



Public Lighting Strategy

October 2018

If this strategy is a printed version, to ensure compliance, reference must be made to the Energy Queensland Controlled Documents to obtain the latest version.

Abstract: The EQL Public lighting Strategy focuses upon supporting and partnering with customers around public lighting solutions. Within regulatory, safety and technical boundaries, EQL will approach public lighting in a flexible manner, offering smart technology and tariff solutions to meet customer expectations whilst balancing commercial outcomes. This document focus upon the three main areas of: Streamline Customer Engagement, Standardise Product Offerings and Technology Process Improvement.

Keywords: streetlights; customers; technologies; Asset Safety and Performance; Distribution; mercury vapour; LED; luminaire

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1 Overview

1.1 Purpose

The purpose of Energy Queensland Limited's (EQL's) Public lighting Strategy is: *To support and partner with customers to offer flexibility in lighting, smart technologies and tariff solutions for public lighting services to manage customer expectations whilst meeting ongoing regulatory, safety and compliance requirements and achieving balanced commercial outcomes.*

(Breakout Box 1 – Diagram Public lighting)

1.2 Scope

This document outlines EQL's approach to public lighting within its geographical area. With the merger of the two distribution companies, Energex and Ergon Energy (plus other affiliated companies), it is envisaged that this document will provide a united and clarified approach for public lighting for EQL. This document focuses upon the three main areas of: Streamline Customer Engagement, Standardise Product Offerings and Technology Process Improvement.

2 References

2.1 Energy Queensland controlled documents

Nil

2.2 Energex controlled documents

- Standard 01226 - Public Lighting Management Standard
- Standard STNW1144 - Standard for Public Lighting Assets
- Queensland Public Lighting Design Manual
- Queensland Public Lighting Construction Manual
- Standard 576 – Standard Conditions for Public Lighting Service

2.3 Ergon Energy controlled documents

- Standard STNW1144 - Standard for Public Lighting Assets
- Queensland Public Lighting Design Manual
- Queensland Public Lighting Construction Manual
- STNW06xx – Standard Conditions for Public Lighting Service

2.4 Other sources

AS/NZS 1158.1.2 – Lighting for roads and public spaces Vehicular traffic (Category V) lighting – Guide to design, installation, operation and maintenance; Figure 8.1

<http://www.mercuryconvention.org/Convention/Text/tabid/3426/language/en-US/Default.aspx>, 20/03/18;

3 Legislation, regulations, rules, and codes

This document is in accordance with the following:

AS/NZS 1158 series – Lighting for Roads and Public Spaces
Queensland Government Notified Prices
Queensland Public Lighting Construction Manual
Standard Conditions for Public Lighting Services
National Electricity Rules
Queensland Electricity Act and Regulations
Queensland Electrical Safety Act and Regulations
Queensland Local Government Act
Queensland Transport Infrastructure Act
Queensland Transport Operations Act (Road Use Management) Act
Work Health and Safety Act

4 Definitions, acronyms, and abbreviations

4.1 Definitions

For the purposes of this strategy, the following definitions apply.

Category P Lighting	Lighting which is applicable to roads on which the visual requirements of pedestrians are dominant, e.g. local roads and to local area traffic management devices (LATMS) installed on such roads. Also, lighting which is applicable to outdoor public areas, other than roads, where the visual requirements of pedestrians are dominant, e.g. outdoor shopping precincts.
Category V Lighting	Lighting which is applicable to roads on which the visual requirements of motorists are dominant, e.g. traffic routes.
Driver	Generally used to control the current and/or voltage to a solid state lighting source such as LEDs (Light Emitting Diodes).
LED	A luminaire using an array of LEDs for lighting roadways and public spaces.
Major Road	Means a main or arterial, or distributor road as defined by Public Body requiring illuminating to the performance, installation and design requirements of Category V lighting as specified in AS/NZS 1158.
Minor Road	Means a road other than a Major Road as defined by the Public Body requiring illuminating to the performance, installation and design requirements of Category P lighting as specified in AS/NZS 1158.
Photocontrol	A device for turning a roadway or area lighting on and off, with other possible functionalities such as dimming control.
Rate 1	Energex Non Contributed or Ergon Owned and Operated: Public Lighting supplied, installed, owned and maintained by Ergon Energy or Energex.
Rate 2	Energex Contributed: Public lighting owned and maintained by the Electricity Entity; or Gifted and Ergon Operated: Public lighting Gifted to and thereafter operated and maintained by Ergon Energy.

Rate 3 (or Rate 8)	Energex Unmetered or Customer Owned and Operated (Ergon): Public lighting supplied, installed, owned and maintained by the Public Body. Supply is unmetered and has a fixed wattage and must comply with the AS/NZS 3000 Wiring Rules. Beyond the Point of Supply, reticulation is owned and maintained by the consumer.
7 Pin NEMA	The receptacle used between an external locking type photocontrol and dimmable driver for lighting level control.

4.2 Acronyms and abbreviations

The following acronyms and abbreviations appear in this strategy.

AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AS&P	Asset Safety and Performance
DTMR	Department Transport and Main Roads
EQL	Energy Queensland Limited
IOT	Internet of Things
LED	Light-Emitting Diode
LGA	Local Government Association

5 Context

5.1 Linkage to Corporate Strategy

EQL's vision of Energising Queensland Communities will be achieved by safely delivering secure, affordable and sustainable energy solutions with our communities and customers. This vision extends to our public lighting customers. Public lighting services provide a safe, secure and visually attractive light environment for the community in public streets, parks and thoroughfares.

EQL's corporate strategy is delivered through four strategic objectives. The EQL Public lighting Strategy supports delivery of the strategic objectives in the following ways:

Be community and customer focussed:

EQL's major customer base for public lighting is the local government authorities (LGAs) and the Department of Transport and Main Roads (DTMR). Service provisions with public lighting enhances community living experiences throughout Queensland.

Operate safely as an efficient and effective organisation:

EQL has the technical capability, knowledge and experience to maintain and operate public lighting throughout Queensland – a vast geographical footprint. Operating and maintaining its own assets enhances safety and economies of scale reflect the efficiencies and effectiveness. EQL will be proactive in its use and operation of public lighting equipment and assets whilst considering the effects on the environment.

Strengthen and grow from our core:

Public lighting, as part of EQLs asset base, provide the opportunities to work and partner with customers to optimise its assets through lowering of costs. EQL will manage these assets safely in line with current and evolving asset standards.

Create value through innovation:

Public lighting assets are a gateway for trialling and adopting new technologies. For example, LED lamps and smart PE cells can form part of the basis for smart cities and facilitate the Internet of Things (IoT). Technology and products in this area are rapidly changing and offer many opportunities.

6 Background and Regulatory Regime

EQL owns, operates and maintains approximately 470,000 streetlights (Rate 1 and 2) and keeps billing records for another 52,000 public lighting owned and maintained by Council and DTMR (Rate 3). A breakdown on the luminaire categories and rates is given in Breakout Box 2.

There are two types of public lighting categories; major and minor road lighting. The minor road lights are typically Category P lighting installed on minor roads controlled by local Council's and include fluorescent, mercury vapour and compact fluorescent luminaires with a light output generally 80 Watts or less. The major road lights are typically Category V lighting installed on major roads controlled by the DTMR and major arterial roads controlled by Council's. The luminaires are typically mercury vapour and sodium vapour lights with an output in the range of 100 Watt to 700 Watts. The majority of the EQL public lighting (approximately 70%) are located on minor road ways. The public lighting are predominantly installed on wood and steel poles, with a small proportion on concrete and aluminium poles.

In line with the Queensland Government's position of no asset sales from the 2015 State election and its prior decision to transform the electricity network through the merger of Energex, Ergon Energy and [related] entities, EQL's Public Lighting Strategy focuses on maximising asset utilisation and trialling and facilitating new technologies and opportunities for the benefit of the customer, community and the organisation. This strategy assumes that ownership of Rate 1 & 2 public lighting assets remains with EQL for the foreseeable future. Unmetered (Energex) or Customer Owned and Operated (Ergon) (Rate 3) public lighting conditions remain unchanged.

The National Electricity Rules (NERs) govern the operation of the National Electricity Market (NEM) in Australia. The Rules have the force of law, and are made under the National Electricity Law (NEL). Where public lighting services are undertaken by DNSPs in the NEM, the pricing is regulated by the Australian Energy Regulator (AER) in accordance with provisions under Chapter 6 of the NER (noting differing arrangements across jurisdictions referred below). The objective of AER's regulatory decision making is to:

- promote and incentivise efficient investment in and economically efficient use of public lighting services; and
- where possible, encourage the potential development of competition in the market.

Aspects of the regulatory treatment of public lighting differ across the NEM regions, reflecting the different state and territory governments' past policies and approaches. In Queensland the AER regulates the prices for public lighting services, though EQL has service delivery discretion, such as technology choice and whether to provide services in-house or procure through a third party.

The provision, construction, and maintenance of public lighting assets are currently classified as an Alternative Control Service under a price cap form of control. The Australian Energy Regulator (AER) has made a preliminary decision to retain the same classification of services for public lighting (including

emerging public lighting technologies¹) through the next regulatory period, 2020-2025. Only watchman lights have changed classification from Unregulated to Alternative Control Service².

(Breakout Box 2 – EQL Public lighting statistics)

EQL is obligated by the AER to prepare Regulatory Information Notice (RIN)'s which provide information on a variety of service performance data and expenditure relating to public lighting.

There is also a role for AEMO in public lighting. AEMO is responsible for managing unmetered load tables which establish the assumed electricity consumption attributed to each type of public lighting.

EQL has a legislative obligation to connect public lighting to the network, but the provision of public lighting services in Queensland is currently characterised by:

- no legislated service standards in relation to the connection and ongoing maintenance
- no legislative instrument setting out the roles and responsibilities of public lighting service providers and the relationship between DNSPs and customers
- the lack of a legislated contestability framework that authorises third party providers
- a mix of non-binding operating codes and policies.

The principal source of service standard obligations for public lighting in Queensland is the Australian Standard AS/NZS 1158 - Lighting for Roads and Public Spaces and the Australian Standard AS/NZS 3000 - Wiring Rules. AS/NZS1158 is considered to be the Public Lighting Code, but is not mandatory and will usually be called upon by authorities as best or good practice guidelines. There are a number of provisions in the Electricity Safety Regulations 2013 (such as (Clauses 70 and 71) which requires licensed electrical workers and electrical companies to comply with the Wiring Rules. In addition, EQL provides public lighting services in accordance with the Electrical Safety Act's Code of Practice - Working Near Overhead and Underground Electric Lines.

The conditions regarding the design, installation and maintenance of public lighting assets are set out in EQL's policy document Public Lighting - Standard Conditions for Public Lighting Services. The Queensland Public Lighting Design and Construction Manuals also set requirements for the design and construction of public lighting infrastructure. The design, installation and maintenance of public lighting assets can be and is undertaken by third party contractors as well as EQL.

¹ Emerging public lighting technology is defined by the AER as luminaires that the Qld distributors do not provide at the time of the AER's determination but may become available during the 2020-25 regulatory control period.

² Australian Energy Regulator, Preliminary Framework and Approach, Energex and Ergon Energy Regulatory control period commencing 1 July 2020, March 2018.

7 Principles

To deliver on the strategy purpose, EQL's Public lighting Strategy focuses on the following three areas:

Streamline Customer Engagement

Improve engagement with our public lighting customers to better understand and deliver on their expectations. Centralise management of public lighting services to provide a consistent, coordinated service to customers.

Standardise Product Offerings

Proactive adoption of advances in lighting technology and alignment of public lighting pricing to deliver customer and business benefits.

Technology Process Improvement

Streamline public lighting management and services offering to align with technology capability and provide consistent service levels to customers across EQL.

There are a number of customer focused principles that drive the EQL public lighting strategy. These principles are specifically focused on maintaining a sound working relationship between EQL and its public lighting (PL) customers, developing good asset management capability, reducing operating and maintenance costs and transitioning to energy efficient public lighting schemes. The major public lighting principles are:

- Lower the total cost of public lighting services and deliver better value propositions for PL customers
- Work collaboratively with PL customers to address the current technical, regulatory and financial barriers to achieving deployment of energy efficient LED lighting technologies
- Improve data capture and provide to PL customers to support decision making processes and improve day to day interactions
- Engage PL customers on performance measures and service delivery expectations with the intent of improving the customer experience and involvement in public lighting management
- Achieve "good industry practice" for public lighting management

7.1 Streamline Customer Engagement

- 7.1.1 As Distribution Network Service Providers, the regulated functions of public lighting will remain with the Distribution and Asset Safety and Performance (AS&P) Business Units. Distribution will be responsible for: connection; design; delivery of work; customer engagement; MoU and service level agreements; and RIN reporting. AS&P will be responsible for: technical and connection standards; trials and implementation of new technology; the asset management programme of works; and Facilities Access Agreement arrangements.
- 7.1.2 EQL will centralise its external enquiries handling and response mechanisms through its distribution business to enable improved communication and consistency in response to customers.
- 7.1.3 EQL shall build its own technical, commercial and operational capability as well as establish and build partnerships (with, for example suppliers, contractors) to get the best outcomes for customers, around the future for public lighting assets.
- 7.1.4 EQL will work with customers to support technology and energy efficiency expectations. Understanding that there are different customer drivers for public lighting and associated equipment upgrades and changes, EQL will take a flexible (within regulatory, safety and technical standards) approach in accommodating customer requests.
- 7.1.5 EQL will provide customers with relevant, consistent and timely information in relation to their public lighting billable assets e.g. annual performance reports.

7.2 Standardise Product Offerings

- 7.2.1 In providing public lighting services, EQL aims to deliver the most cost effective lifecycle solution based on the public lighting standards, condition, location and customer requirements.
- 7.2.2 Customers will be encouraged to fund future public lighting investments in recognition of customer concerns around technology, asset values and increasing costs. Over an extended period of time this approach will reduce the Public Lighting Asset Base (PLAB), and may have some impact on the Customer Service Obligation (CSO) in regional Queensland. On replacement, existing Energex Contributed/Gifted and Ergon Operated (Rate 2) assets can remain the same, subject to customers contributing towards the costs of the assets being replaced.
- 7.2.3 EQL will meet the requirements of new and emerging national and international standards and obligations e.g. Minamata Convention (still to be ratified). This business decision will be achieved through both a replacement on failure of MV luminaires (up to 2020) and MV replacement program (after 2020 and for the next regulatory period). EQL will work with those customers that wish to fund an accelerated transition to LED technology. (See Breakout Box 3). For the EQL funded replacements, it is expected that a new Public Lighting Asset Base dedicated to LED lighting be created.
- 7.2.4 EQL intends to provide standard offerings for LED luminaires as a direct replacement for a conventional light (e.g. MV or HPS). The standard LED luminaire offerings by EQL in Queensland are (refer Standards Alert StdsA406A):
- Minor road luminaires - 17W, 22W and 25 W
 - Major road luminaires - 50 W, 80 W, 90W, 100W, 170W, 175 W, 240W, 270W and 300W,
- 7.2.5 EQL will develop a "Public Lighting Asset Management Plan to manage its public lighting assets. The objective of the Plan is to provide a management framework that will ensure that EQLs public lighting assets meet the industry standards and the needs of its public lighting customers. The Plan has a focus on the following areas:
- Design and construction practices
 - Patrols and maintenance programs
 - Lamp and associated component replacement programs
 - Fault identification and rectification
 - Equipment selection and procurement programs
 - Luminaire replacement and refurbishment practices

- 7.2.6 The Policies, Design and Construction Standards for public lighting are covered in the Public Lighting Manuals developed jointly between Energex and Ergon Energy. The three applicable manuals are:
- Queensland Public Lighting Design Manual
 - Queensland Public Lighting Construction Manual
 - Standard Conditions for Public Lighting Service
- 7.2.7 EQL's maintenance strategy will reflect changes in standards brought about through new technology or changing rules and regulations. This will ensure EQL's public lighting population is compliant and good industry practice.
- 7.2.8 EQL will review its public lighting tariffs and consider options to enable greater transparency, cost reflectivity, and flexibility of choice, with a view to facilitate a pathway for new technologies. It is expected that tariffs at a more component-specific level will provide the pricing signals necessary to better inform customers in their decision to replace with technologies. The provision of more accurate and transparent pricing information will enable customers to factor into their decision making process the costs and benefits associated with LED lights. The process to achieve this will include confirmation of EQL's position for Loss of Asset or Exit Fees for luminaires that are replaced before end of life.
- 7.2.9 Facilities Access Agreements will be managed in a flexible manner to accommodate (within reason) customer requests and ensure a competitive offer. Charges will be reviewed in order to offer competitive services
- 7.2.10 Subject to Regulatory determination, EQL expects to pursue opportunities for our public lighting assets to support unregulated activities and revenue where practical
- 7.2.11 EQL have also identified and are offering as an alternative, a LED luminaire that has a higher impact rating capability and less susceptible to damage that can be inflicted on conventional lighting. This may be particularly attractive to customers where vandalism of public lighting is an issue

7.3 LED Replacement Offerings

- 7.3.1 EQL will replace a failed conventional public lighting luminaire (not bulb replacement) with an equivalent LED light.
- 7.3.2 In the current regulatory period 2015 to 2020, EQL will replace conventional lights with LED under the following conditions.
- Public lighting customer to fully fund the cost of the replacement program
 - Rate 2 lights will remain under Rate 2 conditions
 - Rate 1 lights will remain under Rate 1 conditions, and an assessment will be made if there is an applicable exit fee (applies if the public lighting and assembly is less than 20 years)
 - If the exit fee is applicable, this will be reduced from the PLAB
- 7.3.3 It is expected that in the next regulatory period 2020 to 2025, EQL is proposing to undertake a replacement program (due to the Minimata convention) for MV lights, which are predominantly minor road luminaires. EQL will be working with public lighting customers to determine the appropriate funding arrangements. The considerations for the replacement program are:
- Will a new PLAB be established for LED luminaires
 - Who will fund the replacement program? If EQL funds, the new LED luminaires are expected to have a Rate 1 LED tariff. If Council/TMR funds and gifts to EQL for maintenance, then the LED luminaires are expected to have a Rate 2 LED tariff. If Council/DTMR fund and maintain then the LED luminaires are expected to have a Rate 3 LED tariff. EQL are also proposing as part of their Tariff Structure Schedule (TSS) AER submission for an alternate cost reflective Tariff for LED luminaires

- 7.3.4 It is expected that in the future a number of Councils/DTMR will request smart control technology for the future LED public lighting. It is likely that the smart technology will be installed in a city or town precinct where ownership of lights could be EQL or Council/DTMR. There are a number of funding and cost recovery options for consideration

7.4 Technology Process Improvement

- 7.4.1 Recognising lighting and technology advances, EQL's base offering of LED luminaires has been revised to include a 7 pin NEMA socket to facilitate future technology developments and enable customers to explore smart city frameworks. Through research, trials and market participation, EQL will continue to evaluate and review its base offering and align with future standards and network technology strategies e.g. IoT (Internet of Things) strategy.
- 7.4.2 EQL will continue to support and partner with customers to undertake trials and facilitate desired service offerings.
- 7.4.3 As technology changes and opportunities increase for expanded data capture and reporting, requirements and benefits will be monitored and systems and processes reviewed and updated.
- 7.4.4 EQL will explore the potential to leverage new customer driven technology to increase cost efficiency and decrease risk in managing the asset life cycle.
- 7.4.5 Cost efficiency in asset life cycle management will also be facilitated through ongoing review of asset management practices including risk drivers, and increased utilisation of inventory data.

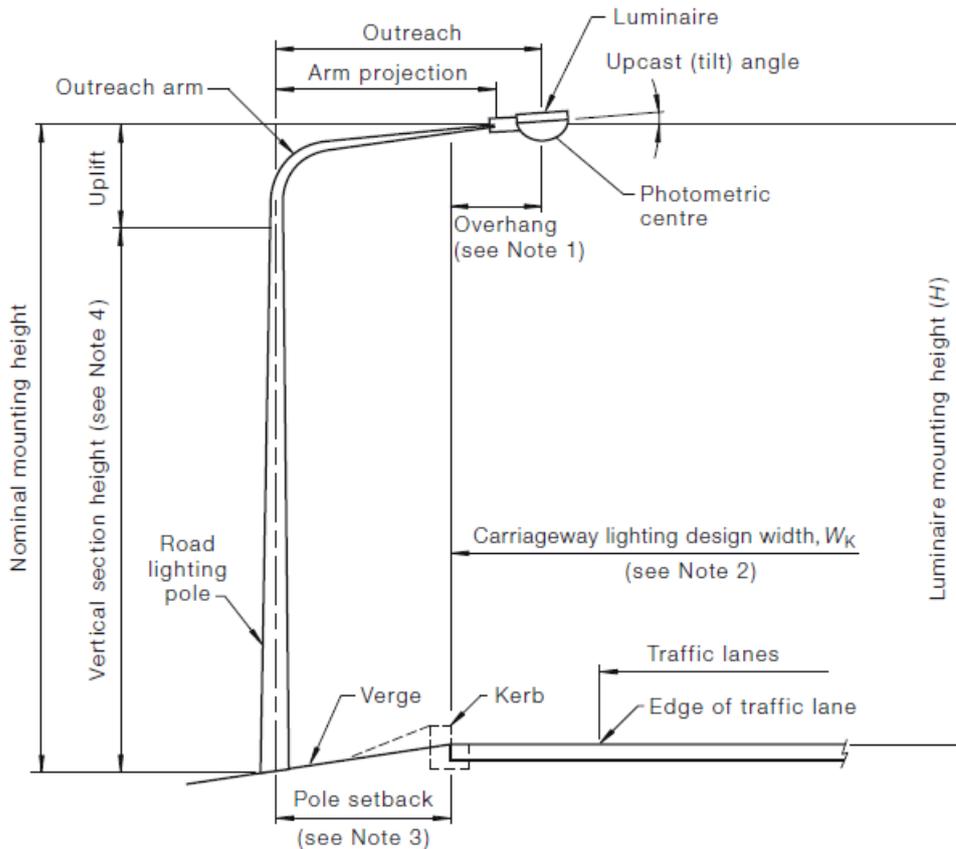
8 Review

EQL will review this strategy as required to encapsulate changes in the external environment, customer requirements and technical standards.

Annex A

Diagrams

A.1 Breakout Box 1 – Diagram Public lighting



NOTES:

- 1 Overhangs of between 0 and $H/4$ will generally achieve the best lighting designs.
- 2 W_K is the width of that part of the carriageway that is used for calculation or assessment of road lighting (see Clause 8.1.2).
- 3 Pole setback is the horizontal distance between the edge of the carriageway and the centre-line of the lighting pole, measured normal to the direction of traffic. Shoulders and breakdown lanes should be taken as part of the carriageway.
- 4 Vertical section height is only applicable where a detachable outreach arm is used.

(AS/NZS 1158.1.2 – Lighting for roads and public spaces Vehicular traffic (Category V) lighting – Guide to design, installation, operation and maintenance; Figure 8.1)

A.2 Breakout Box 2 – EQL Public lighting Statistics (as at March 2018)

ENERGEX				
Lamp Type	R1	R2	R3	Grand Total
Fluorescent	33667	17921	1537	53125
Incandescent	0	255	45	300
LED	1623	1140	1996	4759
Mercury Vapour	59896	84437	4975	149308
Metal Hallide	344	333	3172	3849
Sodium Vapour	53524	70713	27152	151389
Grand Total	149054	174799	38877	362730

ERGON ENERGY				
Lamp Type	R1	R2	R3	Grand Total
Compact Fluorescent	63	569	59	691
Fluorescent	56	28	33	117
Incandescent	2	0	0	2
LED	264	240	113	617
Mercury Vapour	62110	29985	2614	94709
Metal Hallide	169	464	555	1187
Sodium Vapour	27888	22765	9828	60481
Grand Total	90551	54051	13202	157804

A.3 Breakout Box 3 – Minamata Convention on Mercury

The Minamata Convention on Mercury is a global treaty to protect human health and the environment from the adverse effects of mercury. It was agreed at the fifth session of the Intergovernmental Negotiating Committee on mercury in Geneva, Switzerland at 7 a.m. on the morning of Saturday, 19 January 2013 and adopted later that year on 10 October 2013 at a Diplomatic Conference (Conference of Plenipotentiaries), held in Kumamoto, Japan.

The Minamata Convention entered into force on 16 August 2017, on the 90th day after the date of deposit of the 50th instrument of ratification, acceptance, approval or accession.

The Convention draws attention to a global and ubiquitous metal that, while naturally occurring, has broad uses in everyday objects and is released to the atmosphere, soil and water from a variety of sources. Controlling the anthropogenic releases of mercury throughout its lifecycle has been a key factor in shaping the obligations under the Convention.

Major highlights of the Minamata Convention include a ban on new mercury mines, the phase-out of existing ones, the phase out and phase down of mercury use in a number of products and processes, control measures on emissions to air and on releases to land and water, and the regulation of the informal sector of artisanal and small-scale gold mining. The Convention also addresses interim storage of mercury and its disposal once it becomes waste, sites contaminated by mercury as well as health issues.

(<http://www.mercuryconvention.org/Convention/Text/tabid/3426/language/en-US/Default.aspx>, 20/03/18)