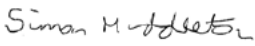


Attachment 7.2

Settlements System Compliance Summary

Endorsement

Name	Job Title/Role	Signature	Date
Simon Middleton (Endorsement)	Senior Manager- Electricity and Market Reform (Core Operations)		11/12/23
Michael Besselink (Approver)	Executive General Manager (Core Operations)		18/12/23

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1. Executive Summary

In 2020 we commenced development of governance documents to support the Settlements System Project. The objective of the Settlements System Project was to develop a new system to fulfil the Market Operator settlement functions under the Interim Northern Territory Electricity Market (I-NTEM) operating in the Darwin-Katherine Interconnected System (DKIS). The Business Case for the investment in a new settlement system was finalised and approved in 2022, with the new system being implemented in September 2023 at a total cost of \$2.9 million.

The purpose of this document is to identify the underlying need and drivers for the project and to summarise the reasoning and governance for implementing the new system in 2023. The document provides justification for seeking recovery of unfunded costs for the Settlement Systems project that we incurred in the 2019-24 period, and the ongoing costs in the next regulatory period.

1.1. Business need

Power and Water holds a licence to undertake system controller functions across the NT Power system in accordance with section 38 of the Electricity Reform Act 2000 and the System Control Technical Code. In May 2015 the interim Northern Territory Electricity Market (I-NTEM) commenced in the Darwin-Katherine Interconnected System (DKIS). To support the commencement of the I-NTEM, amendments were also made to the Electricity Reform (Administration) Regulations 2000 which imposed market operator functions described under the SCTC on the System Controller, primarily around participant registration and the facilitation of virtual settlement.

The I-NTEM was intended to be the first step towards the development of a full electricity market, and as such it was designed and implemented using a minimalist approach to developing systems and regulatory arrangements¹. To facilitate the commencement of the I-NTEM, a bespoke settlements system was developed in 2015 to support the Market Operator's settlement function (the bespoke system). The bespoke settlement system was based on Microsoft Excel, and initially designed to operate settlements for up to 1,500 interval meters. At the time, it was expected that the development of the full market for the DKIS (NTEM) would occur relatively quickly and would enable the replacement of the bespoke system with one which met the functions required under the full market arrangements.

A key issue with the bespoke system was its limitations with processing the significant data requirements of smart meters. Since its implementation in 2015, NTESMO has worked with the bespoke system vendor to enhance its functionality to accommodate the significantly increased volume of interval sites being included in the settlement calculations. By 2020, the bespoke system supported settlements of 16,000 interval meters, and this increased to more than 31,000 by 2023².

With such a significant increase in meter data, the bespoke system functionality was crashing intermittently while performing settlement runs. The vendor also confirmed that the bespoke system could no longer support this level of data requirements as it could not perform operational or conduct repairs. Given the compromised functionality, and with the bespoke system no longer supported by the vendor, it was clear that the bespoke system had reached 'end of life' status.

¹ Northern Territory Electricity Market Priority Reform – Introductory notes on scope of work program June 2020

² As at 1 July 2023 there were 31,336 interval meters

These issues collectively led to significant compliance risks for the Market Operator in it not being able to perform its settlement function and issue settlement information, with the added risk that this failure could potentially result in a solvency risk for market participants.

Given NTESMO's Market Operator functions and obligations under the System Control Technical Code, compliance has been the primary driver of the need for the Settlements System project. Although the final design of the NTEM is yet to be settled, the secondary driver for the Settlements System project was the ability for the new settlement system to adapt and configure to meet expanded settlement functions and manage the increased number of generators expected to enter the market.

Meeting our compliance obligations with respect to accurate and timely settlements is an important means by which NTESMO can provide confidence to electricity market participants that there is a robust settlements system in the I-NTEM and in time the NTEM that can be relied upon. This in turn is likely to facilitate new market entry consistent with the NT Government's target of 50% renewables for electricity supply by 2030.

1.2. Options analysis conducted

Through the development of the Settlement System Project, two options were considered to address the need as shown in Table 1. Under our governance process we decided that Option 2 was preferred to Option 1.

Table 1 Summary of credible options

Option No.	Option name	Description	Recommended
1	Do nothing (business as usual)	Under this option, we considered ongoing use of the bespoke system despite compromised functionality and lack of vendor support. This would have required reliance on increased labour hours to manually check system outputs. The 2015 bespoke system was not fit for purpose, and there were incidences of the system crashing and market settlement not being conducted. This raised insolvency risk for market participants as well as compliance risks.	Reject
2	New settlements system	Under this option, we considered procuring an off-the-shelf or bespoke settlements system. Under this option, NTESMO would develop a detailed list of its requirements for the settlements system that would meet current I-NTEM requirements. The settlements system solution would need to be easily configurable to meet future requirements of the NTEM, as well as require minimal configuration with existing Power and Water ICT systems. The ICT solution most likely to meet NTESMO's requirements would be revealed by an Expression of Interest (EOI) and subsequent competitive tender process involving potential vendors.	

1.3. Procurement process

A vital element of our governance process was to ensure an efficient solution to meet the need. In this respect, NTESMO conducted a two-stage procurement process for the preferred new settlements system based on an initial EOI stage followed by a Grade 3 public tender involving short-listed vendors identified during the EOI stage. The EOI process attracted six potential vendors.

The EOI sought preliminary quotes from these vendors for either commercial off-the-shelf or bespoke (including custom build) solutions to develop the new ICT settlements system. The EOI intended to gain information on costs associated with the proposed technology, case studies of successful implementation by the vendor, identification of risks/issues and the proposed ongoing support solution.

Following the public tender, NTESMO selected its preferred vendor, [REDACTED] which offered an off-the-shelf product that required minimal configuration with Power and Water's existing ICT systems. This product also provided a pathway to implement future settlement functions when required once the NTEM design is settled. [REDACTED]

1.4. Implementation timing and cost

The successful vendor was provided a detailed set of functional and non-functional requirements to enable a short design phase for it to deliver the detailed design of the new settlements system. NTESMO also provided the vendor with access to relevant business subject matter experts, technical systems and infrastructure to conduct the work.

The governance document for the Settlements System project approves a total project value of \$5,488 million, from development of the business case and implementation of the system, along with forecast operational costs. The amount included in the Regulatory Proposal has been adjusted to address capital expenditure allocated to Power Service and ongoing unregulated activity, which is discussed further in section 6 below.

2. Background on project development

The scope of the Settlements System project was originally planned to be delivered as part of the NTEM Phase 1- Detailed Design and Implementation Project (NTEM Phase 1 Project), which was established through a preliminary business case approval in January 2019. In response to the NT Government's deferral of the final state NTEM in February 2020, the NTEM Phase 1 Project was varied to, among other things, establish the Settlements System as a specific sub-project.

In April 2020, the Settlements System project was moved from a NTEM Phase 1 Project to the Core Capabilities Program³ due to the realisation that the bespoke system would need to be replaced, as opposed to the initial plan to modify. Given the change in technical scope and the enhanced need for ICT project management expertise, the inclusion of the Settlements System project within the Core Capabilities Program was considered well aligned. In support of this approach, a new preliminary business case was approved in December 2020.

³ Core Capabilities Program comprises five major ICT projects; Meter to Cash (meter data management system, retail billing system and integration layer), Physicals to Financials (financial management system), Asset Management System, Project / Service Delivery System and a Customer Portal.

Due to ongoing delays by the NT Government in the development and finalisation of the NTEM policy design, a Project Variation request was submitted to the Transformation Steering Committee⁴ in June 2021 providing the following two options for consideration:

- Pause the project until July 2022 when there was expected to be both regulatory and funding certainty, which would cause the delivery date of the system to move to the first quarter of 2024; or
- Issue an Expression of Interest in July 2021 with the aim of issuing a Request for Proposal in December 2021 after the NTEM Reform program released the draft rules in September 2021. This would cause the delivery date of the system to move to March 2023.

The Transformation Steering Committee instructed the project team to follow the second option after considering the risk factors and proposed mitigation options to support a prudent and efficient approach to implementing the project. The project team noted at this time that there was no certainty that the above timeline would be delivered by the NT Government, and noted that if there are further delays to the release of the NTEM Reform rules it would result in delays to the project delivery dates. As noted in Chapter 6, the project was subject to a business case assessment under Power and Water's governance process and was subsequently approved.

3. Identified need

The bespoke system was developed in 2015 to support NTESMO perform its market settlement functions under the I-NTEM. Through the Microsoft Excel platform the bespoke system conducted the settlement calculations and issued virtual invoices to retailers and credit notes to generators.

The bespoke system was built to perform basic virtual settlement tasks with little functionality to perform more complex tasks. Its design was premised on 'piggy backing' off existing arrangements and accommodating legacy ICT infrastructure, systems and operational practices. As discussed below, from 2021 the bespoke system no longer received vendor support and its continued use became dependent on significant manual work-arounds, and was no longer able to meet the settlement functions of the Market Operator.

3.1. Primary investment driver – Settlement Function Compliance

The 2015 bespoke system was deemed to have reached an 'end of life' status for the following reasons:

- It was not inherently secure.
- It was no longer being supported by the vendor, who considered the current system was not designed for long term use with any further development of the system slow and inherently risky.
- It would not support the expected significant rise in metering data stream inputs given it was designed for approximately 1500 meters, managed in excess of 31,000 meters in 2023, and was anticipated to require management of over 90,000 meters by the end of the smart meter rollout.
- It did not conduct the required validation to support the data processing required to conduct the market settlements and ancillary (essential) services calculations.
- It did not deliver transparency to customers in the settlement of commercial transactions.
- It required enhancements for the Meter to Cash IT program (introduction of the Market Settlements and Transfer Solution (MSATS) transactions and revised meter data file format).

⁴ Transformation Steering Committee oversees the Core Capabilities Program

- It was rudimentary in its design and is not configurable to meet any settlement function design changed anticipated through the NTEM reforms.

Advice from the original developer concurred with NTESMO's assessment that the 2015 bespoke system could not be adapted to fully support current market settlement requirements or meet future needs expected once the full market design is finalised.

NTESMO is required to meet its legal responsibilities in accordance with section 38 of the *Electricity Reform Act 2000* and the System Control Technical Code, in its role as market operator in the DKIS, as well as prepare for future NTEM reform to be initiated by the NT Government, which is intended to further increase the amount of renewable generation in the market.

The operational instability created by the 2015 bespoke system created significant compliance and service delivery risk for NTESMO having regard to its responsibilities which ultimately also created solvency risk for market participants. Appropriate mitigation of these risk factors could not be achieved through enhancements to the 2015 bespoke system, but rather necessitated investment in a new system.

3.2. Secondary investment drivers –service improvement and future configurability

Associated with NTESMO meeting its compliance obligations, a further need was the ability to make service improvements including quicker processing time and reducing the risk of not meeting the proposed seven-day settlement time.

In addition to these service improvements, the bespoke system was not considered capable of efficient updates and enhancements to comply with any future market design, including:

- minimisation of service disruptions
- introduction of two reference nodes into the DKIS
- management of settlement residue due to the introduction of two reference nodes
- introduction of a process for management of participant default (prudential risk)
- calculation and management of financial for out-of-balance settlements.

4. Options analysis

This section describes the various options that were analysed to address the increasing settlement failure risk under the 2015 bespoke system, and identifies the preferred option to efficiently address the risk. The options are analysed based on ability to address the identified needs, prudence and efficiency, commercial and technical feasibility, deliverability and benefits.

4.1. Comparison of credible options

In developing the project, we compared two potential options to address the needs.

4.1.1. Option 1 – Do nothing (continue with the 2015 bespoke system)

A do-nothing option did not satisfy the identified need because the bespoke system was not designed to deliver a settlements function for the current and prospective number of generators and interval meters operating in the I-NTEM, let alone expected in the NTEM.

Maintaining the 2015 bespoke system also increased the risk that settlement could not be facilitated due to system failure. This risk would amplify over time as more smart meters were installed. The impact of failing to settle the market would see the cash flow of generators severely hampered, with an estimated \$10M-\$20M exchanged between market participants each month. In addition to the financial risk of the bespoke system failing, such a system could have damaged confidence in the DKIS and discouraged potential new market participants.

Continued operation of the bespoke system had become dependent on a significant amount of manual work arounds. This would increase operating costs and increase the risk of settlement error, including due to operator error and Excel spreadsheet processing failure.

In addition to this, the bespoke system's file format was not compatible with the meter to cash software system being implemented within Power and Water. As the bespoke system was no longer supported by the Vendor, there were no updates available for it to become compatible with the meter to cash system. Ultimately, retention of the bespoke system was expected to compromise the ongoing ability of NTESMO to facilitate the settlement function of the Market Operator.

For the above reasons, the do-nothing option was assessed to not be a prudent course of action for NTESMO, nor would it provide an efficient settlement system that delivers outcomes that are commensurate with the expectations of market participants over time.

4.1.2. Option 2 – Invest in a new settlements system

Option 2 was to invest in a new off-the-shelf or bespoke settlement system that could be designed with the capability to deliver an efficient settlements function commensurate with current (I-NTEM) and prospective (NTEM) settlement demands and design, with minimal re-configuration required of Power and Water's existing ICT systems. A new system would also remove the ongoing need for manual workarounds to operationalise the settlement system.

The key advantages of this option included that it:

- satisfied the identified need
- was technically feasible
- was appropriate in scope to address the identified need and does not require additional works.

An efficient cost was able to be facilitated through a competitive tender process involved appropriately qualified vendors based on a detailed list of NTESMO's requirements.

The new settlement system was able to be delivered within the required timeframe based on an agreed contractual position with the successful vendor.

4.2. Benefits of Option 2

As noted above, Option 2 was identified as the preferred option. Table 2 provides a summary of the benefits identified by Option 2.

Table 2 Summary of benefits arising from Option 2

Benefit Title	Benefit Category	Current State	Future State	Timing
Operational Risk	Non-financial	Risk of system failing given its age and volume of meters requiring settlement. Estimated that market participants would exchange between \$10-\$20M every month for market settlements.	System can support settlement with current and future projected volumes of meters and participant contract configurations	Sept 2023
Performance Constraints	Non-financial	System time taken to run settlements was increasing and could not be run remotely over the VPN	System can support settlement with current and future projected volumes of meters	Sept 2023
Meter to Cash compliant	Non-financial	System will not support MSATS transactions or new meter data file format	System can manage new data input formats	Sept 2024
Flexibility to support market changes	Non-financial	Current system will not support the proposed NTEM Priority Reform Program	System that can support the proposed NTEM Priority Reform Program	[Unknown]
Support additional market entrants	Non-financial	Manual work required in old system	An automated process and reports can expand as new entrants join the NTEM	[As Required]
Efficiencies	Non-financial	Manual data entry and query Correction of manual data errors Monthly set up time for each settlement run	Reduce manual data entry through automation Reduce monthly system set up and running time Better reporting for easier identification of exceptions	Sept 2023

The new Settlements System will reduce the operating time and resource effort of the settlements team through greater automation and integration with the MSATS data feeds, better exception management tools and reporting.

The 2015 bespoke system processes utilised approximately two FTEs each month spread across the Market Operator team.

5. Procurement

NTESMO conducted a two-stage procurement process for the preferred new settlements system based on an initial Expression of Interest (EOI) stage followed by a Grade 3 public tender involving short-listed vendors.

The EOI sought preliminary quotes from vendors for commercial off-the-shelf or bespoke (including custom build) solutions to develop the ICT settlements system. The EOI was intended to gain information on cost associated with the proposed technology, case studies of successful implementation by the vendors, identification of risks/issues and proposed ongoing support solution.

[REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]

[REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

5.1. Strategic alignment

The NT Government's vision is for renewable generation to supply 50 per cent of energy consumed in the NT by 2030. Power and Water is committed to helping the NT Government achieve this vision, which will require investment in Power and Water's network and associated systems to facilitate around 30 per cent large scale renewables that connect to the grid, with about 15-20 per cent coming from residential rooftop solar.⁵

In this strategic context, Power and Water's 2024-2029 Strategic Plan refocuses the business with two goals:

1. Modernising our business.
2. Embracing a sustainable future with innovation.

Each of these goals is underpinned by three objectives of which NTESMO's settlement system investment aligns with:

- Successful investments in core systems and capability to improve efficiency and value of service.
- Structuring, facilitating and enabling infrastructure and innovations that support the renewable energy transition and achieving economic growth targets.

5.2. Dependent projects

The Meter to Cash Program is a key project that Power and Water's network business proposes to implement in the 2024-29 regulatory period and that will directly impact on NTESMO's settlements system investment. NTESMO has explicitly scheduled for the settlements system investment to be completed before the Meter to Cash Program investment is undertaken.

5.3. Deliverability

The new Settlements System went live on 13 September 2023 and was run in parallel to the 2015 bespoke system for the first four weeks. The Vendor continue to provide ongoing monthly customer support through the provision of business hours support line through which they are able to answer queries with the operational of the system. In addition to this NTESMO is able to request the Vendor make minor enhancements and changes each month, with the Settlements System receiving twice yearly product updates as the Vendor enhances the system.

5.4. Customer considerations

NTESMO has engaged with its stakeholders regarding the settlement system investment. Stakeholders recognise the importance of the investment to providing confidence in the I-NTEM and future NTEM, including facilitating new renewable generation entrants to the market.

NTESMO recognises customer concerns regarding the price impacts of the investment. A rigorous procurement process in relation to the settlements system investment to ensure it delivers the required settlement services at efficient cost. Chapter 9 of the Regulatory Proposal discusses the measures proposed to reduce the impact the retrospective revenue recovery will have on customers.

⁵ Power and Water, Statement of Corporate Intent, 2023/24, p 5

6. Governance and refinement of cost estimates

6.1. Development of Business Case

The development of this project has been subject to the stringent business case approval framework which is established through the Project Investment Delivery Management Standard⁶. Pursuant to this framework, a preliminary business case was developed which estimated the project cost with a 25 per cent contingency. Through the expression of interest process the estimate of costs were able to be refined, with the Final Business Case providing a 20 per cent contingency. The Business Case also identified the ongoing operational costs required for ongoing vendor support as well as ICT infrastructure.

6.2. Revisions to business case

In August 2023 a project variation request was approved which revised the ongoing operational The increased expenditure was due to schedule variance and additional requirements to maintain on premises server support as opposed to cloud based storage. The ongoing operational expenditure relating to ongoing vendor support and on premises ICT infrastructure.

6.3. Final project costings

Table 3 provides a summary of the Settlements System project costs approved through the governance documentation.

Table 3 Business Case Approved Expenditure (\$'000)

ITEM	VALUE (\$'000)
Implementation Costs	2,913
Ongoing Opex over 36 months	2,407
Initial business cases costs included in earlier project	168
TOTAL	5,488

⁶ Attachment 2.3 to the NTESMO Regulatory Proposal

While the NTESMO Regulatory Proposal seeks to recover of this expenditure, the amount has been reduced by \$368K which is the amount allocated to Power Services through the CAM process. The ongoing operational costs have also been reduced by \$120K per annum which is Territory Generation's annual contribution for unregulated settlement functions. The Revenue Proposal also forecasts expenditure which have not otherwise been included in the Business Case in anticipation of enhancements over and above those provided through the ongoing Vendor support and the integration of MSATS. Table 4 provides a summary of the total expenditure sought to be recovered through the NTESMO Proposal.

Table 4 Settlements Systems expenditure included in the NTESMO Regulatory Proposal

Item	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
	Nominal \$'000	Nominal \$'000	Nominal \$'000	Nominal \$'000	Real FY23 \$'000	Real FY23 \$'000	Real FY23 \$'000	Real FY23 \$'000
Business Case Development	2	184	15	53				
Development and Implementation				921	2,025			
Ongoing					761	748	776	
Forecast Expenditure not included in Business Case						280	30	827
Less funding from alternative sources				-368	-120	-120	-120	-120
Total	2	184	15	553	2,666	908	686	707

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