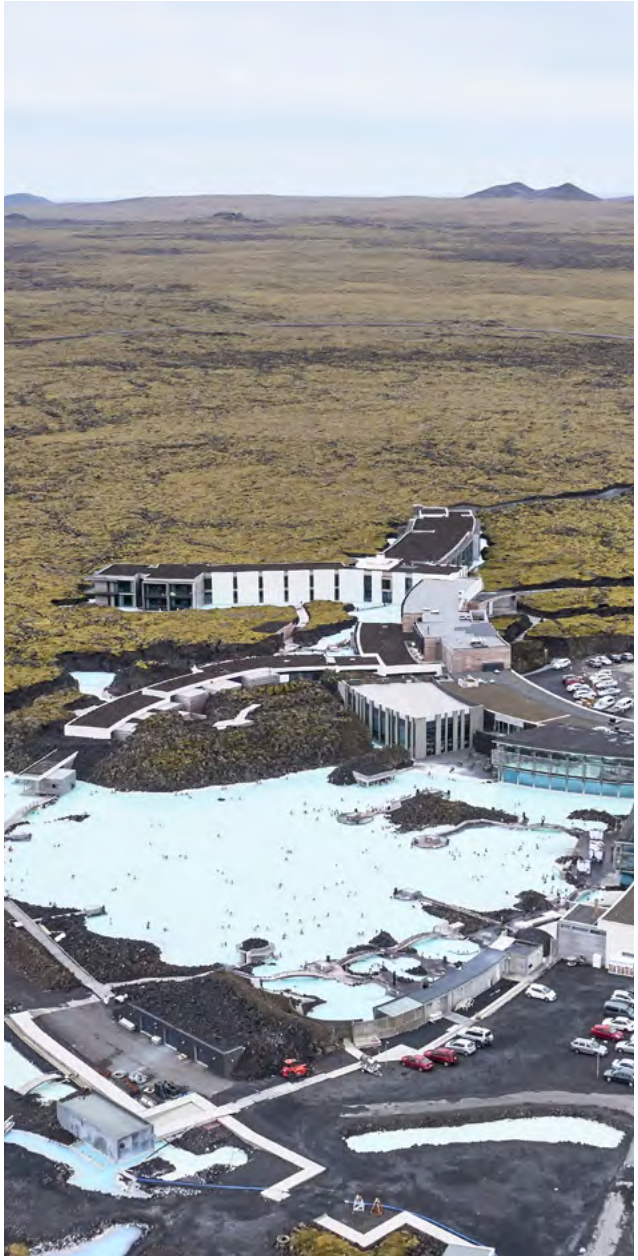
Airport Associates

Airport Associates is responsible for transport of products and baggage within the airport area and check-in services for various airlines. In 2018, around 700 people worked for the company in the summer and 500 in the winter[11].

Lagardere Travel Retail

Lagardere Travel Retail ehf. is owned by Lagardère SCA in France and an Icelandic company, NQ ehf. The company runs restaurants at the Flugstöð Leifs Eiríkssonar terminal and employs 200 people in the summer and around 150 in the winter[12].

9 KPMG (2018). Suðurnes 2040.
10 IGS Ground Services. https://www.igs.is/
11 Mbl.is (2018). Starfsfólk Airport Associates á fundi.
12 Lagargére.https://www.lagardere-tr.com/en



8.4 Tourism

Important industry

Tourism has been a growing industry in Iceland in the past years and approximately 42% of the country's foreign exchange earnings (ISK 376.6 billion) came from tourism in 2017. The total number of employees in tourism-related professions ranged between 24,500 and 31,700 (depending on seasons) in 2017. Most of them worked in tourist accommodations or catering, 15,400-19,500 persons. From 2013 to 2017, the number of wage earners in tourism-related operations increased by 68%[1].

Tourism in the Suðurnes region

The tourist industry in the Suðurnes region has grown extensively and it has become the region's largest industry with a 26% share of the labour market in 2018. Companies in tourism have also increased, and in 2018 there were 200 tourism-related companies in the region. There are many opportunities for continued growth in tourism in Suðurnes, considering its spectacular environment on the doorstep of an international airport. However, the region seems to elude the attention of tourists, even though most of them drive along the entire peninsula en route to the capital region. Suðurnes was named one of the 100 most sustainable destinations in 2017 by the non-profit foundation Green Destinations and also received 3rd prize in the Earth Award category at the ITB trade show in Berlin in 2018[2].

Necessary to improve signage for tourists

It is easy to travel Reykjanes peninsula. Distances are short and access generally good for tourists. Nevertheless, the Reykjanes destination plan states that many things regarding tourism infrastructure must be improved. The region must be clearly distinguished from other regions with signage and marketing to give it a comprehensive image and make it clear for tourists that they are located on Reykjanes peninsula. Signage indicating services, including basic services like restrooms, is also lacking[3].

The world-famous Blue Lagoon

The most significant growth in tourism in the Suðurnes region has been in connection with the development and services of Keflavík Airport and the Blue Lagoon.[4] FKeflavík Airport was covered in the chapter on aviation-related operations. The Blue Lagoon is a spa which was created from run-off water from the energy company Hitaveita Suðurnesja in Svartsengi. When silica dissolves from the rock, white mud is formed in the lagoon. It is proven to have a healing effect on skin diseases. Next to the lagoon is a hotel and a clinic, where the effect of geothermal seawater on the skin is studied and skin products developed. In 2018, almost 900 people of 42 nationalities worked at the Blue lagoon [5].

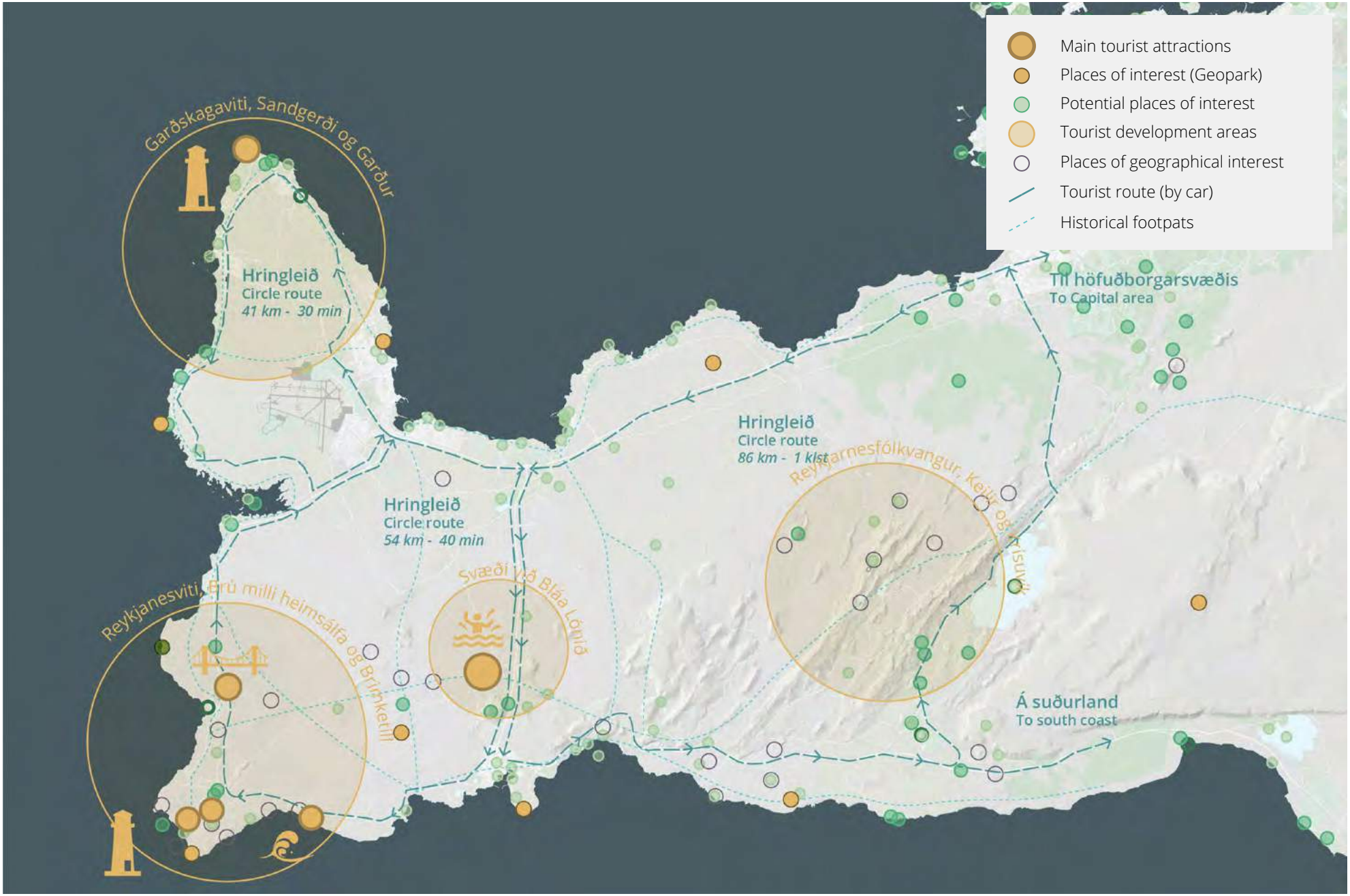
1 Ferðaþjónusta á Íslandi í tölum 2018. Ferðamálastofa.

2 Markaðsstofa Reykjaness. Áfangastaðaáætlun Reykjaness 2018-2021.

3 Markaðsstofa Reykjaness. Áfangastaðaáætlun Reykjaness 2018-2021.

4 Markaðsstofa Reykjaness. Áfangastaðaáætlun Reykjaness 2018-2021.

5 Blue Lagoon (2018). Ársskýrsla 2018.



Main tourist attractions in the Reykjanes peninsula.

Places of accommodation and restaurants

Hotels, guesthouses and B&B in the Suðurnes region can mainly be found close to towns and villages. From 2010, tourist accommodation in Suðurnes has more than doubled and at the same time the number of overnight guests has increased and the utilisation of tourist accommodation has been the best in the country after the capital region. Tourist accommodation in Suðurnes accounted for 5% of the total tourist accommodation in the country in 2018. In 2016, there were 108 registered permits for tourist accommodation with a total of 3,520 beds[6] vat the District Commissioner's[7]. At the Public Health Authority in Suðurnes, there were 91 catering licences, of which 36 were for restaurants and cafés. The remaining licences were for kiosks, social centres and catering services[8].

Number of nights spent at tourist accommodation

In Iceland the increase in the number of nights spent at tourist accommodation began to slow down in 2017, at which point the lowest increase was in the capital region (5.5%) and the highest increase in the Suðurnes region (52.2%). This great increase in the number of overnight stays at tourist accommodation in Suðurnes indicates a significant growth in tourism in the region. In 2018 there were two five-star hotels in Suðurnes[9].

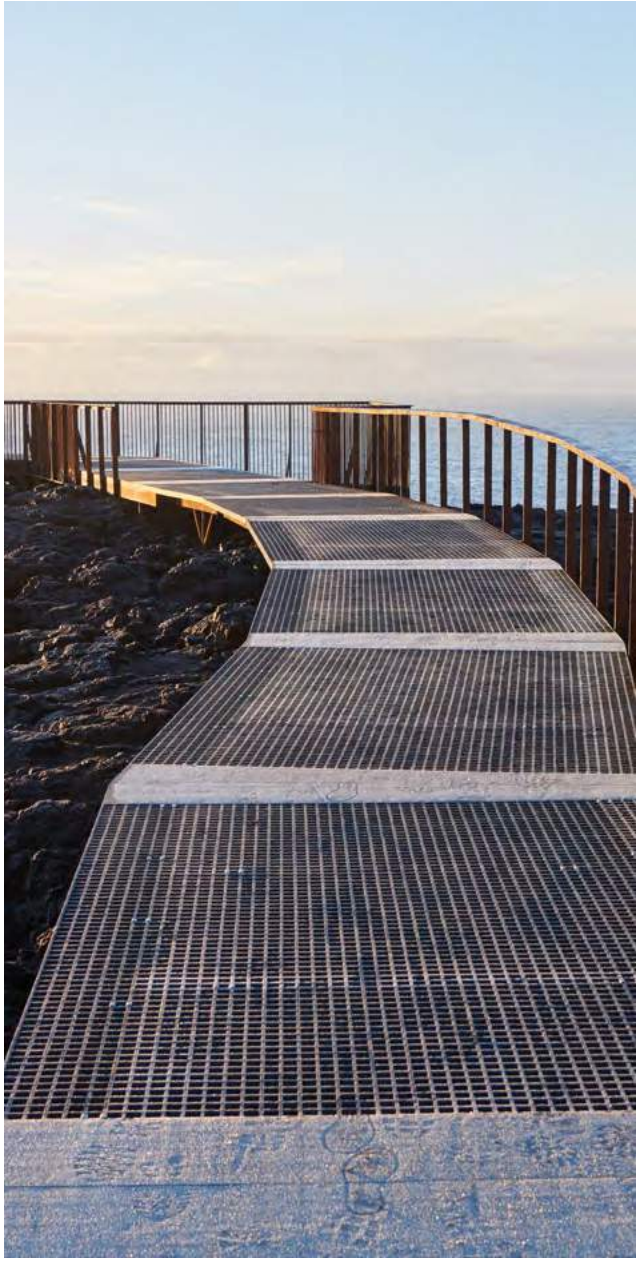
6 Syslumenn.is, 2018
7 Heilbrigðiseftirlit Suðurnesja. 2018.
8 Áfangastaðaáætlun Reykjaness. 2018-2021.
9 Suðurnes 2040. KPMG.

However, the average number of nights spent by each tourist in Suðurnes is quite low, or 1.29 in 2018, which means that most visitors don't stay for longer than one night in the region. Many visitors choose to spend the night before their flight close to Keflavík Airport. The Reykjanes destination plan 2018–2021 outlines the goal to increase the average number of nights per tourist to two in order to stimulate income from tourism in the region[10].

Reykjanes Unesco Global Geopark

In 2015, Reykjanes peninsula joined the ranks of 140 territories in 38 countries which have been certified as UNESCO Global Geopark by the United Nations Educational, Scientific and Cultural Organization. Geoparks are areas that include geological heritage of international significance and are controlled by a comprehensive policy on protection, education and sustainable development[11]. Reykjanes Geopark is a cooperating forum which is based on the utilisation of the region's special position, that is, its notable geological heritage and unique geological history for value creation. Reykjanes Geopark is responsible for developing destinations, raising awareness of environmental issues, education on the area's geology, product development and marketing[12].

10 Áfangastaðaáætlun Reykjaness 2018-2021.
11 Reykjanes UNESCO Global Geopark, 2017.
12 http://www.reykjanesgeopark.is/is



Visitor centre and information centres

The Reykjanes Geopark Visitor Centre and the Reykjanes Information Centre are operated year-round in Duus Museum in Reykjanesbær. All municipalities have some kind of an information centres inside their sports centres, Garðskagi Heritage Museum and the Suðurnes Science and Learning Centre in Sandgerði. Isavia operates an information service to assist passengers at the airport and help them resolve any issues they may have[13].

Reykjanes Marketing Office

Reykjanes Marketing Office is a cooperation platform for the municipalities, state and tourism companies on marketing the region as a destination. The marketing office made the Reykjanes destination plan 2018–2021. According to the plan, Reykjanes Geopark is defined as an emphasis area, which will be prioritised in destination development. These include the most frequented destinations in the region according to the number of cars counted there 2017–2018:

- Blue Lagoon Spa (1.3 million visitors).
- Garðskagaviti: Bird and northern lights watching, two lighthouses, white beach, heritage museum and café (300,000 visitors).
- Bridge between continents: Connecting the Eurasian and North American plates (177,000 visitors).
- Reykjanesviti and Gunnuhver: The first lighthouse on the coast of Iceland was built on Valahnúkur on Reykjanes in 1878, with outdoor recreation and hot spring area (130,000 visitors).
- Brimketill: A special pool on the seashore in the westernmost part of Staðarberg cliff, close to Grindavík (65,000 visitors)[14].

Visit Reykjanes

Visit Reykjanes is a brand for the destination Reykjanes, which is used in marketing for foreign visitors. It considers the following factors when attracting tourists to Reykjanes peninsula:

- Ocean and beaches: The surf and panoramic view, view of the northern lights from the sea, walking on beaches, sea angling, whale watching, fishing from the beach, diving, nature sightseeing and bird watching.
- People, history and culture: The history of life along the coastline, seaside villages, fishing huts and fish processing. The ocean biosphere and food traditions in connection with restaurants serving seafood from the region. The musical heritage, diverse museums and exhibitions, culture festivals, lighthouses, churches, etc.
- Health and wellness: The Blue Lagoon, pure and clean air, energy sources, good facilities for outdoor recreation on land and at sea, good walking paths, golf, swimming pools, cycling, fresh food, etc.
- Earth and energy: Reykjanes Geopark and destinations within it, unique nature and exploitation of renewable energy, sustainability[15].

13 Áfangastaðaáætlun Reykjaness 2018-2021.

14 Áfangastaðaáætlun Reykjaness 2018-2021.

15 Áfangastaðaáætlun Reykjaness 2018-2021.

8.5 Energy-intensive industry

Aluminium smelters

There are three large aluminium smelters in Iceland which accounted for approximately 17% of the country's export in 2018 and over 1% of the world's aluminium production. The largest of the three is Alcoa Fjarðaál in Reyðarfjörður in the East Fjords, which produces 350,000 tons of aluminium per year. The second largest is Norðurál, which is part of Century Aluminium, and has a capacity of 300,000 tons per year. It is located on Grundartangi in about a 40-minute driving distance north of Reykjavík. The third largest is ISAL in Straumsvík in Hafnarfjörður at a 30-minute driving distance from Keflavík Airport. It is part of Rio Tinto and is the oldest of the three smelters. It has a production capacity of 200,000 tons per year[1].

1 The Icelandic Economy. Iceland Chamber of Commerce. 2019.

Silicon metal production plants

In the past few years, extensive investments have been made in silicon metal production plants in Iceland. Elkem has been in operation on Grundartangi since 1979 but recently two new silicon metal production plants were constructed, in Helguvík in the Suðurnes region and at Bakki near Húsavík in North Iceland. The United Silicon plant in Helguvík closed in November 2016, just over one year of its opening, due to technical difficulties and complaints about pollution. Expensive measures must be taken to improve the plant and it is unclear when and if operations will be launched again[2]. PCC at Bakki recently decided to temporarily halt its production due to little demand for silicon metal on the world market, caused by the COVID-19 pandemic[3].

2 The Icelandic Economy. Iceland Chamber of Commerce. 2019.
3 https://www.ruv.is/frett/2020/06/25/thungt-hogg-fyrir-samfelagid-og-sveitarfelagid-allt

Data centres, a growing energy-intensive industry

The data centre industry is the energy-intensive industry which is growing most rapidly in the world. The circumstances in Iceland are particularly feasible for data centres due to supply of renewable energy, electricity security, natural cooling in a cold climate and technological expertise—specialised jobs are created by data centres. In 2019, Landsvirkjun, the national power company, sold 520 GW hours to four companies in the data centre industry: Reykjavík DC, Etix Everywhere Iceland, Advania Data Centres and Verne Global. The latter two are located in Reykjanesbær. Large international companies and research institutions are among the data centres' clients[4].

4 https://arsskyrsla2019.landsvirkjun.is/fyrirtaekid/vidskiptavinir#Gagnaversidnadur

8.6 Fisheries and agriculture

Sustainable fisheries

The Icelandic fisheries control system is based on transferable catch permits, a so-called quota system, which was established around 1990 after many years of overfishing of important fish species. The system's main purpose is to make fishing sustainable while maximising profit from the ocean's resources. In spite of the controversy surrounding transferable catch permits which have led to a concentration in the industry, it is almost undisputed that the quota system has been effective in maintaining fish stocks[1].

Fisheries in the Suðurnes region

Fisheries is primarily practised in Grindavík and Sandgerði in addition to fish processing in Garður. There used to be a thriving fishing industry at the harbours of Reykjanesbær. However, fishing operations have decreased significantly since most of the quota was sold away from the municipality at the end of the 20th century[2]. New technology in fish processing has also led to a decrease in jobs in fisheries in the last decades. On the other hand, the export value of seafood products has increased considerably and significant innovation and product development has taken place in the full utilisation of seafood[3].

1 The Icelandic Economy. Iceland Chamber of Commerce. 2019.
2 Vefur Reykjanesbæjar
3 Suðurnes 2040. KPMG.

Growth in aquafarming

In recent years, foreign investors have invested considerably in aquaculture in Iceland. In 2018, approximately 19,000 tons of farmed fish were produced in Iceland. However, it only accounted for 1% of exports. Most of the fish is salmon farmed in floating marine pens and there are plans for more extensive salmon farming in the Westfjords and East Fjords. However, salmon farming is controversial because of its environmental impact and its impact on the wild salmon stock. In 2019 new legislation was approved at the Alþingi parliament to guarantee sustainable production[4].

Aquafarming in the Suðurnes region

In Suðurnes the circumstances are considered to be feasible for aquaculture on land and the short distance to Keflavík Airport means that the fish can be exported quickly after slaughter. Fisheries company Samherji operates an Arctic char farms on land near Grindavík and on Vatnsleysuströnd near Vogar. The products are processed in the company's high-tech plant in Sandgerði. Samherji is currently the world's largest Arctic char producer[5]. Matorka also operates an aquafarm for trout on land near Grindavík. The aquafarm uses run-off water from Svartsengi to keep the water at the ideal temperature, which maximises fish growth rate. There is also plentiful groundwater in the area, a key condition for aquafarming on land[6].

4 The Icelandic Economy. Iceland Chamber of Commerce. 2019.
5 https://www.samherji.is/is/fiskeldi
6 https://www.mbl.is/200milur/frettir/2018/04/25/fundu_kjoradstaedur_a_reykjanesi/

In Suðurnes, projects have also been launched on the cultivation of mussels, the exploitation of seaweed for beauty and food products, shark production and product development for dried fish in retail sale

Agriculture

Historically, agriculture was the main industry in Iceland but today it is only a small part of the economy (1% of GDP and 0.6% of export). Agriculture is protected and financially supported by the state. Most farmers practise sheep farming, followed by cattle farming (mostly dairy production), poultry and pork farming. There is also some grain farming and vegetable farming in greenhouses, which are heated year-round with geothermal heat[7].

In the municipality Vogar there are thriving pork, poultry and egg farms. The tourist industry has invited tourists to participate in sheep roundups in the autumn and in Suðurnes there are also horse rentals[8].

7 The Icelandic Economy. Iceland Chamber of Commerce. 2019.
8 Áfangastaðaáætlun Reykjaness 2018-2021.

8.7 High-tech and innovation

Growing international sector

The international sector is comprised of companies that make products and services based on ingenuity and technology, independent from natural resources and compete on the international market. The sector accounted for 12% of Iceland's GDP in 2018. In the past years, the Icelandic state has introduced incentives for innovation and development in the international sector. For example, financial contributions to innovation and technology development funds have multiplied since 2004. Companies receive a 20% tax deduction of the cost of research and development, up to ISK 600 million. Some investors are also entitled to a 50% tax deduction of investments of up to ISK 10 million, provided they fulfill certain conditions[1].

High-tech companies related to fisheries

Marel is the largest Icelandic high-tech company. It specialises in the development and production of equipment, general solutions, software and services in food production of poultry, meat and fish. The company employs more than 6,000 people in 30 countries, of whom 720 are based in Iceland. Marel had a turnover of EUR 1.3 billion in 2019[2]. Other large high-tech companies related to fisheries are Skaginn 3X, Hampiðjan, Curio and Valka[3].

1 The Icelandic Economy. Iceland Chamber of Commerce. 2019.
2 https://marel.com/is/frettir/marel-1f-2020-mikill-voextur-i-poentunum-og-sterkt-sjodstreymi-en-heimsfaraldur-setur-mark-sitt-a-afkomu/
3 https://www.vb.is/frettir/hataeknifyrirtaeki-i-fremstu-rod/147145/

Development and production of generic pharmaceuticals

The patent licence environment in Iceland permits producers of generic pharmaceuticals to develop and stock up on pharmaceuticals before the patent licences expire. This provides the producers of general pharmaceuticals an advantage over foreign competitors and makes pharmaceuticals among Iceland's biggest export products. In 2009–2014, they accounted for about 2.2% of the total export value. Furthermore, this has resulted in extensive local knowledge on the production and sale of generic pharmaceuticals[4].

Genetic research

DeCODE genetics has studied the genome of more than 160,000 Icelanders who have participated in research and donated biological specimen. Personal information is coded so that it cannot be traced back to individuals. The mission with the research is to search for the causes of many of the most serious diseases which afflict humankind, such as cancer, heart diseases and diabetes. The company's discoveries have been used to produce new medicine, including for cardiac diseases and Alzheimer's[5].

World-class prosthetics production

Össur is an international health technology company which designs and produces prosthetics, braces and support equipment for people with mobility impairment. Össur employs 4,000 people in more than 25 countries. Its headquarters are in Iceland but it has branches around the world which tend to a growing market. The company is listed on the Copenhagen Stock Exchange[6].

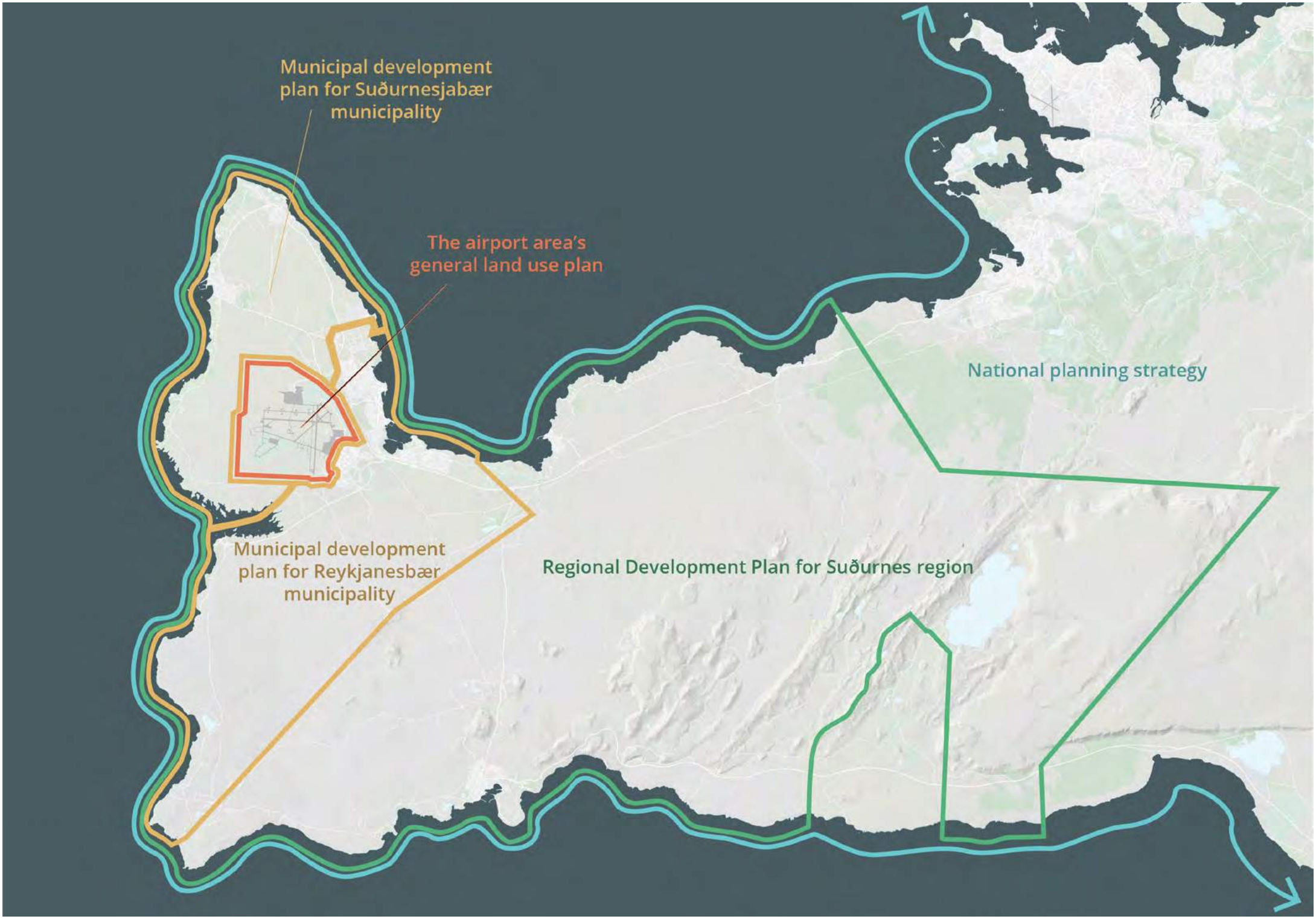
Carbon sequestration at Hellisheiði power plant

CarbFix is a collaborative project between the University of Iceland and Reykjavík Energy. Its mission is to capture carbon dioxide and hydrogen sulphide from the emissions of Hellisheiði power plant and carbon dioxide straight from the atmosphere. The gases are dissolved in water and then pumped into a borehole where they turn to stone. The project has received many international research grants and much media attention in the last few years[7]. The cost of the carbon sequestration at Hellisheiði power plant is approximately ISK 3,000 per ton of carbon dioxide. It is hoped that with further development and scale economics it will be possible to reduce the cost. However, it is already lower than the cost of purchasing emissions permits on the European market[8].

Natural skin products

Skin products are made from the white silica mud which is formed in the Blue Lagoon. Natural skin products are also made under the brand Taramar in Sandgerði. They avoid any toxic chemicals that cannot be used in food products, and use only herbs and seaweed from exceptionally clean areas[9].

4 https://skemman.is/bitstream/1946/24033/1/%C3%ADslenski%20lyfjai%C3%B0na%C3%B0urinn%20final.pdf
5 https://www.decode.is/thekking-i-allra-thagu/
6 https://www.ossur.com/is-is/fyrirtaekid/um-ossur
7 https://www.hi.is/frettir/carbfix_verkefnid_faer_evropsk_nyskopunarverdlaun
8 https://www.or.is/um-or/fyrir-fjolmidla/frettir/aukin-utbreidsla-carbfix-i-nyju-felagi/
9 https://taramar.is/taramar-er-ny-kynslod-af-hudvorum/


Municipal development plan for Suðurnesjabær municipality
The airport area's general land use plan
National planning strategy
Municipal development plan for Reykjanesbær municipality
Regional Development Plan for Suðurnes region

9 Policy and planning

By making zoning plans and related environmental impact assessments the objective is to guarantee that parties of interest will be involved in decisions concerning the allocation of land. Planning is mostly the responsibility of the municipalities but national plans must be taken into consideration, for example regarding infrastructure and nature protection.

Here, some policies and planning issues that concern the development area are discussed:

- **National legislation and policies,** such as the national planning strategy, environment and preservation issues
- **Suðurnes regional development plan,** which is the joint policy for the municipalities in the Suðurnes region
- **General land use plans for surrounding areas**
- **Zoning plans at Keflavík Airport**
- **Limitation of land use and permits**

9.1 National legislations and policies

In Iceland, the planning authority is in the hands of the municipalities. There are four planning levels. The state's policy on planning is presented in the national planning strategy. Neighbouring municipalities can put together a joint policy on regional planning. A municipality's comprehensive land use policy is stated in the municipal development plan and in the detailed land use plan, in which the arrangement of buildings in a specific zone is described. A masterplan (or framework strategy) is sometimes also made to bridge the gap between the municipal development plan and detailed land use plan. The levels of planning must be coordinated.

National planning strategy

The national planning strategy is laid out as a policy for four areas, that is, the planning of the central Highland, planning of rural areas, planning of residential patterns and distribution of residential areas and planning of ocean and coastal territories. The national planning strategy's aims include encouraging a dense, continuous and mixed land use and strengthening local communities. The quality of residential areas must be upheld and it must be considered that residents are to have access to public and outdoor recreation areas which encourages them to exercise and experience nature. The plan must work towards securing a healthy environment with nature protection, good utility pipes, acoustics and air quality. Environmentally-friendly solutions are to be sought. Residential planning is to result in competitive communities and powerful infrastructure for a diverse economy which is able to withstand societal and environmental changes.

Iceland's Climate Action Plan

Energy exchange in transportation and carbon sequestration are two of the main issues that the Government of Iceland will focus on in its Climate Action Plan 2018–2030. Energy exchange reduces carbon emissions with the gradual reduction of the use of fossil fuels for cars and ships. Carbon sequestration will be encouraged with increased forestation, soil reclamation and reclamation of wetlands. The government has presented 33 actions on climate issues which are to reduce carbon emissions and increase carbon sequestration. Their joint goal is to ensure that Iceland will fulfil its commitments for 2030 according to the Paris Agreement and reach the government's goals on carbon neutrality by 2040.

The plan states that Iceland will participate in CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation), the International Civil Aviation Organization's new international scheme on greenhouse gas emissions from aircraft. The goal is to achieve a carbon neutral growth in international aviation from 2020 with carbon offsetting and carbon emissions through special project certifications.

The government's Action Plan also concerns improving infrastructure and allowances for active modes of transport and eco-friendly vehicles, better public transport and more.

Protection of natural and cultural relics

The Nature Conservation Act defines different categories for conservation areas largely overlap with the conservation categorisation of the IUCN. The categories reflect different conservation provisions and the usability of the areas. The act also includes special protection for certain natural phenomena, such as postglacial lava, wetlands, salt marshes, etc.

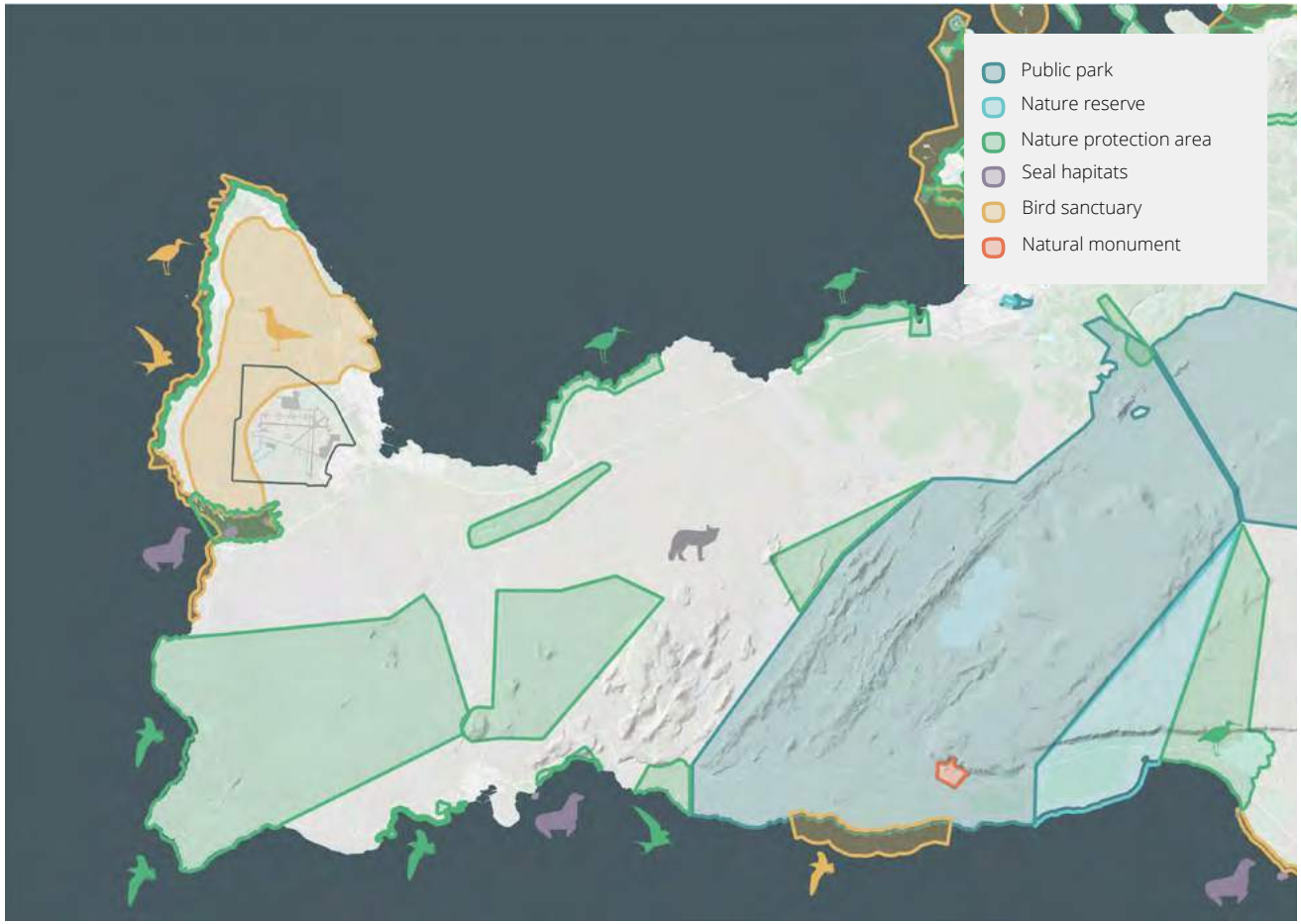
The Nature Conservation Register documents areas that are already listed as natural conservation sites (Part A), areas for which there are plans to declare natural conservation sites (Part B) and other natural monuments which are considered to require protection (Part C).

Construction projects are not impossible in such areas but it must be proven that they are necessary and that great care has been taken in terms of planning. There are management and conservation plans in effect for most protected areas, which state what kind of land use and buildings can be constructed there, among other things.

Nature reserves in the Suðurnes region

No areas in the immediate vicinity of the airport are conservation areas but some of them are either in Part C of the Nature Conservation Register or are included in the Icelandic Institute for Natural History's recommendations in Part B (see the map to the rigth).

The closest nature reserve is Reykjanesfólkvangur, which is under protection because of its diverse geological formations. It includes the crater Eldborg which is protected as a natural monument. Further east is the nature reserve Herdísarvík. There are 11 areas in total in Part C of the Nature Conservation Register, mostly because of geological heritage, flora and fauna or relics. Coastal areas are usually protected due to birdlife but the areas closer inland because of geological formations, often in connection with the plate boundaries and the accompanying seismic activity[1].



Different types of nature conservation areas in the Reykjanes peninsula.

1 https://natturuminjaskra.ni.is/

9.2 Regional planning in the Suðurnes region

The Regional Development Plan for the Suðurnes Region 2008–2028 was confirmed in November 2012. It presents the policy on the issues which the municipalities in Suðurnes would like to coordinate. The regional development plan will be reviewed in the coming months.

Policy on employment issues

The regional development plan defines four employment areas in Suðurnes with emphasis on cooperation between the municipalities and other parties in their development. The municipalities are to organise operations in these areas and cooperate on the areas' development, operations and marketing. The areas are:

A - Ásbrú north – aviation-related operations, industry and a port for large vessels.

B - Ásbrú and the hallway – aviation-related operations, health services, educational institutions, research, innovation and development, intellectual property industry and data centres, trade and services along Reykjanesbraut highway.

C - Keilisnes – future industrial area for businesses and industry.

D - Reykjanes – power production and research. Geothermal resource park with the goal of increasing the utilisation of green energy and supporting eco-friendly production, such as aquaculture and greenhouse farming.

Policy on distribution systems and transport

Emphasis is placed on the continued usage of the current distribution systems of electricity and it is assumed that more lines can be established within those systems. The municipalities' regional development plans also take full consideration for a potential rail system along Reykjanesbraut highway.

Policy on the exploitation of resources

The regional development plan's main objective is to promote the responsible and economical exploitation of resources in the Suðurnes region for the benefit of the region's residents and future generations. The construction of buildings, energy supply and population development are to consider the opportunities that lie in the area's natural uniqueness in the world.

Goals that concern employment development on the basis of natural resources and the multiuse of geothermal heat, fisheries and opportunities connected with geological history and cultural relics. Two goals have already been reached, that is, reviewing the limits of water protection areas and working towards the establishment of a geopark.

The exploitation of the high-temperature geothermal areas that are mentioned in the framework strategy is planned; in the strategy five high-temperature areas have been moved to the exploitation category. It is remarked that due to the nature protection value of high-temperature geothermal areas, great care must be taken in the exploitation of the geothermal heat. Its impact on the preservation and/or outdoor recreation value of high-temperature geothermal areas must also be considered. The establishment of a geopark is a way towards that goal.

Policy on ports

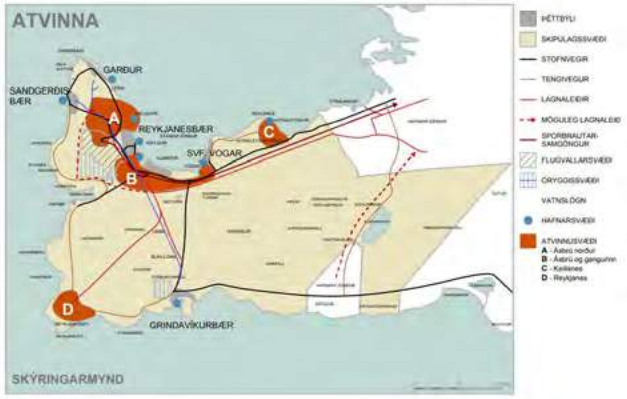
It is assumed that the ports in Grindavík and Sandgerði will continue to serve as fishing ports in the future. The future plan for the Helguvík port is that it will serve sea transport. It has previously served as a stopover between Iceland and Europe on Eimskip transport routes.

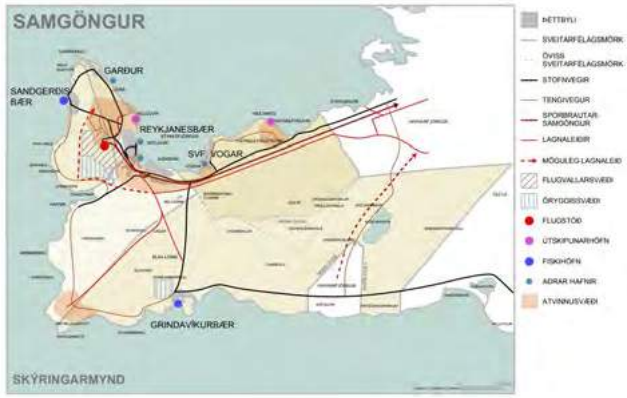
Policy on the airport area

The continued development of the airport is included in the plan. Sufficient space has been reserved for its expansion and the expansion of the security area. Emphasis is also placed on effective connections for transportation between the airport area, the municipalities in Suðurnes and the capital region.

Policy on outdoor recreation and tourism

Útivistargildi svæðisins felst í einstakri náttúru og því að meginhluti svæðisins er óraskaður. Tekið er fram að náttúru- og söguminjarnar séu auðlind fyrir útivist og ferðaþjónustu auk menningarlegs mikilvægis. Þá er sett fram stefna um áframhaldandi skógrækt á núverandi skógræktarsvæðum en passa vel að ný skógræktarsvæði raski ekki náttúrumyndunum, menningarminjum eða útsýni.





9.3 General land use plans

A municipal development plan is in effect for each municipality and includes its policy and land use, population development, environmental issues and transport and service systems. The Municipal development plan is intended to provide an overall image of developments which is then defined in more detail on other planning stages.

According to special provisions in the national planning act and laws on the establishment of public limited companies on the operations of Keflavík Airport, a special committee is responsible for the airport's planning strategy, including the making of a general land use plan for the airport area. For that reason, it is not part of the municipal development plan of the municipalities to which it belongs.

The airport area's general land use plan

The existing airport area's general land use plan took effect in 2017. It was a cooperative project between Isavia, the Icelandic Coast Guard and Keflavík Airport's Planning Committee. The planning area is in two parts: The airport area (A), where Keflavík Airport's Planning Committee is responsible for planning; and the security area (B), where the Icelandic Coast Guard is responsible for planning, working at the authority of the Minister for Foreign Affairs. In the masterplan a policy is presented on the positioning of runways and driveways, including one that goes in the same direction as runway 01/19 and the relocation of a planned runway in the direction NW/SE.

Airport service areas do not have definite limits in the organisational draft but their suggested location and capacity in three areas is displayed in diagrams: FLE1 (203 ha), which is reserved for an air terminal, aprons, etc. and FLE2 (69 ha) for service buildings, such as a kitchen and fuel storages. The land use plan assumes that significant enlargement of the buildings in the area, approximately 430,000 m^2, will be approved, in addition to the already existing 98,437 m^2 (organisational change in 2018).

The third airport service area is called Háaleitishlað (HLH, 144 ha) and is the one located closest to Ásbrú. It is intended for buildings that do not require to be in the immediate vicinity of the terminal, such as hangars and warehouses. A permit has been granted for new buildings of the total size of 65,000 m^2, in addition to the existing 68,435 m^2. Furthermore, an industrial area (AT1, 39 ha) is included in the map in line with the regional development plan, which is part of the area called Ásbrú north. This area is intended for transportation operations, hotels and car rentals. The area is uninhabited and a permit has been granted for buildings of a total size of 60,000 m^2.

Safety area (B) is intended for various operations, such as hangars and maintenance facilities, housing for accommodation and other services. The area is 755 ha in total and it is estimated that 10,000 m^2 of additional buildings can be constructed there. An area reserved for fuel lines

between the airport and the supply station in Helguvík is also included in the safety area.

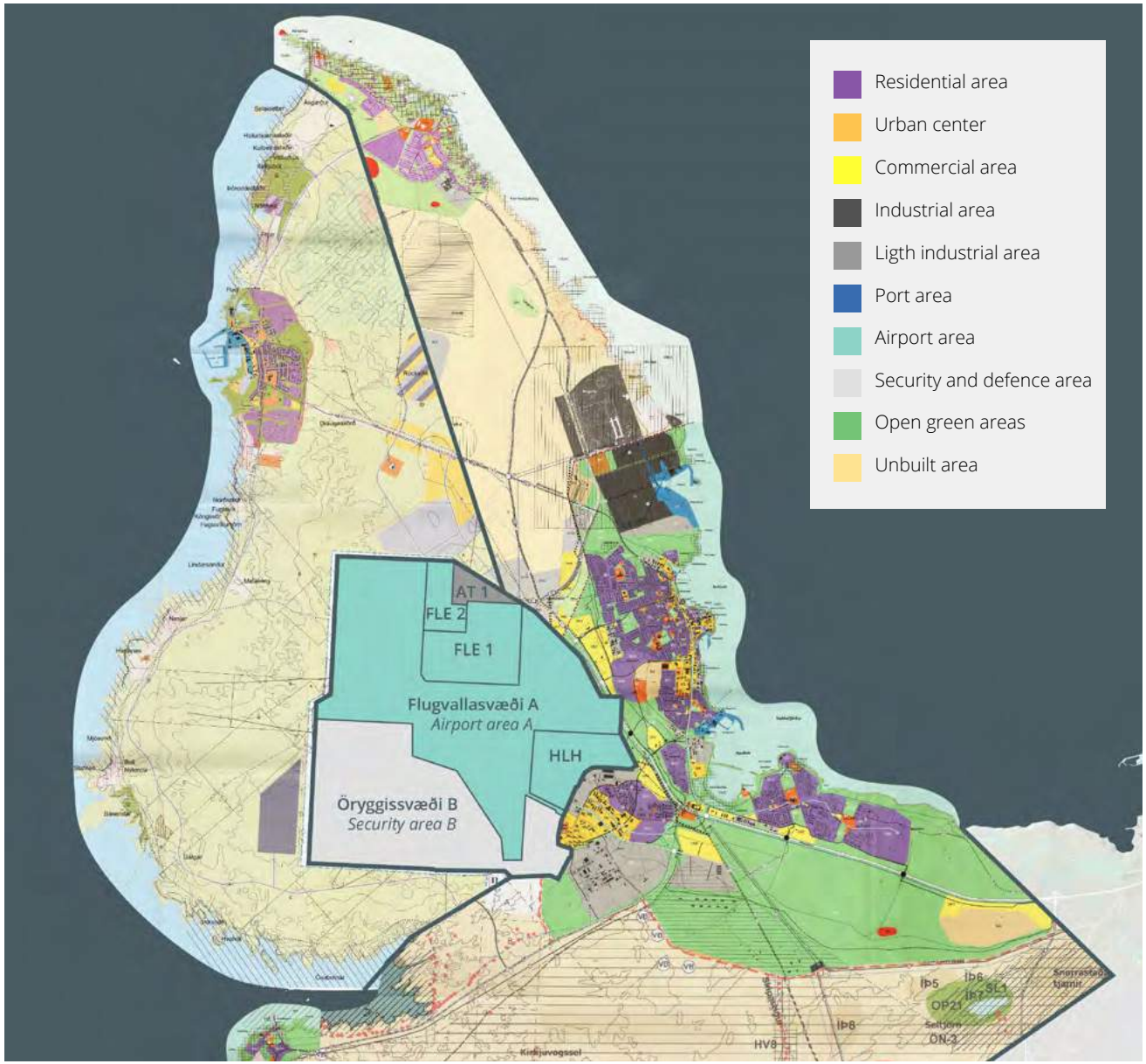
Reykjanesbær Municipal Development Plan

The existing municipal development plan for Reykjanesbær municipality was confirmed in 2017 but is currently being reviewed. In the regional development plan, the location of existing neighbourhoods in Keflavík and Njarðvík is secured but emphasis is placed on densifying populated areas to make better use of infrastructure. Additionally, new lots are reserved for residential housing, particularly closer to the airport (lots marked with ÍB28, ÍB29 and ÍB30) with plans for approximately 900 new apartments in an area measuring 77 ha.

In the municipal development plan, new areas for shops and services are mapped out, which are located alongside Reykjanesbraut highway close to the airport (VÞ 1-5). These areas measure a total of 90 ha.

By the harbour in Helguvík, an area of 133 ha is defined as an industrial area for, among other operations, energy-intensive industry. Only a small part of the area is currently in use.

By the port in Helguvík, a 34 ha harbour area with a 200 metre quay is planned.



The map shows the general land use in Reykjanes Peninsula. The colours represent different activities, see legend for further details.

Municipal development plan for Suðurnesjabær municipality

The municipal dvelopment plan for Suðurnesjabær is in process after the recent merger of two municipalities, Sandgerðisbær and Garður. Until the new joint general land use plan will be approved, the land use plan for each of the previous municipalities will be in effect.

In the municipal development plan for Garður (confirmed in 2015), increased residential housing is planned but closest to the airport there will be an extensive business area and an area for shops and services, while north of Helguvík harbour an industrial area is planned. The business area and area for shops and services are mostly planned close to Rósaselstorg, a roundabout connecting the towns and the airport. Areas for shops and services (marked with VÞ 4-7) measure a total of 21 ha. The business areas measure about 50 ha in total. The industrial area north of Helguvík is 145 ha. The future vision is for further enlargement of business areas north of Rósaselstorg but it is currently unconfirmed in the general land use plan.

The municipal development plan of Sandgerðisbær (confirmed in 2011) assumes the enlargement of residential areas both to the north and south of the current residential area. Closest to the airport, business areas measuring 103 ha and areas for shops and services measuring 81 ha are planned. West of the airport an industrial area of 83 ha is planned.

During the making of a new general municipal development plan the borders of the aforementioned areas may change. However, given the policies of the existing land use plan for the two municipalities, it is clear that extensive land is available for business operations.

Masterplan for Ásbrú

Ásbrú is the district of Reykjanesbær which is located closest to the airport and it is closely connected to the airport through the business area on Háaleitishlað. The district was originally built as a US Naval Air Station and used to be fenced off, or until the US military departed in 2006. Since then new residents have moved in and diverse operations now exist in the area.

In the masterplan for Ásbrú the district's future development is outlined. Emphasis is placed on making the district family friendly and suitable for a diverse community. It is to have a lively town atmosphere, which will be achieved, for example, through a denser population pattern and diverse residential apartments. Sheltered green outdoor recreational areas where people can meet up and children play year-round are to be created. A strong local spirit is to be created and for that purpose the district's history and area's cultural heritage will be used.

Noise contors around the airport.

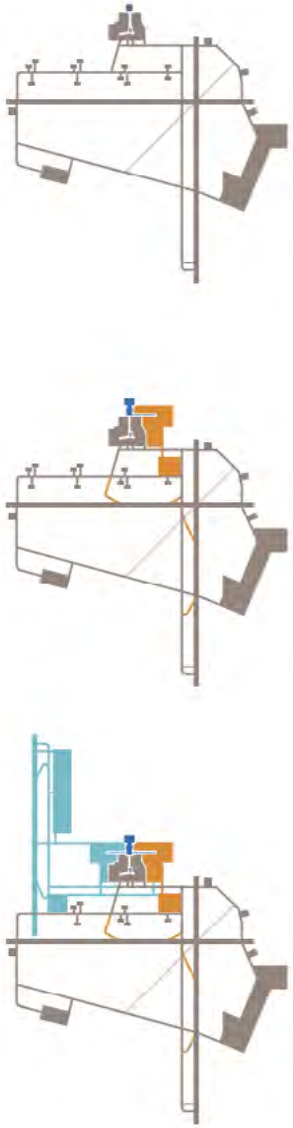
9.4 Planning within the airport

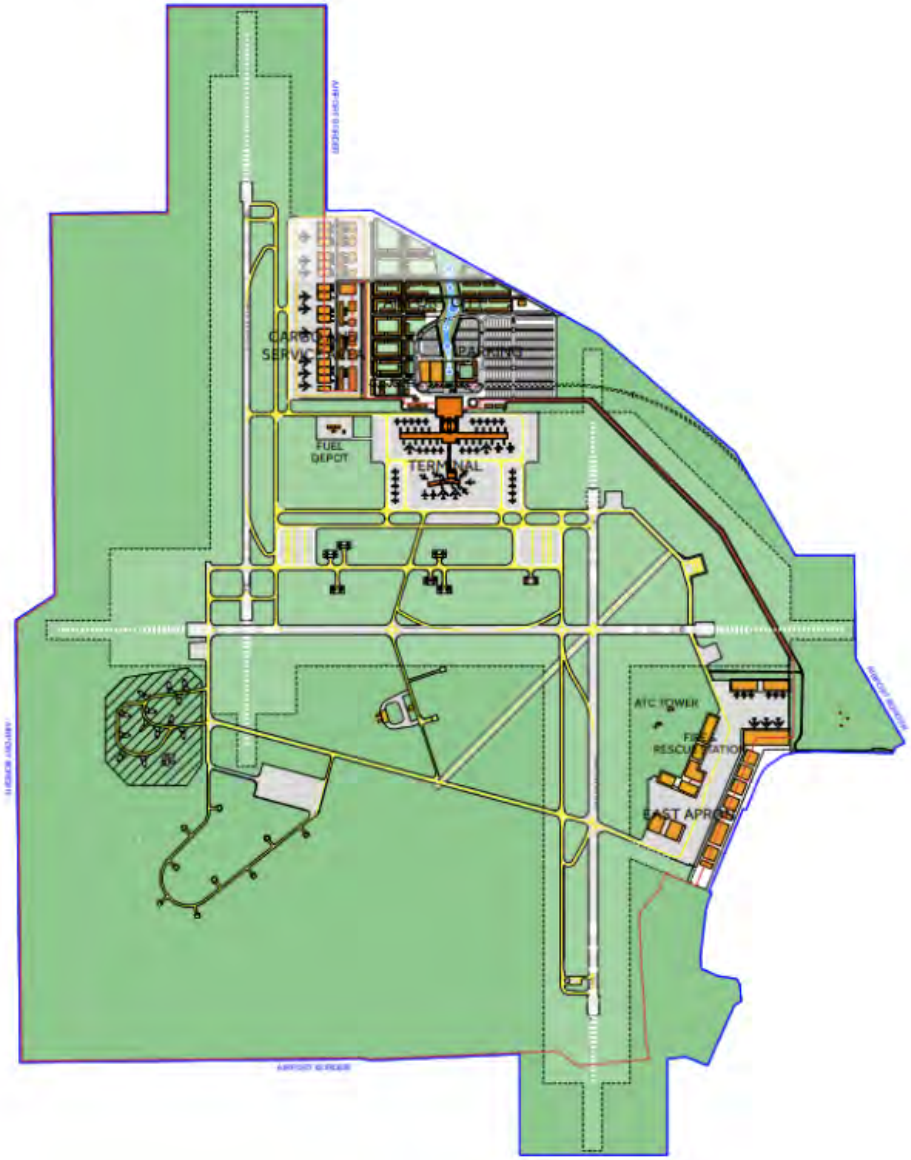
Masterplan for Keflavík Airport

Isavia has presented its policy in the aforementioned airport area's land use plan for Keflavík Aiport with a Masterplan 2015-2040[1].

It includes the planned expansion of the terminal with the goal of being able to facilitate an increased number of passengers, an estimated 14 million in 2040. Plans are made for arrangements to access the terminal from the north, for a business area for aviation related operations (Airport City), facilities for cargo transport and a flight kitchen to the west of the Airport City, and finally a more distant area (East Apron), which is called Háaleitishlað in the general land use plan.

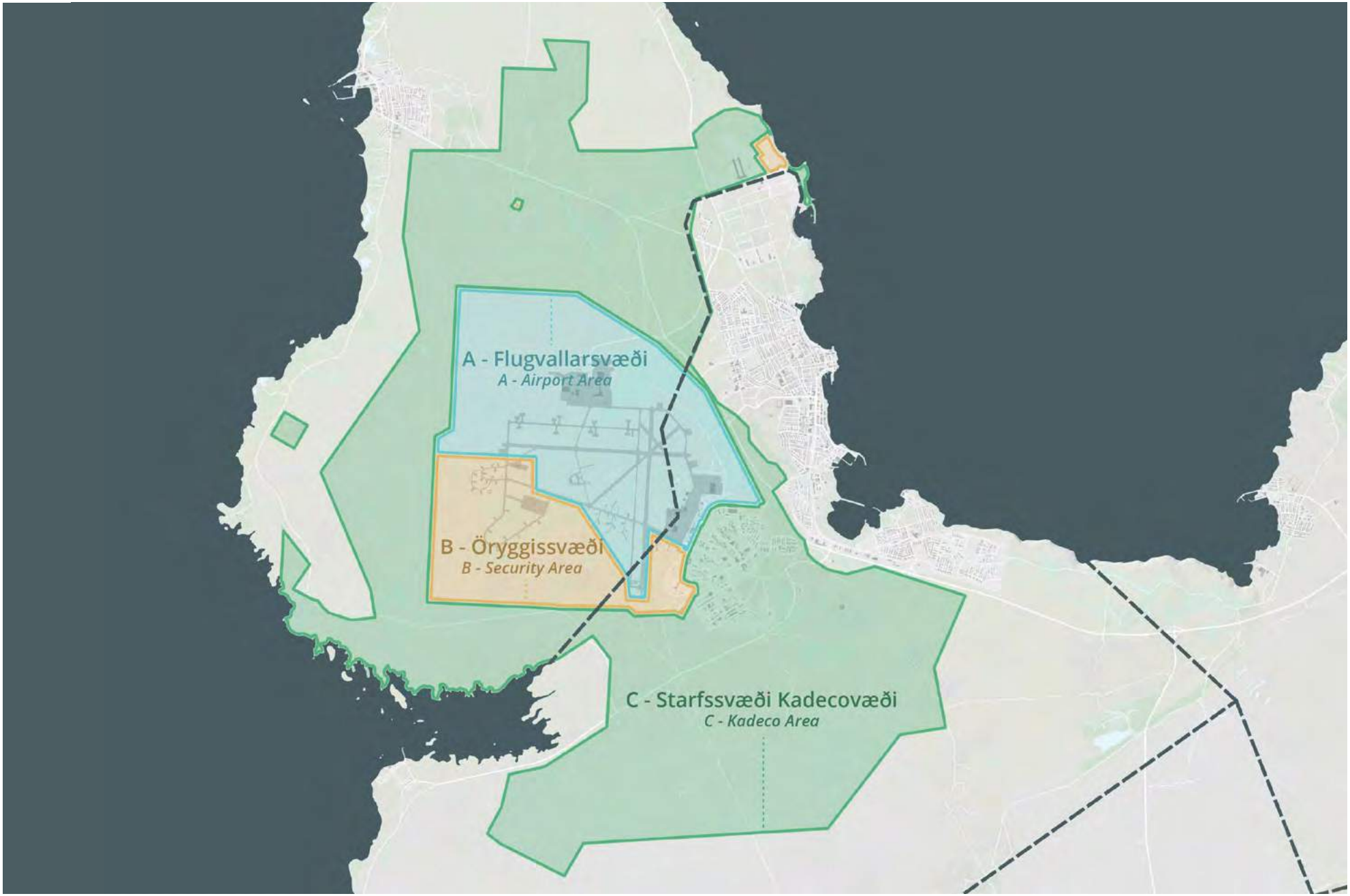
The masterplan strategy also includes a new N–S runway, assuming that before it will be constructed, ways will be sought to maximise the use of the existing runways. A new runway calls for a new location of the control tower. The detailed land use plan for the buildings to the north and northwest of the terminal took effect in March 2019.





Mapping from the Masterplan for Keflavík Airport.

1 https://www.isavia.is/media/1/kef-masterplan-hq-final_web.pdf


A - Flugvallarsvæði
A - Airport Area
B - Öryggissvæði
B - Security Area
C - Starfssvæði Kadecovæði
C - Kadeco Area

Kadeco area.

9.5 Limitation of land use

Water protection area

There are no water protection areas within the airport area. Since 1985 it has been known that there is groundwater pollution on Miðnesheiði heath, where the airport is located. Miðnesheiði has a dolerite bedrock which water and other liquids can easily move through. It is known that the groundwater in the area is contaminated, primarily by three pollutants: hydrogen chloride compounds, oils and nitrates. Recent testing indicates that the pollution is limited to the airport area and that the level of groundwater pollution is declining in the largest part of Miðnesheiði (Kadeco and Almenna verkfræðistofan, 2009). According to a status report, the groundwater body Rosmhvalanes (Miðnesheiði) is believed to be in danger (The Environment Agency of Iceland, 2013)[1][2].

Relics

According to cultural heritage laws, it is obligatory to register archeological remains while making land use plans. Usually, a thorough listing of archeological remains is made in connection with the making of detailed land use plans, because it is on that level of planning that land is reserved for business operations and building lots.

The Cultural Heritage Agency of Iceland supervises the registration of archeological remains, along with buildings and man-made structures that have a scheduled or protected status.

No archeological remains are known to exist in the vicinity of the airport which might limit development.

Land ownership

The airport area lies on the borders of the municipalities Suðurnesjabær and Reykjanesbær but is defined as a separated planning area.

All of the land that lies within the borders of Keflavík Airport, where construction projects will take place, is in Kadeco's ownership. Kadeco is a company owned by the Icelandic state which has the main role of leading formal cooperation on the organisation, development, utilisation and marketing of the land surrounding Keflavík Airport and nearby areas[3]. Kadeco also owns a large adjoining area, divided into 3 categories.

Isavia supervises the land which is defined as Airport Area A, according to laws No. 76/2008[4].

1 (Umhverfisstofnun, 2013)
2 Stækkun Keflavíkurflugvallar. VSÓ fyrir Isavia. 2018.
3 Ársskýrsla Kadeco
4 Stækkun Keflavíkurflugvallar. VSÓ fyrir Isavia. 2018.

The map shows local plans in place around the airport area as well as protected areas and resources.