Office of Energy and Climate Change

Metering and monitoring plan

Report outline

January 2024

NSW GOVERNMENT

Acknowledgment of Country Office of Energy and Climate Change as part of the NSW Department of Climate Change, Energy, the Environment and Water acknowledges the Traditional Owners and Custodians of the land on which we live and work and pays respect to Elders past, present and future.

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Title Metering and monitoring plan report outline

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How to use this report template

Please use this template as a guide for developing a metering and monitoring plan for the metering plan implementation grants. It provides step-by-step instructions about the content that should ideally be included. The metering and monitoring plan may be adapted to your organisation's needs.

Important information

When producing a metering and monitoring plan report, you must use your organisation's own branding. Please do not use the NSW Government brand identity.

Table of contents

At the start of the report, please include the business name and site details as well as the report quality assurance review: Below is an example of the cover page for the report:

Metering and monitoring plan

[Business Name]
[Site Name/Address]

Report quality assurance review				
Review number	Date of review	Description	Author	**Reviewer**
[Insert Rev no.]	[Insert date]	e.g. Draft, final draft, final	[Insert name]	**[Insert name]**

Site details

Summarise site details and key project contacts:

Business details	
Business name	
Address of site	
ABN	
Project leader name	
Phone number	
Email	
Alternative contact name	
Phone number	
Email	
Report author details (if different from above)	
Company name	
Nominated individual/s	
Primary contact name	
Phone number	
Email address	
Alternative contact name	
Phone number	
Email address	

1. Executive summary

In the executive summary, provide a high-level summary of the organisation's metering and monitoring plan (MMP) for executive decision makers, including, but not limited to:

- organisational context, objectives, background information
- work/steps undertaken to prepare the MMP
- gaps in the existing metering and monitoring system
- how the plan proposes to close the gaps and contributes to the objectives
- metering and monitoring recommendations broken down by subsystem, priority, and cost
- conclusions.

2. Project context and objectives

2.1 Site profile and project objectives

Site profile

Identify and describe:

- site's function
- industry type
- operating hours
- production volume (if applicable)
- energy management system (EnMS) or associated practices already in operation.

Project objectives

Identify and describe:

- key process/functional areas
- major energy using sub-systems and processes[1].

Provide diagrams where possible.

2.2 Energy use

Identify and provide the following information:

- Annual electricity, natural gas and other fuel consumption details at the site, including energy/fuel tariffs and total costs.
- Monthly energy consumption of different fuels represented in graphical form for a year (using most recent data). Include daily load profiles for energy consumption (if available).
- Site map detailing functional areas & sub-systems. Highlight the key energy using processes and equipment.
- Estimated energy balance for the site[2].

[1]For example, machinery, process equipment, conveying, thermal energy production/distribution, heating, ventilation, air conditioning etc. or parts thereof)

[2] The energy balance estimate should be based on actual site equipment ratings, processes, and information from any existing energy monitoring systems. Visit the site to collect the required information. The intent is to highlight key energy users at the site to inform the MMP.

3. Energy distribution and MMP boundary

3.1 Energy distribution

- Identify energy types to be included in the scope of the MMP. e.g. electricity, natural gas and derivatives such as compressed air, steam etc. Provide brief description of each energy type distribution included in the scope.
- Provide explanation/justification for any energy types excluded from the scope of the MMP.
- For each energy type within the scope of the MMP, provide basic line/block diagram(s) from incoming supply point to end-use[3].
- Show existing meters on the basic line/block diagram(s).
- Label the diagram as accurately as possible and provide legends to refer to the labels.

3.2 MMP boundary

- Draw a boundary on the line/block diagram to identify branches/end-uses of the energy distribution to be included in the scope of the MMP.
- Provide explanation/justification for any branches/end-uses excluded from the MMP.

[3] Inspect site as necessary to collect the required information to produce the block/line diagrams. Gather sufficient information to create diagram(s) that provide a general overview of how energy is distributed throughout the site from incoming supply to end use.

4. Metering and monitoring system design

4.1 Metering design

Expanding on the diagram(s) produced in Section 3, show the locations of all existing and proposed meters. Include a metering schedule table to provide relevant additional information. Ensure the following is clear and unambiguous, please include:

- meter identification[4]
- metering hierarchy (upstream and downstream) and their relationships (connected in parallel or in series)
- distinguish between meters that are:
  - existing to remain
  - existing to be modified
  - existing to be removed
  - proposed to be installed
  - virtual
- areas/end uses:
  - currently metered
  - proposed to be metered
  - will remain unmetered.

4.2 Prioritisation of meters, key energy users and meter information

The metering system planning should be at the sub-system level (or system level in some cases) so that these can be prioritised individually based on their energy use and function.

For each relevant system/sub-system within the boundary, provide the following information in combination of a metering schedule (refer to Appendix C) or text:

- Key energy users:
  - List which equipment is using significant energy within the system/sub-system (e.g. fans, drives, burners, production line).
- Meter location:
  - Clearly identify the metering point location.

[4] Use consistent identifiers for all metering and monitoring hardware throughout all MMP documents including the report body text, schematics, schedule, quotations etc. The reader must be able to easily identify and cross-reference equipment items across the MMP content.

    - Attach a photograph of the location if possible. The photographs may be included in Appendix C.
- Energy type, meter/ device type and device model:
    - Electricity, gas, thermal meter etc.
    - Sensor, counter, pulse etc.
- Monitoring parameters in the data collection system:
    - List both the existing and proposed parameters that are being collected and should be collected/calculated in the monitoring system (e.g. SCADA) within the system/sub-system.
- Priority:
    - Prioritise and justify the metering and monitoring for each system/sub-system based on energy use, energy efficiency opportunity size and other relevant factors[5].

4.3 Energy performance

Energy drivers

- Identify key drivers of energy consumption for the system/sub-system to identify the right point to meter and other data to collect.

Energy Performance Indicators (EnPIs)

- Propose useful EnPIs to be generated by the proposed metering and monitoring system[6].
- Define EnPI data sources/input variables, formula, units, description etc. for each EnPI.

4.4 Communications system design

Provide a schematic block diagram of the proposed metering communications network including:

- metering interfaces for both existing and proposed meters
- network connections
- data storage
- user terminals

On the diagram, ensure the following is clear:

- communication equipment identification[7]
- which equipment is
    - existing to remain

[5] Justify why a meter is being proposed at a certain location, the priority level, and what value will be achieved by installing it. Consider the value, need, impact and complexity of the proposed meters.

[6] An EnPI can be a simple parameter, a simple ratio or a complex model. Examples of EnPIs can include energy consumption per time, energy consumption per unit of production, and multi-variable models.

[7] Use consistent identifiers for all metering and monitoring hardware throughout all MMP documents, including the report body text, schematics, schedule, quotations etc. The reader must be able to easily identify and cross-reference equipment items across the MMP content.

  - exiting to be modified
  - existing to be removed
  - proposed to be installed.

Describe the basic features of the proposed communications system, including:

- system architecture (e.g. IoT/cloud, SCADA, BMS)
- equipment make and model, data storage method and details (data export formats available and data access methods, software)
- how process/functional/production data is, and will be, extracted stored and used (e.g. production data stored in SAP)
- polling and transmission frequency.

5. Implementation of proposed solutions

5.1 Cost estimate for solutions

Provide cost estimates for both the recommended and any alternate metering and monitoring system solution[8]. Include:

- breakdown of costs at the system/sub-system level
- ongoing costs for:
  - maintenance and meter calibration
  - analytics and reporting
- recommendations to the business to implement the proposed solution or parts of the proposed solution based on priority identified in the design

Have a detailed discussion with business decision makers to finalise the solution to be recommended for implementation.

5.2 Costed proposal for implementation

Provide a detailed costed proposal for the implementation of the finalised metering and monitoring solution. This may be included in the Appendix or as an attachment. The costed proposal should contain, as a minimum:

- itemised quotations
- technical datasheets for the metering system equipment with detailed specifications.

Typical items, include:

- meter/sensor hardware (unit and total cost of each type)
- communication infrastructure (hardware and cabling)
- communications infrastructure (installation)
- human-machine interface (including hardware, software, installation, and configuration)
- cloud services and data access (including data storage, web-based data access and telecommunication carrier data service etc.) for first year cost only
- project management costs
- exclusions
- potential government co-funding for the implementation
- datasheets/specification sheets for the proposed meters.

[8] This may be done by identifying various options/priorities and providing associated costs estimates for each.

Provide cost estimates for expected ongoing costs (annual). Typical items include:

- monitoring, analysis, and reporting services
- maintenance.

Templates are available on the NSW Climate and Energy Action website for electricity and gas that may be used as guides to develop the Request for Proposal and determine the requirements for the Proposal.

Ensure that:

- the costed proposal is detailed enough such that it is ready for implementation without any further investigation or request for quotes
- costs must be itemised, not lump sums
- for ongoing services such as software licensing, cloud, and telecommunications carriage, provide first-year costs only.

Obtain a minimum of one quotation for the implementation of the proposed metering solution. Three separate quotations are preferred.

5.3 Risks, challenges and benefits

Explain in detail the risks, challenges and potential benefits of the proposed priority metering and monitoring solution relating to the business and the site.

For risks, include likelihood and impact. Examples of risks and challenges requiring analysis include:

- equipment supply and labour
- installation timing, shutdowns, and co-ordination
- reliability
- information security
- business resourcing and ongoing commitment
- health and safety.

Explain the benefits, both direct and indirect. Examples of benefits include:

- ongoing energy and cost savings
- access to government programs (e.g. NSW Energy Security Safeguard and grants)
- plant monitoring and maintenance
- accounting, reporting and EnPI/KPI tracking (contribution to an EnMS and Net Zero planning)
- business case development for an Energy Conservation Measure (ECM).

5.4 Next steps

Provide actionable next steps to implement the costed proposal for the metering and monitoring solution. These steps may relate to:

- financing and funding sources, indicating priorities (i.e. high, medium and low) and timeframes
- tendering, procurement and installation of proposed solutions
- development of energy management systems or workflows

- use of available data to make informed decisions towards increased energy performance and reduced costs.

Appendix

Please include the following information as appendices of your MMP.

Appendix A: Site layout

Site layout with highlighted systems and sub-systems

Appendix B: Energy distribution schematic diagrams

Detailed schematic of energy distributions systems

Appendix C: Metering schedule

Summary table of all recommended metering and monitoring points for each sub-system. Images can also be attached if needed and you may expand the schedule to suit your needs. See example below:

ID	Utility metered	Meter type	Meter model	Location of meter/board	Area/equipment covered
0	*Gas*	*Flow Meter*	*FLXXX*	*Upstream of steam boiler*	*Boiler to rendering vessel*

Appendix D: Quotations

Include quotations for the implementation of your MMP.

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For more information about metering initiatives, please visit our website or email us at energyefficiency.program@environment.nsw.gov.au.