ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

CHRISTCHURCH CITY COUNCIL AND CONTACT ENERGY LIMITED

Prepared by: Rebecca Elliot

Date audit commenced: 27 January 2020

Date audit report completed: 16 March 2021

Audit report due date: 01 May 2021

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EXECUTIVE SUMMARY

This audit of the **Christchurch City Council (CCC) DUML database** and processes was conducted at the request of **Contact Energy Limited (Contact)**, 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.

This DUML database switched from Contact Energy's CTCT participant code to the CTCS code on 1 October 2020. This is managed by Contact Energy's subsidiary Simply Energy. Contact Energy carried out a material change audit in relation to the ICPs that were switched to the CTCS code. This did not include the management of unmetered load. Therefore, a material change should have been undertaken prior to this. This is recorded as non-compliance in Contact Energy's Reconciliation Participant audit. This audit examines submission since it switched to the CTCS participant code.

The previous audit contained assessment of both the Orion and Mainpower databases. This audit reviews the Orion database only and a separate report has been completed for the assessment of the Mainpower database. Orion manage the database of unmetered load information on behalf of CCC for the Orion network area. CCC is Contact's customer.

Orion has some unmetered smart lights connected on its LV network, which are available 24 hours, and are turned on and off by a light sensor. Orion's smart light ICPs 0007182097RN3F9, 0007182098RNC27 and 0007182100RN8D0 are recorded with "inactive reconciled elsewhere" status, and the volumes are submitted against the corresponding DUML ICP for the NSP. The DUML lights are controlled, and the on and off hours are recorded by the data logger. Because of the different control methods, the smart lights are unlikely to have the same on hours as the DUML ICPs. In addition to this these have been missed from submission since switching to the CTCS participant code in October 2020. Simply Energy are aware of this issue and the missing volumes are expected to be added in the next available revisions and will be included in submissions going forward. There is an estimated under submission of 30,934.87 kWh from October to December 2020.

Orion's fault, maintenance, new connection, and upgrade work is completed by Orion's approved contractors. The contractors provide paperwork to Orion confirming that work is complete, and Orion uses this information to update the database.

This audit found four non-compliances, and no recommendations were raised. The future risk rating of 16 indicates that the next audit be completed in six months. I have considered this in conjunction with Contact Energy's responses. The report due date was May 2021, as it is very overdue and has extended beyond the recommended period, I recommend that the next audit be in three months.

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	Estimated under submission of 30,934.87 kWh from October to December 2020 due to the smart light volumes being omitted from submission. The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual under submission of 5,300 kWh. 45 lamps have incorrect total wattages, resulting in an estimated under submission of 279W or 1,192 kWh p.a. based on 4,271 burn hours. 42.36 kW relating to smart lights connected to "reconciled elsewhere" status ICPs 0007182097RN3F9, 0007182098RNC27 and 0007182100RN8D0, are reconciled under the DUML ICP for the same NSP. The on hours for these ICPs may differ to the logger hours, because they are controlled by daylight sensors.	Weak	Medium	6	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	Three lights not recorded in the database.	Moderate	Low	2	Identified
Database accuracy	3.1	15.2 and 15.37B (b)	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual under submission of 5,300 kWh. 45 lamps have incorrect total wattages, resulting in an estimated under submission of 279W or 1,192 kWh p.a. based on 4,271 burn hours.	Moderate	Low	2	Identified
Volume information accuracy	3.2	15.2 and 15.37B (c)	Estimated under submission of 30,934.87 kWh from October to December 2020 due to the smart light volumes being omitted from submission. The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual under submission of 5,300 kWh. 45 lamps have incorrect total wattages, resulting in an estimated under submission of 279W or 1,192 kWh p.a. based on 4,271 burn hours.	Weak	Medium	6	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			42.36 kW relating to smart lights connected to "reconciled elsewhere" status ICPs 0007182097RN3F9, 0007182098RNC27 and 0007182100RN8D0, are reconciled under the DUML ICP for the same NSP. The on hours for these ICPs may differ to the logger hours, because they are controlled by daylight sensors.				
Future Risk Rating						16	

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
		Nil

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

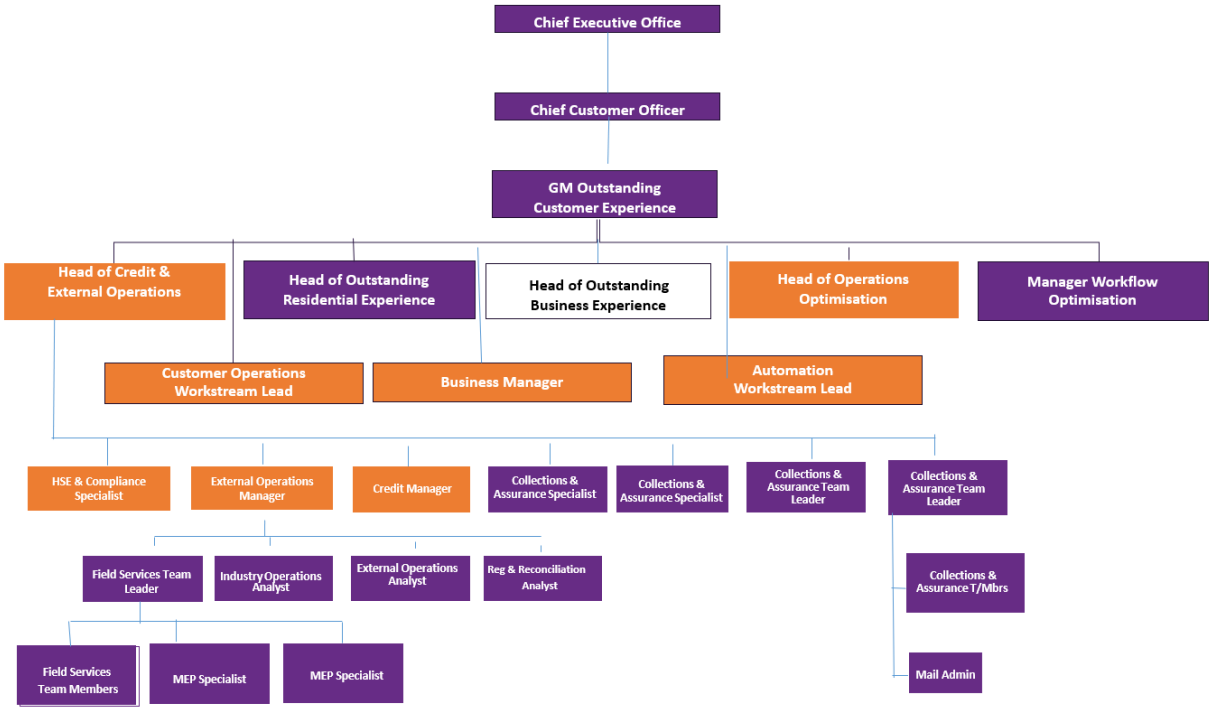
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

Contact Energy submitted this data as HHR under exemption no. 177. Since switching to the CTCS participant code on 1 October 2020, this load is submitted under the DST profile therefore this exemption is no longer relevant to the scope of this audit.

1.2. Structure of Organisation

Contact Energy provided a copy of their organisational structure.



1.3. Persons involved in this audit

Auditor:

Name	Company	Role
Rebecca Elliot	Veritek Limited	Lead Auditor
Claire Stanley	Veritek Limited	Supporting Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Penny Lawrence	Operations Services	Orion
Luke Cartmell-Gollan	Commercial Operations Manager	Contact Energy

1.4. Hardware and Software

Orion use a purpose-built Oracle Streetlighting/DUML database for the management of the DUML information. Backup and restoration procedures are in place, and access to the Orion network (including the database) is restricted using logins and passwords.

Systems used by the trader and their agent 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

Orion

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0007102593RN8D3	Orion_CCC GXP street light ICP	BRY0661	DST	15,029	1,067,632.5
0007102594RN519	Orion_CCC GXP street light ICP	ISL0331	DST	3,647	294,446.9
0007102595RN95C	Orion_CCC GXP street light ICP	ISL0661	DST	25,428	1,990,582.3
Total				44,104	3,352,661.7

CCC has some unmetered smart lights connected on its LV network, which are available 24 hours, and are turned on and off by a light sensor:

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0007182097RN3F9	Orion CCC GXP smart street light ICP	BRY0661	RPS	46	2.04
0007182098RNC27	Orion CCC GXP smart street light ICP	ISL0331	RPS	1	0.02
0007182100RN8D0	Orion CCC GXP smart street light ICP	ISL0661	RPS	437	40.30
Total				484	42.36

These are recorded with "inactive - reconciled elsewhere" status, and the volumes are expected to be submitted against the corresponding DUML ICP for the NSP as discussed in **sections 2.1** and **3.2**.

1.7. Authorisation Received

All information was provided directly by Contact, Simply Energy and Orion.

1.8. Scope of Audit

This audit of the CCC DUML database and processes was conducted at the request of Contact 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.

The unmetered load is managed by Orion and the data is held in their DUML database, on behalf of CCC, who is Contact's customer.

This DUML database switched from Contact Energy's CTCT participant code to the CTCS code on 1 October 2020. This is managed by Contact Energy's subsidiary Simply Energy. This audit examines submission since it switched to the CTCS participant code. A material change should have been undertaken prior to this occurring. This is recorded as non-compliance in Contact Energy's Reconciliation Participant audit.

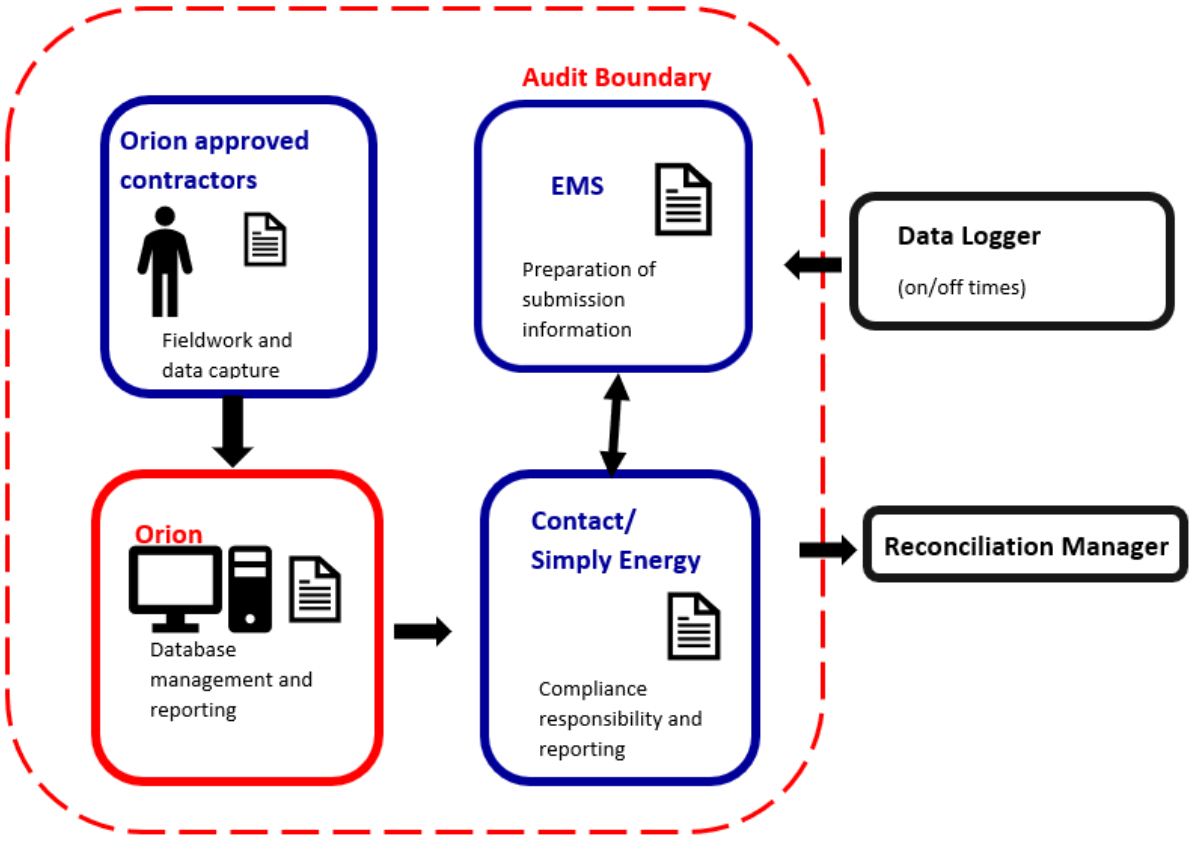
The previous audit contained assessment of both the Orion and Mainpower databases. This audit reviews the Orion database only and a separate report has been completed for the assessment of the Mainpower database. Orion manage the database of unmetered load information on behalf of CCC for the Orion network area. CCC is Contact's customer.

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 diagrams below show the audit boundaries for clarity.

Orion's fault, maintenance, new connection and upgrade work is completed by Orion's approved contractors. The contractors provide paperwork to Orion confirming that work is complete, and Orion uses this information to update the database.

Contact have moved the reconciliation of this database to their CTCS participant code, so this is now reconciled using the DST profile and the submission information is prepared by EMS and then submitted by Simply Energy.

The smart light ICPs 0007182097RN3F9, 0007182098RNC27 and 0007182100RN8D0 are recorded with "inactive - reconciled elsewhere" status, and the volumes are expected to be submitted against the corresponding DUML ICP for the NSP. This is discussed in **sections 2.1** and **3.2**.



A field audit was undertaken of a statistical sample of 541 items of load on 1-2 March 2021.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Tara Gannon of Veritek Limited in March 2020. The summary table below shows the statuses of the non-compliances raised in the previous audit. Further comment is made in the relevant sections of this report.

Table of Non-compliances

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	288 lamps have incorrect total wattages, resulting in estimated over submission of 282.5W or 1,207 kWh p.a. based on 4,271 burn hours.	Still existing
			41.852 kW relating to smart lights connected to "reconciled elsewhere" status ICPs 0007182097RN3F9, 0007182098RNC27 and 0007182100RN8D0, are reconciled under the DUML ICP for the same NSP. The on hours for these ICPs	Still existing

Subject	Section	Clause	Non-compliance	Status
			may differ to the logger hours, because they are controlled by daylight sensors. Submissions are calculated based on a snapshot at the end of the month.	Cleared
Database accuracy	3.1	15.2 and 15.37B(b)	288 lamps have incorrect total wattages, resulting in estimated over submission of 282.5W or 1,207 kWh p.a. based on 4,271 burn hours. Some addresses and GPS coordinates do not reflect the physical location of the item of load, particularly where the light is installed beyond the customer's boundary.	Still existing Cleared
Volume information accuracy	3.2	15.2 and 15.37B(c)	288 lamps have incorrect total wattages, resulting in estimated over submission of 282.5W or 1,207 kWh p.a. based on 4,271 burn hours. 41.852 kW relating to smart lights connected to "reconciled elsewhere" status ICPs 0007182097RN3F9, 0007182098RNC27 and 0007182100RN8D0, are reconciled under the DUML ICP for the same NSP. The on hours for these ICPs may differ to the logger hours, because they are controlled by daylight sensors. Submissions are calculated based on a snapshot at the end of the month.	Still existing Still existing Cleared

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

Contact 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*
- *methodology for deriving submission information complies with Schedule 15.5.*

Audit observation

The process for calculation of consumption was examined and the application of profiles was checked. The database was checked for accuracy.

Audit commentary

Contact reconciles this DUML load using the DST profile. Simply Energy on behalf of Contact send the monthly kW values to EMS. EMS prepare the submission file using the data logger hours to determine the burn hours and the file is then sent to Contact who submit the data under the CTCS code.

I checked the data submission for December 2020 and found some differences:

ICP	Submitted kWh Value	Expected kWh Value	kWh difference
0007102593RN8D3	330,433.96	330,905.10	-471.14
0007102594RN519	85,984.46	85,943.42	41.05
0007102595RN95C	606,437.97	616,319.49	-9,881.52
		TOTAL	-10,311.62

This is due to the smart light ICPs with the status "reconciled elsewhere" being missed from submission. Simply Energy are aware of this issue and the missing volumes are expected to be added in the next available revisions and will be included in submissions going forward. There is an estimated under submission of 30,934.87 kWh from October to December 2020. This is recorded as non-compliance below.

CCC's smart lights are connected to the LV network and are available 24 hours. The lights are turned on and off by a light sensor. The DUML lights are controlled, and the on and off hours are recorded by the data logger. Because of the different control methods, the smart lights are unlikely to have the same on hours as the DUML ICPs. This is recorded as non-compliance below.

As discussed in **section 3.1**, festive lights have not been connected at all during the last five years and were correctly excluded from the calculation.

The field audit found that the database accuracy was not confirmed as accurate with a 95% level of confidence resulting in an estimated annual under submission of 5,300 kWh.

A small number of lights were found to have the incorrect ballast applied resulting in an estimated under submission of 1,192 kWh. This is detailed in **section 3.1**.

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.

The monthly report is provided with a daily kW value. The daily value is used for submission. Revisions are carried out if the data changes. This meets the requirements of the code.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 06-Feb-20 To: 31-Dec-20	Estimated under submission of 30,934.87 kWh from October to December 2020 due to the smart light volumes being omitted from submission. The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual under submission of 5,300 kWh. 45 lamps have incorrect total wattages, resulting in an estimated under submission of 279W or 1,192 kWh p.a. based on 4,271 burn hours. 42.36 kW relating to smart lights connected to "reconciled elsewhere" status ICPs 0007182097RN3F9, 0007182098RNC27 and 0007182100RN8D0, are reconciled under the DUML ICP for the same NSP. The on hours for these ICPs may differ to the logger hours, because they are controlled by daylight sensors. Potential impact: High Actual impact: Medium Audit history: Three times previously Controls: Weak Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
Medium	Controls are rated as weak as the reconciliation process has weak checks in place to ensure submission is correct. These are largely manual and are not robust when the volume of unmetered load being reconciled is considered. The impact is assessed to be medium based on the effect on submission for the months where the smart light submission volumes were missing.

Actions taken to resolve the issue	Completion date	Remedial action status

The issue related to the inactive ICP capacities not being reconciled was identified by Simply Energy prior to audit (February 2021) and affected periods were all fixed at the next available revision. Incorrect Ballasts were corrected. Orion submit wash-up daily capacity values which are processed, so volumes were corrected with the market at the next opportunity. There is currently not (an operational) solution for correctly calculating the on-hours of the smart lights. We believe the current methodology is the best available at the current time.	Complete Complete Unknown	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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*
- *the items of load associated with the ICP identifier.*

Audit observation

The databases were checked to confirm the correct ICP was recorded against each item of load.

Audit commentary

All Orion items of load have an ICP recorded against them.

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 databases were checked to confirm the location is recorded for all items of load.

Audit commentary

The database contains fields for the street name, number, and GPS coordinates. GPS coordinates are recorded for all items of load.

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 light type and wattage capacity,
- wattage capacities include any ballast or gear wattage, and
- each item of load has a light type, light wattage, and gear wattage recorded.

Audit commentary

The database contains a lamp type, which corresponds to a lamp total wattage including ballast wattage. All items of load have a lamp type and total wattage recorded. The accuracy of the recorded wattages is discussed in **section 3.1**.

I confirmed that no light types had an invalid zero or blank total wattage recorded, and all light types which required a gear wattage had a valid lamp and gear wattage recorded. The accuracy of the recorded wattages is discussed in **section 3.1**.

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

A field audit was undertaken of a statistical sample of 541 items of load for Orion on 1 - 2 March 2021. The sample was selected from four strata, as follows:

- Street names A – K,
- Street names L – Z,
- BRY, and
- ISL.

Audit commentary

The field audit discrepancies are detailed in the table below:

Address	Database count	Field count	Count difference	Wattage difference	Comments
Chedworth Ave	6	6		3	3 x incorrect wattage recorded as 18W LED but 24W LED found in the field
Acheron Dr	10	10		3	3 x incorrect wattage recorded as 18W LED but 24W LED found in the field
Barnes Rd	10	10		1	1 x incorrect wattage recorded as 2*30 FF but 19W LED found in the field
Allen St	8	8		7	7 x incorrect wattage recorded as 29W LED but 36W LED found in the field
Alport Pl	5	5		1	1 x 2*30W FF not located in the field, 1 x 20W LED located in the field
Arcon Dr	16	15	-1	2	1 x 29W LED not located in the field 1 x incorrect wattage recorded as 69W LED but 20W LED found in the field 1 x incorrect wattage recorded as 29W LED but 19W LED found in the field
Basingstoke St	10	11	+1	9	9 x incorrect wattage recorded as 21 LED but 29W LED found in the field 1 additional 29W LED located in the field
Bennett St	5	5		5	4 x incorrect wattage recorded as 2*30W FF but 20W LED found in the field 1 x incorrect wattage recorded as 35W LED but 20W LED found in the field
Bradnor Rd	4	4	-1		1 x 2*30 FF not located in the field
Carnarvon St	7	7		1	1 x incorrect wattage recorded as 55W LED but 67W LED found in the field
Chelsea St	9	9		1	1 x incorrect wattage recorded as 29W LED but 36W LED found in the field
Deal St	7	7		2	1 x incorrect wattage recorded as 42W LED but 45W LED found in the field 1 x incorrect wattage recorded as 65W LED but 40W LED found in the field

Address	Database count	Field count	Count difference	Wattage difference	Comments
Dover St	12	12		7	6 x incorrect wattage recorded as 70W HPS but 21W LED found in the field 1 x incorrect wattage recorded as 70W HPS but 20W LED found in the field
Elba Cr	8	8		1	1 x incorrect wattage recorded as 47W LED but 70W HPS found in the field
Farnborough St	7	6	-1	1	1x 2*20 FF not located in the field 1 x incorrect wattage recorded as 29 LED but 36W LED found in the field
Hawford Rd	21	23	+2	6	2 x additional 24W LED located in the field 5 x incorrect wattage recorded as 18W LED but 24W LED found in the field 1 x incorrect wattage recorded as M11FF but 24W LED found in the field
Jubilee St	9	9		1	1 x incorrect wattage recorded as 29W LED but 36W LED found in the field
Manor Pl	7	6	-1	6	1 x 70HPS not found in the field 5 x incorrect wattage recorded as 18 LED but 24W LED found in the field 1 x incorrect wattage recorded as 100 LED but 120W LED found in the field
Manuka St	5	5		4	4 x incorrect wattages recorded as 3x 2*30W FF but 20W LEDs found in the field and 1 x 70W HPS recorded in the database but 1 x 20W LED found in the field
Ranger St	7	7		1	1 x incorrect wattage recorded as 2*30FF but 22W LED found in the field
Rudds Rd	11	11		2	1 x incorrect wattage recorded as 29W LED but 36W LED found in the field 1 x incorrect wattage recorded as 25W LED but 29W LED found in the field
Russell St	5	5		5	5 x incorrect wattage recorded as 19.9W LED but 22W LED found in the field
Grand Total	**541**	**537**	**7 (-4+3)**	**69**	

The field audit identified three additional items of load missing from the database. This is recorded as non-compliance in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 06-Feb-20 To: 31-Dec-20	Three lights not recorded in the database. Potential impact: Low Actual impact: Low Audit history: Three times previously Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as moderate. The volume of errors occurring since the LED rollout indicate there is room for improvement. The impact is assessed to be low, due to the small number of additional lights found as part of the field audit.

Actions taken to resolve the issue	Completion date	Remedial action status
Orion completed a field check of issues identified and where required updated RAMM to record the correct values from the change/start date. Orion submit wash-up daily capacity values which are processed, so volumes were corrected with the market at the next opportunity.	Complete	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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 database functionality achieves compliance with the code.

The change management process and the compliance of the database reporting 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 databases were checked for audit trails.

Audit commentary

Orion demonstrated a complete audit trail of all additions and changes to the database information. The user who processed the change is stored in the back end of the database.

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	CCC streetlights connected to the Orion network within the CCC geographical boundary.
Strata	The database contains 44,104 items of load. The processes for the management of all CCC items of load is the same. The database was divided into four strata: • street names A to K, • street names L to Z, • BRY, and • ISL.
Area units	I created a pivot table of the roads in each database and used a random number generator to select a total of 36 sub-units across the four strata.
Total items of load	541 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

A field audit was conducted of a statistical sample of 541 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	100.0	Wattage from survey is estimated to match the database wattage.
R_L	94.1	With a 95% level of confidence, it can be concluded that the error could be between -5.9% and +3.0%
R_H	103.0	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019. 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 5.9% lower and 3.0% higher than the wattage recorded in the DUML database. The result is only just outside of the range. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 1 kW higher than the database indicates.

There is a 95% level of confidence that the installed capacity is between 222 kW lower to 111 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 5,300 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 948,900 kWh p.a. lower to 473,000 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 %

Light description and capacity accuracy

As discussed in **section 2.4**, all lights have a lamp and gear wattage recorded.

Lamp and gear wattages for all other lamps were compared to the expected values, and the following exceptions were identified:

Model	Database wattage	Correct wattage	Quantity	Total difference
36W FF	42	46	12	48
58W FF	65	72	33	231
		Total	45	279 W

This could result in an estimated annual under submission of 1,192 kWh.

ICP number accuracy

As discussed in **section 2.2**, all lights have a GXP and corresponding ICP recorded. The ICP and corresponding GXP number are assigned based on information provided during the connection process.

Address location accuracy

As discussed in **section 2.3**, all lights have an address recorded.

Where Orion is aware that lights are installed but CCC has not provided roading information, Orion records the GPS locations of the lights and a placeholder for road name such as "Road 1", "Unknown" or "Unnamed". Once the street details are provided the road names are updated.

Where lighting is installed beyond the customer's property boundary, such as in parks, reserves, and community housing properties, a single GPS and address location which reflects the point of connection to the streetlight circuit is recorded for all lights at that address.

Change management process findings

Fault, maintenance, new connection, and upgrade work is completed by Orion's approved contractors. The contractors provide paperwork to Orion confirming that work is complete, and Orion uses this information to update the Streetlighting/DUML database and GIS. For new subdivisions, this paperwork includes "as built" plans.

Upon receipt, paperwork is checked for completeness and accuracy and any issues are followed up with the contractor. The information is sent to the GIS team so that the GIS can be updated, and then returned to the connections team to update the Streetlighting/DUML database from the date the change or new connection was effective. Once data entry is complete, the values loaded are checked against the paperwork provided, and some spot checks in the field are completed. Paperwork is normally promptly provided electronically and processed within two to three business days of receipt.

All jobs are tracked using job numbers by the connections team as part of the works management process. Late paperwork from contractors, and late updates by the GIS team are followed up. A checklist is followed to ensure that all steps in the process are completed.

Orion's approved contractors have access to a web-based version of the Streetlighting/DUML database in the field and advise Orion's connections team if they notice any discrepancies in the data recorded. Orion's operation team acts on these notifications and checks and updates the data where necessary.

Orion has some unmetered smart lights connected on its LV network. Smart lights are available 24 hours and are turned on and off by a light sensor. The smart lights are connected to ICPs 0007102593RN8D3, 0007102594RN519 and 0007102595RN95C, which have a status of inactive - reconciled elsewhere. The load for these ICPs is expected to be reconciled under the DUML ICPs as discussed in **sections 2.1** and **3.2**.

An LED upgrade project is underway. Lights are upgraded in batches of 600-1,200 at a time. The upgrade data including pole, light, and installation date information is provided in spreadsheet form and the IT team run scripts to load the information in the database. The IT and connections teams complete

testing on the updates to ensure that the records are correct. There has been in increase in the frequency of batch notifications for the roll-out being received, to improve the timeliness of the update and the accuracy of the database.

Quarterly outage patrols are completed by Orion's contractors as part of the maintenance programme. Outages are also reported by residents within the CCC region and work orders are raised with contractors as required.

Orion's database records a "start date" and "created date". The "start date" is entered by the user and reflects the date that the light was installed or changed, and system controls prevent future "start dates" from being entered. The "created date" reflects when the database record was created. Full history of the records that applied from each start date can be viewed in the database.

Festive lights

Festive lights are recorded in the database with a class of "miscellaneous" and street address which includes "Christmas lights". These lights are listed as 'Out of Service' in the database when disconnected and made active when they are connected so that they can be included in submission data. The festive lights have not been connected for about five years. They have been correctly excluded from submission information.

Private lights

New private lights are not accepted, and where private lights are identified Orion arranges for standard or shared unmetered load to be created. In the meantime, private unmetered lights are recorded in the database against the appropriate ICP number and reported in the monthly extracts.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 06-Feb-20 To: 31-Dec-20	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual under submission of 5,300 kWh. 45 lamps have incorrect total wattages, resulting in an estimated under submission of 279W or 1,192 kWh p.a. based on 4,271 burn hours. Potential impact: Medium Actual impact: Low Audit history: Three times previously Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as moderate. The volume of errors occurring since the LED rollout indicate there is room for improvement. The impact is assessed to be low, based on the potential kWh variances detailed above. .

Actions taken to resolve the issue	Completion date	Remedial action status
Orion completed a field check of issues identified and where required updated RAMM to record the correct values from the change/start date. Orion submit wash-up daily capacity values which are processed, so volumes were corrected with the market at the next opportunity.	Complete	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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*
- *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 the ICP has the correct profile and submission flag, and
- checking the database extract combined with the on hours against the submitted figure to confirm accuracy.

Audit commentary

Contact reconciles this DUML load using the DST profile. Simply Energy on behalf of Contact send the monthly kW values to EMS. EMS prepare the submission file using the data logger hours to determine the burn hours and the file is then sent to Contact who submit the data under the CTCS code.

I checked the data submission for December 2020 and found some differences:

ICP	Submitted kWh Value	Expected kWh Value	kWh difference
0007102593RN8D3	330,433.96	330,905.10	-471.14
0007102594RN519	85,984.46	85,943.42	41.05
0007102595RN95C	606,437.97	616,319.49	-9,881.52
		TOTAL	-10,311.62

This is due to the smart light ICPs with the status “reconciled elsewhere” being missed from submission. Simply Energy are aware of this issue and the missing volumes are expected to be added in the next

available revisions and will be included in submissions going forward. There is an estimated under submission of 30,934.87 kWh from October to December 2020. This is recorded as non-compliance below.

CCC's smart lights are connected to the LV network, and are available 24 hours. The lights are turned on and off by a light sensor. The DUML lights are controlled, and the on and off hours are recorded by the data logger. Because of the different control methods, the smart lights are unlikely to have the same on hours as the DUML ICPs. This is recorded as non-compliance below.

As discussed in **section 3.1**, festive lights have not been connected at all during the last five years and were correctly excluded from the calculation.

The field audit found that the database accuracy was not confirmed as accurate with a 95% level of confidence resulting in an estimated annual under submission of 5,300 kWh.

A small number of lights were found to have the incorrect ballast applied resulting in an estimated under submission of 1,192 kWh. This is detailed in **section 3.1**.

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.

The monthly report is provided with a daily kW value. The daily value is used for submission. Revisions are carried out if the data changes. This meets the requirements of the code.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 06-Feb-20 To: 31-Dec-20	Estimated under submission of 30,934.87 kWh from October to December 2020 due to the smart light volumes being omitted from submission. The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual under submission of 5,300 kWh. 45 lamps have incorrect total wattages, resulting in an estimated under submission of 279W or 1,192 kWh p.a. based on 4,271 burn hours. 42.36 kW relating to smart lights connected to "reconciled elsewhere" status ICPs 0007182097RN3F9, 0007182098RNC27 and 0007182100RN8D0, are reconciled under the DUML ICP for the same NSP. The on hours for these ICPs may differ to the logger hours, because they are controlled by daylight sensors. Potential impact: High Actual impact: Medium Audit history: Multiple times Controls: Weak Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**

Medium	Controls are rated as weak as the reconciliation process has weak checks in place to ensure submission is correct. These are largely manual and are not robust when the volume of unmetered load being reconciled is considered. The impact is assessed to be medium based on the effect on submission for the months where the smart light submission volumes were missing.

Actions taken to resolve the issue	Completion date	Remedial action status
The issue related to the inactive ICP capacities not being reconciled was identified by Simply Energy prior to audit (February 2021) and affected periods were all fixed at the next available revision.	Complete	Identified
Orion completed a field check of issues identified and where required updated RAMM to record the correct values from the change/start date. Orion submit wash-up daily capacity values which are processed, so volumes were corrected with the market at the next opportunity.	Complete	
There is currently not (an operational) solution for correctly calculating the on-hours of the smart lights. We believe the current methodology is the best available at the current time.	Unknown	
Preventative actions taken to ensure no further issues will occur	**Completion date**	

CONCLUSION

This DUML database switched from Contact Energy's CTCT participant code to the CTCS code on 1 October 2020. This is managed by Contact Energy's subsidiary Simply Energy. Contact Energy carried out a material change audit in relation to the ICPs that were switched to the CTCS code. This did not include the management of unmetered load. Therefore, a material change should have been undertaken prior to this. This is recorded as non-compliance in Contact Energy's Reconciliation Participant audit. This audit examines submission since it switched to the CTCS participant code.

Orion has some unmetered smart lights connected on its LV network, which are available 24 hours, and are turned on and off by a light sensor. Orion's smart light ICPs 0007182097RN3F9, 0007182098RNC27 and 0007182100RN8D0 are recorded with "inactive - reconciled elsewhere" status, and the volumes are submitted against the corresponding DUML ICP for the NSP. The DUML lights are controlled, and the on and off hours are recorded by the data logger. Because of the different control methods, the smart lights are unlikely to have the same on hours as the DUML ICPs. In addition to this these have been missed from submission since switching to the CTCS participant code in October 2020. Simply Energy are aware of this issue and the missing volumes are expected to be added in the next available revisions and will be included in submissions going forward. There is an estimated under submission of 30,934.87 kWh from October to December 2020.

Orion's fault, maintenance, new connection, and upgrade work is completed by Orion's approved contractors. The contractors provide paperwork to Orion confirming that work is complete, and Orion uses this information to update the database.

This audit found four non-compliances, and no recommendations were raised. The future risk rating of 16 indicates that the next audit be completed in six months. I have considered this in conjunction with Contact Energy's responses. The report due date was May 2021, as it is very overdue and has extended beyond the recommended period, I recommend that the next audit be in three months.

PARTICIPANT RESPONSE

Contact has reviewed this report and their comments are contained within the report.