ECOI
Electronic Communications
Office of Iceland

Decision no. 1/2024
Cost analysis of wholesale prices for optical waves and amendments to the reference offer of leased lines

Case number: 2023050044

9 February 2024

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1 Introduction

(1) Míla hf. (Míla) has decided to offer a new service, optical waves, and has submitted a cost analysis of that service, as well as an amendment to the company's reference offer. Míla's wholesale tariff for optical waves and the amendment to the reference offer for leased lines, which is here under discussion, is principally based on the obligations imposed on the company by the Decision of the Post and Telecom Administration (PTA) no. 21/2015, dated 12 August 2015, on the designation of an undertaking with significant market power and on the imposition of obligations on the wholesale market for trunk segments of leased lines.

(2) This new service, which is covered by the Míla tariff, is part of the wholesale market for trunk segments of leased lines, which is Market no. 14 according to the recommendations from the EFTA Surveillance Authority (ESA) from 2004 (Market 14/2004).

(3) The decision underpinning the obligations imposed on Míla in respect of trunk segments of leased lines was made under Act No. 69/2003 on the Post and Telecom Administration. That Act has now been replaced by Act no. 75/2021 on the Electronic Communications Office of Iceland, which came into force on 1 July 2021.

(4) Pursuant to Act no. 75/2021, the Electronic Communications Office of Iceland (ECOI) took over the statutory role of monitoring implementation of the Electronic Communications Act no. 81/2003 and no. 70/2022, which replaced older legislation on 1 September 2022. This includes monitoring the tariffs of Míla for services on which obligations have been imposed with Decisions issued by the PTA and the ECOI.

(5) The ECOI generally assumes that the PTA's prior rulings set a precedent for the Office's administrative practice, as they involve the implementation and interpretation of the same provisions of legislation on electronic communications. ECOI Decisions should likewise be regarded as a continuation of the Decisions of the PTA, e.g. due to obligations that have been imposed on Míla.

(6) A preliminary draft of the ECOI decision on the cost analysis of wholesale prices for optical waves and the amendment of the reference offer for leased lines was submitted for domestic consultation from 24 November to 27 December 2023. Comments were received from Nova hf. Nova's comments, Mila's replies and the ECOI's position can be found in Appendix II.

(7) The draft decision was sent to the EFTA Surveillance Authority (ESA) and other regulatory authorities in the EEA for consultation on 9 January 2024, cf. the provisions of Article 28(1) of Act No 75/2021 on the Electronic Communications Office of Iceland and the ESA Recommendation of 2009 on such consultations. ECOI has received ESA's Decision, dated 7 February 2024, which is included in Appendix VI to this decision. ESA did not comment on the draft decision, but pointed out the long time that has passed since the last market analysis was conducted and encouraged ECOI to carry out a new market analysis of the trunk segment of leased lines as soon as possible.

(8) The following sections cover the legal grounds, methodology and calculations that led to the ECOI conclusion.

2 PTA Decision no. 21/2015

(9) On 12 August 2015, the PTA issued Decision no. 21/2015 on the designation of an undertaking with significant market power and on the imposition of obligations on the wholesale market for trunk segments of leased lines (Market 14/2004).

(10) The PTA concluded that the definitions of Market 14 set out in the Recommendation of the EFTA Surveillance Authority (ESA) from 2004 apply in Iceland. The PTA decided to designate Míla as an undertaking with significant market power on the wholesale market for trunk segments of leased lines (Market 14/2004).

(11) With the authorization of Article 32 of the older Electronic Communications Act no. 81/2003[1] the PTA imposed an obligation on Míla that the tariff for wholesale service for the company's trunk segments of leased lines would be cost-oriented. To establish prices for trunk segments of leased lines, a cost analysis method based on historical costs attributed to the relevant services (HCA FAC) should be applied.

(12) The decision stated that when implementing its cost analysis, Míla should base its methodology on Chapter IV of Regulation no. 564/2011 on bookkeeping and cost analysis in the operations of electronic communications companies[2], such as on evaluation of operational assets, service life and return on investment. Furthermore, account should be taken of the PTA position on criteria and calculations in the PTA Decision no. 14/2011 with respect to cost analysis for trunk segments of leased lines.

(13) According to the PTA's Decision no. 21/2015, Míla's cost analysis for wholesale tariff for trunk segments of leased lines should be based on the following main criteria:

- Allocation of costs is based on accounting separation for a trunk line network, on Míla's asset bookkeeping and on costs from Míla's bookkeeping system where operational costs are entered under bookkeeping accounts.
- The cost base is Míla's historical costs (HCA).
- Operational costs are based on the preceding financial year in each instance. The methodology is based on allocating all costs to the service in question (FAC).
- When evaluating investments for leased lines, the reference shall be indexed historical costs. Replacement cost of operational assets shall also be taken into account, in the light of next generation networks (NGN).
- A depreciation methodology shall be used that reflects the value in use of an asset.
- The annuity method shall be used to calculate annual investment costs.

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[1] New telecommunications legislation, Act no. 70/2022, entered into force on 1 September 2022.

[2] The Regulation on Accounting and Cost Analysis in the Operations of Telecommunications Companies no. 555/2023 has superseded Regulation no. 564/2011.

- The cost of the trunk line network shall be captured, including share of joint costs, management, IT and senior management in accordance with separation of accountancy.

- The required rate of return used shall be based on weighted average cost of capital (WACC real) from capital tied in assets used in connection with provision of service where the risk premium reflects the risk related to operations on the relevant market.

- The number of lines shall be calculated taking into account line equivalents. In assessment of line equivalent one shall normally take into account costs in proportional context to the capacity and length of leased lines. In the case of new service it is authorized to take into account an estimate of the number of connections.

- Average base unit cost for the whole country, and/or for specific categories of paths, is calculated from allocated operational and investment costs divided by number of lines or line equivalents.

(14) Míla shall ensure at all times that tariffs include all wholesale services on the market for trunk segments of leased lines available from Míla to its own units and affiliated companies. Furthermore, Míla is obliged to review the product offer in its tariff in step with market requirements at any given time and if reasonable requests are received in accordance with the access obligation. All additions and amendments to the tariff shall be endorsed in advance by the ECOI and do not come into force until such an endorsement has been provided, following national consultation and consultation with the EFTA Surveillance Authority and other telecommunications surveillance institutions in the EEA.

(15) Míla is authorized to offer tariffs by categories of paths if they are based on cost reference and if there is non-discrimination between parties.

(16) The Míla tariffs for leased lines shall be easy to understand and shall take into account the following main principles:

- They shall be based on costs and on objective criteria such as distance and capacity.

- They shall take into account all service items included in the relevant service.

- They shall in general be divided into: Setup charge (installation) and subscription charge (fixed lease charge for a specific period of time). Where another division is used (such as price per kilometre) it shall be based on objective criteria.

(17) According to the Decision, Míla's tariff for leased lines was generally divided into setup charge, subscription charge per month and kilometre charge per month, exceptions to this rule being that the lease of dark fibre is based solely on a setup charge and the distance charge (divided into urban and rural) and the tariff for Metropolitan Data Highway is based on a setup charge and then a subscription charge per month. The PTA considered that Míla should in the coming years aim towards amendments in its tariffs such that there will only be a price for a subscription charge per month independent of distance where possible and based on capacity and on the service items included in the service in question.

(18) PTA Decision no. 21/2015 also imposed an obligation for transparency on Míla. The Decision set out the following regarding reference offers:

> *"With the authority of Article 29 the PTA imposes the obligation on Míla for the publication of an itemised reference offer for trunk segments of leased lines and related facilities and service. Publication on the Míla website is deemed adequate. The reference offer should be broken down in accordance with the needs of the market and should contain a description of Míla terms and conditions along with the relevant tariff. Míla shall publish a reference offer in accordance with the description here above and shall update it as required, such as for changes in needs of parties to the market or as a result of changes in technology. Should the Míla reference offer not be considered adequate for the market, the PTA could prescribe amendments to the offer pursuant to Article 29(2) of the Electronic Communications Act. All changes to the reference offer shall be submitted to the PTA for endorsement with reasonable notice and they will not come into force without the endorsement of the PTA. Míla shall send all agreements made on wholesale trunk segments of leased lines to the PTA."*

(19) In accordance with the above, the ECOI requested that Míla make the necessary amendments to the company's reference offer so that the offer would reflect this new service that Míla intends to offer.

3 Facts of the case

(20) In an e-mail from Míla on 25 April 2023, the company stated that it had in recent weeks been working on reviewing and revising the tariff for Míla's Metropolitan Data Highway to better meet customer needs for high-speed connections within the capital area and between larger urban centres outside the capital area. They went on to state that the distribution area and tariff for the Metropolitan Data Highway had been last revised in the spring of 2021 and the new tariff entered into effect in June 2021. Since that time, customers' needs for high-speed connections had increased at a rapid pace, including with the development of data centers in rural areas and greatly increased traffic on both fixed and mobile networks, alongside fibre optic cable installations and 5G both inside and outside the capital area. It was therefore time to revise the tariff and the distribution area of the Metropolitan Data Highway to ensure equal access to high-speed telecommunications services for all parts of the country. Míla requested a meeting with the ECOI to present their ideas.

(21) On 27 April 2023, Míla and the ECOI held a meeting where Míla presented these plans of the company.

(22) In an e-mail on 8 May 2023, Míla submitted an Excel model with a cost analysis of Metropolitan Data Highway services along with the main calculation criteria. A copy of Míla's presentation from the meeting on 27 April was also included. Míla also requested a meeting to review the model.

(23) On 11 May 2023, Míla and the ECOI held a meeting. The cost model was reviewed and discussed, including a discussion on whether replacement costs of new equipment in which Míla was investing should be used as reference.

(24) On 12 May 2023, the ECOI requested additional information on the number of connections and equivalents. Míla responded on 22 May, stating that they were working on the cost analysis and intended to use replacement costs as reference. In an e-mail on 23 May, the ECOI pointed out that the use of equivalents in calculations was desirable.

(25) On 18 August 2023, Míla submitted a cost analysis for optical waves, which consisted of a report, an Excel model with a cost analysis of optical waves, and an overview of equipment from the manufacturer [...][3]. Míla stated that the company felt that it was appropriate to limit this cost analysis to a new DWDM system rather than update the Metropolitan Data Highway service as originally specified. This was done for the sake of simplicity, as the company felt there was no reason to revise the price of the Metropolitan Data Highway service, which was a different system and limited to the capital area and Blönduós.

(26) On 18 September 2023, the ECOI informed Míla that due to how busy they were in carrying out market analyses, the Office had not been able to work on Míla's cost analysis for bitstream services and optical waves. The ECOI requested information on the prioritization of cost analyses, as it was expected that major changes would be forthcoming with a new market analysis decision in the bitstream market so work on that cost analysis would likely not produce a decision before a market analysis decision would be made. Subsequently, there was

[3] Information in brackets in this document is confidential and have therefore been removed.

some communication between Míla and the ECOI on this subject, which does not affect this case.

(27) On 19 September 2023, the ECOI requested a new cost model due to an error in the previous model. An updated model was received the same day from Míla.

(28) In an e-mail dated 12 October 2023, the ECOI made recommendations to Míla regarding administrative costs, installation costs, calculation of monthly rates, and the use of equivalents.

(29) On 16 October 2023, Míla submitted an updated cost analysis along with responses to the feedback from the ECOI.

(30) Míla's e-mail dated 7 November 2023 pointed out, regarding the cost analysis for optical waves, that, as the company has stated at a meeting with the ECOI, the company sustained considerable financial losses each day as this major investment was left unused while waiting for the ECOI's conclusion on the cost analysis. Míla therefore suggested at the meeting that the company be authorized to start selling this service, subject to approval from the ECOI. With reference to the above, and taking into account that it was a service for which customers were waiting, it would be Míla's desire to start selling the service based on the tariff according to the available model, subject to approval from the ECOI, adding that Míla had amended the model according to the ECOI's suggestions.

(31) In the ECOI's reply the same day, the Office pointed out that it had not taken the Office long to process the cost analysis. The ECOI referred to the obligations imposed on Míla on the trunk line market. The ECOI also pointed out that the Office considers it appropriate that market participants should be allowed to comment on this new product before it is placed on the market and that the matter should take its normal course according to law, as this is a product that could have a major impact on telecommunications markets. On the other hand, the ECOI understood Míla's point of view and would stress that the matter be processed promptly.

(32) The ECOI's response also stated that in view of the fact that this is a new product, it was necessary to amend Míla's reference offer on the trunk line market to describe this new product. As a result, the ECOI requested an update to the reference offer as soon as possible. An amendment to the reference offer and the cost analysis would be carried out simultaneously and would be combined for national consultation and consultation with ESA before a decision to approve a new tariff.

(33) The ECOI also mentioned, in terms of the setup charges, that the tariff should be cost-based. In determining setup charges, two approaches had been used in previous cost analyses. Either the cost of establishing a new connection would be part of the total cost, in which case income from the setup charges (and other income) would be deducted from the total cost before calculating monthly fees. The other approach would be for setup charges to reflect the actual cost of establishing a new connection, but Míla had not demonstrated a cost of ISK 107 thousand to establish a new connection. As a result, Míla would either have to demonstrate these costs or estimate the income from setup charges and deduct the total income before calculating monthly fees.

(34) Míla's e-mail dated 15 November 2023 included a reference to a site with an updated reference offer as well as a calculation of the cost of installing a connection, see Section 4.5. Míla also reiterated their request that the ECOI allow Míla to offer this product before the standard process of national consultation and consultation with ESA had concluded. In this connection, Míla pointed out that the obligations on which this cost analysis was based had been imposed on Míla by PTA Decision no. 21/2015. This decision was based on market conditions in 2014 and thus did not reflect current market conditions, as there had been a significant increase in competition in the market and it would benefit Míla immensely to be able to offer this product on the market as soon as possible. In its reply dated 16 November, the ECOI announced that it intended to submit a draft decision for consultation soon. The ECOI considered it important to get the market participants' perspective on this cost analysis and the product, especially as it was a new product. The reply also stated that obligations on the market were in force, and that ESA had placed great emphasis on following the standard procedure through national consultation and consultation with ESA when enforcing these obligations.

(35) During the period of 17 to 21 November 2023, the ECOI and Míla had several email communications regarding the service life of equipment, changes to the reference offer, a picture of the system, how kilometre classification was performed and corrections of the model. Míla submitted an updated cost model on 20 November 2023, on which the result is based.

4 Míla's cost analysis for optical waves

4.1 General

(36) Sections 4.2 to 4.8 below provide the criteria and conclusions of the ECOI regarding cost analysis for optical waves. The main factors that the ECOI considers important as prerequisites for the Office's position in calculating its optical waves tariff are discussed.

(37) These factors are as follows:

- Weighted average cost of capital
- Operating costs
- Investment costs
- Setup charges
- Equivalents
- Calculation of lease

(38) Each section is structured with a description of the Míla cost analysis coming first, followed by the position of the ECOI for each issue. Section 4.8 includes a summary of the ECOI's conclusions and the decision handed down by the ECOI.

(39) The ECOI conclusion is based on authority granted to the Office in the Electronic Communications Act no. 70/2022 where reference is particularly made to Article 52 of the Electronic Communications Act on price control and to ECOI Decision no. 21/2015.

(40) Míla has submitted a cost analysis for optical waves access, information on costs from the manufacturer and further information pursuant to the ECOI's request.

(41) The ECOI's conclusion is based on Míla's cost analysis dated 18 August 2023 with the amendments made in Míla's cost model, the last of which were made on 20 November 2023, along with the setup charge calculations received on 15 November 2023.

4.2 Weighted average cost of capital

4.2.1 Míla's cost analysis

(42) According to Míla's report dated 18 August 2023, Míla's calculations are based on 7.9% WACC.

4.2.2 Position of the Electronic Communications Office of Iceland

(43) The European Commission (EU) has issued a notice with guidelines for calculating infrastructure cost of capital (the WACC Notice). The primary purpose of these guidelines is to harmonize the calculation of the WACC and make it more accessible and predictable. The ECOI intends to take these guidelines into account where appropriate.

(44) Appendix I provides the ECOI's review and conclusion on WACC for the year 2022. WACC calculations are based on the BEREC report dated 9 June, 2022: Report on WACC parameter calculations according to the European Commission's WACC Notice (WACC parameters Report 2022), BoR (22) 70.

(45) The ECOI concludes that WACC based on nominal risk-free rate ($WACC_{nominal}$) for 2022 is 7.93%.

(46) Míla's calculations in the cost model on which the ECOI result is based are based on the WACC that the ECOI calculated for 2022, i.e. 7.93%.

(47) The ECOI determines WACC annually, or as needed, and it was last calculated for the year 2022.

4.3 Operating costs (OPEX)

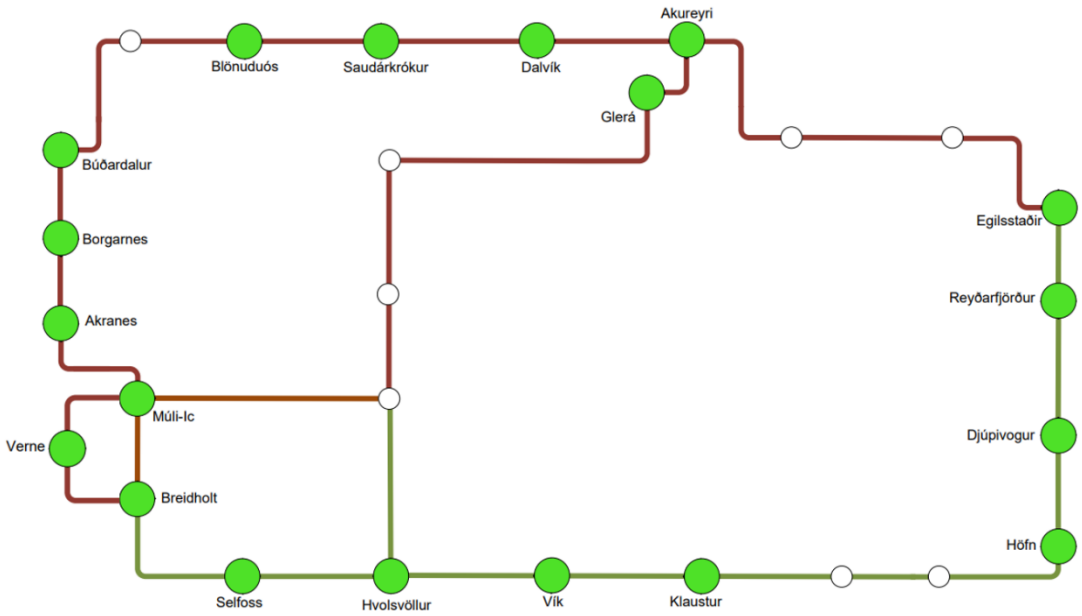
4.3.1 Míla's cost analysis

(48) Míla's cost analysis, dated 18 August 2023, is for a new DWDM system that went into operation in May 2023. The cost analysis is therefore based on estimated operating costs. The system consists of 30 DWDM locations in the national network and on the southwest corner of Iceland. These locations are connected by a 2,013 km stretch of the Míla fibre-optic system.

(49) The operational costs of Míla's dense wavelength-division multiplexing (DWDM) system consist of the estimated annual operating costs and administrative costs. Operating costs are calculated from the Míla tariff where applicable, fibre-optic, electricity, hosting, monitoring and employee labour, plus other operating costs and service contracts. The costs of investing in a new system from [...] are assessed. Administrative costs are then allocated based on annual capital and operating cost.

(50) According to a presentation given by Míla to the ECOI on 27 April 2023, the system would be developed in stages. Míla expects that with time, more routes and locations will be added. The following figure shows the current Míla DWDM system, i.e. at the time of the cost analysis:

Figure 3.1 Míla's DWDM system



(51) The figure shows locations where the service will be available (green circles).

(52) According to Míla's report dated 18 August 2023, in the absence of historical costs, Míla considers it appropriate to use Míla's tariff as a basis for estimating the operating costs. This includes fibre-optic cables, housing 32 racks, 48V power consumption, labour and system monitoring. There is also estimated cost for the service contract from the manufacturer.

(53) The calculations assume equipment at the following locations:

Múli
Akranes
Borgarnes
Búðardalur
Staður
Blönduós
Sauðárkrókur
Dalvík
Akureyri
Reykjahlíð
Hjarðarhagi
Egilsstaðir
Reyðarfjörður
Djúpivogur
Höfn
Hestgerði
Fagurhólsmýri
Klaustur
Vík
Hvolsvöllur
Selfoss
Breiðholt
Múli
Laugarvatn
Bláfellsháls
Steinsstaðir
Hofsós
Ólafsfjörður
Glerá
Verne

(54) There are 30 locations, Múli is duplicated as test equipment is installed there.

(55) Míla's estimated operating costs for new equipment are as follows:

OPEX	Quantity	Monthly	Annually
Labour	*30*	*15,200*	*5,472,000*
Hosting	*32*	*22,300*	*8,563,200*
Electricity	*32*	*8,010*	*3,075,840*
Other	*30*	*5,000*	*1,800,000*
NOC	*1*	*[...]*	*[...]*
Service contracts	*1*	*536,134*	*6,433,610*

[...]

(56) Calculation of labour is based on the rate for Specialist D in Míla's tariff. Hosting is based on Míla's tariff for hosting, with two cabinets in Múli and Breiðholt. Calculation of electricity

costs is based on an average consumption of approximately 0.3 kW. Miscellaneous costs of ISK 5,000 are estimated for each location. It is also assumed that an agreement is made within the company for monitoring (NOC) [...] ISK per month, and finally, the cost of a service contract with the equipment manufacturer is ISK 536,134 per month.

(57) Míla assumes the following costs for fibre-optic leasing:

Location A	Location B	Fiber km	Airline km	Fiber [km]
Múli	Akranes	49	23	2,080,764
Akranes	Borgarnes	37	25	2,261,700
Borgarnes	Búðardalur	76	64	5,789,952
Búðardalur	Staður	41	51	4,613,868
Staður	Blönduós	78	99	8,956,332
Blönduós	Sauðárkrókur	42	31	2,804,508
Sauðárkrókur	Dalvík	42	57	5,156,676
Dalvík	Akureyri	47	38	3,437,784
Akureyri	Reykjahlíð	90	55	4,975,740
Reykjahlíð	Hjarðarhagi	141	95	8,594,460
Hjarðarhagi	Egilsstaðir	48	29	2,623,572
Egilsstaðir	Reyðarfjörður	34	27	2,442,636
Reyðarfjörður	Djúpivogur	83	42	3,799,656
Djúpivogur	Höfn	86	63	5,699,484
Höfn	Hestgerði	53	29	2,623,572
Hestgerði	Fagurhólsmýri	63	54	4,885,272
Fagurhólsmýri	Klaustur	88	70	6,332,760
Klaustur	Vík	73	63	5,699,484
Vík	Hvolsvöllur	90	71	6,423,228
Hvolsvöllur	Selfoss	51	43	3,890,124
Selfoss	Breiðholt	22	48	4,342,464
Breiðholt	Múli	10	4.5	407,106
Múli	Laugarvatn	23	56	5,066,208
Laugarvatn	Bláfellsháls	75	52	4,704,336
Bláfellsháls	Steinsstaðir	137	109	9,861,012
Steinsstaðir	Hofsós	62	48	4,342,464
Hofsós	Ólafsfjörður	83	40	3,618,720
Ólafsfjörður	Glerá	67	48	4,342,464
Glerá	Akureyri	10	3	271,404
Hvolsvöllur	Laugarvatn	95	58	5,247,144
Breiðholt	Verne	55	46	4,161,528
Verne	Múli	62	38	3,437,784
	Total	2,013	1,580	142,894,206

(58) Fibre-optic leasing is calculated based on Míla's tariff with a 15% discount and the monthly price is calculated according to distance of a direct path.

(59) According to the above, the estimated operating cost of Míla is ISK [...] per year.

4.3.2 Position of the Electronic Communications Office of Iceland

(60) As stated above, operating costs are based mostly on internal purchases of Míla services according to the tariff. The largest part of the operating cost is the rental of fibre-optic between locations, which is according to the Míla tariff for fibre-optic. The ECOI has reviewed Míla's calculations and estimates of operating costs and does not comment on Míla's conclusions.

(61) Accordingly, operating expenses for the calculation of the tariff are estimated at ISK [...] per year.

4.4 Investment cost (CAPEX)

4.4.1 Míla's cost analysis

(62) Míla's cost analysis, dated 18 August 2023, is for a new DWDM system that went into operation in May 2023. The cost analysis is therefore based on the purchase price of DWDM equipment. The costs of investing in a new system are assessed.

(63) According to Míla's report, the equipment is from the manufacturer [...], investment in equipment is ISK [...] million and the installation cost ISK [...] million, for a total of ISK [...] million. The service life of equipment is estimated at around 10 years and WACC at 7.9%[4].

(64) The Míla cost analysis specifies the prices of the manufacturer's equipment for each location, according to the quote.

(65) The following table shows Míla's installation costs for this equipment:

[4] Míla's calculations in the cost model are based on 7.93% WACC.

Type code	Actual period
502000 Domestic travel	[...]
503000 Food for each whole day, min. 10 hour travel	[...]
503010 Accommodation and food for 24 hours 6568	[...]
503030 Food for half a day, min. 6 hour travel	[...]
506005 Working clothing	[...]
510000 Cables and equipment	[...]
515005 Radio equipment	[...]
518165 Customer terminal equipment	[...]
519075 Connection and installation supplies	[...]
519080 Connection materials - partners	[...]
519105 Tools and machinery	[...]
519115 Small items such as screws, nuts, etc.	[...]
529015 Purchased work for telecommunications services	[...]
529055 Purchased car rental services	[...]
529135 Hired driving services	[...]
547075 Stationery, folders, packaging and smaller office supplies	[...]
547095 Shipping	[...]
550325 Maintenance work	[...]
550340 Lights and electrical materials	[...]
551115 Fuel for rental cars	[...]
599901 Wages	[...]
599903 Driving	[...]
599904 Miscellaneous costs	[...]
Total	**[...]**

(66) Míla allocates installation costs to connections between locations, the share depending on whether the connection has an optical amplifier or not, and the testing equipment also has a smaller share.

The following table shows investments for each leg and how the installation costs are distributed: [...]

(67) With the installation cost, the investment cost of equipment adds up to ISK [...]. Míla assumes a service life of 10 years and 7.93% WACC in its calculations. The annual payment is therefore ISK [...].

(68) As regards the service life of equipment, an email from Míla, dated 20 November 2023, stated that it would be normal for the DWDM system to have a longer service life than IP/MPLS, adding that the DWDM system is actually more of a basic system and that its service is life longer than that of equipment based on routing and a package network, and that in Míla's experience, the useful life of DWDM equipment was approximately 10 years.

4.4.2 Position of the Electronic Communications Office of Iceland

(69) As stated above, most of the investment cost is based on the cost of purchasing equipment, and Míla submitted a quote from the manufacturer confirming the cost of equipment, most of which was purchased in 2022. Installation cost is based on actual costs, of which the largest part by far is wages.

(70) Míla assumes a service life of 10 years for equipment, which the ECOI considers to be rather long for equipment, which typically has a service life of 5 to 8 years. As stated by Míla, this service life is based on Míla's experience with similar equipment. Therefore, the ECOI does not comment on the assumed 10-year service life of this equipment.

(71) Míla uses $WACC_{nominal}$ as basis for its calculations, which is in line with previous cost analyses as these are replacement costs. As other telecommunications companies could buy comparable equipment and lease resources from Míla to create a similar product, it is natural to use replacement costs as basis.

(72) In view of the above, the ECOI does not comment on Míla's investment costs and the assumed annual payment of ISK [...] in the calculation of lease prices.

4.5 Setup charges

4.5.1 Míla's cost analysis

(73) Míla's e-mail, dated 15 November 2023, included the following on setup charges:

> *"For clarification, Míla points out that the service charge in trunk networks is ISK 96,386, which is why it is normal for optical waves to take full account of this as they are in fact part of a country-wide trunk line system. These are products that are comparable in terms of installation work and processes.*
>
> *Míla employees must travel on site to install the connection, often in consultation with the customer, and staff has to be sent to both ends of the connection, i.e. point A and point B.*
> *When it comes to connections in rural areas, Míla employees or contractors have to travel some distances to install connections. Míla uses these trips to carry out other tasks as well, if possible.*
> *There is also work carried out in defining the relationships in systems and handling registrations and orders.*
> *Using a preliminary cost estimate, it can be assumed that the costs are as follows.*
>
> **Location A**

Description	Quantity	EV	Total
Installation on site and driving	3.00	12,990	38,970
Installation of network route	1.00	15,200	15,200
Order/registration	0.50	12,990	6,495
Mileage fee	35	141	4,871
		Total	**65,536**

Location B

Description	Quantity	EV	Total
Installation on site and driving	3.00	12,990	38,970
Installation of network route	1.00	15,200	15,200
Order/registration	0.50	12,990	6,495
Mileage fee	35	141	4,871
		Total	**65,536**

Overall total	**131,071**

To maintain consistency in the service charge, as noted earlier, Míla proposes a charge of ISK 96,386 for optical waves, to be reviewed when the overall cost analysis for trunk lines is updated."

4.5.2 Position of the Electronic Communications Office of Iceland

(74) In determining setup charges, two approaches have been used in previous cost analyses. Either the cost of establishing a new connection is part of the total cost, in which case income from the setup charges (and other income) is deducted from the total cost before calculating monthly fees. The alternative approach is for the setup charges to reflect the actual cost of establishing a new connection. As this is a new product, Míla has proposed an estimate of costs as there is no actual cost to use as basis.

(75) Míla's initial report assumed a setup charge of ISK 107,000, in line with the charge for the Metropolitan Data Highway. In an e-mail dated 17 November 2023, Míla confirmed that the company intended to use ISK 96,386 as an estimate instead.

(76) The ECOI has no comment on Míla's estimate and the company's setup charge of ISK 96,386. When reviewing this tariff, the ECOI will require actual figures on the cost of installing a connection.

4.6 Number of equivalents

4.6.1 Míla's cost analysis

(77) Míla's report, dated 18 August 2023, includes the following:

"Equivalents are calculated for bandwidth and distance; on the one hand, an exponent of 0.35 is used for bandwidth

Gb/s	Equivalent
1	1.00
10	2.24
25	3.09
100	5.01

and, on the other hand, an exponent of 0.4 for distance."

Distance km	Equivalent
1	1.00
25	3.62
50	4.78
100	6.31
200	8.33
300	9.79
400	10.99

(78) The ECOI commented on Míla's calculations in the original cost analysis, but these were not actual equivalent calculations and it was not possible to see from the cost model how the conclusion on price was calculated.

(79) Using an updated model, submitted by Míla on 10 October 2023, the base unit price for a 1Gb/s connection under 25 km was calculated from the inputs, thus making the tariff calculations traceable.

The table below shows Míla's estimate of the number of connections for each leg and calculations of equivalents based on this. [...]

(80) Míla concludes that the number of equivalents is [...].

4.6.2 Position of the Electronic Communications Office of Iceland

(81) Míla's tariff varies depending on the data transfer speed and the distance of the connection. To calculate the tariff, equivalents are used, as well as an exponent to determine how much prices increase with data transmission speeds and distance of connections.

(82) Míla has chosen to use an exponent of 0.35 for the data transmission speed and 0.4 for distance to calculate equivalents. The exponent determines how much equivalents (and prices) increase with higher data transmission speeds or longer distances. If the exponent is 1, prices would increase in direct proportion to the increase in the transmission rate, so a 10 Gb/s connection would be 10 times more expensive than 1 Gb/s. If the exponent is 0, the price would be completely independent of the data transmission speed or distance. Thus, an exponent of 0.4 for distance gives a higher increase in price with a distance than 0.35 for the data transmission speed, as can be seen when comparing the equivalents for 100 Gb/s and 100 km in the tables above. It should be noted, however, that the size categories are not the same, as the highest data transmission speed is 100 Gb/s whereas distance goes up to 400 km.

(83) Previous cost analyses of the trunk line market have been based on an exponent of 0.35 to 0.45 for data transmission speed, and the ECOI makes no comment on the use of an

exponent of 0.35 in this tariff, especially considering the growing need for higher data transmission speeds. The ECOI makes no comment on Míla's use of an exponent of 0.4 for the equivalent of distances, since from a cost perspective it is clear that the cost is much more dependent on distance[5] than the data transmission rate.

(84) As for Míla's estimate of the number of connections sold and how connections will be selected, it is difficult to confirm that estimate. Míla stated that the Míla IP/MPLS system would be the largest single buyer, with about 80% of connections. Other connections are then sold to other telecommunications companies or in other internal sales at Míla. The adoption of this service by Míla customers is uncertain, but it is clear that demand for higher data transmission rates has increased. Market participants have also complained about the high prices of trunk connections in rural areas, so demand for this new product can be expected. At this time, the ECOI does not comment on Míla's estimate of demand.

(85) Thus, the ECOI has no comment on Míla's equivalent calculations, and for calculations of monthly prices to be based on [...] equivalents.

4.7 Calculation of lease prices

4.7.1 Míla's cost analysis

(86) The results of Míla's calculations, based on the most recent update to Míla's cost model from 20 November 2023, is that the total annual cost of the DWDM system would be as follows:

Note	Operating expenses	Percentage %
Operations	[...]	16%
Fiber	142,894,206	79%
Overhead	[...]	5%
Total	**[...]**	**100%**

Note	Annual investment fee	Percentage %
New DWDM system equipment	[...]	100%
	[...]	**100%**

Overall total	[...]

(87) Míla noted that in previous analyses, administrative costs were around 10% for the transmission network, but in 2022 they were around 20%. In view of this, Míla considers it appropriate for administrative costs to be around 15% as the system is under construction and it is natural for administrative costs to be higher than 10%.

[5] Fibre-optic leasing is the largest individual cost item, and this cost is highly dependent on distance.

(88) The administrative costs are calculated from the annual investment fee and operating cost not calculated based on the tariff as administrative costs are already included in Míla's tariff. For these calculations, the administrative cost is [...].

(89) Míla determines prices for ports, which are then collected with the monthly fees. Prices of ports are consistent with IP net prices for 1 GbE and 10 GbE, according to the following table:

Port fees

Port GbE	Factor	Monthly fee
1	1.00	3,600
10	2.50	9,000
25	3.60	12,960
100	6.25	22,500

Port fees are not charged separately but are included in monthly rates

(90) Míla calculates estimated revenue from port fees, based on estimates of the number of connections, with estimated revenue from ports amounting to ISK [...]. This revenue is deducted from the total cost before the monthly fees are calculated, after which the port fee is added to the monthly price, based on the size of the connection, to calculate a tariff that includes port fees.

(91) Revenue from the contract with [...] per year is deducted from the total cost. ISK [...] remains for the calculation of the monthly price. The following table shows Míla's calculations:

Equivalents and new revenue from connections without ports

New revenue	[...]
Number of equivalents	[...]
Price of one equivalent	10,291
Base price of 1Gb/s - 25 km	**37,294**

(92) The following table shows Míla's calculations of monthly prices without ports based on equivalents for each connection:

Distance (km)	Factor	1Gb/s	10Gb/s	25Gb/s	100Gb/s
25	3.62	37,294	83,490	115,058	186,912
50	4.78	49,209	110,166	151,819	246,631
100	6.31	64,932	145,365	200,327	325,432
200	8.33	85,679	191,810	264,333	429,410
300	9.79	100,765	225,584	310,876	505,020
400	10.99	113,054	253,095	348,789	566,610

(93) Míla's tariff for optical waves according to bandwidth and distance is as follows:

Distance (km)	1Gb/s	10Gb/s	25Gb/s	100Gb/s
25	44,494	101,490	140,977	231,912
50	56,409	128,166	177,739	291,631
100	72,132	163,365	226,247	370,432
200	92,879	209,810	290,253	474,410
300	107,965	243,584	336,796	550,020
400	120,254	271,095	374,709	611,610

(94) Port fees are included in the monthly price. The distance categories are based on the number of kilometres below the specified distance, i.e. 0 to 24, 25 to 49, etc.

4.7.2 Position of the Electronic Communications Office of Iceland

(95) The position of the ECOI is based on an updated cost model submitted by Míla on 20 November 2023 and fundamentally based on PTA Decision no. 21/2015, dated 12 August 2015.

(96) The main assumptions of the Míla cost model are as follows:

- Operating costs are based on estimated costs and are largely based on the current Míla tariff.
- This is a new product and therefore the investment is based on the purchase of equipment, which was largely made in 2022.
- Estimates of the number of equivalents were based on expected demand for the service and equivalent coefficients.
- The nominal expected rate of return for capital ($WACC_{nominal}$) for 2022 is estimated at 7.93%.

(97) Administrative costs are calculated at 15% of annual payments and operating costs not calculated from the Míla tariff.

(98) The following table lists the total estimated costs and the calculations of the monthly fee for a basic connection of 1 Gb/s and less than 25 km:

Operating costs	ISK per year
Operations	[...]
Fibre-optic leasing	142,894,206
Total	**[...]**
Operating costs without administrative costs	[...]

Investment costs	ISK
Equipment	[...]
Installation	[...]
Total	**[...]**

	ISK per year
Annual investment payment	**[...]**
Administrative costs	[...]
Total cost	**[...]**

Deduction due to income	ISK per year
[...] contract	[...]
Income from ports	[...]
Total	**[...]**
For the calculation of monthly fees	**[...]**
Monthly fee for one equivalent	**ISK 10,291**
Monthly fee for basic connection 1Gb/s - 25 km	**ISK 37,294**

(99) Thus the results of calculation of monthly lease for a basic connection (1Gb/s and <25 km) without ports is ISK 37,294/month. The monthly price for other connections is then determined by equivalent coefficients:

Distance in km	1Gb/s	10Gb/s	25Gb/s	100Gb/s
25	ISK 37,294	ISK 83,490	ISK 115,058	ISK 186,912
50	ISK 49,209	ISK 110,166	ISK 151,819	ISK 246,631
100	ISK 64,932	ISK 145,365	ISK 200,327	ISK 325,432
200	ISK 85,679	ISK 191,810	ISK 264,333	ISK 429,410
300	ISK 100,765	ISK 225,584	ISK 310,876	ISK 505,020
400	ISK 113,054	ISK 253,095	ISK 348,789	ISK 566,610

(100) These prices are minus port prices, but an amount corresponding to the price of two ports is added to each connection to calculate the final monthly fees. The following port prices are used as basis:

Port GbE	Monthly fee
1	ISK 3,600
10	ISK 9,000
25	ISK 12,960
100	ISK 22,500

(101) This results in the following monthly prices for optical waves with port prices included:

Distance in km	1Gb/s	10Gb/s	25Gb/s	100Gb/s
25	ISK 44,494	ISK 101,490	ISK 140,977	ISK 231,912
50	ISK 56,409	ISK 128,166	ISK 177,739	ISK 291,631
100	ISK 72,132	ISK 163,365	ISK 226,247	ISK 370,432
200	ISK 92,879	ISK 209,810	ISK 290,253	ISK 474,410
300	ISK 107,965	ISK 243,584	ISK 336,796	ISK 550,020
400	ISK 120,254	ISK 271,095	ISK 374,709	ISK 611,610

(102) The ECOI has reviewed Míla's calculations of monthly fees and does not comment on them.

4.8 The ECOI's conclusion on Míla's cost analysis

(103) The ECOI has reviewed Míla's criteria and calculations of operating costs, administrative costs, annual investment payments, setup charges, equivalents and calculations of optical waves leasing, according to Míla's cost analysis dated 18 August 2023, with the amendments made to the analysis in the course of the ECOI's review. The last update to the cost analysis is dated 20 November 2023.

(104) In accordance with Sections 4.1 – 4.7 above, on Míla's criteria and calculations for optical waves, the ECOI has reviewed Míla's conclusions on setup charges and monthly fees for access to Míla's optical waves.

(105) The ECOI has decided to approve Míla's cost analysis for optical waves and for monthly prices for the service to be as follows:

Distance in km	1Gb/s	10Gb/s	25Gb/s	100Gb/s
25	ISK 44,494	ISK 101,490	ISK 140,977	ISK 231,912
50	ISK 56,409	ISK 128,166	ISK 177,739	ISK 291,631
100	ISK 72,132	ISK 163,365	ISK 226,247	ISK 370,432
200	ISK 92,879	ISK 209,810	ISK 290,253	ISK 474,410
300	ISK 107,965	ISK 243,584	ISK 336,796	ISK 550,020
400	ISK 120,254	ISK 271,095	ISK 374,709	ISK 611,610

(106) The monthly price includes port fees. Setup charges will be ISK 96,386.

(107) Given that the cost analysis is based on demand estimates that have a significant impact on the outcome, the ECOI considers it appropriate that the cost analysis be reviewed when actual demand is available. Operating costs are also based on estimates, not actual costs. Míla must therefore submit an updated cost analysis based on the cost model currently approved by the ECOI no later than 1 March 2025.

5 Amendments to the reference offer for leased lines for new services

(109) Since optical waves is a new product, the ECOI requested amendments to the reference offer for leased lines.

(110) The availability of this product required an amendment to Appendices 1, 2a and 3.

(111) In Appendix 1, the following amendments were made:

(112) Added to Section 3.4:

3.4. DWDM

- *DWDM is a connection that is completely separate from other connections in Míla's systems, with separate and secured bandwidth, comparable to that of a fibre-optic connection (virtual fibre-optic).*
- *Conduits are specifically designed to ensure safe operation and all connections and routes are monitored by Míla's system monitoring 24/7, 365 days a year.*
- *DWDM is available in selected locations in the national network and in the capital area, see Míla's website for details.*
    - *https://www.mila.is/endursoluadilar/stofnnet/Ljósbylgja.*
- *All locations have 100Gb/s interface/bandwidth.*
- *25Gb/s, 10Gb/s and 1Gb/s interfaces/bandwidth can be requested but are subject to availability.*

Benefits and characteristics of optical waves:

- *High bandwidth.*
- *Separate bandwidth via special DWDM channels.*
- *Secured bandwidth.*
- *Comparable connection via virtual fibre.*
- *High security, connection monitored 24/7, 365 days a year.*
- *Separate routes, that protect each other in the fibre-optic layer, can be purchased.*
- *Conduits are specially chosen to simplify maintenance, increase security, and improve overview.*

(113) Added to Section 6.3:

6.3. Optical waves

Fixed monthly rates in six distance categories in selected locations in the national network and the capital area.

(114) In Appendix 2a, the following amendments were made:

(115) Added to Section 1.7:

1.7. Optical waves

Vegalengd [km]	Hraði 100Gb/s	Hraði 25Gb/s	Hraði 10Gb/s	Hraði 1Gb/s
0-24 km	231.912 kr	140.977 kr	101.490 kr	44.494 kr
25-49 km	291.631 kr	177.739 kr	128.166 kr	56.409 kr
50-99 km	370.432 kr	226.247 kr	163.365 kr	72.132 kr
100-199 km	474.410 kr	290.253 kr	209.810 kr	92.879 kr
200-299 km	550.020 kr	336.796 kr	243.584 kr	107.965 kr
300 km +	611.610 kr	374.709 kr	271.095 kr	120.254 kr
Afgreiðslugjald	96.386 kr	96.386 kr	96.386 kr	96.386 kr

(116) In Appendix 3, the following amendments were made:

(117) Added to Section 4.5:

4.5. Optical waves***:***

Optical waves *refers to the use of dense wave-length division multiplexing technology to transport Ethernet connections in Míla's DWDM system.*

See table 1 below for communication standards and interfaces.

(118) Table 1 in chapter 5 was amended to include details on communication standards and interfaces for optical waves:

Ljósbylgja

1 Gbit	1000Base T eða 1000Base LX	RJ45-SMF
10 Gbit	10000Base LX	SMF
25 Gbit	25GBASE-LR	SMF
100 Gbit	100GBASE-LR4	SMF

(119) The amendments to the reference offer are only related to Míla's provision of a new product, optical waves. The ECOI has not reviewed the reference offer in other respects. The ECOI does not comment on Míla's amendments.

The Decision

1. **ECOI endorses the cost analysis submitted by Míla hf., dated 18 August 2023, with those amendments made to the Míla hf. cost model, the most recent amendments having been made on 20 November 2023.**

2. **According to the conclusion of the cost analysis, the monthly fee for access to Míla's optical waves are the following:**

Distance in km	1Gb/s	10Gb/s	25Gb/s	100Gb/s
25	ISK 44,494	ISK 101,490	ISK 140,977	ISK 231,912
50	ISK 56,409	ISK 128,166	ISK 177,739	ISK 291,631
100	ISK 72,132	ISK 163,365	ISK 226,247	ISK 370,432
200	ISK 92,879	ISK 209,810	ISK 290,253	ISK 474,410
300	ISK 107,965	ISK 243,584	ISK 336,796	ISK 550,020
400	ISK 120,254	ISK 271,095	ISK 374,709	ISK 611,610

3. **The monthly fee includes port fees, setup charges will be ISK 96,386. Prices are ex VAT.**

4. **The tariff will come into force on 10 March 2023, Míla hf. has issued a notification on the entry into force with the required notice.**

5. **The ECOI also endorses amendments to Míla's reference offer for leased lines specified in Chapter 5 of this decision.**

6. **This Decision can be appealed to the Appellate Committee for Electronic Communications and Postal Affairs see Article 20 of Act no. 75/2021 on the ECOI. The appeal shall have reached the Appellate Committee within four weeks from the time that the party in question became aware of the decision of the ECOI. Costs for an appeal are according to Paragraph 5 of Article 20 of the same Act, and in addition to this there is a special appeal charge to the amount of ISK 150,000 to be paid pursuant to Article 6 of Regulation no. 36/2009 on the Appellate Committee for Electronic Communications and Postal Affairs. Pursuant to Act no. 75/2021 on the ECOI, a party can also refer a decision from the ECOI directly to the courts without the case being first put to the Appellate Committee. Such cases shall be brought within three months from the time that the party in question received information about the Administration's decision. Appeal does not postpone the legal impact of decisions by the Administration. Appeal direct to the courts hinders the Appellate Committee being authorised to take a case for processing.**

Reykjavík, 9 February 2024.

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Appendix I: Weighted average cost of capital (WACC)
Appendix II: Comments from national consultation, Míla‘s response and ECOI‘s position
Appendix III: Changes to appendix 1 in reference offer for leased lines
Appendix IV: Changes to appendix 3 in reference offer for leased lines
Appendix V: Changes to appendix 2a in reference offer for leased lines
Appendix VI: ESA’s Decision