PRB | Performance review body of the single european sky

Performance Review Body Monitoring Report

Netherlands - 2023

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1 OVERVIEW

1.1 Contextual information

National performance plan adopted following Commission Decision (EU) 2023/179 of 14 December 2022

List of ACCs 1
Amsterdam ACC

No of airports in the scope of the performance plan:
- **≥80'K** 1
- **<80'K** 3

Exchange rate (1 EUR=)
2017: 1 EUR
2023: 1 EUR

Share of Union-wide:
- **traffic (TSUs) 2023** 2.3%
- **en route costs 2023** 3.8%

Share en route / terminal costs 2023 77% / 23%

En route charging zone(s)
Netherlands

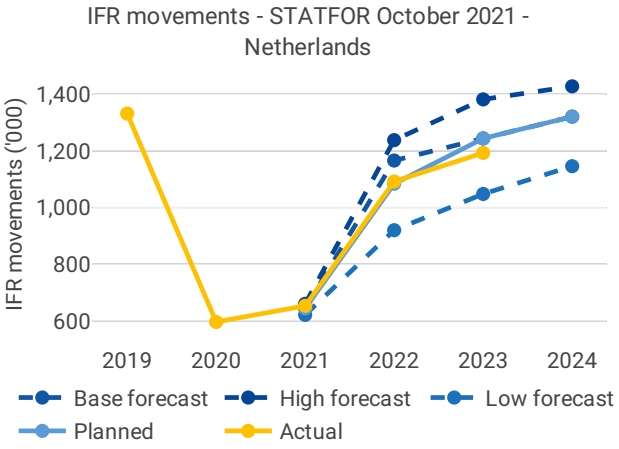
Terminal charging zone(s)
Netherlands

Main ANSP
- LVNL

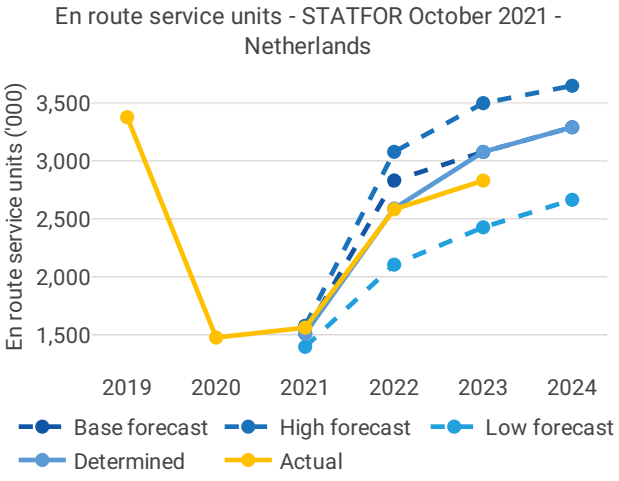
Other ANSPs
- MUAC

MET Providers
- Royal Netherlands Meteorological Institute (KNMI)

1.2 Traffic (En route traffic zone)

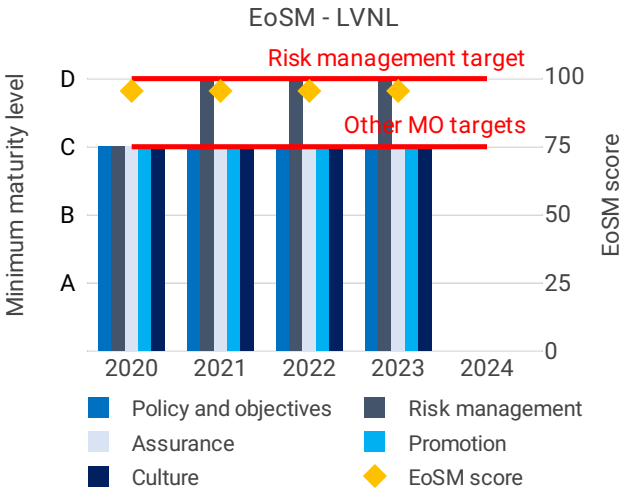


- Netherlands recorded 1,193K actual IFR movements in 2023, +9% compared to 2022 (1,092K).
- Actual 2023 IFR movements were -4.1% below the plan (1,244K).
- Actual 2023 IFR movements represent 90% of the actual 2019 level (1,332K).



- Netherlands recorded 2,834K actual en route service units in 2023, +10% compared to 2022 (2,586K).
- Actual 2023 service units were -8% below the plan (3,081K).
- Actual 2023 service units represent 84% of the actual 2019 level (3,381K).

1.3 Safety (Main ANSP)

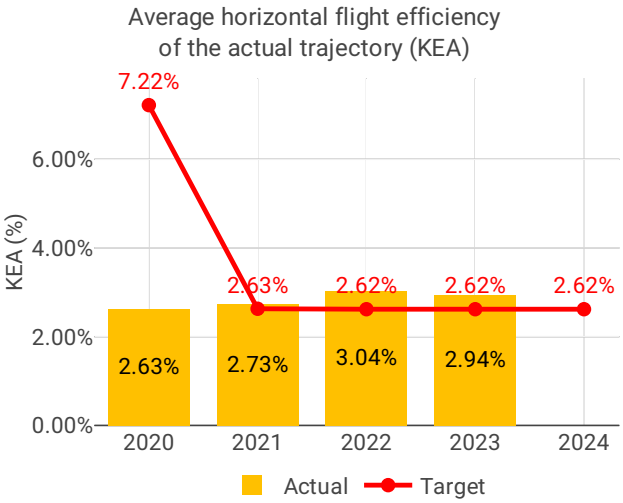


• LVNL achieved its RP3 EoSM targets levels already in 2021 and maintained these levels through 2022 and 2023. Specific measures were implemented ensuring continuous safety improvements (e.g. annual update of safety manual, establishment of a risk-based safety plan, and update of safety risk target document and corresponding unit safety case).

• The Netherlands did not provide monitoring data for separation minima infringements in 2022. Compared with 2021, the absolute number of SMIs increased. Rate of runway incursion remained stable. LVNL recorded a marginal increase in the rate of separation minima infringements.

• LVNL do not use automated safety data recording systems for runway incursions.

1.4 Environment (Member State)



• The Netherlands achieved a KEA performance of 2.94% compared to its target of 2.62% and did not contribute positively towards achieving the Union-wide target.

• Both KEP and SCR values improved compared to 2022. Despite the KEA target being missed, the improvement in SCR shows that The Netherlands has improved the environmental efficiency of its airspace when accounting for impacts outside of its control.

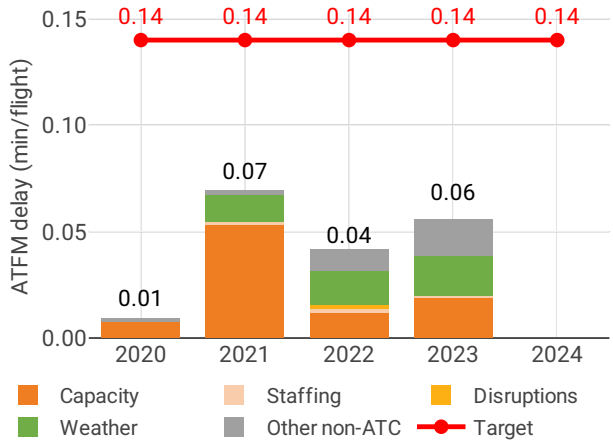
• The share of CDO flights decreased from 26.13% to 25.11% in 2023.

• During 2023, additional time in terminal airspace decreased from 1.12 to 1.10 min/flight, while additional taxi out time increased from 2.77 to 3.13 min/flight.

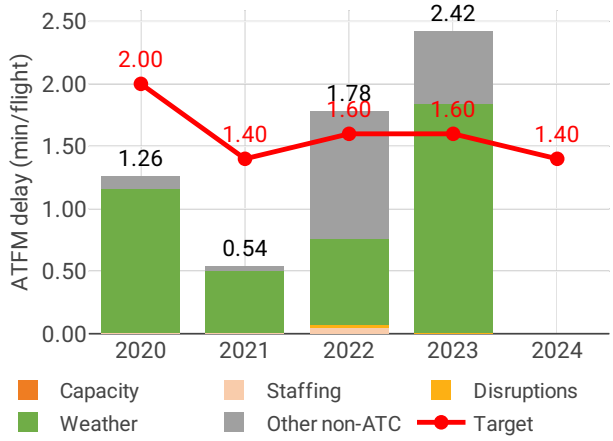
• The NSA states that the worsening environmental performance was due to internal and external issues such as weather effects, maintenance at Schiphol airport, and re-routing around the reserved areas for the military exercises for both MUAC and LVNL.

1.5 Capacity (Member State)

Average en route ATFM delay per flight by delay groups



Average arrival ATFM delay per flight by delay groups



• The Netherlands registered 0.06 minutes of average en route ATFM delay per flight during 2023, thus achieving the local target value of 0.14. Delays in the Netherlands increased by 0.03 minutes per flight year-on-year.

• Most of the delays accumulated between May and October, mostly due to Frisian air exercise, adverse weather conditions and ATC capacity.

• The share of delayed flights with delays longer than 15 minutes in the Netherlands increased by 1 percentage point compared to 2022 and was lower than 2019 values.

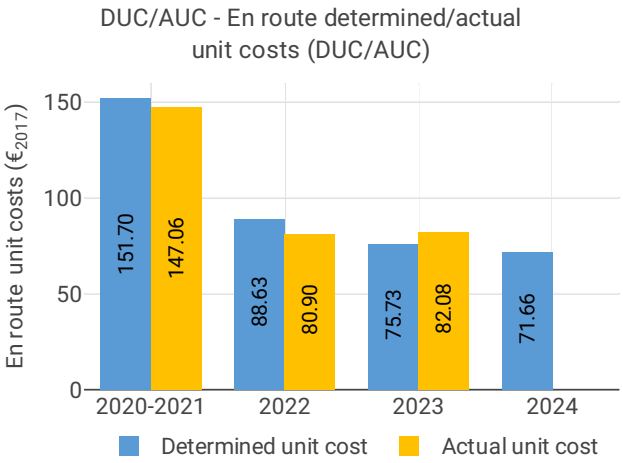
• The average number of IFR movements was 12% below 2019 levels in the Netherlands in 2023.

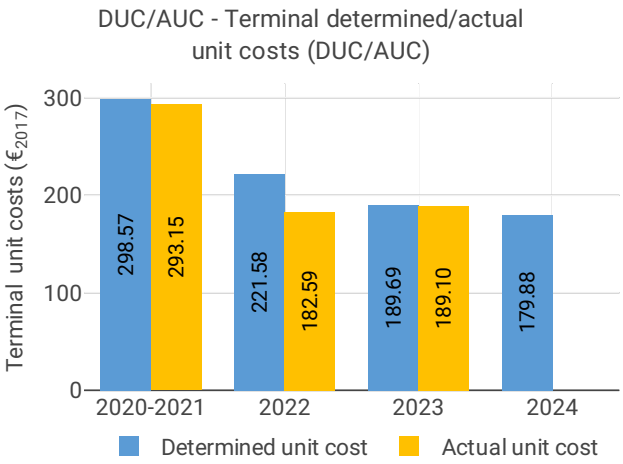
• The number of ATCOs in OPS is expected to decrease by 9% by 2024, with the actual value being below the 2023 plan in Amsterdam by 7 FTEs.

• The yearly total of sector opening hours in Amsterdam ACC was 40,028, showing a 0% change compared to 2022. Sector opening hours are 0% above 2019 levels.

• Amsterdam ACC registered 13.1 IFR movements per one sector opening hour in 2023, being 12.3% below 2019 levels.

1.6 Cost-efficiency (En route/Terminal charging zone(s))





• The en route 2023 actual unit cost of the Netherlands was 82.08 €2017, +8.4% higher than the determined unit cost (75.73 €2017). The terminal 2023 actual unit cost was 189.10 €2017, -0.3% lower than the determined unit cost (189.69 €2017).

• The en route 2023 actual service units (2.8M) were -8.0% lower than the determined service units (3.1M).

• In 2023, the en route actual total costs were -0.7 M€2017 lower (-0.3%) than the determined costs. The reduction was mainly due to lower-than-planned staff costs (-18 M€2017, or -12%). This reduction was influenced by the impact of the inflation as, in nominal terms, there was a slight increase in actual staff costs of +0.4% when compared to the determined figures. On the other hand, Netherlands registered higher actual other operating costs (+11.0 M€2017, or +17%) and cost of capital (+5.9 M€2017 or +621%) when compared to determined costs. The difference in cost of capital is primarily attributed to the rising interest rates (from 0.28% to 2.53%).

• LVNL spent 27 M€2017 in 2023 related to costs of investments for both en route and terminal charging zones, which is +2.2% higher than determined.

• The en route actual unit cost incurred by users in 2023 was 96.69€ (+18% above the 2023 DUC), while the terminal actual unit cost incurred by users was 234.45€ (+13% above the 2023 DUC). The difference between the AUCU and the DUC for both charging zones is mainly driven by the inflation adjustment (+31 M€ for the en route charging zone and +9.9 M€ for the terminal charging zone).

2 SAFETY - NETHERLANDS

2.1 PRB monitoring

• LVNL achieved its RP3 EoSM targets levels already in 2021 and maintained these levels through 2022 and 2023. Specific measures were implemented ensuring continuous safety improvements (e.g. annual update of safety manual, establishment of a risk-based safety plan, and update of safety risk target document and corresponding unit safety case).

• The Netherlands did not provide monitoring data for separation minima infringements in 2022. Compared with 2021, the absolute number of SMIs increased. Rate of runway incursion remained stable. LVNL recorded a marginal increase in the rate of separation minima infringements.

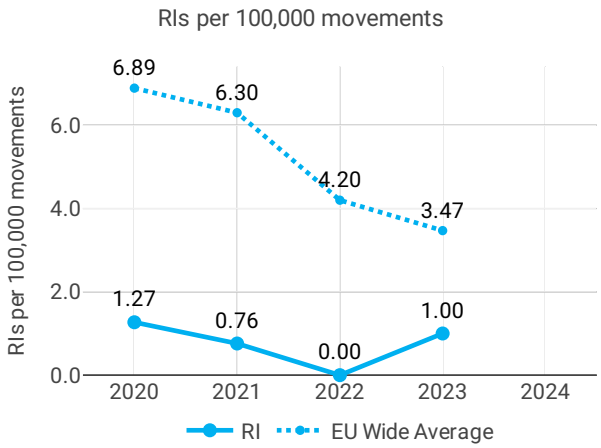
• LVNL do not use automated safety data recording systems for runway incursions.

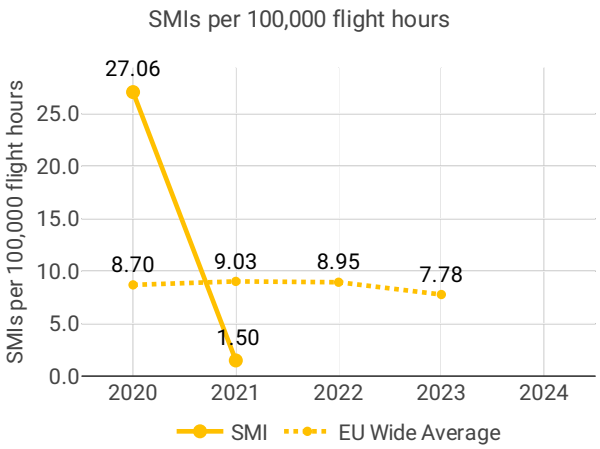
2.2 Effectiveness of Safety Management (EoSM) (KPI#1)

Focus on EoSM

All five EoSM components of the ANSP meet the RP3 target level. The level was maintained compared with 2022.

2.3 Occurrences - Rate of runway incursions (RIs) (PI#1) & Rate of separation minima infringements (SMIs) (PI#2)





3 ENVIRONMENT - NETHERLANDS

3.1 PRB monitoring

• The Netherlands achieved a KEA performance of 2.94% compared to its target of 2.62% and did not contribute positively towards achieving the Union-wide target.

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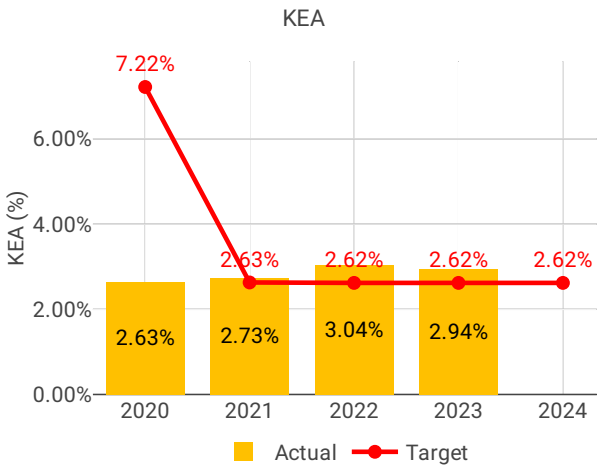
• The share of CDO flights decreased from 26.13% to 25.11% in 2023.

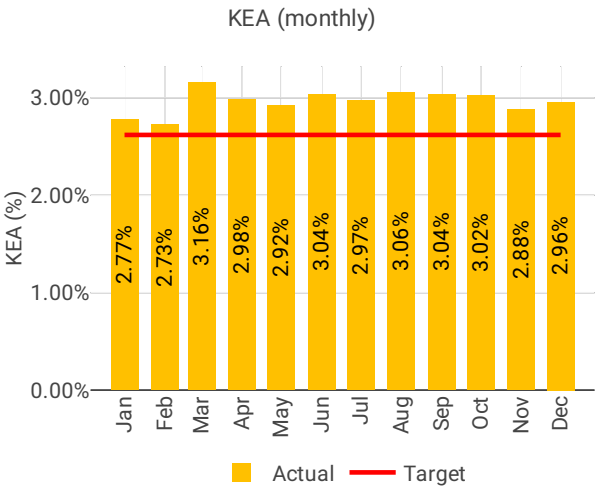
• During 2023, additional time in terminal airspace decreased from 1.12 to 1.10 min/flight, while additional taxi out time increased from 2.77 to 3.13 min/flight.

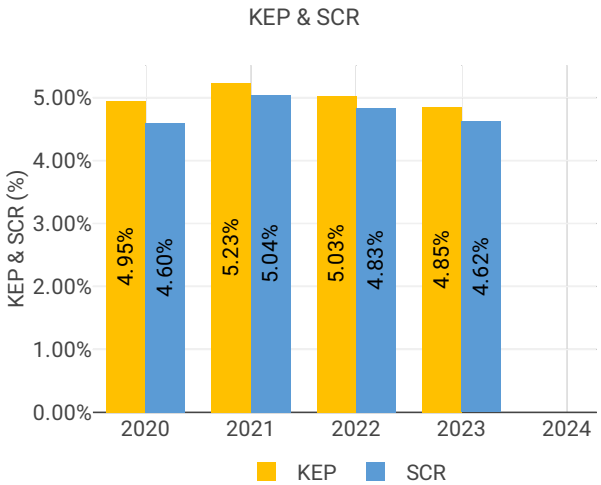
• The NSA states that the worsening environmental performance was due to internal and external issues such as weather effects, maintenance at Schiphol airport, and re-routing around the reserved areas for the military exercises for both MUAC and LVNL.

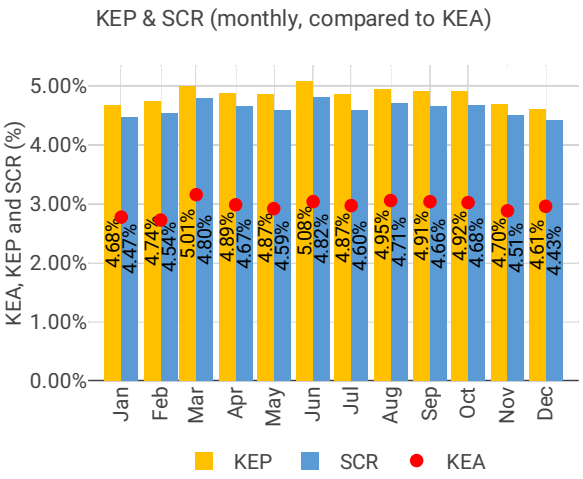
3.2 En route performance

3.2.1 Horizontal flight efficiency of the actual trajectory (KEA) (KPI#1), of the last filed flight plan (KEP) (PI#1) & shortest constrained route (SCR) (PI#2)



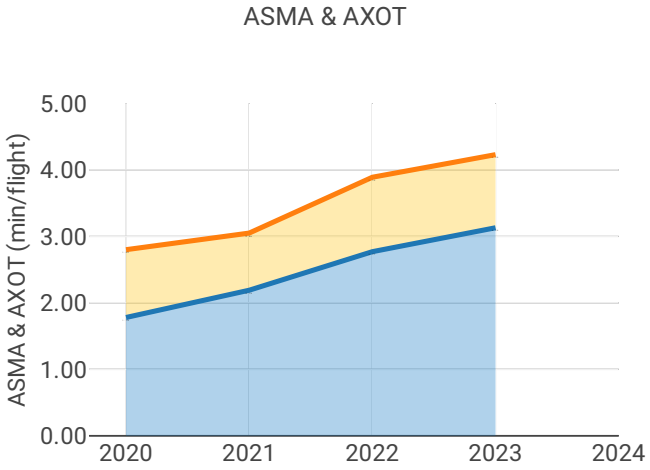


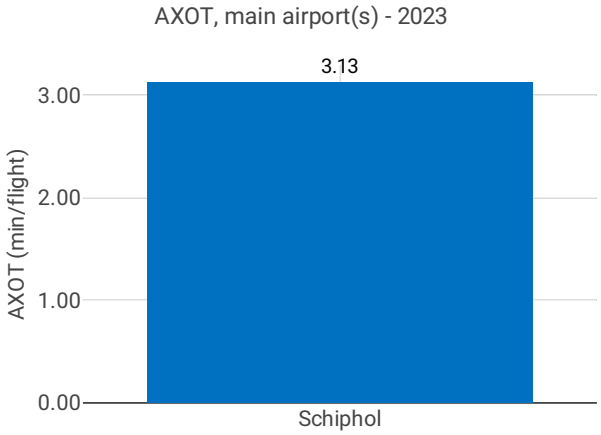


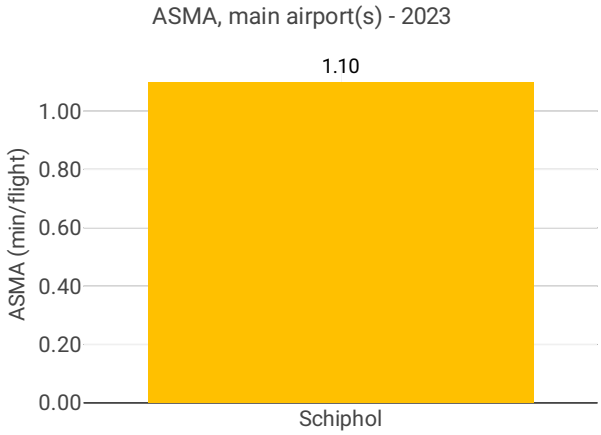


3.3 Terminal performance

3.3.1 Additional taxi-out time (AXOT) (PI#3) & Arrival Sequencing and Metering Area (ASMA) time (PI#4)







Focus on ASMA & AXOT

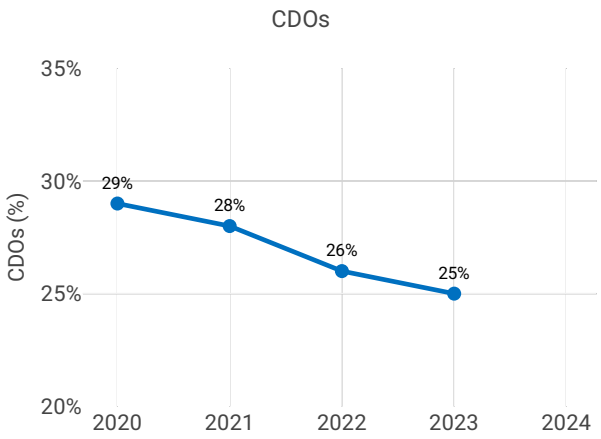
AXOT

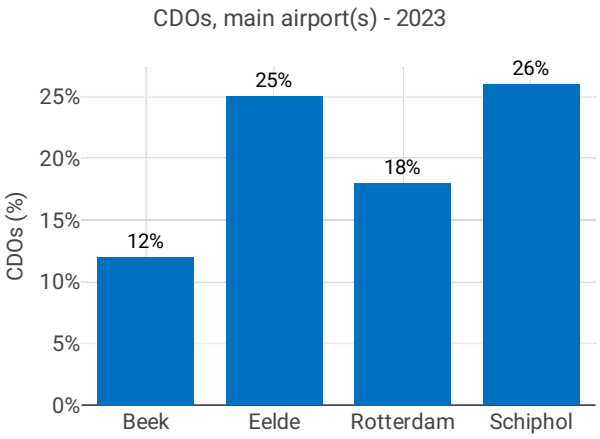
Additional taxi-out times at Amsterdam (EHAM; 2019: 3.11 min/dep.; 2020: 1.78 min/dep.; 2021: 2.19 min/dep.; 2022: 2.77 min/dep.; 2023: 3.13 min/dep.) increased in 2023 by 13% resulting in an annual value above the SES average 2.81 min/dep. and also above the pre-COVID value in 2019.
According to the Dutch monitoring report: *No specific initiatives are planned. The performance is mainly influenced by the runway combination in use (e.g. taxiing around an active runway instead of crossing it - that only happens when the runway is not in use) or taxiway maintenance.*

ASMA

Additional times in the terminal airspace of Amsterdam (EHAM; 2019: 1.78 min/arr.; 2020: 1.02 min/arr.; 2021: 0.86 min/arr.; 2022: 1.12 min/arr.; 2023: 1.1 min/arr.) decreased in 2023 by 2% resulting in an annual value just below the SES average 1.16 min/arr. and lower than the pre-COVID value in 2019.
According to the Dutch monitoring report: *RECAT-EU and Time-Based Separation has been introduced at Amsterdam-Schiphol resulting in increased runway capacity under certain circumstances and reduced time in ASMA. Furthermore, implementation of fixed arrival routes in the Schiphol TMA are planned in RP4. Expected effects are reduced vectoring and more predictable times in the TMA.*

3.3.2 Share of arrivals applying continuous descent operations (CDOs) (PI#5)





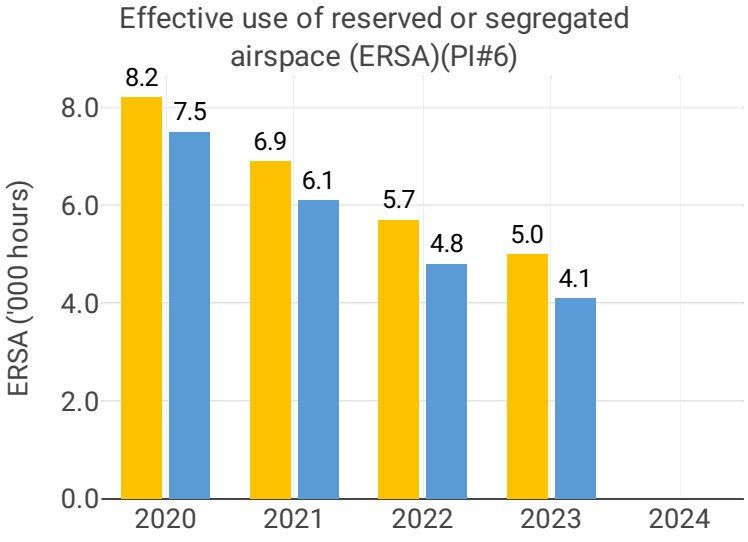
Focus CDOs

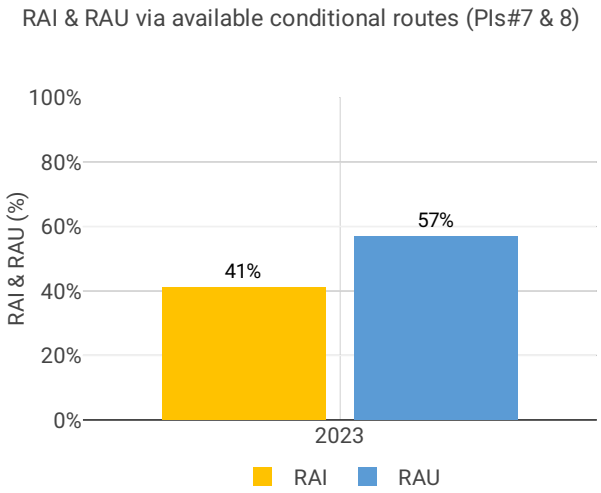
All airport have shares of CDO flights below the overall RP3 value in 2023 (28.8%).
Amsterdam (EHAM), Groningen (EHGG) and Rotterdam (EHRD) have a lower share of CDO flights than in 2022 while it has increased at Maastricht-Aachen (EHBK) from 10.4% in 2022 to 12.1% of CDO flights in 2023.According to the Dutch monitoring report: *For the Netherlands, the percentage of arrivals performing a CDO is similar in 2023 compared to 2022, 2021, and 2020. Even with lower traffic levels arrivals have to fly a part of the approach in level flight e.g. due to procedures (vertical separation between parallel approaches, interception of glide slope from below).*
Implementation of fixed arrival routes in the Schiphol and Rotterdam TMA in RP4 should improve predictability of distance to go for airspace users and thus a higher share of CDOs.

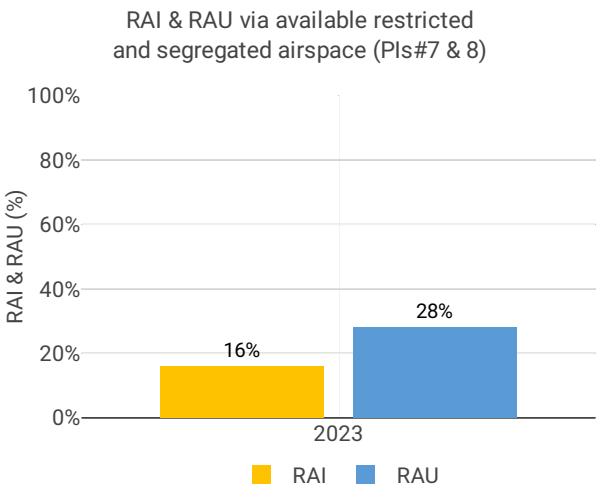
Airport level

	Additional taxi-out time (PI#3)					Additional ASMA time (PI#4)					Share of arrivals applying CDO (PI#5)				
Airport Name	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
Schiphol	1.78	2.19	2.77	3.13	NA	1.02	0.86	1.12	1.10	NA	30%	29%	27%	26%	NA
Beek	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	11%	9%	10%	12%	NA
Eelde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	26%	28%	27%	25%	NA
Rotterdam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20%	22%	19%	18%	NA

3.4 Civil-Military dimension







Focus on Civil-Military dimension

Update on Military dimension of the plan

For obvious flight safety reasons, military activities must be segregated from civil flows which has an impact on both horizontal (HFE) and vertical flight efficiency (VFE).
Because ASM manageable areas form an integral part of the nominal system, military airspace reservations shall be considered as part of the performance baseline rather than a key factor degrading environmental KPIs.
As a result of implementation of the FUA concept the impact of military activities using Restricted Airspace (RSA) on civil performance is highly minored when associated with an efficient ASM process:
- At strategic level (HLAPB) by designing areas in accordance with A-FUA concept (MVPA/VGA structures), especially for congested airspaces.
- At pre-tactical level (AMC), by managing these areas in a dynamic way, with an associated level 2 CDM process, validated by HLAPB.
- At tactical level (ACC/Regional Military Control Centre) by activating/deactivating areas as close as possible to actual use and allowing crossing or direct routes when possible (in accordance with TRA status), with an associated level 3 CDM process validated by HLAPB.
- At each level, HLAPB, AMC or ACC/Regional Military Control Centre, a key factor of efficiency is a trust-driven civil-military cooperation. As a counterpart, AOs and CFSPs must be reactive and take efficiently into account available or released airspaces. At last, ANSP have also to adapt the route network to create more DCTs within military areas.
Finally, local circumstances (e.g. constrained airspace, proximity of international hubs, etc….) as well as a large number of military missions that differ from one State to another must be taken into account. Therefore, airspace needs (e.g. airspace requirements for the 5th generation fighters) and related ASM procedures of the States differ and standardized objectives cannot be defined.

Military - related measures implemented or planned to improve capacity

FABEC States are working on mid-term improvements regarding implementation of ASM level 1. 2. and 3 procedures. Some local initiatives regarding ASM/ATFCM convergence, like the traffic Light Scheme concept in France are promoted at FABEC level, as well as at ECAC level in the EUROCONTROL OEP framework. Another major improvement is the interconnection of the existing ASM tools (e.g. LARA, STANLY_ACOS) at FABEC Level, to enhance regional coordination among FABEC AMCs as well as with the NM.

Initiatives implemented or planned to improve PI#6

For MUAC the ATMP will be used to propose improved routings to aircraft operators in pre-tract. The tool takes into account the expected airspace availability. This tool allows airlines to reduce the amounts of fuel used by proposing fuel-saving alternatives. MUAC is expanding their capacity to do these route suggestions.

Initiatives implemented or planned to improve PI#7

No data available.

Initiatives implemented or planned to improve PI#8

No data available.

4 CAPACITY - NETHERLANDS

4.1 PRB monitoring

• The Netherlands registered 0.06 minutes of average en route ATFM delay per flight during 2023, thus achieving the local target value of 0.14. Delays in the Netherlands increased by 0.03 minutes per flight year-on-year.

• Most of the delays accumulated between May and October, mostly due to Frisian air exercise, adverse weather conditions and ATC capacity.

• The share of delayed flights with delays longer than 15 minutes in the Netherlands increased by 1 percentage point compared to 2022 and was lower than 2019 values.

• The average number of IFR movements was 12% below 2019 levels in the Netherlands in 2023.

• The number of ATCOs in OPS is expected to decrease by 9% by 2024, with the actual value being below the 2023 plan in Amsterdam by 7 FTEs.

• The yearly total of sector opening hours in Amsterdam ACC was 40,028, showing a 0% change compared to 2022. Sector opening hours are 0% above 2019 levels.

• Amsterdam ACC registered 13.1 IFR movements per one sector opening hour in 2023, being 12.3% below 2019 levels.

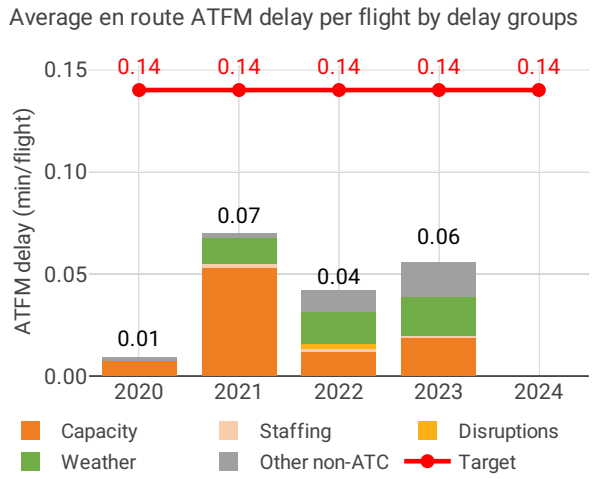
• The Netherlands registered an average airport arrival ATFM delay of 2.42 minutes per flight in 2023, thus not achieving the local target of 1.60 minutes.

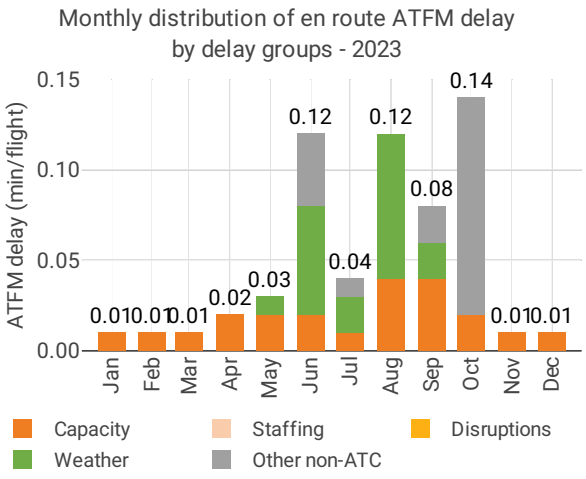
• Compared to 2022, average arrival ATFM delays in the Netherlands were 36% higher in 2023, while the number of IFR arrivals increased by 8%.

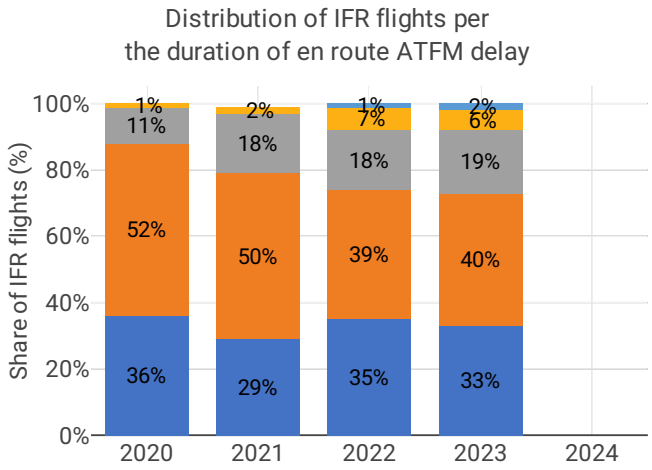
• The main reasons for delays were weather, accounting for 76% of delays, and other, non-ATC related causes, responsible for 24%.

4.2 En route performance

4.2.1 En route ATFM delay (KPI#1)







Focus on en route ATFM delay

Summary of capacity performance

The Netherlands achieved the required en route capacity performance for 2023. There were 1 128k flights handled in the Dutch airspace (both Amsterdam ACC and the DECO sectors in MUAC). There were 67k minutes of en route ATFM delay attributed to ANSPs in Dutch airspace.

NSA's assessment of capacity performance

Weather and temporary airspace closures impacted the performance across the board. The war in Ukraine has caused an increase in military exercises in Dutch airspace. This is expected to continue into the coming years

Monitoring process for capacity performance

LVNL reports its en-route capacity performance to the state through their Quarterly performance report. This report is based on LVNL data and available PRU data, which is consolidated and analysed and the results compared to the reference and indicative values. The performance data is also monitored on a monthly basis through the AFG/PMG (ANSP FABEC Group / Performance Management Group) capacity report. This report is based on MUAC data and available PRU data, which is consolidated and analysed and the results compared to the reference and indicative values.
MUAC reports its en-route capacity performance to the states through the MUAC Finance and Performance committee. Similarly to the LVNL data the performance data is also monitored on a monthly basis through the AFG/PMG capacity report.

Capacity planning

The ANSPs in the Netherlands, LVNL and MUAC, contribute to the new NOP planning process, both the long term NOP and the weekly Rolling NOP. They contribute information and data to the provision for a consolidated European network view of the evolution of the air traffic, enabling the planning of the service delivered to match the expected air traffic demand in a safe, efficient and coordinated manner. However, the 10% capacity buffer requested by the NM, the recommendation for zero delay and the continuous optimistic traffic forecast selected have naturally an adverse impact on ANSPs finance.

Application of Corrective Measures for Capacity (if applicable)

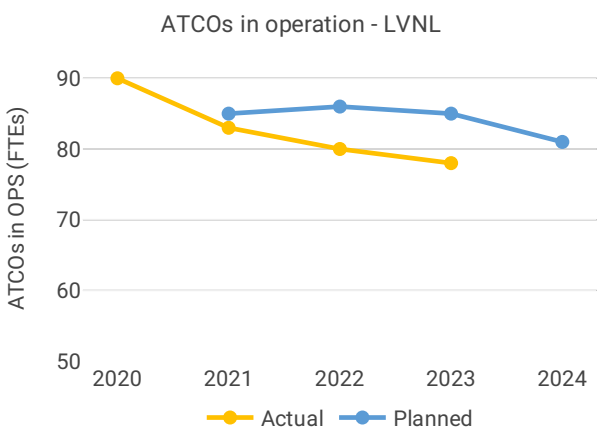
Not applicable.

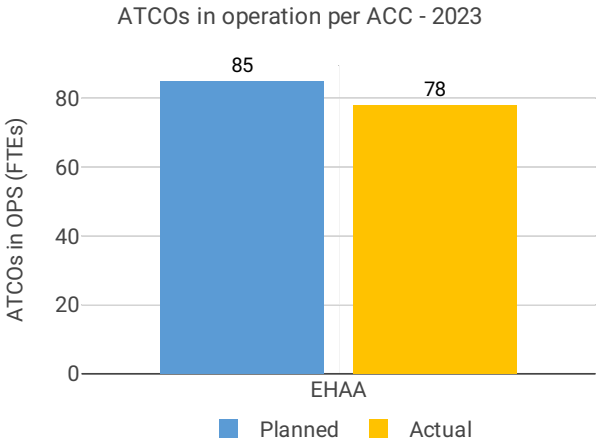
Additional Information Related to Russia's War of Aggression Against Ukraine The Netherlands has experienced changes in traffic flows due to the Russia/Ukraine situation. It is mainly noticed that UK Asia traffic flows fly through the Belgian instead of the Dutch airspace, additionally the France Asia traffic flows now fly down south instead of to the North through Dutch airspace and towards Russia.

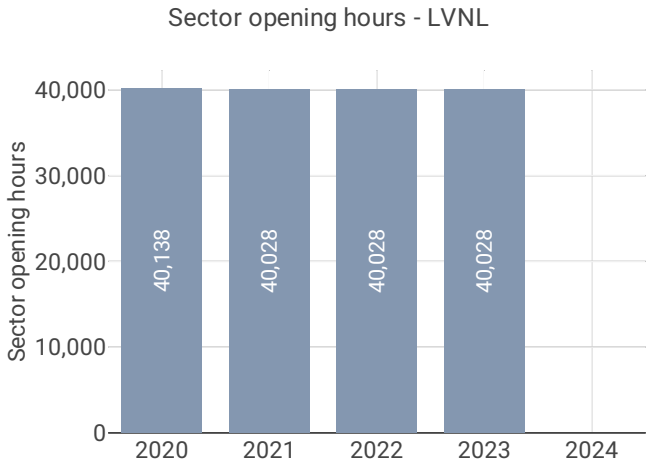
En route Capacity Incentive Scheme

LVNL: Netherlands use an incentive scheme based only on delays attributed to C,R,S,T,M & P delay codes. The new target for LVNL was set at 0.07 minutes per flight and the actual performance is reported as 0.06 minutes per flight (CRSTMP only), which falls within the deadband. Neither bonus nor malus is due**MUAC**: Netherlands use an incentive scheme based only on delays attributed to C,R,S,T,M & P delay codes. The new target for MUAC was set at 0.09 minutes per flight and the actual performance is reported as 0.06 minutes per flight (CRSTMP only), which falls within the deadband. Neither bonus nor malus is due

4.2.2 Other indicators





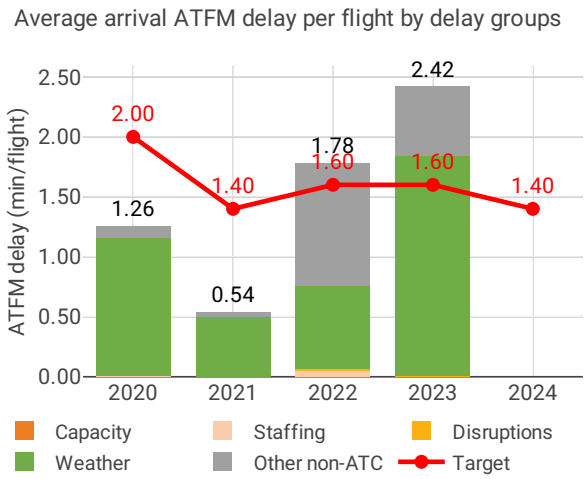


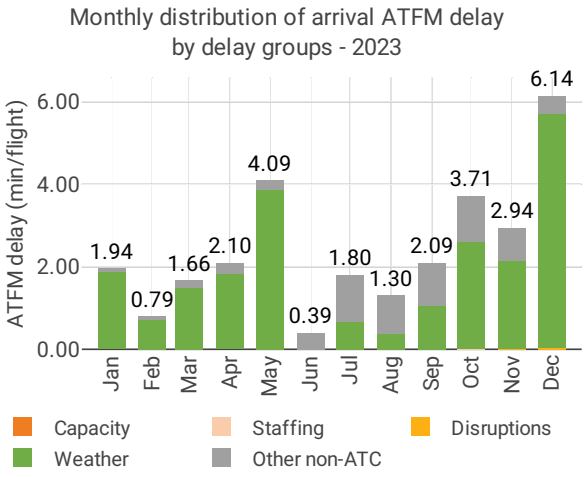
Focus on ATCOs in operations

N/A

4.3 Terminal performance

4.3.1 Arrival ATFM delay (KPI#2)





Focus on arrival ATFM delay

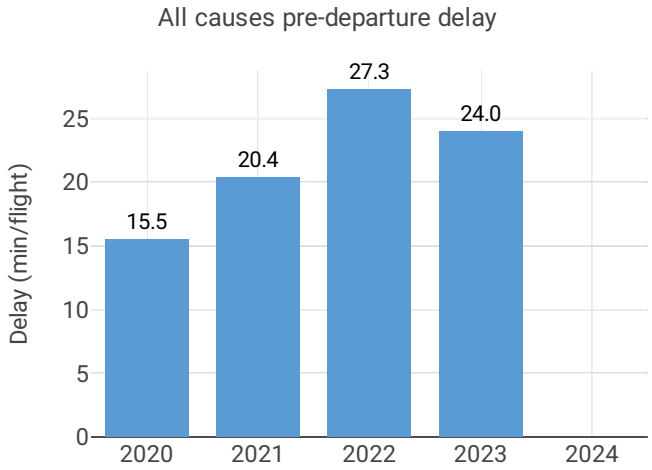
For the Netherlands, the scope of the performance monitoring of terminal services under RP3 comprises a total of 4 airports. In accordance with IR (EU) 2019/317 and the traffic figures at these 4 airports, only Amsterdam must be monitored for pre-departure delays.
The Airport Operator Data Flow is fully established at Amsterdam and the monitoring of pre-departure delays can be performed. Nevertheless, the quality of the reporting does not allow for the calculation of the ATC pre-departure delay, with more than 40% of the reported delay not allocated to any cause.
Traffic at these 4 airports decreased in 2023 was still 10% lower than in 2019, with an increase of 8% with respect to 2022.
Average arrival ATFM delays in 2023 was 2.42 min/arr, compared to 1.78 min/arr in 2022.
ATFM slot adherence has improved (2023: 98.5%; 2022: 97.7%).

Amsterdam (EHAM: 2019: 4.23 min/arr.; 2020: 1.41 min/arr.; 2021: 0.60 min/arr.; 2022: 1.98 min/arr.; 2023: 2.65 min/arr.) significantly increased the arrival ATFM delays, resulting in one of the highest values amongst the SES monitored airports.
76% of the delays were attributed to Weather, followed by 23% attributed to Aerodrome Capacity issues.
The rest of Dutch airports registered zero or nearly zero arrival ATFM delays in 2023.According to the Dutch monitoring report:
Long term corrective measures are considered feasible and LVNL is working with AAS, the main airline operators at Schiphol and the slot coordinator to better spread traffic demand, possibly by improving the slot allocation. This with the aim of reducing bunch forming for inbound for inbound aircraft since this is one of the major causes of airport delay at Schiphol. With the envisaged growth in traffic volume at Schiphol this delay cause will gain importance in the coming years. Additionally, LVNL has started activities to increase the runway capacity of Schiphol. In January of 2023 RECAT-EU wake turbulence categories and Time-Based Separation (TBS) were realised. A part of this increase could be used to reduce airport ATFM delays.
In the coming years each year one runway will undergo heavy maintenance, lasting 2-3 months. This reduced runway availability increases the probability that only one landing runway can be used while demand is for two runways.
Due to the war in Ukraine there has been a Europe-wide trend for more and longer military exercises. These exercises impact the available airspace around the major Aerodrome in the Netherlands. There is significant risk of these exercises further influencing capacity performance.

The Dutch performance plan sets a national target on arrival ATFM delay for 2023 of 1.60 min/arr. This target was not met, with an actual performance of 2.42 min/arr.
The incentive scheme uses modulated pivot values limited to CRSTMP delay causes. According to the Dutch monitoring report, this pivot value for CRSTMP is 0.37 min/arr in 2023 and based on the attribution

of the regulation reason, the actual CRSTMP value for 2023 was 0.020 min/arr.
The NSA calculates a bonus of € 376.64180.According to the Dutch monitoring report:
The terminal and airport delay target was not met, with a performance of 0.82 min/fl. above target. However, it should be noted that the CRSPTM target was met.
The Airport ATFM delay per flight was not met in 2023, primarily due to aerodrome capacity and weather related incidents. Additionally, the Frysian Flag military exercise, and runway maintenance also caused additional delays.
The main causes for the target not being met were out of the control of the ANSP (weather, aerodrome capacity, military exercises). Long term corrective measures are considered feasible.

4.3.2 Other terminal performance indicators (PI#1-3)



Airport level

	Avg arrival ATFM delay (KPI#2)				Slot adherence (PI#1)			
Airport name	2020	2021	2022	2023	2020	2021	2022	2023
Beek	NA	0.01	0.10	0.04	96.0%	97.4%	97.2%	98.5%
Eelde	0.01	0.00	0.01	0.01	88.0%	91.9%	98.1%	99.1%
Rotterdam	NA	0.00	0.00	0.01	100.0%	98.8%	98.9%	98.9%
Schiphol	1.41	0.60	1.98	2.65	97.6%	98.1%	97.7%	98.4%

	ATC pre departure delay (PI#2)				All causes pre departure delay (PI#3)			
Airport name	2020	2021	2022	2023	2020	2021	2022	2023
Beek	NA	NA	NA	NA	NA	NA	NA	NA
Eelde	NA	NA	NA	NA	NA	NA	NA	NA
Rotterdam	NA	NA	NA	NA	NA	NA	NA	NA
Schiphol	NA	NA	NA	NA	15.5	20.4	27.3	24.0

Focus on performance indicators at airport level

ATFM slot adherence

All four airports showed adherence above 98% and the national average was 98.5%. With regard to the 1.5% of flights that did not adhere, 0.5% was early and 1% was late.

ATC pre-departure delay

The share of unidentified delay reported by Amsterdam (the only Dutch airport subject to monitoring of this indicator) in 2023 was well above 40% every month of the year, preventing the calculation of this indicator.
The insufficient data quality provided by Amsterdam is a long standing issue.
The Dutch monitoring report does not mention any special measure to improve the data reporting, but reports:
The calculation of the ATC pre-departure delay is based on the data provided by the airport operators

through the Airport Operator Data Flow (APDF).
However, there are several quality checks before EUROCONTROL can produce the final value which is established as the average minutes of pre-departure delay (delay in the actual off block time) associated to the IATA delay code 89 (through the APDF, for each delayed flight, the reasons for that delay have to be transmitted and coded according to IATA delay codes.
However, sometimes the airport operator has no information concerning the reasons for the delay in the off block, or they cannot convert the reasons to the IATA delay codes. In those cases, the airport operator might:
- Not report any information about the reasons for the delay for that flight (unreported delay)
- Report a special code to indicate they do not have the information (code ZZZ)
- Report a special code to indicate they do not have the means to collect or translate the information (code 999)
To be able to calculate with a minimum of accuracy the PI for a given month, the minutes of delay that are not attributed to any IATA code reason should not exceed 40% of the total minutes of pre-departure delay observed at the airport.

All causes pre-departure delay

Amsterdam is the only Dutch airport subject to the monitoring of this indicator.
The total (all causes) delay in the actual off block time at Amsterdam in 2023 was 24.01 min/dep, an improvement with respect to the 27.35 min/dep observed in 2022, but nevertheless the third highest among the RP3 monitored airports.
According to the Dutch monitoring report: *The departure delays in 2020 and 2021 were on the low end due to the lower amount of flights because of COVID-19. The beginning of the COVID-recovery in 2022 caused delays to move back towards 2019 levels. While 2022 had additional issues relating to the recovery and increased flight numbers (which is why 2023 subsequently saw a small reduction in delay duration), we expect this rising trend to hold until the values from 2019 are matched.*

5 COST-EFFIENCY - NETHERLANDS

5.1 PRB monitoring

• The en route 2023 actual unit cost of the Netherlands was 82.08 €2017, +8.4% higher than the determined unit cost (75.73 €2017). The terminal 2023 actual unit cost was 189.10 €2017, -0.3% lower than the determined unit cost (189.69 €2017).

• The en route 2023 actual service units (2.8M) were -8.0% lower than the determined service units (3.1M).

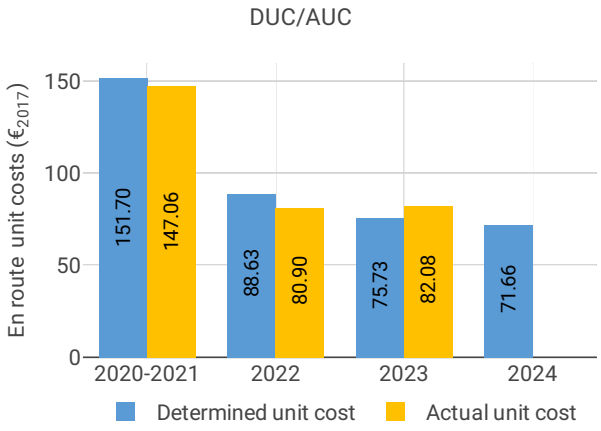
• In 2023, the en route actual total costs were -0.7 M€2017 lower (-0.3%) than the determined costs. The reduction was mainly due to lower-than-planned staff costs (-18 M€2017, or -12%). This reduction was influenced by the impact of the inflation as, in nominal terms, there was a slight increase in actual staff costs of +0.4% when compared to the determined figures. On the other hand, Netherlands registered higher actual other operating costs (+11.0 M€2017, or +17%) and cost of capital (+5.9 M€2017 or +621%) when compared to determined costs. The difference in cost of capital is primarily attributed to the rising interest rates (from 0.28% to 2.53%).

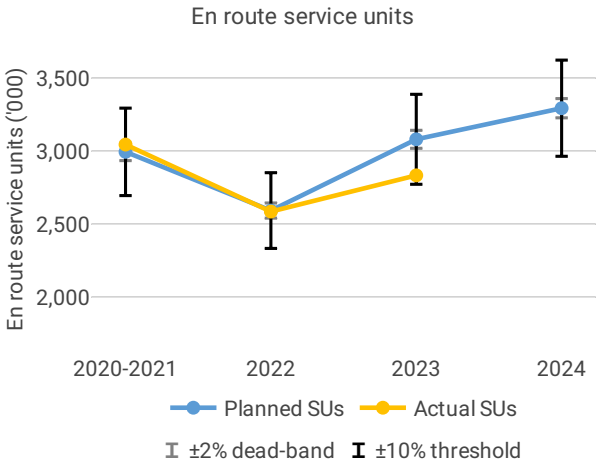
• LVNL spent 27 M€2017 in 2023 related to costs of investments for both en route and terminal charging zones, which is +2.2% higher than determined.

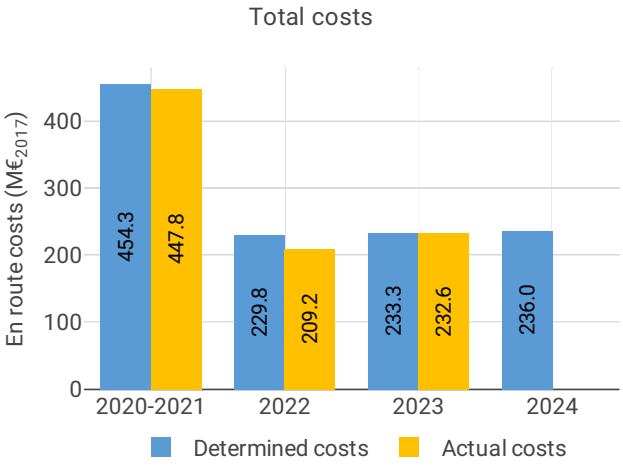
• The en route actual unit cost incurred by users in 2023 was 96.69€ (+18% above the 2023 DUC), while the terminal actual unit cost incurred by users was 234.45€ (+13% above the 2023 DUC). The difference between the AUCU and the DUC for both charging zones is mainly driven by the inflation adjustment (+31 M€ for the en route charging zone and +9.9 M€ for the terminal charging zone).

5.2 En route charging zone

5.2.1 Unit cost (KPI#1)

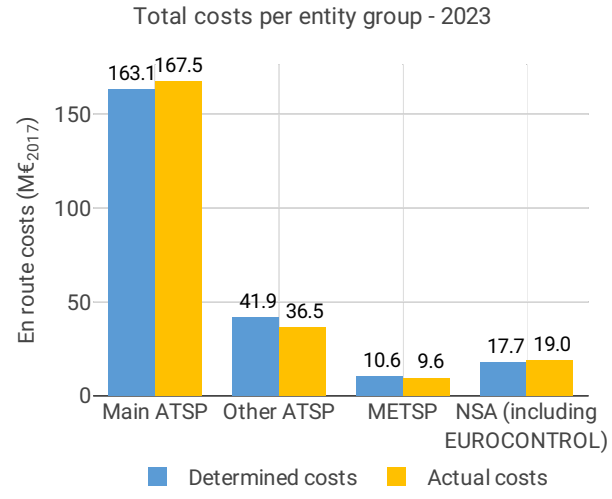


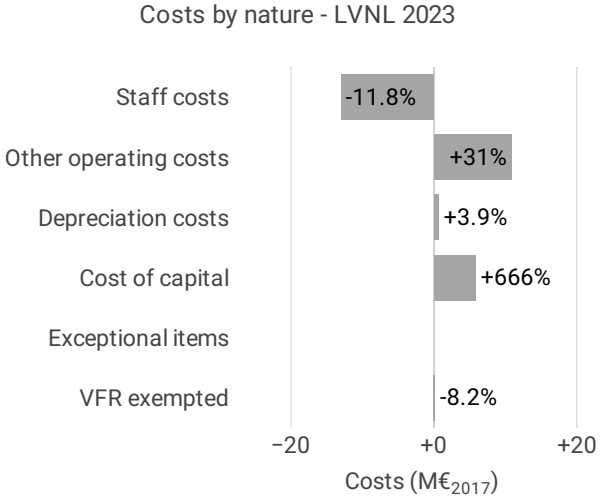




Actual and determined data

Total costs - nominal (M€)	2020-2021	2022	2023	2024
Actual costs	474	245	281	NA
Determined costs	478	246	253	259
Difference costs	-4	-1	28	NA
Inflation assumptions	**2020-2021**	**2022**	**2023**	**2024**
Determined inflation rate	NA	1.5%	1.6%	1.6%
Determined inflation index	NA	108.6	110.3	112.1
Actual inflation rate	NA	11.6%	4.1%	NA
Actual inflation index	NA	121	126	NA
Difference inflation index (p.p.)	NA	+12.5	+15.7	NA





Focus on unit cost

AUC vs. DUC

In 2023, the en route AUC was +8.4% (or +6.35 €2017) higher than the planned DUC. This results from the combination of significantly lower than planned TSUs (-8.0%) and slightly lower than planned en route costs in real terms (-0.3%, or -0.7 M€2017). It should be noted that actual inflation index in 2023 was +15.7 p.p. higher than planned.

En route service units

The difference between actual and planned TSUs (-8.0%) falls outside the ±2% dead band, but does not exceed the ±10% threshold foreseen in the traffic risk sharing mechanism. The resulting loss of en route revenues is therefore shared between the ANSP and the airspace users.

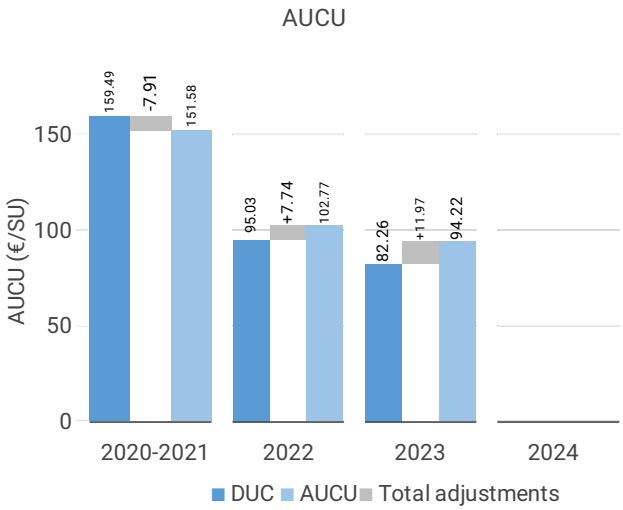
En route costs by entity

Actual real en route costs are -0.3% (-0.7 M€2017) lower than planned. This is the result of lower costs for the other ANSP (MUAC (Netherlands), -12.7%, or -5.3 M€2017) and the MET service provider (-9.8%, or -1.0 M€2017) and higher costs for the NSA/EUROCONTROL (+6.9%, or +1.2 M€2017) and the main ANSP, LVNL (+2.7%, or +4.4 M€2017).

En route costs for the main ANSP at charging zone level

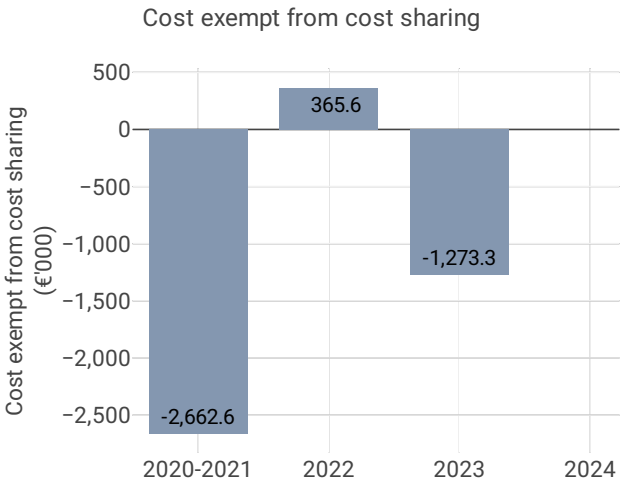
Higher than planned en route costs in real terms for LVNL in 2023 (+2.7%, or +4.4 M€2017) result from:
- Significantly lower staff costs (-11.8%), due to inflation index impact (-15.7 p.p.) since in nominal terms staff costs are slightly higher than planned by +0.7%; mainly because a combination of opposite factors, "in summer 2023 the wages increased. The number of staff on LVNLs payroll is below the assumed number of staff in the performance plan due to the tight labour market conditions. Pension costs were lower than expected due to a reduced pension premium compared to the performance plan':
- Significantly higher other operating costs (+31.0%), mainly due to energy costs higher than expected and the costs of hiring external staff;
- Higher depreciation (+3.9%), non specific driver information has been provided;
- Significantly higher cost of capital (+666.0%), due to the higher interest rates; and
- Significantly lower deduction for VFR exempted flights (-8.2%).

5.2.2 Actual unit cost incurred by the users (AUCU) (PI#1)



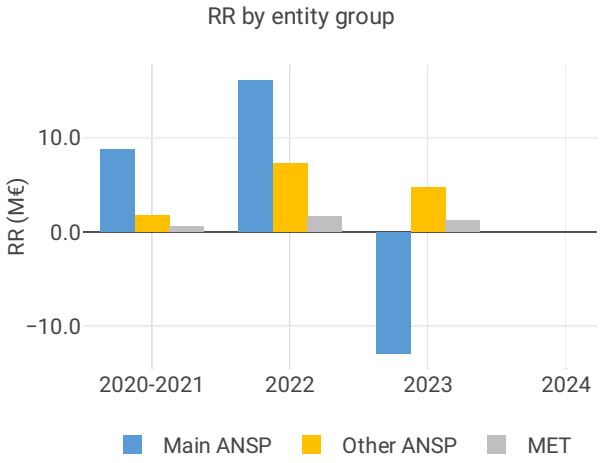
AUCU components (€/SU) – 2023

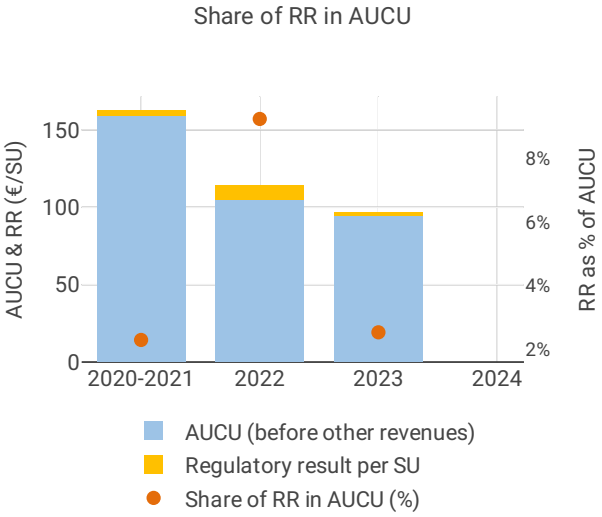
Components of the AUCU in 2023	€/SU
DUC	**82.26**
Inflation adjustment	10.79
Cost exempt from cost-sharing	-0.45
Traffic risk sharing adjustment	3.34
Traffic adj. (costs not TRS)	0.83
Finantial incentives	0.00
Modulation of charges	0.00
Cross-financing	0.00
Other revenues	-2.54
Application of lower unit rate	0.00
Total adjustments	11.97
AUCU	**94.22**
AUCU vs. DUC	**+14.6%**

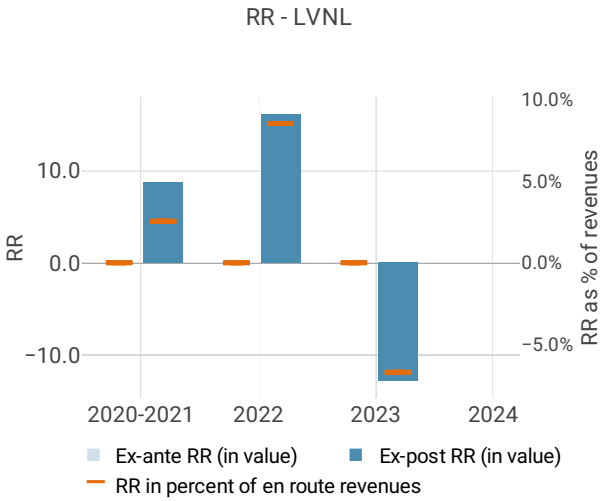


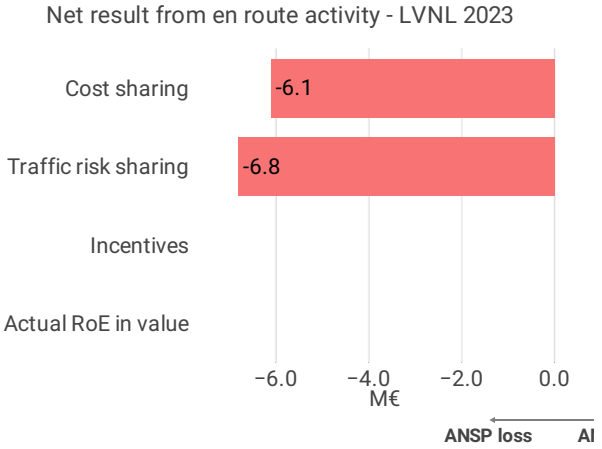
Cost exempt from cost sharing by item - 2023	€'000	€/SU
New and existing investments	-602.8	-0.21
Competent authorities and qualified entities costs	-373.5	-0.13
Eurocontrol costs	1,595.0	0.56
Pension costs	-1,978.0	-0.70
Interest on loans	0.0	0.00
Changes in law	86.0	0.03
Total cost exempt from cost risk sharing	**-1,273.3**	**-0.45**

5.2.3 Regulatory result (RR)









Focus on regulatory result

LVNL net gain on activity in the Netherlands en route charging zone in the year 2023

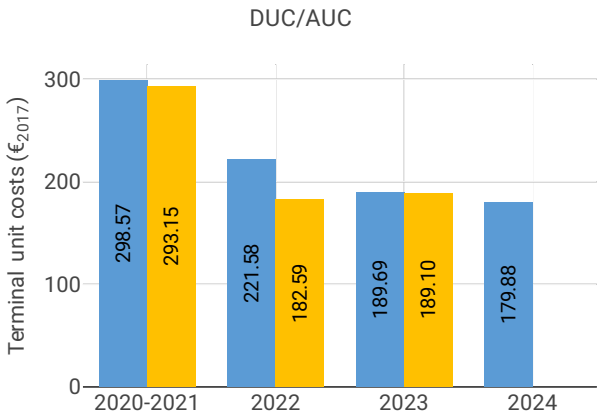
LVNL reported a net loss of -5.8 M€, as a combination of a gain of +0.9 M€ arising from the cost sharing mechanism, with a loss of -6.8 M€ arising from the traffic risk sharing mechanism.

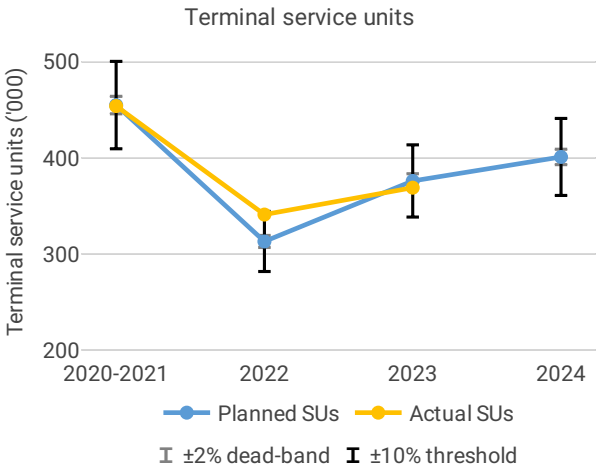
LVNL overall regulatory results (RR) for the en route activity

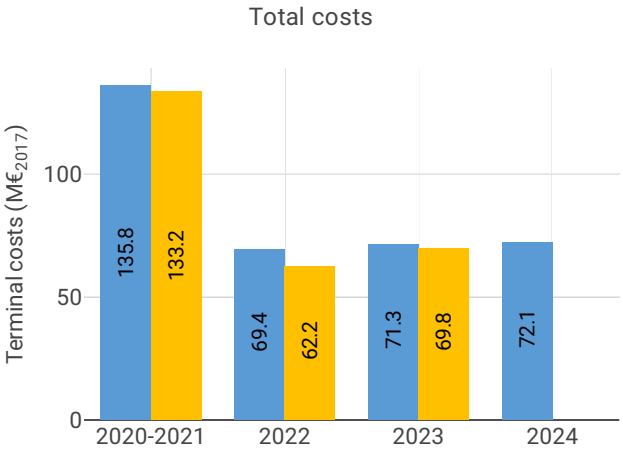
LVNL has no return on equity, as its assets are entirely financed through debt, no ex-ante estimated surplus was embedded in the cost of capital provided in the PP for RP3. Therefore, ex-post, the overall RR is equal to the net loss from the en route activity mentioned above (-5.8 M€) and corresponds to -2.9% of the en route revenues.

5.3 Terminal charging zone

5.3.1 Unit cost (KPI#1)

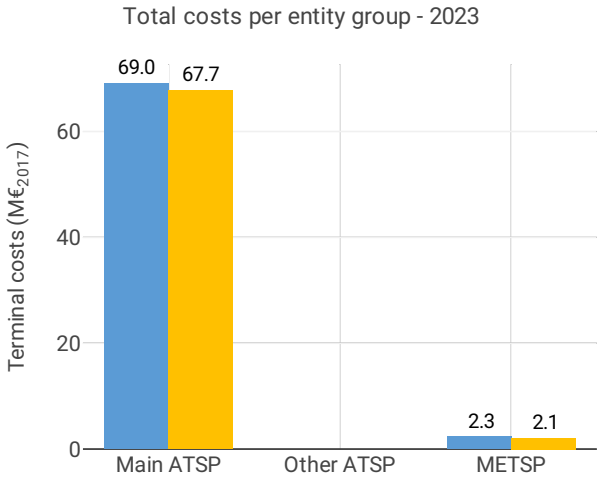


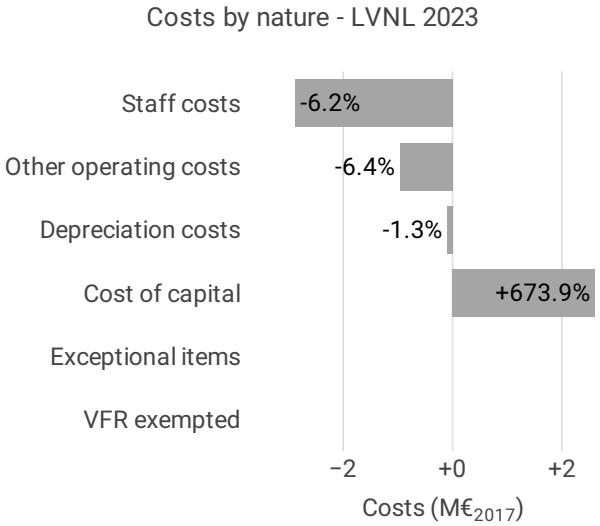




Actual and determined data

Total costs - nominal (M€)	2020-2021	2022	2023	2024
Actual costs	142	74	85	NA
Determined costs	143	75	78	80
Difference costs	-2	-1	7	NA
Inflation assumptions	**2020-2021**	**2022**	**2023**	**2024**
Determined inflation rate	NA	1.5%	1.6%	1.6%
Determined inflation index	NA	108.6	110.3	112.1
Actual inflation rate	NA	11.6%	4.1%	NA
Actual inflation index	NA	121	126	NA
Difference inflation index (p.p.)	NA	+12.5	+15.7	NA





Focus on unit cost

AUC vs. DUC

In 2023, the terminal AUC was -0.3% (or -0.59 €2017) lower than the planned DUC. This results from the combination of lower than planned terminal costs in real terms (-2.1%, or -1.5 M€2017) and lower than

planned TNSUs (-1.8%). It should be noted that actual inflation index in 2023 was +15.7 p.p. higher than planned.

Terminal service units

The difference between actual and planned TNSUs (-1.8%) falls inside the ±2% dead band. Hence loss of terminal revenues is borne by the ANSPs.

Terminal costs by entity

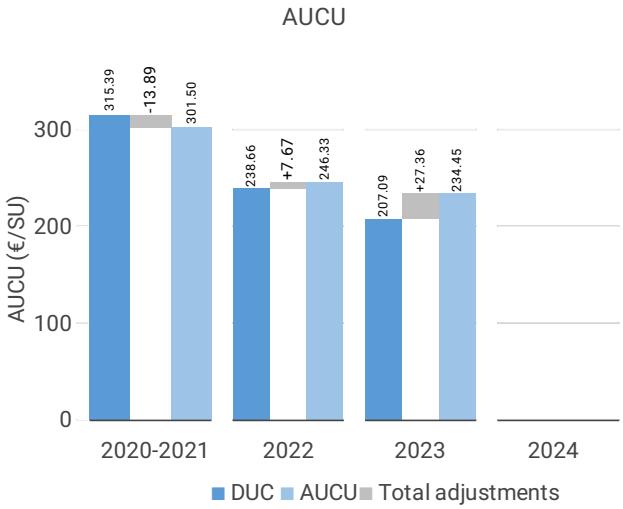
Actual real terminal costs are -2.1% (-1.5 M€2017) lower than planned. This is the result of lower costs for the main ANSP, LVNL (-1.9%, or -1.3 M€2017) and the MET service provider (-9.1%, or -0.2 M€2017).

Terminal costs for the main ANSP at charging zone level

Slightly lower than planned terminal costs in real terms for LVNL in 2023 (-1.9%, or -1.3 M€2017) result from:

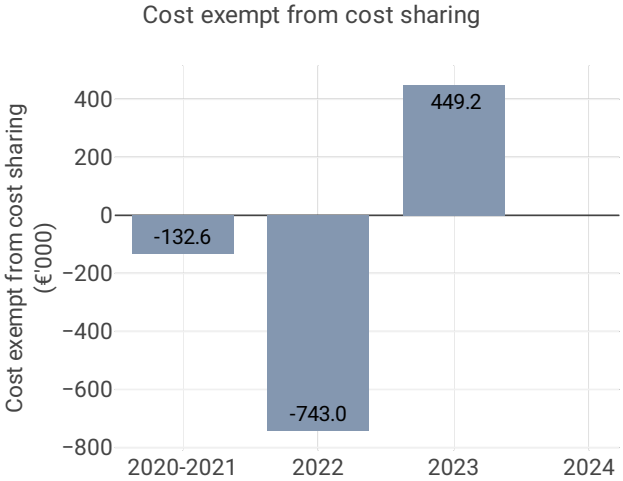
- Significantly lower staff costs (-6.2%), due to inflation index impact (-15.7 p.p.) since in nominal terms staff costs are higher than planned by +7.1%; mainly due to summer 2023, wages increased. However, due to the tight labour market, the number of staff on LVNL's payroll was below the performance plan's assumptions. Pension costs were lower than expected due to a reduced pension premium;
- Significantly lower other operating costs (-6.4%) ,due to inflation index impact (-15.7 p.p.) since in nominal terms staff costs are higher than planned by +6.8%, mainly due to higher energy costs than expected and the costs of hiring external staff;
- Slightly lower depreciation (-1.3%); and,
- Significantly higher cost of capital (+673.9%) due to the higher interest rates.

5.3.2 Actual unit cost incurred by the users (AUCU) (PI#1)



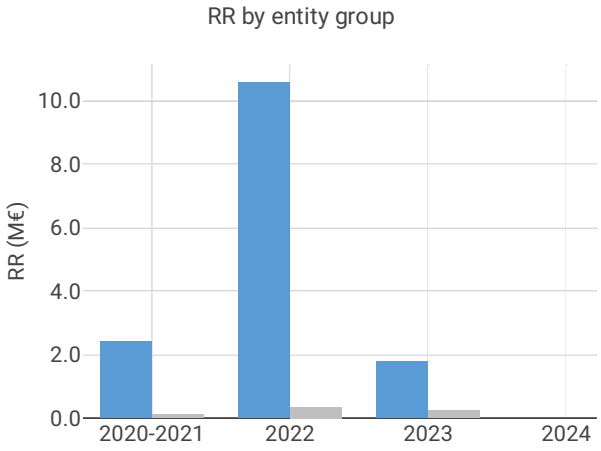
AUCU components (€/SU) – 2023

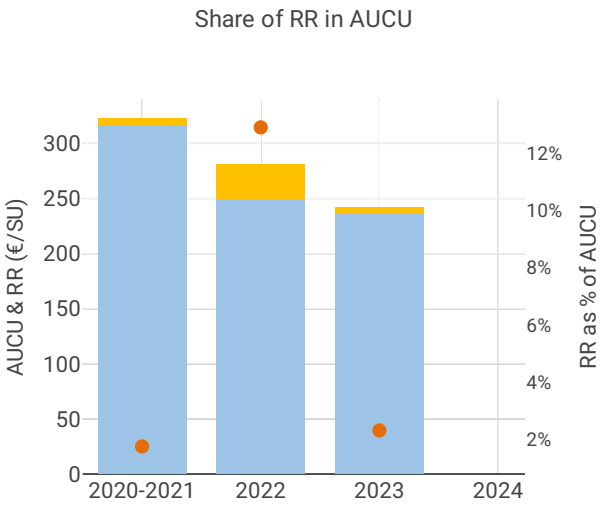
Components of the AUCU in 2023	€/SU
DUC	**207.09**
Inflation adjustment	26.96
Cost exempt from cost-sharing	1.22
Traffic risk sharing adjustment	0.00
Traffic adj. (costs not TRS)	0.13
Finantial incentives	1.02
Modulation of charges	0.00
Cross-financing	0.00
Other revenues	-1.96
Application of lower unit rate	0.00
Total adjustments	27.36
AUCU	**234.45**
AUCU vs. DUC	**+13.2%**

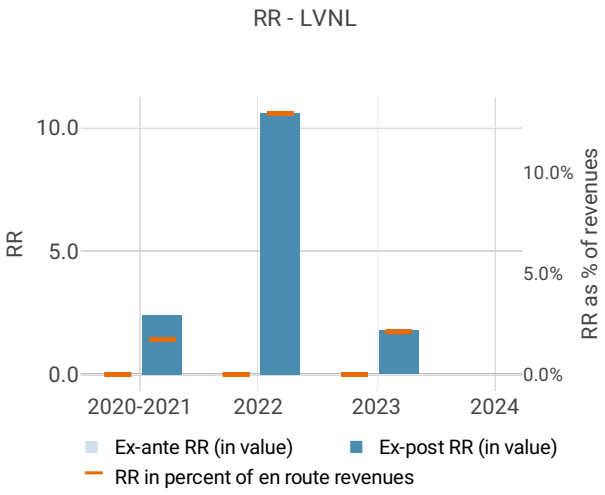


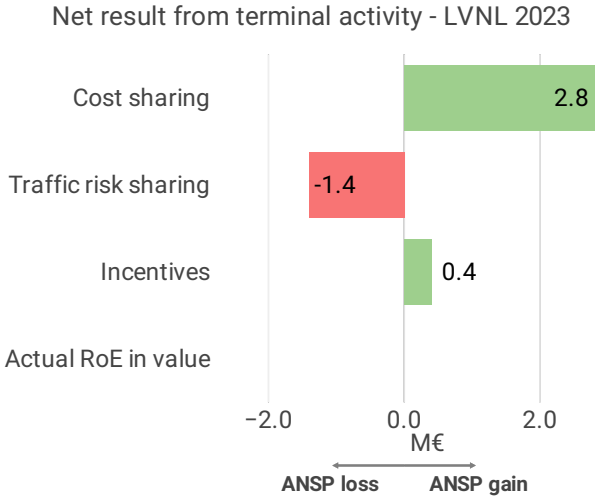
Cost exempt from cost sharing by item - 2023	€'000	€/SU
New and existing investments	-144.7	-0.39
Competent authorities and qualified entities costs	0.0	0.00
Eurocontrol costs	0.0	0.00
Pension costs	-878.0	-2.38
Interest on loans	1,386.0	3.76
Changes in law	86.0	0.23
Total cost exempt from cost risk sharing	**449.3**	**1.22**

5.3.3 Regulatory result (RR)









Focus on regulatory result

LVNL net gain on activity in the Netherlands terminal charging zone in the year 2023

LVNL reported a net gain of +1.8 M€, as a combination of a gain of +2.8 M€ arising from the cost sharing mechanism, with a loss of -1.4 M€ arising from the traffic risk sharing mechanism and a gain of +0.4 M€ relating to financial incentives.

LVNL overall regulatory results (RR) for the terminal activity

LVNL has no return on equity, as its assets are entirely financed through debt, no ex-ante estimated surplus was embedded in the cost of capital provided in the PP for RP3. Therefore, ex-post, the overall RR is equal to the net gain from the terminal activity mentioned above (+1.8 M€) and corresponds to 2.1% of the en route revenues.