ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

WAKA KOTAHI HAWKES BAY AND GENESIS ENERGY
NZBN: 9429037706609

Prepared by: Rebecca Elliot

Date audit commenced: 2 May 2023

Date audit report completed: 14 August 2023

Audit report due date: 1 September 2023

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This audit of the **Waka Kotahi Hawkes Bay (Waka Kotahi)** DUML database and processes was conducted at the request of **Genesis Energy (Genesis)** in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

ICPs 0000939905HB23E and 7012031000CH80C have switched from Meridian Energy to Genesis Energy. The Waka Kotahi Hawkes Bay database is now one audit.

The field audit found that the database accuracy fell just outside of the allowable +/-5% threshold with the range being between 94.8% to 100.7% resulting in a potential estimated over submission of 14,700 kWh per annum.

The change management processes are robust and the database is relatively static.

I have repeated the last audit's recommendation that the light make and model descriptions require more detail to ensure that the correct wattage is being applied.

This audit found four non-compliances and two recommendations are made. The future risk rating of six indicates that the next audit be completed in 18 months' time. I have considered this in conjunction with:

- the robust change management processes in place,
- the size of the database,
- the static nature of the dataset, and
- Genesis' comments and agree with this recommendation.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	11(1) of Schedule 15.3	Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 14,700 kWh per annum. Monthly database snapshot being used to calculate submission, so changes made at a daily level are not tracked.	Moderate	Low	2	Investigating
All load recorded in database	2.5	11(2A) of Schedule 15.3	Two additional items of load identified by the field audit.	Strong	Low	1	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 14,700 kWh per annum. Luminaire make and model information is insufficient to identify the specific items of load.	Strong	Low	1	Investigating
Volume information accuracy	3.2	15.2 and 15.37B(c)	Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 14,700 kWh per annum. Monthly database snapshot being used to calculate submission, so changes made at a daily level are not tracked.	Moderate	Low	2	Investigating
Future Risk Rating						6	

Future risk rating	0	1-4	5-8	9-15	16/18	19+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

RECOMMENDATIONS

Subject	Section	Recommendation
Database accuracy	3.1	Genesis to liaise with Waka Kotahi and Napier City Council to confirm which database light ID 65203 is to be reconciled to.
		Update lamp descriptions so that wattage can be derived.

ISSUES

Subject	Section	Description	Issue
		Nil	

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code

Code reference

Section 11 of Electricity Industry Act 2010.

Code related audit information

Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

Audit observation

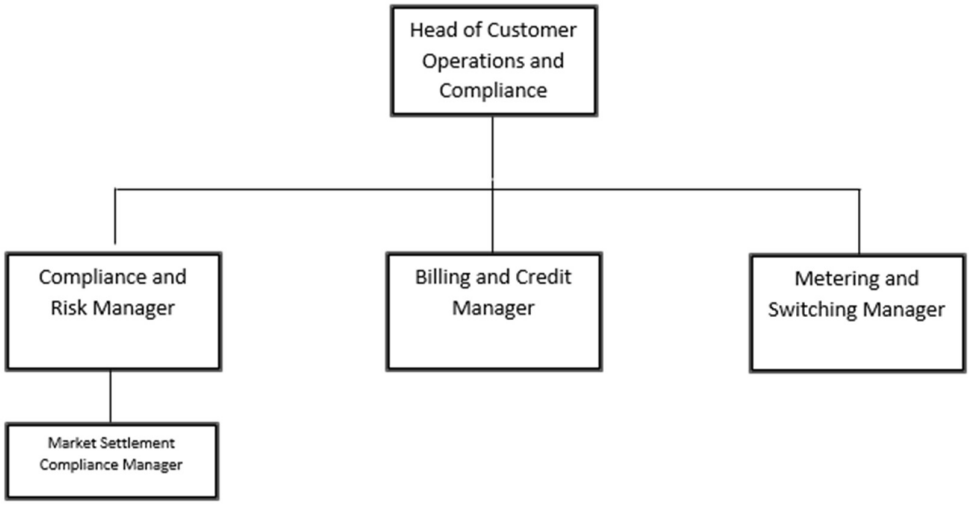
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

There are no exemptions in place relevant to the scope of this audit:

1.2. Structure of Organisation

Genesis Energy provided a copy of their organisational structure.



1.3. Persons involved in this audit

Auditor:

Rebecca Elliot

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Johan van Staden	Risk & Compliance Specialist	Genesis Energy
Shantelle Comer	Customer Operations Data and Systems Specialist	Genesis Energy
Kara Atkinson	Director	NZ Streetlighting

1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by Thinkproject Ltd. The database is commonly known as "RAMM" which stands for "Roading Asset and Maintenance Management". The specific module used for DUML is called RAMM Contractor.

Stantec confirmed that the database back-up is in accordance with standard industry procedures. Access to the database is secure by way of password protection.

Systems used by the trader to calculate submissions are assessed as part of their reconciliation participant audits.

1.5. Breaches or Breach Allegations

There are no breach allegations relevant to the scope of this audit.

1.6. ICP Data

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0000048330HB687	STREETLIGHTING MASTER ICP GXP - WTU0331	WTU0331	NST	111	18,598
0000048331HBAC2	STREETLIGHTING MASTER ICP GXP - FHL0331	FLH0331	NST	129	24,321
0000939905HB23E	STREETLIGHTING MASTER ICP GXP – RDF0331	RDF0331	NST	679	125,391
7012031000CH80C	STREETLIGHTING MASTER ICP GXP – WPW0331	WPW0331	CST	139	24,054
TOTAL				1,058	192,364

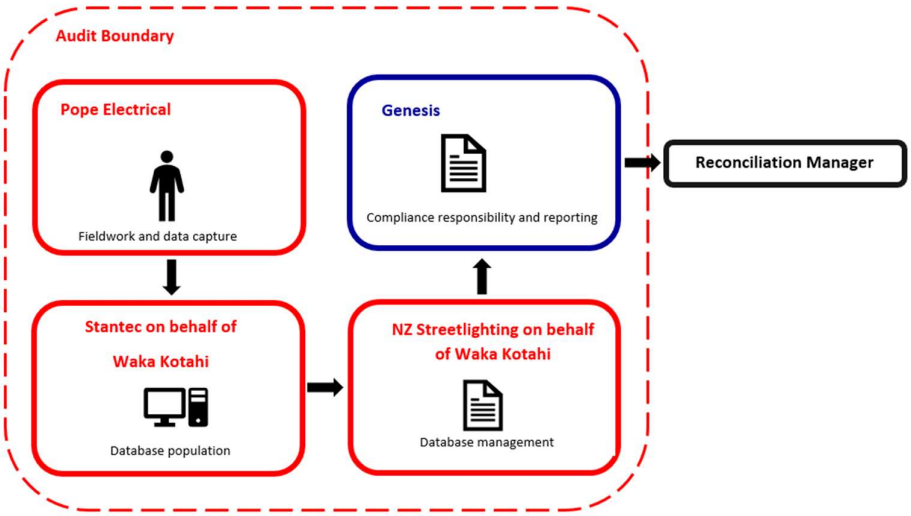
ICPs 0000939905HB23E and 7012031000CH80C have switched from Meridian Energy to Genesis Energy, so the Waka Kotahi Hawkes Bay is now one audit.

1.7. Authorisation Received

All information was provided directly by Genesis, NZ Streetlighting and Stantec.

1.8. Scope of Audit

The database is remotely hosted Thinkproject Ltd and is managed by Stantec on behalf of Waka Kotahi, who is Genesis's customer. Reporting is provided to Genesis on a monthly basis by NZ Streetlighting. The RAMM database is updated by Stantec. The fieldwork and asset data capture are conducted by Pope Electrical. The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information based on the database reporting. The diagram below shows the audit boundary for clarity.



The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

The field audit was undertaken of all 239 items of load in July 2023.

1.9. Summary of previous audit

The previous audit was conducted in January 2022 by Steve Woods of Veritek Limited. The audit found four non-compliances and made no recommendations. The status of compliance against the relevant clauses is detailed in the table below:

Subject	Section	Clause	Non-Compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Under submission occurred by 1,392 kWh per annum due to minor database errors. The current monthly report does not include asset removal dates, so if a light is removed during the month, it does not appear for the entire month.	Still existing
All load recorded in database	2.5	11(2A) of Schedule 15.3	One additional item of load identified by the field audit.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	43 items of load have the incorrect ballast applied. Delays in updating the database for new connections. Four errors identified by the field audit. Luminaire make and model information is insufficient to identify the specific items of load.	Cleared Cleared Still existing Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	Under submission occurred by 1,392 kWh per annum due to minor database errors. The current monthly report does not include asset removal dates, so if a light is removed during the month, it does not appear for the entire month.	Still existing

1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F)

Code reference

Clause 16A.26 and 17.295F

Code related audit information

Retailers must ensure that DUML database audits are completed:

1. *by 1 June 2018 (for DUML that existed prior to 1 June 2017)*
2. *within three months of submission to the reconciliation manager (for new DUML)*
3. *within the timeframe specified by the Authority for DUML that has been audited since 1 June 2017.*

Audit observation

Genesis have requested Veritek to undertake this streetlight audit.

Audit commentary

This audit report confirms that the requirement to conduct an audit has been met for this database within the required timeframe.

Audit outcome

Compliant

2. DUML DATABASE REQUIREMENTS

2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)

Code reference

Clause 11(1) of Schedule 15.3

Code related audit information

The retailer must ensure the:

- *DUML database is up to date, and*
- *methodology for deriving submission information complies with Schedule 15.5.*

Audit observation

The process for calculation of consumption was examined.

Audit commentary

Genesis reconciles this DUML load using the NST profile for the three ICPs on the Unison network and the CST profile for the ICP on the Central Hawkes Bay network. The on and off times are derived from a data logger.

I checked the submission calculation provided by Genesis for June 2023 and found it was accurate.

As detailed in **section 3.1**, in absolute terms, total annual consumption is estimated to be 14,700 kWh lower than the DUML database indicates. This is outside the allowable +/- 5% variance threshold and is recorded as non-compliance below.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

Due to a change of staff the process recorded in the last audit has been paused and the database snapshot is used to calculate the monthly kW value. Previously, the data was imported into a database, and this was used the asset install dates to calculate active days for each item of load. Where the dates were null, a historic date was entered to ensure the item of load was recorded for the full month. This is recorded as non-compliance as changes are not being tracked at a daily basis as required by the code.

The last report noted that the monthly database report did not include asset removal dates where a light was removed or replaced with another light. I confirmed that the monthly reports being provided do include the light replacement value but not where a light is removed. Genesis is working with NZ Streetlighting to get this information included in the report.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Feb-22 To: 30-Apr-23	Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 14,700 kWh per annum. Monthly database snapshot being used to calculate submission, so changes made at a daily level are not tracked. Potential impact: Low Actual impact: Low Audit history: Twice previously Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate overall but there is room for improvement. The audit risk rating is low based on the estimated kWh impact to the market.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis and our customer will seek to identify recent-historic removal dates and input these into the database where possible.	1/11/2023	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will work with our customer to identify a and implement a robust way to track removal dates in the future.	1/1/2024	

2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)

Code reference

Clause 11(2)(a) and (aa) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *each ICP identifier for which the retailer is responsible for the DUML, and*
- *the items of load associated with the ICP identifier.*

Audit observation

The database was checked to confirm an ICP is recorded for each item of load.

Audit commentary

An ICP is recorded for each item of load.

Audit outcome

Compliant

2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

The DUML database must contain the location of each DUML item.

Audit observation

The database was checked to confirm the location is recorded for all items of load.

Audit commentary

The database contains the nearest street address, pole numbers and Global Positioning System (GPS) coordinates for each item of load, and users in the office and field can view these locations on a mapping system.

Audit outcome

Compliant

2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)

Code reference

Clause 11(2)(c) and (d) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *a description of load type for each item of load and any assumptions regarding the capacity*
- *the capacity of each item in watts.*

Audit observation

The database was checked to confirm that it contained a field for lamp type and wattage capacity and included any ballast or gear wattage.

Audit commentary

Lamp make, lamp model, lamp wattage and ballast wattage fields are included in the database and all were populated.

Audit outcome

Compliant

2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)

Code reference

Clause 11(2A) of Schedule 15.3

Code related audit information

The retailer must ensure that each item of DUML for which it is responsible is recorded in this database.

Audit observation

The field audit was undertaken of all 239 items of load.

Audit commentary

The field audit discrepancies are summarised in the table below.

Error type	Quantity
Additional lights found in the field	2
Incorrect wattage	10
Lights not found in the field	0
Total	12

Two additional lights found in the field therefore non-compliance is recorded.

The accuracy of the database is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 01-Feb-22 To: 30-Apr-23	Two additional items of load identified by the field audit. Potential impact: Low Actual impact: Low Audit history: Twice previously Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as strong. Lighting designs and as-built plans are reviewed to ensure the database is accurate. This one error does not indicate a systemic issue. The impact on settlement and participants is minor; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis and our customer will include the identified lights in the audit to the database.	1/11/2023	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis and our customer will review our controls to identify how this non-compliance occurred, strengthening these controls if possible.	1/11/2023	

2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3)

Code reference

Clause 11(3) of Schedule 15.3

Code related audit information

The DUML database must track additions and removals in a manner that allows the total load (in kW) to be retrospectively derived for any given day.

Audit observation

The process for tracking of changes in the database was examined.

Audit commentary

The RAMM database functionality achieves compliance with the code.

The change management process and the compliance of the database reporting provided to Genesis is detailed in **sections 3.1** and **3.2**.

Audit outcome

Compliant

2.7. Audit trail (Clause 11(4) of Schedule 15.3)

Code reference

Clause 11(4) of Schedule 15.3

Code related audit information

The DUML database must incorporate an audit trail of all additions and changes that identify:

- *the before and after values for changes*
- *the date and time of the change or addition*
- *the person who made the addition or change to the database.*

Audit observation

The database was checked for audit trails.

Audit commentary

The database contains a complete audit trail of all additions and changes to the database information.

Audit outcome

Compliant

3. ACCURACY OF DUML DATABASE

3.1. Database accuracy (Clause 15.2 and 15.37B(b))

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

Audit must verify that the information recorded in the retailer's DUML database is complete and accurate.

Audit observation

The DUML Statistical Sampling Guideline was used to determine the database accuracy. The table below shows the survey plan.

Plan Item	Comments
Area of interest	Waka Kotahi streetlights in and around Hawkes Bay area from just north of Napier down to Central Hawkes Bay
Strata	The database contains 1,058 items of load in the Waka Kotahi Hawkes Bay area area. The processes for the management of all Waka Kotahi items of load is the same. I selected the following strata based on road name protocol: • roads 002-0577/14.59- 002-0658/09.33-I, • roads 002-0658/12.49 - 050-0000 C, • roads 050-0000 D - 051-0000-D 2, and • roads 051-0000-D 3 - 051-0018-W
Area units	I created a pivot table of the roads in each database and used a random number generator in each spreadsheet to select a total of 16 sub-units.
Total items of load	173 items of load were checked.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority against the database or in the case of LED lights against the LED light specification.

The change management process and timeliness of database updates was evaluated.

Audit commentary

Database accuracy based on the field audit

A field audit was conducted of a statistical sample of 173 items of load. The "database auditing tool" was used to analyse the results, which are shown in the table below.

Result	Percentage	Comments
The point estimate of R	98.2	Wattage from survey is lower than the database wattage by 1.8%
R_L	94.8	With a 95% level of confidence, it can be concluded that the error could be between -5.2% and 0.7%
R_H	100.7	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019 and the table below shows that Scenario C (detailed below) applies.

The conclusion from Scenario C is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 5.2% lower and 0.7% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 3.0 kW higher than the database indicates.

There is a 95% level of confidence that the installed capacity is between 10 kW lower to 1.0 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 14,700 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 42,700 kWh p.a. lower to 5,400 kWh p.a. higher than the database indicates.

Scenario	Description
A - **Good accuracy, good precision**	This scenario applies if: (a) R_H is less than 1.05; and (b) R_L is greater than 0.95 The conclusion from this scenario is that: (a) the best available estimate indicates that the database is accurate within +/- 5 %; and (b) this is the best outcome.
B - **Poor accuracy, demonstrated with statistical significance**	This scenario applies if: (a) the point estimate of R is less than 0.95 or greater than 1.05 (b) as a result, either R_L is less than 0.95 or R_H is greater than 1.05. There is evidence to support this finding. In statistical terms, the inaccuracy is statistically significant at the 95% level
C - **Poor precision**	This scenario applies if: (a) the point estimate of R is between 0.95 and 1.05 (b) R_L is less than 0.95 and/or R_H is greater than 1.05 The conclusion from this scenario is that the best available estimate is not precise enough to conclude that the database is accurate within +/- 5 %

ICP accuracy

Light ID 65203 is recorded against the Waka Kotahi ICP 0000939905HB23E. This is believed to be a Napier City Council owned spotlight but is not recorded in that database. I recommend that Genesis as the trader for both databases works with Napier City Council and Waka Kotahi to confirm where this asset should b be recorded.

Description	Recommendation	Audited party comment	Remedial action
ICP accuracy	Genesis to liaise with Waka Kotahi and Napier City Council to confirm which database light ID 65203 is to be reconciled to.	Genesis agrees that this is likely owned by Napier City Council. Genesis has contacted the Council and will work with them to move this asset to their database.	Identified

Lamp description and capacity accuracy

Analysis of the database found all lights were correctly recorded.

As reported in the last audit, the light make and model descriptions do not always contain sufficient information to derive the wattage from either a plan or a specification sheet. For example, the ITALO 2 0F3 STE-M 4.7-6M 150-watt luminaire is recorded as ITALO 2-Veh. I recommend that the light descriptions are updated so they can derive the wattage.

Description	Recommendation	Audited party comment	Remedial action
Database accuracy	Update lamp descriptions so that wattage can be derived.	Genesis will work with out customer to update lamp descriptions where possible and where accuracy is questioned.	Investigating

Change management process findings.

The processes were reviewed for new lamp connections and the tracking of load changes due to faults and maintenance. All fault and maintenance work is overseen by NZ Streetlighting. Stantec update the database and the field work is and conducted by Pope Electrical.

For new installations, or an alteration to load requires an application. This is reviewed by NZ Streetlighting and then passed to the Retailer and the Network to progress. An expected livening date is included as part of the form. NZ Streetlighting diarise these and follows up if no update is received. Once received the database is updated.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Feb-22 To: 30-Apr-23	Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 14,700 kWh per annum. Luminaire make and model information is insufficient to identify the specific items of load. Potential impact: Low Actual impact: Low Audit history: Once Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as strong as change management processes are robust. The audit risk rating is low based on the estimated kWh impact to the market.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis will work with the customer to implement changes based on the two previous recommendations.	1/12/2023	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will work with the customer and their field staff to ensure lamp descriptions are input in future.	1/10/2023	

3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

- *volume information for the DUML is being calculated accurately, and*
- *profiles for DUML have been correctly applied.*

Audit observation

The submission was checked for accuracy for the month the database extract was supplied. This included:

- checking the registry to confirm that all ICPs have the correct profile and submission flag, and
- checking the database extract combined with the burn hours against the submitted figure to confirm accuracy.

Audit commentary

Genesis reconciles this DUML load using the NST profile for the three ICPs on the Unison network and the CST profile for the ICP on the Central Hawkes Bay network. The on and off times are derived from data loggers.

I checked the submission calculation provided by Genesis for June 2023 and found it was accurate.

As detailed in **section 3.1**, in absolute terms, total annual consumption is estimated to be 14,700 kWh lower than the DUML database indicates. This is outside the allowable +/- 5% variance threshold and is recorded as non-compliance below.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

Due to a change of staff the process recorded in the last audit has been paused and the database snapshot is used to calculate the monthly kW value. Previously, the data was imported into a database, and this was used the asset install dates to calculate active days for each item of load. Where the dates were null, a historic date was entered to ensure the item of load was recorded for the full month. This is recorded as non-compliance as changes are not being tracked at a daily basis as required by the code.

The last report noted that the monthly database report did not include asset removal dates where a light was removed or replaced with another light. I confirmed that the monthly reports being provided do include the light replacement value but not where a light is removed. Genesis is working with NZ Streetlighting to get this information included in the report.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(b) From: 01-Feb-22 To: 30-Apr-23	Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 14,700 kWh per annum. Monthly database snapshot being used to calculate submission, so changes made at a daily level are not tracked. Potential impact: Low Actual impact: Low Audit history: Twice previously Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate overall but there is room for improvement. The audit risk rating is low based on the estimated kWh impact to the market.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis and our customer will seek to identify recent-historic removal dates and input these into the database where possible.	1/11/2023	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will work with our customer to identify a and implement a robust way to track removal dates in the future.	1/1/2024	

CONCLUSION

ICPs 0000939905HB23E and 7012031000CH80C have switched from Meridian Energy to Genesis Energy. The Waka Kotahi Hawkes Bay database is now one audit.

The field audit found that the database accuracy fell just outside of the allowable +/-5% threshold with the range being between 94.8% to 100.7% resulting in a potential estimated over submission of 14,700 kWh per annum.

The change management processes are robust, and the database is relatively static.

I have repeated the last audit's recommendation that the light make, and model descriptions require more detail to ensure that the correct wattage is being applied.

This audit found four non-compliances and two recommendations are made. The future risk rating of six indicates that the next audit be completed in 18 months' time. I have considered this in conjunction with:

- the robust change management processes in place,
- the size of the database,
- the static nature of the dataset, and
- Genesis' comments and I agree with this recommendation.

PARTICIPANT RESPONSE

The database is accurate and strong controls are in place to ensure accuracy for billing and submission purposes. Genesis and our customer will work together to carry out the preventative actions to strengthen controls where possible to ensure and improvement in compliance can be made. Specific non-compliances mentioned in this audit will be investigated and rectified as soon as possible.