ENERGY ADEQUACY ASSESSMENT PROJECTION (EAAP) GUIDELINES

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1. INTRODUCTION

1.1. Purpose and scope

These are the *EAAP Guidelines* made under clause 3.7C(k) of the National Electricity Rules (NER). (**Procedures**).

These Procedures have effect only for the purposes set out in the NER. The NER and the National Electricity Law prevail over these Procedures to the extent of any inconsistency.

1.2. Definitions and interpretation

1.2.1. Glossary

Terms defined in the National Electricity Law and the NER have the same meanings in these Procedures unless otherwise specified in this clause.

Defined terms/Terms defined in the NER are intended to be identified in these Procedures by italicising them, but failure to italicise a defined term does not affect its meaning.

The words, phrases and abbreviations in the table below have the meanings set out opposite them when used in these Procedures.

Term	Definition
10% POE demand traces	Hourly 10% POE demand profiles used in *EAAP*. The method of developing demand traces is explained in Schedule 1 of this document.
50% POE demand traces	Hourly 50% POE demand profile used in *EAAP*. The method of developing demand traces is explained in Schedule 1 of this document.
90% POE demand traces	Hourly 90% POE demand profile optionally used in *EAAP*. The method of developing demand traces is explained in Schedule 1 of this document.
10% POE simulation case	The *EAAP* simulation using a *GELF* for a given Scenario with 10% POE demand traces.
50% POE simulation case	The *EAAP* simulation using a *GELF* for a given Scenario with 50% POE demand traces.
Baseload generation	*Generating units* that typically run all times through the year except during maintenance *outages*. Coal-fired *generating units* are a typical example of baseload *generating units*.
ESOO	Electricity *statement of opportunities*
FCAS	Frequency control *ancillary services*, as that term is defined in section 4.1 of AEMO's Procedure SO_OP 3708A Frequency Control Ancillary Services[1]
FOR	Forced outage rate (unplanned outage data used stochastically in the modelling). ~~as that term is defined on page 12 of Guidebook for forced outage data recording: Definitions and assumptions.~~
Forecast generation capability	The maximum *generation* in GWh each of the *scheduled generating units*, a group of *scheduled generating units* or the *power station* (as appropriate) is capable of producing, taking the *energy* limitations anticipated under various *scenarios* into consideration.

[1] This document is available at: https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Power_System_Ops/Procedures/SO_OP_3708---Non-market-Ancillary-Services.pdf This document is available at: https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Power_System_Ops/Procedures/SO_OP_3708---Non-market-Ancillary-Services.pdf

Term	Definition
Hydro power scheme	One or more hydro *power stations* including pump storage units relying on a common river system for their energy source can be defined as a *hydro power scheme*, including run–of-the-river hydro *power stations*.
Intermediate generation	Generating units that are not included in baseload generation or peaking generation are generally included in this category.
Monte Carlo simulations	Probabilistic computational algorithms that rely on repeated random sampling to compute their results. Monte Carlo methods are useful in studying complex systems with significant uncertainty in inputs.
NSCAS	Network support and control ancillary services
Network Support Agreement[2]	An agreement between a *Network Service Provider* and a *Market Participant* to provide a non-*network* alternative to a *network augmentation* to improve *network* capability.
Peaking generation	*Generating units* that are relatively expensive to run and generally run only for few hours a day when the demand is high.
Run-of-river hydro power stations	The hydro *power stations* utilizing the natural flow and elevation drop of a river to *generate* electricity. *Power stations* of this type are built on rivers with a consistent and steady flow, either natural or through the use of a large reservoir at the head of the river that then can provide a regulated steady flow for the down-stream *power station*.
Scenarios	As defined in section 4.1 of this document.
Simulation case	An *EAAP* simulation with a *GELF* for a given Scenario and with a given POE demand trace (10% POE or 50% POE).
Study period	24 month period under investigation by *EAAP*.

1.2.2. Interpretation

These Procedures are subject to the principles of interpretation set out in Schedule 2 of the National Electricity Law.

[2] This definition is included in the "New Chapter 10 Glossary Terms" section (refer page 361) of the Final Report of the Congestion Management Review by Australian Energy Market Commission. This report can be accessed using the following weblink: https://www.aemc.gov.au/markets-reviews-advice/congestion-management-reviewat: https://www.aemc.gov.au/markets-reviews-advice/congestion-management-review

2. NER REQUIREMENTS

AEMO is required to develop and publish the *EAAP guidelines* in accordance with Rule 3.7C,
which states:

EAAP guidelines

(k) *AEMO* must develop and *publish* guidelines (the '*EAAP guidelines*') that:

(1) define scenarios that *AEMO* must study in preparing the *EAAP*;

(2) define modelling assumptions for the *EAAP*;

(3) define the components of a *GELF* that a *Scheduled Generator* must include in a *GELF* submitted under paragraph (g);

(4) provide detail on the forms of the *GELF* sufficient for a *Scheduled Generator* to meet the requirements of paragraph (g);

(5) define variable parameters specific to a *GELF* ('*GELF parameters*') that are likely to have a material impact on the *GELF* and therefore the *EAAP*, and which may include, but are not limited to, parameters in relation to:

(i) hydro storage including pump storage;

(ii) thermal generation fuel;

(iii) cooling water availability; and

(iv) gas supply limitations;

(6) define circumstances where a *GELF* submitted under paragraph (g) can apply to a collection of *scheduled generating units* that face common *energy constraints* due to their geographic location, access to fuel source or another similar reason;

(7) define the form of information to be submitted by each *Scheduled Generator* in accordance with paragraph (e);

(8) define arrangements for managing the confidentiality of information submitted to *AEMO* under this rule 3.7C; and

(9) specify when a *Scheduled Generator* is required to update a *GELF* under paragraph (h)(2).

In preparing the *EAAP Guidelines*, *AEMO* is required to comply with Rule 3.7C(l), which states:

(l) The scenarios that are defined for the purposes of subparagraph (k)(1) may include, but are not limited to:

(1) water conditions such as normal rainfall and drought;

(2) material restrictions on the supply of a significant fuel source;

(3) other limits on a fuel source for a major form of generation; and

(4) any other scenario that AEMO reasonably considers will have a material impact on the *EAAP*.

EAAP principles

Rule 3.7C(m) requires AEMO to comply with the EAAP principles in preparing the EAAP guidelines. The EAAP principles are specified in Rule 3.7C(b), which provides:

(b) The *EAAP* must:

(1) cover a 24 month period;

(2) be *published* at least once in every 12 month period and more frequently if required under paragraph (d);

(3) provide a probabilistic assessment of projected *energy* availability for each *region*;

(4) provide projected *unserved energy* levels for each *region* with a monthly resolution;

(5) provide aggregated information on the adequacy of *energy* availability for each scenario that *AEMO* defines for the purposes of the EAAP, based on information received from *Registered Participants* and on anticipated *power system* constraints;

(6) take into account:

(A) where relevant, the information and *medium term PASA* inputs referred to in clauses 3.7.1 and 3.7.2;

(B) where relevant, the matters AEMO considers in, and for the purposes of, clause 5.6.5(c) in carrying out the *ANTS review*;

(C) *Generator Energy Limitation Frameworks* provided in accordance with paragraph (g), including *GELF*s that apply to more than one *scheduled generating unit* under clause 3.7C(k)(6) where those *GELF*s adequately represent the relevant *generating units*; and

(D) *GELF parameters* for each *GELF* which are provided in accordance with the *EAAP guidelines* and are updated in accordance with the *timetable*.

In addition, AEMO must comply with Rules 3.7C (o) and (q) in developing, publishing and amending the *EAAP Guidelines*. These state:

(o) AEMO must develop and *publish* the *EAAP guidelines* in accordance with the *Rules consultation procedures*.

(q) AEMO may from time to time in accordance with the *Rules consultation procedures* amend or replace the *EAAP guidelines*.

This document details the *EAAP guidelines* as required by Rule 3.7C(k). ~~These *EAAP guidelines* commence on 1 November 2016.~~

3. PREPARATION OF THE EAAP

AEMO is required by Rule 3.7C(d) to *publish* an *EAAP:*

1. at least once in every 12 month period in accordance with the *timetable;* and
2. as soon as practicable after becoming aware of any new information that may materially alter the most recently published *EAAP*.

The *EAAP* will be prepared and *published* in accordance with Rule 3.7C. The *EAAP* will use probabilistic modelling to determine the *regional Unserved Energy* (USE) at an hourly resolution during the *Study Period*. This involves the use of time-sequential, security constrained optimal dispatch simulations, incorporating *Monte-Carlo Simulations*.

The annual percentage of USE per *region* will be the key indicator of *energy* adequacy in the *NEM*. The *EAAP* will cover the scenarios listed in section 4.1 of this document.

AEMO will use the modelling assumptions listed in section 4.2 of this document in preparing the *EAAP*. At least once in every 12 month period, or when notified by AEMO that an additional *EAAP* is required, the *GELF parameters* will be submitted by *Scheduled Generators*, consistent with the selected form of *GELF* as explained in sections 4.3, 4.4, 4.5 and 4.6 of this document.

4. EAAP GUIDELINES

These EAAP guidelines cover the following areas, as required by Rule 3.7C(k):

- scenarios that AEMO must study in preparing the EAAP;
- modelling assumptions for the EAAP;
- components of a GELF that a Scheduled Generator must include in a GELF submitted under Rule 3.7C(g);
- the forms of the GELF sufficient for a Scheduled Generator to meet the requirements of Rule 3.7C(g);
- variable GELF parameters that are likely to have a material impact on the GELF;
- circumstances where a GELF submitted under Rule 3.7C(g) can apply to a collection of scheduled generating units that face common energy constraints due to their geographic location, access to fuel source or another similar reason;
- the form of information to be submitted by each Scheduled Generator in accordance with Rule 3.7C(e);
- arrangements for managing the confidentiality of information submitted to AEMO under Rule 3.7C.;
- when a Scheduled Generator is required to update a GELF under paragraph (h)(2).

4.1. Scenarios that must be studied in preparing the *EAAP*

The following scenarios will be included in the first *EAAP* to be *published* by 31 March 2010:

1. Low rainfall – based on rainfall experienced in a specified historical period;
2. Short-term average rainfall – based on the average rainfall recorded over the past 10 years; and

3. Long-term average rainfall – based on the average rainfall recorded over the past 50 years, or the longest period for which rainfall data is available should this be less than 50 years.

(Collectively referred to as '***Scenarios***').

~~Simulation cases will be carried out for the first two scenarios. A simulation case would only be run for the third scenario if the annual USE in any region was above 0.002% of the regional energy demand in the second scenario, and the input data provided for the third scenario suggested potentially improved conditions.~~

Simulation cases

Each *Scenario* will be simulated with 10% POE demand traces (**10% POE simulation case**) as well as 50% POE demand traces (**50% POE simulation case**) for all *regions*.[3]

This means that there will be up to six simulation cases studied for the *EAAP*. They are:

1. Simulation case 1: Low rainfall scenario with *10% POE demand traces*
2. Simulation case 2: Low rainfall scenario with *50% POE demand traces*
3. Simulation case 3: Short-term average rainfall scenario with *10% POE demand traces*
4. Simulation case 4: Short-term average rainfall scenario with *50% POE demand traces*
5. Simulation case 5: Long-term average rainfall scenario with *10% POE demand traces*
6. Simulation case 6: Long-term average rainfall scenario with *50% POE demand traces*

If the need arises, AEMO will conduct simulations of *90% POE demand traces* or additional scenarios as appropriate in future using the *GELF* information provided by *Scheduled Generators* in accordance with these *EAAP guidelines*. ~~Any extra scenarios that would require additional information from participants will be done in consultation with stakeholders~~

~~4.1.~~4.2. Modelling assumptions for the *EAAP*

Sharing *USE* among regions

Whenever *USE* is predicted in a simulation, *USE* will be shared between *regions* in proportion to the *regional* demands until *interconnector* limits are reached. After reaching the *interconnector* limits, the remaining *USE* will be reported for the *region* it belongs to in addition to the shared component of *USE* for that *region*.

Number of Monte Carlo simulations to be performed

AEMO will use a sufficient number of *Monte Carlo simulations* for each of the simulation cases to achieve convergence of monthly *USE* values to within an acceptable tolerance.

Determination of hourly *USE* for Scenarios

For each of the *Scenarios*, the 10% POE simulation case hourly *USE* results will be combined with the 50% POE simulation case hourly *USE* results using weighting factors

[3] The method of developing demand traces is explained in Schedule 1 of this document.

consistent with the weighting factors used for the *ESOO* to determine the hourly *USE* for the *Scenario*.

AEMO is not explicitly modelling simulation cases for 90% POE demand traces unless USE outcomes are expected to be materially different from 50% POE outcomes. If not explicitly modelled, USE values included in the probability weighted calculation of expected USE arising from 90% POE demand traces are assumed to be zero.

~~4.1.1.~~4.2.1. Modelling of generation plant for EAAP

All generators that contribute to operational demand[4] are modelled in the EAAP, consistent with the approach used in both the *medium term* PASA and Electricity Statement Of Opportunities (ESOO). ~~Only the scheduled generating units semi-scheduled generating will be modelled in EAAP. All operational[1] generators units will be modelled in *EAAP*, this includes all scheduled generating units and semi-scheduled generating units. The *semi-scheduled generating units* are not required to provide *GELF* information.~~

Existing Generation

Generating units included in the most recent *medium term* PASA at the time the *GELF* is submitted will be modelled for *EAAP*.

New Generation

New *generating units* for the upcoming two years will be modelled once they are 'committed', as reported in the latest NEM *ESOO*, as well as the most recent information that is available on the AEMO Generation Information webpage.[5]

Retiring Generation

AEMO will consider a *Scheduled Generator's* advice regarding the decommissioning of *generating units* submitted for the *medium term PASA* as well as for the purposes of the NEM *ESOO* or *published* on the AEMO Generation Information webpage. –The *generating units* will be modelled as unavailable after the proposed decommissioning date.

~~Self-Dispatch Level~~

~~AEMO proposes to include self-dispatch levels (the 'must run' component) as a component of the GELF.~~

~~Generator Ramp Rates~~

~~AEMO proposes to include ramp rates of generating units as a component of GELF. Ramp rates for scheduled generating units of thermal power stations will be submitted on the basis of individual scheduled generating units.~~

[4] For details on operational demand, please refer to demand definitions here https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/system-operations/dispatch-information

[5] The AEMO Generation Information webpage can be accessed ~~using the following weblink: http://www.aemo.com.au/Electricity/Planning/Related-Information/Generation-Information~~ at: http://www.aemo.com.au/Electricity/Planning/Related-Information/Generation-Information.

~~Some hydro power generating units are combined to model hydro power schemes. The ramp rates for combined hydro power generating units will be the combined ramp rates of all physical hydro power generating units.~~

Capacity of Generating Units

The *PASA availability* of *generating units* submitted for the most recent *medium term* PASA will be used to represent the availability of *generating units* for *EAAP* modelling.

Scheduled outages of Generating Units

AEMO proposes that maintenance outages be modelled using the most recent information submitted for the *medium term PASA*.

If *USE* is predicted in periods where *outages* of *scheduled generating units* are planned to occur, where possible, the o*utages* will be shifted to periods where *USE* is not predicted. This approach is based on the assumption that *scheduled generating unit* planned *outages* would be re-arranged if they caused *USE* in one or more *regions*. If AEMO has been advised by the *Scheduled Generator* that it is not feasible to shift the *outage*, it will be modelled to occur at the periods advised.

Generator price input

AEMO will use a suitable pricing structure for *generating units* reflecting the submitted *GELF parameters* to achieve realistic *dispatch* of *generating units* modelled in the *EAAP*. The pricing structure will also take into account the requirement to minimise *USE*.

Generator Forced Outage Rates (FOR)

The *EAAP* will use FOR data collected on an annual basis for the purpose of producing ~~the a National Transmission Statement under Rule 11.27 or the *National Transmission Network Development Plan* under the *Rules* (as the case may be~~ the annual ESOO.

~~4.1.2~~4.2.2. NEM Network model

A five-~~state~~region model will be used, and includes:

- Generator marginal loss factors; and
- Inter-regional loss factor models.

Refer to Schedule 2 for details of the *inter-regional* loss model and the *marginal loss factors* used in the *EAAP*. ~~The interconnector FOR used in the Minimum Reserve Levels by AEMO will be used in the EAAP.~~

4.2.3. Power transfer capability and network constraints

Network power transfer capability is defined by a set of *network* constraint equations. The *network* model is used to constrain the dispatch of *interconnectors* and *generation* to avoid power flows exceeding *network* capability.

This section describes the set of constraint equations used in the *EAAP* simulations to model the existing and future *network* capability.

The *EAAP* simulations model the power transfer capability of the *network* using system normal ST PASA formulated constraint equations only. *Outage* and other types of constraint equations are excluded from the simulations. The reasons for this are as follows:

- *Network outages* would normally be moved if they were likely to cause security or reliability issues;
- FCAS constraint equations are not represented in the *EAAP* simulations because under system normal conditions, Basslink is the only *interconnector* affected by FCAS constraints;
- *Interconnector* rate of change and other types of constraint equations are not represented in the *EAAP* as these equations are generally invoked as required, depending on *power system* conditions. It is not appropriate to assume these constraint equations are active across the *study period*. *Interconnector* rate of change constraint equations are also not meaningful when applied to an hourly data resolution.

The constraint equations will factor in:

- the demand profile of the selected *simulation case*;
- seasonal equipment ratings;
- *PASA availability* of *scheduled generating units* as submitted for the *medium term PASA*;
- use/enabling of control schemes, ~~*NCAS*~~*NSCAS* and *Network Support Agreements* to achieve maximum power transfer capability levels;
- future *generation* relevant for the *study period*;
- future *network augmentations* relevant for the *study period*.

~~4.2.~~4.3. Components of static *GELF* parameters that a Scheduled Generator must include in a *GELF* submitted under Rule 3.7C(g)

Components of a *GELF* to be submitted must be on the basis of *scheduled generating units*. Components of a *GELF* can be submitted for groups of *scheduled generating units* within a *power station* or on a *power station* basis provided the impact of the energy limitation applies equally across the *generating units* in the group or in the *power station* (as the case may be). Aggregation of two or more *power stations* will not be permitted for providing *GELF parameters* except for hydro *power stations* constituting *hydro power schemes*.

The components of a *GELF* should include:

- power station name;
- in the case of hydro power stations, the name of the hydro power scheme it belongs to;
- type of power station (coal-fired, gas-fired, hydro, GT etc);
- number of generating units at the power station and their MW capacities;

- state whether energy or capacity limitations (or both) are likely to be experienced by the power station or the hydro power scheme under the Scenarios considered for the EAAP – briefly explain each of the limitations and the cause of these restrictions;
- for thermal power stations not belonging to hydro power schemes, state whether the energy/capacity restrictions apply to the whole power station, to a group of generating units at the power station or to individual generating units at the power station; and
- State the generation group the generating units belong to. All generating units modelled in the EAAP must be categorised into Baseload, Intermediate or Peaking generation groups. Refer to the Glossary for the definitions.

~~4.3.~~4.4. Additional components of static *GELF* parameters associated with Hydro Power Schemes

Cascaded pump storage *hydro power schemes* can be complex in their operation. –Five typical models representing *hydro power schemes* have been included in Schedule ~~4~~3 as examples.

Scheduled Generators should select the model best representing their *hydro power schemes*, giving consideration to the inflow patterns consistent with the scenarios as well as the configuration of the *hydro power schemes* when establishing static *GELF parameters* and advise the selected model to AEMO. AEMO will then review the proposed model and decide if it is adequate for the purposes of the *EAAP*. If not, AEMO will discuss the inadequacies of the proposed model with the *Scheduled Generator* in question to establish an adequate model. The timeframe to complete this task is covered in section ~~5.8~~4.8 of this document.

The following information must be provided for each of the reservoirs associated with a *hydro power scheme*:

- Maximum active reservoir storage (GL);
- Minimum active reservoir storage (GL).

The following information on tunnels associated with *hydro power schemes* would form a part of *GELF* if AEMO, in conjunction with the *Scheduled Generator* who owns the *hydro power scheme*, determines it is required to accurately model the *hydro power scheme* for the purposes of the *EAAP*:

- The rate at which water can be transferred through the tunnel (ML/hour); and
- The reservoirs to which the tunnels are connected.
- In addition, each of the *hydro power stations* has the following static *GELF parameters*:
- Water utilization factor for generation and pumping for each generating unit or for the power station in GWh per GL;
- Connected to which reservoirs (e.g. upstream reservoir and downstream reservoir).

~~4.4.~~4.5. The forms of the *GELF* sufficient for a Scheduled Generator to meet the requirements of Rule 3.7C(g)

Scheduled Generators should submit a *GELF* representing *energy* limitations likely to be experienced by their *power stations*. It is acknowledged that the *energy* limitations experienced by some of the *generating units* or *power stations* can be better expressed in

the form of a capacity limitation; hence,
it is proposed to allow the *energy* limitations to be expressed as an *energy* limitation or a capacity limitation.

Energy limitations in a *GELF* could be due to (but not limited to):

- limitations on a primary energy source (i.e. coal, gas or availability/allocation of water for hydro power generation);
- limitations on power station services (i.e. cooling water, high cooling water temperatures, boiler feed water, etc.); and
- environmental issues, such as emission limits, operation allowed only at specific times of the day/week, etc.

~~4.5.~~4.6. Variable parameters to be specified in a *GELF*

The variable parameters *Scheduled Generators* must submit in a *GELF* should cover the full *study period* and have a monthly resolution, unless a different resolution has been previously agreed
with AEMO.

A separate set of variable *GELF parameters* should be submitted for each of the *Scenarios* included in the *EAAP*.

Water-related *energy* limitations included in *forecast generation capability* submitted as a variable *GELF parameter* should be based on the known current share of water available for *generation*, as advised by jurisdictions and water authorities. *Scheduled Generators* should not assume that water allocations above this level would be made available in the future.

Variable *GELF* parameters to be submitted by non-hydro power stations

1. Monthly forecast generation capability in GWh taking into account the energy limitations anticipated in each Scenario for each of the scheduled generating units, group of scheduled generating units within the power station or for the power station; and
2. If there are any capacity limitations associated with the energy restrictions, monthly capacity profiles for each of the scheduled generating units should also be submitted.

Variable *GELF* parameters to be submitted for *hydro power schemes*

1. Active reservoir storage at the beginning of the *study period* in GL;
2. Monthly inflows to reservoirs in GL during the *study period*;
3. Minimum reservoir level that can be reached in each month of the *study period* without violating long-term reservoir management policy; and
4. Any other limitations on reservoir capacities or levels that should be considered within the
study period.

~~4.6.~~4.7. Circumstances where a *GELF* can apply to a collection of scheduled generating units that face common energy constraints due to their geographic location, access to fuel source or another similar reason

The *GELF* for *power stations* that do not constitute *hydro power schemes* will cover common *energy constraints* applying to *generating units* within a *power station* only and will not cover common *energy constraints* applicable for multiple *power stations* due to the difficulty in modelling them.

~~4.7.~~4.8. The form of information to be submitted by each *Scheduled Generator* in accordance with Rule 3.7C(e)

The *GELF parameters* are to be submitted by each *Scheduled Generator* in an electronic format using the interface developed by AEMO for this purpose. This interface will include features that will enable the *Scheduled Generators* to submit *GELF* parameters conveniently at a relatively low administrative cost.

~~The proposed static *GELF parameters* applicable to each *Scheduled Generator* will be inputted by AEMO by 1 October 2009.~~ *Scheduled Generators* will be responsible for maintaining the accuracy of static *GELF parameters* associated with the scheduled generating units and the hydro power schemes they own. Any errors in the static *GELF* parameters should be reported to AEMO promptly.

The variable GELF parameters must be submitted by each *Scheduled Generator* within three weeks from the time AEMO issues an AEMO Communication for *EAAP* reporting.

To assist with resource planning, in the event that additional *EAAP* reporting is not required, AEMO will target an *EAAP* publication date of end of November each year, with the deadline for submitting a *GELF* being before the end of the fifth business day in October.

~~4.8.~~4.9. When a *Scheduled Generator* is required to update a *GELF* under paragraph (h)(2)

Additional EAAP reporting will be required if AEMO becomes aware of any new information that may materially alter the most recently published *EAAP*. The factors AEMO will consider in determining whether additional EAAP reporting is required are outlined in the *Reliability Standard Implementation Guidelines*.

At AEMO's discretion, some or all *Scheduled Generators* will be required to update and resubmit variable *GELF parameters* when AEMO has an obligation to publish an EAAP under clause 3.7C(d)(2), and an AEMO Communication will be issued to this effect.

In exercising this discretion, AEMO will consider whether the new information is likely to have materially impacted the variable *GELF parameters* most recently submitted by each *Scheduled Generator*.

~~4.9.~~4.10. Information to be included in the publication of the EAAP

There will be two versions of the *EAAP published*:

- a public version; and
- a version covering individual scheduled generating units or hydro power schemes. ~~Th~~The second version will be available only to the Scheduled Generator who owns the relevant scheduled generating units or the hydro power scheme.

The public version will be available to all Market Participants and will include the following items for each of the Scenarios on regional basis:

- Monthly USE for the study period in GWh; and

USE for the first 12 months and for the second 12 months in the study period in GWh. Monthly energy generation for the study period in GWh will be provided on a NEM-wide basis.

The second version will include the following items for each of the Scenarios:

- ~~Monthly energy generation reductions in GWh for the scheduled generating unit or hydro power scheme for the study period;~~
- ~~Monthly capacity reductions in MW for the scheduled generating unit or hydro power scheme for the study period;~~
- Monthly generation contribution in GWh from the scheduled generating unit or hydro power scheme for the study period; and
- Monthly generation contribution in GWh for the first 12 months and for the second 12 months in the study period.

~~4.10.~~4.11. Arrangements for managing the confidentiality of information submitted to AEMO

Subject to the requirement to *publish* the *EAAP*, that is, the public version described in section 4.10 of this document, the *GELF* information submitted by the *Scheduled Generators* for the purposes of the *EAAP* will be treated as *confidential information* in accordance with the *Rules*.

5. SCHEDULE 1: DEVELOPMENT OF 10% POE AND 50% POE DEMAND TRACES FOR THE EAAP

The demand traces used in the *EAAP* ~~will~~represent operational demand, and therefore reflect the demand met by *scheduled* and ~~-~~*semi- scheduled* and large non-scheduled *generation* in the NEM[6].

~~An~~ A half-hourly resolution is~~will be~~ used in the *EAAP* probabilistic simulations~~, requiring hourly *demand traces* to be used.~~. These traces ~~will be~~are generated using the same method employed to produce demand traces for both the ~~*National Transmission Statement under Rule 11.27 or the National Transmission Network Development Plan under the Rules (as the case may be*~~*ESOO* and *medium term* PASA[7].

The method involves adjusting historical demand patterns to match forecast *energy* and ~~peak~~maximum demand projections to determine *10%* and *50% POE demand traces* for the *study period*. Where appropriate, *90% POE demand traces* are also developed using the same method. The historical years used in deriving the ~~*10% POE* and *50% POE*~~ demand traces ~~generally~~ reflect ~~the most recent year/s in which the load traces most closely matched the criteria for the nominated 10% and 50% POE years~~ those used in the MT PASA.

A 10% POE maximum demand projection takes into consideration both the probability of extreme temperatures and day of the week. It is expected to be exceeded, on average, no more than once every 10 years. That is, for any given year, there is a 10% probability that a 10% POE projected maximum demand will be exceeded. Similarly, 50% POE projected demands are expected to be exceeded no more, on average, than one year in every two.

~~Suitable adjustments will be made within the model to take into account the demand side participation (DSP) using the committed amounts of DSP *published* in the latest NEM *ESOO*.~~

[6] For details on operational demand please refer to demand definitions here https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/system-operations/dispatch-information

[7] The latest information on the methodology used to develop demand traces can be found in the methodology documents available at https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-reliability/nem-electricity-statement-of-opportunities-esoo

6. SCHEDULE 2: INTER-REGIONAL LOSS MODEL AND MARGINAL LOSS FACTORS USED FOR THE EAAP

The *demand traces* used by AEMO will be derived on the basis of "~~as generated~~ sent-out". The estimated auxiliary load is automatically calculated during the modelling as a fixed percentage of "as generated power". The generator auxiliary information supplied to the model is based on AEMO's latest modelling assumptions[8], which are published on the AEMO website. The overall auxiliary load is therefore dependent on the particular dispatch outcome in each simulation as all generator types have varying levels of auxiliary load.

The *EAAP* simulations will ensure that the *regional* scheduled maximum demands include a proportion of the *inter-regional losses* calculated using loss equations. AEMO proposes that for each *interconnector*, there will be a proportion of the *inter-regional losses* set per *region*.

Marginal loss factors are used in determining pricing and dispatch order in the *EAAP* simulations, but are not used to adjust physical demand. The *Marginal loss factors* applied in the *EAAP* studies for the first year will also be applied for the second year of studies.

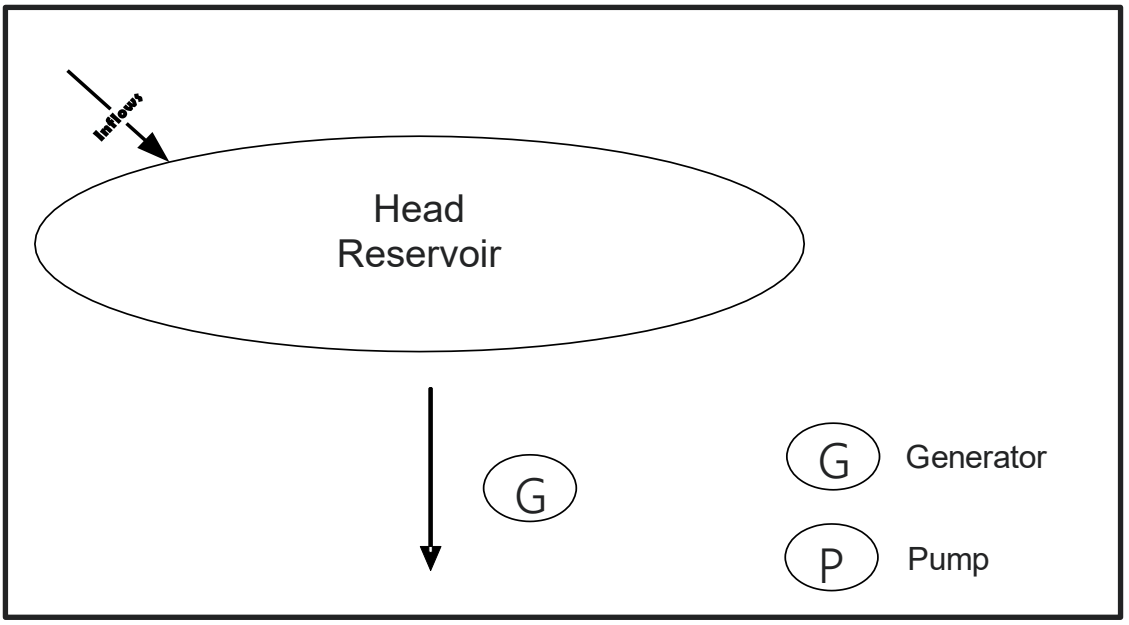
The *inter-regional loss* models, *inter-regional loss* proportions and *marginal loss factors* for the *EAAP* studies will be sourced from the latest version of the AEMO document "List of Regional Boundaries and Marginal Loss Factors~~"~~[9].

[8] The latest information on AEMO's modelling of generator auxiliary load can be found at https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-reliability/nem-electricity-statement-of-opportunities-esoo

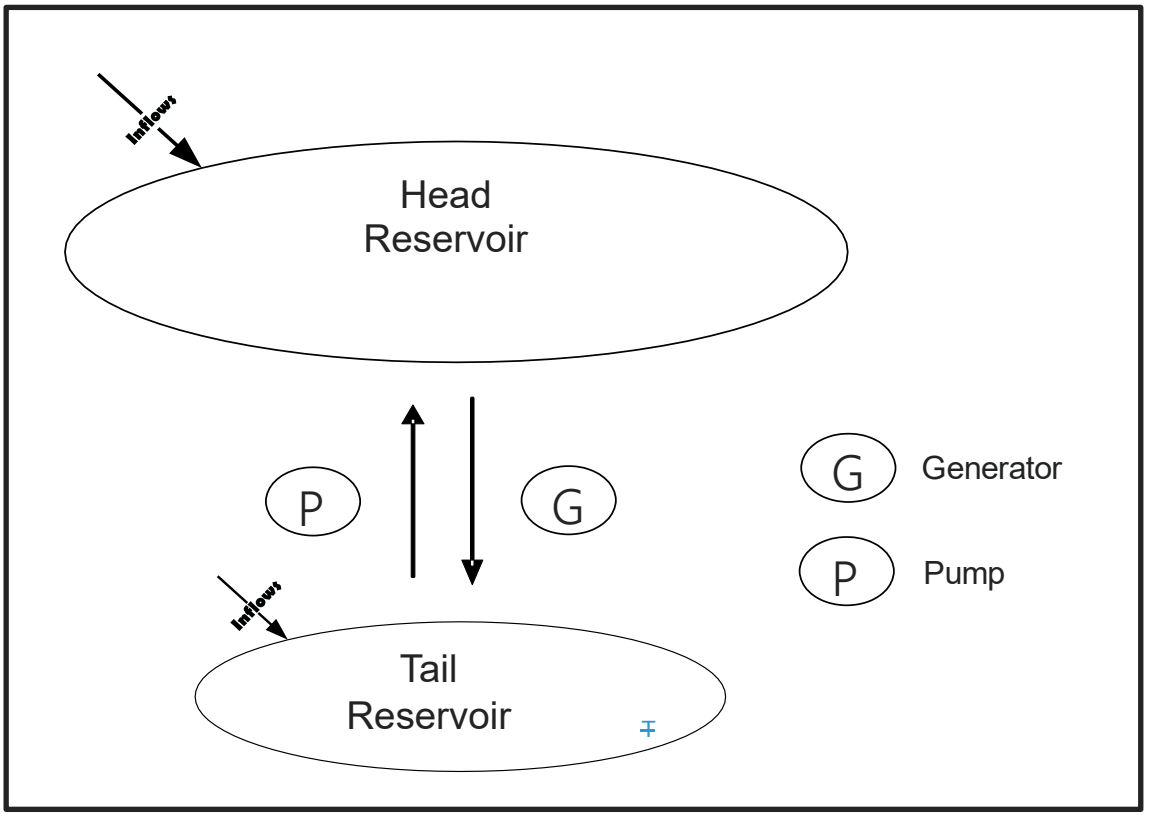
[9] The *AEMO* document "List of Regional Boundaries and Marginal Loss Factors" can be accessed ~~using the weblink~~at: https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Loss-factor-and-regional-boundaries

7. SCHEDULE 3: EXAMPLES OF *HYDRO POWER SCHEME* MODELLING FOR EAAP

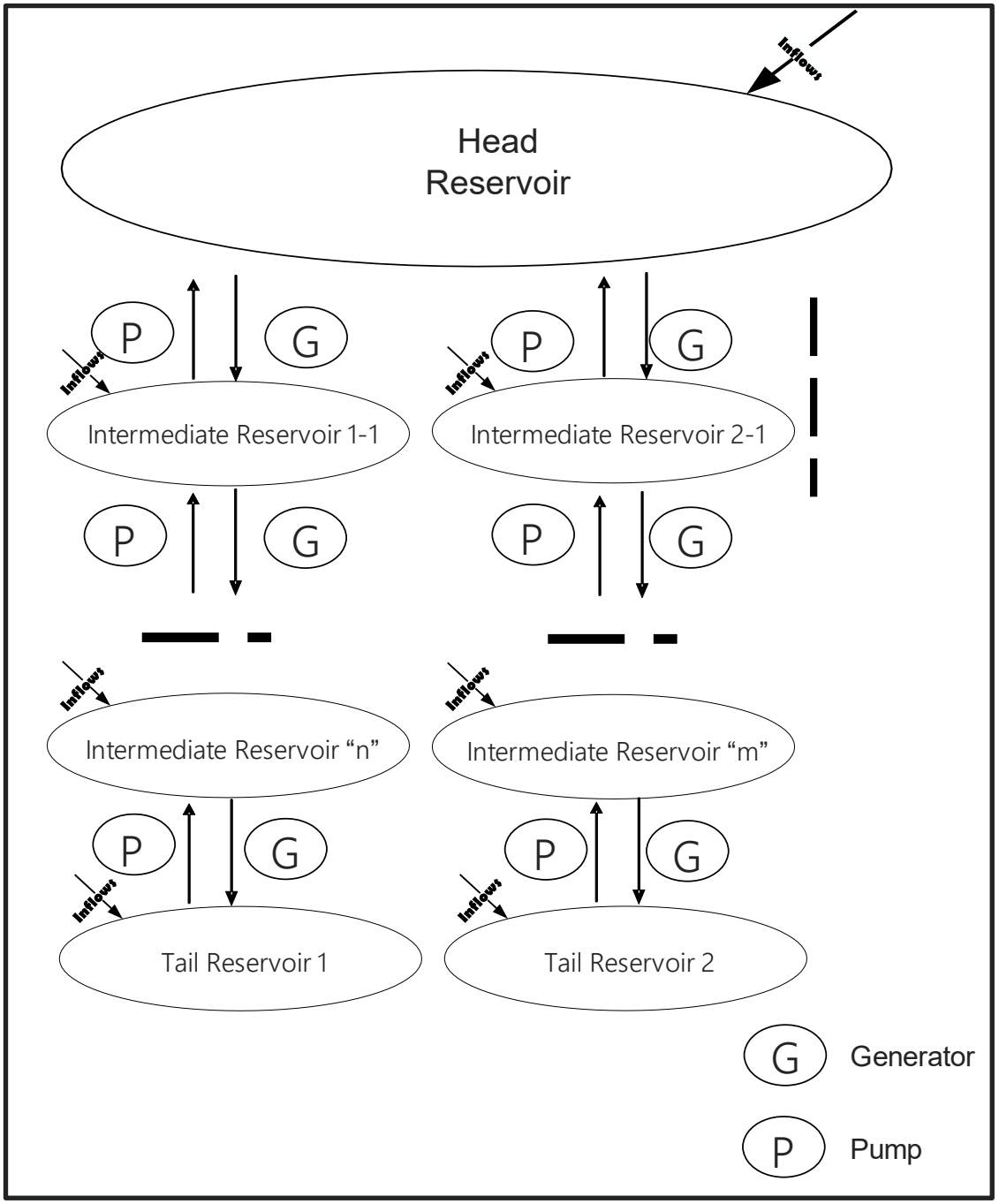
7.1. Sample Model 1 – Run of river Hydro Power Station



7.2. Sample Model 2 – Basic Pump Storage Hydro Power Schemes



7.3. Sample Model 3 – Complex Pump Storage Hydro Power Schemes



7.4. Sample Model 4 – Aggregated Complex Pump Storage Hydro Power Schemes

A suitable combination of physical hydro *power stations* so that complex *hydro power schemes* can be approximated by one of the three models presented above.

7.5. Sample Model 5 – Hydro Power Schemes with specific generation profiles

Hydro power schemes may be modelled by means of different hourly *generation* profiles for the *study period* to suit various *Scenarios*. This will be an option made available to *Scheduled Generators* to submit variable *GELF parameters* for *hydro power schemes*.