International Transport Forum

Connecting Remote Communities

Summary and Conclusions

179 Roundtable

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The International Transport Forum

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- Canada: Tretheway, M., Kositsky, J., Andriulaitis, R., Tretheway, G. (2021), "Northern and Arctic Air Connectivity in Canada", presented by Mike Tretheway and Jody Kositsky (InterVISTAS Consulting);
- Chile: Villalobos, R., Berríos, N., Muñoz, M., Koffman, E. (2021), "A Review of Public Transport Policies in Remote Communities of Chile", presented by Nicolas Céspedes (Chilean Ministry of Transport and Telecommunications);
- Greece: Lekakou, M., Remoundos, G., Stefanidaki, E. (2021), "Applying the Island Transport Equivalent to the Greek Islands", presented by Maria Lekakou and Georgios Remoundos (University of the Aegean);
- United Kingdom: Laird, J. (2020), "Transport Connectivity for Remote Communities in Scotland", presented by James Laird (Peak Economics).

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Executive summary

What we did

This report provides an overview of transport connectivity challenges facing small communities in remote areas. It reviews existing support measures in a selection of ITF countries, drawing on examples from Australia, Canada, Chile, Greece, Finland, Japan, Norway, and the United States. The report sets out best practice in ensuring adequate connectivity for remote communities, based on the case studies.

What we found

Residents of remote and sparsely populated areas often face a host of socio-economic challenges. Many grapple with inadequate access to goods and services, lower wages, unemployment or out-migration, and higher costs of living. Many remote regions have rapidly aging populations. Higher costs, market isolation and structural weaknesses including reliance on less dynamic sectors of the economy can make remote regions relatively less productive. Transport markets serving such regions are inevitably thin and inadequate. The high cost of transport connectivity reinforces these trends.

Most remote communities face higher costs of travel and more complex and often seasonal transportation links. Extreme weather in many remote regions, exacerbated by climate change impacts, make resilience an important issue. In Canada and Greenland, for example, permafrost thaw may significantly diminish the time during which ice roads can be used. Resilience implications are particularly severe where connections are used to provide lifeline services. The lack of alternative routes means that temporary disruption of such connections can lead to permanent loss of industries and jobs in remote communities. Deteriorating work opportunities and living conditions may put the existence of a remote community at risk as inhabitants choose to look for better prospects elsewhere.

Lack of sufficient demand often deters private-sector providers from offering connections to remote areas. Where commercial transport struggles to provide these, governments often step in. Support takes the form of either public service provision or subsidies, such as budgetary and tax expenditures or transfer of risk from the private sector to the government.

Government approaches to determine the level of public support for connectivity to remote and sparsely populated regions differ. Countries generally use two distinct approaches to decision making on transport provision for remote areas:

The “adjusted efficiency” approach strongly relies on cost-benefit analysis to assess the relevant social, economic, and environmental effects of support, in order to prioritise potential interventions on the basis economic efficiency. It is commonly used for instance in France, Norway and the United Kingdom.

The “efficient fairness” approach determines the level of support based on eligibility criteria, such as geographic distance or indicators of isolation. It relies on specific equity goals or minimum access thresholds and does not require cost-benefit-analysis. This approach is used notably in Chile and in the United States.

Both approaches have weaknesses, however. First, governments rarely conduct assessments of cross-regional connectivity or accessibility. Data collection is often insufficient and definitions of remoteness and isolation vary widely across jurisdictions, even within countries. Where assessments are carried out, they often focus only on one specific mode of transport.

Secondly, challenges persist in incorporating accessibility considerations into government appraisal and prioritising different kinds of support. Standard transport appraisal frameworks and decision-making processes often fail to consider regional economic impacts as well as important social impacts, e.g. relating to health, education or equity. Methodological challenges make it difficult to compare the socio-economic value of expenditure on transport schemes in remote areas with transport interventions elsewhere.

What we recommend

Develop objectives for the accessibility of remote communities

Clearly state accessibility objectives for remote communities and consider how transport could deliver the connectivity needed to achieve them. Governments should assess connectivity needs with regard to local, regional and national socio-economic development objectives. Connectivity assessments should take into account all relevant transport modes.

Establish workable definitions of remoteness and isolation to compare accessibility across regions

Clearly defined concepts of remoteness and isolation will allow to assess and compare the accessibility of remote communities in the national context. Assessments should be based on access to services rather than expressed in terms of distance. Accessibility-based assessments have the advantage of incorporating forms of connectivity beyond the physical links offered by transport, such as that provided by the internet. In this approach, policy objectives define the basic services and the minimum required level of access to them.

Adapt appraisal tools to account for all costs and benefits of providing good connectivity for remote regions

Appraisal guidelines should account for all relevant social, economic, and environmental impacts of projects. Distributive impacts and affordability considerations of investments and policies are of particular importance in remote locations. The appraisal framework should set out how to account for interdependencies with local development objectives as well as any wider national objectives, such as health or education. The guidelines should set out how to apply appraisal tools in a cost-effective manner by considering the proportionality of resources to commit to evaluation with respect to the size of the intervention. The guidance might include practical tools such as calculation handbooks and ready-made surveys that require little effort to adapt to the local context.

Monitor the effectiveness of support schemes for better connecting remote communities

Connectivity support measures for remote regions should be monitored and periodically reviewed for their effectiveness to achieve intended outcomes. Adding sunset clauses to support schemes can be effective to ensure that the measures are evaluated and kept fit for purpose.

Develop integrated accessibility plans to link transport and basic services

Solutions to connectivity problems for remote communities may exist outside the transport sector. An integrated approach to the provision of services will best address their challenges, including those relating to broadband infrastructure, education, health care, and social services. Breaking down administrative silos and engaging local stakeholders in decision-making processes may help to develop flexible, cost-effective solutions.

Support innovations that could reduce costs or improve service quality

Transport authorities should pilot and co-develop innovative transport solutions for remote regions jointly with those communities, private and non-profit actors, and in partnership with other public authorities. This may require organisational change and the adaptation of policy processes and legal frameworks. To support innovation, governments could provide start-up funding or cover the administrative or application costs of transportation companies that serve rural and remote areas.

Introduction

Maintaining transport links to remote regions is important to governments for economic, social, and strategic reasons. In fact, maintaining and supporting these links can have transformational impacts on the communities and are often essential for their survival. In these communities, the market is often unable to provide remote communities with adequate levels of connectivity. Governments therefore step in to support the connections through a range of programmes, which include the provision of subsidies.

Remote and sparsely populated areas face many challenges including:

- access to a limited range of education and career options
- lower wages
- high cost of living
- lack of full-time employment opportunities
- seasonality for some jobs, e.g. tourism and certain agricultural sectors.

These socio-economic outcomes are often influenced by how easily residents can access goods, services and activities – their accessibility (Litman, 2018).

This report first gives an overview of the rationale and government objectives to support remote communities with better accessibility through enhanced transport links. It then highlights some challenges for air, maritime and surface transport. The third section summarises government-designed support measures currently addressing transport challenges and provision gaps in remote communities. It classifies these support measures, highlighting the main design and implementation obstacles. Finally, the fourth section discusses two government approaches for determining the level of transport support in remote communities.

Why should governments better connect remote communities?

Governments support – and in some cases actively encourage – settlements in far-away regions. These regions have economic sectors (agriculture, mining, tourism, etc.) and cultural assets that governments aim to sustain or revitalise. In some cases, support follows national strategic objectives where support is directed to remote border territories or islands to avoid depopulation.

Transport and infrastructure are a vital part of safeguarding accessibility for people in remote areas and can have large societal benefits (Wallace et al., 2005). Where private markets fail to provide transport connections, public support helps to maintain citizen access to services and health care and reduces the risk of social and economic isolation (DfT, 2013). Table 1 provides an overview of the social, economic and strategic objectives used to underpin funding for connectivity in remote areas. The sections below highlight the role of transport in meeting these objectives.

Table 1. Objectives that are used to justify transport-support measures in remote communities

Social objectives	Economic objectives	Strategic objectives
• Better access to services: health care, social services, education • Better social inclusion: Access to social activities and networks, family, friends, culture	• Better access to employment and economic opportunities • Improvements in productivity • Lowering consumer prices through lowering transport costs • Access to international business and freight networks	• Economic rebalancing and territorial cohesion • National unity

Meeting social objectives

Access to services

Remote communities often require government support for better connection to centres of economic activity for minimum levels of health care, education, and other essential services (Chilean Ministry of Transport and Communications, 2013). As access to these services can be critical, these connections are often referred to as “lifeline services”. This term is often used by policy makers in setting out the rationale for transport subsidies in remote areas (Transport Scotland, 2020).

Access to health care is a striking example of the challenges remote communities face. It is costly for governments to maintain health services in regions with a low population density, therefore residents of remote communities often travel long distances to access them. In Canada, it is not unusual for persons requiring specialised health services to travel 200 km or more to the nearest hospital. In the Canadian Arctic, people from remote communities may travel up to three hours by plane to obtain routine hospital services (Browne, 2009). A study from 2005 estimates that about 3.6 million Americans did not obtain care because of a lack of transport to medical facilities (Wallace et al., 2005).

Limited access to essential services especially affects those living in remote communities who cannot use a private vehicle, notably the elderly. For example, in the remote regions of Australia, Finland, Greece, Mexico, and Norway, only about 2% of elderly residents have walkable access[1] to public transport. In Chile, this share stands at only 0.8% in the most remote places compared to 42% in its most accessible areas (OECD, 2017). Aging populations are prevalent in remote communities and might increase the need for public transport provision and specialised mobility options in the future. Between 2003 and 2019, the age dependency ratio – the ratio between the average share of population over 65 with respect to the working age population – increased by 9% in remote regions (OECD, 2020). Improving elderly mobility is a key objective of rural transport policy making in Japan where the population over 75 is expected to make up over 21% of the total population by 2045, compared to 15% in 2020 (Ministry of Land, Infrastructure, Transport and Tourism, 2020).

Social inclusion

Remote communities are often excluded from social opportunities through transport poverty. Many residents face insufficient access to jobs, services and social activities due to limited affordable transport options. Governments increasingly recognise that in addressing transport poverty it is important to support individual mobility not only for accessing employment and services, but also for social inclusion.

Government guidance in Australia recognises this (Rosier and McDonald, 2011) and addressing transport-related social exclusion has also become part of transport policy in the United Kingdom, a process initiated by the UK Social Exclusion Unit's 2003 report into transport and social exclusion (Office of the Deputy Prime Minister, 2003).[2] Scottish transport policy aims to "reduce inequalities by minimising the connectivity and cost disadvantages faced by island communities and those in remote rural areas" (Transport Scotland, 2020). The development agency for the Highlands and Islands of Scotland (HIE) estimated annual fuel costs for a single person in a Highlands town to be 3.7 times higher compared to an English rural town, mainly due to longer distances but also higher fuel costs (Highlands and Islands Enterprise, 2016).

Some governments have included specific objectives to better connect indigenous low-income remote communities, which are often disproportionately affected by high transport costs (see e.g. Government of Canada, 2020; Queensland Government, 2020). In Australia, the great majority of people living in very remote Aboriginal and Torres Strait Islander communities experience financial difficulties in covering their essential transport expenses. A study concluded that access to regular public transport would represent an effective increase in disposable income of AUD 1 000-3 000 annually in the surveyed communities, based on annual private vehicle expenditures (Spandonide, 2014). Access to regular public transport, in this sense, was considered a change from a single weekly transport option to a multiple-link daily option.

Meeting economic objectives

Access to employment and economic opportunities

High travel costs, geographic distance, and insufficient transport links can deter segments of the population from entering the labour market, leading to involuntary unemployment. Transport and Infrastructure Council Australia (2015) is one government example improving transportation to facilitate access to employment. In Canada, among First Nations people in Saskatchewan and British Columbia, respectively 51% and 44% reported that not having the means of transport to get to available jobs caused them difficulty in finding work (OECD, 2020). Searching for suitable jobs can be particularly difficult in

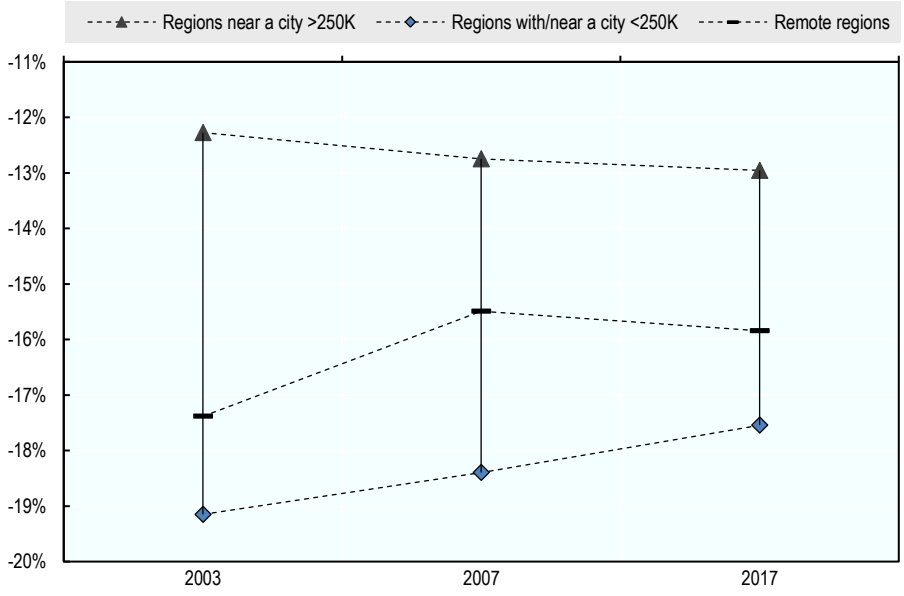
sparsely populated areas. Access to job centres is limited and the role of informal networks in job searching appears to be more pronounced (McQuaid et al., 2004). In addition, job-seekers face a limited choice of employers (thin labour markets), which can effectively raise firms' bargaining power over workers (Laird and Mackie, 2014). Stronger penetration of broadband connectivity, offering web-based jobs, may help to mitigate these issues but transport is likely to remain the principal means to access employment.

Productivity improvements

Remote communities face high unit costs for transport, which influences the cost of doing business. Where transport infrastructure is poor and transport markets are thin, transport costs can make products less competitive compared to those produced in high density areas. Firm productivity is also hampered by restricted access to inputs and consumer markets, and less competitive labour markets. Governments have justified support for transport connectivity in remote areas with the objective of improving productivity (Scotland's National Transport Strategy, Transport Scotland, 2020).

Productivity has drifted downward in remote[3] regions since the global financial crisis (see Figure 1). The OECD (2020) suspects that further concentration of productive industries in cities translated into productivity losses in remote regions. Because low-density regions often have less diversified economies and produce a limited range of goods and services, they are more vulnerable to industry-specific shocks. In addition to a slow-down in trade brought about by the financial crisis, low-density economies have faced increased competitive pressures from low-wage emerging economies. Without increased exports, the sources of productivity gains have remained limited for remote regions.

Figure 1. Divergence of productivity in remote regions after 2007



Note: Value indicates percentage gap to OECD average (=100). 2017 Productivity measured as GVA per worker.

Source: OECD (2020), p.52.

Consumer welfare improvements

In remote areas, oil, food and other consumer goods prices may be significantly higher due to distance, lacking economies of scale, seasonal disruptions or complexity of transportation. In addition, imperfect competition may lead to higher gaps between prices and costs than in denser regions. Indeed, firms may gain significant market power in the absence of strong local competition. Economic theory suggests that this is particularly the case for spatial market power in the retail sector in isolated remote regions or communities with a small local market size, although empirical evidence is sparse (Laird and Mackie, 2014).

The differences in prices of goods can be so vast that many residents of remote areas regularly travel for shopping. According to a survey conducted in Kuchinoerabu, an island located in the southern periphery of Japan south of Kyushu, shopping accounted for half of the respondents' trip purposes with medical care accounting for another third (ITF, 2018). Some governments, including Greece, Japan and Spain (Canary Islands), subsidise both passenger tickets and freight and logistics companies, with the objective of lowering prices for goods.

Access to international business and freight networks

Some remote areas have specific industry sectors that require connections to international freight networks. For example, Norway and Scotland support air transport connections to their remotely located petroleum and seafood sectors (see Halpern and Bråthen, 2010). As a by-product, some of these connections also strongly benefit local tourism sectors. Other countries such as Australia, Canada, and Chile have large mining sectors, with many of the sites located in remote areas. These governments are developing policies to enable use of drones in these regions, which has the potential to provide more flexible and cost-effective connectivity options for freight (Box 1).

Box 1. Drone-enabled connectivity solutions for remote areas

Many remote areas are difficult to reach by conventional means of transport. Connecting island, mountainous regions, and some rural areas often requires cost-intensive transport by ship, plane or helicopter. In these areas, the cost of maintaining traditional airport infrastructure can be prohibitively expensive. Even when infrastructure is available, passenger or cargo flights may not be affordable due to the higher per passenger or per tonne of freight operating costs faced by airlines.

With drones, remote areas can become better connected. Drones can provide more flexibility in delivering urgently needed products (e.g. medical supplies) and can operate without manning and infrastructure, and in difficult weather conditions.[4] For example, in Canada, drones are used in the context of the Covid-19 pandemic to deliver supplies while limiting the amount of physical contact with First Nations communities.[5]

Drones could be used for both short-haul (including first- or last-mile delivery) and long-haul operations. The Alaska Fairbanks Drone Test Site, for instance, has started investigating operations in an area frequently affected by avalanches almost 160 km wide. Extremely long distances and harsh climate still represent an obstacle to battery life and make drones a less viable option in some very remote arctic regions (Tretheway et al., 2020). The limited storage space of drones makes it difficult to carry larger items and is currently suitable for small parcels only.

Autonomous drone services capable of transporting people may have the potential to become a cost-effective solution for remote communities. This is particularly relevant where the population is not

large enough to sustain regular air services with conventional aircraft. A recent study conducted by Market Economics for the Ministry of Transport of New Zealand estimated the economic benefits of passenger-carrying drones being used to conduct air services connecting small communities to larger airports. The overall resulting savings could be as high as NZD 1.4 billion over 25 years. The estimate takes account of passenger time savings as well as changes in trade and airport-related activity. In some cases the economic and social benefits could be substantially higher, e.g. for communities on islands or with poor land-based connectivity.

For some activities, such as transporting low-weight, high-volume goods to rural areas, drones could reduce emissions compared to surface transport. When carrying heavier items, however, they are likely to be more energy-intensive than surface transport options. Before widely promoting this means of transportation, governments should factor in the net environmental impact of drones, also taking into account the sources of energy production and the lifecycle costs associated with their production.

To ensure that drones are deployed in an effective and publically acceptable manner, it is important that policy makers devise timely and adequate regulatory frameworks that help integrate drones into the existing transport networks, taking into account issues such as privacy.

Source: ITF (forthcoming), New Zealand Ministry of Transport (2019).

Meeting strategic objectives

Economic rebalancing and territorial cohesion

Geographical rebalancing to strengthen cohesion and ensure integration of left-behind regions into the national economy is a priority for many governments. Chile, for example, has adopted a policy to strengthen economic development and decentralisation through better connectivity in its National Policy for the Development of Isolated Locations (SUBDERE, 2011; Villalobos et al., 2020). Additionally, the National Transport Strategy of Chile aims to "rebalance wellbeing" throughout the country (Chilean Ministry of Transport and Communications, 2013).

One of the European Union's territorial policy objectives is to ensure access to infrastructure, services and economic opportunities to avoid rural depopulation. Deteriorating work opportunities and living conditions often prompt residents to leave their communities, contributing to the spiral of economic and demographic decline (European Commission, 2008). The European Commission's 2008 Green Paper on Territorial Cohesion advocated a common and integrated approach for transport in remote regions, mountainous regions (around 10% of the EU population), island areas (3% of the EU population), and 18 special regions (mostly border regions) with very low population density. These regions may benefit for example from support by the Cohesion Fund and the European Regional Development Fund.

Countering depopulation

Japan has 148 remote islands of which 71 are inhabited and entitled to specific support. The Islands are scattered around the nation, many in the Pacific Ocean far from other land mass. One example are the Ogasawara Islands in Tokyo's administrative area. They are 1 000 km south-south-east of the capital and the population of 2 440 is a 24-hour ferry ride from the mainland. Remote Japanese islands face drastic population decrease: the total population of these scattered islands has fallen steadily from 1.3 million in 1955 to 636 000 in 2010, a trend that is expected to accelerate. To reverse it and maintain viable

populations on the islands, Japan provides public support to transport and industry, and employment opportunities for residents, with support amounting to around USD 44 million per year (Financial Times, 2017). For example, Yonaguni, Japan's westernmost inhabited island is 2 000 km from Tokyo and has a population of only 2 000. A four-hour ferry connects it to a neighbouring island with onward ferries to the regional capital in Okinawa, but it is also connected by a 3.5-hour flight directly to Tokyo Haneda airport.

National unity

Geopolitical considerations can also motivate governments to provide support for remote regions. A frequent concern is to avoid depopulation of regions that are considered strategically important. Some transport schemes have been motivated by policies for national unity, with the aim of reinforcing economic, cultural, and social links with economic centres to control border territories. Chile provides one example of support measures for transport in isolated areas motivated by their proximity to borders as the National Policy for the Development of Isolated Locations (Supreme Decree No. 608 of 2010), states that Chile "seeks to reinforce sovereignty: the State must ensure its presence throughout the territory" (Villalobos et al., 2020).

Remote communities and the transport challenge

Remote communities face diverse conditions, but they face a number of common transport challenges. Geographically isolated regions are often dependent on air and maritime connections. In many cases however, demand is insufficient to make services profitable, which provides little incentive to private transport operators to maintain marginal routes. Other challenges relate to geographical barriers, complexity of trips, climate change and seasonality of transportation links. Infrastructure network resilience is a major challenge for surface transport in remote areas.

Air transport

Airlines often have little or no economic incentives to operate remote air services. Services to remote locations often do not achieve sufficient load factors to be commercially viable. With fewer passengers across whom fixed costs are spread, and with the higher per-passenger operating costs for small aircrafts, they are difficult to operate profitably. It is particularly difficult to maintain adequate frequencies of service on such routes (ITF, 2018). Remote air routes often face shortages of qualified pilots and mechanics and the difficulty of attracting these profiles (Tretheway et al., 2020).

Remote routes may also be crowded out from slot-constrained major airports. This is because at airports where demand exceeds supply and landing slots are scarce, slots tend to be allocated to the highest yielding destinations. As a consequence, routes to remote destinations are increasingly being moved to secondary airports, a trend that decreases overall accessibility for residents in more sparsely populated regions. This in turn leads to poorer connectivity between remote locations and socio-economic centres of activity. To counter such outcomes, some countries safeguard slots for remote connections in their slot-constrained hubs. For example, slots for routes to Western Australian destinations are safeguarded at Sydney Airport (see Annex).

Small airports struggle with both higher costs per passenger and lower aeronautical and commercial revenues than at bigger airport sites. This is often due to the seasonality of traffic, smaller catchment areas and a less well-off customer base. According to the Airports Council International, 71% of airports handling less than one million passengers make losses annually[6] in Europe (ACI Europe, 2019).

In Canada, 38 out of the 46 Inuit communities are so-called “fly-in communities” where air is the only available mode of transport to them. Beside costly and infrequent connections, these communities deal with ageing equipment and low infrastructure quality, such as small gravel airstrips used only by specialised aircraft and pilots. The most popular types of aircraft are often unable to land at smaller airports with shorter or gravel runways (Tretheway et al., 2020). Canada’s North is potentially facing a shortage of combi-planes such as the Boeing 737-200 carrying both passengers and freight, which are able to land on gravel runways.[7]

Geographic and climatic conditions often pose additional challenges. Tretheway et al. (2020) review some of the specific conditions that impact air connectivity in remote arctic regions of Canada. Climate change and permafrost thaw can negatively impact runways and other infrastructures. More frequent weather incidents and more extreme weather conditions can be expected to harm air service reliability in the years to come. Adequate levels of investment in climate change adaptation are therefore essential to preserving future air connectivity in this region.

Maritime transport

Maritime passenger and freight transport in remote areas is affected by issues of viability similar to those described for air transport. Lifeline ferry services in Scotland, particularly in more remote and sparsely populated areas, even when subsidised by government, typically have low frequencies of service – often only one, two or three services a day (Laird, 2012). In extreme cases, frequencies may be as low as one trip per month, e.g. between the Chilean islands Alejandro Selkirk and Robinson Crusoe that lie some 800 km off the mainland coast.

Low viability of these routes gives rise to a host of difficulties. Giannopoulos and Aifandopoulou-Klimis (2004) observed that connectivity of Greek islands suffered from low-capacity utilisation of the fleet, low reliability, diverging service characteristics on outward and return routes, and general inadequacy of port infrastructure. Lekakou et al. (2020) indicate that economic recession aggravated many of the existing issues in Greece, leading to decreasing island connectivity in recent years. Withdrawal of public support due to the imposition of severe austerity measures has cut services. In the past, the state obliged profitable ferry operators (and their customers) to cross-subsidise unrelated, non-profitable services through a 3% surcharge on tickets. This surcharge was abolished in 2015 for the negative effect of penalising successful non-subsidised services, but with no substitute funding for the services dependent on subsidy.

In Portugal, the Azores and Madeira face under-provision of maritime transport due to the geographical dispersion of some islands and their long distance from the mainland. Without protection or subsidies, private operators may fail to provide essential transport services that do not meet their commercial interests, despite the dependence of the island residents on reliable maritime transport. This is particularly the case for small remote islands, such as Corvo and Flores. Portugal therefore restricts cabotage in the Azores and Madeira to four authorised operators so that they can cross-subsidise services to the remoter islands (OECD, 2018). This has the downside of inflating prices for the commercially viable services.

Aging and underutilised assets are another challenge in remote communities. Deployment of vessels in remote areas often means very low returns. Flexible management and sharing of assets can reduce costs for areas struggling with economies of scale and seasonality of traffic. For instance, Estonia provides Canadian authorities with their icebreaker during the summer months to reduce the proportion of idle time in port. Governments could explore whether such collaboration might be feasible between other countries and for other vessel types (e.g. seasonal passenger ferries).

Surface transport

Public authorities struggle to sustain public transport in remote communities. Local spending cuts can exacerbate this situation. In some countries, austerity in the aftermath of the 2008 economic crisis accelerated rationalisation and centralisation, affecting the distribution of basic services. At the same time, local funding for public transport has decreased in many instances. In the United Kingdom, the Campaign for Better Transport (2018) calculated a 32% reduction in spending on bus services by local authorities between 2010-11 and 2016-17. Similarly, in Scotland, local transport budgets are being reduced in real terms, services are being cut, and maintenance and renewals are delayed. Whilst central government has been increasing its budget year on year in most countries, local authority budgets have been cut. Many local authorities are now directing their resources towards education and away from transport. In addition, a dichotomy between long-distance strategic connections and local transport investments has been observed in the United Kingdom. If this trend persists, it could create significant distributional issues in transport connectivity across different transport user groups (Laird, 2020).

Remote and sparsely populated areas often face lower infrastructure network resilience and reliability. In some cases this is due to high costs and lack of funding for maintenance. For example, remote communities in Scotland currently face a backlog of road maintenance, leading to a less resilient transport network. In case of weather-related disruptions, or simply interruptions due to the age or low maintenance of transport assets, residents often have to rely on one route with no alternatives.

Resilience issues can often be exacerbated by climate change impacts. Permafrost thaw may significantly diminish the time during which ice roads can be used. In Canadian arctic regions, environmental impacts have adversely affected the access to and safety of sea-ice trails. In Canada, these trails are used by Inuit for activities such as hunting. The circumpolar Arctic is warming two-to-three times more rapidly than the global average (IPCC, 2018). The specific impacts of climate change on the social and economic landscapes of remote communities, specifically those that affect mobility, will become even more important in the future.

Government support measures connecting communities

Governments have developed a range of policies to support transport connectivity in remote regions. These range from direct subsidies for operators and users, to regulatory intervention that creates indirect subsidy. Table 2 classifies the main types of support according to subsidy recipients and the nature of the subsidies, whether direct or indirect, and examples of how support is delivered. The examples include air, maritime, road, and rail schemes aiming to improve connectivity for remote communities. A more detailed summary of schemes applied in selected countries can be found in the Annex. The following sections summarise the five main challenges in designing and implementing support schemes in remote areas.

Table 2. Government support measures to improve remote transport connectivity

Taxonomy of measures	Support to operators	Support to users	Support for infrastructure
Direct subsidy	Route-based compensation, e.g. through Public Service Obligations (European Union) Operator-based support Start-up aid for airlines and shipping companies Capital acquisition subsidies (e.g. for aircraft used to serve remote Japanese islands) Research and innovation grants (e.g. drone operations development and testing, mobility apps)	Passenger compensation Medical travel reimbursement Passenger discounts for children, students, and the elderly (e.g. France, Norway, Spain) Fuel cards for residents (Australia) Driver licensing programmes (Australia)	Infrastructure funding State aid to ports and airports (operational and capital expenditure)
Tax expenditure and other foregone revenue (indirect subsidy)	Tax breaks for operations in remote areas Discounted airport charges (e.g. Japan)	Air Passenger Duty exemption for children under the age of 12 (United Kingdom)	-
Funding of loss-making state-run services or public enterprises (indirect subsidy)	Support to loss-making state-owned or community-owned airlines or ferry operators	-	Support to loss-making state-owned or community-owned airports and ports
Transfer of risk to government (indirect subsidy)	Preferential loans to acquire capital (e.g. European Union's outermost regions) Revenue guarantees (e.g. United States Small Community Air Service Development Program)	-	Preferential loans for new infrastructure
Induced transfer or shadow subsidy with an opportunity cost (indirect subsidy)	Slot ring-fencing at airports Monopoly or restricted competition on a designated route/area Exemption from licensing rules to pursue freight and passenger transport (e.g. Azores, Portugal)	-	Provision of certain services (e.g. Australia's Remote Aerodrome Inspection programme)

Support measure design and implementation challenges

Communities face a host of issues regarding the design and implementation of connectivity support measures, which may lead to an inefficient allocation of resources, despite government willingness to provide them. These include:

- challenges in attracting bidders in tendering processes for the award of subsidies and concessions
- unintended incentive structures generated by subsidies such as local overbidding for support
- insufficient data collection, monitoring and revision of support measures over time
- the absence of flexible, tailored services on offer for remote communities
- a lack of co-ordination between regional policy actors and missed opportunities for organising service delivery and transport in a holistic manner.

Fostering competition in public transport tenders

Route-based subsidies awarded through competitive tendering are still the most common instrument to connect remote and sparsely populated areas via air and maritime. Attracting bidders to remote transport markets can be challenging however and policy makers should consider the use of performance-based contracts where legally possible.

Tendering is a requirement in the European Union, and in countries with a strong focus on competition, such as Australia and the United States. The EU legal instrument that allows Member States to impose and assign public service obligations for transport services (PSOs), including air and maritime transport, is Article 4, paragraph 1 of Regulation 3577 (1992). The PSO regulation allows for cultural and legislative differences between member states, and thus grant relative freedom in the choice of criteria used for evaluating the need for a subsidised route (Nicolaides, 2014). The EU interpretive guidance on PSOs is relatively vague, stating that lifeline services shall enable members of a community to "participate in cultural, economic and social life of their Member State".[8] However, all member states must base their decision of imposing an air PSO on some common criteria: the inadequacy of other transport modes and the nature or absence of existing air transport supply and indirect air services at other nearby airports. EU Member states also enjoy relative discretion in their choice of service provider, fares, service levels and subsidy amounts, though the weight of each criterion must be set out clearly in the tender documents.

Air transport subsidy schemes in the form of PSOs are commonly public, short-term contracts with governments, who determine service levels, including flight frequency, the type of aircraft, schedules, and fares (Fageda et al., 2018). In return, the airline receives a subsidy and, in some cases, is protected from competition (operating under a monopoly, sometimes temporarily). The airline may also be granted priority to use specific, earmarked slots at important airports. In maritime shipping these types of protections against competition are allowed under EU cabotage rules.

Tendering remote air services can be challenging. PSO tendering processes use competition to achieve competitive pricing. However, it is not unusual that tenders for services to remote areas attract only one bidder. More generally domestic routes are often dominated by one operator. For example, the competition for PSO contracts in Norway has been rather weak, with Widerøe's Flyveselskap AS (a former subsidiary of the SAS Group) as the dominant operator of domestic routes (ITF, 2018). Maritime public service tendering processes face similar challenges in selecting ferry operators. For example, in calls for tenders to connect islands, Estonian authorities observed low levels of competition in bidding for public

service contracts. In several instances, only one or two companies participated in the bidding process (ITF, 2020c).

Where legal flexibility for this exists, performance-based contracts should be considered as a viable alternative to tendering. A lack of competition in the bidding process, as well as high transaction costs, suggests that tendering might not be the adequate way of providing access to remote places. In the absence of a broad competitive market, a single-service provider subject to strict performance and cost monitoring by authorities may be a better fit for low-volume services on marginal routes. Communities may obtain better value-for-money services through negotiated performance-based contracting based on achieving designated performance objectives reflected, for example, in KPIs and incentive regimes (see the example of Victoria, Australia: Kavanagh, 2016).

Addressing moral hazard in allocating subsidies

Incentive structures generated by subsidies may lead to inefficiencies and rent-seeking behaviour. When local authorities do not bear any responsibility for funding of support measures, they tend to overbid for support. See Bråthen and Halpern (2012) for a discussion on air PSOs in this respect. Evidence from research on PSOs for ferry services in Greece, Ireland, and Scotland suggests that decisions on the choice of routes supported depended, to some extent, on successful lobbying by regional stakeholders (Angelopoulos et al., 2013; Bråthen and Halpern, 2012; Williams and Pagliari, 2004).

Strategies to counteract local overbidding involve passing responsibility and budget to regional decision making bodies and linking the consultative processes with local communities to local co-funding obligations, to increase community ownership and responsibility. In Norway, from 2024, the responsibility for tendering PSO contracts will be transferred from the Ministry to the regions. In Japan, co-funding and consultation with local stakeholders is practised to allocate both maritime and air transport subsidies. The amount of subsidy provided by the central government to maritime transport links to remote islands is half of the expected loss on the route calibrated with benchmark operating costs. The other half is provided by the local government. In order to apply for an air transport subsidy, committees comprised of local government, local offices of central government, airlines and other aviation stakeholders need to agree a three-year, lifeline regional public transport plan. Seeking compromise between central and local governments is part of the process. There is also a scheme for airfare discounts, which subsidises half of the difference between the air fare discount envisaged by the local committee on the route, and the average air fare level of other non-subsidised routes in the region.

Monitoring support schemes

Monitoring and periodically reviewing the effectiveness of support, and assessing whether a programme achieves the intended outcomes is crucial, especially when governments commit themselves for a long period of time. They often do so to provide operators and inhabitants with stability. However, policy makers need to ensure that support schemes are stable but also flexible enough to remain well-targeted and cost-effective. Adding sunset clauses to the schemes may be an effective way of ensuring that the schemes are periodically reviewed and kept fit for purpose.

Information on the effectiveness of support schemes for remote communities is sparse. The amount of subsidies spent on support measures is difficult to obtain in most countries. Impact reports and findings are seldom made public and there is little indication of any action taken by authorities based on these findings. EU countries are subject to reporting requirements for PSOs, but these seem to be loosely respected by the Member states (ITF, 2019c). While an inventory list of PSOs exists for air transport and is

published regularly by the European Commission, the table does not include complete information for all countries and individual tenders.

Collecting and publishing reliable, up-to-date data and information on contracts, costs, revenues, subsidies, fares, frequencies and locations of stops and stations is an important prerequisite for evaluations. Monitoring prices and fair structures can be crucial to monitor behaviour of firms on low-competition routes. Tretheway et al. (2020) argue that, in the absence of competition, there is a risk of monopolistic pricing, which may harm accessibility and drive up prices of consumer goods in remote communities. This is also illustrated by an example from the Greek islands, where, in some cases, transportation and logistics companies have not lowered their prices despite the introduction of freight transport subsidies.

Data is also a key requisite for establishing the need for support. User data is needed, ideally including demographic and socio-economic profiles, mobility behaviour, car ownership rates, modal split, dependence on public or special transport, destinations, travel times to services, frequency of trips by purpose, and access to internet and mobile phone. However, local budgets and capacities are not always sufficient to collect the data. In addition, can be challenging to retrieve data from difficult-to-reach populations since they may not be able to afford internet and a mobile phone, or do not use these technologies. In Canadian communities, the number of households with landline telephones is diminishing, also making it harder to survey the population through traditional means.

Greater involvement of local residents might help to better reach communities and understand their mobility needs. This has great potential to innovate the collection of required information, whether it be quantitative or qualitative research. Spandonide (2015) has shown the value of involving aboriginal community researchers in defining future mobility preferences due to their experience of using transport services in remote communities and understanding of the needs and expectations of the local community.

Innovation and tailored transport

Innovation can play a larger role in connecting remote communities in the future. There are many ways of approaching this and efficient transport services in thin markets will greatly depend on factors specific to each community such as population densities and average distances travelled. Instead of using scaled-down versions of public transport supply in cities, there is potential to better tailor solutions to remote areas. Flexible on-demand transport services, with some of them in Mobility-as-a-Service applications, are being tested in rural areas of Australia, Finland, and Japan, but applications in very remote areas remain the exception.

Accessibility could be improved by organising mobile school, library, and health services. The School of the Air or the Royal Flying Doctor Service in Australia are examples that combine in-person consultations and telehealth via video. In Finland and France, the postal service allows mail carriers to check on isolated inhabitants on behalf of relatives to offer social contact and assess the need for medical assistance. Home deliveries could be pooled via platforms that could provide additional income to individuals offering ride-sharing services.

Governments are developing policies that allow for greater use of drones in remote areas (Box 1, p.13). Autonomous drone services capable of transporting people and cargo can offer a cost-effective solution, though all of their environmental costs and possible negative impacts on the existing transport links need to be assessed by governments in the decision-making process.

Resources could be targeted at developing the energy autonomy of transport in remote areas as a long-term means to address self-sufficient local mobility needs. An in-depth study conducted in Australia has ranked some of the solutions that would work particularly well in remote settings (Box 2).

Box 2. Service delivery and transport in remote Australia

There are 1 200 Aboriginal and Torres Strait Islander (ATSI) remote communities with a total population of 80 000. This represents 50% of the very remote Australian population, while the urban ATSI population represents less than 4% of the total population (around 800 000). Average incomes are two-to-three times lower than the national average. Half of the very remote ATSI communities have no access to public transport services.

Multi-modal mobility needs are intense (60-70 000 km per year for people living in very remote locations, over twice the average level), while the motorisation level is low. While there is a national average of 0.75 SUV/4x4 vehicles per person, this falls to 0.05 SUVs per person in very remote ATSI communities.

Most communities experience over three road closures per year for a total duration of over a week. Transport costs are generally 70% higher than in the rest of the country. Externalities of poor connectivity are significant, particularly in terms of transport safety.

Government agencies have debated the value of essential services provision and acceptable levels of service delivery. In 2014, the Western Australian government considered stopping the delivery of essential services in very remote communities smaller than 200 inhabitants.

A five-year study conducted by the Australian government identified four high-potential solutions for service delivery in very remote communities:

1. Focusing on long-term innovations: Driverless, renewable energy-based electric vehicles, including powering off-grid settlements and digital access to remote automation (e.g. 3D printing, augmented reality)
2. Supporting purchase of more reliable and longer lasting vehicles
3. Providing more mobile services to the local population
4. Supporting community transport services and infrastructure capacity building.

These initiatives performed particularly well in terms of cost efficiency for the end-user. For example, renewable energy-based e-mobility solutions could significantly decrease dependence on costly fuels for remote communities' business owners and residents. Promotion of active (e-)mobility (electric bikes) was also included for local mobility solutions.

Source: Spandonide (2014).

Breaking administrative siloes to develop integrated accessibility plans

Effective remote connectivity requires co-ordination of policies and breaking administrative siloes. The implementation of support schemes often suffers from challenges linked to poor alignment with the relevant current and future local and regional policies.

For example, in Scotland, health and education-related trips formed large components of the patronage for air services to and from the islands (Laird, 2020). However, transport schedules did not necessarily reflect these interdependencies and there appears to be little formal co-ordination between the authorities responsible for each of these areas.

For better efficiency, Finnish communities provide on-demand transportation for different user groups and combine trips to include customers paying for themselves with those being publicly subsidised. In that process, major challenges arose in collaboration between the public and the private sectors, and also between government authorities and different levels of government. School transportation, social and health service transportation, and public transport are organised by different municipal departments, and overseen by different ministries (Eckhardt et al., 2017).

Making consultation processes and stakeholder engagement activities a formal part of the decision-making process will improve co-ordination and desired outcomes. Local authorities should be represented, especially when these are responsible for the provision of remote transport infrastructure or services. Such consultation with local actors to determine the allocation of transport subsidies has been institutionalised in Japan. Regional public transport plans are developed jointly by local governments, local offices of central government, transport and infrastructure providers. This consultation process has become a requirement for eligibility for support.[9]

Multi-sectoral co-ordination should also be reflected in assessment procedures. Evaluations should be broad enough to provide a wider picture of the effectiveness of accessibility support beyond the transport sector. This would offer broader insights on the achievement of wider social and economic goals. Assessments should ideally highlight the schemes' contribution to local, regional and national socio-economic development objectives to ensure coherence. The UK procedure for assessing government intervention, developed by the Ministry of Finance and followed by spending departments, requires not only an outline of the rationale and objectives of the proposal, but also proof that the project fits with the existing policies and wider public sector objectives (HM Treasury, 2018).

Wider policy objectives can also be successfully reflected in cross-sectoral schemes that combine connectivity and socio-economic development policies. Japan's regional development grants for remote islands, are both multi-modal and multi-sectoral. They provide air and maritime ticket discounts to residents, while offering transport cost relief for agricultural products, and promoting initiatives related to local job creation and tourism promotion (see Annex).

Many countries, such as Canada, Chile, Finland, and Norway, have created integrated cross-sectoral plans for enhancing connectivity. These plans combine broadband coverage, transport and other communications and are supported by consultation processes involving all stakeholders. For example, in Canada, the new Arctic and Northern Policy Framework aims to develop multi-purpose corridors for broadband, energy and transportation to combine infrastructure investments more efficiently (Government of Canada, 2020). The Framework is an important attempt to address social and economic challenges holistically, uniting various stakeholders and levels of government.

In the face of scarce resources, taking a comprehensive approach can facilitate pragmatism and include a mix of low-cost solutions, capacity building, new business models (including not-for-profit solutions) and technological solutions. In some cases, local capacity development and job creation can substitute for long-distance travel to employment opportunities elsewhere while improving local infrastructure networks. This includes self-sufficient local mechanic and infrastructure maintenance services (Spandonide, 2015). E-services, e-health, and e-learning can also reduce the need for transport. An example for inclusive e-services includes providing citizens (especially the elderly) with local points of contact that offer assisted teleconference possibilities.

Determining the right level of connectivity support for remote communities

There are two common challenges in determining the right level of state support to better connect remote communities:

Variations in definitions and lack of knowledge about remote communities' accessibility. Governments are often unable to identify isolated and remote communities in terms of their access to essential services. Governments do not consistently collect data on the levels of access to essential services and definitions of remoteness and isolation vary across or even within jurisdictions. This creates challenges in assessing the need for investment and tracking progress of programmes. Measuring the extent to which communities are connected is not straightforward and subject to methodological discussions. The fact that connectivity and accessibility can be provided by other means than transport (e.g. broadband connectivity) further complicates the assessments.

Approaches to determine acceptable levels of access for remote communities and the price at which transport services should be provided also vary significantly. Ultimately, such decisions are political, but methodological challenges make it difficult for policy makers to make informed decisions. Currently, the tools available in transport appraisal do not capture all benefits and costs of improving connectivity to remote communities.

The sections below explore these issues and consider potential approaches to delivering better services for remote communities.

Closing the knowledge gap on connectivity in remote communities

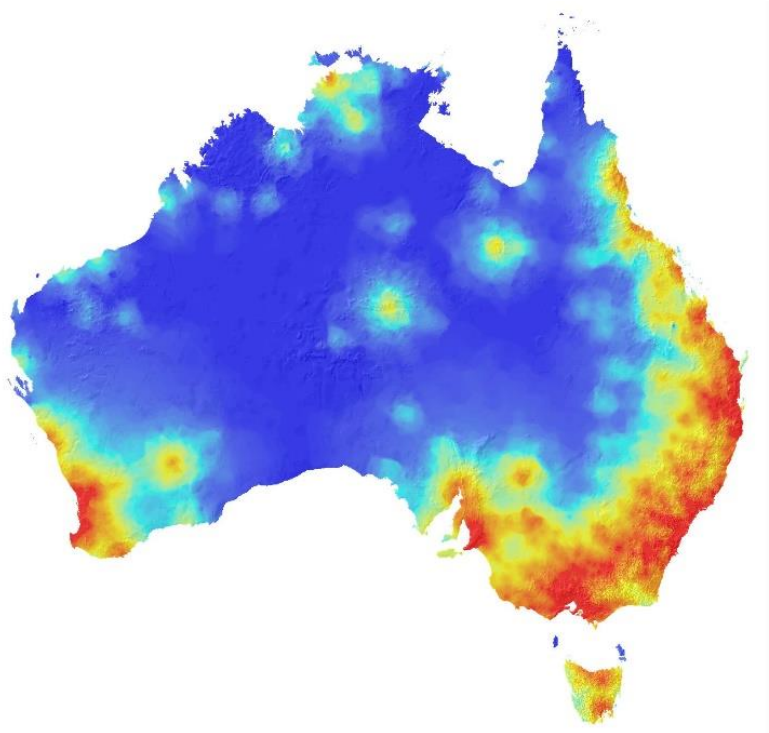
Remoteness indexes

Mapping different access levels within remote areas starts with devising an index of remoteness. Only few countries have indexes in place that further distinguish between accessible and remote rural areas. Often, driving time to population centres is used as an indicator of remoteness instead of accessibility to services by digital or physical means.

Comparing countries is challenging, as statistical definitions of remoteness are rarely consistent across countries and they rely on administrative or legal boundaries that are very different in size and not necessarily comparable across countries. Table 3 highlights the vast differences among statistical definitions used to designate remote areas. They range from simple rural classifications to more sophisticated measures of isolation and remoteness, such as multi-dimensional indexes.

An example of measurement used at the national level is the Australian Remoteness Structure under the Australian Statistical Geography Standard (ASGS). The structure divides Australia into five classes of remoteness on the basis of a measure of relative access to services (Australian Bureau of Statistics, 2018). Access to services (service centres) is measured using the Accessibility and Remoteness Index of Australia (ARIA+), illustrated in Figure 2.

Figure 2. Access to services based on the Accessibility and Remoteness Index of Australia



Note: Dark blue areas indicate remoteness from service centres while red areas indicate higher accessibility.

Source: Hugo Centre for Population and Housing, https://www.adelaide.edu.au/hugo-centre/services/aria

In Scotland, the terms “remote” and “very remote” are used to refer to settlements that are more than thirty or sixty minutes away from an urban area of 10 000 people or more. These categories are then split into rural (settlements with <3 000 people) and small towns (>3 000 people) sub-categories (Scottish Government, 2018).

Among the more developed classifications, Statistics Canada, in close collaboration with Crown Indigenous Relations and Northern Affairs Canada (CIRNAC) and Indigenous Services Canada (ISC), released a remoteness index for Canadian communities in April 2020. It measures proximity to centres of economic activity, taking into account the relative proximity to and the size of population agglomerations as well as travel costs by different modes of transport and their seasonal availability (Subedi et al. and Statistics Canada, 2020). The report suggests a remoteness classification through five categories: easily accessible, accessible, less accessible, remote and very remote areas. In this order they are ranked from 0 to 1 with easily accessible starting at 0. Devising such an index can provide useful insights for policy making. For example, the data suggests a negative correlation between remoteness and general well being in First Nations Communities (Indigenous Services Canada, 2018). At the highest degree of remoteness (Statistics Canada Community Remoteness Index), the Community Well Being score is 15% lower than for communities with a remoteness score of 0, highlighting the importance of better accessibility.

Table 3. Statistical classifications of remoteness in selected countries

Country	Statistical classification	Definition
Australia	ARIA+ Index: remote and very remote	ARIA+ is an index of the accessibility/remoteness of places to service centres. Geographical areas are given a score (0 to 15) based on the road distance to service towns of different sizes. Remote: average value > 5.92 and ⩽ 10.53; very remote: > 10.53.
Canada	Remoteness Index	The index is determined by its distance to all the population centres for each populated community (census subdivisions), in a given travel radius, as well as their population size. It is expressed by a value ranging from zero to one, where zero correspond to the minimum value of remoteness and one corresponding to the maximum value of remoteness. Any area outside a population centre with a population of less than 1 000 and a density of less than 400 people per km² is considered a rural area. Areas with lower population density, but higher employment density and adjacent to a population centre of at least 400 employees per km² are considered part of the population centre.
Chile	Isolated territories	The definition combines structural isolation and integration indices. The structural isolation index contains the following components: habitability of the environment; distances to communal, provincial and regional capitals; geo-strategic elements (distance to border and contested areas); and demographic elements such as the age dependency ratio (% of adults over 65 and minors under 15 years), and population growth. The integration index measures the level of integration of a community in terms of the presence of different social, financial and basic services and the time of access to them.[3]
Finland	Sparsely populated rural areas	Identification of sparsely populated rural areas (and distinction from "rural heartland") based on population density, land-use intensity and economic diversity.
Norway	Level 0 remote municipalities	Centrality index combining two components that take into account the number of workplaces and the number of different types of service functions (goods and services) people living in each basic statistical unit can reach by car within 90 minutes. These units are then classified into six categories.
Scotland (United Kingdom)	Remote and very remote settlements	Settlements that are >30 or >60 minutes travel from an urban area of 10 000 inhabitants or more.
OECD definition	Regions remote from cities (2019 methodological update)	Remoteness based on access to cities. The region does not have access to a metropolitan area and 50% of its population does not have access to any functional urban area of at least 50 000 within a 60-minute drive.

Source: Australia: Australian Bureau of Statistics (2018). Canada: Statistics Canada (2020). Chile: SUBDERE (2012). Finland: Finnish Environment Institute (SYKE). Norway: Statistics Norway (2016). Scotland, UK: Laird (2020). OECD: Fadic et al. (2019).

The OECD has developed their own international classifications. In regions classified as remote by the OECD, the population does not have access to a metropolitan area and 50% of its population is further than a 60-minute drive from any functional urban area of 50 000 inhabitants (Fadic et al., 2019). However, typologies that aim to benchmark countries against one another often fail to capture the large differences in distances that exist between countries. The definition of remote rural areas by the OECD (see Table 3) captures rurality in a broad sense but hides more extreme forms of remoteness. It still englobes relatively accessible rural areas in many countries. For example, according to the typology, 23% of Canadians live in remote regions. In Estonia, this share is at 21% although the maximum distances to population centres are much smaller than in Canada.

Multi-dimensional assessments of accessibility and remoteness

The concept of accessibility – "the ease of people's access to goods, services and activities" (Litman, 2018) – is closely related to that of mobility and connectivity. Previous ITF Roundtables have studied these definitions. The 2019 Roundtable on Accessibility and Transport Appraisal offers the following summary (ITF, 2019d):

> *"While the terms accessibility, connectivity and mobility are often used interchangeably, there are important distinctions between these related concepts. Mobility refers to the ease of physical movement between locations. Connectivity can refer to either physical (e.g. through physical transport infrastructure), spatial (e.g. through aviation networks) or virtual (i.e. via digital networks) connections. Accessibility refers to the ease with which people can reach opportunities and activities."*

While connectivity may remain unchanged – a network of roads can be stable over time – accessibility may change for economic or social reasons. For example, when public transport becomes inaccessible due to price or when demographic change occurs in a certain area having an effect on people's ability to use a private vehicle. Accessibility hence recognises user needs and the economic dimension.

Although the concept has benefitted from a lot of debate and research, the focus has remained largely on accessibility within urban areas, while accessibility of sparsely populated remote areas remains underexplored. This is true both for academic debate as well as for policy making and rural transport planning processes.

Among countries using formal project appraisal, few countries as yet use accessibility or connectivity assessments to underpin support decisions, even less so in projects connecting remote areas. When accessibility or connectivity is assessed, procedures often do not clearly identify or specify the policy issues to be addressed beforehand. This may influence the choice of indicators and their weight. For example, affordability or safety, including with a gender lens, may be attributed a stronger importance, depending on the specific challenges present in a remote community. [10]

There are a few cases where multi-dimensional accessibility or remoteness assessments are carried out. These assessments focus more on transport related challenges in remote communities than other factors but include a range of quantitative and qualitative attributes.

In Chile, authorities calculate the communities' degree of isolation, based on travel times from each location to a number of defined basic services (Berríos et al., 2020). These include public transport services, education, health services, supply and sale of products, financial services, administrative services and other services specific to communities. There are opportunities to extend the calculation to include affordability and quality-of-life indicators related to environmental and socio-cultural wellbeing.[11] Currently, measuring affordability of transport in remote areas of Chile is difficult, as income data from national surveys are geographically aggregated and do not allow for fine-grained analysis in the specific zone of study.

Lekakou et al.'s (2020) index for Greek islands defines the island's transport potential to assess connectivity. In addition to remoteness and isolation values, the multi-criteria analysis takes into account affordability, travel time, ferry frequency, the quality of on-board and customer services, and environmental performance. It also uses economic development indicators, adequacy of infrastructure and existence of other modes of transportation and public services to construct the index.

Appraisal of transport schemes: Adjusted efficiency or efficient fairness?

There are two main approaches that are used by governments to decide on the form and level of support for connectivity for remote communities:

"Adjusted efficiency": This strongly relies on cost-benefit analysis to assess the social, economic, and environmental effects of support, in order to prioritise potential interventions on the basis their economic efficiency. Cost-benefit analysis to compare projects is at the heart of decision-making in many countries (e.g. France, Norway and the United Kingdom). The assessment of projects in remote communities can be adjusted to take account of any potential wider economic and social benefits of a scheme and the potential of a scheme to contribute to regional development objectives.

"*Efficient fairness*": This does not require cost-benefit-analysis but determines the level of support based on eligibility criteria, such as geographic distance or assessments of remoteness as discussed above. In Chile, the level of subsidy is determined by the most cost-effective allocation of available funding. Support is awarded by matching the total subsidy amount allocated to provinces to the amount spent in the Santiago area. Eligibility for specific support is determined by a multi-dimensional indicator of remoteness, not by cost-benefit analysis. If the community is considered sufficiently remote under this assessment, a community can benefit from transport subsidies evaluated according to their cost-effectiveness. Similar user-based cost-effectiveness economic appraisals are applied in Australia and the United States (Essential Air Services). In the United States, a set of eligibility rules define the level of support. Only communities located more than 210 miles from the nearest large- or medium-sized airport can benefit from air service subsidies.

The adjusted efficiency approach may be better suited for assessments in countries with relatively low socio-economic disparities among citizens, while the efficient fairness approach may be better suited for countries where socio-economic disparities are high, or where resources for remote connectivity are particularly scarce.

To devise schemes under a paradigm of equity or fairness, it could be useful to base decision-making on what could be called *explicit accessibility objectives* – established, desirable levels of accessibility that must be guaranteed to all citizens. Tools such as (weighted) multi-criteria decision analysis may be well suited to appraising interventions with such explicit accessibility objectives.

Assessing all relevant costs and benefits of connectivity in remote areas is a challenging task. In remote areas, the (conventional) returns on the investment are hard or impossible to estimate with precision.

The challenge for the standard CBA approach is that it does not capture benefits important to transport schemes in remote regions, such as reduced involuntary unemployment, educational and health outcomes or even cohesion and reduced social isolation. In addition, the strong focus of standard CBA approaches on time savings may not be as relevant in remote areas. For example, community well-being measures or distributional measures such as affordability may have a more important role in decision making, depending on the socio-economic profile of an area.

CBA also faces obstacles defining a counterfactual case, that is, what could be expected to occur in the absence of the project it is assessing. These shortcomings are acute as many transport projects have a potentially transformational role for remote communities. Many also address market distortions and therefore potentially generate wider economic benefits. Transport improvements in remote areas can have a life-changing impact on the communities, especially among disadvantaged individuals. For example,

Wallace et al. (2005) demonstrated that provision of transport for non-emergency health care can have a large net societal benefit.

Difficulties in determining potential benefits for communities can ultimately lead to underfunding. The schemes often struggle to perform well on the value-for-money criterion that is one of key considerations in the standard transport appraisal. For this reason, many experts have argued that the CBA approach is not appropriate for decision-making on such projects.

The CBA approach may however remain a legal requirement in many instances. To help policy makers deal with the methodological challenges of considering all impacts of transport schemes in remote areas, harmonised guidelines, including calculation handbooks and ready-made survey templates could deliver more comprehensive assessments, and minimise the amount of resources needed to make CBA of remote connectivity schemes more complete.

Notes

1 Walkable access for the elderly in this case means the share of the elderly population living within a ten-minute walk of the closest public transport stop in TL3 regions. The OECD divides subnational regions in macro- (TL2) and micro- (TL 3) regions. A large TL2 region would be e.g. the Ontario Province in Canada, which contain 2 197 TL3, or small, regions. See OECD, 2017.

2 Although recommendations for accessibility planning included addressing social exclusion, the adoption of this approach by local authorities has been mixed. See https://bettertransport.org.uk/sites/default/files/research-files/Transport-and-social-exclusion-summary.pdf.

3 The definition of remote regions by the OECD captures rurality in a broad sense but hides more extreme forms of remoteness. In regions classified as remote by the OECD, the population does not have access to a metropolitan area and 50% of its population does not have access to any functional urban area of at least 50 000 inhabitants within a 60-minute drive (Fadic et al., 2019).

4 For a discussion on drones, see also the ITF Summit 2019 session on Ensuring Access for remote and rural communities, https://www.youtube.com/watch?time_continue=2&v=M4_u2h3JTO8.

5 See https://www.newswire.ca/news-releases/drone-delivery-canada-announces-commercial-agreement-with-globalmedic-for-first-nations-covid-19-project-806780463.html.

6 The analysis considers airports in 45 European countries.

7 Transport Canada reports a looming shortage of combi-planes (carrying both passengers and freight) capable of landing on gravel runways. Many airlines in the North operate Boeing 737-200 combi-aircraft as they can land on gravel runways, have a longer range than turboprop aircraft, and can accommodate significant volumes of freight and passengers on the same flight. However, the 737-200 combis are nearing the end of their lifespan, and there is no direct replacement for this aircraft available on the market that has similar range and payload. This shortage can lead to increased costs of goods and travel in Canada's North.

8 See https://ec.europa.eu/transport/sites/transport/files/c20173712-guidelines-pso.pdf, page 13.

9 Information provided in a 2019 unpublished summary of Japanese support measures for remote transport connectivity by Katsuhiro Yamaguchi, University of Tokyo.

10 See https://www.theglobeandmail.com/news/british-columbia/what-to-do-about-safety-on-highway-of-tears-bc-already-has-its-answer/article27170780/.

11 The methodology used in Chile will be reviewed in 2020. The ITF Roundtable has initiated peer-learning opportunities for countries to further develop their methods to measure accessibility and remoteness.

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Annex A. Overview of support measures in selected countries

Air transport subsidies

Route-based support measures: Route-based subsidies across different transport modes are the most widely-used instrument to connect remote and sparsely populated areas. The term used by the European Union (EU) for such schemes is public service obligations (PSOs). Schemes based on similar principles can be found in the Australia and the United States.

In the European Union, Article 4, paragraph 1 of Regulation 3577 (1992) allows for the Member States to impose and assign public service obligations for transport services, including air and maritime transport. Norway, as a member of the European Economic Area EEA), uses a similar PSO scheme. Launched in 1978, the Essential Air Services (EAS) programme serves 159 eligible communities within the United States of which 44 are in Alaska. In Australia, the Remote Air Services Subsidy (RASS) scheme ensures air connectivity to its remotest locations.

The common feature of air transport subsidy schemes in the form of PSOs is that they are public short-term contracts between airlines and governments, who determine service levels, including flight frequency, the type of aircraft, schedules, and fares (Fageda et al., 2018). In return, the airline receives a subsidy and, in some cases, is protected from competition (operating under a monopoly, sometimes temporarily). The airline may also be granted priority to use specific, earmarked slots at important airports.

Australia

Route-based subsidies: The Australian federal government's Regional Aviation Access Programme (RAAP) subsidises air carriers providing a weekly air service to and from remote communities through the Remote Air Services Subsidy (RASS) scheme (Department of Infrastructure, Transport, Cities and Regional Development, 2017). Indigenous communities constitute 86 of those 266 directly serviced, the remaining typically being cattle stations, with populations ranging from 6 to 200 people. Seven air carriers provide air transport services to communities in seven different Australian states under the RASS scheme.[1]

The three main eligibility criteria are the need for a weekly service, being sufficiently remote in terms of surface transport to neighbouring communities or population centres with a weekly transport service, and having an aerodrome meeting RASS standards. After a competitive tendering process in line with the Commonwealth Procurement Rules, airlines are contracted by the Australian government for a fixed period. The scheme's total annual budget is around USD 14 million (Fageda et al., 2018).

Funding and assistance for infrastructure improvements: The RAAP further provides two funding programmes; the Remote Aerodrome Upgrade (RAU) programme and the Remote Aerodrome Inspection (RAI) programme. The latter provides designated remote Indigenous communities in northern Australia with annual airdrome inspections and other services help communities meet safety obligations (DoITCR, 2015). The RAU programme, with the aim of improving remote aerodrome safety and accessibility, provides funding for upgrading remote airstrips in isolated communities (DoICTR, 2019). Funding can cover costs related to upgrading runway surfaces, stormwater drainage, buying safety equipment or

1 Queensland, Northern Territory, South Australia, Western Australia and Tasmania.

infrastructure (e.g. animal proof fencing), but not landside works (e.g. buildings). The programme announced Commonwealth funding of AUD 10.1 million for 34 upgrading projects in March 2019.[2]

Passenger-based subsidies: On a state level, Queensland's Local Fare Scheme provides residents of remote communities with up to AUD 400 in subsidies for return tickets to and from certain destinations (ITF, 2018). Residents must provide a letter of eligibility from their local council proving residency of over three years, and cannot benefit from the scheme more than 12 times a year.

Canada

Capital expenditure funding for airports: Canada does not provide route-based subsidies to airlines. The Airports Capital Assistance Programme, through which the Government has invested over CAN 785.9 million for 904 projects at 182 airports, funds projects aimed at improving regional airport safety, protecting assets (e.g. equipment) and reducing operating costs (Transport Canada, 2019).[3]

Airports that receive funds from this programme must have year-round scheduled commercial passenger service, except for airports designated as being remote under the National Airports Policy issued 13 July 1994 (Transport Canada, 2014). The programme has a projected annual budget of CAN 38 million until the end of FY 2022 (Transport Canada, 2018).

Operational expenditure funding for airports: On a smaller scale, with a planned budget of CAN 1.6 million for FY 2019-20, the Airports Operations and Maintenance Subsidy Program (O&MSP) is targeted at airports owned by Transport Canada, thus ensuring there is no overlap with the Airports Capital Assistance Programme (Transport Canada, 2017). This programme covers remote airports' operational deficits, whereas the ACAP funds capital projects. Designed in 1972 to maintain "safe, year-round linkages to the national transport network among remote communities", the programme now provides funding to four airports.

Another small-scale regional programme (CAN 1 million) is the Labrador Coastal Airstrips Restoration Program, which ensures that airstrips in the north-eastern province of Newfoundland and Labrador are maintained at the level of compliance needed to meet Transport Canada airport certification requirements.

European Union and European Economic Area

Route-based subsidies and carrier exclusivity: In the EU, routes deemed vital by member states to cohesion, development and connectivity, which cannot be commercially run, can be awarded a PSO by member states. PSO regulations allow for cultural and legislative differences between member states, and thus grant relative freedom in the choice of criteria used for evaluating the need for a PSO route (Nicolaides, 2014). However, all member states must base their decision of imposing an air PSO on some common criteria: the inadequacy of other transport modes, existing air transport supply and indirect air services at other nearby airports. Member states also enjoy relative discretion in their choice of service provider, fares, service levels and subsidy amounts, though the weight of each criterion must be set out clearly in the tender documents. The relative flexibility of PSO rules leads to a very heterogeneous situation across Europe (Fageda et al., 2018).

2 A list of Round 6 projects can be found at https://www.infrastructure.gov.au/aviation/regional/rau-round-6.aspx.

3 A complete list of projects by province can be found at https://www.tc.gc.ca/en/programs-policies/programs/airports-capital-assistance-program/acap-projects.html.

Air PSO routes are largely domestic, with only seven routes covering two different countries. Extra-EU routes are excluded from PSO contracts. Thirteen member states currently have 179 air PSOs.[4] Croatia, Cyprus[5], Czech Republic, Estonia, Finland, France, Greece, Ireland, Italy, Portugal, Spain, Sweden and the United Kingdom (European Commission, 2017a). France has the largest number of passengers travelling on PSO routes, with 5.7 million passengers annually (i.e. 20% of passengers). Ireland has the highest share of PSOs in domestic traffic (70%), while Norway, which is part of the EEA, has the highest number of PSO routes at around 60 (Bråthen and Eriksen, 2018). The Azores (Portugal), which is considered part of the EU Outermost Regions[6], is one of the largest networks fully operated under an air transport PSO system (Pita et al., 2013).

Air PSOs can be imposed on routes to and from airports serving peripheral or development regions, or on "thin routes" which generally have traffic of less than 100 000 passengers annually (European Commission, 2017a). Any EU air carrier, individually or with other carriers, can submit a tender. However, PSOs do not automatically create restriction and/or compensation rights for air carriers operating such routes: open PSOs (21.5% of total routes) grant access to all carriers capable of meeting requirements, with no exclusivity or compensation. Restricted PSOs, which represent the remaining 78.5% of PSO air routes, grant exclusivity to a single air carrier and can provide subsidies to compensate losses from operations (ERA, 2016). In Europe 136 of the 170 PSO air routes are subsidised by public authorities, amounting to a total of EUR 300 million of annual subsidies.

The amount of subsidies spent by each country on PSOs is difficult to obtain. While an inventory list of PSOs exists for air transport and is published regularly by the European Commission, numbers are not published for all countries and individual tenders.

Passenger-based subsidies for residents: Certain communities with an air PSO route also benefit from additional subsidies for residents only. The EU categorises passenger-based subsidies for residents of air PSO routes into three types of aid: the setting of a maximum fare, preferential fares for residents and additional discounts for residents (European Commission, 2018). Maximum fares are the most popular measure and are applied on over 75% of routes. Preferential rates for residents are applied on around 50 routes in France, Portugal, Italy and the United Kingdom, and many Spanish PSO routes apply additional discounts to residents. On Norwegian PSO routes, air fare discounts are provided to children, students, elderly, disabled persons, and accompanying persons (ITF, 2018).

4 A complete inventory of these routes can be found here: https://ec.europa.eu/transport/sites/transport/files/pso_inventory_table.pdf.

5 Note by Turkey

The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member

States of the OECD and the European Union The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

6 Article 349 of the Treaty on the Functioning of the EU recognises the specific constraints of EU Outermost regions and provides for the adoption of specific aid measures. See https://eur-lex.europa.eu/summary/glossary/outermost_regions.html?locale=en.

Subsidies to airports: In 2014, the European Commission issued renewed[7] guidelines on State aid to airports and airlines to decongest hub airports and optimise airport capacity (European Commission, 2014). These guidelines imposed restrictions on previously unregulated investment aid to larger airports (i.e. those with over 5 million passengers a year) while freeing up aid for smaller, regional airports (less than three million passengers annually).

Start-up aid to airlines: Launching new routes was restricted to airports with under 3 million passengers and operating aid to these smaller airports was also introduced (Oxera, 2014).

Japan

Subsidies, discounts, and tax breaks for airlines: Japanese airlines serving remote routes are offered discounts for landing charges at remote island airports (ITF, 2018). Japanese airlines benefit from tax breaks when acquiring small aircraft to operate routes to remote regions. The Japanese government also applies reductions for domestic aviation fuel tax rates and fixed-asset tax rates for aircraft operating on routes between economic centres and remote regions and islands.

The operational subsidy to air routes was introduced in 2011, when subsidies for regional transport were integrated under the Programme for Securing, Sustaining and Improving Regional Public Transport in the government's General Account (see "Multi-modal schemes" below), , while aircraft acquisition subsidy for remote island routes remained in the Special Account for Airport Development. In 2017, 14 remote air island routes received operational subsidies.[8] It is granted annually and is limited to routes meeting certain criteria, notably having sufficient geographical and meteorological constraints, and no or poor availability of alternatives across other transport modes. Subsidies are provided to the routes between a remote island and its closest hub city to which alternative sea connections take at least two hours. On the route, operators should not compete with each other (two operators competing in a route are not eligible for subsidy) and the operating plan needs to be appropriate and feasible.

United States

Subsidies to airlines: The US government created the Essential Air Service (EAS) programme to ensure that airlines maintain a minimum level of air services to small communities served before the Airline Deregulation Act in 1978 (US Department of Transportation, 2017). It was established through the addition of Section 419 to the Federal Aviation Act. Funding is provided by fees levied by the Federal Aviation Administration (FAA). In FY 2018, total funding amounted to USD 288 million (Congressional Research Service, 2018). Generally, the programme consists of subsidising two daily round trips to a large- or medium-sized hub with 30- to 50-seat aircraft, ensuring pre-deregulation levels of service, or additional flights with smaller (nine seats or less) aircraft. Currently, the US Department of Transportation (DOT) supports 109 communities in the 48 contiguous states, 63 Alaskan communities and two Hawaiian communities through these subsidies (Congressional Research Service, 2018).[9]

Eligible communities need to have had air services before deregulation, be located more than 70 miles from a large airport, meet certain thresholds in terms of minimum amount of traffic and a maximum

7 These new guidelines replaced the 1994 and 2005 Aviation Guidelines.

8 Rishiri, Okushiri, Oshima, Niijima, Miyakejima, Hachijojima, Tsushima, Fukue, Iki, Kikai, Tokunoshima, Yonaguni and two Okierabu routes.

9 The current list of EAS-eligible communities can be found at https://www.transportation.gov/sites/dot.gov/files/docs/Current%20list%20of%20Eligible%20EAS%20communities%20excl%20AK%20%20HI_Oct2016.pdf

required subsidy per passenger. Eligibility is based on routes being thin rather than communities being remote, so many routes protected by this programme are short enough to benefit from relatively short surface transport routes.

The DOT determines minimum levels of service and number of seats, aircraft characteristics and the maximum number of intermediate stops required for each community through the hub allowing connections to the national air network. Carriers respond with proposals through a competitive tendering process, and are contracted by the government for two or four years. After having formally consulted the community on their carrier of preference, the DOT must consider five factors besides subsidy requirements: reliability, arrangements made with larger carriers for onward flights, interline agreements with larger carriers to allow seamless, single-ticket passenger and cargo transport, preferences of actual and potential users and the presence of a marketing plan. Subsidies are calculated using objective parameters and provided on a per-flight basis.

Funding and assistance to small airports: The Small Community Air Service Development Program (SCASDP), which financially assists communities to address air service and fare issues, has broader eligibility criteria than EAS and offers a wider set of tools, including revenue guarantees, financial assistance for marketing programmes, start-up costs and studies (US Department of Transportation, 2019). Grant applicants, self-identify air service problems and propose appropriate solutions. Applicants are typically communities or grouped communities with an airport smaller than a primary small hub based on 1997 data (FAA, 2019a). Between 2002 and 2017, 401 grants totalling around USD 118 million were awarded. The programme's funding was USD 10 million in FY 2017 (US GAO, 2019).

Capital expenditure funding for airports: The Federal Aviation Administration (FAA) runs an Airport Improvement Program (AIP) which provides funding to public agencies and private entities for the planning and development of public-use airports included in the National Plan of Integrated Airport Systems (NPIAs) (US Department of Transportation, 2018). Selected projects include runway reconstructions, taxiway and terminal maintenance and the construction of fire-fighting facilities. Although the AIP is not specifically aimed at small and/or remote communities, the federal government co-funds a higher share of costs for small primary, reliever and general aviation airports than it does for large and medium primary hubs (90% of eligible costs for the former, and 75% for the latter). The programme places emphasis on projects related to safety, capacity and the environment, and has provided a total of USD 3.18 billion in funding over 2015-19 (FAA, 2019b).

Water transport subsidies

Australia

Water infrastructure support: Maritime transport programmes aimed specifically at remote communities in Australia are carried out at the State level, as programmes depend on each State's geographical characteristics. For example, the Northern Territory (NT) government owns 14 remote barge landings, nine of which service remote communities with no other means of land transport (Northern Territory Government, 2019a). The remaining five are heavily or entirely dependent on barges for freight, and do not have access to other modes of surface transport during the rainy season, when the roads are closed. These landings are all on Aboriginal land, which is managed by land councils or the Office of Township Leasing. The NT Government had a budget of AUD 6.4 million in FY 2018-19 for improving barge landings and goods handling in four remote aboriginal communities (Northern Territory Government, 2018).

European Union and European Economic Area

Operating expenditure subsidies and concessions for maritime transport operators: Maritime and air transport are subject to Article 106(2) of the Treaty of the Functioning of the European Union (TFEU). Companies providing services of general economic interest are subject to the rules of treaties, especially those governing competition (European Commission, 2019a). However, certain rules applying to public service compensation in these sectors are established in Regulation (EC) No 1008/2008 for air services and Regulation (EEC) No 3577/92 for maritime transport.

Regulation (EEC) 3577/92, also called "cabotage regulation", regulates maritime transport between two points within the European Union. As in the previous regulation, it sets out the differences between PSOs and State aid, based on the so-called "Altmark Criteria" (referring to the Altmark judgement, where the European Court of Justice ruled that compensations for provision of public services do not constitute State aid if four cumulative conditions are met).[10] It allows the free movement of maritime transport services (passengers and goods) and tendering for all community ship-owners within the European market. Member states can award public service contracts (PSCs) after imposing PSOs on certain routes, or they can apply PSOs to all operators on certain routes through a declaration regime, a licensing or an authorisation system (Baird and Wilmsmeier, 2011). The Greek PSO ferry transport system is currently the largest in Europe in network-kilometres, and one of the least costly (Baird, 2012).

Maritime PSCs are used when compensation is involved. They can include fixed standards of continuity, regularity, capacity and quality, at a pre-defined ticket price. Tender contract requirements and criteria are at the discretion of member states and, when applicable, local governments. Maritime (as well as road and rail) PSOs and PSCs exist in a wide variety of different forms within and across countries. For example, in Greece, coastal transport network (CTN) routes are organised into three categories: regular commercial lines, non-regular lines which are operated commercially but granted exclusivity by the State, and public service lines which benefit from exclusivity and subsidies (Lekakou et al., 2020). In Scotland, on the other hand, numerous different bodies are involved in ferry operations (Audit Scotland, 2017). Ferries and harbours on the subsidised network are owned by public, private, and independent bodies. This leads to a wide range of different contracts – although generally, operators pay leases and harbour dues to asset owners. Roughly half of all Scottish ferry routes are subsidised by Transport Scotland. Remaining routes are operated and funded by local councils, community groups and the private sector.

Numbers on expenditures or an inventory list of maritime transport PSOs are not published by the European Union. For a discussion on maritime transport subsidies, see ITF (2019c).

Restriction of cabotage markets: The right of providing regular transport of containerised and general cargo to Portuguese Azores and Madeira is reserved for authorised operators that comply with a minimum frequency of services. They must have a weekly connection between the mainland and the region where

10 The four conditions are:

"The recipient undertaking must have PSOs to discharge and these must be clearly defined;

The parameters for calculating the compensation must be objective, transparent and established in advance;

The compensation cannot exceed what is necessary to cover all or part of the costs incurred in the discharge of the PSO, taking into account the relevant receipts and a reasonable profit;

Where the undertaking which is to discharge public service obligations is not chosen pursuant to a public procurement procedure which would allow for the selection of the tenderer capable of providing those services at the least cost to the community, the level of compensation needed must be determined on the basis of an analysis of the costs of a typical well-run company" (European Commission, 2016).

it operates as a minimum. Operators must also guarantee a stopover in each island every two weeks, ensure continuity of the service for at least two years and must set the same freight price for the same type of merchandise in all islands of the region where it operates (OECD, 2018).

Japan

Route- and passenger-based subsidies for maritime transport: The predominant mode of transport for remote islands in Japan is maritime transport. According to the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), in April 2019 there were 296 remote island sea routes operated by 224 enterprises[11] and 552 vessels. In FY 2017, the total number of passengers served by the maritime sector was 44 million which translated to 994 million passenger-kilometres travelled.

The Act on Remote Island Sea Route Improvement (the Act) was enacted in 1952 to facilitate shipping services to remote islands. The Act stipulates that the central government would provide subsidies to shipping routes that do not have alternative modes of transport (air route is not covered by the Act). If a private operator exits the market, local government often replaces the service by direct or PPP operations.

The routes between a remote island designated under the Act and its closest hub city are eligible for subsidy. The route should provide connectivity similar to that of national or prefectural roads, and provide transport of mail, life-line goods and basic resources needed by residents. Subsidies are provided 50/50 by the central and local government. Apart from an operational subsidy, central government also subsidises construction or replacement of vessels for remote island routes.[12] There is a special on-top subsidy to reduce the fare of the shipping service to the level of local bus services for residents. Discounts for residents of the remote Ogasawara islands, for example, are fixed at 25% (regular) and 35% for students.[13]

United States

State-owned and operated maritime transport: The State of Alaska operates the Alaska Marine Highway System (AMHS), which are ferries serving communities with no road access. The Systems consists of ten ferries serving thirty-five communities from Dutch Harbor in the Aleutian Chain to Bellingham, Washington in the contiguous United States (Alaska DOT, n.d.). Ferries transport passengers, goods and even vehicles. Alaska State General Funds provide financial support for capital projects, and the federal Ferry Boat Program (FBP) provides funding to the AMHS for vessel and terminal improvements (Eliott Bay Design Group and McDowell Group, 2017). Funding for operating expenses from the Alaskan General Fund Support has been continually decreasing, from USD 123.7 million in 2013 to USD 88.7 million in 2017. The Alaska state budget for FY 2020 is set to further and drastically cut funding to the AMHS, with the governor's office wishing to explore privatisation or public-private partnerships as solutions.

11 Of which 146 are private firms, 30 are joint ventures between local governments and the private sector, and 48 are public-sector enterprises.

12 30% of vessels procured by PPP and 10% of efficient vessels procured by private shipping firms.

13 See https://www.ogasawarakaiun.co.jp/english/service/.

Surface transport

Australia

Regional infrastructure programmes: Road transport in Australia is mostly governed at the State level. Each state has its own transport programme with specific measures directed at remote and regional areas, including infrastructure building, upgrading and repair projects and passenger transport subsidisation programmes (Transport and Infrastructure Council, 2015).

The Northern Territory government's Remote Passenger Transport Program, for example, funds remote and regional passenger road transport operations that provide regular, scheduled services. Generally, funding is limited to one to three years as the programme seeks to assist specific route services towards commercial viability (Northern Territory Government, 2019b). The programme has a budget of around AUD 3 million for FY 2019-20 (Northern Territory Government, 2019c).

European Union

Operating expenditure subsidies and concessions for road and rail transport operators: Compensation for PSOs in land transport is governed by Article 93 of the TFEU and applied according to Regulation (EC) 1370/2007. This regulation covers PSOs and PSCs, the contracts that cover PSOs (DLA Piper, 2010), and sets the conditions under which PSO compensation payments and concessions in public passenger road and rail transport can be exempt from prior State aid notification to the Commission (European Commission, 2019a). It also sets out the difference between service contracts and service concessions, with the assumption of commercial risk by the service operator characterising the latter.[14] It further differentiates between service provision and infrastructure construction, operation and maintenance, which are regulated by Directive 2014/23/EU. This regulation applies to service contracts and service concessions for public passenger services by bus, tram, railway and metro, except for bus and tram service contracts, which are regulated by directives 2014/24/EU and 2014/25/EU. The duration of public service contracts cannot exceed ten years for road-based services and fifteen years for track-based modes.

When a public authority grants transport companies exclusivity or provides compensation for a road or rail PSO, this must be done through a PSC. It must be especially clear on the definition of the compensation or exclusivity rights (Bywater, 2008). Cost and revenue allocation between the company and the public authority must be previously established. As is the case for all PSOs, the selection of service providers must be based on the principles of openness, transparency and non-discrimination. Typical requirements – aside from service frequency and quality, typical for all PSO modes – can include service provision in small communities and service provision in the early morning and/or late at night (Nicolaides, 2014).

Road-based public transportation in Europe is generally governed at a regional or local level, and government support to bus services varies in nature. In Scotland, local authorities provide subsidies to bus companies when routes are not commercially viable (Laird, 2019). In Greece, some remote islands subsidise private operators, but other islands (e.g. Rhodes and Kos) run municipally-operated bus services (Lorenzini and Ambrosino, 2019).

14 A service contract is a "contract for pecuniary interest for the provision of services", whereas a service concession is a "contract for pecuniary interest for the right to exploit services under operating risk".

Japan

Support for bus transport: Following the motorisation of Japanese transport in the 1960s and the erosion of the railway's profitability, bus services became the new norm as a "last resort" (ITF, 2018). In 1967 a vehicle acquisition subsidy was initiated and in 1969 an operational subsidy for bus services in underpopulated areas was introduced. The Japanese government stopped providing subsidies to the national train network (Japanese National Railways, JNR) in the 1990s, after the initially public entity was split into seven different firms and privatised.[15]

Central and local governments split the costs incurred by the subsidisation of bus companies' losses on routes judged as being essential.[16] Bus subsidies were integrated into multi-modal subsidies by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), in association with the Act on Regional Public Transport Revitalisation and Recovery (2007), before being unified in the Programme for Securing, Sustaining and Improving Regional Public Transport in 2011. In 2014, the Act on Regional Public Transport Revitalization and Recovery was revised to facilitate re-organisation of essential bus service networks in conjunction with regional strategies by empowering local stakeholders. The 2011 Programme was revised so that committees of local stakeholders were given the possibility to consolidate the essential bus service network. Once authorised centrally by MLIT, additional financial support would be granted.

United States

Assistance and financial support for local public transport: The Formula Grants for Rural Areas programme (49 U.S.C. 5311) assists States and federally recognised indigenous tribes in projects with an annual budget of USD 646 million for FY 2018. Project assistance relates to capital, planning an operating, reverse commuting, job access, and the acquisition of public transport services, to support public transport in rural areas with populations under 50 000 (US Department of Transportation, 2018). It also provides financial support for designing, training and technical assistance specifically for transit operators in non-urban areas. Funds are allocated to States using a formula taking into account land area, population, revenue vehicle miles and low-income individuals, and are made available during the year of attribution plus two subsequent years. Out of the total budget, USD 35 million are set aside for grants for a tribal transit program, and USD 20 million are set aside for the Appalachian Development Public Transportation Assistance Program.

Multi-modal schemes

Australia

Several Australian states have multi-modal transport programmes aimed specifically at remote and/or indigenous communities. On top of its Local Fare Scheme for air transport, for example, Queensland's Transport Infrastructure Development Scheme (TIDS) has a specific Aboriginal and Torres Strait Islanders component, which provides annual funding of AUD 8.2 million. This component seeks to improve transport access to ATSI communities and has funded road improvement works and upgrades to aerodromes, barge

15 Rapid motorisation adversely affected the financial standing of the Japanese National Railways (JNR), which started to operate a deficit in 1964. By 1980, the deficit reached JPY one trillion per year. As a solution to this, the JNR was split into six passenger firms and one freight firm in 1987 for privatisation. Four of the passenger firms were subsequently listed in the stock market and fully privatised. This put an end to the government's funding of national railway operations.

16 Only bus routes with an average ridership of five are eligible for subsidies.

ramps and jetties in 34 indigenous communities (Queensland Government, 2019). Queensland operates other programmes directed at remote and indigenous communities, such as the Indigenous Driver Licensing Program, which provides licensing services in remote areas.

Chile

Subsidies and exclusivity granted to transport operators: As part of the National Public Transport Subsidy Law of 2009, the Regional Transportation Support Programme provides subsidies for transport services in isolated communities. Water transport modes (lake, fluvial and maritime) receive the most funding, though most of the subsidised services are over land due to lower operating costs. Subsidies range between USD 13 000 and USD 6 million annually.

Projects are identified and prioritised with a specially-designed methodology called the "Methodology of Identification of Isolated Areas for the Granting of Transportation Subsidies". It calculates travel times from each location to the destination with basic services under consideration, and prioritises routes according to travel times to the different services (public transport, education and health services, etc.). The methodology also accounts for each location's characteristics (population, age structure, socio-economic level, etc.) and the comparative characteristics of access to the considered destination (cost, time, frequency, modes of transport, etc.).

Subsidy amounts are calculated and contractual models are adapted to the context based on projected demand and fares. For example, contract start dates can differ to allow time for building a new vessel. Generally, operators in remote areas benefit from a monopoly after having replied to a call for public tender. Over the contract period, operators are obliged to provide passenger, cargo and vehicle data to enable demand analysis, occupation and revenue estimation for the following period.

Contracts vary widely. For example, for water transport services, vessel ownership can be mixed (public and private); contracts can last between three and eight years, with immediate or delayed start of service. Subsidy payments can be made monthly, per trip or per nautical mile.

In 2018, 776 transport services connecting a total of 668 280 passengers were covered by this programme, totalling USD 80.3 million in subsidies.

European Union

Special subsidies, loans and assistance to outermost regions: The European Union's outermost regions (ORs) are nine geographically remote regions in the Caribbean, Macronesian area and the Indian Ocean. They benefit from a special status under Article 349 of the TFEU, recognising specific issues faced by ORs and distinguishing them from other EU regions and overseas countries and territories (OCTs) (European Commission, 2017b). The EU compensates for transport costs linked to geographical and meteorological constraints through an additional specific allocation of the European Regional Development Fund (ERDF) (European Parliament, 2018). Between 2014 and 2020, the ERDF will have funded EUR 819.8 million worth of projects in the ORs and sparsely populated areas (European Commission, 2019b). Operating aid from the fund can also be used to offset additional costs arising from specific socio-economic situations (e.g. lack of human capital), as well as cover PSOs in these regions. The European Union further provides low-risk loans and grants for infrastructure development and assists new entrants to stimulate competition, reduce market-entry costs and market failure risk (Pickup and Mantero, 2017).

As part of the induced benefits for transport operators, Regulation (EC) 1071/2009 and the Treaty on the Functioning of the European Union (TFEU) allows member states to exempt their outermost regions from

a licensing procedure to pursue freight and passenger transport, because of the special characteristics of, and constraints in, those regions (OECD, 2018).

Freight transportation subsidies: Whereas maritime and air transport subsidies to remote or isolated areas are mainly applied to passenger transport, Spain also extends them to freight transport, particularly to the Canary and Balearic Islands, with the objective to lower prices of imported goods (ITF, 2019c). In 2018, the regional government spent EUR 35 million on maritime freight transportation under the compensation scheme for the carriage by sea and by air of goods to and from de Canary Islands. Around 97% of the scheme is granted to maritime transport, the rest being dedicated to air cargo.

Japan

The Japanese government's subsidies for regional public transport across surface, air and maritime modes were integrated into a single Programme for Securing, Sustaining and Improving Regional Public Transport (PSSIRPT) in 2011 (ITF, 2018).

Subsidies to local governments: In April 2017, the Japanese government installed a new grant as part of the Act on National Border Remote Islands. This grant funds 50-60% of local government expenditures to provide reduced sea and air fares, with the objective of matching maritime transport fares with Japan Railway Group's fare levels, and air transport fares with high-speed rail (Shinkansen) fare levels. According to the Cabinet Secretariat and Cabinet Office, ferry fares would be reduced on average by 25% and air fares by 38%. Costs covered by the grant also include transport cost relief for agricultural products, and expenses related to job creation and tourism promotion. These measures were introduced as a strategic response to protecting the remote island rim of the national border.

United States

Infrastructure funding: The US DOT's Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grants programme provides funding to investments in transport infrastructure and has recently shifted its funding strategy to rebalance past under-investment in rural areas (US Department of Transportation, 2019). Programme funding covers roads, bridges, transit, rail, ports and intermodal transportation. Since the programme started, following the American Recovery and Reinvestment Act of 2009, it has provided total funding of USD 7.1 billion. For FY 2019, up to half of the programme's USD 900 million budget will be awarded to rural projects, if they meet criteria.

These criteria include safety, economic competitiveness, quality of life, state of good repair, innovation and partnerships with a broad range of stakeholders. In rural areas, projects specifically aiming to improve access to reliable, safe and affordable transportation are given special consideration, as are projects promoting regional connectivity, stimulating economic growth or competitiveness.[17]

17 The complete list of projects funded in FY 2018 can be found at https://www.transportation.gov/sites/dot.gov/files/docs/policy-initiatives/327856/build-fact-sheets-121118-355pm-update.pdf.

Annex B. List of participants

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International Transport Forum

Connecting Remote Communities

This report explores the accessibility challenges that people face in remote areas. It demonstrates how state support can ensure access to essential services and reduce social and economic isolation where private markets fail to provide adequate transport connections. It provides a classification of policy interventions in different countries and reviews common design and implementation challenges. Finally, it analyses different approaches to determine the appropriate level of state support for transport in remote communities.

All resources from the Roundtable on Connecting Remote Communities are available at:
www.itf-oecd.org/connecting-remote-communities-roundtable

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