

Annex G (Key Performance Indicators)

Annex to the EETS Domain Statement concerning the Danish Kilometer Tolling Scheme

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1 DOCUMENT HISTORY

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2 DEFINITIONS AND ABBREVIATIONS

All definitions in the EETS Domain Statement shall have the same meaning in this Annex.

In addition to the definitions in the EETS Domain Statement the following definitions shall apply for this Annex:

“Agreed System Downtime” means periods of system outages due to maintenance or similar which is commonly agreed between the EETS Provider and the Toll Charger.

“Key Performance Indicators (KPIs)” means metrics of performance measurement having a target of required performance indicating either compliance or non-compliance with the service level requirement.

“Target Service Level” means the service level requirement set by the Toll Charger for KPIs defining at what service level a key performance indicator must achieve.

3 INTRODUCTION

This Annex sets out the principles and methodologies for complying with the performance regime for the Danish Kilometer Tolling Scheme. The content of the Annex is as follows:

- (i) **Section 4:** In this section, a description of the different KPI categories applied under the KmToll Scheme are included;
- (ii) **Section 5:** In this section, a summary of all required KPIs including the defined Target Service Levels is presented;
- (iii) **Section 6:** In this section, a detailed break down of each KPI is provided; and
- (iv) **Section 7:** In this section, a description is given to what happens in case the EETS Provider is non-compliant with the required KPIs including an overview of how remuneration is reduced according to the EETS Provider’s potential non-compliance.

4 CATEGORIES OF KPIS

The KPIS are divided into three (3) categories. The categories are as follows:

- (i) Data exchange (DE)
- (ii) Availability (AV)
- (iii) Service (SE)

Each KPI is measured according to a Target Service Level.

5 KPI TABLE

In the table below all KPIS including Target Service Level are shown.

Table 1. Key Performance Indicators (KPIS)

Reference	Title	KPI summary	Target Service Level	Frequency	Measured by
Category 1 – Data exchange					
KPI_DE1	Timeliness of Toll Declarations – short timeframe	The percentages of Toll Declaration packages transferred from the EETS Provider to the Toll Charger within one (1) calendar day (running day + 1) after the date where the data was recorded in the OBE.	95,00%	Monthly	Toll Charger
KPI_DE2	Timeliness of Toll Declarations – long timeframe	The percentages of Toll Declaration packages transferred from the EETS Provider to the Toll Charger within five (5) calendar day (running day + 1) after the date where the data was recorded in the OBE.	99,95%	Monthly	Toll Charger
KPI_DE3a	Detection of OBE anomaly	Events where the Toll Charger detects an OBE Type 1 with 'status OK' in a vehicle passage at a roadside enforcement point, but Toll Charger have not received a Toll Declaration from the EETS Provider within 6 Days which can be map-matched to the enforced road segment.	0,1%	Monthly	Toll Charger
KPI_DE3b	Detection of OBE anomaly	Events where the Toll Charger detects a vehicle whitelisted to use an OBE Type 2 in a vehicle passage at a roadside enforcement point and the CCC data response from the EETS Provider on the specific time is "status OK" but the Toll Charger has not received a Toll Declaration from the EETS Provider within six (6) days which can be map-matched to the enforced road segment.	0,1%	Monthly	Toll Charger
KPI_DE4	Data format quality of Toll Declarations	The percentages of Toll Declaration packages transferred from the EETS Provider to the Toll Charger which must comply ADU requirements.	99,99%	Monthly	Toll Charger
KPI_DE5	Vehicle description validity	The number of cases of charging relevant vehicle description characteristics that are not correct in the Toll Declaration packages forwarded	0	On request by Toll Charger	Toll Charger

Reference	Title	KPI summary	Target Service Level	Frequency	Measured by
		by the EETS Provider to the Toll Charger.			
KPI_DE6	Timeliness of Whitelists	The percentages of full Whitelists transferred by the EETS Provider to the Toll Charger once daily. Currently not applicable. See note on KPI_DE6.	96,00%	Quarterly	Toll Charger
KPI_DE7	Timeliness of Blacklists	The percentages of full Blacklists transferred by the EETS Provider to the Toll Charger once daily. Currently not applicable. See note on KPI_DE7.	96,00%	Quarterly	Toll Charger
KPI_DE8	Data quality of Whitelists	Cases of RSE observations not matching Whitelists - hence correct Whitelist compilation.	0	Monthly	Toll Charger
KPI_DE9	Data quality of Blacklists	Cases of RSE observations not matching Blacklists - hence correct Blacklist compilation.	0	Monthly	Toll Charger
KPI_DE10	GNSS data quality_rural	The accumulated percentages of toll segments in rural areas identified with the need for gap-closing above to the average performance across EETS Providers.	35,00%	Monthly	Toll Charger
KPI_DE11	GNSS data quality_urban	The percentage above the average performance for toll segments identified through gap-closing across EETS Providers.	35,00%	Monthly	Toll Charger
KPI_DE12	Continuous low GNSS data quality_rural	Cases where the GNSS data quality for rural areas have been lower than the allowed threshold performance for three (3) calendar months in a row.	0	Monthly	Toll Charger
KPI_DE13	Continuous low GNSS data quality_urban	Cases where the GNSS data quality for rural areas have been lower than the allowed threshold performance for three (3) calendar months in a row.	0	Monthly	Toll Charger
Category 2 - Availability					
KPI_AV1	Availability of the EETS Provider	The target value of interface availability of the EETS Provider within one (1) calendar month according to interface specifications.	99,90%	Monthly	EETS Provider
Category 3 – Service					
KPI_SE1	Incident management	The percentages of incidents with "Urgent" criticality reported by the Toll Charger must have been responded to by the EETS Provider within two (2) hours and the EETS Provider shall provide a timeframe for corrective actions within four (4) hours.	100%	Monthly	EETS Provider

Note: KPI_DE6 and KPI_DE7 have been suspended since exchange of full Exception Lists is not implemented at this stage. The KPI will go into effect if exchange of full Exception Lists is implemented at a later stage.

6 CALCULATION OF KPIS

The following section describes the KPIs from Table 1 in detail. For each KPI the following methodology is used to describe the KPI:

- (i) The purpose of the KPI;
- (ii) Description of the process;
- (iii) Target Service Level;
- (iv) Actor being monitored;
- (v) Period of monitoring;
- (vi) Data and calculation of the KPI;
- (vii) Exclusions to the KPI;
- (viii) Issues or other aspects affecting the KPI;
- (ix) Reporting; and
- (x) Penalty level and calculation

6.1 Timeliness of Toll Declarations – short timeframe

KPI_DE1	Timeliness of Toll Declarations
The purpose of the KPI	The purpose of KPI_DE1 is to ensure that Toll Declarations packages are transferred from the EETS Provider to the Toll Charger in a timely manner, so the Toll Charger can perform toll collection and process enforcement cases effectively.
Description of the process	The Toll Charger will count the number of Toll Declarations received from the EETS Provider that arrive more than one (1) calendar day after the date of the recorded GNSS location data timestamp contained in the Toll Declaration within the monitoring period. The amount of Toll Declarations received too late is compared with the total number of Toll Declarations received from the EETS Provider during the monitoring period.
Target service level	95,00 % of the Toll Declaration packages shall be transferred to the Toll Charger within one (1) calendar day after the date where the data was recorded (running day + 1).
Actor being monitored	EETS Provider
Period of monitoring	Monthly (per calendar month)
Data and calculation of the KPI	<p>The date measure from GNSS location data timestamp contained in the Toll Declaration is compared with the date the Toll Declaration is received by the Toll Charger. All timestamps are based and compared on UTC time.</p> <p>The number of Toll Declaration packages that contain GNSS location data timestamped more than two (2) calendar days before the time of the Toll Declaration is received by the Toll Charger are observations on threshold breaches.</p> <p>Calculation of KPI: $KPI_DE1 = (1 - TD2/TD)$</p> <p>where</p>

	<p>TD2 = Number of Toll Declarations packages received two (2) calendar days after data recording. TD= Total number of Toll Declarations packages received.</p>
Exclusions to the KPI	<p>Periods of Agreed System Downtime are excluded from the KPI calculation. If the interface is down due to the Toll Charger, this period must be excluded from the KPI calculation.</p>
Issues or other aspects affecting the KPI	<p>Date of transfer to the Toll Charger define the KPI monitoring period the Toll Declaration is included in. There is no upper threshold for when or with how much delay the EETS Provider can provide a Toll Declaration to the Toll Charger. All received Toll Declarations will be subject to toll collection.</p>
Reporting	<p>Reporting on KPI_DE1 shall take place calendar quarterly by the Toll Charger and shall be done to the EETS Provider in case required KPI Target Service Level is breached.</p>
Penalty level and calculation	<p>Penalty level = 5% of monthly remuneration Penalty calculation: Penalty amount = RM * penalty level where RM = Remuneration for the monitoring period Penalty level = 5%</p>

6.2 Timeliness of Toll Declarations – long timeframe

KPI_DE2	Timeliness of Toll Declarations
The purpose of the KPI	The purpose of KPI_DE2 is to ensure that Toll Declarations packages are transferred from the EETS Provider to the Toll Charger in a timely manner, so the Toll Charger can perform toll collection and process enforcement cases effectively.
Description of the process	The Toll Charger will count the number of Toll Declarations received from the EETS Provider that arrive more than five (5) calendar days after the date of the recorded GNSS location data timestamp contained in the Toll Declaration within the monitoring period. The amount of Toll Declarations received too late is compared with the total number of Toll Declarations received from the EETS Provider during the monitoring period.
Target Service Level of the KPI	99,95 % of the Toll Declaration packages shall be transferred to the Toll Charger within five (5) calendar days after the date where the data was recorded (running day + 5).
Actor being monitored	EETS Provider
Period of monitoring	Monthly (per calendar month)
Data and calculation of the KPI	<p>The date measure from GNSS location data timestamp contained in the Toll Declaration is compared with the date the Toll Declaration is received by the Toll Charger. All timestamps are based and compared on UTC time. The number of Toll Declaration packages that contain GNSS location data timestamped more than six (6) calendar days before the time of the Toll Declaration is received by the Toll Charger are observations on threshold breaches.</p> <p>Calculation of KPI: $KPI_DE2 = (1 - TD6/TD)$ where TD6 = Number of TD received six (6) calendar days after data recording. TD= Total number of TD received.</p>

Exclusion to the KPI	<p>Periods of Agreed System Downtime are excluded from the KPI calculation.</p> <p>If the interface is down due to the Toll Charger, this period will be excluded from the KPI calculation.</p>
Issues or other aspects affecting the KPI	<p>Date of transfer to the Toll Charger define the KPI monitoring period the Toll declaration is included in.</p> <p>There is no time wise upper threshold towards when the EETS Provider can forward a Toll declaration to the Toll Charger. All received Toll Declarations will be subject to toll collection.</p>
Reporting	<p>Reporting on KPI_DE2 shall takes place monthly by the Toll Charger and shall be done to the EETS Provider in case required KPI service level is breached.</p>
Penalty level and calculation	<p>Penalty level = 10% of monthly remuneration</p> <p>Penalty calculation: Penalty amount = RM * penalty level</p> <p>where</p> <p>RM = Remuneration for the monitoring period Penalty level = 10%</p>

6.3 Detection of OBE anomaly

KPI_DE3a	Detection of OBE anomaly
The purpose of the KPI	<p>The purpose of KPI_DE3a is to ensure that enforcement observations for vehicles whitelisted with an OBE Type 1 and toll payment match, for the Toll Charger to conduct successful enforcement procedures.</p>
Description of the process	<p>The Toll Charger will compare enforcement observations of whitelisted vehicle on a specific road segment with Billing Details compiled based on received Toll Declarations for the point in time of the enforcement observation. Technically that means that the Toll Charger will map-match received Toll Declarations to identify the segments that the vehicle has driven, and compare with the enforcement observation. The comparison will take place six (6) calendar days after the road side data capture to identify if enforcement observations for the vehicle can be matched with Billing Details at the enforcement observation.</p> <p>The process is undertaken for all enforcement observations for whitelisted vehicles if the OBE Type 1 is detected to be 'Status OK' from the DSRC based CCC at the roadside.</p> <p>The comparison will be based on PAN number, EquipmentOBEId, Vehicle LPN, timestamp and road segment of the enforcement point and Toll Declarations matched road segment.</p>
Target Service Level of the KPI	<p>0,1 % events where the Toll Charger detects an OBE Type 1 with CCC 'status OK' datapoint obtained through DSRC CCC in a vehicle passage at a roadside enforcement point, but no matching Billing Detail can be produced based on received Toll Declarations from the EETS Provider latest six (6) days after the enforcement observation.</p>
Actor being monitored	EETS Provider
Period of monitoring	Monthly (per calendar month)
Data and calculation of the KPI	<p>For each enforcement observation when the Toll Charger detects an OBE Type 1 with 'status OK' at an enforcement point on the tolled road, the Toll Charger will match the OBE with Billing Details compiled based on Toll Declarations packages received from the EETS Provider.</p> <p>For every instance of it not being possible to match despite OBE Type 1 CCC 'status OK', the KPI_DE3 counter will be increased by 1.</p>

	The KPI is based on a per case basis observation scheme.
Exclusion to the KPI	None.
Issues or other aspects affecting the KPI	Toll Charger will notify the EETS Provider of outstanding unmatched enforcement case earliest six (6) days after the enforcement case capture.
Reporting	Reporting on KPI_DE3 shall takes place calendar quarterly by the Toll Charger and shall be done to the EETS Provider in case of observations negatively impacting remuneration.
Penalty level and calculation	2250 DKK per case as deduction of remuneration.

KPI_DE3b	Detection of OBE anomaly
The purpose of the KPI	The purpose of KPI_DE3b is to ensure that enforcement observations for vehicles whitelisted with an OBE Type 2 and toll payment match, for the Toll Charger to conduct successful enforcement procedures.
Description of the process	<p>The Toll Charger will compare enforcement observations of a whitelisted vehicle on a specific road segment with Billing Details compiled based on received Toll Declarations for the point in time of the enforcement observation. Technically this means that the Toll Charger will map-match the received Toll Declarations to identify the segments that the vehicle has driven and compare with the enforcement observation. The comparison will take place no later than six (6) calendar days after the road side data capture to identify if enforcement observations for the vehicle can be matched with Billing Details at the enforcement observation.</p> <p>The process is undertaken for all enforcement observations for whitelisted vehicles with OBE Type 2 based on the CCC data request and related CCC data response interface.</p> <p>The comparison will be based on PAN number, EquipmentOBEId, Vehicle LPN, timestamp and road segment of the enforcement point and Toll Declarations matched road segment.</p>
Target Service Level of the KPI	0,1 % events where the Toll Charger detects an OBE Type 2 with 'status OK' in a vehicle passage at a roadside enforcement point, but no matching Toll Declaration is received from the EETS Provider latest six (6) days after the enforcement observation.
Actor being monitored	EETS Provider
Period of monitoring	Monthly (per calendar month)
Data and calculation of the KPI	<p>For each enforcement observation when the Toll Charger detects an OBE Type 2 and receives a CCC data response with 'status OK' the Toll Charger will match with Billing Details compiled based on Toll Declarations packages received from the EETS Provider.</p> <p>For every instance where it's not possible to match despite OBE Type 2 CCC 'status OK', the KPI_DE3 counter will be increased by 1.</p> <p>The KPI is based on a per case basis observation scheme.</p>
Exclusion to the KPI	None.
Issues or other aspects affecting the KPI	The Toll Charger will notify the EETS Provider of outstanding unmatched enforcement cases earliest six (6) days after the enforcement case capture.
Reporting	Reporting on KPI_DE3 shall takes place calendar quarterly by the Toll Charger and shall be done to the EETS Provider in case of observations negatively impacting remuneration.
Penalty level and calculation	2250 DKK per case as deduction of remuneration.

6.4 **Data format quality of Toll Declarations**

KPI_DE4	Data format quality of Toll Declarations
The purpose of the KPI	The purpose of KPI_DE4 is to ensure the consistency and conformity of the Toll Declaration packages forwarded by the EETS Provider to the Toll Charger.
Description of the process	The Toll Charger will as part of the data transfer mechanism handling and data processing verify if data received from the EETS Provider complies with ADU requirements. In case Toll Declarations do not comply with ADU requirements the Toll Charger will negatively acknowledge the Toll Declaration and notify the EETS Provider as part of the data transfer mechanism processes.
Target Service Level of the KPI	99,99% of Toll Declaration packages forwarded by the EETS Provider to the Toll Charger must comply with data formats and ADU requirements of the Toll Charger.
Actor being monitored	EETS Provider
Period of monitoring	Monthly (per calendar month)
Data and calculation of the KPI	<p>The Toll Charger will calculate compliance with the Target Service Level by monitoring each Toll Declaration package as it is either received successful being compliant or received but rejected as the data format is not compliant. Counts in each case over the measurement period is compared to determine compliance with the Target Service Level.</p> <p>KPI calculation: $KPI_DE4 = 1 - (NITD/NTD)$</p> <p>where</p> <p>NITD: Number of TD not acknowledged sent during the period. NTD: Number of TD sent during the period.</p>
Exclusion to the KPI	None.
Issues or other aspects affecting the KPI	None.
Reporting	Reporting on KPI_DE4 shall takes place calendar monthly by the Toll Charger and shall be done to the EETS Provider in case required KPI Target Service Level is breached.
Penalty level and calculation	<p>Penalty level = 1% of monthly remuneration</p> <p>Penalty calculation: Penalty amount = RM * penalty level</p> <p>where</p> <p>RM = Remuneration for the monitoring period Penalty level = 1%</p>

6.5 **Vehicle description validity**

KPI_DE5	Vehicle description validity
The purpose of the KPI	The purpose of KPI_DE5 is to ensure Toll Declarations forwarded by the EETS Provider to the Toll Charger contain correct toll relevant vehicle characteristics ensuring correspondence to the actual vehicle characteristics of the tolled and OBE equipped vehicle.
Description of the process	Upon request by the Toll Charger the EETS Provider must deliver OBE specific vehicle documentation to prove that the vehicle characteristic information embedded in the OBE and provided in Toll Declarations and used to calculate toll is correct.

	The Toll Charger will request at least 100 and maximum 500 specific OBE selected at random or based on suspicions out of the charged OBE in the recent calendar quarter.
Target Service Level of the KPI	0 cases of non-correlation information of charging relevant vehicle description characteristics provided in Toll Declarations and vehicle documentation upon which the declaration is based.
Actor being monitored	EETS Provider
Period of monitoring	On request from the Toll Charger
Data and calculation of the KPI	<p>The Toll Charger will compare vehicle characteristics data contained in Toll Declarations received from the Toll Charger with the vehicle documentation provided by the EETS Provider for the specific tolled vehicle.</p> <p>Per cases the audit is deemed compliant if vehicle characteristics match and non-compliant in case of discrepancies. If several deviations are noticed for one vehicle, it will only be counted as one occurrence of a discrepancies case.</p> <p>Every time there is a case of discrepancies, the KPI_DE5 counter will be increased by 1.</p> <p>The KPI is based on a per case basis observation scheme.</p>
Exclusion to the KPI	None.
Issues or other aspects affecting the KPI	<p>The KPI will solely be based on audit of the documentation delivered by the EETS Provider.</p> <p>The EETS Provider must deliver required vehicle documentation within twenty-five (25) Business Days from receiving the request from the Toll Charger. A maximum of one (1) audit can be undertaken per calendar month. Initiating an audit is at the discretion of the Toll Charger. The Toll Charger may choose not to undertake an audit for one or several months in a row.</p> <p>The Toll Charger may on a continuous basis perform its own validity checks of vehicle characteristics contained in a Toll Declaration against national vehicle registries.</p>
Reporting	Reporting on KPI_DE5 shall takes place calendar quarterly by the Toll Charger and shall be done to the EETS Provider in case required KPI Target Service Level is breached.
Penalty level and calculation	1225 DKK per case as deduction of remuneration.

6.6 Timeliness of full Whitelists

Note: KPI_DE6 is not currently applicable since exchange of full Exception Lists is not implemented at this point. The KPI will go into effect if exchange of full Exception Lists is implemented at a later stage.

KPI_DE6	Timeliness of full Whitelists
The purpose of the KPI	The purpose of KPI_DE6 is to ensure that full Whitelists are transferred from the EETS Provider to the Toll Charger in a timely manner.
Description of the process	The Toll Charger requires to receive a new latest updated full Whitelist from the EETS Provider daily. The Toll Charger monitor if new Exception Lists are received according to requirements. The measurement period is calendar quarterly. In case Exception Lists are not received as required it will be deducted negatively in the measurement calculation. A wrong format list will be denied and considered as not received.

Target Service Level of the KPI	96,00% of full Whitelists transferred by the EETS Provider to the Toll Charger at a daily basis.
Actor being monitored	EETS Provider
Period of monitoring	Quarterly (per calendar quarter)
Data and calculation of the KPI	KPI calculation: $KPI_DE6 = (1 - NFWL / ND)$ where NFWL = Number of daily Full WL received late or not received at all for the period. ND = Number of days of the period.
Exclusion to the KPI	Periods of Agreed System Downtime are excluded from the KPI calculation. If the interface is down due to the Toll Charger, this period will be excluded from the KPI calculation.
Issues or other aspects affecting the KPI	Annex E (Technical Conditions) defines mechanism and Exception List handling requirements and timeliness of daily Whitelist transfer.
Reporting	Reporting on KPI_DE6 shall take place calendar quarterly by the Toll Charger and shall be done to the EETS Provider in case required KPI Target Service Level is breached.
Penalty level and calculation	Penalty level = 5% of monthly remuneration Penalty calculation: Penalty amount = RM * penalty level where RM = Remuneration for the monitoring period Penalty level = 5%

6.7 Timeliness of full Blacklists

Note: KPI_DE7 is not currently applicable since exchange of full Exception Lists is not implemented at this point. The KPI will go into effect if exchange of full Exception Lists is implemented at a later stage.

KPI_DE7	Timeliness of full Blacklists
The purpose of the KPI	The purpose of KPI_DE7 is to ensure that full Blacklists are transferred from the EETS Provider to the Toll Charger in a timely manner.
Description of the process	The Toll Charger requires to receive a new latest updated full Blacklist from the EETS Provider daily. The Toll Charger monitor if new full Blacklists are received according to requirements. The measurement period is calendar quarterly. In case Exception Lists are not received as required it will be deducted negatively in the measurement calculation. A wrong format list will be denied by the interface and considered as not received.
Target Service Level of the KPI	96,00% of full Blacklists transferred by the EETS Provider to the Toll Charger once daily.
Actor being monitored	EETS Provider
Period of monitoring	Quarterly (per calendar quarter)

Data and calculation of the KPI	<p>KPI calculation:</p> $KPI_DE6 = (1 - NFLL / ND)$ <p>where</p> <p>NWLL = Number of daily Full BL received late or not received at all for the period.</p> <p>ND = Number of days of the period.</p>
Exclusion to the KPI	<p>Periods of Agreed System Downtime are excluded from the KPI calculation.</p> <p>If the interface is down due to the Toll Charger, this period will be excluded from the KPI calculation.</p>
Issues or other aspects affecting the KPI	None.
Reporting	Reporting on KPI_DE7 shall take place calendar quarterly by the Toll Charger and shall be done to the EETS Provider in case required KPI Target Service Level is breached.
Penalty level and calculation	<p>Penalty level = 5% of monthly remuneration</p> <p>Penalty calculation:</p> $\text{Penalty amount} = RM * \text{penalty level}$ <p>where</p> <p>RM = Remuneration for the monitoring period</p> <p>Penalty level = 5%</p>

6.8 Data quality of Whitelists

KPI_DE8	Data quality of Whitelists
The purpose of the KPI	The purpose of KPI_DE8 is to ensure the consistency and quality of the Whitelists transferred from the EETS Provider to the Toll Charger. Non-consistency poses an enforcement process issue.
Description of the process	<p>Data quality of the transferred Whitelist entries are measured by the DSRC readings from equipped vehicles compared with the Whitelists transferred from the EETS Provider to the Toll Charger.</p> <p>Based on OBE Type 1 CCC transactions at RSE the Toll Charger will perform validation against the Whitelist to check list compilation against road observed issued OBE from the EETS Provider. The Whitelist used for this compilation is the Whitelist acknowledged by the Toll Charger at the time of the DSRC reading at the roadside.</p>
Target Service Level of the KPI	0 events where the Toll Charger detects an OBE Type 1 at the RSE from the EETS Provider active for the KmToll Domain which cannot be validated against the Whitelist and is also not blacklisted, hence, the compilation of the Whitelist is not correct.
Actor being monitored	EETS Provider
Period of monitoring	Monthly (per calendar month)
Data and calculation of the KPI	<p>Every time there is a case of discrepancies between RSE detection and the exception list, the KPI_DE8 counter will be increased by 1.</p> <p>The KPI is based on a per case basis observation scheme.</p>
Exclusion to the KPI	Either KPI_DE8 or KPI_DE9 can be triggered for one case, hence, double penalization in relation to data quality of exception list handling will not take place.

Issues or other aspects affecting the KPI	Transfer of whitelist must happen according to Exception Lists handling procedure described in Annex E (Technical Conditions).
Reporting	Reporting on KPI_DE8 shall takes place calendar monthly by the Toll Charger and shall be done to the EETS Provider in case required KPI Target Service Level is breached.
Penalty level and calculation	2250 DKK per case as deduction of remuneration.

6.9 Data quality of Blacklists

KPI_DE9	Data quality of Blacklists
The purpose of the KPI	The purpose of KPI_DE9 is to ensure the consistency and quality of the Blacklists transferred from the EETS Provider to the Toll Charger. Non-consistency poses an enforcement process issue.
Description of the process	Data quality of the transferred Blacklists are measured by the DSRC readings from equipped vehicles compared with the Blacklists transferred from the EETS Provider to the Toll Charger. Based on OBE Type 1 CCC transactions at RSE the Toll Charger will perform validation against the Blacklist to check compliance as issued and blacklisted OBE from the EETS Provider is on the Blacklist when bringing detected on the KmToll Domain. The Blacklist used for this compilation is the Blacklist acknowledged by the Toll Charger at the time of the DSRC reading at the roadside.
Target Service Level of the KPI	0 events where the Toll Charger detects an OBE Type 1 at the RSE from the EETS provider active for the KmToll Domain which cannot be validated against the Blacklist and is also not whitelisted, hence, the compilation of the Blacklist is not correct.
Actor being monitored	EETS Provider
Period of monitoring	Monthly (per calendar month)
Data and calculation of the KPI	Every time there is a case of discrepancies between RSE detection and the Blacklist, the KPI_DE9 counter will be increased by 1. The KPI is based on a per case basis observation scheme.
Exclusion to the KPI	Either KPI_DE8 or KPI_DE9 can be triggered for one case, hence, double penalization in relation to data quality of exception list handling will not take place.
Issues or other aspects affecting the KPI	Transfer of Blacklist must happen according to Exception Lists handling procedure described in Annex E (Technical Conditions).
Reporting	Reporting on KPI_DE9 shall takes place calendar monthly by the Toll Charger and shall be done to the EETS Provider in case required KPI Target Service Level is breached.
Penalty level and calculation	2250 DKK per case as deduction of remuneration.

6.10 GNSS data quality_rural

KPI_DE10	GNSS data quality_rural
The purpose of the KPI	The purpose of KPI_DE10 is to ensure GNSS positioning quality that allows the Toll Charger to calculate Toll with high accuracy.
Description of the process	A toll segment listed as a non-environmental zone toll segment is considered a rural area toll segment. All toll segments are listed in the KmToll Law governing the EETS Domain as either a toll segment within environmental zone or outside an environmental zone.

	<p>GNSS locational data delivered in Toll Declarations to the Toll Charger from the EETS Provider form the basis of the toll calculation by identifying used toll segments. In case of e.g. low accuracy or missing data in sequence, the Toll Charger performs 'gap-closing' between toll segments identified with high confidence.</p> <p>By counting the number of rural toll segments identified both without or with gap-closing during the period of monitoring, the percentage of toll segments which are identified through gap-closing is established of per EETS Provider.</p> <p>The above calculation is performed for all EETS Providers, and by averaging these across EETS Providers where toll collection has been performed in the monitoring period, a baseline for the period is calculated – on which a tolerance level above the global average is allowed.</p>
<p>Target Service Level of the KPI</p>	<p>The measured performance for the EETS Provider must not deviate more than 35% above the average performance across all EETS Providers.</p> <p>Note: The Target Service Level will be re-assessed and updated after the first three (3) calendar months of operation (following go-live), and applied after six (6) calendar months.</p>
<p>Actor being monitored</p>	<p>EETS Provider</p>
<p>Period of monitoring</p>	<p>Monthly (per calendar month)</p>
<p>Data and calculation of the KPI</p>	<p>Rural toll segments within acknowledged Billing Details form the data foundation for the KPI. Each toll segment is stated in the Billing Detail holds information on the method of toll segment identification as either identified with or without gap-closing. An average is calculated based on all rural toll segments.</p> <p>KPI formula:</p> <p>(1)</p> $Average_{EP} = \frac{\text{\# of rural toll segments identified through gap_closing}}{\text{total \#number of rural toll segments identified}}$ <p>(2)</p> $Average\ all\ EPs = \frac{\sum_{i=0}^n average_i + \dots + average_n}{n}$ <p>where</p> <p>N = number of active (toll collection performed) EETS Providers in the period.</p> <p>The performance for the EETS Provider must not deviate more than 35% above the average performance across all EETS Providers.</p> <p><u>Example 1:</u></p> <ul style="list-style-type: none"> • Percentage of segments requiring gap closing for EP₁ = 2% • Average all EPs = 1,8% <p>EP₁ performance is 11% above the average for all EETS Providers which is below the threshold of 35% and therefore within the allowed performance tolerance, hence a KPI compliant performance. Example 1 does not incur a penalty.</p> <p><u>Example 2:</u></p> <ul style="list-style-type: none"> • Percentage of segments requiring gap closing for EP₁= 2.5% • Average all EPs = 1,8% <p>EP₁ performance is 39% above the average for all EETS Providers which is above the threshold of 35% and therefore not within the allowed performance tolerance, hence a not KPI compliant performance. Example 2 does incur a penalty.</p>

Exclusion to the KPI	None.
Issues or other aspects affecting the KPI	The Toll Charger performs all toll segment identification centrally in the GNSS Tolling Engine – hence all GNSS locational data within Toll Declarations across EETS Providers will be treated equally during the monitoring period.
Reporting	Reporting on KPI_DE10 shall take place calendar monthly by the Toll Charger and shall be done to the EETS Provider in case required KPI Target Service Level is breached.
Penalty level and calculation	10% of monthly remuneration.

6.11 GNSS data quality_urban

KPI_DE11	GNSS data quality_urban
The purpose of the KPI	The purpose of KPI_DE11 is to ensure high quality of GNSS locational data delivered to the Toll Charger to allow Toll calculated with high accuracy.
Description of the process	<p>A toll segment listed as a non-environmental zone toll segment is considered a rural area toll segment. All toll segments are listed in the KmToll Law governing the EETS Domain as either a toll segment within environmental zone or outside an environmental zone.</p> <p>GNSS locational data delivered in Toll Declarations to the Toll Charger from the EETS Provider form the basis of the toll calculation by identifying used toll segments. In case of e.g. low accuracy or missing data in sequence, the Toll Charger performs 'gap-closing' between toll segments identified with high confidence.</p> <p>By counting the number of urban toll segments identified either without or with gap-closing during the period of monitoring, the percentage of toll segments which are identified through gap-closing is established per EETS Provider.</p> <p>The above calculation is performed for the EETS Provider, and by averaging these across EETS Providers where toll collection has been performed in the monitoring period, a baseline for the period is calculated – on which a tolerance level above the global average is allowed.</p>
Target Service Level of the KPI	<p>The measured performance for the EETS Provider must not deviate more than 35% above the average performance across EETS Providers.</p> <p>Note: The Target Service Level will be re-assessed and updated after the first three (3) calendar months of operation (following go-live), and applied after six (6) calendar months.</p>
Actor being monitored	EETS Provider
Period of monitoring	Monthly (per calendar month)
Data and calculation of the KPI	<p>Urban toll segments within an acknowledged Billing Details form the data foundation for the KPI. Each toll segment is stated in the Billing Detail holds information on the method of toll segment identification as either identified with or without gap-closing. An average is calculated based on urban all toll segments.</p> <p>KPI formula:</p> <p>(1)</p> $Average, EP = \frac{\# \text{ of rural toll segments identified through gap_closing}}{\text{total \#number of urban toll segments identified}}$ <p>(2)</p> $average \text{ all EPs} = \frac{\sum_{i=0}^n average_i + \dots + average_n}{n}$ <p>where</p>

	<p>N = number of active (toll collection performed) EETS Providers in the period.</p> <p>The performance for the EETS Provider must not deviate more than 35% above the average performance across all EETS Providers.</p> <p><u>Example 1:</u></p> <ul style="list-style-type: none"> Percentage of segments requiring gap closing for EP₁ = 2% Average all EPs = 1,8% <p>EP₁ performance is 11% above the average for all EETS Providers which is below the threshold of 35% and therefore within the allowed performance tolerance, hence a KPI compliant performance. Example 1 do not incur a penalty.</p> <p><u>Example 2:</u></p> <ul style="list-style-type: none"> Average EP₁ = 2.5% Average all EPs = 1,8% <p>EP₁ performance is 39% above the average for all EETS Providers which is above the threshold of 35% and therefore not within the allowed performance tolerance, hence a not KPI compliant performance. Example 2 does incur a penalty.</p>
Exclusion to the KPI	None.
Issues or other aspects affecting the KPI	The Toll Charger performs all toll segment identification centrally in the GNSS Tolling Engine – hence all GNSS locational data within Toll Declarations across EETS Providers will be treated equally during the monitoring period.
Reporting	Reporting on KPI_DE11 shall takes place calendar monthly by the Toll Charger and shall be done to the EETS Provider in case required KPI Target Service Level is breached.
Penalty level and calculation	10% of monthly remuneration.

6.12 **Continuous low GNSS data quality_rural**

KPI_DE12	Continuous low GNSS data quality_rural
The purpose of the KPI	The purpose of KPI_DE12 is to ensure that low quality of GNSS locational data delivered to the Toll Charger to allow Toll to be calculated with high accuracy is addressed and resolved in a timely manner.
Description of the process	<p>A toll segment not listed as an environmental zone toll segment is considered a rural area toll segment. All toll segments are listed in the KmToll Law governing the EETS Domain as either a toll segment within environmental zone or outside an environmental zone.</p> <p>GNSS locational data delivered in Toll Declarations to the Toll Charger from the EETS Provider form the basis of the toll calculation by identifying used toll segments. In case of e.g. low accuracy or missing data in sequence, the Toll Charger performs 'gap-closing' between toll segments identified with high confidence.</p> <p>By counting the number of rural toll segments identified either without or with gap-closing during the period of monitoring, the percentage of toll segments which are identified through gap-closing is established per EETS Provider.</p> <p>The above calculation is performed for the EETS Provider, and by averaging these across EETS Providers where toll collection has been performed in the monitoring period, a baseline for the period is calculated – on which a tolerance level above the global average is allowed.</p> <p>The GNSS data quality is measured calendar monthly. The KPI track and compare performance for the most recent three (3) calendar months. Performance above</p>

	the Target Service Level is not allowed for three (3) continuous calendar months in a row.
Target Service Level of the KPI	<p>The measured performance for the EETS Provider is not allowed to be non-compliant with the tolerance level of 15% above the average performance across EETS Providers for three (3) calendar months in a row.</p> <p>Note: The Target Service Level will be re-assessed and updated after the first three (3) calendar months of operation (following go-live) and applied after six (6) calendar months.</p>
Actor being monitored	EETS Provider
Period of monitoring	Monthly (per calendar month)
Data and calculation of the KPI	<p>Rural toll segments within acknowledged Billing Details form the data foundation for the KPI. Each toll segment is stated in the Billing Detail holds information on the method of toll segment identification as either identified with or without gap-closing. An average is calculated based on urban all toll segments.</p> <p>KPI formula:</p> <p>(1)</p> $Average, EP = \frac{\text{\# of rural toll segments identified through gap closing}}{\text{total \#number of rural toll segment identified}}$ <p>(2)</p> $average\ all\ EPs = \frac{\sum_{i=0}^n average_i + \dots + average_n}{n}$ <p>where</p> <p>N = number of active (toll collection performed) EETS Providers in the period.</p> <p>The performance for the EETS Provider must not deviate more than 15% above the average performance across all EETS Providers.</p> <p>Count the number of calendar months in the recent three calendar months where the allowed performance is breached.</p> <p><u>Example 1:</u></p> <ul style="list-style-type: none"> • EP₁ at the end of monitoring period <ul style="list-style-type: none"> ○ Month 1: Compliant (performance within tolerance) ○ Month 2: Non-compliant (performance not within tolerance) ○ Month 3: Compliant <p>Performance do not result penalty for example 1.</p> <p><u>Example 2:</u></p> <ul style="list-style-type: none"> • EP₁ at the end of monitoring period <ul style="list-style-type: none"> ○ Month 1: Non-compliant (performance not within tolerance) ○ Month 2: Non-compliant (performance not within tolerance) ○ Month 3: Non-compliant (performance not within tolerance) <p>Performance result in a penalty for example 2.</p>
Exclusion to the KPI	First three (3) calendar months of operation is excluded from the calculation.
Issues or other aspects affecting the KPI	The Toll Charger performs all toll segment identification centrally in the GNSS Tolling Engine – hence all GNSS locational data within Toll Declarations across EETS Providers will be treated equally during the monitoring period.

Reporting	Reporting on KPI_DE12 shall take place calendar monthly by the Toll Charger and shall be done to the EETS Provider in case required KPI Target Service Level is breached.
Penalty level and calculation	20% of monthly remuneration.

6.13 Continuous low GNSS data quality_urban

KPI_DE13	Continuous low GNSS data quality_urban
The purpose of the KPI	The purpose of KPI_DE13 is to ensure that low quality of GNSS locational data is addressed and resolved in a timely manner.
Description of the process	<p>A toll segment listed as an environmental zone toll segment is considered a urban area toll segment. All toll segments are listed in the KmToll Law governing the toll domain as either a toll segment within environmental zone or outside an environmental zone.</p> <p>GNSS locational data delivered in Toll Declarations to the Toll Charger from the EETS Provider form the basis of the toll calculation by identifying used toll segments. In case of e.g. low accuracy or missing data in sequence, the Toll Charger performs 'gap-closing' between toll segments identified with high confidence.</p> <p>By counting the number of urban toll segments identified either without or with gap-closing during the period of monitoring, the percentage of toll segments which are identified through gap-closing is established per EETS Provider.</p> <p>The above calculation is performed for the EETS Provider, and by averaging these across EETS Providers where toll collection has been performed in the monitoring period, a baseline for the period is calculated – on which a tolerance level above the global average is allowed.</p> <p>The GNSS data quality is measured calendar monthly. The KPI track and compare performance for the most recent three (3) calendar months. Performance above the Target Service Level is not allowed for three (3) continuous calendar months in a row.</p>
Target Service Level of the KPI	<p>The measured performance for the EETS Provider is not allowed to be non-compliant with the tolerance level of 15% above the average performance across EETS Providers for three (3) calendar months in a row.</p> <p>Note: The Target Service Level will be re-assessed and updated after the first three (3) calendar months of operation (following go-live) and applied after six (6) calendar months.</p>
Actor being monitored	EETS Provider
Period of monitoring	Monthly (per calendar month)
Data and calculation of the KPI	<p>Urban toll segments within an acknowledged Billing Detail form the data foundation for the KPI. Each toll segment is stated in the Billing Detail hold information on the method of toll segment identification as either identified with or without gap-closing. An average is calculated based on urban all toll segments.</p> <p>KPI formula:</p> <p>(1)</p> $Average, EP = \frac{\# \text{ of urban toll segments identified through gap-closing}}{\text{total \#number of urban toll segments identified}}$ <p>(2)</p> $average \text{ all EPs} = \frac{\sum_{i=0}^n average_i + \dots + average_n}{n}$ <p>where</p>

	<p>N = number of active (toll collection performed) EETS Providers in the period.</p> <p>The performance for the EETS Provider must not deviate more than 15% above the average performance across all EETS Providers.</p> <p>Count the number of calendar months in the recent three (3) calendar months where the allowed performance is breached.</p> <p><u>Example 1:</u></p> <ul style="list-style-type: none"> • EP₁ at the end of monitoring period <ul style="list-style-type: none"> ○ Month 1: Compliant (performance within tolerance) ○ Month 2: Non-compliant (performance not within tolerance) ○ Month 3: Compliant <p>Performance do not result penalty for example 1.</p> <p><u>Example 2:</u></p> <ul style="list-style-type: none"> • EP₁ at the end of monitoring period <ul style="list-style-type: none"> ○ Month 1: Non-compliant (performance not within tolerance) ○ Month 2: Non-compliant (performance not within tolerance) ○ Month 3: Non-compliant (performance not within tolerance) <p>Performance result in a penalty for example 2.</p>
Exclusion to the KPI	First three (3) calendar months of operation is excluded from the calculation.
Issues or other aspects affecting the KPI	The Toll Charger perform all toll segment identification centrally in the GNSS Tolling Engine – hence all GNSS locational data within Toll Declarations across EETS Providers will be treated equally during the monitoring period.
Reporting	Reporting on KPI_DE13 shall takes place calendar monthly by the Toll Charger and shall be done to the EETS Provider in case required KPI Target Service Level is breached.
Penalty level and calculation	20% of monthly remuneration.

6.14 **Availability of the EETS Provider**

KPI_AV1	Availability of the EETS Provider
The purpose of the KPI	The purpose of KPI_AV1 is to ensure that the EETS Provider’s back office interfaces toward the Toll Charger is available for data transfer.
Description of the process	The Toll Charger will monitor availability of the EETS Provider based on interface responses sent by the EETS Provider’s interfaces when the Toll Charger transfers data through interfaces towards the EETS Provider. The interface is considered available when the payload is delivered by the API within three (3) retries performed within a timeframe of 15 minutes.
Target Service Level of the KPI	99,90%
Actor being monitored	EETS Provider
Period of monitoring	Monthly (per calendar month)
Data and calculation of the KPI	The Toll Charger will collect, and count interfaces responses provided by the EETS Provider’s interfaces each time a data transfer towards the EETS Provider is made. KPI calculation:

	<p>KPI_AV1 = $(1 - \text{NIRN} / \text{NIR})$</p> <p>where</p> <p>NIRN = Number of interface negative responses.</p> <p>NIR = Number of successful data transfers.</p>
Exclusion to the KPI	Periods of Agreed System Downtime are excluded from the KPI calculation.
Issues or other aspects affecting the KPI	None.
Reporting	Reporting on KPI_AV1 shall take place calendar monthly by the Toll Charger and shall be done to the EETS Provider in case required KPI Target Service Level is breached.
Penalty level and calculation	<p>Penalty level = 5% of monthly remuneration</p> <p>Penalty calculation: Penalty amount = RM * penalty level</p> <p>where</p> <p>RM = Remuneration for the monitoring period Penalty level = 5%</p>

6.15 Incident management

KPI_SE1	Incident management
The purpose of the KPI	The purpose of KPI_SE1 is to ensure the ability of the EETS Provider to conduct incident management towards the Toll Charger.
Description of the process	<p>For all incidents with "Urgent" criticality, as defined in Annex I (Service Conditions), the EETS Provider must have responded within two (2) hours and having provided a timeframe for corrective actions within four (4) hours during normal working hours.</p> <p>The EETS Provider must log the time of receiving incidents from the Toll Charger and when the EETS Provider respond to each individual incident. For incidents classified as "Urgent" by the Toll Charger when sent to the EETS Provider the EETS Provider must measure and adhere to defined response Target Service Level.</p>
Target Service Level of the KPI	100%
Actor being monitored	EETS Provider
Period of monitoring	Monthly (per calendar month)
Data and calculation of the KPI	<p>Based on the monthly number of incidents reported by the Toll Charger to the EETS Provider the EETS Provider must note the number of incidents with "Urgent" criticality and note its response time.</p> <p>Every time the EETS Provider do not provide a response within the allowed timeframe, the KPI_SE3 counter will be increased by 1.</p> <p>The KPI is based on a per case basis observation scheme.</p>
Exclusion to the KPI	This KPI does not include incidents with "Low", "Normal" and/or "High" criticality. This KPI does not include the EETS Provider's remediation time, however, the EETS Provider is required to also provide expected remediation time related to the incidents as described in the Target Service Level.
Issues or other aspects affecting the KPI	Measurement is made during working hours 09.00-16.00 CET/CEST.

Reporting	Reporting on KPI_SE1 shall takes place calendar monthly by the Toll Charger and shall be done to the EETS Provider in case required KPI Target Service Level is breached.
Penalty level and calculation	2250 DKK per case as deduction of remuneration.

7 NON-COMPLIANCE WITH KPIS AND REDUCTION OF REMUNERATION

In case the EETS Provider does not comply with a KPI during a period of monitoring, a reduction in remuneration paid to the EETS Provider may be applied on a calendar quarterly basis.

A case is considered to be subject to penalty when the EETS Provider does not comply with the specified KPI once or multiple times. Reduction in remuneration is per KPI basis and is accumulated in case the EETS Provider does not comply with multiple individual KPIS within the monitoring period. If a case is not remedied within the time period mentioned next to the respective KPI it will be considered as a new case until the requirements is fulfilled.

Reduction in remuneration depends on the importance of the KPI to the Toll Charger. An overview of how much the remuneration may be reduced depending on the KPI can be found in Table 2. The reduction of the remuneration however can never exceed 50% in any given calendar month.

Table 2. Reduction of Remuneration

Reference	Title	Target Ser-vice Level	Frequency	Reduction of remuneration
KPI_DE1	Timeliness of Toll Declarations – short timeframe	95,00%	Monthly	5% of monthly remuneration
KPI_DE2	Timeliness of Toll Declarations – long timeframe	99,95%	Monthly	10% of monthly remuneration
KPI_DE3a	Detection of OBE Type 1 anomaly	0,1%	Monthly	DKK 2250 per case
KPI_DE3b	Detection of OBE Type 2 anomaly	0,1%	Monthly	DKK 2250 per case
KPI_DE4	Data format quality of Toll Declarations	99,99%	Monthly	1% of monthly remuneration
KPI_DE5	Vehicle descrip-tion validity	0	On request by TC	DKK 1225 per case
KPI_DE6	Timeliness full of Whitelists	96,00%	Quarterly	5% of monthly remuneration Note: Currently not applicable.
KPI_DE7	Timeliness full of Blacklists	96,00%	Quarterly	5% of monthly remuneration Note: Currently not applicable.
KPI_DE8	Data quality of Whitelists	0	Monthly	DKK 2250 per case
KPI_DE9	Data quality of Blacklists	0	Monthly	DKK 2250 per case

Annex G (Key Performance Indicators)

Annex to the EETS Domain Statement concerning the Danish Kilometer Tolling Scheme

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KPI_DE10	GNSS data quality_rural	35%	Monthly	10% of monthly remuneration
KPI_DE11	GNSS data quality_urban	35%	Monthly	10% of monthly remuneration
KPI_DE12	Continuous low GNSS data quality_rural	0	Monthly	20% of monthly remuneration
KPI_DE13	Continuous low GNSS data quality_urban	0	Monthly	20% of monthly remuneration
KPI_AV1	Availability of the EETS Provider	99,90%	Monthly	5% of monthly remuneration
KPI_SER1	Incident management	100%	Monthly	DKK 2250 per case