

Operating Code 2 : Outage And Other Related Planning - Generating Unit Outage

By :

Ir. NORHASBI ABDUL WAHAB – TENAGA NASIONAL BERHAD

22nd January 2014



The Malaysian Grid Code Awareness Programme Funded by
Akaun Amanah Industri Bekalan Elektrik (AAIBE)

Introduction

- OC 2 is concerned with the coordination between GSO & Users through the various time scales of planned outages of Plant & Apparatus which may affect the operation of the Grid System.
- It primarily outlines the generation & transmission outage planning processes from Year 0 (current year) to Year 5.
- Each year is considered to start on the 1st of September.
- The time scales involved are Operation Planning & Operation Control phases.

Objectives

- Enable the **GSO** to coordinate generation & transmission outages to achieve **economic operation & minimise constraints**.
- To set out procedure including **information required** & a typical timetable for the coordination of planned outage requirements for Generators and other Users that will have an effect on the operation of the Grid System.
- To establish the responsibility of the GSO to produce an **Operational Plan** on the Grid System.

Scope

Applies to the **GSO** & the following **Users**:-

- All Generators with CDGUs
- All Generators with Generating Units not subject to Dispatch by the GSO, with total on-site generation capacity equal to or above 30MW where the GSO considers it necessary
- TNB Transmission
- Distributors
- Directly Connected Customers
- Network Operators
- Interconnected Parties

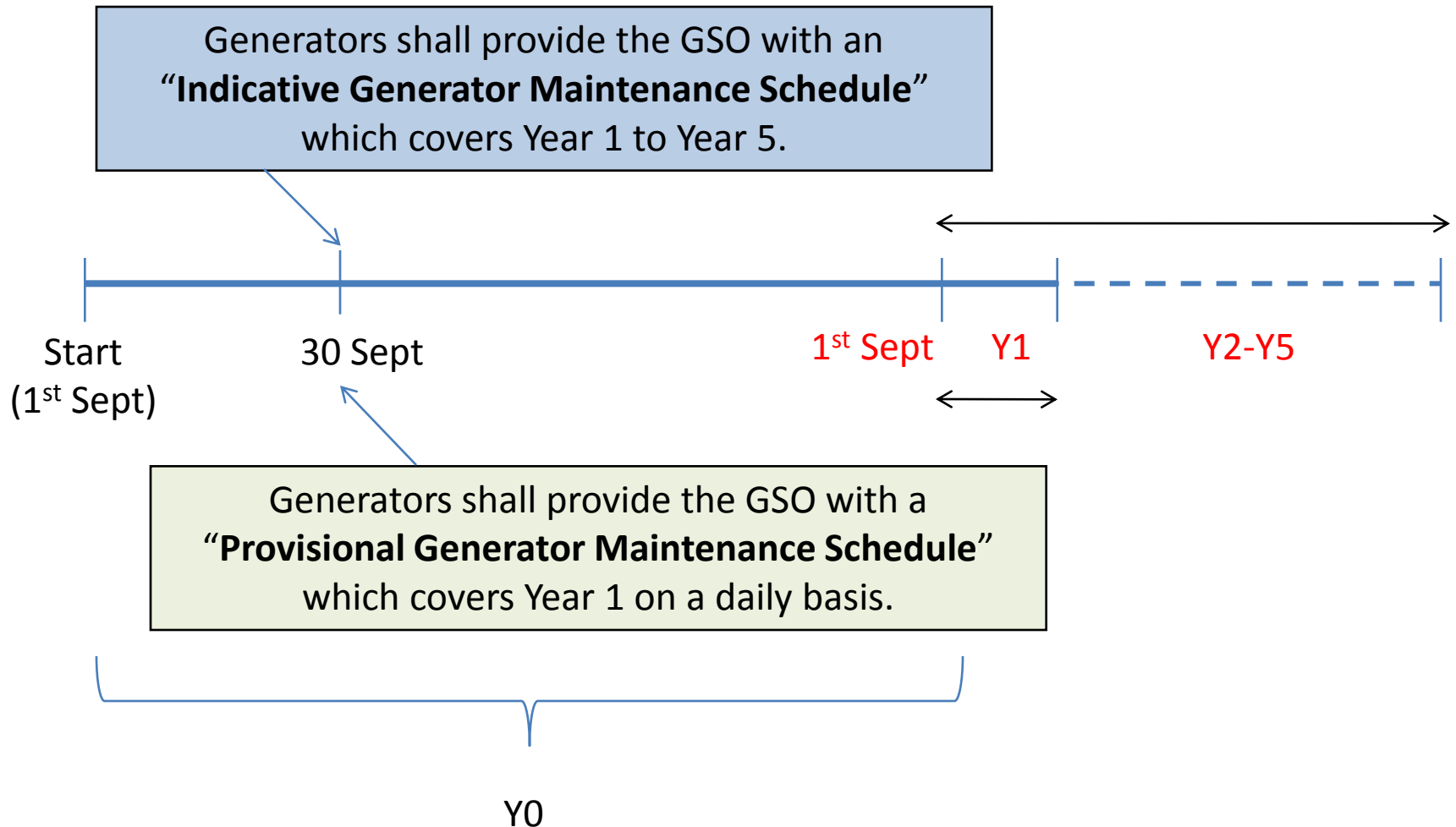
Submission Of Planned Outage Schedules by Users

- In each Year, by the end of September of Year 0, each Generator with CDGUs shall provide the GSO with an "Indicative Generator Maintenance Schedule" which covers Year 1 up to Year 5. The schedule will contain the following information:
 - (1) Identity of the CDGU;
 - (2) MW not available;
 - (3) Other Apparatus affected by the same outage;
 - (4) Duration of outage;
 - (5) Preferred start and end date;
 - (6) State whether the planned outage is flexible, if so, provide the earliest start date and latest finishing date;
 - (7) State whether the planned outage is due to statutory obligation (for example for pressure vessel inspection/boiler check), if so, the latest date the outage must be taken; and
 - (8) To state detail of any test which may affect the performance of the Grid System or the GSO's operational plan or risk of tripping.

Submission Of Planned Outage Schedules by Users

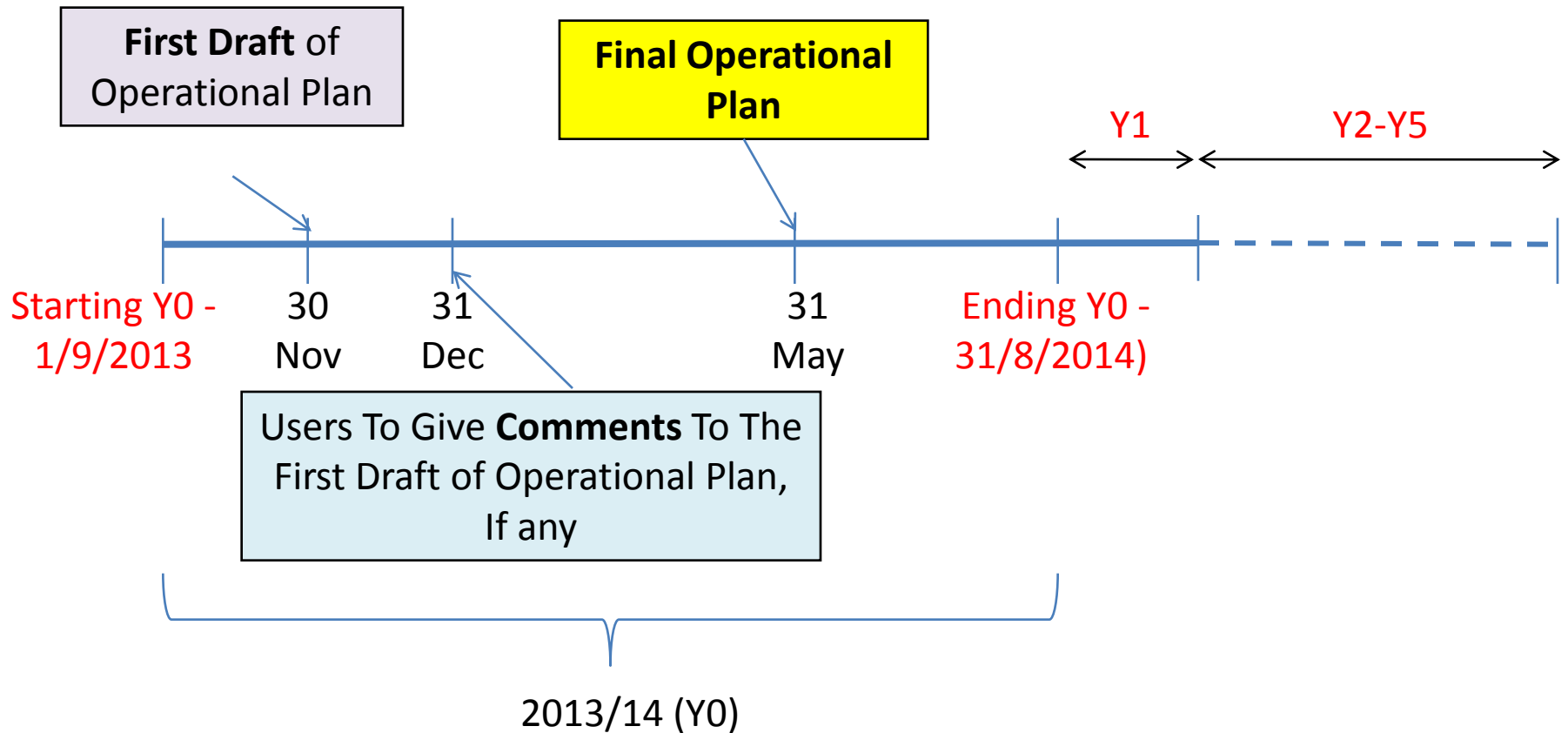
- In each Year by the end of September of Year 0, each Generator with CDGUs shall also provide the GSO with a “**Provisional Generator Maintenance Schedule**” which covers Year 1 on a daily basis. It means providing information for each day of Year 1 beginning 1st of September and ending 31st of August.
- This schedule shall be submitted, in a format agreed by the GSO, and take account of the Operational Plan described in OC2.5, comprising of:
 - (1) **type of outages** for each CDGU;
 - (2) the **period** of each outage consistent with the Operational Plan; and
 - (3) any other outages as required by statutory organisations or for **statutory reasons**

Submission Of Planned Outage Schedules by Users



Note: Each year starts on the 1st Sept.

Planning Of Generating Unit Outages by GSO

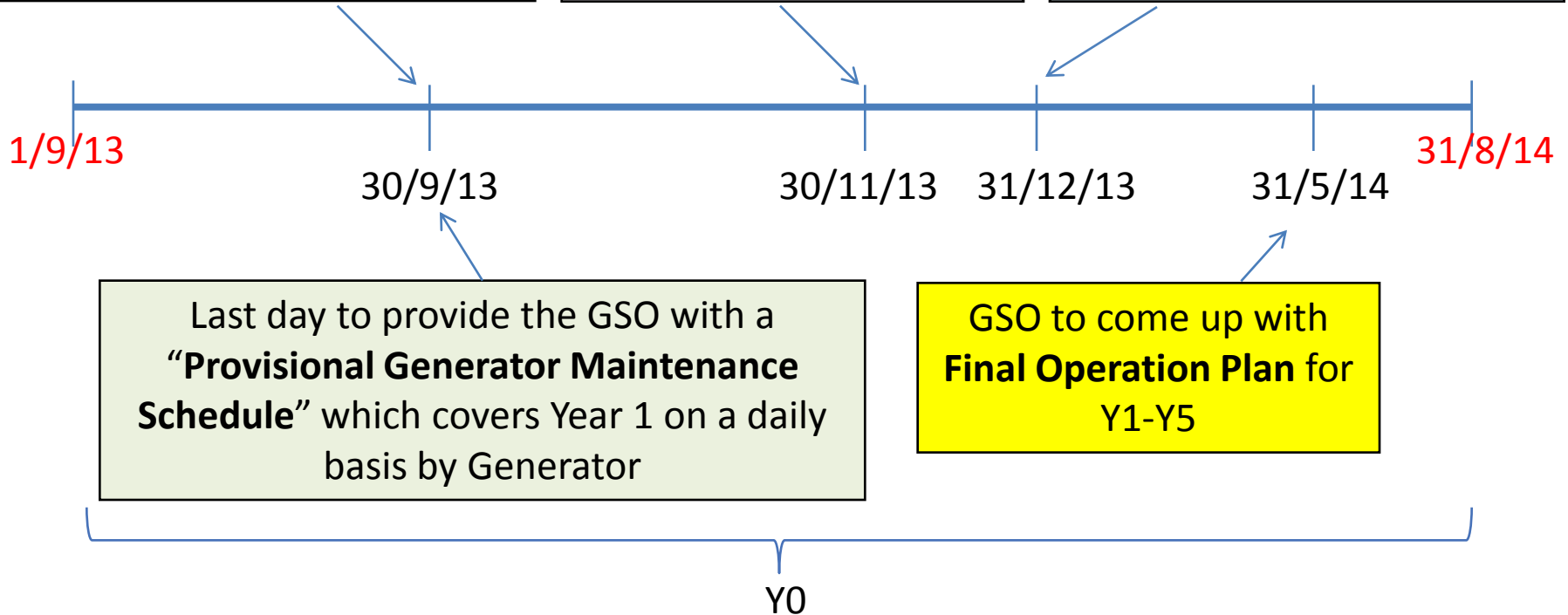


Summary of Outage Submission and Planning

Last day to provide “**Indicative Generator Maintenance Schedule**” for Y1-Y5 by Generator

GSO to come up with **draft** of Operation Plan for Y1-Y5 & feedback to Users

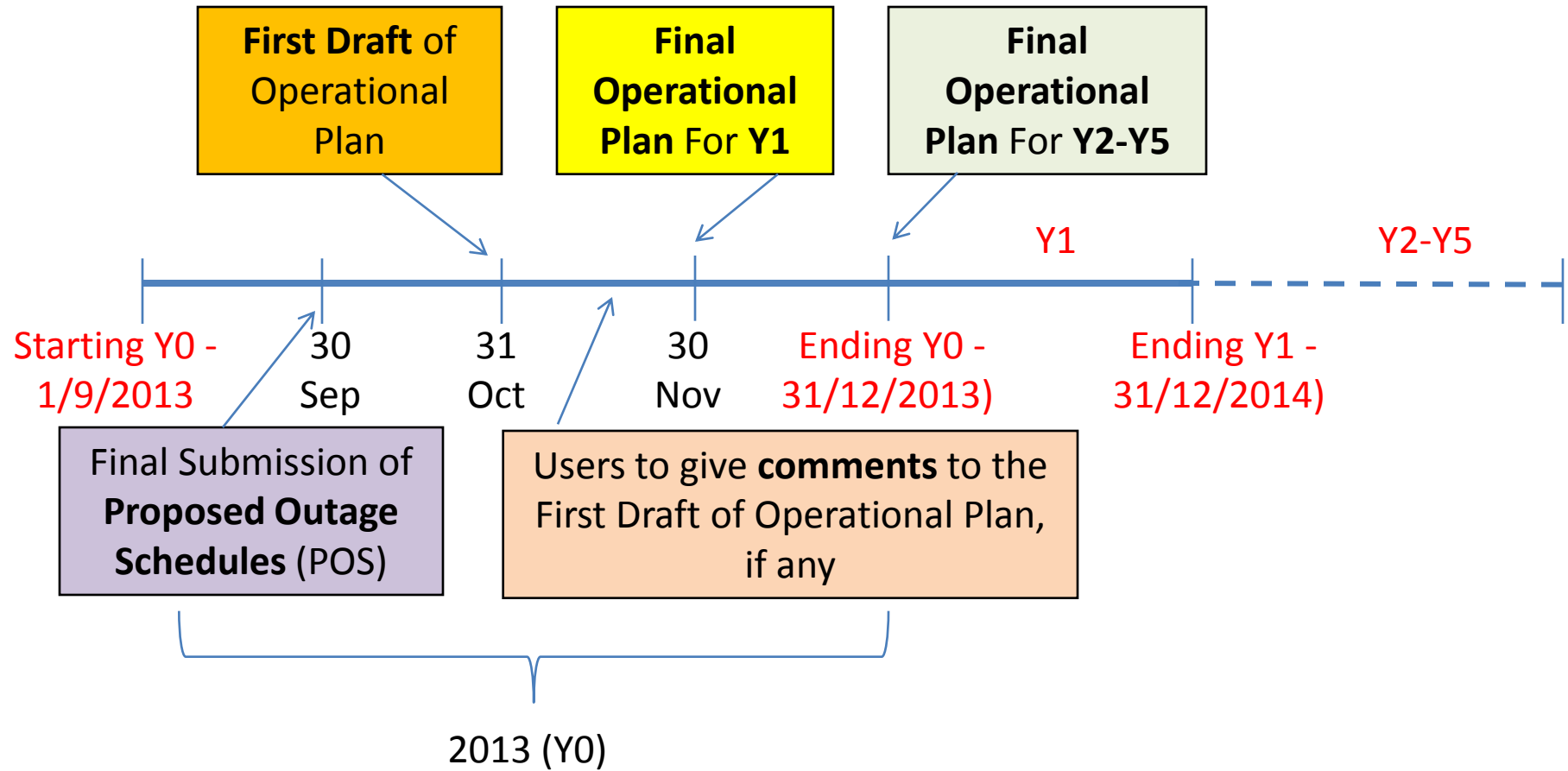
Users to give **comments** to GSO with regards to the proposed draft of Operation Plan for Y1-Y5



Note: Each year starts on the 1st Sept.

Planning Of Generating Unit Outages by GSO - Current Practice

(To follow ASAC Submission Req. in PPAs & SLAs)



Planning Of Generating Unit Outages – Planned Outages

- Once the Operational Plan is issued by the GSO, the **maintenance outage can only be changed**:
 - (a) by **order of the GSO** for reasons of **security** of the Grid System provided that **safety of any equipment is not compromised** and that the order is not in violation of any statutory requirements;.
 - (b) by **approval of the GSO prior to the commencement of the outage**, for reasons of security of supply, or security of the Grid System, or safety of User's staff, or safety of User's equipment or safety of members of the public;
 - (c) by **agreement** between the GSO and a Generator where only that Generator is affected by the proposed changes;
 - (d) by agreement between the GSO and a Directly Connected Customer where only that Directly Connected Customer is affected by the proposed changes; or
 - (e) by agreement between the GSO and a Network Operator or the Distributor where only the Network Operator or the Distributor is affected by the proposed changes.

Planning Of Generating Unit Outages – Unplanned Outages

- Unplanned Outage in this context refers to **outages not included in the Final Operation Plan** established by the GSO by the end of May of each year.
- Where due to **unavoidable circumstances** a User needs to arrange an Unplanned Outage then the **User must give as early as possible notification** of the Unplanned Outage and submit it to the GSO for approval.
- This will normally be **provided in writing** but where this is not possible, it may be provided by telephone or other electronic means provided that it is **acknowledged by the GSO** and a **written record** of the request is **kept by the GSO and the User**.
- The GSO **may request** the User to **make changes** related to an Unplanned Outage programme when in the opinion of the GSO the Unplanned Outage would adversely affect the security of the Grid System.
- For a **Forced Outage**, the **GSO** shall take all reasonable measures to maintain the **integrity and security** of the Grid System.

Programming Phase in Year 0

- The GSO shall prepare a **preliminary** outage programme for the **8th week ahead** - a **provisional** plan for **7 week ahead**, **firm** plan for **1 week ahead** and the **Day Ahead** plan.
- The **GSO will notify each User**, in writing of those aspects of the preliminary Transmission System outage programme which **may operationally affect that User** including in particular proposed start dates and end dates of relevant Transmission System outages and changes to information supplied by the GSO.
- The **GSO will also indicate** where a need may exist to use **Operational Intertripping, emergency switching, emergency Demand management** or other measures including **restrictions** (and the reasons for such restrictions) **on the Dispatch Units** to allow the security of the Grid System to be maintained within the Licence Standards.

Programming Phase in Year 0 (cont)

- User shall submit notification on **confirmation of outages** involving their system in **not less than 2 weeks prior** to intended outage date.
- By **1700 hours each Friday**, GSO shall prepare :-
 - 7 week ahead **provisional** outage program
 - 1 week ahead **firm** outage program, and
 - **A day Ahead** outage program for the weekend through the next normal Working Day

Programming Phase in Year 0 - Summary

8-week outage program

7 weeks Provisional outage program by 1700 hrs
(starting from Wk2 to wk8)

Users submit notification and confirmation of outages

Firmed Day Ahead & Week Ahead outage program by 1700 hrs

Wk -2

Wk 0
(Friday)

Day
ahead

Wk 1

Wk7

Wk8

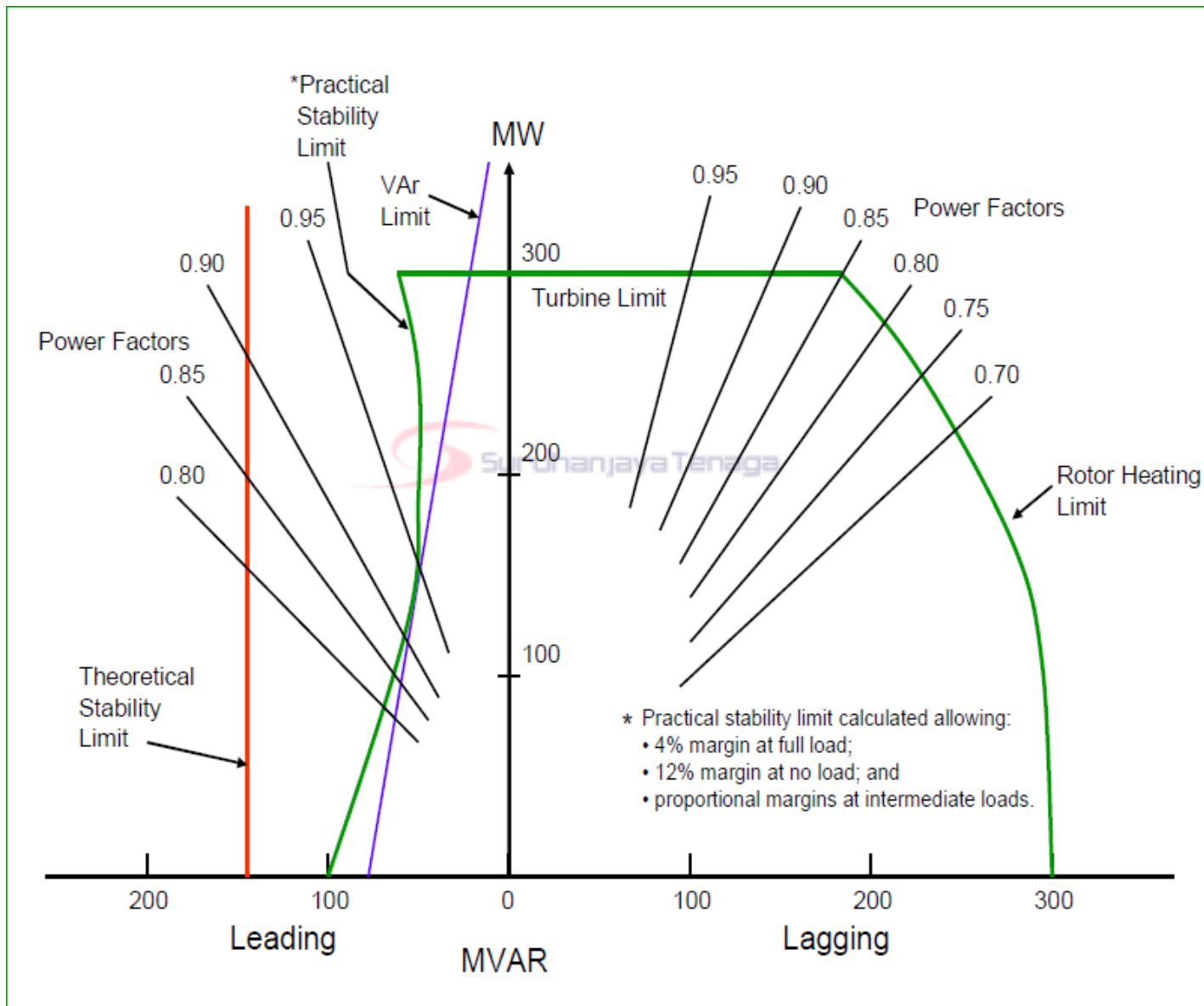
Operational Planning Data Required

- On **commissioning** and by the **end of September** in the year following the commissioning and by the end of September **every third (3rd) year** thereafter or when there is **change in parameters**, each **Generator shall submit**, in respect of each CDGU, to the GSO and Grid Owner, in writing, the followings :-
 - a) **Generation Planning Parameters** (as per Appendix 1)
 - b) **Generator Performance Chart** (as per Appendix 2)
- Any changes to the Generation Planning Parameters or Generator Performance Chart shall be **promptly notified** to the GSO and the Grid Owner.
- Relevant Generators shall submit the **CCGT Module Planning Matrix** to reflect the true operating characteristics of their CCGT Units.

Generation Parameters Required For Operational Purposes

- Regime Unavailability;
- Synchronising Intervals;
- De-Synchronising Interval;
- Synchronising Generation;
- Minimum On-time;
- Run-Up rates;
- Run-Down rates;
- Notice to Synchronise;
- Minimum Shutdown Time;
- Two Shifting Limit; and
- Regulation Parameters.

OC2 Appendix 2 : Generation Parameters – Example Generating Unit Capability Curve



Data Exchange

- All studies in operational timescale shall be carried out by the GSO. The GSO may at the request of a User carry out studies for that User. Both the GSO and the User shall make the necessary data to carry out the study available for the purposes of such study.
- Any information used in or arising from the studies must only be used by the User in operating that User's System and must not be used for any other purpose or passed on to, or used by, any other business of that User or to, or by, any person within any other such business or elsewhere.

Notices Of Inadequate Generation Capacity to Meet Demand – Year Ahead

- In each year, by the end of May the GSO will take into account the Generator Maintenance Schedule of each Generator, forecast of Output Usable supplied by each Generator and forecast Demand, **issue a notice in writing to:**
 - (a) all Generators with CDGUs listing any **period** in which there is **likely to be inadequate generation Capacity to meet Demand**; and
 - (b) all Generators with CDGUs which may, in the reasonable opinion of the GSO be affected, listing any period in which there is likely to be an **unsatisfactory localised inadequacy of generation Capacity**, together with the identity of the relevant **System Constraint Group** or Groups, within the next Year, together with a **statement of the deficit of generation**. The GSO and each Generator will take these into account in **seeking to co-ordinate outages** for that period.

Notices Of Inadequate Generation Capacity to Meet Demand – Programming During Period Of Inadequate Generation Capacity

- By 1000 hours each Business Day, each Generator shall provide the GSO in writing with a best estimate of **Dispatch Unit inflexibility**, or **CDGU unavailability due to a maintenance outage**, on a daily basis for the period of **2 -14 days ahead** (inclusive).
- By 1600 hours each Wednesday each Generator shall provide the GSO in writing with a best estimate of Dispatch Unit inflexibility, or CDGU unavailability due to a maintenance outage, on a weekly basis for the period of **2 - 7 weeks ahead** (inclusive).
- Between 1600 hours each Wednesday and 1200 hours each Friday if the GSO, taking into account the estimates supplied by the Generators and Demand forecast for the period, foresees that:
 - (1) there **is inadequate generation Capacity** to meet Demand for any period **within the 2 – 7 weeks ahead** (inclusive), it **will issue a notice in writing to all Users and the Energy Commission**; and/or
 - (2) it **will issue a notice in writing to all Users** which may be **affected by that localised inadequacy of generation**. A separate notice will be given in respect of each affected System Constraint Group.

Notices Of Inadequate Generation Capacity to Meet Demand – Programming During Period Of Inadequate Generation Capacity (cont)

- The **GSO will then contact Generators** in respect of their Generating Plant to discuss outages and whether any change is possible to the estimate of Dispatch Unit inflexibility or CDGU **unavailability due to a maintenance outage**. The **GSO will also contact Users** who have agreed to **participate in Demand Control**, as determined under OC1.4.4 to discuss levels of firm Demand Control that can be activated.
- If on the **day prior to a Schedule Day**, it is apparent from the Availability Declarations submitted by Generators under SDC1 that there will be **inadequate generation Capacity** to meet Demand and/or localised inadequate generation Capacity to meet Demand (as the case may be), then in accordance with the procedures and requirements set out in SDC1, the GSO may contact Generators to **discuss whether changes to inflexibility or Offered Availability are possible**, and if they are, will reflect those in the Generation Schedule. **The GSO will also invoke Demand Control to the extent that it is required to match generation and Demand.**



THANK YOU



**The Malaysian Grid Code Awareness Programme Funded by
Akaun Amanah Industri Bekalan Elektrik (AAIBE)**